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CADASTRU

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LUCRĂRI ŞTIINȚIFICE

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ANALES DE L'UNIVÉRSITÉ DE CRAIOVA

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ROMANIA

ANALES OF THE UNIVERSTY OF CRAIOVA
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The Internațional Conferance was organized by the University of Craiova, Facvulty of Agriculture, in cooperation with ASAS, Craiova Branch

WORKING GROUPS SESSION

WORKING GROUP 3: FUNDAMENTALLY DISCIPLINES AND ENVIRONMENT AND PLANT MANAGEMENT

Genetics and Plant Breeding, Botany, Physiology, Biochemistry, Phytopatology, Entomology, Micrtobiology, Forestry Sciences, Ecology and Environment Protection

WORKING GROUP 4: MANAGEMENT, AGRICULTURE MECHANIZATION AND CADASTRE

Economic Disciplines with Agricultural Application, Machines, Agricultural and Horticultural Equipments, Agricultural, Horticultural and Forestry Constructions, Transports, Cadastre and Terrestrial Measurements

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WORKING GROUP 3: FUNDAMENTALLY DISCIPLINES AND ENVIRONMENT AND PLANT MANAGEMENT

WORKING GROUP 4: MANAGEMENT, AGRICULTURE MECHANIZATION AND CADASTRE

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MODALITĂȚI DE REFACERE A FITOPOULAȚIILOR PERICLITATE DIN FLORA ARGEŞ

METODS OF RESTAURATION IN ENDENGERED PHYTOPOPULATIONS FROM ARGEŞ COUNTY FLORA

VALERIU ALEXIU, MĂDĂLINA MARIAN,
University of Piteşti

Key words: sozology, biotechnology, micropropagation

REZUMAT

Proiectul îşi propune să implementeze o metodologie de cercetare, care să evalueze explicit strategiile de conservare a biodiversității prin metode convenționale şi biotehnologice pentru categoriile sozologice periclitate din județul Argeş. Proiectul vizează verificarea datelor corologice a speciilor cormofitice din județul Argeş, identificarea categoriilor sozologice de plante, refacerea populațiilor din categoriile sozologice periclitate, vulnerabile şi rare, experimentarea modului de repopulare şi aclimatizare a acestor specii pe sole-martor, în habitatele din care au fost prelevate speciile selectate, pentru conservarea biodiversității naturale, precum şi înmulțirea lor în scopuri ornamentale, medicinale etc.

ABSTRACT

The project wants to implement a research methodology that could asses the strategies of preservation of the biodiversity through biotechnologies in vitro for the jeopardized sozologic cathegories from Arges County. The project convets the checking of the chorologic data of the chormophytic species from Arges County, the identification of the sozologic cathegories of plants, the restoration of the population of the endangered, vulnerable and rare sozologic cathegories through biotechnologies in vitro, the testing of the manner of re-people and acclimation of the species, in control-fields, in the habitats where the selected species were drawn from.

INTRODUCTION

The micropropagation in vitro is the vanguard application of the biotechnology for the majority of plants.

The used technics refer to field and lab studies. The technics of crops in vitro permit to express the regenerative potential of the cell and the vegetal tissue through its ezposure to the nutritional and hormonal conditions as well as to the environmental factors strictly controlled. The methodology will pursue the evolution of the crops “in vitro” set up in correlation with the above mentioned factors, factors which need the best values for the used biologic material. Species belonging to some vulnerable sozologic cathegories in the

Arges County flora will be studied. The comparison will be the method used for this study because each species answers to a certain increase technology. In this purpose the most efficient and quick method of obtaining the planting material will be chosen.

- The restoration of the people of vulnerable and jeopardized species from the habitats they belongs as characteristic or accompanying species which means the ecologic restoration of the habitats.
- The involving of the groups of interest and of the potential users of the project results (the representatives of the central and local administration, the local population, representatives of the economic and business unit, civil society and professional organizations) as members in the activities of preservation of the biodiversity of species, dissemination, checking and instruction regarding the use of the scientific products of the elaborated instrument of analysis, valuation and prognosis.

MATERIAL AND METHODS

The obatain results and the experience gained in this project, could be capitalized for the foundation of plans the preservation of the floral biodiversity, of the identification of the main habitats of community interest where species of plants from sozologic cathegories could be found and thus facilitating the harmonization with the programs of the similar European Network.

This project promotes the security of the socio-ecological complexes and proposes long-term solutions suitable for the socio-economic circumstances respecting the national lawes and those resulted from the implementation of the communitar lawes in the domain of the environmental protection. It also tries to educate the people about the scenaries of risk and about the ways which lead to the preservation of the flora biodiversity. Taking into consideration the aim of the programs (that of creating circumstances for a better collaboration between the various research-development and inovation entities) and the economic agents, in order to solve the identified problems, the project proposes a sinergical action between Pitesti University (a well known research institute), the Arges County Museum (the first museum of ecology from Europe; it has topnotch researchers), Biophan natura naturans Băiculeşti (unit of research-development having a private capital and a non-economic activity:research-development). The aims of the project are materialized through the implementation of a technological system, directed toward the preservation of the vegetal biodiversity, the protection of the floristic patrimony, the reduction of the anthropic impact on flora and vegetation through the implementation of an efficient alternative of using the endangered species.

The project respect the aims of PNCDI II – Program 4

- the scientific foundation and the development of technologies for the preservation, reconstruction and the strenghten of the ecological and biological diversity
- development public-private partenership in science and created the scientific park.
- The project is in concordance with the transformation process of universities and public institution of research and development to increase the their capacity to collaboration with private enterprises.

The scope of the project

The aim of the project is to know of the present state of the jeopardized, vulnerable, rare and endemic flora from Arges County in order to find the best ways for restoration of their people (through conventional methods of controlled propagation and unconventional through biotechnologies in vitro), in their habitats as well as for practical purposes. Thus the uncontrolled gathering and the diminish of the natural people and their extinction are avoided.

The aim is correlated with the indicators of result of the Program 4 as falows:

At the end of the project the adeqvate metodology for the restoration of people at spontaneous endangered taxons will be propose. Ph.D-s envolved in the project belonging

both to the coordinator and the parteners: 9. Through its aim the project follows the reassessment of the importance of the plants in the biodiversity context because Romania has signed the Convention on Biological Diversity in 2002 and of the Global Strategy for the Preservation of Plants.

RESULTS AND DISCUSSIONS

S/T current stage in the field, at national in international level, according to project theme

Although there is no complete inventory of Earth vascular plants, one could estimate there are almost 300.000 taxons. On Europe itself we witness almost 12.000 species of cormophita (Cristea V., Denayer Simone, 2004). Over 34.000 taxons are globally endangered to extinction. The overexploitation, the inappropriate agricultural and forestry practice, the urbanisation, the land use caused modifications, the invasive species expansion, the foreign species introduction and, of course, the climate modifications are major causes especially for vegetal diversity decline (Anca Sârbu et al., 2007).

The Plant Conservation Global Strategy major purpose is to stop the vegetal diversity decline. The legislative framework has national, regional and global dimension and impose to signing states to fulfil till 2010 some tasks that aim to vegetal diversity conservation at all three diversity levels: genetic, specific and ecologic diversity. In Europe has been implemented the European Plant Conservation Strategy. Europe is among the first regions of the Globe which benefit from a conservation programme. Official documents such as: IUCN Red List, Berna Convention, Habitats Directive certify the endangered taxon and habitat status. There are evaluated as endangered 21% of Europe vascular plants (IUCN Red List), as submitted to extinction 50% of Europe endemic vascular plants and, unfortunately, 64 species are already officially lost.

In the period 2001-2004, Romania took part in *Important Plant Areas (IPA-s) in Central and Eastern Europe* Programme due to *The Romanian Protection and Conservation Important Areas Identification* project. There are selected 276 sites, eligible for I.P.A. European Network and 8 of these are located in Arges County. On European Union territory has been identified 9 bio-geographic regions. Romania is a country on which one could find the largest number of these regions in Europe. We are talking about five regions: *Alpine, Continental, Panonic, Stepic* and *Pontic* regions. The *Natura 2000* sites, presented by EU states, represent 18% of EU surface. Due to the enriched value of biodiversity, Romania would greatly contribute to the European Ecological Network. In 2007, the **Community Importance Potential Sites List** was elaborated (pSCIs – potential Sites of Community Importance – the precursor of *Special Conservation Areas* according to *Habitats* European Directive). In 2010, the Community Importance Sites List would be approved and in 2016, these sites would become **Special Conservation Areas,** creating a *Natura 2000* Protected Areas functional system. First to decide sites location and list elaboration one could gather the data based on standard procedures and to have GIS format maps attached. In Arges County there are 12 areas as possible *Natura 2000* sites.

Contribution of the project to the development of the knowledge in the specific field including the degree of novelty and complexity of the proposed solutions.

Situated among the alpine character, main peaks of Fagaras Mountains and the Romanian Plane, the Arges County geographical location determine the embracement of all Carpathian-Danubian geological units, made from age or nature different layers, characterised by a different architecture in comparison with the surrounding geological units. Due to its longitude and latitude, the Arges County benefit from a no extreme values climate that does not profoundly affect the vegetation and flora development. In order to elaborate the *Arges County Floristic Epitome*, we studied the specialised literature, published by botanists, as follows, and also researches on the field and in University and

Museums Herbariums: Bărbulescu C., Ciocârlan V., Todor I., Buia Al., Turcu Gh., Tauber F., Diaconescu Florița, Drăghici Bibica, Georgescu C.C., Grecescu D., Haralamb At., Hoffmann Ul., Ionescu-Dunăreanu I., Mihăilescu Simona, Neblea Monica, Popescu A., Sanda V., Puşcaru-Soroceanu Evdochia, Richițeanu A., Stancu Daniela, Boşcaiu N., Alexiu V. and others. Despite the Arges County area represents only 2,9 % of Romania, meaning 6801 sq.km., Arges County preserves 64% of Romanian Cormoflora (3136 spontaneous species, Ciocarlan, 2000) due to its geographical position, to the balanced and to the diversity of this great altitudinal amplitude relief forms.

In the Arges County Cormoflora one could count 2009 species, belonging to 547 genus and 119 families, according to specialised studies and to personal researches. This phytodiversity is steady on some limits as long as the ecosystems balance is not disturbed. If not, we recorded a decrease of some species individuals, the increase of other species populations, species extinction or apparition. In the last Century, the human activity had been the worst factor on natural phytodiversity. The Man, starting by communicating with the nature, becomes to judge it as an enemy. The main causes of phytodiversity depletion were and unfortunately still are the overexploitation of habitats and species, ecosystems deterioration and pollution.

The overexploitation of species due to picking activities led to significant phytodiversity depletion. The plants were collected to prepare food, medicines, for decorative and industrial use or for botanical collections (cca. 500 species from Romanian Flora). We could also add the companies which sell spontaneous decorative species. Today, around 60 species of cormophita form Romanian Flora are collected and traded on street markets and in tourist sites, more than a half of them are nominated in the Romanian Plants Red List.

The overexploitation of the habitats, mainly, the deforestation, the intensive sheepherding, the uncontrolled use of wetlands resources, mainly, the draining, the agrocenose increase and the natural borders destruction led to some species extinction, to other species reduced number of individuals, to areas modifications, to adventive species invasion which are responsible of phytocenose physiognomy changes and to interspecific concurrence that inflict native species exclusion.

Judging based on these fact, we are committed to ask for initiation of corological research activities, to verify the present published botanical data, to identify the sozological categories, especially of those endangered to extinction, wounded, vulnerable and rare in Arges County. As a result, we envisage the vulnerable and endangered flora species determination, species which would favourable respond to conventional multiplying methods or to unconventional ones, such as *in vitro* micropropagation, an up-to-date biotechnology applicable to a majority of species.

Also, we will disseminate to the great public the negative effects of human activities on endangered and wounded habitats.

Among those 2009 published species from Arges County, **411 species and subspecies are distributed in different sozological categories**: rare, vulnerable, endangered, endemics etc. There has been issued an endangered species list (globally, European and national scale, regionally), species included also in international reference documents: Global Red List (GRL), Habitats Directive (HD), Berna Convention (BC), the Romanian Superior Plants Red List (RRL), 1994. In Arges County flora are selected 4 endangered taxon categories:

- Global Endangered Species, (included in Global Red List, II b, IV b Adendum of Habitats Directive, Berna Convention – App.I);
- European Endangered Species (vascular plants included simultaneously in both II b, IV b Adendum of Habitats Directive and Berna Convention – App.I);
- Endangered and Endemic Species (included in Romanian Red List, as critical status species, endangered, vulnerable and no among the first two categories);

- Subendemic and endangered Species (included in Romanian Red List, as critical status species, endangered, vulnerable and no among the first three categories).

The problems that are to be solved by running this project are alike with those one could find in advanced countries that benefit from researches in Environment Domain. The solutions to these problems would embed **rich degree of novelty and utility, are complex and would have a special and important practical and scientific application in develop environment protection technologies**. We aim to produce feasible and integrated solutions through scientific interdisciplinary research, taking into account the overwhelming necessity of environment protection and of durable development, the global climate changes; solutions to cope with economics mechanisms and property structure changes, solutions fit to European market requirements.

The knowledge of the factors that influence the most the organogenetic capacity and the embriogenesys (indirect and direct embriogenesys) represents an essential direction for controlling the regenerative process, as in reducing the of high regenerative frecquency and of ensuring a high grade of experimental reproduction, as well as to orientate and adapt this process to different genetic improvement strategies.

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VERBESINA ENCELIOIDES – O NOUĂ PLANTĂ ALOHTONĂ ÎN ROMÂNIA

VERBESINA ENCELIOIDES – A NEW ALIEN PLANT IN ROMANIA

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Cuvinte cheie: Verbesina encelioides, plantă alohtonă, buruiană, România
Key words: Verbesina encelioides, alien plant, weed, Romania

REZUMAT

O nouă plantă alohtonă – Verbesina encelioides – este raportată din Dobrogea Centrală, România. Prezentăm informaţii despre caracteristicile sale morfologice, biologice, ecologice, invazivitate şi răspândire.

ABSTRACT

A new alien plant species – Verbesina encelioides – is reported from Central Dobrogea, Romania. We provide information about its morphological features, biology, ecology, invasiveness and distribution.

INTRODUCTION

The alien flora of Romania currently includes 435 species, 384 of which are neophytes (Anastasiu & Negrean 2005). Species of alien origin make up about 11.5 % of the total flora of the country (Ciocârlan 2000), but new alien species are continuously reported (e.g. Anastasiu & Negrean 2008, Sîrbu & Oprea 2008), further increasing the number of non-native taxa in the national flora.

In the present paper we report a new alien plant species for Romania with a short description and distribution range based on published data and examined herbarium specimens.

MATERIAL AND METHOD

During field work on alien invasive plants in Dobrogea and Danube Delta, we recorded a new alien species – *Verbesina encelioides*. We recorded geographic coordinates using WGS 84 system, biological and ecological features, as well as the plant species associated. We also questioned local people on the arrival data and presence of this plant in their localities. We took digital photographs and voucher specimens that are deposited in the Herbarium of University of Bucharest [BUC]. The taxonomy and nomenclature of species follow Tutin et al. (1964-1980) and the definition of invasive status is that used by Richardson et al. (2000) and Pyšek et al. (2004).

RESULTS AND DISCUSSIONS

Verbesina encelioides (Cav.) Bentham & Hooker fil. ex A. Gray (Fig. 1) belongs to Asteraceae family and is native in North America (Hansen 1976). This species is an erect, branched annual, about 30-50 cm height, but sometimes reaching up to 130 cm (Hansen 1976). Leaves are simple, petiolate, opposite below and without auricles, alternate above, toothed, with fine white hairs on the underside. Flowers heads resemble with small sunflowers and can be solitary or in cluster of up to three heads. We counted up to 42 flower heads per plant. Ligulate florets are 10-15, 15-25 mm long, yellow to bright-yellow, 3-lobed at apex. Tubular florets are also yellow. Achenes of ligulate florets are triangled,

tuberculate, blackish, 4 × 2 mm, while achenes of tubular florets are flattened, white-winged, coverd with fine hairs, blackish, 5-5.5 × 4-4.5 mm (Fig. 2). Every head flowers could has about 100 flattened achenes and 10 triangled achenes. *Verbesina encelioides* has no relatives in Romanian flora, so it can not be confused with other taxa.

Current distribution of *Verbesina encelioides* includes North America, Central America, South America, Africa, Asia, Oceania and Europe (EPPO, 2008). For Europe Hansen (1976) reported its presence as doubtful in Germany, Sweden and Switzerland, while EPPO sources indicate it from Denmark, Spain, UK and Austria (EPPO 2008).

In Romania we found *Verbesina encelioides* in few locations from Central Dobrogea, where it covers large surfaces: Sarighiol de Deal E - 44° 42' N, 028° 31' E, Sarighiol de Deal SW - 44° 41' N, 028° 29' E (Tulcea County), Râmnicul de Jos - 44° 37' N, 028° 26' E, Grădina N - 44° 34' N, 028° 26' E, Cheia N - 44° 31' N, 028° 25' E, Cheia S - 44° 30' N, 028° 25' E (Constanța County).

The way of introduction and time of arrival in Romania remain unknown. For other countries there are reports regarding the introduction of seeds with wool, or as contaminants in pasture hay or cereal grain (EPPO 2008).

According to locals and our observations, *Verbesina encelioides* flowers from September to October, after the abundant rains. The number of achenes produced per plant can reach 4500. In October, these are dispersed under or nearby the parent plant, or by winds. We have not data about germination, but according to local people this plant appears after gathering in the crops and after rain.

Verbesina encelioides can encompass a variety of habitats, temperatures and elevations (Shluker 1999). We found it in stubble fields, lucerne fields (*Medicago sativa* subsp. *sativa*) and in ruderal places along roads, up to 245 m altitude. The area of occurrence is characterized by soil of carbonated chernozem type, drought and high temperatures during the summer time. Generally, *Verbesina encelioides* displays allelopathic effects inhibiting native plants growth (EPPO 2008). However, we found this species accompanied by: *Reseda lutea*, *Iva xanthifolia*, *Xanthium strumarium* subsp. *italicum*, *Chenopodium strictum*, *Ballota nigra* subsp. *nigra*, *Hibiscus trionum*, *Amaranthus retroflexus*, *Amaranthus albus*, *Convolvulus arvensis*, *Artemisia absinthium*, *Cannabis sativa* subsp. *spontanea*, *Artemisia vulgaris*, *Berteroa incana*, *Conyza canadensis*, *Elymus repens* s.l., *Setaria verticillata*, *Datura stramonium*, *Onopordum acanthium*, *Cirsium arvense*, *Hyoscyamus niger*, *Sinapis arvensis*, *Cynodon dactylon*.

Verbesina encelioides is reported as weed in many crops from different regions and countries (EPPO 2008). In Europe this plant it could be an emerging invader take into account its invasive and aggressive behaviour shown where it has been introduced (EPPO 2008). In Romania, *Verbesina encelioides* could be considered as naturalized, but with a high invasive potential favoured by the dry climate of Dobrogea region and by the high proportion of areas with disturbed habitats.

Verbesina encelioides is a poisonous plant especially for livestock (EPPO 2008). Its toxicity has been confirmed by local people that call it “iarbă de tiță”, this meaning poison weed. However, sheep do not consume it.

Although *Verbesina encelioides* is a beautiful plant, local people does not use it as ornamental because of its unpleasant smell.

To eradicate this plant we recommend chemical control, as well as mechanical control for small surfaces. Special measures for quarantine weeds are also required.

CONCLUSIONS

A new alien plant is reported from Romania – *Verbesina encelioides* – native in North America. Although its occurrence is presently limited to few locations in Central Dobrogea, the species seems to be naturalized, but there are conditions to become invasive.

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Fig. 1 Verbesina encelioides – habitus (orig.)

Fig. 2 Verbesina encelioides – winged achenes (orig.)

CIUPERCI PARAZITE ŞI SAPROFITE PE SFECLA PENTRU ZAHĂR (*BETA VULGARIS* L.)

SAPROPHYTIC AND PARASITIC FUNGI ON SUGAR BEET (*BETA VULGARIS* L.)

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Key words: micromycetes , sugar beet, new host.

REZUMAT

Semnalarea şi identificarea agenților patogeni la sfecla pentru zahăr reprezintă unul dintre cele mai importante obiective din protecția plantelor deoarece poate reduce semnificativ pagubele din punct de vedere economic. Astfel s-au izolat şi identificat genurile de micromicete dezvoltate pe hibridul de sfeclă pentru zahăr Libero, din zona de Sud a Moldovei (Ferma Ezăreni, din cadrul U.Ş.A.M.V "Ion Ionescu de la Brad", Iaşi) şi de pe semințele altor soiuri şi hibrizi de sfeclă pentru zahăr (Libero, Merak, Victor, Braşov, Bârsa), în timpul germinației, prin metoda camerei umede ("blotter method").

Metoda camerei umede presupune incubarea semințelor la o temperatură de 22˚C. După perioada de incubație micromicetele dezvoltate pe fiecare glomerulă au fost analizate la microscop şi identificate pe baza caracteristicilor morfologice înscrise în determinatoarele pentru micromicete.

În urma analizelor de laborator au fost izolate şi identificate 8 genuri de micromicete (Sclerotinia spp., Botrytis spp., Fusarium spp., Alternaria spp., Penicillium spp., Cladosporium spp., Vollutella spp., Trichotecium spp.) dintre care 2 genuri sunt menționate pentru prima dată în România (Vollutella spp., Trichotecium spp.).

ABSTRACT

Reporting and identification of pathogens in sugar beet is one of the major objectives of plant protection because it can significantly reduce the economic damage.Was isolated and identify all micromycetes genera developed on Libero sugar beet variety during the field trial localized on south region from Moldavian plain (Ezareni Farm Resort at the University of Agricultural Sciens and Veterinary Medicine "Ion Ionescu de la Brad", Iasi) and, also from other seed varieties of sugar beet (Libero, Merak, Victor, Barsa, Brasov) during germination using "Blotter method".

The "blotter method" is one of the incubation methods where seeds are incubated at 22˚C. After incubation, fungi developed on each seed are examined under different magnification of a stereomicroscope and identified.

During the laboratory analysis 8 genera of micromycetes (Sclerotinia spp., Botrytis spp., Fusarium spp., Alternaria spp., Penicillium spp., Cladosporium spp., Volutella spp., Trichotecium spp.) were isolated and identified. Volutella spp. and Trichotecium spp. are reported for the first time on sugar beet in Romania.

INTRODUCTION

Seeds are the main source of the infectious inoculum. Due to continuous growth of the exchange of seed material and spreading threat of new pathogens have always given special attention to sugar beet seeds. Reporting and identification of pathogens in sugar beet is one of the major objectives of plant protection. These activities help to establish

preventive measures, the proper preparation of graphics for forecasting and warning of treatment and to avoid pollution by pesticides of agrobiocoenosis.

MATERIAL AND METHOD

Were harvested sugar beet roots (Libero) in October of 2008, from experimental field of Ezăreni farm, for laboratory analysis. The collected samples were analyzed for presence of parasitic and saprophytic micromycetes. Micromycetes were examined microscopically to identify the genus and species. Micromycetes identified were included in mycological Herbarium of Moldova "C. Sandu-Ville".

At the beginning of 2009 have also been analyzed the seeds from 5 genotypes of sugar beet.

The material used in this study was rapresented by 2 varieties of sugar beet Brasov and Barsa, and 3 hybrids Libero, Merak and Victor. The seeds from the hybrids have been pelleted with Thiram, Hymexazol, Imidacloprid, Tefluthrin and calibrated to 3,50 - 4,75 mm.

The varieties Barsa and Brasov have not been treated, instead they have been washed with water (V1) or treated with ethylic alcohol (V2).

The seeds were put to germination using ”blotter method” that is one of incubation methods where seeds are plated on well water-soacked blotters (filter paper), and incubated at 22 degrees.

The germination and development of the micromycetes were observed on each seed. After that, the micromycetes have been examined under the microscope and identified. The identification of the fungi is based on the way they grow on seed ”habits characters”, and on the morphological characters of fruiting bodies, spores/conidia observed under microscope.

RESULTS AND DISCUSSIONS

After harvest, on sugar beet roots were identified the following species of micromycetes:

1. *Trichotecium roseum* (Pers.) Link., Obs.Myc. I. 16 (1890); Sacc., Syll.Fung. V, 178 (1886); Lindau, Rabenh., Kr. Fl. Deutschl. VIII, 365 (1907) ; Migula, Kr. Fl.Deutschl. Pilze.III.4.2131, Tab. XCII, fig. 1 (1934), Săvul. Et Sandu, Quatrieme contrib. a la conneseance de Mycromycetes de Roumanie, Mem. Sc., Acad. Roum. Ser. III, Tom XV Mem. XVII, 476 (1940); Săvulescu Tr. şi alții – Starea fitosanitară în România, anul 1942-1943, ICAR, Metode, îndrumări, rapoarte, anchete, 96 (1947).

Fungus was found on sugar beet roots. Has conidiophores with conidia of 18-24 x 7,5-9 µm. Conidia hyaline, 2-celled, ovoid to ellipsoid, pink to brown in mass. Beta vulgaris. L, is a new host to our country of this micromycetes.

2. *Volutella roseola* - Cooke, Gilman, A manual of soil Fungi p.356 (1957). Fungus was found on sugar beet roots. It has white mycelium (sporodochia 300-500 µm with spines of 150-250 x 6.25 µm). Conidiophores layer was 30-50 µm height. Conidia are cylindrical with rounded ends, with a drop of oil at middle, hialine, 6-6,5 x 2 µm. Fungus is new found for the country and Moldavia area.

3. *Sclerotinia sclerotiorum* (Lib.) de Bary (Vergh. Morph. Biol. Der Pilze, Mycet. Bact., p. 236, 1884) -Has an abundant white-gray mycelium that develops both the surface and inside the bodies contested.

4. *Botrytis cinerea* Pers.- Fungus found on beet roots have long conidiophores, slender, branched and the apical cells enlarged; conidia hyaline, gray in mass, 1-celled, ovoid.

5. *Fusarium* spp. - Develop a mycelium branched, thin white in mass. Conidia 2 or 3-celled, oblong with both ends sharp and with several transverse bulkheads; tinge of pink in mass.

6. *Alternaria tenuis* Ness. (sin. *Alternaria alternata* (Fr.) Keissler) –Conidiophores dark, simple, elongate. Conidia dark, with both cross and longitudinal septa, variously shaped, ovoid.

7. *Penicillium* spp.- Developed a green mycelium on sugar beet root. Conidiophores arising from the micelyum are branched near the apex to form a brush-like. Conidia brightly colored in mass, 1- celled, globose.

8. *Cladosporium* spp. - Has conidiophores dark, branched variously near the apex. Conidia is dark, 1- or 2- celled, variable in shape and size.

It was assessed the germination and presence of micromycetes (Table 1). The examination of micromycetes developed on sugar beet seed, under a microscope revealed the presence of four types of saprophytic fungi: *Alternaria* spp., *Rhizopus* spp., *Penicillium* spp. *Aspergillus* spp.

Table 1

Evaluating proces of germination and presence of micromycetes on sugar beet seeds.

Name of variety / hybrid/variant	Germination (%)	Name of identified species
Brasov – V_1	85%	*Alternaria* spp. *Rhizopus* spp. *Penicillium* spp. *Aspergillus* spp.
Brasov – V_2	85 %	*Penicillium* spp. *Rhizopus* spp. *Alternaria* spp.
Barsa – V_1	89%	*Alternaria* spp. *Rhizopus* spp. *Penicillium* spp. *Aspergillus* spp.
Barsa – V_2	89 %	*Alternaria* spp. *Rhizopus* spp. *Penicillium* spp.
Libero	98 %	-
Victor	100 %	-
Merak	100 %	-

V_1- seeds washed with distilled water.

V_2 - seeds disinfected with alcohol.

CONCLUSIONS

1. In the autumn of 2008, after laboratory analysis that were made on the sugar beet roots, have been pointed out 8 genus of micromycetes which, 3 of them parasites (*Botrytis cinerea* Pers., *Fusarium* spp., *Sclerotinia sclerotiorum* (Lib.) de Bary) and 5 genus saprophytes (*Alternaria tenuis*, Ness, *Penicillium* spp., *Cladosporium* spp., *Trichotecium roseum* (Pers.) Link., *Volutella roseola* - Cooke).

2. From the surface of the seminal tegument belonging to these 5 genotypes (Libero, Merak, Victor, Barsa, Brasov) during the germination process have been identified 4 genus of saprophytes micromycetes (*Alternaria* spp, *Rhizopus* spp., *Penicillium* spp., *Aspergillus* spp.).

3. Pelleting of seeds Libero, Merak and Victor did not allow the installation of the micromycetes into the germination process.
4. The best germination (100%) has been recorded on Libero, Merak and Victor hybrids.

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AUTORECEPAREA SEMINȚIŞULUI DE GÂRNIȚĂ ŞI CER

THE SELF CUTTING BACK OF HUNGARIAN OAK AND TURKEY OAK SAPLING-COVERED AREA

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Key words: Hungarian oak, Turkey oak, area, adaptasion, the self cutting, mountain

REZUMAT

Autoreceparea se produce la puieții de gârniță şi cer instalați sub masiv, în ochiuri sau în teren deschis şi reprezintă una din principalele forme de adaptare a speciei pentru a continua să existe, atunci când unul din factorii ecologici determinanți devine limitativ şi întrerupe viața tulpinii pe o perioadă scurtă de timp.

Capacitatea unor specii forestiere de a se autorecepa în primii ani de la instalare, face parte din adaptările acestora la manifestările extreme ale unor factori ecologici ***(Marcu, 1965; Doniță, 1978****).*

Stațiunile ocupate de gârniță şi cer sunt din cele mai neprielnice, atât în ce priveşte umiditatea şi temperaturile extreme din timpul verii, cât şi solurile grele, argiloase, destructurate. Acțiunea acestor factori a determinat adaptarea speciei la acest mod de a reacționa atunci când unul din factori devine limitativ, în încercarea sa de a se salva.

Autoreceparea puieților de cer şi, în mod special a celor de gârniță, este un fenomen complex care practic a salvat această specie de la dispariție în momentele de criză profundă prin care a trecut în ultima perioadă de stres climatic provocat de seceta prelungită din anii 1988-2001.

Prin cercetările noastre am stabilit factorii ecologici care pot declanşa procesul de autorecepare, modul de manifestare în ecosistemul forestier şi posibilitățile silvicultorilor de a limita acest proces, precum şi modul de utilizare a puieților autorecepați în procesul de regenerare naturală a arboretelor de gârniță şi cer.

ABSTRACT

The self cutting back for the Hungarian oak and the Turkey oak represents the saplings reaction to the restrictive ecological factors. It is produced only to those saplings with a strong development of the root in the first years from planting. The Hungarian oak and Turkey oak saplings self cutting back is produced in the first year from sapling planting but in a low proportion, under 1.0%. The trunk self cutting back can be produced early from vegetation start, in the first days for the wounded plantlets, whose extremity was broken through a mechanical action of an external factor. Beginning with the second year of vegetation, the self cutting back appears to the saplings which do not have a normal development and which have not been eliminated. The capacity of the Hungarian oak and Turkey oak saplings and especially of the Hungarian oak saplings to self cut back is a very important factor in the existance and the perpetuation of the two species in their areas. The high periodicity of the fructifications combined with the phenomenon of extended drought which took place in the last years could have led to the saplings extinction without the straightening possibility if the self cutting back and the saplings keeping at the minimal limit necessary for stands constitution had not been produced. The phenomenon intensity is higher in the southern part of the studied territory because of extreme temperature manifestations during the summer and because of low rain-fall.

INTRODUCTION

The self cutting back is done for Hungarian oak and Turkey oak sapling planted under the mountain, in open field and it represents one of the main species adaptation form in order to continue its existence when one of the determinant ecological factors becomes restrictive and interrupts the trunk life for a short period of time.

The capacity of the forest species to self cut back in the first years after planting is a part of their adaptations to the extreme manifestations of some ecological factors (Marcu, 1965; Doniță, 1978).

The forests resorts occupied by the Hungarian oak and Turkey oak are the most unfavourable both from the point of view of humidity and extreme temperatures during the summer and unstructured, clayey, heavy soils. The action of the factors determined the species adaptation to this type of reaction when one of the factors becomes restrictive in its attempt to save itself.

The self cutting back of the Turkey oak sapling and especially of the Hungarian oak sapling is a complex phenomenon which actually saved these species from extinction in the moments of deep crisis through which the species passed in the last period of climate stress made by the 1988 – 2001 extended drought.

By our researches, we established ecological factors which can set the self cutting back process, the way of behaviour in forest ecosystem and the silviculturists possibilities to limit this process, as well as the utilization way of the self cutting back sapling in the natural regeneration process of Hungarian oak and Turkey oak trees.

MATERIAL AND METHOD

The chosen area for the researches is in Oltenia and it includes Motru Hills, Jiu Hills, Gilort Hills, Amaradia Hills, the northern part of Bălăcița Plateau, the northern-eastern part of Segarcea plain, the northern-western part of Leu-Rotunda Plain, geomorphologic units can be found in Jiu Basin.

The place of the researches was limited to areas with a large Hungarian oak and Turkey oak spreading, for the southern part of the territory in Bucovăț and Seaca de Pădure forests from Craiova Forest District and for the central and northern parts, in Argetoaia, Războinicu, Şuşița, Motru, Cărbuneşti, Murgeşti from Filiaşi, Strehaia, Motru, Turceni and Cărbuneşti Forest Districts.

The observations were performed in Segarcea, Craiova, Filiaşi, Şimian, Corcova, Strehaia, Motru, Tarnița, Târgu-Jiu, Peştera, Cărbuneşti, Turceni, Hurezani and Amaradia Forest Districts, in 49 production units.

There were chosen these representative forests with a maximum Hungarian oak and Turkey oak spreading, in order to examine the medium conditions in which the two species vegetate. The purpose was not to influence the conclusions which have a general meaning for this studied territory.

The cutting back of the Hungarian oak and Turkey oak sapling is produced in the whole Hungarian oak and Turkey oak area in the studied territory but the intensity of the phenomenon is higher in the southern part of it.

In order to research the diversity of the conditions in which the natural regeneration of Hungarian oak and Turkey oak takes place and to establish the way and the intensity of self cutting back phenomenon manifestation, there were placed 55 experimental areas and there were made a lot of field observations on the stand placed in different slope and exhibition conditions (table 1).

Location of research plots

(Table 1)

No.	Forest District	U. P.	u. a.	No.of test units	The area of test units (m^2)	Resort type	Forest type	Soil type
0	1	2	3	4	5	6	7	8
1	Craiova	II	46 B	3	240	8322	7322	2301
2		III	124 A	3	300	8322	7322	2307
3	Filiaşi	I	44 B	1	80	7331	7113	2201
4		II	76 A	1	80	6141	7313	2409
5			79 I	2	120	6144	7226	2409
6			79 I	1	80	6144	7226	2409
7			80 H	2	160	6144	7314	2409
8			81 D	2	160	6144	7414	2409
9			82 F	1	60	6142	7411	2401
10			82 L	3	176	6143	7311	2401
11			82 M	3	296	6144	7314	2409
12			85 D	1	90	6144	7226	2409
13			88 K	2	140	6141	7313	2409
14			88 J	1	70	6141	7313	2402
15			99 F	2	100	6144	7226	2409
16			110 E	2	160	6144	7226	2409
17			112 A	2	120	6144	7226	2409
18			112 B	2	140	6144	7226	2409
19			112 C	2	140	6142	7312	2401
20			153 B	1	40	6144	7226	2409
21			156 F	1	60	6142	7411	2402
22		III	66 C	1	80	7322	7312	2401
23			67 B	1	60	7334	7314	2402
24	Strehaia	I	117 C	2	140	6142	7411	2407
25			308 A	2	180	6142	7411	2209
26		IV	45 C	1	50	6142	7312	2409
27			46 D	2	120	6142	7222	2409
28			47 C	2	120	6142	7411	2407
29			50 D	2	140	6142	7222	2407
30	Motru	II	117 E	1	60	6131	5133	2401
31	Turceni	VII	1 A	1	80	6142	7112	2407
32	Cărbuneşti	III	55 C	2	120	6132	7411	2401
Total				55	3962			

RESULTS AND DISCUSSIONS

Analyzing the self cutting back of the Hungarian oak and Turkey oak sapling in the test areas placed into the studied territory, the following data are recorded:

- The medium number of the cutting back sapling is between 33% and 93% from the medium number of the inventoried sapling;

- The lowest proportion of the cutting back sapling, 33% - 64% was determined in better regenerated and better led areas, in which opening cutting of the eyes and eye enlargement was made on time as well as in stand mixture, in Hungarian oak and Turkey oak mixture and in other normal mixtures of common oak, Hungarian oak and Turkey oak from the forest resorts placed on the northern slope or on the plateaus from the middle and northern parts of the studied territory (u.a. 79I, 82M from U.P. Argetoaia, Filiaşi Forest District;u.a. 46D from U.P. IV Şuşița, Strehaia Forest District, u.a. 1A from U.P. VII Gârbovu, Turceni Forest District; u.a. 55B from U.P. Cărbuneşti, Cărbuneşti Forest District);

Self cutting back of Hungarian oak and Turkey oak seedlings from U.P.II Argetoaia, u.a. 82M (autumn 2002)

Table 2

Specifications	Species	Sapling age(years) …..								Total
		1	2	3	4	5	6	7	≥ 8	
1	2	3	4	5	6	7	8	9	10	11
Sapling no. – total	Hungarian oak	0	1	1	3	7	2	11	17	42
from which self cutting back no.		0	1	1	1	4	1	6	10	24
%		0	100	100	33	57	50	55	59	57
Sapling no. – total	Turkey oak	2	20	78	119	68	29	8	5	329
from which self cutting back no.		0	4	17	36	22	12	3	4	98
%		0	20	22	30	33	41	38	80	32

Except Hungarian oak sapling of an age of 2-3 years which are in a small number, the highest proportion of self cutting back Hungarian oak and Turkey oak is observed at the sapling of a bigger age than 5-8 years and over 8 years. The self cutting back for Hungarian oak sapling was produced in a bigger procentage (58%) compared with Turkey oak sapling in case of which the procentage of self cutting back sapling is smaller (32%). The situation is similar in the test areas placed in u.a. 79I, 46D,1A,55B.

Self cutting back of Hungarian oak and Turkey oak seedlings from U.P.III Seaca de Pădure, u.a. 124A, (autumn 2003)

Table 3

Specifications	Species	Sapling age (years)								Total
		1	2	3	4	5	6	7	≥ 8	
1	2	3	4	5	6	7	8	9	10	11
Sapling no. – total	Hungarian oak	0	3	0	12	5	1	1	0	22
from which self cutting back.		0	1	0	10	4	1	1	0	17
%		0	33	0	83	80	100	100	0	77
Sapling no. – total	Turkey oak	2	2	2	3	0	0	1	0	10
from which self cutting back no.		0	1	2	3	0	0	1	0	7
%		0	50	100	100	0	0	100	0	70

The higher proportion of the self cutting back sapling (65% - 93%) was determined in the case of Plateau Hungarian oak and Plain Turkey oak and Hungarian oak of a medium productivity, also in the case of stand affected by drying in which the placement of the sapling was made because of the low fructification of the Hungarian oak, or around the Turkey oak, where the sapling density was very low(u.a. 124A din U.P.III Seaca, Craiova Forest District, u.a. 99F, 110E from U.P.II Argetoaia, Filiaşi Forest District, u.a. 117C from U.P.I Războinicu, Strehaia Forest District).

The highest proportion of the self cutting back sapling is represented by the sapling with higher ages than 3-7 years. The self cutting back was produced in a higher procentage (77%) for the Hungarian oak sapling and in a lower procentage (70%) for the Turkey oak sapling, the proportion of self cutting back sapling for the two species being of 75% from the total number of self cutting back sapling. In the test areas placed in u.a. 99F the proportion of the self cutting back sapling is 93%, in u.a. 110E – 82% and in u.s. 117C – 73%.

From the made observations and researches resulted that the self cutting back is produced both to the sapling placed under the mountain and to the sapling placed in eyes or open field. The causes which determine the self cutting back in the studied territory are many: insolation, soil water deficit, strong shadowing, early frosts, late frosts, late start in vegetation, exaggerate extension of thevegetation season which favours more rises which does not reach to lignify in autumn, the physiological imbalance between the bigger capacity of the root and the slow development of the trunk, the weather changes by the

sudden change from drought to optimal rains for the rise of the sapling in hight, the sapling injury during the exploitation proces, the fungi attack especially Microsphaera alphitoides attack, the sapling injury because of the grazing and other causes.

The way in which the self cutting back of Hungarian oak and Turkey oak is produced and the moment in which it takes place are the expression of the physiological modifications which appear in the case of the self cutting back patterns and they can be observed and determined through the manifestation way of the factors that cause them.

Thus, the sapling self cutting back caused by insolation is produced to the highest number of sapling in this territory because of the lack of water in the soil and sapling sweat rising. In such conditions the root cannot provide the necessary water in order to keep the trunk physiological processes.

The so-called self cutting back is produced when the ecological factor is in normal limits which means that the soil humidity is in normal limits and the temperature decreases.In this moment, the self cutting back is produced by starting from the area of a vigurous offshoot parcel with a fast growth in height, usually, pasing in height the sapling trunk and having the tendency to replace it. In many cases, after the self cutting back is produced, it was observed that the innitial trunk of the planted sapling remained alive and continued to vegetate together with the offshoot which appeared because of the stress suffered by the first trunk. As a result, it can be said that after the self cutting back is produced in such a way and after the vigurous growth of the offshoot, the innitial trunk vegetation is connected with the trophic space size of the sapling which influences the light quantity which can be used by that sapling. If the offshoot cannot seize all water and soil substances supply, it will continue to vegetate the sapling innitial trunk as well and in that case there will be two trunks. If the phenomenon will continue next year, the self cutting back will be produced again in the same conditions, remaining the same root and more patterns. There are many cases with three – four patterns which make the impression of an offshoot or root sucker regeneration.

The repeated self cutting back without innitial trunk drying is produced only for the Hungarian oak, in the areas where there is enough light and in which the pattern has enough trophic space in the soil. The first tendency is to cover the soil and to create an own microclimate against water evaporation from the soil, and if the light is suficient that means the pattern will be stronger, with vigurous growth in height and thickness and will eliminate the other patterns in seven – eight years. The insuficient light will lead to an irregular development of the trunks which will look like a bush, phenomenon which is seenable under the mountain with an under 0.8 consistency. These patterns make a false impression of the sapling-covered area planted in conditions of extended drought and that they result from offshoots or root suckers.

The patterns trunks, which suffered repeated self cutting back and represent the future stands, present swordcuts at the basis which are seenable by the small forest level and sometimes for the tree lifetime. The sapling-covered area placed under the mountain and keeping it for a long time under the mountain will emphasize this defect because of the many self cutting back made year after year until the indivizualization of a single pattern.This type of self cutting back for Hungarian oak sapling appears to all the sapling planted in big proportion in the studied territory in the last two decades.

The Hungarian oak did not fructify well from 1981 to 2003, the planted sapling proceeded from very low fructifications. More over, in the last decades, the Hungarian oak was strongly affected by the phenomenon of drying. In the barren stand areas and in the areas with a reduced consistency, where the forest soil quality was preserved, there were planted sapling from the low fructification and because of the extraordinary capacity to self cutting back, the planted sapling resisted under the mountain. Where the light was sufficient, in the barren areas of a bigger dimension, after a period of four-five years of self cutting back, the sapling looked like a bush and then it individualized one pattern

becoming in such a way preexistent usable sapling. The pattern which is so near the root will generally be the most vigorous. This species type of reaction determines the valorization of these saplings by placing them in the light and leading the regeneration of the stands affected by drying.

Another important cause which produces the saplings self cutting back is their shadowing (Ciumac, 1967). As we have already mentioned, the Hungarian oak sapling can be placed and can resist under the mountain at an under 0.8 consistency. Starting with the second year, they will self cut back because of the light lack. The lack of the light influences the offshoot, which appear each year, to vegetate, sometimes in a big number, four – five patterns like a bush, which extend more horizontally so that the leafage absorbs more light. Because of that they resist for a long time under the mountain sometimes forming an under level in the Hungarian oak pure stands.

The self cutting back is also produced because of the early frosts for the sapling which have already done the second and the third rising and this happens because they could not lignify being offshoot at the basis if the sapling have small ages or one or more offshoots start from the lateral buds which take place to the terminal stem. In a similar way, the self cutting back is produced for the saplings affected by the late frosts or to those attacked by Microsphaera alphitoides or to the red of games ones, grazed or broken in exploitation process of the mature trees (Ciumac, 1967).

Another type of the self cutting back appearance was observed at the saplings planted under the mountain and which were not put in the light in the first two years from the plantation. After they were put in the light, after two or three years from plantation, in conditions of sufficient humidity, the potential of rising in height becomes suddenly very high, a physiological imbalance is produced, the capacity of the feeble trunk cannot take over the whole afflux of water and nutritive substances sent by the root and as a result it is activated the start into vegetation of a bud near the root and the self cutting back is produced. The phenomenon was observed in the permanent test areas in which there were periodically made measurements and observations related to the saplings of different ages. This aspect was emphasized for the saplings which had small rising, caused by the lack of light, after they were put into the light, they self cut back, while the saplings which had more light being more vigorous, and continued to grow more intensely without the process of self cutting back.

The self cutting back of the sapling shows the existence of restrictive factors in the regeneration process but in the same time it is an argument that the root is strongly developed and capable to keep the sapling viability for the next two – three years.

The self cutting back is, in fact, a specific feature of the species with a strong development of the root in the first years from the sapling planting.

The study of the phenomenon in which the self cutting back is produced can lead to the determination of how favourable it is to plant the Hungarian oak and Turkey oak saplings and help to establish the technical solutions about the intervention in the mature stands in which will take place the natural regeneration, as well as, it helps to establish the directing way of the ecological factors of which resultant has to be optimal in certain given conditions in order to lead the regeneration process.

Analyzing the Hungarian oak and Turkey oak self cutting back, it was generally found that it is produced in the first year from the sapling plantation in a very low proportion. The percentage of the one year self cutting back saplings is under 1.0%.It was also observed the trunk self cutting back which began from the vegetation start, in the first days, for the wounded plantlets whose extremity was broken through a mechanic action of an external factor. The self cutting back of the saplings which was produced in the first year is made by mechanical external factors, as a result of extremity breaking through grazing, phenomenon which can be easily observed, especially for the Turkey oak saplings in their first year of vegetation.

Beginning with the second year of vegetation the self cutting back is produced for the sapling which do not have a normal development and which have not been eliminated. The sapling elimination generally appears to those saplings whose root has not developed properly as a result of the high density of the plantlets or the water lack in the first part of the vegetation season, which did not allow a sufficient development of the root.

CONCLUSIONS

1. The self cutting back for the Hungarian oak and the Turkey oak represents the saplings reaction to the restrictive ecological factors. It is produced only to those saplings with a strong development of the root in the first years from planting.

2. The Hungarian oak and Turkey oak saplings self cutting back is produced in the first year from sapling planting but in a low proportion, under 1.0%. The trunk self cutting back can be produced early from vegetation start, in the first days for the wounded plantlets, whose extremity was broken through a mechanical action of an external factor. Beginning with the second year of vegetation, the self cutting back appears to the saplings which do not have a normal development and which have not been eliminated.

3. The capacity of the Hungarian oak and Turkey oak saplings and especially of the Hungarian oak saplings to self cut back is a very important factor in the existance and the perpetuation of the two species in their areas. The high periodicity of the fructifications combined with the phenomenon of extended drought which took place in the last years could have led to the saplings extinction without the straightening possibility if the self cutting back and the saplings keeping at the minimal limit necessary for stands constitution had not been produced.

4. The self cutting back appears in the following parametres:

- the medium number of the self cut back saplings is between 33% and 93% from the medium number of planted saplings;
- thelowest self cut back saplings proportion is between 33% and 64%,in the better regenerated areas which are better led and in which the opening and enlargement eye cuts were made in time as well as in the mixture stands, in Turkey oak – Hungarian oak mixture and in normal mixtures of common oak, Hungarian oak and Turkey oak, in forest resorts placed on the northern slopes or on the plateaus in the middle and northern parts of the studied territory.

5. The phenomenon intensity is higher in the southern part of the studied territory because of extreme temperature manifestations during the summer and because of low rain-fall.

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CARACTERIZAREA STAŢIUNILOR FORESTIERE CU GÂRNIŢĂ ŞI CER DIN BAZINUL JIULUI

DESCRIBING HUNGARIAN AND TURKEY OAK FOREST RESORTS IN JIU AREA

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Key words: Hungarian oak, Turkey oak, Jiu area, forest resorts

REZUMAT

Gârniţa şi cerul se găsesc în componenţa arboretelor începând din silvostepa externă şi până în etajul deluros de gorunete, goruneto-făgete şi amestecuri ale acestora, cu precizarea că arborete pure în acest etaj formează numai cerul. Cunoaşterea tipurilor de staţiuni forestiere dintr-un teritoriu permite alegerea speciilor forestiere pentru programele de împădurii în concordanţă cu factorii staţionali favorabili acestora. Caracterizarea şi descrierea tipurilor de staţiuni forestiere din bazinul Jiului vine să completeze structura vegetaţiei forestiere din acest teritoriu.

În câmpia forestieră cele mai răspândite tipuri de staţiuni sunt: câmpie forestieră de cereto-gârniţete Bm, luvosol roşcat (brun roşcat luvic), preluvosol roşcat stagnic (brun roşcat, divers pseudogleizat), frecvent cu caracter vertic, edafic mijlociu - mezotrofic, moderat excesiv până la oligomezohidric, estival uscat-reavăn - CF, ce-gâ. Bm. T_{III}. $H_{(E)\ -II.}$ $Ue_{1.}$, începând din zona Dâlga, Cobia, Bucovăţ, Seaca, pe suprafeţele cele mai mari, ***3167*** *ha şi âmpie forestieră, luncă de şleau Bm, preluvosol gleic, edafic mijlociu-mare - eutrofic, euhidric, estival jilave CF(l).şl.Bm. $T_{IV.}H_{IV}Ue_4$, se găseşte pe* ***1113*** *ha în lunca Jiului. În etajul deluros de cvercete FD_1 cele mai răspândite tipuri de staţiuni sunt: deluros de cvercete cu stejar Bm, luvosol stagnic, cu Poa pratensis - Carex caryophyllea - mezotrofic, excesiv până la oligohidric, estival reavăn - uscat-reavăn - FD_1. Bm. T_{III}. $H_{E-\ I}$. Ue_2. În etajul deluros de cvercete FD_2 sunt: deluros de cvercete (de gorun, cer, gârniţă) Bm, luvosol ± albic stagnice edafic mijlociu cu Carex-Poa - mezotrofic, excesiv până la oligohidric, estival uscat-reavăn - FD_2, go, ce, gâ. Bm. T_{III}. H_{E-I}. Ue_1. În etajul deluros de cvercete FD_3 cel mai răspândit tip de staţiune este: deluros de gorunete Bm, preluvosol tipic ± stagnic edafic mijlociu, cu graminee mezoxerofite ± Luzula - oligomezotrofice, oligomezohidrice, estival reavăn - uscat-reavăn - FD_3, go. Bm. T_{II}. H_{II}. Ue_{2-1}. Alte tipuri de staţiuni fără gârniţă şi cer sunt numeroase iar suprafaţa cea mai mare o reprezintă tipul deluros de cvercete, cu făgete de limită inferioară Bm, eutricambosol edafic mijlociu, cu Asperula -Asarum - mezotrofic şi eutrofic, mezohidric, estival reavăn FD_2, fa. Bm. T_{III-IV}.H_{III}. Ue_2 (6.2.5.2.) pe* ***8209*** *ha. Prezentarea tipurilor de staţiune are importanţă şi pentru celelalte ştiinţe biologice şi poate fi valorificat de botanişti, biologi, ştiinţele agricole, etc. Este primul studiu al staţiunilor forestiere făcut pe un teritoriu mare şi cuprinde întreaga vegetaţie forestieră existentă în acest teritoriu.*

ABSTRACT

The Hungarian oak and the Turkey oak are found in the structure of the stands starting from the external forest steppe to the hilly common oak trees level, common oak trees – beech trees and their mixtures but we must say that pure stands at this level can be formed only by the Turkey oak. The most spread types of resorts in forest steppe are: internal forest steppe with horizontal lines mezoxerophyle – xerophyle Bm(i), argil cernozem on fine clays – eutrophic, oligomezotrophic to oligohydric, moist-dry-moist

during the summer – Ss, Bm(i), T_{IV}, $H_{II/I}$, Ue_{2-1}; it occupies an area of 734 ha in Rebegi, Drănic area, at the contact with the medium forest steppe, on horizontal low to moderate inclined fields with substrata of fine clays and fine loess materials and medium forest steppe of horizontal lines xerophyle Bm(s) argil cernozem on fine clays – eutrophic and megatrophic, oligohydric, dry-moist during summer – Ss, Bm(s), T_{IV-V}, H_I, Ue_1, which can be found in the same areas as the former described before type of resort, on an area of 405 ha, on substrata which are richer in argil, argil-clayey in Bt. In the forest plain, the most spread types of resorts are: the forest plain of Turkey oak trees – Hungarian oak trees Bm, luvic reddish type of soil (luvic brown-reddish), stagnant luvic reddish type of soil (brown-reddish, diverse pseudogleized type), frequently with a vertical feature medium edaphic, mezotrophic, excessive moderate to oligomezohydric, dry-moist during summer – CF, Bm, T_{III}, $H_{(E)-II}$, Ue_1, beginning with Dâlga, Cobia, Bucovăț, Seaca area, on the largest areas, 3167 ha and forest plain, causeway water meadow Bm, gleic luvic type soil, medium – high edaphic – eutrophic, euhydric, damp during summer CF(I), Bm, T_{IV}, H_{IV}, Ue_4, on an area of 1113 ha in Jiu water meadow. In the hilly horizontal lines FD1 level the most spread types of resorts are: hilly horizontal lines with oak Bm, stagnant luvic type soil with *Poa pratensis* – *Carex caryophyllea* – mezotrophic, excessive to oligohydric, moist-dry-moist during the summer – FD1, Bm, T_{III}, $H_{E-1,}$ Ue_2. In the level of hilly horizontal lines FD2, there are: hilly horizontal lines (of common oak, Turkey oak and Hungarian oak), Bm, Luvic type soil, stagnant, medium edaphic with *Carex* – *Poa* – mezotrophic, excessive to oligohydric, dry-moist during summer – FD2, Bm, T_{III}, $H_{E-1,}$ Ue_1. The forest vegetation is consisted of common oak trees – causeway of a medium productivity, hill causeway with common oak of a medium productivity, Hill Turkey oak of a medium productivity and it occupies 7587 ha, starting in Filiaşi area and to the superior limit of the studied territory. In the level of hilly horizontal lines FD3, the most spread type of resort is: hilly common oak Bm, typical luvic soil, stagnant, medium edaphic with graminaceae mezoxerophyle – *Luzula* – oligomezotrophic, oligomezohydric, moist-dry-moist during summer – FD3, Bm, T_{II}, H_{II}, Ue_{2-1}. The forest vegetation is formed of side common oak trees with graminaceae and Luzula luzuloides, Hill Turkey oak trees of a medium productivity. Other types of resorts without Hungarian oak and Turkey oak are numerous and the largest area is represented by hilly horizontal lines type with beech trees of inferior limit Bm, eutricambosoil medium edaphic with *Asperula* – *Asarum* – mezotrophic and eutrophic, mezohydric, moist during summer FD2, Bm, $T_{III - IV}$, H_{III}, Ue_2 (6.2.5.2.), on an area of 8209 ha. The presentation of the resort types is of a great importance for the other biological sciences and it can be valorized by the botanists, biologists, agriculture sciences, etc. It is the first study of the forest made on a large territory and it includes the whole existent forest vegetation in this territory.

INTRODUCTION

The forest resort (the biotope) is made of relief elements, stones or parental material, soil and climate and it represents the climatic content and edaphic of substance and energy of biocoenosis (C.D. Chiriță, 1977).

The production and productivity of the forest ecosystems is determined both of the composition and the structure of the biocoenosis (phytocoenosis) and the degree of favourability of the resort, the measure in which it is capable to satisfy the ecological and functional demands of the species which are part of the stand (D. Târziu,1997).

The growing of the trees and stands has not only its biological strict feature but also a strong ecological feature because it depends on all climatic, edaphic and orographic factors. For that, to know how to make the forest resorts and the proportion among their compound elements as well as the proportion between them and the biocoenosis has the

highest theoretical and practical importance in order to understand the way in which the forest are made and work, because they are the most complex terrestrial ecosystems.

To know the forest resorts as integrated subsystems of the forests permits to establish the ways of how to enter life intimacy of the forest in order to ensure an optimal and durable functionality, a maximum stability and productivity of the forest and of course to ensure its perenniality.

To ensure the continuity of the forest ecosystems in the studied territory indicates the necessity of knowing the ecological factors which become restrictive or lead to the ecosystem extinction so that the action of man to have as a result keeping and increasing the forest productivity in these areas with big fluctuations of the stationary factors.

Knowing the intensity, the rhythm and the significance of the relations between the biocoenosis and its environment now and in perspective, we can establish and apply better the technical measures in order to direct the planted forest in concordance with the set social – economical purposes.

The physical – geographical elements – geological, geomorphologic, edaphic and the ecological ones – light, heat, atmospheric humidity and the soil one, the chemical compounds of the atmospheric air and soil ones associate and combine in different ways, making complex more or less united of territory (land shaft) and ecological environment, capable to provide the life requests for a certain type of forest vegetation. The resultant of the ecological factors action is the forest vegetation which develops for a long period of time in that territory setting up this way the ecological specific of the resort.

Knowing the types of the forest resorts in a territory permits to choose the forest species for afforestation programmes in concordance with the stationary factors favourable to them.

The description of the forest resorts types from Jiu area completes the structure of the forest vegetation in this territory.

MATERIAL AND METHOD

The chosen territory for the researches is in Oltenia and it includes Motru Hills, Jiu Hills, Gilort and Amaradia Hills, the northern part of Bălăcița Plateau, the north – eastern part of Segarcea Plain, the north-western part of Leu – Rotunda plain, geomorphologic units in Jiu area.

The presented Hungarian oak and Turkey oak forest resorts types are found in the administration of fourteen Forest Districts: Segarcea, Filiaşi, Şimian, Corcova, Strehaia, Motru, Tarnița, Târgu-Jiu, Peşteana, Cărbuneşti, Turceni, Hurezani and Amaradia in forty-nine production units in Dolj, Gorj and Mehedinți Counties.

In the studied territory the types of Hungarian and Turkey oak resorts include a series of elementary stationary units, ecological alike and forester equivalent, which were grouped in resort categories on phytoclimatic areas using the model presented in “Forest resorts” (Chiriță, 1977, Tîrziu, 1997), respecting the notes in these works as well as those in “Guide-book for forest arrangement” – 1984, put up-to-date using as a model The Romanian soil Taxonomy System 2003 (table 1).

Besides the climate, the soil is one of the main elements of the resort and for that it is necessary the presentation of the most important features of it from the favourability grade and influence over the forest vegetation point of view as well as the placement in size categories which define the resort type. The first element is the useful physiological, edaphic volume which represents the thickness of the soil superior strata in which the trees set their roots and from which they absorb the water and the mineral substances. This is expressed in m^3/m^2 and represents the volume of thin soil which exists in surface unit and there are the following categories (Chiriță and contributors, 1977):

- null to the minimum 0.0 … 0.15 m^3/m^2 class of size 0 …m;

- small 0.15 – 0.30 m^3/m^2 class of size I;
- sub medium 0.30 – 0.45 m^3/m^2 class of size II;
- medium 0.45 – 0.60 m^3/m^2 class of size III;
- big 0.60 – 0.90 m^3/m^2 class of size IV;
- very big over 0.90 m^3/m^2 class of size V.

Another important element is the humidity pattern and the soil capacity to provide water for forest vegetation. The soil humidity variations during the vegetation period as well as the soil capacity to keep the water from rain-fall or other sources and to give it to the plants are important edaphic ecological compounds of the resorts.

Depending on the quantity of water kept in the soil at a certain moment, there are the following representative levels of humidity which are determined organoleptically (Păunescu, 1975): U_0 – dry; U_1 – dry – moist; U_2 – moist; U_3 – moist – damp; U_4 – damp; U_5 – damp - humid; U_6 – humid; U_7 – humid – wet; U_8 – wet; U_9 – partially submerse; U_{10} – completely submerse.

These humidity levels can refer to vernal seasons (the first two weeks after the snow melt) or summery ones (from July to the end of September). The capacity of water providing of the forest soils varies in accordance with the humidity interval and edophic volume as it follows: extremely oligohydric ($H_{0\ ...m}$), oligohydric (H_1), oligomezohydric (H_{II}), mezohydric (H_{III}), euhydric (H_{IV}), megahydric (H_V), excessively moderate ($H_{(e)}$), excessive (H_E) (Chiriță and contributors, 1977).

Soil trophicity expresses the degree of nutritive substance provisioning of the forest vegetation: it is expressed by the global potential trophicity indicator got as a product between the percentage of humus related to the volume (H), the horizon thickness in dm, the saturation degree in bases (U) at pH = 8.3; the percentage between the thin soil volume and the total volume of the soil (r_v), the apparent density (Da) and 0.1 (having low values). The global potential trophicity indicator is calculated separately on horizons and then it is summed up for the whole profile getting the following classification:

$T_{0...m}$ – extremely oligotrophic soils Tp fewer than 10
T_1 - oligotrophic soils Tp 10 – 30
T_{II} – oligomezotrophic soils Tp 30 – 50
T_{III} - mezotrophic soils Tp 50 – 80
T_{IV} - eutrophic soils Tp 80 – 140
T_V - megatrophic soils Tp over 140.

The resort types establishment was made in a long period of time by walking in the field and the stationary factors correlation with the existent forest vegetation beginning with 1980 and till 2006. The most important data base from forest planning, they were up-dated and they will be presented on phytoclimatic areas both for Hungarian and Turkey oak type of resorts and for other types of resorts which exist in the studied territory.

RESULTS AND DISCUSSIONS

The obtained results will be presented in the table with specific references for each type of resort.

Forest sites types over the studied area with Hungarian oak and Turkey oak

Tabelul 1 (Table 1)

No.	Resort type	The area for forest districts (ha)														Total
		Segarcea	Craiova	Filiași	Strehaia	Corcova	Șimian	Motru	Turceni	Amaradia	Hurezani	Cărbunești	Pește ana	Tg.-Jiu	Tamița	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	9530	734														734
2	9320	405														404.7
3	9210	47.8														47.8
4	8511	20.5	1092													1112.5
5	8430	50.7														50.7
6	8420		438													438.2
7	8411		141													140.6
8	8323		46.5													46.5
9	8322	1169	1998													3167
10	8321		165													165.3
11	7540			340						4.9						344.8

12	7532			4.4												4.4
13	7530			115						198						313.3
14	7430			38												38
15	7421							379.1								379.1
16	7420			143												142.8
17	7334			598												598.1
18	7333			22.7												22.7
19	7332			3805						2563						6368.2
20	7331			205						50.1						254.6
21	6182					1444										1444.4
22	6155				53.6											53,6
23	6153				13.9		29.9	58.2	186		10.1			50.6		348.7
24	6152			116	870.9		31.8	957.7	1214		1986	528	1069	705.4	108.1	7587.4
25	6151														61.5	61.5

26	6144			719												718.6
27	6143			116	432.3	42.8	60		103.9	23.1		73.8	1.2	1188		2041.3
28	6142			1001	4622	4993	1085	4317	11514	952	12217	8282	9027	10488	687.5	69185
29	6141			192	278.7			49.1	8.9		80.5					609.5
30	6132				3577	792.6	546	1711	756.2		48.5	6114	787.4	1971	537.4	15113
31	6131				640.3	268.1	2.3	180.9				139.7		67.6	108.1	1407
32	5254							5						10.4		15.4
33	5253							40.6						7.1	9.8	57.5
34	5252													1.6		1.6
35	5132							1980						866.9	1378	4225.7
Total		2427	3880,5	7415.3	10488,7	7540,5	1755	9687,6	13783	3791,1	14342,1	15137,5	10884,5	15356,6	2890,4	117589.9

Types of forest resorts from forest steppe with Hungarian oak and Turkey oak

1) 9.5.3.0. Internal forest steppe with horizontal lines mezoxerophyle – xerophyle Bm(i), argil cernozem on thin clays – eutrophic, oligomezo – to oligohydric, summery – moist – dry – moist – Ss, cv. Bm(i), T_{IV}, $H_{0/1}$, U_{e2-1} occupies an area of 734 ha in Rebegi, Drănic area, at the contact with the medium forest steppe, on horizontal and low to moderate inclined fields with substrata of thin clays and thin loess materials. The soil is an argil cernozem one, clay – argil in A, argil – clay in Bt, with a medium and high edaphic volume. There are determined ecological features: a very marked summery deficit, the summery humidity – moist to moist – dry, followed by moist – dry to dry and big compacity

in Bt horizon. In living layer there are plants which show an advanced summery dryness as*: Artemisia* sp., *Andropogon ischaemum, Stipa* sp. These are horizontal line resorts with Hungarian oak and Turkey oak, fluffy oak – grayish oak having also common maple, maple, apple tree, pear tree and a sub stand formed of hedge thorn and blackthorn. The resort is of medium reliability for Hungarian oak and Turkey oak.

2) 9.3.2.0. Medium forest steppe of xerophyle horizontal lines Bm(s) argil cernozem on this clays – eutrophic and megatrophic, oligohydric, dry – moist summery – Ss, cv Bm(s), T_{IV-V}, H_I, U_{el} – they can be found in the same areas as the previous described resort on an area of 405 ha, on richer argil and argil – clay in Bt sub strata. The soils are of an intense humus, clay – argil to clay in the superior part of A horizon, clay – argil in B, well grainy structured in A and subpolyhidric in B with a moderate internal drainage. There is a very high edaphic volume. The edaphic conditions are very favourable to the xerophytes oak forests. The potential trophicity is very high rich in accessible nitrogen and changeable bases. There is a very low active acidity so the soil is practically neutral. The effective trophicity is conditioned by the humidity which is medium to high. The accessible water is provided at a medium level to sub medium level during spring and it is poor to very poor during summer (H_I, $H_{0...m}$). The ecological factors determine the xerophytes nature of the vegetation but ensure its superior productivity or a medium to superior one. Turkey oak stands are of superior productivity and the mixtures of Turkey oak and grayish oak are of medium productivity.

3) 9.2.1.0. Internal forest steppe of mezoxerophyle horizontal lines with a medium to inferior reliability, argil – vertical chernozem, Ss, cv, Bm, T_{IV}, H_{II}, U_{el} – it is found in Dâlga area on an area of 48 ha. The vegetation is formed of mixture stands of fluffy oak and Turkey oak and Hungarian oak or pure turkey oak trees of forest steppe.

Types of forest resorts in forest plain with Hungarian oak and Turkey oak (CF)

1) 8.5.1.1. Forest plain, causeway water meadow BM, gleic soil, edaphic medium – high, eutrophic, euhydric, damp during the summer CF (I).sl. BM. T_{IV}, H_{IV}, U_{e4} – can be found in Jiu water meadow on an area of 1113 ha. The edaphic volume is medium or high of a medium reliability for oak – causeway or causeway water meadow. It frequently appears the turkey oak.

2) 8.4.3.0. causeway Forest Plain Bs, reddish soil (brown – reddish) edaphic big – eutrophic and megatrophic, euhydric, moist during summer – CF, sl., Bs, T_{IV-V}, H_{IV}, U_{e2}, cannot be found too much in this geographical territory – an area of only 51 ha. The relief is of tabular – inter rivers plain. There are depressions and glens in tabular plains, terraces, shadowed and semi shadowed slopes which are low inclined, inferior slopes no matter the exhibition, but near the lakes and streams, irrigation canal with a higher atmospherical humidity with profound soils formed on the loess and loess deposits like reddish soils (brown – reddish). In A horizon, the soils are clayey and clay – argil types and in Bt horizon they are clay – argil to argil types. The climatic conditions are specific to moderate – humid forest area with a Mediterranean tone. The edophic conditions are very favourable to the plain causeway – Turkey oak trees. The potential and effective trophicity are high or very high and provide with accessible nitrogen and changeable bases is good and very good and the soil reaction is practically neutral. The accessible water is provided at a high level; the air and aeration are good and very good and the herbaceous plants are of *Arum – Pulmonaria* type.

3) 8.4.2.0. Forest rain of transitions causeway – Turkey oak trees Bs(m), reddish soil (brown – reddish), profound medium – eutrophic, mezohydric moist – dry – moist – during summer CF, sl., ce., Bs(m), $T_{IV,}$ H_{III}, U_{e2-1} – it occupies longer areas, 483 ha, in Bucovăț geographical area. The resorts are plane, placed in low hilly areas, in the area of

high forest plain, ob shadowed or semi shadowed slopes with reddish (or typical brown – reddish) soils, profound, acid, mezzo bases, with a moderate content of nutritive substances, very profound morphologically and physiologically, with a dry – moist humidity during summer. Lythologic substrata are of sedimentary nature, loess, clays and small siliceous material. The texture is clayey in the superior horizon clay – argil to argil – clay in Bt. There where the incline is lower, the texture is clayey less clay – argil compact moderate in B horizon. The hydrologic system is imbalanced. In these resorts, there are normal mixtures of common oak, Hungarian oak and Turkey oak.

4) 8.4.1.1. Forest plain Bm – i, with edaphic soil medium to inferior CF, Bm – I, $T_{III - II}$, $H_{III - II}$, U_{e2-1}. They are resorts of a medium to inferior reliability with an oligomezotrophic specific, placed in the law hilly area on the sunny and semi sunny slopes, lightly inclined to inclined with vertical reddish soils (vertical brown – reddish) and reddish soils (typical brown – reddish), profound medium, generally with a short profile, with medium to heavy texture, compact moderate, formed on a lythologic substrata made of fine sedimentary deposits.

The humidity system of the soils oscillates during the vegetation period between dry and moist – dry. The humus content is moderate in superior horizons and then suddenly decreases less than 30 – 35 cm at very low values. The potential trophicity is medium to inferior and the productivity is medium inferior for Hungarian oak and Turkey oak. The forest vegetation is made of Plain Turkey oak of an inferior productivity. It occupies 141 ha in the studied territory in Mosna – Seaca de Pădure area.

5) 8.3.2.3. Forest plain, Bm, reddish soil, edaphic medium to high for Hungarian oak trees, CF, Bm, T_{III}, $H_{(E) - II}$, U_{e2-1}. The resorts are placed on plane fields, sometimes low inclined or lightly depression in the plain region. The lythologic substratum is consisted of fine sedimentary deposits (loess materials, fine clays and often argils). The soils are of reddish type (brown – reddish) vertical soils and vertical stagnant (brown – reddish with vertical features) which present A horizons with thicknesses of 50 – 60 cm, well structured compact moderate with a marked breaking – up till 30 – 40 cm with a compact clay – argil Bt horizon, placed in depth.

The aeration is sub medium to low in spring and autumn because of the excessive humidity during these seasons but in the other seasons the aeration is good at least in A_0, A_0/Bt horizons. The hydric system is of periodically percolate type, in spring and autumn the soil is humid – damp to damp and during summer is moist to dry – moist.

The potential trophicity is high (mezotrophic to eutrophic). On the slopes the soil is more broken – up. The forest vegetation is consisted of stands of superior productivity Plateau Hungarian oak trees type, superior productivity Plain Turkey oak and Hungarian oak trees, superior productivity slope Turkey oak and Hungarian oak trees, forest which can be found in Seaca Forest on 47 ha (that part of the forest situated in Jiu area).

6) 8.3.2.2. Forest plain of Turkey oak – Hungarian oak trees Bm, reddish soil (brown reddish) stagnant reddish soil (brown – reddish - diverse) frequently with a vertical feature, edaphic medium to mezotrophic, excessively moderate to oligomezohydric, dry – moist during the summer – CF, Bm, T_{III}, $H_{(E) - II}$, U_{e1}.

These are resorts of plane fields in the plain or which are low inclined with a marked variability of the insolation, relative humidity and air temperature based on its exhibition and field inclination. The lythological substratum is consisted of fine sedimentary deposits on which there were formed reddish soils (brown – reddish soils) or frequently vertical reddish soils (frequently vertical brown – reddish), clayey or clay – argil in the superior horizon, argil – clayey or argil starting of the depth of 20 – 25 cm with a medium edaphic volume. The potential trophicity is sub medium and medium and there is a moderate active acidity. In spring, there is an excess of humidity even bogging in eyes but during summer, there is a deficit of water. The forest vegetation is represented by Plain Hungarian oak trees, Plateau Hungarian oak trees, Turkey oak trees, Turkey oak trees – Hungarian oak

trees of a medium productivity which can be found in Dâlga, Cobia, Bucovăț, Seaca on the largest areas, 3167 ha.

7) 8.3.2.1. Hungarian oak tree plain forest Bm, stagnant low medium soil (brown low medium soil)plane soil, medium edaphic – oligomezotrophic and mezotrophic, excessive to oligohydric, during summer dry – moist – dry CF, Bm, T_{II-III}, H_{E-1}, Ue_{1-0}.

These are resorts in the area of low hills from the plain forest placed on the plateaus, with clay – argil substrata which are hardly permeable, with a lack of humus, with Bt horizon beginning from 30 cm. The hydric system is percolate and imbalanced. The soils have a big content of argil and they present a big compactness. The forest vegetation is formed of stands of Plain Turkey oak and Hungarian oak trees type with an inferior reliability (plateau), on an area of 165 ha in Bucovăț.

Types of forest resorts in hilly horizon line level with oak (and with Turkey oak, Hungarian oak, common oak and their mixture) (FD_1)

1) 7.5.4.0. Hilly horizon lines with oak Bs, brown eubases soils normal phreatic or gleic, edaphic big in high water meadows FD_1 (I) Bs, T_{IV}, H_{IV}, Ue_{5-3} – hilly horizon lines with oak, brown humid phreatic, gleyed and semi gley big in high water meadow. The resorts are in the sectors of high water meadows which cannot be flooded, with sand-clayey to clay – dusty alluvia, brown eubases soils, humid phreatic, gleyed and semi gley, moderate to intense humus, profound and very profound, sand – clayey to clayey with a high phreatic moistening with a high potential trophicity, with a high edaphic volume. These are resorts of a superior reliability for pedunculate oak and mixtures of water causeway in the low hill area. Flora is represented by species of *Geum, Dentaria, Pulmonaria*. The forest vegetation occupies 354 ha in Filiaşi area and it is consisted of water meadow oak trees, water meadow oak trees – water meadow causeway and riverside coppices of black alter tree in the hilly region of medium productivity. The Turkey oak can be found as well.

2) 7.5.3.0. Hilly horizon lines with oak, alluvium soil, FD_1 (I) Bm-s, T_{III-IV}, H_{IV}, $Ue_{4-2,}$ with a moderate humus content. They are resorts of medium productivity for pedunculate and mixtures of water meadow causeway in the low hilly region, which are situated in the interior water meadows in light depressions. The soils are of alluvium type soils with a moderate humus content, semi gleic, medium profound to profound, mezotrophic to eutrophic, eubases low acid, with a summery vernal, balanced humidity system, with clay – sandy texture and a medium edaphic volume. Flora is represented by species like: *Assarum, Arum, Pulmonaria, Dentaria, Geum*. The forest vegetation occupies 313 ha in Filiaşi and Melineşti areas with oak trees of low terraces and oak trees – water meadow causeway of a medium productivity in which Hungarian oak and Turkey oak can be found with trees well developed but which cannot exceed the pedunculate oak.

3) 7.4.3.0. Hilly horizon lines with oak, high edaphic soil, eutrophic and megatrophic, euhydric, moist during summer $FD_{1,}$ Bm-s, T_{IV-V}, H_{IV}, Ue_2. These resorts are frequently situated on the inferior slopes, light platforms and depressions with diverse exhibitions. The soils are of typical argil ones with a moderate to intense humus content, eubases, with a high potential trophycity, with clayey to clay – argil texture, medium to high edaphic volume, profound with light phenomena of argilization. The resorts are of a superior reliability for common oak, Turkey oak, Hungarian oak and their mixtures. Flora is represented by species of *Brachypodium, Pulmonaria* and *Geum* and the forest vegetation is formed of stands of Turkey oak of a superior productivity and a normal mixture of common oak, Hungarian oak and Turkey oak of a medium productivity in Filiaşi area on an area of 38 ha.

4) 7.4.2.0. Hilly oak trees with typical soil or stagnant medium edaphic $FD_{1,}$ Bm-s, T_{III}, H_{E-II}, Ue_2. These are resorts of medium productivity for causeway – Turkey oak trees with common oak, placed on diverse inclined slopes and with diverse exhibitions. The soils

are typical or stagnant (typical brown soils), low structured, profound, formed on clays substrata in alternation of argils and broken stones, with a medium edaphic volume, medium potential trophicity and clay – sandy texture. The hydric system is of mezohydric type with small seasonal variations. Flora is represented by the following species: *Stellaria*, *Poa, Carex, Euphorbia*. The forest vegetation is consisted of hill causeway – Turkey oak trees with common oak of medium productivity on an area of 143 ha in Piria - Filiaşi area.

5) 7.3.3.4. Hilly oak trees stagnant medium edaphic soil FD_1, Bm, T_{III}, $H_{(E)-II}$, Plateau Ue_2. These are resorts of medium productivity for Hungarian oak placed on the plateaus. The soils are of vertical stagnant ones (brown medium to high podzoled, pseudogleic vertical), formed on argil clays and alternations of clays and argils with medium edaphic volume, medium potential trophicity, a moderate content of humus with a clayey – sandy to hard argil texture, moderate acid with a slow internal drainage. The hydrologic system is of a mezohydric one with high seasonal variations. Flora is represented by the following species: *Carex, Stellaria* and *Geum*. Forest vegetation is consisted of Hill Hungarian oak, on the plateau, of a medium productivity and Hill Turkey oak – Hungarian oak, on the plateau, of a medium productivity and they occupy an area of 598 ha in Argetoaia - Filiaşi area.

6) 7.3.3.3. Hilly horizontal lines with oak , Bs, stagnant soil, high edaphic, mezotrophic, excessive moderate to mezohydric, moist during summer - FD_1, Bs, T_{III}, $H_{(E)-III}$, Ue_2. these are resorts of high productivity for horizontal lines placed on low to moderate inclined slopes with different exhibitions. The soils are more or less stagnant (pseudogleic ones), profound or very profound, with a moderate content of humus, formed on sedimentary rocks, with clayey – sandy texture in the superior horizons and cleyey – argil or argil – cleyey in depth, with a high edaphic volume, a medium potential trophicity, moderate acid and a slow internal drainage. The hydric system is of a mezohydric type and the humidity system is one with high seasonal variations. Flora is represented by the following species: *Carex, Stellaria and Geum*. The forest vegetation is formed of normal Hill Turkey oak trees and Hill Turkey oak and Hungarian oak trees of superior productivity found in Filiaşi area, on an area of 23 ha.

7) 7.3.3.2. Hilly horizontal lines with oak Bm, stagnant soil, with *Poa pratensis* – *Carex caryophyllea* – mezotrophic, excessive to oligohydric, moist – dry – moist during summer - FD_1, Bm, T_{III}, H_{E-I}, Ue_2. These are resorts of medium productivity for Turkey oak trees, Turkey oak – Hungarian oak trees and mixtures of the common oak with these species placed on low to moderate inclined slopes with southern exhibition or on the plateaus. The soils are of brown luvic type, low to moderate podzoled, more or less stagnant (pseudogleic), profound, sometimes low structured, with a moderate content of humus, clays to clay – dusty in the superior horizons and clay – argil in Btw horizon, with a slow internal drainage and water stagnation of a short time at the surface, high edaphic volume, medium potential trophicity, moderate acid, medium hydric system, high alternating humidity system. Flora is represented by the following species: *Carex, Stellaria* and *Geum*. The forest vegetation is consisted of normal Hill Turkey oak trees and Hill Turkey oak – Hungarian oak trees of medium productivity, on an area of 6368 ha in Gogoşu, Argetoaia, Filiaşi, Melineşti, Fărcaşu areas, actually the largest area of Hungarian oak and Turkey oak spreading.

8) 7.3.3.1. Hilly horizontal lines with oak Bi-m stagnant luvic soil, medium to oligomezotrophic edaphic, excessive moderate to oligomezohydric, moist – dry – moist during summer - FD_1, Bi-m, T_{II}, $H_{(E)-II}$, Ue_1. These resorts are found on low inclined slopes or on the plateaus, with southern exhibition, with lythological substrata formed of clays in alternation with argil and broken stones, with brown vertical luvic soils, more or less stagnant (pseudogleized), moderate to high podzoled, with hard argil Btw horizon, beginning with 30 – 35 cm, medium edaphic volume, seldom sub medium, with a sub medium potential trophicity, moderate acid to acid with water excess during spring and a

big deficit o water during summer. The forest vegetation is formed of Hill Turkey oak – Hungarian oak trees of an inferior productivity. They can be found on an area of 255 ha in Filiaşi and Melineşti area.

Resort types from the hilly level of horizontal lines (common oak, Turkey oak Hungarian oak and their mixtures) and hilly causeway (FD2)

1) 6.1.5.3. Hilly horizontal lines with hill causeways without beech tree, Bs/m, big edaphic – eutrophic soil, euhydric to mezohydric, moist during summer – FD_2, Bs/m, T_{IV}, $H_{IV/III}$, Ue_2. These resorts are very much spread in the hilly horizontal lines and hill causeways without beech tree, on inferior or medium slopes with different inclination and exhibitions, prevalent low and moderate inclined, wide peaks, fragmented plateaus and other platforms. The soils are of brown eubases and mezabases types and low podzoled, low stagnant (pseudogleized), sometimes humid phreatic, profound and very profound, sandy-clayey to clayey and seldom clayey – argil, with a big and very big edaphic volume, the potential trophicity is high and the accessible water is of a high level to medium. The resorts are of a superior to medium reliability for common oak and Turkey oak species which are found in hill causeways. It occupies an area of 349 ha in Strehaia, Prunişor, Motru, Târgu-Jiu areas and on a big proportion in Gârbova-Turceni area.

2) 6.1.5.2. Hilly horizontal lines Bs-m, luvic, stagnant soil medium to high edaphic FD_2, Bm-s, T_{IV}, H_{III-IV}, Ue_{2-1}. These resorts are of medium reliability for common oak trees, common oak trees – hill causeways or hill causeways – Turkey oak trees, situated on low inclined slopes with different exhibitions. The lythological substratum is formed of argil clays, sands and their alternations. The soils are of brown proluvic type, eutrophic with a medium content of humus and a medium edaphic volume, low acid, mezohydric to euhydric, hydric system and a medium alternating humidity system. Flora is represented by *Carex pilosa*. The forest vegetation is compound of medium productivity common oak trees – causeway, hill causeway with common oak of a medium productivity, Hill Turkey oak trees of a medium productivity and it occupies 7587 ha, beginning with Filiaşi area and by the superior limit of the studied territory.

3) 6.1.5.1. Hilly horizontal lines (of Turkey oak and Hungarian oak) Bi, low edaphic soil, mezotrophic, oligomezohydric, moist-dry-moist during summer - FD_2, Bi, T_{III}, H_{II}, Ue_{2-1}, it is found in Mehedinți Plateau on an area of 62 ha.

4) 6.1.4.4. Hilly horizontal lines Bm, luvic stagnant soil, plateau medium edaphic FD_2, Bm, T_{III}, H_{E-I}, Ue_1. These are resorts of a medium reliability for common oak, Turkey oak and Hungarian oak and their mixtures, situated on the plateaus. The soils are of luvic soils type (brown luvic ones) medium and high podzoled, vertical, stagnant (pseudogleized) with a low to medium edaphic volume with a medium potential trophicity, with a moderate content of humus, low acid, with an imbalanced hydric system, clayey – argil. Flora is represented by oak *Poa – Carex species*. The forest vegetation is represented by Hill Hungarian oak trees of a medium productivity plateau and a normal mixture of common tree, Hungatrian oak and Turkey oak spread on an area of 719 ha in Argetoaia - Filiaşi area.

5) 6.1.4.3. Hilly horizontal lines and hill causeways Bs, high edaphic, stagnant luvic soil with Carex pilose – eutrophic, light excessive and euhydric, damp-moist-damp during summer. FD_2, Bs, T_{IV}, $H_{(E)-IV}$, Ue_{4-3}. These are resorts of a superior reliability for common oak, Hungarian oak, turkey oak, their mixtures and hill causeways situated on low inclined slopes, platforms and water meadow terraces with partially shadowed exhibitions on substrata of sedimentary rocks. The soils are of typical luvic type, low stagnant (brown typical luvic ones, low pseudogleized), profound, with Bt(w) horizon under 50 cm, with a moderate humus content, clay-sandy, with a high edaphic volume, a high potential effective trophicity, moderate acid with an alternating moderate humidity system. Flora is

represented by *Carex pilosa*. The forest vegetation is consisted of normal Hill Turkey oak trees of a superior productivity, Hill Turkey oak trees – Hungarian oak trees of superior productivity, normal mixture of common oak, Hungarian oak and Turkey oak of superior productivity spread in Filiaşi, Strehaia, Corcova, Turceni, Peşteana, Melineşti, Cărbuneşti and Târgu-Jiu area, on an area of 2041 ha.

6) Hilly horizontal lines (of common oak, Turkey oak and Hungarian oak), Bm, luvic-stagnant medium edaphic soil with *Carex* – *Poa*, mezotrophic, excessive to oligohydric, dry-moist during summer - FD_2, Bm, T_{III}, H_{E-I}, Ue_1. These are resorts of a medium reliability for common oak, Hungarian oak and Turkey oak and their mixtures, situated on moderate inclined slopes with diverse exhibitions. The soils are of a typical luvic type, vertical, stagnant (typical brown luvic, vertical, pseudogleized) with A horizon under 40 cm, with a humidity surplus during spring, with a clay – sandy to argil texture, with a medium useful physiological thickness and a medium edaphic volume. Flora is represented by Corex and Poa species. The forest vegetation is represented by common oak trees with carex pilosa of a medium productivity, Hill Turkey oak trees of a medium productivity, Slope Hungarian oak trees of a medium productivity, spread on the studied territory starting from Filiaşi to Târgu-Jiu and Tarnița on an area of 69185 ha, being the resort with the largest spreading in the whole platform of Jiu.

7) 6.1.4.1. Hilly horizontal lines (common oak, Turkey oak and Hungarian oak), Bi, medium edaphic stagnant luvic soil with *Carex* – *Poa pratensis*, FD_2, T_{II}, H_{E-I}, Ue_1. These are resorts of inferior reliability for Turkey oak trees – Hungarian oak trees, Turkey oak trees and mixtures of common oak, Turkey oak and Hungarian oak, localized on sunny slopes, light to low inclined or on heavy soils plateaus. The soils are of a luvic type, vertical, stagnant (vertical brown luvic pseudogleized ones), moderate to high podzoled medium profound, eventually low structured, formed of clays in alternation with argils and broken stones with clay-sandy texture to very argil in B horizon, with the useful physiological thickness and the edaphic volume small to medium. Flora is represented by *Carex* and *Poa* species. The forest vegetation is consisted of Hill Turkey oak trees and Hungarian oak trees of inferior productivity spread in Filiaşi, Strehaia, Motru and Hurezani areas on an area of 610 ha.

8) 6.1.3.2. Hilly horizontal lines (common oak, Turkey oak and Hungarian oak), Bm, medium edaphic typical luvic soil with mezoxerophyle – mezotrophic graminaceae, oligomezohydric, moist-dry-moist during summer - FD_2, Bm, T_{III}, H_{II}, Ue_{2-1}. These are resorts of medium reliability for common oak trees – Turkey oak trees, Turkey oak trees – causeways, Hill Turkey oak trees, Hill Turkey oak trees – Hungarian oak trees, common oak trees. It can be found in Strehaia, Corcova, Prunişor, Motru, Tarnița, Turceni, Cărbuneşti, Pesteana and Târgu-Jiu areas on an area of 15113 ha.

9) 6.1.3.1. Hilly horizontal lines (common oak, Turkey oak and Hungarian oak), Bi, typical luvic soil, small edaphic with mezoxerophyle – oligotrophic acidophil and oligomezotrophic, oligomezohydric, dry-moist during summer - FD_2, Bi, T_{I-II}, $H_{II/I}$, Ue_1.These are resorts of inferior reliability for common oak trees, horizontal lines with common oak trees, Turkey oak trees and Hungarian oak trees: they are spread in Strehaia, Corcova, Motru, Cărbuneşti, Târgu-Jiu and Târnița areas on an area of 1407 ha.

Types of resorts in the hilly level of common oak trees, beech trees and common oak trees – beech trees (FD3)

1) 5.1.3.2. Hilly common oak trees Bm, medium edaphic, typical luvic stagnant soil with mezoxerophyle graminaceae and Luzula – oligomezotrophic, oligomezohydric, moist-dry-moist during summer – FD3, Bm, T_{II}, H_{II}, Ue_{2-1}. These are resorts of a medium reliability for common oak, spread in Motru, Târgu-Jiu and Târnița areas, on an area of 4226 ha. They occupy the superior slopes and under peaks with sunny exhibition and

seldom semi sunny exhibition with a moderate to high inclination, on substrata formed from surface deposits which ensure normal drainage soil formation. The soils are of luvic type soils (brown argil ones) sometimes low stagnant (pseudogleized), oligobases, medium moderate profound and profound, with a low content of humus, sandy to clayey – sandy in the superior horizons and clayey – argil in B horizon, with a medium edaphic volume. The potential trophicity is sub medium. Flora is represented by: *Festuca heterophylla, Luzula albida, Poa memoralis, Cytisus nigricans, Genista tinctoria* and some other species. The forest vegetation is consisted of side common oak trees with graminaceae and Luzula luzuloides, Hill Turkey oak trees of a medium productivity.

Other types of forest resorts in the studied territory

In the studied territory there are other types of resorts in which Hungarian oak and Turkey oak miss (table 2). Their presentation is necessary in order to complete the image of the existent stationary factors in this territory and the succession evaluation of the forest vegetation.

Other forest resorts without Hungarian oak and Turkey oak

Table 2

No.	Type of resort symbol	The area on forest districts (ha)														Total
		Segarcea	Craiova	Filiaşi	Strehaia	Corcova	Şimian	Motru	Turceni	Amaradia	Hurezani	Cărbuneşti	Peşteana	Tg.- Jiu	Tarniţa	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	9614	135														134.6
2	9613	92														92
3	9612	30.6														30.6
4	9112		172													172
5	9111		209													208.5
6	8542		131													131.2
7	8533		23.7													23.7
8	8524		11.1													11.1
9	8523	46.1	994													1040
10	8522		123													122.8
11	8512		14.9													14.9
12	7533			79,2												79,2
12	7524			311												310.6
13	7523			668												668
14	7521			40.7												40.7
15	7520									143						143.1
16	7510									91.6						91.6
17	6311												517			516.6
18	6264				285	11.7		94.4	13.8	2.4	189	26.6		229	31.5	883
19	6263			11.8	636	69.8	13.1	30.5	448		367	838	20.9	149		2584
20	6262				66.5	80					45.9			3.3	6.3	202
21	6253			10.4	64.9		1.5	18.6			480		186	63.5		824.8
22	6252			327	477	540	37.2	642	250		398		2401	2151	986.2	8209
23	6251														93.4	93.4
24	6241				221	1517	18.8	583	1046	32.6	6547	6773.2	1521		57.4	18315.2

25	6232				287	202								119	2.6	609.8
26	6231				7.6	44.9		14.1			35.8	122			244.6	469.3
27	5244							834								833.9
28	5242							248						759	5010	6016
29	5241														444.5	444.5
30	5233							159								159
31	5232							738								737.5
32	5231							361						583	1223	2167
33	5222														38.3	38.3
34	5221														132	132
35	5212														736.1	736.1
36	5153													55.1	7.8	62.9
37	5152													30.6	445.5	476.1
38	5151														149.5	149.5
39	5142							406						415	38	858.5
40	5131							238							633.4	871.8
41	5112														32.4	32.4
	total	303.7	1679	1369	2044	2465	70.6	4365	1758	270	8063	7760.2	4645	4557	10313	49658.2

The forest steppe resort type without Hungarian oak and Turkey oak are: forest steppe – poplar tree water meadow of riverside coppice – Bs (9.6.4.1.) – on an area of 135 ha; forest steppe – poplar tree water meadow of riverside coppice – Bs-m (9.6.1.3.) – on an area of 92 ha; forest steppe – poplar tree water meadow of riverside coppice – Bm-i.

The forest resorts types in the forest plain without Hungarian oak and Turkey oak are: alder tree forest plain (8.5.4.2.) – on an area of 131 ha, forest plain – silky willow water meadow of riverside coppice (8.5.3.3.) – on an area of 24 ha; forest plain – poplar tree water meadow of riverside coppice – Bs (8.5.4.2.) – on an area of 11ha; forest plain – poplar tree water meadow of riverside coppice – Bs(m) (8.5.2.3.) – on an area of 1040 ha; forest plain – poplar tree water meadow of riverside coppice – Bm(i) (8.5.2.2.) – on an area of 123 ha; forest plain – causeway water meadow Bs (8.5.1.2.) on an area of 15 ha.

The forest resorts types in hilly horizontal lines level (FD1) without Hungarian oak and Turkey oak are: hilly internal water meadows (7.5.3.3.) – on an area of 79 ha; hilly alluvial horizontal lines (7.5.3.2.) - on an area of 4 ha; hilly oak trees with an alluvial type soil, moderate humus content (7.5.2.4.) – on an area of 313 ha; hilly oak trees with an alluvial type soil, low humus content in Jiu water meadow (7.5.2.1.) – on an area of 41 ha; hilly horizontal lines with oak Bi-m, an alluvial type soil with low humus content – oligotrophic and mezotrophic, euhydric, moist during summer – FD1(I), Bi-m, T_{I-II}, H_{IV}, Ue_4 (7.5.2.0.) – on an area of 143 ha in Amaradia water meadow; hilly horizontal lines with oak, major river bed with rocky place and gravel without arborescent forest vegetation (7.5.1.0.) in Melineşti on an area of 92 ha.

The types of forest resorts in hilly horizontal lines and hill causeway level (FD2) without Hungarian oak and Turkey oak are: resorts on waste heap of sterile resulted by uncovering of coal strata in Peşteana area on soils cultivated with acacia stands of a medium productivity, on an area of 517 ha (6.3.1.1.); hilly horizontal lines and beech trees of inferior limit with water meadow luvic type soil, in Argineşti, Lunca Banului, Hurezani, Târgu-Jiu areas, on an area of 883 ha (6.2.6.4.); hilly horizontal lines Bm(s), mollic alluvial type soil with an intense to moderate humus content, mezotrophic and eutrophic, euhydric and megahydric, damp-humid-moist-damp during summer – FD2 (I), Bm(s), T_{III-IV}, H_{IV-V}, Ue_{5-3} (6.2.6.3.); it is occupied by oak trees on low terraces, poplar tree and silky willow riverside coppice in Filiaşi, Prunişor,Strehaia, Turceni, Hurezani, Târgu-Jiu areas, on an area of 2584 ha, hilly horizontal lines Bi(m), an alluvial type soil with low humus content –

oligotrophic, euhydric, moist during summer - FD2 (I), Bi(m), T_I, H_{IV}, Ue_{3-2} (6.2.5.3.) – on an area of 825 ha; hilly horizontal lines with beech trees of inferior limit Bm, eutricambosoil, medium edaphic with Asperula – Asarum – mezotrophic and eutrophic, mezohydric, moist during summer FD2, Bm, T_{III-IV}, H_{III}, Ue_2 (6.2.5.2.) – on an area of 8209 ha; hilly horizontal lines with beech trees of inferior limit Bm, luvic type soil stagnant, medium-high edaphic with Carex pilose – oligomezotrophic and mezotrophic, excessive moderate to euhydric, damp-moist-damp during summer – FD2, Bm, T_{II-III}, $H_{(E9-IV)}$, Ue_{4-3} (6.2.4.1.) – on an area of 16453 ha; hilly horizontal lines with beech trees of inferior limit typical luvic soil (6.2.3.2.) – on an area of 610 ha; hilly horizontal lines with beech tree of inferior limit Bi, small – medium luvic type soil with acidophil, mezoxerophyle plants (6.2.3.1.) – on an area of 469 ha.

The types of forest resorts in common oak trees, beech trees and common oak trees-beech trees (FD3) without Hungarian oak and Turkey oak are: hilly beech trees of inferior limit, Bm, medium-high edaphic, luvic type stagnant soil with Carex pilosa, resorts of medium productivity for beech tree, they can be found in Motru area, on an area of 834 ha (5.2.4.4.); hilly beech trees, Bm, medium edaphic eutricambosoil with Asperula-Asarum – mezotrophic and eutrophic, mezohydric, moist during summer – FD3, Bm, T_{III-IV}, H_{III}, Ue_2 (5.2.4.2.), it occupies the medium, semi shadowed and shadowed slopes in Motru, Tarnița and Târgu-Jiu areas, on an area of 6016 ha; hilly beech trees Bi, small brown edaphic – oligomezotrophic, oligomezohydric, moist during summer – FD2, Bi, T_{II}, H_{II}, Ue_2, with an inferior reliability for beech tree, spread on an area of 444 ha in Târnița, placed on superior shadowed or semi shadowed slopes; hilly beech tree Bm, stagnant medium edaphic luvic type soil, with *Carex pilosa* – mezotrophic to oligomezotrophic, euhydric and mezohydric, moist-damp-moist during summer – FD3, Bm, T_{II-III}, H_{IV-III}, Ue_{3-2}. These are resorts of medium reliability for beech tree, spread in Motru area, on an area of 159 ha (5.2.3.3.); hilly beech tree, Bm, medium edophic typical luvic soil with Festuca – oligomezotrophic and mezotrophic, mezohydric, moist during summer – FD3, Bm, T_{II-III}, H_{III}, Ue_2 (5.2.3.2.), on an area of 738 ha; hilly beech trees Bi, small edaphic typical luvic soil with *Vaccinium – Luzula* – oligotrophic, oligomezohydric, moist-dry-moist during summer – FD3, Bi, T_I, H_{II}, Ue_{2-1}(5.2.3.1.), on an area of 2167ha; hilly common oak trees, Bm, stagnant luvic type soil with Carex pilosa – oligomezotrophic and mezotrophic, excessive moderate tu euhydric, moist-damp-moist during summer – FD3, Bm, T_{II-III}, $H_{(E)-IV}$, Ue_3 (5.1.4.2.), on an area of 859 ha; hilly common oak trees, Bi, small edaphic luvic type soil with Cytisus – Genista – oligotrophic, oligohydric and extremely oligohydric, dry – moist during summer – FD2, Bi, T_I, H_{I-m}, Ue_1 (5.1.3.1.), on an area of 872 ha.

CONCLUSIONS

1. The Hungarian oak and the Turkey oak are found in the structure of the stands starting from the external forest steppe to the hilly common oak trees level, common oak trees – beech trees and their mixtures but we must say that pure stands at this level can be formed only by the Turkey oak.

2. The most spread types of resorts in forest steppe are: internal forest steppe with horizontal lines mezoxerophyle – xerophyle Bm(i), argil cernozem on fine clays – eutrophic, oligomezotrophic to oligohydric, moist-dry-moist during the summer – Ss, Bm(i), T_{IV}, $H_{II/I}$, Ue_{2-1}; it occupies an area of 734 ha in Rebegi, Drănic area, at the contact with the medium forest steppe, on horizontal low to moderate inclined fields with substrata of fine clays and fine loess materials and medium forest steppe of horizontal lines xerophyle Bm(s) argil cernozem on fine clays – eutrophic and megatrophic, oligohydric, dry-moist during summer – Ss, Bm(s), T_{IV-V}, H_I, Ue_1, which can be found in the same areas as the former described before type of resort, on an area of 405 ha, on substrata which are richer in argil, argil-clayey in Bt.

3. In the forest plain, the most spread types of resorts are: the forest plain of Turkey oak trees – Hungarian oak trees Bm, luvic reddish type of soil (luvic brown-reddish), stagnant luvic reddish type of soil (brown-reddish, diverse pseudogleized type), frequently with a vertical feature medium edaphic, mezotrophic, excessive moderate to oligomezohydric, dry-moist during summer – CF, Bm, T_{III}, $H_{(E)-II}$, Ue_1, beginning with Dâlga, Cobia, Bucovăț, Seaca area, on the largest areas, 3167 ha and forest plain, causeway water meadow Bm, gleic luvic type soil, medium – high edaphic – eutrophic, euhydric, damp during summer CF(I), Bm, T_{IV}, H_{IV}, Ue_4, on an area of 1113 ha in Jiu water meadow. The edaphic volume is medium or high, of a medium reliability for oak trees – causeway or water meadow causeways. It often appears Turkey oak in this area.

4. In the hilly horizontal lines FD1 level the most spread types of resorts are: hilly horizontal lines with oak Bm, stagnant luvic type soil with *Poa pratensis – Carex caryophyllea* – mezotrophic, excessive to oligohydric, moist-dry-moist during the summer – FD1, Bm, T_{III}, $H_{E-1,}$ Ue_2. They are resorts of a medium productivity for Turkey oak trees, Turkey oak trees – Hungarian oak trees and mixtures of common oak with these species, placed on low to moderate inclined slopes, with southern exhibition or on plateaus, on an area of 6368 ha in Gogoşu, Argetoaia, Filiaşi, Melineşti, Fărcaşu areas, practically the largest area of Hungarian oak and Turkey oak spreading.

5. In the level of hilly horizontal lines FD2, there are: hilly horizontal lines (of common oak, Turkey oak and Hungarian oak), Bm, Luvic type soil, stagnant, medium edaphic with *Carex – Poa* – mezotrophic, excessive to oligohydric, dry-moist during summer – FD2, Bm, T_{III}, $H_{E-1,}$ Ue_1.These are resorts of medium reliability for common oak, Hungarian oak and Turkey oak and their mixtures, placed on moderate inclined slopes with diverse exhibitions starting from Filiaşi to Târgu-Jiu and Tarnița on an area of 69185 ha, being the resort with the highest spreading in the whole platform of Jiu; hilly horizontal lines (of common oak, Turkey oak and Hungarian oak), Bm, typical luvic soil, medium edaphic, with graminaceae, mezoxerophyle – mezotrophic, oligomezohydric, moist-dry-moist during summer, FD2, Bm, T_{III}, H_{II}, Ue_{2-1}. They are resorts of medium reliability for common oak trees – Turkey oak trees, Turkey oak trees – causeways, Hill Turkey oak trees, Hill Turkey oak trees – Hungarian oak trees, common oak trees. It can be found in Strehaia, Corcova, Prunişor, Motru, Tarnița, Turceni, Cărbuneşti, Peşteana and Târgu-Jiu areas, on an area of 15113 ha; hilly horizontal lines Bs-m, luvic type soil, stagnant medium to high edaphic FD2, Bm-s, T_{IV}, $H_{III-IV,}$ Ue_{2-1}. Flora is consisted of Carex pilosa. The forest vegetation is consisted of common oak trees – causeway of a medium productivity, hill causeway with common oak of a medium productivity, Hill Turkey oak of a medium productivity and it occupies 7587 ha, starting in Filiaşi area and to the superior limit of the studied territory.

6. In the level of hilly horizontal lines FD3, the most spread type of resort is: hilly common oak Bm, typical luvic soil, stagnant, medium edaphic with graminaceae mezoxerophyle – *Luzula* – oligomezotrophic, oligomezohydric, moist-dry-moist during summer – FD3, Bm, T_{II}, H_{II}, Ue_{2-1}. They are resorts of medium reliability for common oak, spread in Motru, Târgu-Jiu and Tarnița areas, on an area of 4226 ha. Flora is represented by the following species: *Festuca heterophylla, Luzula albida, Poa nemoralis, Cytisus nigricans, Genista tinctoria* and other species. The forest vegetation is formed of side common oak trees with graminaceae and *Luzula luzuloides*, Hill Turkey oak trees of a medium productivity.

7. Other types of resorts without Hungarian oak and Turkey oak are numerous and the largest area is represented by hilly horizontal lines type with beech trees of inferior limit Bm, eutricambosoil medium edaphic with *Asperula – Asarum* – mezotrophic and eutrophic, mezohydric, moist during summer FD2, Bm, $T_{III - IV}$, H_{III}, Ue_2 (6.2.5.2.), on an area of 8209 ha.

8. The presentation of the resort types is of a great importance for the other biological sciences and it can be valorized by the botanists, biologists, agriculture sciences, etc.

9. It is the first study of the forest made on a large territory and it includes the whole existent forest vegetation in this territory.

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ACTIVITATEA MITOTICĂ ŞI INDICII FAZELOR MITOZEI LA FLOAREA-SOARELUI

THE MITOTIC ACTIVITY AND THE MITOSIS INDEX PHASES TO SUNFLOWER

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Cuvinte cheie: floarea-soarelui, mitoza, indicele mitotic, variabilitate.
Key words: sunflower, mitosis, the mitotic index, variability.

REZUMAT

Proporționalitatea intensității diviziunii celulare la diferite genotipuri se păstrează constantă pe parcursul diferitelor faze ontogenetice ale dezvoltării plantelor, de aceea, determinarea activității mitotice în radicelele de floarea-soarelui de 1-2 cm (2-3 zile după germinare), ar putea contribui la relevarea particularităților diviziunii celulare la genotipurile homozigote şi heterozigote de floarea-soarelui şi corelarea lor cu heterozisul.

În scopul determinării activității mitotice şi a indicilor fazelor mitozei la floarea-soarelui s-au cercetat patru genotipuri. Acestea au fost reprezentate de doi hibrizi româneşti (Saturn şi Minunea) şi doi hibrizi străini (Flavia şi PR63A82). Activitatea mitotică a genotipurilor analizate, exprimată prin indicele mitotic, a variat în limitele de 14,8% şi 23,0%. Din acest punct de vedere, s-a constatat superioritatea hibridului Saturn printr-un procent al indicelui mitotic cu 35,7% mai mare decât cel al hibridului Minunea, cu 27,8% activitate mitotică mai mare decât cea a hibridului Flavia şi cu 16% mai mult decât la hibridul PR63A82.

ABSTRACT

The proportionality cell division intensity to different genotypes is kept constant along the different ontogenetic phases, therefore, the mitotic activity determination in the 1-2 cm sunflower radicules (2-3 days after germination), could contribute to cell division particularities revealing to homozygote and heterozygote sunflower genotypes and their correlation with the heterosis.

In order to determine sunflower mitotic activity and the mitotic index phases, were investigated four genotypes. They were represented by two Romanian hybrids (Saturn and Minunea) and two foreign hybrids (Flavia and PR63A82). The mitotic activity analyzed to these genotypes, expressed by mitotic index, was variable from 14,8% to 23,0% limits. From this point of view, it was found superiority of the mitotic index percentage to Saturn hybrid with the 35,7% bigger than Minunea hybrid, with the 27,8% bigger than Flavia hybrid and with the 16% more than the PR63A82 sunflower hybrid.

INTRODUCTION

Mitosis is the process by which a eukaryotic cell separates the chromosomes in its cell nucleus into two identical sets in two daughter nuclei. It is generally followed immediately by cytokinesis, which divides the nuclei, cytoplasm, organelles and cell membrane into two daughter cells containing roughly equal shares of these cellular components. Mitosis and cytokinesis together define the mitotic (M) phase of the cell cycle – the division of the mother cell into two daughter cells, genetically identical to each other and to their parent cell.

Mitosis occurs exclusively in eukaryotic cells, but occurs in different ways in different species. The process of mitosis is complex and highly regulated. The sequence of events is divided into phases, corresponding to the completion of one set of activities and

the start of the next. These stages are prophase, metaphase, anaphase and telophase. These phases can be distinguished through microscopic analysis.

During prophase, the chromosomes condense into shorter and thicker rodlike structures that can be easily seen to consist of two sister chromatids connected by a centromere. During metaphase the chromosomes are fully aligned end to end at the cell's midline at what is known as the metaphase plate. The attachments between sister chromatids to each other split during anaphase, producing single-chromatid chromosomes. During telophase, the nuclear membranes are dephosphorylated and begin to reform around the two sets of chromosomes at either pole, enclosing and separating them from the rest of the cytoplasm. The mitotic spindle disappears. The chromosomes decondense and become thinner and more difficult to distinguish from each other.

Cytokinesis begins the process of separating the two daughter cells and is nearly complete by the end of telophase. The end result is the production of two new cells that are genetically identical to each other and to the parent cell.

MATERIALS AND METHODS

In order to determine the sunflower mitotic activity and the mitotic index phases, it were investigated four genotypes. They were represented by two Romanian hybrids (Saturn and Minunea) and two foreign hybrids (Flavia and PR63A82). The chromosomes evidence was realized using the squash method, with the Feulgen-Rossenbeck rapid coloration chromosomes method (figure 1).

To carry out the chromosomes view using the optic microscope, these were colorized with the basic fuchsine decolorized solution (Schiff reactive), prepared in the laboratory. The effective colorized operation was the introduction to 3-4 cc colorant solution from sunflower radicules placed in glass ampoules, at room temperature. After max. 30 minutes, the meristematic tissues were colored in purple-red. To increase the chromosomes-cytoplasm contrast and the optimal microscopic preparation view, before the study under the microscope the colored radicules were kept in a 45% acid acetic solution, for 15 minutes, to remove colorant excess.

After the microscopic preparation study, it were calculated the next index:

► Mitotic index ($\mathbf{I_{m\%}}$), or the cells percentage in division to the total number of cells, using this formula:

$\mathbf{I_{m\%} = N_m \times 100/N_t}$, where:

N_m - the total number of cells in mitotic division;

Nt - the total number of studied cells

A high mitotic index value shows that the tissue that were in division a large number of cells.

► The mitotic index phases, or the cells percentage in different mitosis division phases to the total number of cells in mitosis, using these formulas:

$\mathbf{I_m\ prophase\% = N_{prof.} \times 100/N_m}$, where:

$N_{prof.}$ – the number of cells in prophase;

N_m - the total number of cells in mitosis;

$\mathbf{I_m\ metaphase\% = N_{met.} \times 100/N_m}$, where:

$N_{met.}$ - the number of cells in metaphase;

N_m - the total number of cells in mitosis;

$\mathbf{I_m\ anaphase\% = N_{anaf.} \times 100/N_m}$, where:

$N_{anaf.}$ - the number of cells in anaphase;

N_m - the total number of cells in mitosis;

$\mathbf{I_m\ telophase\% = N_{tel.} \times 100/N_m}$, where:

$N_{tel.}$ - the number of cells in telophase;
N_m - the total number of cells in mitosis.

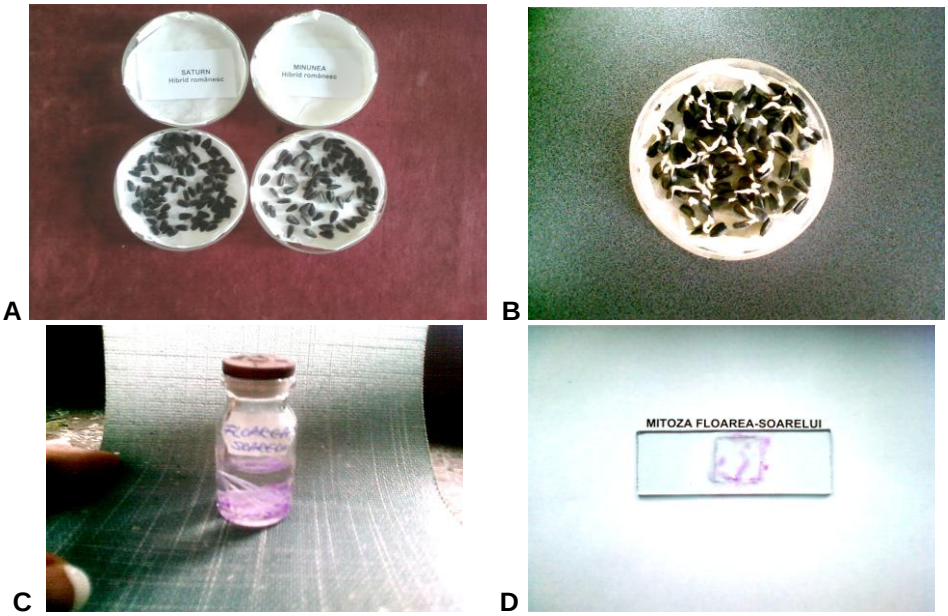

Figure 1. The steps of the mitosis study: A – Preparing the sunflower seeds germination in the Petri boxes; B – The germinated seeds; C – The colored radicules of sunflower using Schiff reactive; D – The semi-permanently microscopic preparation, ready for study.

RESEARCHES RESULTS

Experimental results concerning the variability of the sunflower mitotic activity are reported in table 1. In this respect, the mitotic activity of the sunflower genotypes studied, expressed by mitotic index, was variable from 14,8% to 23,0% limits. From this point of view, the analyze of the cells division highlighted the sunflower hybrids variability and their specificity. Thus, the Romanian hybrid Saturn recorded the highest mitotic activity (23%), fallowed by the PR63A82 (19,3%) and the Flavia (16,6%) foreign hybrids, and the lowest mitotic activity (14,8%) was found discovered to the Romanian sunflower genotype Minunea.

The prophase mitotic index (I_m P%) recorded values included between 44,3% (foreign genotype Flavia), 45,8% (Romanian genotype Minunea), 47,5% (Romanian genotype Saturn) and 48% (foreign sunflower genotype PR63A82).

The metaphase mitotic index (I_m M%) has registered 19,1% value (Minunea), 20,3% (PR63A82), 20,9% (Saturn) and 22,1% value (Flavia).

As regards the anaphase mitotic index (I_m A%), its values ranged by 12,8% (foreign genotype PR63A82), 13,2% (Romanian genotype Saturn), 13,8% (foreign genotype Flavia) and 14,0% (Romanian genotype Minunea).

The telophase mitotic index (I_m T%) has registered variable values included between 18,4% (Saturn), 18,9% (PR63A82), 19,8% (Flavia) and 21,1% (Minunea).

In conclusion, the mitotic activity analyzes as well as the mitotic index phases highlighted the sunflower hybrids genotypic specificity and that the bigger mitotic activity was registered to the Romanian genotype Saturn. From this point of view, it was found superiority of the mitotic index percentage to Saturn hybrid with the 35,7% bigger than Minunea hybrid, with the 27,8% bigger than Flavia hybrid and with the 16% more than the PR63A82 sunflower hybrid.

Proportionality intensity cell division to different genotypes is kept constant along the different ontogenetic phases, therefore, the determination of mitotic activity in the sunflower radicules could contribute to cell division particularities revealing to homozygote

and heterozygote sunflower genotypes and their correlation with the heterosis. The genotype responses in this study were probably genotype-dependent.

Table 1

The mitotic activity (I_m %) and the mitosis index phases to sunflower*

Sunflower genotypes	Nt $\overline{X}$	N_m $\overline{X}$	I_m %	The mitosis index phases			
				I_m P %	I_mM %	I_m A %	I_m T %
Saturn	26	6	23,0	47,5	20,9	13,2	18,4
Minunea	27	4	14,8	45,8	19,1	14,0	21,1
Flavia	24	4	16,6	44,3	22,1	13,8	19,8
PR63A82	31	6	19,3	48,0	20,3	12,8	18,9

***** The average values of 50 determinations under the microscope

Nt - the total number of studied cells;
N_m - the total number of cells in mitosis;
I_m% - the mitotic index;
I_m P% – the prophase mitotic index;
I_m M% - the metaphase mitotic index;
I_m A% - the anaphase mitotic index;
I_m T% - the telophase mitotic index;
$\overline{X}$ - the average values.

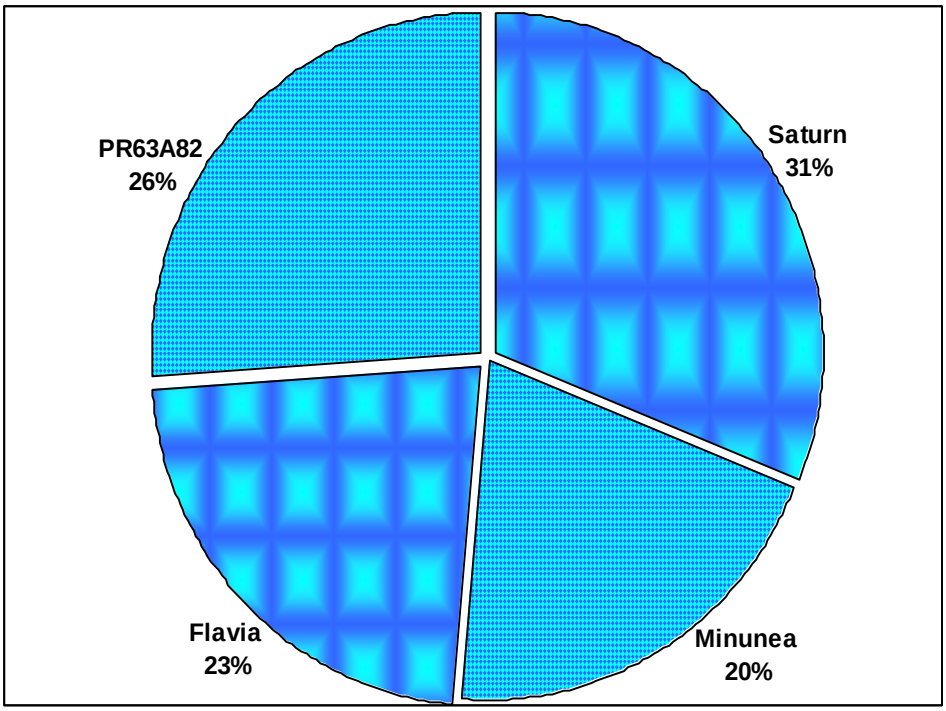

Figure 2. The mitotic activity diagram (I_m %) to four sunflower genotypes

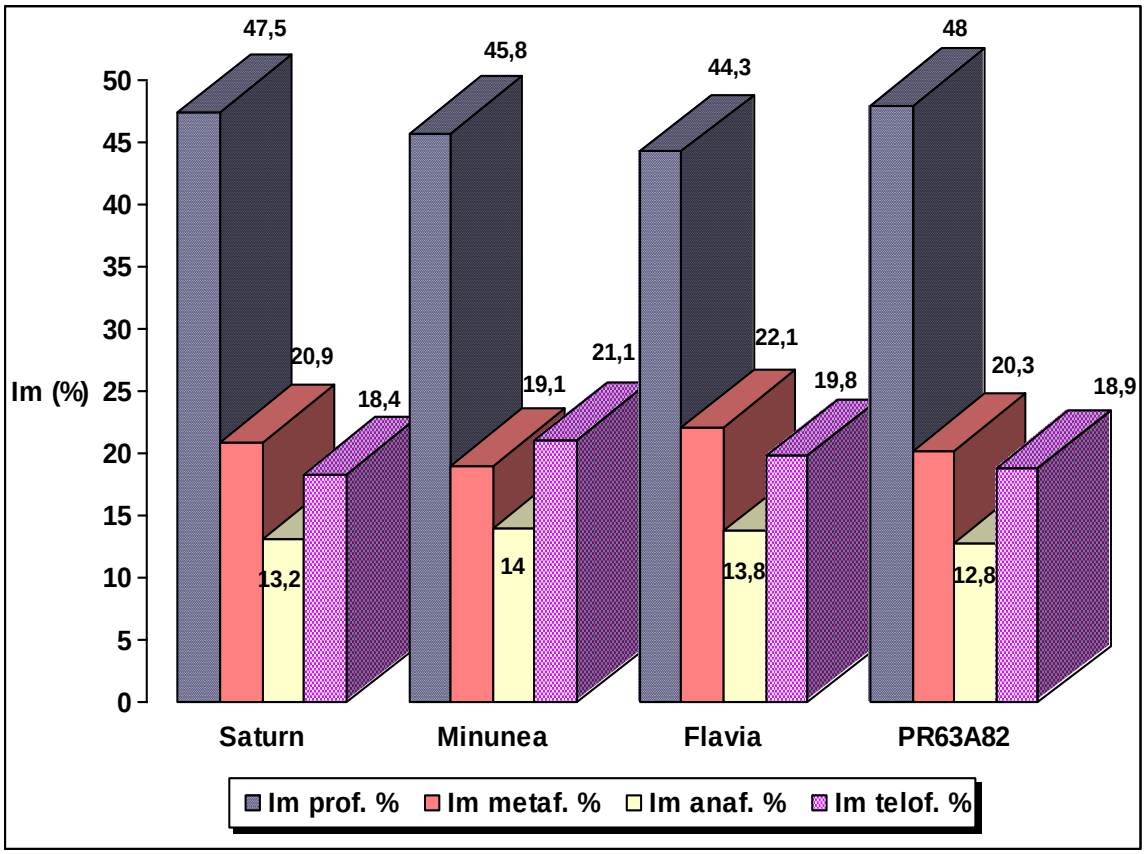

Figure 3. Graphical representation of the mitosis index phases variability (I_m % prophase, metaphase, anaphase and telophase) to some sunflower genotypes

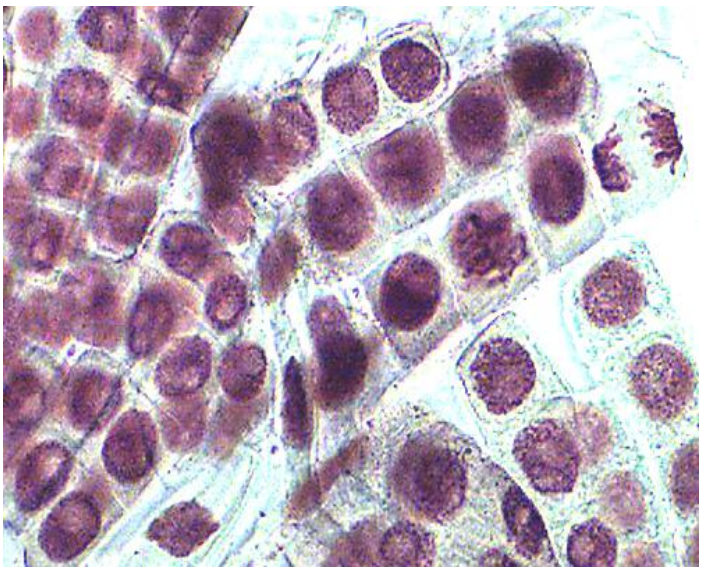

Figure 4. Aspects of the mitosis division to sunflower (seen under the microscope)

CONCLUSIONS

1. The mitotic activity analyze as well as the mitotic index phases highlighted variability of sunflower genotypes from this point of view.

2. The mitotic index was varied from 14,8% to 23,0% limits.

3. Also, was highlighted genotypic specificity of sunflower hybrids studied and the fact that, the bigger mitotic activity of the meristeme it was recorded in Romanian genotype Saturn.

4. The results confirm superiority of the Saturn hybrid in terms of mitotic index percentage with the 35,7% bigger than Minunea hybrid, with the 27,8% bigger than Flavia hybrid and with the 16% more than the PR63A82 sunflower hybrid.

5. The determination of mitotic activity to sunflower may contribute revealing the peculiarities of cell division to homozygote and heterozygote genotypes and their correlation with the heterosis.

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STUDIU DE DOCUMENTARE PRIVIND RĂSPUNSUL FLORII-SOARELUI LA CULTURA *IN VITRO*

DOCUMENTATION STUDY REGARDING THE SUNFLOWER RESPONSE TO „IN VITRO" CULTURE

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Cuvinte cheie: floarea-soarelui, *in vitro*, biotehnologie, embriogeneză, protoplasti.
Key words: sunflower, *in vitro*, biotechnology, embryogenesis, protoplasts.

REZUMAT

Acestă lucrare reprezintă un studiu de documentare. Sursa de documentare a fost o bibliografie variată, precum şi diferite site-uri de internet. Am încercat în această lucrare să redăm câteva dintre cele mai recente rezultate communicate de diferiți autori, privind răspunsul florii-soarelui la cultura in vitro, atât în ceea ce priveşte rezultatele actuale, cât şi unele perspective.

Cultura in vitro şi micropropagarea pot constitui tehnici eficiente de multiplicare rapidă a unui număr mare de genotipuri de floarea-soarelui. Embriogeneza somatică indirectă, cu formarea de calus intermediar, este utilă în cercetările privind selecția in vitro a formelor rezistente de floarea-soarelui la factorii de stres biotic si abiotic.

În general, răspunsul florii-soarelui la cultura in vitro depinde de mediul de cultură, de genotip şi de natura explantelor. Mediile de cultură variază în funcție de tipul de organogeneză şi embriogeneză.

ABSTRACT

This paper is a documentation study. The source of documentation was the various bibliography and different internet sites. In this paper we tried to render the some recent results communicated by different authors, regarding the sunflower response to in vitro culture, both in terms of actual results as well as some perspectives.

In vitro culture and micropropagation can be effective techniques for rapide multiplication to a large sunflower genotypes number. The indirect somatic embryogenesis with the intermediate callus formation is useful in the researches regarding in vitro selection for the resistant forms to biotic and abiotic stress factors.

Generally, the answer sunflower to in vitro culture depends by culture medium, genotype and by explants nature. The medium culture varies with the organogenesis and embryogenesis type.

INTRODUCTION

Sunflower (*Helianthus annuus* L.), as one of the most important oil-producing crops, represents an important target for genetic improvement through gene transfer or somatic hybridization. Unfortunately, sunflower is recognized as recalcitrant to in vitro culture. The plant regeneration from sunflower protoplast was achieved by protocols that considerably differ with respect to basal medium and concentration of growth regulators added. In most cases regeneration was restricted to a small proportion of genotypes.

Efficient methods of sunflower regeneration are useful for facilitating breeding programs for improved cultivars by providing rapid multiplication of plants having desirable traits. The availability of a large number of regenerated plants increases the speed of selection and further breeding cycles. It is also of considerable interest to apply the

methods of plant genetic engineering to develop improved sunflower cultivars. The application of these methods to sunflower improvements requires the development of methods for the efficient production of plants which have been transformed to contain foreign DNA. A number of methods are now available which allow the introduction of DNA into and selection of transformed plant cells or tissue. The regeneration of whole transformed plants from cells or tissue is often difficult or inefficient. For this reason regeneration methods that are suitable for use in combination with methods of transforming plant tissue are useful in the production of whole transformed plants. The sunflower embryo is a convenient system for the comparative analysis of gene expression in development.

There are many communication regarding the sunflower shoots regeneration by hypocotyls explants, cotyledon or portions of leaves, apical meristemes, medullar parenchyma and immature embryos, with or without formation of callus. Sunflower hypocotyls protoplasts divide symmetrically to form loosely associated micro colonies when cultured in liquid medium, whereas when embedded in agarose beads they divide asymmetrically to give rise to embryo-like structures.

MATERIAL AND METHODES

This is a documentation study. The source of documentation was the various bibliography and different internet sites. In this paper we tried to render the some recent results communicated by different authors, regarding the sunflower response to *in vitro* culture.

As the Elena Badea (2001), *in vitro* culture and micropropagation can be effective techniques for rapid multiplication a large number of sunflower genotypes. The indirect somatic embryogenesis, with intermediary callus formation, is useful in researches regarding *in vitro* culture for the resistant forms to biotic and abiotic stress factors. Therefore, extension of time to maintain the callus at culture medium is utile, because favorized the increase of genetic variation within grown calluses and between regenerated plants.

When it seeks shortened multiplication duration of the disease plant resistance, *in vitro* obtained, the direct somatic embryogenesis is useful. Therefore, reducing maintenance time at the culture medium to somatic embryos, lead to avoidance of the device vegetative pronounced dwarfism phenomenon.

RESEARCHES RESULTS

It is well known that sunflower is a recalcitrant specie, highly difficult to be genetically transformed. In order to improve *in vitro* sunflower protoplast regeneration, Elena Rákosy-Tican and co. (2007), made the following experiment: three cultivars (Romanian hybrids) and one inbred line were used for protoplast isolation from etiolated hypocotyls. Isolated protoplasts were embedded in alginate disks and cultured in two plating densities, using two culture regimes as indicated by previous authors. Plating efficiency, callus development and plant regeneration were evaluated as well as old callus histology. In cv. 'Select', the effects of 1:50 hemoglobin and 1 mM spermidine were assayed on asymmetric division and/ or plating efficiency. Plant regeneration from hypocotyl protoplasts was achieved for two cvs., 'Florom 328' and 'Turbo', with the former proving once more its totipotency. Moreover, the histology of old green compact protoplast-derived callus revealed a very well organized structure suggesting senescence. In the non-responsive cv. 'Select', hemoglobin was found to stimulate protoplast asymmetric division and the development of heart-shaped embryo-like structures, while spermidine stimulated overall protoplast plating efficiency.

Significant limitations to sunflower (*Helianthus sp*.) culture are fungal diseases, like those caused by *Verticillium dahliae* and *Sclerotinia sclerotiorum*, because they not only

affect yield but also affect the quality of the products. Conventional genetic improvement has not been efficient to confer resistance, caused by the limited sources of effective natural resistance to main pathogens and also to the polygenic character of the resistance to pathogens like *Sclerotinia*. Despite several publications in sunflower genetic transformation (Davey, M.R. et all., 2005; Charriere, F., Hahne, G.,1998), there was no efficient or reproducible protocol. In Argentina, Laura Mabel Radonic and co. (2006) determined that the selection by *in vitro* rooting in a Km culture medium is a successful method as no escapes were obtained. Nevertheless some difficulties remain in sunflower transformation as the *in vitro* regeneration of plantlets (T0) is *via* organogenesis, producing chimeras that not necessarily will give an offspring (T1) that carries and/or express the transgene. Therefore, the application of sequential transformation steps to introduce several genes in sunflower is extremely difficult.

Table 1

Percentage of shoot frequency grouped by height, color/aspect, floral-bud and *in vitro* rooting, according to the four analyzed characteristics (by Laura Mabel Radonic, 2006)

		C	C-Km	A	A-Km
Height (cm)	Lower than 2,5	57,3%	57,7%	23,6%	53,5%
	2,5-3,5	11%	21,2%	29,9%	24,5%
	Taller than 3,5	31,7%	21,2%	46,5%	22,0%
Color/Aspect	Good	85,4%	59,6%	72,4%	67,4%
	Affected	11,0%	25,0%	21,3%	21,6%
	Severely affected	3,7%	15,4%	6,3%	11,0%
Floral-bud	No	74,4%	86,5%	63,0%	88,7%
	Yes	25,6%	13,5%	37,0%	11,3%
Rooting	No	61,0%	100%	38,6%	99,3%
	Yes	39,0%	0%	61,4%	0,7%

In his studies, G. Nestares (2005), made the following experience: cotyledons from 20 inbred lines of sunflower were evaluated *in vitro* for their regeneration ability on two culture media supplemented with growth regulators. Plant regeneration by direct organogenesis was observed after 4 weeks. Significant differences among inbred lines were found for the *in vitro* traits percentage of organogenic explants percentage of shooting explants percentage of hypertrophying explants and percentage of callusing explants. The medium effect was significant for all variables. Some *in vitro* traits displayed significant genotype-culture medium interaction. Regeneration ability was influenced by culture medium, genotype and their interaction and genetic parameters were estimated taking this interaction into account. Heritability values ranged from 0.74 to 0.45. Strong positive correlations were observed among the organogenesis-related traits 'percentage of organogenic explants percentage of shooting explants and proliferation rate.

In Ireland, Charriere F. and Hahne G. proved that somatic embryos or shoots can be induced *in vitro* on immature zygotic embryos of sunflower depending on the sucrose concentration of the culture medium. On a medium containing 3% sucrose only shoots are induced while on a medium containing 12% sucrose somatic embryos are formed. Although these two different reactions are not induced by changes in the concentration of externally supplied growth regulators. the induction of both morphogenic events is probably depending on internal hormone regulation, in response to the medium composition. Addition of auxins or abscisic acid to the organogenic medium (3% sucrose) induced somatic embryogenesis whereas addition of auxin polar transport inhibitors led to shoot formation under otherwise embryogenic conditions (12% sucrose). Moreover, among the cytokinins tested, zeatin had an unexpected embryogenic effect independently of the sugar concentration of the medium.

Also, Geneviève Jeannin, Roberte Bronner and Günther Hahne (2004), proved that immature zygotic embryos of sunflower constitute an experimental system where the change of a single key factor (sucrose concentration) conditions the *in vitro* morphogenesis to either organogenesis (87 mM sucrose) or somatic embryogenesis (350 mM sucrose). Experiments with a variety of culture media differing in the sugar type and concentration, as well as osmotic pressure, indicate that a minimal threshold level of both, sugar supply and osmotic pressure, are required for somatic embryogenesis, but not organogenesis, to occur. The nature of the sugar used, though, was less important.

In Turkey, Turhan H., Baser I. (2004), determined that the response of sunflower cultivars to drought stress under both *in vitro* and *in vivo* conditions. Murashige and Skoog basal medium supplemented with a range of polyethylene glycol (PEG 1000) concentrations was used for *in vitro* drought screening. Results from both *in vitro* and *in vivo* experiments showed that plant growth decreased with increasing PEG concentrations. In addition, there were differences between the cultivars in terms of their response to drought. The significant correlations between *in vitro* (except number of roots) and *in vivo* characters indicate that an *in vitro* approach could be useful in screening and selecting for drought response prior to field trial. As a result, all *in vitro* characters measured (except number of roots) could give clues for performance of sunflower genotypes against drought *in vivo*.

In Argentina, Maria Laura Mayor (2002), in an attempt to broaden the knowledge about the genetic control of the *in vitro* regeneration ability, made the following experience: seven cytoplasmic male-sterile, seven fertile inbred lines, and their hybrids were evaluated for their organogenic response in two different culture media. Among the F1 hybrids, the genetic differences are due to a significant additive control mainly performed by the female inbred lines. Nevertheless, there is an additive effect from the male inbred lines and a dominant effect contributing to this variation. This last effect is confirmed with the presence of heterosis. Furthermore, the parameters that outline the regeneration ability are positive correlated. The analysis of *females x males* interaction suggests the exclusion of male inbred lines which performed similarly in this interaction. The cross interaction *genotype x culture* media shows that the genotypes are better adapted to a particular culture medium. The Maria Laura Mayor study's showing the existence and control of the genetic variability for the *in vitro* regeneration capacity is a useful tool to considering in a selection scheme for this character in sunflower.

M. L. Mayor study's shall also give an indication of the success in regenerating sunflower plants is influenced by the genotype, the media and the interaction between them. The addition of casein hydrolisate in culture media does not diminish the percentage of hyperhydric shoots. The regeneration rate does not improve also.

From the results obtained in Germany, Weber S. and co. (2000), concluded that successful selection of interspecific hybrid progenies with superior ability to regenerate shoots from apical meristems was performed in sunflower which now allows for the

development of lines for improved biotechnological applications. Early generations of interspecific hybrids originating from crosses between the two *H. annuus* CMS lines `HA89' and `Baso', and 9 wild species were screened for their ability to regenerate *in vitro*. Evaluation of 36 progenies allowed to identify seven progenies from crosses involving *H. mollis, H. giganteus, H. strumosus*, and *H. decapetalus* which showed a significantly higher regeneration potential than the commercial hybrid `Albena' regarding the number of shoots per explants. Among these progenies, 47.2 to 62.4% of explants produced shoots with an average of 2.3 to 3.5 shoots per cultured explants.

After Weber, S., sunflower regeneration *in vitro* was significantly determined by the genotype. More than half of the investigated interspecific hybrids performed better than the inbred `HA89' demonstrating that the high regeneration potential available in the wild species can be efficiently transferred to cultivated sunflower. The seven progenies with high regeneration potential *in vitro* were characterized by agronomic performance in the field. Two of the interspecific hybrids derived from *H. strumosus* and *H. decapetalus* not only showed a superior regeneration potential but also proved to be competitive to commercial hybrids with regard to important agronomic traits, e.g. fat content and TGW.

CONCLUSIONS

1. *In vitro* culture and micropropagation can be effective techniques for rapid multiplication of a large number of sunflower genotypes.

2. The plant regeneration from sunflower protoplast was achieved by protocols that considerably differ with respect to basal medium and concentration of growth regulators added. In most cases regeneration was restricted to a small proportion of genotypes.

3. The indirect somatic embryogenesis, with intermediary callus formation, is useful in researches regarding *in vitro* culture for the resistant forms to biotic and abiotic stress factors.

4. When it seeks shortened multiplication duration of the disease plant resistance, *in vitro* obtained, the direct somatic embryogenesis is useful.

5. *In vitro* sunflower regeneration ability is influenced by culture medium, genotype and their interaction. The cross interaction *genotype x culture media* shows that the sunflower genotypes are better adapted to a particular *in vitro* culture medium.

6. *In vitro* approach could be useful in sunflower screening and selecting for drought response prior to field trial.

7. The sunflower *in vitro* culture results obtained so far are not sufficient for practical exploration of sunflower protoplast, but they are encouraging, because they prove that plants regeneration possibility from protoplast.

8. Development of research in embryo culture is so alert, that an exhaustive presentation is currently almost impossible. Ethical issues raised by the application of new biotechnologies must be analyzed and solved with great thoughts and openness, but hamper the progress of this promising field of genetics.

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OBSERVAȚII ASUPRA STRUCTURII FRUNZEI ÎN SECȚIUNE TANGENȚIALĂ LA SPECIILE ALCHEMILLA CONNIVENS ŞI ALCHEMILLA CRINITA

OBSERVATIONS ON THE STRUCTURE OF THE LEAF IN TANGENTIAL SECTION IN THE ALCHEMILLA CONNIVENS AND ALCHEMILLA CRINITA SPECIES

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Key words: the basal leaf, epidermis, Alchemilla, anatomy, Romania

REZUMAT

În lucrare sunt prezentate aspecte referitoare la structura epidermei frunzei de la două specii de Alchemilla (A. connivens şi A. crinita). S-au realizat secțiuni tangențiale prin limb (jupuiri ale epidermelor), analizându-se epiderma adaxială şi abaxială, pentru a

evidenţia stomatele, forma şi dimensiunile lor, celulele epidermice şi perii. Descrierile histo-anatomice ale epidermelor adaxiale şi abaxiale de la cele două specii de Alchemilla sunt însoţite de măsurători micrometrice şi fotografii originale.

ABSTRACT

The paper presents aspects which refer to the structure of the leaf epidermis in two species of Alchemilla (A. connivens and A. crinita). We performed a tangential section through the foliar limb (excoriations of the epidermis), analyzing the adaxial and the abaxial epidermis, in order to highlight the stomata, their form and dimensions, the epidermal cells and the hairs. The histo-anatomical descriptions of the adaxial and abaxial epidermis in the two species of Alchemilla are accompanied by micrometric measurements and original photos.

INTRODUCTION

In Romania, the species of *Alchemilla* can be found almost exclusively in the mountainous regions to the alpine ones.

For *Alchemilla*, the leaf is the organ which offers many diagnems, taking into consideration the fact that it has a higher variability as compared to other organs (the flower, the fruit and the seed) which are less variable.

The leaf anatomy to *Alchemilla* is less approached in the consulted literature.

In this context, the paper presents the histo-anatomical aspects of the leaf in tangential section, respectively adaxial and abaxial epidermis in the two species of *Alchemilla* (*A. connivens* and *A. crinita*).

The structure of the leaf stalk and of the foliar limb, in a cross-section, was presented in a previous paper (Violeta Boruz 2006).

MATERIAL AND METHOD

The investigated material, represented by basal leaves, comes from the Parâng Mountains. It has been preserved (in 70% ethylic alcohol) to the full flowering of the plants. We performed a tangential section through the foliar limb (excoriations of the epidermis), analyzing the adaxial and the abaxial epidermis, in order to highlight the stomata, their form and dimensions, the epidermal cells and the hairs. Clarification and coloring sections were made according to the methodology of M. Andrei & Roxana Paraschivoiu 2003. The preparations have been analyzed with a Nikon microscope and photography with a Nikon camera. Measurements were made on microscope MC-3. There were 10 measurements each (the epidermal cells, the stomata, the hairs) or 10 counts (the stomata and the hairs). Have been considered the highest individual value (V_M), the minimum individual value (V_m) and average **(** $\overline{X}$ **)** which is the arithmetic average of the 10 individual values.

RESULTS AND DISCUSSIONS

Alchemilla connivens Buser

Tangential section through the limb. The epidermis

a. *Adaxial epidermis* (fig. 1) is composed of tangentially elongated cells, with thin side walls, sinuous, without intercellular spaces.

Length of epidermal cells: V_M = 112.5 μm; V_m = 72 μm; $\overline{X}$ = 95.85 μm.

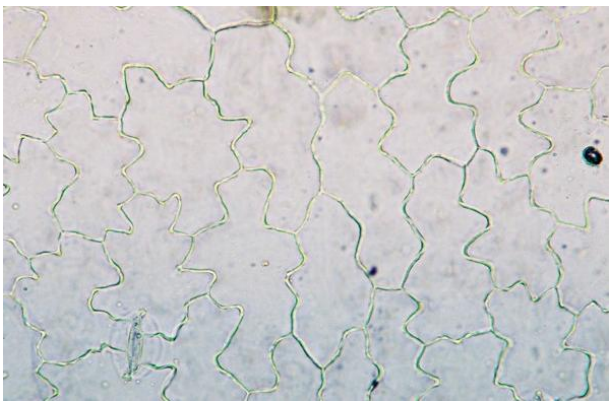

Fig. 1. Adaxial epidermis to *A. connivens*: the epidermal cells, the stomata (Oc. 10x, Ob. 40, Orig.)

The width of epidermal cells: V_M = 63 μm; V_m = 45 μm; $\overline{X}$ = 57.6 μm.

As annexes of the epidermis are the stomata and the hairs.

The stomata are rare, anomocytic type, the average cells length the stomata 34.848 μm and average width of 25.344 μm. The hairs are unicellular, elongated and pointed ends. Length the hairs: V_M = 774 μm; V_m = 450 μm; $\overline{X}$ = 620.1 μm.

The hairs density could not be determined because they are very rare and in many microscopic fields do not appear.

b. *Abaxial epidermis* (fig. 2) is composed of cells somewhat smaller than those on the upper epidermis. The cells are tangentially elongated and stronger cell walls sinuous (fig. 2) compared with the upper epidermis cells.

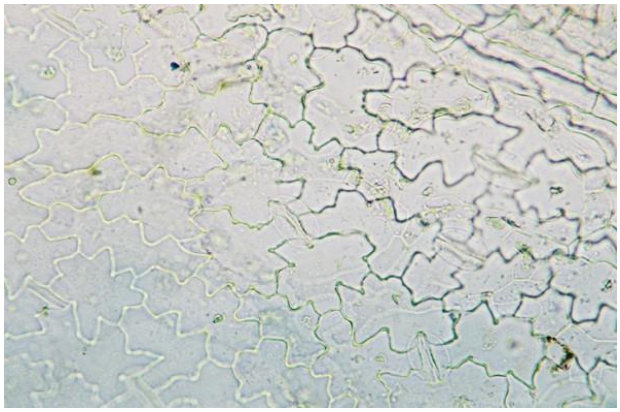

Fig. 2. Abaxial epidermis to *A. connivens*: the epidermal cells, the stomata (Oc. 10x, Ob. 40, Orig.)

Length of epidermal cells: V_M = 94.5 μm; V_m = 63 μm; $\overline{X}$ = 81 μm.

The width of epidermal cells: V_M = 58.5 μm; V_m = 31.5 μm; $\overline{X}$ = 39.15 μm.

As annexes of the epidermis are the stomata and the hairs.

The stomata are anomocytic type. They are more numerous than the adaxial epidermis, average length 33.44 μm and average width is 21.472 μm.

The hairs (fig. 3) are more numerous than the adaxial epidermis. They are unicellular, sharp pointed.

Length of the hairs: V_M = 765 μm; V_m = 495 μm; $\overline{X}$ = 634.5 μm.

Density of the hairs / mm^2: V_M = 18 / mm^2; V_m = 6 / mm^2; $\overline{X}$ = 12 / mm^2.

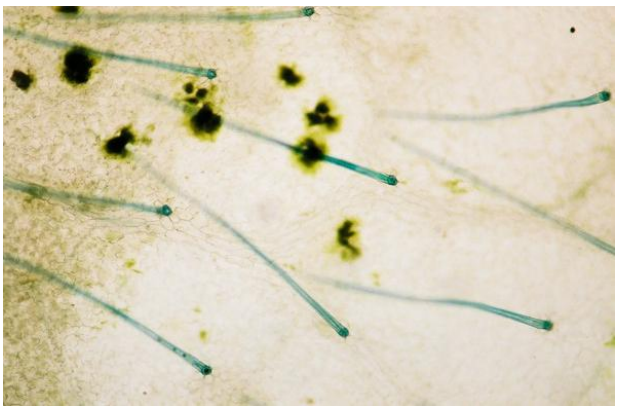

Fig. 3. The hairs on abaxial epidermis to *A. connivens* (Oc. 10x, Ob. 10, Orig.)

Alchemilla crinita Buser

Tangential section through the limb. The epidermis

a. *Adaxial epidermis* (fig. 4) is composed of polygonal cells with walls moderately curled, without intercellular spaces. Length of epidermal cells: V_M = 60.75 μm; V_m = 33.75 μm; $\overline{X}$ = 47.7 μm. The width of epidermal cells: V_M = 33.75 μm; V_m = 15.75 μm; $\overline{X}$ = 24.975 μm.

The stomata are anomocytic type. Length of the stomata: V_M = 31.5 μm; V_m = 27 μm; $\overline{X}$ = 28.8 μm. Density of the stomata: V_M = 191 / mm^2; V_m = 85 / mm^2; $\overline{X}$ = 136 / mm^2.

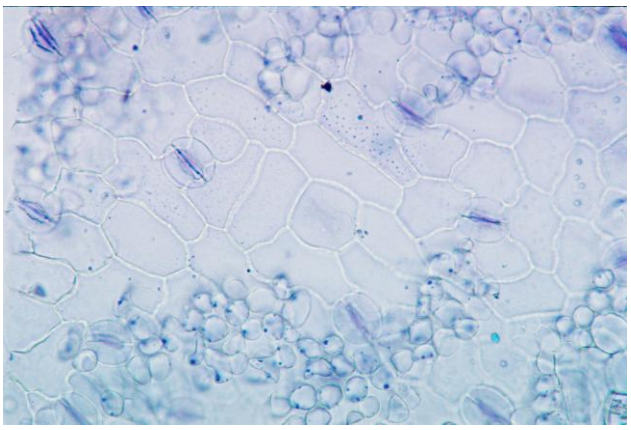

Fig. 4. Adaxial epidermis at *Alchemilla crinita*: the epidermal cells, the stomata (Oc. 10x, Ob. 40, Orig.)

b. *Abaxial epidermis* (fig. 5) is composed of cells with polygonal shape, where the walls are strongly curled. Length of epidermal cells: V_M = 45 μm; V_m = 29.25 μm; $\overline{X}$ = 36.9 μm. The width of epidermal cells: V_M = 29.25 μm; V_m = 15.75 μm; $\overline{X}$ = 20.7 μm.

The stomata are anomocytic type (with annexes cells which do not differ essentially from the neighboring epidermal cells). They are almost evenly distributed on both epidermis, that leaves can be called amphistomatic. Length of the stomata: V_M = 27 μm; V_m = 22.5 μm; $\overline{X}$ = 24.975 μm. Density of the stomata: V_M = 276 / mm^2; V_m = 191 / mm^2; $\overline{X}$ = 219 / mm^2.

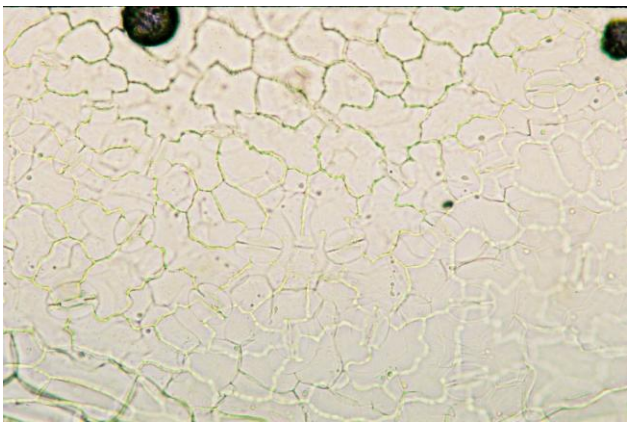

Fig. 5. Abaxial epidermis at *Alchemilla crinita*: the epidermal cells, the stomata (Oc. 10x, Ob. 40, Orig.)

The hairs (fig. 6) are unicellular elongated. Length of the hairs: V_M = 1260 μm; V_m = 1026 μm; $\overline{X}$ = 1115.1 μm. Density of the hairs: V_M = 18 / mm^2; V_m = 12 / mm^2; $\overline{X}$ = 14 / mm^2.

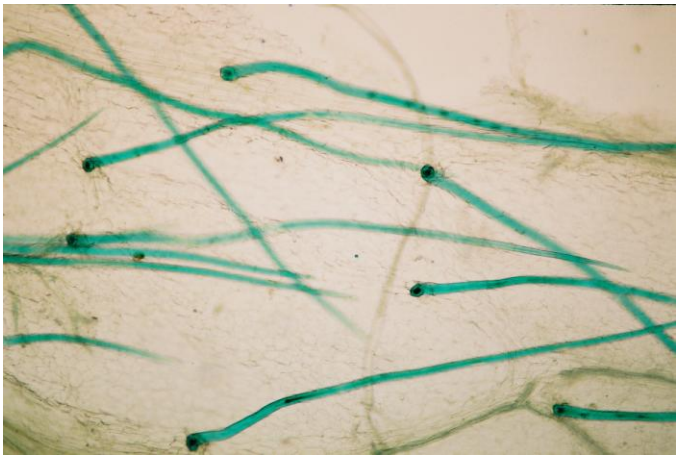

Fig. 6. Abaxial epidermis with the hairs at the *Alchemilla crinita* (Oc. 10x, Ob. 40, Orig.)

CONCLUSIONS

After analyzing the material we can say that structurally speaking the stomata are of anomocytic type.

The epidermal cells in both species of *Alchemilla* analyzed are higher on adaxial epidermis than the abaxial epidermis.

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ASPECTE PRIVIND PARTICULARITĂȚILE FIZICO-CHIMICE ŞI FIZIOLOGICE IMPLICATE ÎN REZISTENȚA LA SECETĂ A UNOR SPECII LEMNOASE

ASPECTS REGARDING THE PHYSICAL-CHEMICAL AND PHYSIOLOGICAL CHARACTERISTCS IN DROUGHT RESISTANCE OF WOODEN SPECIES

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Key words: drought, water content, osmotic pressure, transpiration

REZUMAT

În zonele secetoase, productivitatea plantelor lemnoase este determinată de capacitatea lor de a-şi păstra activitatea fiziologică în condițiile unei aprovizionări limitate cu apă. Cercetările care fac obiectul prezentei lucrări au avut ca scop stabilirea particularităților fizico-chimice şi fiziologice implicate în rezistența la secetă a speciilor Acer campestre, Eleagnus angustifolia, Quercus robur, Alnus glutinosa, Populus alba, Salix alba.

Rezultatele obținute în urma determinărilor ne permit să apreciem că dintre cele şase specii luate în studiu, Acer campestre şi Eleagnus angustifolia suportă cel mai bine stresul hidric, Quercus robur are o rezistență moderată, iar Alnus glutinosa, Salix alba şi Populus alba, sunt cele mai sensibile.

ABSTRACT

In droughty areas, wooden plants productivity is determined by their capacity to preserve the physiological activity under the conditions of a poor water supply. The researches in the hereby survey aim at establishing these characteristics at the following species: Acer campestre, Eleagnus angustifolia, Quercus robur, Alnus glutinosa, Populus alba and Salix alba.

The results that were obtained after the determinations allow us to appreciate that, between the 6 species used in the survey, Acer campestre and Eleagnus angustifolia best dealt with water supply interruption, Quercus robur have an average drought resistance, while Alnus glutinosa, Salix alba and Populus alba are the most sensitive to water supply interruption.

INTRODUCTION

For a long time, it was believed that plants resistance to droughty periods is a phenomenon that is caused by a decrease of the transpiration process. The drought resistance is a much more complex phenomenon that cannot be estimated after one or another physiological process.

The physiologic plant activity is first of all determined by the physical-chemical characteristics of the protoplasm: viscosity, permeability, available and attached water content, the osmotic pressure of cell juice.

It is rather difficult to establish the biotypes that are resistant to drought, because these plants have different characteristics and action simultaneously, this fact giving the resistant characteristic.

MATERIAL AND METHOD

The drought resistance of the six species used in the survey was tested by cropping them in vegetation pots, under balanced soil humidity. This way, plants developed under average humidity conditions, and at some time, water supply was interrupted, and the

physiologic and physical-chemical indexes were compared, in the lack of water and under average humidity.

The osmotic pressure of cell juice in leaves was determined by the plasmolitic method.

The concentration of cell juice (expressed in % s.d.s.) was determined by refractor metric means (Abbe refractometer).

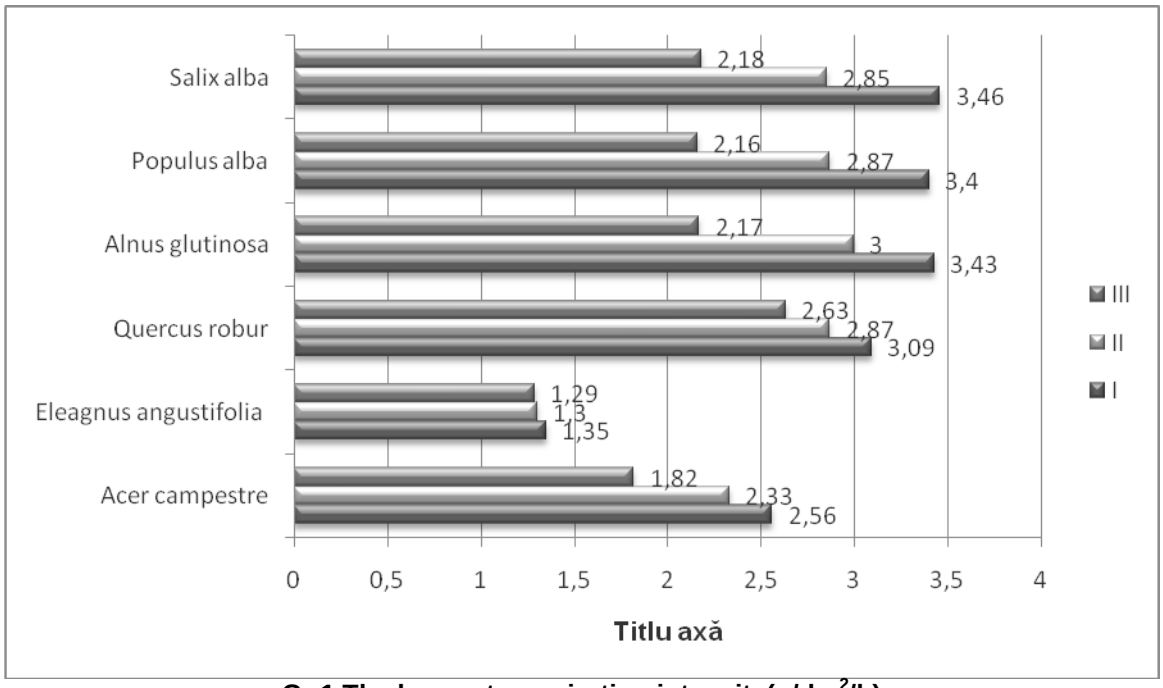
The total water content- was determined by introducing the weight vegetal material and drying it at a 105°C temperature, until its weight was constant. There was made a difference between the fresh vegetal material and the dried vegetal material, and the result was expressed in %. Water forms were determined by the *Dumanski method,* while the transpiration intensity, by the *Ivanov method.*

RESULTS AND DISCUSSIONS

The leaves transpiration intensity

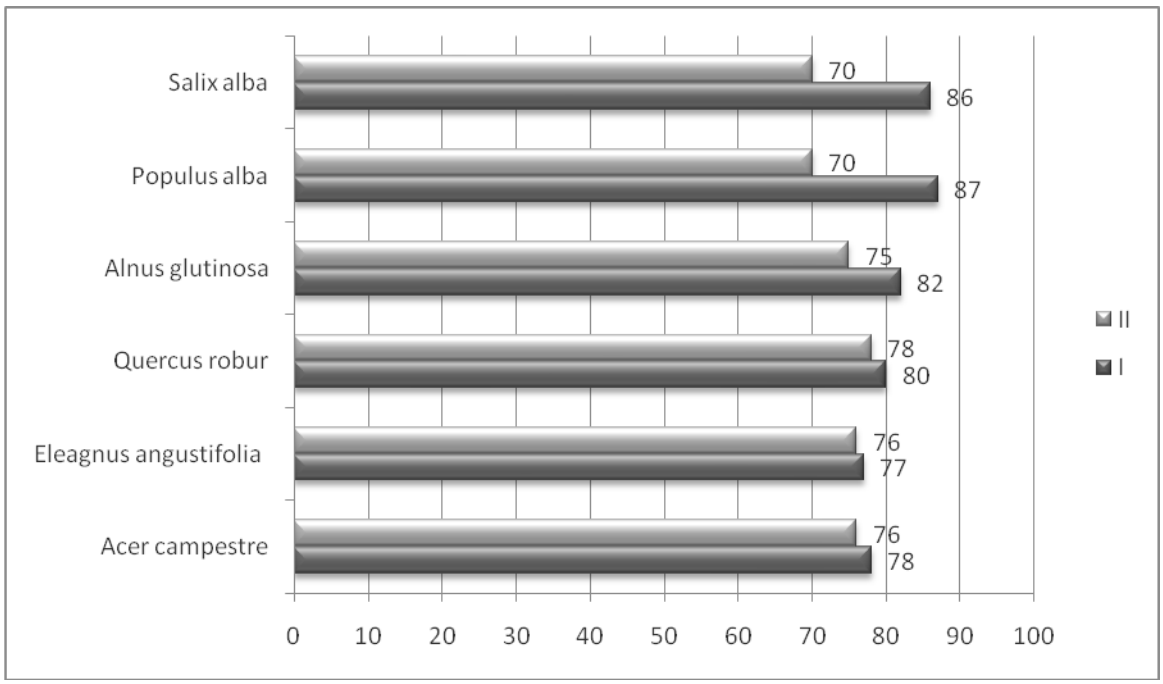
In order to measure the transpiration intensity at the plants that were used in the experiments, plants were average water supplied between 5 and 10 days, after which water supply was interrupted.

From the facts in the gr. 1, we can conclude that the least variations of transpiration intensity, as a result of stopping water supply was at *Eleagnus angustifolia* species, while the most damaged species was *Populus alba*. It lost important water quantities during the transpiration process.

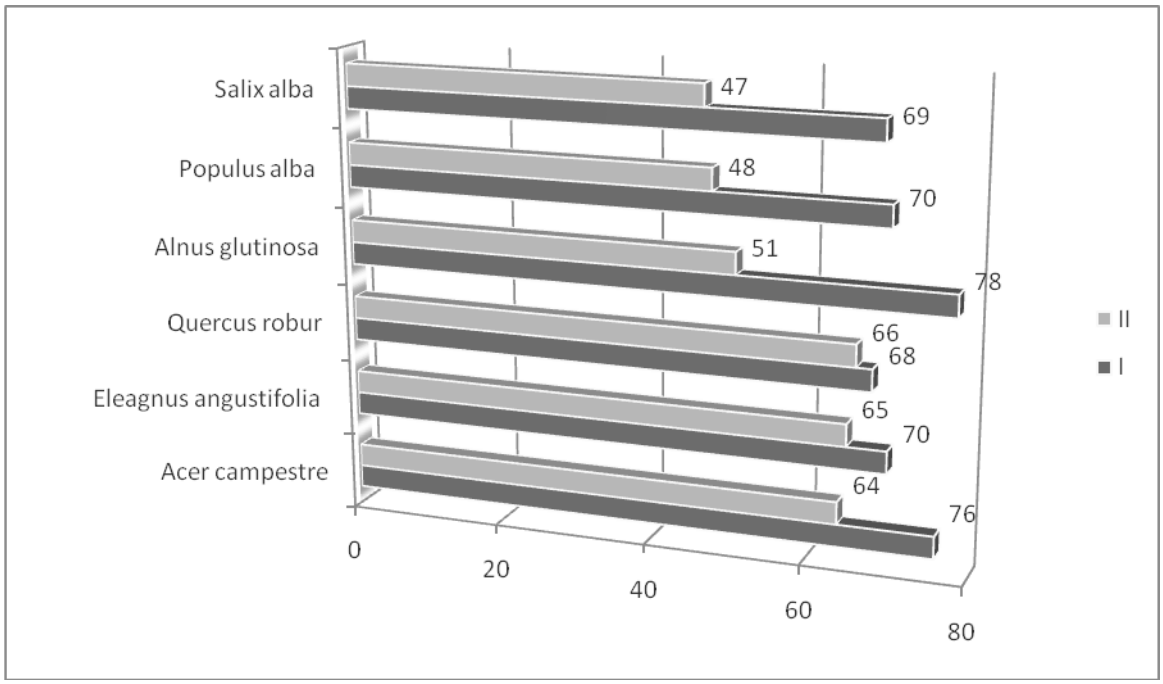


Gr.1.The leaves transpiration intensity(g/dm^2/h)

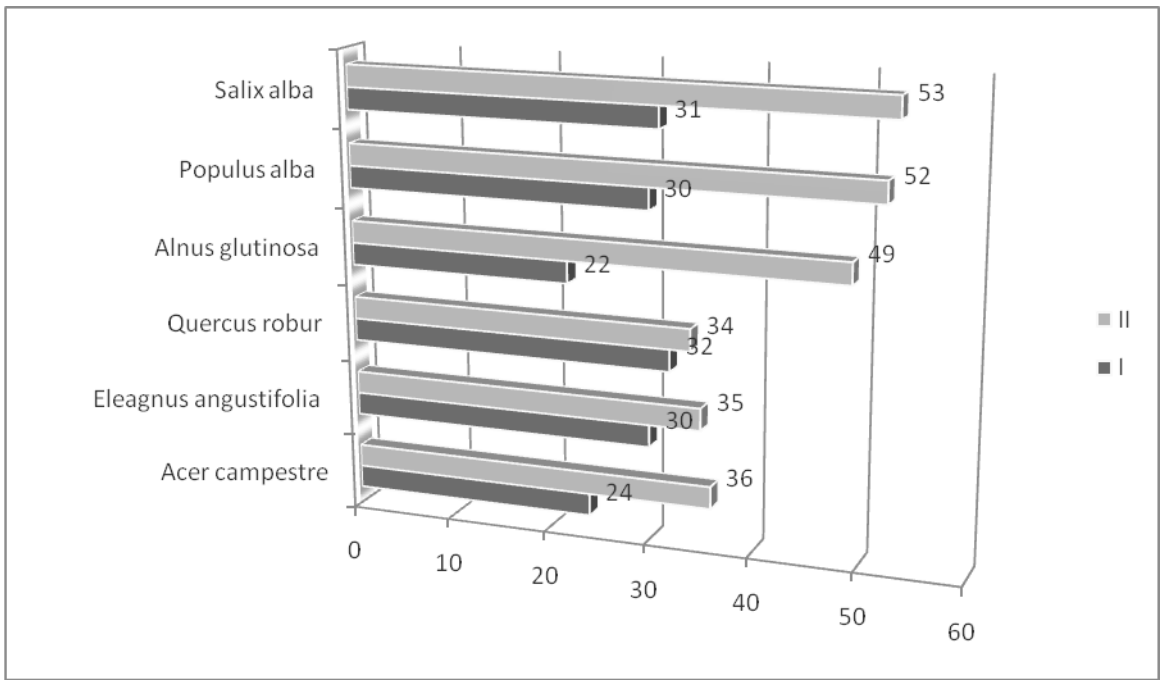
The total water content of plants insignificantly decreased in the case of *Eleagnus*, it was noticed an average decrease of water content at *Quercus robur* and *Acer campestre*, and an important water loss at *Salix alba* and *Populus alba*, which, after 7 days of water supply interruption began to flag.Regarding the free and attached water content, at all species used in the survey, while reducing the water supply there was noticed an increase of the attached water content, and a decrease of the free water content.



Gr.2. The total water content of plants(%)



Gr.3.The content of free water(%)

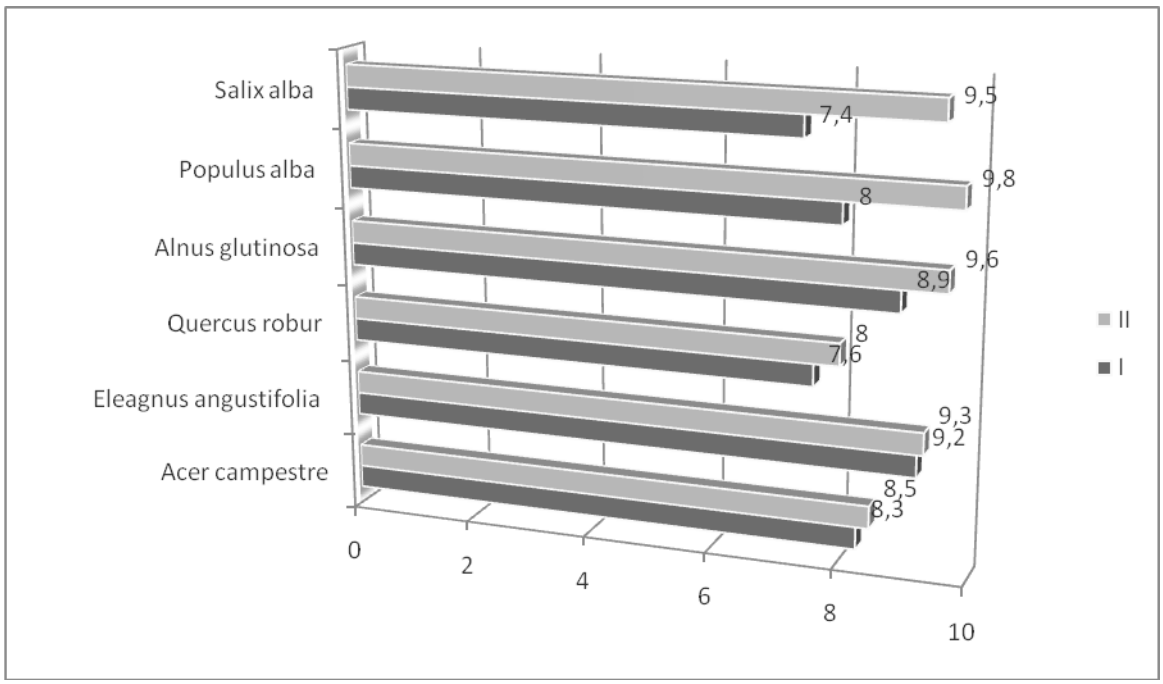


Gr.4. The content of attached water(%)

The concentration of cell juice

The increase of cell juice concentration, while water supply was interrupted is the result of the decrease of the total water content; there is a correlation between the two parameters.

Pursuit to this fact, the highest cell juice concentration was noticed after 7 days, and the highest values were noticed at the *Quercus robur* leaves.

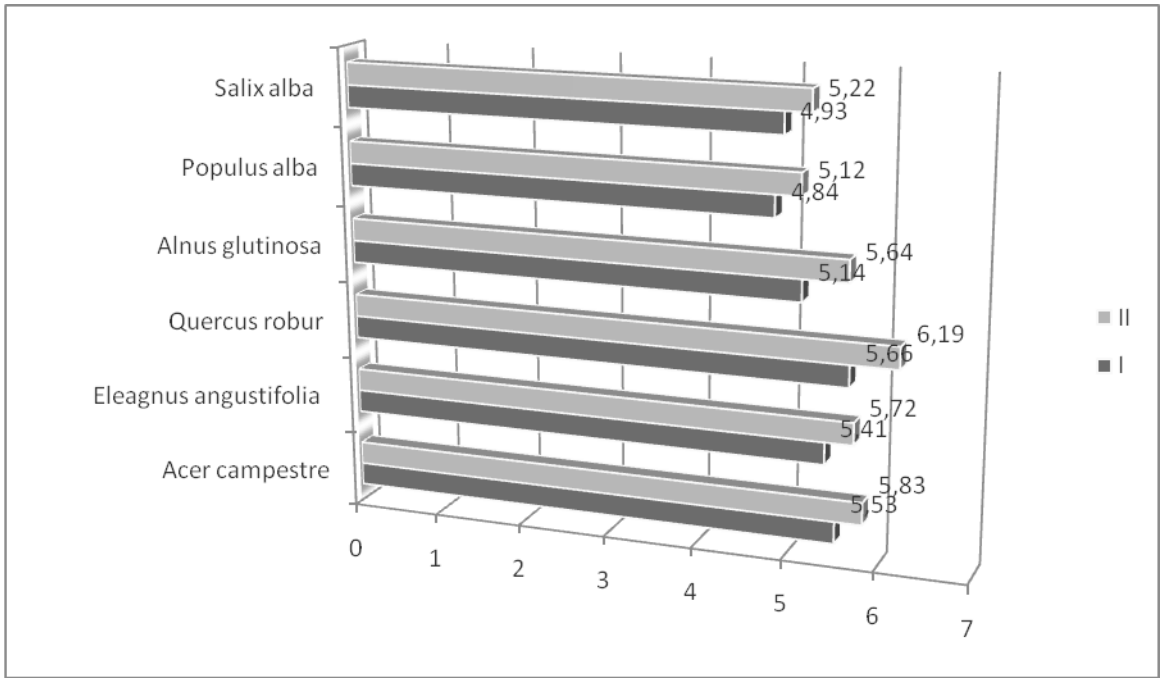


Gr.5. The concentration of cell juice(%s.d.s)

The osmotic pressure of cell juice had high values at the plants at which the water supply was interrupted, these being directly proportional to the cell juice concentration.

The highest osmotic pressure was noticed at *Acer* and *Quercus* plants, after 7 days after the water supply was interrupted.

The increase of the osmotic pressure, under drought conditions is of highly importance, because it provides the ascension of the soil solution in the plant.



Gr.6. The osmotic pressure of cell juice(atm)

CONCLUSIONS

- The results that were obtained after the determinations allow us to appreciate that, between the 6 species used in the survey, *Acer campestre* and *Eleagnus angustifolia* best dealt with water supply interruption.
- *Quercus robur* have an average drought resistance, while *Alnus glutinosa*, *Salix alba* and *Populus alba* are the most sensitive to water supply interruption. This is why at the latter mentioned species there were noticed many physical-chemical changes.
- It is to be known that, apart from the physiological accommodation of plants to drought conditions, there must be taken into consideration the morphologic accommodations: development of the root system, protective tentacles, and the position of stomata on the leaves, the thickness of the cuticle.

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CERCETĂRI PRIVIND ACȚIUNEA POLUANȚILOR ATMOSFERICI ASUPRA FIZIOLOGIEI PLANTELOR LEMNOASE SPONTANE DIN JUDEȚUL MEHEDINȚI

SURVEYS ON THE ATMOSPHERIC POLLUTING ACTION ON THE PHYSIOLOGY OF SPONTANEOUS WOODEN PLANTS IN MEHEDINTI COUNTY

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Key words: atmospheric polluting, photosynthesis, respiration, transpiration

REZUMAT

Experiențele efectuate în anii 2008-2009 au avut drept scop stabilirea efectului nociv al poluării asupra vegetației lemnoase spontane din județul Mehedinți.

Ca zonă critică sub aspectul poluării s-a ales zona vestică a oraşului Drobeta-Turnu-Severin, în care sunt amplasate Combinatul de apă grea, ROMAG PROD şi centrala termică, ROMAG TERMO. Determinările au fost efectuate pe speciile Corylus avellana, Crataegus monogyna, Robinia pseudacacia, Quercus robur, Populus tremula, Juglans regia şi Acer campestre

Dintre speciile luate în studiu, cea mai rezistentă s-a dovedit a fi Robinia pseudacacia urmată de Acer campestre şi Quercus robur .Speciile cele mai sensibile la acțiunea poluanților sunt Juglans regia, Corylus avellana şi Populus tremula.

ABSTRACT

The experiments that were taken in 2008-2009 aimed at establishing the harmful effect of pollution on the wood spontaneous vegetation in Mehedinti County.

As a critical polluted area it was chosen the western part of Drobeta –Turnu-Severin, where can be found the Heavy Water Factory, ROMAG PROD and the Thermal Station, ROMAG TERMO. Determinations were made on the following species: Corylus avellana, Crataegus monogyna, Robinia pseudaccacia, Quercus robur, Populus tremula, Juglans regia, Acer campestre. . Of all species used in the survey, the most resistant to polluting factors was Robinia pseudoaccacia followed by Acer campestre and Quercus robur. The most sensitive species to polluting factors were: Juglans regia,Corylus avellana, Populus tremula.

INTRODUCTION

Knowing the action of atmospheric polluting factors on plants is very important, not only from the metabolic changes point of view, but also on the use of plants in populated and industrial areas.

For foresters, farmers and wine-growers the atmospheric pollution can damage wood, fruit or wine. Atmosphere pollution is a reality nowadays.

It can harm cultivated and spontaneous plants in different percentages, depending on the nature of the polluting factor, the species involved in the pollution process and the clime conditions in the polluted area.

Even if overreactions aimed at making people conscious of the danger, it is now time to solve this serious pollution matter.

MATERIAL AND METHOD

The experiments that were taken in the summer of 2009 aimed at establishing the harmful effect of pollution on the wood spontaneous vegetation in Mehedinti County.

As a critical polluted area it was chosen the western part of Drobeta –Turnu-Severin, where can be found the Heavy Water Factory, ROMAG PROD and the Thermal Station, ROMAG TERMO. Determinations were made on the following species: *Corylus avellana, Crataegus monogyna, Robinia pseudaccacia, Quercus robur, Populus tremula, Juglans regia, Ager campestre*. For the comparative survey, there were made determination on plants belonging to the same species, placed at a 30 km distance from the pollution source. On the material chosen for experiments there were determined: the intensity of transpiration, the concentration of the cell juice, the total content of water, the quantity of assimilated pigments, the intensity of photosynthesis and respiration.

The concentration of the cell juice (expressed in % s.u.s.) was determined by refractor metric means, i.e. the juice was obtained by pressing on the leaves with a steel press.

The quantity of assimilated pigments in leaves was determined using a specter-photo-meter UV-VIS Jasco 650.

RESULTS AND DISCUSSIONS

The intensity of photosynthesis

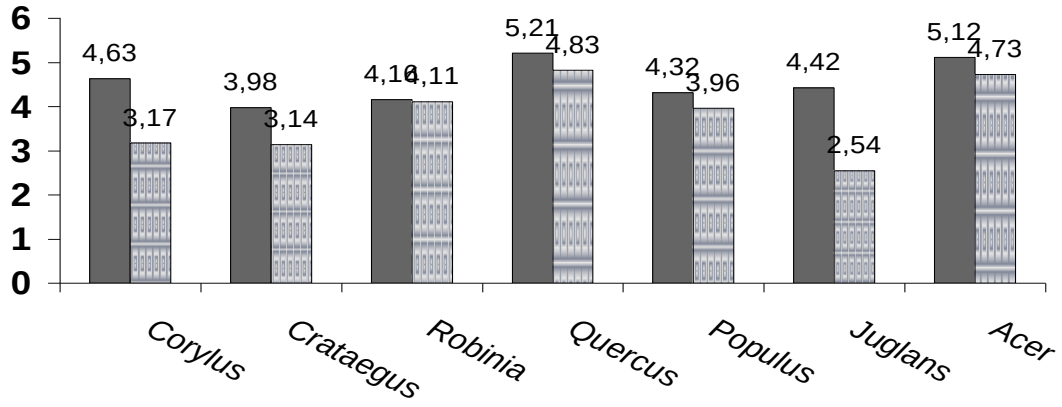
Both at the plants situated in the polluted area, and the witness plants there was measured the dioxide quantity which was absorbed by the leaves exposed to a 25000 light intensity and at a 25°C temperature.

At *Juglans regia* seedlings in the polluted area there was noticed a significant decrease of the photosynthesis process, i.e. 58.2% of the intensity of photosynthesis of control plants.

At the *Corylus avellana* leaves there was also noticed a decrease of the photosynthesis process, i.e. 70% of the value of photosynthesis process of witness plants.

Locus tree leaves best supported the action of polluted factors, and the photosynthesis process intensity only decreased with 3%.

The decrease of the photosynthesis process at most of the plants that were used in the survey can be a result of: the decrease of the assimilating surface, as a cause of leaves necrosis, the decrease of the assimilated pigments quantity, closing of stomata.



Gr.1- The influence of atmospheric pollution on the photosynthesis process ($cm^3CO_2/dm^2/h$)

The intensity of the respiration process

Taking into consideration the respiration process, the data that were obtained in the survey were contradictory. If at *Corylus avellana, Crataegus monogyna, Juglans regia* and *Robinia pseudacacia,* the respiration process increased, at *Quercus, Populus* and *Acer*, the values of the process were less than the ones at the control test.

These variations can be a result of the change of the enzymatic action under the influence of polluting factors.

The intensity of the transpiration process

After the experiments were taken, it was noticed that atmospheric pollution causes an increase of the transpiration process, the highest increases being at the *Juglans regia, Corylus avellana* and *Populus termula*.

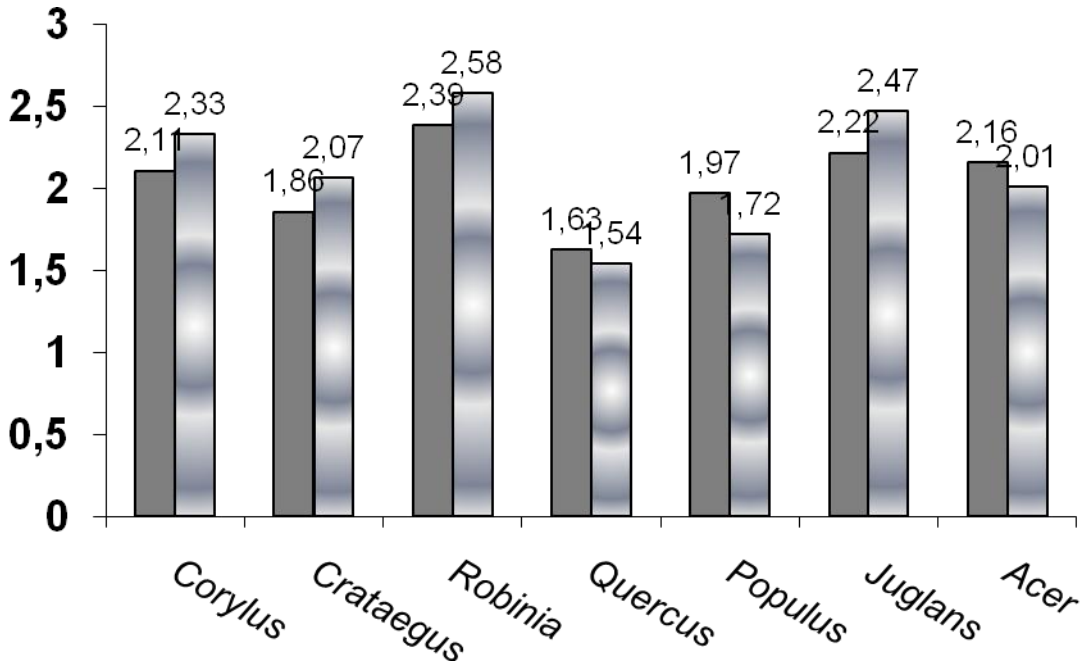
The increase of the transpiration intensity is a result of the change of the stomata apparatus and of cell permeability.

The plant water content

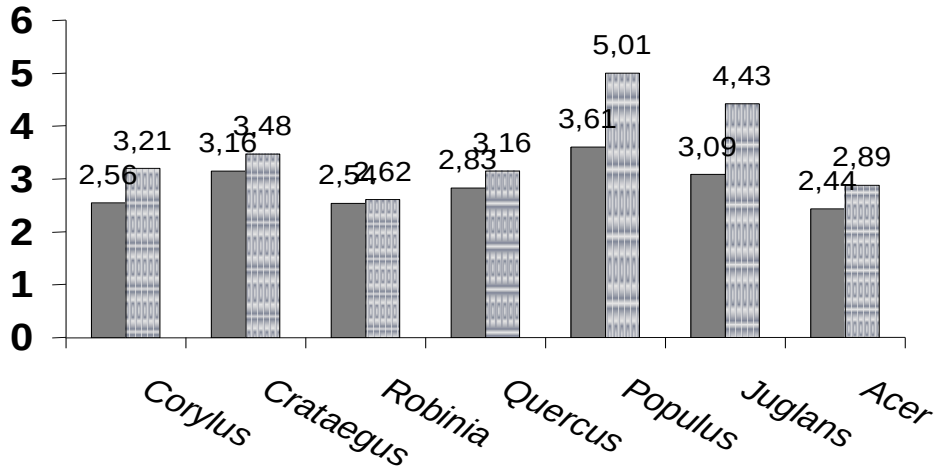
Knowing the water content of plants damaged by polluting factors is of a great importance, because water is the primer element that conditions the normal development of organisms. It both influences the intensity, but also the direction of the development of every physiological process.

Photosynthesis, respiration, enzymatic processes and growth are linked to the tissues water content.

According to the facts in table 1, plants in the polluted area had a less water content, in comparison with plants in the witness area.



Gr.2. The influence of atmospheric pollution on the respiration process



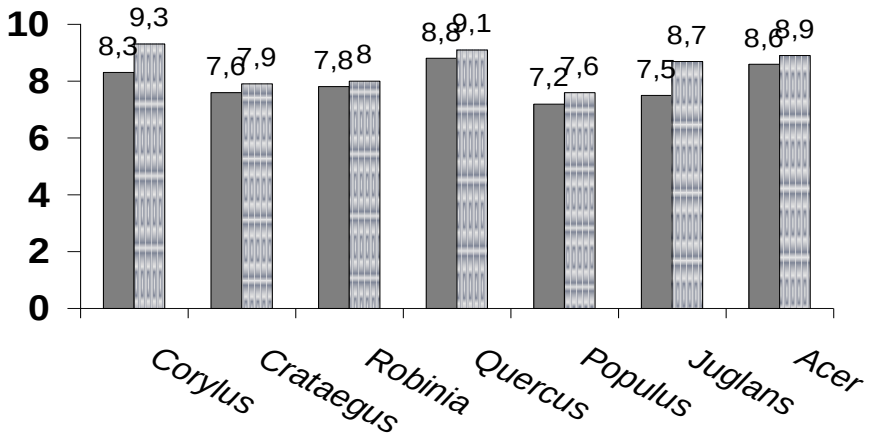
Gr.3 The intensity of transpiration process(mg/dm^2/h)

Table 1

The total water content of polluted plant leaves(%)

Plant	The total water content of polluted plant leaves (%)	
	martor	polluted plant
Corylus avellana	82,1	69,8
Crataegus monogyna	82,3	75,2
Robinia pseudacacia	81,5	80,0
Quercus robur	81,0	79,1
Populus tremula	86,2	82,6
Juglans regia	84,3	68,9
Acer campestre	81,5	79,4

The concentration of cell juice -The refractometric determinations of cell juice concentration, which was extracted from the leaves of plants used in the experiments were expressed in % s.d.s., and indicated an increase, under the influence of atmosphere polluted factors.



Gr. 4.The concentration of cell juice(%s.d.s.)

The intensity of plain assimilation

The data show that important biomass decreases were noticed at *Juglans, Corylus, Crataegu*s and *Populus* species, *while Robinia, Quercus and Acer* were less damaged.

Table 2

The intensity of plain assimilation(g/m^2/day)

plant	*The intensity of plain assimilation* (g /m^2/day)	
	martor	**poluată**
Corylus avellana	4,51	3,23
Crataegus monogyna	4,83	3,73
Robinia pseudacacia	4,17	4,02
Quercus robur	3,97	3,43
Populus tremula	5,16	3,97
Juglans regia	5,05	3,88
Acer campestre	4,29	3,83

The assimilated pigments content

The quantity of the assimilated pigment was established using a specter photo meter. It was noticed that at all plants in the polluted area the pigment content decreased. Also, the ratio between yellow and green pigments changed (the green pigments quantity increased). The highest changes of the assimilated pigments content were at *Populus, Juglans* and *Corylus* species.

The decrease of the pigments content at the plants in the polluted areas could have been caused by: stop of the synthesis of the plastids protean stroma, the direct damage of chloroplasts, replace of the magnesium atom with the hydrogen one, and formation of pheophytine, the increase of oxidative process activity in the damaged tissues

Table 3

The quantity of assimilated pigments in leaves (g/100g veg. mat.)

Control plants	total	Chlorophill a	Chlorophill b	Yellow pigments
Corylus avellana	0,810	0,357	0,148	0,305
Crataegus monogyna	0,773	0,322	0,149	0,302
Robinia pseudacacia	0,738	0,297	0,146	0,295
Quercus robur	0,817	0,363	0,144	0,310
Populus tremula	0,612	0,223	0,140	0,249
Juglans regia	0,659	0,281	0,145	0,233
Acer campestre	0,820	0,360	0,150	0,310
Polluting plants	**total**	**Chlorophill a**	**Chlorophill b**	**Yellow pigments**
Corylus avellana	0,740	0,240	0,146	0,354
Crataegus monogyna	0,765	0,286	0,159	0,320
Robinia pseudacacia	0,738	0,290	0,148	0,300
Quercus robur	0,799	0,320	0,159	0,320
Populus tremula	0,590	0,211	0,129	0,250
Juglans regia	0,614	0,206	0,130	0,178
Acer campestre	0,799	0,330	0,149	0,320

CONCLUSIONS

- The main polluting sources in Mehedinti County are ROMAG PROD, by hydrogensulphide emissions, and ROMAG TERMO, which, by the dioxide, sulphur dioxide, nitrogen oxides and suspension powders in the atmosphere lead to the increase of polluting substances in the atmosphere.
- Atmosphere pollution in the industrial area in Mehedinti County has many damaging effects on plants;
- The most damaged process is the photosynthesis one, which stands for almost one half of the photosynthesis of unpolluted plants;
- As a result of the decrease of the photosynthesis process, the assimilated quantity decreases, too;
- Regarding the respiration process, there cannot be established a direct correlation between its intensity and degree of pollution;
- As a result of the changes of the stomata apparatus and as a result of the decrease of cell permeability, the intensity of the respiration process increased at most of the plants used in the survey;
- Determining the total water content in the leaves points out a decrease, with a direct link between the increase of cell juice concentration;
- The quantity of assimilated pigments decreases at the plants in the polluted areas, while the ratio between the green and yellow pigments changed, too;
- Of all species used in the survey, the most resistant to polluting factors was *Robinia pseudoaccacia* (locus tree), followed by *Acer campestre* (common maple) and *Quercus robur* (oak tree);
- The most sensitive species to polluting factors were: *Juglans tree* (nut-tree). *Corylus avellana* (peanut tree), *Populus tremula* (aspen).

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EVALUAREA IMPACTULUI PRODUS DE S.C. MITTAL STEEL S.A. ASUPRA APELOR DIN ZONA GALATI
THE EVALUATION OF THE IMPACT PRODUCED BY S.C. MITTAL STEEL S.A. ON THE WATER IN THE GALAȚI COUNTY

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University of Galati[1], Faculty of Agriculture, University of Craiova[2]

Key words: polluting emission, chemical indicators, parameter

REZUMAT

,,Poluarea reprezinta contaminarea mediuluii inconjurator cu materiale care infesteaza sanatatea umana, calitatea vietii sau functia naturala a ecosistemelor”.

ABSTRACT

“The pollution represents the contamination of the environment by materials which harm the wealth, the quality of life and the natural functioning of the ecosystems”.

INTRODUCTION

S.C. MITTAL STEEL S.A. Galați is the biggest steel producer from the country and one of the biggest production capacities from Central and East Europe, both concerning the designed capacity and the technological possibilities generated by the available equipment. It produces and commercializes finite and flat steel products and long steel semi-finished goods, in a various assortment totalizing more than 350 types of steel.

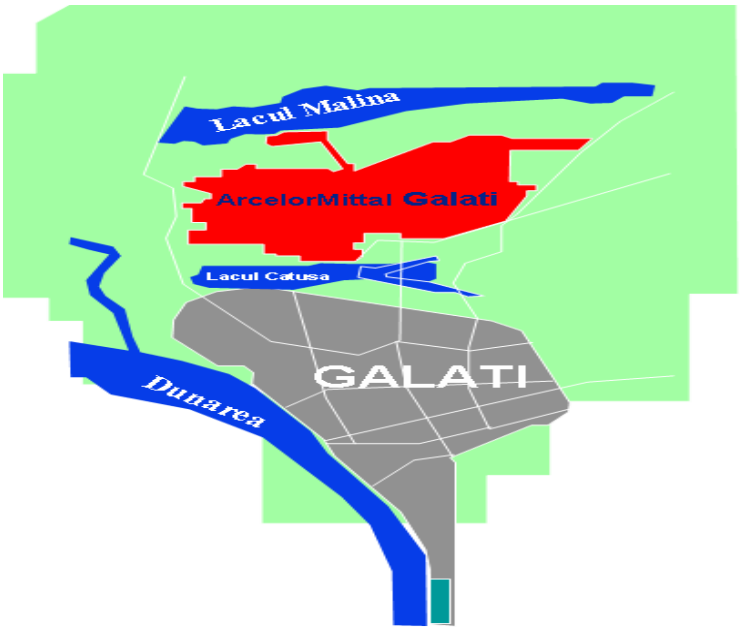

Figure 1. Location of Arcelor MITTAL GALATI

The aggregate works functions continuously having a linear technological flow; it starts from the raw materials warehouse to the warehouse and the loading platform with the finished products. The raw materials discharged into the ore ship are transported by belts and brought in normal and large CFR wagons as iron ore, coking coals, calcite and charcoal ore. Then, they are taken from warehouses and worked up in ores agglomeration factories and in coking batteries.

The raw materials, in the form of paddle or coke, are sent directly to the storage yards and from here to the furnace for producing cast iron.

The disposing of the aggregate work at a distance of 3-5 km far from the inhabited zone and on the direction NE-SW which overlaps the predominant direction of the wind assuring a good absorption, a good transfer of noxa emitted in the atmosphere most time of the year but also an adequate dispersion of these is very important from the ecological point of view.

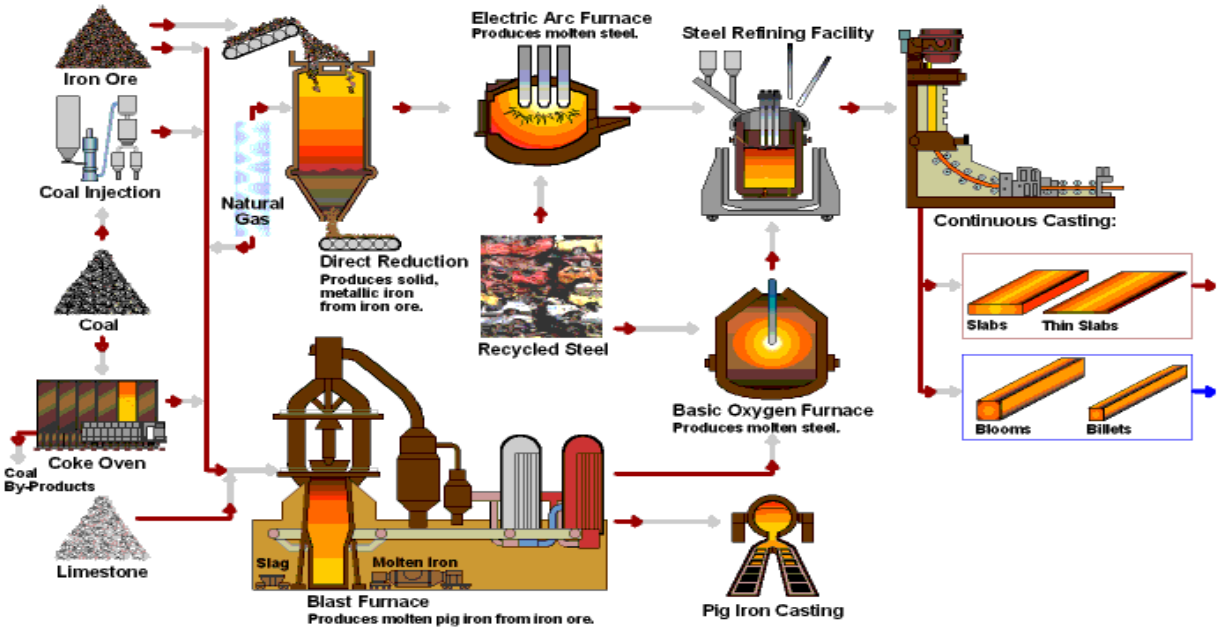

Figure 2. The technological flow

MATERIAL AND METHOD

For determining the polluting emission resulting from the production process it was pursued:

-the identification of the tributaries contribution with the two sections: upstream and downstream;

- the quantization of these effects on the qualities of the natural receivers;

- the analysis of the evolution of the quality chemical indicators;

The evaluation of the post impact due to the industrial activity on the S.C. MITTAL STEEL S.A.Galati siderurgical platform was done in view of both the spatial dimension (the control sections on Siret River and Danube River being under the influence of the three industrial tributaries) and the temporal dimension (following the quality evolution under chemical aspect between 2003-2006).

For the identification of the tributaries contribution, the S.C. MITTAL STEEL S. A. Galati upstream and downstream platform sections (Siret River) and the Siret – Danube upstream and downstream confluence were chosen for analysis. We mention that between the control sections on the Siret River chosen for this analysis, there is no other effluent evacuation, only those coming from S.C. MITTAL STEEL S.A. Galați discharged in Siret River by Mălina and Cătuşa River, and those three industrial tributaries flow into Siret River less than 10 kilometres of the confluence with the Danube.

For determining the three tributaries weights deriving from the S.C. MITTAL STEEL S.A. Galați platform and the quantization of their effects on the quality of the natural receivers, downstream/upstream reports for the indicators used in the analysis, both for the sections of reference for this objective on Siret river and for those of reference for the analysis goal on Danube River were calculated.

The analysis of the quality chemical indicators in 2003-2008 in the S.C. MITTAL STEEL S.A. Galați (Siret River) platform upstream- downstream control sections illustrated the following aspects:

In the large majority of the controlled situations, the concentration level of dissolved oxygen indicated the first category of water quality according to STAS 4706/88, from 10 downstream/upstream reports, 8 were values over the unity, hence 80%;

- The indicator BCO_5 was permanently, by the concentration level, above the limit of the first category of water quality in the S.C. METTAL STEEL S.A. Galați platform upstream section, situation also confirmed by the downstream/ upstream report.
- The concentration of the CODMn indicator between 2003-2006 in the S.C.MITTAL STEEL S.A. Galați upstream section was above the limit of the first category of water quality, and the subunitary values of the downstream / upstream report doesn't indicate an influence in point of the industrial platform;
- The downstream/ upstream report for the suspension parameter indicates supraunitary values in a proportion of 66% from the analyzed situations, which proves that this indicator in the downstream section has often presented higher values than those from the upstream;
- For the calcium parameter from the analysis it can be estimated that the tributaries contribution from S.C. METTAL STEEL S.A. Galați is small enough- in 60% from the analyzed situations the downstream/upstream report was supraunitary; the concentration level of this indicator corresponds to the first category of water quality, according to STAS 4706/88;
- For the Mg indicator the downstream/upstream report indicates various supraunitary values - 90%- which allows the estimation that the industrial effluents contribution from S.C.MITTAL STEEL S.A. Galati is significant at this parameter;
- The chloride parameter within the analyzed period, 2003-2006, presented higher concentrations in platform downstream section than those illustrated in the S.C.MITTAL STEEL S.A. Galați upstream section in proportion of 77,7%. As level of concentration, this was within the limits of the first category of water quality, according to STAS 4706/88;
- The sulphate concentration level was within the limits of the first category of water quality and the values of the downstream/upstream report indicates a proportion of 30% for the supraunitary values, hence an insignificant effluents contribution on the platform.
- The nitrate in the great majority of the analyzed situations through the emphasized concentrations were within the limits of the first category of water quality, and the analyze of the downstream/upstream report indicates a proportion of 33,3% supraunitary values;
- The nitrate were within the limits of the first category of water quality (STAS 4706/88), and the downstream/upstream report of the analyzed situations indicates only one supraunitary value-10%;
- The phosphorus through the emphasized concentrations between 2003-2006 confers the "degraded" quality for the downstream section; the downstream/upstream report indicates 77,7% supraunitary values, showing an substantial contribution of the effluents on the platform for this parameter;
- The ammonium (the first category of quality 1mg/l) in 61,5% from the analyzed situations in the platform downstream section was above the limit of the first category of water quality, while in the upstream section the exceeding of the limit of the first category of water quality was in proportion of 30%; it can be appreciated the significant contribution of the industrial activity from S.C. MITTAL STEEL S.A. Galați to this parameter which confer the "degraded" quality for the downstream section;
- The phenols represents one of the factors that give the "degraded" quality to the Siret's water downstream the industrial platform; the concentrations level at this indicator was permanently above the limit of the first category of quality between 2003-2006, and the downstream/upstream report values indicates 85,7% supraunitary values;

- The downstream/upstream reports' analysis for the Fe indicator illustrates various supraunitary values – 70%- from the analyzed situations (hence it illustrates the tributaries contribution from S.C.MITTAL STEEL S.A. Galați). Studying the ferrum evolution within between 2003-2006, it can be observed the constant depreciation of the limit of the first category of water quality;

The analysis of the quality chemical indicators within 2003-2006 in the Siret-Danube confluence upstream-downstream control sections illustrated the following aspect:

- The oxygen operating conditions through the DO indicator illustrates the first category of quality both before and after the Danube-Siret confluence. The downstream/upstream reports had supraunitary values in proportion of 90% from the analyzed situations (fig. nr.);
- The CBO_5 indicator analyzed within the period 2003-2006 was within the limits of the first category (STAS 4706/88) in the large majority of the analyzed situations both in upstream and downstream of the confluence with Siret River.

Yet, the supraunitary values of the downstream/upstream report indicate a contribution of organic matter (80%) of the Siret River;

- The downstream/ upstream report values for the suspension parameter indicates supraunitary values in proportion of 90%, which would illustrate that after the confluence with Siret River, the Danube's water presented increased concentrations for this indicator;
- For the calcium parameter from the analysis of the diagrams and of the Siret – Danube confluence downstream/upstream report, it can be appreciated that the values were supraunitary in proportion of 80%, which would indicate a certain contribution of Siret River at the charging with calcium of the Danube's water in this sector;
- The Mg indicator for the concentrations level was within the limits of the first category of quality for the surface waters, but the supraunitary values of the downstream/upstream reports indicates the Siret's contribution in achieving concentrations level illustrated in the Danube's water;
- The analysis of the chloride parameter indicates the first category of quality for the Danube's water in the analyzed sector; the supraunitary reports illustrate a bigger concentrations of this indicator after the confluence with Siret river;
- The level of sulphate concentrations was within the limits of the first category of water quality for the surface waters, both upstream and downstream the confluence with Siret River, but the values of downstream/upstream reports indicates higher concentrations after the confluence with Siret River (100%);
- The nitrite in the large majority of the analyzed tests was through the emphasized concentrations within the limit of the first category of water quality for surface waters. The downstream/upstream reports (the Siret-Danube confluence) analyzed between 2003-2006 indicates supraunitary values in proportion of 100%;
- The phosphorus through the emphasized concentrations within the period 2003-2006 confers the "degraded" quality for the Danube's water in the Siret confluence upstream and downstream sections. The downstream/upstream reports indicates supraunitary values in proportion of 80%;
- The emphasized concentrations for the ammonium indicator confers the first category of quality for the Danube's water in the analyzed sector between 2003-2006;
- The phenols are one of the polluting elements for the surface waters from the Siret-Danube confluence sector.

The diagram analysis indicates a constant exceeding of the limit of the first category of quality for the surface water; the downstream/upstream reports values were supraunitary in proportion of 66%, illustrating a possible contribution of the Siret River to this indicator;

- The analysis of the ferrum indicator within 2003-2006 in the Siret -Danube confluence downstream-upstream sections shows various exceeding of the limit of the first

category of quality estimated by STAS 4706/88 for the surface waters; the period 2003-2006 indicates very increased concentrations level for this indicator.
The downstream/upstream report values were supraunitary in proportion of 100%, clearly indicating the ferrum charging of Siret- downstream the S.C. MITTAL STEEL S.A. Galati platform.

CONCLUSIONS

The analysis of the results led to the emphasis of the following conclusions:

- Zn- in comparison with the limit of 0,03 mg/l (STAS 4706/88) all the emphasized concentrations indicated both downstream and upstream exceeding of the MAL, increased concentrations downstream in comparison with upstream Siret-Danube confluence were identified in proportion of 40%o;
- Cu- through the level of emphasized concentrations in the Danube confluence upstream/downstream sections was within the limits stipulated by STAS 4706/88; yet the downstream/upstream report analysis indicates a proportion of 90% of the supraunitary values;
- Cr- was above the MAL (STAS 4706/88) only in May 2006 (the analysis was effectuated within the period 2003-2006), the rest of the concentrations of this parameter being within the limits of the category of quality stipulated by the norms in force, in 40% of the analyzed situations the level of concentrations of this indicator was higher downstream the confluence with Siret River, indicating the industrial effluents contribution from S.C. MITTAL STEEL S.A. Galați
- A special situation indicated the analysis of Cd parameter between 2003-2006 both downstream and upstream the confluence with Siret River, the emphasized concentrations exceed a lot the MAL stipulated by STAS 4706/88 (startling concentrations between 2003-2004), but for the achievement of this concentration level, the downstream/upstream reports analysis indicates a contribution of the industrial effluents (through Siret River) of only 50%;
- Pb- excepting some periods of 2003 (June) when the MAL 4706/88 was exceeded, in the rest of the analyzed situations the concentrations of this parameter were within the limits of the first category of quality for the surface waters; in 60% of the analyzed situation the values of the downstream/upstream report were supraunitary.
- Mn- exceeding the MAL (maximum admitted limit) of the first category of quality of surface waters in the Siret-Danube confluence downstream section in 2003; the downstream/upstream reports had supraunitary values in proportion of 80%;
- For the comparative evaluation of the industrial tributaries effects from S.C.MITTAL STEEL S.A. Galați, both concerning the Siret's quality downstream the platform and after its confluence with the Danube river, we present the centralized proportional expression of the values of the downstream/upstream report within 2003-2006.
- According to the obtained data, it can be observed that, in the case of the majority of the analysed indicators, the concentrations level emphasized in the Siret confluence downstream section is higher (the supraunitary downstream/upstream reports values); consequently, it can be assumed that, the influence of the industrial tributaries from S.C. MITTAL STEEL S.A. Galați are felt at least from a distance as big as the distance of the Siret-Danube confluence.

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CARACTERIZAREA CALITĂȚII APELOR DE SUPRAFAȚĂ SUB ASPECT BIOLOGIC ÎN PERIOADA 2003-2008 LA S.C. MITTAL STEEL S.A. GALAȚI

THE ANALYSE OF SURFACE WATER QUALITY FROM A BIOLOGICAL POINT OF VIEW AT S.C. MITTAL STEEL S.A. GALAȚI BETWEEN 2003-2008

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Keywords: concentration is fluctuating, process, indicators.

REZUMAT

For the identification of the tributaries contribution, the S.C. MITTAL STEEL S. A. Galati upstream and downstream platform sections (Siret River) and the Siret – Danube upstream and downstream confluence were chosen for analysis. We mention that between the control sections on the Siret River chosen for this analysis, there is no other effluent evacuation, only those coming from S.C. MITTAL STEEL S.A. Galați discharged in Siret River by Mălina and Cătuşa River, and those three industrial tributaries flow into Siret River less than 10 kilometres of the confluence with the Danube.

The evaluation of the post impact due to the industrial activity on the S.C. MITTAL STEEL S.A.Galati siderurgical platform was done in view of both the spatial dimension (the control sections on Siret River and Danube River being under the influence of the three industrial tributaries) and the temporal dimension (following the quality evolution under chemical aspect between 2003-2006).

ABSTRACT

Pentru identificarea aportului afluenților s-au selectat pentru analiză secțiunile amonte şi aval platformă S.C. MITTAL STEEL S.A. Galați (Siret) şi amonte şi aval confluență Siret cu Dunărea. Menționăm că între secțiunile de control de pe Siret selectate pentru această analiză nu există alte evacuări de ape uzate decât cele provenite de la S.C. MITTAL STEEL S.A. Galați şi deversate în Siret prin intermediul Bălților Mălina şi Cătuşa, iar cei trei afluenți industriali se varsă în Siret la mai puțin de 10 km de confluența cu Dunărea.

Evaluarea post impactului datorat activității industriale de pe platforma siderurgică S.C. MITTAL STEEL S.A. Galați s-a efectuat avându-se în vedere atât dimensiunea spațială (secțiunile de control de pe Siret şi Dunăre aflate sub influența celor trei efluenți industriali) cât şi dimensiunea temporală" (urmărirea evoluției calității sub aspect chimic în intervalul 2003 - 2006).

INTRODUCTION

The analyse regards the quality of natural receptors, the qualitative ones – the Siret and the Danube rivers, and the chemical changes due to the industrial activities quartered on the S.C. MITTAL STEEL S.A. platform. The unit was placed between Cătuşa River to the East, and Mălina River to the West. The Cătuşa River is also used as a nautical base by Dunărea Galați Club. There is a project for 1997, which is already contracted with the constructor to build the Cătuș a upstream dam. The water consumption is 18.5 m/steel tone, and the degree of water recirculation is 93%. The industrial effluent comprises three categories:

a) conventional water, representing the water used in indirect cooling processes, with an average flow of about 98.100 m3/day;

b) industrial effluent which are impurified through technological processes, with an average flow of about 81.400 m3/day;

c) effluents which transport the sludge (waste), with an average flow of about 59.600 m3/day;

These waters are rich in ammonia, phenols, cyanides, sulphocyanide, hydrogen sulphide, tars, oils. The specific impurificators concentration is fluctuating, depending on the capacity in the functioning process, the coal type, the technique condition of the filtering aggregates, the quality of additional materials in the filtering stages, the quality of the installations monitoring and exploitation in every technological phases.

MATERIAL AND METHOD

Beginning with 2002, in Siret River, which was analysed in two representative control sections – upstream discharge (1) and after the effluents discharge from MITTAL STEEL Galați (2), a series of aspects of the quality of water were pointed out, according to STAS 4706/88.

From a chemical point of view, the indicators of the oxygen system had values corresponding to the I-st and II-nd category of water quality in the control section (1); in section (2) the defined values of these indicators corresponding to the III-rd category outlines the contribution of the effluents discharged by S.C. MITTAL STEEL S.A. Galați.

The Siret' mineralization had close values in the two drawing sections that had been analysed, exceeding the limits stipulated by the same STAS for the I-st category of water quality. Referring to the budget of nutrients – azoth and phosphorus – a bigger concentration of ammonia ions was detected in the sector upstream S.C. METTAL STEEL S.A Galați, which denotes a tendency of water impurification, a high concentration of nutrients favouring the grow of vegetal organisms (phytoplankton) in water.

Among the pollution specific indicators, the metallic ions in water – Mn, Cu, Cr, Cd, Tel - were detected in concentrations corresponding to the I-st category of water quality in both stations. A water impurification with Fe ions was noted in station (1), but especially in station (2), the water corresponding to the II-nd category of quality. The impurification of water with Zn is obvious, the registered values exceeding the maximum limit admitted by STAS 4706/88.

Although, the concentrations with Cu, Cr, Cd, Tel once detected in the CS Galați upstream section didn't have a high amount in water, in the sediments of this section a high amount of accumulated metals was detected.

The sediments of an aquatic ecosystem, the source of nutritive components, but also the seat of some toxic and noxious products, influences the life and the activity of the main biogenesis, namely the phytoplankton, the zooplankton and the zoo benthos.

In specific physico-chemical conditions – high temperatures, deficit of oxygen, strong water moving – the bottom sediments can be a source of impurification that lead to the water quality degradation. An active phenomenon named biological methylation takes place in the case of accumulation of metal ions in the natural sediments.

The organic substances decompose under the action of micro organisms and the methylic derivates that result from it. These substances have the property to form metal-organic compounds of chelating. The methylation increases the toxicity of these compounds and the accumulation speed in sediments and aquatic organisms. The observation of the dynamics of heavy metals ions accumulation in sediments is an important and efficient element to determine the pollution effects of an anthropogenic origin.

The biological analysis on water and substrate samples, which were concomitantly drawn with the physico -chemical and bacteriological ones in the same control sections - Siret River – (1) upstream CS Galați and (2) downstream CS Galați – have led to a series of conclusions.

The associations of zooplanktonic and phytoplanktonic organisms had bigger numerical densities in station (1) than in station (2).

The composition of zoo benthonic association comprised organisms of only two systemic groups - Tubifex Rivulorum and dipterous insects- bloodworms, taking into account that mineral oil products were badly felt in the sediments facies and in the water mass. The consequence of the impact of complex impurification sources (cyanides, phenols, ammonia, heavy metals, mineral oil products) caused by the discharges from Mittal Steel Galați, is registered at the level of control section (2) through a half cut of the quantitative values of bathyal biogenesis compared to the values in the downstream section. The zoo benthos is the representative biogenesis for a flow and reflects, in time, the unfavourable environmental conditions, i.e. the reorganization of its composition.

The biological researches made on the Siret River in 2005, pursued the dynamics development of the planktonic organisms communities – phytoplankton and zooplankton – belonging to the primary and secondary production. The sampling of biological analyses was made according to the work methodology of the study of the quality running waters, concomitantly with the four pshyco-chemical analyses in the S.C. MITTAL STEEL S.A. Galați upstream and downstream Siret control sections.

The analytical data obtained on the basis of the temporary determinations, allowed the saprobiotic and trophic water characterisation, from the point of view of the charge with biodegradable organic materials (pollution index) and of the nutritive content for the phytoplankton which it could also influence the water quality. It was pursued the ecological characterisation of Siret River on the portion Adjudu Vechi- Şendreni, the control section upstream S.C. MITTAL STEEL S.A. Galați. The estimation of the water quality of Siret River was done taking into account the data provided by biocenotic structure of the analysed organisms (benthos, plankton) correlated to the evolution of the main physico-chemical parameters. To obtain a correct interpretation of the biological analysis results, one must know, besides the biogenesis specific composition, the whole of the abiotic environmental factors, their influence on the biotic composition of the ecosystem, the relation between these factors and biogenesis. In the analysed portion, besides the natural factors, there are also other factors such as: the water impurification upstream and along Vrancea County, effluents with large organic loadings and a high amount of toxic substances – detergents, phenols, cyanides.

In Şendreni checking station situated in Galați County, upstream the confluence with Rm Sărat and Buzău River and where the effluents of GALCO SA Galați are discharged, chemically, the water of Siret River belongs to the II-nd category of quality following the oxygen indexes, the specific toxicity indexes and natural degradation indexes because of the excessive effluents mineralization during 2003-2006.

Biologically, the betonical association, only sometimes representative because of the level fluctuations and of the muddy riverbanks, reflects a very limited specific. There were detected some gastropods (Planorbis genus), dipters (Chironomus, Tipula), oligochaeta (Tubifex), and rarely dragonflies (Gomphus). The specific composition and the quantity of the phytoplanktonic association were highly reduced. The phytoplnaktonic species pertained to the systematic groups: Cyanophyta, Bacillariophyta, Eglenophyta. Cyanophiceae were represented by Merismopedia and Oscillatoria genera. Taking into account the organic and bacterial loading, it was discovered a limited grow of the phytoplanktonic association in the Şendreni section compared to the others upstream sections. The biological researches made in 2003-2006 of the Danube water in the Siret upstream and downstream confluence control sections, pursued the dynamics of the phytoplankton and zooplankton evolution, of the biogenosis with important significations regarding the waters quality.

The sampling of biological analyses was made concomitantly with the pshyco-chemical ones, according to the work methodology of the study of the Danube water quality. On the basis of the analytical data obtained, a saprobiotic and trophic water characterisation was made, from the point of view of the charge with biodegradable

organic materials (pollution index) and with the nutritive content (trophicity) for the phytoplankton which it could also influence the water quality. Thus, it was pursued the qualitative structure – systemic groups and species of organisms – and the quantitative structure – density cell/l, biomass mg/l moist substance.

The biological researches made in 2005-2006 pursued the ecological characterisation of Siret River in Şendreni section, situated upstream S.C. METTAL STEEL S.A. Galaț i. These researches took into account not only the natural factors but also the water impurification and the effluents upstream and along Vrancea County, effluents with large organic loadings and a high amount of toxic substances – detergents, phenols, cyanides.

In the Siret River – upstream S.C. METTAL STEL S.A. Galați control section, the analyse took into account the main pollution agents from the effluents composition - phenols, cyanides, sulphides, heavy metals, ammonia, tar, oil mineral products, etc. Once, these agents arrive in the receptor water circuit, they change the main physico-chemical and biological parameters of water quality, having serious consequences on the biological equilibrium of the aquatic ecosystem.

The impurification intensity and, consequently, the disorder of the biological equilibrium from an aquatic ecosystem depends on the type of the polluting substances , their quantity, their discharging frequency, their infiltration in the receptor, the manner and the mixture of the effluent waters with the receptor waters, the dilution process, etc. The biological researches made on the Danube River in the Siret upstream and downstream confluence control sections, in 2003 - 2006, pursued the dynamics of the evolution of the main biogenosis – phytoplankton and zooplankton – having an important role regarding the waters quality. The global structure of the phytoplanktonic association - Cyanophyta, Bacillariophyta, Euglenophyta, Pyrrophyta şi Chlorophyta – illustrated by the value 2 of the pollution index (WQI), denotes an average degree of organic substances loading, corresponding to the b-mesosaprobe area and to the II-nd category of quality.

CONCLUSIONS

- The proper purification of the effluents before draining off into the receptor is highly necessary:

- to function according to the parameters required by all the purge stations.
- to modernise all the purge installations and the equipments with which they are equipped especially those from the effluents purge stations of the cocso-chimical works, so that the respective installations work properly.
- proper purification of the effluents which came from the Malina annexe household, the pig farm (1000 pigs/ year), through the projection, the execution, and the exploitation of an adequate effluents purge station , the present attempt to purify them by treating these effluents with chloramines before draining off into the Malina River being totally inappropriate.

- It is possible to micropelletize the powder collected during the sintering processes and to reintegrate it into the production circuit.
- In order to valorise the rich iron deposits from the aerator ponds, there have been started ponds cleaning actions, which allow the reconstruction of the depositing capacity and the reintegration into the production circuit of the reusable materials.

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REFACEREA POPULAȚIILOR DE *ARNICA MONTANA* L. ÎN JUDEȚUL ARGEŞ

THE REMAKE OF THE *ARNICA MONTANA* L. POPULATION IN ARGEŞ COUNTY

CHIRIȚOIU MAGDALENA

Key words: *Arnica montana* L., repopulation, Argeş County

REZUMAT

În lucrarea de față sunt prezentate câteva date preliminare referitoare la refacerea unor populații de Arnica montana L. în habitatele din județul Argeş în care această categorie sozologică este vulnerabilă, atât în Europa, cât şi în România. O altă parte din explantele obținute în laborator vor fi folosite şi pentru inițierea unor culturi în scopuri medicinale şi ornamentale, evitându-se astfel colectarea abuzivă a plantei din natură şi, implicit, conservarea biodiversității. La finalul acestui proiect de cercetare va fi elaborată tehnologia de înmulțire in vitro, precum şi harta corologică a speciei în județul Argeş, alături de „Catalogul categoriilor sozologice din județul Argeş".

ABSTRACT

In the present paper some preliminary data regarding the remake of the Arnica montana L. population in the habitats from the Argeş County. This is a vulnerable sozological category, both in Europe and in Romania. Another part of the explants will be used for the initiation of some culture for medicinal aims as well as ornamental ones, avoiding this way the abusive gathering of the plant from nature and consequently the conservation of the biodiversity. At the end of this research project a technology of multiplication in vitro, will be figured as well as the chorological map of the species in the Argeş County, together with the "Catalogue of the sozological categories from the Argeş County".

INTRODUCTION

The species *Arnica montana* L. is a vulnerable taxa, both in Europe (ALEXIU V., 2008) and in Romania, conformable to *The Red List of the superior plants from Romania* (OLTEAN M. et al., 1994); this is why measures for the remake of the endangered phyto-populations have been taken in the Argeş County. This species is – together with other ones – part of a project financed by CNMP; the project's main goal is the study of the chorology and the percentage of the various sozological categories for the conservation and the remake of the respective population through conventional methods and multiplication biotechnologies.

MATERIALS AND METHODS

First of all, data regarding the species chorology from the specialized literature and the ones gathered in the field were compared; in the Argeş County it was found at Cheile Dâmbovicioarei, Cheile Brusturetului (POP O., 2006), M. Ghimbav: Cheile Cheii (DIACONESCU FLORIȚA, 1970), Cheile Mari ale Dâmboviței (POP O., 2006), M. Iezer-Păpuşa: Colții lui Andrei Mari, Valea Pârâului Iezer (ALEXIU V., 1998). The following habitats where *Arnica montana* is less present were identified in the field:

- The Code conformable to Directive Habitats 92/43 EEC: 6520 – Mountain hay meadows
- The Code conformable to Convention from Berna: 3.8 Continental Meadows

- EUNIS Classification: E2.2333 Eastern Carpathian yellow oatgrass meadows
- The Code from the Palearctic Habitate: 38.2 Carpathian yellow oatgrass meadows (DONIȚĂ N., 2005).

Biological material for the obtaining of the explants was also gathered. Samples of soil were gathered in this purpose and then the necessary physical and climate parameters for the multiplication technology were measured.

The spatial coordinates were measured with the GPS in order to draw the chorologic map of the species in the Argeş County.

The Project is proceeding and in its next stages the planting and the acclimatization of the new phyto-individuals will take place in the habitats where the germinal material was brought from.

RESULTS AND DISCUSSION

THE DESCRIPTION OF THE SPECIES

Arnica montana L. (2n=38) belongs to fam. *Asteraceae* and, from a coeno-taxonomic viewpoint it belongs to two associations:

Molinio-Arrhenatheretea Tx. 1937
Arrhenatheretalia Pawl. 1928,
Cynosurion R. Tüxen 1947,
Festuco rubrae-Agrostetum capillaris Horvat 1951
Molinetalia W. Koch 1926
Molinion caeruleae W. Koch 1926
Molinietum caeruleae W. Koch 1926 (COLDEA GH., 1991)

It is a herbaceous, evergreen, medicinal plant; it has hibernante vegetative organs; it is found in hay fields and wet field, meadows, bushes at the hilly, montane and sub-alpine floors; it is also called *carul pădurilor, carul zânelor, ciudă, cujdă, iarba soarelui, podbal, podbeal de munte, roit, tabacu-câmpului, lâna-oilor.*

General spreading in Europe and Siberia.

Photo 1. *Arnica montana* (original)

HISTORY

It is known since the ancient times; the Dacians used it as a medicinal plant as a cure for cuts and infected plagues, as well as for the oral inflammation, the dysenteries, diarrhea, psychic diseases, the liver diseases and flue.

ECOLOGY

The species is characteristic for a boreal and cold climate; it is micro-termophilous to termophilous, mesophilous, acid-neutrophilous. It vegetates in regions where the average yearly temperatures are 2-5^{0}C, on wet soils whose pH is 5-7.2.

THE DESCRIPTION OF THE SPECIES

Cylindrical and thick rhizome from which fibrous roots grow. The stem is erected and cylindrical and simple, rarely ramified, hairy ended with an inflorescence. The leaves are ovate or elliptical, sessile, hairless and hairy, placed in a rosette shape; the leaves from the stem are little and opposed. Yellow flowers, in calathid, the

ones from borders are ligulae, while the ones from the centre are tubular. It blooms in June-July. The fruits are hairy achenes with pappus (photo 1).

THE TECHNOLOGY OF THE CULTURE

The plants vegetate in sunny places, on wet soils which are rich in humus and well drained; the pH = 5.8-7.6. They resist to low temperatures (even -25^0 C). The sowing could be effectuated directly in the field soon after the maturation of the seeds; 6-8 kg/ha are used; at 1.5-2 cm depth; the distance between the lines 60-70 cm, while the one between the plants 20-30 cm. The seeds will be placed in cold hotbed in early spring and the obtained transplant will be transplanted in the field when the explants have two leaves. The multiplication could be also obtained in autumn or in late spring at 60×30 cm through the vegetative way, through the rhizomes gathered from 3-4 years old plantations.*

THE HARVEST

The flowers (*Arnicae flos*) are picked in June-July, at the beginning of the blossoming by cutting the inflorescences. In order to be drained they are exposed in sunlight; the artificial draining is done at about 40-50^0 C. The obtained products are packed in sacks and cloth bales and are kept in dry and well-aerated rooms.

CHEMICAL COMPOSITION

Both the roots and the flowers contain volatile oil (the roots: 0.5-1.5%; the flowers: 0.04-3.8%). It is orange and it has got an aromatic smell. It is semi-solid. The roots also contain: caffeic acid, fumaric acid, succinic acid, inulin, thymol, thymohydroquinone, methyl-ether, 3-ethylphenol, saccharose etc.

The flowers among the volatile oil also contain: arnidiol, arnisterine, faradiol, astragaline, izocvereitine, carnaubilic alchool, paraffin, and caffeic acid, carotenoids (xantophyll, xantophyllepoxid, and zeaxanthin).

PHYTOTHERAPY

The active principles of the plant have the following features: antiseptic, anti-inflammatory, antisclerotic, cholagogue and choleretic, diuretic, hypotensive. They influence the blood's flux by increasing the speed of the blood having positive inotropic and chronotropic effects. For extern use, the flowers have the following effects: ocitocic, vasoconstriction and vulnerary action. The product irritates the skin provoking erysipeloid vesicles and eruption; because of that the correct way of administration is very important. Sometimes the products based on *Arnica montana* could be abortive. Other effects: prevents the inflammation and diminishes the still existing ones; it is also used for the prevention of the sclerosis or helps to cure it, fluidizes the bile helping to eliminate it, it increases the urine quantity eliminated from the organism (PÂRVU C-TIN., 2002).

The oil extracted from the plant is used as flavour in the industry of drinks and in the composition of the skin creams in the cosmetics industry.*

CONCLUSIONS

Arnica montana L. is a vulnerable taxon both in Europe and Romania. After some field researches it resulted that *Arnica montana* L. exists in some habitats but in a less quantity. Because of that a remake of those populations and the application of a work methodology for faster obtaining new individuals are necessary. They will be planted in the places where the biologic material was gathered and they will be used in medicinal, alimentary, and ornamental aims; thus, the abusive gathering will be avoided and the biodiversity will be preserved. The data about the multiplication *in vitro* technology and the explants' acclimatization will be completed in the following stages of the project.

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STRUCTURA ARBORETELOR DE CER ŞI GÂRNIŢĂ DIN CÂMPIA OLTENIEI

THE STRUCTURE OF THE QUERCUS CERRIS AND QUERCUS FRAINETTO FOREST STANDS FROM OLTENIA PLAIN

FLORIN - DORIAN COJOACĂ

Key words: structure, forest, distribution, Oltenia plain.

REZUMAT

Gârniţa şi cerul, specii de quercus termofile şi mezoxerofite, au o largă răspândire în Câmpia Olteniei, ocupând împreună o suprafaţă de cca.14700 ha.

Lucrarea prezintă specificul structural al cereto-gârniţetellor din Câmpia Olteniei. În urma prelucrărilor specifice s-au determinat parametrii statistici ai distribuţiilor experimentale pentru suprafeţele eşantionate.

Distribuţiile experimentale întâlnite în arboretele de cer şi gârniţă la data eşantionării au fost optimizate cu ajutorul distribuţiilor teoretice Charlier tip A şi Beta.

Prin modelarea distribuţiilor experimentale, lucrarea surprinde dinamica stucturii arboretelor de cer şi gârniţă din această zonă a ţării.

ABSTRACT

The quercus frainetto and the quercus cerris are quercus termofile and mezoxerofite species and have a widely spread in Oltenia plain, they fill together an area of about 14700 ha.

This work presents the structural specific of the quercus cerris and quercus frainetto from Oltenia plain.

After the specific processing, there were determined the statistical parameters of the experimental distributions for the sampled areas.

These experimental distributions that were met in the quercus cerris and quercus frainetto forest stands at the sampling time were optimised with the help of theoretic distributions (Charlier A and Beta distribution).

Through the modelling of the experimental distributions, the work surprises the dynamics of quercus cerris and quercus fraineto forest stands structure from Oltenia plain.

1. INTRODUCTION

The quercus frainetto and the quercus cerris, termofile and mezoxerofile species, have a large extent in Oltenia plain, they occupy together around 14700 ha.

The research were located in Oltenia plain, especially because of the features of the quercus cerris and quercus frainetto forests from this area, features that could be explained through the mosaic of the stationary conditions, especially concerning the ground. The distribution of this species is limited to south by the humidity of the air during summer and by the presence of the grounds with sandy structure.

The investigations with biometric data that were made, try to deepen and to complete what is known about the dynamics of the structure of quercus cerris and quercus frainetto forest stands from the area chosen to study. Such research are meant finally to be valued for practical purposes, both for a rational leading of the arbors and for the insurance of a better stability of them, a stability of the forests production in general.

Nowadays, when the growth of multipurpose role of the forests, the increase of the technology level in working for a better organization of the forests, the deepen of the

experimental investigations and the obtaining of new data in this domain is a fully justified goal.

2. MATERIALS AND METHODS

Having in consideration the area occupied by the quarks cerise and quarks frailest (14687,3 ha), for the selection of the investigated forest stands, it was used the deliberately sample. Through the consultation of the forest management plans, it was firstly realised, the detailed acquaintance of the studied area, but also the identification of the forestry from the Oltenia plain that have cerris and girne in their component.

Further, the attention of the research was directed especially to the pure forest stands of quercus cerris and quercus frainetto (there were considered pure all the forest stands which had in their composition one of the species of quercus cerris or quercus frainetto in a percentage of 8/10 or more).

The research was restricted to areas with large extent of the both species, especially to surprise the average conditions in which the species live with the goal of not influencing the conclusions with general character for this observed territory.

The analyse of the structure of the forest stands was realised by using experimental markets located in forest stands representative for the growth conditions and was based on counting and measuring. The arranged units in which the markets were located were chosen so that the entire surface of both studied species is covered.

The experimental areas were located in the contents of the arranged unit in sections of forest stands that were highly homogeneous in point of their age, composition, stationary conditions, density, the way of trees distribution.

Also for the spread of the research in the studied area (Oltenia plain) and for the location of the experimental surfaces from each forestry, there were taken in consideration the weight of quercus cerris and quercus frainetto, the structure on age classes, production classes and the forest stands consistency, but also the stationary and typical considerations, after consulting various topography descriptions from arranged units.

The inventory itself consisted in measuring the diameters of the base and total heights for all the trees from the experimental markets.

This way the research material consists in 17 experimental surfaces (10 quercus cerris surfaces and 7 quercus frainetto surfaces) of rectangular shape of 2000 m^2 installed on the entire area of species (figure 1).

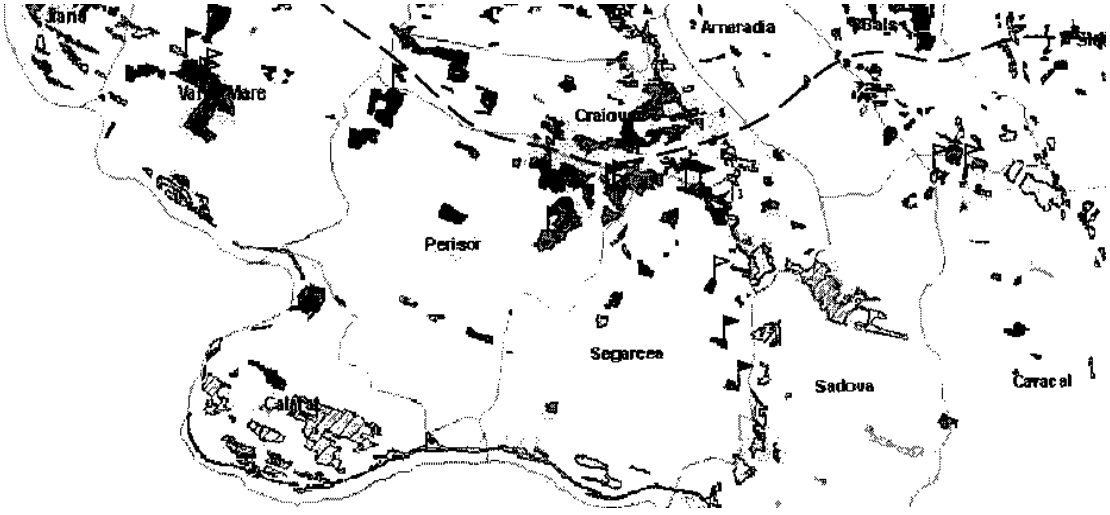

Figure 1 – Mapping of the experimental surfaces

The randomized distribution of the sample surfaces ensures the forest stands study in several conditions: stationary, age, productivity, etc. (table 1).

Table 1

General al data for characterising from experimental surfaces

Experi-mental surface	Forestry	Produc tion unit	a.u.	Surface ha	Conditi-ons site*	Type of forest**	Produc - tion class	Consis-tency	Age	Compo-sition
Quercus cerris										
Se_1	Perisor	I Verbicioara	123B	12,1	8.3.2.2.	712.3	III	0,8	105	10CE
Se_2		III Târnava	31E	0,8	9.5.3.0.	713.2	III	0,8	40	10CE
Se_3		IV Fântânele	195B	3,3	8.3.2.2.	712.3	III	0,9	35	8CE2GÂ
Se_4			220A	13,1	8.3.2.2.	712.3	III	0,9	55	9CE1GÂ
Se_5	Vânju Mare	II Lunca Vânjului	97A	5,9	8.3.2.2.	712.3	III	0,8	50	10CE
Se_6		X Viaşu	45J	4,1	8.3.2.3.	712.1	II	0,9	55	10CE
Se_7	Segarcea	V Dâlga	23A	14,8	8.3.2.2.	712.3	III	1,0	30	8CE2DT
Se_8		VI Drănic	10A	9,5	3/349	713.1	II	0,8	70	9CE1FR
Se_9			19E	17,8	3/349	713.1	II	0,9	55	10CE
Se_{10}			37B	6,1	9.5.3.0.	713.2	III	0,9	50	10CE
Quercus frainetto										
Se_{11}	Perisor	IV Fântânele	183B	1,3	8.3.2.2.	721.3	III	0,7	55	10GÂ
Se_{12}	Vânju Mare	III Pătule	95	15,6	8.3.2.3.	721.1	II	0,8	70	8GÂ1CE1TE
Se_{13}			99C	5,6	8.3.2.3.	721.1	II	0,9	60	8GÂ2CE
Se_{14}			105C	8,2	8.3.2.2.	721.3	III	0,9	60	8GÂ1CE1TE
Se_{15}	Segarcea	V Dâlga	37D	13,0	8.3.2.2.	721.3	III	0,9	40	9GÂ1CE
Se_{16}	Caracal	IX Cezieni	54C	14,5	8.3.2.3.	721.1	II	0,9	35	8GÂ2DT
Se_{17}	Amaradia	IV Viişoara	46N	6,4	8.3.2.2.	721.3	III	0,7	55	10GÂ

* 8.3.2.2. - quercus cerris-quercus frainetto plain forest, foxy, different, pseudogleizated, middle edaphic ground (Bm);
8.3.2.3. - quercus cerris - quercus frainetto plain forest, foxy, podzolic, big edaphic ground (Bs);
9.5.3.0. - intern forest steppe,mezoxerophile-xerophile degraded on fine clay (Bm);
3/349 - intern forest steppe ,mezoxerophile-xerophile cvercete (oak, flasks and sky), podzolic edaphic medium with meso-xerophytes grass degraded, weak, podzolic, pseudo-gleizated sole (Bs);
** 712.1 – normal plain quercus cerris (s);
712.3 –quercus cerris from the plain region (m);
721.1 – plateau quercus frainetto of superior productivity (s);
721.3. – plain quercus frainetto of medium productivity (m).

The structures were analysed compared to the number of trees through the parameters of the experimentally distribution - the minimum, the maximum, the amplitude, the average, the variant, the standard deviation, the coefficient of variation and through mathematic expressions of the coefficients of the theoretic devoted special literature (Giurgiu, 1979, 2004; Leahu, 1994).

The comparison of the experimental distribution with the theoretic ones from the point of view of the parameters (averages, standard deviation, variation and the coefficient of variation) were made on the base of the compliance test.

Referring to the mathematic modelling, this was used in the study of the forest stands structure compared to the biometric characteristics of the trees. In this respect were used functions and regression equations known and recommended for the forest stands with regular structure, echiens (Giurgiu, 1979; Leahu, 1994).

3. RESEARCH RESULTS

3.1. THE STRUCTURE OF QUERCUS CERRIS CERRIS AND QUERCUS FRAINETTO FROM OLTENIA PLAIN

The structure of forest stands expresses normally their composition. Forest stands are defined by indicating the structure, ie by specifying the distribution of constituents in relation to different variables of them. The structure is determined by the diversity of tree components, the numerical and spatial relationships between trees of various kinds, etc.. Therefore, the structure of forest stands are spatial and temporal relations between components. The knowledge of forest stands structure provides scientific information for the development of biometric processes that makes it possible interpretation of the results in terms of variability and probability theory (Leahu, 2001). Thus one can achieve a relatively mild highlighting of the correlations between different characteristics of tree species components.

Given the complexity of factors involved in defining the structure of forest stands, based on actual conditions were established structural models that satisfy the conditions stationed and socio-economic and environmental objectives of forest stands of quercus cerris and quercus frainetto of Oltenia Plain.

3.1.1.THE DISTRIBUTION OF FOREST STANDS IN RELATION TO TREES DIAMETER

To capture the structural specificity of distribution of the number of trees in a stand, it is necessary to reach a deeper understanding of their dimensional differentiation. In this regard, it is known that a relatively echien or echien stand in relation to age, there is a continuous process of crossing from one tree to another chenotic class, which can be lower or higher. In general, there is a change from a higher class in a lower, thus feeding the natural elimination process that occurs with lower intensity on inferior chenotic classes (Leahu, 1994).

Dimensional gap of trees occurs both because of differences of biologic individual potential and because of the action of the interior environment in air and soil. Structural differentiation in the stands is therefore a consequence of the state of integrity and eventually leads to the natural elimination of trees, following the characteristic of self-adjuement of biological systems.

In the statistical analysis of forest populations, base diameter (at 1.30 m) is the most important biometric indicator of dimensional characterization of forest stands, both on its relevance regarding the tree form but because of the facilities in measurement, processing and interpretation.

The distribution of trees number per diameter classes for quercus quercus cerris-quercus frainetto from Oltenia plain, was obtained from the total inventory of trees in the 17 experimental areas and specific processing.

In terms of distribution of trees by diameter classes, the structure of the 17 stands for quercus quercus cerris and quercus frainetto sampled is generally similar. This is the result of both the management way through silvicforest planning of quercus cerris - quercus frainetto in Oltenia plain and of how the environmental requirements of the two species correlate with stational potential. Thus, the frequency curves for the distribution of diameters of trees in categories, in addition to being presented a higher frequency of medium-sized tree of categories, is characterized, with some exceptions, and an extension of the right branch, ie a positive asymmetry, the left one (Fig. 2, 3). The extension of the right branch frequency curve is due to ecological basis, as determined by the unabated growth of thick trees that develop open crown, they are less influenced by other trees in

lower ceilings. In the process of differentiation the vigurous trees become more favorable positions for the accumulation of woody biomass. As observed in Figures 2 and 3 a small number of favoured trees reach larger diameters by impairing a much larger number of specimens with small diameters.

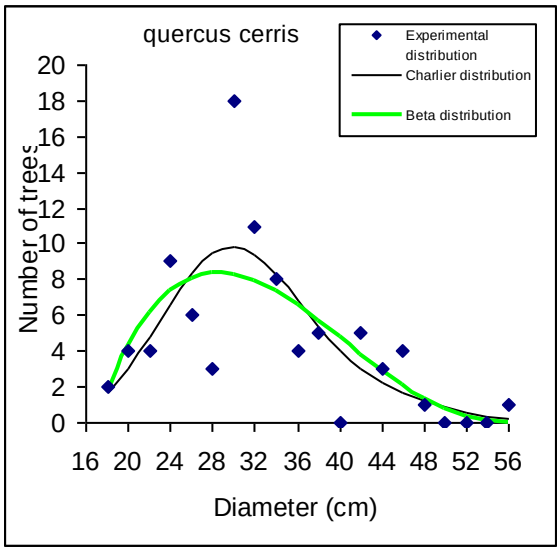

Fig. 2 The adjustment of the experimental distribution of the number of trees in diameter classes with theoretical distribution Charlier A and beta stand in Se_1

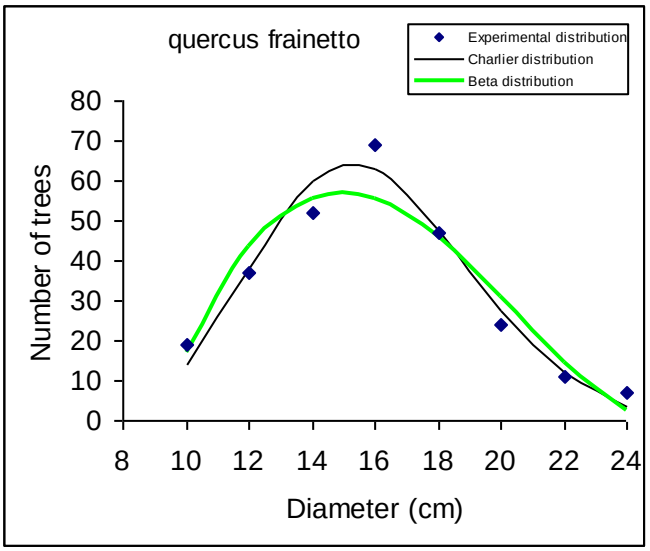

Fig. 3 The adjustment of the experimental distribution of the number of trees in diameter classes with theoretical distributions Charlier A and beta stand in Se_{15}

To determine a theoretical number of trees on diameters categories as close to the experimental distribution for forest stands of quercus cerris and quercus frainetto in Oltenia Plain, was used the characterization of their structure by Charlier distribution, type A and Beta distribution (specific to echien relatively echien structures), features that can be adapted to a variety of experimental distribution (Fig. 2, 3).

To characterize the experimental distributions of the number of trees per diameter class for quercus cerris - quercus frainetto from Oltenia Plain were determined statistical parameters used to offset their experimental values (Table 2).

Table 2

Statistical parameters of the experimental distribution of the number of trees in diameter classes

Specifications	Se_1	Se_2	Se_3	Se_4	Se_5	Se_6	Se_7	Se_8	Se_9	Se_{10}
0	1	2	3	4	5	6	7	8	9	10
Quercus cerris										
Minimal (cm)	18,00	8,00	6,00	6,00	12,00	14,00	8,00	20,00	22,00	14,00
Maximal (cm)	56,00	30,00	20,00	34,00	30,00	44,00	18,00	40,00	40,00	26,00
Amplitude (cm)	38,00	22,00	14,00	28,00	18,00	30,00	10,00	20,00	18,00	12,00
Average (cm)	31,68	17,41	12,61	21,02	19,31	25,80	12,06	30,45	29,79	18,59
Varianța (cm^2)	58,23	17,82	11,69	19,96	15,35	44,48	3,89	20,74	15,62	7,29
Standard deviation	7,63	4,22	3,42	4,47	3,92	6,67	1,97	4,55	3,95	2,70
The coefficient of variation	24,09	24,24	27,11	21,25	20,29	25,85	16,36	14,96	13,27	14,52
The standard deviation of the average (cm)	0,81	0,26	0,17	0,36	0,28	0,64	0,10	0,46	0,45	0,19
Index of asymmetry (A)	0,59	0,11	- 0,29	-0,72	0,23	0,64	0,33	0,02	0,25	0,53
Index of excess (E)	0,20	-0,04	- 0,53	1,74	-0,39	0,12	- 0,33	-0,58	-0,42	-0,01

α*	2,41	2,01	1,12	4,46	1,21	0,81	2,38	1,51	1,33	1,16
γ*	0,98	2,93	1,34	3,76	2,12	1,72	3,64	1,33	1,97	2,26

Quercus frainetto							
Specifications	Se_{11}	Se_{12}	Se_{13}	Se_{14}	Se_{15}	Se_{16}	Se_{17}
Minimal (cm)	10,00	16,00	14,00	14,00	10,00	8,00	10,00
Maximal (cm)	32,00	38,00	32,00	36,00	24,00	22,00	32,00
Amplitude (cm)	22,00	22,00	18,00	22,00	14,00	14,00	22,00
Average (cm)	20,33	26,17	24,10	24,17	15,80	13,93	17,81
Varianța (cm^2)	28,22	24,06	18,82	20,24	10,57	11,81	25,47
Standard deviation	5,31	4,90	4,34	4,50	3,25	3,44	5,05
The coefficient of variation	26,13	18,74	18,00	18,62	20,58	24,67	28,34
The standard deviation of the average (cm)	0,39	0,48	0,43	0,43	0,20	0,20	0,36
Index of asymmetry (A)	0,01	0,11	-0,18	0,34	0,30	0,26	0,49
Index of excess (E)	-0,83	-0,06	-0,62	0,34	-0,27	-0,42	-0,34
α*	0,93	1,31	1,36	1,31	1,09	0,87	0,56
γ*	1,16	1,65	0,89	1,65	1,83	1,45	1,69

- α and γ are exponents for Beta function

The comparison of the experimental distribution of the number of trees per diameter classes for quercus cerris and quercus frainetto from Oltenia plain in the sampled areas compared with theoretical distributions Charlier type A and Beta was achieved by χ^2 and Kolmogorov-Smirnov adjusting tests, both being recognized for statistical examination of the significance. For all the forest stands considered, the experimental value is lower than the theoretical value, indicating that the experimental data follows the two legitimacies (Table 3).

Table 3

Compliance tests

Experi-mental surface	Statiscal test							
	$\chi^2_{teoretic5\%}$				Kolmogorov -Smirnov			
	Charlier distribution		Beta distribution		Charlier distribution		Beta distribution	
	Experi-mental value	Teoretical value (p=5%)	Experi-mental value	Teoretical value (p=5%)	Experi-mental value	Teoretical value (p=5%)	Experi-mental value	Teoretical value (p=5%)
Se_1	2,027	27,587	2,058	28,869	0,091	0,293	0,063	0,293
Se_2	0,317	16,919	0,726	18,307	0,017	0,376	0,021	0,376
Se_3	4,905	11,070	6,878	12,592	0,060	0,448	0,053	0,448
Se_4	1,134	21,026	1,630	22,362	0,035	0,342	0,045	0,342
Se_5	0,935	14,067	1,062	15,507	0,054	0,405	0,022	0,405
Se_6	0,760	22,362	0,907	23,685	0,081	0,331	0,061	0,331
Se_7	2,758	7,815	0,364	9,488	0,049	0,516	0,018	0,516
Se_8	0,270	15,507	0,218	16,919	0,035	0,390	0,015	0,390
Se_9	0,337	14,067	0,254	15,507	0,047	0,405	0,015	0,405
Se_{10}	0,871	9,488	0,635	11,070	0,050	0,478	0,023	0,478
Se_{11}	0,500	16,919	0,054	18,307	0,043	0,376	0,007	0,376
Se_{12}	0,686	16,919	1,263	18,307	0,035	0,376	0,054	0,376
Se_{13}	0,216	14,067	0,152	15,507	0,023	0,405	0,020	0,405
Se_{14}	0,961	16,919	1,461	18,307	0,057	0,376	0,056	0,376
Se_{15}	0,563	11,070	1,210	12,592	0,033	0,448	0,023	0,448
Se_{16}	0,782	11,070	1,466	12,592	0,034	0,448	0,024	0,448

Se_{17}	1,001	16,919	0,193	18,307	0,083	0,376	0,017	0,376

Therefore, the structure of forest stands of quercus cerris and quercus frainetto from Oltenia Plain in terms of distribution of trees in relation to the diameter, is characterized by a very flexible graphic frequency curve of a particular asymmetry and flattening, which confirms previous similar research of forest stands in echiens and relatively echiens (Armăşescu, 1981).

The knowledge of forest stands structure, in terms of distribution of the number of trees per diameter classes, is important for determining both the structure per ranges volume and the setting of the volume on dimensional ranges compared to age.

3.1.2. THE DISTRIBUTION OF FOREST STANDS IN RELATION TO TREES HEIGHT

The full characterization of forest stands structure assumes, however, the knowledge of distribution of the number of trees in relation to their height. Thus, when inventory conducted in the 17 experimental areas were determined and there were determined the total heights of all trees.

Despite the genetic homogeneity, the age and the stational conditions the height of the tree from the forest stands of cerris and girne taken in the study, presents obvious variations from copy to copy. This variability is due to competition for light in the crown.

The distribution on classes of cerris and girne from Oltenia plain follows known distribution laws and can be expressed by an asymmetrical frequency curve, the characteristic being the negative asymmetry (right), the opposite than in the case of diameters (Fig. 4, 5).

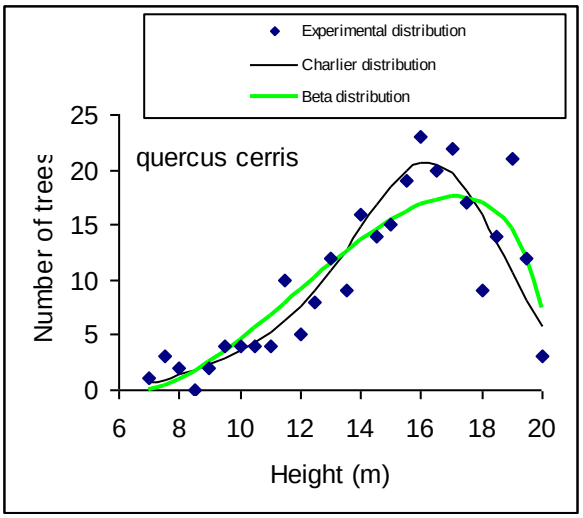

Fig. 4 The adjustment of the experimental distribution of the number of trees in heights classes with theoretical distribution Charlier A and beta stand in Se_2

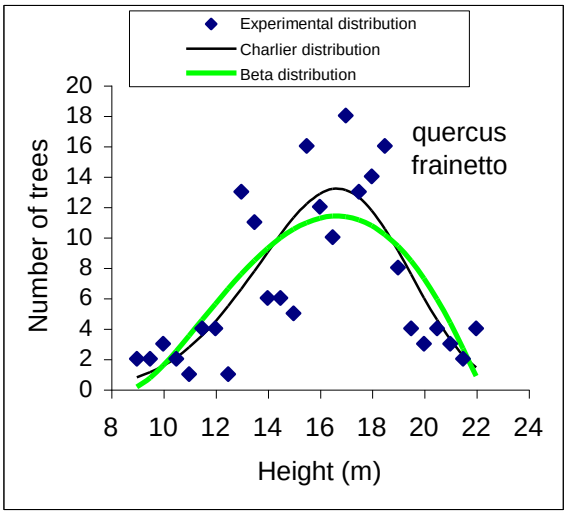

Fig. 5 The adjustment of the experimental distribution of the number of trees in heights classes with theoretical distributions Charlier A and beta stand in Se_{11}

The extension of the left branch of the curve of frequency has organic explanations, starting from the light relations of the trees at the level of the crown. In the competition for light in the tree crown, they seek to occupy positions as favorable to the light, accelerating their growth in height at the expense of the growth in diameter. It is produced like this an agglomeration of trees favored in their higher ceiling, respectively in large height classes . The lower height classes held intense embarrassed relationships, and many of these categories are involved in the process of natural elimination. Thus, is carried the upward extension branch of the frequency curve.

Following the general trend of the distribution of the number of trees on categories of heights, for the adjustment of the experimental frequencies were used, as with diameters, Charlier function and Beta function (Fig. 4, 5). These features allow a better adaptation to different actually distributions of the number of trees on heights categories.

To characterize the experimental distributions of the number of trees per height class for quercus cerris and quercus frainetto from Oltenia plain were determined their statistical parameters used to compensate the experimental data (Table 4).

Table 4

Statistical parameters of the experimental distribution of the number of trees by height class

Specifications	Se_1	Se_2	Se_3	Se_4	Se_5	Se_6	Se_7	Se_8	Se_9	Se_{10}
0	1	2	3	4	5	6	7	8	9	10
quercus cerris										
Minimal (cm)	19,00	7,00	4,00	6,00	12,00	14,00	8,00	19,00	19,00	13,00
Maximal (cm)	27,50	20,00	16,50	17,50	22,50	27,00	18,00	26,50	22,50	23,50
Amplitude (cm)	8,50	13,00	12,50	11,50	10,50	13,00	10,00	7,50	3,50	10,50
Average (cm)	23,01	15,42	12,23	14,79	17,48	21,66	12,00	24,37	21,10	17,46
Varianța (cm^2)	3,14	8,06	8,78	3,75	8,18	12,85	4,20	2,56	0,68	6,46
Standard deviation	1,77	2,84	2,96	1,94	2,86	3,59	2,05	1,60	0,82	2,54
The coefficient of variation	7,71	18,41	24,22	13,09	16,37	16,55	17,08	6,56	3,91	14,56
The standard deviation of the average (cm)	0,19	7,00	0,15	0,15	0,20	0,34	8,00	0,16	0,09	0,18
Index of asymmetry (A)	-0,27	-0,66	-1,04	-2,65	-0,21	-0,55	0,19	-1,13	-0,37	0,22
Index of excess (E)	-0,23	-0,01	0,48	8,50	-1,06	-0,82	-0,33	1,14	-0,16	-0,77
α*	1,56	1,69	1,20	3,62	0,40	0,43	1,15	1,97	1,76	0,53
γ*	1,86	0,50	0,17	0,51	0,29	0,01	2,17	0,26	0,94	1,05
quercus frainetto										
Specifications	Se_{11}	Se_{12}	Se_{13}	Se_{14}	Se_{15}	Se_{16}	Se_{17}			
Minimal (cm)	9,00	14,00	12,50	12,50	8,00	7,00	10,00			
Maximal (cm)	22,00	25,00	23,50	23,00	18,50	17,00	22,00			
Amplitude (cm)	13,00	11,00	11,00	10,50	10,50	10,00	12,00			
Average (cm)	16,16	20,40	19,51	17,96	13,31	12,39	15,06			
Varianța (cm^2)	8,02	6,02	6,76	5,17	6,40	6,71	7,47			
Standard deviation	2,83	2,45	2,60	2,27	2,53	2,59	2,73			
The coefficient of variation	17,53	12,03	13,32	12,66	19,00	20,91	18,16			
The standard deviation of the average (cm)	0,21	0,24	0,26	0,22	0,16	0,15	0,19			
Index of asymmetry (A)	-0,33	-0,48	-0,89	0,03	0,16	-0,32	0,06			
Index of excess (E)	-0,22	-0,20	-0,10	0,02	-0,68	-0,90	-0,34			
α*	1,54	1,52	1,25	1,51	0,89	0,66	0,76			
γ*	1,09	0,84	0,31	1,33	0,84	0,43	1,36			

- - α and γ are exponents for Beta function

The modelling of experimental distributions of the number of trees per height class for quercus cerris and quercus frainetto in Oltenia plain from sampled areas is done in good conditions by applying theoretical distributions Charlier type A and Beta, as

demonstrated by applying statistical tests χ^2 and Kolmogorov-Smirnov, in all cases the experimental value is lower than the theoretical value (Table 5).

Table 5

Compliance tests

Experi-mental surface	Statiscal test							
	$\chi^2_{teoretic5\%}$				Kolmogorov -Smirnov			
	Charlier distribution		Beta distribution		Charlier distribution		Beta distribution	
	Experi-mental value	Teoretical value (p=5%)	Experi-mental value	Teoretical value (p=5%)	Experi-mental value	Teoretical value (p=5%)	Experi-mental value	Teoretical value (p=5%)
Se_1	0,721	24,996	0,901	26,296	0,043	0,311	0,046	0,311
Se_2	1,475	36,415	0,987	37,652	0,024	0,253	0,034	0,253
Se_3	5,020	35,172	4,624	36,415	0,060	0,257	0,081	0,257
Se_4	6,102	32,671	7,095	33,924	0,046	0,266	0,156	0,266
Se_5	6,099	30,144	5,381	31,410	0,096	0,278	0,052	0,278
Se_6	2,081	36,415	1,673	37,652	0,070	0,253	0,073	0,253
Se_7	2,066	28,869	2,481	30,144	0,041	0,285	0,032	0,285
Se_8	5,829	22,362	5,101	23,685	0,045	0,331	0,099	0,331
Se_9	0,472	11,070	0,821	12,592	0,018	0,448	0,043	0,448
Se_{10}	1,135	30,144	0,891	31,410	0,069	0,278	0,024	0,278
Se_{11}	1,551	36,415	1,693	37,652	0,033	0,253	0,059	0,253
Se_{12}	0,939	31,410	0,997	32,671	0,033	0,271	0,057	0,271
Se_{13}	1,829	31,410	1,447	32,671	0,067	0,271	0,085	0,271
Se_{14}	1,091	30,144	1,541	31,410	0,064	0,278	0,091	0,278
Se_{15}	1,905	30,144	1,947	31,410	0,049	0,278	0,057	0,278
Se_{16}	4,419	28,869	3,684	30,144	0,075	0,285	0,043	0,285
Se_{17}	3,631	33,924	4,235	35,172	0,073	0,261	0,051	0,261

3.1.3. THE DIAMETERS – HEIGHT CORRELATION

To the establishment of relations between the diameters and heights of quercus cerris and quercus frainetto forest stands from Oltenia plain was taken in consideration the rule that expresses the strong link between structural horizontally and vertically layout in a stand, which manifests itself as a legitimate correlation of the structure of forest stands. Acting on this legitimacy by taking care and managing works it is obtained a nearness of the real structure of forest stands to the corresponding structure to a production and protective effect which becomes greater.

The statistical relationship between diameter and height in forest stands with echiene structure is curvilinear and it is correctly expressed by the following regression equation recommended in the scientific literature (Leahu, 1994):

$h = a_0 + a_1 d + a_2 d^2$, where:

h is the average height corresponding to the diameter d;

d - diameter category;

a_0, a_1, a_2 - equation of regression coefficients specific to each type of structure to stand.

Analyzing the correlation between the diameters and heights of quercus cerris and quercus frainetto in studied echiene forest stands, it is stated that from the lower diameter class to the upper ones, heights are becoming larger. In the same category of diameters one can meet different values for height, and overall averages are set in order after a fairly regular curve (Fig. 6, 7).

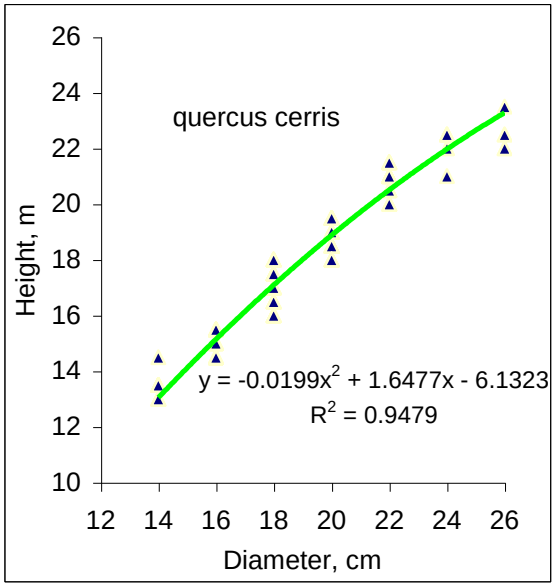

Fig. 6 The correlation between diameters and heights in the quercus cerris forest stand Se_{10}

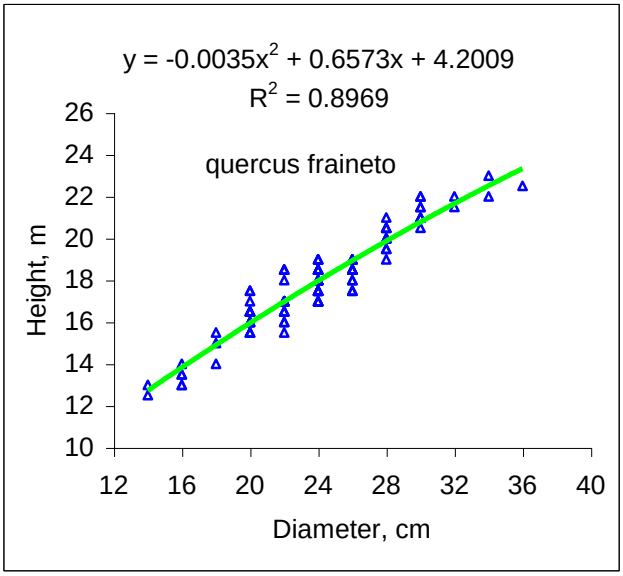

Fig. 7 The correlation between diameters and heights in the quercus frainetto forest stand Se_{14}

The analysis of the structure of trees in forest stands in terms of distribution of diameters and heights categories contributes to both the knowledge of legitimacies referring to the variation of these two important features of trees in a stand and the establishment of correlations between them (Table 6). The correlation coefficients (r) which expresses the relationship between diameter and height, with values ranging from 0.9414 to 0.9816 at quercus cerris, and from 0.9324 to 0.9707 at quercus frainetto (Table 6) shows that the structure of quercus cerris and querus frainetto the point of the correlation between the diameters and heights it is submitted to the principle of unity between part and whole, which means that the horizontally or vertically structure in a stand can be conceived only in close relationship with the whole structure in a stand that is unitarian and indivisible.

Table 6

The values of coefficients a_0, a_1, a_2 and of correlation coefficients

Specifi-cations	Se_1	Se_2	Se_3	Se_4	Se_5	Se_6	Se_7	Se_8	Se_9	Se_{10}
	Quercus cerris									
a_0	11,339	-2,9496	-4,4375	-0,9001	-5,1966	-6,0339	0,9487	-3,6629	8,9295	-6,1323
a_1	0,5155	1,5112	2,0049	1,2362	1,6798	1,6416	0,8915	1,555	0,6207	1,6477
a_2	-0,0044	-0,0247	-0,0504	-0,00223	-0,0251	-0,0206	0,002	-0,0204	-0,007	-0,0199
correlation coefficient	0,9560	0,9816	0,9472	0,9500	0,9660	0,9725	0,9414	0,9496	0,9540	0,9736
Specifi-cations	Quercus frainetto									
	Se_{11}	Se_{12}	Se_{13}	Se_{14}	Se_{15}	Se_{16}	Se_{17}			
a_0	2,4927	2,7176	-9,9671	4,2009	-0,2737	-3,5894	2,6446			
a_1	0,86	0,9017	1,9737	0,6573	0,979	1,607	0,8771			
a_2	-0,0086	-0,0083	-0,0302	-0,0035	-0,0072	-0,0311	-0,0094			
correlation coefficient	0,9615	0,9324	0,9457	0,9470	0,9707	0,9752	0,9726			

3.2. THE CURRENT STRUCTURAL MODEL OF QUERCUS CERRIS AND QUERCUS FRAINETTO FOREST STANDS IN OLTENIA PLAIN

The optimum organization of forest biocenoses implies:

- the forming of optimal structures in composition relation respectively the optimization of the forest stands composition;
- achieving optimal rescheduling of trees vertically;
- adjusting the number of individuals per unit area (density optimization of forest stands).

The directing of the forest stands to the optimal structure is achieved by applying a system of appropriate forest- technical interventions which are adapted to stational growth and development conditions of forest stands.

The obtaining of a current structural model of the studied quercus cerris and quercus frainetto forest stands was achieved by adjusting the total number of trees by diameter and height categories with Charlier type A and Beta distributions (Fig. 8-15). The parameters of optimal distributions were established using the average of relative theoretical frequency of the number of trees and the average of the number of trees in the sampled forest stands (Table 7).

Table 7

Statistical parameters of the actual distribution throughout the experimental area of quercus cerris and quercus frainetto

Specifications	Quercus cerris		Quercus frainetto	
	Diameters	Heights	Diameters	Heights
Minimal (cm)	6,00	4,00	8,00	7,00
Maximal (cm)	56,00	27,50	38,00	25,00
Amplitude (cm)	50,00	23,50	30,00	18,00
Average (cm)	18,10	15,74	18,61	15,29
Varianța (cm^2)	54,24	21,39	35,54	13,89
Standard deviation	7,36	4,62	5,96	3,73
The coefficient of variation	40,68	29,38	32,04	24,38
The standard deviation of the average(cm)	0,16	0,10	0,17	0,10
Index of asymmetry (A)	1,02	0,32	0,51	0,14
Index of excess (E)	1,07	-0,31	-0,35	-0,57
α*	1,12	1,86	1,05	1,36
γ*	5,28	1,87	2,61	1,76

- - α and γ are exponents Beta function

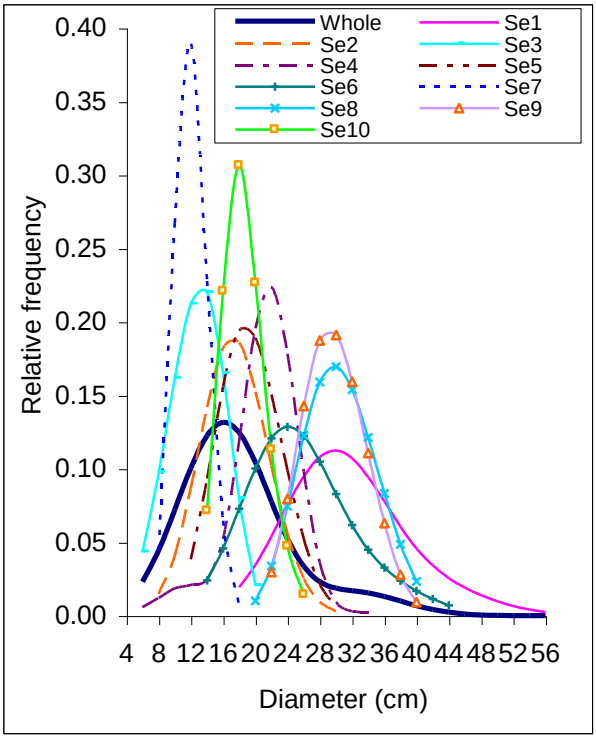

Figure 8 The modelling of the distribution of the number of trees in categories of diameters and the establishment of the best distribution through the theoretical Charlier distribution on quercus cerris from *Oltenia plain*

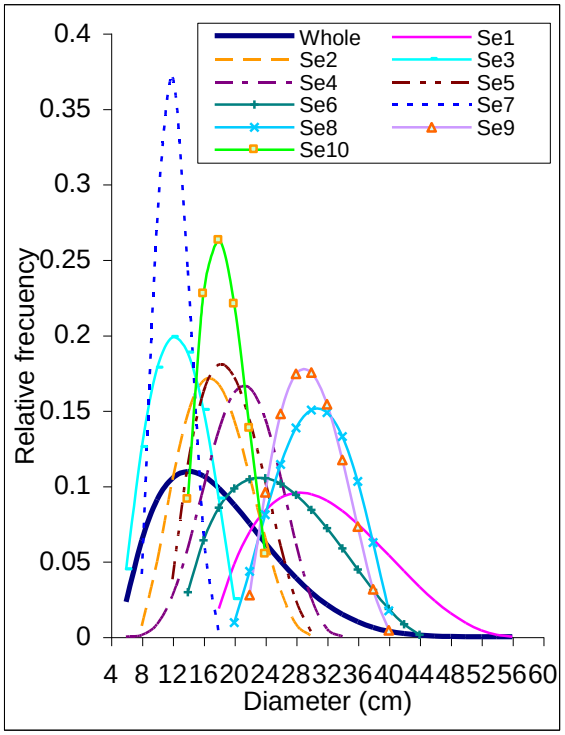

Figure 9 The modelling of the distribution of the number of trees in categories of diameters and the establishment of the best distribution through the theoretical Beta distribution on quercus cerris *from Oltenia plain*

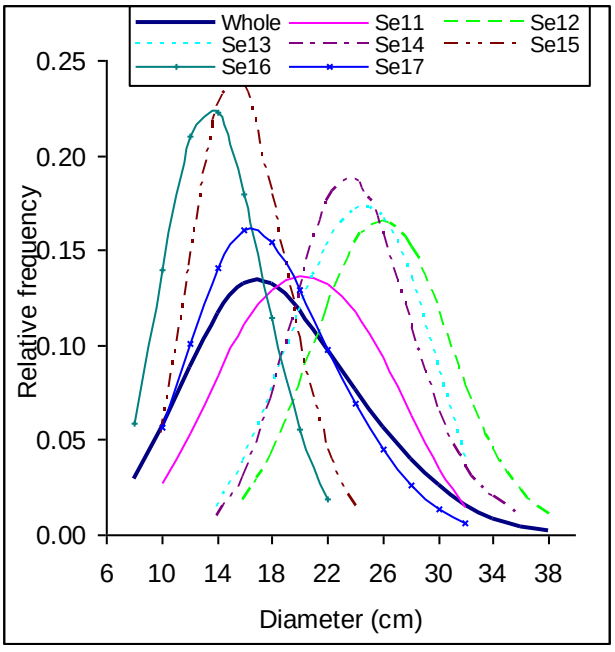

Figure 10 The modelling of the distribution of the number of trees per diameter class and the setting of the optimal distribution through Charlier theoretical distribution on quercus frainetto from Oltenia plain

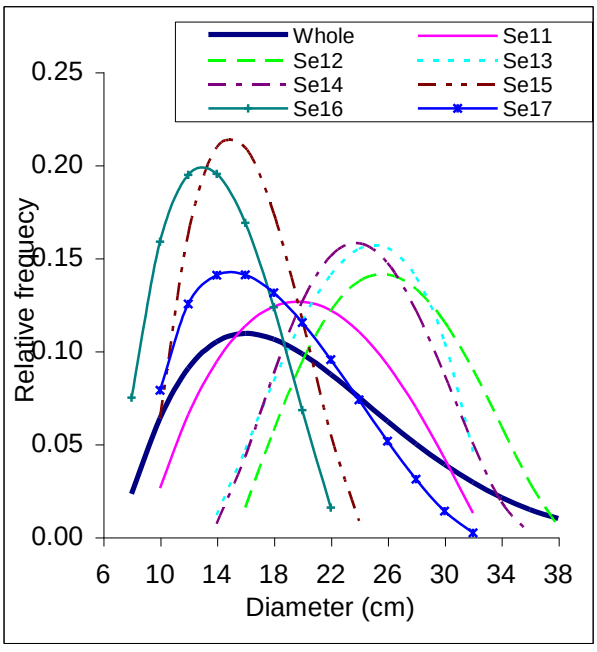

Figure 11 The modelling of the distribution of the number of trees per diameter class and the setting of the optimal distribution through Beta theoretical distribution on quercus fraineto from Oltenia plain

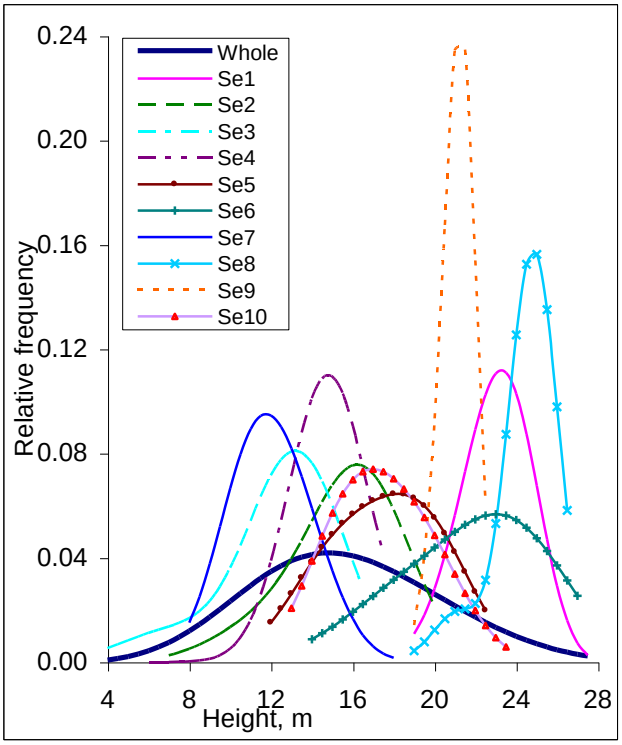

Figure 12 The modelling of the distribution of the number of trees on high chategories and the setting of the optimal distribution through Charlier theoretical distribution on quercus cerris from Oltenia plain

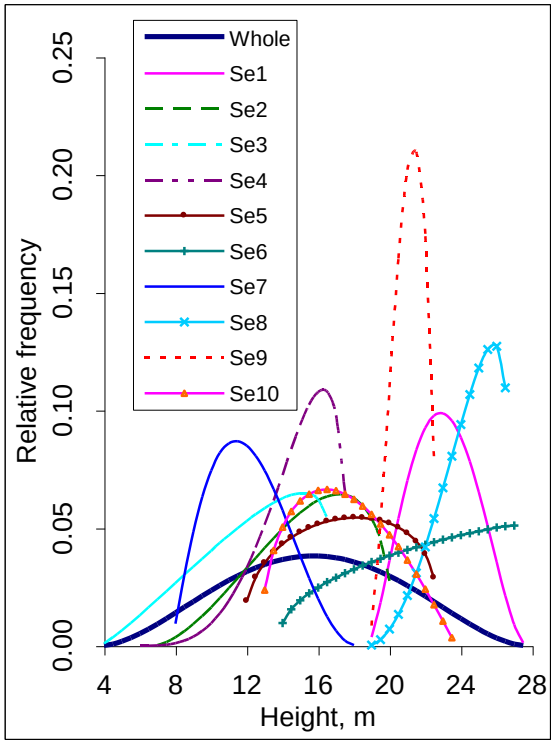

Figure 13 The modelling of the distribution of the number of trees on high chategories and the setting of the optimal distribution through Beta theoretical distribution on quercus cerris from Oltenia plain

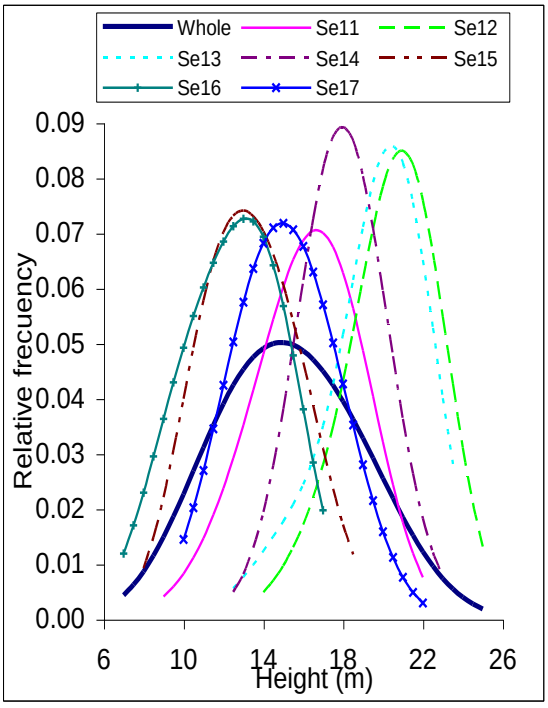

Figure 14 The modelling of the distribution of the number of trees on high categories and the setting of the optimal distribution through Charlier theoretical distribution on quercus fraineto from Oltenia plain

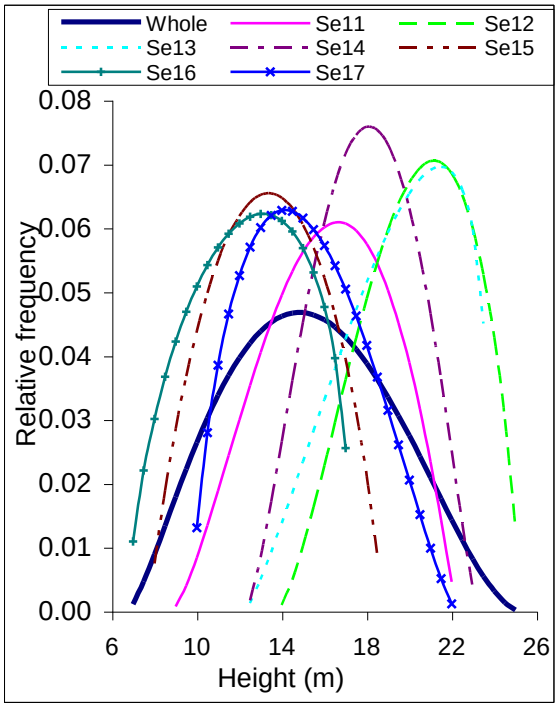

Figure 15 The modelling of the distribution of the number of trees on high categories and the setting of the optimal distribution through Beta theoretical distribution on quercus fraineto from Oltenia plain

4. CONCLUSIONS

The research conducted in quercus cerris and quercus frainetto from Oltenia plain led to obtain conclusive results on the structure of the two studied species (quercus cerris and quercus frainetto).

From the data presented and interpreted in previous chapters may be off the following:

- fhe forest stands of quercus cerris and quercus frainetto from the studied area are echiene and relatively echienestands, the current structure being the result of the application of silvicultural interventions over time;
- in Oltenia plain, both the quercus cerris and quercus frainetto are widespread, occupying an area of about together 14700 ha (4650 ha quercus cerris and 10050 ha quercus frainetto), their spread being limited to the south by the summer humidity and the presence of sandy textured soil;
- from the research carried resulted a very large variability in the number of trees per hectare, having values ranging between 380 and 2060 to quercus cerris and their age ranging from 35 to 105 years and the number of trees per quercus frainetto hectare varies between 505 and 1470, and the age is between 35 and 70 years. This dynamics of the number of trees per hectare is determined by the way there were applied care work (intensity) in some stands or the unfulfilling of the other (Se_2, Se_3 and Se_{16});
- the experimental distribution of the number of trees by diameter and height categories was adjusted by the theoretical distributions established in the scientific literature (the theoretical Charlier distribution and the Beta distribution). The application of the two types of theoretical distributions showed that the diameter (regardless of species) are more variable than heights. The explanation is found in the coefficient of variation of the number of trees in diameter classes (with values between 13,27-27,11% to quercus cerris and 18,00-28,34 to quercus frainetto), which is higher than that of the distribution of trees for their height (3,91-24,22 to quercus cerris and 12,03-20,91% to quercus frainetto). Also, the coefficients of variation values below 30% indicates the homogeneity of the sampled populations and their low variability;
- by testing the significance with the help of χ^2 and Kolmogorov-Smirnov tests, the research has shown that the theoretical distribution Charlier, both for the case of the diameters and iiin the case of the heights, offsets more experimental distributions and ensures greater efficiency in processing and interpreting experimental data;
- the relationship between diameters and heights is expressed by a polynomial function of second degree and the values of the correlation coefficients (r = 0.9324 - 0.9816) confirm the assumption that the correlation between diameters and heights undergoes the principle of the unity between piece and whole and expresses the horizontal and vertical aspect of the ecosystem;
- the research has allowed the definition and indications of structural models of quercus cerris and quercus frainetto forest stands for the area taken in study.

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CARACTERISTICI STRUCTURALE ALE FRUNZEI LA *ROBINIA PSEUDOACACIA* VAR. *OLTENICA,* CULTIVATA PE TERENURI DEGRADATE (HALDE DE STERIL)

THE STRUCTURAL FEATURES OF THE *ROBINIA PSEUDOACACIA* VAR. *OLTENICA* LEAVES, CULTIVATED ON DEGRADED SOILS (STERILE WASTE DUMPS)

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Key words : Robinia pseudoacacia, leaf ultrastructure, sterile waste dump, heavy metals, radionuclides.

REZUMAT

Specia Robinia pseudoacacia este o specie fixatoare de azot, care amelioreaza calitatea si proprietatile solului. Ea poate fi utilizata ca specie pionier la reimpadurirea terenurilor degradate (halde de steril si cenusa cu un continut ridicat in metale grele si radionuclizi), unde alte specii nu reusesc. Analiza caracteristicilor ultrastructurale ale frunzelor la genotipul Nisipeni 16, cultivat pe halde de steril de la punctul Rovinari-Statiune (Jud. Gorj) si a exemplarelor Control de la Pepiniera Arginesti (Jud. Mehedinti), a subliniat implicarea activa a speciei in neutralizarea metalelor grele si/sau radionuclizilor. Specia poseda caracteristici ultrastructurale care o fac apta in procesul de fitoremediere. Poseda un sistem circulant aerifer in tot mesofilul, in care a fost constatata existenta a doua tipuri de materiale straine. De asemenea, la concentratii crescute de metale (fier), cloroplastele devin agranale si are loc sintetiza de fitoferrina acumulata in cloroplast si celula, cristale de oxalat de calciu, s.a.

ABSTRACT

Robinia pseudoacacia is a nitrogen-fixing species which improves the soil quality and properties. It can be used as a pioneer species to reforest the degraded land (sterile and ash waste dumps with a high content of heavy metals and radionuclides), where other species failed. The analysis of the ultrastructural features of the leaves in Nisipeni 16 genotype, planted on the sterile waste dump in the site Station-Rovinari (Gorj district), and in Control from Orchard Arginesti (Mehedinti district), underlined the active implication of this species in the heavy metal or/and radionuclide neutralization. This species has ultrastructural features that make it fit for the phytoremediation process. It possesses an aeriferous circulatory system in the whole mesophyll, in which the existence of two foreign substances was noticed. At high amounts of metals (iron), the chloroplasts become agranal and a synthesis of the phytoferritin accumulated in chloroplasts and in cells, calcium oxalate crystals, a/o, takes place.

INTRODUCTION

The extractive and energy industries contribute to the dislocation of a great amount of soil and to its artificial modification, by forming sterile and ash waste dumps that present a high content of heavy metals and radionuclides, a permanent source of pollution (Corneanu M. et al., 2007). In Romania, the middle Jiu river valley is a well known coal basin in active exploitation. Nearby the surface exploitations, the Thermo-Electric Power Plant (TEPP) – Rovinari is surrounded by ash and sterile waste dumps of different ages.

An efficient method for the environment "cleaning" is represented by the phytoremediation process (Ruskin et al., 1994). This implies the use of different vegetal species, capable of radionuclide and heavy metal accumulation from the environment. One of these species is *Robinia pseudoacacia*, used for the fixing of the sterile and ash waste dumps in this area. In a previous research performed in different regions, it was reported that some vegetal species (*Taraxacum officinale*, *Convolvulus persicus*, *Populus* sp., *Robinia pseudoacacia* a/o) can accumulate radionuclides and heavy metals from the environment in their organism (Corneanu G. et al., 2007). These species can be used as phytoremediatory species, for the cleaning of different heavy metals and radioactive materials from the environment.

Robinia pseudoacacia was introduced into Romania as an ornamental species in 1750, but the first forestry plantation was established in 1852 in Oltenia, near the town Băileşti. Nowadays, the area occupied by this species is of about 250,000 ha (4% of the total forestry area). Recently, the interest in this species has increased, as it is used for the forestation of abandoned lands based on an E.U. regulation, as well as for its melliferous qualities and for its phytoremediation role. In 1966 a new variety was described on the sandy soils of South Oltenia, *Robinia pseudoacacia* var. *oltenica*, with distinct differences from the basal type (Bîrlănescu et al., 1966) and valuable forestry properties (Corneanu et al., 2007). In *Robinia pseudoacacia* species, variability represents an important factor in the selection of fast growing genotypes (Orlović et al., 2004).

In this paper, were analyzed the ultrastructural features of the *Robinia pseudoacacia* var. *oltenica* leaves, originating from an unpolluted Control area and from the sterile and ash waste dump of Rovinari (Gorj district). The purpose of this research was to establish the presence or absence of foreign material in the leaf, the point of penetration into the cell and the ultrastructural modifications at the leaf level.

MATERIAL AND METHOD

Biological material

The *Robinia pseudoacacia* var. *oltenica* seedlings, belonging to Ciurumela 23 clone, were obtained from seeds harvested in the Orchard Arginesti (Mehedinti district, the middle Jiu River valley). The seedlings were obtained in the Biological Research Station of the USAMVB, Timisoara. They were planted on the sterile and ash waste dumps from Rovinari (Gorj district, the middle Jiu River valley). The Control variant was represented by plants in the Orchard Arginesti. Previous research performed in this area showed the presence of a high radioactivity on the sterile and ash dumps, in comparison with the values recorded in the Control area (Table 1).

Table 1.

The soil radioactivity in some stations around CEPP Rovinari (after Corneanu et al., 2006)

Radionuclide	Control - Strâmba	CEPP – Rovinari	
(Bq/kg soil ± %)		Puza - Ash dump	Station -Sterile dump
U-235	2.2 ± 0.6	3.0 ± 0.75	0.06 ± 0.3
Th-234	-	37.4 ± 14.0	116.8 ± 50.0
Ac-228	24.2 ± 3.0	26.4 ± 9.0	38.1 ± 5.0
Ra-226	18.1 ± 1.5	30.2 ± 6.0	44.8 ± 4.0
Pb-214	20.4 ± 1.4	33.9 ± 4.0	44.8 ± 4.0
Bi-214	15.7 ± 1.6	26.5 ± 3.0	44.9 ± 3.0
Pb-212	-	54.9 ± 6.0	-
Bi-212	-	26.7 ± 3.0	-
Cs-137	-	2.73 ± 8.0	130.3 ± 6.0
K-40	335.7 ± 16.0	551.9 ± 5.0	424.2 ± 21.0

The above data reveal a higher content of radionuclides in the ash and sterile dumps, in comparison with the same content in a Control area, near Control station (Strâmba monastery).

Similarly, Bogatu et al. (2007) studied the content of radionuclides in a waste copper mining deposit from Moldova Noua (Caras-Severin district, Danube valley), as well as the evolution of the transport processes for Cu, Zn, Mn and Fe. They established that some plants accumulated metals differently. Thus *Festuca arundinacea* accumulated up to 100 mg/Zn/kg dry stuff and *Hippophae rhamnoides* 60 mg Zn/kg dry stuff.

Work method

The structural and ultrastructural features of the leaves were established in mature plants (while flowering). The small pieces of leaf having a size of about 1 mm^3 were prefixed in a 2.7% glutaraldehyde solution (2 ½ h), postfixed in a 1% osmic acid solution (1 ½ h), infiltrated and embedded in Epon 821. Seriated sections of about 80-90 nm thick were contrasted with uranyl acetate and lead citrate and analyzed by a JEOL JEM -1010 Electron Microscope (Electron Microscopy Centre, *Babes-Bolyai* University from Cluj-Napoca).

RESULTS AND DISCUSSIONS

Robinia pseudoacacia has an imparipinnate leaf and the leaf limb has a bifacial dorsiventral structure. The structural features of leaves established in this experiment are similar to the structural features reported by other authors (Toma and Rugina, 1998).

1. Control variant

The upper epidermis consists of polygonal cells covered with a thick cuticle. The epidermal cells have a pelicular cytoplasm and a few cellular organelles (Fig. 1). At the same time, there were rarely tector hairs on their surface.

The lower epidermis has a thinner cuticle and the uni- or three-cellular tector hairs have different lengths. Stomata of the anomocytic type are disposed only on the ventral epidermis, while the substomatal chamber is evident.

The leaf mesophyll is differentiated in palisade and lacuna parenchymas of different thicknesses, consisting of different numbers of cell layers, depending on the analyzed genotype.

Palisade parenchyma consists of 3-4 layers of high cells, rich in cytoplasm and cellular organelles. In other genotypes, the palisade parenchyma consists of 5-7 cell layers, the ones from the upper epidermis being higher. Between the parenchyma cells, from upper epidermis to lower epidermis, there is an aeriferous circulatory system. It plays a role in ventilation and different matter transport in the leaf parenchyma.

Lacuna parenchyma consists of 3-4 cell layers (7-8 in other genotypes of black-locust), of a polygonal shape, with spaces of different sizes between them. These cells have a small amount of cytoplasm and cellular organelles (Fig. 1). Many chloroplasts are transformed into amyloplasts (Fig. 1). In parenchyma of black-locust, the chloroplasts present or do not present a granal system, depending on the parenchyma type and on their juvenility (Figs. 4, 5).

In the palisade parenchyma cells (especially), the nucleus is in an intense metabolic activity, characterized by specific ultrastructural features: fine blocks of heterochromatin disposed in its mass, as well as the presence of a metabolic structure of *NAB's* type (Fig. 4). Mitochondria have slightly dilated crista and an electron dense matrix (Fig. 4). In some cells of the mesophyll, especially in the palisade parenchyma, there are crystals of calcium oxalate, of a prismatic or rhomboidal shape (Fig. 1). In the cell wall, can be distinguished small nanoparticles which penetrate it (Fig. 8). These particles are more numerous in plants developed on the sterile or ash waste dumps.

Young chloroplasts have no granal system, being characterized by numerous stroma thylakoids and plastoglobuls, especially in the hypodermic layer (Fig. 3). In some parenchymatic cells, starting from the hypodermic layer situated near the upper epidermis,

to the lower epidermis, there are phytoferritin particles in the chloroplast and sometimes almost the whole cell is full of this substance. The phytoferritin is present both in the palisade parenchyma (Figs. 1, 6) and in the lacuna parenchyma (Figs. 1, 7).

Phytoferritin is an iron-protein complex found in plant chloroplasts. It was discovered by Barton (1966) in the senescent leaves of *Phaseolus* sp. Other authors have also reported similar patterns of change in other senescent plant material. In general, phytoferritin particles have been observed only within plastids of plant cells, except fungi, and more particularly within plastids or dark grown tissues, where an extensive thylakoid system has not developed yet. Iron administration to iron-starved plants increases the storage of ferritin in the chloroplasts (Crichton et al., 1978). Thus, in some genotypes of plants harvested from the waste dumps, the presence of phytoferritin in chloroplasts is different.

Saikawa (1972) studied 250 species of higher plants and showed the presence of phytoferritin particles in 37 species, including *Robinia pseudoacacia* and *R. pseudoacacia* var. *umbraculifera*. Depending on the aggregation type of the phytoferritin particles, the plants might be divided into three types: Type-A with disordered clusters, Type-B crystalline lattice-like linear arrangement of the phytoferritin particles and Type-C, an intermediate type. The phytoferritin particles in *Robinia pseudoacacia* var. *umbraculifera* showed a typical curved parallel arrangement (Type-C). A similar arrangement was found in *Peireskia undulata* (*Cactaceae*). The aggregation according to Type-C was reported in many species.

The presence of this substance in the chloroplasts of *Robinia pseudoacacia* underlined the property of this species to absorb matter from the environment. The structural basis of this process is represented by the aeriferous circulatory system in the leaf mesophyll.

In other cells, other types of particles are present, both in palisade parenchyma and in lacuna parenchyma.

Pulvini are organs that regulate leaf position and thus intervene in the photosynthetic activity in many angiosperm families, mainly in *Fabaceae* species (Rodrigues and Machado, 2008). The studies performed by Moysset and Simón (1991) in *Robinia pseudoacacia* suggested that both the cortical cells and the vascular apparatus of the pulvinus participate in the redistribution of ions and in the transmission of stimuli during the foliola movements (depending on the environmental conditions). In another paper, Moysett et al. (1991) studied the changes in shape and size of *Robinia* pulvinar cortical cells in relation to the foliola movement. Both the size and shape of cell sections underwent changes during movement. They established that the distribution pattern of K^+ and Cl^- in cell walls and protoplasts showed that these ions are mainly responsible for turgor changes. A section through a pulvinus structure in *Robinia pseudoacacia*, Control variant, is presented in Fig. 2. The cortical cells and the vascular apparatus involved in foliola movement are to be distinguished.

Seasonal cytological changes. Different authors reported seasonal cytological changes in different species depending on the environmental conditions.

Pomeroy and Siminovitch (1971) reported seasonal cytological changes in the secondary phloem parenchyma cells in *Robinia pseudoacacia*, in relation to cold bitterness. Thus, the total protoplasm including mitochondria, lipid bodies, membrane-bound vesicles derived from invagination and folding of the plasmalemma, is closely related to the seasonal cycle of frost resistance. The structural organization of the endoplasmic reticulum also varies seasonally. This process was also reported by different authors in other species: apple, *Malus domestica* HV “McIntosh” (Kuroda and Sagisaka, 2005), mulberry, *Morus bombycis* (Ukaji et al., 1999), Douglas-fir, *Pseudotsuga menziesii* (Singh et al., 1983), a/o.

Ukaji et al., 1999, pointed out that Siminovitch et al. (1968) reported seasonal ultrastructural changes in the endoplasmic reticulum, as well as seasonal changes in the amount of total proteins in crude microsomes, in the study performed on the cortical parenchyma cells in *Robinia pseudoacacia*.

Ferrar and Evert (1997), after a study performed in *Robinia pseudoacacia*, analyzed the seasonal changes that occur in the vascular cambium of *Robinia pseudoacacia*. The specific goals were to determine the changes that occur (1) in all cytoplasmic components throughout the year, (2) during the transition from dormancy to activity and vice-versa, with special reference to membrane traffic, and (3) in storage materials such as starch, lipid droplets, tannins, and protein bodies, throughout the year.

These modifications reported by different researchers can be related to differences in leaf ultrastructural features recorded in Control and in plants developed on sterile waste dump (different environmental conditions in the same season).

The vascular system (Fig. 7) consists of liberous and ligneous vessels and fundamental parenchyma. The ligneous fibers present lignified walls. In different plant species (*Robinia pseudoacacia*, *Populus italica*, *Ulmus* sp., *Dianthus caryophyllus*, *Daucus carota*, *Triticum aestivum*), the presence of vessel-associated-cells (v.a.c.), with some cytological and cytochemical characteristics and properties, was described (Czaninski, 1977).

2. *Robinia pseudoacacia* var. *oltenica* (Ciurumela 23), planted on sterile dump

The anatomical structure of the leaf, in the Ciurumela 16 clone vegetated on the sterile waste dump, has particular features, owing to the presence of radionuclides and heavy metals in the environment (soil), as *Robinia pseudoacacia* is a phytocumulatory species (Raskin et al., 1994).

The two epidermises have the same features, but the thorn presence is rare. The stomata are present only on the lower epidermis. The palisade parenchyma is performed from 2-3 layers cells, rich in cytoplasm and cellular organeles. The lacuna parenchyma is performed from 3-4 cells layers, with spaces between them (Fig. 9).

In the palisade parenchyma, the chloroplasts present usually an agranal structure, with stroma thylakoids disposed in groups of 2-4, plastoglobuls and 1-2 starch grains (Fig. 10). In the young chloroplasts, there is a low amount of plastoglobuli, the stroma of the thylakoids being evident. In the lacuna parenchyma, the chloroplasts are usually transformed into amyloplasts or have many starch granules and a vestigial granal system (Fig. 11).

In many parenchyma cells, both in the palisade parenchyma, and in the lacuna parenchyma, as result of the phytoferritin synthesis, take place his accumulation in chloroplasts and in all the cells (Fig. 12). Sometimes the whole cell is full of phytoferritin (Fig. 9). The synthesis of phytoferritin is more intense in this variant, because there are numerous heavy metals in the environment. In the cell vacuola are present a granular substance synthesized and accumulated in cell (Fig. 13).

In the aeriferous circulatory system, near the parenchymatous cells, there are two types of particles: (a) particles of acicular shape and (b) elongated particles disposed in group (Fig. 14).

The cells are in a metabolic activity, outlined by the fine dispersion opf the chromatin in its inner, and by the presence of the *NAB's* corpuscles in the nucleus (Fig. 15). Also, in the cell vacuola, are present is present a granular matter (Fig. 16). On the other hand, the cells are exposed to stress factors (heavy metals and/or radionuclides) or there is in an enhanced metabolic activity, through the synthesis of different substances. These conditions are underlined by several structural modifications. Thus in some cells, the stroma thylakoids are dilated, and in the mitochondria there are evident lyses areas (Fig. 16). Stoyanova-Koleva and Tchakalowa (2008) described also the ultrastructural

adulterations in the chloroplast ultrastructure at *Potamogeton natans* and *Myriophyllum spicatum*, as result of the presence of some heavy metals (Pb, Cd and Cu) in water.

Both the synthesized substances and the foreign matter from the environment can circulate through the aeriferous circulatory system (Figs. 9, 13) and the cell membrane.

Many other papers demonstrated the black locust involvement in the phytoremediation processes and in the absorbtion of the heavy metals or radionuclides from the environment, respectively, while contributing to the environment decontamination.

Merten et al. (2005) examined the distribution of rare earth elements (REE) in the study of the remediation process of acid mine drainage at Ronneeburg mining site (Germany, Eastern Thuringia), one of the largest uranium mines and processing sites worldwide. They analyzed the uranium content in soil and in some plants with high availability to heavy metals: *Geum urbanum*, *Geranium robertianum*, *Betula pendula*, *Populus balsamifera* and *Robinia pseudoacacia*. The concentration of REE was the highest in the *Populus* species and the lowest in the *Robinia* species.

The „Public Works Bulletin“, edited by the Army Corps of Engineers (2007), recommended the use of trees and herbaceous vegetation for terrestrial area decontamination in different cases. Thus, in the contamination cases in the Pacific Coast Region, Central Plain Region, Rocky Mountains Region, in Southeast Region or in Northeast Region from USA, with cadmium, copper and zinc, *Alnus incana* and *Robinia pseudoacacia* are recommended for decontamination. In the case of contamination with different types of explosives (RDX, TNT), *Robinia pseudoacacia* and some herbaceous species are recommended for remediation (*Phalaris arundinacea*, *Solidago canadensis*, *Polygonum pensylvanicum*, *Helianthus nuttallii*, a/o).

Mihucz et al. (2008) established the concentration of uranium and thorium in soil and in the leaves of some cultivated plants (*Robinia pseudoacacia*, *Populus x albus*, *Populus x canescens*, *Quercus pubescens*, *Eleangus angustifolia*) in the uranium mining area of Kövágószölös (Hungary). The uranium concentration in the plant was about one order of magnitude higher in the samples as compared to the thorium concentration values. The redistribution of uranium demonstrated a slow process and no critical changes resulted in the uranium concentration in the surface soil layer even after the fall of the leaves.

Robinia pseudoacacia species, together with other vegetal species, are also recommended for the decontamination of areas contaminated with different hydrocarbons (Tischer and Hübner, 2002).

CONCLUSIONS

The analysis of the leaf ultrastructural features in *Robinia pseudoacacia* var. *oltenica*, in the plants developed on the sterile waste dumps from Station-Rovinari point (an area with an enhanced content of heavy metals and/or radionuclides) and in Control plants from Orchard Arginesti (Mehedinti district), revealed some differences as well as the presence of some particular features in this species, with importance in the accumulation and storage of heavy metals and/or radionuclides from the environment (the phytoremediation process).

1. In the leaf mesophyll there is an aeriferous circulatory system playing a role in ventilation and in the substance transition. In this aeriferous system the presence of two foreign compounds was identified.
2. At the cell wall level, an exchange of substances between the plant cell and the environment takes place.
3. In the presence of a high amount of iron in the environment (probably of other heavy metals, too), the phytoferritin synthesis takes place in chloroplasts. At the same time, another substance accumulated in the cell is also synthesized there, as well as crystals of calcium oxalate.

4. The foliola cells are in an intense metabolic activity, underlined by other structural features: the presence of *NAB's* structures in the nucleus, modifications in the mitochondria structure, a/o.
5. The pulvinus structure playing a role in the foliola movements was noticed and described, a/o.

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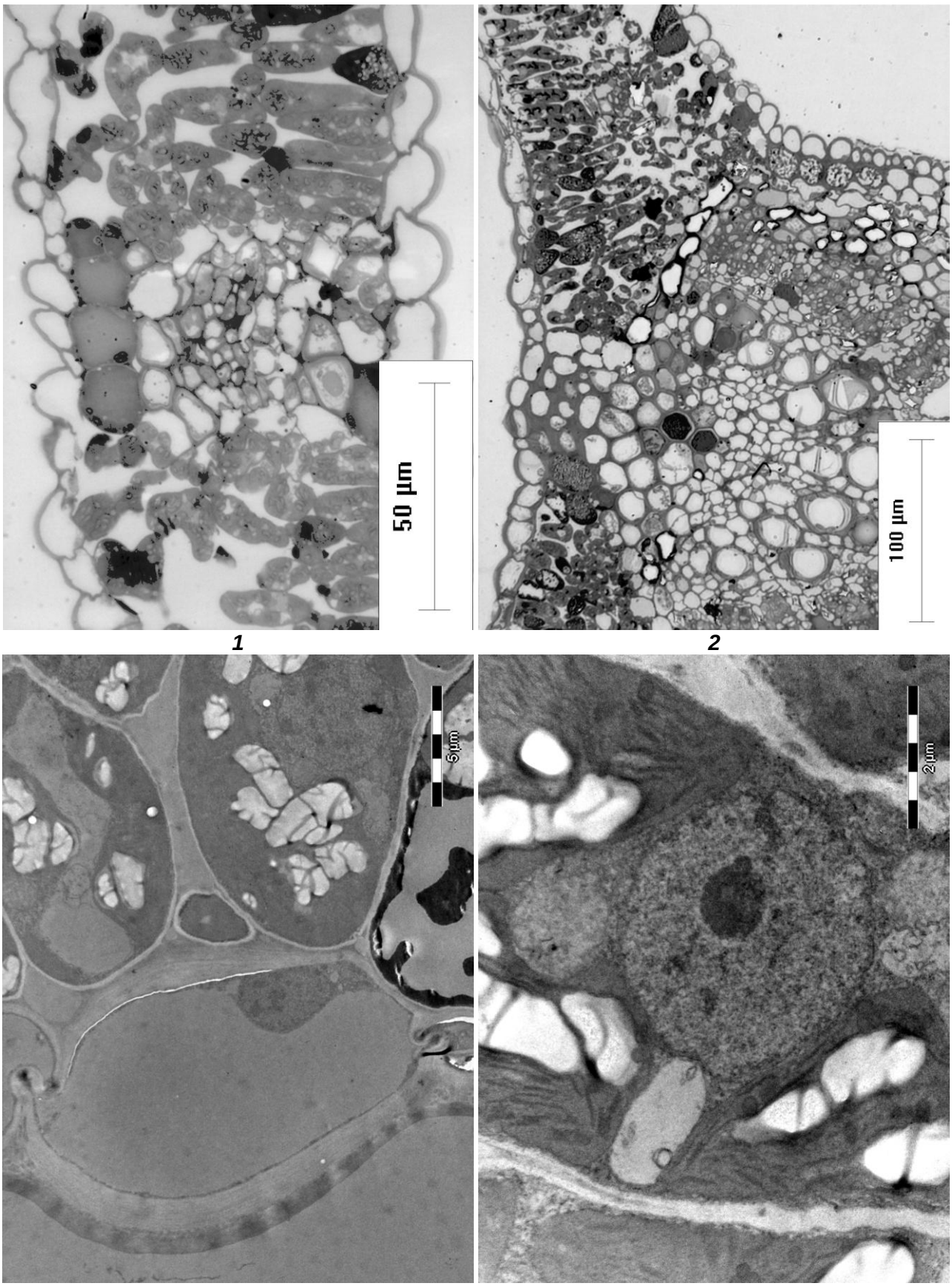

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Plate 1. Structural features in Robinia pseudoacacia var. oltenica leaves – Control. Fig. 1. Transversal section through foliole leaf. Fig. 2. Pulvinus structure. Fig. 3. Epidermal cell and palisade parenchyma: chloroplast in synthesis activity. Fig. 4. Palisade parenchyma: chloroplast with granal structure, mitochondria and nucleus with NAB's.

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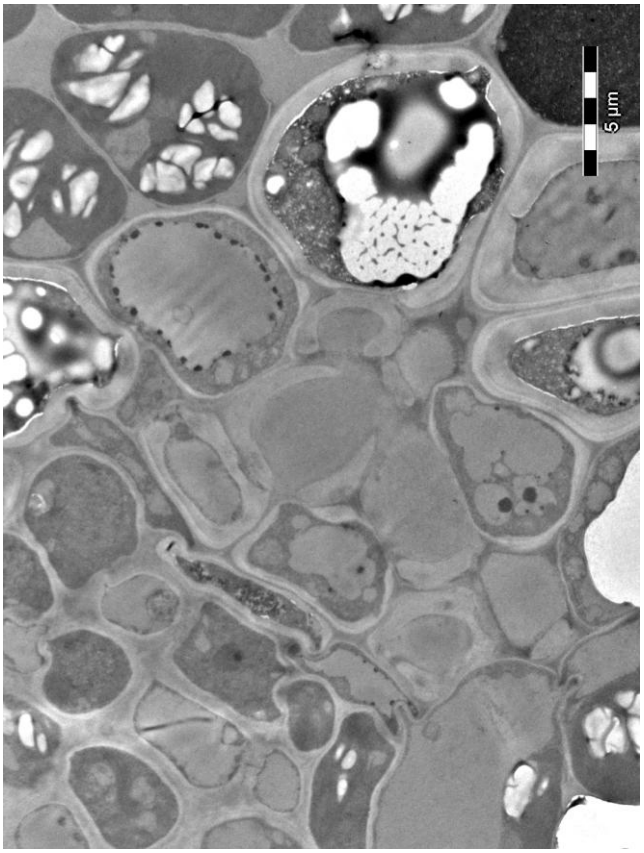

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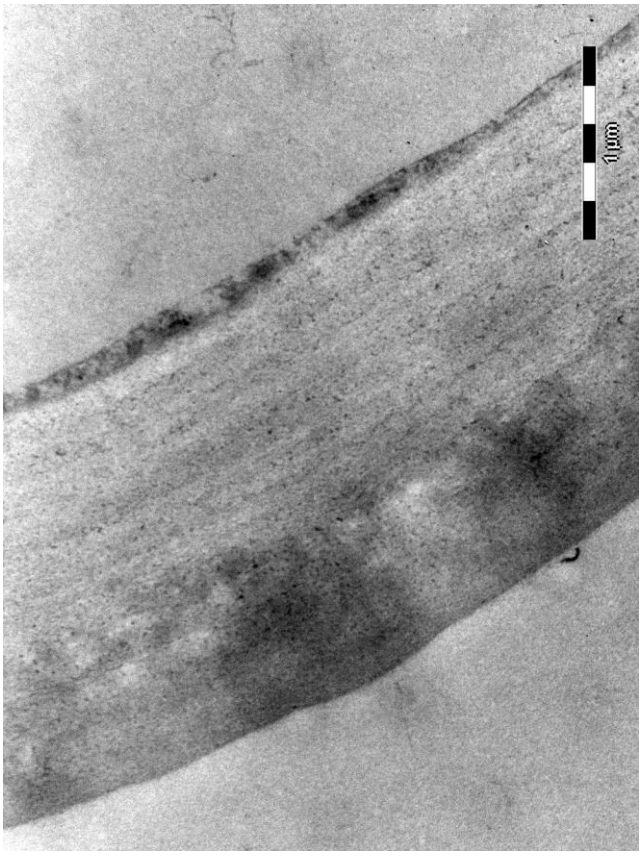

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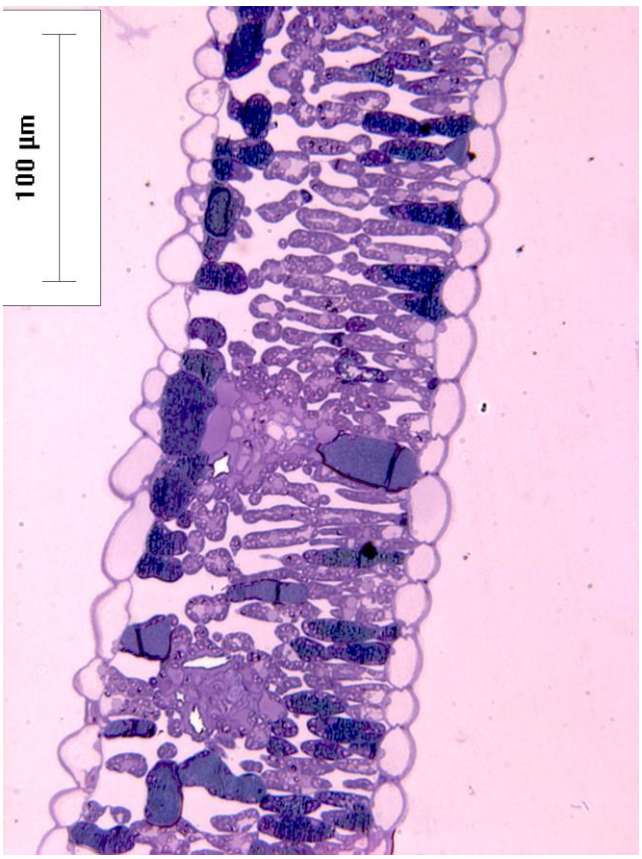
Plate 2. Structural features in Robinia pseudoacacia var. oltenica leaves – Control. Fig. 5. Palisade parenchyma: chloroplast with agranal structure and normal mitochondria. Fig. 6. Phytoferritin synthesis in chloroplast. Fig. 7. Conducting system: ligneous and liberian vessels and parenchyma cells; foreign matter in ligneous vessels. Fig. 8. Cell wall with foreign particles in inner.



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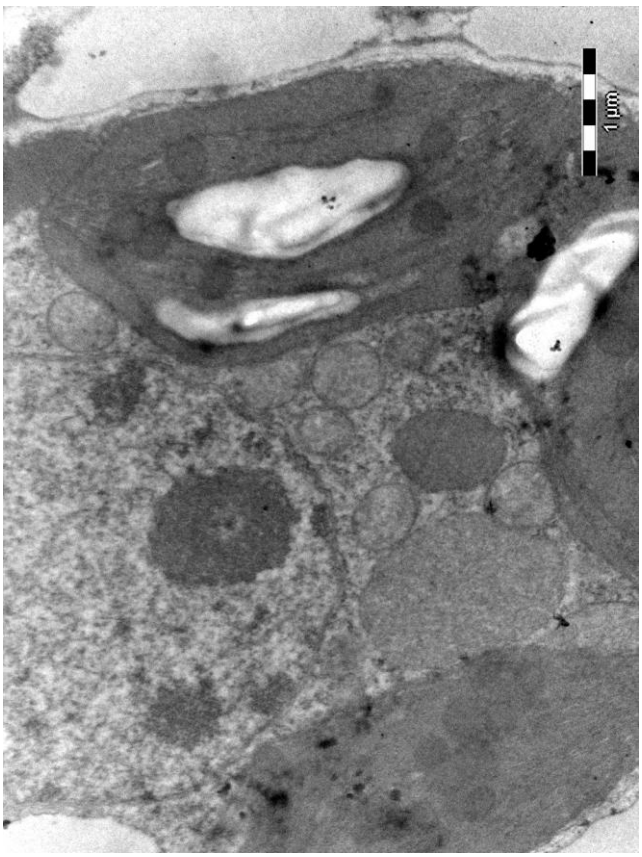

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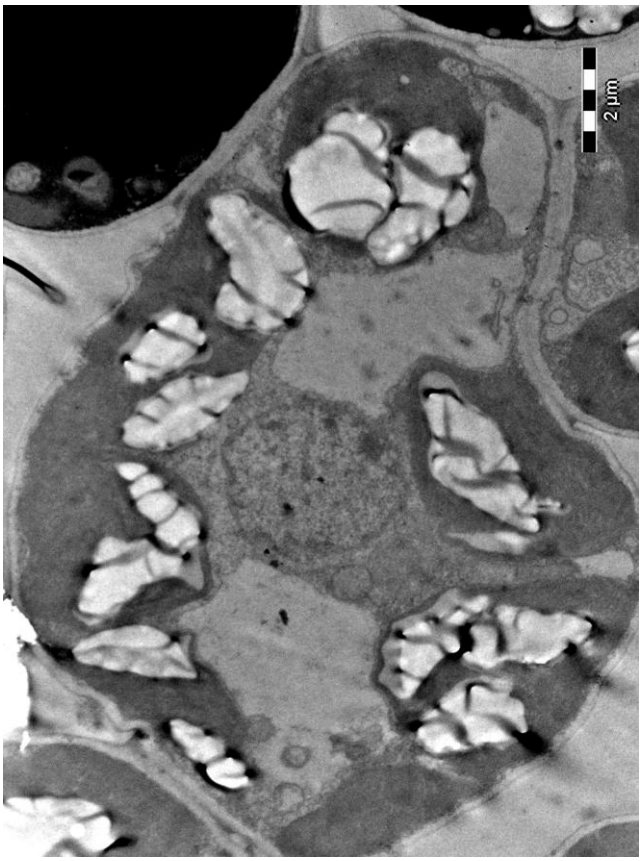

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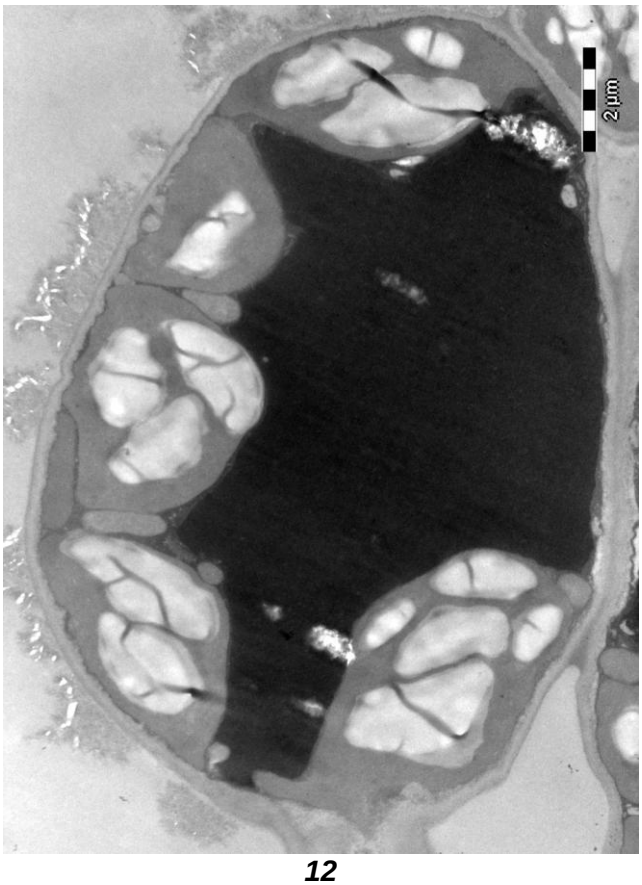

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Plate 3. Structural features of Robinia pseudoacacia oltenica leaves – Sterile dump. Fig. 9. Cross section through the leaf foliole. Fig. 10. Palisade parenchyma: mature chloroplast with agranal structure and nucleus surrounded by numerous mitochondria. Fig. 11. Lacuna parenchyma: chloroplasts transformed in amyloplasts. Fig. 12. Lacuna parenchyma: cell with phytoferritin and exogenous matter in auriferous system.

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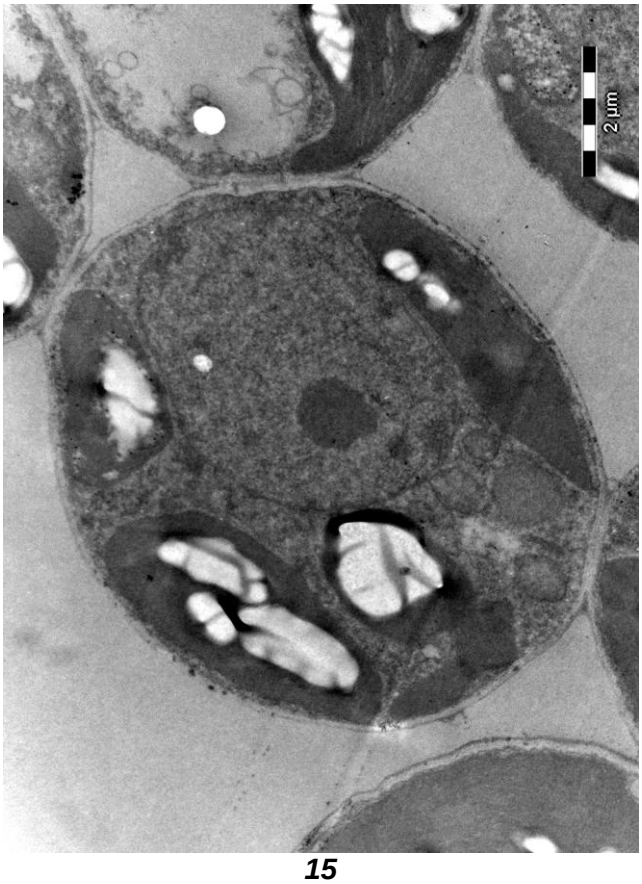

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Plate 4. Structural features in Robinia pseudoacacia oltenica leaves – Sterile dump. Fig. 13. Vacuola with particles of matter synthetized in cell. Fig. 14. Aeriferous circulatory system with exogenous matter. Fig. 15. Nucleus with fine heterochromatin blocks and NAB's corpuscle. Fig. 16. Chloroplast with dilated stroma thylakoids and lysis area in mitochondria.

ROLUL NOS ÎN SINTEZA OXIDULUI NITRIC LA RĂDĂCINI DE TUTUN INFECTATE CU VIRUS

THE ROLE OF NOS IN NITRIC OXIDE SYNTHESIS IN VIRUS INFECTED TOBACCO ROOTS

DANCI O., DANCI M., CHIS S.

Key words: nitric oxide synthase, virus infection, tobacco, nitric oxide

REZUMAT

Oxidul nitric joacă diferite roluri în interacțiunile dintre plante şi patogenii acestora de la contribuția la inducerea sistemică şi locală a genelor de apărare până la semnalizarea infecțiilor în plante. Recent a fost identificată, la tutun şi arabidopsis, o enzimă indusă de prezența patogenilor, numită sintetaza oxidului nitric (NOS), ce acționează ca generator de oxid nitric. Pentru a se evidenția rolul NOS în sinteza NO în plantele infectate cu virus s-a utilizat carboximetoxilamina (CM). S-a observat că în prezența inhibitorului sinteza NO a scăzut foarte semnificativ comparativ cu martorul, dovedind astfel implicarea NOS in sinteza oxidului nitric.

ABSTRACT

Nitric oxide was proved to have several roles in plant-pathogen interactions from the contribution to the local and systemic induction of defense genes to the infection signaling. A pathogen-inducible enzyme, named nitric oxide synthase (NOS) has been recently identified in tobacco and Arabidopsis acting as nitric oxide generator. Nitric oxide synthase (NOS) implication in nitric oxide synthesis in the virus infected roots was proved by NOS activity inhibition using carboxymethoxylamine *(CM). NO synthesis decreased significantly in the presence of the inhibitor proving that NOS is one of the enzymes responsible of its synthesis.*

INTRODUCTION

Nitric oxide (NO) is a bioactive molecule, a free radical that can either gain or lose an electron to energetically more favorable structures, namely the nitrosonium cation (NO^+) and the nytroxil radical (NO^-) [19]. Because of its unique chemistry, which permits both its stability and reactivity, NO and its exchangeable redox-activate forms are now recognized as intra- and intercellular signaling molecules [9, 18]. However, this gaseous free radical rapidly diffuses across biological membranes and can play a part in cell-to-cell signaling [5, 20]. The various effects of this molecule in animal organisms (blood pressure regulation, antioxidant effect, cell death, DNA damage) are well known and thoroughly investigated [13]. Also in plants had far-reaching roles for example in growth inhibition, stimulation of secondary root formation, inhibition of photosynthesis, programmed cell death, abiotic stress responses [2]. In plants, the enzymatic sources of NO are nitrate reductase (NR) [11], nitric oxide synthase (NOS) [1, 4], xantine oxidase, nitrite NO reductase and the copper-containing nitrite reductase [2, 11]. But each of the enzymes generates NO in different stress conditions. It was found that the NOS is more or less nitric oxide generator in plant-pathogen interactions [16]. A pathogen-inducible NOS (NOSi) has been recently identified in tobacco and *Arabidopsis* [4] and two inhibitors like carboxymethoxylamine (CM) and aminoacetonitrile (AA) were found to suppress the ability of tobacco NOS to synthesize NO [18].

Our study came as sequel of an experiment that proved NO presence in virus infected roots [5] and intended to emphasize if the NOSi is responsible of NO synthesis in virus infected plants or not.

MATERIAL AND METHOD

Six weeks old *Nicotiana tabaccum* L. SR1 plants (Medgyesy *et al*., 1980) [12] were transferred from soil to nutrient solution for another week and were grown under controlled conditions in greenhouse at photo flux density of 240 μmol m^{-2} s^{-1} (16/8 h day/night period), at relative humidity of 55-60%, and 25 ± 2˚C temperature. The nutritive solution contained the following chemicals: 2 mM Ca $(NO_3)_2$, 1 mM $MgSO_4$, 0.5 mM KCl, 0.5 mM KH_2PO_4, and 0.5 mM Na_2HPO_4. The micronutrient concentrations used for preparation of the nutrient solutions were: 1 μM $MnSO_4$, 5 μM $ZnSO_4$, 0.1 μM $(NH_4)_6MO_7O_{24}$, 10 μM H_3BO_4, 0.1 μM $AlCl_3$, 20 μM Fe-EDTA.

After a week, some of the plants were mechanically inoculated with a mixture of three viruses: *Potato virus X, Potato virus Y* and *Potato virus A*. Carboxymethoxylamine hemihydrochloride (CM) was used to suppress NOS enzymatic activity in order to identify the origin of NO. The control was constituted of infected roots immersed in dye (DAF-2DA 10μM) (as indicated by Kojima *et all*, 1998) [10]. The samples were constituted of virus infected roots immersed in the dye (DAF-2DA 10μM) added with 2mM CM (noted CM samples).

To detect fluorescence intensity, Zeiss Axiowert 200M-type fluorescent microscope (Carl Zeiss, Germany) connected with a high resolution digital camera (Axiocam HR) was used. FLUAR 5x/0.25 NA and FLUAR 10x/0.50 NA objective lenses were used to investigate the samples. To measure the fluorescence intensity, Axiovision Rel. 4.5 software was applied using a filter set 10. The excitation was set at BP 450/490 nm; the beam splitter at FT 510 nm; the emission at BP 575-640 nm (Carl Zeiss, Germany). The same camera settings were recorded for each digital image.

NO levels were determined after 1, 2, 6, 12, 24 and 48 hours of treatment. The presence of the virus in the leaves and roots, respectively, was assayed and proved using ELISA test kits PathoScreen PVY, PVA and PVX from Agdia Inc., IN, USA, but few days after inoculation viral symptoms could easily be detected visually both on the leaves and the roots. The average value and the standard deviation of 3-5 samples were calculated using the Microsoft Office Excel 2003 program.

RESULTS AND DISCUSSIONS

Inhibition of nitric oxide synthase activity by the presence of carboxymethoxylamine determined a strong decrease in nitric oxide fluorescence leading to the conclusion that NOS might be one of the enzymes involved in NO synthesis in virus-plant interaction. Comparing the results obtained during the 48 ours of experimentation both on the control and on the CM samples, several conclusions could be made. The control constituted of virus infected roots immersed only in DAF-2DA (10μM) showed a slowly increasing in NO intensity during the experimentation time. It could be observed that the two points of significantly NO increasing was registered between 2 and 6 hours of incubation and very significant differences between 24 and 48 hours (table 1).

Comparing to the zero moment of the experimentation the NO synthesis increased significantly after 6 hours of incubation (more than 8 percents) and very significantly after 24 hours (increased with 12.58 % after 24 hours and 19.34% after 48 hours) (figure 1). We suppose that these results are due to the long incubation period with the dye that determined the substance penetration into the deepest tissues of the roots, emphasizing a higher fluorescence on the microscope.

Table 1

Differences significance of the NO synthesis between the control and the CM inhibited samples

Hours	NO synthesis (pixels)		Relative value comparing to the control	Difference toward the control	
	Control	CM sample			
0	7186,06 a	7232,78 a	100,65	-48,72 -	
1	7184,39 a	6603,22 b	91,91	581,17 -	
2	7193,50 a	5683,89 c	79,01	1509,61 *	$LSD_{5\%}$=1163,69
6	7822,61 b	5063,11 d	64,72	2759,5 ***	$LSD_{1\%}$=1631,41
12	7841,72 b	4731,28 d	60,33	3110,44 ***	$LSD_{0,1\%}$=2306,11
24	8220,50 b	4545,28 d	55,29	3675,22 ***	
48	8908,72 c	3596,22 e	40,36	5312,5 ***	
	$LSD_{5\%}$=599,65	$LSD_{5\%}$=564,43			
	$LSD_{1\%}$=792,98	$LSD_{1\%}$=746,39			
	$LSD_{0,1\%}$=1022,52	$LSD_{0,1\%}$=962,44			

This supposition was based on the fact that ELISA testing was done to the donor plants before the beginning of the incubation with the dye and after 48 hours and no significantly differences were registered regarding virus concentration in the roots.

A very significantly decreasing in nitric oxide synthesis was registered during the experimentation when the virus infected roots were incubated in presence of the NOS inhibitor (figure 1).

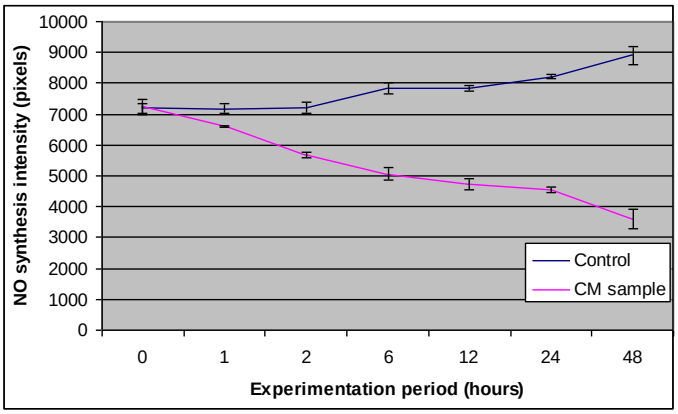

Figure 1. Nitric oxide inhibition in carboximetoxilamine presence. Vertical bars are standard errors

Results registered were significantly inferior to the zero moment of experimentation even after two hours of incubation of the virus infected roots with the NOS inhibitor. Nitric oxide synthesis decreased very quickly in the presence of carboxymethoxylamine during the first six hours of the incubation. A slower NO synthesis decreasing was registered further on, very significantly differences being observed between 24 and 48 hours of incubation.

Comparing the results obtained for the control and for the CM samples it could be observed that very significantly differences were registered after only 6 hours of experimentation. Even if the control registered a slower fluorescence increasing the CM samples presented very significantly NO synthesis decreasing (figure 2). This decreasing is due to the NOS activity inhibition by the CM [4]. No reports were found in the literature specifying the implication or effect of NO on viruses' replication and we supposed that the nitric oxide synthesis decreased because of the NOS inhibitor action.

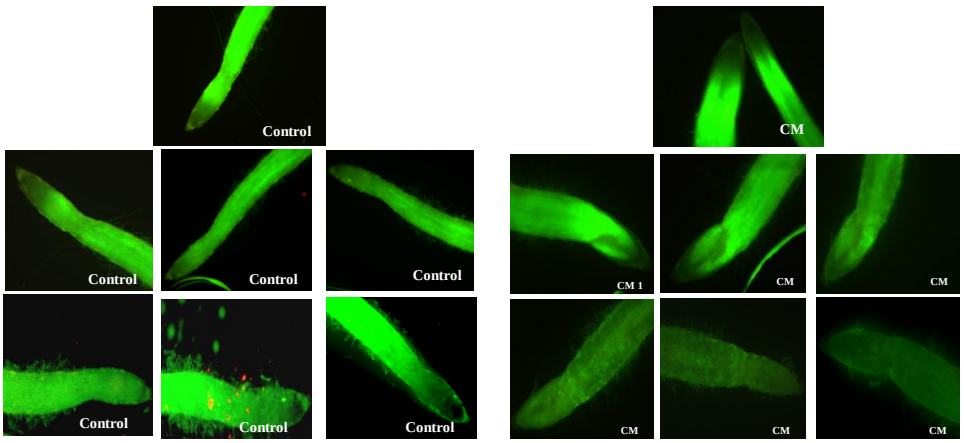

Figure 2. NO fluorescence in control roots (left) and in roots incubated with CM (right) during the 48 hours experimentation.

Microscope pictures emphasized that NO was localized especially in the root tips. The lowest NO levels were seen within the first 0.5 mm of the root tip, which includes root cap and meristem and the maximal values, were detected between 1 and 2 mm from the tip [5]. After 2 or even 2.5 mm from the tip NO fluorescence intensity slowly decreased or reached a constant value. Comparing the results of infected samples with control constituted of healthy plants it was observed that infected roots showed at least two times higher level of NO than the control. Thus, it was concluded that under our experimental conditions an increased NO production was involved in the response reaction to virus infection [8] or as a plant defence mechanism against the pathogens [6]. The highest fluorescence intensity was found at the sieve transport tissues confluence (figure 2) determined by NO accumulation at this level. During time fluorescence appears to not be localized and decreased very significantly probably due to the NOS inhibitor activity.

As nitric oxide is responsible for plants defense activation system against pathogens [3, 18] and its synthesis inhibition might determine the decline in plants resistance to some pathogens [15, 16]. This enzyme has been well characterized in animals and exists as three isoforms: inducible NOS, endothelial NOS and neuronal NOS [1]. There are hem-containing enzymes from the cytochrome P450 family. All three enzymes are large and have two domains separated by a CaM binding site. NO is produced through a 5-electron oxidation of L-arginine catalyzed by nitric oxide synthase [9]. Recently it has been suggested that NOS carries out only 4-electron oxidation, producing nitroxyl anion, and the final step is catalyzed by superoxide dismutase [16].

On the basis of the time course of virus-induced NO production in plants, it was observed that NO was released slowly [5] comparing with the metal induced NO that clearly showed a biphasic reaction namely, a fast burst of NO release followed by a slow increase [2]. In the case of metal induced NO synthesis nitric-oxide burst originates from non-enzymatic reactions as lipid peroxidation or the production of reactive oxygen species [2], while we suppose that in virus infected roots nitric oxide release is due to the enzymatic activity. NOS, an *Arabidopsis thaliana* protein with an atypical NOS activity was found to be targeted to mitochondria in roots [12]. Although concerns about the NO-producing activity of this protein were raised (causing the renaming of the protein to NO-associated 1), compelling data on its biological role were missing until recently. Strong evidence is now available that this protein functions as a GTPase that is actually targeted to plastids, where it might be required for ribosome function [7].

CONCLUSIONS

Our results show that there was a decrease in NO synthesis when CM was added comparing with the control that showed a small increase in the level of NO, confirming our supposition that one of the NO catalyst in the plants might be the nitric oxide synthase.

ACKNOWLEDGEMENTS

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REFACEREA ZONELOR UMEDE IN CONTEXTUL DIRECTIVEI CADRU PRIVIND APA

WETLAND RESTORATION IN WATER FRAMEWORK DIRECTIVE CONTEXT

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Key words: wetland, aquatic ecosystem, Water Framework Directive
Cuvinte cheie: zone umede, ecosisteme acvatice, Directiva Cadru privind Apa

REZUMAT

Marile oscilatii din ultimul secol, in special dezvoltarea rapida a industriei, urbanizarea si cresterea numerica a populatiei a avut un impact imens asupra zonelor umede.In acest context, zonele umede au fost diminuate enorm, cu consecinte dezastruoase pentru comunitatile locale si cu o pierdere enorma a biodiversitatii. Refacerea zonelor umede reprezinta un instrument esential pentru imbunatatirea viitoare a zonelor umede afectate si trebuie sa devina un element de baza al gospodaririi apelor ceruta de Directriva Cadru pentru Apa 60/2000/CEE.

ABSTRACT

The great variation from last century, especially rapid industrial and rural development and population growth, has had an immense impact on wetlands. In this context, wetlands have diminished enormously, with disastrous consequences for the local communities and an enormous loss of biodiversity. Wetlands restoration is an essential instrument for future improvements of degraded wetlands and it should became an integrated element of water management asking by Water Framework Directive 2000/60/EEC.

INTRODUCTION

For the purpose of Ramsar Convention (1971) ,,wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters" (Art. 1).

In entire world the water resources, especially wetlands zones are diminished and in this context more aquatic ecosystems are affected. Their protection is very important, regarding the purposes of wetlands. The most important functions of wetlands are:

-to keep the hydrological balance of the rivers, to regulate of soil wet and diminished soil erosions;

-the conservation of biodiversity for aquatic ecosystems, the place of life for a lot of flora and fauna species;

-water quality control, though chemical purification of this, more exactly, though decreases the organic pollution and nutrients;

-flood control;

-to modify local microclimate;

-drinking water recourses for local communities;

-an important role for education, research, recreation.

MATERIAL AND METHOD

For the following main tasks within the WFD planning process hydro morphological data are needed in relation to the biological quality elements, in particular related to fish, macro invertebrates and birds.

The Water Framework Directive-WFD (2000/60/EC) clearly identifies the protection, restoration and enhancement of the water needs of wetlands as part of its purpose at Article 1(a):

The purpose of this Directive is to establish a framework for the protection of inland surfacewaters, transitional waters, coastal waters and groundwater which:

(a) prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems.

Wetland ecosystems are ecologically and functionally significant elements of the water environment, with potentially an important role to play in helping to achieve sustainable river basin management. The Water Framework Directive does not set environmental objectives for wetlands. However, wetlands that are dependent on groundwater bodies, form part of a surface water body, or are Protected Areas, will benefit from WFD obligations to protect and restore the status of water.

Danube Green Corridor between Ciuperceni and Rast

Pressures on wetlands (for example physical modification or pollution) can result in impacts on the ecological status of water bodies. Measures to manage such pressures may therefore need to be considered as part of river basin management plans, where they are necessary to meet the environmental objectives of the Directive.

Wetland creation and enhancement can in appropriate circumstances offer sustainable, cost-effective and socially acceptable mechanisms for helping to achieve the environmental objectives of the Directive. In particular, wetlands can help to: abate pollution impacts, contribute to mitigating the effects of droughts and floods, help to achieve sustainable coastal

management and to promote groundwater re-charge. The WFD's focus on water bodies and their relationships helps to highlight the functional role of wetland systems within the hydrological cycle and the river basin

Lowland floodplains historically suffered radical physical modification in many parts of Europe, as a result of land drainage and flood management activities, aimed at maximizing agricultural production and protecting people and property. In many cases, decisions about how practical or desirable it will be to restore the hydro-morphology (and the associated biology) of such river systems to the extent needed to achieve good ecological status, will be determined through the application of the tests for the heavily modified water body (HMWB) designation.

Many wetland ecosystems are composed of mosaics of surface water, permanently and temporarily inundated or waterlogged land, such as lowland mire systems, or floodplain wetlands. WFD provisions in relation to surface waters will *in themselves* help to

protect and enhance wetland ecosystems, by defining parts of them as water bodies, and setting objectives for them, where they fall within the WFD categories of rivers, lakes, transitional or coastal waters.

WFD environmental objectives and wetlands

The WFD does not set independent ecological objectives for wetlands other than where those
wetlands, or parts of them, are surface water bodies.

The WFD does however: (a) set groundwater objectives that include obligations towards these ecosystems; and (b) identify the use of wetland functions as a possible means of achieving the Directive's objectives.

The most important WFD provisions in relation to wetlands are:

-obligations to surface waters, which will apply to those 'open water' wetlands which are identified as water bodies [Article 4.1(a)(i)] and belong therefore either to rivers, lakes, transitional waters or coastal waters;

- obligations to prevent more than very minor anthropogenic disturbance to the hydro morphological condition of surface water bodies at high ecological status (HES). The hydro-morphological quality elements of a surface water body include the structure and condition of riparian, lakeshore or inter-tidal zone, and hence the condition of any wetlands encompassed by these zones. This protection is necessary to achieve the objective of preventing deterioration from HES [Article 4.1(a)(i); Annex V 1.2], bearing in mind the exceptions identified at Article 4.6, 4.7 and the additional requirement in Article 4.8;

-obligations to protect, enhance and restore wetlands identified as water bodies, where this is necessary to support the achievement of: (a) good ecological status (GES) or good ecological potential (GEP); (b) good surface water chemical status; or (c) a less stringent objective [Article 4.1(a)(i & ii); Article 4.5]. If damage to any such surface water body, wherever it occurs within a river basin district, is causing a failure to achieve one of the WFDs environmental objectives, then appropriate measures will be required;

- Obligations towards wetlands that are not individual water bodies, but part of the riparian zone. Member States are required under Article 11.3(i) to establish measures to control and mitigate modifications to the structure and the condition of these zones, including that of any wetland they contain, to the extent necessary to ensure that the hydro morphological conditions of the water bodies are consistent with the required ecological status or ecological potential;

-obligations to achieve good groundwater status [Article 4.1(b)(i & ii), as defined in Annex V 2.1.2 and 2.3.2.] and to reverse any significant and sustained upward trends in the concentration of any pollutant in groundwater in order to progressively reduce pollution of groundwater [Article 4.1(b)(iii)]. Member States must, among other things, control and remedy anthropogenic alterations to groundwater quality and water levels to the extent needed to ensure that such alterations are not causing, and will not cause: (a) significant damage to terrestrial ecosystems that directly depend on bodies of groundwater; and (b) significant diminution in the chemical or ecological quality of bodies of surface water associated with bodies of groundwater.

This also includes an obligation to ensure that dependent surface waters achieve their environmental objectives under Article 4, as far as these depend on groundwater quality and quantity. Fens and marshes, that are dependent on groundwater to maintain their characteristic structure and function, may fall within the category of dependent terrestrial ecosystems;

-obligations, as requested specifically under the Habitats (92/43/EEC) and Wild Birds (79/409/EEC) Directives, to take protective or restorative action in the management of wetlands which are included in the register of protected areas following Annex IV(v).

Furthermore, wetlands could play a relevant role in facilitating the achievement of other WFD requirements concerning Protected Areas that do not target wetlands directly. The list below largely refers to objectives established under other Community legislation, the achievement of some of which may conceivably be assisted by the management of wetlands. These are:

-obligations to take protective or restorative action in the management of areas designated for the abstraction of drinking water and areas relevant for the protection of economically significant aquatic species (WFD Annex IV(i & ii));

-obligations to take protective or restorative action in the management of recreational water bodies under the Bathing Water Directive (76/160/EEC) (WFD Annex IV(iii));

-obligations to take protective or restorative action in the management of sensitive areas and vulnerable zones designated under the Nitrate Directive (91/676/EEC) and the Urban Wastewater Directive (91/271/EEC) (WFD Annex IV(iv)).

Article 8 of the WFD requires the establishment of monitoring programmes (in accordance with Article V) in order to progressively reach a comprehensive overview of water status within each river basin district. The WFD calls for the monitoring of surface water, groundwater and Protected Areas.

RESULTS AND DISCUSSIONS

Wetlands play a role in the achievement of the environmental objectives of the WFD and help in the fulfillment of the programme of measures and in its adjustment to regional and local conditions.

This Guidance Document introduces recommendations clarifying the role of wetlands in the river basin management process. Case studies provide an illustration of the circumstances under which Member States may choose to use wetland management measures to ensure the most environmental and cost-effective approach.

Some issues could benefit from further development and some topics should be revisited in future

activities (e.g. through the Pilot River Basin Testing Exercise). Consideration to be given to:

• Defining more in detail how to include wetlands in the programme of measures when preparing the programme of measures themselves;

• Recognizing the diversity of wetlands in the EU and therefore understanding the different ways in which wetlands restoration may contribute to RBM;

• Setting indicators for assessing the progress achieved regarding wetland restoration as part of the river basin management plan;

• Defining indicators and monitoring methods to establish a relationship between wetland health and groundwater quality and quantity status;

• Identifying wetlands within protected areas;

• Elucidating the contribution of wetlands to the environmental cost recovery;

•Investigating links concerning reporting and monitoring for wetland management under both the WFD and the Ramsar Convention.

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STUDIU EFECTUAT ÎN PERIOADA 2005-2009 PRIVIND EVOLUȚIA REZERVEI BIOLOGICE DE PLOŞNIȚA CEREALELOR DIN GENUL EURYGASTER ÎN JUDEȚUL VÂLCEA

STUDY ELABORATED DURING 2005-2009 CONCERNING THE EVOLUTION OF THE BIOLOGICAL RESERVE OF CEREALS BED BUG FROM THE SPECIES EURYGASTER IN THE DEPARTEMENT OF VALCEA

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Key words: cereals bugs, the wheat culture
Cuvinte cheie:ploşnițele cerealelor, cultura de grâu

REZUMAT:

Acestă lucrare se referă la rezerva biologică a plosnițelor cerealelor (Eurygaster sp.) în județul Vâlcea unde s-a efectuat studiul .

În urma atacului pe care îl au asupra culturilor de grâu ele produc pagube care influențează calitatea producției de grâu.

ABSTRACT

This work reports on the biological reserve of cereals bed bug (Eurygaster sp.) in the department of Valcea where this study was elaborated.

After the attack against the wheat crops they produce damages that influence the quality of the wheat production.

INTRODUCTION

In our country bugs cereals are widely spread in the majority of the departments, the number of the population being higher or lower according to the agroclimatic conditions.

The area where this pest produces large damages every year is situated in the south and south-east side of the country, including the plain territory from Oltenia, mostly of Muntenia, Dobrogea and the south of Moldavia.

The species that forms the population of this pest that exist in our country are: Eurygaster integriceps, which represents 88% from total population, E.austriaca and E.maura. The cereals bed bugs have a similar way of living, they have only one generation per year, hibernates as adult, preferring the oak tree.

METHODS AND MATERIALS USED

To elaborate the attack potential forecast it was proceed to counting the pest number withdrawn to hibernate in the forest by using some frames with the interior of 0,5/0,5 m². The frames, 40 borings 0,250 m² each, delimit the surface that is going to be verified on the diagonal of the forest. This was realized on the10^{th} -15^{th} of every year in the oak forest from the department of Valcea.

In the interior of the frame there was analized firstly the leaves' layer, then the rot until the land, noting the lively bed bugs found on m² of verified surface and obtaining the medium density on the m² .

According to the data, it was firstly established the biological reserve of the verified department forests bed bugs. The surface in m² of every forest was multiplied by the numerical medium density on m² and summing the results.

Then the given number of bed bugs was divised by the surface in m² of the verified forests. Thus was obtained the department annual medium reserve on m².

Every spring, in March, the mortality procentage and the biological reserve were determined according to the correction made. The same forests as the ones in autumn were verified, modifiying it only in case of a rate of mortality of over 25%.

OBTAINED RESULTS

Table no 1

The medium biological reserve evolution of cereals bed bugs in the department of Valcea forests between 2005-2009

Season	Autumn 2005	Spring 2006	Autumn 2006	Spring 2007	Autumn 2007	Spring 2008	Autumn 2008	Spring 2009	Autumn 2009
No of eurygaster/m²	0,89	0,83	0,86	0,77	0,75	0,56	0,67	0,61	0,52

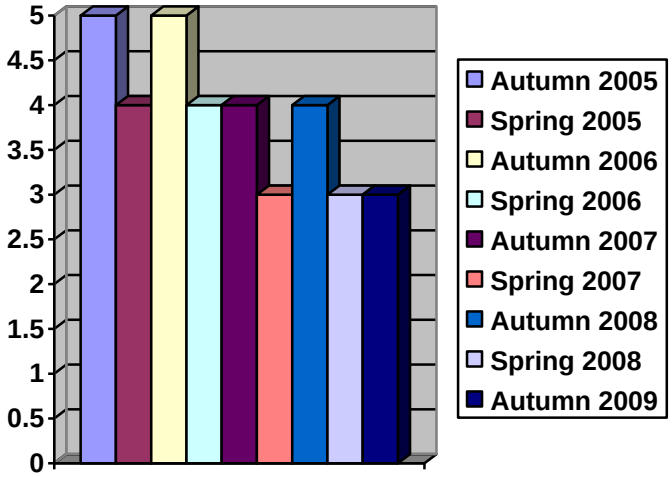

Fig. 1

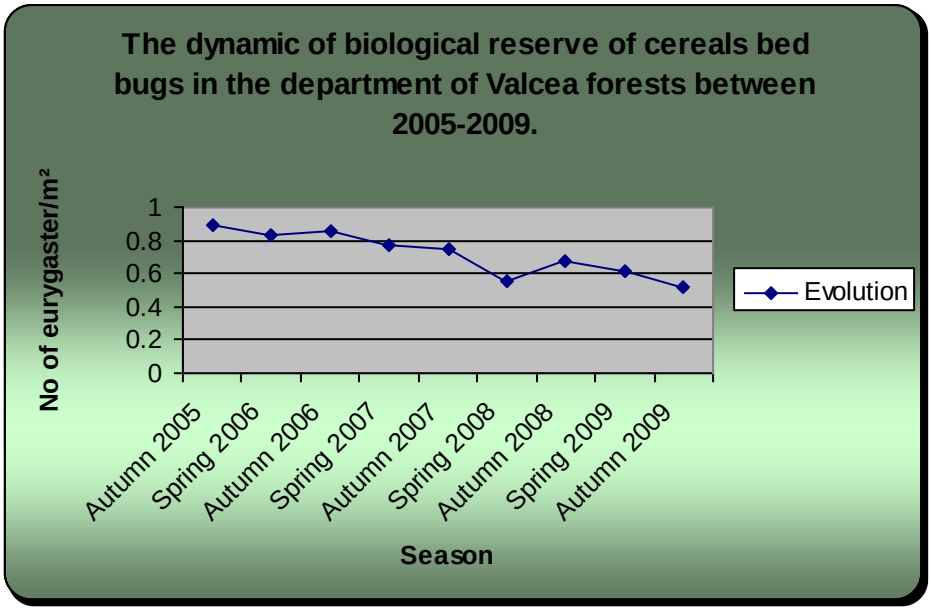

Fig. 2

CONCLUSIONS

Considering the climatical conditions of the years 2005-2009, the biological reserve of cereals bugs from Valcea country has considerable diminished noticing the greater density in the autumn than in the spring of the same country year.

The dynamics of the biological average reserve reflects the decreasing tendency of the cereals bugs , as in the autumn of the year 2005, the biological reserve was 0,89 exemples on m and reduced to 0,52 exemples on m in the autumn of the year 2009.

Another very important factor which led to the diminishing of the biological reserve of the cereals bug and to the improvement of the wheat quality werethe chemical treatments applied during all these years.

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SELECȚIA ŞI COMPORTAREA CELOR MAI VALOROASE GENOTIPURI DE SOIA SUB ASPECTUL STABILITĂȚII PRODUCȚIEI

THE SELECTION AND THE BEHAVIOUR OF THE MOST PERFORMANT AND CONSTANT PRODUCTIVE SOY-BEANS GENOTIPES

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Cuvinte cheie: soia, calitate, cantitate, rezistență, reproducere.
Key words: soy-beans, qualitz, quantity, resistance, breeding.

REZUMAT

Cercetarile in ceea ce priveste comportamentul de soia au fost furnizate in perioada 2003-2005 de statiunile de cercetare de la Fundulea, Teleorman, Brăila, Valu lui Traian, Şimnic, Lovrin, Turda, Secuieni şi Podu Iloaiei.

Principalul obiectiv al reproducerii soia este de a obține soiuri performante din punct de vedere al calitatii, cantitatii, rezistentei, reproducerii.

ABSTRACT

Reserches regarding the behaviour of soy-beans were provided during 2003-2005 in Fundulea, Teleorman, Brăila, Valu lui Traian, Şimnic, Lovrin, Turda, Secuieni and Podu Iloaiei research units.

The main objective of soy-beans breeding is to obtain performant sorts in quality, quantity, resistance, breeding.

INTRODUCTION

Soy is a short day species, particularly sensible to the fotoperioad and the termoperioad, for which any change of the crop area for which the genotype has been established or any variation of climatic factors to the extreme limits, can causes profound changes in the morphology and physiology plant, with major impacts for production.

THE MATERIAL AND THE RESEARCH METHOD

Research as regards the behavior of soybean genotypes were made in 2003-2005 in Fundulea Teleorman, Braila, Simnic and Turda centers.

In the process of soybean improvement, the main objective is the creation of the varieties with favorable genes at higher level for key features: precocity, productivity, quality, resistance to unfavorable environmental conditions and diseases.

To highlight the best soybean genotypes adapted to the conditions of the south, lines of perspective were included in comparative culture of competition, run by the Latin rectangle method with 25 variations in 5 repetitions, maintenance technology is similar to that applied in crop production. Harvested area of every plots was 10m ^{2}.

To analyze behavior genotypes were made morfophysiologichal and phenotype observations of the plant. Also there were made the determination of the main components of productivity. Determinations were made at 20 plants, 4 plants in each plot repetition.

GENOTYPES DESCRIPTION

1. ROMANIAN''99 (var. Strict ENK.) is an early variety, with a growing season of 105-120 days.

The plant is erect, with compact shrubs shape, having semideterminated increase. Plant height is 15-18 cm, foliols form is sharp oval, color flower violet, gray pubescent, yellow grain color, with gray color hil MMB = 150-180 g.

It has a very good resistance to falling and shaking, and medium to drought.

Quality features:

- protein seed content :39-44% s.u. and 19-22,5% fat s.u.
- culture has a potential production of up to 4,000 kg / ha in irrigated crops, in southern areas, and 3,000 kg / ha in irrigated crop in Moldova and Transylvania.

2. DANUBIANA (var. latifolia ENK.) Is a undue variety, the vegetation period of 123-133 days. The plant is erect, with a compact form of bush, with unlimited growth. Plant height is 95-120 cm and height of insertion of the first pods 14-18 cm. Foliols are oval shaped, white flower, reddish pubescent, yellow grain with black hil. MMB = 180-220 g.

It has resistance at drop and shake, and medium resistance to drought.

It has a potential production of up to 4950 kg / ha in irrigated crop experimentation and 3300kg/ha in experimental non-irrigated crop.

Protein seed content: 38-43% s.u. and 18,5-23% fat s.u.

RESULTS AND DISCUSSION

Regarding the main morphological and physiological features of soybean genotypes, the results are extracted from the observations measured by organic comparative culture at Fundulea ICDA. You can see the difference between the genotypes attributes, namely Danubian genotype is 100 cm plant height, unlike genotype Romanian ** 99 which has a plant height of 94 cm.

The production of grains, protein and crude fat obtained in the organic comparative culture Fundulea reveals that 99 genotype ** Romanian had a production of 2885 kg / ha and Danubian genotype had a yield of 3200 kg / ha. You Ycan see that production of crude protein production was 99 Romanian ** 1129.3 kg / ha and the Danubian was 1340.4 kg / ha.

CONCLUSIONS

- The component genotypes of the environmental comparative culture had good and very good resistance to fall.
- Number of pods / plant varied from 51 to 78.
- Weight of 1000 grains ranges from 156 to 180.
- The best results were obtained when Danubian variety.

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WHERE IS EUROPEAN AGRICULTURE GOING?

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The agricultural activity and the forests are still occupying the highest part of European territory and have a central role in determining the health level of the economy and of the environment. In particular, agriculture has still plays an important role to allow an economically sustainable growth of rural areas. Farmers perform different functions, from food production to landscape management, from environment protection to tourism. Probably no other production activity needs wider competences than agriculture.

Europe is the most active exporter but is also the major importer of food products, most of which is coming from developing countries. The agriculture sector is ordinarily utilising safe production methods for both the consumers and the environment and the food is in general of good quality. Moreover, farmers not only assure the production of nourishment for the community but also maintain the country side as an environment where it is possible to live, to work and to spend free time (agro-tourism).

The majority of farms are small, with a family management; often the products are transformed in the farmhouse, but generally they are sold and transformed by specialised food industries and commercialised in all European countries.

Europe is known for the diversity of food products which are the result of the natural environment and of the agricultural methods developed during centuries. Food and beverage have a clear role in the definition of cultural identity of European regions and population. The EU has the significant task to protect and to valorise the different products and the culinary traditions that are an important part of the European history. From this the quality trade marks as DOP, IGP or GTS that assure the value of the products to the consumers transmitting also the importance of the territory where they are produced and transformed.

When the Common Agricultural Policy (CAP) was first launched, its primary objective was purely quantitative. It was, in the words of the 1957 Treaty of Rome, to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour.

This was an understandable priority at the time. The major agricultural challenge for the member states was to achieve food self-sufficiency in post-war Europe. In an era of unquestioning technological optimism it was inevitable that the means would be sought in mechanisation, chemical inputs and other industrial approaches. This objective was successfully reached by promoting industrial inputs and production systems. However for the last 25 years, EU agriculture has instead been characterised by the surplus production, environmental pollution and unsustainable resource use which result from those industrial systems.

However, over 50 years later, the situation of EU agriculture is fundamentally different. We are now 27 Member States and containing surplus production is now the first priority, together with counteracting the negative consequences of the inappropriate application of technical progress, such as rural depopulation, environmental degradation and unsafe food.

The BSE crisis and other recent scandals in food and farming have highlighted that current food production patterns threaten not only the environment but also public health. This has led to a serious crisis of confidence. Simultaneously, there is well-founded criticism of the EU role in global agricultural trade. Europe can not forget to be a fundamental partner for developing countries. Witnessing the dramatic changes taking place at the close of the twentieth century as a result of scientific knowledge and human inventiveness in technology and globalization, it becomes difficult to comprehend how the great mechanical, social, industrial and scientific revolutions, the advances in agricultural sciences, medical sciences, health care and education which changed the industrialized world, could leave millions of farmers, forest dwellers and fishermen of developing and the least developed countries still using techniques and implements which had been devised about 2,500 years ago.

By 1970, the global economy has been transformed, and industrialized societies have experienced economic growth and expansion of trade without parallel in history, sowing the first seeds of doubt about the price of economic growth, the finitude of some physical resources and the destructive powers of by-products (including wastes) derived from production and consumption. The first public disquiet about damage to the environment came with the publication of Rachel Carson's book, Silent Spring, in 1962, the scenario which created environmentalism in the popular consciousness.

Poverty had been cited as a major cause of environmental degradation. The need for the rural poor to expand their resource base to accommodate growing families has led many farmers to encroach on land which were marginal for agriculture and hasten the downward spiral towards poverty and environmental degradation.

Sustainable development in popular terms was defined as "meeting the needs of the present without comprising the ability of future generation to meet their needs," and growth in the context of poverty eradication a new development paradigm in developing countries held that to be effective, the economic political and social dimensions of secular values would have to integrate to reinforce each other – bringing ethics into both politics and economics leading to greater social cohesion. It showed ways to reduce poverty to achieve growth with greater social integration. Sustainable agricultural development required that those entrusted with the responsibility to manage change would have clearly defined their purposes and policies, and their vision of the economic viability, social equity and ecological sustainability for the future of an agrarian society, indeed of the whole society.

So sustainability is the answer for the modern agriculture not only for developing countries but also for Europe. The central concern is to achieve ecologically sustainable agricultural production systems everywhere, capable of providing everyone in the world with a secure and equitable supply of good and healthy food and clean water.

The key characteristics of such systems can be resumed as follow:

- rely primarily on local, renewable resources

- efficiently use the potential of biological processes to capture the energy of the sun

- maintain the fertility and biological activity of the soil

- maximise recirculation of plant nutrients and organic matter, including waste resulting from food consumption

- maintain a high level of biological diversity in the production system as well as in the agricultural landscape

- provide farm animals with diets and living conditions which reflect their ecological role and allow them to express their natural behaviour.

These criteria can and should be met in different ways under different circumstances. But they can only be met when the principles of ecological sustainability are allowed to influence all relevant social, economic and political factors in the production system.

Farmers should have full access to the necessary means of production, such as land, water and genetic resources, allowing them to achieve an adequate income from farming. An important aspect to be considered is that the local and regional production should have priority in agricultural policies, protecting and recognising the traditional farming systems as an important source of knowledge.

Sustainability, in other words, is not a technical issue limited to agronomic practices in the field. It frequently will require fundamental structural and socioeconomic changes as well. In particular, it will require a reconsideration of many of the industrial products, methods and forms of organisation that were introduced in food and farming over the last few decades.

In Europe about half of the land is farmed. Farming is important for the EU's natural environment. Farming and nature influence each other creating and maintaining a unique countryside. Agricultural land management has been a positive force for the development of the rich variety of landscapes and habitats, including a mosaic of woodlands, wetlands and extensive tracts of an open countryside. Moreover, the ecological integrity and the scenic value of landscapes make rural areas attractive for the establishment of enterprises, for places to live, and for the tourist and recreation businesses.

The links between the richness of the natural environment and farming practices are complex. Many valuable habitats in Europe are maintained by extensive farming, and a wide range of wild species rely on this for their survival. But inappropriate agricultural practices and land use can also have an adverse impact on natural resources, like pollution of soil, water and air, fragmentation of habitats and loss of wildlife and biodiversity.

We can identify three priority areas for action to protect and enhance the EU's rural heritage and to create a sustainable agriculture: biodiversity, water and climate change. The biodiversity, the preservation and the development of 'natural' farming and forestry systems has become crucial. Water management and use is extremely important because it is becoming scarce and precious. Lastly, we have to consider that agriculture is contributing to climate change and is directly influenced by its effects.

The new CAP must ensures that its rules are compatible with environmental requirements and that CAP measures promote the development of agricultural practices preserving the environment and safeguarding the countryside. Farmers are encouraged to continue playing a positive role in the maintenance of the countryside and the environment. CAP should assure direct aid at rural development measures promoting environmentally sustainable farming practices, like agro-environment plans. On the other hand, attracting compliance with environmental laws by sanctioning the non-respect for these laws by farmers through a reduction in support payments from the CAP.

Agenda 21 on sustainable agriculture and rural development (SARD), notes that, by the year 2025, 83 per cent of the expected global population of 8.5 billion will be living in developing countries. Yet the capacity of available resources and technologies to satisfy the demands of this growing population for food and other agricultural commodities remains uncertain. Agriculture has to meet this challenge, mainly by increasing production on land already in use and by avoiding further encroachment on land that is only marginally suitable for cultivation. But it is evident that more research is necessary to introduce efficient measures that favour sustainability in agricultural production. We need to study the principles and rules for the ecological intensification of agriculture, a not well defined concept and open to more precise scientific quantification. More research needs to be done on plant diversity; to understand better the positive and negative elements of monoculture; to asses rates of loss of nutrients or their accumulation in agro-ecosystems; to understand yield decline in long term intensive agriculture; to describe the complexity of the relationships between soil quality and cropping system performance. We need to create models for sustainable livestock development and in general, predictive, mechanistic models of the impact of agriculture on natural ecosystems are still necessary.

Agricultural research, technology transfer and improvements in training are primary components in the sustainable development of agriculture. The involvement of consumer and citizen should also help to enhance the acceptability of the results of agriculture research. Agriculture intensification has received particular support in Europe. This has stimulated studies on the sustainability of available systems of food production being a European priority the development of integrated arable production systems in harmony to environmental needs. In this respect, Europe can share with the rest of the world its experience and knowledge

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METODĂ NEDISTRUCTIVĂ DE INVESTIGARE RAPIDĂ A CAPACITĂȚII ANTIOXIDANTE ŞI A CONȚINUTULUI ÎN POLIFENOLI A PLANTELOR MEDICINALE PRIN SPECTROMETRIE FTIR

NON DESTRUCTIVE METHOD FOR RAPID SCREENING OF ANTIOXIDANT CAPACITY AND POLYPHENOLS OF MEDICINAL PLANT BY FTIR SPECTROMETRY

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Key words: FTIR Spectroscopy, medicinal plants, polyphenols, antioxidant capacity

REZUMAT

Metodele clasice de determinare a capacității antioxidante şi a conținutului în polifenoli se bazează pe diferite reacții chimice care necesită consum de reactivi, de obicei agresivi față de mediu, un timp de lucru îndelungat şi personal calificat. Spectrometria în infraroşu cu transformantă Fourier (FTIR) este o metodă rapidă, nedistructivă şi relativ ieftină care permite atât investigarea calitativă cât şi cantitativă. Ea se bazează pe prezența legăturilor chimice specifice polifenolilor şi substanțelor cu caracter antioxidant (-OH, -COOH, -CH) care au în spectrul infraroşu frecvențe şi intensități caracteristice. Obiectivul lucrării are în vedere investigarea aplicării metodelor spectrometriei în infraroşu (FTIR) la determinarea capacității antioxidante şi a conținutului în polifenoli, parametrii deosebiți de importanți pentru caracterizarea plantelor medicinale. Metoda propusă este rapidă şi o dată calibrată nu implică consum de reactivi.

ABSTRACT

The classic methods used to determine the antioxidant capacity and polyphenols of medicinal plants are limited by money, reagents acquisition, a long time for sample preparation and necessity of qualified personal capable to make the analyzes.

FTIR Spectroscopy is a quick, non-destructive and chip qualitative and quantitative analyzes method. This method depends on types and number of, O-H COOH and C-H bonds present in constituents of analyzed medicinal plants. The main FTIR Spectroscopy applications in medicinal plants analyze is qualitative and quantitative determinations of total polyphenols and antioxidant capacity. Proposed method not requests the reagents once it was calibrated.

INTRODUCTION

All the classical chemical methods used for determination of antioxidant capacity (AC) are laborious and request high reagents consumption, which are potential aggressive for the environment. The aim of this research was to investigate the determination of total antioxidant capacity by FTIR, a fast and non-destructive method, which not requests the reagents once the method was calibrated (Wilson, 1994; Smith, 1996; Roberts, 2004).

The apparition of spectroscopic techniques in the world and the development of NIR and FTIR spectrometers was started after 1957 and expended in the last decades (Norris*, 1984;* Wilson, 1994). In our country FTIR Spectroscopy was used in chemical and

pharmaceutical industries. The research of quality of fodder plants using FTIR was not possible since now because of financial problems. In the last years the high level of financial supporting for national research, after the integration of Romania to the European Union, it was possible the acquisition of FTIR equipments. That's permit innovative researches to develop new methods for detection of bioactive compounds and control of medicinal plants.

MATERIAL AND METHOD

The spectra were obtained using the plants powder and FTIR S-8400 spectrometer (Shimadzu) equipped with EasyDiff device for reflexion measurements of solid substances. The spectra were scanned in range 400-4000 cm^{-1}. The chemical reference methods used for Antioxidant Capacity determination and FTIR calibration was CUPRAC and Folin-Ciocalteu for polyphenols (Dragan, Gergen &Socaciu, 2008). Chemometric software PANORAMA from LabCognition was used for multivariate analysis of experimental data.

RESULTS AND DISCUSSIONS

The infrared spectroscopy is characterized both by rotating and vibrating movement of molecules. A classification of infrared spectroscopy considering the applications, molecular dynamics and the used equipments are the following:

- Near Infrared Spectroscopy (NIRS), corresponding to 0.78 - 2.5 μm (12800-4000 cm^{-1})
- Mid Infrared Spectroscopy (MIR), corresponding to 2.5 - 25 μm (4000-400 cm^{-1})
- Far Infrared Spectroscopy (FIR), corresponding to 25-1000 μm (400-10 cm^{-1}) (Wilson, 1994).The position of IR in electromagnetic spectrum is shown in Figure 1:

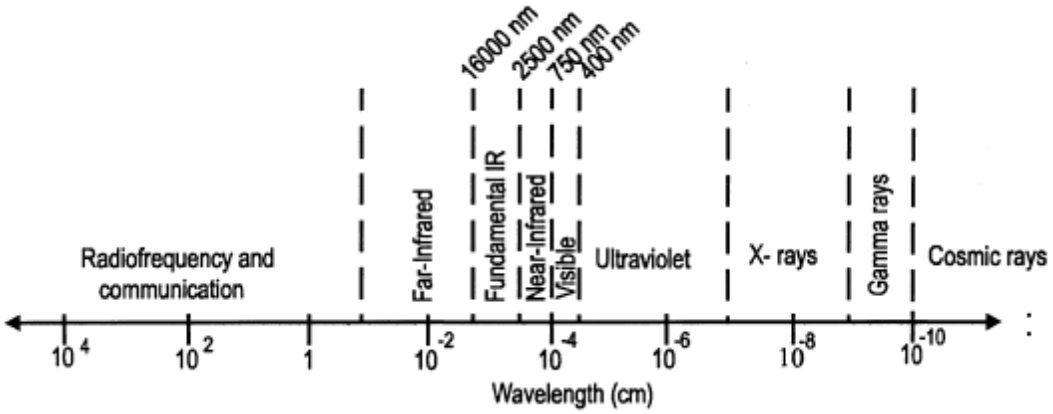

Figure 1. The position of IR in electromagnetic spectrum

Experimental values determined chemical for CUPRAC and Polyphenols are presented in Table 1.The PLS (Partial Last Square) model was used for FTIR calibration and was performed with the results obtained for total polyphenols content and CUPRAC parameters of medicinal plants by chemical method and the values of reflectance from FTIR spectra. The principal chemical bounds present in polyphenols compound are –OH, -COOH, -CH aromatic, -CH3, -C=C- aromatic and aliphatic (Schulz & Baranska**,** 2007; Yu Peiqiang, *2005*). For rozmarinic acid these bounds are presented in Figure 2 and vibrational range in Table 2.

Table 1

Investigated medicinal plants and experimental values determined chemical for Polyphenols and antioxidant capacity by CUPRAC

Nr	Samples	Polyphenols	CUPRAC
		μMol TROLOX/g	
1	Anghinarie *(Cynara Scolynmis.L.)*	114	51
2	Catina *(Hyppophaen rhamnoides)*	246	152
3	Cimbru (*Satureja hortensis)*	563	437
4	Coada calului *(Equisetum arvense)*	177	126
5	Coada soricelului *(Achilea millefolium)*	326	195
6	Crusin *(Rhamnus frangula)*	462	221
7	Echinacee (Echinacea)	458	285
8	Fenicul *(Foeniculum vulgare)*	174	86
9	Galbenele (*Calendula officinalis)*	267	114
10	Macese *(Rosa canina)*	379	261
11	Menta *(Menta piperita)*	509	357
12	Musetel *(Matricaria chamomilla)*	398	216
13	Nalba *(Althaea officinalis)*	101	35
14	Paducel *(Crataegus monogyna)*	710	493
15	Papadie (*Taraxacum officinale)*	342	274
16	Pelin *(Artemisia absinthium)*	165	99
17	Pin *(Pinus silvestris)*	214	106
18	Patlagina (*Plantago lanceolata*)	435	325
19	Pufulita (*Epilobium hirsutum*)	1130	491
20	Roinita (*Melissa officinalis)*	1072	520
21	Rostopasca (*Chelidonium majus)*	238	144
22	Salvie (*Salvia officinalis*)	739	485
23	Salcie *(Salix L.)*	739	477
24	Sinziene *(Galium verum)*	330	243
25	Sunatoare *(Hypericum perforatum)*	845	506
26	*Tataneasa (Symphytum officinale)*	370	275
27	Tei *(Tilia flores)*	755	478
28	Traista ciob (*Capsella bursa pastoris)*	189	99
29	Trei frati patati *(Viola tricolor)*	330	203
30	Troscot *(Polygonum aviculare)*	382	251
31	Valeriana *(Valeriana off.)*	258	155
32	Urzica *(Lamium album*	75	43
33	Arnica (*Arnica Montana*)	622	419

Table. 2

Specific vibrational range for specific chemical bond (Tan et al., 2008)

NR.	WAVENUMBER (CM-1)	BASE GROUP AND VIBRATION MODE	MAIN ATTRIBUTION
1	3396, 2922, 2849	v(OH), v as(C-H), v s(C-H)	HYDROXYL, METHYLENE
2	1718, 1691, 1622, 1229, 1099	v (C=O), v (C=C), v (C-O)	ESTER, CARBONYL, KETONE, AROMATIC BENZENE RING, PHENOLIC HYDROXYL, ESTER
3	1443, 1370,1149	δ (C-H),	METHYLENE, METHYL, PHENYL
4	912, 813, 778	γ(C-H)	END METHYLENE, BENZENE RING

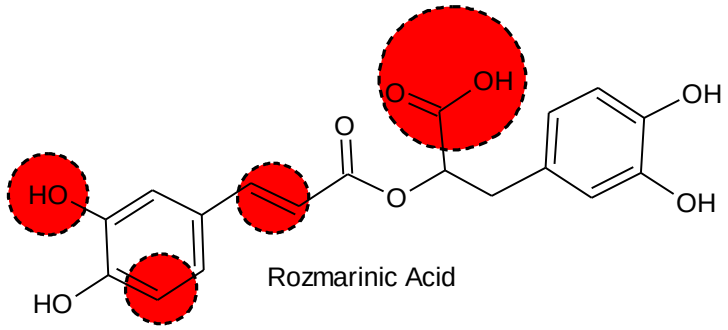

Figure 2. Infra Red active base groups in phenolics acids: -OH, -COOH, C=C aromatic, C=C aliphatic, C-H aromatic

For booth polyphenols and antioxidant capacity the investigated range from IR spectra was 1500-1800 cm^{-1} and 2700-3400 cm^{-1} specific for dominant active groups –OH, -CH and COOH. The number of factors varied between 6 and 8, and internal or external cross validation was used in calibration model. For external cross validation were used another 33 spectra and experimental values determinate on the same samples of medicinal plants. The statistical parameters of calibration with PLS model are presented in Table 3.

Table 3

Statistical parameters of calibration/validation with PLS model

Nr.	Methods	Prediction R^2	RMSEC/ RMSEP	std	Selected spectral range (cm^{-1})
1	PLS FTIRspectra-polyphenols Internal CV	0.9663	50	265	1520…… 1780 2720... .. 3416
2	PLS FTIRspectra-polyphenols External CV	0.8883	94/154	258/257	930..... .. 1549 2880... .. 3304
3	**PLS FTIRspectra-CUPRAC Internal CV**	**0.9874**	**17**	**156**	**1371 .. ….1715 2810…. .. 3489**
4	**PLS FTIRspectra-CUPRAC External CV**	**0.9521**	**35/98**	**153/139**	**1371 …… 1715 2810….. .. 3489**

Quality of calibration is evaluated by the validation methods. External cross validation methods is the most recommended. In this case the major parameters are prediction coefficient R^2 and RMSEC (Root Mean Square Error of Calibration) or RMSEP (Root Mean Square Error of Prediction). The closed these two parameters, the best is the calibration. The best correlation coefficient R^2 = 0.9874 between experimental and predicted CUPRAC results was obtained for the PLS model in range 1371 - 1715 cm^{-1} and 2810 - 3489 cm^{-1}. For this range also external cross validation give good statistical parameters. For polyphenols the quality of calibration is slightly lower than for CUPRAC, smaller R^2 (0.9663 respectively 0.8883) higher RMSEC and also higher difference between RMSEC and RMSEP. These results can be explain by the large different structure of polyphenols with the same antioxidant capacity.

CONCLUSIONS

- The obtained results, using 33 medicinal plant samples, shows a good prediction for the antioxidant capacity (CUPRAC) and Polyphenols using PLS model, constructed with the experimental values determinate by chemical methods and reflectance from FTIR spectra.

- The good prediction obtained for AC and polyphenols demonstrates that FTIR spectra contain o lot of information about some chemical structures of organic compounds with antioxidant capacity.

- The best prediction was obtained for FTIR spectra and Antioxidant Capacity by CUPRAC methods

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ASPECTE PRIVIND CALITATEA SEMINTELOR DE *ROBINIA PSEUDOACACIA VAR. OLTENICA*

RESEARCHES CONCERNING *ROBINIA PSEUDOACACIA* VAR. *OLTENICA* SEEDS QUALITY

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Key words: black locust, forestry seeds, seed quality, biometric characteristics of fruits

REZUMAT

Semințele forestiere constituie materialul forestier de reproducere care stă la baza înființării culturior forestiere, fie ca urmare a instalării acestora prin semănături directe, fie a instalării acestora prin plantații, cu puieți obținuți pe cale generativă. In lucrările de instalare pe cale artificială a vegetației forestiere, calitatea semințelor prezintă deosebită importanță. In acest scop au fost efectuate cercetări asupra mai multor clone de salcâm (Robinia pseudoacacia var. Oltenica) în vederea stabilirii unor caracteristici biometrice ale fructelor precum şi a unor indici calitativi ai semințelor.

Rezultatele au pus în evidență asemănările şi deosebirile existente între martor şi cele 15 clone de salcâm instalate, asemănări şi deosebiri în ceea ce priveşte producția de fructe şi semințe, lungimea şi lățimea medie a fructului, numărul mediu de semințe per fruct, masa a 1ooo de semințe, numărul de semințe la kilogram, puritatea semințelor.

ABSTRACT

Forest seeds represent the forest reproductive material which is the bas of afforstation. The forest culture can be installing, by direct sowing or by seedling. It is know that, seed quality have great importance for artificial forest vegetation installation. This is the reason why research was made on several clones of locust (Robinia pseudoacacia var. Oltenia) to establish biometric characteristics of fruits as well as qualitative indices of seeds.

The results highlighted the similarities and differences between the control and 15 clones of locust installed, similarities and differences in terms of fruit and seed production, mean fruit length and width, the average number of seeds per fruit, mass of 1ooo seed, number of seeds per kilogram, purity of seed.

INTRODUCTION

Robinia pseudoacacia is native from to North America (South-West USA), which was introduced in Europe (France) by Jean and Vespasian Robin in 1601

In Romania was introduced as ornamental species, in 1750, but first forest plantation was done in 1852 in Oltenia, near the city Bailesti, Dolj county. In 1867 the first plantation was established on sandy soil in Deveselu (Oltenia), and after the independence war plantations of acacia were established on sandy soils in southern Oltenia, on an area of almost 30,000 hectares (Haralamb, 1967). Currently, area occupied by this species is of 250,000 hectares (4% of the total area of forests in Romania).

It is an important species for the installation of forest vegetation in the south, the sands of Oltenia and generally spike, on degraded land. To produce seedlings needs on artificial forest stands installation is necessary the best quality seeds in sufficient quantity.

MATERIAL AND METHOD

In order to obtain reproductive material is important to use the best quality seeds. For this purpose an orchards of *Robinia pseudoacacia* var *oltenia* with material taken from the orchards of Arginesti was founded in spring of 2008 to Didactical and Experimental Station (SDE) Timisoara.

a Black locust with flowers ***b Black locust with pods***

Figure 1 Robinia pseudoacacia var oltenica from SDE

There were taken in study 15 clones of black locust *oltenica* plus a common black locust. The entire production of pods was harvested and laboratory measurements were made on fruits and seeds (Figure 1).

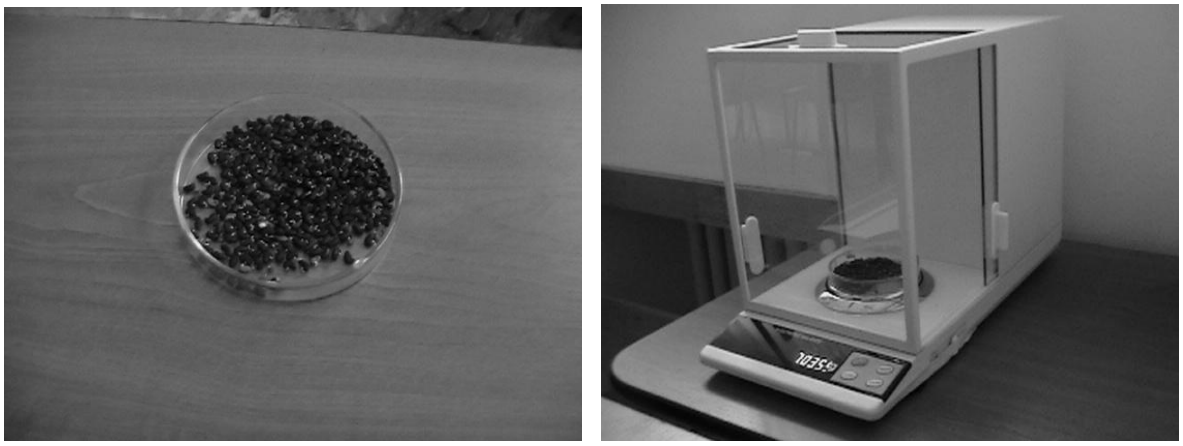

Figure 2 Laboratory measurements

To establish biometric characters of pods were conducted measurements on packs of 10 pods from each tree, a total of 909 determinations. In relation to seed production was established for each clone and the number of seeds per kilogram, mass of 1000 seeds and their purity were also determined. Production was established by weighing all seeds,

from a analytical balance with an accuracy of 0.0001g. Seed purity (P) was determined as the ratio between the weight of pure seed (a) and total weight of sample (b).

$$P = \frac{a}{b}100$$

Mass of 1000 seeds was determined as the simple arithmetic mean of four samples of 100 seeds weighing on analytical balance.

Number of seeds per kilogram was determined from the mass of 1000 seeds on the formula:

$$N_{kg} = \frac{1.000.000}{M_{1.000}}.$$

RESULTS AND DISCUSSIONS

In order to highlight the similarities and differences between clones of *oltenica* black locust installed in orchards of SDE were made several determinations including biometric characters of fruit, length and width of pods. In this sense it was determined the average and standard deviation for each clone separately. The greater variability is observed to 9 Nisipeni clone for both characters - length and width pods. High values occur with clone 13 nisipeni but there has been specify the number of pods which is low (7). In terms of average values of the characters, the highest average values are observed on clones 16 Piscu and 2 Ciurumela the character "long pods" and 2 ciurumela for character "wide pods". In terms of lowest average the clone 23 Ciurumela can be pointed out (Table 1).

Table 1

Descriptive statistic

Clones	fruit length			fruit width		
	Means	N	Std. Dev	Means	N	Std. Dev
1 Ciurumela	78.5325	110	11.33131	11.51782	110	0.964927
2 Ciurumela	102.9632	78	18.91101	11.49436	78	1.354473
3 Ciurumela	80.2059	73	18.29826	12.35753	73	0.980483
18 Ciurumela	72.6225	60	10.60989	10.33150	60	1.135386
20 ciurumela	87.6386	100	18.00298	11.08540	100	1.188542
22 Ciurumela	74.2916	50	15.45342	10.95260	50	1.138194
23 Ciurumela	65.2133	30	15.81430	9.62133	30	1.178104
24 Ciurumela	66.2820	30	11.36995	9.91767	30	1.003280
25 Ciurumela	71.6450	34	17.78752	10.08588	34	0.883310
5 Nisipeni	91.4253	30	15.37695	12.03700	30	0.802192
9 Nisipeni	85.1259	99	22.68400	11.30137	99	1.277997
13 Nisipeni	79.6543	7	18.77933	13.16000	7	1.621727
16 Nisipeni	84.2117	104	19.59487	11.17663	104	0.968457
16 Piscu	104.6002	60	15.70907	11.08133	60	1.033428
18 Piscu	71.4631	36	19.28443	10.83306	36	1.096610
Commom black locust	64.4125	8	12.25643	12.44250	8	0.590684
All Grps	83.1585	909	20.23916	11.17670	909	1.278136

The seed production can not be appreciated by length and width of pods. This is the reason why was considered the number of pods (Figure 1), quantity of seed harvested for each clone (Figure 2) and the number of seeds per pod (Figure 3).

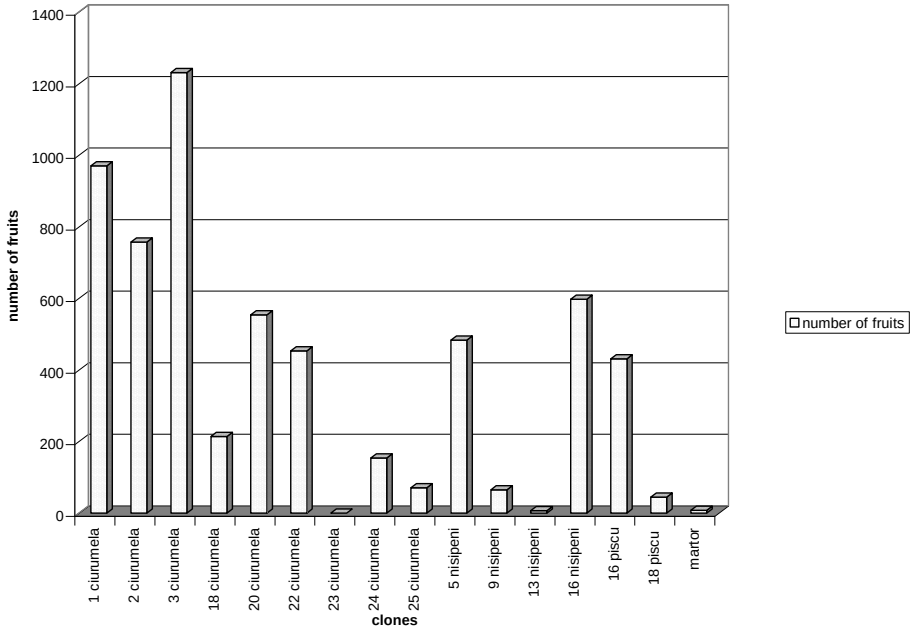

Figure 3 Number of fruits

The graphic representation shows us some connection between the number of harvested pods and seed weight. We can observe the 3 Ciurumela clone position because their higher pods production but not the higher seed quantity.

In terms of number of seeds per pod, no significant differences between clones were established, the number varying between 5 and 12. The lowest values was determined for 13 Nisipeni clone and the cpmmon black locust one but we have to say that in these cases the number of pods was reduced (Figure 3).

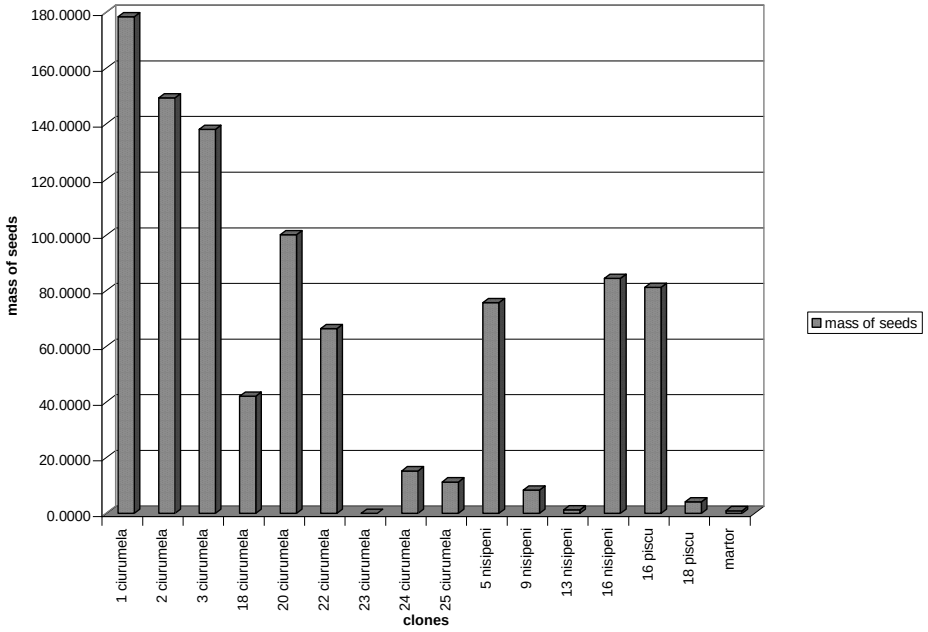

Figure 4 Mass of seeds

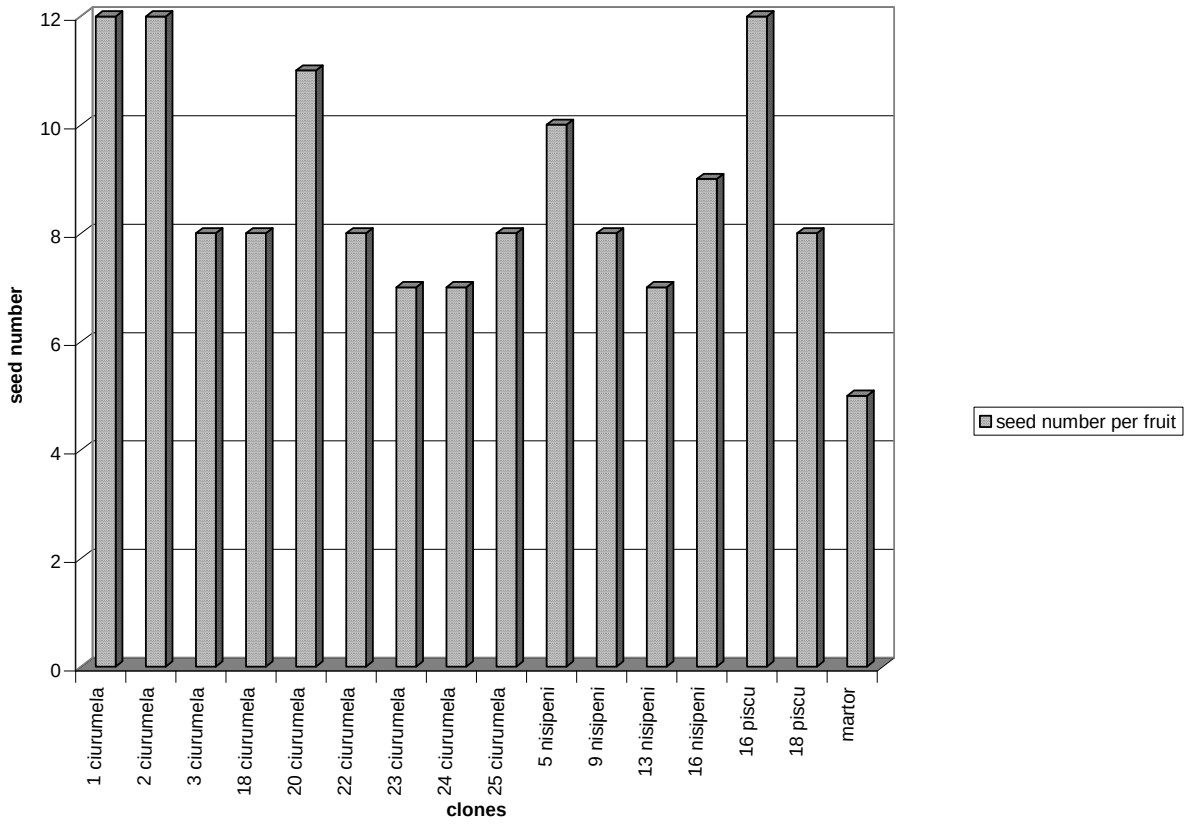

Figure 5 Number od seeds per fruit

To establish seeds quality, three indices were examined: the purity, weight of 1000 seeds and number of seeds per kg. For most clones, the values obtained for the character "purity" are large, over 90%. In terms of mass of 1000 seeds the values varied between 17.0604g for 18 Piscu clone and 22.9237g for 5 Nisipeni and their corresponding number of seeds per kg ranged between 43,623 and 58,615 (Table 2).

Table 2

Seed quality

Clones	Purity (%)	Mass of 1000 seeds	Number of seeds per kilogram
1 ciurumela	92.26	22.6220	44205
2 ciurumela	92.79	20.3257	49199
3 ciurumela	76.43	18.4142	54306
18 ciurumela	92.75	20.5590	48640
20 ciurumela	94.37	22.3111	44821
22 ciurumela	81.65	19.3060	51797
23 ciurumela	84.01	18.9840	52676
24 ciurumela	95.19	19.6915	50783
25 ciurumela	92.75	15.0925	66258
5 nisipeni	83.69	22.9237	43623
9 nisipeni	86.05	19.7013	50758
16 nisipeni	80.47	19.5978	51026
16 piscu	93.29	19.7500	50633
18 piscu	90.02	17.0604	58615

CONCLUSIONS

Research on black locust pods and seeds harvested from the orchards of the Didactical and Experimental Station highlighted the variability in biometric characters of pods (length and width) and differences between analyzed clones in terms of quantitative and qualitative indicators.

It can be appreciate the clones 1, 2 and 3 ciurumela which give the largest productions even if the clone 3 ciurumela it came as a result of a large pods number and not the large number of seeds per pod respectively seed weight.

It is noticed that the total of 160 trees that make up the orchards of the Didactical and Experimental Station only 105 were exploited. Of all the clones analyzed the small results seed production was observed in 13 Nisipeni clone and the common black locust.

In the future it must be done laboratory experiences to determine seeds germination and seed weight influence on their germination and risen.

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SURSE DE MATERIALE FORESTIERE DE REPRODUCERE PENTRU SPECIA *PSEUDOTSUGA MENZIESII* (MIRBEL) FRANCO IN OCOLUL SILVIC ANA LUGOJANA

FOREST REPRODUCTIVE MATERIALS FOR *PSEUDOTSUGA MENZIESII* (MIRBEL) FRANCO IN ANA LUGOJANA FOREST DISTRICT

HERNEA CORNELIA, ONEȚIU CLAUDIU

Key words: Douglas-fir, distribution, forest reproductive material,

REZUMAT

Duglasul este o specie exotică, originară din vestul Americii de Nord care, la noi în țară a fost introdus în cultură acum cca. 120 de ani, de la câmpie până în subzona molidului, la altitudinea de 1400 m. Cercetările s-au realizat în vederea cunoaşterii fondului genetic aparținând speciei Pseudotsuga menziesii (Mirbel) Franco. În acest scop s-a recurs la evaluarea distribuției duglasului în pădurile Ocolului Silvic Ana Lugojana şi analiza arboretelor surse de material forestier de reproducere pentru aceast[specie.

Duglasului s-a adaptat la la condițiile staționale locale şi realizează creşteri foarte frumoase exist\nd în prezent tendința de a realiza arborete amestecate spre deosebire de cele realizate în trecut care erau pure. Nu s-au inregistrat eşecuri în cultura duglasului în această zonă prin urmare putem afirma că specia este adaptată condițiile locale.

ABSTRACT

Douglas-fir is native to western North America. In our country it was introduce 120 years ago from plain to the mountain, up to 1400 m. The research was developed in order to know genetic resources of the specie Pseudotsuga menziesii (Mirbel) Franco. This is the reason why the distribution of Douglas-fir and the analysis of forest reproductive materials stands of the Ana Lugojana Forest District were studied.

Douglas-fir has been adapted very well to local site conditions. The growths made by this specie are very height. Unlike the plantations performed at the beginning of this century were pure, the current trend is to implement mixed stands. There were no failures caused by harmful factors for Douglas-fir culture in this area, so we might consider this specie fully adapted to local conditions

INTRODUCTION

Douglas-fir is originating from the west coast of North America. The high growth rate and wood qualities made that this particular species to be cultivated in Europe and other temperate regions.

In Europe it was introduced 150 years ago and it was planted on large areas that become larger over years. In our country, it was introduce 120 years ago, from plain to the spruce site plant belt, at an altitude of 1400 m.

Forest stands with Douglas-fir on the Ana Lugojana Forest District are some of the oldest and most successful Douglas–fir culture of our country.

MATERIAL AND METHOD

In order to know the genetic fund of the species *Pseudotsuga menziesii* (Mirbel) Franco and forest reproductive materials from "Ana Lugojana" Forest District, a general documentation on Douglas-fir was made and also an analysis of Douglas-fir distribution in "Ana Lugojana" Forest District and a presentation of forest reproductive materials for this specie.

Data processing was done for all forest stands with Douglas-fir in their composition from the Forest District taking into study. Effective surface areas were recorded, defined by the multiplication between the compartment area and the percent of participation of Douglas-fir.

RESULTS AND DISCUSSIONS

Douglas-fir is common in all units of production from "Ana Lugojana" Forest District. The effective area occupied by Douglas-fir in all 45 compartments with this specie in stand composition is 115.80 ha of actual total area of 373.10 hectares. Stands are generally mixed, few stand are pure (UP II Crivina, compartment 53A, 54A, UP IV Cornet compartment 97E).

Distribution of this area per unit of production is shown in the chart below (Figure1):

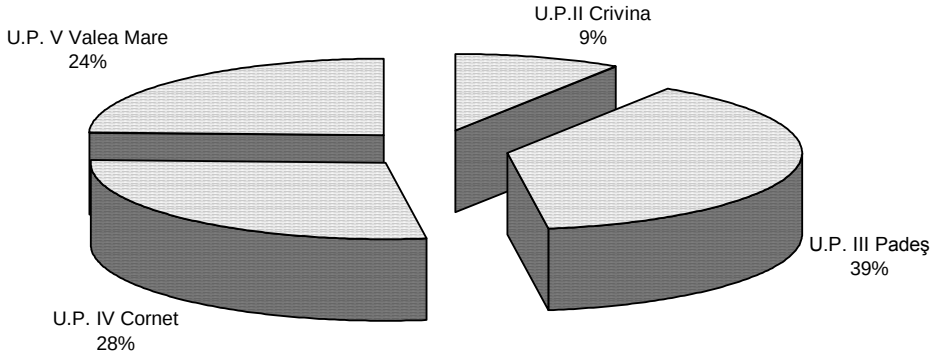

Figure 6 Distribution of Douglas fir on production units

There are four types of soil which Douglas-fir was found. Distribution of Douglas-fir on soil types shows that the largest area is occupied by Eutric cambisols (Figure 2)

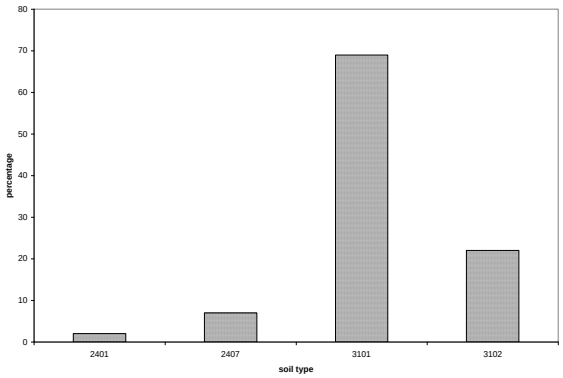

Figure 7 Douglas-fir distribution on soil type

2401 – Typical luvosol
2407 – Stagnic luvosol
3101 – Typical Eutric cambisols
3102 – Mollic Eutric cambisols

In analyzing the distribution of Douglas-fir in Ana Lugojana Forest District, besides the distribution of soil types, an important role it has the distribution of specie on the altitudinal pant belt (Figure 3).

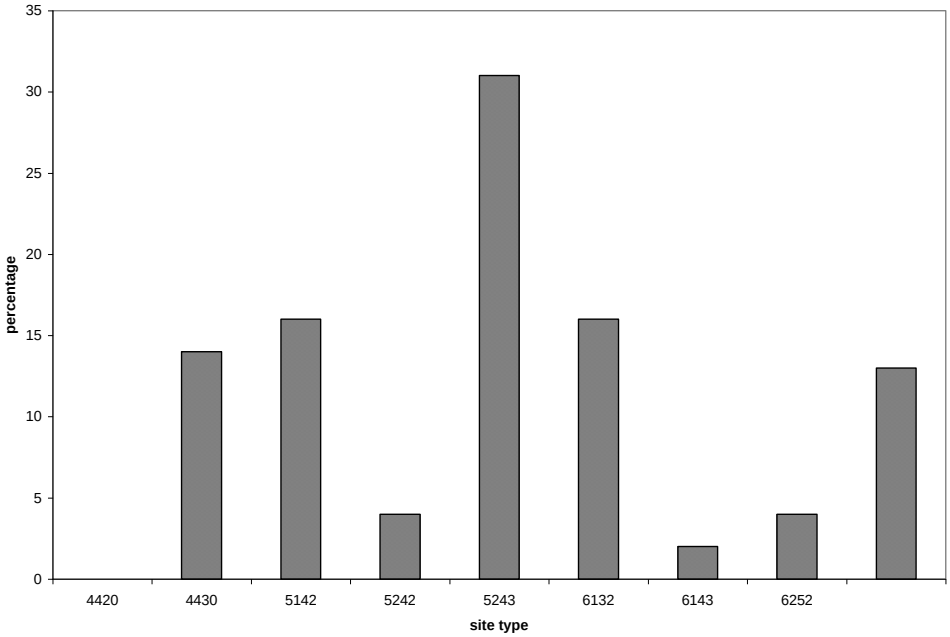

Figure 8 Douglas-fir distribution on soil type

It can be observed that this specie is found on eight forest sites:

❖ 4.4.2.0. – Mountain-premountain of European beech stands, Pm medium yield brown soil with *Asperula-Dentaria*;

❖ 4.4.3.0. – Mountain-premountain of European beech stands, Ps, high yield brown soil with *Asperula-Dentaria*;

❖ 5.1.4.2. – Hilly stand with sessile oak stand, Pm, podzol stagnic with *Carex pilosa*;

❖ 5.2.4.2. – Hilly stand with European beech stand, Pm, medium yield brown soil with *Asperula-Asarum*;

❖ 5.2.4.3. – Hilly stand with European beech stand, Ps, high yield brown soil, with *Asperula-Asarum*;

❖ 6.1.3.2. – Hilly stand with Quercus sp., Pm podzol, medium yield, with meso-xerophytic plants

❖ 6.1.4.3. – Hilly stand with Quercus sp. and mixed stands Ps, podzol, stagnic, high yield with *Carex pilosa*;

❖ 6.2.5.2. – Hilly stand with Quercus sp., Pm, low yield brown soil;

The predominant forest site type is 5.2.4.2 with 31% of total area followed by forest sites found in Moutain-premountain of European beech stands. The other forest sites are spread all together 11% from Douglas-fir area (115.8 ha).

In order to show the Douglas-fir distribution on forest type the graphic below was made (Figure 4):

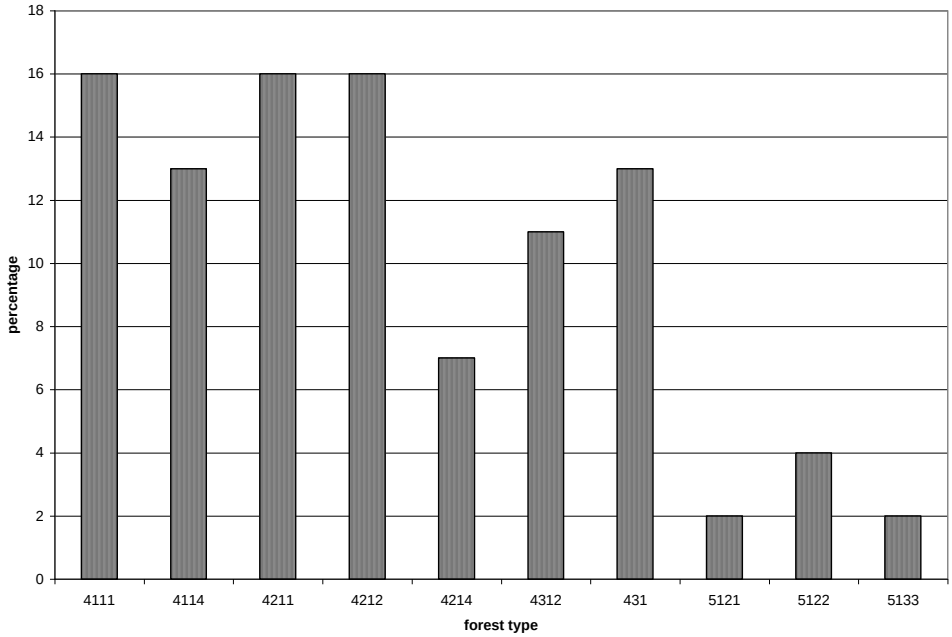

Figure 9 Douglas-fir distribution on soil type

It may be noted that, of the ten types of forest, the highest percentage is represent by 4111 (Stand with European beech with flora of mull, higher productivity), 4211 (Hilly stand with European beech with flora of mull, higher productivity) and 4212 (Hilly stand with European beech on skeleton soil with flora of mull, medium productivity), each with 15.56% of the area occupied by Douglas-fir. Following types 4114 (Mountain stand with European beech on skeleton soil flora of mull, medium productivity) and 4331 (Hilly mixed stand with European beech, medium productivity), with 13.33% and 4312 (Mixed stand of European beech and hornbeam with the flora of Mull, medium productivity) with 11.11%. Other types: 4214 (Hilly stand with European beech, medium productivity), 5121 (Sessile oak stand with *Carex pilosa*, medium productivity), 5122 (Sessile oak stand with *Carex pilosa*, higher productivity), 5131 (Coastal sessile oak with grasses and *Luzula luzuloides*, medium productivity) deals 15.56% of the area occupied by Douglas-fir.

In terms of natural regeneration of Douglas-fir, it appears in a single compartment (52C) of the UP V Valea Mare, with a total area of 2 hectares and 1.6 hectares effective area occupied by Douglas. This represents 4.44% of total effective area occupied by Douglas (Figure 5).

The culture of Douglas-fir in Ana Lugojana Forest District was a still a concern to foresters a century ago.

These pioneering attempts successfully reflected in the exceptional growth that this specie has made in these forest sites.

Of the total compartments where Douglas-fir is present, eleven compartments are provided as forest reproductive materials.

For example:

U.P. II Crivina, compartment 54A, at the age of 85 years, Douglas-fir trees have diameters of 72 cm and 44 m height, a volume increment of 11 cubic meter / year / ha;

U.P. III Padeş, compartment 37B, at the age of 85 years, Douglas-fir reach 40 m height , with diameters of 70 cm, a volume increment of 8 cubic meters / year / ha,

U.P. IV Cornet compartment 97E, at the age of 80 years, has 60 cm diameter and 35 m high, with a volume increment of 11 cm / year / ha;

In U.P. V Valea mare, compartment 51B, at the age of 90 years, Douglas-fir reach 45m height, with a diameter of 70cm, a volume increment of 6 cm / year / ha and more

interesting is that on the opposite side, the compartment 52C natural regeneration appeared, coming from compartment 51b.
These examples could continue throughout the "Ana Lugojana" Forest District.

Figure 10 Douglas-fir natural regeneration

Douglas-fir making same exceptional growth, which shows that forest sites are favorable (Figure 6).

Figure 11 Douglas-fir tree in Ana Lugojana Forest District

All forest stands are first production class, both pure stands and mixed ones.

CONCLUSIONS

Stands with Douglas-fir in their composition from Ana Lugojana Forest District fall into two groups of age. The first group includes stands with aged between 75-105 years. This shows us that was a concern for this species until the outbreak of World War I. After that there was no interest for this specie until 1960 when Douglas-fir returned to the spotlight.

These new interests for Douglas–fir culture can be explained by their very good perform and productivity on these forest site.

At the beginning of the century there was a tendency for pure plantation with Douglas fir. At this time the tendency changed so forester prefer mixture stand with Douglas-fir in forest composition. It is generally introduced at a rate of 60-70%, in addition to natural regeneration. There was no natural regeneration Douglas-fir was introduced in rate of 30-40% in addition to spruce (20-30%) European beech (30-50%). Douglas-fir performs very well in mixed stands with beech and hornbeam because their foliage is important for soil amelioration unlike conifers.

The culture of Douglas-fir in mountain and hilly deciduous forests or in mixtures stands of conifers and European beech has contributed significantly to increase the overall value of these stands.

Surprisingly, natural regeneration of Douglas-fir happened in less favorable site condition, in compartment 52C. This can be explaining by lower crown density of the oak stand which creates advantageous condition for seedlings. At the same time, the valley found between maternal stand and natural regeneration is the cause of the favorable higher atmospheric humidity

The results of Douglas-fir culture in "Ana Lugojana" Forest District are very good. The Douglas-fir is very impressive dimensions, straight steam, cylindrical, well pruning. The volume increment significantly higher than by other main tree specie and very good wood qualities give the status of the most precious resinous introduced in our country

Because there was no failures in Douglas-fir culture in this area caused by harmful factors, this species might be consider a fully adapted to local conditions.

Based on these considerations, can we claim to obtain a reproductive material of the highest quality of forest stands from "Ana Lugojana" Forest District.

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REZULTATE EXPERIMENTALE PRIVIND COMPORTAREA UNOR GENOTIPURI DE ARAHIDE ÎN CONDIŢIILE PEDOCLIMATICE DE LA S.C.D.A. CARACAL

EXPERIMENTAL RESULTS CONCERNING THE BEHAVIOR OF SOME GROUNDNUT GENOTYPES IN THE PEDOCLIMATIC CONDITIONS FROM CARACAL RESEARCH STATION

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Cuvinte cheie: genotipuri de arahide, variabilitate, păstăi
Key words: groundnut genotypes, variability, pods

REZUMAT

Scopul prezentului studiu este acela de a evidenţia variabilitatea fenotipică şi genotipică, precum şi modul de comportare al arahidelor cultivate pentru prima dată la staţiunea S.C.D.A. Caracal. Este prezentată numai variabilitatea caracterele cantitative, variabilitate datorată în mare parte condiţiilor pedoclimatice şi atmosferice nefavorabile găsite de genotipurile de arahide în zona de experimentare. Au fost analizate câteva dintre principalele componente ale producţiei, iar din rezultatele obţinute reiese că la S.C.D.A. Caracal, cultura arahidelor nu întâlneşte condiţii optime în vederea obţinerii de producţii inseminate şi nici de calitate.

ABSTRACT

The aim of this study is to emphasize phenotypic and genotypic variability and the behavior of groundnuts crop cultivated from the very first time to Caracal R. S. It is presented only the variability of quantitative characters, variability determined mostly by unfavorable pedo-climatic and atmospheric conditions find by groundnut genotypes in the experimentation area. It were analyzed some of the main components of the yield and from the obtained results it can conclude that to Caracal R.S. groundnut crop did not reach optimum conditions as concern the obtaining of important yields and of quality.

INTRODUCTION

The largest areas cultivated with groundnuts are spread in tropical and subtropical zones but it started to be grown even in the warmer from all continents.

Crop areas for groundnuts varies in the latitude of 40^0 North and in the latitude of 40^0 South, expanding in crop in different countries depending on environment conditions and economical interests.

In the countries with largest areas of groundnuts it is accorded a more and more attention for this crop by increasing the cultivated areas, continuing perfection of crop technologies, creating new valuable varieties and the appearing of some local structures, national and international which promotes the crop and synchronize the scientific and research activities in this domain.

In the present it reach over to a specialization of commercially the groundnut crop, growing four market types depending on destination of the harvest and botanical framing.

Groundnuts are relative photosensitive and have a higher content of oil and proteins than other vegetables. Are also an excellent source of essential nutrients such as carbohydrates and vitamins. Their growing improves the soil because groundnuts fixes the atmospherically nitrogen with the help of bacteria's from the roots and like a completion, groundnuts are also cultivated in the forage purpose and to check up the soil erosion in the high zones.

Economical and agrotechnic importance of the groundnuts, special attention accorded to this crop, increasing request for groundnuts and groundnuts products on the market will undoubtedly conduct in the future to the increase of the cultivated areas and averages and total obtained yields.

MATERIALS AND METHODS

The researches were made on an argiloiluvial typical chernozem, with a well emphasized profile and significant differences concerning the physical, hydro- and chemical issues.

The main goal of research from this paper is to emphasize the phonotypical and genotypic variability and the behavior of groundnuts cultivated from the very first time in Caracal Research Station.

Biological material utilized in this study was represented by nine groundnut genotypes which were initially studied in comparative and orientation crops in the conditions of Tamburesti Research Station. The experience was set up after blocks method in four repetitions.

The study of the quantitative characters variability was made using the biometric measurements. Averages obtained values were statistically analyzed. On the basis of variability index was established the variation degree of the studied characters as a result of appreciation scale of variability index (s%) after CEAPOIU, 1968.

The significance of the differences between the samples was established with limit differences (DL), calculated for the three limiting value of P 5%, P 1% and P 0.1%.

OBTAINED RESULTS

The data from fig. 1 certify the fact that year 2008 was warmer than the zone characteristics realizing an average temperature of 26.1 ^{0}C, with 2.6 ^{0}C higher than normal which represents 10.0 ^{0}C.

As concerns the month of warm period of the year, the warmest month was August when it was registered an average temperature of 32.4 ^{0}C, with 8.3 ^{0}C higher than monthly average. On the 24 of July it was registered the maximum temperature of 46.7 ^{0}C, this being the highest temperature registered in the last 100 years.

The rainfall in the experimentation period totalized 380.2 mm, being higher than yearly average which is of 315.3 mm. The experimentation period was characterized by un-uniform distribution of rainfalls, these being higher in the last vegetation period fact that did not influenced the obtained results.

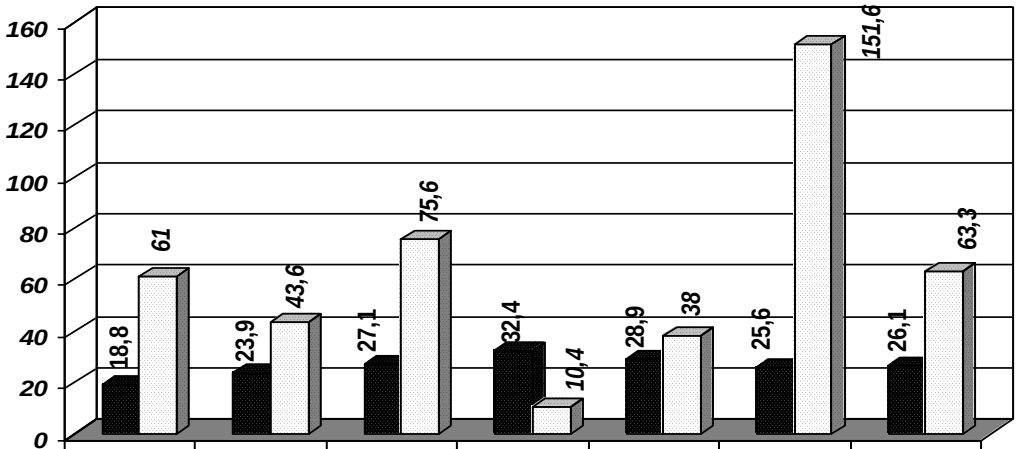
The number of pods formed by a plant represents an important element of yield and among this a special role has mature pods.

In table 1 are presented the average data concerning the variability of the number of mature pods and it can notice a high variability as concerns this character to the experimented groundnut genotypes.

It can establish that some varieties have a bigger number of mature pods/plant: 33.75 T25 line, 26.60 Jelud and 24.8 Black Brazilian varieties while others such as Venus variety, the registered values are smaller (22.09). To other genotypes the registered values are close or a little higher than the control of the experience.

Analyzing the differences between control and the other genotypes it can notice both positive and negative differences as concern this character. Differences considered statistically to the level of very significant towards control registered Jumbo-Virginia and T25 line while Jelud variety recorded significant difference. The other genotypes presented insignificant differences, both positive and negative.

Fig. 1. The registered temperatures (oC) and rainfalls (mm) in the experimentation period (2008)



	V	VI	VII	VIII	IX	X	average
Temp.	18,8	23,9	27,1	32,4	28,9	25,6	26,1
Rainfall	61	43,6	75,6	10,4	38	151,6	63,3

The variability index (s%) for this character recorded very high values, most of the experimented genotypes outrunning the value of 30%.These high values means a variability which is situated out of the admitted limits.

This high variability as concern the number of mature pods is due to the lack of water, both from rain and irrigation in the formation and growing period of the pods.

Table 1

The variability of the number of mature pods to the experimented groundnut genotypes (average of 4 repetitions, 2008)

Crt. no.	Variety or line	$x \pm s_x$	s %	±d	Significance
1.	Tamburesti (Ct.)	22.0±1.90	38.73	-	-
2.	Venus	22.09±2.64	53.46	+0.09	-
3.	Spanish 9184	24.55±1.15	33.27	+2.55	-
4.	Jumbo-Virginia	32.40±2.40	60.77	+10.4	***
5.	Black Brazilian	24.80±2.29	41.33	+2.8	-
6.	Jelud	26.60±2.51	42.21	+4.6	*
7.	Solar	23.5 ± 2.14	29.14	+1.5	-
8.	T242 line	20.79±2.06	44.30	-1.21	-
9.	T25 line	33.75±2.05	40.44	+11.75	***

DL 5% = 2.60; DL 1% = 4.50; DL 0.1% = 6.40

A very important character for yield is represented by the total number of pods formed by a plant. Groundnut pods can contain 1 – 4 seed. The number of seed from pods is variable depending on genotype.

Analyzing the average data from table 2 it can appreciate that special results were obtained depending on genotype. So, to some genotypes the number of total pods formed by a plant was bigger, T 242 line with 56.9, Jelud with 54.4 and Tamburesti with 41.3.

To other genotypes it can establish a considerable decrease of the total number of pods T 25 line with 22.1, Spanish 9184 with 30.1 and Black Brazilian with 35.3.

The differences as concern this character between control of the experience Tamburesti and other genotypes are, generally, negative. An exception makes Jelud

variety and T242 line where the difference of +10.1 respectively +15.6 pods are statistically considered to the level of distinct significant and very significant.

Very significant negative differences registered T25 line (-19.2 pods) while Spanish 9184 variety registered distinct significant negative differences (-11.2 pods).

As concern the values of variability index (s%), for this character it can notice a relative high differences between the experimented genotypes. So, this index presents values placed between 6.36% (Jelud) and 34.76% (Tamburesti). The value over 30% of Tamburesti variety (the control of the experience) denoted the fact that this variety presents a very high variability as concern this character.

Table 2

The variability of total number of pods/plant to the experimented groundnut genotypes (average of 4 repetitions, 2008)

Crt. no.	Variety or line	$x \pm s_x$	s %	±d	Significance
1.	Tamburesti (Ct.)	41.3±1.43	34.76	-	-
2.	Venus	36.8±1.04	9.21	-4.5	-
3.	Spanish 9184	30.1±0.38	12.66	-11.2	000
4.	Jumbo-Virginia	40.6±0.57	14.08	-0.7	-
5.	Black Brazilian	35.3±0.38	11.01	-6.0	0
6.	Jelud	51.4±0.32	6.36	+10.1	**
7.	Solar	38.6±0.24	8.92	-2.7	-
8.	T242 line	56.9±0.55	14.99	+15.6	***
9.	T25 line	22.1±0.35	15.87	-19.2	000

DL 5% = 5.2; DL 1% = 7.6; DL 0.1% = 10.40

In the pedoclimatic conditions from our country the pods formation toke place to appreciatively 35 days from flowering. At the beginning, the pods growth is smaller but it increase once with vegetation growth.

The size, form, color and other aspects of pods are different depending on genotype and crop conditions. At the beginning of their formation, pods color is white, than became yellow-white and at maturity gets the color specify to the genotype.

The shell of pods, at the beginning of their formation is sleek and only close to maturity is appearing reticular lines both longitudinal and transversal.

At the harvest to all plants it can find mature pods and even some enriched to maturity pods (because flowering is extended until harvesting period).

One thousand pods mass presents values between 937g (Spanish 9184 variety) and 1890g (T25 line). Among the other genotypes, with higher values of one thousand pods mass enrolls: Venus (1810g), Solar (1800), Jumbo-Virginia (1730g) and Jelud varieties and even T242 line (1600g).

The smallest value registered Spanish 9184 variety (937g) because this variety presents the smallest pods (the average is of 2 seeds ant these are small, but there is an important percent of pods with one seed).

The differences for one thousand pods mass between the control and the experimented genotypes are positive (Black Brazilian, Jelud, Solar, Venus, Spanish 9184 and Jumbo-Virginia varieties and also T242 and T25 lines).

Negative differences registered Venus variety and these differences were statistically asigured to the level of insignificant, (-153g).

Table 3

The variability of one thousand pods mass (g) to the experimented groundnut genotypes in the conditions from Caracal R.S. (average of 4 repetitions, 2008)

Crt. no.	Variety or line	$x \pm s_x$	s %	±d	Significance
1.	Tâmbureşti (Ct.)	1090 ± 7.6	10.12	-	-
2.	Venus	1810 ± 8.0	12.14	+720	**
3.	Spaniole 9184	937 ± 4.2	9.05	-153	-
4.	Jumbo-Virginia	1730 ± 7.8	11.20	+640	*
5.	Braziliene negre	1100 ±7.3	8.71	+10	-
6.	Jelud	1600 ± 8.5	7.95	+510	*
7.	Solar	1800 ± 3.7	6.50	+710	**
8.	Linia T242	1600 ± 3.8	8.56	+510	*
9.	Linia T25	1890 ± 4.1	26.42	+800	***

DL 5% = 270g; DL 1% = 540g; DL 0.1% = 760g

Analyzing the obtained pods yield (table 4), it can notice that the experimented genotypes presents different values. These values are higher than the control. Still, it can establish a yield under the genetic potential of the genotypes both because less favorable environment conditions (high temperatures) and the lack of water (from rainfall and irrigation). Even if it was applied 6 norms of irrigation of 300 m^3/ha, these were applied late so it did not have a very significant influence upon yield.

The highest dry pod yield was registered to Venus variety (1925 Kg/ha) being fallowed by Spanish 9184 (1900 Kg/ha) and Solar varieties (1850 kg/ha). The smallest dry pod yield was registered to control variety, Tamburesti (1225 Kg/ha).

The differences registered between control and other experimented genotypes are positive statistically asigured to the level of distinct significant (Venus, Spanish 9184, Solar varieties and T25 line) and significant (Jumbo-Virginia, Jelud, Black Brazilian varieties and T242 line).

These values are much reduced comparative to the ones obtained on the sandy soils. Even if the genotypes formed a high number of mature pods/plant, among these a larger number was formed late, when it started the irrigation and after harvest they molded or wrinkled and did not present value as concern the yield quantity. Both soil structure, high temperature and the lack of water determined negative influence as concern the groundnut crop in the conditions from Caracal R.S.

Table 4

Dry pod yield to the experimented genotypes (average of 4 repetitions, 2008)

Crt. no.	Variety or line	Yield (Kg/ha)	Relative yield (%)	±d	Significance
1.	Tâmbureşti (Mt.)	1225	100	-	-
2.	Venus	1925	157,14	+700	**
3.	Spaniole 9184	1900	155,10	+675	**
4.	Jumbo-Virginia	1700	138,77	+475	*
5.	Braziliene negre	1700	138,77	+475	*
6.	Jelud	1715	140	+490	*
7.	Solar	1850	151,02	+625	**
8.	Linia T242	1700	138,77	+475	*
9.	Linia T25	1875	153,06	+650	**

DL5% = 400 Kg/ha; DL1% = 560 Kg/ha; DL 0,1% = 720 Kg/ha

CONCLUSIONS

The exception climatic characteristics of the year 2008 influenced negatively the obtained results for groundnut crop taken into study.

From the researches made in 2008 for groundnut crop cultivated to Caracal R.S. it can conclude:

- pedoclimatic conditions find by the experimented groundnut genotypes cultivated to Caracal R.S. were not favorable to this crop;
- the average data registered for the 4 repetitions concerning the number of mature pods variability denotes a high variability as concern this character to the experimented genotypes;
- the variability index (s %) for the number of mature pods character registered very high values to almost all genotypes outrunning the value of 30%;
- the registered differences for one thousand pod mass between control and the other genotypes are positive (Black Brazilian, Jelud, Solar, Venus, Spanish 9184, Jumbo-Virginia varieties and T242 and T25 lines);
- the highest dry pod yield registered Venus variety (1925 Kg/ha) being fallowed by Spanish 9184 (1900 Kg/ha) and Solar (1850 kg/ha) varieties while the smallest yield registered the control variety, Tamburesti (1225 Kg/ha);
-the best yield are obtained in the conditions of irrigation but these must be applied on time. Their lateness lead to the formation of pods which did not have time to reach maturity and those who formed from the beginning germinated in the pod.

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COMPORTAMENTUL UNOR SOIURI DE VIȚĂ DE VIE DIN COLECȚIA AMPELOGRAFICĂ A U.S.A.M.V IAŞI LA ATACUL PRINCIPALILOR AGENȚI PATOGENI ÎN PERIOADA 2008-2009

GRAPEVINE VARIETIES BEHAVIOR ON MAINE PATHOGENS DURING 2008 AND 2009 FROM THE AMPELOGRAPHICAL COLLECTION OF U.S.A.M.V. IASI

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Key words: grapevine disease, frequency, intensity, attack level
Cuvinte cheie: boli la vița de vie, frecvență, intensitate, grad de atac

REZUMAT

Cunoaşterea răspândirii agenților patogeni ai viței de vie şi a evoluției acestora în plantațiilor viticole constituie un obiectiv major al protecționiştilor. Materialul biologic luat în studiu a fost reprezentat de diferite soiuri de struguri pentru masă şi soiuri de struguri pentru vin. În funcție de gradul de atac înregistrat pentru fiecare soi de viță de vie, a fost stabilită expresia caracterului şi rezistența soiurilor analizate (după OIV 1983). Soiurile luate în studiu au manifestat reacții diferite în aceleaşi condiții de mediu, concretizate prin grade de atac la putregaiul cenuşiu, mană şi făinare care variază între limite destul de mari. Rezultatele privind răspândirea şi evoluția principalilor agenților patogeni au fost înregistrate pe o perioadă de 2 ani (2008 şi 2009) în cadrul colecției ampelografice a U.S.A.M.V Iasi.

ABSTRACT

The knowledge of grapevine pathogen agents spread and their evolution in vineyards constitute a major objective for plant protection. The biological material was represented by different varieties of grapes, table grapes and wine grapes. The field observation was correlated with yearly phonological and ecological elements which lead to prognoses and control of main pathogenic agents. Depending on degree of attack recorded for each variety was established the expression of varietal and resistance of analyzed sorts (by OIV 1983). The grape varieties taken in study showed different reactions under the same environmental conditions, materialized by different attack degrees to grapevine mildew, powdery mildew and grape grey mould. This paper contains results regarding the epidemiology and evolution of the main pathogens on a period during 2 years (2008 and 2009) from ampelographical collection of U.S.A.M.V. Iasi.

INTRODUCTION

Grapevine (*Vitis vinifera* L.), one of the oldest cultivated crops, was grown worldwide on 7.8 million hectares in 2001, 62.7% being in Europe (OIVV, 2002). However, grapevines are exposed to many biotic stresses caused by insects, fungi, bacteria, phytoplasmas and viruses, which are responsible for dramatic economic losses throughout the world, and for entraining the extensive use of agrochemicals. (Laimer, M., 2009).

Among the pathogen agents that provoke big damage to the vineyard are known: *Plasmopara viticola* (downy mildew), *Uncinula necator* (powdery mildew) and *Botrytis cinerea* (grape grey mould).

MATERIAL AND METHOD

Observations were performed in the ampelographic collection of U.S.A.M.V Iasi during 2 years, aiming the frequency (F %), intensity (I %) and attack level (GA %) to the existing grape varieties. Observations and determinations were in scoring the attack on grapes and leaves for downy mildew, powdery mildew and grape grey mould. *Plasmopara viticola* and *Uncinula necator* were pursued on both, leaves and grapes. Based on data from the literature was chosen a methodology to reflect the attack more accurately. *Botrytis cinerea* was followed during ripening of grapes, taking into account all the grapes from vine. Their resistance was classified according to the OIV Scale (1993), in which 9 = a high resistance and 1 = a high sensitivity.

RESULTS AND DISCUSSIONS

Climatic conditions recorded during observations showed different values in studied years. Therefore, in 2008 were registered normal limits of climatic condition, showing values of temperature and rainfall close to normal, 2009 was a very dried year, characterized by a instability of temperature and low rainfall. Observations have showed that incidence of each pathogen was influenced by climatic conditions and their biological reserve. Following the occurrence and evolution of pathogens, it is noted that in 2008 was present: downy mildew – *Plasmopara viticola – (Berk. et M. A. Curtis) Berl. et De Toni.*, powdery mildew – *Uncinula necator – (Schwein.) Burrill* and grape grey mould – *Botrytis cinerea – De Bary (Whetzel).* It was reported sporadic attacks by anthracnose - *Elsinoë ampelina* Shear. In 2009 we encountered the same pathogens, including sporadic attacks by *Pseudopeziza tracheiphila*, presence of Grapevine *fanleaf virus* and *Grapevine flavescence dorée* MLO; the last ones were identify using the serological method ELISA (Enzyme-Linked Immunosorbent Assay).

Data obtained from observations made in the ampelographic collection of USAMV Iasi are showed in figures 1-10.

In figures 1 and 2 the attack of *Plasmopara viticola* on leaves, in table grapes and wine varieties registries higher values in 2008. Only few sorts showed appropriate values, Feteasca regala, Bastard de Magaraci and Babeasca neagra belonging to wine varieties. Muscat Ottonel detached from others and registrated 60% of attack level in 2008.

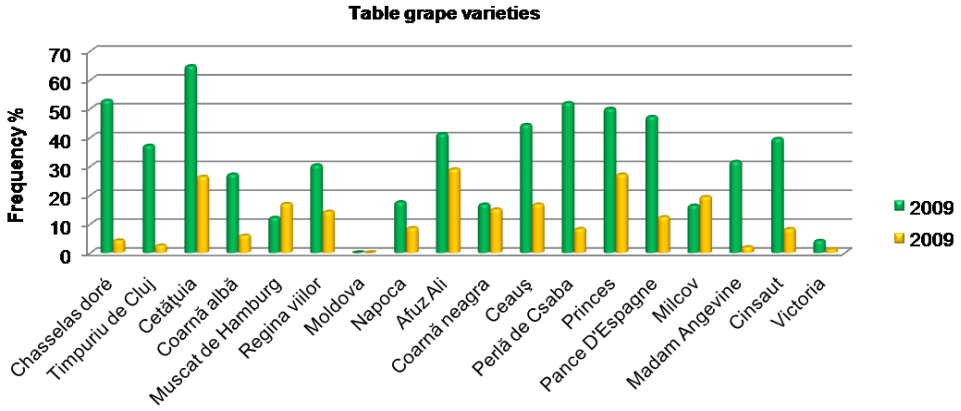

Figure 1 Grapevine downy mildew evolution on leaves during 2008-2009

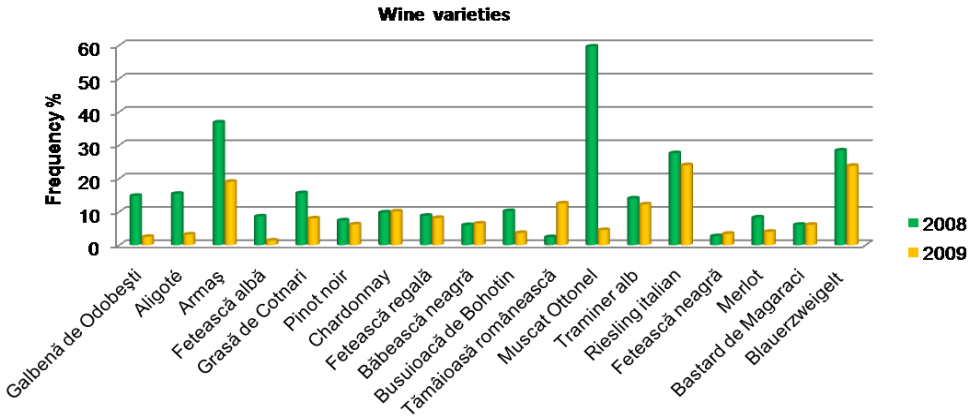

Figure 2 Grapevine downy mildew evolution on leaves during 2008-2009

Regarding the attack on berries, table grape variety registries higher value in 2009, with a maximum degree of attack 55,6% to Ceaus variety. In wine varieties, year 2009 Pinot noir and Feteasca neagra encountered bigger values of pathogen attack. Varieties like Busuioaca de Bohotin, Riesling Italian and Blauerzweigelt showed lower incidence in 2008.

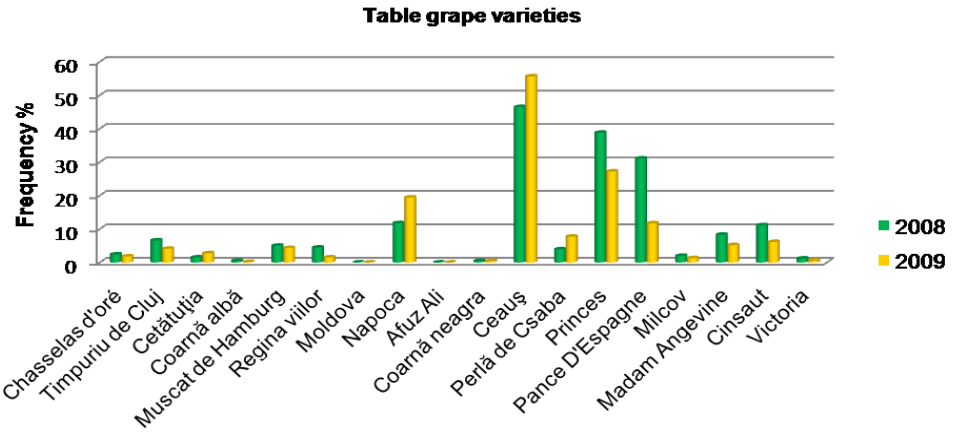

Figure 3 Grapevine downy mildew evolution on berries during 2008-2009

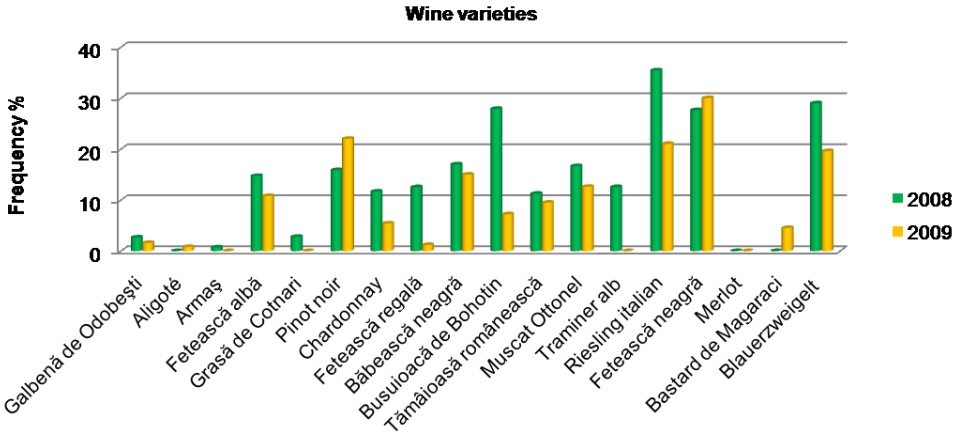

Figure 4 Grapevine downy mildew evolution on berries during 2008-2009

Graphics presented in Figure 5 and 6, regarding the attack of pathogen *Botritys cinerea* on berries, showed lower values in 2009 comparing with 2008, only Victoria variety has similar numbers in both years. Chasselas doreé, Ceaus and Cinsaut varieties

encountered bigger values in 2008. Regarding wine varieties, the attack of grey mould showed higher values in 2008 than in 2009 in all studied varieties.

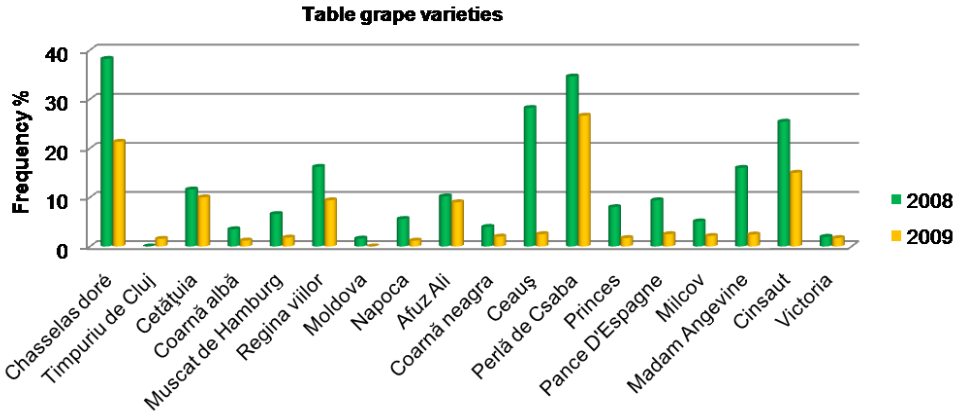

Figure 5 Grapevine grey mould evolution on berries during 2008-2009

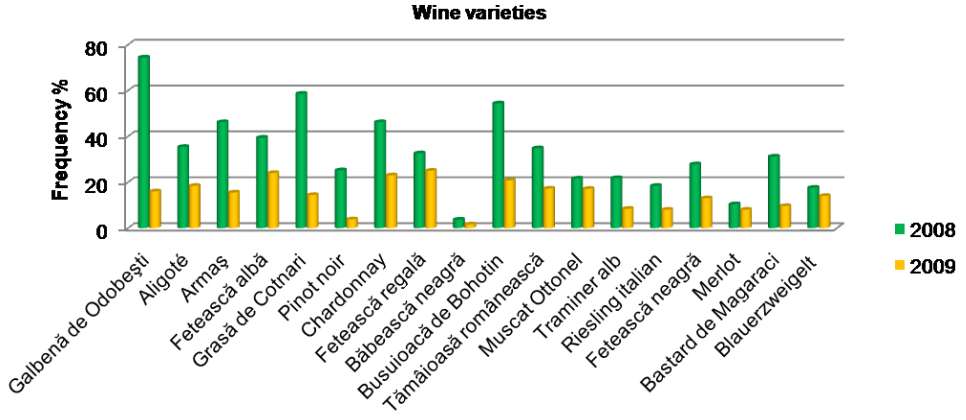

Figure 6 Grapevine grey mould evolution on berries during 2008-2009

In 2009, presence of pathogen *Uncinula necator* on leaves was observed with higher intensity on both table grapes and wine varieties comparing with 2008 (Figure 7 and 8).

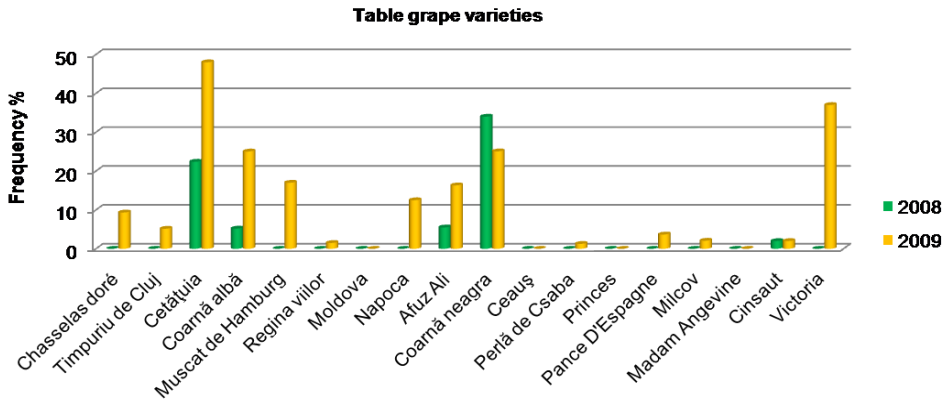

Figure 7 Grapevine powdery mildew evolution on leaves during 2008-2009

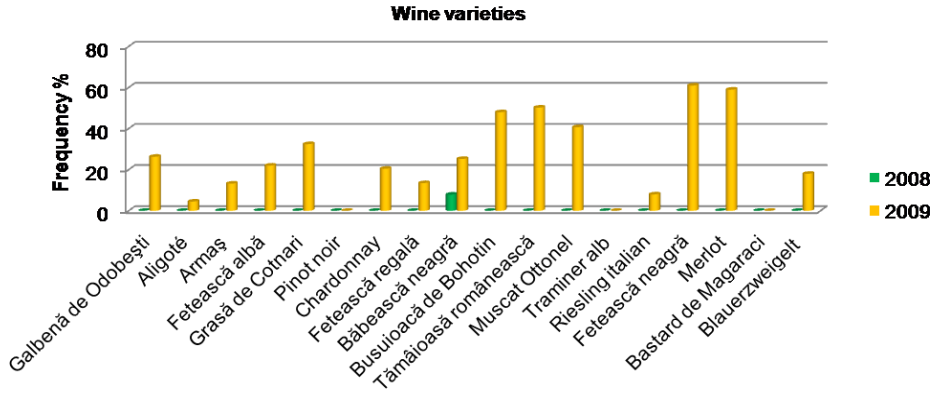

Figure 8 Grapevine powdery mildew evolution on leaves during 2008-2009

The berries attack on table grape varieties as: Cetatuia, Coarna alba, Afuz Ali and Milcov recorded values exceeding 90% in 2008, register itself as being very sensitive. In 2009, varieties as: Muscat de Hamburg, Perla de Csaba and Madam Angevine register as very sensitive to the pathogen attack.

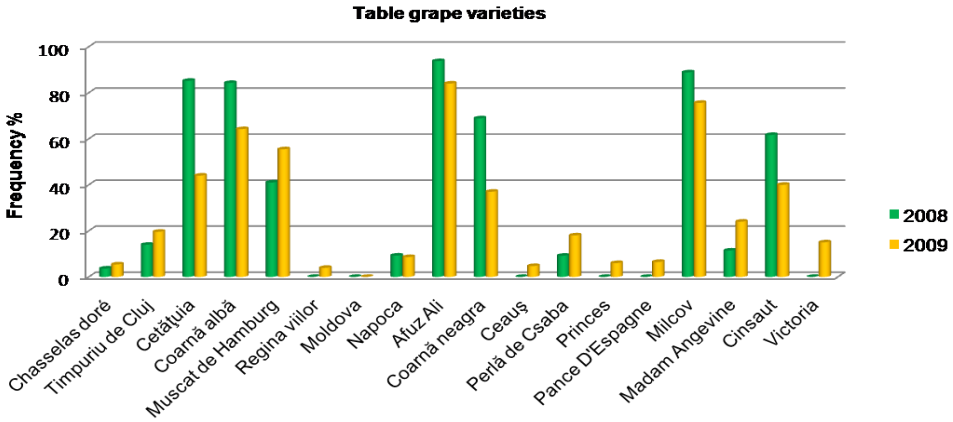

Figure 9 Grapevine powdery mildew evolution on berries during 2008-2009

High degree values were recorded in 2008 for wine varieties: Galbena de Odobesti, Grasa de Cotnari, Babeasca neagra and Blauerzweigelt (Figure 10).

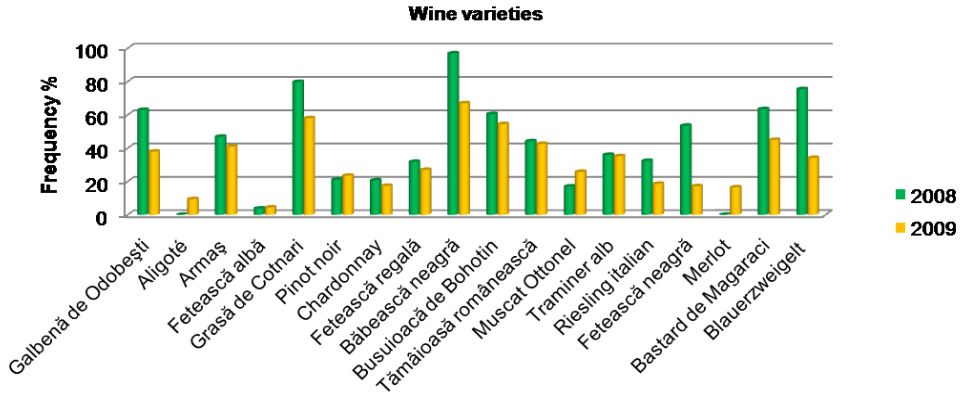

Figure 10 Grapevine powdery mildew evolution on berries during 2008-2009

CONCLUSIONS

- ✓ In 2009 the grape varieties taken in study showed, in generally a good resistance to pathogens attack than in 2008, because of the climatic condition registries this year.
- ✓ Low resistance to mildew attack on leaves, with expression 3 and 4 according to the OIV code 455 recorded table grapes varieties: Cetățuia, Muscat de Hamburg and Princes from table grape varieties.
- ✓ Medium and high resistance showed most of wine varieties, with the expression 5, 6, 7 and very high resistance in varieties Madam Angevine, Merlot and others with the expression 8 and 9.
- ✓ The attack on berries for table grape varieties presents a very low resistance with expression 2 on Ceaus variety according to OIV code 456. The rest of varieties showed medium and high resistance to pathogen, with the expression 5,6, 8 and 9.
- ✓ Low resistance showed variety Perla de Csaba with expression 4. Medium and high resistance to grape grey mould submit wine varieties with expression 6,7 and 8 according OIV code 459.
- ✓ The powdery mildew attack on bunches showed very low resistance for both type of varieties, having degrees of attack exceeding 60% and expression 2 on Merlot, Tamaioasa Romaneasca and Feteasca neagra varieties, according to the OIV code 456. With high and very high resistance are mark out varieties: Perla de Csaba, Pance d'Espagne, Milcov, Aligoté and Rieslig Italian with expression 8.

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COMPARATIVE STUDY OF THE VARIABILITY OF *BETULA PENDULA* Roth CULTIVARS DURING THE PROPAGATION *IN VITRO*

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Key words: Anatomy, *Betula pendula*, cultivars, fasciation, *in vitro*

ABSTRACT

Fasciated shoots formation was induced from leaf callus of 'Fastigiata', 'Dalecarlica', Youngii', 'Purpurea', var. Typica, and var. Melanocortea. Fasciated shoots were not observed to 'Dalecarlica'. This phenomenon was not observed on all media (S, WPM, and MS) enriched with BAP and highest percentage (from 0.4 ±0.1% to 2.0 ±0.1%) was obtained on all media containing 10 mg l^{-1} zeatin. The appearance of fascinated shoots depended from the genotype, type of cytokinin and its concentration. The anatomical study showed that there was no disorder in the tissue position in fascinated shoots. The tissues had the same structural peculiarities as in normal shoots. This distinguishes the fasciations from pathogenous phenomena. The study showed that the theory for the accretion of adjacent stems as a reason for fasciation could not be accepted. The most striking difference between normal and fascinated stems was in the shape and size of the vascular cylinder. In addition, the differentiation of xylem of fascinated stems was delayed compared to that of normal stem. This delay of differentiation could be a result from intense mitotic activity of procambium and cambium in fascinated stems.

INTRODUCTION

It is known that in the process of the callus differentiation and adventitious shoots formation could arise somaclonal variation (De Klerk 1990).

In many publications was documented that many tree species, shrubs, cacti, and herbs develop fascinated stems (White 1948, Mertens and Burdick 1954, Karagiozova and Meshineva 1977, Boke and Ross 1978, Srivastava and Glock 1987, Werner 1988, Varga et al. 1988, Medford et al. 1992, Reboredo 1994, 2007, Tang and Skorupska 1997, Tang and Knap 1998, Papafotiou et al. 2001, Bertaccini et al. 2005). Inheritable fasciation has been observed in a number of experimental systems and the *CLUVATA1* (Leyser and Furner 1992, Clark et al. 1993) and *CLAVATA3* (Fletcher et al. 1999) genes have been shown to be associated with fasciation of stems of *Arabidopsis*. Studies of the bacterium *Rhodococcus fascians* showed that transfer of a gene from the bacterium to host cells induced fasciation. Once the bacterial gene has been transferred to a host plant, other plants as cuttings or *via* grafts from gene-infected plants (Crespi et al. 1992).

The appearance of fascinated shoots has been observed under natural conditions in the case of *Lilium martagon*, *Celosia cristata*, *Euonimus japonicus* (Karagiozova and Meshineva 1977) and *Syringa yosikaea* (Vitkovskii 1959). Such plants have also been induced by mutagens in *Tagetes* (Drjagina et al. 1981). The fasciation has been observed

also in *in vitro* conditions in *Prunus avium* (Kitin et al. 2005), *Kalanchoe blossfeldiana* (Varga et al. 1988), *Mammillaria elongata* (Papafotiou et al. 2001).

There is limited information for the influence of genotype on the variability *in vitro* of *Betula pendula* cultivars, although many experiments related to the propagation of this species *in vitro* have been performed (Iliev 1991, 1993, Welander 1988, 1993, 1995). Therefore, this study was designed to investigate the effect of the interaction of genotype, medium, and cytokinin on the variability *in vitro* of *Betula pendula* cultivars, and to compare the anatomical structure of fascinated shoots with that of normal shoots.

MATERIAL AND METHODS

Induction of fasciated shoots formation

Fasciated shoots formation was induced from leaf callus of 'Fastigiata', 'Dalecarlica', Youngii', 'Purpurea', var. *Typica*, and var. *Melanocortea.* It was cultivated on MS (Murashige and Skoog 1962), S (Simola 1985) and WPM (Lloyd and McCown 1980) medium, containing different concentrations of zeatin (0, 2, 5, 10 и 15 mg l^{-1}) or BAP (0.5, 0.8, 1.0 и 1.2 mg l^{-1}), 30 mg l^{-1} adenin, 20 g l^{-1} sucrose and 7 g l^{-1} agar. Sixteen callus segments were used for each variant of the media and each of them was performed in 3 replication.

The cultures were grown in a cultivation room at a temperature of 22 ± 1°C in a 16h-8h light-dark regime and cool white fluorescent light at 40 μmol $m^{-2}.s^{-1}$ photosynthetic photon flux.

The results were analyzed by SPSS 15.0 LSD test ($p \leq 0.05$), and the comparison of the means was analyzed by ANOVA test at $p \leq 0.05$.

Anatomical study of the fasciated shoots

Fasciated and normal adventitious shoots were harvested and fixed in FAA solution (96% ethyl alcohol, glacial acetic acid, 40% formalin and destiled water; 10:1:2:7, v/v). Then the shoots were transferred to an automatic tissue processor (Leica Histokinette 2000; Leika Micro-system, Wetzlar, Germany), in which the shoots were processed as follows: 1) Dehydratation in an ethanol series (70%, 80%, and 96%) for 90 min and acetone I and II for 15 min each; 2) Infiltration in xylol I and xylol II for 30 min each; 3) Embedding in Parrafin I and Paraffin II for 120 min each; 4) Hematoxylin-Eosin Staining technique: the treatment was consecutively made in a) in xylol I and xylol II for 5 min each; b) 96%, 80%, and 70% of of ethyl alcohol for 5 min resp.; c) Harri's hematoxilin for 6 min; d) control of dirrerentiation under microscope; e) eosin solution (2 g eosin, 400 ml water and 400 ml ethyl alcohol) for 4 min; f) 70% (3-4 immersions), 80% and 70% (for 5 min each) of ethyl alcohol; g) carboxylol (xylol and phenol 3:1) for 5 min; h) hylol I and xylol II for 5 min, each. After the application of "b", "c", "d", and "e" treatments, the plant material was rinsed 3-4 times with tap water. The plant material was embedded ion entelan.

Radial and cross sections were examined under confocal laser scanning microscope (LSM-310; Carl Zeiss, Germany). Transmitted visible light or excitation by incident-light from argon-ion laser (wavelength, 543 nm) with a band-pass filter (BP; 515-565 nm) were used as described earlier (Kitin et al. 2000)

RESULTS AND DISCUSSION

Induction of fasciated shoots

At the time of the callus segments' differentiation of the studied cultivars of silver birch fasciated shoots were observed to appear. They were characterized with lateral growth of the stem and lanceolate leaf blades densely situated on the stem apex (Fig. 1A). The width of the long diameter of these flattened stems was from 4-5 to 10-12 mm.

Subsequently, the same fasciated regenerants formed from 1 to 5 normal lateral shoots without visible signs of fasciation (fig. 1B). The results showed that in the absence or low concentrations of zeatin (2 mg l^{-1}) fasciated shoots did not form. Spontaneous appearance of fasciated shoots was observed with 5, 10 or 15 mg l^{-1} zeatin in the medium and it ranged from 0.2 ± 0.1% (var. *Typica*, medium WPM) to 2.0 ± 0.1% ('Fastigiata', medium WPM) (Table 1). The type of cytokinin was a statistically significant factor for the formation of fasciated shoots (Table 2, = 902.611, p = 0.000) i.e. their appearance was not observed in media containing BAP. Another key factor, also statistically significant, was the concentration of the used optimal cytokinin (Table 2, F = 162.879, p = 0.000), i.e. formation of fasciated shoots was observed only when concentrations of 5, 10 or 15 mg l^{-1} zeatin were used in the growing media. The formation of fasciated shoots depended on the genotype (Table 2, F = 127.377, p = 0.000). Fasciated shoots appeared in the greatest numbers in 'Fastigiata' while they did not form in 'Dalecarlica'. Fasciated shoots were also not observed in var. *Melanocortea* when the callus segments were cultivated in WPM medium regardless of the cytokinin used and its concentration (Table 1).

Statistically significant differences were observed among all studied cultivars. They were highest between 'Fastigiata' and 'Dalecarlica' (0.5362), while no differences were found out between var. *Typica* and var. *Melanocortea* (-0.003) (Table 3).

The statistical analysis showed that the type of growing medium was the most insignificant factor affecting the induction of this phenotypic trait (Table 2, F = 3.795, p = 0.023). Statistical significant differences were observed between S and MS media (0.0472, Table 4).

As expected, the most significant differences were between the hormone-free growing medium (control) and the "optimal" concentration of cytokinin inducing the formation of fasciated shoots (-0.4133, Table 5). The hormone-free media, however, do not induce the formation of adventitious shoots, and therefore the most important scientific contribution of this study is the identification of the differences between the lowest concentrations of the used cytokinins (2 mg l^{-1} zeatin, and 0.5 mg l^{-1} BAP) and the optimal concentrations necessary for the induction of this process (10 mg l^{-1} zeatin and 1.0 mg l^{-1} BAP) (-0.4133, Table 5). The increase of the concentrations of the used cytokinins above the optimal one showed that the number of induced adventitious shoots remained the same and in few rare cases decreased. Differences were not identified between the hormone-free growing medium (control) and the lowest concentrations of the studied cytokinins (0.0000), as well as between 5 and 10 mg l^{-1} zeatin and between 0.8 and 1.0 BAP mg l^{-1} (-0.0000) (Table 5).

The development of normal shoots on the fasciated ones shows that this trait may be considered epigenetic. These changes are relevant to the prototrophic of phytohormone clones. It is well-known that cell division requires exogenous cytokinins which are synthesized in meristemic plant tissues and they are not present in differentiated tissues i.e. in the genome of most somatic cells the loci responsible for phytohormone synthesis are repressed. It is possible that when prototrophic clones are obtained depression of the blocked genes takes place i.e. using the selective system does not appear a mutation but epigenetic variation take place which can be observed in a number of vegetative generations but not in the system of cell-plant-cell.

A number of factors may impact the level of mutability of *in vitro* propagated plants through callus. Bulb plants and some cultivars of *Saintpaulia* have shown stability when propagated with adventitious shoots, but the mutability level of *in vitro* propagated hybrids of genus *Fresia* and of selected cultivars of begonia may be high (Pierik 1987). Similar signs were observed after a year in *Populus nigra* plants produced through induction of adventitious buds and adapted to terrain conditions (Lester and Berbee 1977).

There have been various attempts to explain the origin of fasciation *in vivo* and *in vitro* but this phenomenon is still not clearly understood. It is believed that fasciation may

be the result of the growth of a single apical meristem (Lebedeva 1963, Nestler Nestler 1894) or that fasciations are due to the adhesion of several sides of growth(Vitkovskii 1959, Karagiozova and Meshineva 1977, Zielinski 1945), or it may be the result of hormonal imbalance in plants (Boke and Ross 1978, Nilsson et al. 1996). Cytokinins seem to increase the level of mutability (Ando et al. 1986) when the plants are produced through induction of adventitious shoots *in vitro* (Pierik 1987). The type of tissue or explant used may also impact genetic variability. Due to non-uniformity of callus tissue, mutability may be more common in shoots regenerated from callus especially during continuous subculture than in those regenerated from other types of tissues (D'Amato 1977, Ahuja 1993).

Table 1. Average percentage (M ± SE) of formed fasciated shoots as a result of callus segments' differentiation.

Media	Variants of cytokinins	'Fastigiata'	Dalecarlica'	'Youngii'	'Purpurea'	var. *Typica*	Var. *Melanocortea*
S	0 mg l^{-1} zeatin	0a	0a	0a	0a	0a	0a
	2 mg l^{-1} zeatin	0a	0a	0a	0a	0a	0a
	5 mg l^{-1} zeatin	1.9 ± 0.1e	0a	0.8 ± 0.1c	1.4 ± 0.1d	0.3 ± 0.2b	0.6 ± 0.0c
	10 mg l^{-1} zeatin	1.9 ± 0.1e	0a	0.8 ± 0.1c	1.5 ± 0.2d	0.4 ± 0.1ab	0.7 ± 0.2bc
	15 mg l^{-1} zeatin	1.6 ± 0.1e	0a	0.5 ± 0.1bc	0.8 ± 0.2c	0.3 ± 0.1ab	0.5 ± 0.2b
	0 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	0.5 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	0.8 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	1.0 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	1.2 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
WPM	0 mg l^{-1} zeatin	0a	0a	0a	0a	0a	0a
	2 mg l^{-1} zeatin	0a	0a	0a	0a	0a	0a
	5 mg l^{-1} zeatin	2.0 ± 0.1b	0a	0.6 ± 0.2a	1.4 ± 0.4b	0.2 ± 0.1a	0.3 ± 0.3a
	10 mg l^{-1} zeatin	2.0 ± 0.1d	0a	0.8 ± 0.2b	1.3 ± 0.1c	0.4 ± 0.1ab	0.6 ± 0.3b
	15 mg l^{-1} zeatin	1.8 ± 0.1c	0a	0.4 ± 0.1ab	0.6 ± 0.1b	0.2 ± 0.1ab	0.4 ± 0.4ab
	0 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	0.5 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	0.8 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	1.0 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	1.2 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
MS	0 mg l^{-1} zeatin	0a	0a	0a	0a	0a	0a
	2 mg l^{-1} zeatin	0a	0a	0a	0a	0a	0a
	5 mg l^{-1} zeatin	1.8 ± 0.3c	0a	0.8 ± 0.1abc	1.3 ± 0.7bc	0.5 ± 0.1ab	0a
	10 mg l^{-1} zeatin	1.8 ± 0.2c	0a	0.8 ± 0.0b	1.5 ± 0.0b	0.4 ± 0.1ab	0a
	15 mg l^{-1} zeatin	1.3 ± 0.2c	0a	0.3 ± 0.2ab	0.6 ± 0.3b	0.3 ± 0.1ab	0a
	0 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	0.5 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	0.8 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	1.0 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a
	1.2 mg l^{-1} BAP	0a	0a	0a	0a	0a	0a

The average values in the lines indicated with the same letter are not statistically different at $p \leq 0.05$

Table 2. Significance of the studied factors and their combinations on the induction of fasciated shoots.

Factors	d.f	F	Level of significance
K	5	127.377	0.000
M	2	3.795	0.023
C	1	902.611	0.000
CC	4	162.879	0.000
K x M	10	1.874	0.047
K x C	5	127.377	0.000
K x CC	20	23.326	0.000
M x C	2	3.795	0.023
M x CC	8	0.902	0.514
C x CC	4	162.879	0.000
K x M x C	10	1.874	0.047
K x M x CC	40	0.491	0.996
K x C x CC	20	23.326	0.000
M x C x CC	8	0.902	0.514
K x M x C x CC	40	0.491	0.996

a. R Squared = 0.926 (Adjusted R Squared = 0.890). $p \leq 0.05$

Legend: K = cultivar, M = medium, C = cytokinin, CC = concentration of the cytokinin

Table 3. Effect of genotype on the induction of fasciated shoots.

Genotype		**Average difference**	**Level of significance**
'Fastigiata'	***'Dalecarlica'***	0.5362 *	0.000
	'Youngii'	0.3369 *	0.000
	'Purpurea'	0.1920 *	0.000
	Var. *Typica*	0.4362 *	0.000
	Var. *Melanocortea*	0.4359 *	0.000
'Dalecarlica	***'Youngii'***	- 0.1993 *	0.000
	'Purpurea'	- 0.3442 *	0.000
	Var. *Typica*	- 0.1000 *	0.000
	Var. *Melanocortea*	- 0.1000 *	0.000
'Youngii'	***'Purpurea'***	- 0.1449 *	0.000
	Var. *Typica*	0.0993 *	0.000
	Var. *Melanocortea*	0.0900 *	0.000
'Purpurea'	Var. *Typica*	0.2442 *	0.000
	***Var.* Melanocortea**	0.2439 *	0.000
Var. *Typica*	Var. *Melanocortea*	- 0.0003	0.989

Note: * The average difference is significant at $p \leq 0.05$ estimated by a post hoc LSD test.

Table 4. Effect of used growing media on the induction of fasciated shoots.

Growing media	Average difference	**Level of significance**
S - WPM	0.0166	0.342
S - MS	0.0472 *	0.007
WPM - MS	0.0307	0.079

Note: * The average difference is significant at $p \leq 0.05$ estimated by a post hoc LSD test.

Table 5. Effect of concentrations of used cytokinins on the induction of fasciated shoots.

Concentrations of cytokinins	Average difference	**Level of significance**
1 – 2	0.0000	1.000
1 – 3	- 0.3881 *	0.000
1 – 4	- 0.4133 *	0.000
1 - 5	- 0.2653 *	0.000
2 – 3	- 0.3881 *	0.000
2 – 4	- 0.4133 *	0.000
2 – 5	- 0.2653 *	0.000
3 – 4	- 0.0252	0.263
3 – 5	0.1229 *	0.000
4 – 5	0.1481 *	0.000

Note: * The average difference is significant at $p \leq 0.05$ estimated by a post hoc LSD test.
Legend: The hormone-free medium (0 mg l^{-1} cytokinin) is indicated with "1", and the highest used concentration – with "5".

The studies by Nilson et al. (1996) showed that faciated tissues were characterized with a high level of cytokinins. It was proved that exogenously applied cytokinins induced fasciation in some species (Varga et al. 1988, Thimnn and Sachs 1996, Papafotiou et al. 2001, Kitin et al. 2005). Our results show that under *in vitro* conditions zeatin, depending on its concentration, may also induce this phenotypic trait.

It is thought that the appearance of fasciated shoots of silver birch *in vitro* may be caused in some cases by *p*-fluorophenylalanine as fasciation was not observed in its absence (Srivastava and Glock 1987). The appearance of fasciation under *in vitro* conditions might be the result of suppression of a gene under the influence of zeatin. Zeatin could relieve this suppression by either inhibiting the formation of a repressor or facilitating the synthesis of a faulty repressor. It is believed that in fasciated shoots "the genetic mechanism may be enacted by the hormone imbalance which is restricted for the meristem and its immediate surroundings" (Boke and Ross 1978). The simultaneous appearance, however, of fasciated and normal shoots as well as the appearance of normal shoots on fasciated ones still remains difficult to explain.

Anatomical study of the fascinated shoots

The anatomical structure of the fascinated and normal shoots is shown in Figures 2-6. Fasciated stems were elliptical or with irregular shape on transverse sections (Fig. 2). In contrast, normal stems were rounded and had well-developed cortex and vascular tissues (Fig. 3). The concentric ring of xylem in normal shoots consisted of 5-10 rows of xylem cells with well-developed secondary walls (Fig. 4). In contrast, the vascular tissues of the fascinated stems were less developed or at a much earlier stage of differentiation in comparison to those of the normal stem (Fig. 5 and 6). There was a narrow band of vascular tissues between the cortex and the pith (Fig. 5) and also an infrequent occurrence of birefringence of xylem cells with secondary walls (arrow in Fig. 6). The lack of birefringence indicates early stage of development of the vascular tissue of the fascinated shoots. However, the larger area of cross section of fascinated shoots suggests intensive mitotic activity and larger biomass in comparison to that of normal shoots (Fig. 2 and 3). The cortex parenchyma and the epidermis of both normal and fascinated stems were well-developed and strong birefringence was detected in trichomes (Fig. 5).

Our result showed that there was no disorder in the tissue position in fascinated shoots. The tissues had the same structural peculiarities as in normal shoots. This distinguishes the fasciations from pathogenous phenomena. The study showed that the

theory for the accretion of adjacent stems as a reason for fasciation could not be accepted. The most striking difference between normal and fascinated stems was in the shape and size of the vascular cylinder. In addition, the differentiation of xylem of fascinated stems was delayed compared to that of normal stem. This delay of differentiation could be a result from intense mitotic activity of procambium and cambium in fascinated stems.

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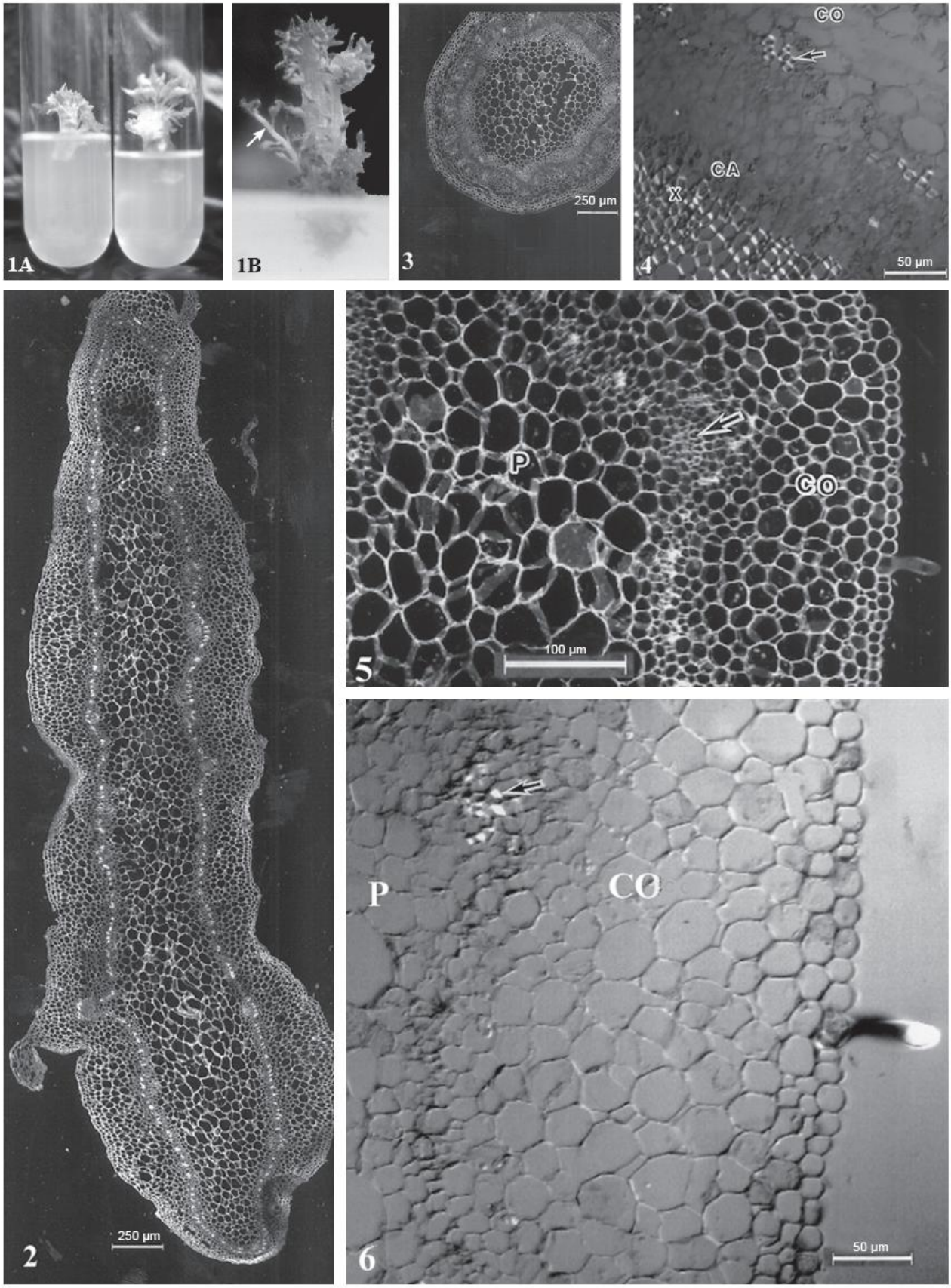

Fig. 1A. Fasciated shoots obtained in vitro, **Fig. 1B.** Appearance of normal on the fasciated shoots (arrow), **Fig. 2.** Cross section at the base of a fasciated shoot, **Fig. 3.** Cross section on the base of normal shoot, **Fig. 4.** Enlarged part of the section of Fig. 3, viewed by polarized light. Birefrigence of secondary walls occurs in the xylem cells and in the sclerenchyma in the cortex (arrow), **Fig. 5.** Enlarged view of a portion of the section of Fig. 2, **Fig. 6.** The same section as in Fig. 5 viewed by polarized light. Birefrigence of secondary walls occurs only in some of the xylem cells (arrow).
Legends to all figures: co – cortex, p – pith, x - xylem

AGRESIVITATEA CIUPERCII FUSARIUM ROSEUM F. CEREALIS (CKE) SNYDER AND HANSEN ÎN CONDIȚIILE DIVERSITĂȚII TROFICE A PORUMBULUI CONVENȚIONAL ŞI TRANSGENIC - YIELD GARD, ÎN JUDEȚUL ARAD

AGRESSIVENESS OF *FUSARIUM ROSEUM F. CEREALIS* (CKE) FUNGI SNYDER AND HANSEN UNDER TROPHIC DIVERSITY CONDITIONS OF CONVENTIONAL AND TRANSGENIC CORN - YIELD GARD, IN ARAD COUNTY

JURCA DORIN, POPESCU GHEORGHE

Key words: Zea mays, Fusarium roseum, aggressiveness, pathosystem

REZUMAT

Diversitatea trofică a porumbului convențional a fost reprezentă de hibrizii DKC 315, DK 440 (Mt. – hibrid cu o mare capacitate de producție şi de adaptare pe diferite tipuri de sol), DKC 5143 şi DKC 5783, iar cel transgenic botezat Yield Gard, de fapt un porumb modificat genetic, obținut prin introducerea unei gene specifice dintr-o bacterie (Bt.) în porumbul convențional, devenit astfel DKC 3946 YG, DKC 4442 YG (Mt.), DKC 5018 YG şi DKC 5784 YG.

În cazul porumbului convențional, atacul de Fusarium roseum a fost cuprins între 44,4 şi 56,4%, o agresivitate care include cei 4 hibrizi în tipul de reacție de sensibilitate.

Porumbul Yield Gard a manifestat fuzarioza într-o proporție foarte redusă, cu o amplitudine de variație cuprinsă între 8,3 şi 11,0%, o adevărată tehnologie ce permite diminuarea riscului de fuzarioză pe ştiuleți din cauza prezenței insectei Ostrinia nubilalis, un diseminator zoochor al ciuperci producătoare de toxine ce pot afecta siguranța vieții omului şi animalelor.

ABSTRACT

Trophic diversity of conventional corn was represented by DK 315, DK 440 hybrids (Mt. – a hybrid with a large production and adjustment capacity in different types of soil), DKC 5143 and DKC 5783, and the transgenic one called Yield Gard (MON 810), actually a genetically modified corn, obtained by introducing a specific bacteria gene (Bt.) in the conventional corn, thus becoming DKC 3946 YG, DKC 4442 YG (Mt.), DKC 5018 YG and DKC 5784 YG.

In case of conventional corn, the attack of Fusarium roseum had an aggressiveness between 44.4 and 56.4%, which includes the 4 hybrids within the sensitivity type of reaction.

Yield Gard (MON 810) corn showed fusariosis in a very low percentage, with an amplitude of variation between 8.3 and 11.0%, a real technology that allows the diminishing the risk of fusariosis occurrence on corn cobs, due to Ostrinia nubilalis insect, a zoochore disseminator of the toxin production fungus, that can affect the life of humans and animals.

INTRODUCTION

Corn is the host plant of a large numbers of pathogens. They invade all the plant's organs from germination till harvesting, and infections on cobs and beans often continue during the harvest keeping period as well. Estimation made in the US on the losses caused by diseases due to all pathogens varies between 7 – 17% annually.

Of corn diseases, fusariosis are the most important, for their spreading in the culture areas, as well as for the high frequency of attack, causing the biggest culture losses. They manifest in two distinct periods of corn vegetation cycle: from germination till the stage of 3-4 leaves and from flowering to maturity (ELENA NAGY, 2004).

Fusariosis is unanimously considered one of the most widespread and destructive corn diseases, in all corn growing areas. The pathogen attack can start at seeds and young plants, which are invaded by the fungi mycelium and subsequently rot (BAICU TATIANA and SEŞAN EUGENIA, 1996; GAZETA DE AGRICULTURĂ, 2007). According to I. COMES et al. (1982) and A. WATSON (2007) corn can be infested at all its vegetation stages. In the beginning, corn roots are invaded (P.E. LIPPS at al., 2001), then the leaves, and within 7 to 10 days, they fall and die at sensitive hybrids (K.D. MALVICK, 1995; P.E. LIPPS et al., 2001). In a more advanced vegetation stage, the attack can occur on stalks, especially on the young growing organs, which show a distinctive bleaching of the marrow; very often, these symptoms are accompanied by the strong redness of the entire plant, which has stunted bean cobs (M. HATMAN et al., 1989; VIORICA IACOB et al., 1998; J. STACK, 2000; P. VINCELLI, G. PARKER, 2002; P.E. LIPPS et al., 2001; GH. POPESCU, 1998, 2005; I. OROIANU, V. FLORIAN, 2006; A. WATSON, 2007). GH. POPESCU (2005) mentions that typical symptoms occur on cobs, within the milk maturity stage. The disease starts from the tip of the cob slowly progressing towards the base, with pink-reddish mycelium covering the beans which lose their germinal capacity (EUGENIA ELIADE, 1985; TATIANA BACIU and T. EUGENIA SEŞAN, 1996; ELENA NAGY, 2004; K. FLOTTBEK, 2005).

If this fungi infested corn is consumed by animals, produces severe infections, due to the fungi capacity of producing toxins (Vincelli P., Parker G., 2002).

MATERIAL AND METHOD

Material and method. In 2008, in Horia locality (SC Hodilact SRL), Arad county, a comparative culture of conventional corn hybrids such as DK 315, DK 440, DKC 5143, DKC 5783 was experimented together with transgenic hybrids (MON 810), namely the same hybrids which were transferred specific genes of *Bacillus thuringiensis* bacteria, protecting the corn against the attack of lepidoptera pests (larvae and butterflies) – European corn borer (*Ostrinia nubilalis*) and Mediterranean borer (*Sesamia sp.)*. In this case, conventional corn became the genetically modified corn called YIELD GARD (MON 810). The aggressiveness of *Fusarium roseum f. cerealis* (corn fusariosis) was analyzed.

The aggressiveness of *Fusarium roseum f. cerealis* pathogen, in the characterization of corn hybrids, was appreciated through the resistance source scale, that is: lack of attack (0) – immune appearance (I), attack of 1-20% - resistant appearance (R); attack between 21-40% - average resistant or tolerant appearance (MR, T); attack over 40% - sensitive (S) – FLOAREA ADAM, GH. POPESCU, 2008.

RESULTS AND DISCUSSIONS

Results and discussions.

In 2006, fungi pathogenesis, component of *Zea mays* – *Fusarium roseum* pathosystem, expressed through aggressiveness, reproduced in tables 1, 2, 3 and 4 as such:

- ***Conventional hybrids***
- aggressiveness of the 4 conventional hybrids had a variability amplitude from 44.44% to 56.40%, percentages achieved by DKC 5783 and DK 315 hybrids, with an aggressiveness average of 51.27% - table 1;
- compared to the witness variant DK 440, pluses of aggressiveness are achieved by DK 315 (7.69) and DKC 5143 (6.82) hybrids – table 2;

- compared to the experiment average, these hybrids achieve pluses of aggressiveness, but without statistical ensuring;
- passing the aggressiveness data through the resistance source scale, through the percentages achieved, hybrids are included in the sensitive reaction type;
- ***Transgenic hybrids or Yield Gard (MON 810)***
- aggressiveness of the 4 hybrids had an aggressiveness average of 9.34% (much smaller than the one achieved by conventional hybrids – 51.27%) with a variability amplitude from 7.69 to 11.08%, percentages achieved by DKC 4442 YG and DKC 5018 YG hybrids - table 3;
- compared to the witness variant DK 4442 YG, all hybrids achieve pluses of attack, namely: DKC 3946 YG–2.56, DKC 5018 YG – 3.39 and DKC 5784 YG – 0.64 - table 4, but without statistical ensuring;
- compared to the experiment average of 9.34% only 2 hybrids (DKC 3946 YG–0.91 and DKC 5018 YG – 1.74) achieve pluses of aggressiveness, but without statistical ensuring;
- passing the aggressiveness data through the resistance source scale, through the percentages achieved, Yield Gard hybrids are included in the resistance reaction type;

Table 1

Average attack aggressiveness (F%) of *Fusarium roseum f. cerealis* (Cke) fungi Snyder and Hansen, compared to the conventional hybrids made in a comparative culture founded in Horia locality, Arad county, in 2008

No.	Hybrid	R_1	R_2	R_3	Σ	X	% of the witness	% of the exp. average
1	DK 315	53.84	53.84	61.53	169.21	56.40	115.78	110.0
2	DK 440 (Mt.)	46.15	46.15	53.84	146.14	48.71	100	95.0
3	DKC 5143	50.0	50.0	66.6	166.6	55.33	114.0	108.31
4	DKC 5783	41.66	50.0	41.66	133.32	44.44	91.22	86.67
Σ		191.65	199.99	223.63	615.27	205.09	-	-
X		47.91	49.99	55.90	153.81	51.27	-	100

Table 2

Significance of differences compared to the witness variant and aggressiveness experiment area (F%) of *Fusarium roseum f. cerealis* (Cke) fungi Snyder and Hansen, compared to the conventional hybrids made in a comparative culture founded in Horia locality, Arad county, in 2008

No.	Hybrid	X	Difference towards the witness	Significance	Difference compared to the exp. average	Significance
1	DK 315	56.40	7.69	-	5.13	-
2	DK 440 (Mt.)	48.71	Mt.	-	-2.55	-
3	DKC 5143	55.33	6.82	-	4.26	-
4	DKC 5783	44.44	-4.27	-	-6.83	-
Experiment average		51.27				

DL 5% - 10.68
DL 1% - 16.18
DL 0,1% - 26.0

Table 3

Average attack aggressiveness (F%) of *Fusarium roseum f. cerealis* (Cke) fungi Snyder and Hansen, compared to the yield gard hybrids made in a comparative culture founded in Horia locality Arad county, in 2008

No.	Hybrid	R_1	R_2	R_3	Σ	X	% of the witness	% of the exp. average
1	DKC 3946 YG	15.38	7.69	7.69	30.76	10.25	133.33	109.77
2	DKC 4442 YG (Mt.)	7.69	7.69	7.69	23.07	7.69	100	82.33
3	DKC 5018YG	8.33	16.6	8.33	32.26	11.08	114.16	118.7
4	DKC 5784 YG	8.33	8.33	8.33	24.99	8.33	108.32	89.18
Σ		39.73	40.31	32.04	112.08	37.36	-	-
X		9.93	10.07	8.01	28.02	9.34	-	100

Table 4

Significance of differences compared to the witness variant and aggressiveness experiment average (F%) of *Fusarium roseum f. cerealis* (Cke) fungi Snyder and Hansen, compared to the yield gard hybrids made in a comparative culture founded

No.	Hybrid	X	Difference towards the witness	Significance	Difference compared to the exp. average	Significance
1	DKC 3946 YG	10.25	2.56	-	0.91	-
2	DKC 4442 YG (Mt.)	7.69	Mt.	-	-1.65	-
3	DKC 5018YG	11.08	3.39	-	1.74	-
4	DKC 5784 YG	8.33	0.64	-	-1.01	-
Experiment average 9.34						

DL 5% - 7.04
DL 1% -10.66
DL 0,1% - 17.13

CONCLUSIONS

Conclusions. In case of conventional corn, the attack of *Fusarium roseum* had an aggressivity between 44.4 and 56.4%, which includes the 4 hybrids within the sensitivity type of reaction.

Yield Gard (MON 810) corn showed fusariosis in a very low percentage, with an amplitude of variation between 8.3 and 11.0%, a real technology that allows the diminishing the risk of fusariosis occurrence on corn cobs, due to *Ostrinia nubilalis* insect, a zoochore disseminator of the toxin production fungus, that can affect the life of humans and animals. In 2008, the insect had an organic aggressivity (on cobs) of 62-96%, an average of larval density of 1.1-3.9, and an average of larval orifice of 1.6-5.2 in case of conventional corn used in the refuge area system.

As it is difficult to obtain a type of corn resistant to the above mentioned insect, for which improvement works try to obtain tolerant hybrids, it is established that the situation is also similar to *Fuzarium roseum*. Transgenic corn (MON 810), besides insect control, also indirectly reduces *Fusarium* attack.

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SFREDELITORUL EUROPEAN – *OSTRINIA NUBILALIS* HB., ÎN RELAȚIE CU BAZA TROFICĂ A PORUMBULUI CONVENȚIONAL, ÎN JUDEȚUL ARAD

EUROPEAN CORN BORER OSTRINIA NUBILALIS HB., IN RELATIONSHIP WITH THE TROPHIC BASE OF THE CONVENTIONAL CORN IN ARAD COUNTY

JURCA DORIN, POPESCU GHEORGHE

Key words: Zea mays, Ostrinia nubilalis, aggressiveness, system

REZUMAT

S-a urmărit în anul 2008, în județul Arad, relația dintre 6 hibrizi de porumb convențional (DKC 5783, DK 315, DKC 3511, DK 440 – Mt., DKC 4626, DKC 5143), cultivați în localitățile Curtici, Pecica, Păuliş, Nădlac, Chişinău Criş, Horia şi insecta dăunătoare Ostrinia nubilalis Hb. Evaluarea relației sau a gradului de realizare a complementării genice plantă gazdă – parazit, conform principiului molecular „o genă, o enzimă“ sau „o enzimă, un substrat trofic“ s-a făcut prin determinările agresivitatea per plantă, agresivitate şi intensitate organică a insectei (tulpină în zonele „sub“ şi „deasupra“ de ştiulete şi la nivelul „ştiuletelui“) şi a tipului de reacție genetică a hibrizilor (imun, rezistent, tolerant, sensibil).

ABSTRACT

In 2008, in Arad county, the relationship between 6 hybrids of conventional corn (DKC 5783, DK 315, DKC 3511, DK 440 – Mt., DKC 4626, DKC 5143), cultivated in Curtici, Pecica, Păuliş, Nădlac, Chişinău Criş, Horia localities and the damaging insect Ostrinia nubilalis Hb. Was analyzed. The evaluation of the relationship or the degree achieving the gene completion host plant – parasite, according to the molecular principle "a gene, an enzyme" or "an enzyme, a trophic substratum" was carried out by determining the aggressiveness per plant, organic aggressiveness and intensity of the insect (stem "under" and "above" the cob's areas and at the "cob's" level) and the type of hybrids genetic reaction (immune, resistant, tolerant, sensitive).

INTRODUCTION

The polyphagic insect, a lepidopteran of *Pyraustidae* family, is currently considered the world's main corn pests, from all cultivated areas. The corn borer, *Ostrinia nubilalis*, is the main phytophagous pest from the United States. the insect is native to Europe and it was first reported in America at the beginning of 1900, once with the imports of broom sorghum (C.E. MASON et al., 1996). The populations rapidly extended, due to the lack of natural pests and large corn cultivated areas (S. BECK, 1987). Nowadays, the pest is spread throughout the entire North America, East of the Rocky Mountains (C.E. MASON et al., 1996). In Romania, the pest is present in all corn cultivated areas, strong attacks being reported in Banat, Transylvania, North of Moldova, the hill area, the Danube Delta and on the valleys of the country's main rivers (F. PAULIAN et al., 1961; MUREŞAN FELICIA and D. MUSTEA, 1994; D. MUSTEA, 1997).

The insect has a very wide host range, attacking practically all herbaceous plants with a stem large enough for the larvae to enter.

In case cultures have been later sowed and delays in vegetation, legume cultures are the most affected (J.L. CAPINERA, 2000; TURNER GABRIELLE et al., 2009). According to Romanian researchers (I. DUVLEA et al., 1976; GH. BOGULEANU et al., 1980; I. PĂLĂGEŞIU, 1993, I. GHIZDAVU et al., 1997; I. PĂLĂGEŞIU et al., 2000, IOANA GROZEA, 2006) the polyphagic insect attacks cultivated plants such as: corn, hemp, sorghum, hop, sun-flower, as well as plants of the spontaneous flora: barn grass (*Echinochoa crus-gali*), wormwood (*Artemisia sp*.), motherwort (*Amaranthus sp*.) etc., but the biggest damages are caused to corn cultures.

The first attacks occur several days after the larvae occurrence (S. GESSEL, D. CALVIN, 2002). It attacks the leaves (T. PERJU et al., 2004, IOANA GROZEA, 2006; F.B. PEAIRS, 2008; A. SPARKS, D.G. RILEY, 2009), male inflorescence (I. DUVLEA, I. PĂLĂGEŞIU, 1987, L. GODFREY, 2006), but the most important damages are produced by larvae in the 3rd and 4th stage, which delve galleries inside the stem and corn cob peduncle (I. ROŞCA, 2001; R.H. SMITH, B.L. FREEMAN, 1991; J. KNODEL, 2002). In Romania, corn borer is the most dangerous pest after the occurrence of panicle and can be found in all corn cultivated areas, attacking different parts of the plant. Damages caused can reach 40% of bean production (PAULIAN et al., 1961).

MATERIAL AND METHOD

Material and method. The frequency of *Ostrinia nubilalis* attack was established in 2008, through the experiments carried out in Arad county (6 localities: Curtici, Pecica, Păuliş, Nădlac, Chişinău Criş and Horia), whose structure was represented by 6 corn hybrids. Corn hybrids from different maturity groups, of American origin (Dekalb), represented the trophy basis both for the parasite fungi from the patho-system (*Fusarium roseum*) and the European corn borer (*Ostrinia nubilalis*).

Dynamics values have been expressed in percentages and reported both towards the witness variant (control) DK 440 and experiment average. Aggressiveness per plant was established according to the attack frequency, and for organic and perforator aggressiveness, density and activity average has been passed through the attack frequency formula, a method which belongs to us, as well as in the case of intensity.

RESULTS AND DISCUSSIONS

Experimental results registered following the attack of *Ostrinia nubilalis* insects, on the 6 corn hybrids cultivated in the 6 localities of Arad county mentioned above, reveal the followings:

- aggressiveness *per plant* achieved through an informative and general observation, oscillated between 44.6-92.0% and had plus values of 7.3-32.6% compared to the witness (DK 440), in the case of conventional corn DKC 5143, respectively DKC 5783. Average per 6 hybrids was of 62.6%, almost double compared to the average of analytical aggressiveness; according to this estimation, all 6 hybrids pass through the 40% attack frequency, in the field of sensitive reaction type;
- stem average aggressiveness *under the cob* area, had a larval density of 34.1% and a larval perforating activity of 59.3% - fig. 1.
- stem average aggressiveness *above the cob* area was of 20.8% (larval density) and of 38.0% perforating activity (fig. 1).
- average aggressiveness regarding the *cob* populated by larvae was of 20.8%, and through the perforations made, of 37.6% (fig. 1).

A synthesis of this parasitic feature shows that the organic aggressiveness average (under the cob, above the cob and at cobs) is of 24.9%, and the one of perforating activity is of 44.9% and indicates that the strongly affected area is underneath the cobs, where a high

genetic complementarity is achieved in the case of host – parasite system; aggressiveness average per experiment/per hybrids was of 34.9%, much more reduced that the aggressiveness per plant, taken through general observation, in comparison with the analytical established one, very important at establishing the PED, after which prophylactic or therapeutic warning is carried out.

Experiment results regarding the attack intensity, as an average of larval density and larval perforating activity point out the followings:

- average attack intensity or larval density expression was of 1.22 larvae *under the cob* area and 1.78 perforating activity average, 1.13, respectively 1.41 *above the cob* area and *at the cob* of 1.02, respectively 1.5 at the perforating activity; larval and perforating activity average is of 1.12, respectively 1.41 larvae per plant, and per experiment/per hybrids the larval average is of 1.26, which estimates a culture loss of approximately 400 kg/ha and which shows that the PED of 250 kg/ha was achieved (figure 2).

Intensity values expressed through the density and larval perforating activity average are important to characterize the hybrids as genetic reaction type (immune, resistant, tolerant and sensitive). According to the scale that we established, following the results obtained, immunity and genetic resistance are excluded and it means that for the 6 analyzed hybrids the tolerance (DK 315, DKC 3511, DK 440 and DKC 4626 are tolerated but very close to the sensitivity value) and the sensitivity (DKC 5783 and DKC 5143) are specific.

In determining the PED, the analytical observance of the pest's aggressiveness and intensity, under the cob area, at an aggressiveness of 34.9% which has as correspondence an intensity of 1.26 larvae per plant, has the precedence, while in the mentioned area they a lot higher, 39.3% - 1.78, values which indicate the achievement of PED and passing to the prophylactic warning.

Under the cob area, which proved to be the most affected and the one which corresponds mostly to the gene complementarity *Ostrinia nubilalis – Zea mays*, is recommended at the value establishing of parasitic features, in view of warning and establishing the type of genetic reaction of conventional corn. The conventional types of corn DK 315, DKC 3511, DK 440 and DKC 4626 showed tolerance, while the hybrids DKC 5783 and DKC 5143 showed to be sensitive.

CONCLUSIONS

The following were established: aggressiveness per plant (general observation) oscillated between 44.6-92% (DKC 315 Pecica and DKC 5783 – Curtici) with an average per experience of 62.6%; organic aggressiveness had values of 16.6-84.6% for larva and 44.6-80.0%, limits of larval activities (perforations) – DK 315 and DKC 5783 in case of "under cob" area, the most affected one; 8.0-43.3% and respectively 19.3 – 62.0%, in the "above the cob" area, at the same hybrids; 8.0-42.6% and 25.3-68.6%, aggressiveness "at cobs", also at the same hybrids. The average attack intensity or the average larval density with those penetrations manifested as such: 1.0-1.7 respectively 1.4-2.58 „under the cob", 1.0-2.27 respectively 1.3-1.5 in the „above the cob" area and between 1.0-1.09 respectively 1.15 „at the cob". For the genetic reaction the orientation was made after the damage caused under the cob area, which pointed out the followings: resistance reaction is missing and average resistance and tolerance reactions are present at DK 315, DKC 3511, DK 440 (Mt.), DKC 4626 hybrids and sensitivity reaction at DKC 5783 and DKC 5143 hybrids.

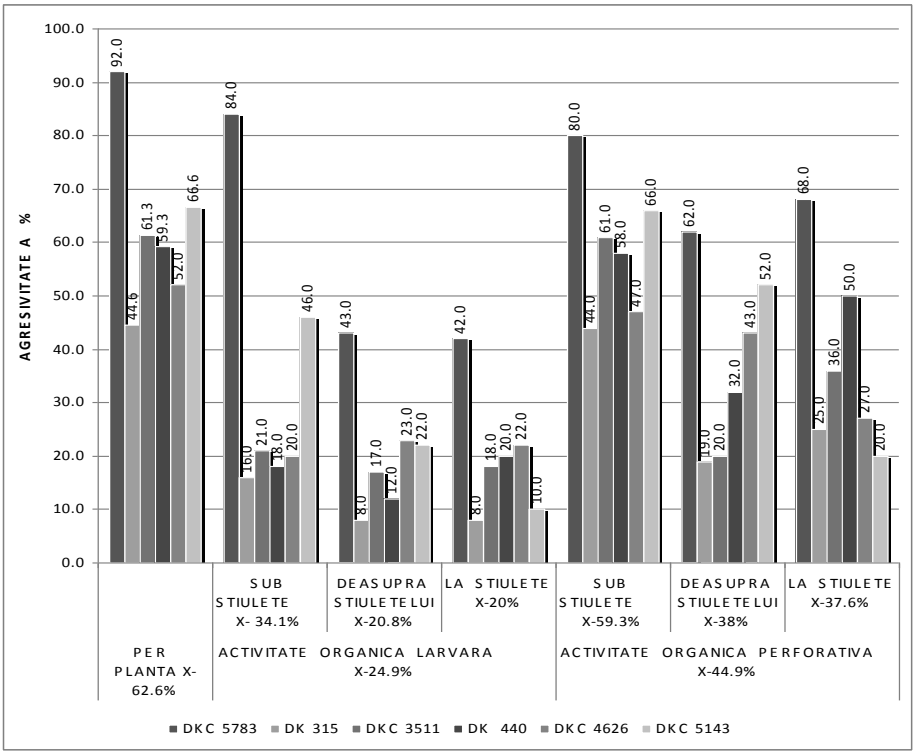

Figure 1 Comparative analysis of Ostrinia nubilalis attack aggressiveness at conventional corn hybrids, expressed through organic perforating activity and density

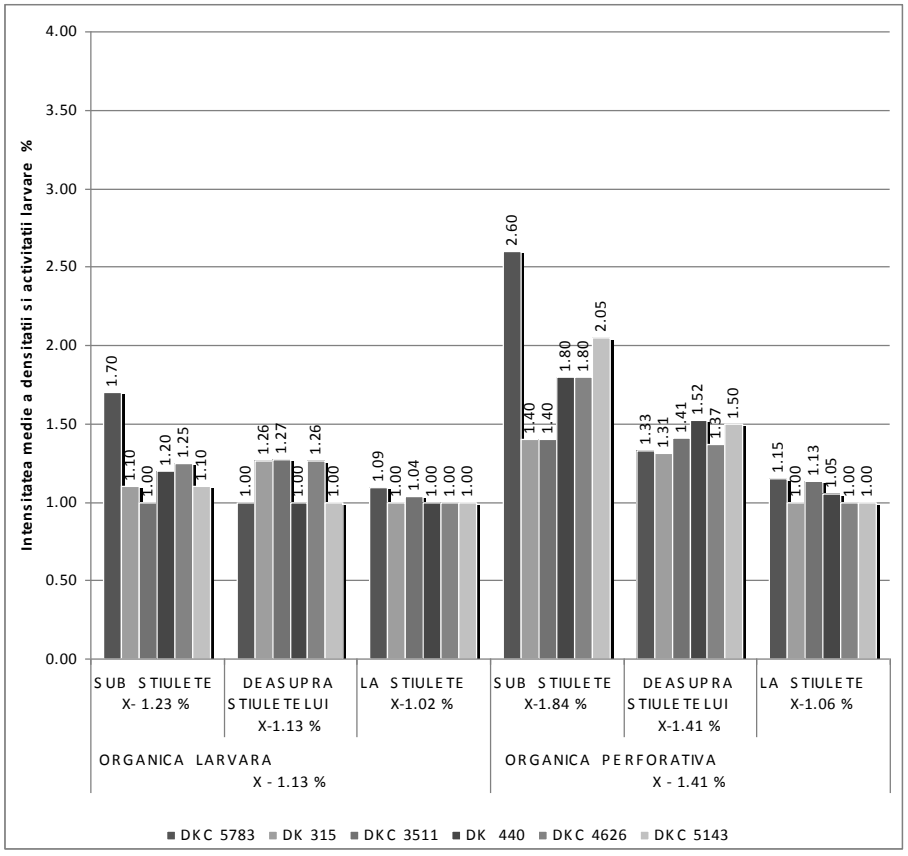

Figure 2 Comparative analysis of Ostrinia nubilalis attack intensity at conventional corn hybrids, expressed through organic perforating activity and density

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CERCETĂRI PRIVIND EFECTUL CONCENTRAȚIEI DE ZAHAROZĂ DIN MEDIUL DE CULTURĂ ŞI DURATA CULTURII DE CALUS ASUPRA BIOMASEI CELULARE DE *VITIS VINIFERA* L.

RESEARCHES CONCERNING THE EFFECT OF SUCROSE CONCENTRATION AND CALLUS CULTURE DURATION ON GROWTH RATE OF *VITIS VINIFERA* L. CELL BIOMASS

LAZĂR ALEXANDRU

Keywords: callus culture, cell biomass, Vitis vinifera L.

REZUMAT

Realizarea culturilor in vitro depinde de o serie de factori dintre care menționăm tipul de explant, mediul de cultură, balanța hormonală şi genotipul. De alegerea celor mai potriviți factori depinde cantitatea de biomasă celulară în culturile de calus şi de celule în suspensie. Un element care permite evaluarea posibilelor performanțe privind obținerea de biomasă celulară îl reprezintă concentrația de zaharoză din mediul de cultură. Aceste determinări s-au făcut separat pentru fiecare soi în parte.

ABSTRACT

The growth rate of cell biomass registered maximum mean value in the cultivation interval of 24 days for Burgund Mare, Cabernet Sauvignon and Pinot Noir and 27 days for Negru Tinctorial, Oporto and Cabernet Sauvignon varieties. Regarding the sucrose concentration added into the culture medium, it has been observed that callus growth rate registered for the concentration of 30 g/l and the most reduced values for callus growth rate were registered for the sucrose concentration of 60 g/l.

INTRODUCTION

The in vitro cell cultures depends on a number of factors of which we mention the kind of explants, the growing medium, genotype and hormone balance. The quantity of cell biomass in cell cultures callus depends by choosing the most appropiate factors. One element that allows assessment of the potential performance of obtaining cell biomass is sucrose concentration.

MATERIAL AND METHOD

The biological material, donor of explants consisted of six grapevine varieties found in the Ampelographic collection of Faculty of Horticulture and Forestry of Banat's University of Agricultural Science Timişoara.The studied grapevine varieties for red wine are Burgund Mare, Cabernet Sauvignon, Oporto, Merlot, Negru Tinctorial and Pinot Noir.

Culture medium that have generated best results was M6, these containing a hormone balance including an auxin, α-naphthalene acetic acid and a cytokinin, kinetin. M6 culture medium represents a variant of Murashige-Skoog [1, 2, 4, 5] medium supplemented with auxin and cytokinin in a ration 4:1.

The research initiated for the six grapevine varieties consists in obtaining of cell biomass via callus cultures using a 20, 30, 50 and 60 g/l sucrose concentration in the culture medium.

RESULTS AND DISCUSSIONS

Analyzing the studied grapevine varieties, it has been observed that the growth rate of cell biomass increases proportionally with cultivation period reaching maximum mean values of 250,75% for Negru Tinctorial after 27 days followed by Oporto, Merlot, Pinot Noir, Cabernet Sauvignon and Burgund Mare variety with mean values of 162,11%, the difference between this and Negru Tinctorial being of 88,64% (table 1).

Table 1

The effect of sucrose concentration on growth rate of cell biomass using callus culture on Burgund Mare variety

Culture duration (days)	Sucrose concentration (g/l) 30	20	50	60	Average	Differences	Significance
0	100,00	100,00	100,00	100,00	100,00	0,00	Martor
3	100,50	100,24	100,47	100,20	100,35	0,35	-
6	103,96	113,44	101,52	110,81	107,43	7,43	-
9	127,99	133,28	101,60	113,03	118,98	18,98	-
12	173,01	175,67	102,47	113,57	141,18	41,18	*
15	224,75	224,75	123,34	135,46	177,08	77,08	***
18	244,70	243,70	149,77	170,95	202,28	102,28	***
21	295,88	281,42	186,25	193,79	239,34	139,34	***
24	303,23	307,44	219,27	218,50	262,11	162,11	***
27	302,49	302,51	218,72	213,23	259,24	159,24	***
30	295,86	293,15	215,06	210,48	253,64	153,64	***
33	284,32	284,19	209,28	203,83	245,40	145,40	***
36	263,99	279,47	208,14	202,04	238,41	138,41	***
Average	246,80	247,79	173,29	176,71	$DL_{5\%}$=32,21	$DL_{1\%}$=43,14	
Val. rel. (%)	100,00	100,40	70,21	71,60	$DL_{01\%}$=56,89		
Differences	0,00	1,00	-73,51 000	-70,09 000			
Significance	Martor	-					

$DL_{5\%}$=16,13 $DL_{1\%}$=21,80 $DL_{01\%}$=29,04

Table 2

The effect of sucrose concentration on growth rate of cell biomass using callus culture on Negru Tinctorial variety

Culture duration (days)	Sucrose concentration (g/l) 30	20	50	60	Average	Differences	Significance
0	100,00	100,00	100,00	100,00	100,00	0,00	Martor
3	100,53	100,43	100,88	100,77	100,65	0,65	-
6	101,16	100,86	102,43	101,15	101,40	1,40	-
9	121,79	122,03	102,50	101,02	111,83	11,83	-
12	179,72	176,56	103,26	101,90	140,36	40,36	-
15	231,38	226,02	137,44	108,30	175,78	75,78	**
18	269,32	256,35	158,85	128,72	203,31	103,31	***
21	282,19	265,67	182,74	145,91	219,13	119,13	***
24	298,84	281,96	202,76	163,99	236,89	136,89	***
27	316,87	301,31	223,54	161,27	250,75	150,75	***
30	320,99	298,04	219,30	150,48	247,20	147,20	***
33	318,93	291,54	198,58	144,74	238,44	138,44	***
36	295,89	285,67	204,86	130,14	229,14	129,14	***
Average	258,60	245,65	173,26	133,60	$DL_{5\%}$=47,88	$DL_{1\%}$=64,12	
Val. rel. (%)	100,00	94,99	67,00	51,66	$DL_{01\%}$=84,57		
Differences	0,00	-12,95	-85,34 000	-125,00 000			
Significance	Martor	-					

$DL_{5\%}$=24,48 $DL_{1\%}$=33,08 $DL_{01\%}$=44,06

Table 3

The effect of sucrose concentration on growth rate of cell biomass using callus culture on Oporto variety

Culture duration (days)	Sucrose concentration (g/l) 30	20	50	60	Average	Differences	Significance
0	100,00	100,00	100,00	100,00	100,00	0,00	Martor
3	100,66	100,64	100,84	101,21	100,84	0,84	-
6	111,23	109,03	103,04	101,61	106,23	6,23	-
9	121,96	122,95	103,40	102,14	112,61	12,61	-
12	155,27	142,30	103,99	103,69	126,31	26,31	-
15	185,71	172,67	120,91	116,31	148,90	48,90	***
18	217,01	216,70	150,90	144,47	182,27	82,27	***
21	235,74	238,03	177,98	173,36	206,28	106,28	***
24	266,24	254,66	201,81	198,18	230,22	130,22	***
27	288,56	270,26	200,49	196,23	238,89	138,89	***
30	283,35	264,34	196,90	195,61	235,05	135,05	***
33	274,31	263,69	193,43	195,22	231,66	131,66	***
36	269,99	261,28	189,27	193,76	228,58	128,58	***
Average	226,55	217,91	163,73	161,75	$DL_{5\%}$=25,93	$DL_{1\%}$=34,72	
Val. rel. (%)	100,00	96,19	72,27	71,40	$DL_{01\%}$=45,79		
Differences	0,00	-8,64	-62,81 000	-64,80 000			
Significance	Martor	-					

$DL_{5\%}$=13,06 $DL_{1\%}$=17,65 $DL_{01\%}$=23,51

The growth rate of cell biomass registered maximum mean value in the cultivation interval of 24 days for Burgund Mare, Cabernet Sauvignon and Pinot Noir and 27 days for Negru Tinctorial (table 2), Oporto (table 3) and Cabernet Sauvignon varieties. Moreover, the growth rate for all studied grapevine varieties did not show a significant increase in the first 9 to 12 cultivation days, value that become significant beginning with the 12th day for Burgund Mare, Merlot (table 4), Pinot Noir and later on the 15th day for the remaining varieties.

Table 4

The effect of sucrose concentration on growth rate of cell biomass using callus culture on Merlot variety

Culture duration (days)	Sucrose concentration (g/l) 30	20	50	60	Average	Differences	Significance
0	100,00	100,00	100,00	100,00	100,00	0,00	Martor
3	101,16	100,67	101,91	100,94	101,17	1,17	-
6	110,30	105,80	105,60	106,46	107,04	7,04	-
9	118,95	118,61	106,94	107,83	113,08	13,08	-
12	143,42	141,92	120,35	115,52	130,30	30,30	*
15	188,69	170,77	126,39	132,97	154,71	54,71	***
18	210,17	206,08	139,53	166,86	180,66	80,66	***
21	253,11	245,09	169,71	185,49	213,35	113,35	***
24	269,91	263,37	195,46	193,13	230,47	130,47	***
27	267,03	262,69	194,78	191,26	228,94	128,94	***
30	265,71	252,78	192,38	190,80	225,42	125,42	***
33	250,42	247,77	187,54	190,09	218,95	118,95	***
36	249,18	242,76	188,06	189,63	217,41	117,41	***
Average	219,11	212,48	161,12	165,56	$DL_{5\%}$=25,27	$DL_{1\%}$=33,85	
Val. rel. (%)	100,00	96,97	73,53	75,56	$DL_{01\%}$=44,64		
Differences	0,00	-6,63	-57,99 000	-53,56 000			
Significance	Martor	-					

$DL_{5\%}$=13,53 $DL_{1\%}$=18,28 $DL_{01\%}$=24,35

Table 5

The effect of sucrose concentration on growth rate of cell biomass using callus culture on Pinot Noir variety

Culture duration (days)	Sucrose concentration (g/l) 30	20	50	60	Average	Differences	Significance
0	100,00	100,00	100,00	100,00	100,00	0,00	Martor
3	101,49	101,70	100,79	100,69	101,17	1,17	-
6	103,16	104,38	101,63	101,90	102,77	2,77	-
9	125,14	131,39	101,15	101,54	114,80	14,80	-
12	157,15	145,63	102,84	102,57	127,05	27,05	*
15	181,54	167,41	116,03	119,57	146,14	46,14	***
18	230,53	198,52	142,06	152,89	181,00	81,00	***
21	244,79	236,07	170,81	178,58	207,57	107,57	***
24	254,38	248,79	196,02	195,41	223,65	123,65	***
27	251,96	245,00	193,70	185,75	219,10	119,10	***
30	246,72	243,10	193,76	184,23	216,95	116,95	***
33	231,10	224,52	190,49	181,95	207,01	107,01	***
36	219,86	216,63	181,25	171,37	197,28	97,28	***
Average	210.43	202.16	158.73	157.31	$DL_{5\%}$=21,56	$DL_{1\%}$=28,88	
Val. rel. (%)	100,00	96.07	75.43	74.76	$DL_{01\%}$=38,09		
Differences	0,00	-8.27	-51.70	-53.12			
Significance	Martor	-	000	000			

$DL_{5\%}$=11,12 $DL_{1\%}$=15,03 $DL_{01\%}$=20,02

Table 6

The effect of sucrose concentration on growth rate of cell biomass using callus culture on Cabernet Sauvignon variety

Culture duration (days)	Sucrose concentration (g/l) 30	20	50	60	Average	Differences	Significance
0	100,00	100,00	100,00	100,00	100,00	0,00	Martor
3	100,91	100,91	100,16	100,47	100,61	0,61	-
6	102,70	104,93	100,97	101,26	102,46	2,46	-
9	113,26	117,78	101,75	104,36	109,29	9,29	-
12	132,42	144,07	103,89	106,73	121,78	21,78	-
15	160,01	158,21	109,72	109,62	134,39	34,39	**
18	178,17	184,51	125,54	118,74	151,74	51,74	***
21	199,05	200,93	149,65	142,57	173,05	73,05	***
24	211,10	210,85	152,05	150,86	181,21	81,21	***
27	218,13	210,57	151,25	150,30	182,56	82,56	***
30	216,63	208,82	150,24	149,56	181,31	81,31	***
33	215,38	207,94	149,22	144,36	179,22	79,22	***
36	213,05	205,55	149,10	142,87	177,64	77,64	***
Average	183,62	182,12	134,02	131,53	$DL_{5\%}$=22,56	$DL_{1\%}$=30,21	
Val. rel. (%)	100,00	99,19	72,99	71,63	$DL_{01\%}$=39,84		
Differences	0,00	-1,49	-49,60	-52,09			
Significance	Martor	-	000	000			

$DL_{5\%}$=11,48 $DL_{1\%}$=15,51 $DL_{01\%}$=20,67

Regarding the sucrose concentration added into the culture medium, it has been observed that callus growth rate registered for the concentration of 30 g/l, values comprised between 258,60% for Negru Tinctorial and 183,62% for Cabernet Sauvignon (table 6), the difference between these being of 74,98% [3].

The most reduced values for callus growth rate were registered for the sucrose concentration of 60 g/l, the values being between 161,75% for Pinot Noir and 131,53% for Cabernet Sauvignon, the difference between these being of 30,22%. Burgund Mare and Merlot registered the lowest values for the sucrose concentration of 50 g/l.

In most of studied grapevine varieties, expect for Burgund Mare where callus was induced on a sucrose concentration of 20 g/l and registered the highest value of cell growth, the callus induced on media with 30 g/l sucrose concentration have generated the largest values for cell growth.

Comparatively with the concentration of 30 g/l used as control variant, the sucrose concentrations of 50 g/l and 60 g/l have registered growth rates significantly inferior. The sucrose concentration of 20 g/l has generated values of cell growth rate close to control variant and without significant differences.

CONCLUSIONS

In conclusion, the sucrose concentration added into culture medium influenced directly the callus growth. In case of Negru Tinctorial, Cabernet Sauvignon, Pinot Noir, Merlot and Oporto varieties the optimal concentration was of 30 g/l, while for Burgund Mare – 20 g/l.

The concentrations of 50 and 60 mg/l proved to generate an inhibitory effect on growth.

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REZULTATE PRIVIND EFECTUL CONCENTRAȚIEI DE ZAHAROZĂ ÎN MEDIUL DE CULTURĂ ASUPRA CANTITĂȚII DE ANTOCIANI SINTETIZAȚI ÎN CULTURA DE CALUS DE *VITIS VINIFERA* L.

RESULTS CONCERNING THE EFFECT OF SUCROSE CONCENTRATION ON THE SYNTHESIZED ANTHOCYANIN AMOUNT IN THE *VITIS VINIFERA* L. CALLUS CULTURE

LAZĂR ALEXANDRU

Key words: callus culture, anthocyanin, Vitis vinifera L.

REZUMAT

Cercetările întreprinse au luat în studiu culturile de celule provenite de la şase soiuri roşii de viță de vie urmărind extracția chimică din biomasa celulară şi determinarea cantitativă a acestora prin spectrofotometrie

Privind toate soiurile prin prisma cantității de antociani sintetizați în cultura de calus, se observă în mod evident că cele mai ridicate valori s-au obținut în cultura de calus la soiul Negru Tinctorial. La acest soi valorile s-au înregistrat în intervalul 10,04 – 12,48 mg/g în condițiile de cultură a calusului pe un mediu de cultură cu o concentrație de 20 g/l zaharoză şi, resperctiv, 30 g/l zaharoză, amplitudinea de variație fiind de 2,44 mg/g. Valorile s-au înregistrat după 6 zile şi respectiv, după 30 de zile de cultură.

ABSTRACT

The researches approached have taken into consideration six varieties of grapevines and were aiming the chemical extraction from the cell biomass and quantitative determination of anthocyanin fractions using spectrophotometry.

Comparing the mean obtained values for the studied grapevine varieties, it has been observed that the largest values for synthesized anthocyanins in callus culture has been registered for Negru Tinctorial variety followed by Burgund Mare, Oporto, Merlot, Pinot Noir and Cabernet Sauvignon. The same hierarchy is maintained for behaviour of grapevine varieties in terms of each type of sucrose concentration added into culture media. The differences found between varieties depending on anthocyanin amount from callus cultures were very significant in most cases.

INTRODUCTION

Anthocyanins are natural pigments that demonstrate homeostatic, hypotensive, cardio-protective and anti-tumor properties [8,12]. In Romania, it is found a large diversity of vegetal sources that may serve as raw materials for anthocynin extraction among which one that proves very potential is Vitis genus [3, 4, 5,13]. The research initiated for the six grapevine (Burgund Mare, Cabernet Sauvignon, Merlot, Oporto, Negru Tinctorial and Pinot Noir) varieties consists in obtaining of anthocyanins [7,14,15] from cell biomass [1,2,6,9,10,11] after 6, 12, 18, 24, 30 and 36 days of cultivation. In the present paper, I will present only the results obtaining after 30 days of cell culture.

MATERIAL AND METHOD

The anthocyanin compounds were extracted from cell cultures using acidulated methanol solution 1% chloride acid. The extraction has been left to rest over night at 4°C.

After extraction, the samples were centrifuged for 3 minutes at 5000 rot/minute and then the supernatant was analyzed using the spectrophotometer at variable wave length UV-VIZ JENWAY 6505.

The UV-VIZ spectra were traced for the wave length domain 350 – 700 nm, considering all studied grapevine varieties and the wave length for which the absorbance was maximum (λ = 525 nm) was identified.

The total anthocyanins were determined being expressed as cyanidin- 3 –glucoside using the molar extinction coefficient 2,95 x 10^4.

RESULTS AND DISCUSSIONS

The research initiated for the six grapevine varieties consists in quantitative determination of anthocyanin fractions from the cell biomass via callus cultures obtained on 20, 30 and 50 g/l sucrose concentration (table 1).

Table 1

The effect of sucrose concentration on total anthocyanin synthesis (mg/g callus) after 30 days in case of studied grape varieties using callus culture

Sucrose	20 g/l		30 g/l		50 g/l		Average	
Grapevine variety	$\bar{x} \pm s_{\bar{x}}$	s %	$\bar{x} \pm s_{\bar{x}}$	s %	$\bar{x} \pm s_{\bar{x}}$	s %	$\bar{x} \pm s_{\bar{x}}$	s %
Merlot	3,30±0,06	3,01	3,51±0,04	1,99	3,50±0,05	2,66	3,43±0,07	3,44
Negru Tinctorial	11,56±0,08	1,24	12,48±0,03	0,37	12,71±0,10	1,33	12,25±0,35	4,95
Pinot Noir	2,77±0,15	9,37	2,89±0,01	0,68	2,88±0,04	2,13	2,85±0,04	2,48
Burgund Mare	6,11±0,01	0,39	6,13±0,07	2,04	5,91±0,07	2,13	6,05±0,07	2,01
Oporto	5,39±0,03	0,89	5,40±0,06	1,99	5,44±0,08	2,66	5,41±0,02	0,50
Cabernet Sauvignon	1,03±0,06	10,79	1,30±0,02	3,03	1,31±0,03	3,33	1,21±0,09	12,82
Average	5,03±1,51	73,39	5,28±1,60	74,39	5,29±1,63	75,71	5,20±0,08	15,13

Table 2

The comparison of variety mean regarding the synthesized anthocyanins (mg/g callus) after 30 days using callus culture

Grapevine varieties	Averages		Relative values (%)	Differences/ Significance
Negru T– Merlot	12,25	3,43	356,69	8,82***
Pinot N – Merlot	2,85	3,43	82,91	-0,59000
Burgund M – Merlot	6,05	3,43	176,18	2,62***
Oporto – Merlot	5,41	3,43	157,63	1,98***
Cabernet S – Merlot	1,21	3,43	35,34	-2,22000
Pinot N – Negru T	2,85	12,25	23,25	-9,40000
Burgund M – Negru T	6,05	12,25	49,39	-6,20000
Oporto – Negru T	5,41	12,25	44,19	-6,84000
Cabernet S – Negru T	1,21	12,25	9,91	-11,04000
Burgund M – Pinot N	6,05	2,85	212,48	3,20***
Oporto – Pinot N	5,41	2,85	190,11	2,57***
Cabernet S – Pinot N	1,21	2,85	42,62	-1,63000
Oporto – Burgund M	5,41	6,05	89,47	-0,64000
Cabernet S – Burgund M	1,21	6,05	20,06	-4,84000
Cabernet S – Oporto	1,21	5,41	22,42	-4,20000

$DL_{5\%}$=0,10 $DL_{1\%}$=0,13 $DL_{0,1\%}$=0,17

Table 3

The comparison of sucrose concentrations regarding the synthesized anthocyanins (mg/g callus) after 30 days using callus culture

Sucrose concentration (g/l)	Averages		Relative values (%)	Differences/ Significance
30 g/l – 20 g/l	5,28	5,03	105,14	0,26***
50 g/l – 20g /l	5,29	5,03	105,28	0,27***
50 g/l – 30 g/l	5,29	5,28	100,14	0,01

$DL_{5\%}$=0,07 $DL_{1\%}$=0,11 $DL_{0,1\%}$=0,21

Considering all studied varieties from the view point of synthesized anthocyanin amount in cell culture, it is clearly observed that the highest values were obtained in callus cultures for Negru Tinctorial variety (table 2).

Table 4

a) The comparison of studied grape varieties regarding the synthesized anthocyanins (mg/g callus) using 20 g/l sucrose

Grapevine varieties	Averages		Relative values (%)	Differences/ Significance
Negru T– Merlot	11,56	3,30	350,58	8,26***
Pinot N – Merlot	2,77	3,30	83,88	-0,53000
Burgund M – Merlot	6,11	3,30	185,18	2,81***
Oporto – Merlot	5,39	3,30	163,56	2,10***
Cabernet S – Merlot	1,03	3,30	31,36	-2,26000
Pinot N – Negru T	2,77	11,56	23,93	-8,80000
Burgund M – Negru T	6,11	11,56	52,82	-5,45000
Oporto – Negru T	5,39	11,56	46,65	-6,17000
Cabernet S – Negru T	1,03	11,56	8,95	-10,53000
Burgund M – Pinot N	6,11	2,77	220,77	3,34***
Oporto – Pinot N	5,39	2,77	194,99	2,63***
Cabernet S – Pinot N	1,03	2,77	37,39	-1,73000
Oporto – Burgund M	5,39	6,11	88,32	-0,71000
Cabernet S – Burgund M	1,03	6,11	16,94	-5,07000
Cabernet S – Oporto	1,03	5,39	19,18	-4,36000

b) The comparison of studied grape varieties regarding the synthesized anthocyanins (mg/g callus) using 30 g/l sucrose

Grapevine varieties	Averages		Relative values (%)	Differences/ Significance
Negru T– Merlot	12,48	3,51	355,86	8,97***
Pinot N – Merlot	2,89	3,51	82,49	-0,61000
Burgund M – Merlot	6,13	3,51	174,90	2,63***
Oporto – Merlot	5,40	3,51	154,05	1,90***
Cabernet S – Merlot	1,30	3,51	36,97	-2,21000
Pinot N – Negru T	2,89	12,48	23,18	-9,59000
Burgund M – Negru T	6,13	12,48	49,15	-6,35000
Oporto – Negru T	5,40	12,48	43,29	-7,08000
Cabernet S – Negru T	1,30	12,48	10,39	-11,18000
Burgund M – Pinot N	6,13	2,89	212,02	3,24***
Oporto – Pinot N	5,40	2,89	186,74	2,51***
Cabernet S – Pinot N	1,30	2,89	44,81	-1,60000
Oporto – Burgund M	5,40	6,13	88,08	-0,73000
Cabernet S – Burgund M	1,30	6,13	21,13	-4,84000
Cabernet S – Oporto	1,30	5,40	24,00	-4,11000

c) The comparison of studied grape varieties regarding the synthesized anthocyanins (mg/g callus) using 50 g/l sucrose

Grapevine varieties	Averages		Relative values (%)	Differences/ Significance
Negru T– Merlot	12,71	3,50	363,27	9,21***
Pinot N – Merlot	2,88	3,50	82,43	-0,61000
Burgund M – Merlot	5,91	3,50	168,97	2,41***
Oporto – Merlot	5,44	3,50	155,63	1,95***
Cabernet S – Merlot	1,31	3,50	37,46	-2,19000
Pinot N – Negru T	2,88	12,71	22,69	-9,82000
Burgund M – Negru T	5,91	12,71	46,51	-6,80000
Oporto – Negru T	5,44	12,71	42,84	-7,26000
Cabernet S – Negru T	1,31	12,71	10,31	-11,40000
Burgund M – Pinot N	5,91	2,88	204,98	3,03***
Oporto – Pinot N	5,44	2,88	188,81	2,56***
Cabernet S – Pinot N	1,31	2,88	45,45	-1,57000
Oporto – Burgund M	5,44	5,91	92,11	-0,47000
Cabernet S – Burgund M	1,31	5,91	22,17	-4,60000
Cabernet S – Oporto	1,31	5,44	24,07	-4,13000

$DL_{5\%}$=0,17 $DL_{1\%}$=0,23 $DL_{0,1\%}$=0,30

In case of Negru Tinctorial variety, the registered values were situated in the interval 10,04 – 12,48 mg/g in callus cultivation conditions with 20 g/l sucrose concentration and 30 g/l, respectively, the variation amplitude being of 2,44 mg/g. The values were registered after 6 days and 30 days, respectively.

The most reduced values of anthocyanins were registered for Cabernet Sauvignon variety with values comprised in the interval 0,70 – 1,31 mg/g and variation amplitude of 0,61 mg/g (table 4). These values were obtained in callus cultivation conditions on culture media with 30 g/l and 50 g/l sucrose (table 3), respectively, the values being measured after 6 and 30 cultivation days.

Comparing the mean obtained values for the studied grapevine varieties, it has been observed that the largest values for synthesized anthocyanins in callus culture has been registered for Negru Tinctorial variety followed by Burgund Mare, Oporto, Merlot, Pinot Noir and Cabernet Sauvignon.

Table 5

a) The comparison of sucrose concentrations regarding the synthesized anthocyanins (mg/g callus) on Burgund Mare variety

Sucrose concentration (g/l)	Averages		Relative values (%)	Differences/ Significance
30 g/l – 20 g/l	6,13	6,11	100,43	0,03
50 g/l – 20g /l	5,91	6,11	96,78	-0,200
50 g/l – 30 g/l	5,91	6,13	96,37	-0,220

b) The comparison of sucrose concentrations regarding the synthesized anthocyanins (mg/g callus) on Cabernet Sauvignon variety

Sucrose concentration (g/l)	Averages		Relative values (%)	Differences/ Significance
30 g/l – 20 g/l	1,30	1,03	125,33	0,26**
50 g/l – 20g /l	1,31	1,03	126,71	0,28**
50 g/l – 30 g/l	1,31	1,30	101,10	0,01

c) The comparison of sucrose concentrations regarding the synthesized anthocyanins (mg/g callus) on Merlot variety

Sucrose concentration (g/l)	Averages		Relative values (%)	Differences/ Significance
30 g/l – 20 g/l	3,51	3,30	106,34	0,21*
50 g/l – 20g /l	3,50	3,30	106,07	0,20*
50 g/l – 30 g/l	3,50	3,51	99,75	-0,01

d) The comparison of sucrose concentrations regarding the synthesized anthocyanins (mg/g callus) on Oporto variety

Sucrose concentration (g/l)	Averages		Relative values (%)	Differences/ Significance
30 g/l – 20 g/l	5,40	5,39	100,16	0,01
50 g/l – 20g /l	5,44	5,39	100,93	0,05
50 g/l – 30 g/l	5,44	5,40	100,78	0,04

e) The comparison of sucrose concentrations regarding the synthesized anthocyanins (mg/g callus) on Negru Tinctorial variety

Sucrose concentration (g/l)	Averages		Relative values (%)	Differences/ Significance
30 g/l – 20 g/l	12,48	11,56	107,94	0,92***
50 g/l – 20g /l	12,71	11,56	109,91	1,15***
50 g/l – 30 g/l	12,71	12,48	101,83	0,23**

f) The comparison of sucrose concentrations regarding the synthesized anthocyanins (mg/g callus) on Pinot Noir variety

Sucrose concentration (g/l)	Averages		Relative values (%)	Differences/ Significance
30 g/l – 20 g/l	2,89	2,77	104,58	0,13
50 g/l – 20g /l	2,88	2,77	104,24	0,12
50 g/l – 30 g/l	2,88	2,89	99,67	-0,01

The same hierarchy is maintained for behaviour of grapevine varieties in terms of each type of sucrose concentration added into culture media. The differences found between varieties depending on anthocyanin amount from callus cultures were very significant in most cases.

Comparing the sucrose concentrations in terms of synthesized anthocyanins, it has been observed that in most cases, the highest values of anthocyanins were registered in case of culture media with concentration of 30 g/l sucrose. The most reduced values were registered for sucrose concentrations of 20 g/l (table 5). The differences between sucrose concentrations regarding the anthocyanin amount are in most cases statistically covered.

CONCLUSIONS

In conclusion, the study results concerning the influence of sucrose concentration on biosynthetic potential of calli revealed statistically insured differences between anthocyanin yield and sucrose concentration added into culture medium.

The supplementation of culture media for calli with 30g/l generated a positive effect on their biosynthetic potential. On contrary, the reduction of sucrose amount to 20g/l determined implicitly a reduction of anthocyanin amount synthesized by calli.

The differences registered between biosynthetic potential of calli rising from different varieties on culture media with the same sucrose amount, were very significant which indicates the major role of genetic component on in vitro anthocyanin production.

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CARTARE QTL PENTRU CULOAREA TEGUMENTULUI SEMINAL ŞI PENTRU CONȚINUTUL ÎN TANINURI CONDENSATE DIN *BRASSICA NAPUS* L.

MAPPING OF QTL FOR SEED COLOUR AND CONDENSED TANNINS CONTENT IN *BRASSICA NAPUS* L.

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Key words: Brassica napus, QTL mapping, seed colour, condensed tannins

REZUMAT

Rapița (Brassica napus L.) reprezintă o potențială sursă de proteine vegetale, datorită compoziției sale echilibrate în aminoacizi esențiali. Culoarea galbenă a tegumentului seminal reprezintă un obiectiv important din cadrul programului de ameliorare al rapiței deoarece este un caracter asociat cu un conținut mai redus de compuşii antinutritivi (sinapină, taninuri condensate, fibre) ce reduc valoarea nutritivă a şrotului de rapiță utilizat ca sursă de hrană pentru animale. Taninurile din plante sunt compuşi fenolici care au capacitatea de a forma complexe insolubile cu proteinele, mineralele şi celuloza. În prezentul studiu s-a realizat cartarea genetică a unei populații de rapiță pentru a identifica şi caracteriza locus-urile ce determină culoarea semințelor, precum şi conținutul total şi individual în taninuri condensate.

ABSTRACT

The objective of this study was to identify quantitative trait loci (QTL) for seed colour, individual and total condensed tannins (syn. proanthocyanidine, PAs) content in a winter rapeseed doubled haploid (DH) population. The plant material consisted of 166 DH lines derived from a cross between an inbred line of the black-seeded German winter oilseed rape cultivar 'Express' and the true-breeding, yellow-seeded line '1012/98', both with 00-seed quality. The QTL were mapped using the software PLABQTL based on seed analyses of DH lines grown on field trials in Rauischholzhausen and Gross-Gerau (Germany). Seed colour was measured quantitatively based on digital reflectance values. Total PAs content was via Vanillin assay quantified. Individual PAs content was quantified via HPLC (High Performance Liquid Chromatography) using internal standards for quantification.

INTRODUCTION

Rapeseed meal is an important product for animal nutrition and is also a potential source of vegetable protein for human nutrition. The meal possesses around 40% protein with a favorable composition of amino acids and high contents of the essential amino acids methionin and cystein. However, due to the high proportion of antinutritive components the utilisation of rapeseed meal/protein in animal and human nutrition is limited. Breeding of yellow-seeded oilseed rape varieties is of high interest with regard to reduction of antinutritive phenolic compounds, in particular lignin and tannins.

The thin seed coats of yellow-seeded genotypes is often associated with a considerable reduction in the size of endothelium cells, which leads to a spatial reduction of condensed tannins and simultaneously reduces the seed fibre content. Because seed colour is very environmentally sensitive we are trying to develop alternative selection tools, including the development of gene-linked markers via mapping of major QTL and relevant candidate genes for tannin compounds.

MATERIAL AND METHOD

Using the software JoinMap 3.0 a dense genetic map was generated from a population of 166 doubled-haploid lines derived from a cross between an inbred line of the black-seeded German winter oilseed rape cultivar 'Express' and the true-breeding, yellow-seeded line '1012/98', both with 00-seed quality. The QTL were mapped using the software PLABQTL 1.3 based on seed analyses of DH lines grown on field trials in Rauischholzhausen and Gross-Gerau (Germany). Seed colour was measured quantitatively based on digital reflectance values. Total PAs content was via Vanillin assay quantified. Individual PAs content was quantified via HPLC using internal standards for quantification.

RESULTS AND DISCUSSIONS

A total of 176 polymorphic Markers (126 AFLP and 50 SSR-Marker) covering 1171 cM were localized in the genetic map for DH population (Figure 1). The linkage groups were designated based on the known marker positions using the standard N1 to N19 nomenclature for *B. napus*, with the expectation of one unidentified group that was named as KG14.

The mean size of chromosomes is 61.6 cM, and this corresponds to an average marker distance of 6.6 cM and 9 markers per chromosome. The largest linkage group (N17) with 112 cM consists of 3 AFLP plus 6 SSR markers and the smallest (N7) has 22 cM and consists of 4 AFLP plus 2 SSR markers.

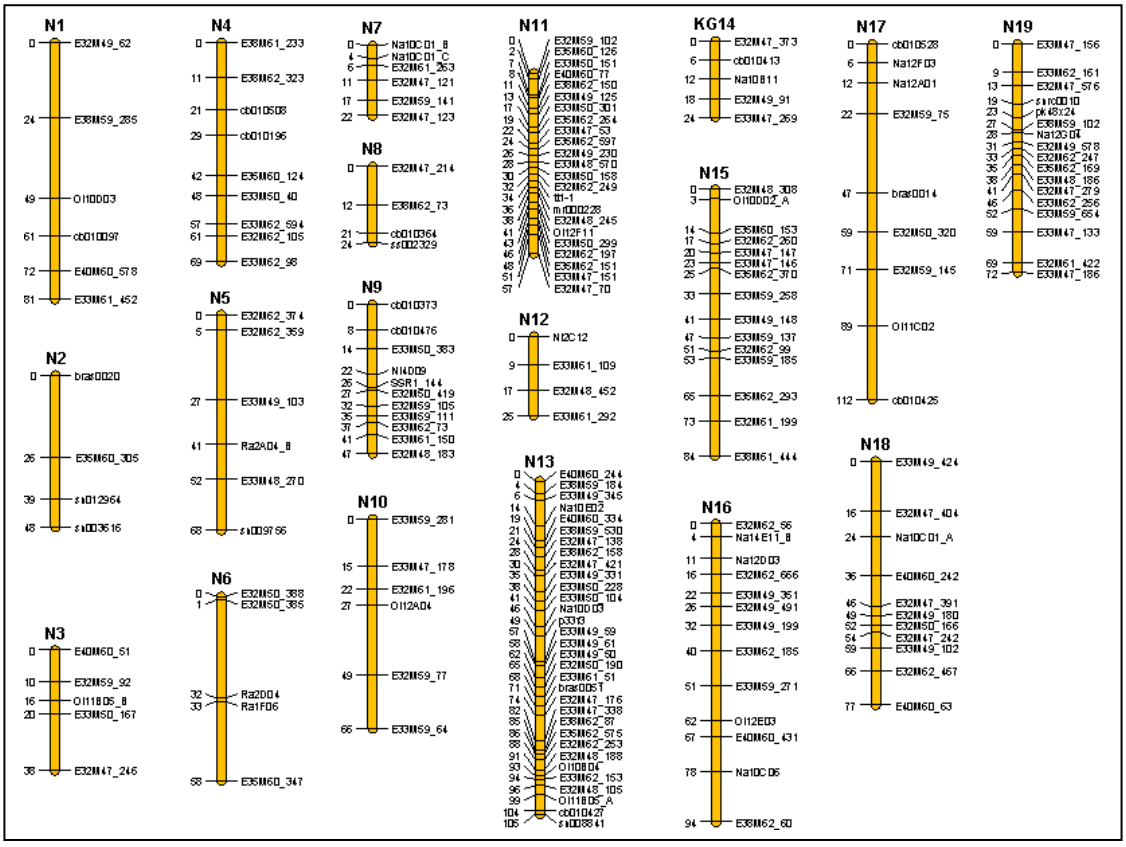

Figure 1: Genetic map of doubled haploid (DH) populations

Table 1 shows the chromosomal positions, flanking markers, LOD score and phenotypic effects of all putative QTL identified for seed colour and all HPLC phenolic compound peaks showing segregation within the DH mapping population.

For seed colour trait three QTL located on linkage groups N9, N11 and N15 explain 66.8% of total phenotypic variance (R2). On linkage group N9 a major QTL for seed colour explained 40.9% of the observed partial phenotypic variance and play an important role in phenotype occurrence. At the same location on linkage group N9 were found the main

QTLs for ADF (acid detergent fiber), NDF (neutral detergent fiber) and ADL content (acid detergent lignin). The second QTL (LOD = 7.6) was found on linkage group N11 and has a smaller effect (R2 = 19.0%; part. R2 = 19.8%) with an additive effect of 0.29%. The third QTL is characterized by the lowest LOD score for seed color (LOD = 3.9) and is localized on linkage group N15.

Table 1

QTL for seed color and condensed tannins in doubled haploid (DH) populations of the *B. napus*

Trait		Marker-Interval	Chr./ Position (cM)	LOD Score	R^2 (%)	Partial R^2 (%)
Seed colour		Ni4D09 / SSR1_144	N9 / 26	6,38***	16,2	40,9
		E32M62_197 / E35M62_151	N11 / 48	7,61***	19,0	19,8
		Ol10D02_A / E35M60_153	N15 / 4	3,89*	10,2	12,2
Flavonoid compounds		sn012964 / sn003616	N2 / 40	6,88***	18,2	8,4
		Ni4D09 / SSR1_144	N9 / 24	3,80*	10,0	7,1
		tt1-1 / mr000228	N11 / 36	8,44***	20,9	18,8
Oligomer PAs	F2PA2	E32M50_419 / E32M59_105	N9 / 30	10,9***	26,2	7,1
		E33M50_158 / E32M62_249	N11 / 32	3,06	8,2	10,2
		E33M49_61 / E33M49_50	N13 / 60	7,67***	19,3	18,0
		Ol10D02_A / E35M60_153	N15 / 4	6,56**	16,7	9,9
		E35M62_370 / E33M59_258	N15 / 26	8,50***	21,1	19,1
	F2PA3	E32M62_197 / E35M62_151	N11 / 48	6,98***	17,7	15,6
		E33M49_61 / E33M49_50	N13 / 62	5,21***	13,5	7,7
		E35M62_370 / E33M59_258	N15 / 26	3,36	9,0	6,4
		E33M59_271 / Ol12E03	N16 / 62	5,62***	14,5	9,9
	F2PA6	E33M59_271 / Ol12E03	N16 / 58	3,70**	9,8	7,2
Polymeric PAs	F3PA3	bras0020 / E35M60_305	N2 / 6	3,58*	9,7	6,2
	F3PA4	E32M48_245 / Ol12F11	N11 / 40	6,36***	16,3	8,5
		E32M49_578 / E32M62_247	N19 / 32	4,09*	10,8	4,1
	F3PA6	cb010097 / E40M60_578	N1 / 62	3,77*	10,0	2,6

***** significant at 0,05 level by Permutations analyse; ****** significant at 0,01 level; ******* significant at 0,001 level

R^2 (%) = phenotypic Variation, **Partial R^2 (%)** = partial phenotypic Variation, **Chr=** Chromosome

n double haploid (DH) population for three oligomeric proanthocyanidins (F2PA2, F2PA3, F2PA6) ten QTL on five linkage groups were found. For oligomeric proanthocyanidin F2PA2 were identified five quantitative trait loci (QTL), which from 8.2 to 26.2% of phenotypic variance explained. The total phenotypic variance is therefore 38.9%. For oligomeric proanthocyanidin F2PA3, four QTLs were localized on linkage groups N11, N13, N15 and N16 with LOD values from 3.4 to 7.0 and 36.9% phenotypic variance. The most influent QTL is positioned on linkage group N11 and explain 17.7% of phenotypic variation. For oligomeric proanthocyanidin F2PA6 was a QTL on linkage group N16 near the SSR Lokus Ol12E03 detected. Two QTL for different oligomeric PAs (F2PA3 and F2PA2, respectively) were located at the same position on chromosome N13 and N15 and

presumably represent gene which alters the type of oligomeric compound produced in the two parental lines. A major QTL for seed colour co-localised with a major locus for oligomeric PAs content (F2PA3) at the same position on chromosome N11. Also, two QTL for F2PA3 and F2PA6 co-localise on linkage group N16.

On DH population from five quantified polymeric proanthocyanidins we found four QTL on four different linkage groups for three of them (F3PA3, F3PA4, F3PA6). For polymeric Proanthocyanidin F3PA3 was identified a QTL on linkage group N2. This QTL explained 9.7% of the observed phenotypic variance and 6.2% of partial phenotypic variance by a LOD score of 3.6. The most influent QTL on genotypic variance for polymeric proanthocyanidin F3PA4, located near the SSR-Marker Ol12F11, explain alone 16.3% of phenotypic variance and 8.5% of partial phenotypic. This QTL was mapped in linkage group N11. The second QTL for F3PA4 (LOD = 4.1) was placed on linkage group N19 and has a minor effect on trait variance (R2 = 10.8%; part. R2 = 4.1%). Both QTLs explain 12.3% from total phenotypic variance. For polymeric proanthocyanidin F3PA6 a QTL on linkage group N1 was detected. The QTL is characterized by a small LOD score (3.8) and explains 2.6% of partial phenotypic variance. The QTL for the polymeric Proanthocyanidine F3PA4 is situated on linkage group N11 in the immediate near of tt1 gene. Also, it is located at distance for 8 cM from a QTL for seed color and a QTL for oligomeric PAs content (F2PA3).

CONCLUSIONS

1. 176 polymorphic Markers (126 AFLP and 50 SSR-Marker) covering 1171 cM were localized in the genetic map for DH population.

2. In double haploid (DH) population we found three QTL for seed colour, three QTL for total seed flavonoids, ten QTL for oligomeric proanthocyanidins (F2PA2, F2PA3, F2PA6) and four QTL for polymeric proanthocyanidins (F3PA3, F3PA4, F3PA6).

3. Mapping of candidate genes for flavonoid biosynthesis and comparison to QTL for major flavonoid compounds will enable us to identify genes involved in the expression and control of seed colour in yellow-seeded oilseed rape.

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STUDIES CONCERNING THE WINTER OATS GENOTYPE COLLECTION RESISTANCE TO POWDERY MILDEW ATTACK (*ERYSIPHE GRAMINIS* F.SP.*AVENAE*)

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Keywords: winter oats, germoplasm, powdery mildew resistance

REZUMAT

Ameliorarea rezistenței la atacul diferiților agenți patogeni a fost o preocupare importantă încă de la realizarea primelor programe de ameliorare ştiințifică.. Făinarea este frecventă, dar pagubele produse nu sunt foarte importante decât la un atac foarte puternic. Studiul a fost efectuat asupra unui materialul biologic a fost alcătuit din 73 de soiuri şi linii de ovăz de toamnă în comparație cu soiul românesc Florina. Atacul de făinare a fost mai puțin extins în anul 2003, şi mai răspândit în anii 2004 şi 2005. În colecția studiată, peste două treimi dintre genotipuri sunt mediu rezistente, media notelor fiind cuprinsă între 1 şi 3. Soiul Compact poate fi recomandat ca genitor pentru programele de ameliorare a rezistenței la făinare.

ABSTRACT

Improving resistance to the attack by different pathogens has been a main concern ever since the achievement of the first programmes of scientific improvement. Powdery mildew is frequent, but damage is serious only when the attack is serious. The study has been carried out on a biological material made of 73 winter oats cultivars and lines that we compared to the Romanian cultivar Florina. The attack by powdery mildew was lower in 2006 and higher in 2007 and 2008. In the studied collection, over 2/3 of the genotypes are medium-resistant, the average score being between 1 and 3. The Compact cultivar can be recommended as a genitor for powdery mildew resistance improvement programmes.

INTRODUCTION

Of the two types of oats, spring oats covers almost the entire cultivated area in Romania. Winter oats is little cultivated, even in the Banat Plain where there are optimal conditions in most years. Though there have been attempts to promote this type of oats for cultivation, it still is little known to cultivators (MĂCEŞANU et al., 1987).

Improving resistance to the attack by different pathogens has been a main concern ever since the first programmes of scientific improvement. Genetically determined resistance should not be confounded with pseudo/resistance, which is due to the existence of some morphological features that prevent the attack or the development of the pathogens (MARTINELLI et al., 2003). Polygenic resistance as an impact on a large number of breeds of the pathogen and is durable, behaving as a quantitative feature (MARTINELLI, 2001). In the process of improvement, one should find resistance sources. To do so, the study of germoplasm is the main element (WESENBEG et al., 1992)

Powdery mildew (*Erysiphe graminis* Dc. et Merat f. sp. *avenae* Merchal,) produces whitish, woven spots made up by the fungus mycelium. After the pathogen reaches maturity, the spots can be washed away by the rain. The pathogen is a fungus that is transmitted through diseased plant debris. The disease is frequent, but the damage is not important, unless the attack is very strong (MARTINELLI, 1990).

MATERIAL AND METHOD

The biological material was made up of 73 cultivars and lines of winter oats. Except for the Florina cultivar, used as a control, all the other forms are foreign cultivars or lines. Most of them are North-American, but there are also many from Western Romania (Great Britain and France), and a few from East and South Europe.

The study was carried out at the B.U.A.S.V.M. in Timisoara, on a collection field in which the attack by powdery mildew was assessed with grades between 0 and 9.

Experimental data were processed through the variance analysis and through applying limit differences test (CIULCA, 2006)

RESULTS AND DISCUSSION

Powdery mildew is a common disease in oats. The disease occurs early in the year in rainy years, but the damage it causes is low since the pathogen evolves rapidly. In winter oats, powdery mildew attack is less damaging due to the fact that the plants are advanced in vegetation at the moment of the attack.

During the experiment, the disease was reported in all the experimental years.

In 2006, powdery mildew was present in most studied genotypes, with only eight of the collection forms not attacked. In the genotypes attacked, the grades ranged between 1 and 5. A 4 grade attack was reported in eight genotypes. Most of them showed low level attack and were graded 1. The control cultivar (Florina) was graded 2. (figure 1)

In 2007, powdery mildew attack was present in all the genotypes of the collection, the cultivars and lines being graded between 1 and 6. Over half of the collection forms were graded 2, while the Florina cultivar was graded 1. Florina was graded 3; in contrast, the seventeen genotypes graded more.

In 2008, the grades were within lower limits compared to the pervious years. Only eight of the studied genotypes were graded 4, most of which being graded 2.

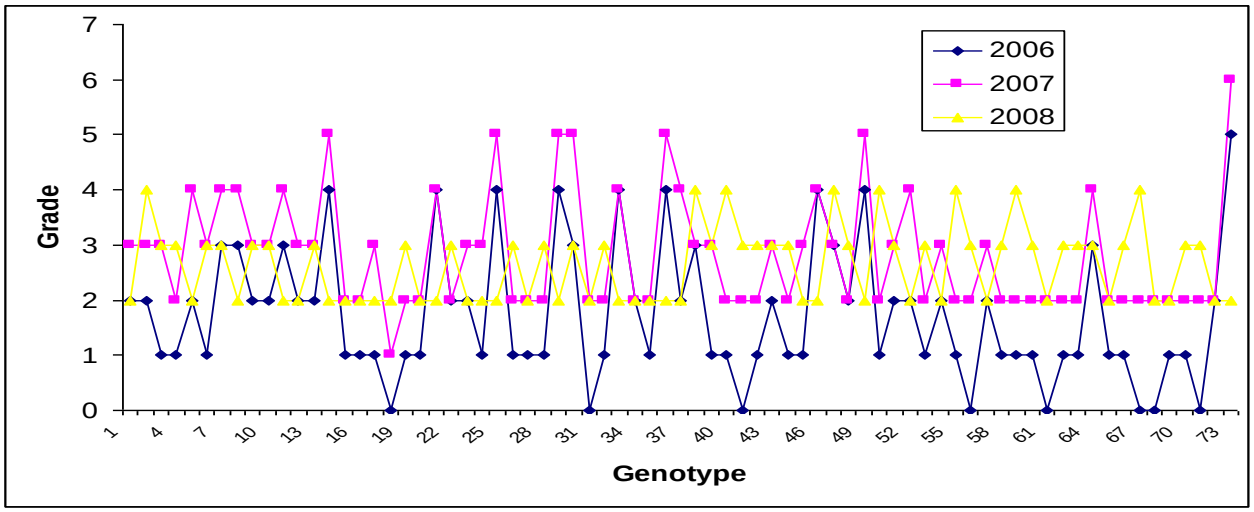

Figure 1. Results concerning powdery mildew resistance between 2006 and 2008

Comparing the attack by powdery mildew during the three experimental years, we can notice that the disease was more restricted in 2006 and more spread in 2007 and 2008. in the three experimental years, the genotype behaviour compared to that of the control was constant.

Assessing the collection after the average of the grades during the three experimental years shows that the studied genotypes are resistant or medium resistant to the attack by powdery mildew. Over 2/3 of the collection forms are within this category, the

average of the grades ranging between 1 and 3. A single genotype was graded over 4. (Figure 2)

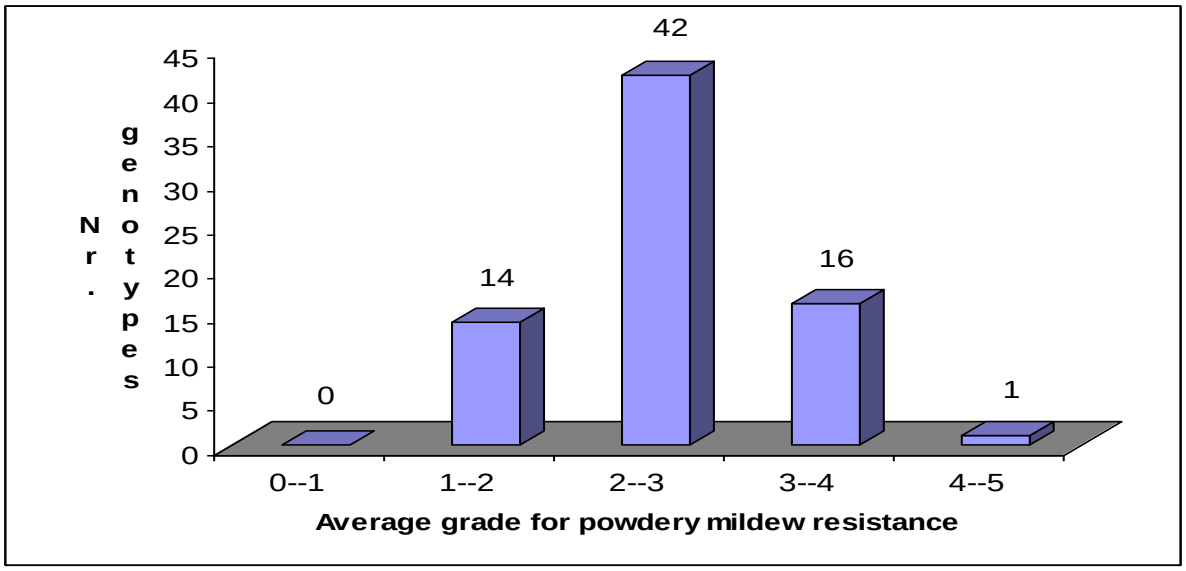

Figure 2. Results concerning the average grade for powdery mildew resistance between 2006 and 2008

Observations from the three experimental years concerning the attack by powdery mildew were interpreted statistically and we can see that very few variants differ in resistance to the attack by powdery mildew of the Florina cultivar, a medium resistant cultivar. Only the Compact cultivar showed a better resistance, which was graded lower than the control. Higher significance grades were in the following genotypes: Nortex, 3868, Cocker 41-51, 4458, 4472, PA 725-2154, but also in the Emperor cultivar, which is significantly distinctly more sensitive than the control. (Table 1)

Studies carried out allowed us to draw the conclusion that there is a single genotype that is very resistant to powdery mildew (Compact) that can be recommended for powdery mildew resistance improvement programmes.

Table 1.

Results concerning powdery mildew resistance in the studied winter oats collection (Timişoara, average of the years 2006-2008)

Nr.	Genotype	Average grade	Percentage compared to the control	Difference to the control	Significance
0	1	2	3	4	5
1.	Florina (mt.)	2.66	100.0	0.00	Control
2.	Norline	3.33	125.0	0.67	-
3.	Arlingthon	3.00	112.5	0.34	-
4.	Blamouth	2.33	87.5	-0.33	-
5.	CI 1908	3.33	125.0	0.67	-
0	1	2	3	4	5
6.	Cimarron	3.00	112.5	0.34	-
7.	Crater	3.66	137.5	1.00	-
8.	Earlygrain	3.33	125.0	0.67	-
9.	Excel	3.00	112.5	0.34	-
10.	Fergushon	3.00	112.5	0.34	-
11.	Fulwood	3.33	125.0	0.67	-
12.	Jeferson	2.66	100.0	0.00	-
13.	Le Conte	3.00	112.5	0.34	-
14.	Nortex	4.00	150.0	1.34	*
15.	Suergrain	2.00	75.0	-0.66	-

16.	Thonson	2.00	75.0	-0.66	-
17.	Walken	2.66	100.0	0.00	-
18.	Compact	1.33	50.0	-1.33	0
19.	Pennwin	2.33	87.5	-0.33	-
20.	2288	2.00	75.0	-0.66	-
21.	3378	3.33	125.0	0.67	-
22.	834-4-1-3	2.33	87.5	-0.33	-
23.	3412	2.66	100.0	0.00	-
24.	S Dak 40	2.66	100.0	0.00	-
25.	3868	4.00	150.0	1.34	*
26.	Cocker 41-51	2.33	87.5	-0.33	-
27.	4444	2.00	75.0	-0.66	-
28.	4451	2.33	87.5	-0.33	-
29.	4458	4.00	150.0	1.34	*
30.	4472	4.33	162.5	1.67	*
31.	4475	2.00	75.0	-0.66	-
32.	4476	2.33	87.5	-0.33	-
33.	4477	3.33	125.0	0.67	-
34.	4478	2.00	75.0	-0.66	-
35.	4480	2.00	75.0	-0.66	-
36.	4482	4.00	150.0	1.34	*
37.	4483	3.33	125.0	0.67	-
38.	4484	3.33	125.0	0.67	-
39.	4488	3.00	112.5	0.34	-
40.	4492	2.66	100.0	0.00	-
41.	5029	2.33	87.5	-0.33	-
42.	5032	2.33	87.5	-0.33	-
43.	Marrettos Anderson	3.00	112.5	0.34	-
44.	8276	2.33	87.5	0.33	-
45.	PA 522-7	2.66	100.0	0.00	-
46.	PA 522-23	3.33	125.0	0.67	-
47.	PA 621-3274	3.33	125.0	0.67	-
48.	PA 724-2580	2.33	87.5	-0.33	-
49.	PA 725-2154	4.00	150.0	1.34	*
50.	PA 725-4743	2.66	100.0	0.00	-
51.	PA 725-4787	3.00	112.5	0.34	-
52.	PA 725-6113	3.33	125.0	0.67	-
53.	PA 822-818	2.33	87.5	-0.33	-
54.	ARK 0151-61	2.66	100.0	0.00	-
55.	AR 104-18	2.66	100.0	0.00	-
56.	Marys Quest	2.33	87.5	-0.33	-
57.	Wodan	2.66	100.0	0.00	-
58.	Gospodarski 48	2.33	87.5	-0.33	-
59.	5183	2.66	100.0	0.00	-
60.	Tripolis	2.33	87.5	-0.33	-
61.	Krusevac	2.00	75.0	-0.66	-
62.	Boer	2.33	87.5	-0.33	-
63.	Algerian	2.33	87.5	-0.33	-
64.	Mirabel	3.66	137.5	1.00	-
0	1	2	3	4	5
65.	Gerald	2.00	75.0	-0.66	-
66.	Nuptiale	2.33	87.5	-0.33	-
67.	Solva	2.66	100.0	0.00	-
68.	Valiant	2.00	75.0	-0.66	-
69.	Barra	2.00	75.0	-0.66	-
70.	Carie	2.33	87.5	-0.33	-
71.	Krypton	2.33	87.5	-0.33	-
72.	Chamois	2.00	75.0	-0.66	-
73.	Emperor	4.66	175.0	2.00	**
DSL 5% = 1.32; DL 1% = 1.77; DL 0.1% = 2.32					

CONCLUSIONS

1. Powdery mildew is a very frequent disease in oats. In winter oats, the attack by powdery mildew is less damaging due to the fact that the plants are in advanced vegetation at the time of the attack.

2. Comparing the attack by powdery mildew during the three experimental years, we can see that the disease was less damaging in 2006 and more spread in 2007 and 2008. The behaviour of the genotypes compared to the control was constant during the three experimental years.

3. In the studied collection, over 2/3 of the genotypes are medium resistant, the average of the grades ranging between 1 and 3. A single genotype recorded an average grade above 4.

4. Only the Compact cultivar showed a better resistance compared to the cultivar Florina (medium resistant). The following genotypes were graded significant grades: Nortex, 3868, Cocker 41-51, 4458, 4472, PA 725-2154, while the cultivar Emperor is significantly more sensitive than the control

5. The cultivar Compact can be recommended as a genitor for powdery mildew resistance improvement programmes.

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MONITORING OF POTATO QUARANTINE BACTERIA

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Key words: organism, quarantine, monitoring, measures

ABSTRACT

The culture of potato is very important for Romania, due to the fact that it is covering about 250 000 hectares, and is easily susceptible of being infected by some quarantine organisms.

The phytosanitary legislative framework for potatoes was harmonized with UE legislation by transposing the basic Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community and the control Directives on Clavibacter michiganensis ssp. sepedonicus, Ralstonia solanacearum, Globodera spp. and Synchytrium endobioticum.

An yearly potato monitoring program was implemented in Romania since 2003, aiming at establishing the presence or absence of the following quarantine organisms : Clavibacter michiganensis ssp. sepedonicus, Ralstonia solanacearum, Globodera rostochiensis , G. pallida, Meloidogyne chitwoodi, M. fallax, Ditylenchus destructor, Synchytrium endobioticum , Tomato spotted wilt virus, Potato stolbur mycoplasm, Potato spindle tuber viroid. This monitoring program concerns both the national potatoes production and the imported potatoes.

As a result of this monitoring program, the first outbreak of Clavibacter michiganensis ssp. sepedonicus was registered in Romania in 2004, as well as some potatoes lots infected by Ralstonia solanacearum imported from Egypt. The quarantine bacteria on potato represent the aim of this study

The phytosanitary measures for the control of potato's quarantine bacteria are in accordance with EU provisions in the field, and have as purpose to prevent the introduction of quarantine pests into Romania and to limit their dissemination.

The status of the main potatoes quarantine bacteria in Romania is the following: Clavibacter michiganensis ssp. sepedonicus – present, restricted distribution; Ralstonia solanacearum – absent.

INTRODUCTION

In Romania, potatoes are cultivated on about 250.000 ha. The most suitable areas are in the centre and north - east part of country, but potatoes are cultivated in almost all the Romanian regions. The Ministry of Agriculture, Forests and Rural Development, through the Phytosanitary Department, is the only central authority for the coordination activity and contacts in matters related to the plant health within the context of Council Directive 2000/29.EC. Together with the County Phytosanitary Units (42), laboratories network and border inspection points (8) it is as well the responsible official body in charge with the implementation of the national legislation in the plant health sector, harmonized with the EU legislation.

The laboratories network, specialized in the detection and identification of quarantine bacteria on potatoes, consists of:

- one Central Laboratory for Phytosanitary Quarantine (responsible for diagnosis of harmful organisms through its five technical departments: entomology, nematology, mycology, virology and bacteriology);

- one regional laboratory for bacteriology (specialized in *Erwinia amylovora* and bacteria on potato).

LEGISLATIVE FRAMEWORK

In order to become an associate member of the EU, Romania adopted a new, harmonized legislation, which has improved the efficiency of the phytosanitary control, and is consisting in principal of:

- Government Ordinance no. 136/2000 on protective measures against the introduction into the Romania of organisms harmful to plant and plants products and against their spread within the Romania, harmonized with the Council Directive 2000/29/EEC, corroborated with the Government Decision no. 1030/2001 providing Methodological Norms for its enforcement (amended in 2003);
- Ministerial Order no. 2007/387 on the control of potato ring rot (harmonized with the Council Directive 2006/56/EEC);
- Ministerial Order no. 2007/586 on the control of *Ralstonia solanacearum* (harmonized with the Council Directive 2006/63/ EEC);

The above legislation nominates the authorities responsible for the application of the regulation (Phytosanitary Department, County Phytosanitary Units and Central Laboratory for Phytosanitary Quarantine), and establishes preventive and containment measures to be applied when outbreaks are registered, taking into observation the regions infected or infested by the quarantine organisms.

MONITORING OF HARMFUL BACTERIA

Starting in 2003, Ministry of Agriculture, Forests and Rural Development has set up yearly monitoring programs, having as main objective to establish the status of harmful organisms on potatoes.

In the monitoring program was also set up a method for monitoring of the rivers and wastes for detecting *Ralstonia solanacearum.*

The monitoring action was taken in accordance with the requirements and methods of the EU, as specified in the national phytosanitary regulations. Inspections were done both on the national production and imported potatoes, taking one sample of 200 tubers/ 25 tones. Most such samples were tested in the Central Laboratory for Phytosanitary Quarantine, while about 30% of the national ware potatoes samples have been analyzed by the regional laboratory for bacteriology in Bacau city.

The positive or doubtful results registered by the regional laboratory were confirmed by the Central Laboratory for Phytosanitary Quarantine.

After the first identification of *Ralstonia solanacearum* on ware potato originating from Egypt, the Ministry of Agriculture, Forests and Rural Development decided to block all potatoes imported from Egypt at the border, until the Immunofluorescence tests confirmed that the potatoes were free to be imported.

Phytosanitary inspection for imported plants and plants products is carried out in BIPs established by the Ministry of Agriculture, Forests and Rural Development, organized at the border points. For assuring a unitary system of working in the territory, a “Fiche of phytosanitary inspection” has been elaborated, and all inspectors make use of the same documents (inspection fiche, reports).

For this monitoring program, a reporter responsible with centralization of the dates regarding the national results was appointed.

LABORATORY METHODS

In diagnosis, internationally recognized methods for the detection and identification of quarantine organisms are used, such as:

- Immunofluorescence test
- Polimerase Chain Reaction

- isolation on culture media,
- biochemical tests,
- and pathogenicity tests for identification of *Ralstonia solanacearum* and *Clavibacter michiganensis* ssp. *sepedonicus* to potatoes (methods described in Ministerial Order no. 2007/387 and Ministerial Order no. 2007/586)

THE RESULTS OF THE IMPLEMENTATION OF THIS SYSTEM

During the six seasons of monitoring the total number of analyzed samples, various results were obtained.

Refering to the internal production it was registered a decrease in the number of seed potato samples in 2008-2009 as compared with 2003-2004 and an increase of the number of ware potato samples in the last season (2008-2009), in comparison with the first one (2003-2004). This fact is explained by the decrease of the cultivated surface of the seed potato. The increase of the number of ware potato samples was based on the increase of the number of samples in area infected with *Clavibacter michiganensis* ssp. *sepedonicus* and was due to the increase of the import of ware potato on risk channels. (see fig. 1 & 2).

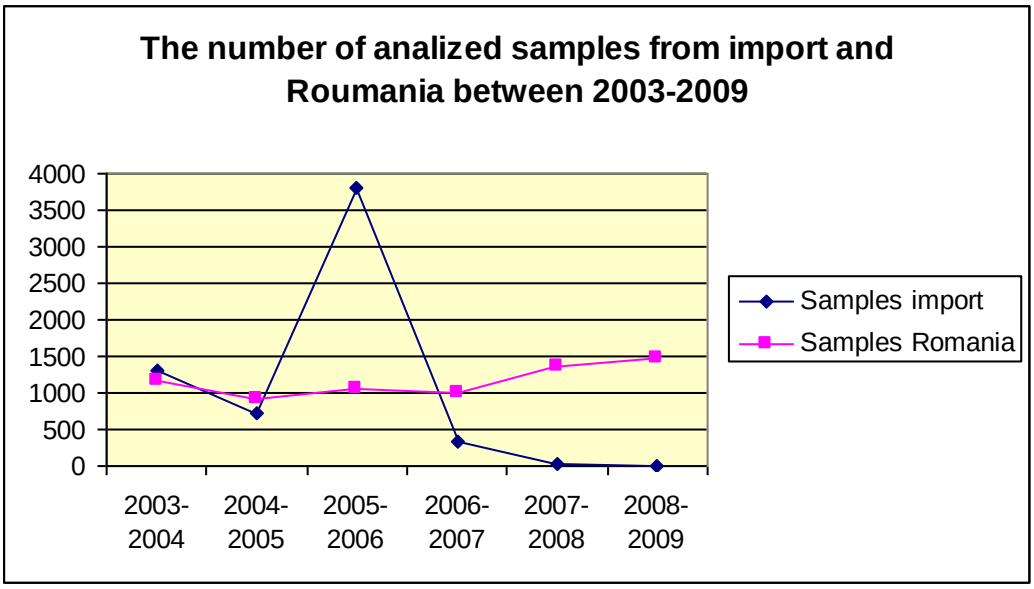

Fig.1 The number of analyzed samples from import and Romania

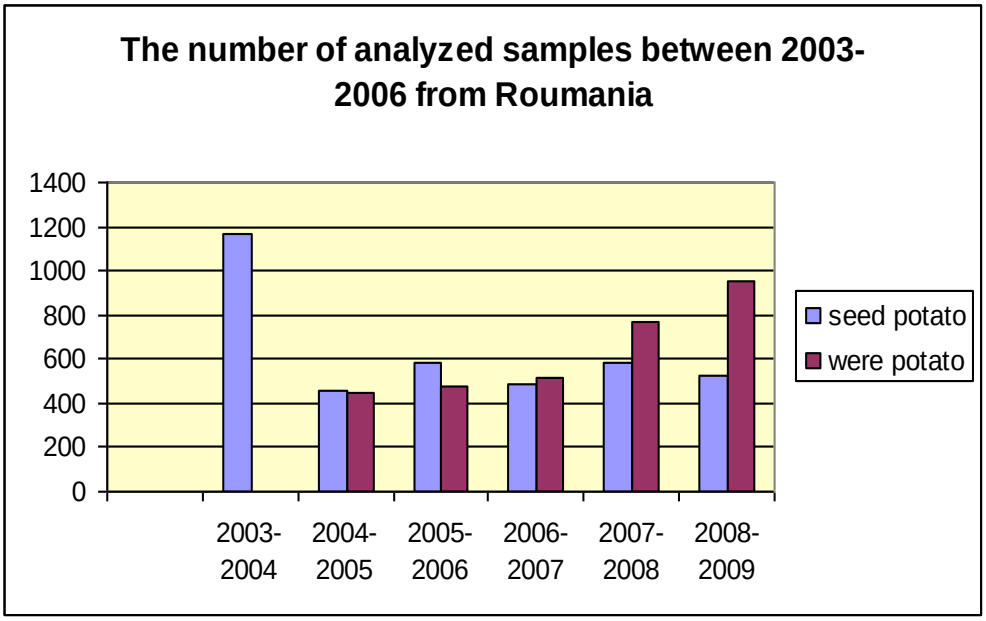

Fig.2 The number of analyzed samples from Romania

Related to the internal production, starting with 2003 a total of 7071 potato tuber samples (3810 seed potato and 3161 ware potato) were analyzed . The results of analyses confirmed the presence of *Clavibacter michiganensis* ssp *sepedonicus* on tubers.

Referring to the results of analyses it was registered an increase of the number of positive ware potato sample in 2008-2009 in comparison with 2004-2005. The number of positive seed potatoes samples was increased in 2007-2008 in comparation with the first monitoring season (2003-2004), bat was registered a decrease the number of positive samples in the last season (2008-2009). (see fig. 3)

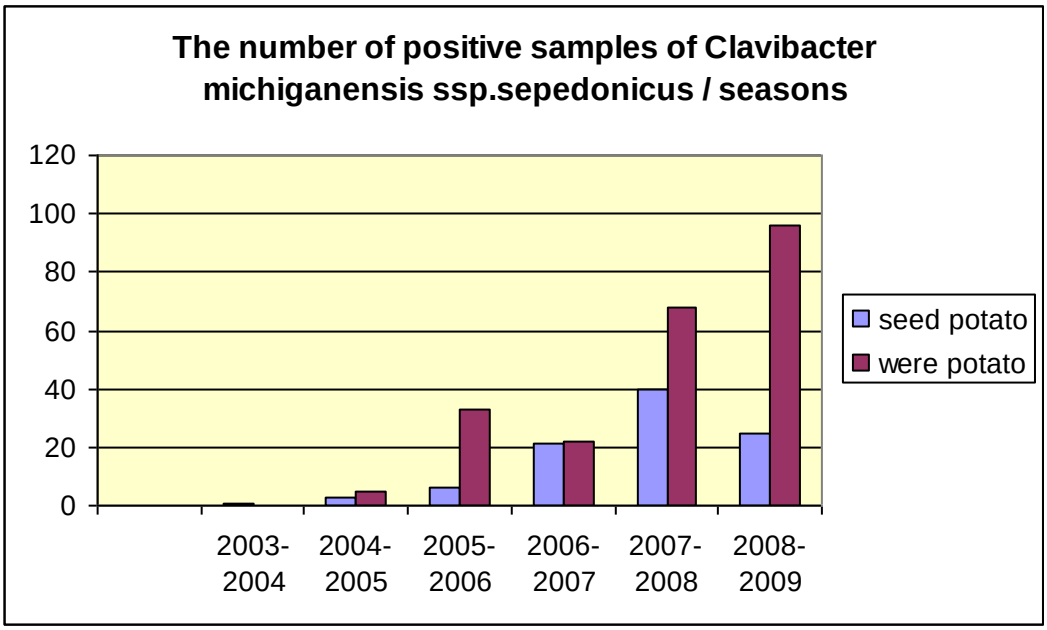

Fig. 3 The number of positive samples of Clavibacter michiganensis ssp. sepedonicus

From the import tubers made between 2003-2009, were analyzed in total 6216 potato samples from witch 1981 seed potato samples and 4235 ware potato samples.

The results of analyses confirmed the presence of *Ralstonia solanacearum* on a total of 39 ware potato samples from Egypt.

The number of positive ware potato samples decreased in 2005-2006 as compared with 2003-2004. (see fig. 4)

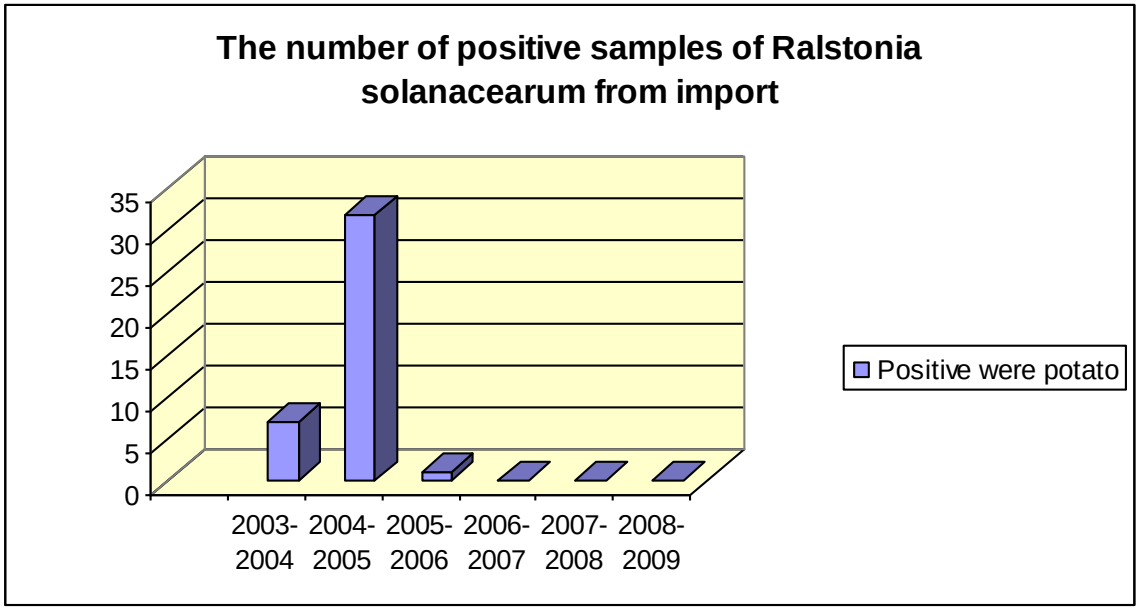

Fig. 4 The number of positive samples of Ralstonia solanacearum

The quarantine organisms *Ralstonia solanacearum*, have not been found on potato during the monitoring on the Romanian territory.

CONCLUSIONS

As a result of this monitoring program the first outbreak of *Clavibacter michiganensis* ssp. *sepedonicus* was registered in Romania (in 2004), as well as some infected potatoes lots by *Ralstonia solanacearum* from Egypt. The phytosanitary measures related to the control of potatoes quarantine organisms are applied according to EU provisions and have as purpose the limitation of dissemination and the prevention of introduction of quarantine pests into Romania.

The status of the main potatoes quarantine bacterria in Romania is the following: *Clavibacter michiganensis* ssp. *sepedonicus* – present, restricted distribution; *Ralstonia solanacearum* - absent;

The quarantine measures apply according to provisions of the phytosanitary legislation in force, in case of quarantine organisms on potato present in Romania, are based on scheduling contaminated areas and specific measures are applied for the limitation of the dissemination of the respective organisms.

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CONTRIBUTIONS TO KNOWLEDGE OF SPECIES COLEOPTERE RAPESEED CROP

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Key words: coleoptere, rape crops, pests, pathogens

ABSTRACT

Observations were made in 2008 in a culture of rape Rotbav town, Brasov County. To collect material traps were used to soil type Barber, who were placed in number 12, in two versions

- V1 - rape samulastră from where there was no chemical treatment to pathogens and pests.

-V2 - rape cultivation, where there were usually treatments to combat pathogens and pests. In June, the two variants were made every 4 collection of material collected in traps at the following date: 3.06.2008, 9.06.2008, 17.06.2008 and 14.06.208. entomological collection of material were retained species coleoptere which were then determined.

After determining there was a presence of 42 species coleoptere two variants, of which 21 species were common. The species most commonly collected and the largest number of specimens collected were: Pterostichus cupreus L., Brachynus crepitans L., Phyllotreta atra F, Amara eurynata Harpalus distinguendus Duft., Cicindela Germany Phyllotreta nemorum L. and L.

INTRODUCTION

In Romania, the total losses from the attack of pathogens, pests and weeds is raised annually at 2.5-3 billion dollars, that is several times greater than the amount required for the purchase of plant protection products, including the cost of treatment works for performance . As with other cultures and the culture of rape is attacked by a number of pests, causing major damage. Culture autumnal rape charge large areas especially in areas with lower temperature, where replaced sunflower (Poland, Germany, England, Scandinavian countries etc.. (Arion, 1957; Balachowschi, Mesnil, 1935-1936, Knechtel, 1951; Manolache and al., 1946-1957, 1969). In our country, although has a long tradition, being cultivated since the first decades of the last century, this culture recorded in recent years reveniment strong, so now some areas exceeding 100,000 ha annually (Baicu, 1982, Panini, 1951; Barbulescu et al., 1993, 2002; Boguleanu, 1980; Hulea et al. 1975; Radulescu et al., 1973, Savulescu et al., 1982; Sin, 2000; Sandru , 1996). Follow the progress achieved in the process of improvement by obtaining varieties whose oil content to 40% and protein in skimmed şroturile, 40% and with a low erucic acid, rapeseed has become from an industrial plant forage, an important plant food. Both because of its many industrial uses, but many agronomic advantages, rape is considered a valuable crop, easily established and marketed, but also some problems with protection, particularly caused by pests (Manolache, Boguleanu, 1978; Paulian, Iliescu, 1973; Paulian et al., 1974; Perju et al., 1976, Popov 2003).

MATERIAL AND METHOD

Observations were made in 2008 in a culture rape of Rotbav town, Brasov County. To collect material were used to trap soil Barber, who were placed in number 12 in two variants:

V1 - samulastră from rape where there was no chemical treatment or the seed or during the growing season.

V2 - rape cultivation, where they applied all links of the technology culture of the plant, harvesting the material from traps was done during the month of June the number 4 in both, the following dates: 3.06.2008, 9.06.2008, 14.06.208 and 17.06.2008. Of the material collected were retained species coleoptere which were then kept for a period of time in an alcohol concentration of about 12%. Following the identification of species coleoptere has reached the following results.

RESULTS OBTAINED

The results of untreated variant (Table 1), each of the 4 entomological collection of the material, the situation is as follows:

- Take the collection, which was made on 3.06.2008 were collected from 134 specimens belonging to coleoptere numnăr one of the 22 species. The species with the highest number of specimens collected were: Pterostichus cupreus L. (32 copies), Brachynus crepitans L. (38 copies), Harpalus distinguendus Duft. (27 copies) and L. Ophonus Azureus (7 copies). A total of 7 species had a single copy. They were Gastroidea polygone L. Ceuthorrhynchus pallinarius, SITON lineatus, Baris chlorizaus, Meligethes aeneus F., Phyllotreta atra F., cockchafer violaceus L., Longitarsus talidus F., F. Tanymechus palliatus and Microlestes maurus.

- The collection II, which was made on 9.06.2008, were collected in total 64 specimens belonging to a number of 13 species. The species with the highest number of specimens collected were Brachynus crepitans L. (28 specimens), Harpalus distinguendus Duft (9 copies) and Phyllotreta atra F. (6 copies). 4 A number of species had a single copy. They were Psilliodes chrysocephala L. Pseudophonus rufipes De Geer., Harpalus laevicollis and Amara familiaris Duft.

- The collection of III made on 17.06.2008, were collected from 73 specimens belonging to coleoptere a number of 14 species. The largest number of copies they have had species: Phyllotreta atra F. (41 copies), Pterostichus cupreus L. (13 copies) and Phyllotreta nemorum L. (5 copies). Other species had between 1 and 2 copies.

- The collection IV, which was conducted on 24.06.2008, were collected 101 specimens belonging to a number of 18 species. The species with the highest number of specimens collected were: Pterostichus cupreus L. (42 copies), Cicindela L. Germany (15 copies); Bracynus crepitans L. (13 copies); Phyllotreta atra F. (8 copies). The other species had between 1 and 4 copies.

When treated variant (Table 2) to each of the 4 entomological collection of the material, the situation is as follows:

- Take the collection, which was made on 3.06.2008 were collected 281 samples of coleoptere belonging to a number of 17 species. The biggest number of collected specimens they had species: Pterostichus cupreus (178 copies), Brachynus crepitans (51 copies), Amara eurynata (13 copies) Harpalus aeneus (10 copies) and F. Ophonus Azureus (7 copies). The other species had between 1 and 5 copies.

- The collection II, which was made on 9.06.2008, were collected in total 235 specimens belonging to a number of 24 species. The species with the highest number of specimens collected were Pterostychus cupreus L. (124 copies), Phyllotreta atra (37 copies) and Brachynus crepitans L. (19 copies). The other species had between 1 and 7 copies.

- The harvesting III, which was conducted on 17.06.2008, were collected 169 samples of coleoptere belonging to 14 species. The largest number of copies they have had species: Pterostichus cupreus L. (99 copies), Amara eurynata (27 copies) and Phyllotreta nemorum L. (9 copies)

- the collection IV, which was conducted on by 24.06.2008, were collected 50 samples of coleoptere belonging to a number of 14 species. The species with the highest number of specimens collected were: Pterostichus cupreus L. (16 copies) and Amara eurynata (12 copies).

Table no. 1

Structure, dynamics and abundance of species of beetles in oilseed rape crops untreated

No.	Harvest date	Name of species	No.of exemplares/catch						No.of exemplares./ species	No.of exemplares./ species
			1	2	3	4	5	6		
1	3.06.2008	1.Harpalus distinguendus Duft	1	8	6	9	2	1	27	134
		2. Gastroidea polygoni L.	1	-	-	-	-	-	1	
		3.Ceuthorrynchus pollinarius	1	-	-	-	-	-	1	
		4. Sitona lineatus L.	1	-	-	-	-	-	1	
		5. Baris chlorizans Germ.	1	-	-	-	-	-	1	
		6. Pterostichus cupreus L.	-	3	12	4	5	8	32	
		7. Amara eurynata Panz	-	2	-	-	-	-	2	
		8.Ophonus azureus F.	-	3	1	-	3	-	7	
		9. Harpalus laevicollis	-	3	-	-	-	-	3	
		10.Bembidion properans Stef.	-	1	-	-	-	1	2	
		11.Brachynus crepitans L.	-	-	6	12	4	16	38	
		12.Pterostichus vulgaris L.	-	-	1	-	-	1	2	
		13.Meligethes aeneus F.	-	-	1	-	-	-	1	
		14.Psylliodes chrysocephala L.	-	-	1	-	-	1	2	
		15.Phyllotreta atra F.	-	-	1	-	-	-	1	
		16.Staphylinis spp.	-	-	-	1	-	1	2	
		17.Amara familiaris Duft.	-	-	-	2	-	1	3	
		18.Opatrum sabulosum L.	-	-	-	1	-	2	3	
		19.Carabus violaceus L.	-	-	-	2	-	-	2	
		20.Longitarsus talidus F.	-	-	-	-	-	1	1	
		21.Tanymecus palliatus F.	-	-	-	-	-	1	1	
		22.Microlestes maurus	-	-	-	-	-	1	1	
2	9.06.2008	1.Cicindela germanica L.	2	-	-	-	-	3	5	64

		2. Brachynus crepitans L.	1	1	2	12	-	12	28	
		3. Psylliodes chrysocephala L.	1	-	-	-	-	-	1	
		4. Anisodactylus signatus Panz.	-	1	-	1	-	-	2	
		5. Amara eurytoma Panz.	-	1	-	-	-	1	2	
		6.Pseudophonus rufipes De Geer	-	1	-	-	-	-	1	
		7. Harpalus distinguendus Duft	-	-	1	6	-	2	9	
		8. Harpalus laevicollis	-	-	1	-	-	-	1	
		9. Amara familiaris Duft.	-	-	1	-	-	-	1	
		10. Phyllotreta atra F.	-	-	-	5	1	-	6	
		11.Phyllotreta nemorum L.	-	-	-	2	-	1	2	
		12. Pterostichus vulgaris L.	-	-	-	1	-	1	2	
		13. Pterostichus cupreus L.	-	-	-	-	-	4	4	
3	17.06.2008	1.Pterostichus cupreus L.	2	9	-	-	-	2	13	73
		2.Cicindela germanica L.	1	-	1	-	-	-	2	
		3. Psylliodes chrysocephala L.	2	-	-	-	-	-	2	
		4. Meligethes aeneus F.	1	-	-	-	-	-	1	
		5. Dermestris frischi Kugel	-	1	-	-	-	-	1	
		6. Tanymecus palliatus F.	-	-	1	-	-	-	1	
		7. Phyllotreta atra F.	-	-	5	27	-	9	41	
		8. Dolichus chalensis Schall	-	-	-	1	-	-	1	
		9. Athous sacheri	-	-	1	-	-	-	1	
		10. Phyllotreta nemorum L.	-	-	-	5	-	-	5	
		11. Pterostichus vulgaris L.	-	-	-	-	-	2	2	
		12. Harpalus distinguendus Duft	-	-	-	-	-	2	2	
		13. Pseudophonus rufipes De Geer	-	-	-	-	-	1	1	
		14.Brachinus prophia Serv.	-	-	-	-	-	1	1	
4	24.06.2008	1.Cicindela germanica L.	1	8	4	1	-	1	15	101
		2.Sciaphobus squalidus	1	-	-	-	-	-	1	
		3.Phyllotreta atra F.	1	2	5	-	-	-	8	
		4.Phyllotreta	1	2	-	-	-	-	3	

		nemorum L.								
		5.Pterostichus cupreus L.	-	18	2	8	1	13	42	
		6.Dermestris frischi Kugel	-	2	2	-	-	-	4	
		7. Brachynus crepitans L.	-	3	3	-	-	7	13	
		8. Longitarsus tabidus F.	-	2	-	-	-	-	2	
		9. Meligethes aeneus F.	-	-	1	-	-	-	1	
		10.Bothynoderes punctiventris	-	-	1	-	-	-	1	
		11. Amara eurynata Panz	-	-	1	-	-	-	1	
		12. Staphylinis spp.	-	-	-	1	-	-	1	
		13. Harpalus distinguendus Duft	-	-	-	2	-	-	2	
		14. Harpalus laevicollis	-	-	-	3	-	-	3	
		15. Athous sacheri	-	-	-	-	-	1	1	
		16. Dolichus chalensis Schall	-	-	-	-	-	1	1	
		17. Pterostichus vulgaris L.	-	-	-	-	-	1	1	
		18. Pseudophonus rufipes De Geer	-	-	-	-	-	1	1	
Total										372

Table no. 2

Structure, dynamics and abundance of species of beetles in oilseed rape crops treated

No.	Harvest date	Name of species	No.of exemplares/catch						No.of exemplares./ species	No.of exemplares./ harvest
			1	2	3	4	5	6		
1	3.06.2008	1. Pterostichus cupreus L.	5	70	9	18	48	28	178	281
		2. Amara eurynata Panz.	1	-	5	5	-	2	13	
		3. Silpha carinata	1	-	-	-	-	-	1	
		4. Brachynus crepitans L.	-	32	6	5	5	3	51	
		5. Tanymecus dilaticollis F.	-	1	-	-	-	-	1	
		6. Harpalus aeneus Panz.	-	-	2	1	5	2	10	
		7. Ophonus azureus F.	-	-	5	-	-	2	7	
		8. Ceuthorrynchus quadridens	-	-	1	-	-	-	1	
		9. Harpalus distinguendus Duft	-	-	-	2	3	-	5	
		10.Tanymecus palliatus F	-	-	-	1	-	1	2	
		11. Pterostichus	-	-	-	-	1	2	3	

		vulgaris L.								
		12.Opatrum sabulosum L.	-	-	-	2	-	-	2	
		13. Bembidion properans Stef.	-	-	-	-	1	-	1	
		14. Epicometis hirta Poda	-	-	-	-	-	1	1	
		15.Amara crenata Dejean	-	-	-	-	-	2	2	
		16.Leptinotarsa decemlineata Say	-	-	-	-	-	1	1	
		17. Psylliodes chrysocephala L.	-	-	-	-	-	2	2	
2	9.06.2008	1. Tanymecus palliatus F	1	-	-	-	-	-	1	235
		2. Microlestis maurus	1	-	-	-	-	-	1	
		3. Otiorrhynchus raucus F.	1	-	-	1	-	-	2	
		4. Phyllotreta nemorum L.	1	-	3	-	-	-	4	
		5. Longitarsus tabidus F.	-	-	-	-	-	1	1	
		6. Phyllotreta atra F.	31	-	6	-	-	-	37	
		7. Baris chlorizans Germ.	5	1	-	-	-	1	7	
		8. Pterostichus nigrita F.	1	1	-	-	-	-	2	
		9. Apion violaceus Kirby	1	-	-	1	-	-	2	
		10. Pterostichus cupreus L.	-	50	2	4	9	59	124	
		11. Harpalus distinguendus Duft	-	3	-	-	-	3	6	
		12.Harpalus aeneus F.	-	2	-	-	4	-	6	
		13.Brachynus crepitans L.	-	3	1	3	3	9	19	
		14. Notiophylus palustris Duft.	-	1	-	-	-	-	1	
		15. Amara eurynota Panz.	-	3	1	1	2	-	7	
		16.Ophonus puncticollis Payk	-	2	-	-	-	-	2	
		17. Psylliodes chrysocephala L.	-	-	1	-	-	-	1	
		18. Bembidion properans Stef.	-	-	2	-	-	-	2	
		19. Ophonus azureus F.	-	-	-	1	-	1	2	
		20. Harpalus calceatus Dej.	-	-	-	2	-	-	2	
		21. Pterostichus vulgaris L.	-	-	-	1	-	-	1	
		22. Linus ascari	-	-	-	-	2	1	3	
		23. Dorcadium	-	-	-	-	-	1	1	

		fulvum								
		24.Silpha carinata	-	-	-	-	-	1	1	
3	17.06.2008	1. Phyllotreta atra F.	5	-	-	-	-	-	5	169
		2. Phyllotreta nemorum L.	4	3	-	-	2	-	9	
		3. Meligethes aeneus F.	1	-	-	-	-	-	1	
		4. Pterostichus cupreus L.	-	55	19	9	10	6	99	
		5. Pterostichus nigrita F.	-	1	-	-	-	-	1	
		6. Amara eurynota Panz.	-	5	12	-	8	2	27	
		7. Linus ascari	-	2	-	-	-	-	2	
		8. Pterostichus vulgaris L.	-	-	2	-	-	2	4	
		9. Harpalus distinguendus Duft	-	-	2	-	2	-	4	

A total of 7 species had a single copy. Two variants (untreated and treated) (Table 3) during the observations were collected copies of coleoptere belonging to a number of 42 species. Of these, a total of 21 species were present in both. In variant 1 were collected 31 species while in variant II were collected from 34 species.

Table 3

Structure and abundance of collected species at coleoptere three harvesting and the two variants

No.	Species Name	Variant untreated	Treated
1	Harpalus distinguendus Duft.	40	17
2	Gastroidea polygoni L.	1	-
3	Ceuthorrynchus pollinarius	1	-
4	Sitona lineatus L.	1	1
5	Baris chlorizans Germ.	1	8
6	Pterostichus cupreus L.	91	417
7	Amara eurynata Panz	5	59
8	Ophonus azureus F.	7	9
9	Harpalus laevicollis	7	2
10	Bembidion properans Stef.	2	3
11	Brachynus crepitans L.	79	75
12	Pterostichus vulgaris L.	7	7
13	Meligethes aeneus F.	3	2
14	Psylliodes chrysocephala L.	4	3
15	Phyllotreta atra F.	56	45
16	Staphylinis spp.	3	-
17	Amara familiaris Duft.	4	1
18	Opatrum sabulosum L.	3	2
19	Carabus violaceus L.	2	-
20	Longitarsus talidus F.	3	2
21	Tanymecus palliatus F.	2	3
22	Microlestes maurus	1	-
23	Cicindella germanica L.	22	7
24	Anisodactylus signatus Panz.	2	-
25	Pseudophonus rufipes De Geer	3	-
26	Phyllotreta nemorum L.	10	17

27	Dermestris frischi Kugel	5	-
28	Dolichus chalensis Schall	2	-
29	Athous sacheri	2	1
30	Brachinus prophia Serv.	1	-
31	Bothynoderes punctiventris	1	-
32	Silpha carinata	-	2
33	Tanymecus dilaticolis	-	2
34	Amara crenata Dejean	-	7
35	Leptinotarsa decemlineata Say	-	1
36	Otiorrhynchus raucus F.	-	2
37	Pterostichus nigrita F.	-	5
38	Apion violaceus Kirby	-	2
39	Harpalus calceatus Dej.	-	2
40	Linus ascari	-	5
41	Dorcadium fulvum	-	1
42	Amara apricana Payk	-	1
Total		372	735

The species with the highest number of specimens collected and were the most common, the two variants were (Table 4): Pterostychus cupreus L. with 91 copies of the variant and 75 untreated specimens from treated variant, Amara eurynota 5 specimens from untreated and 59 variant copies of the variant treated: Harpalus distinguendus Duft., 40 copies of the variant and 17 untreated specimens from treated variant; Cicindela L. Germany, with 22 copies of the variant untreated and 7 copies in variant treated; Phyllotreta nemorum L., with 10 copies of the variant and 17 untreated specimens from treated variant.

Table 4

Coleoptere abundance of species most commonly found in crops of rape in the two variants

No.	**Species Name**	Variant untreated	treated
1	Pterostichus cupreus L.	91	417
2	Brachynus crepitans L.	79	75
3	Phyllotreta atra F.	56	45
4	Amara eurynata Panz	5	59
5	Harpalus distinguendus Duft.	40	17
6	Cicindella germanica L.	22	7
7	Phyllotreta nemorum L.	10	17

It must be emphasized that, contrary to expectations, the number of copies to be treated variant is sometimes higher than the untreated variant, sometimes there are very large differences, as when species Pterostichus cupreus L. species or if Amara eurynata canvases.

CONCLUSIONS

1. 2008 June 4 at the entomological collection of the material (3.06, 9.06, 17.06, 24.06) were collected 372 samples of untreated variant coleoptere to 735 copies and copies in variant treated.

2. In untreated variant, the 372 copies of coleoptere belong to a number of 31 species while in the variant treated coleoptere of 735 specimens belonging to 34 species.

3. A total of 21 species of coleoptere were common, being present in both.

4. The species with the highest number of specimens collected were: Pterostichus cupreus L., Brachynus crepitans L., Phyllotreta atra F., Amara eurynata canvases., Harpalus distinguendus Duft., Cicindela Germany L. and Phyllotreta nemorum L.

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SOME ASPECTS ON THE STRUCTURE AND ABUNDANCE OF SPECIES COLEOPTERE FOR RAPESEED CROP-AUTUMN

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Key words: coleoptere, rape crops, pests, treatments

ABSTRACT

Observations were made in 2008 rape crops in the National Institute for Research and Development for the cultivation of potatoes and sugar beet (INCDCSZ) Braşov, in two experimental variants: V1 - rape culture in which no treatments have been either chemical or seed during the growing season; V2 - rapeseed crops to which the chemical treatments to prevent and combat pests. Within each variant were used to collect material 6 traps each soil type Barber.

Of the material collected were retained species coleoptere which were then determined. The determinations made in version 1, untreated rape, it was found that the 271 copies of coleoptere belong to a number of 28 species, while in version 2 , where rape has been made in treatments during the growing season against pests were collected 411 samples of coleoptere belonging to 30 species. The species most commonly encountered in the two variants were: F. Phyllotreta atra, Phyllotreta nemorum L ., Meligethes aeneus F., Pterostichus cupreus L. and Amara eurynota Panza .. These species were also the highest number of copies. Uncommon species were Malachius bipustulatus L., Amara aenea De Geer, Harpalus laevicollis Heyden, Pterostichus vulgaris L., Baris chlorizans germ., Amara APRICARIA Payk., Amara familiaris Duft., Apion violaceum Kirby, Cantharis fusca L., Cantharis L. green, etc.

INTRODUCTION

In Romania, the total losses from the attack of pathogens, pests and weeds annually amounts to 2.5 - 3 billion dollars, that is several times greater than the amount required for the purchase of plant protection products, including the cost of treatment works for performance. As with other cultures and the culture of rape is attacked by a number of pests, causing major damage. autumnal rape culture occupies large areas especially in areas with lower temperature, where replaced sunflower (Poland, Germany, England, the Scandinavian etc.. (Arion, 1957; Balachowschi, Mesnil, 1935-1936, Knechtel, 1951; Manolache et al., 1946-1957, 1969). In our country, although has a long tradition, being cultivated since the first decades of the century Previously, this record crop in recent years reveniment strong, so now sometimes cultivated areas exceeding 100,000 ha annually (Baicu, 1982, Panini, 1951; Barbulescu et al., 1993, 2002; Boguleanu, 1980; Hulea et al . 1975; Radulescu et al., 1973, Savulescu et al., 1982; Sin, 2000; Sandru, 1996). Follow the progress achieved in the process of improvement by obtaining varieties whose oil content to 40% and protein in degreased grists, 40% and with a low erucic acid, rapeseed has become, from a forage-plant industry, an important plant food. Both because of its many industrial uses, but many agronomic advantages, rape is considered a valuable crop, easily established and marketed, but with some protection problems, especially caused by pests (Manolache, Boguleanu, 1978; Paulian, Iliescu, 1973; Paulian et al., 1974; Perju et al., 1976; Popov, 2003).

MATERIAL AND METHOD OF RESEARCH

The material was collected from rape crops belonging to the National Institute of Research and Development for growing potatoes and sugar beet (INCDCSZ) Brasov, in 2008, in June, using Barber traps soil type. The used two experimental variants, one for each variant 6 traps so:

V1 - rape untreated diseases and pests during the growing season

V2 - rape to which treatments were common during the growing season, diseases and pests. During June 3 harvesting were conducted at each of the two variants, the following data:

- the collection I, on 9.06.2008 - the collection of-II, on 17/06/2008, - harvesting to III, on 24.06.2008. The material so collected was cleaned of plant debris were retained only beetle species that were then kept in a solution of alcohol about. 20% concentration.

After determining the species had the following results

RESULTS OBTAINED

Regarding harvesting situation, the two variants, it is:

- In variant 1 (Table 1) the first harvest, which was made on 9.06.2008, is the presence of 85 copies of coleoptere belonging to a number of 20 species. The species most commonly collected in this collection were Phyllotreta atra F., Pterostichus cupreus L., Harpalus distinguendus Duft. Phyllotreta nemorum L. and

- in the II of harvesting, which was conducted on 17.06.2008, were collected 136 samples of coleoptere belonging to a number of 11 species. The species most commonly collected in this collection were Phyllotreta atra F., Phyllotreta nemorum L., Meligethes aeneus F. Kugel and Dermestes frische.

- To the third harvest, which was conducted on 24.06.2008, were collected 50 samples of coleoptere belonging to a number of 13 species. The species most commonly collected were Phyllotreta atra F., Phyllotreta nemorum L., Pterostichus cupreus L. and Meligethes aeneus F..

- The first harvest table 2, which was made on 9.06.2008 were collected 266 samples of coleoptere, belonging to a number of 17 species. The species most commonly collected were Phyllotreta atra F., Phyllotreta nemorum L., Pterostichus cupreus L. and Meligethes aeneus F..

- In a collection II, which was conducted on 17.06.2008, have been collected a number of 75 copies of coleoptere belonging to 12 species. The species most commonly collected were Phyllotreta atra F., Phyllotreta nemorum L., Meligethes aeneus F. Panza and Amara eurynata ..

- The collection of III, which was conducted on 24.06.2008, have been collected a number of 70 copies of coleoptere belonging to 17 species. The species most commonly collected were Phyllotreta atra F., Phyllotreta nemorum L., Meligethes aeneus F. and Staphylinus spp.

Table no. 1

Structure and abundance of species of beetles collected (by harvesting) from untreated rapeseed variant

No.	Harvest date	Name of species	No.of exemplares/catch						No.of exemplares./ species	No.of exemplares./ harvest
			1	2	3	4	5	6		
1	9.06.2008	1. *Carabus violaceus* L.	1	-	-	-	-	-	1	85
		2. *Anisodactylus signatus* Panz.	1	-	-	-	-	-	1	
		3. *Harpalus aeneus* F.	1	-	-	-	-	1	2	
		4. *Oxythyrea funesta* Poda	1	-	-	-	-	-	1	
		5. *Harpalus distinguendus* Duft.	1	1	1	-	2	1	6	
		6. *Amara eurynota* Panz.	2	-	-	1	-	1	4	

		7. *Dermestes frischi* Kugel.	1	-	-	-	-	-	1	
		8. *Phyllotreta atra* F.	1	1	3	35	-	-	40	
		9. *Brachynus crepitans* L.	-	2	1	-	-	1	4	
		10. *Brachynus psophia* Serv.	-	1	-	-	1	-	2	
		11. *Bembidion properans* Steph.	-	1	-	1	-	-	2	
		12. *Coccinella 7-punctata* L.	-	-	1	-	-	1	2	
		13. *Peritelus familiaris* Boh.	-	-	1	-	-	-	1	
		14. *Leptinotarsa decemlineata* Say.	-	-	-	2	-	-	2	
		15. *Phyllotreta nemorum* L.	-	-	-	5	-	-	5	
		16. *Meligethes aeneus* F.	-	-	-	1	-	-	1	
		17. *Cymindis humeralis* Fourc.	-	-	-	1	-	-	1	
		18. *Microlestes maurus* Sturm.	-	-	-	1	-	-	1	
		19. *Pterostichus cupreus* L.	-	-	-	3	2	2	7	
		20. *Cicindela germanica* L.	-	-	-	-	-	1	1	
2	17.06.2008	1. *Meligethes aeneus* F.	2	1	3	3	-	3	12	136
		2. *Phyllotreta atra* F.	9	2	30	12	9	17	79	
		3. *Phyllotreta nemorum* L.	8	1	10	6	3	7	35	
		4. *Dermestes frischi* Kugel.	1	-	-	2	-	-	3	
		5. *Cicindela germanica* L.	-	1	-	-	-	-	1	
		6. *Ophonus azureus* F.	-	1	-	-	-	-	1	
		7. *Psylliodes chrysocephala* L.	-	-	1	-	-	-	1	
		8. *Psylliodes wrasei* Leonardi et Arnold	-	-	1	-	-	-	1	
		9. *Carabus violaceus* L.	-	-	-	-	-	1	1	
		10. *Malachius bipustulatus* L.	-	-	-	-	-	1	1	
		11. *Amara eurynota* Panz.	-	-	-	-	-	1	1	
3	24.06.2008	1. *Pterostichus cupreus* L.	3	2	1	-	-	-	6	50
		2. *Amara eurynota* Panz.	1	2	-	-	-	-	3	
		3. *Cymindis humeralis* Fourc.	1	-	1	-	1	-	3	
		4. *Meligethes aeneus* F.	1	-	1	3	1	-	6	

		5. *Amara aenea* De Geer	1	-	-	-	-	-	1	
		6. *Harpalus laevicollis* Heyden	-	1	-	-	-	-	1	
		7. *Phyllotreta atra* F.	-	1	3	3	2	3	12	
		8. *Phyllotreta nemorum* L.	-	-	2	1	4	4	11	
		9. *Pterostichus vulgaris* L.	-	-	1	-	-	-	1	
		10. *Staphylinus* spp.	-	-	2	1	1	-	4	
		11. *Galeruca pomonae* Scop.	-	-	-	-	1	-	1	
		13. *Psylliodes chrysocephala* L.	-	-	-	-	-	1	1	
TOTAL										271

Table no. 2

Structure and abundance of species of beetles collected (by harvesting) from rapeseed variant treated

No.	Harvest date	Name of species	No.of exemplares/catch						No.of exemplares./ species	No.of exemplares./ species
			1	2	3	4	5	6		
1	9.06.2008	1. *Phyllotreta atra* F.	25	20	4	43	30	48	170	266
		2. *Phyllotreta nemorum* L.	6	5	9	10	20	10	60	
		3. *Pterostichus cupreus* L.	6	4	-	-	1	-	11	
		4. *Harpalus aeneus* F.	1	1	-	-	-	-	2	
		5. *Dermestes frischi* Kugel.	1	1	-	-	-	-	2	
		6. *Amara eurynota* Panz.	1	1	-	2	-	-	4	
		7. *Carabus violaceus* L.	1	1	-	-	-	-	2	
		8. *Baris chlorizans* Germ.	-	1	-	-	-	-	1	
		9. *Tachyporus nitidulus* F.	-	1	-	-	-	-	1	
		10. *Leptinotarsa decemlineata* Say.	-	-	1	-	-	-	1	
		11. *Microlestes maurus* Sturm.	-	-	1	1	-	-	2	
		12. *Bembidion properans* Steph.	-	-	1	-	-	-	1	
		13. *Amara apricaria* Payk.	-	-	-	1	-	-	1	
		14. *Meligethes aeneus* F.	-	-	-	3	-	2	5	
		15. *Psylliodes chrysocephala* L.	-	-	-	1	-	-	1	
		16. *Amara familiaris* Duft.	-	-	-	-	1	-	1	
		17. *Apion*	-	-	-	-	-	1	1	

		violaceum Kirby								
2	17.06.2008	1. *Leptinotarsa decemlineata* Say.	1	-	-	-	-	-	1	75
		2. *Phyllotreta atra* F.	5	10	3	-	11	12	41	
		3. *Phyllotreta nemorum* L.	3	3	-	-	4	4	14	
		4. *Meligethes aeneus* F.	1	2	2	-	-	3	8	
		5. *Pterostichus cupreus* L.	1	-	-	-	-	-	1	
		6. *Coccinella 14-punctata* L.	1	-	-	-	-	-	1	
		7. *Brachynus crepitans* L.	-	1	-	-	-	-	1	
		8. *Cantharis livida* L.	-	-	1	-	-	-	1	
		10. *Amara eurynota* Panz.	-	-	-	5	-	-	5	
		11. *Harpalus aeneus* F.	-	-	-	1	-	-	1	
		12. *Athous hirtus* Herbst.	-	-	-	1	-	-	1	
3	24.06.2008	1. *Phyllotreta atra* F.	3	18	-	-	1	-	22	70
		2. *Phyllotreta nemorum* L.	2	8	-	-	-	-	10	
		3. *Meligethes aeneus* F.	3	4	-	-	-	-	7	
		4. *Tachyporus nitidulus* F.	1	-	-	-	-	-	1	
		5. *Amara eurynota* Panz.	1	-	-	-	1	2	4	
		6. *Cantharis fusca* L.	-	1	1	-	-	-	2	
		7. *Staphylinus* spp.	-	2	2	1	-	-	5	
		8. *Bembidion properans* Steph.	-	1	-	-	-	-	1	
		9. *Harpalus aeneus* F.	-	-	2	-	1	-	3	
		10. *Harpalus distinguendus* Duft.	-	-	1	-	1	-	2	
		11. *Cymindis humeralis* Fourc.	-	-	2	-	-	1	3	
		12. *Galeruca pomonae* Scop.	-	-	1	-	-	-	1	
		13. *Pterostichus cupreus* L.	-	-	-	1	-	3	4	
		14. *Agriotes lineatus* L.	-	-	-	1	-	-	1	
		15. *Athous sacheri* Kies.	-	-	-	1	-	-	1	
		16. *Ceuthorrhynchus obsoletus* Germ.	-	-	-	-	1	-	1	
		17. *Cicindela*	-	-	-	-	2	-	2	

		germanica L.								
TOTAL										411

In the comment period on the two variants (table 3) were collected 682 specimens belonging to a number of 41 species. Of the 41 species, a total of 18 species were common, being collected at the two variants. They were cockchafer violaceus L., Harpalus aeneus F., Harpalus distinguendus Duft. Amara eurynota canvases., Dermestes frische Kugel., Phyllotreta atra F., Brachynus crepitans L., Bembidion properans Steph., Leptinotarsa decemlineata Say., Phyllotreta nemorum L., Meligethes aeneus F., Cymindis humeralis Fourc., Microlestes maurus Sturm., Pterostichus cupreus L., germany Cicindela L. Psylliodes chrysocephala L., and Staphylinus spp, Galeruca pomonae Purp.

Table3

Structure and abundance of species collected from coleoptere rape crops in the two variants

No.	Species Name	Variant	
		Untreated rape	Treated rape
1.	Carabus violaceus L.	2	2
2.	Anisodactylus signatus Panz.	1	-
3.	Harpalus aeneus F.	2	6
4.	Oxythyrea funesta Poda	1	-
5.	Harpalus distinguendus Duft.	6	2
6.	Amara eurynota Panz.	8	13
7.	Dermestes frischi Kugel.	4	2
8.	Phyllotreta atra F.	131	233
9.	Brachynus crepitans L.	4	1
10.	Brachynus psophia Serv.	2	-
11.	Bembidion properans Steph.	2	2
12.	Coccinella 7-punctata L.	2	-
13.	Peritelus familiaris Boh.	1	-
14.	Leptinotarsa decemlineata Say.	2	2
15.	Phyllotreta nemorum L.	51	84
16.	Meligethes aeneus F.	19	20
17.	Cymindis humeralis Fourc.	4	3
18.	Microlestes maurus Sturm.	1	2
19.	Pterostichus cupreus L.	13	16
20.	Cicindela germanica L.	2	2
21.	Ophonus azureus F.	1	-
22.	Psylliodes chrysocephala L.	2	1
23.	Psylliodes wrasei Leonardi et Arnold	1	-
24.	Malachius bipustulatus L.	1	-
25.	Amara aenea De Geer	1	-
26.	Harpalus laevicollis Heyden	1	-
27.	Pterostichus vulgaris L.	1	-
28.	Tachyporus nitidulus F.	-	2
29.	Staphylinus spp.	4	5
30.	Galeruca pomonae Scop.	1	1
31.	Baris chlorizans Germ.	-	1
32.	Amara apricaria Payk.	-	1
33.	Amara familiaris Duft.	-	1
34.	Apion violaceum Kirby	-	1
35.	Coccinella 14-punctata L.	-	1
36.	Cantharis livida L.	-	1
37.	Athous hirtus Herbst.	-	1

38.	Cantharis fusca L.	-	2
39.	Agriotes lineatus L.	-	1
40.	Athous sacheri Kies.	-	1
41.	Ceuthorrhynchus obsoletus Germ.	-	1
	TOTAL	271	411

The species with the highest number of specimens collected at the two experimental variants were (Table 4) Phyllotreta atra F., Phyllotreta nemorum L., Meligethes aeneus F., Pterostichus cupreus L. and Amara eurynota Panza.

Table 4

Coleoptere abundance of species most commonly found in crops of rape in the two variants

No	Species Name	Variant untreated	trated
1.	Phyllotreta atra F.	131	233
2.	Phyllotreta nemorum L.	51	84
3.	Meligethes aeneus F.	19	20
4.	Pterostichus cupreus L.	13	16
5.	Amara eurynota Panz.	8	13

What should be noted is that all species had a frequency and a large number of copies compared with other species, the highest number of specimens were collected from the version where there were chemical treatments.

CONCLUSIONS

1. In 2008, June 3 were harvesting the species coleoptere, using traps soil type Barber. Collections were made at the following dates: 9.06.2008, 17.06.2008 and 24.06.2008.

2. La version "rape untreated were collected 271 specimens belonging to a number of 28 species, while the variant treated were collected 411 samples of coleoptere belonging to 30 species.

3. The species most commonly collected and the highest number of copies were Phyllotreta atra F., Phyllotreta nemorum L., Meligethes aeneus F., Pterostichus cupreus L. and Amara eurynota Panza .

4. Noteworthy is that all species were larger in variant treated with the other variant, variant untreated.

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AGRICULTURAL ECOSISTEMS AND THE ENVIRONMENT POLLUTION ISSUE

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Key words: pollution, waste, remnants, garbage, ecological hells.

ABSTRACT

20% of all Europe's underground waters are polluted, according to a rapport conditioned by the "European Agency of Environment." In the west Europe 15% of the population doesn't have direct access to the tape water (drinking water) that is according to safety standards; meaning it has excess of bacteria which makes it incompatible with the consuming. In the Eastern Europe 30% of the population is confronted with this problem.

INTRODUCTION

The issue of the relation between man and the environment it isn't new. It emerged at once with the first human collectivities, because the man with its intelligence was not content with the nature like it was, and it started with courage and tenacity to transform it according to its needs.

Multiplying ceaseless, the human being added new sights to the natural landscape, transforming swamps and virgin soils into fertile lands, arid regions into green oasis, it build-up new plants varieties, and domesticated wild animals. Until now the natural balance didn't suffer but perhaps only on very restricted areas which couldn't affect the entirety. The turning point interfered in once with the industrial revolution and, especially, with the new technical scientific revolution.

In one word, the modern science and technique, increasing measureless the man's power, increased on average the life level everywhere. But the other side of the contemporary industrial civilization, of the material progress, it was and it is the deterioration of the environment. Under the economic development impact they have been more or less polluted the soil, water, and air, they gone or they about to vanish more species of plant and animal, and the man is faces at its turn with different diseases caused by pollution, phenomenon that comprises today all the countries and continents. Its effects are felt even in Antarctica. It was evaluated that in a decade, the civilization's drifts caused to the environment more damages than in one millennium.

At the beginning of the Neolithic Age, only about ten million people acted with the nature with primitive tools which practically didn't make a little determinable mark. At the middle of the XIX century, hence no long time after the beginning of the industrial revolution, the globe's inhabitants amount reached one billion people, but the environment degradation doesn't register yet significant concerns, except certain areas from some occidental countries – beginning with England – that get firstly in the "industrialization train" due firstly to the steam engine.

MATERIAL AND METHOD

The pollution as a global issue is the concern of the XX century, more exactly of the last three decades, when the world population increased from 5 to 6 billion inhabitants. Are they many or less? Can their number truly carry out a "demographic pressure" with the environment? These are questions that already concern the demographs, economists, physicians, and other experts, as well as the politicians.

The issue that concerned the experts along the time was actually if it can be provided enough food for the population, and only in the first decades they paid attention to some aspects that proved to have the same significance: the environment degradation due to the pollution, erosion, and other phenomena, own to the deliberate or unelaborated action of the man, a process which affects not only the food finding possibilities, but also other aspects of the human existence, beginning with the health.

There is no doubt the soil is the most precious capital man has for the achievement of its needs and ambitions. Finally at least

Finally, at least until the invention of the artificial photosynthesis, we all depend on the thin and fruitful layer from the Earth surface, where from are extracted all the resources

needed for the life. And one of the big paradoxes is the man trends to endanger the life's root because of its ignorance, negligence or other reasons.
While the modern techniques brought in the productive circuit million hectares of arid land, in the same time other million hectares that are now in agricultural use become inappropriate for agriculture also due to the man's action.
Since the man begun to fight against nature, the deserts' area increased with one billion hectares, and the process is in progress with an accelerated rate. It is fit to mention that each year tens of million of hectares are "sharked" by roads, plants, and cities, the same amount sequences of the unequally combat between the green leaf and asphalt.
Since the first axe cut down the first tree, the forests lost a half of their surface, while in the same time the human race multiplied hundreds or even thousands times. Destroying the forests, to they are own in the highest degree the stability and quality of the three fundamental elements for the men's life – the soil, air, and water – resulted along the time in catastrophic effects. The forests are designated in the establishment of the horizon, relatively thin, of fertile soil, the germinative environment of the vegetable mass.
The massif deforestations buried under sand dunes blooming civilizations not only in the North of Africa, but also in Asia and in some areas of Europe pushed the mountains and hills exposure until limits very near to the catastrophe.
Reforestation is another word to new and its effects are too small to recover the multi-millenary mistake that caused the extinction of a half of the planted trees. Of course in this sense the estimations are very poor. However we turn to some of them which tell us something, no matter how big is the approximation. At the end of the Roman Empire, the Iberia was covered with vigorous forests from Biscaya until the Gibraltar, and it could have an about double population by comparison with the present one, when it remained only about five percent from the former forests.
Out of the soil protection, the forest exerts the most powerful purifying action of air, absorbing the carbon dioxide and giving it back as the very necessary oxygen. Out of the 14-16 billions tons of carbon dioxide annually released in the atmosphere through the fuels burning, plus those coming from the human and animal respiration, two third are absorbed by those "green lungs" of the Earth to which we owe so much.
Not less significant is the forest's function as a regulation agent of the rivers courses. Also the forest is designed to provide the increasing needs of recreation and tourism in the conditions of the modern life, the indispensable bio-physics ambience of the spa, preservation of many species of very useful plant and animal species, etc.
In one word, without enough forests, the development, and finally the life itself are not possible. Today when the forests cover about one third of the dry surface (about 4 billions hectares), world widely it emerged the opinion that it represents a minimum needed under which the human race cannot afford to drop. In the conditions when it remain to recover much more and older mistakes, when a single car absorbs for each 1,000 lm the oxygen amount enough one year for a man, and the stormed rivers make many damages, rinsing what it remained from the soil's fertility, the irrational exploitation of the forest resources became a luxury to expensive.
The range of the soil degradation sources is large, but the most visible part understood by everybody concern the accumulation of huge quantities of every kind of residues. The image of the waste water dumps around the factories, and the impressive waste production from the urban areas, they are only two of this harmful perspectives.
Garbage existed from everlasting, but this notion as many others significantly altered its content. For the traditional rural farms, and thus for the rural localities, the garbage consisted about exclusively of unused vegetable remnants by the farm stocks, that putrefied a few month, and during the spring or autumn they have been spread on the field for the soil manuring. It practically was a complete natural recovery that occurred about the

same in the cities perimeter where the peripheries didn't differentiate to much by the village's way of life.

In a very different manner is the situation in an industrialization world, when two of five inhabitants of the globe are already live in cities – by comparison with one of seven at the beginning of the XX century. Supplementary they multiplied the big and very big cities, the cities with over one million inhabitants being more than 200. In average each inhabitant of the European cities it produces more than 1.5kg of garbage per day, and in USA three times more. Usually the garbage road ends at the city's periphery, in the existent wholes or on barren, where it gathers in huge bulks, accepted as inevitable easements, deforming the landscape, polluting the soil, air, and underground waters. And it is worse a significant part of these garbage, especially the plastics, they are extremely persistent at the bacteria action and practically don't recycle naturally.

The rudimentary disposal of the waste begun to raise serious problems in the strong industrialized areas from the Occident for more than one hundred years, in 1870, in England, and in 1892, in Germany, it has been set in the big cities the incineration of the garbage, with a partial recovery of the heat producing steam and electric power. The incineration system extended and improved very much, choosing for the centralized burning in big factories, more advantageous for the big cities.

Today the tractors' ploughs frequently drive out plastic packaging and cans, first on the arable lands around the urban centers, and also in other places. The presence of these thrown objects and of many others is unfortunately met everywhere the citizen "escapes" in the middle of the nature, without giving up at least for a short time to use the house's accommodations, and to the reflex gesture to throw away the scraps.

Through the burning of eight billions of conventional fuel it is thrown each year about one and a half billion of ash, dust, and gases. Besides the fuels' burning – coal, oil, wood, natural gases – same king of issues are done by other industries, especially the chemical metallurgical industries, some building machines brunches, alimentary industry etc – and also the circulation of cars, planes, trains, ships etc.

Making abstraction of some industrial units placed in the nature, the gross of the atmospheric pollution comes from the cities, because the industry emergence occurs either in the cities, or there subsequently is organized a city. So, the first victims are the citizen. It still is a significant amount of "ecologic hells", urban areas where the industrialization poisons are felt through mixed effects: infected air, noise, overcrowd. In such places – as like Sao Paulo, Ciudad de Mexico, Detroit, Calcutta, Los Angeles, New York – the sickness rate of the breathing apparatus, including the lung cancer, it is a few times higher, being also registered different other risk agents for the human health, and not only for those who leave in the city.

Approaching this issue, the experts consider that besides the decrease by all means of the pollution sources and, if possible, even for the wholly elimination of some of them, the air recovery cannot be conceived without the crucial contribution of the green areas. But if the air, like it is, it still can be breathe everywhere free of charge, not the same thing occurs with the drinkable water, which has already a price for the citizen, and in a continuous escalation. Because the water, the second element in order of the man's needs, after the air, it also became an industrial product. Nearby the big cities and industrial units they emerged huge installations for the natural waters "treatment" through decantation, filtration, sterilization etc.

At the first sight, it seams paradoxical to talk about the need to provide water on a planet which have so much water, enough to wholly flood with a 3 km thick layer. The issue is 97% of the globe's water is salty, and out of the rest of 3% the most part is in icebergs. It results the world population has at its disposal for individual use about 1% of the fresh water, respectively that from rivers, lakes, and some underground waters.

Even so, it could be more than enough but like other natural resources, the water is not uniformly shared on the globe's surface, and a large part of it is already much polluted.
On the whole of the pollution, the rate of the used – domestic or industrial – water is overwhelming. If at the air pollution the symbol image is offered by the "perforated" trees by the "acid rains", at the pollution of water the characteristic expression could be considered the "black tides", namely the pollution, practically continuous with oil of the world's oceans and seas, having catastrophic effects with the marine flora and fauna.
The main causes of the pollution are the agriculture and industry that is shown in a report of the European Agency of Environment. Until 10-20 years ago, the Europe's waters were more polluted. Until 1993 for instance, only 30% of the continent's lakes were clean enough for swimming safely.
Today about 90% of them are good for swimming. That is due to the fact the industrial and domestic remnants are no longer and anyhow thrown in the water, but they are firstly cleaned. Unfortunately only in the agricultural activities didn't register too many improvements. The fertilizers used for plants growth are still polluting the rivers and lakes with nitrates in a large proportion.

RESULTS AND DISCUSSION

• *Nitrates.*
Accumulation of nitrates in the vegetables and water designed for human consumption are noxious beyond some limits. The nitrates (NO3) are combinations of the nitrogen with the oxygen that are not toxic, but they become toxic when they are reduced in nitrites (NO2), either between the harvest and consumption, or in the man's alimentary canal under the action of bacteria. The nitrites cause respiratory deficiencies especially for the new born babies, and states of dizziness.
The accumulation of nitrates in the vegetable it results from the lack of balance between the nitrates absorption from the organic fertilizers and the irrigation water, and their transformation in proteins at the leaves level. Their absorption is superior to the plants' own consumption, reason because they accumulate in roots (carrots, red beet, turnip-rooted cabbage), in the stems and stalks (spinach and some species of beet), and in leaves (green salad, spinach etc.)
Research accomplished in France, Switzerland, Austria, and Low Land Counties, shows the nitrates percent from the planted vegetables by the biologic agriculture are in general significantly lower to that from the vegetables obtained through conventional methods. The difference is more obvious in the spring and summer when the days are longer and the light intensity is higher. On the contrary the difference makes indistinct during the winter.
The greenhouse vegetable harvest during the winter is problematical because the limiting agent is the sunlight and, thus, any fertilizing system could be, the nitrates content in the greenhouse crops is higher than in the field crops. The fact is the most significant agent for the nitrates accumulation is the light intensity; as more powerful it is less nitrates are cumulated in the vegetables. Thus it is suggested to feed ourselves with vegetables from the field crops, and to avoid the vegetables from the greenhouse.
In France comparative tests had emphasized the biologic salads often had a high enough nitrates content (more than 1000 mg per kg), by they contains in average 30% les nitrated than the salads coming from the conventional crops; at the carrots the percent diminish with 40% by comparison with the same conventional outputs. Finally, the nitrates content varies not only depending on season, but also by the cultural variety: some varieties contain a higher quantity of nitrates than others.
The soil moisture must, as much as possible, be kept constantly until the harvest. For instance if at the salad the field is dried and with a few days before the harvest it is intensely irrigated, the irrigation become in this case a "pump" of nitrates

Actually even countries with an old civilization meet today a degradation of the environment, linked to the so-called "modern" methods of the intensive production, excepting the soil erosion, catastrophic in the old steppe areas transformed in corny mono-cultures, the use of huge amounts of nitrates as chemical fertilizers, and of the pesticides, it induces a heavy pollution of the soil, water, and even of the some areas far-off the areas with intensive crops.
Besides the aquatic environments pollution with nitrates resulted from the soil super-fertilizing, these environments are also contaminated by the domestic or some alimentary industries effluents, loaded with organic fermentable materials.
This way the underground waters, and sometime the surface waters from many regions of the Occidental Europe have a higher content of nitrates (for instance some underground and surface waters from France contain up to 9 mg/l equivalent of nitric nitrate, which is the maximum authorized by WHO).
This fact is not the only one. In our country in manifold regions from Baragan or Dobrogea, the drinking water is far to be drinkable, being brackish, calcareous or with smell of insecticides. The rivers nearby the oil refineries or form Valea Jiului have the water of the coal color.
This week the Mehedinti Authority for Public Health [Autoritatea de Sănătate Publică (ASP)] presented the results of a report concerning the quality of water from the public wells and from the distribution network – it is shown in article from the newspaper Evenimentul Zilei no. 5034 of August the 23rd, 2007.
In the article they are stated the following: It has been found the water from the centralized installation has a nitrates concentration of about three times higher than the maximum allowed limit of 50 mg/l.
Concerning the public wells, the situation is worse: the nitrated concentration is even six times higher that the maximum allowed limit.
The ASP agents checked this month 2,092 public wells from the county, out of 350 being tapped water samples. According to the performed analysis, the water wasn't drinkable in all the checked wells.
According to the prefect of Mehedinti, in 17 communes, who have 100 villages there are heavy problems of water quality, although in many of them are running modern chloridization stations.
However at the chapter measures, the county and local authorities limit themselves to workshops and warning posters on each well of their using risks.
„We performed this inventory, we put the people in guard, but the remaining is in the assignment of the county board and local boards. The mayors are those who can make a better life for the locals", it claims the Mehedinti prefect's advisor. The local administration at its turn says it doesn't have the necessary fund to drill wells of great deep.

• *Abridgment of the pollution in agriculture*
The Ministry of Environment and Waters Management set off the Program of pollution abridgement in agriculture financed EUR 50 million borrowed from the International Bank for Reconstruction and Development (IBRD).
The EUR 50 million will finance the abridgement of the pollution with nutrients from punctual and diffuse resources, and dissemination of the necessary information to increase the public consciousness concerning the issue.
„The pollution issue goes from the domestic farm level, even from the inappropriate management of the manure in agriculture, the reason we consider the implementation of this program as a very significant measure for the protection of underground and surface waters, and implicitly for the protection of life.
We implement the Program for the Abridgement of the Pollution with Nutrients, by the agency of which we wish to train the public with the forthcoming problems, and to support

the small farmers in adopting the “Code of the Good Agricultural Praxis”, it states the State Secretary in the framework of the Ministry of Environment.
The pollution problem coming from the agriculture it is very poorly known and taken into consideration. The agriculture has a major contribution at the water pollution, an relevant part being own to the nutrients (especially nitrogen and phosphorous compounds)
Performed studies in the framework of the Environment Program for the Black Sea it demonstrates that more than a half of the nutrients quantity from the Danube come from the agriculture.
The Program for the Abridgement of the Pollution with Nutrients will be implemented in the 255 vulnerable areas, detected at the whole country level. The 255 vulnerable areas show high nitrates pollution values from agricultural sources. The application of a big quantity of chemical fertilizers with the aim to increase the output level, it caused the arable soil degradation in these areas. The degradation of the soil fertility doesn’t concern only the agricultural production, but even also the security of the produced aliments.
The program is a follow-up of the pilot project of the Pollution Control in Agriculture, and it will overtake the successfully measures tested in its framework. The control of the pollution in agriculture has been fund by the Government and the World Bank, and it is implemented in the Calarasi County.
As in the case of the program for the control of the pollution in agriculture, Program for the Abridgement of the Pollution with Nutrients will promote the use of the compost, manure that is not detrimental to the environment. As a matter of fact, a research performed by the Research Institute of the Life Quality it revealed the managers of the agricultural companies and associations from the area where it is implemented the program for the pollution control in agriculture, they consider the compost use is better than that of the fertilizers because of more reasons: the compost is not pollutant for the environment, is cheaper and available in the area as a result of the manure platforms establishment in each commune.
The soil nutrients are different chemical elements existing in soils, which are essential for the plant growth. The nutrients necessary in big quantities are called macronutrients (C, O, H, N etc.), and those necessary in small quantities are called micronutrients (Fe, Zn, Mg, Cu etc.). When the nutrients rich the waters in big amounts (especially compounds of nitrogen and phosphorous), they contribute to their pollution.

CONCLUSIONS

The environment pollution is the most significant issue of the XXI century. It is said the pollution emerged once with the human, but in the same time it increased and diversified with the society development. At the ground of the pollution are different agents, among them the most important are:
- Urbanism;
- Industrialization;
- Motorization;
- Chemification;
- Demographic density.

Thus the pollution emerges as a sub product companion of the civilization, that doesn’t limit just inside an enterprise, small collectivity, but it contains cities, areas placed inside of a country or even areas covering large geographic regions, becoming an international issue. Mostly, the present situation is due to the uncontrolled technologies implementation in the industrialized countries, but the pollution develops more and more powerful in the developing countries.
The consequences of the environment pollution development and diversification are varied, some of them known, others can be forecasted, but many emerged as

unpredictable. They act over the atmosphere, lithosphere, hydrosphere and of course, biosphere. As a consequence, it emerged the need of active intervention for the safeguard of the present and future population, by measures of prevention and control of the environment pollution.

They need a multi-disciplinary among different branches of the technology, and they cannot efficient but only if they ground on scientific criteria. In our country it isn't too late to check and control the pollution, this way can be avoided the mistakes of the very industrialized countries, using measures that favor the environment self-defence, the ecologic balance good for the human health.

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ORGANIC AGRICULTURE VIABLE ALTERNATIVE OF THE FUTURE AGRICULTURE

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Key words: biologic agriculture, organic residues, crops rotation, fertilizing, humus.

ABSTRACT

At a global scale, in over 100 countries world widely it is performed the ecologic agriculture. On equal terms as production, the ecologic agriculture it is also important to conserve the environment and to make sure that the nutritive and biological qualities of the agro alimentary products are in standards. Another overall agent it is the economy freedom of this persons and it is also taken as a priority the harmonization and facilitation of this agricultural system.

INTRODUCTION

Named also as biologic agriculture, the ecologic or biodynamic agriculture is production methods that takes into account the traditional knowledges of the peasants and integrate them with the technical development in all the agronomy fields. It is able to fully answer to the social and environment concerns, delivering to the consumers quality products, both in the rich country and the poor countries.

One of the ecologic agriculture main goals is the protection of the biosphere and of the planet resources. It excludes the use of the fertilizers, synthesis pesticides and herbicides. On the other hand, through the crop rotation, through the immobilization of the Nitrogen from the air by the leguminous, and methodic recycling of the organic residues, particularly manure or mature manure, it is considerably reduced the waste of energy: it is absorbed more solar energy and less fossil energy, that improves the energetic efficiency of the agricultural production.

In the same time, the implemented techniques from a region don't have to be implemented in other region just like that. In order to implement an agriculture being in harmony with the nature, it must learn from the biologic techniques used elsewhere, in the same time these must be adapted to the local conditions, having in view the physical and social economical conditions of the region, and optimum capitalizing the ecosystems resources.

The agro-biologists deliver desired feed by the consumers who are concerned to feed only with quality elements, without chemical residues. Supplementary the biologic agriculture, more economic and autonomous, it activates a lot of workers, building up new places of work. It attends also to the re-vivication of the villages, and for keeping the peasants in agriculture, avoiding their exodus en masse towards the urban agglomeration.

The ecologic agriculture is a type of production grounded on the soil biologic activity where are used neither chemical synthesis products (except those tolerated through exception), nor soluble fertilizers.

The agro-biologists give a high significance to the soil care, because they consider that on the balance of this alive and composite environment depends the balance of the plants, animals and humans. Their desire is to cultivate the land and not to exploit it.

The ecologic agriculture methods are grounded on the maintenance of the alive being from the soil and particularly of the micro-flora and micro-fauna, owing to a long and varied cropping rotation, the adequate techniques, and the maintenance of a high rate of organic material in the soil. A good cognition of the soil through observations and analysis is compulsory. The farmer must have exact directions concerning the nature of the soil content in fertilizing elements in order to be able to perform the necessary alterations. The fodder harvest assigned to the livestock insert itself in a balanced rotation of the crops, the livestock's dejections being necessary for an economic and quality manuring.

These incontestable trumps of the biologic agriculture arouse a growing attention. Now it is recognized and stimulated by multiple governments from different states, and by the European Union, which standardized this way of production.

The issues of the ecologic agriculture are more complex than those of the classical agriculture, and the answers are not simple but unique. Each agricultural exploitation

forms a complex system asking adapted solutions to its needs. On the other hand, significant developments have been achieved in the last years (especially in the last decade), but some techniques are not fully accomplished, particularly those concerning the weeds and the phytosanitary protection in pomiculture and viticulture.

MATERIAL AND METHOD

1. Fertilizing and nutritional needs of the plants

The fertilizing object is to maintain or increase the soil fertility and its biologic activity, especially through the organic fertilizers. The last are transformed by the soil microorganisms in humus and mineral elements that are progressively overtaken by the plants, depending on their need in the growing period.

• *The fertilizing implies:*

- A good knowledge of the cropping rotation with plants having different needs and, mainly, with leguminous which enrich the soil content in nitrogen;
- Administration of ground organic fertilizers resulted mainly from the stock-raising farms;
- Complementary infusion of complementary natural elements, especially of those missing from the soil. They are gradually placed to the plants disposal by the intercession of the microorganisms.

The fertilizing is tight bound to the soil farming, and cropping rotation. Some plants, as like the leguminous, have the capability to fix the nitrogen from the air owing to the symbiotic bacteria bound to their roots and, this way, to enrich the soil with nitrogen. The organic fertilizers, especially the farmyard manure, it doesn't wholly mineralize in the first year. In the balance of fertilizers with farmyard manure it has to take into account the unmineralized organic fraction. In the composite system pomiculture – cattle breeding, when the available organic stuff is used in a correct manner, the complementary mineral fertilizing is fulfilled.

• *Plants nutritional needs*

The plants are made of 90% water, and 10% dried stuff. They need at least 32 elements, out of which 3 limit the fertilizing in the conventional agriculture: Nitrogen, Phosphorous, Potassium.

The carbon, oxygen, hydrogen are about 95% of the plants dried stuff. Some elements called "secondary" and the oligoelements are also essential for the plants. Among the indispensable oligoelements for plants we mention: Sulphur, Iron, Magnesium, Molybdenum, Copper, Zinc.

These must be present in sufficient quantities in soil to satisfy the plants' needs.

• *Nitrogen*

The nitrogen is a ground element in the plants' growth. It is basically brought in the soil by the agency of the plants that arrest the nitrogen from the atmosphere (leguminous plants integrated in the cropping rotation or used as green fertilizers), organic farm fertilizers and chalking. The nitrogen deficiency largely develops a slow growth and the yellowing of the leaves. The nitrogen excess develops cryptogamic diseases, the attack of the plants fleas and the falling of the cereals.

• *Nitric nitrogen*

Mark the nitrogen from nitrates. As a general rule the water pollution with nitrate fertilizers is measured in nitric acid equivalent, namely the nitrogen mass corresponding to the anion NO_3 (so, 10 mg of nitric nitrogen correspond to the quantity of 44,5 mg of nitric anion). In the drinkable water the nitric nitrogen content is defined by the WHO it is 9 mg/l, being overrun in numerous regions with an intensive agriculture, particularly in the corny regions from Europe and North America.

• *Phosphorous*

It supports the maturation of the plants' vegetative organs and fruit and seeds development; it is an element of precocity: it promotes the ripening. On the other side it increases the resistance against diseases and drought. The phosphorous deficiency slow-down the blooming, it yellows the inferior leaves, and color in dark red (purple) the others.

• *Potassium*

The potassium concurs to the plant metabolism regulation, and it interferes with photosynthesis, favoring the increase of the sugar and starch content. The potassium deficiencies exhibit a yellowing of the leaves beginning from the edges, followed by a blackening between the nervures. The excess can induce a magnesium block.

• *Calcium*

The calcium helps for the pectin's development that provides the plants rigidity. It favors roots development and ripening of the fruits and seeds. The soil pH is connected by its calcium content. A fertile soil must by adjacent to the neutrality (pH=7). An excess of alkalescency can disturb the assimilation of phosphorous, magnesium, iron, and other oligoelements. The re-equilibration of an acid soil is performed to a supply of chalking.

• *Magnesium*

The magnesium fulfills different basic actions. It interferes especially in:

- Fecundation;
- Development of fruits and seeds;
- Increasing the vegetative content in A and C vitamins;
- Improvement of the soils structure and increasing of the pH in the chalky;
- Assimilation of phosphorous;
- Stimulation of the nitrogen fixing bacteria activity;
- Leaves protection against pests and diseases;
- Improvement of the antagonism to drought.

• *Oligoelements*

The oligoelements are chemical elements indispensable to the life, but they are in a very low quantity in the vegetal and animal organisms (the plants contain oligoelements in proportion of at most 0.05%, dry stuff). The oligoelements have a fundamental function for the plants, in the normal physiologic action at the cell level, a function less known for some of them. The main oligoelements are: magnesium, iron, silicon, zinc, rubidium, copper, bromine, tin, manganese, iodine, born, arsenic, cobalt, and lithium.

2. Fertilizers in the biologic agriculture

• *Compost*

In the biologic agriculture instead of the manure concept it is preferred those of fertilization, because the main goal of the nutritional input isn't only the direct nutrition of the plants like in the case of the conventional agriculture, but also the soil enrichment. By the mediation of the soil moistening process and the activity of the microbial population, in the biologic agriculture it is provided the whole range of nutritional elements necessary to feed the plants, and they reduce the pollution risks of the deep waters.

Due to the increased solubility of the synthesis chemical fertilizers, it is provided a plants' rapid growth, as a main effect, but with a series of collateral unwanted effects. One of the most severe effects of this chemical fertilizers use occurs due to the rinsing phenomenon of the nutritive solution from/on the soil by the irrigation water or rains, and its infiltration in the underground waters, contributing to the acceleration of the eutrophysation process of the water course.

Another phenomenon, occurred due to the infiltration of the excess chemical fertilizers for the plants over-feeding, it is that of parasites proliferation on animals and plants, as like: flies, red spider, Oidium Tuckeri and Botrytis, of those development is accelerated at the crops excessively fertilized with nitrogen. For these reasons in the biologic agriculture it is

preferred the use of the organic or mineral fertilizers where the hardly soluble nutritive elements are mobilized with the help of the soil microorganisms.

3. Getting the Compost

The main land enrichment used sources in the biologic agriculture are represented by the aggregate vegetable residues (stubble, remnants of corn, potatoes, remnants resulted from the trees maintenance etc.) mixed in an adequate ratio with organic fertilizers, mainly stable manure or matured compost.

The embedment in soil of the obtained material it is performed with the tillage at 25-30 cm. this practice is less expensive to reintegrate the organic stuff and for the recovery of the natural soil fertility, because through the stimulation of the micro-flora activity it is. Getting the compost is the main ground of the soil fertilizing. It can be get compost from a permanent livestock layer, using both the solid part of the animal dejection and the urine. It can be composed every not-pollutant organic material, existing in the farm: manure from cattle (the best), ovine, horses, chicken, vegetable scraps such as: straw, hay, grasses (before the seeds emergence), remnants from the trees maintenance, grape vine shoots, wool staples, chicken barbs, wood ash, remnants of fruits and vegetables.

In order to get a good quality compost it isn't enough the order less use without any criterion of any organic material, but the supervision of the composting process, depending on the size, humidity, structure and composition of the residual stuff, so that compost be rapid and efficient available to the microorganisms, being an ideal and rich substratum in nutrients for their development.

From those above mentioned, it result the fundamental significance of the relation between the carbohydrates content (more exact, carbon), and that of proteins (more exact, nitrogen), the used materials for composting. Optimum conditions for the microorganisms' activity are provided when this ration is between 25 and 30.

When the material used for composting is richer in carbohydrates and their by-products, the microorganisms have major difficulties in decomposition of the organic remnants, and thus it will be necessary a longer period for the compost maturation, in this case poorer in humus. When the material used is very rich in proteins and their by-products, it takes place a nitrogen excessive failure, especially in ammonia.

• *Mode of action*

In order to get a good quality compost it is necessary the utilization of a mixture of stuff rich in carbon (straw, sawdust, turf, paperboard, lives of lime, beech, oak etc.) with some having a high nitrogen content (vegetable remnants, dried blood, manure etc.), so that it is provided a good penetrability.

As every biologic process, for getting the compost a special significance must be given to the moisture degree of the composition. The materials to dried (cover, bark, straw, paperboard etc.) delay the microorganisms activity, while the excess of moisture it inhibits the air flow, favoring the putrefaction process development). In order to avoid these undesirable phenomena, it is recommended to diminish the moisture of the air, and of the material rich in water and vice versa, they will be soaked the very dried materials. In other cases it is enough to mix the very dried materials with those very humid.

A very simple method to check the moisture of a mixture is the so called "fist sample", that consists in squashing the compost in hand. If after squashing result a few drops of water, the material can be turned into compost with no problem; the lack of water or water in abundance it means excess of dryness or moisture, and that has to be rectified. A significant function it is own by the good aeration at the end of the conditioning process.

The aeration depends both by the water content of the structure, and the structure, size of the used material. In this case it is necessary the careful mixture of the materials having different sizes and structures, in order to provide the optimum porosity.

In the case of a big mixture, a good aeration can be provided using some very thick drainage pipes, placed on vertical, at a distance of about 1.5 m, in the middle of the mixture. For this purpose can be used timber sticks, immobilized in the soil, which will be drawn off after the building-up of the mixture, letting tubes for the air flow. The fermentation can be achieved in silos, on traditional platforms or sections installed in opened air.

• *Platform and layers*

The platform it is the most practical used structured for getting the compost, being not necessary any special construction, the fermented material being stored straight on the soil in a pyramidal shape. In regard to the fermentation in silo, the platform needs more room, but the fermentation process is the usual one, and effective, because the addition of fresh material is laterally performed, without disturbing the decomposition process. Once gathered enough material for a platform, it can be initiated its stratification, performing a scrupulous mixture of the different materials.

The first layer is formed of a coarser material (branches and other residual materials, resulted from the trees maintenance), that will have the function of a natural bolter for the drainage of the excess water. Then it follows a layer of a more refined material, and a layer of well soaked soil that, at the addition of the manure and matured compost, provides the mixture with a needed microbial load for the process. It follows up in this order, alternating the organic material layers (soil combined with animal stuffs and well moistured vegetables) with manure and the well matured compost, reaching the desired height, and afterwards the platform is covered with straw and a 5 cm thick layer of fine clay.

The lasting of the fermentation process depends on the clime, used materials, and the right setting of the platform. In general it needs about 6 months. The compost is considered matured when it turned in a friable soil mixture, of a dark brown color, with a agreeable, not pungent odor, without insects or earth worms. The shape and size of the platform have to be so that favors the aerobic fermentation process which is at the basis of the process. In general, the platform doesn't overrun a width of 2 m, and a height of 1.8-2 m. The length is established depending on the amount of materials for fermentation.

The laying out must be performed in a shady place, straight on the land. Additionally, depending on requirements, they are added nutrients so that to be rectified the effectual soil deficiencies.

• *Humus*

The humus is an organic material of a black or brown color, which composes in the soil as a degradation result of the vegetal and animal remnants (roots, straw, manure, green fertilizers etc.), due to some microorganisms action (bacteria, fungi), and macro-organisms (soil worms, insects, acarids etc. that compose the soli fauna: about 100,000 per m^2; among them the earth worms, about 10% of the whole biomass, around 1 million per hectare ,they perform the labour equivalent with two oxen which continuously work a hectare of soil). In the soils rich in humus, the micro and macro-organisms activity is intense and favorable, that has a good influence for the fertility. In the planted fields, the humus must regenerate constantly; otherwise the soil progressively becomes poor.

Some crops give back a great quantity of remnants after harvesting: they are "humus generators", especially the fodder crops. Others absorb humus more than they give back; they are "humus consumers": is the case of the sugar beet and potatoes. A soil rich in humus has a good structural stability that considerably limits the hydro- and wind erosion. The humus is especially necessary for the fragile soils (due to their granulation), or sloped fields.

• *Organic Fertilizers*

Organic fertilizers increase the soil humus content, and its capability to retain water, it improve its structural stability, diminish the necessary energy amount for the soil labours,

stimulate the biologic activity and deliver to the soil the major part of the nutrients and fertilizers elements necessary for the vegetation.
Organic materials given to the soil:
- Soil liming with slow evolution: manure, compost, that make stabile humus, improving the soil structure and in general fixing more than a half of the nitrogen content in the first year;
- Soil liming with rapid evolution: liquid fertilizers, solid and liquid dejections of the farm livestock, green fertilizers;
- In a limited complementarity, organic fertilizers with a rapid mineralization, birds manure, fish or meat powder, and blood powder etc.
The organic materials schematically develop in three phases:
- Decomposition in transition products by the micro and macro-organisms;
- Partially transformation into humus;
- Transformation in stable humus.
The carbon/nitrogen ratio (C/N) is the indicative of the organic material given to the soil. The optimum balance is between 10 and 12. When it's higher, the organic materials are less available to feed the microorganisms.
• *Fermentation Activators*
In order to accelerate the beginning of the fermentation process, if the case they are added a very little quantity of activators. These are:
- Ferments consisting in extracts of plants, de bacteria or enzymes;
- Preparations grounded on silica (SiO_2) or plants (nettle, milfoil, dandelion, valerian, and rush).

4. Green Fertilizers

The green fertilizers are hidden or associated crops used in the field culture, pomiculture, vegetable crops and viticulture. Their implementation doesn't cause the space losing for the main crops, because they are placed on the empty spaces (free) or associated with other plants. They are harvested either as fodder, or crushed and embedded in the soil crust. Embedded to deep the green fertilizers go through a partial anaerobic degradation, especially in the clayish soils.
Main species of used plants as green fertilizers:
a) Leguminous: bean, blue pea, cockshead, fodder pea, mash, clover. Their main feature is the fix the nitrogen from the air, and efficiently restore to the plants.
b) Cereal crops: barley (for light or chalky soils), outs (in the humid and cold regions), rye. The cereal crops are planted in general associated with leguminous in order to increase the vegetation mass, due to the favorable effect over the soil structure, and for the high enough C/N ratio.
c) Crucifers: fodder cabbage, fodder raps, white mustard, fodder beet. The crucifers have more benefits: their roots stir the soil due to their rapid development, in the same time mobilize better the mineral reserve from the soil, particularly the potassium. Even more, they grow on the poor lands, and some of them (white mustard, fodder beet) are able to control the nematodes (class of worms with thin, cylindrical body).
d) Other species: spinach and sunflower (very persistent against the draught, with a rapid development in worm clime conditions); different melliferous plants (mobilize the potassium present in the soil, and fight against the nematodes).

5. Cropping Techniques

a) Minimum tillage. Eventually it is performed a cultivation of soil before the planting, that favors the development of the roots. It is performed a simple superficial harrowing to embed the seeds. The roots cause the deep soil mobilization.

b) An easy fertilizing. Sometimes it is necessary an easy fertilization, less for leguminous. It is used for instance manure leak. The given fertilizers to the main crop will be available for this one if the green fertilizer is embedded in soil right after the fertilizing.
c) Embedment in soil of the green fertilizers. The embedment in soil of the green fertilizers it must given a special attention. The manner they are broken up / smashed has an impact with the crop that follows the green fertilizers.
With the aim the vegetable biomass to be able to decompose in contact with the air, the embedment in soil is performed at the surface, 5 to 10 cm in the heavy soils, 10 to 20 cm in the light soils. In order to perform this operation, the green fertilizers are broken with equipment with revolving devices, or they are cut with a special mower, provided with several cutting bars.
The brake up is performed when it is necessary a rapid decomposition, especially in gardening due to the rapid cropping rotation. The green fertilizer is mixed with soil using a harrow. It never has to be embedded through a deep ploughing because the organic material ferments, and that inhibits the root growth and it develops the parasitism. The aerobe decomposition of the green fertilizers must be progressively, and as much as possible finished before the main crop sowing, to avoid the risks of the main culture's development. The green fertilizer decomposes faster if it is tender and rich in proteins, but also when the soil is ventilated through cropping techniques.
The embedment period of the green fertilizers is determined by the subsequent crops, clime, and the soil state. It must be avoid the embedment of the green fertilizers instantly after the rain, when the soil it is still humid. On the other side, the optimum stage for smashing the green vegetable mass before the embedment in soil, it must be performed before the earing for cereals, of before the first stage of blooming for the dicotyledonous. After this moment it appears the risk of seeds emergence, and thus of the self-seeding, followed by the lignifications of the green fertilizers, which causes a nitrogen blockage.

RESULTS AND DISCUSSIONS

Natural fertilizers in the ecologic agriculture:
• *Mineral Fertilizers*
These are the completion fertilizers or soil liming and not substitutes of the recycled nutritive elements. The soil liming adjusts the soil characteristics (calcium, pH etc.), and the fertilizers complete the coming organic fertilizers, bringing to the soil the indispensable elements, existing in not sufficient quantities: phosphorous, potassium, calcium, magnesium or oligoelements. The deficiencies are emphasizes through the soil analysis.
The only authorized mineral fertilizers are natural substances that didn't suffer but physical treatments (smashing, sieving). They generally must have low solubility, so that they cannot be directly assimilated by the plants; the microorganisms must solubilize them. In the same time, some fertilizers (as like the *patentable*) make an exception to answer to the potassium and magnesium needs.
• *Fertilizers with calcareous dominance*
- Sand with calcareous alga chips. It is a natural soil lime of marine origin that allows the pH increasing of soils to acid, and to enrich them in calcium. It contains calcium 30-40%, and also magnesium carbonate and manifold oligoelements (copper, iron, silica, magnesium etc.). These algae are finely-crushed before use, their efficiency depending on the fineness of the grinding, like for all the other mineral soil limes. The alga powder is directly dispersed on the soil, over the animals bedding, or embedded in compost during its preparation (3-4 kg alga per 1 ton of organic fertilizer). It is also possible through direct pulverization on leaves in order to stimulate the vegetation, and to combat against some pests. It is preferred a gentle and fractionated use, once every two years for instance, instead a massif use every five years.

- Dolomite. This sedimentary rock, rich in calcium and magnesium, it is used in the acid or neutral soils. It profitably can replace the alga sand, especially in the region faraway from the sea.

• *Phosphorous sources*

- Natural phosphates. In case of phosphorous deficiency, in the acid soils it is performed the administration of the natural phosphorous, deriving especially from North Africa (Marocco) or phosphatated chalk. In the calcareous soils they are applied natural phosphate (as like Senegal phosphate, for instance). Each time, when it is possible, the fertilizers addition is accomplished through the conveyance of the compost.
- Thomas Scoria. Sub product of the metallurgic industry, Thomas scoria (or de-phosphorylation scoria) can be used in the neutral or acid soils.

• *Potassium sources*

- Magnesium sulphate. Deriving from the sea water's decantation, the magnesium sulphate delivers magnesium to the soil. It is used especially in the alkaline soils.
- Iron sulphate. It is added in the manure in wrac or compost with the purpose to avoid the inhibition caused by the direct administration.

• *The need of mineral fertilizers is hereby estimated:*

- By the soil's examination: for instance the mineral fertilizers needs are lower in the sandy soils than in the callow soils;
- By the crop examination, in order to find the eventual deficiency, diseases, or pests attack;
- By laboratory chemical analyses. In the case of an element high deficiency, the adjustment is done in manifold successive stages in order to avoid the soil unbalance. For each element incorporated in soil they are planed maximal doses. It is also taken into account the soil capability to keep fertilizing element; that depends on its clay and humus constant.

CONCLUSIONS

The techniques and methods from the biologic agriculture regard the long term preservation and improvement of the soils fertility, increasing of the soils' qualitative value where the biologic balances must be kept, non-pollutant, without pesticide remnants, the optimization of the nutritive state in the soil-plant system.

The ecologic agriculture (biologic, organic) by its nature is grounded on bio-diversity. Many of its praxis preserve and increase the diversity abundance. For instance: cropping rotation is a compulsory praxis in the ecologic agriculture; the trees, alive fund, and the crops edges keep a rich diversity of natural predators, as like the spiders, birds, and Coleoptera, that concur to the pests control. Also, only through the simple use of the organic fertilizers, they are increased the soil fertility, and the diversity of the organisms living in the soil.

Romania has the natural conditions and favorable condition for the ecologic (biologic) agriculture. Having in view the opportunities Romania has, as well as the new trends of the communitarian agricultural praxis, oriented towards a clean agriculture, the Ministry of Agriculture and Rural Development enacted the basis legal and institutional framework, partially harmonized with the EU regulations in the field, needed for the development of the supervised ecologic agriculture in our country.

The use of the biologic agriculture methods and techniques for the rehabilitation of the agricultural lands it is sporadically at national level and actually it is implemented on limited plots, especially in the stations for research and truck farming.

Despite all these difficulties, (lower efficiency by comparison with the conventional agriculture), the ecologic agriculture begun to get room, especially in some Western European countries (France, Germany, Switzerland, Sweden an others). The biologic alimentary products carry the specification "natural product", besides the origin and other

specifications. In the future the output must increase, and in the same time intensify the scientific research efforts to improve the ecologic agriculture techniques.The assessment of the ecologic agriculture results must take into account not only the economic efficiency, but also the effects with the environment, of national and universal patrimony preservation, and alimentary products' quality.

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ÎMBUNĂTĂTIREA BIOREMEDIERII SOLURILOR POLUATE CU ȚIȚEI PRIN UTILIZAREA UNUI PRODUS NATURAL BIODEGRADABIL

ENHANCED BIOREMEDIATION OF SOILS POLLUTED WITH CRUDE OIL USING A NATURAL BIODEGRADABLE PRODUCT

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Key words: bioremediation, crude oil, polluted soils, natural biodegradable product.
Cuvinte cheie: bioremediere, titei, soluri poluate, produs natural biodegradabil.

REZUMAT

Poluarea accidentala cu titei a devenit in zilele noastre un fenomen obisnuit si poate cauza catastrofe ecologice si sociale. Bioremedierea solurilor poluate cu titei este limitata de activitatea microorganismelor degradatoare de hidrocarburi.

Principalul scop al acestui studiu este acela de a creste bioremedierea solurilor poluate cu titei prin adaugarea unui produs biodegradabil natural si a inoculului bacterian. Biodegradarea a fost cuatificata prin analize de total hidrocarburi din petrol (THP).

Lucrarea prezinta date obtinute in urma procesului de biodegradare a unui sol poluat artificial cu 5% si 10% petrol, tratat cu un produs natural biodegradabil si inocul bacterian. Procesul de biodegradare are loc in timp pentru a reutiliza solul in scopuri agricole.

ABSTRACT

Crude oil pollution accidents are nowadays become a common phenomenon and have caused ecological and social catastrophes. Crude oil bioremediation of soils is limited by the bacteria activity in degrading the spills hydrocarbons.

The aim of this study is to enhance the bioremediation of soils polluted with crude oil by adding the natural biodegradable product and bacterial inoculum. Biodegradation was quantified by total petroleum hydrocarbons (TPH) analyses.

The paper presents data obtained in biodegradation process of an artificial polluted soil with 5% and 10% crude oil, treated with a natural biodegradable product and bacterial inoculum. Biodegradation process takes time to reuse the soil in agricultural scopes.

INTRODUCTION

The development of petroleum industry, and also extractive and processing one, including crude oil transport could lead to unpredictable secondary phenomena with effects more or less harmful for environment and human life. One of this phenomenon is soil pollution with crude oil, petroleum products with or without salty water, petroleum residual products, resulted from crud oil exploitation and extraction (Răuță, 1986).

In accordance with this phenomenon, starting with 1991, the Institute for Soil Science, Agrochemistry and Environmental Protection – ICPA, Bucharest initiated a study in all country. This study had like propose to elucidate the pollution nature, its extension and its impact on soil and microorganisms existing in soil (Toti, 1999).

In the study were identified and isolated the main heterotrophic bacteria and microfungi biodegraders of crude oil and assigned some conditions to stimulate their proliferation. Were selected some agro-pedo-improvements practices and biological management to contribute and action on pollutant disappearance from soil (Voiculescu, 2002).

All these research lead to the elaboration of a bioremediation method in-situ of soil polluted with crude oil by using selected microorganisms, with a high efficiency in biodegradation, low costs, without affecting soil characteristics, fertility (Toti, 2003).

Petroleum fuel and crude oil products represent the one of the most common environmental contaminant. Common sources of these products are motor fuel station underground storage tanks, home and commercial heating oil storage tanks, fuel distribution centers, refineries, crude oil production sites and accidental spills (Bartha, 1986).

Based upon the available information on the chemistry and toxicology of petroleum hydrocarbons, it is possible that petroleum hydrocarbon fuels and oils are mainly composed of aliphatic and aromatic hydrocarbon compounds and petroleum aromatic hydrocarbons generally appear to be more toxic than petroleum aliphatic compounds.

Petroleum hydrocarbon products are mixtures of over 250 hydrocarbon compounds. The various product mixtures produced by the manufacturers are based upon physical and performance-based criteria and not specific formulas. As a result, the product compositions can vary depending upon, in part, the crude oil refined to produce the product, the type of product, the season of the year, and any performance additives (Alexander, 1994).

Because high concentrations (>1%) of petroleum hydrocarbons in soil have demonstrated phytotoxic properties, as well as the uncertainty about the fate and transport of high concentrations of petroleum in soils and upon human health, the specific fuel nondefault closure levels have maximum limits applied. It is generally recognized that the toxicity, (human and environmental), of petroleum products increases as the molecular weights of the compounds decrease (Pepper, 1996).

MATERIALS AND METHODS

The main objective of the present study was to enhance the bioremediation method of the soils polluted with crude oil by using the natural biodegradable product ECOSOL. It has been achived an experiment in Green House. The soil was artificial polluted with 5% and 10% crude oil, then was applied the treatment consisting in ECOSOL and bacterial inoculum.

The experiment has 11 experimental variants with soil polluted 5% and 10% crude oil, treated with 50g, 100g and 200g ECOSOL/20 kg polluted soil, inoculated and uninoculated with bacteria selected according to the following experimental scheme:

- ✓ V_1, control (unpolluted soil);
- ✓ V_2, polluted soil with 5% crude oil;
- ✓ V_3, polluted soil with 10% crude oil;
- ✓ V_4, polluted soil with 5% crude oil + 50 g ECOSOL;
- ✓ V_5, polluted soil with 5% crude oil + 50 g ECOSOL + bacterial inoculum;
- ✓ V_6, polluted soil with 5% crude oil + 100 g ECOSOL;
- ✓ V_7, polluted soil with 5% crude oil + 100 g ECOSOL + bacterial inoculum;
- ✓ V_8, polluted soil with 10% crude oil + 100 g ECOSOL;
- ✓ V_9, polluted soil with 10% crude oil + 100 g ECOSOL + bacterial inoculum;
- ✓ V_{10}, polluted soil with 10% crude oil + 200 g ECOSOL;
- ✓ V_{11}, polluted soil with 10% crude oil + 200 g ECOSOL + bacterial inoculum.

The soil used in experiment is a cambic chernozem sampled from Teleorman area. Chemical characteristics of the soil used in the experiment are presented in table 1.

Table 1

Chemical characteristics of the soil

Soil type	pH	Organic Carbon (%)	Total Nitrogen (%)	C/N ratio

Calcic chernozem	8,09	2,99	0,279	12,5

The chemical characteristics of the natural biodegradable product ECOSOL used in the experiment are presented in table 2.

Table 2

Chemical characteristics of the natural biodegradable product ECOSOL

Natural biodegradable product	Total Nitrogen (%)	Organic Carbon (%)	Phosphorous (%)	Potassium (%)	Sodium (%)
ECOSOL	0,935	23,72	0,39	3,32	4,97

The inoculum was developed from microorganisms that occur naturally in the soil with the addition of crude oil. The microorganisms use the petroleum hydrocarbons as a source of carbon. It was stimulated the growth of the microbial population by adding the fibers provided from celluloid wastes.

The density of crude oil used in artificial pollution of soil is been calculated with the following formula:

$$\rho = \frac{m}{V} = m \times V^{-1}$$

The value obtained for the crude oil used in the experiment is:

$$\rho = 836{,}9 \text{ kg/m}^3$$

This value shows that is a light crude oil.

In the first experimental year was observed an increase of biodegradability rate in accordance with the applied treatment, so the experiment continued. In the second experimental year was used a plant to observe the influence of crude oil on plant growth and also to enhance the bioremediation by phytoremediation. The plant used was maize.

RESULTS AND DISCUSSIONS

Petroleum fuel or crude oil contaminated sites have been characterized by the total of all the petroleum hydrocarbons, called total petroleum hydrocarbons (TPH). In this paper are presented the influence of crude oil on plant growth.

In figure 1 are presented the maize plants (was choosed one repetition) in each experimental variant after one month from emergence. The figure shows that in all the plots were the soil was polluted with 10% crude oil, the plants haven't rise up even the treatment was applied.

In the plots were the soil was polluted with 5% the plants rise up with delay, the plant are at least two times lower than control, and differences between treatments can be observed after one month.

Figure 1 Maize plant in each experimental variant after one month from appearence

In table 3 are presented the characteristcs of plants after 5 months from seeding, in the second experimental year of bioremediation and the first one when a plant was used in experiment.

The number of plant/plot, the height of plants, the number of leaves and the biomass are proportional with the treatment. As it can be observed the control presents values very high for all the parameters analysed, the plots with soil polluted with 5% crude oil have values lower then control and the plots with soil polluted with 10% crude oil have no value because the plants did not rise up.

Table 3

Evolution of plant biomass in all experimental variants and repetitions according with the applied treatment

No.	Experimental variant	Repetition	Plants/plot (number)	Height (cm)	Leaves (number)	Biomass (g)
1	V_1, control (unpolluted soil)	R1	4	138	12	99
2		R2	5	140	13	113
3		R3	5	139	12	107
4	V_2, polluted soil with 5% crude oil	R1	4	46	7	6
5		R2	4	53	9	4
6		R3	4	57	8	5
7	V_3, polluted soil with 10% crude oil	R1	-	-	-	-
8		R2	-	-	-	-
9		R3	-	-	-	-
10	V_4, polluted soil with 5% crude oil + 50 g ECOSOL	R1	5	57	7	7
11		R2	5	50	7	5
12		R3	5	51	8	3,5
13	V_5, polluted soil with 5% crude oil + 50 g ECOSOL + bacterial inoculum	R1	3	57	8	5
14		R2	4	56	9	5
15		R3	5	52	7	6,5
16	V_6, polluted soil with 5% crude oil + 100 g ECOSOL	R1	5	68	9	7
17		R2	4	47	8	6,5
18		R3	5	56	8	5
19	V_7, polluted soil with 5% crude oil + 100 g ECOSOL + bacterial inoculum	R1	5	83	8	8
20		R2	5	48	9	5
21		R3	5	56	8	6,5
22	V_8, polluted soil with 10% crude oil + 100 g ECOSOL	R1	-	-	-	-
23		R2	-	-	-	-
24		R3	-	-	-	-
25	V_9, polluted soil with 10% crude oil + 100 g ECOSOL + bacterial inoculum	R1	-	-	-	-
26		R2	-	-	-	-
27		R3	-	-	-	-
28	V_{10}, polluted soil with 10% crude oil + 200 g ECOSOL	R1	-	-	-	-
29		R2	-	-	-	-
30		R3	-	-	-	-
31	V_{11}, polluted soil with 10% crude oil + 200 g ECOSOL + bacterial inoculum	R1	-	-	-	-
32		R2	-	-	-	-
33		R3	-	-	-	-

From treatment point of view, can be analysed all the parameters for the soil polluted with 5% crude oil. The number of plant/plot, the height of plants, the number of leaves and the biomass are increasing with the treatments applied.

CONCLUSIONS

The experimental study leads to the following preliminary conclusions:

- ✓ In the plots were the soil was polluted with 5% the plants rise up with delay, the plant are at least two times lower than control, and differences between treatments can be observed after one month.
- ✓ In all the plots were the soil was polluted with 10% crude oil, the plants haven't rise up even the treatment was applied.
- ✓ The number of plant/plot, the height of plants, the number of leaves and the biomas are proportional with the treatment. For all the parameters analysed the control presents values very high, the plots with soil polluted with 5% crude oil have values lower then control, proportionaly with the treatment apllied and the plots with soil polluted with 10% crude oil have no value because the plants did not rise up.

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STUDIUL INTERACȚIUNII DINTRE GENOTIP ŞI FACTORII DE INTENSIFICARE A PRODUCȚIEI LA PORUMB

STUDY OF THE INTERACTION BETWEEN GENOTYPE AND YIELD INTENSIFICATION FACTORS IN MAIZE

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Key words: maize, genotype, yield intensification factors

REZUMAT

În programele de ameliorare a porumbului, crearea unor hibrizi cu o productibilitate mare poate fi realizată prin îmbunătățirea potențialului de utilizare eficientă a azotului şi de densitatea culturii.

Pe baza rezultatelor se observă că există diferențe semnificative între tratamentele cu azot şi între hibrizii studiați sub aspectul greutății boabelor pe ştiulete. De asemenea se observă existența unor diferențe semnificative între diferitele combinații hibride în ceea ce priveşte potențialul lor de valorificare pentru ambii factori de intensificare a producției. Ca atare, există o variabilitate evidentă între combinațiile hibride studiate, care pot fi folosite pentru a îmbunătății potențialul de utilizare a celor doi factori în programele de ameliorare a porumbului.

ABSTRACT

In maize breeding programs the development of high yielding hybrids can be achieved by the improvement of nitrogen use efficiency and plant density. Based on obtained results we observe significant differences between nitrogen treatments and studied hybrids regarding the grain weight per cob.

There is also a significant difference between different hybrid combinations regarding their potential of valorification for both factors of intensifying the production. According to these data it was observed that there is a considerable variability between the studied combinations, which can be used to improve the potential of the utilization of the two factors in maize breeding programs.

INTRODUCTION

Maize hybrids differ in their response to plant density (Luque *et al.*, 2006). Early maturing maize hybrids tended to be lower in growth rate than the later maturing maize hybrids (Azadgoleh and Kazmi, 2007). Their potential to grain yield significantly differ under varying plant density levels due to difference in their genetic potential (Liu *et al.,* 2004). Although grain yield per plant is decreased, in response to decreasing light and other environmental resources available to each plant (Pagano and Maddonni, 2007).

In selecting improved cultivars, breeders empirically select those that are more efficient in terms of nitrogen absorption and utilization. As modern maize genotypes were selected in the presence of high fertilization, they were consequently selected for their adaptation to high input (Hirel B. et al., 2001). However, expression of genetic variability for GY is largely dependent on the level of nitrogen fertilization.

The existence of an interaction of genotype x level of fertilization was shown in maize by various investigators (Moll et al., 1987; Landbeck, 1995). In addition, it was found that correlations among various agronomic traits were very different depending upon the level of nitrogen fertilization (Bertin and Gallais, 2000).

MATERIAL AND METHOD

The experiment was organized in randomized complete block design with three repetitions having a plot size of 3.5 m x 10 m. The 15 maize hybrids between the six inbreed lines were randomized in combinations with three plant density: D_1 (24 cm x 70 cm, or aprox.60000 plants ha^{-1}), D_2 (29 cm x 70 cm or aprox.50000 plants ha^{-1}) and D_3 (36 cm x 70 cm or aprox.40000 plants ha^{-1}), and four nitrogen level: N_0, N_{33}, N_{66}, N_{100} kg ha^{-1}.

Data were statistically analyzed using analysis of variance procedure for three factors randomized complete design. Means were compared using least significant difference test (Ciulca, 2006).

RESULTS AND DISCUSSIONS

Based on variance analysis we observe there is a significant negative influence of separate effects of nitrogen and hybrids studied for grain weight, and combined effects of those. Nitrogen treatment has the greatest influence over grain weight variability per cob, followed by the combined effect of the three factors. Also, we observe a high and statistically assured interaction between the hybrids and the two studied factors

Reduction of the nutrition surface on the plant by increasing the density from 40 to 50000 plants/ha determined a non significant reduction of grain weight per cob.

Table 1

Variance analysis for the influence of hybrids, density and nitrogen application on grain weight/cob

Variability source	SS	DF	MS	F
Total	78156,60	539		
Repetition	32,53	2	16,26	F = 0,18
Density	471,94	2	235,97	F = 2,6
Nitrogen	15173,4	3	5057,79	F = 55,74**
Hybrids	3390,51	14	242,18	F = 2,67**
Density x Nitrogen	1706,94	6	284,49	F = 3,14**
Density x Hybrids	5292,36	28	189,01	F = 2,08**
Nitrogen x Hybrids	7197,92	42	171,38	F = 1,89**
Density x Nitrogen x Hybrids	12404,5	84	147,67	F = 1,63**
Residual	32486,5	358	90,74	

Also, we observe there are no significant differences between densities of 60 and 5000 plants/ha regarding this trait. In conditions of an increase of density from 40 to 60000 plants/ha we observe a reduction of grain weight which is statistically assured.

Table 2

Comparison of grain weight/cob for different plant density

Plant density	Grain weight (g)		Relative value (%)	Difference/ Significance
50000 - 40000	156,57	156,93	99,77	-0,36
60000 - 40000	154,79	156,93	98,63	$-2,14^0$
60000 - 50000	154,79	156,57	98,86	-1,78

$LSD_{5\%}$=1,97 g $LSD_{1\%}$=2,61 g $LSD_{0,1\%}$=3,36 g

Analyzing the unilateral effects of different nitrogen treatments over the grain weight we observe the existence of statistically assured differences only in case of application of doses of 100 kgN/ha. Supplementing the applied nitrogen doses to 100 kg N/ha determined the obtaining of grain weight of approximately 7-8%.

Table 3

Comparison of grain weight/cob for different nitrogen level

Nitrogen level (kg./ha)	Grain weight (g)		Relative value (%)	Difference/ Significance
33 - 0	153,18	151,98	100,79	1,20
66 - 0	154,11	151,98	101,40	2,13
100 - 0	165,19	151,98	108,69	13,21***
66 - 33	154,11	153,18	100,61	0,93
100 - 33	165,19	153,18	107,84	12,01***
100 - 66	165,19	154,11	107,19	11,08***

$LSD_{5\%}$=2,28 g $LSD_{1\%}$=3,01 g $LSD_{0,1\%}$=3,85 g

Having in mind the cumulated effect of plant density over the grain weight of studied hybrids we observe the existence of significant differences between their reactions to increasing plant density. Hybrid Lc 864 x Ta 409 manifests the highest potential of valuating the nutrition and light surface corresponding to the density of 40000 plants/ha.

Table 4

Comparison of grain weight/cob of the hybrids for different plant density

No.	Hybrids	Plant density		
		40000	50000	60000
1	Lc 113 x Lc 86	153,71a	163,43cd	162,75c
2	Lc 113 x Lv 94	153,59a	160,29c	160,65c
3	Lc 113 x Lv 95	147,84a	161,29c	150,57a
4	Lc 113 x Lc 864	154,75a	157,21bc	164,07c
5	Lc 113 x Ta 409	150,50a	156,12bc	151,07a
6	Lc 86 x Lv 94	156,75bc	157,29bc	154,99ab
7	Lc 86 x Lv 95	155,92bc	159,87bc	163,40c
8	Lc 86 x Lc 864	153,50a	156,37bc	152,90a
9	Lc 86 x Ta 409	153,34a	156,79bc	153,90ab
10	Lv 94 x Lv 95	154,50a	153,37ab	155,32ab
11	Lv 94 x Lc 864	153,00a	153,79ab	159,82bc
12	Lv 94 x Ta 409	151,67a	152,29ab	157,07abc
13	Lv 95 x Lc 864	156,17bc	147,62a	156,57abc
14	Lv 95 x Ta 409	163,25c	155,46b	152,99ab
15	Lc 864 x Ta 409	163,42c	157,37bc	157,90abc

$LSD_{5\%}$=7,65 g $LSD_{1\%}$=10,07 g $LSD_{0,1\%}$=12,91 g

Hybrids 113 x Lc 86 and Lc 113 x Lv 94 present a positive effect of interaction with plant density in conditions of increasing of plant density, achieving the highest values of grain weight per cob in comparison to the other hybrid combinations. In case of hybrids: Lv 94 x Lv 95 and Lc 86 x Ta 409 we observe a high stability of grain weight per cob in conditions of increasing plant density. Regarding the nitrogen treatment effect over the studied hybrids we observe there are no significant differences between the grain productions achieved by hybrids cultivated on non fertilized plots. Hybrids Lc 86 x Lv 95, Lc 864 x Ta 409 and Lc 86 x Lv 94 record the highest potential of valuating nitrogen treatment on plots fertilized with a dose of 33 kg/ha, while the hybrid Lc 113 x Lv 95 manifested the lowest capacity of valuating the dose of 33 kg/ha applied. On the plots fertilized with 66 kgN/ha, we observe low and statistically not assured differences between studied hybrids regarding their potential to valuate efficiently the applied treatment.

Table 5

Comparison of grain weight/cob of the hybrids on different nitrogen level

No.	Hybrids	Nitrogen level (kg N/ha)			
		0	33	66	100
1	Lc 113 x Lc 86	157,10b	150,81abcd	154,06a	172,73cd
2	Lc 113 x Lv 94	157,50b	152,83abcd	156,78a	165,67bcd
3	Lc 113 x Lv 95	154,05ab	142,72a	153,45a	162,78abc
4	Lc 113 x Lc 864	156,50ab	154,49bcd	154,45a	169,34bcd
5	Lc 113 x Ta 409	150,05ab	153,27abcd	155,56a	151,45a
6	Lc 86 x Lv 94	148,28ab	156,72d	153,11a	167,34bcd
7	Lc 86 x Lv 95	148,28ab	158,49d	156,34a	175,89d
8	Lc 86 x Lc 864	147,72ab	151,16abcd	155,11a	163,11abc
9	Lc 86 x Ta 409	154,28ab	143,72ab	148,89a	171,89cd
10	Lv 94 x Lv 95	151,05ab	151,94abcd	153,34a	161,34ab
11	Lv 94 x Lc 864	147,28ab	156,72d	154,67a	163,56bc
12	Lv 94 x Ta 409	148,94ab	151,38abcd	149,67a	164,78bcd
13	Lv 95 x Lc 864	144,72a	155,38cd	150,45a	163,34bc
14	Lv 95 x Ta 409	155,28ab	155,94d	157,89a	159,89ab
15	Lc 864 x Ta 409	157,72b	158,05d	157,89a	164,67bcd

$LSD_{5\%}$=11,85 g $LSD_{1\%}$=15,60 g $LSD_{0,1\%}$=20,01g

Hybrid combinations Lc 86 x Lv 95 and Lc 113 x Lc 86 present a high evaluating potential of applying doses of 100 kg N/ha, significantly superior in comparison to the hybrids Lc 113 x Ta 409, Lv 95 x Ta 409, Lv 94 x Lc 864, etc.

CONCLUSIONS

Based on obtained results we observe significant differences between nitrogen treatments and studied hybrids regarding the grain weight per cob.

Regarding the nitrogen treatment effect over the studied hybrids we observe there are no significant differences between the grain productions achieved by hybrids cultivated on non fertilized plots.

There is also a significant difference between different hybrid combinations regarding their potential of valorification for both factors of intensifying the production.

According to these data it was observed that there is a considerable variability between the studied combinations, which can be used to improve the potential of the utilization of the two factors in maize breeding programs.

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CERCETĂRI PRIVIND DIVERSITATEA FENOTIPICĂ A UNOR LINII CONSANGVINIZATE DE PORUMB PENTRU DIFERITE CARACTERE DE PRODUCȚIE

RESEARCHES CONCERNING THE PHENOTYPIC DIVERSITY OF SOME MAIZE INBRED LINES FOR DIFFERENT YIELD TRAITS

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Key words: phenotypic diversity, maize, inbred lines.

REZUMAT

În lucrările de ameliorare care urmăresc obținerea de hibrizi comerciali, aplicarea selecției la nivelul liniilor consangvinizate este mai eficientă deoarece se reduce volumul de cheltuieli şi permite evaluarea unui număr mare de linii consangvinizate de perspectivă.

Obiectivele acestui studiu au constat în evaluarea diversității fenotipice a şase linii consangvinizate de porumb pentru nouă caractere de producție. Rezultatele obținute indică faptul că unele dintre aceste linii reprezintă un material valoros pentru diferite caractere de producție, care pot fi utilizate în programele de încrucişări dialele pentru obținerea unor combinații hibride valoroase.

ABSTRACT

In breeding programs which follow the obtaining commercial hybrids, applying selection among consanguine lines is much efficient because it reduces costs and allows the evaluation of a high number of perspective consanguine lines.

The objective of this study was to evaluate the phenotypic diversity of six maize inbred lines for nine quantitative yield traits. The results of this study suggest that some of maize inbreeds line represent a valuable material for different yield traits, that could be successively used for further breeding program include diallel crossing methods, as a good base for development of the hybrid combination.

INTRODUCTION

Maize possesses high genetic diversity and enormous biological diversity which justifies the attention it continues to enjoy from geneticists and plant breeders (Sofi and Rather, 2006).

In breeding programs which follow the obtaining commercial hybrids, applying selection among consanguine lines is much efficient because it reduces costs and allows the evaluation of a high number of perspective consanguine lines (Argillier et. al., 2000 Crop Sci). Thereby, using phonotypical similarity as an measure of diversity may offer information concerning the predicting some hybrid combinations which manifest a high intensity of heterosis (Bernardo).

Phenotypic diversity of parental forms necessary to obtain high levels of heterosis may be due to phytogenetic genealogy of consanguine lines and as a result of breeding process (Hallauer).

Phenotypic description of consanguine lines may represent interest for plant breeding and seed production, because phonotypical differences may be useful in establishing authenticity in case of using them as parental forms for producing hybrid seed (Bennetzen and Hake, 2009).

The objective of this study was to evaluate the phenotypic diversity of six maize inbred lines for nine quantitative yield traits, and the possibilities of using these lines in maize breeding.

MATERIAL AND METHOD

The experimental design was a randomized complete block (RCB) with six inbred lines in three replications.

From each plot 20 plants were evaluated for the following yield traits: plant height (PH); leaf number/plant (LN); cob length (EL); row number/cob (RN); grains number/row (GN/R); grains number/cob (GN/C); cob weight (CW); grains weight (GW); grain rate (GR).

The data were analyzed by similarity coefficients, UPGMA cluster analysis, ANOVA, principal components.

RESULTS AND DISCUSSIONS

According to the data presented in table 1 we observe that concerning the nine quantitative traits, the highest phonotypical similarity is present between lines: Lc 113- Lc 86 (95,13 %); Lc 864 – Ta 409 (88,42 %); Lv 94 – Ta 409 (83,09 %); Lv 94- Lv 95 (82,10 %). Therefore., it is less likely that hybrids obtained by combining these lines to manifest high levels of heterosis for analyzed yield traits.

A high level of phenotypic differentiation was observed between lines: Lc 86 – Lc 864 (56,40 %); Lc 113- Lc 864 (51,25 %); Lv 95- Lc 864 (45,79 %); Lc 864 – Lv 94 (41,34 %). Crossing this phenotypical differentiated lines allows the obtaining of hybrids with a gene combinations useful for different yield components. Having in mind the six lines involved in the study we observe that line Lc 864, manifests a high average phenotypic differentiation (approximately 50 %), in comparison to the other lines, exception being the Ta 409.

Table 1

Similarity coefficients between maize inbreed lines related to analyzed quantitative traits

No.	Lines	Lc 113	Lc 86	Lv 94	Lv 95	Lc 864	Ta 409
1	Lc 113	1.00	0.9513	0.6563	0.6878	0.4875	0.5759
2	Lc 86	0.9513	1.00	0.7708	0.7321	0.4360	0.6393
3	Lv 94	0.6563	0.7708	1.00	0.8210	0.5876	0.8309
4	Lv 95	0.6878	0.7321	0.8210	1.00	0.5421	0.6224
5	Lc 864	0.4875	0.4360	0.5876	0.5421	1.00	0.8842
6	Ta 409	0.5759	0.6393	0.8309	0.6224	0.8842	1.00

Having in mind the phenotypic similarity among the six consanguine lines, we made a dendrogram by the cluster method, which presents 3 clusters.

First group is composed of lines Lc 113 and Lc 86 which manifest a reduced phenotypic differentiation of approximately 5 %. In the second cluster are included lines Lv 94 and Lv 95 with a phenotypic similarity of 82 %, respectively a differentiation of approximately respectiv 30 % from lines of the first group.

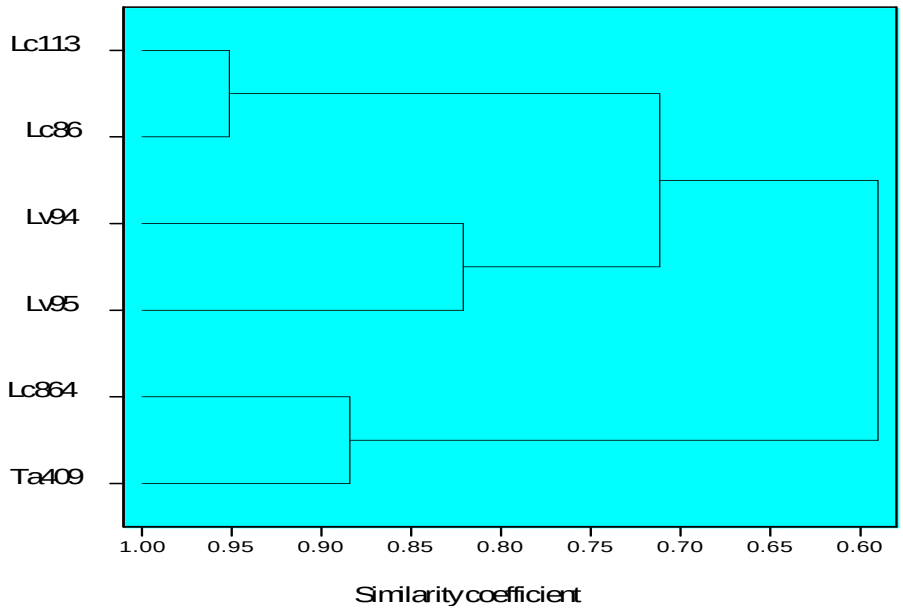

Fig. 1. UPGMA clustering of maize inbred lines according with the quantitative yield traits

Lines Lc 864 and Ta 409 with a similarity of approximately 89 % make the third group, manifesting a medium differentiation of 40 % in comparison to the other four lines.

According to the result presented in table 2, we observe that lines Lc 864 and Ta 409 generate the highest differences between studied traits, having high contributions for total variability. The lowest variability was recorded in case of line Lv 95.

Table 2

Variance analysis for the inbred lines with reference to studied quantitative traits

No.	Line	Between groups		Inside groups		F value
		SS	DF	SS		
1	Lc 113	61988	1	17631	7	24.61**
2	Lc 86	58830	1	17184	7	23.96**
3	Lv 94	53366	1	17123	7	21.82**
4	Lv 95	53234	1	18097	7	20.59**
5	Lc 864	64907	1	17349	7	26.19**
6	Ta 409	60303	1	16722	7	25.24**

Referring to variance analysis for studied quantitative traits in respective lines, we observe that high and significant values of variance were recorded in case of grain weight per cob and grain number per row. The lowest variability among consanguine lines was observed for leaf number/plant, cob length and number of rows per cob.

Table 3

Variance analysis for the quantitative traits studied in maize inbred lines

No.	Traits	Between goups		Inside groups		F value
		SS	DF	SS	DF	
1	Plant height	1.12	1	15.54	4	0.29
2	Leaf number/plant	0.01	1	0.12	4	0.07
3	Cob lenght	0.01	1	0.31	4	0.11
4	Row number/cob	0.04	1	0.13	4	1.27
5	Grains number/row	1.42	1	0.38	4	15.07**
6	Grains number/cob	1.94	1	48.88	4	0.16
7	Cob weight	0.24	1	28.50	4	0.03
8	Grain rate	0.18	1	0.82	4	0.89
9	Grains weight	433.33	1	100.19	4	17.30**

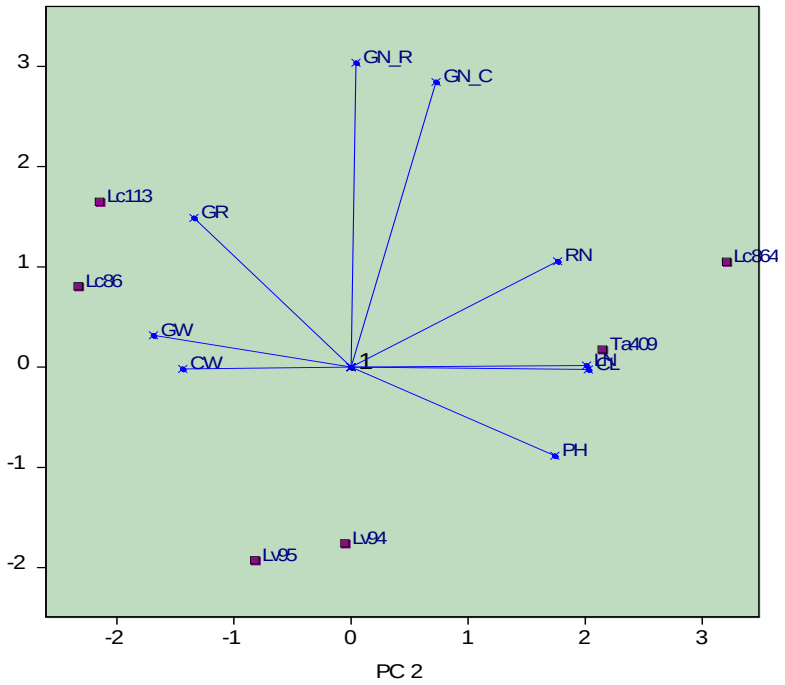

Fig. 2. Biplot graphic of first two principale components for the studied inbred lines and traits

The biplot graphic based on first two main components explain 96,5 % from the nine traits variability. Also, it indicates that the lines Lc 113 and Lc 86 presents high values of grain number/row, grain number/cob, cob weight and grain weight per cob.

Lines Lc 864 and Ta 409 are valuable regarding grain percentage, manifesting superior values of plant height and leaf number per plant. For line Lc 864 we recorded the highest value of gain number per cob.

CONCLUSIONS

The maize inbred lines differed significantly in several parameters measured, because they come from some distinct genetic and morphological backgrounds.

The UPGMA clustering groups studied consanguine lines in three groups with a average phenotypic diversity of 30-40 %.

The results of this study suggest that some of maize inbred line represent a valuable material for different yield traits, that could be successively used for further breeding program include diallel crossing methods, as a good base for development of the hybrid combination.

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DETECȚIA PLANTELOR MODIFICATE GENETIC (PORUMB ŞI SOIA) ÎN PRODUSE FURAJERE COMPLEXE

DETECTION OF GENETICALLY MODIFIED CORN AND SOYBEAN IN COMPLEX FEED PRODUCTS

MIHACEA SORINA, BOLDURA OANA-MARIA

Key words: Bt corn, RR soybean, genetically modification, PCR

REZUMAT

Scopul prezentei lucrări a fost de a detecta porumb şi soia modificate genetic în nouă amestecuri de făină şi furaje, deoarece ambele produse se găsesc pe piață în România – porumbul este cultivat, iar soia este importată. Au fost testate nouă probe dintre care două au conținut numai soia, două numai porumb, iar în celelalte şapte probe au fost prezente ambele specii. Etapa de detecție a produselor modificate genetic a subliniat că patru dintre probe au conținut soia modificată genetic iar alte trei porumb transgenic.

Prezentele experimente au evidențiat că detecția plantelor modificate genetic este posibilă, chiar dacă sunt prezente în amestecuri complexe. Procedurile de detecție sunt precise, permițând o identificare sigură.

ABSTRACT

The aim of this paper was to detect genetically corn and soybean in nine feed or flour mixtures because both of these GM products are present on Romanian market – GM corn is cultivated and GM soybean is imported. Nine samples were analyzed and it turned out that two of them contained only soybean, two only corn and seven samples contained both of the species. The step involving GM specific amplifications pointed out that four of the samples contained GM soybean and other three samples contained GM corn.

Our experiments pointed out that the detection of GM soybean and corn it is possible, even when both of them are present in a complex product. The detection reactions are accurate, allowing an unambiguous identification.

INTRODUCTION

In this period in Romania, the MON 810, a variety of genetically modified corn developed by Monsanto Company is cultivated. This variety is genetically engineered to produce a modified insecticide (Cry1Ab) which protect the corn plants from European corn borer larvae (*Ostrinia nubilalis*). The cry IA coding sequence from Bacillus thuringiensis was modified to optimize and maximize the expression of the δ-endotoxin CRYIA protein in plants. The protein becomes toxic for lepidopterean larvae following cleavage to a bio-active trypsin-resistant core. The insecticidal activity is considered to be depend on the binding of the active fragment to specific receptors present on the midgut epithelial cells of susceptible insects and eventually resulting in cell lysis. The aminoacid sequence of the toxin expressed in the modified corn was found to be identical to that occurring naturally, and equivalent to the protein produced as a biopesticide being widely used by the organic food industry. The construct used in the transformation of MON 810 corn (GM corn) include the enhanced CaMV 35S-promoter, the corn hsp70 intron 1 and the synthetic δ-endotoxin cry IA [1,7,8].

Another GM product is the Roundup Ready (RR) soybean with tolerance to glyphosate, which is imported in our country. Glyphosate, the active ingredient of Roundup is a systemic, post emergent herbicide used worldwilde as a non-selective weed control agent. Glyphosate acts as a competitive inhibitor of 5-enol-pyruvylshikimate-3-phosphate (EPSPS), an essential enzyme of the shikimate biochemical pathway involved in the production of the aromatic aminoacids phenylalanine, tyrosine and tryptophan. The inserted glyphosate tolerance gene codes for a bacterial version of this essential enzyme, ubiquitous in plants, fungi and microorganisms and is highly insensitive to glyphosate. It can therefore fulfil the aromatic aminoacid metabolic needs for plant. The construct used in the transformation of RR Soybean (Gm soybean) include the enhanced CaMV 35S-promoter, the chloroplast transit peptide from petunia hybrida, EPSPS gene from *Agrobacterium* sp. strain CP4, followed by the *nos* terminator [2,6,8].

The aim of this paper was to detect genetically modified (GM) corn and soybean in nine feed or flour mixtures because both of these GM products could be found.

Usually GMO screening is performed by targeting specific regulatory sequences – promoters or terminators shared by the most aproved GMO. It is known that in RR soybean, the identification of both the 35S promoter and the nos terminator is possible, whereas only the 35S promoter is present in the MON 810 corn line. To avoid the confused results the genetically modified soybean was detected using the *nos* terminator and for corn, a fragment between CaMV 35S-promoter and the corn hsp70 intron (*mg* region) was amplified.

The detection method was PCR (Polymerisation Chain Reaction), using the primers designed for the specific genes. The first step was the DNA isolation and purification, from all of the samples. Then, to check if the DNA is amplifiable, primers for *zein* (corn specific) and *lectin* (soybean specific) genes were used. The primers ZEIN 3 and ZEIN 4 specific to the corn *zein* gene will be used to confirm the presence and quality of DNA extracted from the corn samples. If the extracted DNA is present, intact and amplifiable a band of 277 bp will be amplified. The primers for *lectin* gene, GMO3 and GMO4 were used for the same purpose and the length of the amplified fragment have to be 118bp. These analysis will be used to determine if the samples contained corn, soybean or both [5].

Then, to check if the samples are genetically modified, the GMO screening was performed. All of the samples were amplified with mg1, mg2 primers and nos primers and the products were analysed: a 610 bp fragment pointed out the GM corn presence and a 118 one is specific for GM soybean.

MATERIAL AND METHODS

As biological material nine complex samples, with different GMO content were used. First the samples were grinded, the flour was homogenized and then the analytical samples were prepared (100 mg for each sample).

The DNA was extracted using CTAB method [4]; beside, an extraction blank control (EB) and an environment control (EC) were done. The DNA was quantified by spectrophotometry method and then it was analysed.

The DNA was analysed using the following amplifications [3]:

The primers sequences for corn:

ZEIN3: AGTGCGACCCATATTCCAG and ZEIN4: GACATTGTGGCATCATCATT

The amplification program was as follows: denaturation 95°C - 3 min; 50 cycles: denaturation 95°C -1 min; primer annealing 60°C - 1 min, DNA synthesis 72°C - 1 min; final extension 72°C - 3 min.

The primers sequences for soybean:

GMO3: GCCCTCTACTCCACCCCCATCC and GMO4:GCCCATCTGCAAGCCTTTTTGTG

The amplification program was as follows: denaturation 95°C - 3 min; 40 cycles: denaturation 95°C -30 sec; primer annealing 63°C - 30 sec, DNA synthesis 72°C - 30 sec; final extension 72°C - 3 min.

The primers sequences for *nos:*

nos-f:GCATGACGTTATTTATGAGATGGG and *nos-r*: GACACCGCGCGCGATAATTTATCC

The amplification program was as follows: denaturation 95°C - 3 min; 40 cycles: denaturation 95°C -25 sec; primer annealing 62°C - 30 sec, DNA synthesis 72°C - 45 sec; final extension 72°C - 7 min.

The primers sequences for *mg region:*

mg1 TATCTCCACTGACGTAAGGGATGAC and mg2 TGCCCTATAACACCAACATGTGCTT

The amplification program was as follows: denaturation 95°C - 3 min; 50 cycles: denaturation 95°C -45 sec; primer annealing 62°C - 50 sec, DNA synthesis 72°C - 50 sec; final extension 72°C – 3 min.

The content of the PCR mixture was the same for all of the amplificationa: PCR buffer 1x; MgCl2 2,5mM; dNTP 0,2mM; primer 1 0,5µM; primer 2 0,5µM; Taq DNA polymerase 0,025U.

The PCR products were analysed by agarose gel electrophoresis and DNA fragments were visualised with ethidium bromide in UV light.

RESULTS AND DISCUSSIONS

After the DNA was extracted from all of the samples the specie specific amplifications were performed. All of the samples were amplified with both pairs of primers, for zein and lectin genes and the products were analysed by agarose gel electrophoresis (Fig. 1).

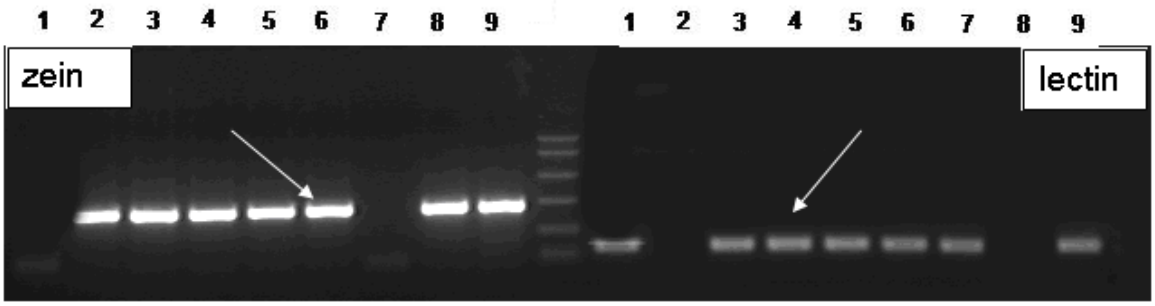

Fig. 1. The DNA amplification with zein primers (left) and lectin ones (right)
(1-9 the analyzed samples)

It turned out that the samples 2,3,4,5,6,8 and 9 contained corn and the soybean was present in 1,3,4,5,6,7 and 9 samples, because a 277 bp, respectively 118 bp were amplified. It seemed that the samples 3,4,5 and 6 contained both, corn and soybean products, 1 and 7 only corn and 2 and 8 only soybean.

Further on, the test for each of the GM products was performed, to check if the corn or the soybean present in the analysed samples were genetically modified or not.

In the first step the primers specific for the GM corn were used. The gel analysis confirmed that the cross contamination was avoided in the DNA extraction procedure. For the extraction blank, a sample which was generated by performing all steps of the extraction procedure, except addition of the test portion (test portion was substituted by equal amount of water) the amplification reaction was negative. The PCR controls were also as expected (610 bp). The non template control (NTC) was negative, confirming that the contamination was avoided during the PCR reagents manipulation.

Analyzing the results it was pointed out that from the samples 2,3,4,5,6,8 and 9 which contained corn, only in 3, 6 and 8 it was genetically modified (Fig.2).

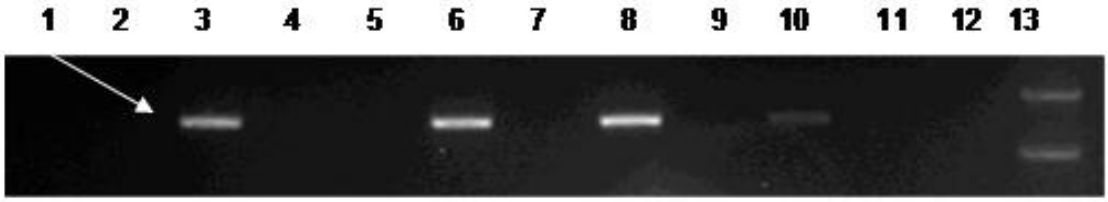

Fig. 2. The DNA amplification with mg1/mg2 primers, specific for GM corn
(1-9 analyzed samples. 10-positive control, 11 – extraction blank, 12- non template control, 13- molecular marker)

In the next step the primers specific for the GM soybean were used. The gel analysis confirmed that all of the negative and positive controls were as expected. The amplified band had 118 bp, specific for nos gene terminator.

Analyzing the results it was pointed out that from the samples 1,3,4,5,6,7 and 9 samples which contained soybean, only in 5, 6 and 7 it was genetically modified (Fig.2).

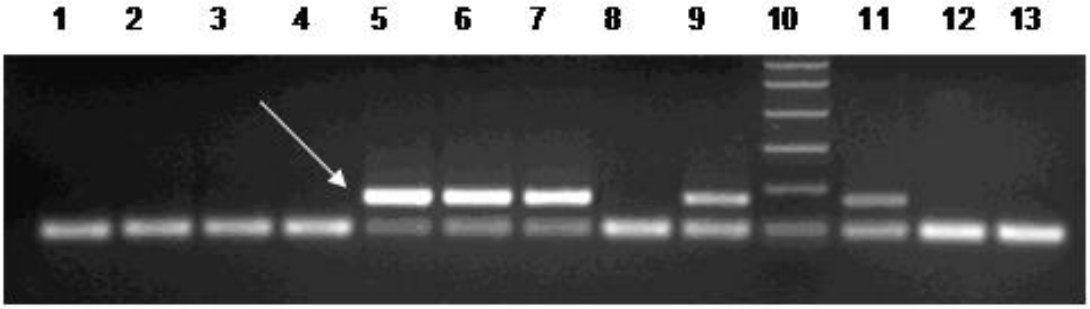

Fig. 3. The DNA amplification with nos primers, specific for GM soybean
(1-9 analyzed samples. 11-positive control, 10- molecular marker, 11 positive control, 12-extraction blank, 12- non template control)

The samples positive for *zein*, but negative for mg region were considered to be conventional corn and the samples positive for *lectin* but negative for *nos* were considered to contain conventional soybean.

The summarization of the results allowed the determination of the précised content from each of the analyzed sample (Table 1).

Four of the samples contained only one specie (two positives and two negatives) 1-negative RR soybean, 2 - negative GM corn, 7-positive GM soybean, 8-positive GM corn. Other five ones contained the both species, with different content in GM product: 3-negative GM soybean, positive GM corn, 4-negative GM soybean negative GM corn, 5-positive GM soybean negative GM corn, 6-positive GM soybean positive GM corn, 9-positive GM soybean negative GM corn.

It turned out that even the analyzed products were complex, the DNA extraction was possible and also the GM detection.

Table 1

The samples content according with different amplification reactions

Sample number	Soy bean	GM Soybean	Corn	GM corn	The sample content
1	**+**	**-**	**-**	**-**	negative GM soybean
2	**-**	**-**	**+**	**-**	negative GM corn
3	**+**	**-**	**+**	**+**	negative GM soybean, positive GM corn
4	**+**	**-**	**+**	**-**	negative GM soybean negative GM corn
5	**+**	**+**	**+**	**-**	positive GM soybean negative GM corn
6	**+**	**+**	**+**	**+**	positive GM soybean positive GM corn
7	**+**	**+**	**-**	**-**	positive GM soybean
8	**-**	**-**	**+**	**+**	positive GM corn
9	**+**	**+**	**+**	**-**	positive GM soybean negative GM corn

CONCLUSIONS

The present experiments pointed out that two samples contained only soybean, two only corn and seven samples contained both of the species. For GM soybean, the identification the *nos* terminator was performed, whereas the mg region (from 35 S promoter) was amplified for the GM corn detection. It turned out that three samples contained GM corn because only *mg* region was amplified and other four samples contained GM soybean.

Our experiments pointed out that the detection of GM soybean and corn it is possible, even both of them are present in a product. The detection reactions are accurate, allowing an unambiguous identification.

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CERCETĂRI CU PRIVIRE LA STUDIEREA REZISTENȚEI

LA ÎNGHEŢ LA NUC

RESEARCH REGARDING COLD RESISTANCE IN WALNUT TREE

MOTOUNU MONICA

Key words: cold resistance, walnut tree.

REZUMAT

Dintre factorii climatici, un rol hotărâtor în viaţa plantelor îl au condiţiile nefavorabile din timpul iernii. Prin noţiunea de rezistenţă la îngheţ se înţelege capacitatea plantelor de a supravieţui la temperaturi suboptimale, iar prin rezistenţa la iernare se înţelege capacitatea de a rezista fără vătămări la ansamblul condiţiilor nefavorabile din timpul iernii, cu particularităţi caracteristice pentru diferite zone naturale. Rezistenţa nucului la acţiunea temperaturilor scăzute este necesară pentru extinderea treptată a ariei de răspândire spre regiuni cu condiţii ecologice mai puţin favorabile şi adaptarea lui printr-un proces de selecţie naturală sau artificială.

În experimente s-au utilizat lăstari de nuc, recoltaţi pe parcursul lunilor de iarnă. S-au efectuat determinări ale conţinutului de apă liberă şi apă legată, ale conţinutului de taninuri şi zaharuri reducătoare. S-au observat modificări fiziologice şi biochimice induse de perioada de repaus.

ABSTRACT

Unfavorable conditions in winter are determinant role for plants life in temperate and cold areas, from among climatic factors. Cold resistance means the plant capability to survive to suboptimal temperature and winter resistance means capability to resist without injuries to unfavorable conditions from winter. Walnut resistance on low temperature is necessary for expansion of spreading area to regions with lower ecological conditions and for walnut adaptation through natural and artificial selection process.

Experiments were performed using walnut branch, during winter months. We determinate free and bound water content, tannins content, reducing sugars. We observed that period of latency induce physiological and biochemical modification in walnut.

INTRODUCTION

Water and reserve substances content influenced frost resistance of trees. The exposure of xylem parenchyma cells to low temperatures induced an increase in intracellular solute concentration, mainly in sugars (Sauter J.J., Kloth S., 1987; Sauter J.J., 1988; Ameglio T., Cruiziat P., 1992). This accumulation of soluble sugars is thought to play a key role in preventing damage during the chilling period (Livingston D., Henson C.A., 1998; Sauter, 1988). The tissues collected when the temperatures were lower, from December to February, exhibited higher content of soluble sugars than those harvested at early autumn or spring, when the minimum temperatures rose to 10°C and above (Sakr S. et all, 2003). Gradually preparation o trees to low temperatures consist in transformation of starch in sugars, going to growth of cell sap concentration. These processes of hydrolysis begin after leafs falls and intensify in winter.

MATERIAL AND METHOD

One-year-old twigs were cut from 10-year-old walnut trees (grown outdoors near Pitesti). The twigs were harvested at different times (the end of each month from November 2008–February 2009). Reducing sugars were determined using Schoorl method. Water content was determined in percents of free and bound water. Tannins content were determined by titration with $KMnO_4$.

RESULTS AND DISCUSSIONS

In figure 1 are represented the results obtained for tannins determinates in walnut twigs. We observe growth of tannins content from November (0,865 %/100 g of fresh weight) to February (1,876 %/100 g of fresh weight), enhanced the frost resistance. Duncan Test show significant differences from results ($p<0,05$).

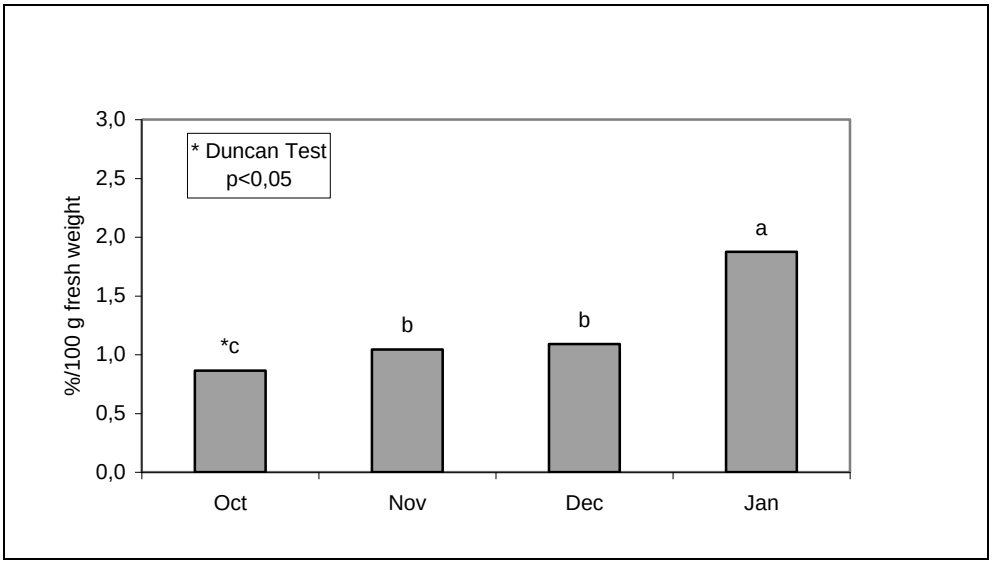

Figure 1. Tannins content in walnut twigs (Different *letters* on top of columns indicate statistical differences at p<0.05 according to the *Duncan test*)

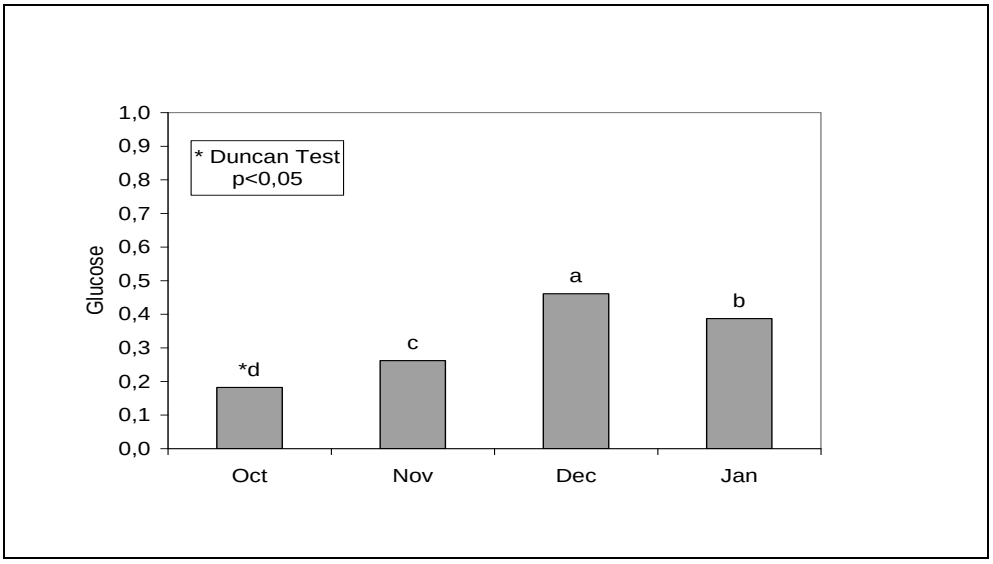

Figure 2. Glucose content in walnut twigs (Different *letters* on top of columns indicate statistical differences at p<0.05 according to the *Duncan test*)

In figure 2 are represented the results obtained for reducing sugars (glucose %) from twigs. The bigger values were obtained in December (0,461 mg) and January (0,387 mg), when were registered the lowest temperature.

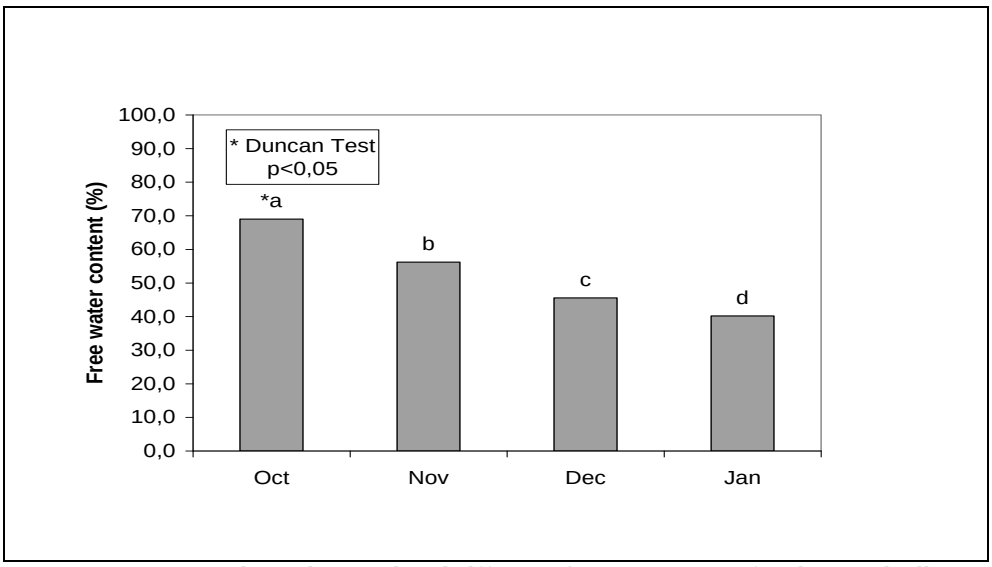

Figure 3. Free water content in walnut twigs (Different *letters* on top of columns indicate statistical differences at p<0.05 according to the *Duncan test*)

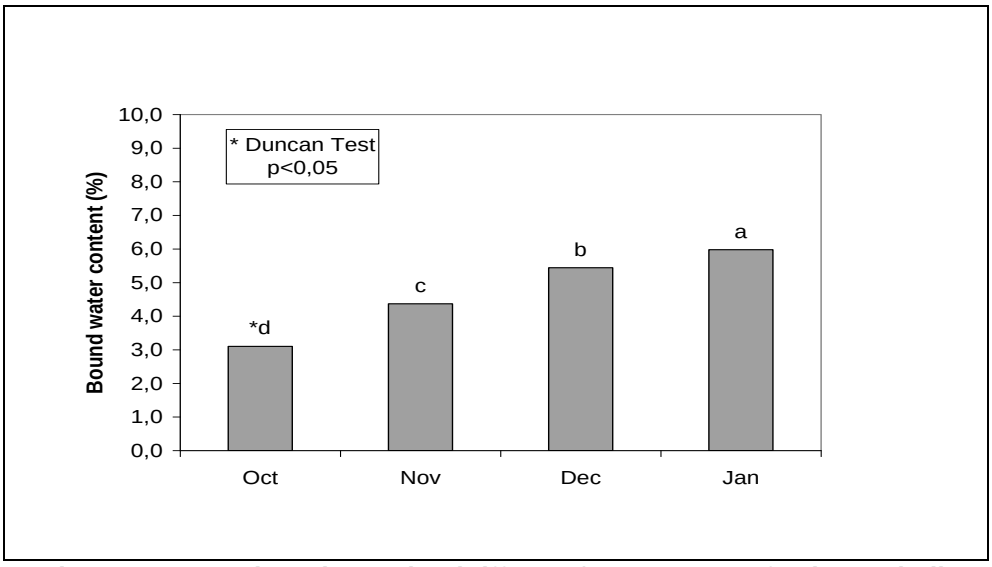

Figure 4. Bound water content in walnut twigs (Different *letters* on top of columns indicate statistical differences at p<0.05 according to the *Duncan test*)

In figures 3 and 4 are represented the values obtained for free and bound water content from walnut twigs in October, November, December and January. The bigger value for bound water are obtained in January (5,98%), correlated with the lower air temperature.

CONCLUSIONS

Latency period induce many modifications of physiological processes in walnut tree, which may be synthesized in:

- Regarding tannins content we observed that once of entrance in latency period the quantity of tannins growth, rising the frost resistance.
- Regarding quantity of reducing sugars, in October glucose content begin to growth, registering the bigger value in December, after this month glucose content decrease.
- In winter, walnut tree enter in latency period, when the intensity of metabolic processes decrease very much, the growth is stopped, correlated with decrease of total water in walnut twigs.

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VARIABILITATEA CARACTERELOR PLANTEI LA UN SET DE LINII CONSANGVINIZATE ŞI LA HIBRIZII REZULTAŢI DIN COMBINAREA LOR, ÎN CONDIŢIILE DE LA SCDA SIMNIC

THE PLANT CHARACTERS VARIABILITY OF SOME INBRED MAIZE LINES SET IN ADRS SIMNIC AREA CONDITIONS

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Key words: inbred line, maize, plant characters

REZUMAT

Principalul obiectiv al lucrării prezentate este studiul comparativ în zona de influenţă a SCDA Şimnic a unor hibrizi de porumb autohtoni şi străini. Ne-am oprit la hibriziiF376 şi Olt, care în ultimii ani s-au dovedit corespunzători pentru zona de centru şi de sud a Olteniei, alături de trei hibrizi de porumb obţinuţi la SCDA Şimnic din linii consangvinizate extrase din populaţii locale de porumb HSŞ1, HSŞ2 şi HSŞ3, iar ca material străin la trei hibrizi KWS: Laureat, Mikado şi Luce, care sunt în ultimii ani recomandaţi ca hibrizi de referinţă în zonă de către firma respectivă.

Materialul este reprezentat de 13 linii consangvinizate (7 româneşti şi 6 străine) şi 8 hibrizi (5 româneşti şi 3 străini) rezultaţi din aceste linii. Liniile consangvinizate folosite sunt: RF408, RF406, RF403, RS235, RS151, RS64, RS13, K5361, K8112, K9340, K7448, K4432 şi K7619. Hibrizii folosiţi sunt: F376 (RF408xRF406), Olt (RF408xRF403), HSŞ1 (RS235xRS151), HSŞ2 (RS64xRS235), HSŞ3 (RS64xRS13), Laureat (K5361xK8112), Mikado (K9340xK7448) şi Luce (K4432xK7619).

A fost analizată variabilitatea caracterelor plantei cu privire la: înalţimea totală a plantei, înălţimea de inserţie, prolificitatea, numărul de frunze pe plantă, numărul de ramificaţii pe plantă, diametrul celui de I doilea interned, SGUT răsărire-înflorit, SGUT răsărire-mătăsit. Cei mai de dorit sunt hibrizii de tipul tardivo – precoce, caracterizaţi printr-o perioadă vegetativă (de acumulare) mai lungă, care să permită o capacitate de asimilare intensă şi rapidă a substanţelor de rezervă şi printr-o perioadă generativă (de formare a producţiei) mai scurtă, care să permită o recoltare mai timpurie şi pregătirea terenului în bune condiţii în toamnă.

ABSTRACT

The main objective of this paper is focus on the comparative study of some autochthonous and foreign inbred maize line in ARDS Simnic field conditions. The material is represented by 13 inbred lines (7 romanian lines and 6 foreign lines). The inbred lines used in this study were: RF 408, RF406, RF403, RS235, RS151, RS64, RS13, K5361, K8112, K9340, K7448, K4432 and K7619.

The results were focus on specific characters, as follows: plant characters (the height of plants, the main maize cob insertion height, maize cobs number/plant, the leaves number/plant, the leaves surface, the ramifications number/ear, the second basis internode diameter, amount of utile temperature degrees (SGUT) from emergence till flowering stage and amount of utile temperature degrees (SGUT) from emergence till silk stage. It was presented the plants characters variability and the significance of differences between some autochthonous and foreign inbred maize line.

INTRODUCTION

Undoubtedly, maize is the most studied plant, especially from genetic point of view. The biological characters of this vegetal species represent the most serious reason of theoretical and experimental genetic researches of maize. The particular advantages for genetic research are represented by: the natural diversity of species, plant morphology and physiology, unsexed reproduction, great number of available gametes for descending generations (each maize plant has ability to form approximately 14-15 million pollen grains and minimum 400-500 female gametes), the cytogenetic structure of somatic cells and maize gametes.

Heterosis is one of the most important biological phenomenons, which has a special practical significance. Numerous studies have emphasized the superior performances for the F1 hybrids, as a result of genetic, phenotypic, physiologic, metabolic, molecular differences among parental crossed forms (Copândeanu Ana and Căbulea, 2004). The hybrid vigor phenomenon, termed heterosis was remarked accidentally in the XX^{th} century when the researchers crossed free-pollinated maize populations. This study importance is more significant as only 36% (911 499 hectares) of the land sowing with maize in Romania (2 531 941 hectares in 2007 year) represent the surface seeded with F1 hybrids. This rate represents an increase with 3% comparatively with the surface seeded with F1 hybrids in 2006 year (33% - 855 335 hectares) when the total surface seeded with maize was 2 591 923 hectares That means in 2007 year was recorded an increase of the surface seeded with F1 hybrids only with 56 164 hectares comparatively with 2006 year. Therefore, we consider that heterosis is sill a current study for romanian researchers.

MATERIAL AND METHODS

The main objective of this paper is focus on the comparative study of some autochthonous and foreign maize inbred lines in ARDS Simnic field conditions.

The material is represented by 13 inbred lines (7 romanian lines and 6 foreign lines). The inbred lines used in this study were: RF 408, RF406, RF403, RS235, RS151, RS64, RS13, K5361, K8112, K9340, K7448, K4432 and K7619.

The methodology used for material evaluation was focus on testing in experimental units with two row-plots and three replications. The trials were hand planted with 2-3 seed rate/hole using a planter. The plants were counted at 4-6 leaves stage, recording a good stand of 50 000 plants/acre for rain fed conditions and 60 000 plants/acre for irrigated conditions. The trial was placed triple balance lattice.

The results were focus on specific characters, as follows: plant characters (the height of plants, the main maize cob insertion height, maize cobs number/plant, the leaves number/plant, the leaves surface, the ramifications number/ear, the second basis internode diameter, amount of utile temperature degrees (SGUT) from emergence till flowering stage and amount of utile temperature degrees (SGUT) from emergence till silk stage.

The variance analysis was calculated for each plant, ear and performance characters and the limit differences estimation was realized comparatively with the average, used as control.

For the estimation of differences significance comparatively with the average was use test **t** values (Ceapoiu, 1968).

RESULTS AND DISCUSSION

Plant height. For this character was observed a very representative variability within the studied lines set and the differences were statistical assured for most cases. Thus, most romanian lines (RF408, RS235, RS64 and RS151) exceeded the average (control value) with distinct and very significant distinct differences or at least were at the control level, as RF406. These inbred lines were used in different combinations, especially

as maternal forms. The lines RF406 and RS13, used exclusively as paternal forms, recorded very significant distinct height level, inferior to that of the control value. On the other hand, the foreign inbred lines showed different height level inferior to that of the control value, excepting K9340 and K7448 line, which exceeded significantly the trial average. This aspect shows, one more, that foreign studied lines were obtained using modern breeding methods, as haploids followed by the material diploidisation, resulting 100 homozygote lines and further a maxim depression expressed in this case by very high decrease of plants height. Comparatively, the romanian lines obtained using classical breeding methods (repeatable inbreeding, SIB pollinations, the second cycle selection) undoubtedly, show a residual heterosis, expressed by shorter height (table1).

The main maize cob insertion height. The studied lines present also great variability for this character and the differences were positive and negative significant comparatively with the control. In this case, is desirable to put the results close or below the average value, because a higher maize cob insertion could have a negative influence to stalk break and lodging resistance. For insertion height the obtained values are statistical assured. Thus, the lines RS235, RS151, Rs64 and K4432 recorded significant superior values comparatively with the control value and those of the lines RF406, RF403, K8112, K7448 and K7691. In case of foreign studied lines was observed lower height insertion, which was presented only to parental forms used for cross-breeding (table 1).

The maize cobs number per plant (prolificacy) For this character didn't exist differences statistical assured, but it was observed that the values of the lines obtained to ARDS Simnic were superior to those of the other studied lines, excepting RS13 line (exclusively used as parental form). For three lines obtained to ARDS Simnic, the results showed the trajectory followed by lines selection focus on better prolificacy correlated with a superior drought tolerance (table 1).

Table 1

Analyze of variance for plant traits at inbreed lines

Inbred lines	Plant height (cm)	The main maize cob insertion height.	Prolificacy	The leaves number per plant	The leaves surface	The ramifications number per ear.	The second basis internode diameter	SGUT (emergence till flowering stage)	SGUT (emergence till silk stage)
RF 408	242***	87***	1,15	13,9	41,75^{o}	4,8^{ooo}	2,89	825	851
RF 406	204	55^{ooo}	1,05	13,9	49,91**	8,8***	3,12**	803	838
RF 403	171^{ooo}	58^{ooo}	1,03	12,6^{ooo}	35,19^{ooo}	12,7***	3,20***	804	808^{o}
RS 235	232***	82**	1,17	13,8	42,88	8,9***	2,96	813	838
RS 151	219**	94oo95***	1,14	13,9	51,12***	14,3***	2,91	814	839
RS 64	242***	80	1,17	16,5***	64,62***	10,3***	2,78	872*	872
RS 13	168^{ooo}	74	0,99	14,4	45,79	12,8***	2,88	825	829
K 5361	187^{oo}	60^{ooo}	1,08	12,8^{oo}	28,92^{ooo}	4,0^{ooo}	2,95	715^{ooo}	773ooo
K8112	173^{ooo}	72	1,02	12^{ooo}	37,40^{ooo}	4,4^{ooo}	2,71	804	829
K9340	214*	72	1,05	17,1***	49,90**	4,4^{ooo}	2,56^{ooo}	851	887*
K7448	217*	68^{oo}	1,09	14,3	41,02^{oo}	4,8^{ooo}	2,50^{ooo}	877**	911***
K4432	197	86***	0,96	16,6***	49,22**	4,4^{ooo}	2,62^{oo}	898***	918***
K7619	169^{ooo}	68	1,14	14,2	45,76	4,3^{ooo}	2,41^{ooo}	905***	868
Mean	**202,7**	**75,5**	**1,08**	**14,3**	**44,88**	**7,6**	**2,81**	**831**	**851**
DL5%	10,68	4,21	0,13	0,83	2,84	0,39	0,17	32,06	32,63
DL1%	14,51	5,72	0,18	1,13	3,86	0,53	0,23	43,57	44,35
DL 0,1%	19,44	7,66	0,24	1,52	5,17	0,71	0,31	58,35	59,40

The leaves number per plant. It was observed that the differences were statistical assured, but the values weren't always correlated with higher plants length, as we expected.

The precocious lines K5361 and K8112 recorded significant distinct values inferior to the control value. This is happen due to pronounced depression, as a result of breeding method (haploidy), expressed in this case through accented depression of plants vigor.

The leaves surface. For most cases, this character recorded statistical assured differences comparatively with the control, which were closely correlated with plant leaves number. Thus, the lines RF403, K5361 and K8112 recorded significant differences inferior to the control value (similar situation as leaves number character) and the lines RS64, K9340 and K4432 recorded also significant differences superior to the control value. It is remarkable the value of the line RS151, which exceeded the control value with very significant distinct differences, even the plant leaves number are below the experience average. This aspect illustrate a very accented leaves growth and also a very intensive photosynthetic activity reflected by the high yield level (54,7 q/ha).

The ramifications number per ear. For this character all studied lines presented very significant distinct differences positive for the lines: RF406, RF403, RS235, RS151, RS64, RS 13 and negative for the lines: RF408, K5361, K8112, K9340, K7448, K4432, K7619, comparatively with the control value. It is to observe that romanian lines, excepting RF408 line, are distinguished by foreign lines recording numerous ramifications per ear. This type of ear could determine better drought and heat tolerance, especially for spreading out the pollen for longer period, but could have also negative effect to the yield, because the plants consume great amount of synthesized elements.

The line RF408 was the only one which is clearly different not only as the ear aspect, but also as the phenotypic plant aspect. This line is possible to include in genotype genes preceded from different germplasm sources, other than romanian local populations.

The second basis internode diameter. Analyzing this character can be observed that delayed foreign lines show a remarkable lightness and the selection of these lines taking account a superior stalk break and lodging resistance, based on excellent stem flexibility and also reduced resistance to header combine action. Therefore, the hybrids Mikado and Luce are recommended for grain and fodder. The lines K9340, K7448, K4432 and K7619 are remarkable through significant inferior differences comparatively with the control value. On the other side are situated two inbred lines used as parental forms for romanian valuable hybrids, as follows: RF406 and RF403.

SGUT (emergence till flowering stage) and SGUT (emergence till silk stage)

Considering the data recorded between flowering and silk stages we classify the studied lines in three groups: earliness lines (K5361), intermediate lines (K8112, RF406, RF403, RS235, RS151, RS13) and delayed lines (RF408, RS64, K9340, K7448, K4432, K7619).

CONCLUSIONS

For the plant height was observed a very representative variability within the studied lines set and the differences were statistical assured for most cases. The studied lines present also great variability for the main maize cob insertion height and the differences were positive and negative significant comparatively with the control. For the prolificacy didn't exist differences statistical assured, but it was observed that the values of the lines obtained to ARDS Simnic were superior to those of the other studied lines, excepting RS13 line. It was observed that the differences between the leaves number per plant were statistical assured, but the values weren't always correlated with higher plants length, as we expected. For most cases, the leaves surface recorded statistical assured differences comparatively with the control, which were closely correlated with plant leaves number. All studied lines presented very significant distinct differences positive for the lines: RF406, RF403, RS235, RS151, RS64, RS 13 and negative for the lines: RF408, K5361, K8112,

K9340, K7448, K4432, K7619, comparatively with the control value, for the ramification number per ear. Analyzing the character the second basis internode diameter can be observed that delayed foreign lines show a remarkable lightness and the selection of these lines taking account a superior stalk break and lodging resistance, based on excellent stem flexibility and also reduced resistance to header combine action.

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CONSIDERAŢII PRIVIND FLORA SEGETALĂ ŞI GRADUL DE ÎMBURUIENARE DINTR-O CULTURĂ DE VIŢĂ DE VIE A PODGORIEI ŞTEFĂNEŞTI - ARGEŞ

CONSIDERATIONS REGARDING SEGETAL FLORA AND WEEDING DEGREE OF A VITICULTURAL PLANTATION FROM STEFANESTI - ARGES VINEYARD

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Key words: segetal flora, weeding degree, vineyard, Ştefăneşti, Argeş.

REZUMAT

Prezenta lucrare a fost elaborată pe baza studiilor întreprinse în cadrul proiectului nr. 51-009/2007, „Strategii alternative recomandate producătorilor viticoli privaţi de combatere a buruienilor şi fertilizare a plantaţiilor cu impact asupra conservării şi îmbunătăţirii însuşirilor biologice, fizice şi a materiei organice din sol”.

Unul din obiectivele specifice ale proiectului este combaterea buruienilor din plantaţiile viticole intensive, pentru prezervarea şi îmbunătăţirea însuşirilor fizice, chimice şi biologice ale solului, prin: folosirea raţională a erbicidelor (fără riscuri majore pentru mediu), menţinerea intervalului dintre rândurile de plante sub un covor vegetal anual, mulcirea solului, de pe intervalul dintre rândurile de plante, cu material biologic (resturi vegetale uscate).

Investigaţiile efectuate s-au axat pe întocmirea unui inventar al florei segetale dintr-o plantaţie viticolă şi determinarea gradului de îmburuienare în trei variante experimentale, folosind rama metrică: ogor negru/îngrăşăminte verzi erbicidat, ogor negru neerbicidat şi mulci (paie şi coceni tocaţi).

SUMMARY

This paper was elaborated on the basis of studies effected for the project no. 51009-2007, „ALTERNATIVE STRATEGIES RECOMMENDED FOR PRIVATE PRODUCERS TO PROTECT THE VINEYARD AGAINST WEEDS AND THE VINEYARD FERTILIZATION WITH IMPACT AGAINST CONSERVATION AND IMPROVING BIOLOGICAL, PHYSICAL FEATURES AND ORGANIC MATTER FROM SOIL”.

One of the specific objectives of the project is the weed control from the intensive vineyards to preservation and improvement of physical, chemical and biological characteristics of the soil: rational use of herbicides without major risks to the environment, the maintenance of an annually vegetal layer on the interval among the plant rows, mulching of soil on the interval of plant rows with biological material (dried vegetal remains).

In this paper we present an inventory of segetal flora from a vineyard and determination of weeding degree in three experimental variants, using metric frame: black field/ green manures with herbicides, black field without herbicides and mulch (straw + chopped maize stalk).

INTRODUCTION

A broad knowledge and the inventory of segetal flora, together with the establish of weeding degree, are important actions in planning a rational weed management in agriculture.

The relief of vineyard Ştefăneşti-Argeş very roughed, comprising a south-south western principal slope, out of which are opened numerous amphitheatres on valleys of the affluents from the left bank of Argeşel river. The climatic conditions (T_m= + 10^0C, P= 617-700 mm, the dominant winds (North – East (21,6%), South-East (16,85%), v=2-2,5 m/s) are favourable for cultivation of wine.

The type of soil is regosol with a low alkaline reaction and small quantity of organic matter (humus). This soil presents a low permeability for water. The humidity is uniform in case of variant with mulch and vegetal remains (10-12 cm and 5-8 cm thickness).

MATERIALS AND METHODS

The floristic inventory of weeds and work of mapping segetal flora was carried out in 2009, in a viticultural plantation from Ştefăneşti-Argeş vineyard. The weeding degree was realized in April, May and June, using numerical quantitative method (Chirilă, 1989) with the sample surface of 0,25 m^2. To establish the average number of weeds/m^2 were effected 33 measurements with a 50 x 50 cm frame: 14 measurements in black field without herbicides – **V1**, 10 measurements in black field/green manures with herbicides – **V2**, and 9 measurements in mulch plot (straw + chopped maize stalk) – **V3**.

The fixing points were disposed at an equal distances between of them, at 3 m distance from the edge of rows. All data from the fields were comprised in synthetic tabels (Table nr. 1, 4, 7), but the number of individuals from each fixing point was multiplied with 4 to express the weeding degree at m^2.

On the basis of determinations effected in the fields, we calculated: average of weeds/m^2 for each species (m), participation (p%) and constancy (k%). After the classification of the species in 6 biological categories we calculated the ratio between it.

For each species were given information regarding its affiliation to various ecological factors: humidity, temperature and soil reaction.

The averages of all weeds belonging to the same group of weeds are added, for to know which are the groups who should be given a special attention (Table 3, 6, 9).

To establish the similitude degree regarding floristic composition (weed species) of the analized variants, the similarity Jaccard ratio was calculated with the NTSYS soft.

RESULTS AND DISCUSSIONS

In the mapping plots were identified 62 species (most of them are annual dicotyledons), which belongs to 25 botanical families. The most of the weeds belongs to *Asteraceae* (14 sp.), followed by *Poaceae* (8 sp.), *Fabaceae* (5 sp.), *Brassicaceae* (4 sp.), *Lamiaceae* (3 sp.), *Polygonaceae* (3 sp.), *Scrophulariaceae* (3 sp.), etc.

The dominant weeds from each of variants are:

- *Portulaca oleracea* (136,28 plants/m^2), *Setaria viridis* (53,71 plants/m^2) and *Echinochloa crus-galli* (50,57 plants/m^2) – **V1**;
- *Xanthium italicum* (12,4 plants/m^2), *Convolvulus arvensis*(13,6 plants/m^2), and *Setaria viridis* (48 plants/m^2) - **V2**;
- *Conyza canadensis*(12,44 plants/m^2), *Cirsium arvense* (6,22 plants/m^2), *Tussilago farfara* (6,22 plants/m^2) and *Bromus sterilis* (19,11 plants/m^2) – **V3**.

In this case, the mulch stratum creates a different conditions (thermic, hygric and photic), which permitted development of the others species of weeds.

If the moisture factor is regarded, the mesophytes (45,16%) account for the highest percentange. According to the temperature index, the flora is preponderantly mesothermal, the mesothermal species being dominant (46,77%). From the point of view of soil reaction, the flora has a predominant euriionic character (50%). But, also, the cormoflora fund is remarked by the particicpation with a significant weight low acid neutrophilic species (33,87%).

The floristic spectrum of the plots without herbicides is almost similar with the variant – black field/green manures with herbicides, but presents a small weeding degree, approximately 110,8 plants/m^2. The floristic similarities between **V1** and **V2** are emphasized by the grouping in the same branch of cluster diagram (the value of Jaccard index is 0,3) (Fig. 1). The **V3** variant presents a reduced similarity with the others variants, from the point of weeds spectrum, and the value of Jaccard in this case is 0,278.

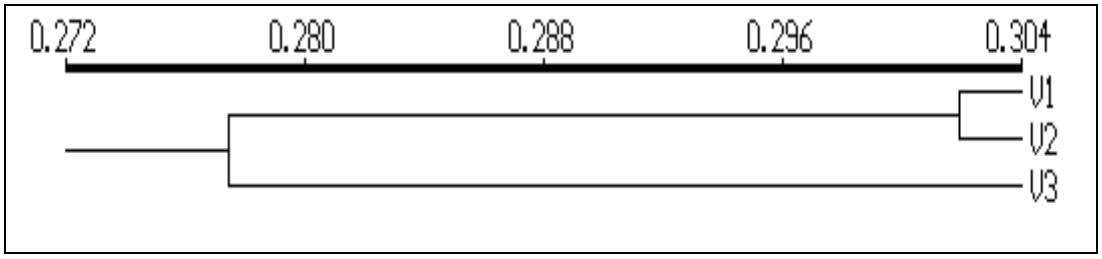

Fig. 1. Dendrogram of the analyzed variants

Foto 1 – Experimental plot (V1)

Foto 2 – Experimental plot (V2)

Foto 3 – Experimental plot (V3)

Table 1

The weeding of viticultural plantation (V1) from Ştefăneşti, Argeş (April - June 2009) vineyard

Nr. crt.	Species	Measurements														m	p%	k%	Biological categories	Group of weeds
		1	2	3	4	5	6	7	8	9	10	11	12	13	14					
1.	*Portulaca oleracea*	220	400	212	100	120	144	128	200	340	-	40	-	4	-	136,28	34,26	78,57	A.d.	9
2.	*Amaranthus retroflexus*	44	80	140	64	-	-	-	-	-	80	60	52	88	16	44,57	11,20	64,28	A.d.	8
3.	*Convolvulus arvensis*	56	40	-	4	36	-	-	48	100	40	20	40	20	20	30,28	7,6	78,57	P.d.	23
4.	*Setaria viridis*	80	80	40	40	72	120	24	96	200	-	-	-	-	-	53,71	13,5	64,28	A.m.	42
5.	*Echinochloa crus-galli*	40	80	-	40	-	-	60	48	116	4	40	80	80	120	50,57	12,71	78,57	A.m.	42
6.	*Digitaria sanguinalis*	80	72	120	-	28	24	72	120	24	-	-	-	-	-	38,57	9,69	57,14	A.m.	43
7.	*Cirsium arvense*	24	-	-	4	-	-	20	24	-	4	-	4	4	4	6,28	1,57	57,14	P.d.	23
8.	*Xanthium italicum*	-	-	-	24	4	16	-	4	-	-	-	-	-	8	4	1	35,71	A.d.	10
9.	*Polygonum convolvulus*	-	-	-	4	-	-	-	-	-	-	-	-	-	-	0,28	0,07	7,14	A.d.	3
10.	*Elymus repens*	-	-	-	-	72	24	104	76	100	-	-	-	-	-	26,85	6,75	35,71	P.m.	54
11.	*Chenopodium album*	-	-	-	-	-	4	-	-	-	20	16	20	16	8	6	1,5	42,85	A.d.	8
12.	*Hibiscus trionum*	-	-	-	-	-	-	-	-	-	-	-	-	4	-	0,28	0,07	7,14	A.d.	10
-	-	544	752	512	280	332	332	408	616	880	148	176	196	216	176	**397,67**	**99,86**	**-**	**-**	**-**

Table 2

Other species

1.	*Solanum nigrum*	A.d.	**13.**	*Capsella bursa-pastoris*	A.d.
2.	*Conyza canadensis*	A.d.	**14.**	*Setaria pumila*	A.m.
3.	*Clematis vitalba*	P.d.	**15.**	*Matricaria inodora*	A.d.
4.	*Medicago lupulina*	A.d.	**16.**	*Daucus carota* ssp. *carota*	A.d.
5.	*Sorghum halepense*	P.m.	**17.**	*Cichorium intybus*	P.d.
6.	*Sambucus ebulus*	P.d.	**18.**	*Veronica persica*	A.d.
7.	*Trifolium repens*	P.d.	**19.**	*Sonchus arvensis*	P.d.
8.	*Galinsoga parviflora*	A.d.	**20.**	*Torilis arvensis*	A.d.
9.	*Papaver dubium*	A.d.	**21.**	*Bromus sterilis*	A.m.
10.	*Stellaria media*	A.d.	**22.**	*Lamium amplexicaule*	A.d.
11.	*Thlaspi arvense*	A.d.	**23.**	*Cornus sanguinea*	P.d.
12.	*Descurainia sophia*	A.d.			

Table 3

Average number of weeds on groups (m^2)

Gr. 3	36,56	**Gr. 23**	36,56
Gr. 8	50,57	**Gr. 42**	104,28
Gr. 9	136,28	**Gr. 43**	38,57
Gr. 10	4,28	**Gr. 54**	26,85

The ratio between biological categories

A.d.	A.m.
P.d.	P.m.

The ratio between species

20	5	=**35**
8	2	

The ratio of average

191,41	142,85	=**397,67**
36,56	26,85	

The ratio of participations

48,1	35,9	=**99,93**
9,18	6,75	

A.d. – annual dicotyledons; P.d. – perennial dicotyledons; A.m. – annual monocotyledons; P.m. – perennial monocotyledons.

Foto 4 – *Portulaca oleracea* L.

Table 4

The weeding of viticultural plantation (V2) from Ştefăneşti, Argeş (April - June 2009) vineyard

Nr. crt.	Species	Measurements										m	p%	k%	Biological categories	Group of weeds
		1	2	3	4	5	6	7	8	9	10					
1.	*Xanthium italicum*	16	4	8	16	8	8	8	16	20	20	12,4	11,19	100	A.d.	10
2.	*Portulaca oleracea*	4	-	-	4	-	-	-	8	12	-	2,8	2,52	40	A.d.	9
3.	*Convolvulus arvensis*	8	12	8	40	28	4	32	4	-	-	13,6	12,27	80	P.d.	23
4.	*Chenopodium album*	-	4	-	4	-	-	8	-	12	-	2,8	2,52	40	A.d.	8
5.	*Polygonum aviculare*	-	12	-	8	-	-	-	-	-	-	2	1,80	30	A.d.	3
6.	*Conyza canadensis*	-	24	4	-	-	24	12	-	-	-	6,4	5,77	40	A.d.	9
7.	*Medicago lupulina*	-	12	-	-	-	-	-	-	-	-	1,2	1,08	10	A.d.	9
8.	*Setaria viridis*	-	80	80	-	40	80	-	120	40	40	48	43,32	70	A.m.	42
9.	*Cirsium arvense*	-	8	-	-	-	-	8	4	-	12	3,2	2,88	40	P.d.	23
10.	*Trifolium repens*	-	4	24	4	4	-	-	-	-	-	3,6	3,24	40	P.d.	24
11.	*Torilis arvensis*	-	-	8	-	-	-	4	-	-	-	1,2	1,08	20	A.d.	6
12.	*Sonchus oleraceus*	-	-	4	-	-	4	4	-	-	-	1,2	1,08	30	A.d.	9
13.	*Vicia sativa*	-	-	4	-	-	-	-	-	-	-	0,4	0,36	10	A.d.	7
14.	*Amaranthus retroflexus*	-	-	4	-	-	-	12	12	36	20	8,4	7,58	50	A.d.	8
15.	*Cichorium intybus*	-	-	-	-	4	-	-	-	-	-	0,4	0,36	10	P.d.	21
16.	*Rumex crispus*	-	-	-	-	16	-	-	-	-	-	1,6	1,44	10	P.d.	21
17.	*Erigeron annuus*	-	-	-	-	4	8	-	-	-	-	1,2	1,08	20	A.d.	11
18.	*Capsella bursa-pastoris*	-	-	-	-	-	-	4	-	-	-	0,4	0,36	10	A.d.	5
-	-	28	160	144	76	104	128	92	164	120	92	**110,8**	**99,93**	-	-	-

Table 5

Other species

1.	*Polygonum convolvulus*	A.d.	**9.**	*Artemisia absinthium*	P.d.
2.	*Plantago lanceolata*	P.d.	**10.**	*Plantago major*	P.d.
3.	*Malva sylvestris*	P.d.	**11.**	*Matricaria perforata*	A.d.
4.	*Trifolium pratense*	P.d.	**12.**	*Verbena officinalis*	P.d.
5.	*Lotus corniculatus*	P.d.	**13.**	*Daucus carota* ssp. *carota*	A.d.
6.	*Arctium lappa*	P.d.	**14.**	*Geranium dissectum*	A.d.
7.	*Verbascum blattaria*	P.d.	**15.**	*Raphanus raphanistrum*	A.d.
8.	*Ballota nigra*	P.d.	**16.**	*Hordeum murinum*	A.m.

Table 6

Average number of weeds on groups (m^2)

Gr. 3	2	**Gr. 10**	12,4
Gr. 5	0,4	**Gr. 11**	1,2
Gr. 6	1,2	**Gr. 21**	2
Gr. 7	0,4	**Gr. 23**	16,8
Gr. 8	11,2	**Gr. 24**	3,6
Gr. 9	11,6	**Gr. 42**	48

The ratio between biological categories

A.d.	A.m.
P.d.	P.m.

The ratio between species

17	2	=**34**
15	-	

The ratio of average

40,4	48	=**110,8**
22,4	-	

The ratio of participations

36,42	43,32	=**99,93**
20,19	-	

Foto 5 – *Convolvulus arvensis* L.

Table 7

The weeding of viticultural plantation (V3) from Ştefăneşti, Argeş (April - June 2009) vineyard

Nr. crt.	Species	Measurements									m	p%	k%	Biological categories	Group of weeds
		1	2	3	4	5	6	7	8	9					
1.	*Matricaria perforata*	8	-	-	-	-	-	-	-	-	0,88	1,28	11,11	A.d.	4
2.	*Conyza canadensis*	20	76	-	16	-	-	-	-	-	12,44	18,19	33,33	A.d.	9
3.	*Cirsium arvense*	8	-	-	-	-	40	-	4	4	6,22	9,09	44,44	P.d.	23
4.	*Medicago lupulina*	8	-	4	-	-	-	-	-	-	1,33	1,94	22,22	A.d.	9
5.	*Daucus carota* ssp. *carota*	-	4	4	4	-	-	-	-	4	1,77	2,58	44,44	A.d.	11
6.	*Tussilago farfara*	-	-	56	-	-	-	-	-	-	6,22	9,09	11,11	P.d.	25
7.	*Rumex crispus*	-	-	-	16	-	-	4	4	8	3,55	5,19	44,44	P.d.	21
8.	*Geranium dissectum*	-	-	-	-	4	-	32	-	-	4	5,84	33,33	A.d.	11
9.	*Bromus sterilis*	-	-	-	-	60	52	-	60	-	19,11	27,94	33,33	A.m.	41
10.	*Convolvulus arvensis*	-	-	-	-	4	-	4	20	16	4,88	7,13	44,44	P.d.	23
11.	*Veronica persica*	-	-	-	-	-	40	-	-	-	4,44	6,49	11,11	A.d.	4
12.	*Veronica arvensis*	-	-	-	-	-	20	-	-	-	2,22	3,24	11,11	A.d.	4
13.	*Stellaria media*	-	-	-	-	-	4	-	-	-	0,44	0,64	11,11	A.d.	4
14.	*Erigeron annuus*	-	-	-	-	-	-	-	-	8	0,88	1,28	11,11	A.d.	11
-	-	44	80	64	36	68	156	40	88	40	**68,38**	**99,92**	-	-	-

Table 8

Other species

1.	*Trifolium pratense*	P.d.	**9.**	*Sambucus ebulus*	P.d.
2.	*Senecio vulgaris*	A.d.	**10.**	*Fumaria schleicheri*	A.d.
3.	*Sonchus oleraceus*	A.d.	**11.**	*Galium aparine*	A.d.
4.	*Cornus sanguinea*	P.d.	**12.**	*Ballota nigra*	P.d.
5.	*Ranunculus acris*	A.d.	**13.**	*Capsella bursa-pastoris*	A.d.
6.	*Taraxacum officinale*	P.d.	**14.**	*Lamium purpureum*	A.d.
7.	*Buglossoides arvensis*	A.d.	**15.**	*Descurainia sophia*	A.d.
8.	*Papaver dubium*	A.d.	**16.**	*Sonchus arvensis*	P.d.

Table 9

Average number of weeds on groups (m^2)

Gr. 4	7,98	**Gr. 23**	11,1
Gr. 9	13,77	**Gr. 25**	6,22
Gr. 11	6,65	**Gr. 41**	19,11
Gr. 21	3,55		

The ratio between biological categories

A.d.	A.m.
P.d.	P.m.

The ratio between species

$$\frac{19}{10}\ \frac{1}{-} = \mathbf{30}$$

The ratio of average

$$\frac{28,4}{20,87}\ \frac{19,11}{-} = \mathbf{68,38}$$

The ratio of participations

$$\frac{41,48}{30,5}\ \frac{27,94}{-} = \mathbf{99,92}$$

Foto 6 – *Solanum nigrum* L.

CONCLUSIONS

The floristic inventory of weeds in viticultural plantation from Ştefăneşti-Argeş vineyard comprises 62 species, belonging to 25 botanical families. In case of analyzed variants, the most species were annual dicotyledons.

The average of weeding degree was 397,67 plants/m^2 (black field without herbicides), 110,8 plants/m^2 (black field/green manures with herbicides) and 68,38% (mulch straw + chopped maize stalk).

The mixture of straw and chopped maize stalk may be used as an alternative method to combat weeds from viticultural plantations.

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MODIFICĂRI FIZIOLOGICE PRODUSE DE *DIPLOCARPON ROSAE* LA PLANTELE DE TRANDAFIRI

PHYSIOLOGICAL MODIFICATIONS PRODUCED BY *DIPLOCARPON ROSAE* IN ROSES PLANTS

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Key words: attacked plants, healthy plants, pathogen, roses plants.

REZUMAT

Cercetările privind unele modificări fiziologice produse de Diplocarpon rosae Wolf. s-au efectuat la plantele de trandafiri cultivate în Parcul Nicolae Romanescu din Craiova.

Ca rezultat al acţiunii patogenului în plantele de trandafiri atacate se observă că dinamica diurnă a fotosintezei şi transpiraţiei prezintă un minim dimineaţa, un maxim după prânz şi un alt minim spre seară, cu variaţii specifice în funcţie de condiţiile climatice, frecvenţa şi intensitatea atacului.

Plantele atacate de patogen prezintă o scădere a conţinutului în clorofilă ca rezultat al blocării biosintezei acesteia şi o scădere a conţinutului în apă totală ca rezultat al lezării ţesuturilor de apărare, dereglării mecanismelor de închidere şi deschidere a stomatelor, fapt manifestat prin ofilirea şi uscarea prematură a plantelor.

ABSTRACT

The research regarding several physiological modifications produced by Diplocarpon rosae Wolf. was made on roses plants cultivated in Nicolae Romanescu Park, Craiova.

As a result of the action pathogen on the attacked rose plants one can also observe that the diurnal dynamics of the photosynthesis and of transpiration presents a minimum in the morning, a maximum after lunch and a minimum toward the evening, with specific variations in connection with the climatic conditions, the frequency and intensity of the attack.

The plants attacked by the pathogen present a decrease of chlorophyll content as a result of the blockage of its biosynthesis and the decrease of the total water contents as a result of lesion of the defense tissues, malfunctioning of the closing and opening mechanisms of stomates, which is manifested by the withering and premature drying of the plants.

INTRODUCTION

Diplocarpon rosae Wolf. which causes black spot disease on leaves. These attacks have a serious contribution to the reduction of plant vigor and psychological decline, with an important contribution to the reduction of the exploitation period of the rose crops.

MATERIAL AND METHOD

The research regarding some physiological modifications produced by *Diplocarpon rosae Wolf.* was made at variety of roses *Rotilia* cultivated in Nicolae Romanescu Park of Craiova, in 2009.

Variety of roses *Rotilia* presents a height of 80 cm, bright red colored flowers with a diameter of 3-4 cm.

The estimate of the attack was made using the calculation formulae (Săvescu A., Rafailă C.). The diurnal dynamics of photosynthesis and transpiration was established with the analyzer LCi (Ultra Compact Photosynthesis Measurement System). The total

water contents and of dry substance were determined by gravimetric method. The contents of the chlorophyll was estimates by Minolta SPAD 502 chlorophyll meter.

RESEARCH RESULTS

Diplocarpon rosae Wolf. presents mycelium growing initiated under cuticles, then reaches the intercellular spaces of palisade tissue. Mycelium filaments growing from the point of centrifugal infection are initially hyaline then blackish brown. Under the cuticle small isolated flat stroma are formed. On this stroma there is a difference in the hyaline conidia, bicellular, strongly strangled in the right partition, arranged on short hyaline filaments (Fig. 1).

In our country, usually in summer, the disease spreads through conidia is spread by wind, and from one year to another disease is transmitted through the mycelium of resistance from the branches, which during new acervuli with conidia are formed.

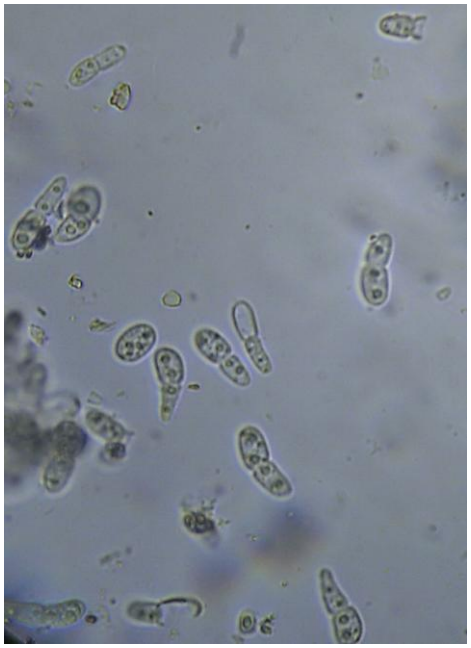

Fig. 1. The microscopic image with the bicellular conidia (ob. 40 x oc. 10).

Black spotting of the leaves of the roses generally appears on the leaves, on their upper side forming blackish spots, circular, at first small, having radial aspect and bounded edges (Fig. 2 and Fig. 3).

***Fig. 2. The rose plants* Rotilia *attacked by the* Diplocarpon rosae Wolf.**

***Fig. 3. The rose leaves* Rotilia *attacked by the* Diplocarpon rosae Wolf.**

The radial aspect of the spots is due to the mycelium growth, which spreads radially beginning at the point of infection. After a while the core of the spots are gray and on the surface of the spots there are small dots, black, visible to the naked eye which represent under cuticle camps of conidiophores and conidia respectively acervuli fungus. By the breaking the cuticle it takes place the release of conidia, thus disseminating the fungus.

Besides the leaves, young shoots are also being attacked, on the surface of which there appear violet-blackish spots and asexual fructifications - acervuli fungus.

The diurnal dynamics of the physiological processes at the rose plants was established, according to the frequency, the intensity and the degree of attack, but also by the climatic conditions, on July 24th 2009.

The estimation of the attack produced by the Diplocarpon rosae Wolf. *at* Rotilia *rose plants is presented in Fig. 4.*

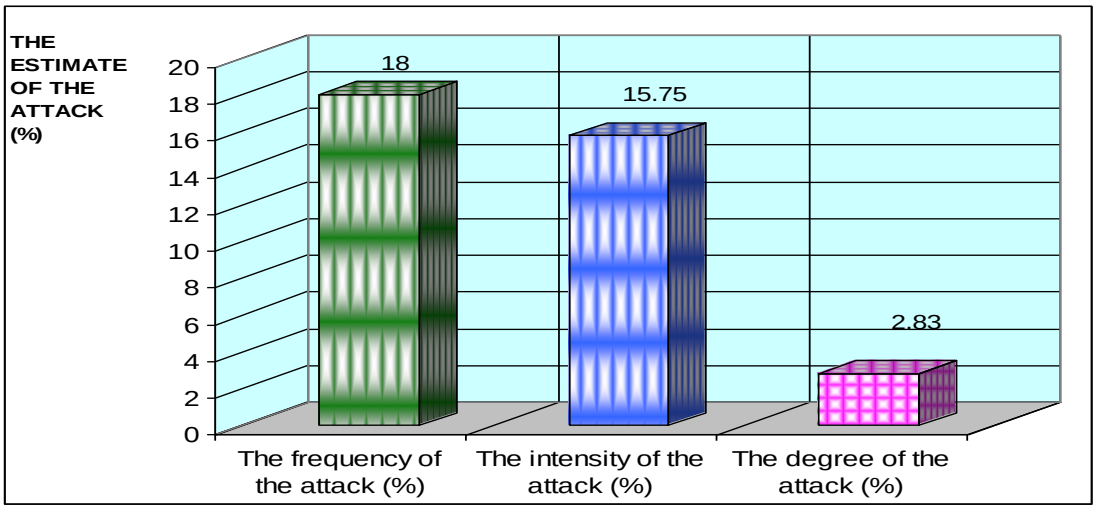

Fig. 4. The estimate of the attack produced by *Diplocarpon rosae* in the rose plants.

The diurnal dynamics of photosynthesis in the attacked plants is similar to that in healthy plants but the recorded values are lower as a result of the reduction of the assimilation surface and the deterioration of the chlorophyll pigments (Fig. 5).

The diurnal dynamics of transpiration in the attacked plants present values are lower in comparison with the healthy plants as a result of the occlusion of the stomates by the mycelium of the fungus and the malfunctioning of the stomatic apparatus (Fig. 6).

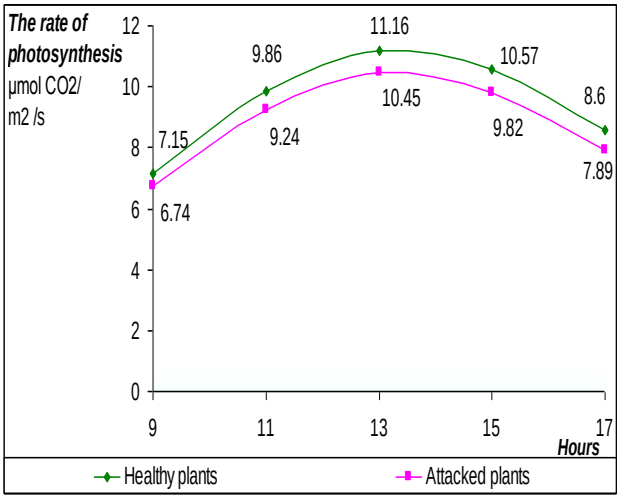

Fig. 5. The diurnal dynamics of photosynthesis at the *Rotilia* rose plants.

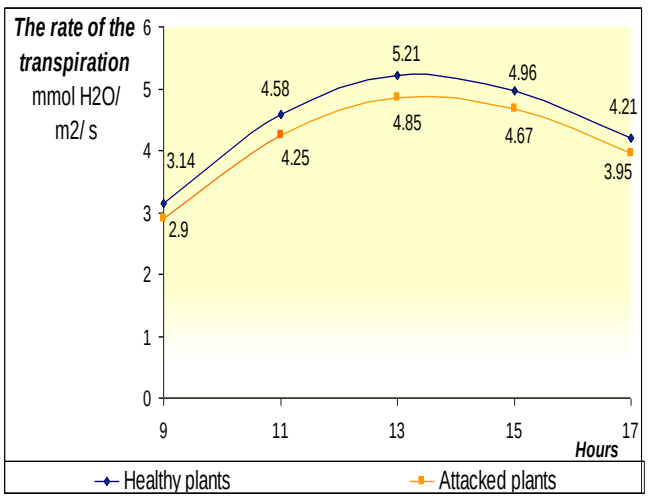

Fig. 6. The diurnal dynamics of transpiration at the *Rotilia* rose plants.

Among the climatic factors with importance upon photosynthesis and transpiration, there were analysed the photosynthetic active radiation incident on the surface of the leaf and leaf temperature.

The intensity of photosynthesis and intensity of transpiration varies depending on the light radiation received by leaves.

At the *Rotilia* plants one can notice an intensification of the photosynthetic active radiations present on the surface of the leaves starting with the early hours of the morning (9 a.m.) when one can record values of 1370 µmol /m^2 /s for the healthy plants and of 1352 µmol / m^2 / s for the attacked plants, their growth up until after lunch (1 p.m.) when one record 1568 µmol / m^2 / s for the healthy plants and 1535 µmol / m^2 / s for the attacked plants, and towards evening (5 p.m.) one can notice a decrease, recording values of 1490 µmol / m^2 / s for the healthy plants and of 1480 µmol / m^2 / s for the plants attacked.

The diurnal increase of the photosynthetic active radiations correlate with the increase of the photosynthesis and transpiration, but present different values in the attacked plants, in comparison with the healthy plants.

At the rose plants linear regression made between the *rate of photosynthesis* and *photosynthetic active radiations* shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.93 for the healthy plants and 0.83 for the attacked plants (Fig. 7).

The linear regression made between the *rate of transpiration* and *photosynthetic active radiations* shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.98 for the healthy plants and 0.96 for the attacked plants (Fig. 8).

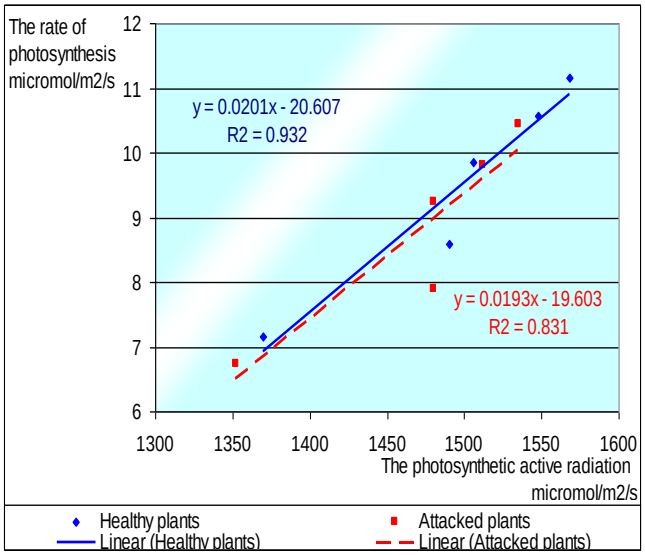

Fig. 7. The correlation between the rate of photosynthesis and the photosynthetic active radiation at the rose plants.

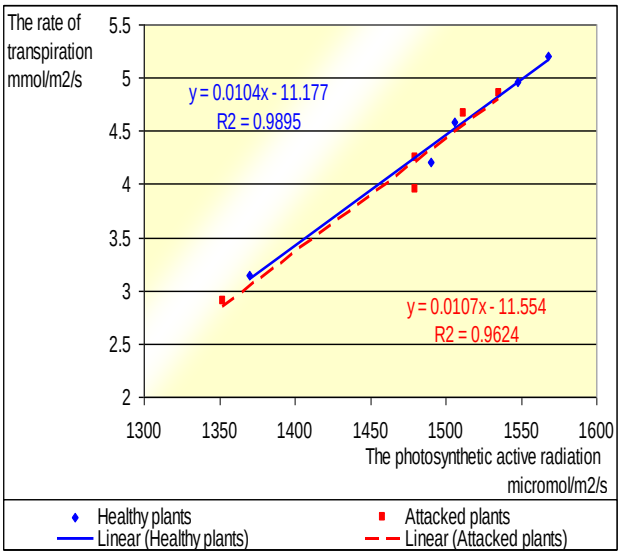

Fig. 8. The correlation between the rate of transpiration and the photosynthetic active radiation at the rose plants.

The intensity of photosyntesis and transpiration varies depending on the temperature.

At the *Rotilia* plants one can notice an increase of the leaf temperature starting with the early hours of the morning (9 a.m) when values of 34 ^oC are recorded in the healthy plants and 34.2 ^oC in the plants attacked, the increase of the temperature up until after lunch (1p.m) when one record 37.8 ^oC in the healthy plants and 38.1 ^oC in the attacked

plants, and towards the evening (5 p.m) the gradual decrease of the temperature, recording values of 36.4 ^{o}C in the healthy plants and 36.5 ^{o}C in the plants attacked.

The diurnal increase of the leaf temperature starting with the early hours of the morning is correlated with the increase of the photosynthesis and transpiration, but presents different values in the attacked plants, as a result the action of the pathogen.

At the rose plants linear regression made between the *rate of photosynthesis* and *leaf temperature* shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.90 for the healthy plants and 0.91 for the attacked plants (Fig. 9).

The linear regression made between the *rate of transpiration* and *leaf temperature* shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.97 for the healthy plants and 0.99 for the attacked plants (Fig. 10).

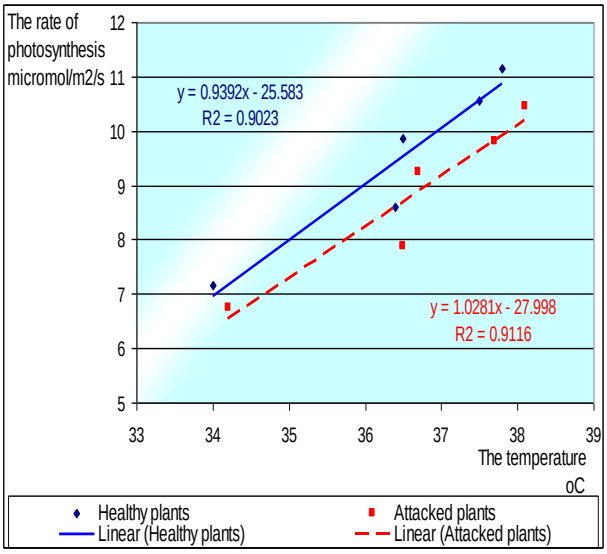

Fig. 9. The correlation between the rate of photosynthesis and the leaf temperature at the rose plants.

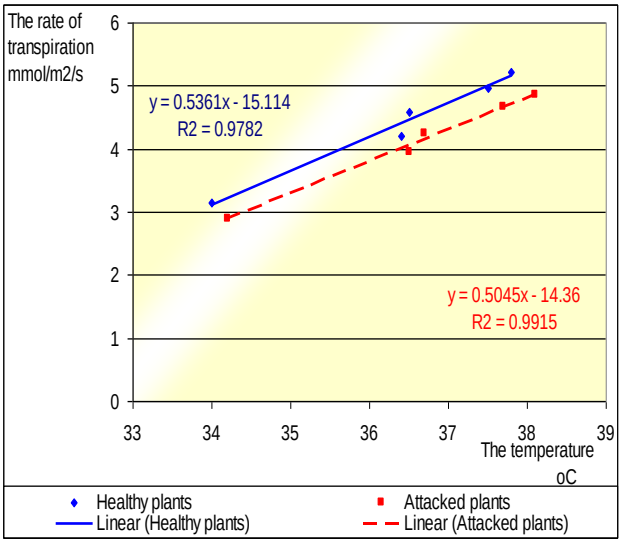

Fig. 10. The correlation between the rate of transpiration and the leaf temperature at the rose plants.

The total water contents and the dry substance contents. At the attacked rose plants there can be seen a decrease of the total water contents by 1.08 % and a increase of the dry substance contents by 2.94 % as a result of the the malfunctioning of the mecanism of closing and opening of stomates, which is manifested by the withering and premature drying of the plants (Fig. 11).

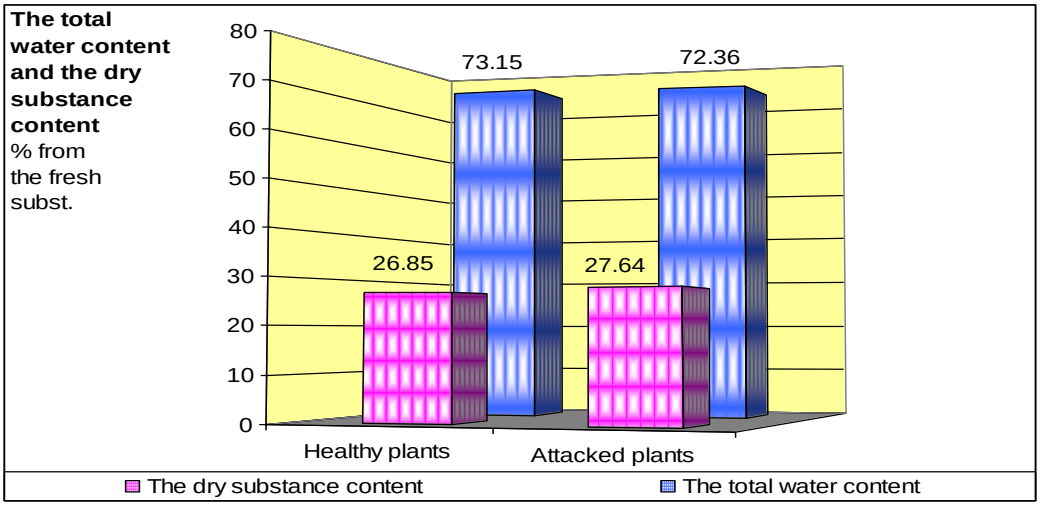

Fig. 11. The total water contents and the dry substance content at the *Rotilia* rose plants.

The chlorophyll content. The rose plants attacked by the pathogen present a decrease of the chlorophyll content by 7.31 % as a result of the blockage of its biosynthesis and the deterioration of the chlorophyll pigments (Fig. 12).

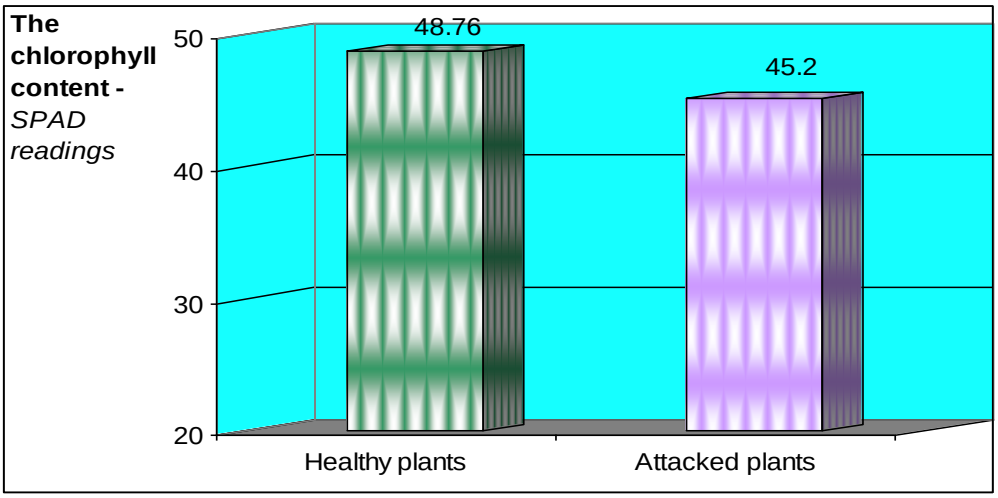

Fig. 12. The chlorophyll content at the *Rotilia* rose plants.

CONCLUSIONS

At the rose plants attacked by pathogen one can notice:

- the intensity of photosynthesis and transpiration presents a values lower in comparison with the healthy plants which is materialized in reduction of the quantity of nutritive substances that are assimilated and accumulated in the plants;
- the decrease of contents in chlorophyllian pigments because of the intensification of the chlorophylases and deterioration of the chloroplasts;
- the decrease of total water contents wich determine the withering and premature drying of the plants.

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CERCETĂRI PRIVIND UNELE MODIFICĂRI FIZIOLOGICE PRODUSE DE *VENTURIA INAEQUALIS* LA *MALUS DOMESTICA*

RESEARCH REGARDING SOME PHYSIOLOGICAL MODIFICATIONS PRODUCED BY *VENTURIA INAEQUALIS* IN *MALUS DOMESTICA*

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Key words: apple, attacked plants, healthy plants, pathogen.

REZUMAT

Cercetările privind modificările fiziologice produse de Venturia inaequalis (Cooke.) Wint. s-au efectuat la soiul de măr Elstar cultivat în Stațiunea Didactică Banu Mărăcine, Dolj.

În plantele atacate se observă că dinamica diurnă a fotosintezei şi transpirației prezintă un minim dimineața, un maxim după prânz şi un minim spre seară, în funcție de condițiile climatice, frecvența şi intensitatea atacului.

La plantele atacate se observă o scădere a conținutului în clorofilă cu 8,91 % ca urmare a blocării biosintezei pigmenților clorofilieni. Aceste plante prezintă o scădere a conținutului în apă totală cu 2,04 % ca urmare a dereglării mecanismelor de închidere şi deschidere a stomatelor, fapt manifestat prin scăderea turgescenței celulare, ofilirea şi uscarea frunzelor.

ABSTRACT

The research regarding physiological modifications produced by Venturia inaequalis (Cooke.) Wint. was made at Elstar apple varieties cultivated in the Didactic Resort Banu Mărăcine, Dolj.

In the attacked plants, one can observe the diurnal dynamics of the photosynthesis and of transpiration presents a minimum in the morning, a maximum after lunch and a minimum toward the evening, in connection with the climatic conditions, the frequency and intensity of the attack.

At the attacked plants one can also observe a decrease of chlorophyll content by 8.91 % as result of the blockage biosynthesis of the chlorophyllian pigments. These plants present a decrease of total water content by 2.04 % as a result of malfunctioning of closing and opening mechanisms of the stomates, which is manifested by the decrease of the cellular turgor, the withering and drying of the leaves.

INTRODUCTION

Apple scab is a disease of apple trees caused by the ascomycete fungus Venturia inaequalis *(Cooke.) Wint.*

Apple scab appears in orchards from all regions, being considered one of the most damaging diseases due to high crop losses both quantitative and qualitative.

MATERIAL AND METHOD

The research physiological was made at *Elstar* apple varieties cultivated in the Didactic Resort Banu Mărăcine, Dolj.

Elstar apple variety has great force and conical crown. The fruit is spherical, regular with smooth skin, bright red color. It is a sort of average productivity.

At the attacked plants for the estimate of the attack was made using the calculation formulae of the Săvescu A., Rafailă C.

The physiological processes was determined with the ultra compact photosynthesis measurement system LCi. The total water contents was determined by the gravimetric method. The chlorophyll content was estimates by Minolta SPAD 502 chlorophyll meter.

RESEARCH RESULTS

Venturia inaequalis (Cooke.) Wint. presents the mycelium which is developing under cuticle, is brownish-olive, is septal, branched and forms during the time of copulating brown stroma that appear on conidiophores and conidia. Conidiophores are short, cylindrical, brown, unicellular, and on these at each end a brown conidia is formed, initially unicellular, and then bicellular.

In autumn, on the fallen leaves as a result of the sexual process, peritecia is formed which reaches maturity the following spring. Peritecia are globular, immersed in the substrate with brown wall, having at the top an opening pore surrounded by brown, rigid pores. In peritecia asca is formed, in the shape of elongated stalk, with 8 bicelular ascospores which have unequal cells.

All young organs of apples are being attacked (leaves, branches young sepals of flowers and fruit).

On the leaves spots more or less circular in shape, undefined, light gray are being observed at the beginning of the attack. The colour of the spots is given by the fungus mycelium, which develops radial under cuticle surrounding the point of infection. Later, with the formation of asexual part (conidiophores with conidia), the spots acquires an olive brown color and velvety appearance (Fig. 1 and Fig. 2).

The attack on flowers, especially on sepals, is similar to that described on leaves and the fruit attack manifests itself through the appearance of gray-olive spots, in respect of which tissues cracks.

Fig. 1. The *Elstar* apple plants attacked by the *Venturia inaequalis.*

***Fig. 2. The leaves plants* Elstar *attacked by the* Venturia inaequalis.**

The diurnal dynamics of the physiological processes at the apple plants was established, according to the frequency, the intensity and the degree of attack, but also by the climatic conditions, on June 12th 2009.

The estimation of the attack produced by the Venturia inaequalis at the apple plants Elstar is presented in Fig. 3.

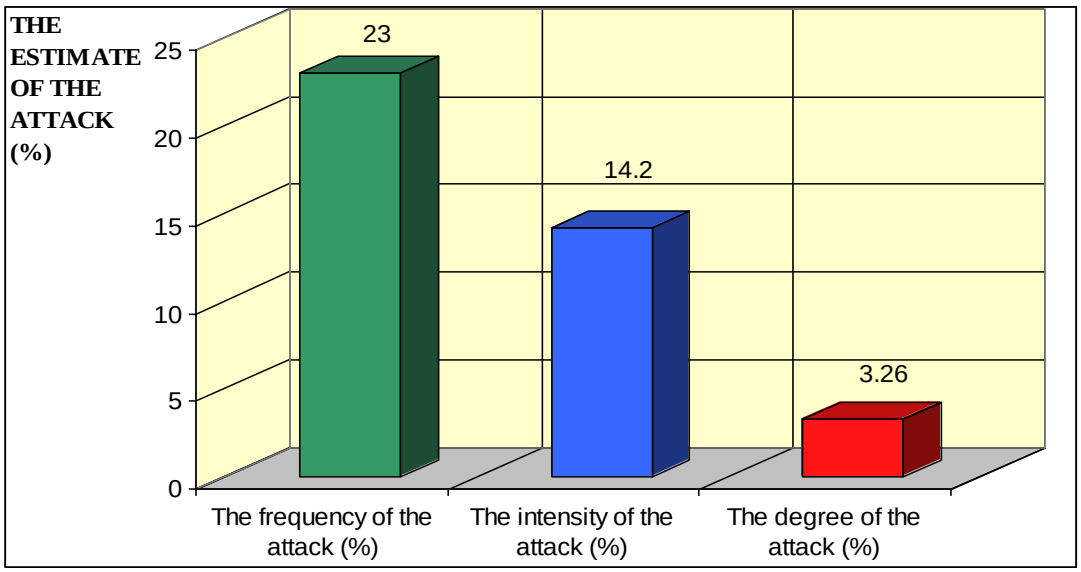

Fig. 3. The estimate of the attack produced by *Venturia inaequalis* in the *Elstar* apple plants.

The diurnal dynamics of the rate of photosynthesis in the attacked plants is similar to that in healthy plants but the recorded values are lower as a result of the reduction of the assimilation surface, as well as the inhibition of several biochemical reactions of the photosynthesis (Fig. 4).

The diurnal dynamics of transpiration in the attacked plants present values are lower as a result of the malfunctioning of the closing and opening mechanisms of the stomates (Fig. 5).

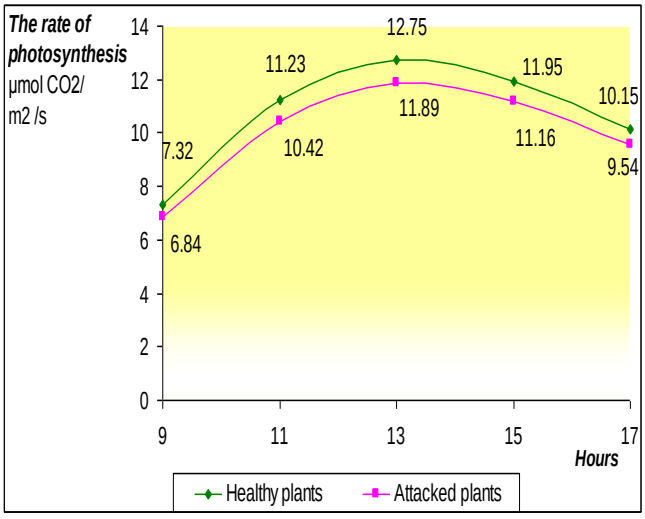

Fig. 4. The diurnal dynamics of photosynthesis at the *Elstar* apple plants.

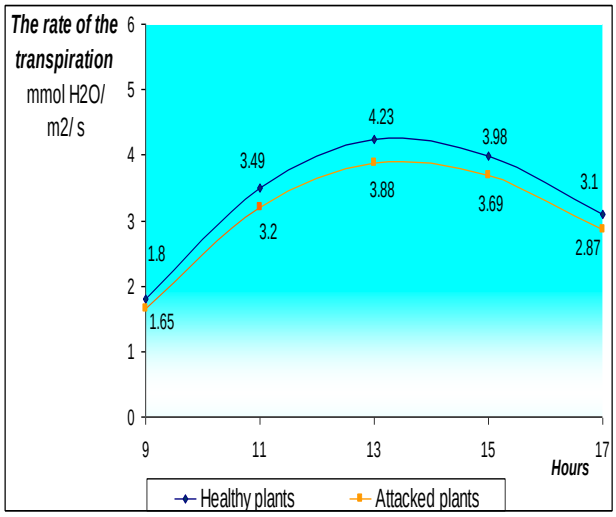

Fig. 5. The diurnal dynamics of transpiration at the *Elstar* apple plants.

The intensity of photosynthesis and the intensity of transpiration depending on the light radiation received by leaves.

At the apple plants one can notice an intensification of the photosynthetic active radiations present on the surface of the leaves starting with the early hours of the morning (9 a.m.) when one can record values of 1282 µmol / m^2 / s for the healthy plants and of 1260 µmol / m^2 / s for the attacked plants, their growth up until after lunch (1 p.m.) when one record 1474 µmol / m^2 / s for the healthy plants and 1430 µmol / m^2 / s for the attacked plants, and towards evening (5 p.m.) one can notice a gradual decrease, recording values of 1402 µmol / m^2 / s for the healthy plants and of 1390 µmol / m^2 / s for the plants attacked.

The diurnal increase of the photosynthetic active radiations starting with the early hours of the morning is correlate with the increase of the photosynthesis and of the transpiration, but present different values in the attacked plants as a result of several structural modifications appeared in the attacked plants.

The linear regression made between the rate of photosynthesis and photosynthetic active radiations shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.97 for the healthy plants and 0.94 for the attacked plants (Fig. 6).

The linear regression made between the rate of transpiration and photosynthetic active radiations shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.97 for the healthy plants and 0.95 for the attacked plants (Fig. 7).

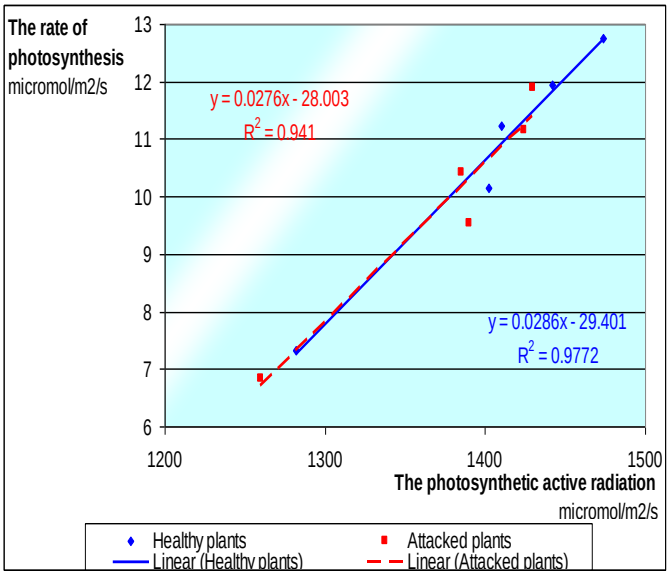

Fig. 6. The correlation between the rate of photosynthesis and the photosynthetic active radiation at the *Elstar* apple plants.

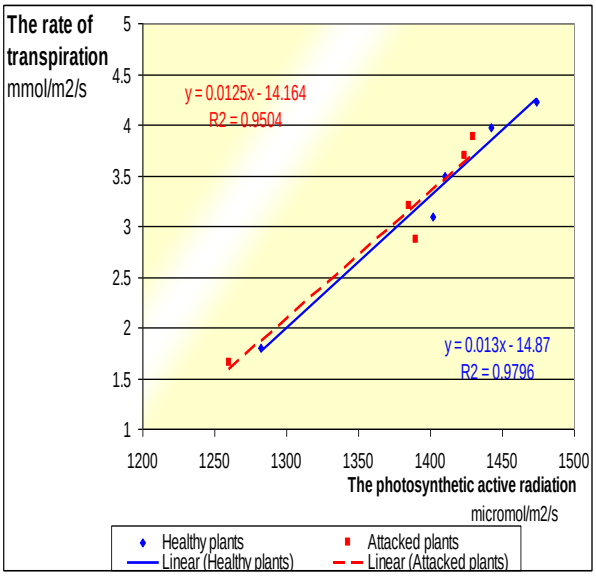

Fig. 7. The correlation between the rate of transpiration and the photosynthetic active radiation at the *Elstar* apple plants.

The intensity of photosynthesis and the intensity of transpiration depending on the temperature air does correlate with the relative humidity.

At the apple plants one can notice an increase of the leaf temperature starting with the early hours of the morning (9 a.m) when values of 30.1 ^oC are recorded in the healthy plants and 30.3 ^oC in the plants attacked, the increase of the temperature up until after lunch (1p.m) when one record 35.2 ^oC in the healthy plants and 35.4 ^oC in the attacked plants, and towards the evening (5 p.m) the gradual decrease of the temperature, recording values of 32.4 ^oC in the healthy plants and 32.6 ^oC in the plants attacked.

The diurnal increase of the temperature starting with the early hours of the morning is correlate with the increase of the photosynthesis and of the transpiration, but present different values in the attacked plants.

The linear regression made between the rate of photosynthesis and leaf temperature shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.96 for the healthy plants and 0.97 for the attacked plants (Fig. 8).

The linear regression made between the rate of transpiration and leaf temperature shows a good correlation between the two factors analyzed, the coefficient of determination (R^2) was 0.96 for the healthy plants and 0.97 for the attacked plants (Fig. 9).

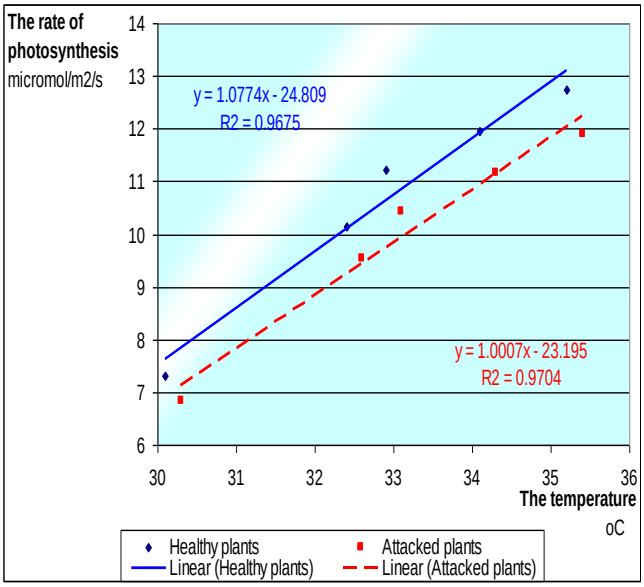

Fig. 8. The correlation between the rate of photosynthesis and the leaf temperature at the *Elstar* apple plants.

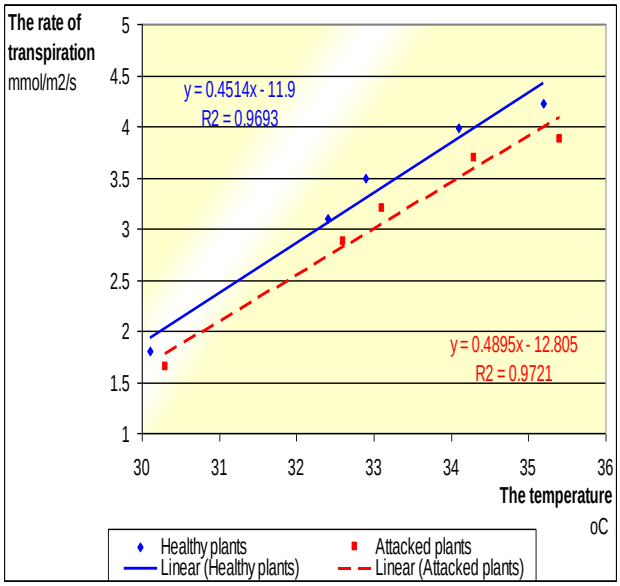

Fig. 9. The correlation between the rate of transpiration and the leaf temperature at the *Elstar* apple plants.

The total water contents and the dry substance contents. At the *Elstar* apple plants attacked by the pathogen present a decrease of the total water content by 2.04 % and an increase of the dry substance content by 3.85 % which is manifested by the decrease of the cellular turgor, the withering and premature drying of the plants (Fig. 10).

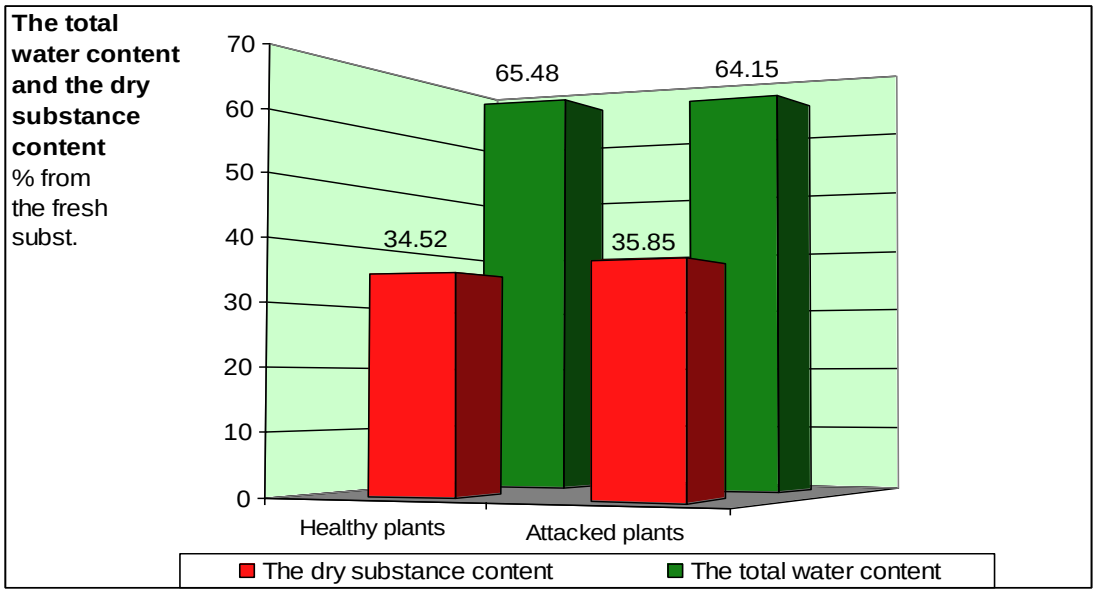

Fig. 10. The total water contents and the dry substance content at the *Elstar* apple plants.

The chlorophyll content. The plants attacked present a decrease of the chlorophyll content by 8.91 % as a result of the deterioration chlorophyll pigments and several structural modifications appeared in the host plants under the damaging action of the pathogen (Fig. 11).

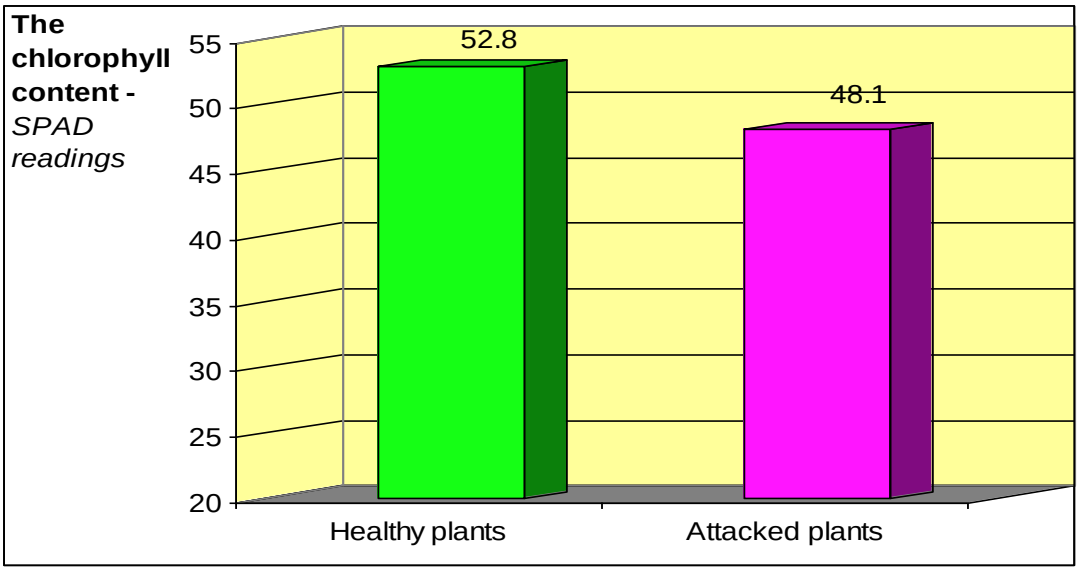

Fig. 11. The chlorophyll content at the *Elstar* apple plants.

CONCLUSIONS

At the apple plants attacked by pathogen one can notice: the diurnal dynamics of the photosynthesis and of transpiration presents a minimum in the morning, a maximum after lunch and a minimum toward the evening, with specific variations in the plants attacked; as a result of the action pathogen on the attacked plants one can observe a decrease of the chlorophyll content by 8.91 % because of the deterioration of the chloroplasts and the decrease of the total water content by 2.04 %, wich determines of the withering and premature drying of the plants.

In the attacked plants present of the physiological modifications with implications on the production.

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CERCETĂRI PRIVIND PĂDURILE DE *QUERCUS CERRIS* DIN NORD-ESTUL JUD. DOLJ

RESEARCHES ABOUT *QUERCUS CERRIS* FORESTS SITUATED IN THE NORTH-EAST OF DOLJ COUNTY

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Key words: ***vegetation, plant communities, floristic composition, chorology, ecology***
Cuvinte cheie: ***vegetaţie, asociaţie vegetală, compoziţie floristică, corologie, ecologie***

REZUMAT

Teritoriul studiat este situat în nord-estul Jud. Dolj, cuprinzând şi o mică suprafaţă din sudul jud. Vâlcea, în apropiere de şoseaua Craiova-Bălceşti. Pădurile de cer (Quercus cerris), alcătuiesc etajul vegetaţiei arborescente din zona de câmpie şi de deal la altitudini de 100-300 metri. În teritoriul studiat ceretele se întâlnesc pe câmpiile înalte şi pe versanţii dealurilor, indiferent de expoziţie şi înclinare. Geneza acestor păduri, este legată atât de microclimatul călduros, cât şi de structura solului, a cărui umiditate oscilează sezonier.Din punct de vedere ecologic, luând în considerare indicii ecologici U, T, R, se constată că ceretele analizate sunt păduri xero-mezofile, moderat-termofile, acid-neutrofile. Ceretele pe care le avem în vedere în prezenta lucrare sunt încadrate în asociaţia Quercetum cerris Georgescu 1941 (Syn. Quercetum cerris Borza 1931 n.n., Quercetum cerris typicum Paşc., et al. 1956). Productivitatea ceretelor este în general bună, putându-se valorifica la timpul potrivit atât lemnul arborilor, cât şi produsele forestiere alimentare, medicinal, tinctoriale, ornamentale.

ABSTRACT

The studied territory is situated in the north-east of Dolj County but a small are from the south of Vâlcea County near the Craiova-Bălceşti road is also included.

Cerris (Turkey oak – Quercus cerris) and Hungarian oak (Quercus frainetto) forests form the level of arborescent vegetation in plain and hill areas at altitudes of 100 – 300 meters high. From the ecological point of view, taking into consideration the ecological indicators, it is found out that the Cerris forests are xero-mesophyll, moderate-thermophyll, and acid-neutrophyll. In the studied territory the Cerris forests are found on the high plains and on the hill slopes, no matter the exposure and incline. The productivity of the Cerris forests is generally good and it can ve valued at the proper time the wood of the tres and also the medical, ornamental, tinctorial and food forested products.

INTRODUCTION

The studied territory is situated in the north-east of Dolj County but a small are from the south of Vâlcea County near the Craiova-Bălceşti road is also included. From 1999 to 2009, within the studied territory, there were made complex studies of corm flora and vegetation in the following forests: Picături Forest, Gruița, Piatra, Valea Țiganului, Racul, Dobrețul, Sălişte, Murgaşului, Bulzeşti, Delnița, Cioarecu, Cismele, Iezeru, Bisa, Aninoasa, Mădulăreasa, Dosul Pescenei, Vişa, Icoana-Şăimu, Casele, Rupturile, Bejenel and

Tughinul. These forests are situated in the same area with the following places: Picăturile, Murgaşi, Balota, Veleşti, Gaia, Bulzeşti, Frățila, Dobrețu, Bălceşti. They belong to Amaradia, Bălceşti and Balş Forest Departments. Cerris (Turkey oak – *Quercus cerris*) and Hungarian oak (*Quercus frainetto*) forests form the level of arborescent vegetation in plain and hill areas at altitudes of 100 – 300 meters high.

MATERIAL AND METHOD

For the study of the vegetal carpet in the studied territory, we have used methods of phyto-sociologic research characteristic to the Central European phyto-sociologic School, which was based on the principles and methods elaborated by J. Braun-Blanquet (1926) and adapted by A. Borza (1934) to the particularities of our country's vegetation. The basic coenotaxonomic unit which was used to study the vegetation was the vegetal association. The associations were identified and distinguished according to the characteristic, edifying, dominant and differential species. The name of the vegetal association was given taking into account the regulations stated by the **Phytosociologic Nomenclature Code** (2005). The synthetic table of the described plant community contain information referring to: number of surveys, altitude (m.s.m), exposure, inclination (in grades), the completion of the crowning (where it is the case), vegetation level of covering (%) and the analyzed surface (m^2). The vertical arrangement of the phytosociological table was done according to the coenotaxonomic criterion.

RESULTS AND DISCUSSIONS

A complex study about the Cerris forests in our country was made by C.C.Georgescu who published in 1941 a great work: "The Cerris as a forest type". From the climate point of view these forest formations are related to the excessive summer heat in the studied territory.

Cerris forests in the studied territory are well structured and from the consistency point of view they are solid stands and very rare they are clearing stands. The clearing of the forest appears as a result of the anthropic factors and less because of unfavourable stationary conditions. The soils of the Cerris forests are situated between degraded cernozem and brown-reddish forest soils which are podzol-like, hardly permeable, very wet during spring and very dry during summer with an acid to neutral reaction. From the ecological point of view, taking into consideration the ecological indicators, it is found out that the Cerris forests are xero-mesophyll, moderate-thermophyll, and acid-neutrophyll.

The *Quercus cerris* forest which are described in this thesis are included in the plant community *Quercetum cerris* Gerorgescu 1941 (*Quercetum cerris* Borza 1931, *Quercetum cerris* typicum Pascu et al 1956) (table 1). From the phytocenotaxonomical point of view the analyzed the cerris forests are formed of 9 species which are specific to the *Quercetalia pubescentis* et *Quercion petraeae*, 16 species of the pubescenti-petraeae, 4 species for the *Quercion frainetto*, 52 species belong to the *Querco-Fagetea* et *Fagetalia*, and the rest are companions. From the floristically physiognomy and composition point of view the analyzed Cerris forests present at the arborescent stratum together with the dominant and enlightening species the following species: *Acer tataricum, A. campestre, Carpinus betulus, Pyrus pyraster, Malus domestica,* etc. The shrub and sub-shrub strata are well developed being represented constantly by the following species: *Crataegus monogyna, Prunus spinosa, Cornus sanguinea, C. mas, Euonymus europea, Rosa canina, Ligustrum vulgare*. The covering of the grass stratum is of 30 – 60%. At the grass stratum forming in these thermophyll forests, there are a lot of Mediterranean and Sub-Mediterranean species like: *Lychnis coronaria, Aperula taurina, Cruciata pedemontana, Primula vulgaris*. The productivity of the Cerris forests is generally good and it can ve valued at the proper time the wood of the tres and also the medical, ornamental, tinctorial and food forested products.

Taking into account the order for "the actualization of the annexes no. 2, 3, 4 and 5, in the Emergency Ordnance of the Romanian Government, no. 236/2000, regarding the status of protected areas, their conservation and the preservation of wild flora and fauna, approved with changes and completions, by the Law no. 462/2001, in the Official Gazette, part 1, no. 1097/6.12.2005 and Romanian Manual for Interpretation of Natura 2000 Habitats in Romania (2008), there can be noticed that the habitat in the studied territory is mentioned **91I0***, (CLAS. PAL.: 41.7A) – Euro-Siberian steppic woods with Quercus spp. and **91M0** (CLAS. PAL.: 41.76) – Pannonian-Balkanic turkey oak-sessile oak forest.

Table 1

Ass. Quercetum cerris Georgescu 1941 (Syn. Quercetum cerris Borza 1931 n.n., Quercetum cerris typicum Paşc., et al. 1956)

No. of relevée	1	2	3	4	5	6	7	8	9	10	K
Altitude m.o.s. (x 10 m)	150	150	160	160	170	180	180	230	230	250	
Exposure	-	V	S-V	-	N-E	E	S-E	S-E	S-V	E	
Inclination (in grades)	-	10	10	-	5	5	5	10	10	15	
Canopy	0.6	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	
Coverage of herbacaeous layer (%)	60	40	40	40	45	30	40	45	35	30	
Sampling surface (m^2)	400	400	400	400	400	400	400	400	400	400	
Char. ass.											
Quercus cerris	3-4	4	3-4	4	4	4-5	4	4	4	4-5	V
Quercetalia pubescentis et Quercion petraeae											
Fragaria viridis	+	+	+	+	+	+	+	+	+	+	V
Vincetoxicum hirundinaria	-	+	+	+	+	+	+	+	+	+	V
Genista tinctoria	-	-	-	+	-	+	-	+	+	-	II
Lathyrus niger	+	-	+	-	-	-	+	-	+	-	II
Cruciata glabra	+	+	+	+	+	+	+	+	+	+	V
Potentilla micranta	+	+	+	+	+	+	+	+	+	+	V
Acer tataricum	-	+	+	+	+	+	+	+	+	+	V
Campanula persicifolia	+	+	+	+	+	+	+	+	+	+	V
Polygonatum latifolium	+	+	+	+	+	+	+	+	+	+	V
Quercion farnetto											
Lychnis coronaria	-	+	+	-	+	-	+	-	+	+	III
Tamus communis	+	+	+	+	+	+	+	+	+	+	V
Aremonia agrimonioides	+	+	+	+	+	+	+	+	+	+	V
Helleborus odorus	+-1	1	1	+-1	+	+-1	+-1	1	1	+-1	V
Queretea pubescenti-petraeae											
Crysanthemum corimbosum	-	+	-	-	+	-	-	+	+	+	III
Lithospermum purpureocaeruleum	+	+	-	+	+-1	+	+	+	+	+	V
Cornus mas	-	-	+	-	-	-	+	+	+	-	II
Viola hirta	+	+	+	+	+	+	+	+	+	+	V
Hypericum perforatum	-	+	+	+	+	+	+	-	+	-	IV
Hieracium bauhini	-	-	+	+	-	-	-	+	+	+	III
Euonymus verrucosus	+	+	+	+	+	+	+	+	+	+	V
Potentilla argentea	-	+	-	+	+	+	+	+	+	+	IV
Asparagus tenuifolius	+-1	+	+-1	+	+-1	+	+-1	+-1	1	+	V
Doronicum hungaricum	-	-	+	+	-	-	-	+	+	-	II
Polygonatum odoratum	+	+	+-1	+-1	+	+-1	+	+-1	+	+	V
Carex tomentosa	+	+	+	+	+	+	+	+	+	+	V
Arabis turrita	-	+	-	-	+	-	-	+	+	+	III
Gagea pratensis	-	+	-	+	-	+	-	+	+	-	III
Vicia sparsiflora	-	-	+	-	-	-	+	-	+	-	II
Trifolium alpestre	+	-	-	-	+	+	-	-	+	+	III
Fagetalia et Querco-Fagetea											
Euphorbia amygdaloides	+	+	+	+	+	+	+	+	+	+	V
Veronica officinalis	-	+	+	+	+	+	+	+	+	+	V
Corydalis solida	+	+	+	+	+	+	+	+	+	+	V
Corydalis cava ssp. marchalliana	+	+	+	+	+	+	+	+	+	+	V
Festuca heterophylla	-	+	-	-	+	-	-	+	+	+	III
Acer campestre	+	-	+	+	+	+	+	-	+	+	V
Anemone nemorosa	+	+	+	+	+	+	+	+	+	+	V

Anemone ranunculoides	1	1	+-1	1-2	1-2	2	2	1	1	1-2	V
Poa nemoralis	+	+	+	+	+	+	+	+	+	+	V
Brachypodium silvaticum	-	+	+	+	+	+	+	1	+	+	V
Scilla bifolia	2	1-2	1-2	1-2	2	1	2	2	1-2	1-2	V
Carex digitata	+	-	-	+	-	-	-	+	-	-	II
Fragaria vesca	+	+	+	+	+	+	+	+	+	+	V
Euonymus europaeus	+	+	+	-	+	-	-	+	+	+	IV
Ghechoma hirsuta	-	-	-	+	-	+	-	+	+	+	III
Arum maculatum	-	+	+	-	-	-	+	-	+	-	II
Veronica chamaedrys	+	+	+	+	+	+	+	+	+	+	V
Primula vulgaris	2	2	1-2	1-2	2	1-2	1-2	1	1	1	V
Asperula taurina	-	-	+	-	-	+	-	+	+	+	III
Melissa officinalis	-	-	+	-	+	-	+	+	+	+	III
Origanum vulgare	+	-	+	-	-	+	-	+	+	+	III
Poa sylvatica	-	+	+	-	+	-	+	-	+	+	V
Melica uniflora	-	+	+	+	-	-	+	-	+	+	III
Calamagrostis epigeios	1	+-1	+-1	+-1	+-1	+	1	+-1	+-1	+	V
Carex muricata	-	-	-	+	-	+	-	+	+	-	II
Chelidonium majus	-	-	+	-	-	-	+	-	+	-	II
Urtica dioica	+	+	+	+	+	+	+	+	+	+	V
Silene alba	-	+	+	+	+	+	+	-	+	-	IV
Rumex sanguinea	+	+	+	+	+	+	+	+	+	+	V
Potentilla argentea	-	+	+	+	+	+	+	-	+	+	IV
Geum urbanum	+	+	+	+	+	+	+	+	+	+	V
Agrimonia eupatoria	+	+	+	+	+	+	+	+	+	+	V
Anthriscus sylvesris	+-1	+-1	+	+	+	+-1	+	+	+	+	V
Alliaria petiolata	+	+	+	+	+	+	+	+	+	+	V
Hypericum hirsutum	-	+	+	+	-	-	+	-	-	+	III
Viola odorata	+	+	+	+	+	+	+	+	+	+	V
Viola suavis	+-1	1	1	+-1	+	+-1	+-1	1	1	+-1	V
Cruciata laevipes	+	+	+	+	+	+	+	+	+	+	V
Trifolium pratense	-	+	-	-	+	-	-	+	+	+	III
Trifolium pannonicum	-	-	-	+	+	-	+	-	+	-	II
Lathyrus nissolia	-	+	-	-	+	-	-	+	+	+	III
Lathyrus sylvestris	-	-	-	+	-	+	-	+	+	-	II
Lathyrus venetus	-	-	+	-	-	-	+	-	+	-	II
Lathyrus vernus	+	+	+	+	+	+	+	+	+	+	V
Rosa galica	-	-	+	-	-	+	-	-	-	-	I
Lotus corniculatus	-	+	-	-	-	-	+	-	+	+	II
Astragalus glycyphyllos	+	+	+	+	+	+	+	+	+	+	V
Vicia grandiflora	-	-	+	-	-	+	-	-	+	-	II
Vicia tetrasperma	+	-	-	-	+	-	-	+	-	-	II
Prunetalia et Prunion spinosae											
Prunus spinosa	+-1	1	+-1	+	+-1	+	+	+-1	+	+	V
Cornus sanguinea	+	+	+	+	+	+	+	+	+	+	V
Ligustum vulgare	+-1	1	1	+-1	+	+-1	+-1	1	1	+-1	V
Evonymus europaea	+	+	+	+	+	+	+	+	+	+	V
Crataegus monogyna	+	+	+	+	+	+	+	+	+	+	V
Rosa canina	+	+	+	+	+	+	+	+	+	+	V
Geum urbanum	+	+	+	+	+	+	+	+	+	+	V
Berberidion											
Viburnum lantana	+	+	-	-	+	-	+	+	-	-	III
Physalis alkekengi	+	+	+	+	-	-	+	-	+	+	IV
Carex silvatica	+	-	-	+	-	-	-	-	-	+	II
Mercurialis perennis	+	+	+	+	-	-	+	+	+	+	IV
Carex pillosa	+	+	+	+	+	-	-	-	+	-	III
Variae Syntaxa											
Urtica dioica	+	+	+	-	-	+	+	-	-	+	III
Sambucus nigra	+	-	-	+	+	+	+	-	-	+	III
Aegopodium podagraria	-	-	-	+	+	-	-	-	-	-	I
Robinia pseudoacacia	+	+	-	-	-	+	+	-	-	-	II
Stachys silvatica	-	+	+	-	-	-	+	+	+	-	III
Galeopsis speciosa	-	+	-	-	-	-	-	-	-	+	I
Erodium cicutarium	+	-	+	-	-	-	-	+	+	+	III
Odontites verna	+	-	-	+	-	-	-	-	-	+	II
Veronica hederifolia	+	+	+	+	-	-	+	+	+	+	IV
Lapsana communis	+	+	+	+	+	-	-	-	+	+	IV

Asperugo procumbens	-	+	+	-	-	+	+	-	+	-	III
Verbascum phaeniceum	+	+	+	-	-	+	+	-	-	+	III
Lamium purpureum	+-1	+-1	+-1	+	+	+	+-1	+-1	+	+	V
Valerianella locusta	-	-	-	+	+	-	-	-	-	-	I
Myosotis sylvatica	-	+	+	-	-	-	+	+	+	-	III
Myosotis sparsiflora	-	+	-	-	-	-	-	-	-	+	I
Galanthus elwesii	+	+	+	+	+	+	+	+	+	+	V
Cynoglossum officinale	+	-	-	+	-	-	-	-	-	+	II
Campanula bononiensis	+	+	+	+	-	-	+	+	+	+	IV
Leonurus cardiaca	+	+	+	+	+	-	-	-	+	+	IV
Campanula persicifolia	+	-	+	-	+	+	-	-	-	+	III
Campanula rapunculus	+	+	+	-	-	+	+	-	-	+	III
Pulmonaria officinale	-	-	-	+	+	-	-	-	-	-	I
Ballota nigra	-	+	+	-	-	-	+	+	+	-	III
Salvia nemoralis	-	+	-	-	-	-	-	-	-	+	I

PLACE AND DATA OF THE RELEVÉS**:**: **1, 2 – GRUIȚA FOREST, 15.06.2005; 3 – MURGAŞULUI FOREST, 10.05.2006; 4 – BISA FOREST, 10.06.2006; 5 – DELNIȚA FOREST, 9.07.2007, 6 – CIOARECU FOREST, 24.06.2007; 7 – CISMELE FOREST, 2.07.2008; 8 - MĂDULĂREASA FOREST, 18.06.2008; 9, 10 – ANINOASA FOREST, 20.06.2008.**

CONCLUSIONS

The *Quercus cerris* forest which are described in this thesis are included in the plant community *Quercetum cerris* Gerorgescu 1941 (*Quercetum cerris* Borza 1931, *Quercetum cerris* typicum Pascu et al 1956). Cerris forests in the studied territory are well structured and from the consistency point of view they are solid stands and very rare they are clearing stands. Both in the case of Cerris forests, the genesis of these forests is connected both with the warm microclimate and soil structure whose humidity varies seasonly. The clearing of the forest appears as a result of the anthropic factors and less because of unfavourable stationary conditions. The productivity of the Cerris forests is generally good and it can ve valued at the proper time the wood of the tres and also the medical, ornamental, tinctorial and food forested products.

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CONTRIBUTIONS REGARDING THE STUDY OF THE *POTENTILLETALIA CAULESCENTIS* BR.-BL. 1926 ORDER IN THE OSLEA MOUNTAIN (ROMANIAN CARPATHIANS)

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Key words: plant communities, phytocoenoses, corology, pedogenetic role.
Cuvinte cheie: asociație vegetală, fitocenoză, corologie, rol pedogenetic

REZUMAT

În urma cercetărilor geobotanice efectuate între anii 2007-2009, pe Muntele Oslea au fost identificate un număr de 4 de asociații vegetale ce aparțin ordinului POTENTILLETALIA CAULESCENTIS Br.-Bl. 1926 (Syn. ASPLENIETALIA RUTAE-MURARIAE Oberd. et. al. 1967): 1. Asplenietum trichomano-rutae murariae Tx. 1937 (Syn. Asplenietum rutae-murariae Schiwickerath 1944), 2. Asplenio-ceterachetum Vives 1964, 3. Asplenio viridae-Cystopteridetum fragilis Oberd. (1936) 1949 (Syn. Valeriana sambucifolia-Poa nemoralis Beldie 1967; Saxifraga cuneifolia-Campanula carpatica Soz. Zolyomi 1939;Cystopteridetum fragilis Oberd. 1938) şi 4. Asplenio quadrivalenti-Poëtum nemoralis Soó 1944 ex Gergely et al. 1966 (Syn. Poëtum nemoralis calcicolum Csürös 1958; Pop et Hodişan (1959) 1967; Aspleniom-Poëtum nemoralis Soó 1944 n.n., Poëtum nenoralis coarctatae Pop et Hodişan 1959; Sedo hispanici-Poëtum nemoralis (Soó 1944) Pop et Hodişan 1985. Pentru fiecare asociație vegetală am acordat atenție în ceea ce priveşte corologia, ecologia, fizionomia şi compoziția floristică, precum şi importanța acesteia.

ABSTRACT

In the Oslea Mountain the relief is dominated by rocks, which determined a saxicole vegetation, well developed in this region. In this paper, we present 4 plant communities within order *POTENTILLETALIA CAULESCENTIS* Br.-Bl. 1926 (Syn. *ASPLENIETALIA RUTAE-MURARIAE* Oberd. et. al. 1967): 1. *Asplenietum trichomano-rutae murariae* Tx. 1937 (Syn. *Asplenietum rutae-murariae* Schiwickerath 1944), 2. *Asplenio-ceterachetum* Vives 1964, 3. *Asplenio viridae-Cystopteridetum fragilis* Oberd. (1936) 1949 (Syn. Valeriana sambucifolia-Poa nemoralis Beldie 1967; Saxifraga cuneifolia-Campanula carpatica Soz. Zolyomi 1939;*Cystopteridetum fragilis* Oberd. 1938) and 4. *Asplenio quadrivalenti-Poëtum nemoralis* Soó 1944 ex Gergely et al. 1966 (Syn. *Poëtum nemoralis calcicolum* Csürös 1958; Pop et Hodişan (1959) 1967; *Aspleniom-Poëtum nemoralis* Soó 1944 n.n., *Poëtum nenoralis coarctatae* Pop et Hodişan 1959; *Sedo hispanici-Poëtum nemoralis* (Soó 1944) Pop et Hodişan 1985. For each vegetal association the corology, ecology, aspect physiognomy and floristic composition as well as their importance are taken into consideration.

INTRODUCTION

The Oslea Mountain are part of the Vulcan Mountains (Romanian Carpathians). In the Oslea Mountain the relief is dominated by rocks, which determined a saxicole vegetation, well developed in this region. The flora and vegetation of the Oslea Mountain is characteristic to the Carpathians. There are some particularities, given by the relief, altitude, climate, nature of rocks and soil. The diversity of the species of plants and

animals, some of them being rare and endemic, involves the necessity of their protection and reduction of the anthropic factors wich represent a real danger to the ecosystem integrity and of the bodiversity preservation.

MATERIALS AND METHODS

For the study or the vegetal carpet in the Oslea Mountain we have used methods of phyto-sociologic research characteristic to the Central European phyto-sociologic School, which was based on the principles and methods elaborated by J. Braun-Blanquet (1926). The plant communities were identified and distinguished according to the characteristic, edifyng, dominant and differential species. The name of the vegetal association was given taking into account the regulations stated by the Phytosociologic Nomenclature Code (2000). As for the classification of the vegetal associations, we have used synthesis papers on the Romanian vegetation, elaborated by G. Coldea (1986, 1991), D. Ivan – coordinator (1992), L. Mucina, G. Grabher & T. Ellmauer (1993), J.S. Rodwell, J.H.J. Schaminée, L. Mucina, S. Pignatti, J. Dring, D. Moss (2002).

RESULTS AND DISCUSSIONS

According to the research carried out between 2006-2008, in the Oslea Mountains, tthere were identified 4 plant communities belonging to *POTENTILLETALIA CAULESCENTIS* Br.-Bl. 1926 (Syn. *ASPLENIETALIA RUTAE-MURARIAE* Oberd. et. al. 1967):1.*Asplenietum trichomano-rutae murariae* Tx. 1937 (Syn. *Asplenietum rutae-murariae* Schiwickerath 1944), 2. *Asplenio-ceterachetum* Vives 1964, 3. *Asplenio viridae-Cystopteridetum fragilis* Oberd. (1936) 1949 (Syn. *Valeriana sambucifolia-Poa nemoralis* Beldie 1967; *Saxifraga cuneifolia-Campanula carpatica* Soz. Zolyomi 1939;*Cystopteridetum fragilis* Oberd. 1938) and 4. *Asplenio quadrivalenti-Poëtum nemoralis* Soó 1944 ex Gergely et al. 1966 (Syn. *Poëtum nemoralis calcicolum* Csürös 1958; Pop et Hodişan (1959) 1967; *Aspleniom-Poëtum nemoralis* Soó 1944 n.n., *Poëtum nenoralis coarctatae* Pop et Hodişan 1959; *Sedo hispanici-Poëtum nemoralis* (Soó 1944) Pop et Hodişan 1985.

The phytocoenosis of the plant communities appear in the rocks slits and also on the limestone layer at the alpine level. The 4 described plant communities have an important pedogenetic role.

1. *Ass. Asplenietum trichomano – rutae murariae* Tx. 1937 (Syn. *Asplenietum trichomano-rutae murariae* Tx. 1937 (Syn. *Asplenietum rutae-murariae* Schiwickerath 1944). Phytocoenoses of this plant community were noted for the first time in the Romanian Carpathians by Ana Paucă (1941) in Codru and Muma Mountains. Together with the enlightening species of the plant community in the floristic composition, there are other chalcophile species as: *Moehringia muscosa*, *Minuartia verna*, *Euphrasia salisburgensis*, *Calamintha baumgartenii*, *Galium anysophyllon*, *Saxifraga cuneifolia*, *Sedum annuum*, *Poa nemoralis*, *Saxifraga ascendens* etc.

Corology. The phytocoenoses grows in the rock slits and also on the limestone layer from Oslița, Piatra Boroştenilor, Dealul Boului, Bistița Valley.

2. Ass. *Asplenio–cetarachetum* Vives 1964 is a Mediterranean – Balkan association described for the first time in our country from the Danube Defile by Resmeriță and his co-workers in 1969. In the floristic composition we can observe the presence of an important number of Dacian and Dacian – Balkanorigin species: *Dianthus kitaibelii, Campanula grossekii, Seseli rigidum, Alyssum petraeum, Asperula capitata* and so on.

Corology: In the researched area, this type of phytocoenoses has been analyzed in the Bistrița Valley, Groapa lupilor, Piatra Boroştenilor, Oslița, Muchia Oslei.

3. *Asplenio viridae-Cystopteridetum fragilis* Oberd. (1936) 1949 (Syn. *Valeriana sambucifolia-Poa nemoralis* Beldie 1967; *Saxifraga cuneifolia-Campanula carpatica* Soz. Zolyomi 1939;*Cystopteridetum fragilis* Oberd. 1938). Phytocoenoses of this association grow in the fissures and shelves of the calcareous rocks with a bit high humidity from the mountain and subalpine levels. Together with the enlightening species in the floristic composition there also are: *Carex brachystachys, Asplenium viride, Moehringia muscosa* and so on. As different species for this association we can mention: *Viola biflora, Cystopteris montana, Phylitis scolopendrium, Gymnocarpium robertianum, Saxifraga androsacea, Alchemilla conjuncta, Ligusticum mutellina* and so on.

Chorology. This kind of phytocoenoses was analysed on Bistrița Valley, Boului Valley, Oslița, Piatra Boroştenilor.

Taking into account the order for "the actualization of the annexes no. 2, 3, 4 and 5, in the *Emergency Ordnance of the Romanian Government*, no. 236/2000, regarding the status of protected areas, their conservation and the preservation of wild flora and fauna, approved with changes and completions, by the Law no. 462/2001, in the *Official Gazette*, part 1, no. 1097/6.12.2005 and *Romanian Manual for Interpretation of Natura 2000 Habitats in Romania* (2008), there can be noticed that the habitat in the Oslea Mountain is mentioned **8210**, (CLAS. PAL.: 62.1) – Calcareous roky slopes with chasmophytic vegetation and **8220** (CLAS. PAL.: 62.2) – Siliceous roky slopes with chasmophytic vegetation.

PLANT COMMUNITIES OF THE POTENTILLETALIA CAULESCENTIS BR.-BL. 1926 (SYN. *ASPLENIETALIA RUTAE-MURARIAE* OBERD. ET. AL. 1967) ORDER

Table 1

No. of plant communities	1	2	3	4
No. of relevées	10	8	10	12
Altitude m.o.s. (x 10 m)	80-155	70-110	90-170	80-160
Char. ass.				
Asplenium viride	I	I	V	-
Tortula muralis	III	-	I	-
Ctenidium molluscum	III	I	I	III
Poa rehmanii	I	I	I	I
Campanula crassipes	-	-	-	I
Ceterach officinarum	I	V	-	-
Silene saxifraga	I	-	-	-
Cystopteridion et Potentilletalia				
Asplenium ruta-muraria	V	II	III	IV
Saxifraga paniculata	III	II	V	III
Cystopteris fragilis	IV	III	V	II
Sedum hispanicum	-	I	-	II
Moehringia muscosa	II	III	I	III
Micromerion pulegii				
Micromeria pulegium	-	I	-	-
Draba lasiocarpa	-	I	-	-
Athamantha t. x hungarica	-	III	-	-
Asplenietea trichomanis				
Edraianthus graminifolius	I	-	II	II
Asplenium trichomanes	I	IV	III	III
Polypodium vulgare	I	I	I	I
Poa nemoralis	I	II	-	VI
Sedum maximum	-	I	-	I
Valeriana tripteris	-	I	I	-

Thymus comosus	I	I	-	II
Cardaminopsis arenosa	-	I	I	II
Silene dubia	-	I	-	II
Sempervivum zelebori	I	-	-	I
Seslerietalia				
Gallium anisophyllon	I	-	III	I
Carex semprevires	II	-	III	II
Sesleria rigida	-	-	I	-
Scabiosa lucida	I	-	-	I
Thymus pulcherrimus	I	-	-	-
Variae Syntaxa				
Saxifraga ascendens	I	I	II	III
Doronicum columnae	I	-	-	I
Senecio rupestris	I	-	-	-
Valeriana officinalis	-	I	-	II
Melica ciliata	I	I	-	-
Parnassia palustris	-	-	I	II
Acinos alpinus	I	-	-	-
Teucrium montanum	-	II	-	-
Clematis alpina	-	-	I	-
Campanula polymorpha	I	-	II	-
Saxifraga aizoides	II	-	III	-
Veronica baumgartenii	II	-	I	-
Jovibarba sobilifera	I	-	-	-
Poa compresa	-	I	-	-
Sempervivum montanum	I	-	-	-
Alyssum saxatile	-	II	I	-
Tortula ruralis	I	-	-	I
Euphrasia minima	-	-	I	I
Geranium macrorrhizum	I	I	-	-

1. *Asplenietum trichomano-rutae murariae* Tx. 1937 2
2. *Asplenio-ceterachetum* Vives 1964;
3. *Asplenio viridae-Cystopteridetum fragilis* Oberd. (1936) 1949 1
4. *Asplenio quadrivalenti-Poëtum nemoralis* Soó 1944 ex Gergely et al. 1966

CONCLUSIONS

In the Oslea Mountain the relief is dominated by rocks, which determined a saxicole vegetation, well developed in this region. According to the research carried out between 2007-2009, in the Oslea Mountain, there were identified 4 plant communities belonging to *POTENTILLETALIA CAULESCENTIS* Br.-Bl. 1926 (Syn. *ASPLENIETALIA RUTAE-MURARIAE* Oberd. et. al. 1967):): 1. *Asplenietum trichomano-rutae murariae* Tx. 1937 (Syn. *Asplenietum rutae-murariae* Schiwickerath 1944), 2. *Asplenio-ceterachetum* Vives 1964, 3. *Asplenio viridae-Cystopteridetum fragilis* Oberd. (1936) 1949 (Syn. *Valeriana sambucifolia-Poa nemoralis* Beldie 1967; *Saxifraga cuneifolia-Campanula carpatica* Soz. Zolyomi 1939;*Cystopteridetum fragilis* Oberd. 1938) and 4. *Asplenio quadrivalenti-Poëtum nemoralis* Soó 1944 ex Gergely et al. 1966 (Syn. *Poëtum nemoralis calcicolum* Csürös 1958; Pop et Hodişan (1959) 1967; *Asplenion-Poëtum nemoralis* Soó 1944 n.n., *Poëtum nenoralis coarctatae* Pop et Hodişan 1959; *Sedo hispanici-Poëtum nemoralis* (Soó 1944) Pop et Hodişan 1985.

For each vegetable association the chorology, ecology, physiognomy and floral composition as well as their importance are taken into consideration. The phytocoenosis of

the first two associations appear in the rocks slits and also on the limestone layer at the alpine level. The 4 described plant communities have an important pedogenetic role.

The investigated territory has many areas and regions where many rare, extinct, vulnerable, endemic species grow. To conserve these species and also the phytocoenoses it is necessary to attach particulat importance to their protection and conservation.

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CARACTERIZAREA EFICIENŢEI ECOLOGICE A PERDELELOR FORESTIERE PRIN CUANTIFICAREA ACUMULĂRII DE CARBON ÎN BIOMASĂ LA SPECIILE FORESTIERE SPECIFICE SISTEMULUI DE AMELIORARE SADOVA-CORABIA

THE CHARACTERIZATION OF THE ECOLOGICAL EFFICIENCY OF THE FOREST CURTAINS THROUGH THE QUANTIFICATION OF THE BIOMASS CARBON ACCUMULATION FOR THE FORESTSPECIES WHICH ARE SPECIFIC TO THE SADOVA-CORABIA IMPROVEMENT SYSTEM

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Key words: boimass, carbon accumulation, forest
Cuvinte cheie: biomasa, acumulare de carbon, specii forestiere

REZUMAT

Cercetările şi experimentele s-au desfăşurat pe nisipurile şi solurile nisipoase din sudul Olteniei şi anume în zona aşa numitelor „nisipuri din stânga Jiului". Cercetările au fost efectuate între anii 2000-2005 în locaţii cu următoarele repere: unităţi amenajistice, respective parcele forestiere la care s-a raportat localizarea parcelelor agricole învecinate.

Acumularea de carbon în biomasa tulpinilor reprezintă forma cea mai stabilă de carbon acumulat la nivelul de biomasă lemnoasă, întrucât durata sa de rezidenţă este egală, cel puţin, cu ciclu extraforestier (construcţii, mobilă, etc). Acumularea de biomasă şi implicit de carbon în ramuri este relativ proporţională cu acumularea de biomasă în tulpină. Totuşi salcâmul de caracterizează ca o specie cu biomasa ramurilor, în valori absolute, mult mai ridicată decât la celelalte specii cultivate în perdele.

ABSTRACT

The researches and the experiments were carried on the sandy soils in the south of Oltenia, better said in the area of what it is called "the sands in the left of Jiu". The researches were performed from 2000 to 2005 in locations with the following marks: planning units, forest lots to which it was reported the nearby agricultural lots. The carbon accumulation in stem biomass represents the most stable form of accumulated carbon at wooden biomass level, because its residential duration is equal, at least with the extra forest cycle (construction field, furniture field, etc.) By the way of comparison with the maxim supply of carbon in the case of Euro-American poplar, we have here 95% for acacia, 51% for nut tree and only 12% for small willow, for a specific length of the production cycle.

Biomass accumulation and implicit carbon one in the branches of the trees is relatively proportional to stem accumulation. However, the acacia is characterized as a branches biomass species in absolute values higher than the other species which are grown in the forest curtains.

INTRODUCTION

The researches and the experiments were carried on the sandy soils in the south of Oltenia, better said in the area of what it is called "the sands in the left of Jiu". The researches were performed from 2000 to 2005 in locations with the following marks: planning units, forest lots to which it was reported the nearby agricultural lots.

MATERIALS AND METHODS

In order to avoid the big number of data resulted from the field measuring, there will be presented only the charts and the diagrams related to the carbon content in different biomass compounds in carbon units determined through field direct measuring. The carbon content in surface unit represents an ecological efficiency indicator of the vegetal species in environment conditions which are specific to the forest curtains in the sandy areas.

RESULTS AND DISCUSSIONS

Stem biomass carbon accumulation – in trees from protection forest curtains.

The carbon accumulation in stem biomass represents the most stable form of accumulated carbon at wooden biomass level, because its residential duration is equal, at least with the extra forest cycle (construction field, furniture field, etc.) Comparatively, among the forest species in the forest curtains which are specific to the Sadova-Corabia system, the carbon accumulation at different ages in stem biomass is shown in the following table.

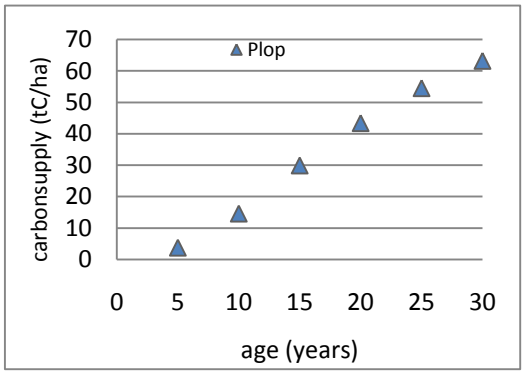
The carbon supply in stem biomass at different ages for forest curtains species

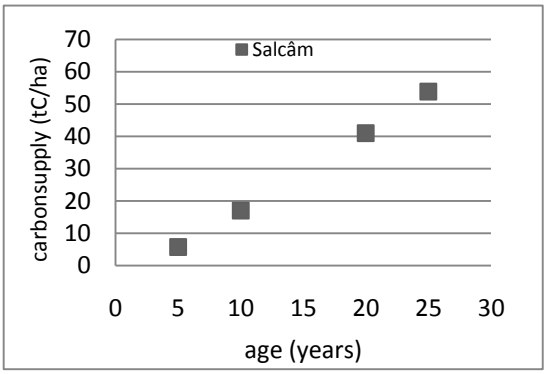
Table 1

Age (years)	*Acacia*	*Poplar*	*Nut tree*	*Small willow*
~5	*5.74*	*3.71*	*-*	*0.09*
~10	*17.02*	*14.56*	*2.41*	*0.71*
~15	*-*	*29.89*	*-*	*1.97*
~20	*41*	*43.38*	*12.28*	*3.68*
~25	*53.93*	*54.51*	*18,98*	*-*
~30	*60.51*	*63.21*	*-*	*-*

The most efficient species is the hybrid poplar, followed by the acacia and the least efficient is the small willow. Actually, the volume and the wooden biomass higher for hybrid poplars than for acacia are probably due to the bio-cumulative more favourable reactivity of the two species to irrigation and fertilization.

By the way of comparison with the maxim supply of carbon in the case of Euro-American poplar, we have here 95% for acacia, 51% for nut tree and only 12% for small willow (figure 1), for a specific length of the production cycle.





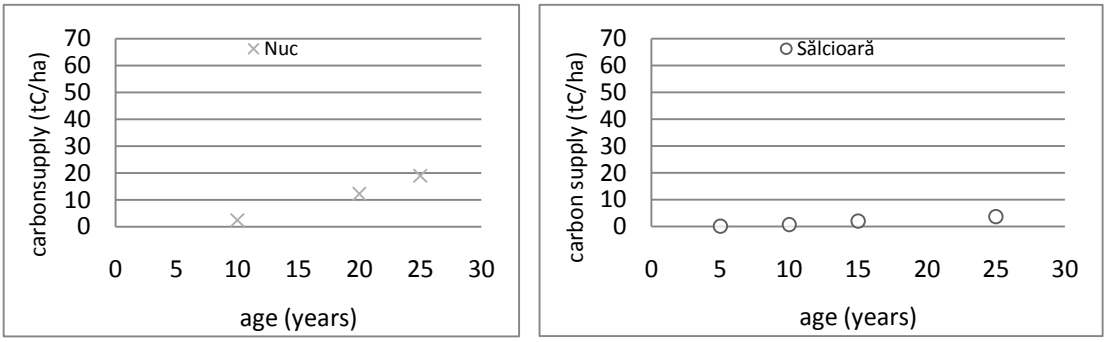


Figure 1. ***Carbon accumulation in steam biomass for different species of forest curtains*** **(plop =poplar; salcam = acacia; nuc=nut tree; salcioara = small willow)**

Carbon accumulation in braches biomass for the trees in protection curtains.

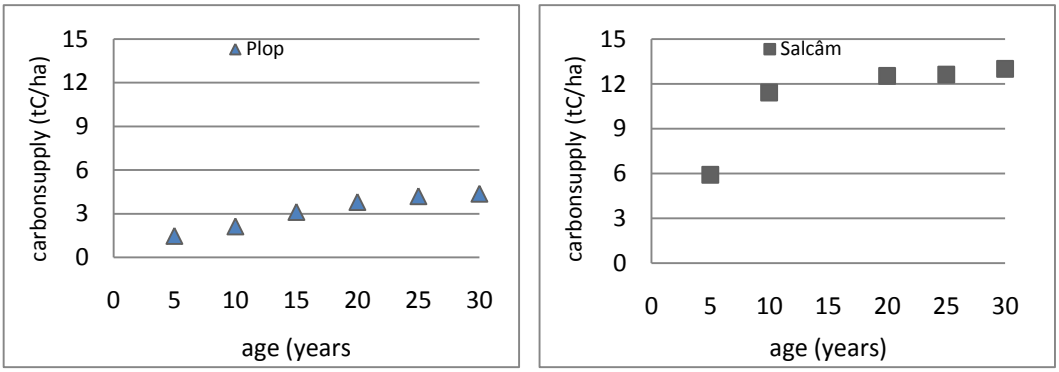
Biomass accumulation and implicit carbon one in the branches of the trees is relatively proportional to stem accumulation. However, the acacia is characterized as a branches biomass species in absolute values higher than the other species which are grown in the forest curtains. Compared with the other species, the acacia is a branchy species, very active in proportion to the light which leads to a rich top crown with thick branches (Nuta, S.,2005).

The carbon supply in branches biomass for the species in the forest curtains

Table 2

Age (years)	*Acacia*	*Poplar*	*Nut tree*	*Small willow*
~5	*5.92*	*1.47*	*-*	*0.08*
~10	*11.43*	*2.12*	*2.07*	*0.43*
~15	*-*	*3.11*	*-*	*0.92*
~20	*12.54*	*3.79*	*7.14*	*1.31*
~25	*12.64*	*4.19*	*9.55*	*-*
~30	*13.02*	*4.36*	*-*	*-*

At the end of the production cycle, compared with 100% carbon supply in acacia branches, it was only 33% in poplar branches; for the nut tree, it was 73% and for the small willow, it was 10%.



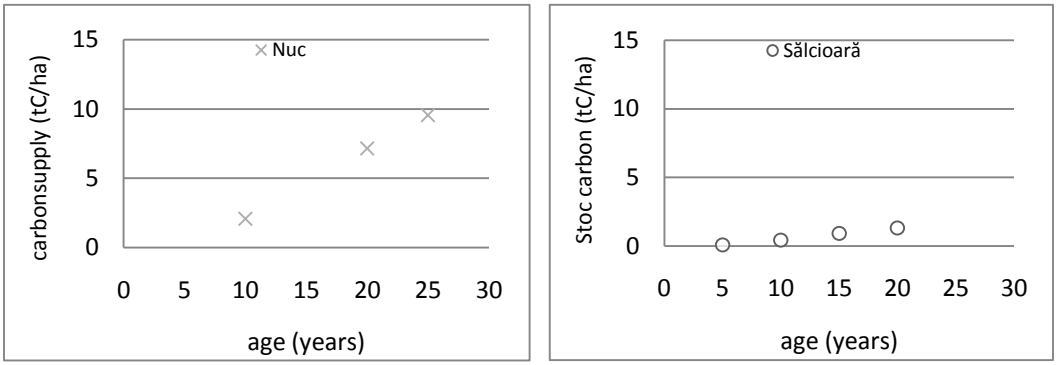


Figure 2.*The carbon accumulation in branches biomass for the different species in the forest curtains curtains* (plop =poplar; salcam = acacia; nuc=nut tree; salcioara = small willow)

This is associated with the well-known character of the light species like the acacia and the nut tree. The other species are characterized by a biomass reparation in branches and carbon content as well, which is more reduced quantitatively (table 2). However, the branches biomass represents 20 – 23% compared with the acacia, nut tree and small willow steam biomass, and only 6% for Euro-American poplar (figure 2).

CONCLUSIONS

The carbon accumulation in stem biomass represents the most stable form of accumulated carbon at wooden biomass level, because its residential duration is equal, at least with the extra forest cycle (construction field, furniture field, etc.) By the way of comparison with the maxim supply of carbon in the case of Euro-American poplar, we have here 95% for acacia, 51% for nut tree and only 12% for small willow, for a specific length of the production cycle.

Biomass accumulation and implicit carbon one in the branches of the trees is relatively proportional to stem accumulation. However, the acacia is characterized as a branches biomass species in absolute values higher than the other species which are grown in the forest curtains. At the end of the production cycle, compared with 100% carbon supply in acacia branches, it was only 33% in poplar branches; for the nut tree, it was 73% and for the small willow, it was 10%.

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STUDIUL STRATEGIILOR DE COMBATERE DIFERENŢIATĂ A BURUIENILOR, PATOGENILOR ŞI DĂUNĂTORILOR PRIN PRISMA MARJEI BRUTE, ÎN DIFERITE CONDIŢII PEDOCLIMATICE

THE STUDY OF DIFFERENTIAL MANAGEMENT OF WEEDS, PESTS AND PATHOGENS USING GROSS PRODUCT INDEX IN DIFFERENT ENVIRONMENTAL CONDITIONS

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Cuvinte cheie: tehnologii de cultură, marja brută, producţie, eficacitate
Key words: cropping technology, gross product, yield, efficiency

REZUMAT

Timp de trei ani (2005,2006 şi 2008) în patru locaţii diferite: Iazu, Caracal, Roznov şi Valea lui Mihai au fost amplasate patru experienţe vizând tehnologii diferite la cultura grâului: control, standard, îmbunătăţită şi avansată. În fiecare locaţie s-a determinat producţia şi marja brută, acesta din urmă fiind unul dintre cei mai importanţi indicatori economici într-o fermă. Exceptând Iazu, în toate celelalte locaţii producţiile şi marja brută pentru tehnologiile standard, îmbunătăţită şi avansată au fost superioare având asigurare statistică comparativ cu tehnologia de control. Pentru două locaţii Roznov şi Valea lui Mihai diferenţa dintre marja brută pentru tehnologia îmbunătăţită şi cea avansată nu a prezentat eficienţă economică. Marja brută se recomandă a fi utilizată pentru a măsura cu o mai mare precizie eficienţa tehnologiei aplicate folosind inputurile directe, independent de inputurile indirecte, care pot varia de la o fermă la alta şi în funcţie de managementul specific.

ABSTRACT

In four different places: Iazu, Caracal, Roznov and Mihai Valley during three years (2005, 2006 and 2008) have been evaluated four experiences with four wheat cropping technologies: control, standard, improved and advanced technologies. For each place was determinated the yield and gross product index, one of the most important indicator for farm activity. Excepting Iazu, in all other places, the yields and gross product index for standard, improved and advanced technologis were superior having statistical assurance compratively with control technology. For two places Roznov and Mihai Valley, the difference between gross product for improved and advanced technologies is not economically efficient. The gross product index is recomanded to measure with more precision the technology efficience using ony direct inputs independently of indirect inputs, which ca vary for each farm and specific management.

INTRODUCTION

In plant protection can be used five control strategies: chemical, biological, physical, biopesticides and human factors. Theoretically, the integrated fight involved all plant protection techniques used according with specific situation. The most common method for disease, pests and weeds control is chemical one. This method is recommended by economical and technical advantages. The agrotechnical methods can also control the attack of pests and pathogens with low costs. For example, high plants/density, high reutilizing rates, short crop rotations, susceptible cultivars can increase the attack of constrainers (Baicu, 1993). The wheat pathogens control must be included in an integrated management strategy, which involved according to chemical factors, pathogen biology,

host resistance, the most proper methods which can limit the pathogens actions (Maloy, 2005).

MATERIAL AND METHODS

During three years (2005, 2006, 2008) in four different places: Iazu, Caracal, Roznov and Mihai Valley have been tested four different wheat cropping technologies, as follows:

- Control technology (Ceck)
- Standard technology
- Improved technology
- Advanced technology

All this tested technologies are presented in the table no.1to 4.

The gross product index represents an important indicator for farming activity. To calculate the gross product index is necessary to know the costs, such as: fertilizers, seeds (including seed treatment cost), fungicides, herbicides, insecticides, assurance, irrigation and other costs. The formula for gross product index is : Gross product = (yield x sell price)+ subventions)-costs

The gross product index doesn`t involves direct inputs or structure costs, which represent: fuel costs, machinery repair costs, land design costs, social costs, professional costs, rent costs, credit costs, salary costs, cereals transport costs, etc.

The formula for net product index is: Net Product=Gross Product – structure costs.

Table no.1

Wheat technological variants tested to Iazu

Technologies	Control variant	Standard variant	Improved variant	Advanced variant
Variety	Dropia	Dropia	Dropia	Dropia
Seed Treatment	Divident 1l/t	Sumi 8 2FL 1,5 l/t	Divident 0,30 FS 1l/t	Celest Star 1l/t
Fertilizing level	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)
Weeds control	-	2,4 D 1l/ha	Peak 75 WG 20g/ha	Lintur 0,15 kg/ha
Diseases control	-	Carbendazin 0,6 l/ha	Artea 30 EC 0,4 l/ha	Artea 30 EC 0,4 l/ha, Amisat Xtra 0,5 l/ha
Pests control	-	Cipertrin 0,2 l/ha	Karate Zeon 2,5 CS 0,15 l/ha	Artea 80 g/ha

Table no.2

Wheat technological variants tested to Caracal

Technologies	Control variant	Standard variant	Improved variant	Advanced variant
Variety	Dropia	Dropia	Dropia	Dropia
Seed Treatment	Divident 1l/t	Sumi 8 2FL 1,5 l/t	Divident 0,30 FS 1l/t	Celest Star 1l/t
Fertilizing level	150 kg/ha nitrogen (March)	150 kg/ha nitrogen (March)	150 kg /ha nitrogen (march) + 60 kg/ha nitrogen (May)	150 kg /ha nitrogen (march) + 90 kg/ha nitrogen (May)
Weeds control	-	2,4 D 1l/ha	Peak 75 WG 20g/ha	Lintur 0,15 kg/ha
Diseases control	-	Carbendazin 0,6 l/ha	Artea 30 EC 0,4 l/ha	Artea 30 EC 0,4 l/ha, Amisat Xtra 0,5 l/ha
Pests control	-	Cipertrin 0,2 l/ha	Karate Zeon 2,5 CS 0,15 l/ha	Actara 80 g/ha

Table no.3

Wheat technological variants tested to Roznov

Technologies	Control variant	Standard variant	Improved variant	Advanced variant
Variety	Dropia	Dropia	Dropia	Dropia
Seed Treatment	Divident 1l/t	Sumi 8 2FL 1,5 l/t	Divident 0,30 FS 1l/t	Celest Star 1l/t
Fertilizing level	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)	18-46-0 200 kg/ha (oct.) + 100 kg/ha nitrogen (March)
Weeds control	-	2,4 D 1l/ha	Peak 75 WG 20g/ha	Lintur 0,15 kg/ha
Diseases control	-	Carbendazin 0,6 l/ha	Artea 30 EC 0,4 l/ha	Artea 30 EC 0,4 l/ha, Amisat Xtra 0,5 l/ha
Pests control	-	Cipertrin 0,2 l/ha	Karate Zeon 2,5 CS 0,15 l/ha	Actara 80 g/ha

Table no.4

Wheat technological variants tested to Mihai Valley

Technologies	Control variant	Standard variant	Improved variant	Advanced variant
Variety	Dropia	Dropia	Dropia	Dropia
Seed Treatment	Divident 1l/t	Sumi 8 2FL 1,5 l/t	Divident 0,30 FS 1l/t	Celest Star 1l/t
Fertilizing level	20-20-0 300 kg/ha(oct.)	20-20-0 300 kg/ha(oct.)	20-20-0 300 kg/ha(oct.)	20-20-0 300 kg/ha(oct.)
Weeds control	-	Peak 75 WG 20g/ha	Peak 75 WG 20g/ha	Peak 75 WG 20g/ha
Diseases control	-	Carbendazin 0,6 l/ha	Artea 30 EC 0,4 l/ha	Artea 30 EC 0,4 l/ha, Amisat Xtra 0,5 l/ha
Pests control	-	Suprsect 0,2 l/ha	Karate Zeon 2,5 CS 0,15 l/ha	Actara 80 g/ha

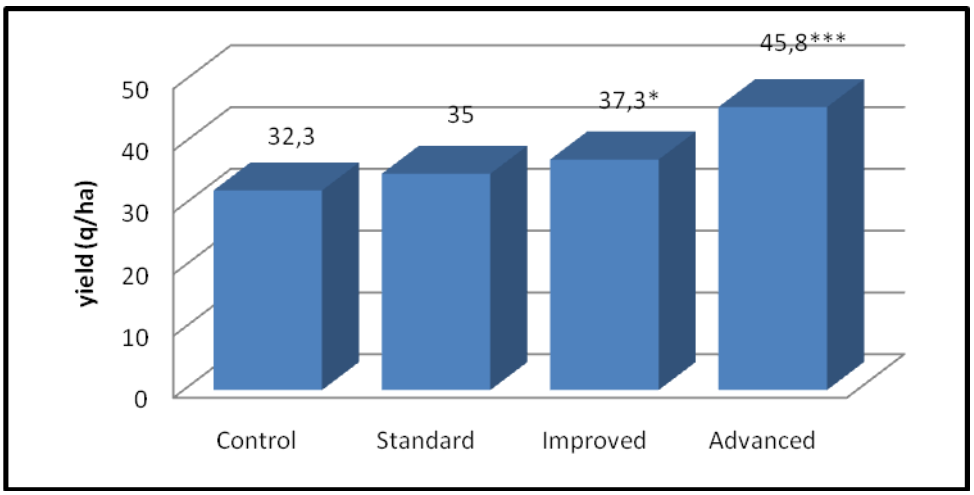
RESULTS AND DISCUSSIONS

In Iazu place the yield was significantly higher for improved technology comparatively with control technology and advanced technology with 13,5q/ha. The improved technology involved weeds, pests and diseases control. For standard technology the plant protection didn`t achieved yield increases statistically assured, meaning that the yield didn`t reflect the costs (Fig. 1).

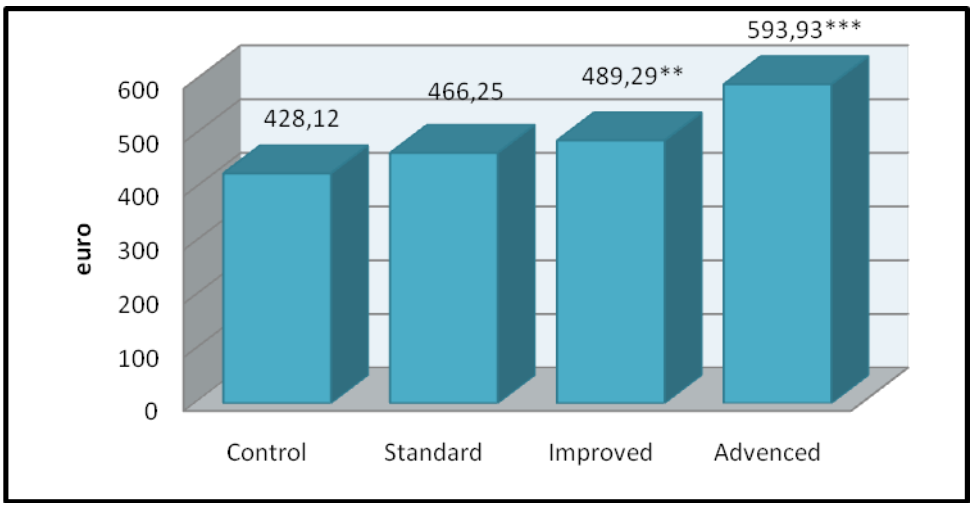
Using gross product index can be observed that in Iazu place only improved and advanced technologies present economical advantages, the increases ranged between 61,17 euro/ha to 165,81 euro/ha statistically assured comparatively with the control technology.

In Caracal place all variants recorded superior yields comparatively with the control. The standard technology recorded an increase of 9,9 q/h, improved technology 15,1 q/ha and advanced technology 20,9 q/ha. Using gross product index all experimented variants are economical, the increases were: 155,48 euro/ha (standard variant), 217,44 euro/ha (improved variant) and 280,58 euro/ha (advanced variant) (Fig. 2).

In Roznov place the yield ranged between 43,7 q/ha (control variant) and 57,2 q/ha (advanced variant). The yield increase realized to standard variant was distinct significant, while the increases obtained for improved and advanced variants were very significant. All variants recorded increases of gross product index comparatively with control variant. The advanced technology is not economical to apply in Roznov place. The difference between control and standard technology is 102, 2 euro/ha, while the difference between improved and advanced technologies is 2,35 euro/ha (Fig. 3).

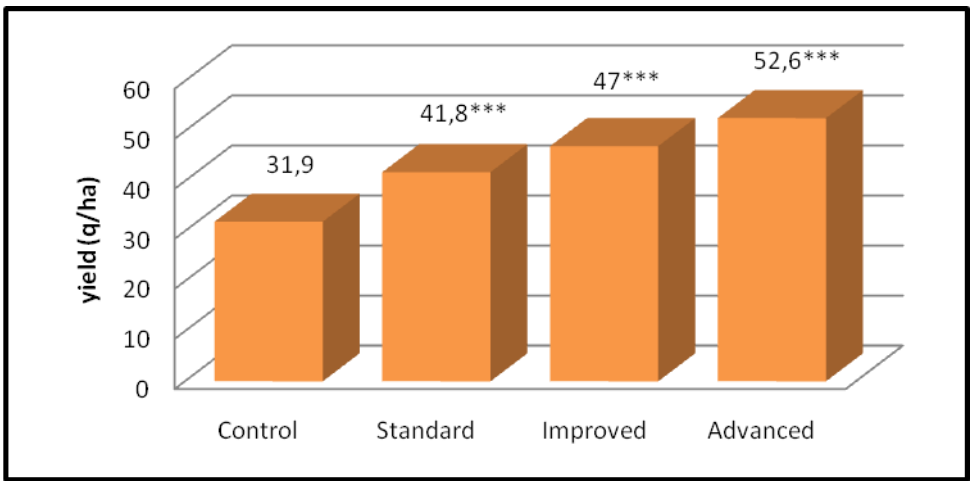


DL 5%= 4,35 q/ha; Dl 1%=6,11 q/ha; DL0,1%=8,63 q/ha

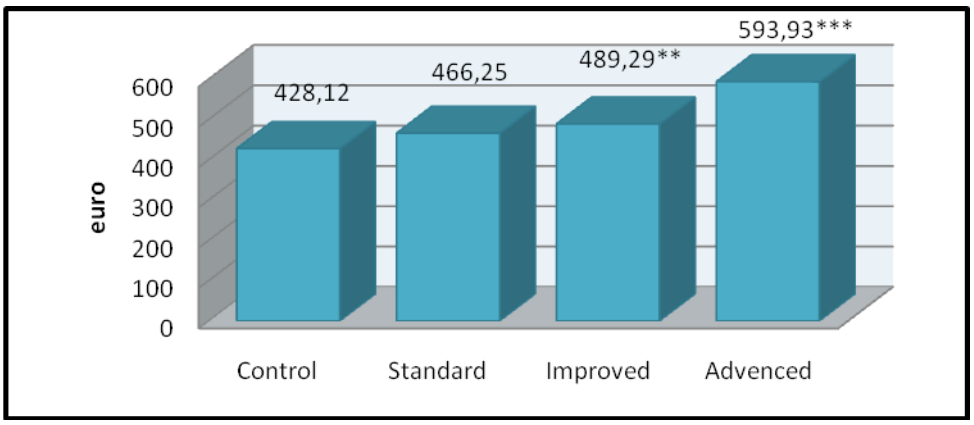


DL 5%= 40,12 euro; Dl 1%=56,32 euro; DL0,1%=79,51 euro

Fig.1. IAZU- Yield and gross product index for tested technologies (2005,2006, 2008)



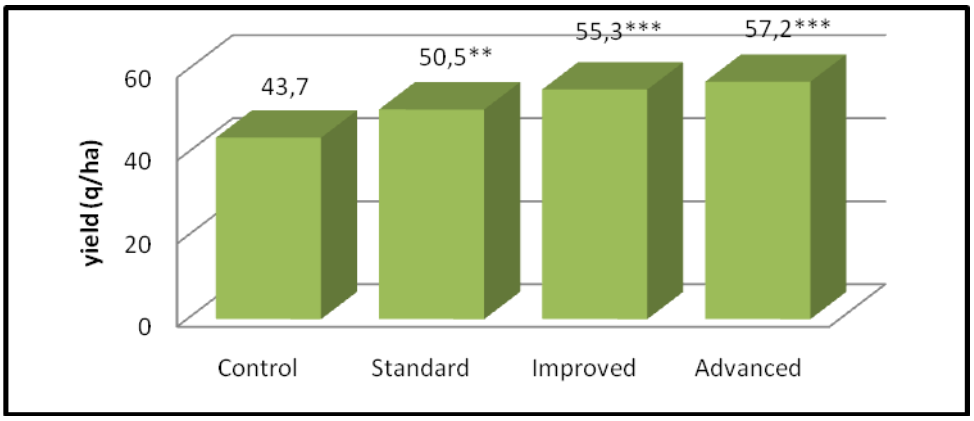
DL 5%= 4,35 q/ha; Dl 1%=6,11 q/ha; DL0,1%=8,63 q/ha



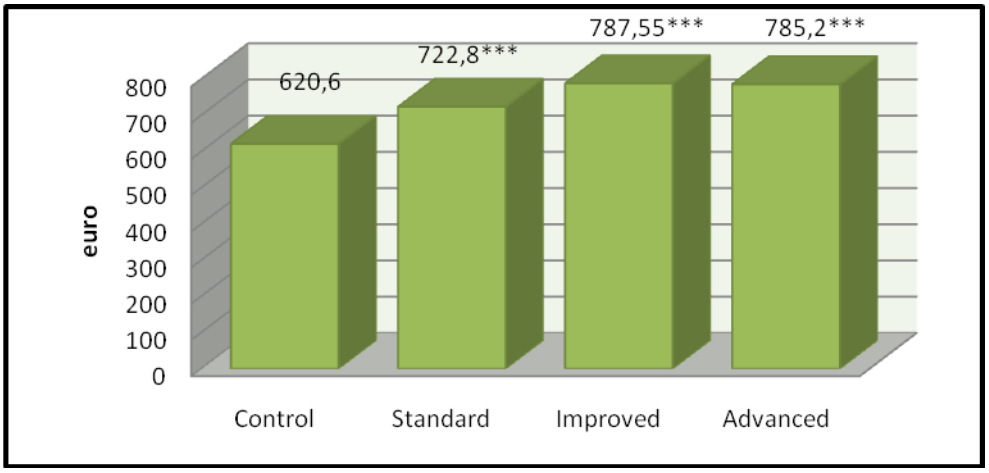
DL 5%= 40,12 euro; Dl 1%=56,32 euro; DL0,1%=79,51 euro

Fig.2. CARACAL- Yield and gross product index for tested technologies (2005, 2006, 2008)

In Mihai Valley place the differences between yield level for all tested variants were high and ranged between 30,1 q/ha (Control) to 54,7 q/ha (advanced technology).The standard variant recorded an increase of 17,7 q/ha, improved variant 20,4 q/ha and advanced variant 24,6 q/ha. Using the gross product index the lowest value was recorded by control variant (416,6 euro/ha) (Fig.4).

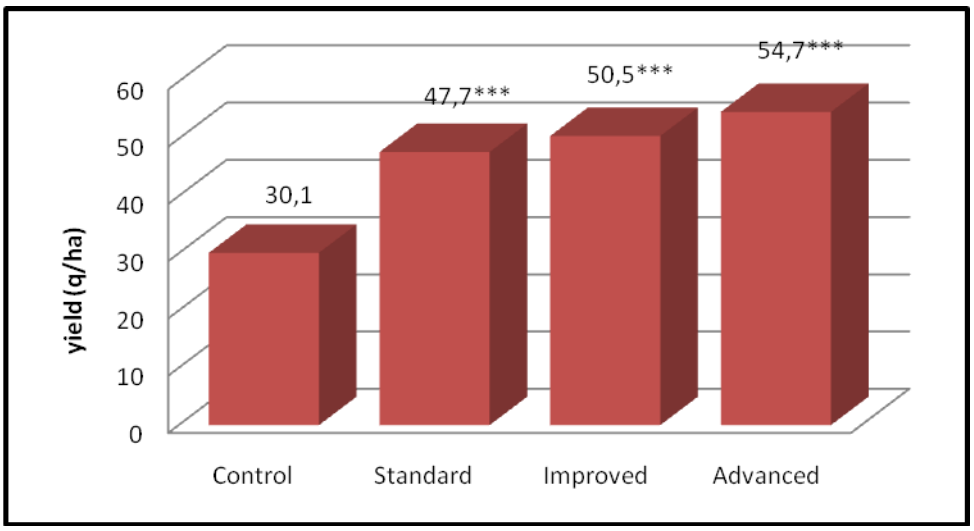


DL 5%= 4,35 q/ha; Dl 1%=6,11 q/ha; DL0,1%=8,63 q/ha

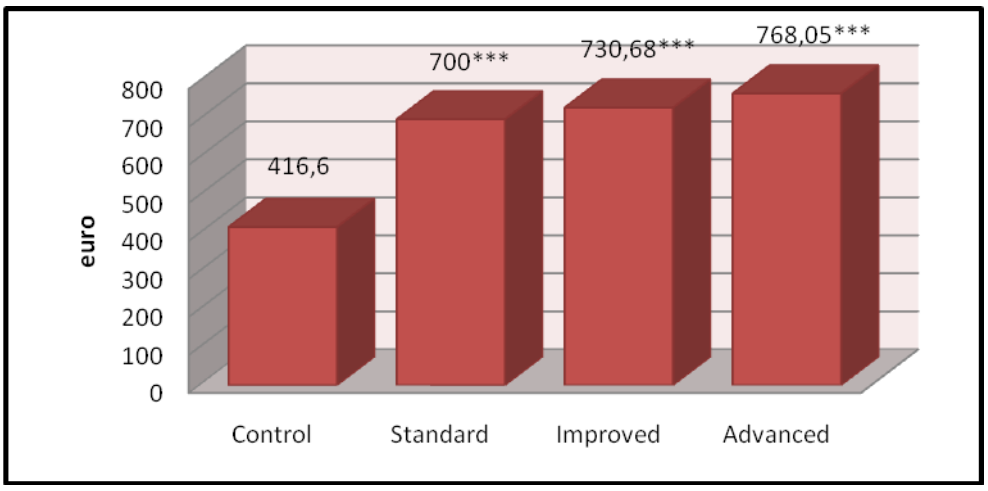


DL 5%= 40,12 euro; Dl 1%=56,32 euro; DL0,1%=79,51 euro

Fig.3. ROZNOV- Yield and gross product index for tested technologies (2005, 2006, 2008)



DL 5%= 4,35 q/ha; Dl 1%=6,11 q/ha; DL0,1%=8,63 q/ha



DL 5%= 40,12 euro; Dl 1%=56,32 euro; DL0,1%=79,51 euro

Fig.4. MIHAI VALLEY- Yield and gross product index for tested technologies (2005, 2006, 2008)

CONCLUSIONS

The improved and advanced technology recorded the best economically results for all experimental areas.

The improved technology applied to Iazu involved the following traits: seed treatment with Divident 0,30 FS 1l/t, fertilizing with 200 kg/ha complex fertilizer 18:46:0 basal applied in autumn and 100 kg/ha nitrogen top-dress applied in early spring, Peak 75 WG 20 g/ha used for weeds control, treatments in vegetation for foliar diseases control using Artea 330 EC 0,4 l/ha and the insecticide Karate 2,5 CS 0,15 l/ha for pests control.

The advanced technology applied to Iazu involved the following traits: seed treatment with Celest Star 1l/t, fertilizing with 200 kg/ha complex fertilizer 18:46:0 basal applied in autumn and 100 kg/ha nitrogen top-dress applied in early spring, Lintur 0,15 kg/ha used for weeds control, treatments in vegetation for foliar diseases control using Artea 330 EC 0,4 l/ha and AmistarXstra 0,5 l/ha and the insecticide Actara 80 g/ha for pests control.

The improved technology applied to Caracal involved the following traits: seed treatment with Divident 0,30 FS 1l/t, fertilizing with 150 kg/ha nitrogen applied in March and 60 kg/ha nitrogen applied in May, Peak 75 WG 20 g/ha used for weeds control, treatments in vegetation for foliar diseases control using Artea 330 EC 0,4 l/ha and the insecticide Karate 2,5 CS 0,15 l/ha to pests control.

The advanced technology applied to Caracal involved the following traits: seed treatment with Celest Star 1l/t, fertilizing with 150 kg/ha nitrogen applied in March and 90 kg/ha nitrogen applied in May, Lintur 0,15 kg/ha used for weeds control, treatments in vegetation for foliar diseases control using Artea 330 EC 0,4 l/ha and AmistarXstra 0,5 l/ha and the insecticide Actara 80 g/ha for pests control.

The improved and advanced technologies applied to Roznov were the same with those applied to Iazu.

The improved technology applied to Mihai Valley involved the following traits: seed treatment with Divident 0,30 FS 1l/t, fertilizing with 300 kg/ha complex fertilizer 20:20:0 basal applied in autumn, Peak 75 WG 20 g/ha used for weeds control, treatments in vegetation for foliar diseases control using Artea 330 EC 0,4 l/ha and the insecticide Karate 2,5 CS 0,15 l/ha to pests control.

The advanced technology applied to Mihai Valley involved the following traits: seed treatment with Celest Star 1l/t, fertilizing with 300 kg/ha complex fertilizer 20:20:0 basal applied in autumn, Lintur 0,15 kg/ha used for weeds control, treatments in vegetation for foliar diseases control using Artea 330 EC 0,4 l/ha and AmistarXstra 0,5 l/ha and the insecticide Actara 80 g/ha for pests control.

It is recommended the gross product index as an economic indicator for managing farming costs.

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MONITORIZAREA PRINCIPALELOR BURUIENI ŞI PATOGENI DIN CULTURA DE GRÂU ÎN DIFERITE CONDIȚII PEDOCLIMATICE

THE MONITORING OF THE MOST IMPORTANT WEEDS AND PATHOGENS OF WHEAT IN DIFFERENT ENVIRONMENTAL CONDITIONS

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Cuvinte cheie: buruieni, patogeni, tehnologie de cultură, eficacitate
Key words: weeds, pathogens, cropping technology, efficiency

REZUMAT

Timp de trei ani (2005,2006, 2008) în patru locații diferite Iazu, Caracal, Roznov şi Valea lui Mihai au fost evaluați principalii patogeni şi buruieni în patru sisteme diferite de cultură aplicate la grâu: control, standard, îmbunătățită şi avansată. Buruienile şi patogenii au variat de la o locație la alta, deşi unele dintre ele au fost comune. La Iazu s-a semnalat Septori tritici, Erysiphe graminis, Puccinia sp., şi Cladosporium herbarum, iar ca buruieni au fost prezente Anthemis arvensis (ANTAR), Veronica sp. (VERHE), Capsela bursa pastoris (CAPBP), Sinapis arvensis (SINAP), Daucus carota (DAUCA) and Convolvulus arvensis (CONAR).La Caracal atacul de Septoria tritici avarait între 10 şi 96% (la tehnologia avandată comparativ cu tehnologia de control), Erysiphe graminis a variat între 3-42% (la tehnologia avandată comparativ cu tehnologia de control) şi Fusarium graminearum a variat între 7-10% (la tehnologia avandată comparativ cu tehnologia de control). Buruienile din acesată locație au fost Cirsium arvense (CINAR), Anthemis (ANTAR), Convolvulus (CONAR), Papaver rhoeas (PAPRH) Viola (VIOAR), Gallium (GALAP), Capsela bursa pastoris (CAPBP) şi Lhitosporium (LHIAR).La Roznov au fost prezente Erysiphe graminis şi Cladosporium herbarum, iar la Valea lui Mihai Erysiphe graminis, Septoria tritici şi complexul de patogeni care produc Black Point.Fără îndoială tehnologia avansată reprezimtă cea mai bună opț iune pentru controlul acestor patogeni şi buruieni.Erysiphe graminis a fost controlat foarte bine în cadrul tehnologiilor imbunătățită şi avansată.

ABSTRACT

In four different places Iazu, Caracal, Roznov and Mihai Valley during three years (2005, 2006 and 2008) the specific wheat weeds and pathogens were evaluated using four different technologies: control, standard, improved and advanced technologies. The weeds and pathogens were different for each place, but some of them were commune. For Iazu place were noticed the pathogens Septoria tritici, Erysiphe graminis, Puccinia sp. and Cladosporium herbarum and weed were Anthemis arvensis (ANTAR), Veronica sp. (VERHE), Capsela bursa pastoris (CAPBP), Sinapis arvensis (SINAP), Daucus carota (DAUCA) and Convolvulus arvensis (CONAR). For Caracal place the attack of Septoria tritici vary between 10-96% (advanced comparatively with the control), for Erysiphe graminis was between 3-42% (advanced comparatively with the control) and for Fusarium gramearum was between 7-10% (advanced comparatively with the control). The specific weeds for this place were Cirsium arvense (CINAR), Anthemis (ANTAR), Convolvulus (CONAR), Papaver rhoeas (PAPRH) Viola (VIOAR), Gallium (GALAP), Capsela bursa pastoris (CAPBP) and Lhitosporium (LHIAR). For Roznov place were distinguished Erysiphe graminis and Cladosporium herbarum and for Mihai Valley Erysiphe graminis, Septoria tritici and the complex Fusarium + Black Point.Undoubtedly, the advanced

technology represents the best solution for control these constrainers. Among all pathogens Erysiphe graminis was controlled the best using improved and advanced technologies.

INTRODUCTION

All over the time weeds were defined in different ways by researchers and farmers. The Romanian Encyclopedic Dictionary (1962) weeds are defined as:,, foreign plants in a crop, which produce high losses, using the water and nutrients from the soil and finally determine yield decreases ,,The seed mast be protected against soil-borne diseases and pests, as well as against foliar diseases and pests." (Berca, 2004). Among Diseases, pests and weeds, the last ones determine the highest losses.

MATERIAL AND METHODS

During three years (2005, 2006, 2008) in four different places: Iazu, Caracal, Roznov and Mihai Valley have been tested four different wheat cropping technologies, as follows:

- Control technology (Ceck)
- Standard technology
- Improved technology
- Advanced technology

It was noticed the attack degree for pathogens and pests and weeds number/m^2. The results were evaluated comparing the applied technologies using as check the control technology.

RESULTS AND DISCUSSIONS

The pathogens and weeds monitoring was realized in all platform places. On Iazu platform the main pathogens were *Septoria tritici, Erysiphe graminis, Puccinia* sp., and *Cladosporium.* The attack frequency ranged between 10% and 85% to *Septoria tritici* (the advanced technology comparatively with the standard one), between 10% and 80% to *Erysiphe graminis* (the advanced technology comparatively with the standard one), between 1% and 20% to *Puccinia graminis* (the advanced technology comparatively with the standard one) and between 4% and 18% to *Cladosporium* (the advanced technology comparatively with the standard one) (Fig 1).

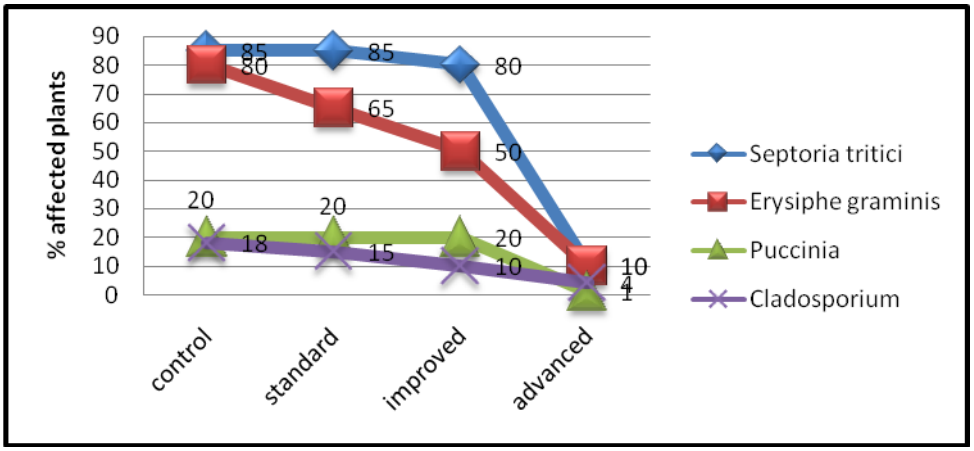

Fig. 1. Diseases monitoring to Iazu (2005, 2006, 2008)

The weeds presented to Iazu were: *Anthemis arvensis* (ANTAR), *Veronica sp.* (VERHE), *Capsela bursa pastoris* (CAPBP), *Sinapis arvensis* (SINAP), Daucus *carota var. spontanea* (DAUCA) and *Convolvulus arvensis* (CONAR).

Figure no. 2. presents weeds number/mp for each variant. *Anthemis* is very well controlled; *Veronica* is still present for all variants and *Capsella bursa pastoris* only in improved and advanced variants (Fig. 2).

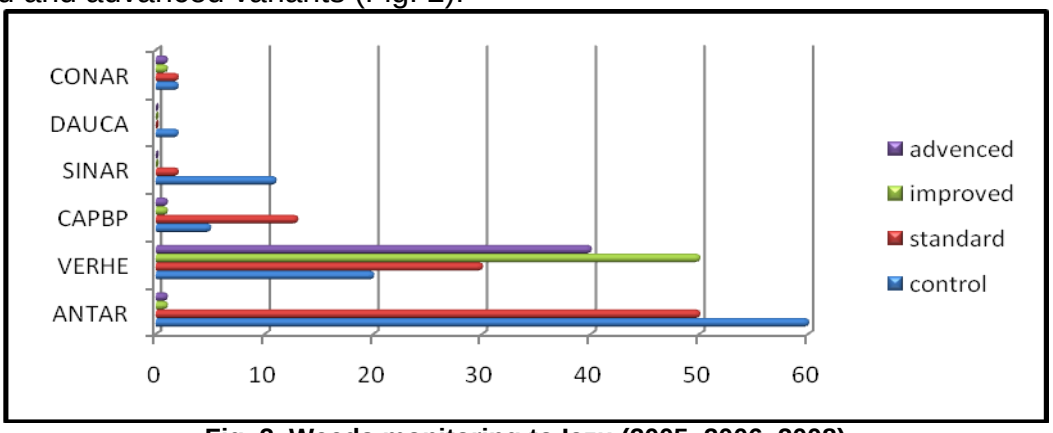

Fig. 2. Weeds monitoring to Iazu (2005, 2006, 2008)

The diseases presented to Caracal were *Septoria tritici* between 10% and 96% (the advanced technology comparatively with the control one), *Erysiphe graminis* between 3% and 42% (the advanced technology comparatively with the control one) and *Fusarium graminearum* between 7% and 10% (the advanced technology comparatively with the control one) (Fig. 3).

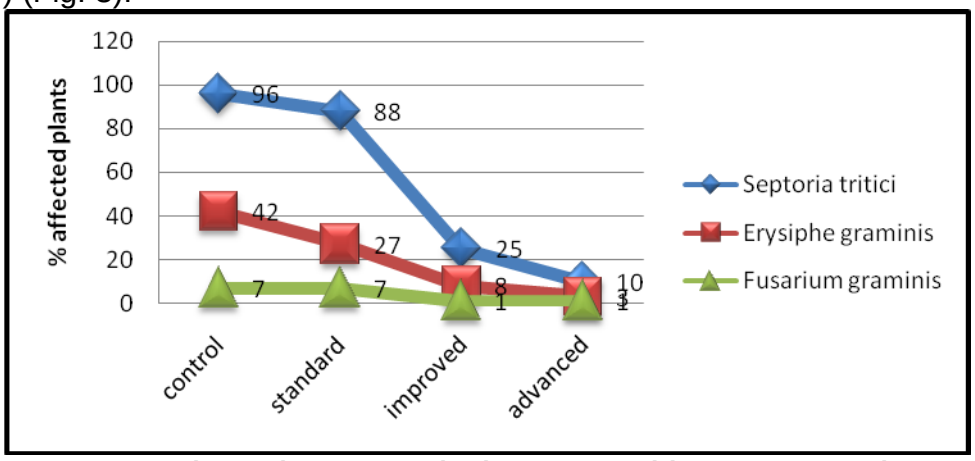

Fig. 3. Diseases monitoring to Caracal (2005, 2006, 2008)

The most widely spread weed from Caracal was *Cirsium arvense* with 6 plants/m^2 (Fig. 4).

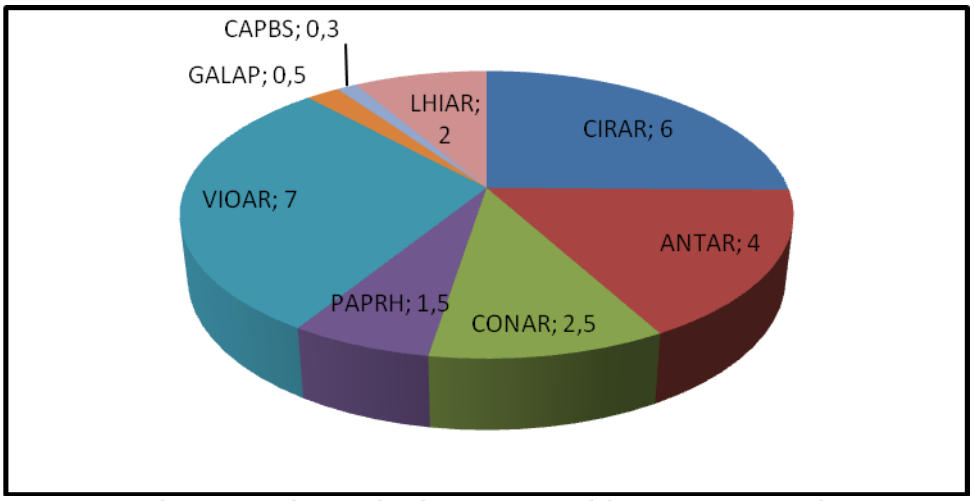

Fig. 4. Weeds monitoring to Caracal (2005, 2006, 2008)

To Roznov were presented only the pathogens *Erysiphe graminis* and *Cladosporium.* The treatment reduced the attack degree to 20% for *Erysiphe graminis* even for standard variant, but had no effect to *Cladosporium* (Fig. 5).

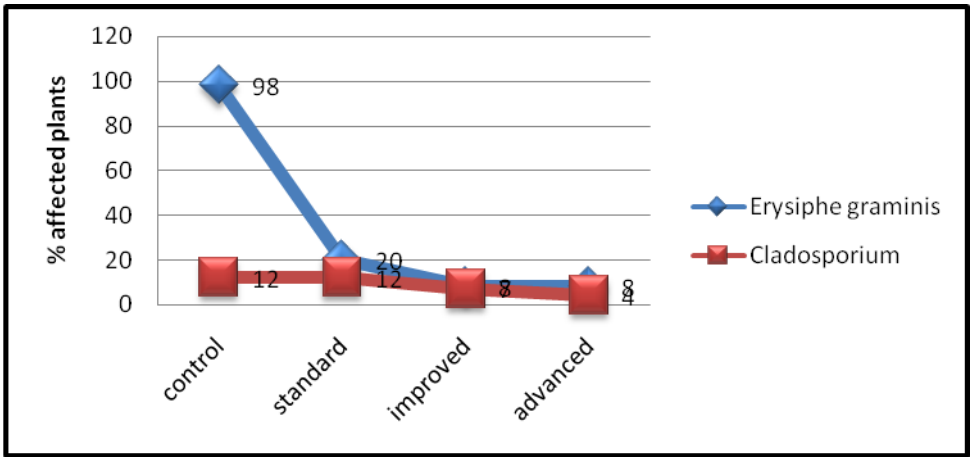

Fig. 5. Diseases monitoring to Roznov (2005, 2006, 2008)

To Mihai Valley the pathogens presented were *Erysiphe graminis*, *Septoria tritici* and the pethogens complex responsible for Black Point symptom + Fusarium (Fig.6).

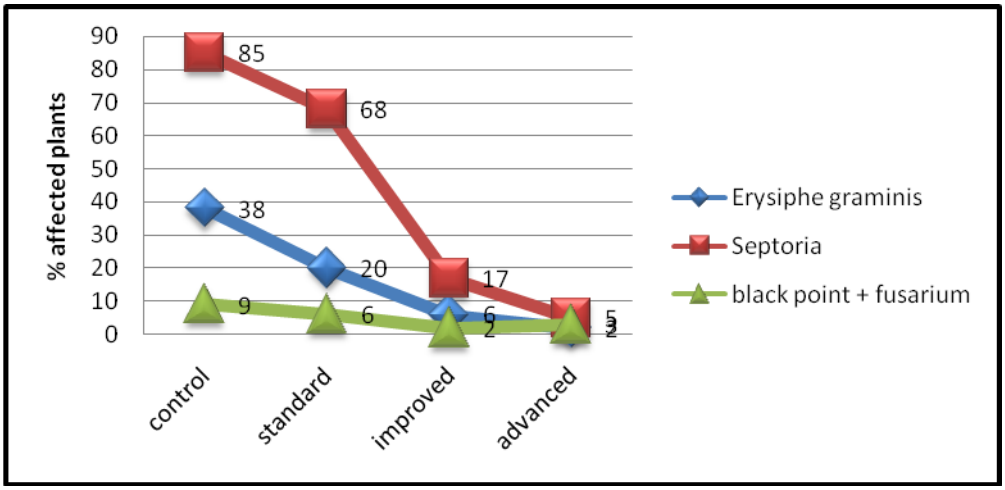

Fig. 6. Diseases monitoring to Mihai Valley(2005, 2006, 2008)

There was observed also the pests and the most important was *Lema melanopa.*

CONCLUSIONS

Weeds and pathoges are different for each location. The advanced technology is the best solution to control these constrainers. Among foliar pathogens Erysiphe graminis was well controlled using improved and advanced technologies.

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THE IDENTIFICATION OF SOME VALUABLE WHEAT GENOTYPES IN THE BREEDING PROCESS, BASED ON THE YIELD POTENTIAL, IN NORMAL AND DROUGHT CONDITIONS

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ABSTRACT

On Şimnic Researches Station, inside off the wheat breeding process, during 2005-2006, for a number of 2 wheat genotypes types with Rht dwarfing genes, there were identified a series of positive variants based on the yield results obtained also in the normal and drought climatic conditions, at least for this specie the drought tolerance not being a very objective criteria for extracting the most valuable forms.

INTRODUCTION

The wheat cultivation shows a great importance for the Romanian agriculture, by its success or fails depending the food security of our country. Although, every year it is introduced on cultivation a great number of Romanian and foreign genotypes, not always it is known totally the adaptability level of those once on the specifically pedo-climatic conditions of the area, so the yield potential being decreased in a great number of cases.

MATERIAL AND METHOD

The biological material experimented on Şimnic Researches Station between 2005 and 2008 is represented by an assortment of 2 wheat genotypes types (*rht1&Rht8* and *Rht1&rht8*), wheat types that have some *Rht* genes combination, from every types of wheat variety being experimented 25 genotypes.

Concerning the applied experimental method, for every wheat variety type were organized an experience with 25 variants in three repetitions after the randomized blocks model. The area of a variant was by 10 m^2, the recorded date being processed after the statistically and observation method and the variants analysis. The control of the experience for every variety type was considered the variants average.

In order to establish the adaptability level of the studied variants, it was considered the Sensibility Drought Index (SDI) after Fischer and Maurer, also being calculated the drought intensity in the references year. For this reason it was calculated:

$$ISS = \frac{P_n - P_s}{P_n \circ I} \qquad I = 1 - \frac{\bar{P}_s}{\bar{P}_n}$$

ISS (SDI) - Sensibility Drought Index
Pn – the yield in the normal climatic year
Ps – the yield in the drought year
I – the drought intensity

$\bar{P}s$ and $\bar{P}n$ the yield average from the normal and drought year

In order to quantified in the most objective manner the biological value of every genotype, there were considered the yield obtained in the 2006-2007 agricultural year, yield obtained during the drought (Ps), together with the one obtained in 2005-2006 and 2007-2008 (Pn), normal year from climatic point of view.

The values of those two yields will be considered coordinates of the point corresponding to each genotype, in this way showing a dispersion field.

Dividing the dispersion field in four sectors, that has the commune origin the X coordinate point represented by the yield result of the control in 2007 and respectively by Y coordinate represented by the average yield result from 2006-2008, the positive variants being placed in the upper-right sector.

RESULTS AND DISCUSSIONS

Concerning the *rht1&Rht8* variety type, in the case of S110 genotype, it was calculated the highest value of SDI by 0.33, the yield of this genotype in the normal years being of 4710 kg/ha, while in severe drought it was recorded 3760 kg/ha.

The highest yield was obtained on S026 variety with 7055 kg/ha, as average of the two years normal climatic conditions and respectively a yield of 3790 kg/ha in 2007, from this showing a difference of 3265 kg/ha. The value of this difference proves a smaller level of stability, but a biological potential very high for the favorable area for wheat cultivation. Also, for the S026 variety there were recorded the highest difference for the different experimental condition, fact that proves the idea that even thought this variety has a high yield potential, it needs to be breed regarding the yield stability (Table 1).

Table 1

The calculation of the SDI based on Fischer and Maurer formula for the *rht1&Rht8* wheat type

Variety	Yield (kg/ha)		The difference P_n- P_s (kg/ha)	ISS	
	P_s	P_n		Val.	Ranking
S002	2900	5060	2160	1.33	20
S005	3500	5510	2010	1.14	15
S008	3920	6325	2405	1.19	18
S011	3940	6025	2085	1.08	13
S012	4600	6285	1685	0.84	10
S013	4020	4820	800	0.52	4
S022	3030	5495	2465	1.40	21
S025	2600	4170	1570	1.18	17
S026	3790	7055	3265	1.45	23
S028	4860	5905	1045	0.55	6
S031	1910	4135	2225	1.68	25
S032	2050	2730	680	0.78	9
S033	1760	3260	1500	1.44	22
S037	2960	4630	1670	1.13	14
S042	2500	4665	2165	1.45	24
S058	3640	5795	2155	1.16	16
S062	3620	4360	740	0.53	5
S064	2670	3320	650	0.61	7
S067	3670	4255	585	0.43	2
S079	3020	5045	2025	1.25	19
S083	3390	4390	1000	0.71	8
S084	2600	3740	1140	0.95	11
S095	3010	4370	1360	0.97	12
S099	3340	3930	590	0.47	3
S110	3760	4710	950	0.33	1
$\bar{x}$	P_s=3242 kg/ha; P_n=4799 kg/ha; I=0.32				

Regarding the *Rht1&rht8* type, the lowest value of SDI was recorded on S053 variety with only 0.70. In this way, the S0110 obtains in normal conditions 5005 kg/ha, while in drought conditions record 3390 kg/ha. The highest yield was recorded on the S044 genotype with an average of the two normal year of 6425 kg/ha.

The highest yield difference was emphasized inside of S059 variety with a value of 3790 kg/ha between the two conditions type. More than that, this genotype shows the highest value of SDI, by 1.33, reason that at least for this type of variety, as more productive genotype it is, as unstable yield capacity it has (Table 2).

Table 2

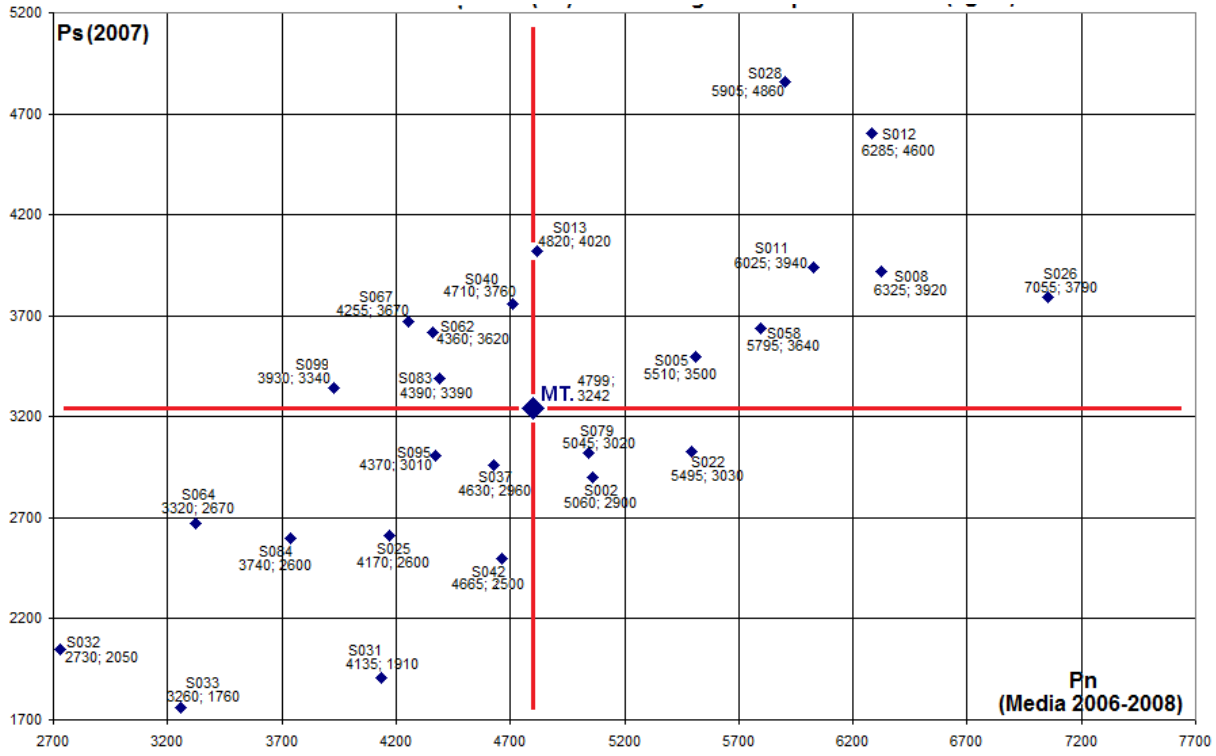
Calculul ISS pe baza formulei lui Fisher şi Maurer pentru liniile de tipul *Rht1&rht8*

Variety	Yield (kg/ha)		The difference P_n- P_s (kg/ha)	ISS	
	P_s	Pn		Val.	Ranking
S003	3135	5710	2575	0.98	12
S004	2775	6195	3420	1.20	23
S014	3157	5820	2663	0.99	16
S015	3080	5600	2520	0.98	13
S018	2175	5180	3005	1.26	24
S019	2600	5185	2585	1.08	18
S021	3050	5285	2235	0.92	8
S034	2595	4590	1995	0.94	10
S035	3255	5935	2680	0.98	14
S036	2700	5055	2355	1.01	17
S038	2500	5145	2645	1.12	19
S039	1840	4000	2160	1.17	21
S043	3270	5950	2680	0.98	15
S044	3555	6425	2870	0.97	11
S045	2910	4670	1760	0.82	5
S047	3070	5345	2275	0.92	9
S048	3090	5335	2245	0.91	6
S051	3590	5320	1730	0.71	2
S052	3300	5100	1800	0.77	3
S053	3390	5005	1615	0.70	1
S055	2355	5025	2670	1.15	20
S059	2555	6345	3790	1.30	25
S061	2625	4510	1885	0.91	7
S065	2025	4405	2380	1.17	22
S066	3490	5585	2095	0.81	4
$\bar{x}$	P_s=2883 kg/ha; P_n=5309 kg/ha; I=0.46				

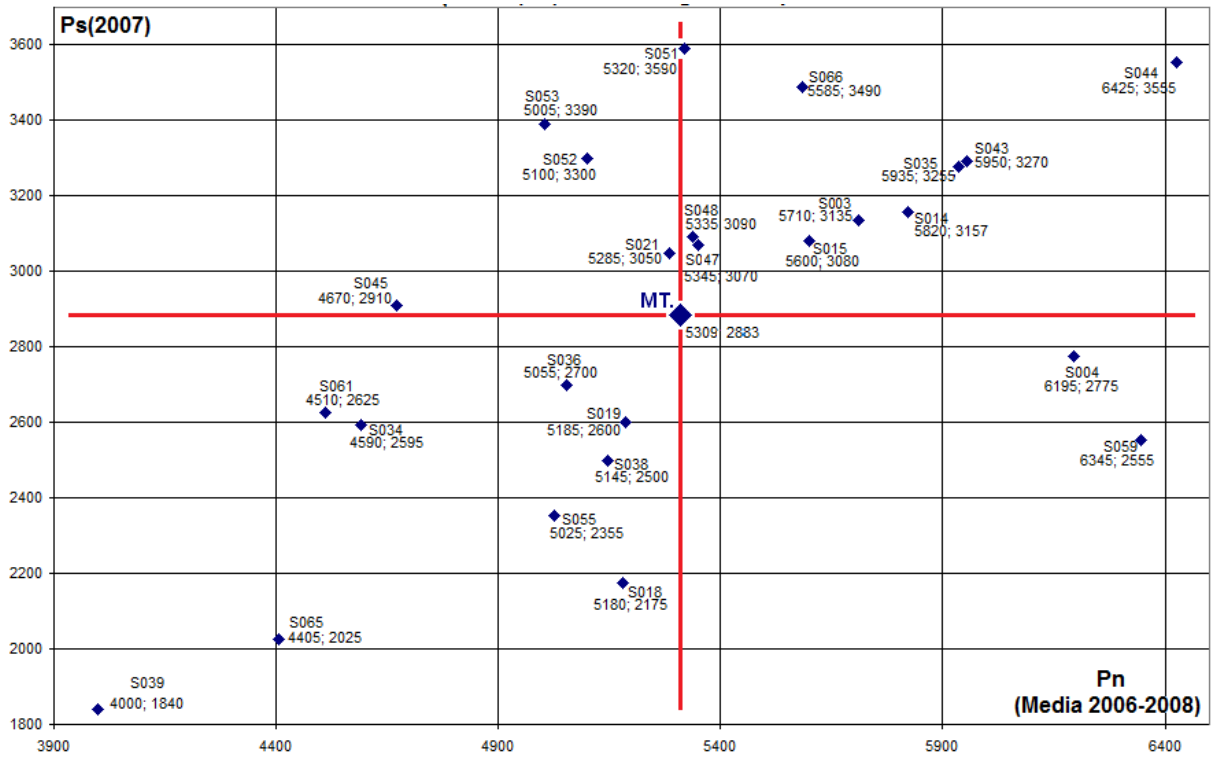
Concerning the emphasizing the positive variants by graphical method of the dispersion field, inside of *rht1&Rht8* wheat type, there were identified 9 positive variants. Those are: S028, S012, S013, S011, S068, S026, S058 and S005. The best result as average of 2006-2008 years was by 7055 kg/ha on S026 variety, while the highest yield on drought conditions was by 4860 kg/ha inside of S028 variety (Graphic 1).

Regarding the *Rht1&rht8* type, based on the value coordinates of each variety, nine genotypes are considerate as being positive variants those genotypes being: S003, S014, S015, S035, S043, S044, S047, S048 and S066.

The best result for the 2006-2008 average were by 6425 kg/ha on S044 and the highest yield recorded in 2007 was by 3590 kg/ha on S051 genotype (Graphic 2).



Graphic 1 The dispersion field of the yields obtained in 2007 correlated with the ones obtained in 2006-2008 for the *rht1&Rht8* wheat type



Graphic 2 The dispersion field of the yields obtained in 2007 correlated with the ones obtained in 2006-2008 for the *Rht1&rht8* wheat type

CONCLUSIONS

1. The highest yield on drought year was emphasized on S028 from *rht1&Rht8* type, with a value of 4860 kg/ha. For normal climatic conditions, the S077 genotype from the same wheat type recorded the highest yield potential with 7055 kg/ha.
2. The *rht1&Rht8* wheat type cumulates the highest number of genotypes that obtains more then 5000 kg/ha, respectively 6 variants, the highest yield level being recorded by the S026 variety from *rht1&Rht8* type with 5966 kg/ha.
3. The value of SDI is not necessary an objective criteria for the productive genotype selection.
4. The genotype that shows a good stability of yield potential in the three year of experience does not reach a high yield level.
5. The lending of the valuable biologic material regarding the yield potential must be made considering the drought sensibility. The genotypes that obtain high results and prove a good level of stability for yield capacity are suitable for all the cultivation areas, while the varieties that obtain the best yield results are suitable for the areas with satisfactory rainfalls/year or in the area with irrigation systems.

EVALUAREA VARIABILITĂȚII SOMACLONALE LA LUCERNĂ CU MARKERI RAPD

ASSESSMENT OF SOMACLONAL VARIATION IN ALFALFA BY RAPD FINGERPRINTING

CERASELA PETOLESCU, GABRIEL NEDELEA

Key words: genetic diversity, alfalfa, RAPD markers, somatic embryogenesis, in vitro culture

REZUMAT

Treizeci de genotipuri de lucernă au fost analizate din punct de vedere al capacității de regenerare a embrionilor somatici via calus. Variabilitatea regeneranților obținuți a fost evaluată cu ajutorul markerilor RAPD. Frecvența de regenerare a fost scăzută, doar de 1%, 3 din cele 30 de genotipuri testate având capacitate regenerativă. Markerii RAPD utilizați au amplificat fragmente cu lungimi cuprinse între 200 bp şi 1230 bp. Numărul total de benzi obținute a variat între 4 şi 9 iar numărul benzilor polimorfice a variat între 2 şi 6. Markerii RAPD pot fi folosiți cu succes în studii de variabilitate, cu ajutorul lor identificându-se polimorfism între regeneranții obținuți.

ABSTRACT

Thirty alfalfa genotypes cultivated in Romania, were analyzed with reference to their ability to regenerate somatic embryos from callus culture and also were verify genetic identity comparing the explant-donors and the in vitro derived plantlets. In order to select genotypes with in vitro stability or instability we evaluate the regeneration ability of the 30 romanian lines or cultivars and genetic diversity of the regenerants using five RAPD markers. 3 out of 30 genotypes tested had regeneration ability with a frequency of 1 %. The RAPD primers amplified fragments with the size ranged from 200 bp to 1230 bp. The total number of clear bands obtained from each primer ranged from 4 to 9. The number of polymorphic bands ranged from 2 to 6. There were differences between genotypes regarding the number of polymorphic bands obtained with the same primer. To date, few studies have been conducted to assess the level of variation among somaclones of Medicago sativa using DNA polymorphism.

INTRODUCTION

Alfalfa (Medicago sativa L.) is the most cultivated forage legume. It is an autotetraploid with 2n = 4x = 32, and allogamous specie. Alfalfa (Medicago sativa L.) is a cross pollinated forage legume a traditional forage crop, widely used for animal feeding. Although alfalfa has been improved with respect to forage quality and pest resistance, little progress has been made in forage yield. Alfalfa is also one of the most frequently studied crops from the point of view of tissue culture derived embryo production (Chen, T.H.H.et al., 1987). Preliminary studies indicate that alfalfa in vitro response is strongly genotype dependent (Atanassov, A. and Brown, D.C.W. 1984; Bingham, E.T. et. al., 1975.) It is also considered the species with the most advanced synthetic seed system, although its use for commercial propagation purposes is still under evaluation (Piccioni, E. et. al., 1997). Moreover, significant progress has been made using genetic engineering methods for improving its nutritional value (Schroeder, H.E. et. al., 1991) to enhance tolerance to abiotic stress (Mckersei, B. D. et. al., 1993) and to use alfalfa as a source of value-added products. The present paper describes plant regeneration via callus culture from thirty

varieties of M. sativa and genetic identity using five RAPD primers, comparing the explant-donors and the in vitro derived plantlets.

The success of a breeding program depends on the genetic variability available into the germoplasm of the crop. Tissue culture is a mutagenic technique causes cytogenetic, genetic and epigenetic variation colectivelly referred to as tissue culture - induced or somaclonal variation. For this reason, plant regeneration from cells cultivated in vitro may be a source of useful variation (Varga et al., 1994). Results of many studies indicate that alfalfa in vitro response is strongly genotype dependent (Atanassov, A. & Brown, D.C.W. 1984; Bingham, E.T. et al. 1975; Badea, E. et al., 1990). However, when in vitro techniques are used for plant propagation and/or genetic modification the most crucial aspect is to retain genetic integrity with respect to the mother plants. Somaclonal variability has been evaluated using molecular markers (Hagima et al., 1996). Several authors have used molecular markers to monitor genetic stability in in vitro culture-derived plants including legume species. Gesteira et al. (2002) used RAPD markers to evaluate genetic stability of regenerants of soybean plants obtained through somatic embryogenesis.

Molecular markers and molecular sequences contain useful information about evolutionary history (Haymer DS, 1994). Recently, the use of random amplified polymorphic DNAs (RAPDs) has become popular. The arbitrarily primed polymerase chain reaction (or RAPD) amplifies anonymous fragments of DNA from any genome (Gardiner S. E., 1997). The size distribution of amplified fragments varies among species.

The present paper describes plant regeneration via callus culture from thirty varieties of M. sativa and genetic identity using five RAPD primers, comparing the explant-donors and the in vitro derived plantlets. RAPD data were analyzed using locus-to-locus gel readings and the rates of in vitro DNA polymorphism were calculated. Only polymorphisms present in all DNA concentrations were included in the analysis.

MATERIAL AND METHOD

Induction of somatic embryogenesis

Plant materials. 30 lines and cultivars obtained in department working in alfalfa breeding from I.N.C.D.A. Fundulea were involved in this study: *Satelit, F 1109-99, F105- 90, Granat, Cosmina, Sigma, F1615-04, F1206-00, F1306-01, F1822-06, Super, F270-91, F1413-02, F1310-01, F1111-99, Pastoral, Magnat, Alina, Selena, Stolo-13, Mf 42-96, Viking, Cristal, F219-91, Coral, Dorina, Saturn, Opal, Venus, F907-97.* For the assessment of the regeneration ability 10 individuals from each cultivars were used. Alfalfa seeds were surface sterilized by immersion in 70% ethanol for 10 sec., and then in 0.1% (w/v) mercuric chloride ($HgCl_2$) solution for 3 min, followed by four washes with sterile distilled water. Sterile seeds were inoculated on half-strength MS (Murashige and Skoog, 1962) medium for germination.

The explants (cotyledon, roots, petiole and leaflet) were prepared from plantlets obtained by seed germination in aseptic conditions, three weeks after culture initiation. For callus and embryogenesis induction was used Murashige and Skoog medium added with 2 mg/l 2,4 D and 0,5 mg/l kinetin, 3% sucrose and B5 vitamins, solidified with agar.

Vigorously growing, light-yellow primary callus was transferred on the same basal medium supplemented with 3% (w/v) sucrose, B5 vitamins and solidified with agar for embryos development and plant regeneration. Embryos with cotyledon were transferred to half-strength MS medium added with 4 mg/l GA_3 for germination.

The plantlets regenerated were maintained in aseptic conditions for further growth. For DNA extraction young leaves from *in vitro* growing plants were sampled. All *in vitro* cultures were maintained at 24°C, with a 16 h light regime.

RAPD analysis

DNA extraction. Total genomic DNA of 39 regenerated plants *via* somatic embryogenesis and from mother plants was extracted using Maxwell™ 16 Instrument from Promega. Purified concentrated products are obtained at high quality and high yield and can be used directly in a variety of downstream applications.

Primers and RAPD-PCR assay. The 5 primers were screen for detection of the genetic polymorphism among regenerated plants and mother plants (Table 1).

The discriminative power of DNA markers used as tool to characterize genetic diversity is very important because they can be used to assess the polymorphism of alfalfa *in vitro* regenerated plants. The amplifications were carried out in a 25 µl PCR buffer containing: GoTaq® Green Master Mix ready-to-use solutions (GoTaq® DNA Polymerase, dNTP, $MgCl_2$, and reactions buffers at optimal concentrations for efficient amplification of DNA templates), RAPD primers, DNA template and Nuclease-Free Water. GoTaq® Green Master Mix contains two dyes (blue and yellow) that allow monitoring of progress during eletrophoresis. DNA amplification was carried out using a Thermal-cycler by Corbett and reactions were submitted to the following PCR program: preliminary DNA denaturation for 5 min at 94°C, followed by 45 cycles consisting of denaturation (1 min, 94°C), primer annealing (1 min, 36°C), and extension (2 min, 72°C). A final extension for 3 min at 72°C was included. The RAPD products were separated by electrophoresis in 2% agarose gels, which run with 1xTAE buffer. Photos documentation was performed under UV light using a photo imaging system. Number of bands generated by different pairs of primer used was scored and the frequency of polymorphism was calculated.

Data analysis. Data were analyzed by current statistical analysis methods. The amplification bands were scored as (1) and (0) on band (allele) presence and absence, respectively. The frequencies of the RAPD fragments were estimated for each of individuals from each genotype. Sizes amplification bands were estimated using PhotoCapt Molecular Weight System.

RESULTS AND DISCUSSIONS

All types of explants (cotyledons, petioles, roots and leaflets) produced callus on MS medium supplemented with 2, 4-D and kinetin combination with similar morphological characters. Embryos could not form unless the callus was transferred to a growth regulator-free medium. After 1 months, all the calli were transferred to hormone-free MS medium for embryos development. For plant regeneration and rooting, cotyledonary embryos developed were transferred to half-strength MS medium added with 4mg/l GA_3. A few of the embryos developed into plants, the rest were arrested at the globular or torpedo stages.

Almost all cultivars tested produced embryogenic calli but embryos failed to develop. 3 cultivars out of 30 genotypes tested have regeneration ability. The frequency of plants with regeneration ability was 1% in the population of all three cultivars selected for this trait. The results obtained are presented in table 2.

In Medicago sativa regeneration is genotype specific and only a few genotypes in some cultivars have been isolated for their ability to regenerate plants from explant derived calli. The ability of alfalfa culture to regenerate plants is under genetic control and occurs with a frequency of 1 to 10% in most cultivars. The variable response within a cultivar reflects the facts that alfalfa is an open-pollinated species and each cultivar is actually a heterogeneous mixture of genotypes.

The 5 primers were screened for their ability to generate RAPD polymorphic DNA bands using the accessions total DNA. Only 4 produced reproducible fragments for two genotypes and one primer produced reproducible fragments for one genotype. The number of total bands, their polymorphism and the percentage of polymorphism are presented in table 3.

Table 1.

RAPD primers used, sequence and size of products

No. crt.	Primer	Sequence (5'-3')	Size of the products
1	G -06	GTGCCTAACC	300-830
2	G -10	AGGGCCGTCT	240-330
3	G -16	AGCGTCCTCC	430-650
4	L -14	GTGACAGGCT	200-400
5	L -12	GGGCGGTACT	300-1200

Table 2.

Results concerning the regeneration ability of the assessed genotypes

No. crt.	Genotype	No. of individuals/ genotype	No. of individuals with regeneration ability	No. of somatic embryos	No. of plantlets
1	Satelit	10	2	33*	-
2	F105-90	10	1	25	16
3	Sigma	10	2	30	15
4	Super	10	2	27*	-
5	F270-91	10	1	19*	-
6	Pastoral	10	1	21*	-
7	Selena	10	1	15	9
8	Coral	10	1	17*	-
9	Dorina	10	1	31*	-

*- embryogenic calli but embryos failed to develop

Table 3.

RAPD primers used and number of bands detected at individuals analyzed from each genotype

Genotype/ individuals no.	No. of bands per primer					No. of polymorphic markers per primer					Percentage (%) of polymorphism					Average of % of polymor-phism/ genotype
	G06	G10	G16	L14	L12	G06	G10	G16	L14	L12	G06	G10	G16	L14	L12	
F105-90/ 17	8	4	8	8	-	6	3	4	4	-	75	75	50	50	-	62,5
Sigma/ 15	-	-	-	-	6	-	-	-	-	5	-	-	-	-	83	
Selena/ 10	6	5	5	9	-	3	4	3	5	-	50	80	60	55	-	61,25
Average of % of polymorphism per primer											62,5	77,5	55	52,5		

The total number of clear bands obtained from each primer ranged from 4 (F105-90 genotype-G10 primer) to 9 (genotype - L14 primer). The number of polymorphic bands ranged from 3 (F105-90 and Selena genotype - G10, G06, G16 primers) to 6 (F105-90 genotype - G06 primer). In the present investigation, the percent of polymorphism per genotype revealed that the genetic diversity of Sigma's regenerants is lower than other two genotypes taken into this study. The comparison of the percentage of polymorphism of RAPD primers revealed that the lowest was with G16 (55%) and the highest was with G10 (77,5%). Amplified fragments ranged from 300 to 1200 bp in size. Sigma RAPD profiles are shown in figures 1.

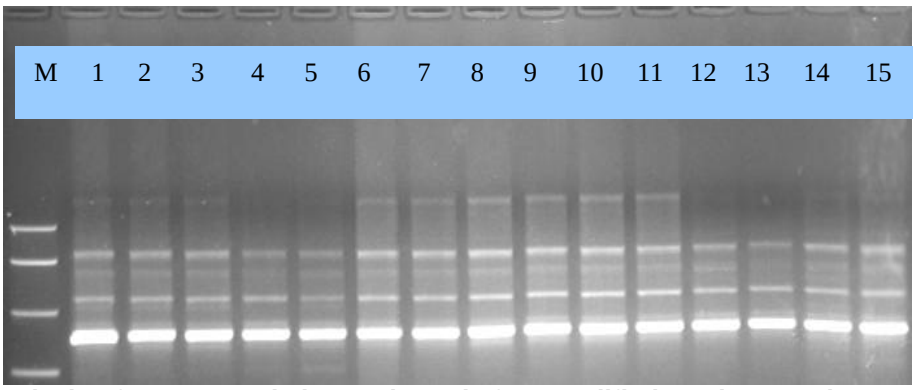


Fig. 1. Analysis of agarose gel electrophoresis for amplified products using L12 primer Sigma genotype; M- molecular marker; 1-14 regenerants; 15 explant-donors

CONCLUSIONS

Experimental results obtained evidenced that RAPD markers allowed us to estimate the overall genetic diversity of the in vitro regenerated alfalfa plants. The number of polymorphic bands ranged from 3 (F105-90 and Selena genotype - G10, G06, G16 primers) to 6 (F105-90 genotype - G06 primer). The genetic diversity of Sigma's regenerants being lower means that this cultivar is less prone to instability *in vitro* than other two cultivar studied. The comparison of the percentage of polymorphism of RAPD primers revealed that the lowest was with G16 (55%) and the highest was with G10 (77,5%).

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EVALUAREA VARIABILITĂȚII SOMACLONALE CU MARKERI ISSR LA LUCERNĂ PRIN INTERMEDIUL ANALIZEI VARIANȚEI

VARIANCE ANALYSIS FOR ASSESSING ISSR VARIATION OF IN VITRO REGENERATED ALFALFA PLANTLETS

CERASELA PETOLESCU, GABRIEL NEDELEA

Key words: Genetic identity, ISSR, variance analysis, Alfalfa

REZUMAT

Scopul principal al acestui studiu constă în evaluarea variabilității somaclonale a regeneranților liniei F105-90, obținuți prin cultura in vitro via calus. Polimorfismul dintre regeneranți şi planta donor de explante a fost evaluat prin intermediul analizei variației pentru cei cinci primeri ISSR utilizati.

Rezultatele obținute au evidențiat o diversitate genetică semnificativă între plantele regenerate cuprinsă între 21,85% şi 35,53%. În ceea ce priveşte variabilitatea existentă între planta mamă, donor de explante şi plantele derivate din aceasta, s-a identificat un nivel ridicat al polimorfismului care a variat între 24% şi 79,10%.

ABSTRACT

The main purpose of this study was to evaluate the genetic variation of the in vitro regenerated plantlets of F105-90 alfalfa line using five ISSR primers. In order to fully exploit ISSR results for studies of the genetic structures of regenerants of F105-90 line, it is necessary to use a method of data analysis that permits identification of variations within population. Genetic identity between the explant-donors and the in vitro derived plantlets was performed using simple matching coefficient.

The variance analysis was used to estimate the polymorphism among the ISSR patterns. The results indicated that was significant genetic diversity among regenerated plantlets ranged from 21,85 % to 25,53 %. A high level of genetic diversity was found between explant-donors and the in vitro derived plantlets ranged from 24% to 79,10%.

INTRODUCTION

Tissue culture is a mutagenic technique causes cytogenetic, genetic and epigenetic variation colectivelly referred to as tissue culture - induced or somaclonal variation [1, 2]. For this reason, plant regeneration from alfalfa cells cultivated *in vitro* may be a source of useful variation [3]. However, when *in vitro* techniques are used for plant propagation and/or genetic modification the most crucial aspect is to retain genetic integrity with respect to mother plants.

Several strategies are available for detecting somaclonal variation including phenotypic identification, cytological analysis, and molecular methods. Several authors have used molecular markers to monitor genetic stability in *in vitro* culture-derived plants [4, 5, 6, 7, 8, 9, 10].

Inter simple sequence repeats has recently been developed as an anonymous, RAPD – like approach that accesses variation in the numerous microsatellite regions dispersed throughout the various genomes and circumvents the challenge of characterizing individual loci that other molecular approaches require. They are characterized by mono-, di- or multi - nucleotide repeats that have 4 -10 repeat units side-

by-side. Extremely high variability combined with greater robustness in repeatability experiments and less prone to changing band patterns with changes in constituent or DNA template concentrations, make them superior to other readily available marker systems in investigations of genetic variation [11, 12]. In the present study, we report the use of molecular marker such as ISSR, for the assessment of genetic diversity of the regenerants compared with mother plants in order to select the most apropiate genotype for the different task of the breeding program.

MATERIAL AND METHOD

Plant materials: 16 regenerated in vitro plantlets of line F 105-90. This line is obtained in department working in alfalfa breeding from I.N.C.D.A. Fundulea.

ISSR analysis.

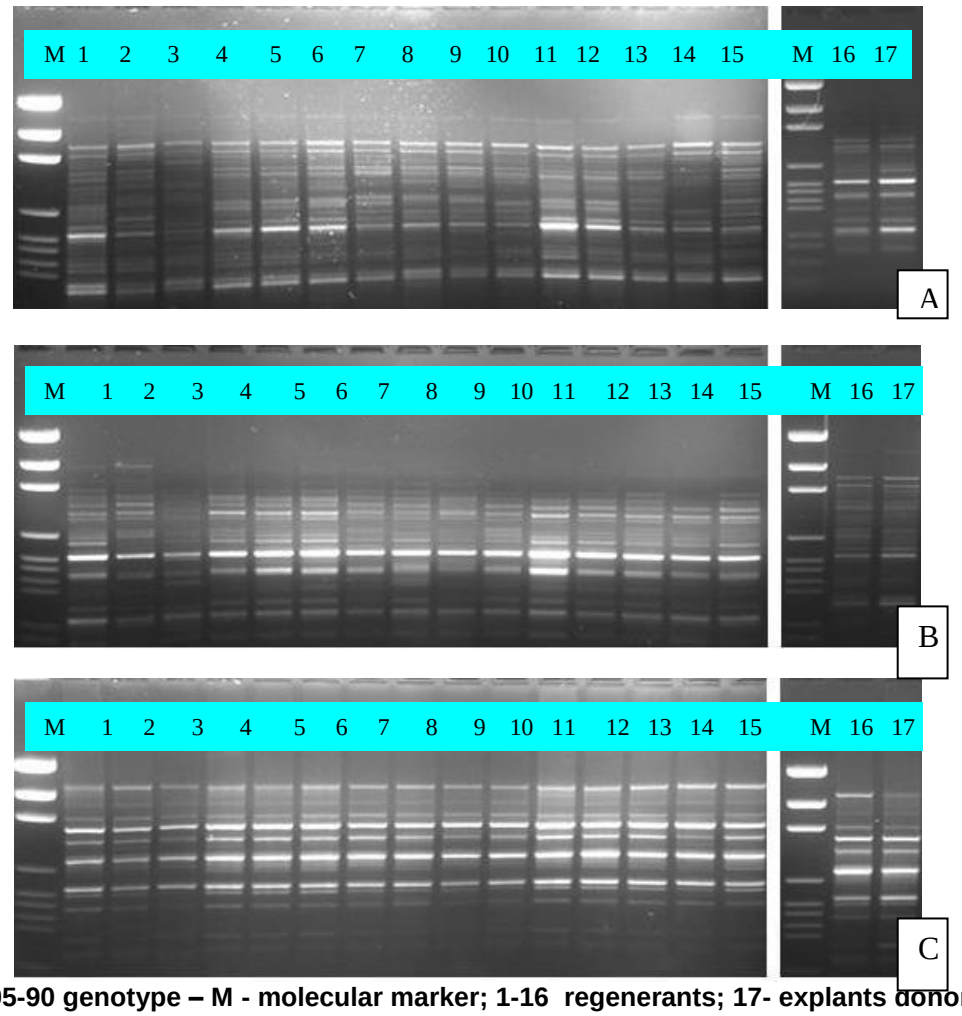
DNA extraction. Total genomic DNA from 16 regenerants and from donor plants was extracted using Maxwell™ 16 Instrument from Promega. Purified concentrated products were obtained at high quality and high yield.

Primers and ISSR-PCR assays. The 5 primers were screen for detection of the genetic polymorphism among regenerated plantlets and mother plants: A12, A13, A17, A21, UBC818 with following sequences: (GA)6CC, (GT)6CC, (GTG)3GC, (CA)6AC, (CA)7G [13]. The amplifications were carried out in a 25 µl PCR buffer containing: GoTaq® Green Master Mix ready-to-use solutions (GoTaq® DNA Polymerase, dNTP, MgCl2, and reactions buffers at optimal concentrations for efficient amplification of DNA templates), ISSR primers, DNA template and Nuclease-Free Water. GoTaq® Green Master Mix contains two dyes (blue and yellow) that allow monitoring of progress during eletrophoresis. DNA amplification was carried out using a Thermalcycler by Corbett and reactions were submitted to the following PCR program: preliminary DNA denaturation for 5 min at 94°C, followed by 35 cycles consisting of denaturation (1 min, 94°C), primer annealing (1 min, 46-51°C), and extension (3 min, 72°C). A final extension for 7 min at 72°C was included. The ISSR products were separated by 2% agarose gels electrophoresis, which run with 1xTAE buffer. Photo documentation was performed under UV light using a photo imaging system. Number of bands generated by different pairs of primers used was scored and the frequency of polymorphism was calculated.

RESULTS AND DISCUSSIONS

Results of evaluating the genetic variability of the 16 regenerats of line F 105-90 highlighted the fact that only three of the five used primers ISSR (A12, A13, A17, A21 and UBC 818) generated a polymorphism which allows an adequate analysis (fig. 1 A,B,C).

Between regenerats of line F 105-90 differences were observed among the alleles of locus A-12, with a frequency of 30%, based on a high intrapopulational variability, of 21,85 %. Between the regenerats of line F 105-90, among the alleles of locus UBC-818, differences were registered with a frequency of 24%, and the variability was high (25,53 %). Results of variance analysis for polymorphic bands obtained with primer A-12 (table 1), attest the fact that the highest distinctly significant variability is registered in case of fragments with a length of 370, 1120 ad 1200 bp, which determines a significant differentiation of regenerates of this line, while the fragment with length of 900 bp presented the highest homogeneity.



F105-90 genotype – M - molecular marker; 1-16 regenerants; 17- explants donor;
Fig. 1. Analysis of 2% agarose gel electrophoresis for amplified products using A-12 primer (A), A13 primer (B) and UBC818 primer (C)

Table 1.

Variance analysis for the polymorphic bands of the A-12 primer in regenerats of F 105-90 genotype

No.	Locus	Between groups		Within groups		F Test
		SS	DF	SS	DF	
1	A12-330	0,080	1	0,857	14	1,31
2	A12-370	2,893	1	0,857	14	47,25**
3	A12-420	0,223	1	3,714	14	0,84
4	A12-500	0,036	1	3,714	14	0,13
5	A12-650	0,025	1	2,413	14	0,14
6	A12-700	0,036	1	3,714	14	0,13
7	A12-750	0,120	1	2,317	14	0,73
8	A12-800	0,063	1	3,937	14	0,23
9	A12-850	0,223	1	3,714	14	0,84
10	A12-900	0,004	1	1,746	14	0,03
11	A12-970	0,723	1	1,714	14	5,91
12	A12-990	0,049	1	0,889	14	0,77
13	A12-1120	1,750	1	2,000	14	12,25**
14	A12-1200	1,286	1	1,714	14	10,50**
15	A12-1420	0,049	1	0,889	14	0,77
16	A12-1600	0,049	1	0,889	14	0,77
17	A12-1730	0,049	1	0,889	14	0,77

Alleles with length of 800, 420, 500, 700 and 850 bp present the highest heterozygosis for the population of F 105-90 regenerats.

Results presented in table 2, highlight the fact that between regenerats of line F 105-90 there are significant differences with polymorphic fragments with lengths of 1280 bp, 1200 bp, 350 bp, and 1330 bp. Also, they contribute to creating high total variability registered in case of primer A 13. The lowest variability was observed in case of fragments with a length of 1080 bp. In regenerats populations the highest heterozygosis was registered by alleles with lengths of 700, 750, 350 and 1330 bp.

Table 2.

Variance analysis for the polymorphic bands of the A-13 primer in regenerats of F 105-90 genotype

No.	Locus	Between groups		Within groups		Test F
		SS	FD	SS	FD	
1	A13-220	0,271	1	0,667	14	5,69*
2	A13-350	1,168	1	2,769	14	5,91*
3	A13-380	0,848	1	1,590	14	7,47*
4	A13-620	0,271	1	0,667	14	5,69*
5	A13-660	0,160	1	1,590	14	1,41
6	A13-700	0,519	1	3,231	14	2,25
7	A13-750	0,463	1	2,974	14	2,18
8	A13-990	0,160	1	1,590	14	1,41
9	A13-1080	0,014	1	0,923	14	0,22
10	A13-1200	1,083	1	0,667	14	22,75**
11	A13-1280	2,077	1	0,923	14	31,50**
12	A13-1330	1,168	1	2,769	14	5,91*
13	A13-1550	0,160	1	1,590	14	1,41
14	A13-1660	0,160	1	1,590	14	1,41

Table 3.

Variance analysis for the polymorphic bands of the UBC-818 primer in regenerats of F 105-90 genotype

No.	Locus	Between groups		Within groups		F Test
		SS	DF	SS	DF	
1	UBC818-310	0,114	1	1,636	14	0,97
2	UBC818-510	0,028	1	0,909	14	0,44
3	UBC818-660	1,392	1	2,545	14	7,66*
4	UBC818-680	0,601	1	2,836	14	2,97
5	UBC818-710	0,092	1	3,345	14	0,39
6	UBC818-860	0,114	1	1,636	14	0,97
7	UBC818-1660	3,438	1	0,000	14	

Results of variance analysis of polymorphic bands generated by primer UBC-818 (table 3), highlight the fact that fragments with length 1660 and 660 bp have the highest contribution to total variability. Amplicon of 660 bp determines a significant differentiation of regenerats of this line. The highest homogenity was registered in case of band with length of 510 bp. In regenerats population F 105-90 the highest heterozygosis was registered within the alleles with length of 710 and 680 bp.

CONCLUSIONS

The variance analysis was used to estimate the polymorphism among the ISSR patterns. The results indicated that was significant genetic diversity among regenerated plantlets ranged from 21,85 % to 25,53 %. A high level of genetic diversity was found between explant-donors and the in vitro derived plantlets ranged from 24% to 79,10%.

Between regenerats of line F 105-90 differences were observed among the alleles of locus A-12, with a frequency of 30%, based on a high intrapopulational variability, of 21,85 %. Between the regenerats of line F 105-90, among the alleles of locus UBC-818, differences were registered with a frequency of 24%, and the variability was high (25,53 %).

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INFLENŢA METALELOR GRELE (CADMIU, LEAD) ASUPRA FORMĂRII RĂDĂCINILOR PLANTULELOR DE *TRITICUM AESTIVUM* L.

THE INFLUENCE OF HEAVY METALS (CADMIUM, LEAD) ON THE FORMATION OF TRITICUM AESTIVUM PLANTULA ROOTS

IRINA PETRESCU, BĂGHINĂ NARCIS, CAROLINA ŞTEFAN, DANIELA BĂLUŢĂ, ANTOANELA COZMA, LIA MICULA

Key words: cadmium, lead, plantula *Triticum aestivum*, roots.

REZUMAT

Cadmiul este, mai întâi, transportat la ficat prin intermediul sângelui. Acolo, se combină cu proteine şi formează compuşi care sunt transportaţi la rinichi. Cadmiul se acumulează în rinichi, unde afectează mecanismul de filtrare. Acesta cauzează excreţia proteinelor şi zaharurilor esenţiale din corpul uman şi a rinichilor ulterior. Cadmiul acumulat în rinichi necesită o perioadă foarte mare de timp pentru a fi eliminat din organismul uman. Cea mai mare proporţie de lead absorbit de organism se fixează în oase unde rămâne chiar şi 25 de ani. De aici, în perioadele în care organismul este slăbit sau suprasolicitat - boală, sarcină, osteoporoză - mineralele stocate în os, inclusiv leadul, sunt puse din nou în circulaţie prin sânge.

ABSTRACT

Cadmium is, firstly, being transported to the liver, through blood. There it combines with proteins and forms components that are being transported to the kidneys. The cadmium accumulates in the kidneys, affecting the mechanism of filtration. This causes the excretion of the proteins and essentials sugars from the human body and consequently from the kidney. The cadmium, accumulated into the kidney needs a really big amount of time to be eliminated out of the human organism. The biggest percentage of absorbed Lead in the organism is being fixed into the bones, where it stays even for 25 years. Here from, during the times where the body is oversolicitated, such as disease, pregnancy, ostheoporosis the minerals accumulated into the bones, including the lead, are again released into the blood circulation.

INTRODUCTION

The toxins that get into the organism are eliminated mostly due to some specific enzymatic systems. But the heavy metals usually stay into the body and are accumulated dose by dose. The lead is toxic because, swallowed or inhaled and absorbs, it affects every system of the body, especially the brain, the kidneys and the reproductive system.

Cadmium may be primarily found in the ground (earth). It is always found in combination with zinc. Cadmium is also found in industry as a inevitably secondary product resulted from the extraction of lead and copper. It gets into the environment especially through soil, because it can be found in the composition of growing stimulators and pesticides.

MATERIAL AND METHOD

To create the experiment, there have been chosen an each sample (100 seeds/sample) of two species of *Triticum aestivum* L.(Alex and Apache).

The experiment have been made by testing the effect on plantula from Alex and Apache type after the germination and growing on different heavy metal based on solutions(cadmium, lead).

Variants with cadmium have been: V1-water control; V2-Cd 10^{-2}; V3-Cd 10^{-3}; V4 Cd10^{-4}.

Lead variants were: V1 - water control; V2 –Pb 10^{-2}; V3-Pb 10^{-3}; V4-Pb 10^{-4} .

It has been intended to establish the effect on development of the roots of plantulas from type Alex and Apache after germinating and growing on different heavy metal solutions (Cd,Pb).

They try to establish the effect that growing on heavy metal solutions has upon the development of roots of plantulae from each type.

RESULTS AND DISCUSSIONS

With the ”Alex “type, the number of formed roots was high at the control variant V1-H2O 6.67±0.28, the highest cadmium concentration V2-Cd 10^{-2}, had inhibitory effect over the growth of the roots of 3.00±0.20. The highest number of formed roots was at the variant V4-Cd 10^{-4} (4.33±0.26) (figure 1).The variability coefficient varied from 20.41 % for V3-Cd 10^{-3} to 27.22 % for V2-Cd 10^{-4}.

From figure 1 we can observe that the number of roots formed at the Apache type ,after determining different cadmium concentrations (V2-V4), differed from the control variant V1.The emphasis is on V4- Cd 10^{-4} and V3-Cd 10^{-3}, which have formed on average 3.67 roots, in comparison with the highest Cd concentration V2-Cd 10^{-2},where the number of roots was on average 3.00.The highest number of roots was formed at the variant V1-H_2O (on average 5.67 roots).

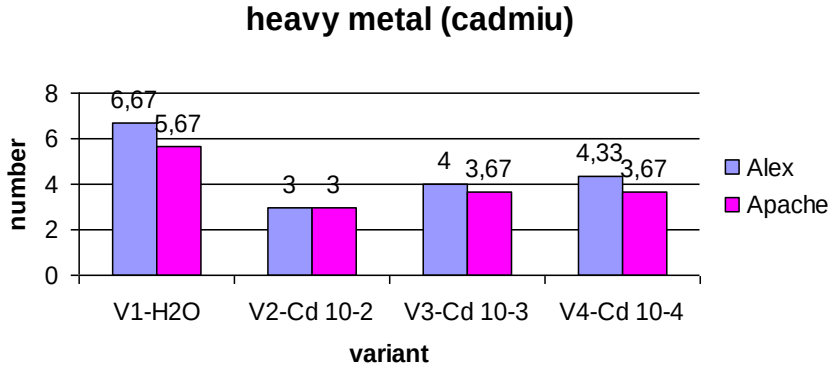

Figure 1 The development of roots in cadmiu

The development of roots at Alex type differs depending on the lead concentration in the analyzed variants (figure 2), emphasizing the inhibitory effect of the lead at the lead variants: V2-Pb 10^{-2} (3.33 ±0.17), variants V3-Pb 10^{-3} (3.00± 0.01) and V4-Pb10^{-4}(3.67 ±0.0).The variability coefficient has values from 12.86% at V4 to 14.71% at V1. The Apache type of grain behaves differently in the aspect of roots forming number. Therefor the values differ V2-Pb 10^{-2} (3.33±0.10)and 3.67 ±0.12 at V4 Pb 10^{-4}.The highest number of the roots was formed at control variants V1-H_2O (5.33)(figure 2.).

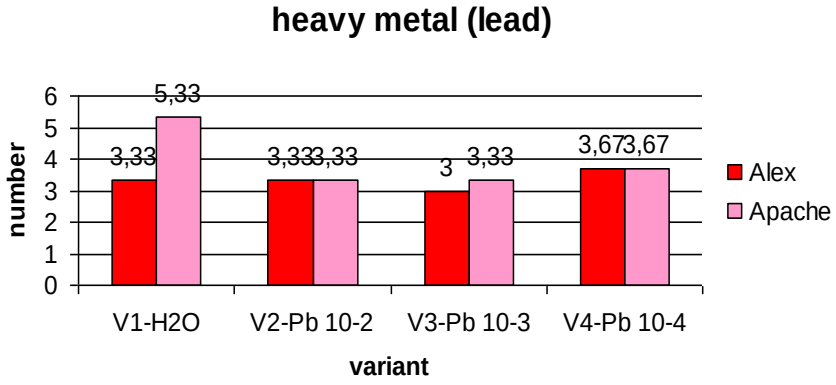

Figure 2 The development of roots in lead

CONCLUSION

The heavy metals have different effect towards the forming of the roots of the plantula at *Tritium aestivum* L. Therefore, at both types “Alex “and “Appache”, the most eloquent effect of the heavy metals (cadmium, lead) was observed at the V2, V3 concentration variants ,where there have been inhibitory but sometimes also stimulating effects towards the growths of the roots of *Triticum aestivum* L. plantula, both at “Alex” and ”Appache” type

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ASPECTS REGARDING THE PRODUCTIVE CAPABILITY AT THE USED PARENTS IN THE INTRASPECIFIC HYBRIDIZATION IN AMARYLLIS.

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Key words: genitor, productive capability, blooming dynamics.

ABSTRACT

The paper presents the results regarding the research on four genitor varieties used for intraspecific hybridization. The productive capability expressed by the amount of plant floral stems, as well as by the blooming dynamics as percentages of floral stems harvested on decades, and the harvested tops.

INTRODUCTION

The Amaryllis is a floriculture species with a very defined placed in the world assortment, but slightly studied in our country. In the countries of origin from the tropical and subtropical regions of the Central and South America, the plant develops its biologic cycle depending on the local climacteric alternances, being constrained to rest in the hot and dry periods of the year.

In the areas with a temperate climate where it is planted in protected areas, at temperatures of 18-23 º C the plant is assisted to enter in the rest period rarefying and cutting out of the irrigations until the leaves get away, and the blooming take place during the months of the winter – spring (February – April), existing concerns for the enlargement of this period.

To that effect in this paper they are reported the data concerning the blooming dynamics and the productive capability of four genitors used in the intraspecific hybridization at Amaryllis.

MATERIAL AND METHOD

The biologic material consisted in four genitor varieties: Red (dark red), White (white with garnet striae), Rose (rose with the median nervure white), Salmon (orange), table 1.

Table 1

Morphologic features and aesthetic details of the flower at the used genitor in the morphologic intraspecific hybridization of Amaryllis

Variety	Morphologic characterization, color attribute of the plant
RED	The inflorescence carries 2-3 flowers of average size, with an erectly position on the stem. Narrow and acuminate tepals. Intense red color, velutinous, without spots, striae. The median nervure yellow at the basis of the cup. Filaments, red gynodium, mauve color anthers and stigma. Floral stem with average length, green color with a mauve shade, covered by deposit. Long, narrow leaves, in a vertical position on the bulb. Bulbs of average sizes, low proliferation rate.

WHITE	Inflorescence with 2-3 smaller flowers. Narrow tepals, externally reflected. White color with garnet striae, more evident on the upper tepals. The median nervure white, green shaded at the basis of the cup. Filaments, gynodium, stigma white, anthers cream. Floral stem short, slight, of intense green color. Short, narrow leaves, in a small number. Small sized bulbs with a good proliferation rate.
ROSE	Inflorescence with 2-3 big flowers. Wide tepals, rounded, wide, externally reflected. Pink color with very narrow striae of a darker shade. The median nervure wide, white with carmine color striae at the basis. Filaments, gynodium, stigma white, anthers cream. Floral stem long, thick, inelastic. Rich leafage, in a bandy position, of dark green color. Bulbs of big size, a very good proliferation rate.
SALMON	Inflorescence with 2-3 flowers. Narrow and acuminate tepals. Intense orange color. The median nervure green at the basis of the tepals. Filaments, gynodium at the basis, orange towards the top, stigma and anthers mauve. Floral stem of average size, thin. Narrow leaves, straight, manifold. Big bulbs, good rate of proliferation.

The observations have been performed on 15 plants from each variety, from where the bulbs were planted in the soil of the greenhouse. The plants have been prepared for the blooming through the alternation of the vegetative growth with an annual rest period, that begun in July, attenuating the irrigation, and than repose them. The vegetative period started in September when the irrigations restarted.

The observations have been performed from the first flowers opening until the end of the blooming, being marked the total harvest of stems, blooming period and the percent of bloomed flowers by decades.

RESULTS AND DISCUSSIONS

Out of the Table no. 2 it is observed the blooming periods at the four varieties framed between the third decade of April and the first decade of June.

Table 2

Results concerning the blooming dynamics at the used genitors for the intraspecific hybridization in Amaryllis

No.	Variety	Floral stems harvest (pieces/year)	Stems harvest year (%)	Out of which: April 3rd*	May 1st*	May 2nd*	May 3rd*	June 1st*
1.	RED	16	106.6	-	13.3	53.4	26.6	13.3
2.	WHITE	15	100.0	-	26.6	40.0	33.4	-
3.	ROSE	20	133.3	26.6	73.3	20.0	13.4	-
4.	SALMON	15	100.0	46.7	33.3	13.3	6.7	-

* decade

* registered harvest on 15 plants.

It is remarked through the early characteristic the varieties ROSE and SALMON, that begun the blooming in the third decade of April. Also among these varieties there are differences concerning the rate of bloomed plants in this period, at the SALMON variety being registered higher values (46,79 %) by comparison to ROSE variety (26,6%).

It is also found at the SALMON variety the harvesting peak (46,7%) is in the third decade of April with a lower harvesting rate in the last decade of May (6,7%), and at the ROSE variety the harvesting peak is in the first decade of May.

The other two varieties (RED and WHITE) started the blooming in the first decade of May, among them being differences concerning both the blooming flowers rate, and the blooming period.

So, at the WHITE variety, the rate of the bloomed plants in the first decade of May is higher (26, 6%) than the one of the RED variety (13, 3%), with a harvesting peak in the second decade of May for the both varieties. It is also found the RED variety has a vegetative period longer in this month until the first decade of June, with a blooming rate of 13.3%. Concerning the stems harvest per plant there are close values, all the genitors having an average of one floral stem. The only one variety that shows differences by comparison to the check-test, statistically supported, it is the ROSE variety (significant positive), table 3.

Table 3.

Amount of floral stems per plant on the used genitors for the intraspecific hybridization in Amaryllis

Variety	AMOUNT of Floral Stems per Plant ($\bar{x} \pm s\bar{x}$)	±d	t	Signification
V1 (check test)	1.1 ±0.03			
V2 RED	1.0 ±0.03	- 0.1	1	-
V3 WHITE	1.0 ±0.03	-0.1	1	-
V4 ROSE	1.3 ±0.03	0.2	2	*
V5 SALMON	1.0 + 0.03	-0.1	1	-

* DL 5% = 0.22 ; DL 1% = 0.30 ; DL 0.1% = 0.43

CONCLUSIONS

Out of the analysis of the registered data at the four genitor varieties, it results the blooming developed during the period April-June, providing a balanced time grading. It is noted due to the early characteristic the varieties RED and SALMON.

In relation to the other three varieties, at the WHITE variety the blooming period was shorter. The harvesting peaks have been registered middle of May at the varieties RED and WHITE, first decade of May at the ROSE variety, and the third decade of April at the SALMON variety.

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CERCETĂRI PRIVIND PRODUSELE DE FRANZELĂRIE ÎMBOGĂȚITE CU SĂRURI MINERALE ŞI VITAMINE

RESEARCHES REGARDING OF BAKERY PRODUCTS ENRICHED WITH SALTS AND VITAMINS

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Key words: food fortification, food safety

REZUMAT

Nivelul substanțelor nutritive determină calitatea produselor alimentare şi reprezintă elementul cel mai important pentru satisfacerea consumatorului. Studiul de cercetare efectuat a urmărit fortificarea produselor alimentare cu nutrienți astfel încât acestea să asigure siguranța alimentară a consumatorilor.

Principiul ştiințific al nutriției urmăreşte selecția alimentelor pe baza criteriilor ştiințifice urmărind păstrarea sănătății consumatorilor, fiind foarte recomandate alimentele fuctionale. Acestea trebuie să asigure un surplus de substanțe care să îmbunătățească nivelul de nutriție al omului.

Fortificarea alimentelor de baza, cum este pâinii ar putea fi făcută prin utilizarea micronutrienților în scopul schimbării structurii biochimice a alimentelor.

Fortificarea se face din rațiuni economice, tehnologice pentru schimbarea atitudinii în nutriție, datorită tendinței de urbanizare şi necesității unei educații a consumatorului. Cercetarea studiază posibilitățile de fortificare a produselor de franzelărie prin adaosul de substanțe care cresc sau descresc conținutul de vitamine sau săruri minerale ale făinii, urmărind si evoluția caracteristicilor de calitate a produselor finite.

După efectuarea experientelor de laborator rezultatele positive au fost aplicate în producția de serie, urmărind aprecierea şi siguranța alimentară a consumatorilor din Iaşi.

ABSTRACT

The level of food nutrients gives the quality of food and represents an essential possibility to content the consumer needs.

The study of research is presently the tendency to supplying the processing, as possibility to assure the food safety through the fortifying of food with nutrients.

The principle of reason nourishment is to select the food after the scientific and reason criterions, watching to touch the object of keeping heath. So, it are indicated the functional food. Some functional food must be supplying with substances which enrichment the nutrient level.

The fortifying of food, as the bread would be made using the micronutrients through the changing the biochemical structure of it. The fortifying of the food is making through the next reasons : economics, technologics, changing of nourishment attitude, the permanently tendency to urbanize, the nourishment education of consumer.

The study research the possibilities of bakery products fortifying, for the completing of quantity of vitamins and mineral salts, nutrients which are decreased at the crushing of grain in flour. After the experiments it was obtained the positive results, which could be introduced in the production, watching the food safety for the Iasi county consumers.

INTRODUCTION

The selecting of the food by the consumers makes after some criterions, which it generate, in the end the healthy human. So that, the”organism knows what its needs“and the selecting of food by the people makes after the principle „self selection“or”instinctive principle“. This principle is depending by the sensorial characteristics of food, but these don’t represented always the nutritive value of food.

The principle of cultural specific model is that through the people has traditional pleasures, being interests by the food which they like it. The principle of the reason nourishment is that through the food selecting by the scientific and reason principles,

watching to touch the objective of keeping healthy. So, for this it is recommended the functional food.

MATERIAL AND METHOD

The functional food are these which decreased the risk of illness and generated :optimizing the increased and developed of babies, children, youngs, for the metabolism optimizing, much for the obesity and diabeth, defending of organism against the stress, the healthy of the cardiovasculare and gastrointestinal system.

The bread is one of the base of food. At the processing of grain and after that the flours from these are decreased the quantity of vitamins and mineral salts. Bigger decreasing it is registered at the vitamin PP and then after smaller decreasing at the vitamin B2. So that, the grain and the flours lots obtained in the Iasi county have small quantities of macro-and microelements. After the quantity of salts it notes that the bakery products are usual poverty in the salts of Ca, Mg, Cr, Zn. Because of this I am necessary considered making the analysis of flours and of the bakery products, which was fortifying with next supplements: flour of bean, grain germens and casein of Ca. The supplements are selected watching the biochemical structure including the vitamin PP, salts of Mg and Cr, at the grain germens, Ca salts from beans and casein of Ca from the milk products.

Through the supplementing of nutrients the dough result after the mixed and fermentation it is differently with the dough less supplements. So that, I used the next recipes : 1. (wheat flour T 480 -10 kg, yeast- 0,5 kg, salt -0,1kg, water -3l, milk-2l, sugar – 0,5 kg) initial sample, 2.(wheat flour T480 – 8,8-9,6 kg, yeast – 0,550 kg, salt – 0,1 kg, water– 3l, milk-2l, sugar-0,5kg, flour of bean– 0,2- 0,8 kg) 3. (wheat flour T480– 8,8-9,6 kg, yeast – 0,550 kg, salt – 0,1 kg, water– 3l, milk- 2l, sugar-0,5kg, embryo grain – 0,3-1,5 kg) (wheat flour T480 – 8,8-9,6 kg, yeast – 0,550 kg, salt – 0,1 kg, water– 3l, milk- 2l, sugar-0,5kg, casein of Ca– 0,4-1,2 kg). The tests by the fortifying flours had been made using the increasing concentration of supplements, starting by 2 % doze, touching the 12% doze. At the three tests increasing of concentration have been made easily every two or three units, and for the last test increasing have been by for units. Fortifying of flours with the supplements have been generated the obtaining of flours with protein changing, supplying with micro and macronutrients.

The changing of protein I am using to study the modifying of structure in the water medium, it made the hydration capacity, and the elasticity of dough obtained through the recipes testing.

The bakery wheat sorts had characteristics of quality modifying after: the volume, the porosity, the dough elasticity. These tests have been realized for the implementing the nutrients for the fortifying bakery products in the process of bakery from Iasi county. So that, have been produced small lots of 50 kg bakery (250 pieces) by each sorts, which are delivered by the COMPAN SA magazine chain from Iasi.

RESULTS OF RESEARCH

Through fortifying of wheat flour type 480 with flour of bean registered the increasing of protein with 1% at the fortifying flour with 2% just at 4% bean, and with 2% at the fortifying flour with 8% flour of bean. (fig.1). The increasing of quantity of protein from fortifying flours had generated the increasing of hydration capacity by the 64% (2%) at the 68 %(8%) (fig.2).

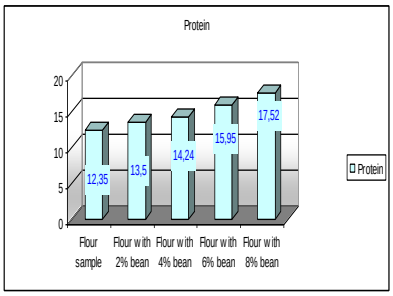


Fig.1.The protein of flours fortifying with bean

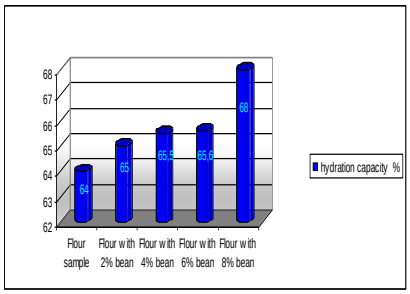


Fig.2 – The hydration capacity of flours fortifying with bean

The dough obtained through the flours with beans was registered an increasing of elasticity with tendency more ascending at the primary tests and a moderate line at the next sample, having the concentration of 6% and 8% flour of bean.(fig.3)

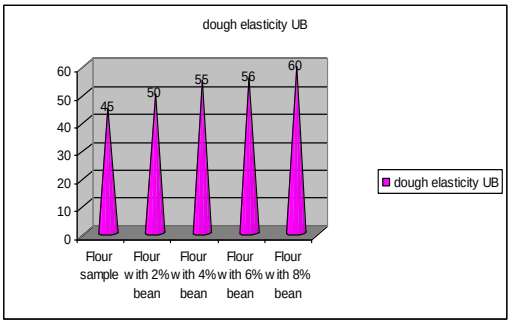


Fig.3. – The resilience dough fortifying with bean

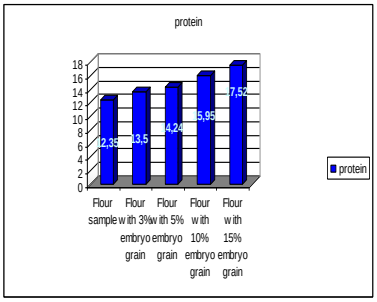


Fig.4. – The protein of flours fortifying with embryo grain

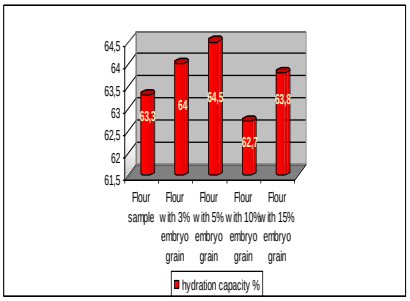


Fig.5 – The hydration capacity of flours fortifying with embryo grain

In the fortifying wheat flour type 480 with embryo grain it was registered the increasing of protein quantity between 1,15% - l,57% (fig.4). The increasing of protein by the flour fortifying generated the increasing of hydration capacity between 63,5%(3%) and 64,5%(5%)(fig.5).

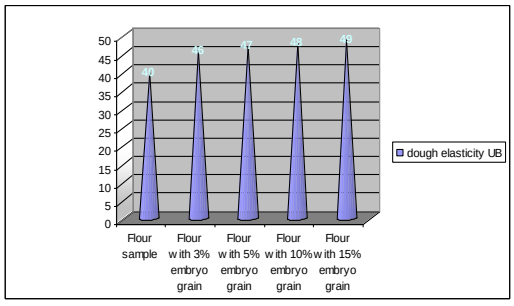


Fig.6. – The resilience dough fortifying with embryo grain

The dough obtained through these flours was registered an increasing of elasticity with easy tendency ascending by the 40 at the 69 units.(fig.6) This increasing by 1,1 % influenced a little the dough elasticity.

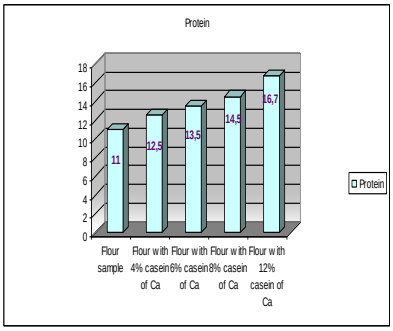


Fig.7. – The protein of flours fortifying with casein of Ca

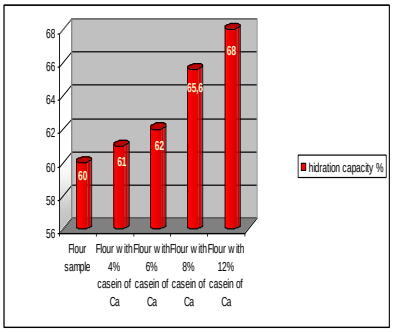


Fig.8 – The hydration capacity of flours fortifying with casein of Ca

Through the fortifying of wheat flour type 480 with casein de calcium it was registered growths of protein quantity by the 1,5% just of 5,7%. (fig.7). The increasing of protein quantity by the flour fortifying was generated the increasing of hydration capacity too, between 60%(initial sample) and 68%(12%). (fig.8).

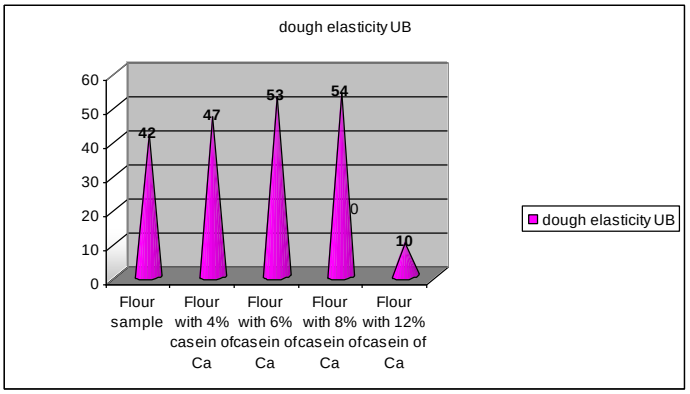
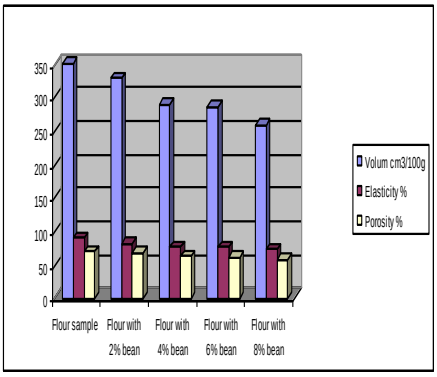


Fig.9.- The resilience dough fortifying with casein of Ca

The dough obtained from the fortifying flours with casein of Ca was registered an optimum value for the elasticity by the 63-64 units for a supplements of 6-8% casein de calcium .(fig.9) The increasing of casein doze until 12 % influenced negative the dough elasticity.



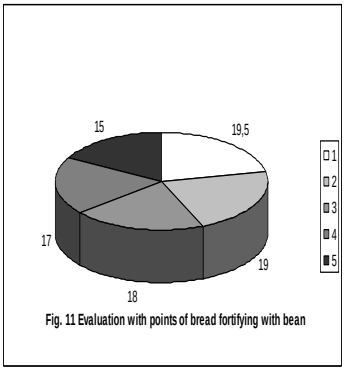
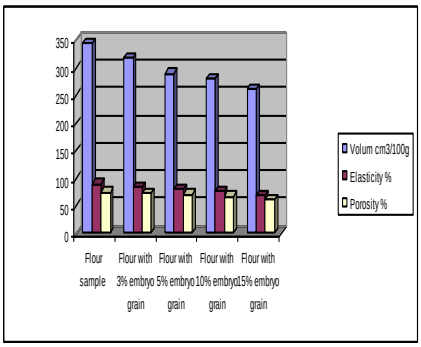


Fig. 10 – Quality characteristics of bread fortifying with bean

From the analysis of quality characteristics of bread which was made by the flour fortifying with the bean flour (fig.10) it was regarding the variety of the quality indicators, obtaing small volume, elasticity and porosity at the same time of increasing of concentration using for bean flour. After the test of consumers the bigger note was obtained by the initial sample, 19,5 points, then next it was the sample supplement with 4% bean flour, 19 points. (fig.11)



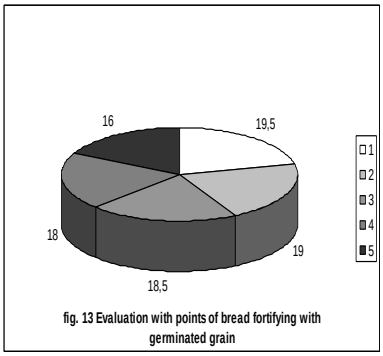
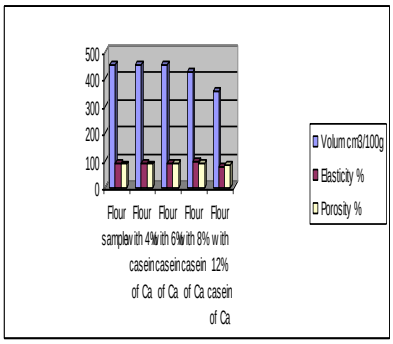


Fig.12 - Quality characteristics of bread fortifying with embryo grain

The dynamic of quality characteristics of bread fortifying with embryo grain (fig.12) are showing an easy decreasing of volume, elasticity and porosity of finally products, at the same time with the increasing of quantity by embryo grain supplemented. At the last of testing on the consumer potential samples the bigger note was obtained by the initial sample with 19,5 points, after that the sample enriched by 4% embryo grain with 19 points.(fig.13)



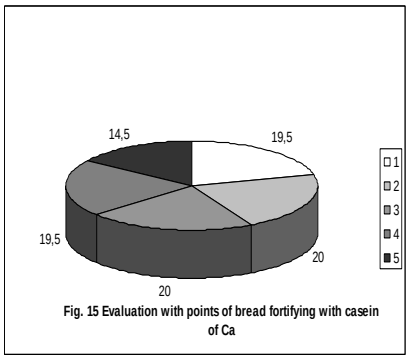


Fig.14. - Quality characteristics of bread fortifying with casein of Ca

The evolution of quality characteristics of bread with flour fortifying with casein of calcium (fig.14) was indicated an easy decreasing of volume, elasticity and porosity of finally products, at the same time with the increasing of quantity of casein supplemented. At the last testing the potential consumers was accorded the bigger notes for the samples with 4% and 6% casein , 20 points, next sample being that enriched with 12% casein which was noted with 14,5 points.(fig.15)

CONCLUSIONS

1. At the evaluation of finally products, the sample of flour T480 supplemented with flour of bean in the concentration by the 4% resulting that it is the best for the obtaining of quality bread, which make the conditions for functional food and the demandes for the consumers.
2. The finally product obtaining from the flour T480 sample enriched with germens in concentration by 4%, it is the best for the obtaining of quality bread, being more accepted by the consumers.
3.The products obtaining from flour T480 sample fortifying with casein of calcium in the concentration by the 4% and 6% has not been noted like the initial sample this is show a low tendency accepting for this product.
4. At the supplementing by the flour of bean or the grain germens was registered the increasing of the quantity of protein, the hydration capacity, the dough elasticity at all using concentrations 4%, 6%, 8%, 12%. Allthough, it should be using all these concentrations I have recomanded to use the concentration of 4% because this is the demand of consumers.
5.When it was using the casein of Ca was generated the increasing of quantity protein, the hydration capacity and the dough elasticity just the sample with the suplements by casein

of 4%, 6%, 8%. Between the exogen resources of proteins using for the fortifying, casein of calcium was only the element which was assured enriched the sensorial quality of finally products, at the concentration of 4% and 6% .

6.Implementing the supplements in the bakery processing(flour of bean, casein of Ca and grain germens) it is necesary for the vitamin PP, the salts of magnezium and crom, nutrients which the organism doesn't synthesed.

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CALITATEA OPTIMĂ A PRODUSELOR DE FRANZELĂRIE ÎN JUDEȚUL IAŞI STUDIU DE CAZ LA SC VEL-PITAR SA IAŞI

OPTIMAL QUALITY OF BAKERY PRODUCTS FROM IASI COUNTY STUDY CASE AT THE SC VEL-PITAR SA FROM IASI COUNTY

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University of Agricultural Science and Veterinary Medicine from Iasi

Key words: total quality management of bakery products

REZUMAT

Acest studiu urmăreşte metodele prin care firma SC Vel-Pitar SA Iasi ar putea obtine în mod constant produse de panificație de calitate superioară, în conformitate cu standardele europene, care să asigure cerințele consumatorilor. Cercetarea a urmărit domeniul panificației din punct de vedere managerial, care trebuie să se înscrie în noile tendințe europene ale managementului calității total şi ale sistemul de analiză a punctelor critice de control. Politica de produs va include utilizarea materiilor prime ecologice precum şi utilizarea de substante nutritive, care să determine creşterea valorii nutritive a produselor de panificație. Politica de preț va urmări introducerea costului calității.

Pentru creşterea calității produselor de panificație firma va adopta direcții de optimizare a calității, orientându-se în special pe estimarea costurilor calității şi concentrându-se şi asupra dezvoltării culturii organizationale, în scopul motivării resurselor umane.

ABSTRACT

This study watched to identifying the methods through the firm SC Vel-Pitar SA Iasi would is obtaining the bakery products with a superior quality, in the conformity of european standards and which assure the demands of consumers. The research will have make the management of proccesing firm from the bakery field, which wish to write in the new tendenses of the Europe of the total quality management, in the system Hazard Analysis Control Critical Point. The polity of the product will include using of the ecological agricultural raw material, as well as the using of the nutritive substances and added substances for the increasing of nutritive value of the bakery products. The polity of the price will watch about the costs of quality.

The study are looking after the increasing the quality of bakery products from the SC VEL-PITAR SA Iasi county for the demands of consumers. For this the researching will be maked the directions for the optimal quality of them. Total Quality Management of the bakery products will concentrate by the culture of firm organizational and by the motivation of human resouces.

INTRODUCTION

Many companies are interested to the increasing of quality and to the reducing of the costs which can be realized through: the reducing of the costs of raw materials, reducing the variaty of products. In the conditions of concurence between the economic firms, quality became the component of polity of product in the mix of the marketing, being necessary their proiection. Step by step the quality is corelating by the costs, very important are : prevention, evaluation and nonquality costs. The major objectiv of the quality cost is the preventing of defects, which can be appear in the agroalimentary products, analysed as the finaly product, the defects, the cost of the analyse of

nonconformity with the demands of consumers, rejects of supplyes: raw materials, other materials, controling, inspection for the high level, reducing of cost at the another category of quality.

MATERIAL AND METHOD

Modern methods for measuring quality parameters refer to the risk analysis, HACCP through which it is determined the type of hazard which can appear in the manufacturing technology of the product, its gravity, its possible occurrences and the control measures which have to be taken in order to avoid them. GMP (General Mode Practices) refers to the general and specific rules regarding good hygiene practices in the manufacturing process, for units which process, store and transport food products according to DS 3027E:2002 standard.

Under the circumstances of the competition fight between economic agents, the quality becomes a component of the product policy in the marketing mix its designing being necessary. Gradually costs are attached to quality, from which the most important are: prevention, evaluation and non quality.

RESULTS OF RESEARCH

Calculation for the sal price for the same ranges of bread as the above mentioned ones, that also includes the quality price.

Table no.1

Calculation for the sal price for the same ranges of bread includes the quality price

	Breads		**White Bread 400 g**	**Bread Dâm-bovița**	**White breadknif**
No	**Specification**	**UM**	**Value**	**Value**	**Value**
1	Cost with the raw material	Ron/g	0,2604	0,6747	0,2777
2	Cost of transport and supplying	lei/kg	0,0297	0,0743	0,0308
3	Cost of material	lei/kg	0,0119	0,0297	0,0123
4	DIRECTIY COST		0,3020	0,7787	0,3208
5	Cost with hygienic Material spare part printers	lei/kg	0,0238	0,0594	0,0247
6	Cost of remuneration	lei/kg	0,1011	0,2527	0,1049
7	Costs with taxes	lei/kg	0,0059	0,0149	0,0062
8	Liquidity	lei/kg	0,0059	0,0149	0,0062
9	Costs of services	lei/kg	0,0059	0,0149	0,0062
10	Costs of utilities	lei/kg	0,0476	0,1189	0,0494
11	INDIRECTLY COST	lei/kg	0,1902	0,4757	0,1976
12	COST OF manufacture	lei/kg	0,4922	1,2544	0,5184
	Cost of quality	lei/kg	0,0265	0,0306	0,0306
13	General cost of society	lei/kg	0,0476	0,1189	0,0494
14	COMPLET COST	lei/kg	0,5663	1,4039	0,5984
15	Profit	lei/kg	0,0345	0,0927	0,0290
16	Prices for saling	lei/kg	0,6008	1,4966	0,6274

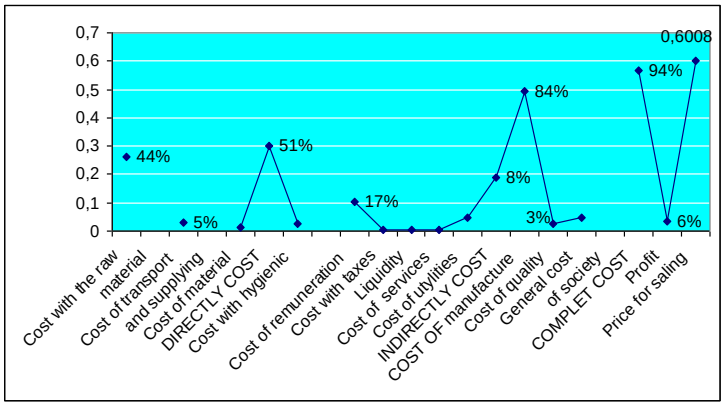

Fig. 1. - The dynamic of costs for the white bread of 400 g

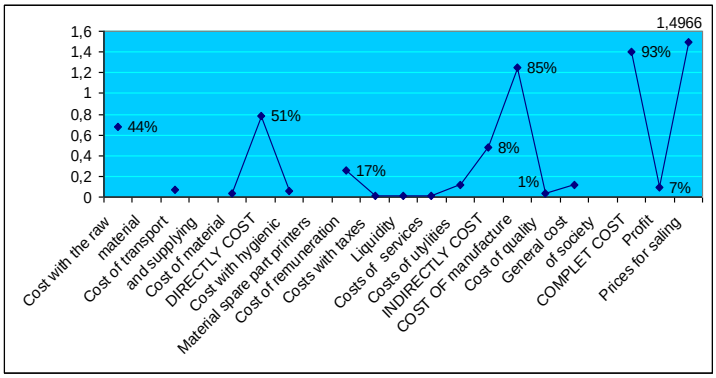

Fig. 2. – The dynamic of costs for the Dâmbovița bread

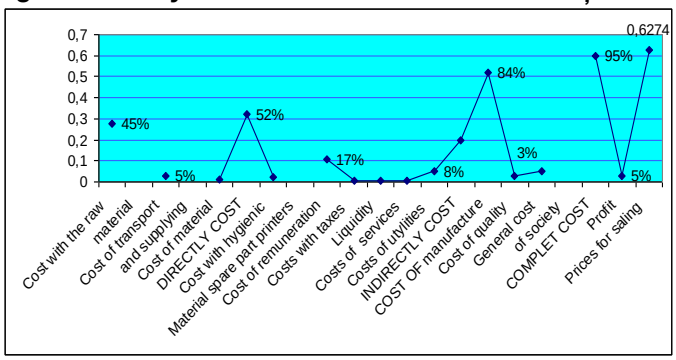

Fig. 3. – The dynamic of cost for the White breadknif

CREATING AN ORGANIZATIONAL CULTURE REGARDING QUALITY ASSURANCE, USING OF VALUES SYSTEM

The culture of organization and ethics affairs reprezents two managerial problems by the firms from Iasi.The organizational culture of the firm reflect the mix of the personality and the styling of the management, marked about the modality in which are achieved the activities of firm, generating the psihosocial medium. The organizational culture is influenced the characteristics of the cultural levels by the superior order.

Between the system of values and the ethics affair there is a corespondense which regarding: the importance of the consumers and a services for them, engaged for quality and inovation, the interest for the employers, importance of honestity, integrity ethics standards, importance of the protection of environmental medium, respecting the low, conflicts of interests and the solution of the problems, loyality in sales and the practicis of marketing, using the intern informations and security of commerce, practicis in the field of prices.

SC VEL-PITAR SA Iasi using the events, symbols and sloganurile, as elements of organizational culture new created. SC VEL-PITAR SA Iasi make using at the evets which have take in the past and which it have important semnification about values which defined the culture of organization, using symbols, diagrams and cromatic images with a semnification for the firm, through it would transmits a mesage or creats an atitude. (The image of baker man by the car involved in distribution). Also, the history of firm gives us the information about „ Vel Pitar“. At the last of the XIV-th century was notified. Its atribution completed others, head with pick up storage the graine, which taste the foods behind to carry on to the meal of hospodar. In those time, Baker take care as bread to be good and to likely the hospodar familly. The values which can be meet in the firm are : intelectual, estetics, economics, socials and religios. In table no. 2. we are presented the system of values from the firm, estabilished on the contents of the answers at the questions completed by the employers of firm.The values as : satisfaction of consumers, comportament ethic/integrity, responsability, respect for others it is situated the first place after 50 % and the profitability, the work team, inovation/chaiging, training/enriched continously occupe a secondary place between 40-47 %, on the last places situated the

security/ personel safety, satisfaction of employers by the function, interest for the mention of the medium condition elements which determinated the harmony of the working team, so that the activity of firm can be developing at a level of performance. Interest for the keeping of condition of medium (22 %) didn't represented a normal think.

Table no. 2

Values system at the SC VEL-PITAR SA Iasi

The level of value in the firm SC VEL-PITAR SA Iasi	%
The satisfaction of consumers	75
Ethic comportament /integrity	45
Responsibility	59
Respect for other	50
Liberty of communication /franknees	42
Profitability	45
Work team	43
Inovation/changing	47
Continuously training /continuously improvement	40
Interest for the keeping of medium conditions	22
Diversity/respect for the perssonal option	30
Activities in comunity interest	45
confidence	27
Sociale responsability	33
Security/ personel safety	17
Respecting of angajaments	55
Satisfaction of employers by the function	21
Happiness of the employers	24

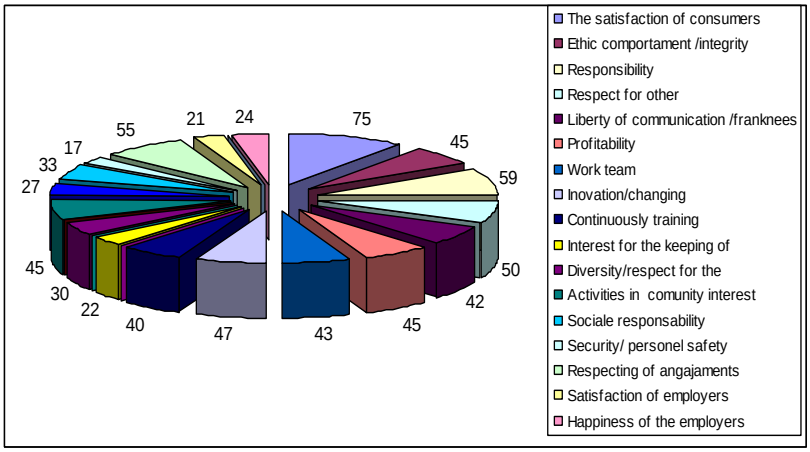

Fig. 4.–The level of value in the firm SC VEL-PITAR SA Iasi

CONCLUSIONS

Total quality management will be applied at SC Vel Pitar SA Iasi by means of:

1.Estimation the price of saling of same ranges of bread including the cost of quality, give us the certitude that the increasing of cost are just of 1-3%.

2.The use of nutritive substances and supplements for the improvement of nutritive values of present bakery products, as urgent measures.The introduction of quality costs in the end product cost, without high risks.

3.Human resources management will concentrate over multiple means of motivating the staff, such as: protection programmes, rewards, simulation systems;

4.The increase of the value levels of organizational culture within the framework of SC Vel Pitar SA Iasi;

5.The security, the satisfaction of the position within the company, are values of organizational culture, which determines team work harmony, so that the company activity should develop at an above medium level of performance. The interest in preserving environment conditions (22%) doesn't show a normal situation. This proves the lack of information of people about the new regulations regarding environment protection, and a poor education, by not taking into account the negative effects of pollution over the environment and over man health.

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9.***Technique Standards of firm for the bakery.

CERCETĂRI PRIVIND UTILIZAREA GERMOPLASMEI LOCALE ÎN OBȚINEREA DE HIBRIZI PERFORMANȚI LA PORUMB, ÎN ZONA CENTRALĂ A OLTENIEI

RESEARCHES ON THE USING OF CORN LOCAL GERMPLASM IN OBTAINING MAIZE HYBRIDS IN CENTRAL OLTENIA

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Key words: inbred lines, drought, corn, hybrids

REZUMAT

Succesul lucrărilor de ameliorare în scopul obținerii de forme rezistente la secetă şi arşiță depinde foarte mult de sursele de germoplasmă folosite.

Lucrările de ameliorare a porumbului pe baze ştiințifice, în țara noastră au fost orientate spre crearea de soiuri tolerante la secetă şi arşiță, care s-au cultivat pe suprafețe mari până la introducerea hibrizilor. Aceste soiuri constituie în prezent surse de gene valoroase pentru crearea de liniiconsangvinizate tolerante la secetă şi arşiță.

Continuand selectia in cadrul populatiei de porumb intr-o noua etapa la SCA Simnic s-au obtinut din acelasi material de plecare (P_0), a populatiei dupa 6 cicluri de selectie in masa (Pm_6), cu populatie dupa 2 cicluri de selectie a liniilor C_1 apreciate "per se" $(PC_1)_2$ si o populatie dupa trei cicluri de selectie in masa, urmate de un ciclu de selectie dupa comportarea liniilor $C_1(Pm_3C_1)$ (Ilicevici S. 1988).

Valorile relative ale capacitatii de productie care exprima prograsul genetic realizat (PGR) dupa trei ani, s-au folosit pentru calculul prograsului genetic asteptat (PGA) dupa 6 ani, la fiecare metoda de selectie. S-a constatat in acest caz ca pentru capacitatea de productie, dupa 6 ani de selectie la Pm_6, progresul genetic realizat este mult mai mic fata de progresul genetic asteptat, la $(PC_1)_2$,progresul genetic realizat este apropiat de progresul genetic asteptat, iar la Pm_3C_1, progresul genetic realizat este superior progeresului genetic asteptat.

Prin urmare cea mai eficace pentru sporirea capacitatii de productie, a fost aplicarea a trei cicluri de selectie in masa, urmate de un ciclu de selectie dupa comportarea liniilor C_1 apreciate "per se". In acest caz asocierea selectiei in masa cu selectia recurenta a permis amelioararea genetica a materialului initial prin folosirea efectelor aditive ale genelor pentru productivitate care au raspuns la selectia in masa si-a efectelor de dominanta, interactiune si epistazie, care au raspuns la selectia recurenta.

ABSTRACT

The success of the breeding works in obtaining drought resistant corn form highly depends on the sources of germplasm.

The breeding corn works on scientific basis have been oriented to the creation of drought tolerant forms of the hybrids that were cropped on a large scale. These varieties are valuable genes sources for creating inbred lines that will be used for hybrids.

Continuing the selection begun at ARDS Simnic with the beginning material (Po) of the population after 6 cycles of mass selection (Pm6) with a population after two cycles of selection of C1 hybrids appreciated "per se" (PC1)2 and a population after three mass selection cycles followed by a selection cycle after the behavior of inbred lines C1(Pm3C1),(Ilicevici S. 1988).

The values of relative yielding capacity that express the genetic progress (GAP) after three years there were used to calculate the expected genetic progress (EGP) after 6 years with each selection method. There was observed that with this case the yielding

capacity, after 6 years of selection in Pm6, the genetic progress is much lower than the expected one with (PC1)2, the achieved genetic progress is close to the expected one.

As a result, the most efficacy for the increasing of the yielding capacity was the applying of three selection cycles followed by a selection cycle after the behavior of C1 lines appreciated "per se". With this case the association of mass selection with the recurrent selection has permitted the breeding of the initial material by using additive effects of the productivity genes that have responded to the mass selection and to the dominance, interaction and epistasy ones that have responded to the recurrent selection.

INTRODUCTION

The economical importance of maize is the diversity of its using, of using it as green fodder, sylo or the opportunities for bioenergy production.

Of the FAO data, the world maize yield is about 21% used for food, 72% as fodder and 7% in industry. The sylo corn is harvested not fully ripen and give the highest nutritive units fodder with the lowest cost. With the corn crop there were made several researches on the several hybrids regarding the drought resistance with irrigated and rainfed conditions with a large spectrum of varieties and hybrids in comparative researches. The high volume of researches has given a lot of experimental data each year.

The short period since the ARDS Simnic work with the corn crop breeding is, in fact the history of introducing and spreading the hybrid corn in our country and it can be divided in several 6 years stages.

The researches that took place at ARDS Simnic show that when the corn hybrids were introduced in our agriculture, as a result of breeding works, the results have increased 8 to 13 % for each experimental cycle of 6 years within each earliness group (ILICEVICI S., 1979, 1980, 1983).

MATERIAL AND METHOD

The goal of this paper was to compare the results obtained with the local inbred lines that were extracted from local populations with the parental forms of few hybrids that recorded good results in this area (l. c. P and l. c. K) as well as of a hybrid that was made in our country, at ICDA Fundulea (l.c.R).

The biological material has consisted of 9 inbred lines that were formerly obtained at ARDS Simnic whose combinatory capacity (CGC) was proven to be good after crossing with a tester. In order to systematize the material there was used a naming system.

1) Type A lines – that were extracted from local germplasm underwent 6 cycles of mass selection (Pm6). The mass selection was performed on isolated plots in the field where the plant characteristics were appreciated and in the laboratory where the cobs were measured applying a rigorous selection with the promoting the most valuable forms each year.

2)Type B lines – that were extracted from local germplasm underwent to three mass selection cycles followed by a selection cycle after the behavior of C1 lines appreciated per se (Pm_3 C_1) that need a 6 years period, as with previous year.

3) Type C lines – extracted from synthetic divergent populations underwent to two recurrent, reciprocal selection $(SRR)_2$ that requires 8 years.

The working methods have been imposed by the bulk of the approached material that consists of 9 inbred lines (three for each type) and three well known inbred lines summon 12 variants placed in randomized blocks in three replications. Along it there was placed a comparative culture of 18 hybrids resulted from the crossing of the 9 inbred lines and the Olt and KWS hybrids which give good results in this zone.

The behavior of the inbred lines and the hybrids was researched during 2004, 2005 and 2006 years. With both cases, with hybrids and lines, the plot was 2 rows 70/29 cm

(50.000 pl./ ha), the surface of the harvested plot was 14 s.m. The previous crop was wheat.

The plow was performed in the first half of November. The fertilization was performed in the spring, at the seedbed preparation, using N60, P2O5 60 kg / ha and 45 kg nitrogen with the second mechanical tillage.

The weed control was performed with preemergent applying with Guardian 2.5 l per hectare dose and postemergent applying with SDMA 2 liter per hectare. There was made two mechanical hoeing and one selectve manual hoeing till the 5-8 leaves stage of the corn (May – June).

RESULTS AND DISCUSSIONS

The data gathered in 2004, 2005 and 2006 years as regard the yields with the 12 inbred lines reflect the paramount influence of the rainfall on yields.

With the 2004 year, the yields (q/ha) are about 22.7 with the type A lines, the first inbred line, of 34.1 with the R inbred well known line. A significant positive yield over the control is given by the P inbred line and significant outputs are given by the inbred line 9 of C type and by the R inbred line that is the mother line of Olt hybrid, a highly drought resistant hybrid.

The three lines of A type as well as the inbred line 4, of B type give significantly inferior yields to the control (table 1).

The behavior of the 12 inbred lines in normal rainfall conditions as 2004 year, at ARDS Simnic show that the central zone of Oltenia offers unsatisfying conditions for corn that pledges for the rehabilitation of the irrigation system.

In the latest years, along with the decreasing of the hybrid producing surfaces, the well known companies as Pioneer, KWS and Monsanto have located their seed producing plots in the South – East part of the Romanian Plain and in the Southern Moldavia. In these areas these companies have made major investments for seed processing.

In the 2005 year, the exceptional conditions with abundant rainfall within the growing period of corn have made that the yields with the inbred lines to reach the maximum (table 1).

Over the average of the experiment used as control we notice that the P inbred line that is part of the well known hybrids give a significant yield output while the inbred line 3 of A type records an inferior output to the control.

Beside the two extreme yields the C type lines give yields close to the A and B types.

The tendency of the C lines and the well known lines to overpass the A and B type lines is determined by higher investments in specific breeding works. We refer at the opportunity to use the reciprocal and recurrent selection in order to increase the genetical diversity with the C type lines as well as the complex programmes of breeding that underwent the inbred lines in the present study.

These facts are better illustrated in 2006.Over the average of the experiment that is the control, two inbred lines of A type give distinct significant outputs while the 8 inbred line and 9 inbred line of C type group, as wel as the R inbred line of the wel known lines give significant outputs.

As a result, the yielding capacity of the inbred lines is an element that must be taken into account when we make an evaluation of a genetic ameliorated matrial.

Table 1

The yields given by the corn inbred lines in 2004, 2005 and 2006 in the soil and clime conditions of ARDS Simnic

Line type	Inbr. line	yield 2004			yield 2005			yield 2006		
		Q/ha	%	S	Q/ha	%	S	Q/ha	%	S
A	l.c.1	22,7	80,2	00	42,0	98,6		31,7	92,7	
	l.c.2	26,0	91,9	0	39,6	92,9		29,4	86,2	00
	l.c.3	24,9	88,0	00	37,4	87,8	00	29,0	85,0	00
B	l.c.4	26,1	92,2	0	42,6	100,0		29,9	87,7	0
	l.c.5	27,6	97,5		39,4	92,5		35,8	104,9	
	l.c.6	29,5	104,2		43,0	100,9		35,0	102,6	
C	l.c.7	27,7	97,9		41,7	97,9		32,6	95,6	
	l.c.8	29,3	103,5		45,9	107,7		37,7	110,5	X
	l.c.9	32,0	113,0	XXX	45,7	107,2		38,0	111,4	X
Well known lines	l.c.P	30,6	108,1	X	46,7	109,6	X	35,2	103,2	
	l.c.K	29,2	103,2		42,2	99,9		36,9	108,2	
	l.c.R	34,0	120,1	XXX	44,9	105,4		38,6	113,2	X
	X Mt.	28,3	100,0		42,6	100,0		34,1	100,0	
		DL 5 % 1 % 0,1 %	7,7 9,8 12,5		DL 5 % 1 % 0,1 %	8,0 10,7 13,0		DL 5 % 1 % 0,1 %	9,5 12,9 16,4	

CONCLUSIONS

The value of the local germplasm with the researched case is confirmed by the results of the B type hybrids and C type hybrids in 2005 over the average of 10 local hybrids cropped in our zone.

The local germplasm there can be extracted hybrids with good drought resistance yet wit a good yielding capacity, as well.

The inbred lines with a good specific recombination capacity are 4, l.c. 5, l.c. 6 of B type, l.c. 7, l.c. 8 and l.c.9, of the C group. The l.c. 1, l.c. 2, l.c. 3 inbred lines from the A type have a lower specific recombination capacity.

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CERCETĂRI PRIVIND CREŞTEREA RADIALĂ A ARBORILOR ÎN PĂDUREA NATURALĂ ÎN RAPORT CU FACTORII CLIMATICI

RESEARCHES REGARDING THE RADIAL GROWTH OF THE TREES IN THE NATURAL FOREST IN COMPARISON WITH THE CLIMATIC FACTORS

ALEXANDRU SĂRARU
Rm. Valcea Forest District

Cuvinte cheie: ecosisteme forestiere, pădure naturală. biogrupă, precipitații, temperaturi
Key words: forest ecosystems, natural forest, biogroup, rainfall, temperatures

REZUMAT

Cercetările sunt localizate în ecosisteme forestiere naturale situate pe versanții estici ai Munților Căpățânii şi în nord-estul Piemontului Oltețului, pe teritoriul județului Vâlcea .

În acest teritoriu, în cadrul unor păduri naturale de fag şi amestecuri ale acestuia cu gorunul, s-au delimitat biogrupe alcătuite din 5-7 arbori care se intercondiționează reciproc între ei în procesele de creştere şi dezvoltare şi interacționează cu factorii climatici (precipitații şi temperaturi medii atmosferice).

Între indivizii ce alcătuiesc astfel de biogrupe se dezvoltă relații de natură diversă, de dominare, competiție, favorizare etc.

Creşterea radială a arborilor este influențată, atât de vârsta şi poziția acestora în cadrul biogrupelor asfel delimitate, cât şi de factorii climatici studiați.

SUMMARY

Researches are located in natural forest ecosystems situated on the eastern slopes of Capatana mountains and in the north east of the Oltet Piedmont on the territory of Valcea district.

In this territory, as part of some natural beech forests and some mixtures of this with the sessile oak, there have been delimitated biogroups made of 5-7 trees which interconnect each other in processes of growth and development and interact with the climatic factors (rainfall and medium atmospheric temperatures).

There are various relations between the individuals that make up such a biogroup, of domination, competition, favour etc.

The radial growth of the trees is influenced by both the age and position of these as part of the biogroups thus delimitated and the studied climatic factors.

INTRODUCTION

The generally accepted axiom in dendrochronology and dendroclimatology states that the radial growth of trees is influenced by the climatic factors. According to the principle of the ecological amplitude, the most sensitive species to the change of the environmental factors is the one at the latitudinal or altitudinal limit of its vegetation habitat. According to this, the signal of the disturbing climatic factor is maximum.

THE PLACE OF RESEARCHES

The researches are located in natural forests situated on the eastern slopes of Capatana mountains, on the south-western part of Valcea Subcarpathians and on the north - east of Oltet Piedmont, on the territorial administrative area of Valcea district (figure 1).

The vegetation of the studied territory is included in the great unit of the „Falling mesophyll forests of resinous and resinous - broad - leaved trees" (**Doniță and al., 1992**).

Regarding the study of the relation radial growth - climatic factors, it has been used climatic parameters given by the meteorological stations from Rm. Valcea (242 m) and Voineasa (650 m) for the studied forest ecosystems.

Figure 1 Map of Valcea district with the location of the studied territory

MATERIALS AND METHODS OF RESEARCH

The material of research was made of a network of eight experimental areas, with a rectangular form, having the size between 1000 and 5700 square meters.

In these research areas there have been delimited biogroups of 5-7 trees, formed around a predominant tree which interconnect each other in the processes of growth and development (figure 2).

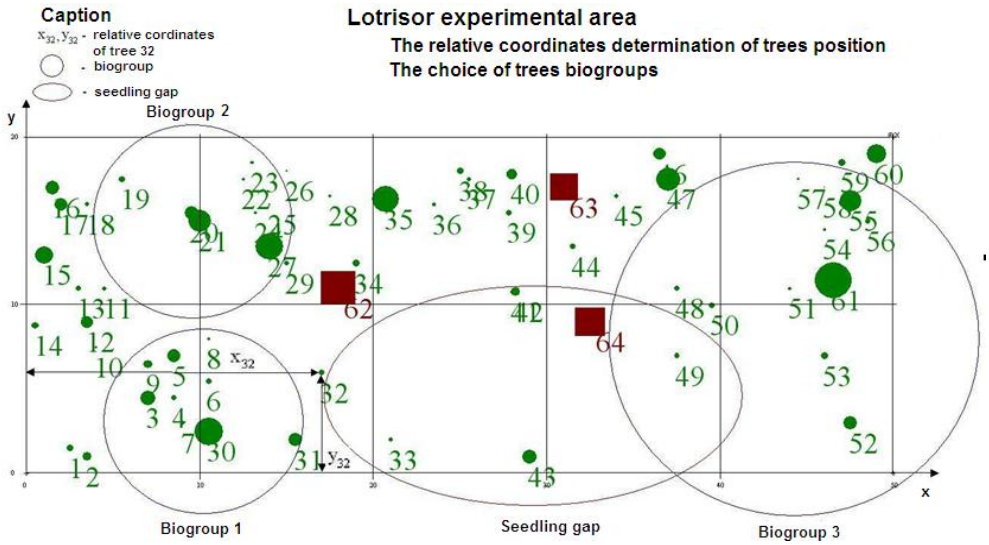


Figure 2 Defining the trees biogroups in the experimental areas

To determine the size of trees' radial growth and to obtain the growth series, and to establish the relations between these and the dynamic of rainfall and medium atmospheric temperatures there have been done the following operations:

- growth samples extraction with Pressler's borer;
- samples conversion through drying and sanding in order to determine the annual layers width (by applying the "Carota" program);
- graphic representation of the conversed data in Microsoft Excel program;

- data processing of the growth series obtained by the method of graphic comparison on a logarithmic scale and the check-up of these with “Confecha” program;

- standardisation of individual growth series in order to eliminate the non-climatic signals and maximize the climatic information by turning the individual growth series into growth indices series, using the polynomial regression curves of the third degree, facilitated by Microsoft Excel calculation program.

ACQUIRED RESULTS

● **The function of response of radial growth – climatic factors relation** .

Analysing the function of response of trees’ radial growth under the limiting or disturbing action of the climatic factors, it has been stated that the size of the annual ring (annual radial growth) is the result of the variation of the climatic parameters (temperatures, rainfall). Emphasizing the way in which the limiting climatic factors influence the course of tree thickness, some determinations regarding the weather course in the past and predictions for the future.

● **Radial growth in comparison with the rainfall**

From the desire to register the rainfall that has a decisive influence on the annual radial growth much more accurately, it has been taken into consideration the rainfall quantities fallen during various time intervals.

To determine the rainfall effect, thus cumulated, over the creation of the annual ring it has been calculated the simple correlation coefficients between the annual radial growth of trees on social classes and fallen rainfall quantities. The result of the tree study for the trees from biogroup 1 Sirineasa is rendered by *chart 1*.

Correlation coefficients between radial growth size of the trees from biogroup 1 Sirineasa and precipitations

Chart 1

Period/tree position	Simple correlation coefficient (r)			
	Predominant	Dominant	Codominant	Average
Previous July/current September	0.196124	0.223623	-0.39999	-0.06627
Previous July/September	0.376756	0.155209	-0.28573	0.013729
Total year	0.207229	0.06499	-0.09346	0.03249
Current January/March	-0.08782	0.061578	0.099468	0.107915
Current March/May	0.075943	0.184414	0.051223	0.130271
Current June/September	0.189808	-0.00368	-0.28346	-0.09726
In the season of vegetation	0.17285	0.111129	-0.21371	-0.03278
Out of the season of vegetation	0.092938	-0.05617	0.162688	0.105174

Studying the data above, it’s very clear that the positive significant correlation of tree radial growth from the dominant content with the rainfall from the previous vegetation season, during the months of July - September (predominant tree) and from the previous season – current season, July previous year - September current year (dominant tree correlates positively and codominant tree negatively). The average annual growth of the trees from the top three Kraft classes correlate significantly and positively with the rainfall during March - May, namely with the rainfall from spring during growth year.

Figures 3 and *4* present graphically the dynamic of annual radial growth of a predominant tree from the experimental area Sirieasa 2 in correlation with the dynamic of rainfall during the period of July - September of the previous year before the creation of the annual ring, namely the dynamic of annual medium growth indices of the trees that make a biogroup in correlation with the rainfall indices fallen during July, the year before growth -

September, the current year. It can be noticed the similar course of growth and rainfall in both cases.

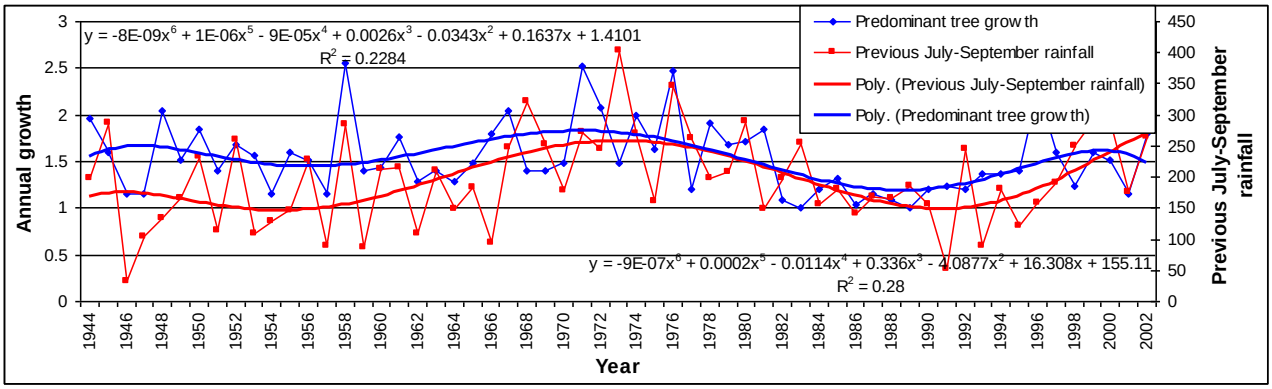


Figure 3 Annual radial growth and rainfail dynamics in the experimental area Şirineasa 2

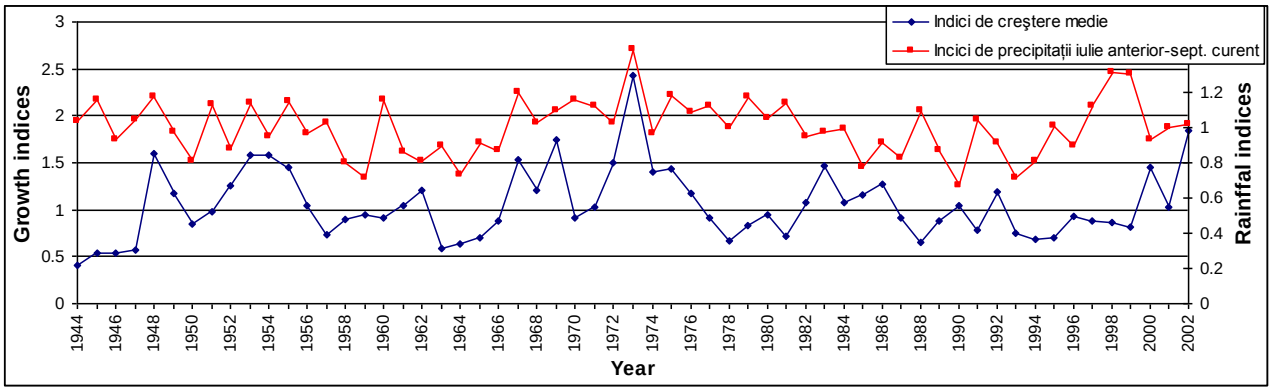


Figure 4 Dynamics of the average growth indices and the rainfail indexes in the experimental area Şirineasa 2

● **Radial growth in comparison with the medium temperatures**

In order to register the influence of atmospheric temperature over trees' thickness growth much more accurately, it has been studied the medium temperature during various time intervals, which overlap more or less with the four seasons or with the period of maximum radial growth as the annual medium temperature .

The data regarding the atmospheric temperature have correlated with the size of trees annual radial growth, having different social positions in study biogroups, by calculating the simple correlation coefficients, the results of the application for the experimental area Lotrisor being rendered by *chart 2* and *figure 5*.

Correlation coefficients between radial growth indices of the trees from biogroup 1 Lotrisor and theaverage atmospheric temperatures

Chart 2

Period/tree position	Simple correlation coefficient (r)				
	Predominant	Codominant	Dominat	Deperisat	Media
Previous July/September	0.118088	0.299782	0.28167	0.375527	0.297224
Previous October/December	-0.15617	0.029288	-0.03763	0.108234	-0.08624
Previous December/current January-March	-0.28426	-0.046974	-0.06994	0.052179	-0.1538
Current January/March	-0.22086	-0.042	0.075547	0.051513	-0.07506
Current April/June	0.333703	0.345964	0.371305	0.382566	0.413349
Curent July/September	0.118088	0.100382	0.221828	0.122622	0.18379
Annual average	0.086231	0.227081	0.333056	0.020528	0.216747

The second type of acquired correlation is the negative correlation between the annual radial growth and the medium temperatures from the period before growth, namely October - December, December - March and January - March. The low temperatures from

the period before radial growth affects mainly the trees from the superior content, predominant. Regarding this, the other trees are probably protected by the predominant trees, affected much more by the negative temperatures out of the vegetation season.

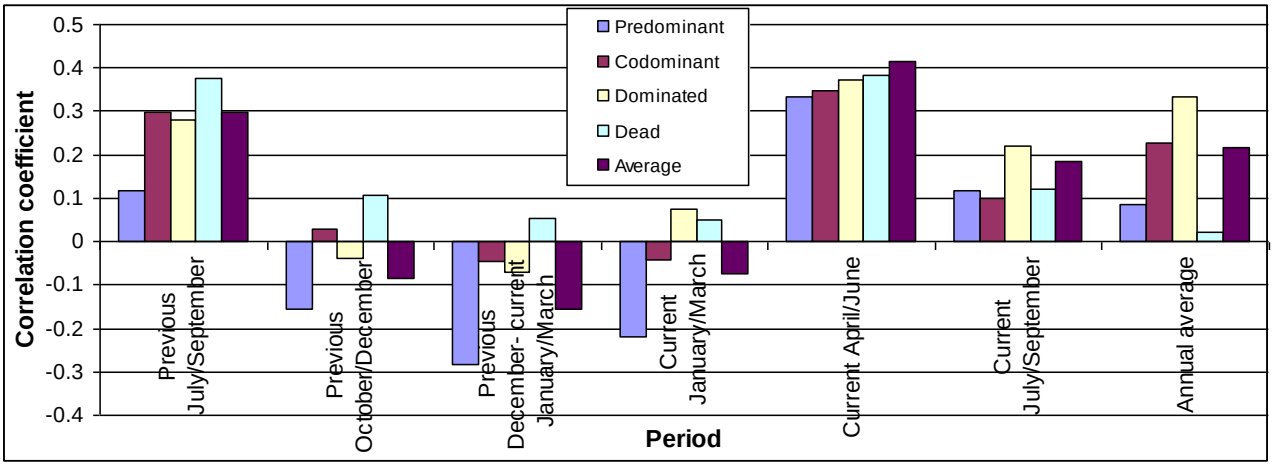
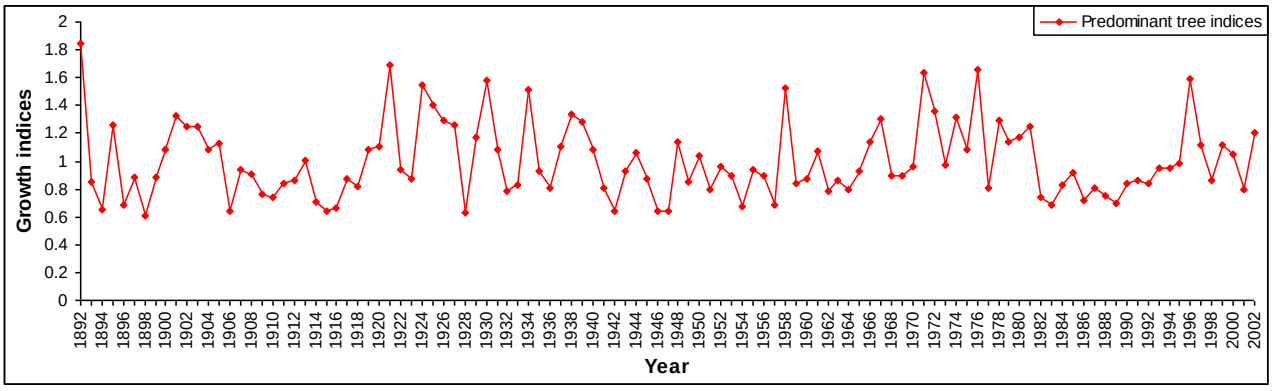


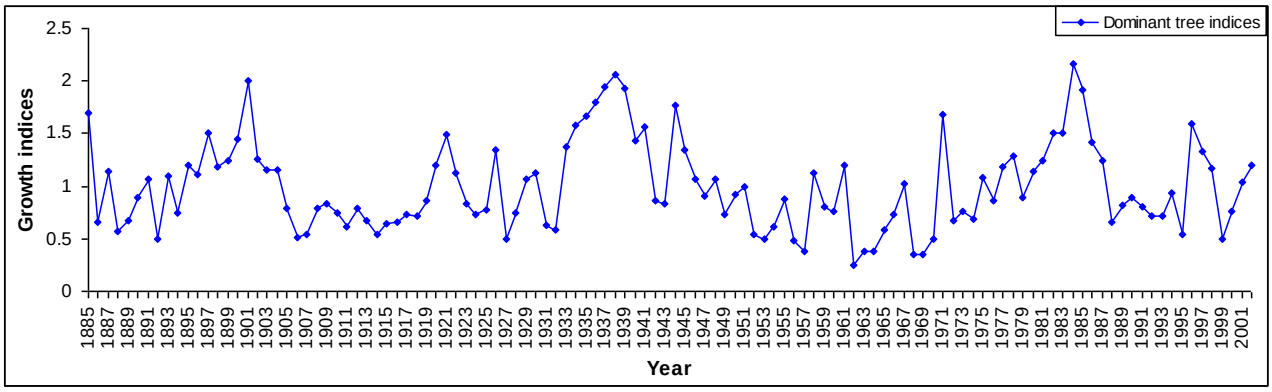
Figure 5 Correlation between the radial growth and the average temperatures for the trees from biogroup 1 Lotrisor

● The transfer function of the relation radial growth –climatic factors

The effect of annual rainfall course over trees' annual radial growth can be observed after the study of growth series, rendered graphically by *figure 6*.



A



B

Figure 6 Growth indices for: A. Predominant tree Şirineasa 2; B. Dominant tree Şirineasa 2

After the analysis of annual rainfall course registered during the studied period, it could be observed that during this, at least 3 periods of dry years could be extended even until 1958, the period 1961-1965 and the period 1982-1986. Of course, other years of heavy rainfall interpose during these years, but they can't change the general weather cours.

In order to determine the transfer function, after the study of growth indices series presented, other periods of minimum growth, from which we can observe the periods 1906 - 1918 and 1894 (1885) - 1898, periods in which the main disturbing factor, which has affected the growth size was probably represented by the insufficient quantity of fallen rainfall.

CONCLUSIONS

○The study of trees' radial growth was approached both in correlation with the two basic parameters of local climate, medium temperatures and rainfall, and much more in correlation with the social position of trees in their life community. On this approach, it could be observed either the analogue response of trees with a close position or the mutual aid relations between distant trees on the social scale regarding the action of these factors.

○ After the study of trees' function of response to the climatic factors, it has been proved the great stability of natural forest from the studied territory to the rainfall. At the same time it could be determined the very significant influence, a positive one, of the medium temperatures during spring over the radial growth, as the negative effect of the low temperatures from the season before.

○ Applying the dendrochronology function of transfer it could easily be determined the weather course in the studied territory during a long period of time, until a date before the first climatic data collection in our country, the information being used to make predictions for the future course of the studied climatic factors.

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ELEMENTELE FIZICO-CHIMICE SUPORT FOLOSITE ÎN EVALUAREA STĂRII ECOLOGICE. STUDIU DE CAZ CURSUL INFERIOR AL RÂULUI JIU

PHYSICO-CHEMICAL QUALITY INDICATORS - SUPPORTING ELEMENTS IN THE ASSESSMENT OF ECOLOGICAL STATUS FOR LOWER JIU

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Key words: Water Framework Directive, ecological status, water body

REZUMAT

Scopul Directivei Cadru este de a menține ecosistemele acvatice şi de a atinge până în anul 2015 starea ecologică bună şi starea chimică bună pentru toate apele de suprafață.

Conform Directivei Cadru pentru Apă, starea ecologică reprezintă "calitatea structurii şi funcționării ecosistemelor acvatice asociate apelor de suprafață". Starea ecologică este definită prin cinci clase: foarte bună, bună, moderată, slabă şi proastă.

Evaluarea stării ecologice se bazează pe starea elementelor biologice, hidromorfologice şi fizico-chimice suport, comparând datele obținute în urma monitorizării cu condițiile de referință.

Un rol important in evaluarea starii ecologice il are gradul de confidenta a datelor, ce se clasifica in trei categorii: grad de confidenta ridicat, mediu si scazut.

ABSTRACT

The Water Framework Directive aims at maintaining the aquatic ecosystems in the European Community and has set a target to achieve good ecological status and good chemical status for all surface water bodies by 2015.

According to Water Framework Directive, the ecological status represents the "quality of the structure and functioning of aquatic ecosystems associated with surface waters". There are five categories of ecological status recognized by the Water Framework Directive: high, good, moderate, poor and bad.

The assessment of ecological status is based on the status of the biological, hydromorphological and physico-chemical quality elements, by comparing data obtained from monitoring network with the reference (undisturbed) conditions.

The confidence level of data is an important element in the assessment of ecological status and is classified in three categories: high, medium and low).

MATERIAL AND METHOD

The aim of this paper is to describe the assessment of the ecological status for surface waters according to the Water Framework Directive with a discussion of a case study.

The Water Framework Directive 2000/60/EC is a directive of the European Parliament and of the Council of the European Union, which establishes a framework for Community action in the field of water policy.

Its purpose is to impose to Member State to achieve by 2015 the good status for surface waters by defining and implementing the necessary measures within integrated programmes of measures and also to maintain good water status where it already exists.

The status of surface waters is defined by the ecological status and chemical status.

"Ecological status" is an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters, classified in:

- High ecological status
- Good ecological status
- Moderate ecological status
- Poor ecological status
- Bad ecological status

Chemical status also defines the quality of aquatic ecosystems in two classes:

- Good chemical status
- Bad chemical status

The indicators involved in assessment of chemical status are the dangerous substances.

"Surface water status" is the general expression of the status of a body of surface water, determined by the poorest of its ecological status and its chemical status.

The assessment of ecological status for surface waters is very important because it is necessary to know in detail the surface water quality in order to forecast the possible consequences of the impact of anthropic pressures.

For natural surface waters, the ecological status is defined by biological indicators, hydro-morphological characteristics, physicochemical quality indicators and specific pollutants.

The present study is referring to the assessment of ecological status for Lower Jiu, which includes two water bodies: Jiu Isalnita reservoir-Bratovoiesti locality and Jiu Bratovoiesti locality-Danube confluence.

In order to evaluate the ecological status it is needed to designate the surface water bodies, to establish the river typology and reference conditions for each type, to evaluate the pressure and the impact of pollution, to have a reliable monitoring network.

According to Water Framework Directive, a surface water body is "a discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, transitional water or a stretch of coastal water.

In the designation of water bodies are used two types of criteria:

a) Standard criteria:

A water body must belong to the same water category: river, lake, reservoir. So the limit between two water bodies is the line between two different water categories (figure no.1)

A water body must belong to a certain water type, taking into account that its quality evaluation will be made by comparing with the reference conditions specific to the respective type (figure no. 2).

Supplementary criteria

A water body must belong to a single class according to the ecological status (figure no. 3).

In the designation of water bodies is very important to integrate all these criteria and also to maintain an equilibrium between them.

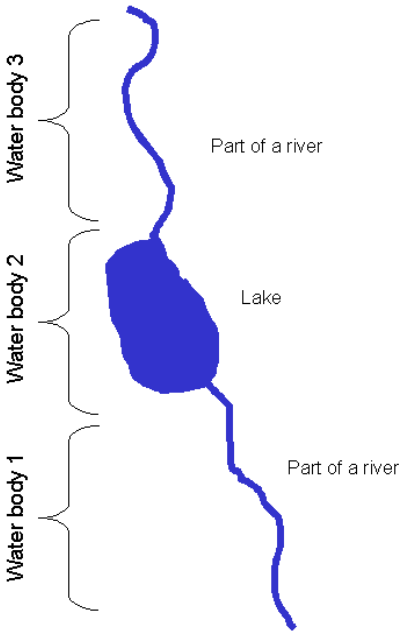

Figure no. 1 The limits of water bodies based on water categories

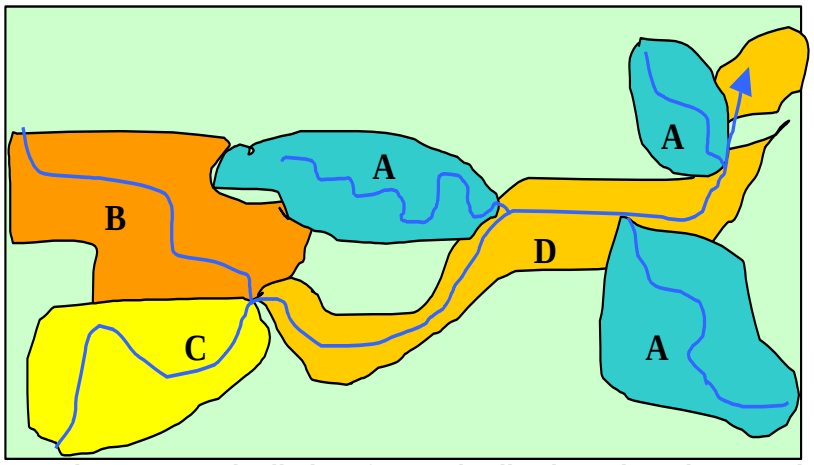

Figure no. 2 The limits of water bodies based on river typology

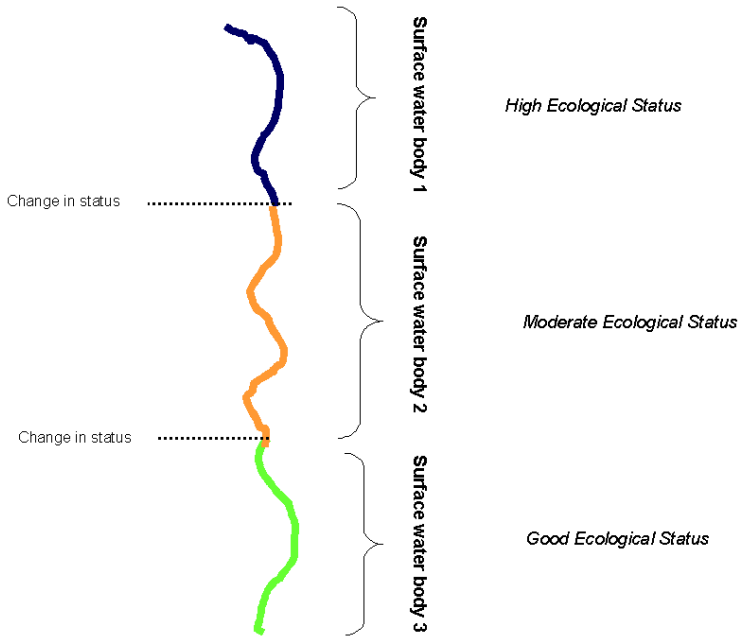

Figure no.3 The limits of water bodies based on water quality

The river typology was also established taken into account the criteria like: eco-region, geology, the lithological structure, slope, altitude, predominant fish fauna, rainfalls, temperature.

The biological elements used in the evaluation of ecological status are:

- Fish fauna
- Aquatic flora represented by: phytoplankton, fitobentos and macrophytes
- Macrozoobentos

The hydro-morphological elements used to assess the ecological status are:

- Hydrological regime, represented by:
  - the water level and flow
  - the connectivity between surface and groundwater body
  - river continuity
- Morphological parameters, represented by:
  - The variation of water depth and width
  - The structure and the substrate of the river bed
  - The structure of the riparian zone

The physicochemical quality indicators-support for the ecological status are:

- Water temperature
- Dissolved oxygen
- Salinity
- pH
- Nutrients

The Specific pollutants synthetic and non-synthetic used in the ecological assessment are:

- Heavy metals: copper, zinc, arsenic, chromium
- Synthetic substances: polychlorinated biphenyls, toluene, xylene, phenol.

For all these quality elements ware established the reference conditions, for each water body.

The ecological status is evaluated by comparing each type of indicator with the reference conditions.

It is well known that the defining elements in the assessment of ecological status for surface waters are the biological ones.

The goal of Water Framework Directive is to achieve until 2015 the water good status, meaning a good ecological and chemical status.

Assessment of ecological status and quantification of its relationships with anthropogenic pressures critically depend on the knowledge of relevant biotic and abiotic settings and processes.

RESULTS AND DISCUSSIONS

Results and discussion. The methodology described in the previous chapter was applied for the Lower Jiu.

The lenght of Jiu river is 339 km, with a catchment of 10080 km2. It crosses through all landforms (mountain, hills and plains).

In this study, the ecological status is assessed for the lower part of Jiu river (99,5 km), from downstream of Isalnita reservoir until Danube confluence, insisting on the physicochemical indicators.

For the assessment were used monitoring data from 2 monitoring stations: Jiu-Podari and Jiu-Zaval.

In Table no.1 are presented the average data for general physicochemical indicators used for the assessment. The average was made for sets of ten analysis and after

comparing the obtained results with the quality objectives for each water type was obtained the ecological status.

The studied indicators were: nitrogen from ammonium, nitrit and nitrate ions ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$), the phosphorous from phosphate ion $P\text{-}PO_4^{3-}$, total phosphorous (TP), dissolved oxygen (OD), acidification status (pH). The measurement unit established was mg/l.

Taking into account the number of analysis, the ecological status was established with a medium confidence level. In case that the set of analysis was more than twelve per year, only then the confidence level would be high.

As it can be seen in table 1, for Lower Jiu, was established a good ecological status for the water body Jiu Isalnita reservoir-Bratovoiesti locality and a moderate ecological status for Jiu Bratovoiesti locality-Danube confluence.

In Table no. 2 it is represented the evaluation of ecological status for Lower Jiu which includes all elements (biological, hydro-morphological, general physicochemical and specific pollutants).

It can be easily seen that the ecological status for the first water body is the result of good staus (G) for: Fish fauna, Benthic invertebrates, Thermal conditions (temperature), Dissolved oxygen, Acidification status (pH), Nutrients ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$, Pt) and specific pollutants. Other indicators, as Fitobentos and Macrophytes, Phytoplankton and Salinity (conductivity) are unknown. Although the Hydro-morphology is bad (a lower quality), it's not taken into account because the biological elements are good.

The ecological status of the second water body is moderate because of the phisicochemical indicators, especially the nutrients ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$).

CONCLUSIONS

According to Water Framework Directive (2000/60/CE), the water good status for all natural water bodies must be achieved. For this study case, one water body is in good status, while the other one has a moderate ecological status.

The objectives will be to preserve the quality of the first water body (Jiu Isalnita reservoir-Bratovoiesti locality) and to improve the quality of the second one (Jiu Bratovoiesti locality-Danube confluence). These objectives will be achieved mainly by implementing the Waste Water Directive, which provides sewerage and waste water treatment plant for all human aglomerations with more than 2000 people equivalents and by implementing the Nitrate Directive through Action Plans with the purpose to eliminate the nitrate pollution from agriculture.

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Table no. 1

The evaluation of ecological status for Lower Jiu taking into account the phisicochemical indicators

Monitoring station/ Water body	River typology	Waterbody code	$N\text{-}NH_4^+$ (mg/l)	$N\text{-}NO_2^-$ (mg/l)	$N\text{-}NO_3^-$ (mg/l)	$P\text{-}PO_4^{3-}$ (mg/l)	TP (mg/l)	OD (mg/l)	pH	Ecological status
Podari/ Jiu Isalnita reservoir- Bratovoiesti locality	RO10*a	RW7.1_B121	0,252	0,045	2,078	0,053	0,104	8,949	7,6	Good
Zaval/ Jiu Bratovoiesti locality-Danube confluence.	RO11*a	RW7.1_B148	0,330	0,044	2,371	0,085	0,147	8,809	7,9	Moderate

Table no. 2

The evaluation of ecological status for Lower Jiu

River	Water body	River typology	Biological elements					Hydro-morphological elements	General physicochemical conditions						Specific pollutants		
			Fish fauna	Benthic invertebrates	Fitobentos and Macrophytes	Phytoplankton	Assessment of biological elements	Hydro-morphology	Thermal conditions (temperature)	Dissolved oxygen	Salinity (conductivity)	Acidification status (pH)	Nutrients ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$, Pt)	Assessment of general physicochemical elements	Specific pollutants	Ecological status	Class of confidence (ecological status)
Jiu	Jiu Ac. Işalnița- Bratovoieşti	RO10*a	G	G	Z	Z	G	B	G	G	Z	G	G	G	G	G	M
Jiu	Jiu Bratovoieşti-confl. Dunărea	RO11*a	Z	H	Z	Z	H	M	G	G	Z	G	M	M	M	M	M

CAPACITATEA DE MULTIPLICARE *IN VITRO* A CĂPȘUNULUI ORNAMENTAL "SERENATA" ŞI EVALUAREA STABILITĂȚII GENETICE UTILIZÂND MARKERI RAPD

IN VITRO MICROPROPAGATION OF ORNAMENTAL STRAWBERRY CVS. "SERENATA" AND THE ASSESSMENT OF GENETIC STABILITY BY RAPD MARKERS

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Key words: intergeneric hybrid, in vitro, micropropagation, genetic stability.

REZUMAT

Pentru determinarea capacității de multiplicare in vitro a hibridului intergeneric Fragaria x Potentilla, varietatea "Serenata", mediile nutritive MS si LF au fost suplimentate cu BAP, Kin, AIA, AIB şi GA_3, în concentratii si combinatii diferite. O rată înaltă de multiplicare asociată cu o vigoare ridicată a lăstarilor a fost obtinută pe mediile de cultură continând 1.0 mg/l BAP, 1.0 mg/l AIA si 0.1 mg/l GA_3. Pentru determinarea stabilității genetice a microlăstarilor au fost folositi 10 primeri (selectati din 48 de primeri, testati initial), iar similaritatea dintre profilele RAPD corespunzătoare plantei martor, respectiv microlăstarilor obținuți după 4 subculturi in vitro, a fost interpretată ca sugerând stabilitatea genetică.

ABSTRACT

The feasibility of in vitro propagation of intergeneric hybrid Fragaria x Potentilla, named "Serenata", was tested by using six MS and, respectively, six LF-based proliferation media supplemented with different combinations and concentrations of benzylaminopurine (BAP), kinetin (Kin), indolylacetic acid (IAA), 3-indolylbutiric acid (IBA), and giberellic acid (GA_3). A high multiplication rate combined with good quality of proliferated shoots and in vitro rooting potential was induced by media containing 1.0 mg/l BAP, 1.0 mg/l IAA and 0.1 mg/l GA_3. Ten primers (from 48 previously tested) were selected and used in RAPD analysis to assess the genetic stability of these shoots. The lack of polymorphisms in micropropagated plants screened through molecular markers was proved by identity of the banding patterns.

INTRODUCTION

Sexual compatibility of *Potentilla palustris* with some *Fragaria* species (Niemirowicz-Szcytt, 1984; Sayegh and Hennerty, 1993), allowed the obtaining of a large range of *Fragaria x Potentilla* intergeneric hybrids ("Serenata", "Pink Panda", "Lipstick", "Red Ruby" and "Vivarosa"), combining the ornamental value given by the beauty of their flowers and prolonged blossoming season (May - October) with production of edible fruits.

Because the genetic limitations associated with high heterozygosity and polyploidy, which hamper the traditional breeding methods, the clonal propagation of intergeneric hybrids *Fragaria x Potentilla* provides an advantage for the multiplication of these elite plants without sexual recombination.

Growth and regeneration *in vitro* is a complex phenomenon and is influenced by a number of genetic and environmental factors (Husaini and Abdin, 2007). As every species seems to have its own specific requirements, there are several reports about the substances and conditions which help cells to differentiate (Sen et al., 2002). Auxins and cytokinines are the two main growth regulators in plants involved in the regulation of division and differentiation (Fehér et al., 2003). Propagation through *in vitro* regeneration of plants has many disavantages (Scowcroft and Larkin, 1988), the most important being the associated genetic instability.

The detection by phenotypic identification of off-types among micropropagateed plants is cumbersome and time-consuming, and is more difficult in perenial crops, were many observation have to be made until maturity. Moreover, all the genetic changes may not be reflected in the observed phenotypic changes (Rani and Raina, 2000).

In one of the first studies, Swartz et al., (1981) listed a divers range of variations in meristem culture (shoot tip)-derived strawberry plants. The abnormal features noted were hyperflowering, fruit malformation, small plants, lower yields, change in bloom date and runnerless female sterile plants (Swartz et al., 1981; Martinelli, 1992).

Brown et al., (1993) suggested the use of PCR for assessing the genetic fidelity of tissue culture-derived plants, RAPD analysis being used successfully for genetic analysis of *in vitro*-raised plant materials (Rani and Raina, 2000).

MATERIAL AND METHODS

Plant material: An ornamental strawberry variety (*Fragaria x Potentilla*), named ”Serenata”, was established *in vitro* culture starting from meristems and then subcultured succesively on Murashige and Skoog (MS) and respectively Lee and Fossard (LF) media supplemented with various combinations of growth regulators (Table 1).

For the initiation of shoot cultures, meristems with 2-3 leaf primordia, of 0.1- 0.3 mm in size, excised from runners formed by field plants of ”Serenata” variety (with red flowers), was used. Six treatments with different combinations and concentration of BAP, Kin, IAA, IBA and GA_3, added to both MS and LF basic culture media, were used in order to find an adequate medium for obtaining a high rate of micropropagation while maintaining a good vigor of micropropagated shoots (Table 1).

Table 1.

The combinations and concentration of growth regulators added to MS and LF culture media

Culture medium code	Basic medium	Concentration of growth regulators in the culture medium (mg/l)				
		BAP	IBA	IAA	GA_3	Kin
MM1	MS, or LF	0.5	0.1	-	0.1	-
MM2	MS, or LF	1.0	0.2	-	0.1	-
MM3	MS, or LF	0.5	-	0.5	0.1	-
MM4	MS, or LF	1.0	-	1.0	0.1	-
MM5	MS, or LF	2.0	-	1.0	-	-
MM6	MS, or LF	1.0	-	-	2.0	0.5

The observations were carried out at every 4 weeks, respectively at the moment of subculturing the micropropagated shoots. The micropropagation rate was calculated as the average number of shoots regenerated on each primary explant cultured *in vitro* on each of the media tested.

After four subcultures, shoots which regenerated from *Fragaria x Potentilla* explants were separated from the micropropagation basal media, when they were approximately 2-3 cm long, and placed on a medium suitable for root growth. Root growth was stimulated by supplementing the solidified basal medium, containing half strenght Murashige -Skoog

macroelements and half Lee-Fossard microelements, with the auxins IBA and IAA at different concentrations. In all treatments, 0.1 mg/l of GA_3 was also added to the basal medium (Table 2). *In vitro* rooting was followed by acclimatization to *ex vitro* conditions, plantlets being transfered in perlite in greenhouse conditions.

Table 2.

The combinations and concentration of growth regulators added to rooting medium

Culture medium code	Basic medium	Concentration of growth regulators in the culture medium for *in vitro* rooting (mg/l)		
		IBA	**IAA**	**GA_3**
RM1	Macroelements MS 1/2 n, Microelements LF 1/2n, Vitamins MS n	0.25	-	0.1
RM2	Macroelements MS 1/2 n, Microelements LF 1/2n, Vitamins MS n	0.5	-	0.1
RM3	Macroelements MS 1/2 n, Microelements LF 1/2n, Vitamins MS n	-	0.5	0.1

To avoid major statistical errors, at least 5 conical flasks (each with 30 ml of culture medium and closed with cotton-wool bungs and tinfoil) with 6 shoots per flask were used as repetitions in each of the experimental treatment investigated. In order to establish the efficiency of each treatment, the rooting rate, average root number and root length, were determined.

Statistical analysis of the data obtained on basal media containing different concentrations of citokinins and/or auxins for *in vitro* micropropagation and *in vitro* rooting, respectively, were performed using Windows SPSS 16.0 program (SPSS, 2007) at $p < 0.05$.

The cultures have been incubated in a growth chamber at the temperature of 22-24°C, with a photoperiod of 16 hours light/8 hours darkness, and a light intensity of about 40 µmol m^{-2} s^{-1}.

DNA extraction: Total genomic DNA was extracted from both tissue culture-derived plants and field grown mother plant using DNEasy Plant Mini Kit (Qiagen), following the manufacturers protocol.To check the degradation of DNA, samples were loaded into 0.8% agarose gel in 0.5 × TBE submitted to electrophoresis, stained with ethidium bromide and observed under ultraviolet (UV). The DNA used for the amplification was of high molecular weight with little degradation and free of RNA as revealed by UV and gel electrophoresis.

PCR conditions: RAPD amplification was performed in a reaction volume of 25 µl containing 4 mM $MgCl_2$, 0.4 mM of each dNTP, 0.6 units Taq DNA polymerase, 0.8 µM primer and 100-200 ng genomic DNA. The amplification reactions were carried out in an TC-512 Gradient Thermocycler (Bibby Scientific Ltd) programmed as following: preliminary denaturation of DNA at 95°C for 2 min, 45 cycles of 92°C for 30 s, 36°C for 25 s and 72°C for 74 s, and a final extension step at 72°C for 7 min. The PCR products were separated by gel electrophoresis on a 1.2 % agarose gel, in 0.5 x TBE buffer during 1 h at 90 V and stained with ethidium bromide (10 mg/ml).

RAPD analysis using each primer was repeated at least twice in order to establish the reproducibility of banding pattern of the DNA sample studied. Electrophoretic DNA bands of low visual intensity that could not be readily distinguished as present or absent were considered ambiguous markers and were not scored.

Photographs of the gels were obtained with a Gene Flash Syngene Bio Imaging. The 100 bp DNA Ladder (Fermentas) was used as a molecular size standard and the size of

the amplification products was estimated using LabImage software from the photographs of the gels.

RESULTS AND DISCUSSION

After the first subculture, the "Serenata" variety of *Fragaria x Potentilla* responded by a good rate of micropropagation during the first subculture on all the six variants of MS culture media, irrespective of combinations of growth regulators. Thus, an average number of 20.6 shoots formed per primary explant was calculated for the treatment with 0.5 mg/l BAP, 0.1 mg/l IBA and 0.1 mg/l GA_3 added to the MS (Fig. 1). A significantly lower rate of micropropagation was obtained with this *Fragaria x Potentilla* variety when the same combination of growth regulators was added to the LF medium. Excepting the treatment with 0.5 mg/l BAP, 0.1 mg/l IBA and 0.1 mg/l GA_3, no other combinations of growth regulators resulted in significantly different rate of shoot micropropagation on the two basic culture media tested (Fig. 1). The micropropagation rate maintained higher over the subsequent subculture on any of the culture media tested, reflecting a superior genetic potential of *in vitro* multiplication. It is relevant the fact that at the end of the second subculture, on the LF medium, a rate of micropropagation as high as 24.3 was calculated in treatment with 1.0 mg/l BAP, 0.2 mg/l IBA, and 0.1 mg/l GA_3 (Fig. 1).

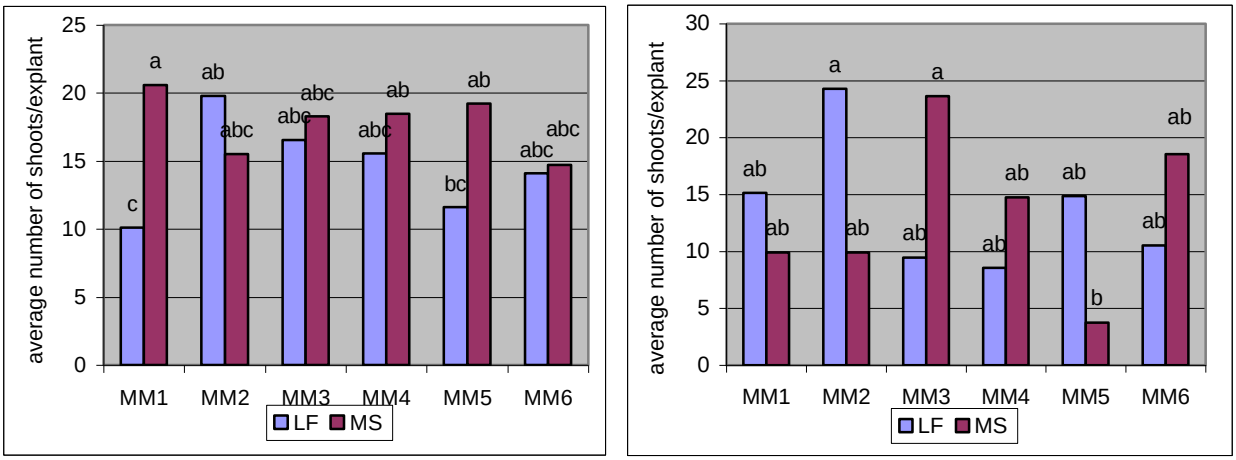

Figure 1. The micropropagation rate of the "Serenata" variety after the first subculture(left) and second subculture (right) on either LF or MS media.

The statistical analysis have revealed that, "Serenata" variety responded by a decreased ability of shoot micropropagation during the third and fourth subcultures. Thus, irrespective of the basic culture medium, the best rates of micropropagation does not exceeds 16 shoots formed per primary explant. However, good rates of shoot micropropagation were promoted in treatments with 1.0 mg/l BAP, combined with either 0.2 mg/l IBA or 1.0 mg/l IAA.

After four weeks in culture medium for *in vitro* rooting, the percentage of microshoots rooted, number of roots and length of roots per culture was influenced by the different types and concentrations of auxins added in the rooting media and hormonal composition of the basal media used for explants micropropagation.

Rooting induction of the shoots started about 16 days after the initiation of culture. Excepting the shoots obtained by treatment with 1.0 mg/l BAP, 1.0 mg/l IAA and 0.1 mg/l GA_3, no other combinations of growth regulators added to the LF basic medium resulted in significantly different rate of shoots rooting. The highest rooting rate (96.6%) was obtained on rooting medium with IBA at 0.25 mg/l and GA_3 at 0.1 mg/l concentration (Table 3).

Table. 3

Effect of different types and concentration of growth regulators on root development from primary expants, after four weeks.

Shoots provenance		Rooting rate (%)			Number of roots per shoot			Length of the roots (mm)		
		RM1	RM2	RM3	RM1	RM2	RM3	RM1	RM2	RM3
MM1	-LF	46,6 abcd	20 bcd	40 abcd	3,73 abcd	1,1 bcd	1,49 abcd	5.91 abc	1.66 bc	2.76 abc
	-MS	40 ab	20 ab	20 ab	2,13 abc	6,19 a	0,93 bc	4.61 bc	9.96 a	1.43 bc
MM2	-LF	60 abcd	20 bcd	20 bcd	5,7ab	1,4 abcd	2,7 abcd	6.63 abc	1.83 bc	3.96 abc
	-MS	80 a	50 ab	60 ab	5,19 ab	3,53 abc	3,59 abc	7.22 ab	4.56 abc	5.79 abc
MM3	-LF	33,2 abcd	80 abc	26,6 bcd	1,61 abcd	5,27 abc	0,4 cd	1.71 bc	6.16 abc	2.83 abc
	-MS	0	0	0	0	0	0	0	0	0
MM4	-LF	96,6 a	86,6 ab	40 abcd	5,66 ab	6,49 a	2,39 abcd	7.49 ab	9.53 a	2.56 abc
	-MS	20 ab	20 ab	0	2,4 abc	1,46 abc	0	1.7 bc	1.7 bc	0
MM5	-LF	59,8 abcd	40 b	16,6 cd	4,69 abcd	2,79 abcd	2,63 abcd	4.44 abc	4.76 abc	2.28 bc
	-MS	53,2 ab	13,2 b	20 ab	4,26 abc	0,7 bc	1,93 abc	4.83 abc	1.25 bc	1.33 bc
MM6	-LF	60 abcd	0	66,6 abcd	5,16 abc	0	4,06 abcd	5.36 abc	0	5.5 abc
	-MS	20 ab	40 ab	33,2 ab	0,63 bc	3,26 abc	2,87 abc	1.33 bc	4.46 abc	3.38 bc

Mean comparison: values in each column on the same rooting medium followed by different letters are significantly different, $p<0.05$

Shoots obtained on MM6-LF failed to induce rhizogenesis. A significantly lower value of the rooting rate was obtained in treatment with IAA at 0.5 mg/l and GA_3 at 0.1 mg/l concentration (RM3), irrespective of the basal medium used for explant micropropagation.

The statistical analysis revealed that the highest mean root number per shoot (6.49) and the highest average length of the roots (9.53 mm) were induced in this variety by the combination 0.5 mg/l IBA and 0.1 mg/l GA_3, for those shoots cultured on MM4-LF variant of medium (Table 3).

During fourth successively subcultures, micropropagation rate values on MM4-MS and MM4-LF did not varied extremely (18.45 – 8.35, respectively 15.55 – 15.35) and shoots obtained were more vigorous, with a better *in vitro* rooting potential than those developed on other culture medium variants.

On the basis of the number, intensity and reproductibility of RAPD bands, ten random primers (Table 4) were selected out of the 48 previously tested and used in RAPD analysis to prove the clonal fidelity (i.e. genetic stability) of the tissue culture-derived microshoots obtained on MM4-LF and MM4-MS. The primers selected for this study gave rise to a total of 60 scorable bands ranging from 312 bp to 2774 bp in size. From the selected markers, two (OPA11 and OPB10) yielded 20 bands across the shoots tested, and another one (OPC09) yielded 7 bands. The other primers were not as efficient in generating succesive PCR products. A total of 180 bands (number of plantlets analyzed X number of bands with all primers) were generated by the RAPD technique, giving rise to monomorphic patterns across all microshoots and control plant studied. All RAPD profiles from the tissue culture-derived ornamental strawberry plants were found to be analogous to those of the control plant, indicating either identity or similarity. Examples of RAPD patterns amplified with primers OPC09 and OPB09 are shown in Figure 2 (a) and (b).

Table 4.

List of primers, their sequence and size of the amplified fragments generated by 10 RAPD primers

No.	Primer	Sequence	No of scorable bands	No of monomorphic bands	Size in bp
1	OPA02	TGCCGAGCTG	5	5	2248-810
2	OPA11	CAATCGCCGT	10	10	2667-312
3	OPA19	CCAACGTCGG	5	5	2356-1138
4	OPA20	GTTGCGATCC	5	5	1881-986
5	OPB09	TGGGGGACTC	4	4	1713-710
6	OPB10	CTGCTGGGAC	10	10	2600-480
7	OPB15	GGAGGGTGTG	5	5	2351-973
8	OPC05	GATGACCGCC	4	4	1755-750
9	OPC06	GAACGGACTC	5	5	2140-598
10	OPC09	CTCACCGTCC	7	7	2774-647

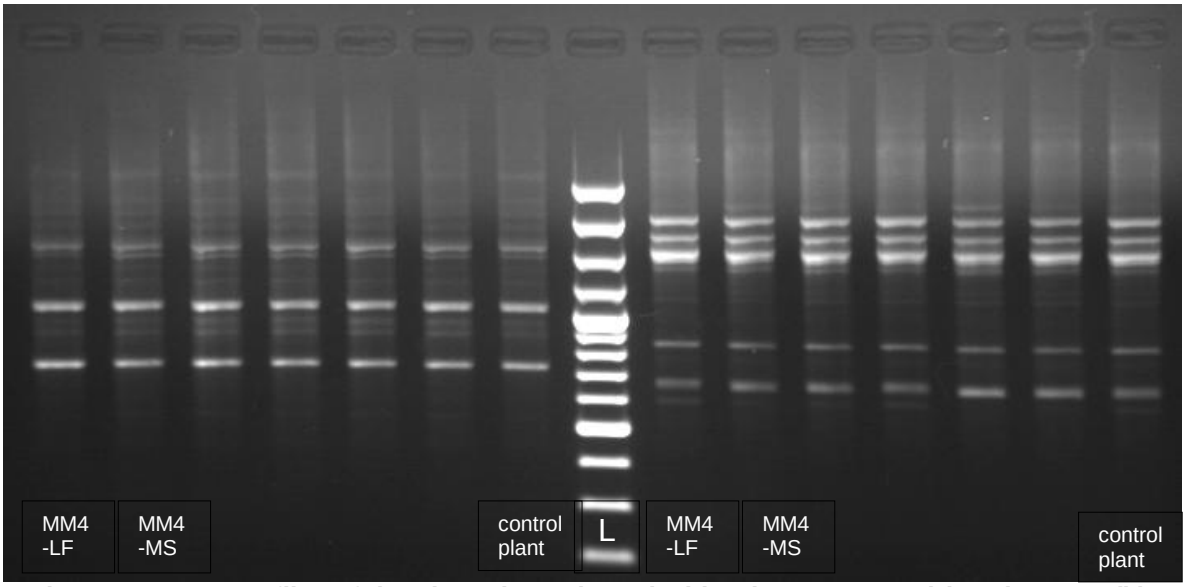

Figure 2. RAPD profiles of the plants investigated with primers OPC05 (a) and OPC06 (b). L= 100 bp DNA ladder.

CONCLUSIONS

In “Serenata” variety of *Fragaria x Potentilla*, the average number of shoots formed per primary explant was higher when the explants were subcultivated on the MS medium, rather than on LF medium (currently used for the micropropagation of the octoploid cultivated strawberry), indicating a more adequate composition of nutrients to the *in vitro* growth requirements of these intergeneric hybrids. Irrespective of the basic culture media, the micropropagation rate of “Serenata” variety was demonstrated to be generally higher when combinations of 1.0 mg/l BAP with either 0.2 mg/l IBA or 1.0 mg/l IAA are used.

In “Serenata” variety, a fairly good rate of rooting was promoted in treatment with 0.25 mg/l IBA and 0.1 mg/l GA_3, but average root number and root elongation were singnificantly higher when IBA concentration was higher. The shoots cultured on MM4-LF responded by higher values for all three rooting caracteristics analysed.

Because there were no changes in the banding patterns observed in the tissue culture plants as compared with that of the control plant, we conclude that our micropropagation protocol can be followed without much risk of genetic instability. The lack of polymorphic bands among the RAPD profiles of microshoots regenerated in basal media supplemented with low concentration of growth regulators, and control plant, denote that no genetic

variation had occurred. Also, the correspondence between RAPD profiles can be associated with a higher genetic stability of this genotype.

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CERCETĂRI PRIVIND ACUMULAREA PROLINEI LA UNELE POPULAȚII LOCALE DE USTUROI (*Allium sativum* L.) ÎN CONDIȚII DE SECETĂ

RESEARCH ON PROLINE ACCUMULATION IN SOME LOCAL POPULATIONS OF GARLIC (*Allium sativum* L.) UNDER DROUGHT

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Cuvinte cheie: usturoi, prolină, stres abiotic
Key words: garlic, proline, abiotic stress

REZUMAT

Plantele reacționează la factorii de stres abiotic, cum sunt seceta sau frigul, prin producerea aminoacidului prolina. La plantele aflate în condiții normale (nestresate) cantitatea de prolină este de aproximativ 5% din totalul aminoacizilor din celulă. La plantele aflate sub acțiunea diferiților factori de stres cantitatea de prolină sintetizată poate ajunge la 80 % în câteva ore sau câteva zile. La plante prolina se acumulează cu precădere în citoplasmă şi mai puțin în vacuole. Scopul acestui studiu a fost de a determina acumularea de prolină pe unele populațiilor locale de usturoi (Allium sativum L.), în condițiile secetei şi pentru a selecta genotipurile rezistente.

Cantitatea de prolină din plantele supuse stresului poate fi estimată fotometric prin măsurarea absorbanței la o lungime de 520 nm.

ABSTRACT

Plants respond to abiotic stress, drought or cold by producing amino acid proline. The amount of proline on plants under normal conditions is about 5 % of total amino acids in the cell. On the plants under the action of various factors stress amount of proline synthesis may reach 80% within hours or days. The plants are accumulating proline mainly in cytoplasm and less in vacuoles. The purpose of this study was to determine the accumulation of proline on some local landraces of garlic (Allium sativum L.), in the drought conditions and to select resistant genotypes.

The amount of proline in plants exposed to stress can be estimated photometrically by measuring absorbance at a wavelength of 520 nm.

INTRODUCTION

Proline accumulation is a common metabolic response higher plants affected by water shortage, the issue extensively discussed in the last 20 years (Taylor, 1996, Rhodes şi colab., 1999).

Proline is to protect the endomembrane system and proteins against the adverse effects of high concentrations of mineral ions and extreme temperatures
(Santarius 1992, Santoro şi colab., 1992).

Increased water shortage is not a perpetual state, appears accidental and often unwanted in spring months from April to May, when the plant root system is weak increased and air temperature is high and accompanied by currents of air. In such cases the plants are fully adapted and characteristic structural adjustments frequently increase drought tolerance, reduced productive capacity. (Ewers and col. 2000).

MATERIAL AND METHOD

Biological material used was collected from the wild growth that is in the experimental field of the Discipline of Genetics Timisoara, in May in drought conditions.
The protocol used was collected plant samples of 200 mg plant material (leaves, garlic) (Allium sativum L.) of six local landraces of three repetition. We determined the amount of proline accumulated in plants at different intervals, using (Abraham et al 2003).

The basis of this method is that it reacts with proline to form a compound ninhidrin red yellow items obtained is extracted in toluene and the amount of proline in plants can be estimated photometrically by measuring absorbance at a wavelength of 520 nm.
Values obtained from Spectrophotometer be recorded and used to calculate quantity of proline in each sample by computing the relationship: The DO520nm x = 200 mM proline. (Abraham et al., 2003)

Table 1

The experimental variants

Variant	Village
1/ 1484	Căpâlnaş – Arad
2/ 1763	Sebiş - Arad
3/ 1780	Răchita – Timiş
4/ 1237	Cenad - Timiş
5/ 1788	Seaca de Câmp - Dolj
6/1791	Răcarii de Jos - Dolj

RESULTS AND DISCUSSIONS

Free proline accumulation in leaf tissue of plants is a response to stressors such as drought that result in increased proline content in all landraces considered for the study.
Under normal hydration can be seen that the smallest amount of proline was accumulated in the 1791 landraces Răcarii de Jos (DJ) (21.0 mM) and the largest amount was accumulated for 1237 - Cenad (TM) (71,6mM).
In drought conditions the proline content began to increase after seven days values ranged from:23,6 mM the landraces 1791 - Răcarii de Jos (Dj), 65,0mM the landraces 1763 – Sebiş (Ar) and 99,0 mM the landraces 1237 Cenad (Tm). Following the experimental results of 14 days, proline content increased, ranging from limits between 114.4 mM to 1237 landraces Cenad (TM) and 110.2 mM in 1484 Căpâlnaş landraces (Ar). As the drought persisted, the plants accumulated a higher amount of proline as a defense against dehydration reaction.

Landraces that have shown resistance to drought accumulated quite significant amounts of proline were observed in landraces: 1763 Sebiş (Ar), 1790 Răchita(Tm) 1788 Seaca de Câmp (DJ).

Table 2

Experimental variants, the amount of proline in the populations analyzed

Landraces	**The amount of proline mM / variant experimental**		
	Experimental variant1	**Experimental variant in 7 days**	**Experimental variant in 14 days**
1484 - Căpâlnaş	35,2 mM	50,6 mM	110,2 mM
1763 – Sebiş	43,4 mM	65,0 mM	98,6 mM
1790 – Răchita	35,0 mM	48,6 mM	88,4 mM
1237 – Cenad	71,6 mM	99,0 mM	114,4 mM
1788 – Seaca de Câmp	38,2 mM	47,5 mM	62,3 mM

1791 – Răcarii de Jos	21,0 mM	23,6 mM	26,8 mM

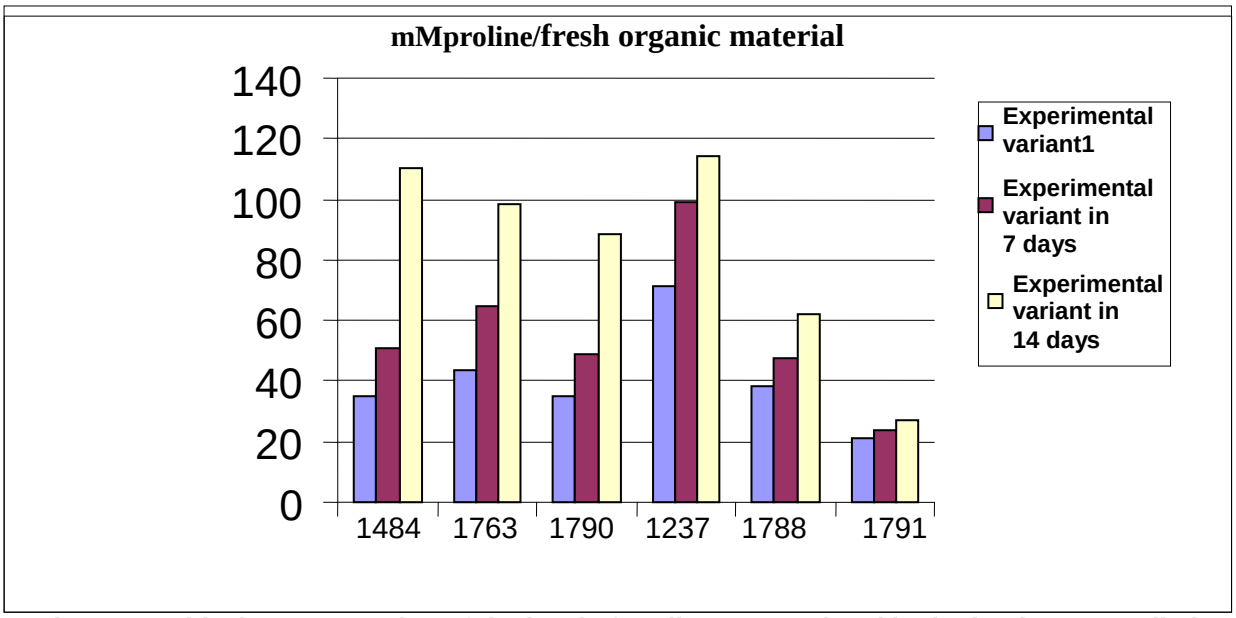

Fig.1 - Graphical representation of the level of proline accumulated in the landraces studied

CONCLUSIONS

Following research it could draw some conclusions:

- Accumulation of proline is a common response of plants sensitive and resistant to drought, therefore there is a general correlation between drought resistance and accumulation of proline, although many bibliographies show a positive correlation between these parameters.
- Landraces 1237 Cenad (TM) is a good accumulator of proline in both the normal hydration conditions and drought.
- It should be noted that all landraces accumulate a significant amount of proline with increasing droughts.

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PROTECŢIA CULTURII DE RAPIŢĂ DE TOAMNĂ FAŢĂ DE GĂRGĂRIŢELE TULPINILOR (*CEUTORRHYNCHUS NAPI* GYLL. ŞI *CEUTORRHYNCHUS QUADRIDENS* PANZ.)

PROTECTION OF WINTER OILSEED RAPE CROP AGAINST CABBAGE STEM WEEVILS (*CEUTORRHYNCHUS NAPI* GYLL. *& CEUTORRHYNCHUS QUADRIDENS* PANZ.)

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R&DAS Caracal

Key words: rape, Ceutorrhynchus napi Gyll. , Ceutorrhynchus quadridens Panz.

ABSTRACT

At present, the rape occupies an especial place into the world economy, as source of vegetable oils utilized in nourishment and industry.

The areas cultivated with winter rape have significantly increased in last time.

The success of the rape crop establishment and the yield assurance is conditioned, in the case of a good technology utilization, by the plant protection against the attacks produced by some harmful pests, which frequently diminish the yield till 35% or even compromise it.

The spatial distribution and the number of the insects in rape field is determined by several environmental and climatic factors, and agricultural technics.

*The aim of the presents field experimentals was to study the rol of the moment applied of chemical treatment on damage causated by cabbage stem weevils (*Ceutorrhynchus napi *Gyll. and* Ceutorrhynchus quadridens *Panz.)*

The first treatment should be when the density of cabbage stem weevils reached at 1-2 ex / plant. It provides a good protection of the stem and finally obtaining high productions.

The gained data may be considered as a basis for estimating the effectiveness of chemical control performed on rape fields.

INTRODUCTION

The success of the rape crop establishment and the yield assurance is conditioned, in the case of a good technology utilization, by the plant protection against the attacks produced by some harmful pests, which frequently diminish the yield till 35% or even compromise it (Ghizdavu & all., 19997; Perju 1995);

The spatial distribution and the number of the insects in rape field is determined by several environmental and climatic factors and agricultural technics (Free & Williams, 1979; Ferguson & all.,1999).

In the oilseed rape crop is a lot of pests, there are only a few species that cause serious damage. The cabbage stem weevils *(Ceutorrhynchus spp.)* are considered to be most damaging beside the pollen beetle (*Meligethes aeneus*) and pod midge *(Dasineura brassicae*)(Lerin J. 1988; Vilau,1991, 2007, Totus 2001).

Area protected against *C. napi* and *C. quadridens* increased proportionally to the increase of area under the rapeseed crops.(Koprna,2001).

The aim of the presents field experimentals was to study the rol of the moment applied of chemical treatment on damage causated by cabbage stem weevils

(C*eutorrhynchus napi* Gyll. and *Ceutorrhynchus quadridens* Panz.), because for now, the treatments was in principal for pollen beetle *(Meligetes aeneus* Fabr.).

MATERIALS AND METHODS

Study of occurrence, evolution and cabbage stem weevils was done on winter oilseed rape in 2008 and 2009 as soon as plants are slow to start in spring vegetation, from the beginning of March in 2008 and the second decade of March in 2009.

In accord with pest occurrence have been performed two treatments for control cabbage stem weevils: in 2008 on March 12 and March 27, and in 2009 on March 27 and April 7. The treatments were made with Decis Mega 50 EW (deltametrin 50 g/l), 0.15 l/ha.

The data were compared with data obtained in cultures treated with delay: in 2008 treatments on March 30 and April 18, and in 2009 the treatments were conducted on April 5 and May 11.

I have been performed observations regarding the plant height, the number of branches, the percentage of plants attacked by cabbage stem weevils, the length of the galleries determined by them, thousand seed weight(g) and seed production.

RESULTS AND DISCUTIONS

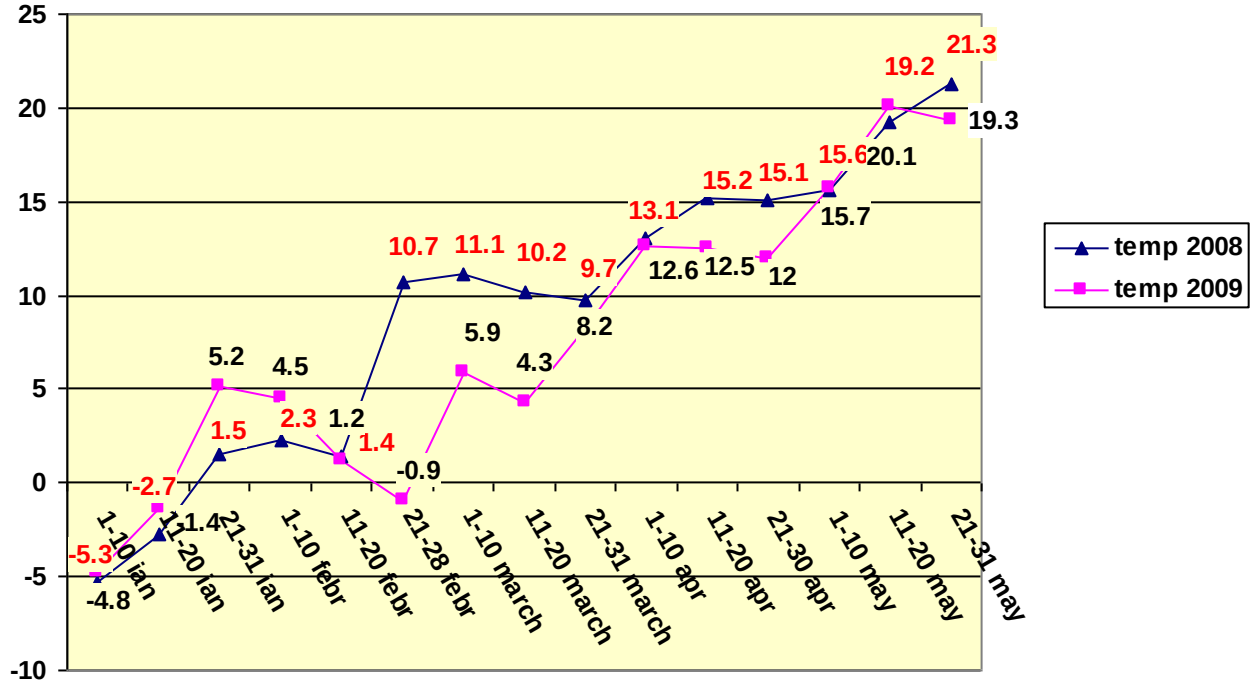
Two *Ceutorrhynchus* species (C*eutorrhynchus napi* Gyll. and *Ceutorrhynchus quadridens* Panz.) among the weevil species are considered as important pests on winter oilseed rape in our region.

In our investigations the pest occurrence and the number of cabbage stem weevils was different, depended on the sum of active temperatures over 10°C, in 2008 the cabbage stem weevils begin to colonize fields of winter oilseed rape, was more early than in 2009. The results as than data were obtained like as the figures 1,2&3.

Similar results obtained Koprna (2001). He show the adults of the most species of *Ceutorrhynchus* end their hibernation and activate early in the spring, when the soil temperature has reached 8-9ºC and the air temperature has risen above 10-12ºC.

Two chemical treatments applied to the rape of a density of cabbage stem weevils up
to 2 ex./ sqm, led to increase the number of branches, a smaller percentage of plants attacked, galleries short, the thousand grain weight and a higher production, compared to the variations that were applied throughout two treatments, but much later, after the cabbage stem weevils lay eggs and larvae have entered in the stem.(Table 1).

Vašák obtained similar results (1999), shows that the percentage of plants attacked by cabbage stem weevils (*Ceutorrhynchus napi* Gyll*. Ceutorrhynchus quadridens* and canvas.) is different depending on culture technology as the application of two treatments attack is 0 and the 3 treatments attack is 10%, depending on the time of treatment.



Pest occurence

- **10 martie 2008**
- ***25 martie 2009***

Figure 1. Evolution of temperature -Caracal

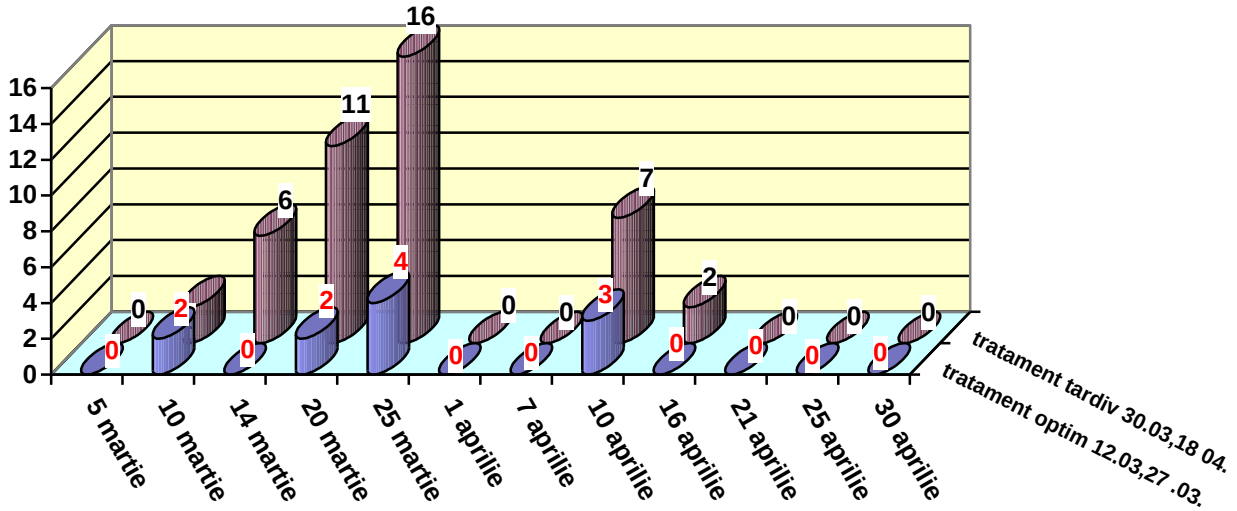


Figure 2 Evolution infestation of the winter oilseed rape with cabbage stem weevils according to the applied treatment - Caracal- 2008

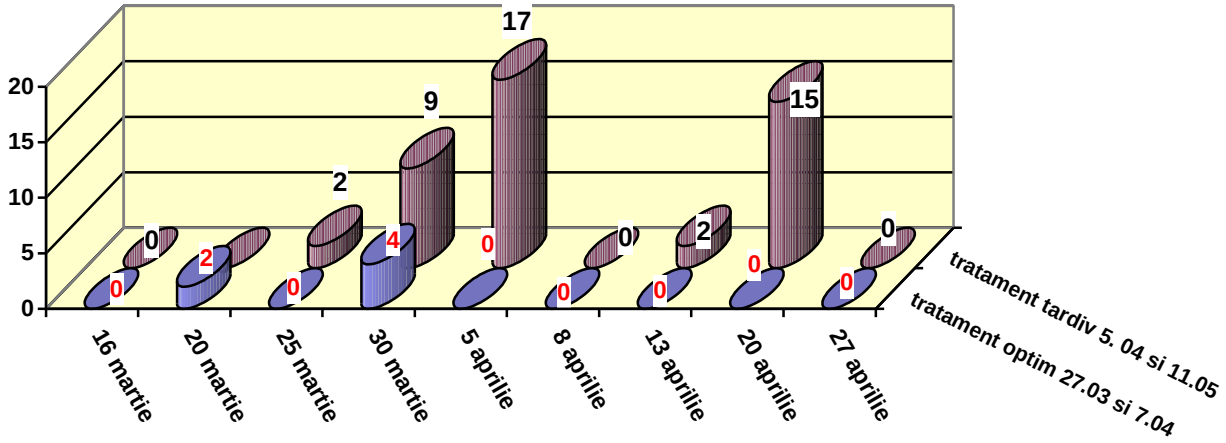


Figure 3 Evolution infestation of the winter oilseed rape with cabbage stem weevils according to the applied treatment -Caracal- 2009

Table 1

Influence of treatments on growth and production elements to winter oilseed rape

Specification	Optimum treatments		Late treatments	
	2008	2009	2008	2009
Plants/sqm	62	65	62	63
Plant height(cm)	162	158	161	156
Number of branches	7.7	7.9	7.1	7.2
Plants attacked by cabbage stem weevils(%)	12	16	81	67
Length of the galleries(cm)	10.4	12.3	97.2	69.8
Thousand seed weight(g)	4.9	5.1	4.2	4.8
Seed yield(kg/ha)	4640	4070	3820	2910
Income (lei/ha)	4872	4273	4011	3055
Income (%)	100	100	82.3	71.5

Price = 1.05 lei/kg

CONCLUSIONS

For control cabbage stem weevils (*Ceutorrhynchus napi* Gyll. *Ceutorrhynchus quadridens* Panz.) is very important when applying the first treatment, which must to be performed at pest occurrence, when its density is a maximum of 2 ex / plant and the second treatment at 10 -12 days.

This ensures protection of the rape throughout the period of infestation of plants against cabbage stem weevils attack.

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INFLUENTA DOZELOR DE SO_2 LIBER (mg\l) ASUPRA PROCESELOR VITAL - METABOLICE ALE BACTERIILOR ACETICE

INFLUENCE OF THE DOSAGES OF SO_2 FREE (mg\l) ON METABOLIC – VITAL PROCESSES OF ACETIC BACTERIA

CARMEN VLADULESCU, AUREL POPA

Key words: acetic acid, acetic bacteria, anhydride sulfurous, viable cells.

ABSTRACT

Acetic bacteria , present in any wine, wait for favorable conditions to multiply. The anhydride sulfurous is among the first substances used in wine industry, owing to its numerous roles ,especially its antioxidant one. Because throughout the time it has been observed that SO_2 has a blocking role in metabolic activities of microorganisms, we aimed to determine the influence of the dosage of SO_2 on the vital-metabolic process of acetic bacteria , undesirable microorganisms in the wine.

The smaller than 60mg/l the dosages of SO_2 are, the more is the number of bacteria cells and as a consequence the quantities of acetic acid in wines are higher.
White wines cannot be obtained without the help of anhydride sulfurous.

INTRODUCTION

Acetic bacteria , present in any wine, wait for favorable conditions to multiply. Acetic bacteria are the only ones capable to oxidize the ethanol in acetic acid in conditions of an acid medium. .

The scientific usage of anhydride sulfurous (SO_2 free) in wine industry began in 1899, when Muller-Thurgau published his study about the useful effects of this substance. Despite Pasteur' studies , who suggested the warming of the wines, the anhydride sulfurous was used to protect grape juice and wines against oxidation and the diseases caused by bacteria. Only the forms of administration and dosage and later the degree of purity have changed meanwhile.

There are many scientific studies which discuss the role of SO_2 in the process of obtaining wines. (Teodorescu St. and colab.1965; Stoian V. and colab.1975; Popa A. and colab.1993; Popa A. and colab.2004; Iliescu Lucia,1961;Popa A. 2008).

The anhydride sulfurous is among the first substances used in wine industry, owing to its numerous roles ,especially its antioxidant one. Because throughout the time it has been observed that SO_2 has a blocking role in metabolic activities of microorganisms, we aimed to determine the influence of the dosage of SO_2 on the vital-metabolic process of acetic bacteria , undesirable microorganisms in the wine.

It was used a white type of wine, 12% alcohol, which was treated with variable dosages of SO_2 free in proportions of 5,10,20,30,60 mg/l , determinations being made at an interval of 30, 60 and 90 days. During these 90 days the temperature was constant: t°C=12 grades.

For physical-chemical and microbiological analysis there were used the methods adopted by O.I.V and the recommendations of European countries.

MATERIAL AND METHOD

The material used for the experiments consisted of:
White wine 12% alcohol
Viable cells UFC/ml=10

RESULTS AND DISCUSSIONS

When SO_2, the quantity of acetic acid equaled 0,47g/l,and a number of viable cells 10^2 were not applied it was observed that:
For the determinations made after 30 days the number of viable cells UFC/ml was 10^3 , after 60 days 10^5 and after 90 days 10^7.

When applying a dosage of 5mg/l of SO_2 free, and a 0,47 quantity of acetic acid and a number of viable cells of 10^2 it was observed that:
After 30 days the number of viable cells UFC/ml was 10^3 , after 60 days it was 10^4 and after 90 days it was 10^6.

When applying a dosage of 10mg/l of SO_2 free, and a 0,47 quantity of acetic acid and a number of viable cells of 10^2 it was observed that:
After 30 days the number of viable cells UFC/ml was 10^3 , after 60 days it was 10^2 and after 90 days it was 10^2.

In conclusion, when applying a dosage of 10mg/l SO_2 free ,after 60, respectively 90 days the number of viable cells equaled the initial number, namely 10^2.

When applying a dosage of 20mg/l of SO_2 free, and a 0,47 quantity of acetic acid and a number of viable cells of 10^2 it was observed that:

After 30 days respectively 60 days the number of viable cells remained unchanged, namely 10^2 and after 90 days the number of viable cells decreased to 10.

When applying a dosage of 30mg/l of SO_2 free, and a 0,47 quantity of acetic acid and a number of viable cells of 10^2 it was observed that:

After 30 days the number of viable cells UFC/ml decreased to 10, after 60 and 90 days it maintained at a value of 8 .

When applying a maximum dosage of 60mg/l SO_2, a 0,47 quantity of acetic acid and a number of viable cells of 10^2 it was observed that:

After 30 and 60 days the number of viable cells UFC/ml decreased to 6, and after 90 days the number of cells was 4.

CONCLUSIONS

According to the researches we have done, we can conclude that:

- Our researches confirm the studies regarding the influence of SO_2 on the vital – metabolic processes of the acetic bacteria.

- For the type of wine on which these researches have been made , there have been meaningful results when the dosage of SO_2 free were 60mg/l,when the number of viable cells of acetic acid is minimum and they cannot influence the quality of wine.

- The smaller than 60mg/l the dosages of SO_2 are, the more is the number of bacteria cells and as a consequence the quantities of acetic acid in wines are higher.

- White wines cannot be obtained without the help of anhydride sulfurous.

Influence of the dosages of SO_2 free (mg\l) on metabolic – vital processes of acetic bacteria

White wine (usual sorts of wine)12 vol % alchool; t°=12°C

Dosage of SO_2 free mg/l	Acetic acid (g/l) H_2SO_4	Viable cells UFC/ml	Determinations according..…….....days					
			30		60		90	
			Acetic acid (g/l) H_2SO_4	Viable cells UFC/ml	Acetic acid (g/l) H_2SO_4	Viable cells UFC/ml	Acetic acid (g/l) H_2SO_4	Viable cells UFC/ml
0	0,47	10^2	0,69	10^3	0,98	10^5	1,25	10^7
5	0,47	10^2	0,71	10^3	0,90	10^4	1,05	10^6
10	0,47	10^2	0,70	10^3	0,89	10^2	0,89	10^2
20	0,47	10^2	0,47	10^2	0,47	10^2	0,47	10
30	0,47	10^2	0,47	10	0,47	8	0,47	8
60	0,47	10^2	0,47	6	0,47	6	0,47	4

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CERCETĂRI PRIVIND INFLUENȚA MICROELEMENTELOR FIER, ZINC ŞI MOLIBDEN ASUPRA PROCESELOR FIZIOLOGICE LA PLANTELE DIN FAMILIA CUPRESSACEAE

RESEARCHES ON THE INFLUENCE OF MICROELEMENTS: IRON, ZINC AND MOLYBDENUM ON THE PHYSIOLOGICAL PROCESSES AT THE PLANTS IN THE *CUPRESSACEAE* FAMILY

VLADULESCU CARMEN, LUMINITA BUSE- DRAGOMIR

Key words: microelements, photosynthesis, respiration, transpiration, pigments

REZUMAT

În experiențele efectuate în Parcul dendrologic ,,Lunca Jiului" Craiova, am urmărit influența microelementelor Fe, Zn şi Mo asupra proceselor fiziologice la puieții în vârstă de doi ani de Juniperus virginiana, Thuja orientalis şi Thuja occidentalis.

Pe materialul supus cercetării s-au determinat: intensitatea fotosintezei, intensitatea respirației, intensitatea transpirației, acumularea de biomasă, cantitatea de pigmenți asimilatori.

Plantele din familia Cupressaceae luate în studiu, au reacționat rapid la aplicarea soluțiilor nutritive cu microelemente, constatându-se intensificarea proceselor de fotosinteză şi respirație, precum şi stimularea biosintezei pigmenților asimilatori.

ABSTRACT

In the experiments taken in the dendrology Park, "Jiul Riverside", in Craiova, there has been noticed the influence of iron, zinc and molybdenum on the physiological processes at the two years old Juniperus virginiana , hTuja orientalis and Thuja occidentalis seedlings.

On the material used in this experiments there were determined: the intensity of the photosynthesis process, the intensity of respiration, the intensity of transpiration, biomass accumulation, the quantity of assimilating pigments.

The plants in the Cupressaceae family that were used in the survey quickly react to the microelements nutritive solutions. It was noticed that photosynthesis and respiration processes intensified, as well as the stimulation of the assimilated pigments biosynthesis.

INTRODUCTION

The survey of microelements nutrition is very practical. The quantitative perspective of the mineral necessities must also be noticed from an economical point of view, because nowadays we are no longer content of an average growth and developing process at plants. We aim at having the best growing and developing process at plants.

Given this perspective, the quantity of various mineral elements is not the same, because a plant can grow and reach maturity even if it does not have the necessary quantity of mineral elements to grow and develop properly.

Another matter linked to the mineral necessities is how plants fulfill their mineral needs. The absorption and transportation of mineral elements depend on external factors, such as: the composition and reaction of the environment, temperature, light, air and soil humidity, and also on internal factors- age, species, phyto-sanitary condition.

The hereby survey deals with the influence of microelements: iron, zinc and cobalt on the main physiological processes of the plants in the *Cupressaceae* family.

The experiments that were taken in 2009 revealed that these elements, even in very little quantities have a main importance on the physiological processes.

MATERIAL AND METHOD

In the experiments taken in the dendrology Park, "Jiul Riverside", in Craiova, there has been noticed the influence of iron, zinc and molybdenum on the physiological processes at the two years old *Juniperus virginiana , Tuja orientalis* and *Tuja occidentalis* seedlings.

On the material used in this experiments there were determined: the intensity of the photosynthesis process, the intensity of respiration, the intensity of transpiration, biomass accumulation, the quantity of assimilating pigments.

The intensity of the photosynthesis process was determined by the *Ivanov* method, based on measuring the CO_2 quantity, which is absorbed by the leaves of plants in a known environment.

The intensity of respiration was determined by the *Boysen-Jensen* method, based on capture and deposit of the dioxide eliminated by the vegetal material.

The intensity of the transpiration process was determined by gravimetric means, by the double weighing of leaves: when the leaf detaches from the plant and after 5 minutes (*the L. A. Ivanon instant method*). The results of the experiment were measured in water mg/100mg leaf/h.

The quantity of leaf pigments was determined with the Minolta chlorophyll meter.

Plants that were bread in vegetation pots with a 1500 ml capacity were watered once in two days with 100 ml solution, as following:

-M-witness plants (water);
-V_1-plants treated with an iron chelate solution, (Fe-EDTA, sol., 0.0037%);
-V_2-plants treated with a zinc chelate solution (Zn-EDTA, 0.0015%);
-V_3-plants treated with a Mo chelate solution (Mo-EDTA, 0.0015%).

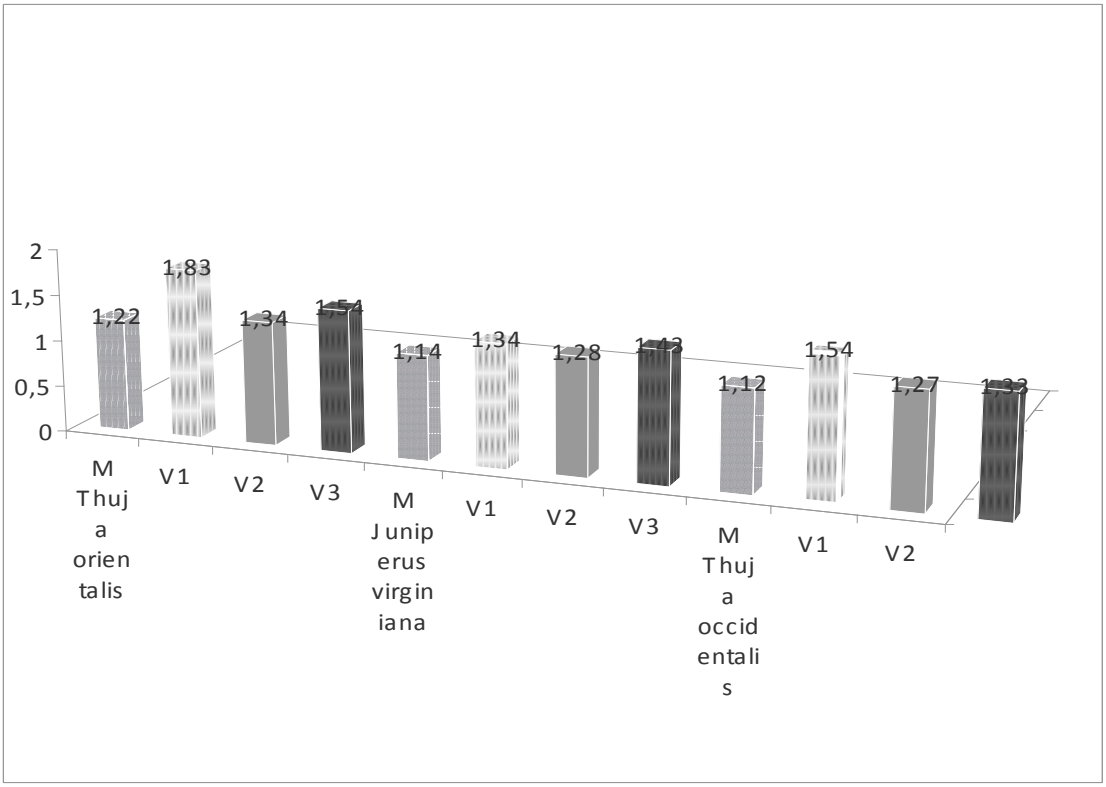
RESULTS AND DISCUSSIONS

The intensity of the photosynthesis process

There was noticed the intensification of the process at all the plants used in the survey, when using nutritive Fe-EDTA solution. The highest values were noticed at the *Thuya orientalis* seedlings, after 20 days from using the nutritive solution. The poorest influence of Fe solution was noticed at seedlings *Juniperus virginiana*, at which the values of the photosynthesis intensity were similar to the ones used in the experimental survey (M).

Zinc did not significantly influence the photosynthesis process. The highest Zinc value was noticed at the *Thuja orientalis* seedlings.

Molybdenum, in a very little concentration highly influenced the photosynthesis process, immediately after using the nutritive solution. The highest values of the photosynthesis process were noticed at the *Thuja orientalis* seedlings, and the lowest at the *Thuya occidentalis* seedlings.

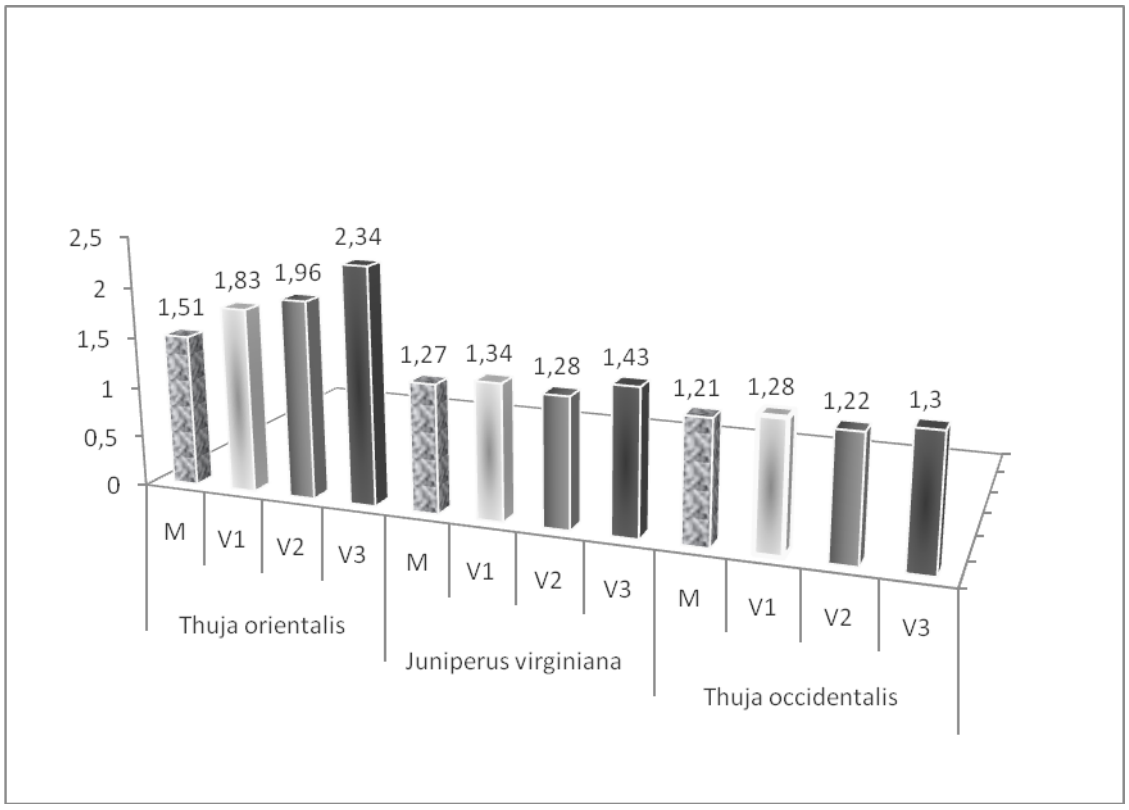


Gr.1.The intensity of the photosynthesis process(cm^3CO_2/g/h) at Juniperus virginiana, Thuja orientalis and Thuya occidentalis seedlings under the influence of Fe-EDTA, Zn- EDTA and Mo-EDTA

The influence of plain assimilation

The influence of plain assimilation was determined by the J.Sachs method, by determining the dry substance quantity in a certain time by a certain foliar surface (mg/dg/day).

As shown in gr. no 2, the intensity of plain assimilation had the highest values at the *Thuya orientalis* seedlings, V_3 variant (with Mo), and the lowest, at the *Thuya occidentalis* seedlings, at the M variant.



Gr. 2.The intensity of plain assimilation) (mg/g/day)at Juniperus virginiana, Thuya orientalis and Thuya occidentalis seedlings under the influence of iron (Fe), zinc (Zn) and molybdenum (Mo)

The quantity of assimilating pigments

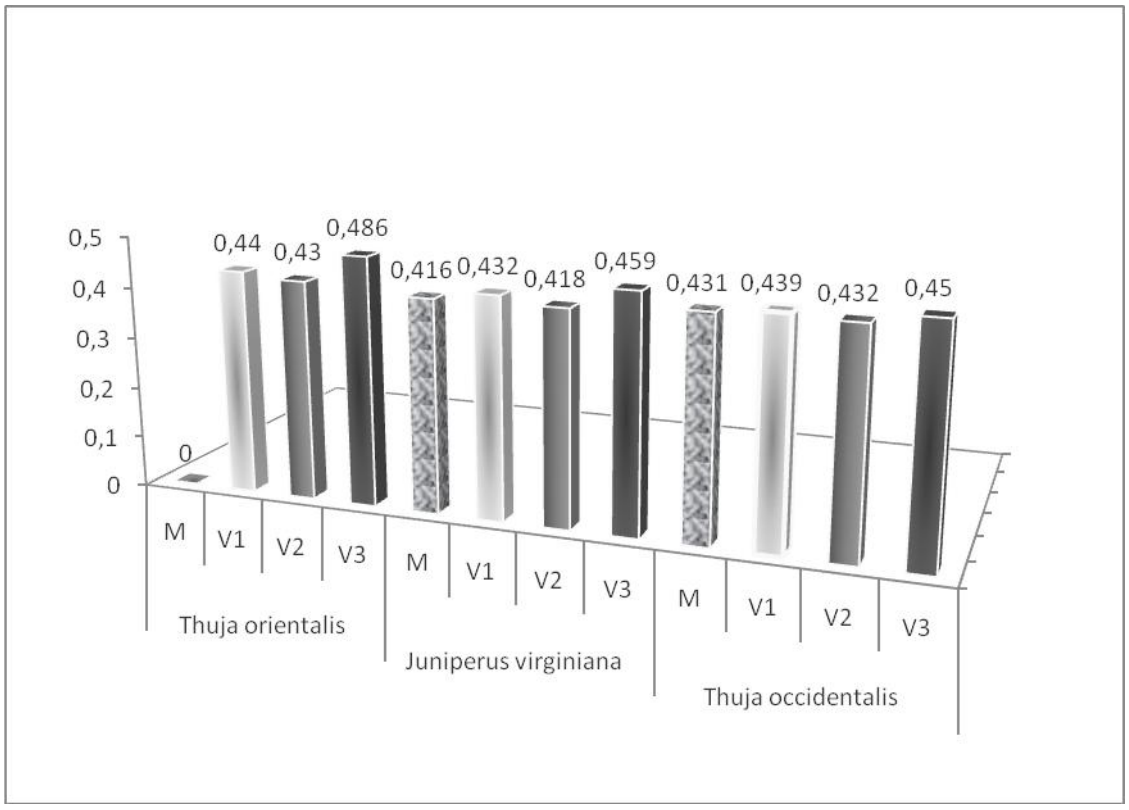
According to the data in gr. 3, the total quantity of pigments increased when Fe and Mo solutions were used, and did not change when Zn solution was used.

The increase of the chlorophyll content under the influence of iron solution can be explained by the fact that iron has a main influence in the composition of the a, b, c cytochromes and also of ferredoxin, which catalyzes the chlorophylls biosynthesis.

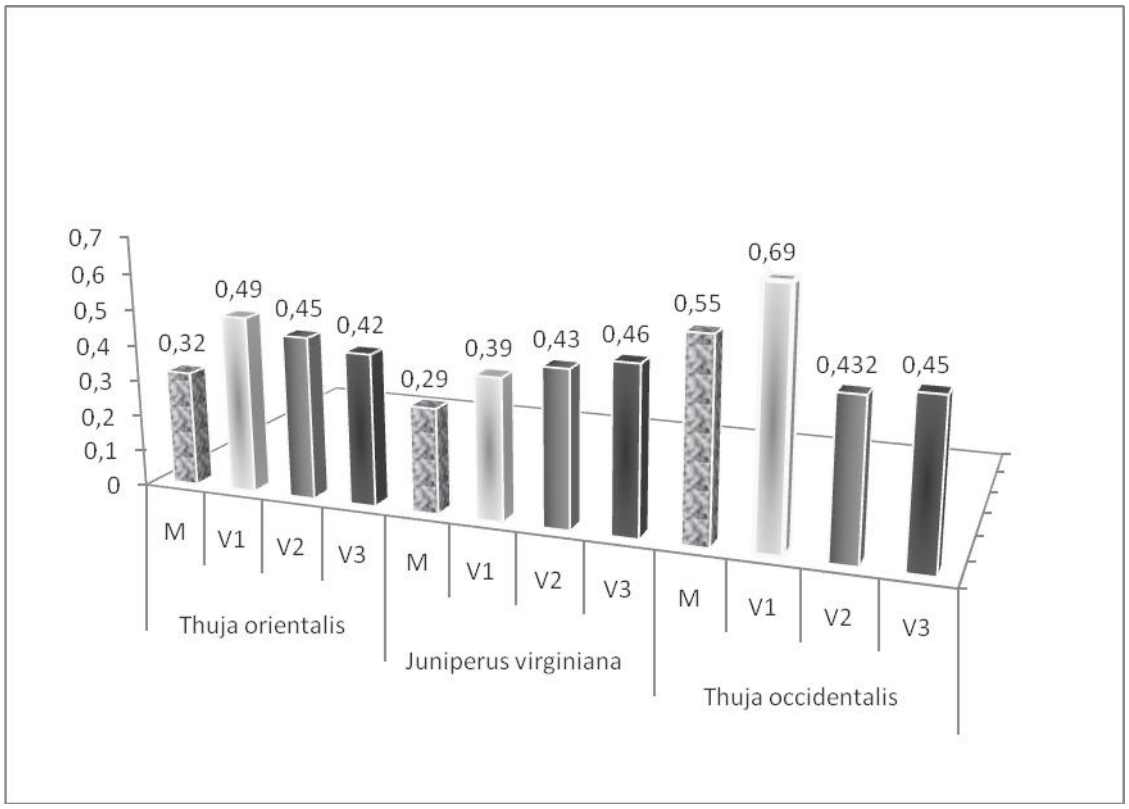
The intensity of the respiration process

The respiration process increased when using Fe, Mo and Zn solutions, after 3 days from the experiments. After that, the values were constant.

Under the influence of Fe solution, the intensity of the respiration process, immediately after using the nutritive solution can be explained by iron incorporation in the respiratory enzymes: catalase, peroxidase, also involved in the respiration process.



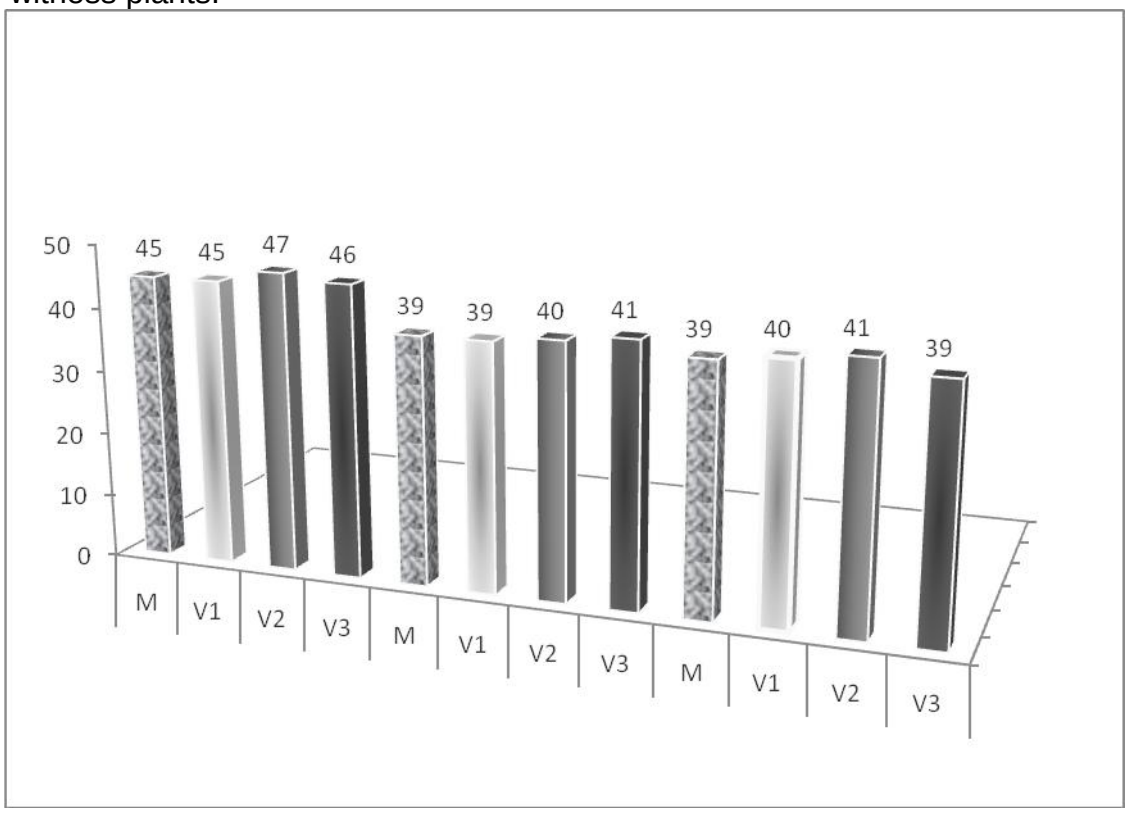
Gr.3 The assimilated pigments content of Juniperus virginiana, Thuya occidentalis and Thuya orientalis leaves (g/100g)



Gr.4.The influence of the Fe, Zn and Mo microelements on the respiration process(cm^3CO_2/g/h) in the leaves of Juniperus virginiana, Thuja orientalis and Thuja occidentalis plants

The intensity of the transpiration process

During the experiments, there was determined the intensity transpiration at different moments of the day (10^{00}, 13^{00}, and 18^{00}).The facts in gr.5, stand for the average of determinations. As a result of the experiments, it was noticed that microelements Fe, Zn and Mo do not significantly influence the close and open mechanism of stomas, while the values of the intensity of transpiration at the three variants are close to the values obtained at the witness plants.



Gr.5.The influence of the Fe, Zn and Mo microelements on the transpiration process(mg H_2O100/g/h) in the leaves

CONCLUSIONS

- Iron has a main influence on vital processes, such as: respiration and photosynthesis. Zinc influences the composition of some enzymes, such as dehydrogenises, with an important influence in the respiration process;
- Molybdenum intensifies the photosynthesis process and stimulates the activity of some enzymes that take part in the respiration process;
- The plants in the *Cupressaceae* family that were used in the survey quickly react to the microelements nutritive solutions. It was noticed that photosynthesis and respiration processes intensified, as well as the stimulation of the assimilated pigments biosynthesis.

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WORKING GROUP 4: MANAGEMENT, AGRICULTURE MECHANIZATION AND CADASTRE

Economic Disciplines with Agricultural Application, Machines, Agricultural and Horticultural Equipments, Agricultural, Horticultural and Forestry Constructions, Transports, Cadastre and Terrestrial Measurements

STUDII ŞI CERCETĂRI PRIVIND PERFECŢIONAREA MAŞINILOR DE SEMĂNAT ÎN CUIBURI

STUDIES AND RESEARCHES CONCERNING TO IMPROVE FOR NEST SOWING MACHINES

ALEXANDRU TUDOR, GLODEANU MIHNEA, BORUZ SORIN

Key words: sowing in nests, depth sowing, plants rise degree.

REZUMAT

În lucrare sunt prezentate îmbunătăţirile aduse maşinilor de semănat în cuiburi care se fabrică în ţara noastră şi sunt prezentaţi indicii calitativi de lucru pentru variantele experimentate.

SUMMARY

In this work are presented the improvements brings to machines for sowing in nests which are produced in our country. Also is presented the work quality index for the variants tested.

INTRODUCTION

Main objectives of weed plants technologies of cultivation are to find solution for increase the productions and their stability, through decreasing the influence of same factors which affect the level of harvest (insufficient water, increased temperatures, worse of soil chemically and physically properties, attack of pests and deseases).

Also, the increasing and conservation soil fertility, decreasing production expenses, especially those energetically for one kg obtained product. Introduction news technology in weed plants crop impose to improve the system of machines for ensure better agrotechnically demands and saving the available energy. It must having in view that in Romania over 75%, of tractors used in agriculture are those of 65 HP and the fact that on short time this structure of power can not be substantially altered. For this reason the machine achieved for applying agricultural technologies with reduced member of works, on without soil preparation (in preserved system or direct sowing, respectively minimum tillage, or zero tillage) must be destinated for these tractors. This means applying some technically solutions which needs a low power for suing. The combination between a machine with active organs sued from the power drive supply (for soil processing) with a sowing machine (solution adapted by many firms, especially from Europe) is not possible for this case of tractors with low and average powers (having in view that only for a drill or for rotary harrow are necessary 30 …40 HP for a meter widh).

MATERIAL AND METHOD

In present, in Romania in frame of set up technologies for weed plants are used technically equipments achieved by builder companies of agricultural machines like

S.C.Mec. Ceahlau, SA. Piatra Neamt. These produce fertilizing and sowing weed plants - SPC type in variants SPC -4 FS, SPC -6 FS and SPC – 8 FS for 4,6,respectively 8 rows.

SPC – 6 FS machine for fertilizing and sowing weed plats (figure 1) is used for sowing maize, beet, sunflower, soy etc. in the same time with the administer process of solid chemicals. This is a carried machine in work time (tracted during transport) which work in unit with wheel tractors of 65 HP.

Fig.1.SPC 6FS type sowing machine with fertilization for weed plants achieved by S.C. Mecanica Ceahlau S.A.

An important demand for sowing machines in nests is adjusting the work depth. For adjusting this work parameter is introduced under each wheel drive of machine a calla with 2-3 cm smallest thon depth sowing (how much the wheels drive are plunged in soil). For this reason is necessary to sue the adjusting screws just to the furrows touch the soil plain. If the screws get to the end of run (and the adjusting process is not achieved), the work section are get down through mounting on support bar (with aid of tape fixing mounted in superior inlets of fixing plates). Check the adjusting process of work depth must be done in field.

Maintain the work depth of furrows (function the break up soil degree) must achieved with aid of springs mounted on threading stems. The tension of these springs must be increased at hard soils, but not very much, because at a great tension the suing wheel can skate (worse the density of sowing). Having in view that the work depth is not constant, are achieve same improvements at sowing machine in nests. Thus, on the frame were mounted chisel knifes equipped at inferior part with break up clutches (figure 2). For soil processing following tractor wheels were mounted break up knifes back of the motive tractor wheels (figure 3).

Methodology of processing obtained data base

Adjustment of sowing machine

- depth sowing – 6 -8 cm;
- disks of distribution: 14 inlets, diameter 5 mm;
- distance between seeds on the row: 25,8 cm;
- dispersion achieved by fan 100…150 mm column H_2 O;
- seed used: Fundulea 376

Fig.2. Sowing machine for weed plants – improved variant

Fig.3. Sowing machine for weed plants – improved variant- laterally view

Instruments and measure devices

For establishing the quality index works were used the following measure and control devices:

- metallic palette for dig up;
- flexible rule (0…300mm)

Establish the work quality index for field condition

- **Average depth sowing**

The measurements were done after method “in green” (after rising of plants) on all rows of a single passage, in three repetitions placed in 3 different zones of the lot (at the end and at middle).

- **Rising degree of plants on row**

The plants rising degree on is also established after the method “in green”. The measurements were done on 6 rows of a single passage with sowing machine, on a length of 10 m, in three repetitions placed in 3 zones of the lat.

OBTAINED RESULTS

After processing the data base measurements concerning the depth sowing usere obtained the values of average depth on the row and of average depth on work widh.

In table 1, 2 are presented the results of measurements at maize crop.

Table 1

Average depth at SPC 6FS - Standard variant

Number of row	Depth sowing a_i [cm] Repetition 1	2	3	Average depth on row a_{mr} [cm]	Average depth on work widh a_{mb} [cm]
1	6,8	4,9	7,2	6,3	
2	5,7	5,3	6,2	5,73	
3	3,2	4,6	4,8	4.2	
4	8,4	7,6	9,2	8,4	
5	4,7	3,8	4,9	4,47	5,98
6	7,1	5,0	8,3	6,8	
Average	5,98	5.2	6.77		

Table 2

Average depth at SPC 6F - Improved variant

Number of row	Depth sowing a_i [cm] Repetition 1	2	3	Average depth on row a_{mr} [cm]		Average depth on work widh a_{mb} [cm]
1	7,8	6,9	7,2	7,3		
2	6,7	6,3	6,2	6,4		
3	6,2	7,6	7,8	7,2		
4	8,4	7,6	7,2	7,73	7,21	7,21
5	6,7	7,8	6,9	7,13		
6	7,3	7,0	8,1	7,47		
Average	7,18	7,2	7,23			

Graphic representation of average depth sowing on a row is presented in figure 4.

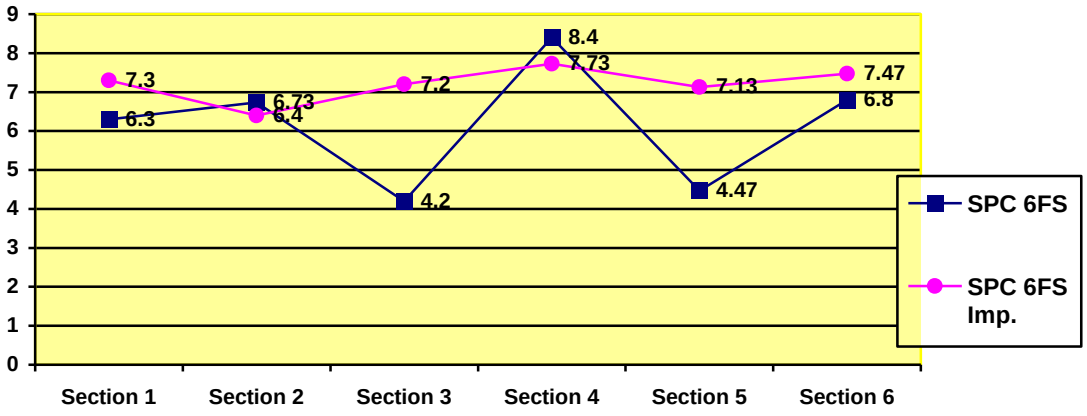

Fig. 4. Graphic representation of average depth sowing on a row.

Accordingly with agrotechnically demands (presented in specific standards) the accepted conditions for experimentation results are ±1 cm given the seeds depth of incorporate (adjusted at 6-8 cm). It finding that for the improved variant depth sowing is between 6, 4 cm and 7, 73cm , with a average value of 7, 21 cm, given the standard variant at witch depth sowing has values between 4,2 cm and 8,4cm, with a average value of 5,98 cm. After date base processing were obtained average values for rise degree of plants on the row, at maize corp. (table 3, 4)

Table 3

Rise degree of plants at SPC 6FS - Standard variant

Number of row	Plants number N_{pl} Repetition			Plants average number $N_{m\,pl}$		Plants average number on work with $N_{m\,b\,pl}$	Rise degree of plants G_r [%]
	1	2	3				
1	38	40	37	38,33			
2	37	36	35	36.00			
3	32	24	18	24,67			
4	37	36	33	35,33	33,72	33.94	89.32
5	35	30	32	32,33			
6	37	36	34	35.67			
Average	36	34,5	31.33	33,94			

Table 4

Rise degree of plants at SPC 6FS - Improved variant

Number of row	Plants number N_{pl} Repetition			Plants average number $N_{m\,pl}$		Plants average number on work with $N_{m\,b\,pl}$	Rise degree of plants G_r [%]
	1	2	3				
1	38	39	36	37			
2	34	36	36	35,33			
3	32	37	38	35.67			
4	41	36	39	38.67	36,67	36,78	*96,45*
5	37	35	39	37.00			
6	35	39	35	36.33			
Average	36,17	37	37.17	36,78			

Graphic representation of rise degree is presented in figure 5

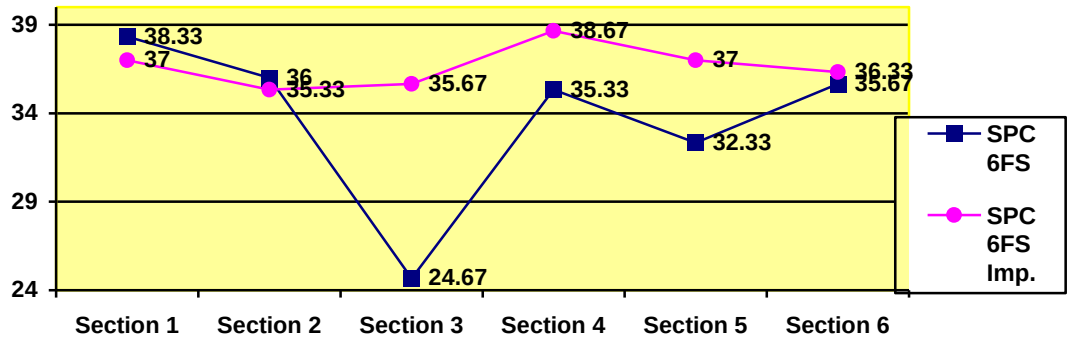

Fig.5.Graphic representation of rise degree ensured by the work sections.

It can be ascertained, from the qualitative point of view, that at the improved variant we have a uniform rise degree with values between 35,67 and 38,67 , with deviations given of theoretically value of – 6,1%, respectively +1,7 %, comparatively with standard variant at witch rise degree has a minimum value of 24,67, with a deviation of – 35,07 %, and average value of 33,94 %.

CONCLUSIONS

From the analyze data base obtained at experimentations result the following conclusions:

- The modifications made are simple for constructive point of view, and have a reduced weight;
- Depth sowing was maintain constant at the improved variant, with a average value of 7,21 cm framing in initially imposed values;
- Soil processing following tractor wheels contribute to achieve a adequate soil processing at mechanic weed process;
- Rise degree of plants was 96, 45 % at improved variant, given the standard at which is 89, 32 %.

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MANAGEMENTUL TIMPULUI

TIME MANAGEMENT

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Key words: time management, priorities, efficiency, attitude, routine, limited resource, targets

REZUMAT

Administrarea timpului joacă un rol important în viața fiecaruia. Prin aceasta lucrare, s-a dorit ca în urma unei analize asupra instrumentelor de planificare, să putem a administra mai bine timpul fără să subestimăm deficultățile schimbării obiceiurilor. Se fac cunoscute teoriile de abilități şi deprinderi care trebuiesc dobândite pentru a putea stabilii prioritățile şi a le planifica în vederea eficientizării activităților. Un alt obiectiv al lucrării este identificarea factorilor care determină pierderea timpului în vederea alegerii instrumentelor şi tehnicilor de economisire Economia de timp rezultă din eliminarea pierderilor de timp ocazionate de trecerea de la un proces la altul sau de la o operațiune la alta precum şi din scurtarea perioadei pentru însuşirea cunoştințelor necesare efectuării unui singur proces sau a unei singure operații

ABSTRACT

Time Management plays an important role in everybody's life. This work is going to show that after an analysis of the planning tools, we can improve the management of time without underestimating the difficulties of changing habits. Presented are the known theories about abilities and skills to be acquired in order to plan and to establish priorities with the goal to make activities more efficient. Another objective of the present work is to identify factors that determine the loss of time in choosing instruments and techniques for saving time. The savings in amount of time result from elimination of losses caused by switching from one process to another or from one operation to another as well as from the shortening of the period of time needed to acquire the knowledge required for a single process or a single operation.

INTRODUCTION

In the first part of the twentieth century, the American writer Carl Sandburg made a statement which once understood changes lives: *Time is the coin of your life. It is the only coin that you got and only you can decide how to spend it. Be careful not to let others spend it for you.*

Time is an essential resource and the way you use first of all affects your success. What is the difference between those who are successful and those who are not? Often what makes the difference is that the first ones use time effectively, while others tend to dispel it; the day of a successful man is 24 hours also!

Health, is perhaps the most important thing in our life, our recovery time can improve or destroy it! The way that you use your time influences your stress level. The more organized you are the better you plan activities, the more you'll feel less stress, and your health will be better. We all know people "grasping" for their work, who never "may" benefit of their paid leave. Such persons do not manage their time effectively and jeopardize their health.

As for happiness, we can say that if we use time effectively we can maintain a balance between work, family life and leisure activities.

MATERIALS AND METHODS

Time is one of those resources which can not be stored, it can not be bought or borrowed; it is a thing we can not decide, we can not negotiate. The two or three hours spent at an unfruitful meeting or two months spent on a useless project are lost forever though, usually, the accumulation of experience and new knowledge often make failures easier to bear.

If we do not have sufficient human resources, we can hire staff. If we need more equipment, we can buy. About time things are very different: we can never change the fact that there are only 24 hours a day.

Even if time has a different value for different people, it is the only resource equally distributed to all.

Time is money.

Benjamin Franklin said: “Time is money”. In most situations, time for different activities is converted into money and it is included in the total costs related to the activity or the project.

Time is a resource to be managed

A good manager fully capitalizes his time. The basic difference between successful managers and managers who fail lies in how they use their time in a limited given period. What matters is how you use the available time. If you manage your time effectively, you can work the same number of hours and get better results, you can work fewer hours and get the same results, or you work more hours and get exceptional results.

To better manage time you should not underestimate the difficulty of changing habits; efficient time administration needs to follow a rigorous program in two stages:

Stage 1: adopt a positive attitude;

Stage 2: acquire needed skills.

STAGE 1: ADOPT A POSITIVE ATITUDE

In everyday life you must be convinced that time is ones most precious goods and that you can control the use of your own time! You must be sure that you can improve the way in which you use your own time. The success and effectiveness depends on your management of time. Stop saying that others are to blame for your time loss! Try not to assign your lack of time to external causes. Of course, there are a number of factors that do not depend on you, but most of your time is under your own control. In most cases, the basic difference between what is and what is not under our control is a matter of attitude. The factors that constitute obstacles in time management are often things such as hesitation, fear or doubt.

STAGE 2: ACQUIRING NEEDED SKILLS

There are four categories of skills required for effective time management, these are:

- to set priorities;
- planning;
- to organize time;
- to delegate.

Setting priorities is the beginning of time management; you first must be able to identify and establish priorities and then concentrate most of the time and effort to achieve them. Planning helps you save time.

If you set your priorities you can start planning. First you must decide what to do then you can design daily, weekly, monthly or yearly action plans. They will all help you save time.

Time organization and time-consuming elements are important and require care

and discipline in their treatment.

Delegation can be a good method to obtain the desired results with the help of additional resources thus gaining the so needed energy to increase performance.

PLANNING TIME AND SETTING PRIORITIES

The Italian economist Vilfredo Pareto's studies have concluded that in most cases a limited number (20%) of factors are responsible of the greatest effect (80%).

This resulted in the Pareto effect which is also applied in the administration of time: 20% of the manager's activities produce 80% of results and, conversely, 80% of the manager's activities have a very small effect, resulting 20%. This means that some activities of a manager bring a great benefit and others a small benefit.

A high benefit activity is that one which makes a major contribution to achieve an objective or purpose. Activities may vary from one job or department to another or from one company to another, but they contribute significantly to the achievements of the manager.

Unlike the activities with great benefit, those with small benefit do not contribute significantly to achievements of the manager. Activities with low benefit produce few results and they may be identified at a manager whose work can be delegated, work which is not necessary, at a manager who travels a lot and who receives uninvited visitors.

It is necessary to identify activities that could be of great benefit and those with small benefit in order to compose a list. Such a list commonly contains four to seven not more than ten activities with high profit.

If the list contains more than ten activities it should be re-read and activities should be eliminated according to the importance of the benefit.

For the list to be useful, every manager must keep it at close view for regular checking. Activities with great benefit are not "nailed down"; there are many reasons for which they may be modified over time: changes in the company's strategy, emergencies, etc.

Setting priorities means motivation to focus effort and energy on annual, monthly or even daily priorities through the establishment of expected key results to be obtained and through identification of those activities required to obtain these results.

In order not to devote time for false priorities we must know well what we want to get, what there is to do and how we need to proceed.

Most managers are working under time pressure and do not differentiate between important activities and pressing activities. Pressing activities require immediate attention and hinder the focus on the important activities which in turn may become urgent themselves. Managers of this type spend their time with such" fire fighting "rather than with acting upon situations that set the fire. Mistaking importance for urgency will lead to spending time only with pressing tasks without doing something really important.

Activities can be classified according to being urgent or important as follows:

-Important

1 Emergencies – crises, pressing and unforeseen problems, project maturity, meetings;

2 Less urgent - business planning, creation of new collaborations, delegation of tasks, training future human resources, prediction of new management strategies according to market developments

-Unimportant

3 Interruptions by talking on the phone, everyday informal communication, unimportant mail;

4 Leisure, relaxation, escape from reality

PLANNING PERSONAL TIME

Golden rules for managing time

There are several simple and practical rules which will help us use our time better. We need to establish a safety margin for unforeseen activities that are pressing. As for setting financial budgets, we must predict both for current expenditure (routine) and for unforeseen (action). We must establish funds for improvement (action).

If we don't follow these principles in the allocation of selection for activities, we will spend available energy and funds, but we won't know what for and why.

It is beneficial to set priorities as early as possible while designing the planning (early in the week, the day, etc). This will result in a better focus on the really important activities.

TIME MANAGEMENT

Using planning tools

Time planning demands the use of very good planning tools. Each of the instruments has a particular role; used adequately they will provide a complete and rigorous planning system. These instruments are:

1. monthly plan;
2. weekly plan;
3. daily plan;
4. action plan;
5. agenda;
6. list of targets;

ORGANIZING PERSONAL TIME

To change the methods of others is difficult; to change your own method is easier. Situations in which one can not do anything are very rare. There and there will always be factors that can not be controlled, but it is certain that the human factor is one that can control the majority of economic, social and any other factors.

Grouping similar activities will lead to an efficient use of time.

Optimizing concentration (focus) leads to efficiency by minimizing the number of interruptions that occur during the working day. In order to increase the productive time, one must establish rituals known to all and respected by all such as not to disturb each other**.**

Interruptions (mobile phones, the secretary, co-workers, bosses, colleagues, friends etc) are one of the biggest obstacles in effective time management. It is imperative to work on a single issue once. Do not try to do several things at once, because the results will be reduced and performance will not be achieved in any of the cases.

Interruptions of any kind (visitors, co-workers, phones, etc.) are serious obstacles to the efficiency of time as they limit the power and duration of concentration (focus).

Learn to limit interruptions, giving you time to be by yourself; establish, plan and limit appointments.

Learn how to deal with interruptions, by saying "no"; be firm, specify from the very beginning how much time you have available.

At moments when nothing seems to go well, events are not controlled and panic and improvisation replace the rational, planned action of each one of us.

Risk and uncertainty are leading to management crisis calling to be dealt with calmly. Thus, an unexpected problem should be solved at first by doing nothing hence having the time to collect the relevant information about the causes that led to this situation.

To know how to plan ones time is probably the most important science that one posses, it is wisdom and an ideal starting point in its acquisition. To organize your work

effectively you must first examine your working methods, you must identify the time burglars (interruptions, meetings, phone calls, etc), and you must calmly analyze the obstacles and find possible solutions to be applied quickly and efficiently.

The stake for a radical change in thinking for each of us is addicted to the education, the ability and capability to adapt to new days and times.

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SISTEM CENTRALIZAT DE MONITORIZARE ŞI AVERTIZARE AL ECHIPAMENTELOR TEHNICE DESTINATE TRATAMENTELE FITO-SANITARE ÎN AGRICULTURA DE PRECIZIE
MONITORING AND WARNING CENTRALIZED SYSTEM OF TECHNICAL EQUIPMENT DESTINED FOR FITO-SANITARY TREATMENT IN THE PRECISIONS AGRICULTURE

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INMA Bucharest

Cuvinte cheie: sistem centralizat de monitorizare şi avertizare, masini de stropit de stropit, agricultura de precizie.

REZUMAT

Principala **direcţie de perfecţionare a maşinilor pentru protecţia plantelor**, o constituie îmbunătăţirea lor constructivă (incluzând aparatura de control şi măsurare) pentru reglarea automată a cantităţii de lichid la hectar, creşterea calităţii tratamentelor şi reducerea poluării remanente a solului prin menţinerea caracteristicilor tehnice iniţiale. Realizarea unui sistem centralizat de monitorizare şi avertizare la maşinile de stropit pentru protecţia plantelor are drept scop urmărirea funcţionării acestora pentru asigurarea uniformităţii cerută de cerinţele agrotehnice şi reducerea riscurilor de poluare a solului şi produselor agricole ca urmare a remanenţei în sol a substanţelor fitosanitare administrate necorespunzător. În cadrul monitorizării la care sunt supuse maşinile de stropit se verifică prin intermediul unor traductoare, următoarele aspecte: funcţionarea pompei (debit, presiune), nivelul de substanţă din rezervor, funcţionarea duzelor.

ABSTRACT

The main plant protection machine perfection direction is their constructive enhancement (including the control and measuring system) for automatic quality control of hectare liquid, the treatment quality rise and the soil remnant pollution through maintaining the initial technical characteristics. The realization of such a warning and monitoring centralized system for sprinkling machines for plant protection has as a main purpose the monitoring of their functioning for ensuring the demanded uniformity by the agro-technical regulation and the pollution risk reduction of the soil and agriculture products following the soil stack residue of fito-sanitary substances wrongfully administered. Inside the monitoring at which the sprinkling machines are subjected we verify through the help of transducers, the following aspects: the functioning of the pomp (pressure, flow); the reservoir substance level, the nozzle functioning.

INTRODUCTION

Agriculture is a base economic branch through the impact on the social domain (a source of ways of human subsistence) and the environment. We can talk about the agriculture practice without referring to the consequences on the environment. Ultra-intensive agriculture, practiced because of the technological level, lead to the accentuated environment degradation and also of the human life, imposing the introduction of the concept of durable agriculture, in which the resource conservation is a fundamental condition.

The durable agricultural system is more and more accepted as an alternative to the conventional agriculture, the rational use of resources ensuring productivity, profitability and environment protection.

The agriculture productivity is influenced by the technology levels applied, the fito-sanitary protection taking a main role inside these types of technologies.

The research and recent studies, regarding the models and equipments of fito-sanitary treatments, concord with the new tendencies for practicing a durable agriculture, well known being the fact that the fito-sanitary protection represents one of the main sources of environment pollution reduction with chemical substances.

An important factor of quality continuous growth politics realized for each economic agent is maintaining the machine conformity for plant protection and the realization premise growth in repeatability condition of these products.

The disease and harmful entities destroying represents an important branch in the plant cultivation technology process. The use of the new plant souls and the application of new technologies in the preparation of the germinator bed would not give the desired results without the correspondent appliance of fito-sanitary treatments. The superior quality indicators at execution, of this paper, highly influences the hectare obtained production.

Where ever is possible, the chemical fertilizers will be replaced with organic fertilizers, such as well fermented manure, compost.

The chemical fertilizers will be applied only on the basis of analyze bulletins, given only in specialized laboratories, which take in consideration the existent chemical compounds from the soil, the quantity of consumed elements by the precedent year crop, of the reserve existent in branches.

It is an accepted fact that fito-sanitary treatments in agriculture, including fruit trees cultures, and fertilizers, herbicides, pesticides and other substances, products of chemical industry, lead to an enhancement of crops, to the enhancement of their quality.

In Romania, the fito-sanitary treatments or some papers of phase fertilization are made only with prepared liquid products with water or specially conditioned with certain organic ingredients, for use.

MATERIALS AND METHODS

The destined installations for fito-sanitary treatments execute these works through the sprinkling method and must correspond to certain general character requirements and/or especially:

- to dose the products exactly on every unit of treated surface;
- to maintain during the work the tuning made on the installation parameters;
- to be equipped with control machinery and automation equipment during use;
- to realize a uniform fragmentation, at a sprinkle density/cm^2, according to the agro-technical requirements;
- to have multiple tune possibilities and to make treatments with a large variety of products, in a variety of volumes;
- construction must be kept simple, robust, from known materials;
- to be lite, easy to maneuver and tune, to be safe to use;
- to be standardized and guaranteed for use safety;
- to have a low cost of fabrication, to realize low amortisments;
- to permit the realization of high productivities;
- to have a good design and easy installation;
- to have a low energy consumption and high work rate;
- the achieving of the given performances can only be made by respecting the conditions referring to the quantity/quality report. The fluent distribution of fito-sanitary substances on targeted surfaces, once with respecting the dosage that ensures the necessary biological effects means quality, and this depends on the following factors:
- the jet flow of pulverized liquid, essential component of work regulation;
- the jet fining degree of pulverized liquid;
- the atmosphere conditions;

- the cover method and penetration of the vegetal mass (homogeneous cover);
- the distribution uniformity in space of the liquid jet, linked to the performance of the pulverizing heads;
- the space positioning of targeted objects or of the surfaces that must be covered.

The reminded points make the responsible elements of quality to be the sprinklers that are so transformed into main parts of any sprinkling machine. This fact explains the vast diversity of pulverizing systems.

The sprinklers, improperly named nozzles, establish the sprinkling, this represents a physical phenomenon of liquid separation into tiny drops, of different diameters, which are then projected on to the targeted objects surface.

The drops jet can contain liquid particles of equal or different sizes in any case, the size spectrum is dependent on many elements, like:

- pulverizing system;
- the type of dispersion or nozzle;
- the work pressure of the sprinkling machine;
- the type of conditioning (formulation) joined with the type of sprinkling liquid;
- the pelicular tension;
- viscosity, etc;

The fragmentation or hydraulic pulverization is made through the forced passing of the sprinkling liquids through calibrated orifices, called nozzles. The passing or forced flow is realized only if the liquid is under pressure or is subjected to other forces, like the centrifugal ones.

In the case of fito-sanitary installations the fragmentation is realized:

- With the help of pulverizing hydraulic nozzles with projection jet (either flat ore cone shaped directly projected, or jet that has an impact with a laminating surface, which, of course changes the direction of the jet, indirect projection jet);
- Through turbionary nozzles, called tangential nozzles, where the liquid is given a circular movement in an room placed before the calibrated orifice;
- Through hydraulic nozzles with two jets that strike each others, and so realizing dispersion.
- The hydraulic nozzles fragmentation with direct projection jet is realized because of the liquid pressure, pressure that induces dispersion energy.
- The most used are the jets with flat or fan nozzles, and the fragmentation is realized through liquid film breaking and the crunching into drops of different dimensions.
- In general the cars destined to fito-sanitary treatments are composed out of the following: assembled chassis, the cardanic action element, pomp, afferent structure reservoir, electro-valves, distributor, ramp support, fan (at sprinkling machines for vineyards and orchard) herbicide ramps, nozzle stand (simple, double, triple); nozzle.
- In the lower figures (1 and 2) are presented two fito-sanitary treatment installations designed and executed by INMA.

Fig. 1 - Sprinkling machine for field cultures JET 4(6)

Fig .2 - Sprinkling machine for vineyard, orchard, VUR 1000

RESULTS

The most important characteristic in the prevention works, is linked to obtaining a good fito-sanitary treatment quality, existing a strict dependency between the biological and qualitative effects, that depend on:

- the pulverizing head performances of the car, installation, equipment;
- the application volume at the surface unit;
- the climatic conditions in which he application is made;
- the way and targeted object form that can facilitate or block the fragmentation homogeneous deposit;
- the subjective factor connected to the operator knowledge, etc.

The fito-sanitary treatment efficiency can be appreciated through the help of physical size, measurable, like the characteristics of liquid jet and functional constructive parameters of the work technical equipment. Any inefficient treatment, regardless of the cause, leads to environment pollution rise, the disease population characteristics modification, harmful elements and weeds, through the rise of their resistance at pesticide action and at big economical loss.

The main direction of perfecting the plant protection machines, is their constructive enhancement (including the control and measuring systems) for automatic tune of the hectare liquid quantity, the rise of treatment quality and the soil pollution deposit reduction through maintaining the initial technical characteristics.

The realization of a warning and monitoring centralized system at sprinkling machines for plant protection has the purpose of following their function for ensuring the demanded uniformity from the agro-technical regulations and the reduction if soil pollution risks and agricultural products due to the percentage of administrated fito-sanitary substance.

Inside the monitoring at which the sprinkling machines are subjected we verify through transducers, the following aspects: pomp functioning (flow, pressure), level of substance from the reservoir, nozzle function.

For the physical size measurement that intervenes inside a technological process the conversion into a different physican nature is necessary, necessary for the other elements from the monitoring system. For example, a temperature or a pressure are converted into tension-electrical nature, electric-proportional current with general size that can be used and produced by the other elements of the monitoring system.

It is called a transducer the element of the monitoring system that realizes the physical measurement conversion, usually not electrical, proportional with the first or dependent on it, through a pre-established in the purpose of using it in an automation system.

There is a large variety of transducers, their structure being much different from a type of transducer to another (fig. 3).

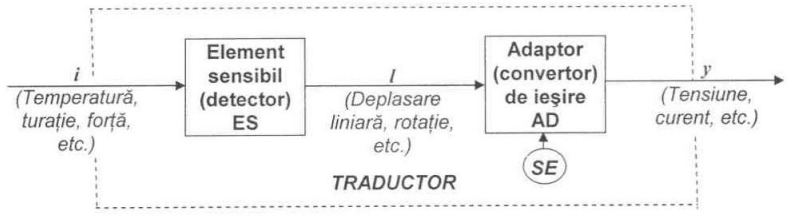


Fig. 3 – The general structure of a transducer
ES – established element; AD- adaptor; SE – included energy source

The size from the transducer entrance I (represented bu pressure values, temperature, speed, etc.) is converted by the sensible ES element into an intermediary size/ which is applied to the AD adapter (exit converter). This transforms the size/ in y

output size, usually of electrical nature (tension, current, resistance, etc.) that can be observed or processed easier in the tuning circuit. The output converter always has the role to realize an adaptation with the other elements from the monitoring system.

Pressure measurement

The pressure is one of the most important state parameters that characterizes the state of a fluid. It is defined as the report between the force that a fluid acts on a surface and the area in a point of the fluid considered as medium continuum. The pressure is independent to the surface orientation oh which is exercised, having the same value in all directions. The horizontal surfaces are equal static pressure planes. In the case of recipient closed fluids, the pressure is independent to its geometrical form.

Inside the fluids each layer serves as support for all the layers on top of it. In the case of liquids the determined pressure by these layers has the name of hydrostatical pressure. The gases being compressible, the action between the layers makes the density be greater by lower layers. So, the static pressure of the gas will grow equivalently. In practice, because the gas density is very small we can consider that gas pressure from a recipient is the same in every point.

In nature and technical installations there can be different types of pressure:

a. *Atmosphere pressure* p_b. The exercised pressure by the gas layer that surrounds the earth is called the atmosphere pressure or barometrical pressure. This varies with: altitude (air weight), with the weather state (given by the air mass movement) and with the geographical position from the earth. The air density variation according to pressure lead to the necessity to establish a reference pressure called normal pressure, this being the correspondent pressure to the sea level at 45 degrees longitude and 0 degrees temperature that has the value p_N=760 mmHg = 101.325 Pa.
b. *The absolute pressure* p_a . The absolute pressure represents a fluid pressure considered towards zero pressure absolute. It is the pressure that is used in all thermo-technical relations.
c. *Overpressure* p_s. When in the technical installations the absolute pressure is bigger than the atmosphere pressure, the difference between them being the overpressure or manometrical pressure.
d. *Depressure* p_v. When in the technical installations the absolute pressure is smaller than the atmosphere pressure, the difference between them is the depressure, underpressure, vacuum ore vacuum-metrical pressure. The vacuum, expressed in percentages from the atmosphere pressure, is:

$$V = \frac{p_v}{p_b} \quad 100$$

Overpressure and underpressure, being expressed in report with the atmosphere pressure are also called relative pressures.

The given pressures can be schematically expressed in figure 4, the relations of connection between them being as it follows:

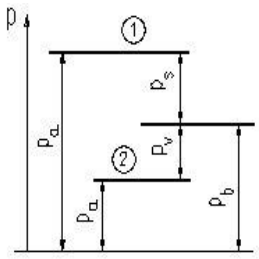


Fig. 4 – Domain scheme for pressure measurement

1. In the case of overpressure:

$p_a = p_b + p_s$;

2. In the case of underpressure:
3. $p_a = p_b - p_v$;

e. *static pressure* p_{st}. The static pressure is the pressure that is exercised on the plane surface of separation from two masses of moving fluid;

f. *total pressure* p_{tot}. If in a fluid current is introduced an obstacle the fuid speed becomes zero and the hole specific kinetic energy of the fluid is manifested under the form of pressure. The pressure from this point of stoppage holds the name of total pressure;

g. *dynamic pressure* p_{dim}. The dynamic pressure is defined as the difference between the total pressure and static pressure from a transversal section through a fluid current.

$$p_{din} = p_{tot} - p_{st}$$

being according to the w speed and fluid density through the relation:

$$p_{din} = \rho \frac{w^2}{2}$$

Flow capacity measurement

The flow capacity is defined as the quantity of solid substance, liquid or gas that passes through a random section in a time unit. The flow measurement of fluids can be realized:

Either by volume flows Q_v, measured in m^3/s, Q_v, represents the fluid volume drained in time unit.

$$Q_V = \frac{\Delta V}{\Delta t}[\frac{m^3}{s}]$$

Where: v - volume

t - time

- Either as mass flow capacities Q_m, measured in kg/s, Q_m represents the fluid mass drained in time unit.

$$Qm = \frac{\Delta m}{\Delta t}[\frac{Kg}{s}]$$

Where: m- liquid mass;

t - time.

Between the two flow capacity types exists the relation: $Qm = \rho \cdot Qv$ (ρ – fluid density). In practice we use [m^3/h]; [l/h]; [l/min], or [N/s], for weight flow capacities.

For flow capacity measurement there are numerous methods that have been used in the past and others that have appeared recently.

Sensors and flow capacity transducers, after the phenomenon or effect that stands at the base of their use, classifies as it follows:

- transducers based on measuring the fall pressure;
- transducers based on measuring the dynamic pressure;
- transducers based on force equilibration;
- transducers based on mechanical trigger;
- transducers based on impulse conservation;
- transducers based on fluid jet turbionation;
- transducers based on electro-magnetic induction;
- transducers based on ultrasound propagation;
- transducers based on tracker following;
- combined and special transducers.

Level measurement

The level measuring in recipients is very important for many technological processes and for existent stock evaluation.

In the process of level measuring there can appear a series of specific problems as: special recipients under pressure or high temperature, the presence of foam at the exterior surface or turbulence, corrosiveness of the used substances, etc.

These problems are resolved through adequate constructive solutions.

In techniques, level is represented as being the height h [m] at which there is the separation surface of two environments with different properties, following a given rally point.

In industrial automations, the transducers of high level have a large utilization not only through the fact that level represents an important parameter for the use of certain technological processes, so intervening in numerous tuning branches, both for the possibilities at which it offers to obtain, relatively easy, the indirect measuring of expressed material quantities expressed under the form of volume or mass. The simplest level transducers are based on the Archimedes force: they can be used only in the case of liquids.

Types of level transducers used in industrial automations are:

- Level transducers with floater;
- Level transducers with immerser;
- Level transducers based on measuring hydrostatical pressure;
- Ultrasonic level transducers;
- Level transducers with nuclear radiations;
- Level transducers with resistive, capacitive, inductive probes;
- Level transducers with thermo-sensible elements.

The monitoring and warning system is composed out of the following elements:

1. Programmable automat (PLC);
2. Digital display with touch screen;
3. Flow capacity transducers for each nozzle;
4. Total flow capacity transducer;
5. Pressure transducer;
6. Reservoir liquid level transducer;
7. Global positioning system.

The system alimentation is done from the tractor electrical installation (12V continuous current).

Function of the warning and monitoring system

The total flow transducer is mounted in the lower part of the sprinkle machine and has the role for measuring the total quantity of liquid that passes through the pomp, and nozzles. The flow transducers through the nozzles are mounted in the upper part of each nozzle with the help of adapters (according to the annexed figure). These transducers have the role to monitor the liquid passing through each nozzle and to transmit this information to the programmable automat.

The pressure transducer is mounted on the hydraulic circuit. This transducer monitors the pressure from the machine's hydraulic system and sends it to the programmable automat. The level transducer is mounted inside the liquid reservoir. This has the role to monitor the liquid quantity left in the tank and, through difference the quantity of consumed liquid.

Through GPS we send to the programmable automat the current position of the tractor and its movement speed, data that help at the worked field surface calculus.

The programmable automat transforms the received information from the transducers into concrete transducer values, speed, level or pressure (l/min, km/h, m, bar) and sends them to the digital display where they will be showed.

In the programmable automat the monitoring and warning program must be loaded, which will have the following functions:

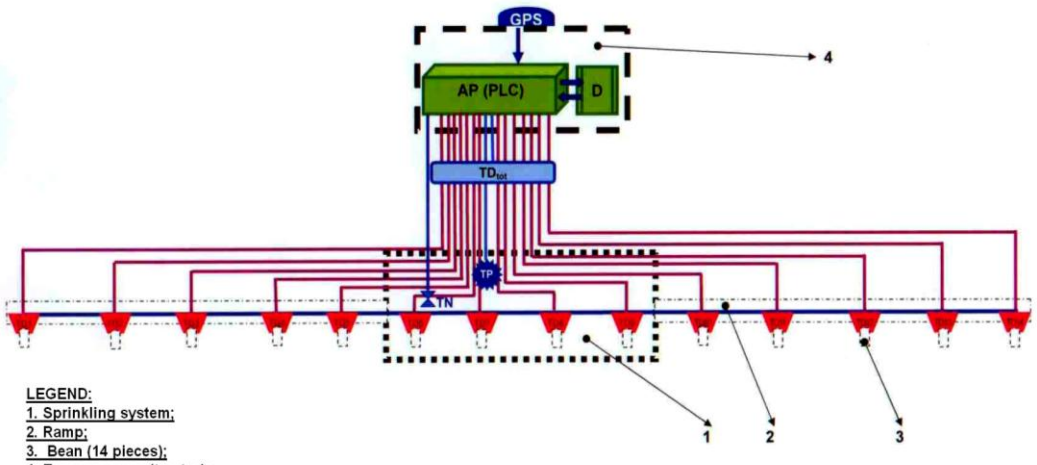
- will perform the received information transformation from the unified signal transducers into real values;
- will intermediate the introduction of input data by the operator referring to the machine functioning characteristics;
- will register data referring to the machine's course;
- will establish the input data comparison with the received real time data from the transducers;
- will control the information and warning display operations in case of damage;
- will establish the communication with the digital display.

In the digital display we must load the program that will realize the graphic interface with the user. Through this program we can introduce the input data in the programmable automat, and we can visualize the transducers information, as well as potential damage.

Before use, through the display we will introduce the input data referring to the machine function characteristics: work surface, quantity of substance that must be sprayed, work pressure, type of the nozzles used.

After start, the programmable automat receives the information about the nozzle flow capacity, the liquid total flow, pressure, reservoir liquid level and the current position of the machine, the travel speed and the traveled space from the afferent transducers mounted on the sprinkling machine. These data are analyzed and compared with the input data introduced by the operator, than are showed on the digital display. In case there are differences between the input data and the measured data, the programmable automat will display a visual and sound warning so that the operator can achieve the necessary corrective actions.

PRINCIPLE SCHEME OF THE WARNING AND MONITORING SYSTEM



LEGEND:
1. Sprinkling system;
2. Ramp;
3. Bean (14 pieces);
4. Energy source (tractor);
TD1, TD2,... TD14 - flow capacity transducer for each bean;
TN - Reservoir liquid level transducer;
TP - pression trnasducer;
TDtot - total flow capacity transducer;
AP (PLC) - programable automatic;
D - touch screen digital display;
GPS - global positioning system.

CONCLUSIONS

In order to respect the European Union legislation, the modern sprinkling machines must ensure am active substance correspondent dosage so that we don't pass the hectare regulations. Through this, we will realize an economy of active substance and an environment protection through avoiding excessive treatment with fito-sanitary substances. That's why a careful monitoring of the treatment process with fito-sanitary substance is necessary.

The control and monitoring system will monitor this process and in the case of abnormal function will signal this to the operator. It will process ultimate generation

sensoristical elements so that it can establish as best as possible the monitoring of the sprinkling machine, in the purpose of practicing a precision agriculture.
Through the monitoring system (centralized system of warning and monitoring) proposed to be created inside the project, creates the premise for obtaining some fito-sanitary treatment equipment that will ensure the uniformity demanded by the agro-technical regulations and reduction of the environment pollution risk reduction (air, water, soil) and of the agricultural products as a result of soil deposits of fito-sanitary substances poorly administered.

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ENERGIILE REGENERABILE – PREZENT ŞI PERSPECTIVĂ

REGENERABLE ENERGY – PRESENT AND PERSPECTIVE

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Key words: regenerable energy, sustainable development, hydraulics, solar, wind

REZUMAT

Lucrarea prezintă un studiu asupra evoluției energiilor regenerabile, pornind de la efectele schimbării climatice datorate in principal creşterii concentrației de gaz cu efect de seră. Conceptul de dezvoltare durabilă implică interesul dezvoltării a noi surse de energie şi minimizarea reziduurilor care afectează mediul. Integrarea în rețelele electrice a surselor regenerabile de energie, în particular a celor dependente de climat, cum ar fi energiile eoliene şi solare, necesită importante amenajări ale acestor rețele, precum şi punerea în practică a noi echipamente şi noi metode de gestiune.

Lucrarea se vrea un punct de pornire in studiul energiilor regenerabile - de o mare importanță pentru dezvoltarea durabilă

ABSTRACT

The paper presents a study of the evolution of the regenerable energies, beginning from the climate changes due to increasing of gases that produce greenhouse effect. The concept of sustainable development implies the need of changing the energy sources and the minimization of residues that harm the environment. The integration within the electrical net of the regenerable energy sources as the clime dependent ones as wind and solar need the development of these nets and equipments as well as their management.

The paper is a starting point in the study of the regenerable energies – as a major component of the sustainable development.

THE EFFECTS OF THE CLIMATE CHANGE

The intensification of the greenhouse effect increases the planet global temperature. Due to human activity the concentration of the gases that produce greenhouse effect has increased beginning with the pre industrial period (1750-1800).

In comparison with 1860, the average temperature of the terrestrial crust has increased by 0.6^0C. According with several statistics, in 2100 the temperature will increase by 1.5 to 6^0C if nothing will be changed. This considerable increase will be accompanied by the increasing of the sea level by 20 cm to 1 m. If the climate change is irreversible, the

mitigation of the gases that produce the greenhouse effect will keep the situation stable.

The natural sequestration agents of CO_2 like soil, trees and oceans will absorb only half of the CO_2 that is produced by human activity (the 2000 level). In order to stabilize the CO_2 concentration to the actual one the emission must be reduced by 50-70%. This reduction is impossible to be done in short time. Because the lifespan of the CO_2 into the atmosphere is about centuries, there are need generations in order to stabilize the CO_2 level to an acceptable level.

The CO_2 is produced by burning all kind of fossil fuels: petrol, gas and coal. The CO_2 debris after coal burning is twice over the gas burning and the oil is between the two.

At the beginning of 2000's the CO_2 distribution worldwide was the following: electric energy 39%, transport 23%, industry 22%, housekeeping 10%, other 4%, agriculture 2%. This distribution is very different in function of country.

In 2000, the world energy consumption was 10 Gtep (tep – tonne, equivalent petrol). The fossil fuels represent around 8 Gtep. Several energetically scenarios are elaborated every year by energy specialized organizations. They indicate a necessary of 15-25 Gtep till 2050. They are based on the different parameter as economic increase, the populace increase, the electricity access of 1.6 billion people and the need of the developing countries. The uncertainty of these parameters explains the difference between estimations. Nevertheless, till the half of the century the energy necessary will double.

THE LIMITATION OF THE FOSSIL FUELS

This fact generates the developing of a new technology that is more expensive. At the same consumption there can be estimated that the actual oil reserves will last 40 years. Others say 20-80 years, in function of consumption variation and new reserves discoveries.

The actual natural gas reserves, with the same actual consumption will be exhausted over 60 years yet the gas consumption increases every year. If the oil and coal will be replaced by gas, it will be finished in 17 years. The replacing of nuclear energy by gas will determine the exhausting of reserves more rapidly, in some countries.

The coal reserves are the largest. There can be estimated that coal will last 200 years.

The energy requirement till 2050 (between 15-25Gtep) will be provided by fossil fuels that will dramatically harm the environment, ignoring the future generations.

In order to reduce the global temperature increasing between $1\text{-}3^0C$ there is need that the total gas emissions in the future centuries to be at most one third of the gas, oil and coal emissions. This means to interdict the burning of two thirds of the fossil fuels that is cheaper. The decreasing reserves will not determine the decreasing of gas emissions. On the other hand, the low price of resources does not encourage new technologies as long as they will be applied on a large scale.

Around 50% of EU energy is supplied by ex EU countries. In actual conditions the dependency of foreign sources will increase up to 70% till 2030.

The dependency to Middle East reserves that have 65% of total reserves will increase. Beginning with 2020 – 2030 the economic and political tensions can diminish the easily extractible reserves and their concentration in zones that are not politically stable which is uncertain for EU members.

The year 1986 is the beginning of sustainable development concept: „the satisfying of the present needs without harming the future generations". This concept implies the finding of new, regenerable energy sources and the mitigation of the residues that are harmful for the environment. The fossil fuels are limited and produce emissions that change the climate. A

sustainable energetic system must use chains of burning with reduced emissions with acceptable costs.

The sustainable development needs equilibrium in economical development, social justness and environment protection in all planet regions. This concept can not be achieved without a large political consensus of majority of countries.

In 1997, by Kyoto treaty there was set up a target the reduction by 5.2% of the gas emissions worldwide till 2010 over 1990. EU has decided the reduction by 8% of gas emissions till 2010 and each of its members has its own duty according with its features. More than half of countries must reduce their emissions (Germany, Austria, Belgium, Denmark, Italy, Luxembourg, Netherlands), other countries must stabilize their emissions (France, Finland) while other countries are authorized to increase their emissions (Greece, Ireland, Portugal, Spain, Sweeden).

In order to decrease the CO_2 concentration till 2050 the emissions must be reduced by half worldwide and in developed countries they must be reduced by 3-5 times.

At the beginning of the third millennium European Commission has made a milestone from the regenereble energy that is written in the White Book „Energy for the future: regenerable energy sources" and the Green Book „Toward an European strategy of security of energy supplying". The Commission has set up as an objective the doubling of the regenerable energy supplying within the global energy consumption from 6% in 1997 to 12% in 2010. This objective is a bottleneck for the sustainable development. A significant effort must be done in the electric domain. Within EU the electric part made of regenerable energy must reach 22.1% till 2010 over 14.2% in 1999.

One of the consequences of opening the electricity market is the developing of a not centralized production on the basis of regenerable energy sources or traditionally production of independent producers.

Technological perspectives

It is difficult to asses which technology will play the most important role in the future against the greenhouse effect. The future energetic system with low gas emissions will probably be a combination of energies that can be found in diverse zone of the planet.

There can be distinguished few tendencies of our energetic future:

An increase of regenerable part is predictable yet its importance will depend on the reduction of the costs and the progresses in energy hoarding that will allow the discontinue producing and distribution of energy. On a long term there is less probable that each regenerable source to overpass 10% of necessary yet their combination could reach 30-50% of the total market toward the half of the century (in 2000 the regenerable energy was 10% of total energy production).

The classic energy sources based on fossil source will still be used for decades in favor of less carbon emission like natural gas. The sequestration of carbon is the only viable solution that will allow the using of fossil source fuels that will limit the CO_2 in atmosphere till the expected new technologies.

The nuclear energy does not generates CO_2 excepting the period of construction and the process of enriching the uranium. This type of energy source will be used in several countries by using a proper treatment of residues, the developing of new generations of reactors, more sure, and then, the developing of nuclear fusion whose perspective is around 2050.

THE PRODUCTION OF ELECTRICITY USING REGENERABLE SOURCES

Ways of producing electricity

The most encountered way of producing electricity is a heat source that produces pressurized water vapors. These vapors enhance their volume in a turbine and move the generator (alternative current) and produce electricity. After doing their job, the water vapors are condensed by using a cool water stream. In figure 1 there is presented the classic cycle of producing electricity.

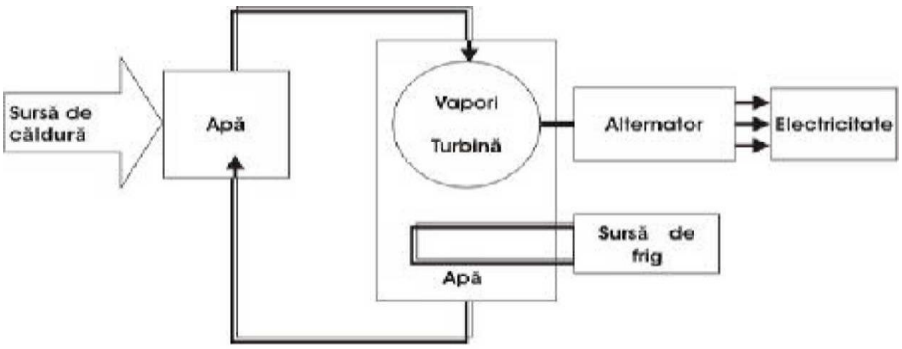


Figure 1 The classic cycle of producing electricity

When the heat resulted in vapor condensation is used for heating, no heat is wasted. The energy source is the result of burning fossil fuel (petroleum, gas, coal) or the result of nuclear fission in reactors that control this reaction.

The fossil fuels or uranium can be replaced by regenerable sources. In this manner, the heat source could be:

- biomass burning (wood, biogas, organic debris);
- geothermal heat obtained either by pumping to the surface of the heated water or by exploiting the high temperature of deep rock layers;
- the Sun, by concentrating the sun rays with parabolic mirrors or by using the warm water from tropical zones.

With the case of regenerable energy source, there is no need of heat source for electricity. It is the case of wind, hydraulic and solar energy.

With the case of wind and hydraulic energy, the turbine moves the electric generator and it is simply moved by wind or water. In the figure 2 there is presented this way to produce electricity.

The wind pressure is the result of its kinetic energy. The water pressure is the result of its potential and kinetic energy.

The electricity produced by the generator can be directly introduced in the electricity net without a convector, (figure 2) yet, with this case, in order to maintain a constant frequency of the tension (and of current) to 50 or 60 Hz, the generator speed must be constant by moving the wind devices or, with the case of water turbines, by adjusting the water flow.

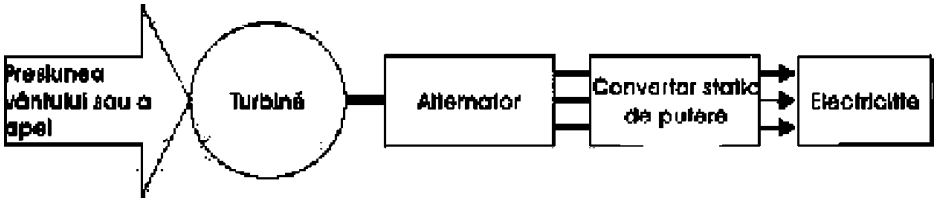


Figure 2. Wind or hydraulic mode of producing electricity.

The advantage of static convectors, on one hand, the possibility of functioning at variable speed and, on the other hand, the increasing of the energetic outturn by reducing the complexity of mechanical wind turbines or the water flow of hydraulic ones. This type of functioning with variable speed is recommendable with small power devices and there is a tendency of its generalizations with wind generators where its more susceptible to appear due to significant variations of the wind speed.

With the case of producing solar electricity, it is produced directly by silica conductors on the basis of solar energy. The static power convectors are used for

optimize the energetic conversion. In figure 3 there is presented this mode of energetic conversion

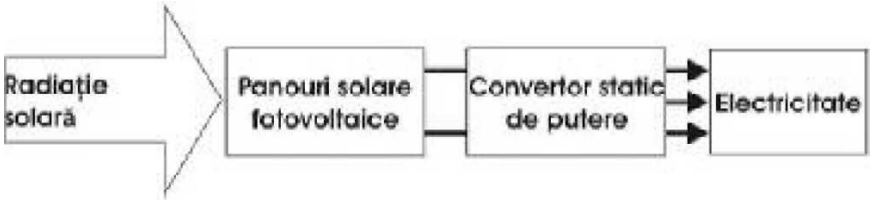


Figure 3. The solar mode of producing electricity.

When the sun shines and the clime is favorable, the Sun gives a power of 1 kw/sm. The solar panels transform in electricity 10-15% of this energy. The energy production of such a panel increases or decreases in function of the solar radiation: 100 kwh/sm/year in Northern Europe and in Mediterranean zone twice. A solar roof of 5 x 4 m has a power of 3kw and produces 2-6 Mwh/year.

Electricity can also be produced by a diesel engine or a gas turbine (derived from the plain engine) that moves an electric generator. The primary energy source is, generally, a fossil fuel yet it could be replaced by biodiesel or biogas.

The outturn factor

The key factor for the competitivity of systems for producing electricity that are based on regenerable energies is the price of the kilowatt – hour. This cost is calculated beginning with the investment price, its duration, the interest of the loan and the functioning costs.

With the case of alleatory systems (wind, solar, hydraulic) the system productivity highly depends on the natural conditions (for example, how long the sun shines); in conclusion, the investment cost depends of the critical power. A wind installation of 1MW can produce at most 1MW yet not permanently because of wind fluctuations in comparison with classic powerplants based on fossil fuel or nuclear. For the wind and solar installations what matters is the generated power, not the possible one.

Table 1 presents the outturn of installations based on regenerable energy with classic cycle water-vapor. The outturn is the ratio between the energy supplied by the production system during its all lifespan and the consumed energy for building the installation.

Table 1

The outturn factor of the installations of producing electricity using regenerable energy

Installation	**The outturn factor**
High power hydraulic	100 - 200
Low power hydraulic	80 - 100
Wind	10 - 30
Solar	3 - 6

The outturn factor is better with the high power hydraulic installations (lifespan more than 30 years, reaching even 50 years) over the low power ones (lifespan of 20-50 years).

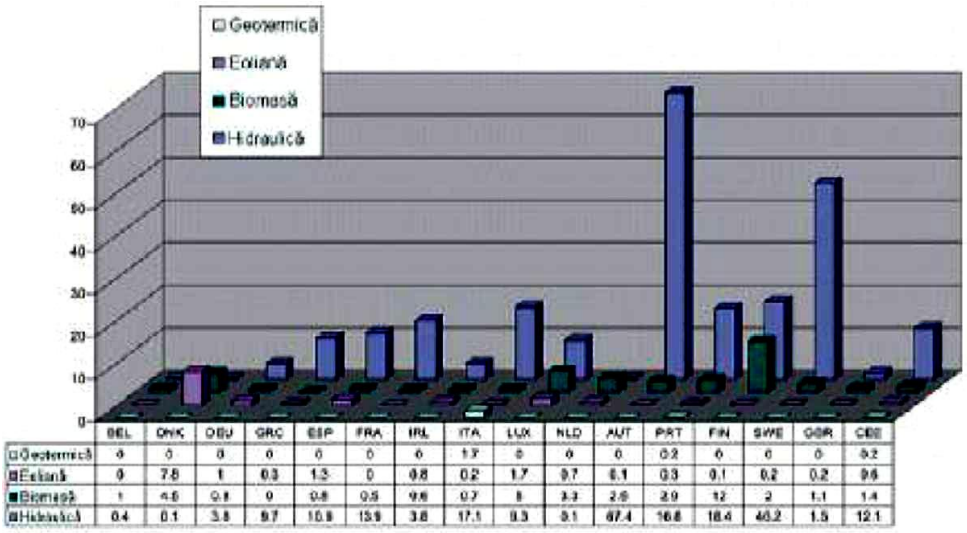
The power of the wind installations has varied from few hundreds of kw before 2000 to few Mw after 2000 with the possibility of reaching 5 Mw in 2010. The life span of a wind installation is around 20 to 25 years.

The solar systems have a very low outturn because the manufacture of silica cells is expensive. A cell generates the energy required for its manufacturing over 4 or 5 years. As the life span of solar cells is 20-30 years, the outturn can reach, at best, to 6.

European objectives

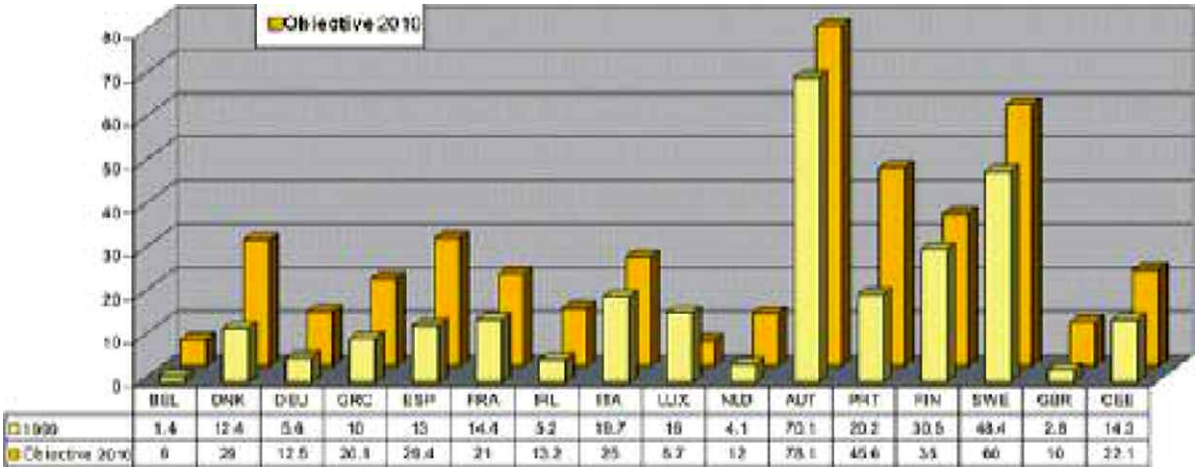
In figure 4 there is presented the distribution of different energy sources (geothermal, biomass, wind, hydraulic) in several EU members in 1999.

At the beginning of 2000 the European Commission has decided the increasing of the green energy sources weight. This weight must increase from 14.2% to 22.1% in 2010. The figure 5 shows, comparatively, for each country, the weight of electricity produced by regenerable sources in 1999 and the objectives for 2010.



	BEL	DNK	DEU	GRC	ESP	FRA	IRL	ITA	LUX	NLD	AUT	PRT	FIN	SWE	GBR	CEE
Geotermică	0	0	0	0	0	0	0	1.7	0	0	0	0.2	0	0	0	0.2
Eoliană	0	7.8	1	0.3	1.3	0	0.8	0.2	1.7	0.7	0.1	0.3	0.1	0.2	0.2	0.6
Biomasă	1	4.6	0.8	0	0.8	0.5	0.6	0.7	1	3.3	2.6	2.9	12	2	1.1	1.4
Hidraulică	0.4	0.1	3.8	9.7	10.8	13.9	3.8	17.1	0.3	0.1	67.4	16.8	18.4	46.2	1.5	12.1

Figure 4. The distribution (%) of the electricity production using regenerable sources in 1999 in EU members.



	BEL	DNK	DEU	GRC	ESP	FRA	IRL	ITA	LUX	NLD	AUT	PRT	FIN	SWE	GBR	CEE
1999	1.4	12.4	5.8	10	13	14.4	5.2	16.7	16	4.1	70.1	20.2	30.5	48.4	2.8	14.3
Obiective 2010	6	29	12.5	20.1	29.4	21	13.9	25	5.7	12	78.1	45.6	35	60	10	22.1

Figure 5. The weight of regenerable energy (%) produced in 1999 and the objectives for 2010.

The integration of new 10 members after 2004 in EU has changed the weight of regenerable energy target for 2010 from 25% to 21%.

The solar energy is not present in this picture because it accounted too little in

1999. Nevertheless, the increasing of this type of energy is important: for instance, in 2003 it reached 43.4%. The installed power of EU was 562.2 Mw in 2003. In the top of the list is Germany (397.6Mw), the Netherlands (48.6Mw), Spain (27.2 Mw) and Italy (26.0 Mw).

CONCLUSIONS

The controlling of greenhouse gases can not be achieved without efficient energy programms in construction, industry and transport sectors. The goal is to use less energy to achieve the same tasks.

The outturn factor is better with hydraulic installations of high power (lifespan over 30 years or even 50years) over the low power hydraulic installations (lifespan of 20-50 years).

The power of wind installations has evolved from few hundreds kw before 2000 to Mw after 2000 with the possibility of stabilizing to 5Mw in 2010.

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ACTUALITATEA METODELOR DE PROMOVARE A PRODUSELOR ECOLOGICE ÎN ROMÂNIA

THE PRESENT OF PROMOTION METHODS FOR ECOLOGICAL PRODUCTS IN ROMANIA

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University „Alexandru Ioan Cuza" of Iaşi

Key words: ecological products, promoting, market, consumption, dynamics

REZUMAT

Produsele ecologice sunt acele produse obținute în condiții naturale şi biologice optime, fără influența substanțelor şi elementelor chimice, toxice sau nocive. În conjunctura actuală a evoluției societății umane, produsele ecologice reprezintă o alternativă sigură şi durabilă la stilul actual de consum alimentar, atât din punct de vedere economic – pentru producători, cât şi din punct de vedere ecologic - pentru păstrarea calității mediului înconjurător şi asigurarea securității alimentare a consumatorilor. În pofida oportunităților de dezvoltare a sectorului agriculturii ecologice din România, suntem de părere că în țara noastră încă sunt necesare măsuri şi decizii radicale destinate să stimuleze dinamizarea sistemelor de producție şi creşterea consumului de produse ecologice.

O problemă reală cu care se confruntă piața ecologică din țara noastră este că metodele de promovare nu sunt adaptate la specificul acestor produse. Promovarea produselor ecologice presupune, în primul rând, crearea unui sistem informațional eficient care să se bazeze pe două orientări principale: conştientizarea avantajelor pe care le oferă consumul acestor produse şi informarea cu privire la potențialele dificultăți de care se pot lovi producătorii, procesatorii şi distribuitorii în urma conversiei la acest sistem de producție. Metodele actuale de promovare nu suscită un interes sporit pentru producători şi distribuitori şi nu se realizează la standardele necesare pentru ca aceste produse să fie suficient de răspândite pe piață. Cauzele principale sunt: producătorii nu folosesc toate mijloacele de promovare, distribuitorii nu sunt la curent cu actualitatea metodelor de promovare a produselor ecologice, iar consumatorii sunt insuficient informați. Lucrarea de față îşi propune să abordeze cele mai moderne şi mai eficiente modalități şi metode de promovare a produselor ecologice, cu scopul de a contribui la dinamizarea sectorului aferent producerii şi consumului de produse ecologice în România.

ABSTRACT

The ecological products are those obtained in the best natural and biological conditions, without the influence of chemical, toxic or harmful elements and substances. In nowadays situation of the human society evolution, the ecological products represent a safer and sustainable alternative, both economically for producers and ecologically for preservation of the environmental quality and ensuring food safety for consumers. Despite the development opportunities of the ecologic sector in Romania, we believe that in our country are still needed the radical decisions and measures designed to stimulate the dynamics of production systems and increasing the consumption of ecological products.

A real problem regarding the ecological market in our country is that the promotion methods aren't adapted to the specific of these products. The promotion of ecological products requires, first, to create an efficient informational system that is based on two main guidelines: awareness of the benefits offered by the consumption of these products and information regarding the potential difficulties that may have producers, processors and distributors after conversion to this production system. The current methods of

promoting not arouse a high interest for producers and distributors and not realized at the necessary standards that these products have been sufficient prevalent on market. The main causes of this situation are: the producers do not use all means of promotion, the distributors are not abreast with the actuality of promotions methods for ecological products and the consumers are insufficiently informed. The aim of this paper is to approach the most moderns and most efficient modalities and methods to promote the ecological products, in reason to contribute at the development of the sector related the ecological productions and consumption in Romania.

INTRODUCTION

In the current Romanian economy, and involved the agricultural sector, it is remark new tendency in evolution, given the many changes due to causes such as: integration into European economic system, the phenomenon of globalization, the necessity to face the competition on international markets, environmental changing that determines new methods and technologies production. One of the economic sectors directly inserted in all these tendencies, by the necessity for adaptation and assimilation the technical-economic news, is the agriculture. Among the sectors of farming that is suited to continuous adjustments based on the market changes, a principal place is taken by ecological production. Within it's one of the main trends of evolution is the adoption of organic production systems to the actual market demands and to the modification of consumer behavior.

The adapting of Romanian agriculture to the ecological production systems represent a really challenge, especially in conditions which the international market is open for products with these characteristics, and consumers are increasingly interested in consumption and utilization the ecologic products. With all these opportunities, we think that in our country are still necessary some radical decisions and measures designed to stimulate the dynamic of production systems and increase the consumption of ecologic products.

In essence, the ecological agriculture it's absolutely manifests the contribution to sustainable economic development and has an essential role in protecting and preserving the environment. From the point of view of consumer, one of the main goals of the ecological agriculture is to realize the agricultural products and food with taste, texture and quality genuine and attractive.

MATHERIAL AND METHOD

From recently market studies results that, although the potential for production and sales of ecological products obtained in Romanian agriculture is very high, the ecologic production and consumption are not fully capitalized on national market, but nothing external. By this approach we propose to identify the main ways to make known the benefits of the practice of ecologic agricultural production with aim to promote at widespread the products that respond at the requirements of sustainable development.

Regarding the establishment of current methods for promoting the ecologic products and to identify the most modern methods of promotion, the approach of this paper is based on market studies and surveys. The main tool is represented by interviews and questionnaires addressed to producers and consumers, too. The motivation for choosing this tool work is the harmonization of requirements from the consumer market with production sector's guidelines. The study was based on interviews of a 400 people and the main goal pursued by the questionnaire is to identify the level of public interest to the ecologic products.

The analysis of the main references regarding the conditions of practice and promoting ways of the ecologic agriculture in Romania is detached following key factors

available to use in all promoting actions of ecological products: price, assortment, packaging, image, availability.

In the Romanian agricultural sector is noting a series of failures related to: practice of ecologic production systems, processing of products obtained in ecologic system, promotion of such products and mainly the information of large public about the existence and utility of these products. In most units of production and processing the food and agricultural products in ecologic systems is found an insufficient capacity or lack to recovery the primary products, such as: grapes, meat and vegetables. The negative effects of this failure are felt directly on typology food consumption at national level and exports, too. A significant part of our country population still does not know well enough the characteristics and advantages of ecologic products consumption, but neither has sufficient and correct information about these products, or the information provided is unclear and allow the creation of confusion.

From the analysis of profile studies, we are identified the main objectives which must be achieved that the production and consumption of ecologic products become a current reality of the national economy. They are:[1]

1. increasing number of operators in the organic sector;
2. ongoing programs for developing trade with ecologic products;
3. increasing the number of exporters;
4. association of small producers;
5. promote a special marketing of ecologic products;
6. increase the number of processing units;
7. increase the production volume in ecologic agriculture;
8. increase the processing capacity of ecologic farming.

Cause the lake promotion of ecologic products on the national market, the ecologic production that is obtained at present in Romania is oriented in a large proportion to exports. For example, honey, medicinal plants and ecological fruits are 90% exported to destinations such as Germany, Italy, Poland, USA. The principals ecological products sold in our country on the organized commercial networks are eggs and milk products.

In Romania, the production and processing sectors, in order to obtain the ecological products, is in a relatively early stage - compared to other European countries - although the naturally productive potential and promote conditions for ecological farming are fully appropriate. The entities that have expressed concerns in order to identify the place and role of ecologic agriculture in national economic development, by studies, surveys, reports and estimates, are: Ministry of Agriculture, producers' associations, agricultural directions, production and distribution companies and marketing units.

RESULTS AND DISCUSSIONS

Production, domestic consumption and export of agricultural products and organic foods are safer ways of national agricultural development, provided that the benefits orientation towards this type of production have been known especially by consumers, that exists the programs to promote these products, redirect the consumer behavior and to be promoted properly all categories of ecological products, to export but equally intensive on the national market, too.

Among the fundamental advantages that benefit the ecological production sector from our country are given:

- the existence of a fertile and productive soil;
- the existence of a sufficient ecological areas unpolluted;
- the sufficient labor to be involved in the production process;

[1] *National Strategy for Export 2006-2009.* Document submitted to public debate (http://www.agricultura-ecologica.ro/arhiva.php)

- the possibility to create and develop small businesses that have as their object of activity the ecological production, through the European financial support.

In addition to these advantages, to promote the ecological production systems must be taken into account the following requirements:[2]

- need to improve the competitiveness of organic products for export;
- covering the existing niche market by identifying of new export markets and strengthen of existing markets;
- production and sales orientation to primary products and processed products;
- creation of a properly production, processing and marketing systems in order to meet the needs of national and foreign markets;
- development of research activities and improve the training of all entities involved;
- creating the organized groups of producers to expand production and markets.

From research realized until now, we observe that the national market of ecological products is less dynamic, the main reason being the lack of promotion of these products, determined by: un-updating of promotion methods; failure of marketing techniques to specific required by these products; lack of guidance by inform the general public.

For these reasons, the domestic consumption of ecological products is at low levels. The sales on the national market for the ecological products are made in only 30% and the causes which led to obtaining these values are the primary and secondary nature (Table1).

Primary and secondary causes for low consumption of ecological products at national level

Table 1

Primary causes	Secondary causes
The ecological products aren't promote by appropriate methods	Out of processors who had own stores for sales and presentation, the other stores don't meet the rules of storage, handling and presentation for green products are in the same place with conventional products and are handled and stored with them.
The population isn't informed about the advantages and qualities of ecological products	Is a major confusion between the terms that define the "ecologic product"; the most common confusion is between "natural product" and "ecologic product", and this produces serious difficulties on promoting the ecologic products at difference price.
The sale on national market is not realized at real production price	Producers are not sufficiently interested to enter on market with ecologic products, justifying this by "non-profitable" of sales.
The inclusion of ecological products in modern distribution network is not profitable	The sales units allow and keep the maintenance of confusion "on shelf" by displaying counterfeit products as ecologic products.
The commercial addition of stores that sell these products is high, so their selling price amounting much	Don't exist the specialized companies, strictly targeted to the marketing of ecological products.
	Local producers haven't sufficient forced to enter on market and compete to other product categories.
	The packages are not sufficiently attractive and convincing.

[2] *Idem*

For these reasons, appears a collective responsibility to promote the ecological products by: strongly action to awareness the population and the consumer information campaigns, but also of the economic operators.

Promotion of ecological products requires, first, the creation of an effective informational system. This must include and be based on two main guidelines: awareness of the benefits offered by the consumption of these products and information about the potential difficulties that may have producers, processors and distributors after conversion to this production system, with role to build a set of preventive measures. (Table 2)

Implications of orientations to the ecological production and consumption systems

Table 2

Awareness of benefits offered by ecological products consumption	Potential difficulties that may face producers, processors and distributors of ecological products
* the food security	* replacement technologies
* protection/conservation of environment	* growth of costs production
* growth of products competitiveness	* drop of sales volume
* dynamic of agricultural sector	* market unprepared for consumption
* contribution to growth of values for micro and macro indicators	* inability to differentiate the organic from conventional products

An essential element in promoting the ecological products is the continuous updating and adapting the promotion methods. A main factor in improving the specific methods to promote the ecologic products is determined by the trade organization of these products. To increase the level of consumer confidence, the trade should be made only by registered dealers at Ministry of Agriculture through different market channels: farm-gate sales, sales through wholesale stores, sales in specialized stores, sales from stock on-line line for ecologic products, seasonal sales markets[3]. Ecological products are at the network of large stores and small specialized shops, too. One means of presentation of ecologic products and establishing new contacts with commercial aim is the participation in exhibitions, fairs and other national and international events.

By awareness of the economic importance of this activity sector, is taken a series of measures prepared to support the ecological agriculture and to promote the related products. Thus, Community assistance is provided through co-financing programs (50% of the European Commission, 20% of professional organizations and 30% of the state budget), according the procedure of Commission Regulation (EC) no. 1071/2005[4]. A key aspect sought in convincing customers to purchase the ecological products is to provide the reliable information regarding: the products impact on environment throughout their life cycle (production, packaging, distribution, use and disposal) and providing the assurance quality for use of these products. The responsibility for producers' information and for promote the concept of ecologic product is both in charge of public organizations and private ones, too[5]. An essential role it has the *education* on ecological agriculture and food, because it represents a modern method of promotion, with orientation to the future.

[3] *Ecological agriculture* (http://www.mapam.ro/)
[4] *Ecological agriculture*. Article of Ministry of Agriculture (http://www.madr.ro/pages/page.php?self=01&sub=0107)
[5] *Idem*

CONCLUSIONS

Promoting the ecological products is one of the aspects of support and encouragement the development of Romanian ecological agriculture. At that point is add another important factor that is into interdependent relationship with promotion.

One of the most important factors that influencing the promotion of ecological products are: the price. It is a fundamental criterion in the choice that consumers make. As an ecological product is more expensive than similar conventional products, is create a big obstacle in changing the consumer behavior, so methods of promotion will take this aspect into account, in order to not create a lack of opportunity for sale. A prerequisite for ecological agriculture development is to encourage and promote the concept of organic farming; so, the consumers will become the aware consumption benefits of ecological products, so they offer a higher price for products whose quality is guaranteed. At the initiative of Directorate General for Agriculture and Rural Development of the European Commission were created the modern means of promotion (websites) that intended to inform the population about the benefits of ecological products consumption and the development of promotional campaigns.

Analyzing the data on the current of methods to promote the ecologic products on the national market, we remark that the current specific ways for promoting the ecologic products are:

- campaigns and information and training activities: events, courses, information meetings;
- publishing and distributing the brochures, manuals, newsletters, posters;
- creating websites with information about ecologic products, electronic training (on European models that have proved successful);
- dissemination of information to the outlets through panels and layout of products in specialized sections;
- active involvement of the media, which has the capacity to offer numerous and detailed information provided by specialists;
- advertisements published in major newspapers and magazines and radio advertising;
- development of typical strategies of "ecological education" to influence the changes in consumer behavior for purchase and consumption process;
- developing marketing and advertising tools that directly address to consumer needs;
- application of the eco-label products certified by the abbreviation "EA".

We consider that the measures oriented to support and promote the ecologic products on the national market, that to expand the trade relations and the international market opportunities, the operators who running the specific business of eco-agricultural sector's with ecological direction, will contribute significantly to supporting the national economy.

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IMPLICAȚIILE APLICĂRII PRINCIPIILOR ECO-ECONOMICE ÎN AGRICULTURA ROMÂNEASCĂ

IMPLICATIONS OF ECO-ECONOMY PRINCIPLES APPLICATION IN ROMANIAN AGRICULTURE

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Key words: agriculture, ecology, economics, development, security

REZUMAT

Eco-economia este un concept relativ nou, ce se dovedeşte a fi de maximă actualitate, cu conotații diverse şi o mare amploare în realitatea economică şi ecologică din prezent. În condițiile în care, şi în România se impune, tot mai mult, acordarea cerințelor de dezvoltare economică cu cele de protecție ecologică, agricultura, ca sector productiv de bază, se dovedeşte a fi capabilă să răspundă cel mai bine acestor deziderate. Necesitatea de a susține o dezvoltare economică permanentă apare ca fiind, în unele cazuri, în conflict cu acțiunile şi măsurile de conservare şi protecție a mediului, iar sistemele agricole pot să rezolve aceste conflicte prin apelarea la metode şi tehnici ecologice eficiente.

În lucrarea de față vom identifica locul eco-economiei în agricultură, pe baza studiilor conform cărora aplicarea principiilor ecologice în dezvoltarea economică permite obținerea de avantaje evidente, precum: menținerea rolului agriculturii ca principal furnizor de produse de bază indispensabile populației, asigurarea unor venituri stabile pentru producătorii care operează în acest sector, protejarea mediului înconjurător pentru o perioadă îndelungată, asigurarea condițiilor decente de viață pentru generațiile viitoare.

În condițiile în care sfera alimentației umane are tendința de a deveni tot mai puțin naturală şi, uneori, chiar nocivă, în sfera cercetărilor agricole curente îşi face tot mai mult loc conceptul de eco-economie şi de aceea considerăm că este mai mult decât o necesitate ca principiile eco-economice să fie promovate şi aplicate simultan, în măsură semnificativă, în domenii interdisciplinare precum economia, ecologia şi agricultura.

ABSTRACT

The Eco-economy is a relatively new concept that is proving to be of maximum topical, with different connotations and a large scale in the environmental and economic reality of today. In condition where, in Romania too, is impose, more and more, the alignment of economic development with ecological protection of environment requirements, the agriculture, as the basic productive sector, is proved to be able for the best response at these goals. The need to sustain a permanent economic growth appears to be, in some cases, in conflict with actions and measures for conservation and protection of environment, and the agricultural systems can resolve these conflicts by appealing to eco-efficient methods and techniques.

In this paper we will identify the place of eco-economics in agriculture, based on studies regarding the application of ecological principles in the economic development, approach that allows to obtain obvious advantages, such as: maintaining the role of agriculture as the main producer of essential products indispensables for people, ensuring the stable incomes for producers who operates in this sector, protecting the environment for a long time, ensuring a decent living conditions for the future generations.

In conditions which the area of human nutrition has tendencies to become less natural and, sometimes, even harmful, in the agricultural currently research area is find more and more place the eco-economy concept. Therefore, we consider that is more than

an necessity for the eco-economy principles to be promoted and simultaneously applied, in significant measure, in the interdisciplinary areas such as economy, ecology and agriculture.

INTRODUCTION

In terms of the conceptual and economic attitudes changes, the new millennium was begun with broad and deep discussions on issues with all news. Between them, a special place it concerns the ways of harmonizing the economic growth with these regarding the protection of natural environment and, thus, ensuring food security. Currently, we are talking more and more of a *sustainable economy*, designed to meet the requirements of compatibility between the technical-economic systems, these of enterprise and the environment.

The *eco-economics* concept, modern and high-current, proposed by Lester Brown in 2001, in the book entitled *Eco-Economy: Building an Economy for the Earth* clarify that the eco-economy or ecological economics refers to the new type of economy that will grow in the future without affecting the environment which is, essentially, the support for economic development. The approach of the new concept of economic development does not restrict its deployment only in certain activities fields. Rather, as the application of eco-economy will be larger, the positive effects will be more visible and more recently felt.

The agriculture is the productive sectors which involves the direct approach of both plans: contribution to the economic and social development and environmental support through the methods and eco-efficient techniques.

In the conjuncture of need to justification the importance and the usefulness of implementation the eco-economy concept in agricultural area, we quote the Lester Brown's claim of "World Status" (2001): "The essential components of strategy for sustainable development include the population stabilization ... the soil conservation ... the protection of biological systems of the earth". Also, the American economist militate for the support of a new economy, based on cooperation between economists and ecologists in order to prove to be a sustainable economy: the eco-economy. The author starts from the ascertainment that "the current economy is unsustainable in terms of the environment, because it is based on an irrational consumption of resources, which leads directly and constantly to increase the environmental degradation.[6]

The world renowned specialists (Dennis Meadows, Lester Brown, Barry Commoner) have expressed the exception concerns to prove the existence of major problems that is confront the environment, as a consequence of economic development, which took place in a rhythm incompatible with the environmental opportunities to support this rate of development.

MATHERIAL AND METHOD

The specialty literature treats in extensive the issues relating to the eco-economics concept and practical applicability in economic activities domains. The international level studies demonstrate that the ecological economics is beneficial not only for areas directly involved in the exploitation and conservation of environmental factors, but also for producers, processors and consumers. The beneficial effects are lasting and benefit the future generations, too.

This paper uses as research method the multi-criteria analysis of sustainable development indicators proposed at international level research and is based on cost-benefit analysis method to estimate the impact that will have the application of eco-economic principles in the field of farming. The impact analysis is oriented on specific directions for study of sustainability: economic, environmental, technological and social.

[6] Lester Brown – *Eco-economics. Creating a economy for our planet*, Technical Publishing House, Bucureşti, 2002

In the framework research, realized under the guidance of Dennis Meadows from „Massachusetts Institute of Technology", it is concluded that, at present, prevail a serious conflict between the industrial civilization and the environment, conflict that affecting the socio-economic development, in two directions:

a) quantitatively - is expected the tendency of depletion the natural resources (energy, raw materials and food) or the consumption of renewable resources at in a higher rate regarding their capacity for regeneration;

b) qualitatively - by physical deterioration and pollution of environmental factors essentials in development: water, air and soil.

The approach of a new type of economy, compatible with the responsibilities which must be assumed to the natural environment - the principal generator of resources necessary to the development and perpetuation of human species - should be based on a set of sustainable principles, realistic and applicable. These principles are:[7]

- *the principle of responsibility* to the next generations, manifested by a special care towards the environment and concern for the human development;
- *the principle of competition and free initiative* in the manifestation of economic activities;
- *the principle of efficiency and effectiveness of technical - economic resources exploitation*;
- *the principle of innovation* and that of efficient use by intellectual capital.

With all support of considerable efforts for improving the relationship preservation of environmental factors - economic development, the 2000 years found the humanity in face of major problems, of which is notes to be of utmost importance: the ensuring food security and the environmental protection on a large scale. Obviously, neither the growth nor economic development problems has not been "solved" on the whole planet.

The modern development, seen in economic, technical, social and human optical, is designed to meet all requirements of sustainable development, but for this, it must take account of certain restrictive essential conditions:

- the use of natural resources, energy and raw materials in a rational way, according to the principles of efficiency;
- the fostering the entrepreneurs access to the financial resources and creating a favorable investment climate;
- the protection of natural environment by developing technologies in all areas of activities.

In conditions which the concepts such as competitiveness, progress, performance are increasingly circulating in economic and social spheres, these factors are essentials for creating a healthy and sustainable economy.

RESULTS AND DISCUSSIONS

The agricultural systems production have role to provide for national economics the basic products, which directly cover the perpetuation of a healthy population able to work. However, in conditions which the food security is threatened by the emergence of fully industrialized products, some of which prove to be even harmful, the agriculture will play still a key role in the economic sphere by:

- ensuring the healthy food products;
- offering the jobs in the agro-food sector;
- environmental protection through the use of modern technologies, created in accordance with the requirements of maintaining the environment quality.

The agricultural production is realized in a specific system, stand-alone which receiving the resources from the national economy and from the surrounding receives the

[7] Cristian-Silviu BANACU – *Sinergetics of techinical-economics systems of eco-management and intelectual venture* (http://www.contabilizat.ro/)

factors for growth and development for plants[8]. For these reasons it is important to analyze the relationship of interdependence between the economy, ecology and agriculture, in the context that the practice of ecologic agricultural production systems involves establishing a three link between these systems belong to different fields of research.

The current period that passing the Romanian agro-food system is characterized by the emergence of economic and social atypical phenomenon, determined by changing of food consumption models, they add the emergence of climate change that affect the development of agricultural production processes. This situation requires the review of technologies, production methods, types of decisions and activities so that the agricultural production processes can ensure, continued, the "green" food in sufficient quantity and superior quality. In this context, is taking into account by the fact that the agriculture is in strong interdependence with environmental factors, which influence the crop produced.

The identification of agriculture development direction in condition to respecting the principles of environmental economics is provided is realized with condition to execute the impact studies and estimations relating the benefits offer by involvement of eco-economy in agriculture. Presently, the indicators system of sustainable development is being defined including the national adaptation. Sustainable development indicators are classified into: state indicators, indicators of driving force and response indicators. Of these, to assess the implications in the agricultural sector we propose a set of analysis indicators grouped in input indicators and output indicators to/from the system (Table 1).

Input and output based sustainability indicators

Table 1

Input based sustainability indicators	Sustainability dimensions *	**Output based sustainability indicators**	Sustainability dimensions *
Natural capital indicators		***Output and production***	
Soil erosion	E, e	***Goods***	
Fertilizer use	E, e	Crop(tree/animal yields)	E
Use of alternative cropping systems	E, e	Production per capita	E, S
Land		***Technology***	
Area of deforestation	E, e, S	Output/input ratio	E
Categories of land use	E, e, S	Total factor productivity	E
Water		Total social factor productivity	E, e
Water use	E, e	***Bads (externalities)***	
Water storage capacity	E, e, S	Air pollutions	S
Polluants concentration in ground/ surface water	E, e, S	Water pollutions	E, e
Energy		Food pollution	E, e
Categories of energy use	E, e	Land pollution	E, e
Man-made and human capital indicators		Biodiversity measures/depletion	E, e, S
Pesticide use	E, e	Habitat destruction	E, S
Fertilizer use	E, e	Land use	E, e, S
Machinery use	E, e	Fertilizer/pesticide use	E, e
Livestock use	E, e	Other management practices	E, e

* E – economic; e – ecological; S - social

[8] Bujor Mănescu – *Horticultural compared systems* (http://www.contabilizat.ro)

Source: Adaptation by Craig A. Bond and Karen Klonsky proposal, in *Ecological and economic indicators for sustainability, SAFS Newsletter, Summer - Vol. 6/No.3, 2006*

The system indicators of ecological economy, with applicability in agriculture, can be adapted and refined according to local conditions of study, new technological occurrences, the change of food consumption behavior and structural changes in the agricultural enterprise.

The inserting of the eco-economy concept in agriculture determined to take the new decisions on the production and consumption systems. The population should be informed on the agricultural products that they consume and the entrepreneurs have a duty to be fully responsible towards their actions and initiatives. All these decisions and concepts changes should be based on the fact that the agricultural products are rich in nutrient content and energy and influences favorably the functioning of human body.

From considerations related to the harmonious combination of economic, agricultural and ecological sciences, it is necessary to promote the widest possible scale a ecological eating, healthy, clean and unpolluted products. In the context which the eco-economy concept is proving to be of a maximum utility to ensuring the sustainable development, we consider more than appropriate that the field of agricultural research embrace this concept.

Since the link economy - environment - agriculture is one indestructible and the correlations between subsystems of the three operating systems are established directly, we think that the development of an „eco" economy type is an urgent necessity of current period and the promotion of the agricultural system based on the ecological principles will lead the realization of products with a rich and balanced nutrient content. In addition, the national economy will benefit by multiple advantages from applying the principles of these new concepts and will be able to get out of the deadlock caused by the use of the agricultural and foods production systems, less effective, and not always advantageous for the human health.

CONCLUSIONS

To determine an increased contribution to ensuring the economic development in harmony with the natural environment is necessary to be accelerated and simultaneous involvement of specialists from several areas of interest. Thus, to ensure a quality agricultural production, which provide healthy, salable and competitive production, not only in the domestic market, but also on the external market, we proposed the review of research area and the application of the methods economic and sustainable effective by point of view of environmental protection.

We consider that eco-economics find a fully deserved place in agriculture, because by applying the ecological principles in economic development will be achieved obvious advantages, such as:

1. the agriculture will be providing the valuable products, essential for the population;
2. the incomes obtained by producers who operate in this sector will be at a superior level that could provide a decent living;
3. by respecting the requirements imposed by sustainable production systems, will ensure the alignment at the quality standards required by European rules;
4. the environment will be protected for a long period;
5. the future generations will have a normal living conditions and will not suffer from lack of resources or lowering these quality.

By promoting the eco-economy concept it is suggested some solutions relevant to synchronize the new model of economic development with the reality of the today world. These solutions consist in:

- promoting a *„budget for restoring the planet",* which includes allocations for the protection and restoration of fertile soils, forests, pastures, fisheries and ocean conservation of biological diversity;

- using the opportunities offered by *new technologies*, which contributing to strengthening the environmental protection and to saving resource;

- transition to an economy based on renewable resources.

Of course, the favorable results of these solutions can be obtained with condition that at implementation of the eco-economics concept in agriculture, being not only the entrepreneurs from this field, but also those working in adjacent areas to agriculture.

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CONSIDERATII ASUPRA CINEMATICII SI DINAMICII SITELOR VIBRATOARE ACTIONATE ELECTROMAGNETIC IN SCOPUL PROCESARII PRIMARE A CEREALELOR

CONSIDERATIONS ON KINEMATICS AND DYNAMICS OF SHAKING SIEVES ELECTROMAGNETICALLY DRIVEN FOR CEREAL PRIMARY PROCESSING

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Key words: vibrating feeder, electromagnetic vibrator, elastic vibrating system, vibration amplitude control, vibration frequency control

ABSTRACT

The paper presents the diagram and the operational principle of electromagnet driven vibrating feeders and the constructive and functional factors influencing the working parameters of this type of equipment. Diagrams are presented of automatic amplitude and frequency control systems of the vibrations generated by the studied electromagnetic device, in view of its utilization for the drive of vibrating feeders for bulk solid material of varied characteristics and properties.

REZUMAT

Lucrarea prezintă diagrama şi principiul operațional al sitelor vibratoare acționate electromagnetic precum şi influența factorilor constructivi şi funcționali asupra parametrilor de funcționare ai acestui tip de echipament. Diagramele prezintă sistemele de control automat al frecvenței şi amplitudinii vibrațiilor generate elecromagnetic în vederea utilizării la acționarea transportoarelor vibratoare pentru materiale solide în vrac cu caracteristici şi proprietăți variate.

INTRODUCTION

Vibrating sieves are used as vibrating feeders at technological primary processing installations for cereals. The vibrating feeders are made of a vibrating chute (channels) that are fixed elastically on stands that receive oscillating movements from rod-crank mechanisms (fig. 1,a) or from vibrating units with eccentric masses (fig.1,b) or from electromagnets (fig.1,c) [1,2], Magnetic drive systems (Fig. 1,c), which are used as free vibrating or with steering suspension features, make use of the operation at resonance conditions with a safer excitation energy and leading to very compact units.

Vibration sieves feeders consist of a conveying device which carries the bulk solid layer and the drive unit for the vibration excitation supported by a spring suspension. The function of vibration feeders is based on the *micro-cast* effect. The vibration agitation is usually induced by a flute vibrating inclined by 20…45 ^{0} to the horizontal. The particles are accelerated starting from definite vibration frequency /amplitude; these acceleration conditions are used to execute a parabolic ejection motion inclined upwards and strike the flute again after an adequate displacement.

This effect (micro-cast) is repeatedly induced at the exciting frequency with the result that the bulk solid layer which is pre-adjusted by the outlet clearance of the feeder is discharging quasisteadily.

The necessary excitation condition for the micro-cast effect to develop is that the vertical upwards directed acceleration induced by the flute vibrations on the particles is larger than the gravitational acceleration (vertical downwards). Important parameter influences on this displacement process are the vibration frequency and amplitude, the angle between the excitation and the flute axis and the bulk solid properties such as particle size, distribution and shape as well as friction.

MATERIAL AND METHODS

On a world level the companies having a long tradition in this field use the electrovibrator for cereal primary processing equipment. In order to operate the shaking sieves designed to drive the technical equipment used in technological primary processing of agricultural products, the electromagnetic vibrators (named electrovibrators), manufactured by specialized companies can be used as single elements or pair elements, generating the sieve frame vibration

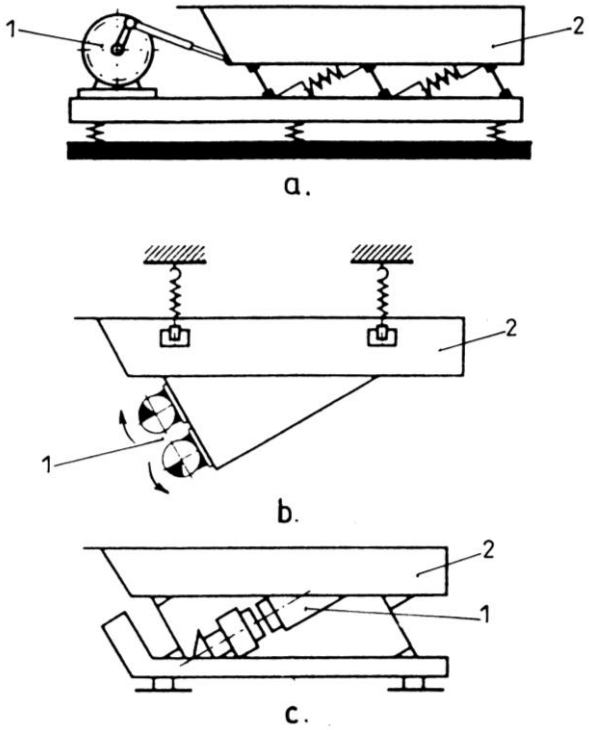

Figure 1. ***Basic types of vibrating feeders: a-with rod-cran mechanism; b-with eccentric mass; c- with electromagnetic vibrator: 1-vibration generating mechanism; 2- vibrating mass with transporting chute.***

By comparing with vibrating sieves driven by eccentric mass, the electrovibrators use leads to many advantages: simplifies the kinematic chain, by eliminating the following negative factors: many specific parts, assembling difficult and laboriously to control, inesthetic guards, rigorous maintenance, big reparation costs, reduced reliability, mechanic shocks (especially when wear appears); intensifies the separating process; diminishes the stress transmitted to foundation; their volume is minimum, which enables their mounting on active parts of equipment so that the vibration direction passes through the mass center of sieves shaker loaded with material (or by its immediate proximity); allows the modification of disturbing force direction any time. The electromagnetic vibrators advantages consists in absence of friction and rotating parts when the productivity is regulated, as disadvantages, we can mention the small amplitude (0,5….2mm) which

excludes the transport of powder loads, as well as the transport little length of vibrator (up to 2,5…6m).

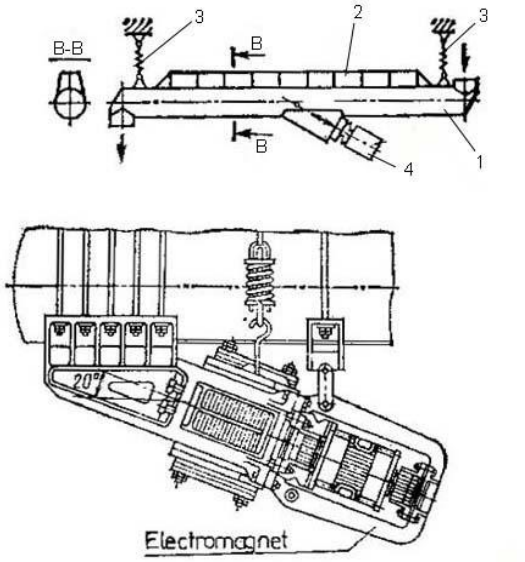

Figure 2. Vibrating feeder electromagnetically driven

The vibrating sieve electromagnetically driven comprises the frame (fig.2), freely hung on elastic elements, frame which receives oscillations transmitted by electromagnetic vibrator 8. The oscillating frame is supported by a rigid longitudinal beam 7. The electromagnetic vibrator can be with simple or double drive, with mobile (indus) and reactive (inductor) part. Being endowed with small mass and power (up to 1kW), the electromagnetic vibrators simply acted can be used to light conveyors. The connecting support of vibrating feeder bear (hang) the auger and ensure the oscillations according to dynamic calculation. There are used single sheet (lamella) springs or many sheets springs. The sheet crossing rigidity must be several times less than the longitudinal rigidity. In terms of bumpers and elastic connections there are used parts which are submitted to shearing, compression and distortion and metallic and rubber blocks. The rubber blocks are characterized by high elasticity and endurance. When metallic and rubber parts are manufactured, it is necessary to ensure the rubber free deformation, which, it is well known, is incompressible within close spaces. The helical and plane springs can also be considerate as elastic elements. The spring sheets thickness is $\delta = 2…6$ mm.

The above vibrating system comprises a simple drive electromagnetic vibrator (Fig.3) including a fixed coil of electromagnet 1 with coils 2, connected to network by a rectifier, the indus 5, rigidly connected to auger 3 of conveyor through the crossing bar 6, endowed with elastic connections 7 and a set of adjusting weights 4, closed alongside with springs in housing 8.

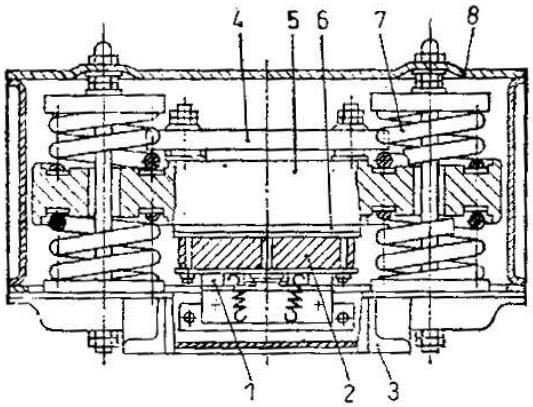

Figure 3. Construction of electromagnetic vibrator

In compliance with the equivalent scheme calculating the vibration of one mass vibrating system shown in figure 4, the system movement equation is:

$$m\ddot{S} + \mu c\dot{S} + c_1 S = F(t) \qquad (1)$$

where: m is the auger reduced mass (equivalent) which includes the indus mass and the adjusting mass; $c_1 = (c + c_0)$ – reduced rigidity (equivalent) of the system, formed of principal elastic elements' rigidity c and rigidity c_0 of vibrator elastic connections.

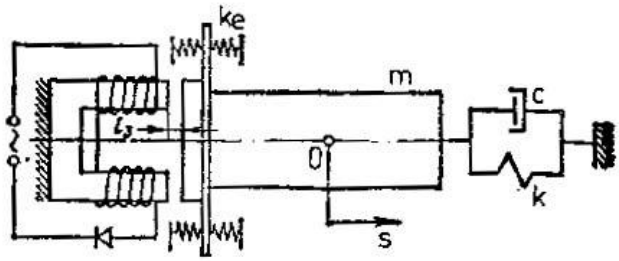

Figure 4. Equivalent scheme for calculating the one mass system vibration system

By replacing the expression of traction force $F(t)$ in equation (1) and taking into account the sinusoidal low of feeding current variation and influence of air variability (interstice) l_j we obtain a differential movement equation which is very difficult to solve. In order to simplify this problem it is supposed a certain constant size of air. Then, the relation (1) acquires the form of a non-homogenous linear equation:

$$m\ddot{S} + \mu c\dot{S} + c_1 S = F(1 + \cos 2p_T t) \qquad (2)$$

where: $F = k_F B_m^2 S_c / 2$ is steady component of vibrator excitation force, in N;

$k_F = 3{,}98 \cdot 10^5$ – proportionality coefficient;

B_m – amplitude of magnetic induction, in T;

S_c- the area of crossing section of coil core, in m^2;

p_T – feeding alternating current frequency.

The equation particular solution (2) is:

$$S = A_0 + A_1 \cos(2p_T t - \varphi) \qquad (3)$$

Where: $A = F/c_1$ is the steady displacement of mass center O of mass m; A_1 – amplitude of oscillations of center O;

φ – angle of phase difference between variable parts of mass center *O* and disturbing force, given by the relations:

$$A_1 = (F/m)\sqrt{(c_1/m - 4p_1^2)^2 + 4\mu^2 c^2 p_T^2/m^2} \quad (4)$$

$$\varphi = arctg\frac{2\mu c p_T}{c_1 - 4mp_r^2} \quad (5)$$

The resonance of oscillating system appears for pulsation: $p_T = \sqrt{c_1/m}$.

For current of industrial frequency, f = 50 Hz, the part supporting the load (the auger) oscillates by a double frequency, namely *f* = 6000 1/min, which is generally inadmissible. In order to diminish the auger frequency up to 3000 1/min, a semiperiod rectifier (Fig.3) is introduced, and the rectified voltage modifies the magnetic flow action and shock movement type. This movement is described as another equation of a disturbing force represented by a circular function Fourier.

Vibration feeders can be considered as two masses spring systems (Fig, 5) [3;4]: the mass of the part feeding the bulk solids m_a consists of the vibrating flute or pipe 1, the bulk solid mass 10 and the magnetic vibrator (positions 2, 3 and 4). The second mass m_f involved is that of the free side consisting of the mobile body 5 and 6. Both masses are connected by springs 7. The electronic control unit 8 is connected with the normal AC voltage supply. Normal 50 Hz excitation will yield a 100 Hz vibration frequency, with thyristor control 25 and 50: efficient control of the vibration amplitude is possible

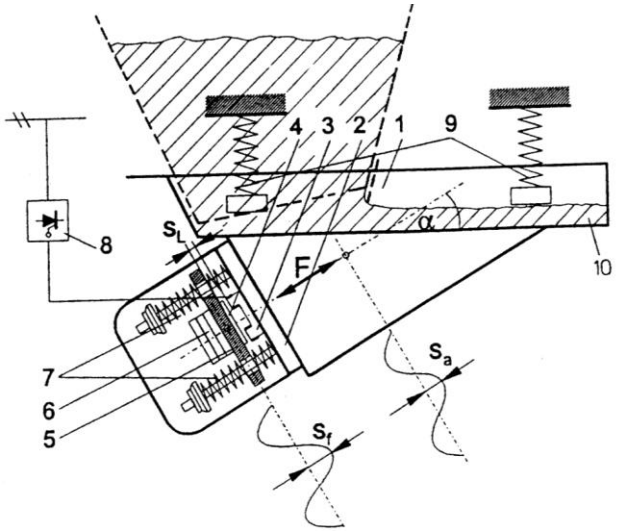

Figure 5. Magnetic vibration feeder: 1-vibration flute; 2 - vibrator housing and other components; 3-electromagnet; 4- mobile magnetic coreplate; 5, 6- additional masses; 7 - spring;8 - control device; 9- suspension springs;10-transported materialS_f - vibration amplitude (free side); S_a -vibration amplitude (working side).

Amplitude s_0 of the chute depends on the constructive and functional parameters, as well as on the type of the transporting material.

The displacement of the vibrating mass can be considered with sufficient approximation, as a harmonic sinusoidal oscillating movement, with elongation *s* given by relation:

$$s = s_0.\sin(\omega t) \quad (6)$$

where: s_0 is the oscillating amplitude; ω – oscillating pulsation: $\omega = 2\pi f$ (were f is the oscillation frequency, in Hz.)

The velocity of the oscillating movement is given by relation:

$$v = s_0.\omega \cos(\omega t) \tag{7}$$

where $v_0 = s_0.\omega$ is the amplitude of the velocity, and the acceleration of the oscillating movement is expressed by relation:

$$a = -s_0.\omega^2 \sin(\omega t), \tag{8}$$

where $a_0 = -s_0.\omega^2$ is the amplitude of acceleration.

The oscillating frequency f of the vibrator is given by the well known relation: $f=\omega/2\pi$.

If the value of the amplitude's acceleration a_0 is in ratio with the gravitation acceleration g, is obtained the characteristic of the machine K_M, given by relation:

$$K_M = \frac{a_0}{g} = -\left|\frac{s_0.\omega^2}{g}\right|. \tag{9}$$

The natural frequency f_e of the spring-mass system without attenuation can be determined with the masses m_a and m_t and the spring constant c.

$$f_c = \frac{1}{2\pi} \cdot \sqrt{\frac{c}{m_r}} \quad ; \tag{10}$$

$$m_r = \frac{m_a \cdot m_f}{m_a + m_f}. \tag{11}$$

The vibrating system responds to an excitation frequency f_a with adequate amplitudes which grow the nearer f_a approaches the natural frequency f_e ($f_a/f_e=1$, resonance). The natural frequency decreases with growing attenuation (Fig. 6), the amplification factor V is very strongly influenced by attenuation. In order to operate vibration feeders close to resonance the system has to be adequately tuned (masses 6, Fig. 5). The effective attenuation is induced by friction, e.g. internally in the bulk solids, and externally at surfaces.

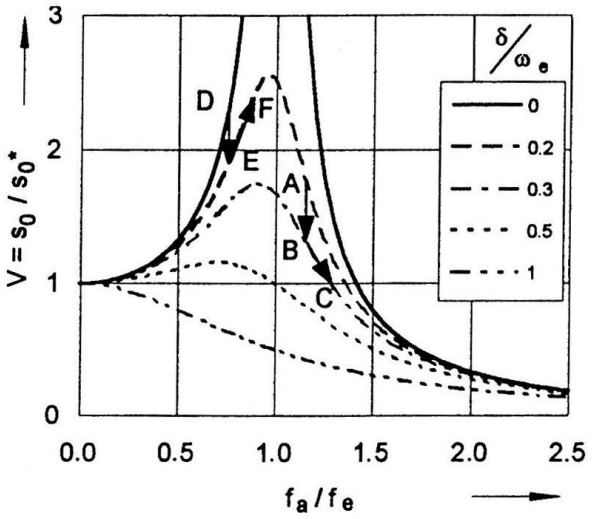

Figure 6. Amplification factor of vibration amplitudes *V* depending on the excitation frequency ratio (f_a/f_e).

For metering purposes close to resonance conditions the automatic control of the vibration amplitude is strongly recommended to keep the disturbance potential within narrow limits [4; 5]. The measurement of the set vibration amplitude can be achieved by acceleration sensors (Fig.7) or by stationary vibration displacement transducers (Fig.8). With the combined control system for the vibration amplitude which automatically keeps the operational conditions close to the resonance frequency it is possible to obtain good linear and reproducible vibration feeder characteristics.

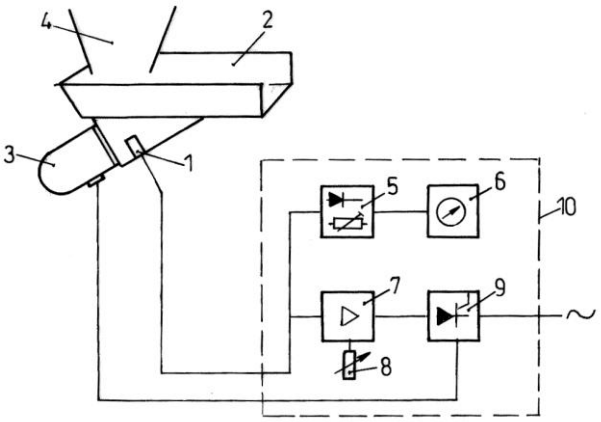

Figure 7. Automatic control of the vibration amplitude: 1 - acceleration sensor; 2, 4 - vibration feeder; 3- vibrator; 5,…, 10- controller.

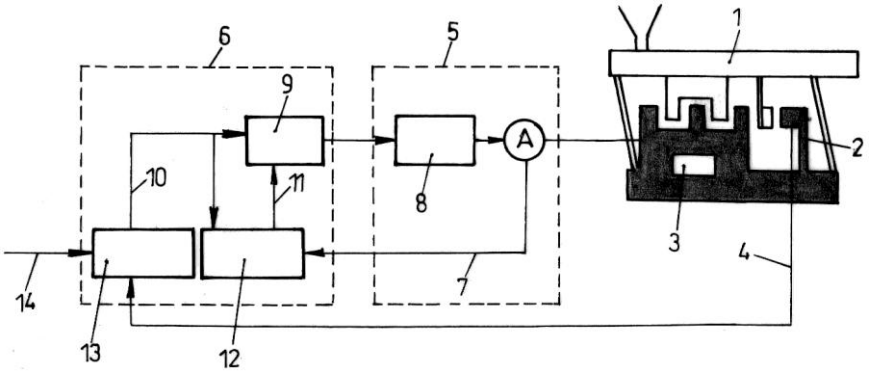

Figure 7. Combined control of vibration amplitude and resonance frequency: 1 - vibration feeder; 2 - vibration transducer; 3 - magnetic drive; 4 - feedback signal;5 - power unit; 6 - control system; 7 - current signal; 8 - amplifier; 9 - AD converter;10 - set-point amplitude; 11 - set-point frequency; 12 - frequency control (slow); 13 - amplitude control (fast); 14 - input signal

CONCLUSIONS

1. Taking into account the technical and economic advantages of the vibrating systems with electromagnets (electrovibrators) they are used not only at vibrating conveyors for grain matters (including seeds) but also at driving the vibrating sieves of technological primary processing installations for cereals;
2.The theoretical study of system of sieves mounted on vibrating frame operated by electrovibrators can be achieved by replacing the real systems with equivalent vibrating dynamic systems with external excitation, comprising one or two vibrating masses;
3. By solving the differential movement equations of vibrating systems with one or two vibrating masses and their applicability for concrete situations, we can study by computer simulation the kinematic and dynamic behaviour of systems endowed with existing or in course of designing vibrating sieves;
4. The results of theoretical researches performed on basis of those presented in the paper allow the optimization of constructive and functional parameters of systems of vibrating sieves, in view of manufacturing state-of the art installation.

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STUDIU PRIVIND POTENȚIALUL ŞI IMPACTUL AGROTURISMULUI ASUPRA DEZVOLTĂRII ECONOMICO-SOCIALE A JUDEȚULUI VÂLCEA

STUDY CONCERNING THE POTENTIAL AND THE IMPACT OF AGROTOURISM ON ECONOMIC AND SOCIAL DEVELOPMENT OF VALCEA COUNTY

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Key words: agrotourism, impact, rural areas, durable development.

REZUMAT

Studiul elaborat are în principal scopul de a pune în evidență oportunitatea apariției şi dezvoltării activității de agroturism în zona de nord a Olteniei, în special în județul Vâlcea. În vederea realizării acestuia s-a efectuat un studiu amplu şi de durată în regiunea respectivă, în urma căruia s-au evidențiat foarte clar şi realist care sunt factorii favorabili şi impactul agroturismului în dezvoltarea economică şi social-culturală.

În final prin analiza şi interpretarea rezultatelor obținute s-a ajuns la concluzia că activitatea de agroturism are un rol şi un impact deosebit de semnificativ în dezvoltarea economico-socială a localităților rurale, întrucât prin utilizarea rațională a tuturor resurselor agroturistice naturale şi antropice, valorificarea superioară a bogatului tezaur etnografic şi cultural-istoric, asigurarea conservării şi protecției mediului, se realizează un adevărat progres în evoluția, dezvoltare şi emanciparea satului românesc din zona de nord a Olteniei.

ABSTRACT

The study is mainly designed to reveal the opportunity of emergence and development of agrotourism activity in the north of Oltenia, particularly in Valcea County. It has been made a lasting and comprehensive study of the region from which it showed very clearly and realistically what are the favorable factors and economic impact of agrotourism in social and cultural development.

Finally the analysis and interpretation of the results concluded that agrotourism activity has a role and a particularly significant impact in social and economic development of rural areas. The rational use of all natural and human agrotouristic resources, higher turning of the rich ethnographic and historical-cultural treasures, ensuring of the conservation and environmental protection, it really made a breakthrough in the evolution, development and emancipation of the Romanian village in the north of Oltenia.

INTRODUCTION

Valcea is a Romanian synthesis of renewal, of curiosity over what belongs to other horizons and deep attachment to tradition, a space of overflowing fantasy. Ethnologists, anthropologists, researchers of popular literature and popular image concluded that the power of fantasizing of Valcea peasant is the highest of all over the Romanian. Popular books and pictures that are found painted in churches 200 or 300 years ago, really prove this freedom, a freedom of metaphor and literary arts, as we find in no other Romanian space.

Also, Valcea is a space for attachment to tradition, to the national idea, to the duke idea, to the orthodoxy and make the attachment to nature, which is absolutely wonderful. A man of the place -200 years ago- a predecessor of Bishop Parent Gherasim, spoke about

this "beautiful garden of the Virgin Mary and of the Romanian Country ..." (Razvan Theodorescu, *Spiritul Valcei in cultura romana*).

MATERIAL AND METHOD

The study focused primarily on the 3 interrelated elements of the agrotourism and rural tourism:

•attraction to natural beauty, novelty, charm and specific life events from the village;

•accommodation and meals, without claiming to be at the hotel standards, but to be provided with quality and hospitality;

•transport, access roads to rural areas are primary elements to ensure a steady stream of tourists.

The practice of a competitive and efficiency tourist activity has become a true science.

The main objective of the study is achieving of a comprehensive awareness on the natural, economic and history-cultural potential of Valcea County.

Therein refers only to the Valcea county, held keeper of history and legend, swing and mystery place for rulers, refuge and shelter in dark periods of history. Presentation of main components of the landscape and resources detailed analysis was made by studying the cartographic, photographic and existing information material, schematization and retaining of the key elements. By way of structuring and presentation and the interest generated by the knowledge of one of the most beautiful and most blessed areas of Romania, the results of information knowledge are at a high level.

RESULTS AND DISCUSSIONS

Starting from the main goal of the undertaken study – the detailed knowledge of arotouristic potential (natural, economical and historical-cultural) of Valcea County – is presented its major components and advantages.

1. Natural tourism potential

1.1. Geographical position

Valcea County is located in the central southern part of Romania, on the Olt river both sides. Its location is clearly defined by geographic coordinates, is included between 44º28′ and 45º36′ 28' latitude and between 23º37' and 24º30' longitude, limited by the District Sibiu (N), Arges (E) Olt (S and SE), Dolj (S and SW), Gorj (W), Hunedoara (NW) and Alba (NW).

The area is 5765 km², representing 2.42% of the country and the residence is Ramnicu-Valcea. Cities: Baile Govora Baile Olanesti, Brezoi, Calimanesti, Dragasani (municipality), Horezu Ocnele Mari. Municipalities: 77. Villages: 564.

1.2. The relief

The relief of Valcea County is included in the Brezoi - Titesti depression and a part of the getic perimeter. On North-east mighty massive Fagaras range between Olt and Topolog rivers built from nine heights, one high in the north along which are found the highest peaks of the Romanian Carpathians Negoiu and Moldoveanul, which rises as peaks of pyramid with crests, that dominate the Olt Valley.

To the west of Fagaras, on the right of Olt river is found Parang Mountain. The Parang Massif presents favorable conditions, human settlements, and hospitable broad valleys in the mountains that permit villages' establishment to the main peaks (eg village Voineasa).

Between the two peaks of the Fagaras opens a longitudinal depression on the East-West which enlarges near the Olt River, in the Titesti tertiary basin. The lowland continues west of the Olt River on Lotrului Valley between the mountains Lotrului and Capatinei.

Cozia Mountains appear as a prominent and abrupt massive with elevation of 1668 m, dominating through its flexibility to the north, depression Lovistea Land and to the south

sub-Carpathian depression Jiblea. Middle level of sub-Carpathian hills and depressions occupy an area of 1 / 5 of the county's territory. The most important sub-Carpathian hills from Valcea are: Magura Slatioara (767m), Tomsani Hill (576m), Costesti Hill (597m) Bunesti Hill (680mA), Petrisor Hill (448m) Guranoaia Hill (448m), Roboaia Hill (871m).

Piedmont plateau step includes the hills and valleys, located on the heights from 300 to 500 m are formed by the lower hills of Dragasani and Balcesti.

1.3. The climate

Climate, though temperate continental, has some nuances that are imposed primarily by carrying out relief in steps, from heights exceeding 2000m (Suru, Mizgavu) and up to 300 400m in "plain" Dragasani. In these conditions meet the temperature variations ranging from 2ºC (in the mountains) and 11ºC (in the southern region of Valcea County). The average annual temperature in Ramnicu Valcea is 10.2 ºC.

Because of relief diversity, distinguish the following climate floor:

-**mountain climate**, with subfloors: **alpine** in mountains with heights over 1800 2000m, as the Fagaras, Lotrului, Capatinii, Parang mountains, where find good grazing alpine meadows, **subalpine**, the mountains with heights up to 1800m, with moderate differences temperature between winter and summer, favorable for development of coniferous and deciduous forests.

-**hill climate**, more diversified due to fragmentation of very sharp relief, so appear these topoclimates: Carpathian hills topoclimat; Carpathian depressions topoclimat that favour the development of agricultural crops; piedmont hills topoclimat, which due to relief, favours the development of oak forests and vine plantations; Olt Valley topoclimat.

In the region of under-Carpathian hills were recorded annual average temperature ranging from 4 to 8°C and precipitation about 600- 800 mm annually; in the hills of the plateau, average annual temperature is between 8-10°C, reduced rainfalls to 400-600 mm annual and winds are frequent, generally with a north to south direction, also those from the west and east directions, specific to Romanian Plain.

1.4. Soils and its riches

Starting from the time of Geto Dacians, at Ocnele Mari is exploiting salt – wealth of price for Sub-Carpathians. Gold mining from Valea lui Stan is mentioned during the reign of Petru Cercel (1583 -1585).

The Lotrului "Cataracts", since the beginning of the twentieth century, began exploitation of “pegmatite with muscovit" (white mica) and “Biotite” (black mica). The entire massif between Manaileasa and Lotru is rich in this deposit. Geological studies undertaken have given reveal a rich deposit - coal, known within the late nineteenth century. In the basement of the county has identified structures of hydrocarbons (oil and gas), exploited at Babeni, Gradistea, Olanu, Madulari, Gusoieni.

In Valcea are also found rocks and building materials of great value, as gneiss of Cozia (exploited since 1927), limestones at Costesti and Pietrari, sandstones in Caciulata, Folestii de Sus-Tomsani, marble at Raul Vadului, tuffs to Goranu, Cetatuia , Ocnele Mari, sand and gravel at Costesti, Francesti, Zavideni, Fiscalia-Ionesti.

Another resource specific county, which connects the existence and development of resorts in the Olt Valley, is the mineral waters. Known in the past centuries, they were used only from 1955 year.

1.5. Hydrography

Valcea County is crossed by a rich hydrographical network. Centrepiece of the whole network is river Olt - legendary river, which with its magnetic wires connects the hearts of all Romans. Olt name appears in very old documents, Ptolemy (ca. 90 -168 AD), remind of river Aluta. Olt River, main flowing water, which crosses the county on a length of 130 km, has a multi-annual average flow of 115 m^3/s in Ramnicu Valcea and an average slope of 1.5 m/1 km, with a huge hydropower potential.

Besides the network of rivers, Valcea county territory has a series of lakes that are meeting in the high mountain regions until Getic Piedmont. Although few in number, with reduced extension, Valcea lakes have a wide variety of formation and gives a special note of the landscape. In Parang Mountains, glacial lakes Cilcescu - which draws its source Lotru - Gauri, Vidal's Lake, Pasari and other from water accumulating in circus of former glaciers. Glacial lakes, by incomparable beauty, are also found in Latoritei-Cioara, Iezerisul Latoritei, Muntele Mic and and Singuraticul montains.

Artificial lakes from which is distinguished the Lotru Vidra Lake (340 million cubic meters), Babeni (48 million cubic meters) and Ionesti (39 million cubic meters) of the Olt River, the glacial lakes in the mountains of Obarsia Lotrului (Galcescu, Zanoaga Mare Iezerul-Parang, Gauri) and the lakes from Latoritei basin (Iezerul Latoritei, Muntinelul Mic, Cioara, Singuraticul) also salt lakes from Ocnele Mari and Ocnita - used for therapeutic purposes - fill the hydrographyc network of the county.

1.6. Vegetation

Diversity of terrain and climatic conditions existing within the county favored the development of rich vegetation, ordered in floors corresponding relief's altitude. Almost 40% of the county is covered with forests (4.2% of the country).

The variety of relief and climate make in the Valcea County to find a rich flora and fauna, characterized by the presence of many species from various parts of Europe. Depending on the distribution of the relief in the district and the climate zones, vegetation presents a multilevel: *alpine vegetation* meets between 2000 2200 m altitude, *subalpine vegetation* on northern slopes down to about 1600 m and on the southern to about 1800 m altitude, *forest floor* overlaps hilly and mountainous terrain, below the floor subalpine, *coniferous forests*, whose upper limit is higher on the southern slopes and lower on the northern handle varied areas in the Fagaras, Lotrului and Capatinii Mountains between 1600 1800m altitude, *mixed forests, coniferous and beech*, occupy a wider area and are found at medium altitudes but with a large development in the Lotrului basin. In Cozia Mountains these forests appear as islands, surrounded by pure beech forest (*Fagus sylvatica*) that climb from about 800 to 1100m altitude, oak forests as a belt around the lower limits of the beech, are present in Olt, Oltet, Bistrita valleys and in the south of the county. Oak forests consist of *Quercus petraea*, Central European origin tree. Generally they are pure forests and occupy low hills at the foot of the mountains including Oltetului Plateau. Worthy to note is that forest of oak (Q. petraea) climb the southern face of the massive Cozia up to 1300 m, representing the highest limits in the country.

1.7. Fauna

Fauna, interesting and rich in species of various origins, retains about the same range mentioned in the flora, in the sense of the predominance of European elements. Composition and distribution of fauna within the county are the result of the climate peculiarities, of relief diversity and altitude superposing.

Some elements of Central Europe are: hedgehog, mole, bear, squirrel, wolf, lynx, wild cat, marten, weasel, deer and badger, of mammals and of birds: nutcracker, jay, owl, northern hawk owl, and others. As elements of the fauna Euro - Siberian quote: hawfinch which stops during summer, common crossbill, magpie, sparrow, sky lark, chaffinch, and blackbird.

Aquatic fauna is represented by several species of fish. In cold, clear waters of mountain living trout (Salmo fario trutto). Also are met Ukrainian brook lamprey (Eudontomyzon mariae), stone loach (Noemacheilus barbetulus), European bullhead (Cattus gabis) and others. In Olt river and its affluent are meet species as: common nase (Chondrostema nasus), Romanian loach (Cobitis romanica), common barbell (Barbus barbus), European chub (Leuciscus cephalus) and others.

As landscape features of Valcea County offers the best conditions for tourism in the most diverse forms, can not be neglected either as recreational activity the sport fishing.

The formation of the accumulation lake upstream of the Vidra dam enables possibility to populate with economically valuable and adapted species for ecological conditions.

1.8. Nature preservation

The conservation of natural resources from Valcea land must be a main concern for us, the more so as the nature protection in our country has become a very topical issue. The many forms of relief, houses a large flora and fauna, among which are many endemism, relicts and some very rare specimens, which by the scientific importance requires a knowledge of their resorts are present, and a more attentive care. In accordance with the National Program on conservation and forest development in the period 1976-2010, logging works in the county were correlated with those of forestation, their rhythm ensuring in this way the protection of hunting and fishing funds.

Taking into account the high rate in the industry grow, placing ever more pronounced in society the elements of modern civilization, a matter of vital importance to our nation is to protect the environment. It is necessary to take stringent measures to control industrial pollutants, prevention of air and water pollution, protect forests, lakes and rivers, mountains, places considered natural monuments.

Actions taken to keep environmental ambiance, the research that are currently under a long-range program are part of the main concerns of local and central bodies, the environment representing one of the important factors for the health of people and smooth running of human life.

2. The economic and cultural potential

2.1. The economy and agriculture

Current economy, now being expansion, modernization, restructuring and privatization, the emergence and development of new companies with private capital, to adapt to competitive market economy, etc., is characterized by a diversified industry, agriculture based increasingly on private property, by an active trade, and by an increased touristic activity, with higher recovery of available potential.

In Valcea county economic activity has an agricultural- industry profile. Distribution of economic activities in the district emphasizes industrial development in the city of Ramnicu Valcea, the cultivation of cereals and vines in the south, fruit growing and forestry in the northern area. Valcea County's agricultural area is 2463.1 km^2, representing 42.7% of the total area of the county and 1.7% of the total land area of the country. Of this, 33.7% is arable land, pastures 45.3%, meadows 12.7%, vineyards 1.7% and 6.6%. After the form of property, to the end of 2007 the private sector had 99.4% of the agricultural area. In late 2007 year, in Valcea County were 5278 active units in following structure: 6 autonomous administration, 279 joint stock companies, 4727 limited liability company, 155 other types of companies and 111 cooperative companies. Of the 5278 active units, 77 were majority state owned and 5201 private majority ownership.

They amounted to a turnover of 22,683.5 billion, of which 63.2% was achieved in join-stock companies, 34.5% in limited liability companies and only 2.3% in other companies. In addition to these units in May were in operation 5490 family associations and 5918 self-employers. However, in early 2007, in Valcea County were operating 366 foreign-owned companies, whose participation in capital of currency was 20.6 million dollars.

2.2. The historic and cultural treasure

An additional contribution to the local economy has the popular crafts with long tradition: pottery (Horezu, Lungesti, Slatioara), Oltenian popular carpets, stitches, kerchief (Horezu, Bunesti, Barbatesti, Pietrari, Paulesti), sheepskin coats (Barbatesti, Vaideeni) and others. On the religious-architectural and historic point of view, region of Valcea is sprinkled with more than 25 monasteries, hermitages and churches nominated as historical monuments of art and architecture, which preserves traces of our ancestors. Of

the most representative we mention: Arnota, Bistrita, Cozia, Dintr-un Lemn, Frasinei, Govora, Stânişoara, Hurezi, Surupatele, Turnu monasteries, Cornet, Dobrusa, Jgheaburi, Pahomnie, Pătrunsa, Sf. Ioan la Piatra hermitages.

Wood was the first material used to build not only homes but also the countless types of construction, furniture and tools. Arts and Crafts in Valcea are an emanation of the creative spirit of the local artisans. Houses with turret are one of the jewels of Romanian folk architecture. Valcea craftsmanship make that decorative woodworking to be kept today at a high level.

From the folk art elements of great artistic importance is distinguished national costume that illustrates the creative spirit of our people. Another area of folk art is ceramics. In art pottery, the ethnographic region of Valcea has its specific. Horezu ceramics, due to very fine ornaments and attractive chromatics is very appreciated both in Romania and abroad.

The **Oltenian kilim** is the living mirror of the blooming plain from this region, being primarily a kilim with vegetal motifs. However, in the decorative composition are used anthropomorphic and zoomorphic motifs. Along with Oltenian kilim specific to Valcea region is the quilt weaving in many shedding harnesses in horizontal machines.

The **Valcea folk area** retains enough elements of ancient culture through which ethnologists may elucidate important issues of ethno-genesis and evolution of the Romanian people. Customs connected with the cycle of human life - birthday, wedding, and funeral - provides the area specificity.

Ancient dance **"jocul calusarilor"** reminds of an ancient world of magic disappeared from the consciousness of people; **alimarile** or **osteteleul** remember the vegetation, sun and life old worship;

3. The agrotourism impact on the studied area

From analysis of agrotouristical and economical-cultural potential is found that although the researchers are found numerous weaknesses, they were not a limiting factor in the implementation and development of rural tourism activities, because their impact on area is small compared at the strengths, that have been and will remain important assets and attractions, the future development of the north area of Oltenia. Most important role of agrotourism in the area is the very strong impact on economic and socio - cultural development of rural land, which during the communist era was forgotten altogether. The benefits of these activities are visible, rapid and significant, manifesting on the level of the Valcea countryside by:

- direct source of capitalization and modernization of farms, because revenues go directly to families of farmers, leading to the recovery of agricultural heritage and exploitation of cultural traditions from the rural world;
- ensuring durable and sustainable development of rural areas through rational use of all resources, waste recycling, reduction and disposal, ensuring of the conservation and environmental protection, decreasing of agricultural and forest land removal;
- acquisition of new skills other than the farmer in the provision of tourist services;
- maintenance and perpetuation of traditional trades and crafts as: pottery, wood processing and leather craft, weaving, glass painting, handicrafts and embroidery;
- stop the exodus of population from rural to urban areas, especially the young population, because of the lack of occupation;
- significant growth of jobs number, especially those occupied by female staff, drawn mainly in the work of agrotourism;
- increase farm and rural household's income and raising the living standards of inhabitants of rural areas that have developed rapidly;
- significant increase of the investments number and volume in the region - in infrastructure, agriculture, trade, services and tourism;

- improvement of habitat, endowment with elements of modern civilization materials (toilet, hot and cold running water in the house, sewerage, telephone, fax, television, etc.), thus substantially reducing the gap between living in rural and urban areas;

- most effective turning of the representative elements of architecture, civilization, religion, art and culture, which expressing a certain cultural identity and develop the spirit of tolerance;

- higher levels of education, culture and civilization for the inhabitants of the villages, because by practice of agrotourism they must study, inform and continuously improve, to rise to the requirements of guests from different social backgrounds and countries;

- recovery typical agricultural products and traditional dishes of the region;

Of those given notice that agrotourism is a particularly important role in the future development of the north area of Oltenia, and the research undertaken clearly and realistically showed, the very strong influence and impact of agrotourism on all fields of activity.

CONCLUSIONS

1. Valcea County has a rich historical, cultural, religious and architectural tradition, authentic and unique traditions, all of which may be exploited and efficiently recovered by the agrotourism activity. The most important known and preservers of traditions are local people. Valcea County through its resources can become the brand image of Romania.

2. The most relevant conclusion is that agrotourism activities in the rural areas where has been implemented and developed have a very important role to revive, recovery and boosting the entire complex of economic, social, cultural and spiritual factors. Its impact in the studied area on whole evolution and development is strong and representative, being a true engine of economic, social and cultural development of villages from Valcea.

3. For harmonious and uniform development of rural tourism in the county, country and at the European Union must develop a set of common strategies and programs, well thought out and coherent, which to act on the basis of accurate, clear and realistic rules and regulations.

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STUDIU PRIVIND IMPLEMENTAREA TEHNOLOGIEI GIS ÎN ELABORAREA PUG LA NIVELUL COMUNEI BISTREȚ – DOLJ

STUDY CONCERNING IMPLEMENTATION OF GIS TECHNOLOGY IN PUG ELABORATION ON THE LEVEL OF BISTRET COMMUNE – DOLJ

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Key words: GIS, PUG, map, plan, topo-surveyng details

REZUMAT

Studiul are ca scop prezentarea în prima parte a unor date generale privind tehnologia GIS şi rolul acesteia în lucrările de urbanism şi publicitate imobiliară. De asemenea, în continuare se prezintă succint care sunt avantajele şi dezavantajele utilizării acestei noi tehnologii în lucrări menționate şi modul de realizare şi implementare a unei scheme organizatorice GIS. În final se descrie explicit care sunt obiectivele urmărite a se realiza la nivelul comunei Bistreț, straturile Gis utilizate în elaborarea Planului Urbanistic General şi paşi concreți urmați în vederea generării unui Certificat de Urbanism.

ABSTRACT

The paper purpose is the presentation on the first part of some general data concerning GIS technology and its role in urbanism and real estate advertising projects. Also, in the next place are presented which are the advantages and disadvantages of this new technology utilization in mentioned projects, and way of realization and implementation of a new GIS master schedule. Finally are described which are the objectives to be achieved on the level of Bistret commune, the GIS layers used in General Urban Plan (PUG), and the concrete followed steps for generation of an Urbanism Certificate.

INTRODUCTION

Geographical Informational System (GIS) is a new technology assisted by computer where through are transposed and analyzed existing details events taking place on the Earth. This integrates operations concerted with data bases, such research and statistical analysis, with benefits of a unique view and geographical analysis, offered by maps.

The system offers the possibility to create maps, to integrate information, to view scenarios, to solve complex problems, to show thoroughly ideas and to develop effective solutions as never be made. GIS is a way used by individuals or organizations, schools, governments and business which search new modalities to solve its problems. It store information about world as a collection of thematically layers between can be made links based on geography. This simple but extremely firm and many-sided concept was proved to be priceless for solving of many real world problems; from detecting of delivery vehicles, to registering of details for planned applications, up to modification of global atmospherically circulation.

Geographical information contains either an explicit geographical reference, such as a national or latitudinal and longitudinal coordinate network, or a default reference such an address, a postal code, name of a census tract, forest lot ID or a street name.

An automated process named geocodification is used to create explicit geographical references (multiple locations) from implicit references (descriptions such addresses).

Geographical informational systems works with two fundamental different types of geographical patterns: “vector” pattern and “raster” pattern. Inside vector pattern,

information about points, lines and polygons are encoded and stoked as a collection of X, Y coordinates. Linear characteristics, as rivers, roads, may be stoked as a collection of points coordinates. Polygonal characteristics, such commercial surfaces and river catch basins, may be stoked as a closed loop of coordinates.

Vector pattern is extremely efficient for description of abstract characteristics, but less efficient for description of some characteristics that are in continuous diversification, such type of soil or costs accessibility for hospitals.

Raster pattern was developed precisely to form these variable characteristics. A raster image includes a network cell square, somewhat as a map or a scanned image. Both patterns (vector and raster) for geographical data storage have distinctive advantages and disadvantages. Modern geographical information systems are able to use both patterns.

MATERIAL AND METHOD

For its practical use, geographical informational system must includes devices and equipments with which can be solved five basic groups of problems:

I. LOCATION: "What's on …?" – identification of objects/phenomenon placed at a certain geographical position specified through denomination, postal address or geographical coordinates.

II. CONDITION: "Where it is …?" – find out the exact position of an object/phenomenon or a set of specified requirements (for example: deforested area of minimum 2000 square meters with auspicious soil for structure building, situated at maximum 100 m from a road).

III. TRENDS: "what was modified since …?" – highlighting of changes occurred in a geographical area during a time period.

IV. FEATURES: "what features are manifesting in area …?" – the answer is obtained by a complex analysis, searching correlations by cause-effect type.

V. SIMULATION: "what will happen if…?" – suppose the anticipation of an event impact (adding / eliminating / conversion of an object / phenomenon) on environment.

GIS technology showing its utility in any field of activity based on spatial information treatment: urban planning, territory planning and public administration; cadastre; environmental protection; agriculture, pedology, forestry and improvement of land; oil and gas; cartography; utilities networks; transport and telecommunications; commerce; special applications; geology; hydrology; oceanography; statistics, population evidence, census, demography; banking; politics.

To be properly and functional at implementation of GIS system must be realized a organization scheme of the staff, which can precise and operative accomplish 11 general activities. Each of it requires some knowledge and skills. Indeed, is not excluded that the same person can execute more then one of these activities or a group of persons to take care only of one from provided activities.

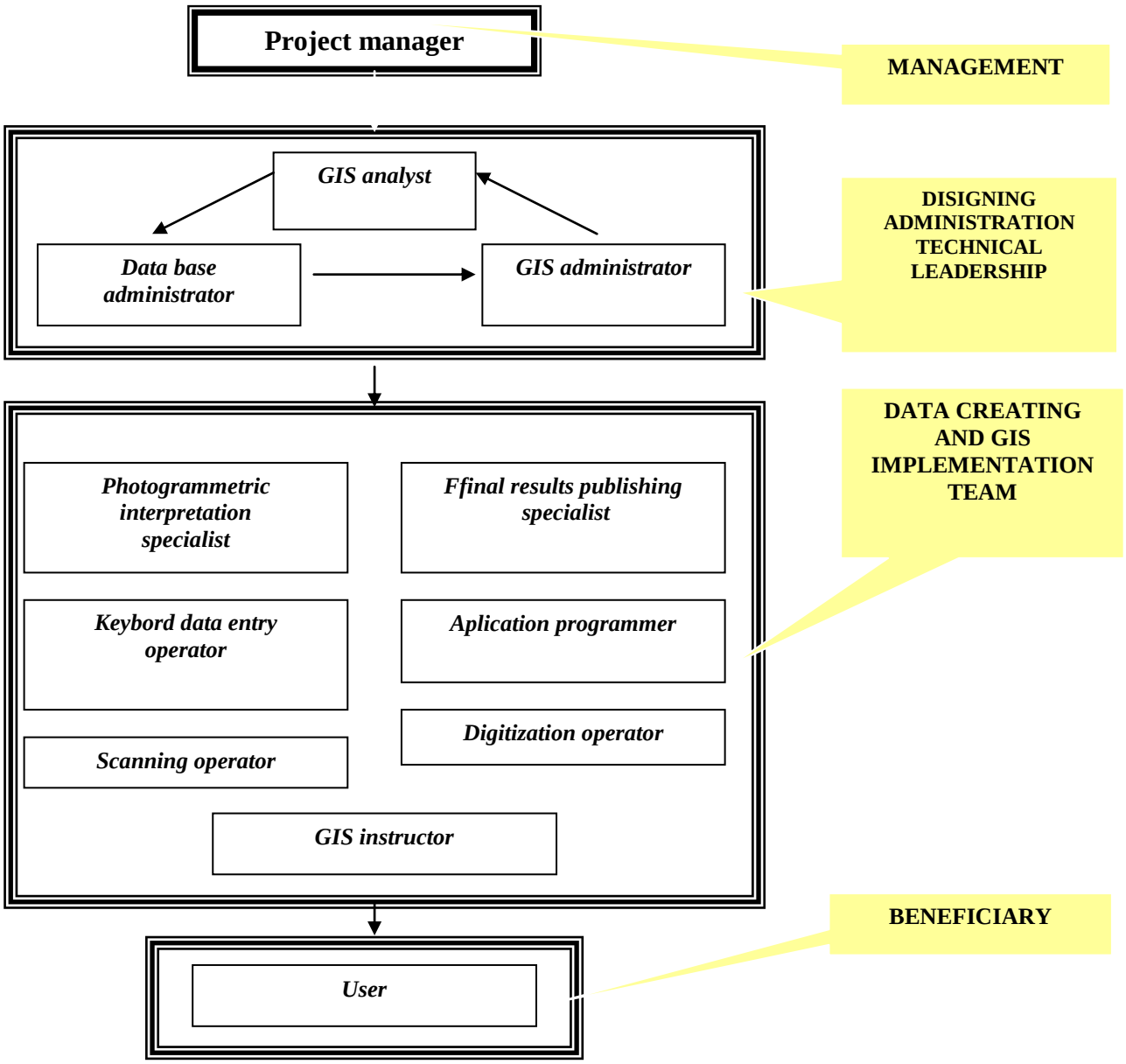


Figure 1. Organization scheme of a GIS

RESULTS AND DISCUSSION

1. GIS system - case study – Bistret commune General Urban Plan (PUG)

The study aimed achievement of following objectives:

- The execution of a **Geographical Informational System (GIS)** for management of general urban plans and urbanism local regulations at county level;
- Obtaining of updated topographic support (inside and outside land), with scanning accuracy 1: 5 000 in digital format (the area average of locality: 6 500 hectares);
- Scaning – vectoring of graphical information from existent PUG and its transposition on actualized topographical support, also the processing of urbanism local regulation in digital format;
- Achievement of GIS application for PUG management, organization of GIS data base and implementation on local authorities' level.

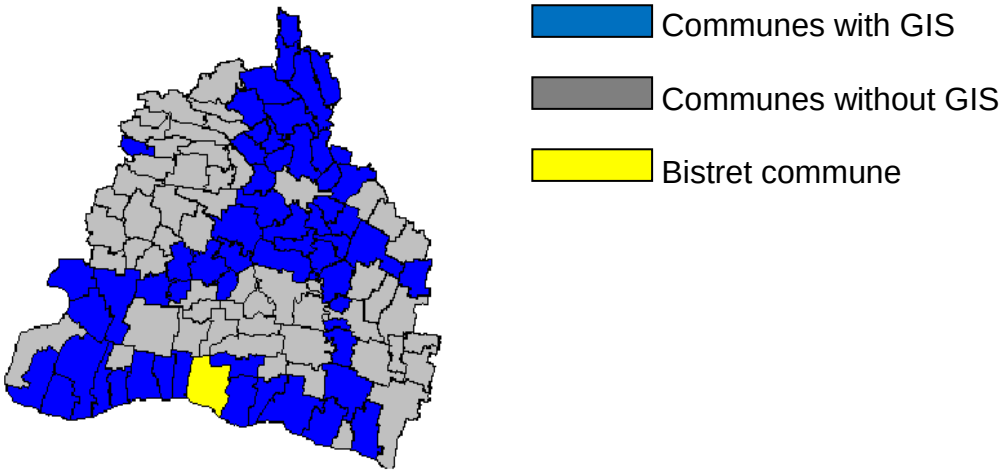


Figure 2. GIS distribution area at the Dolj County level

1.1. Short- term objectives:

- Efficiency of local authorities activity concerning administrative regulations issue in urban planning field;
- Application of rational models for rural and urban localities development and modernization;
- Creation of income sources for local budgets from information management;
- Achievement of an application which efficiently manage local authorities activity concerning issue of administrative regulations.

1.2. Long-term objectives:

- Management improvement in local administration;
- Coherence of administrative act;
- Computerization of administrative act;
- Deep change of relationship between administration and citizen.

Historical monuments management:

- Inventory, data base creation, monuments cadastre, history of intervention on the monument.

Management of protected natural areas:

- Inventory, data base creation, administration of protected natural areas.

Risks management:

- Inventory, risk maps elaboration, natural and technological risks management.

1.3. GIS technology implementation on the level of Bistret commune

Bistret commune is one of the 114 localities from Dolj County, situated in South side of the County, at administrative limit with Bulgaria, bordering with:

- North – Afumati and Urzicuta communes;
- South – Danube River;
- East – Goicea commune;
- West – Negoi.

Figure 3. Bistret administrative-territorial plan

The commune has 4 630 inhabitants living in 1904 households, in the four villages components: Bistret, Bistretu Nou, Plosca and Brandusa.

According map and land registry, the total area of administrative territory is 12 241 hectares, 354 hectares of inside land and 11 887 hectares of outside land.

The General Urban Plan (PUG) of bistret commune was made in 1999 year, using the traditional method.

Commonly a classic PUG represents a collection of 5 – 9 large format drawings, also the local urban planning regulations. In its entirety, the PUG represents a accumulation of information, which must be consulted when require to take some decisions linked with urban planning at local and county level.

By GIS implementation program in management of Bistret commune PUG, was pursue elimination of some deficiencies.

The main elements highlighted in documentation are:

- setting of directions, priorities and regulations in land planning and localities urban development;
- rational and balanced use of land, needful for urban functions;
- indication of the areas with natural risks (landslides, over floods, geological heterogeneous, reduction of vulnerability for existing building fund);
- highlighting of valuable built fund and its capitalization for the benefit of municipality;
- increasing of life quality, especially in housing and services areas;
- substantiating of some public utility investments;
- providing of regulatory support for issue of urban planning and building permits;
- correlation between the collective and individual interests in land use.

1.4. GIS layers for Bistret PUG

Pursuing the framework structure for a PUG achievement, were made following GIS layers:

1. Topographical support: - administrative border, administrative area, water, communication routes, constructions, level lines, lines, land, texts.

2. Bordering in the area: - area with natural risks – floating, area with natural risks – landslide, border between villages, area of heritage protection, area of sanitary protection, area of technical protection, area of proposed inside land.

3. Existent situation: area with special destination, existent central area, area with constructions for technical-urban works, area communal household – graveyards, area for public institutions and services, existent inside land, objectives with patrimony value area, planted place, pleasure, sport areas, agricultural units area, industrial units area – depositing, surfaces drew from inside land, surfaces entered in outside land.

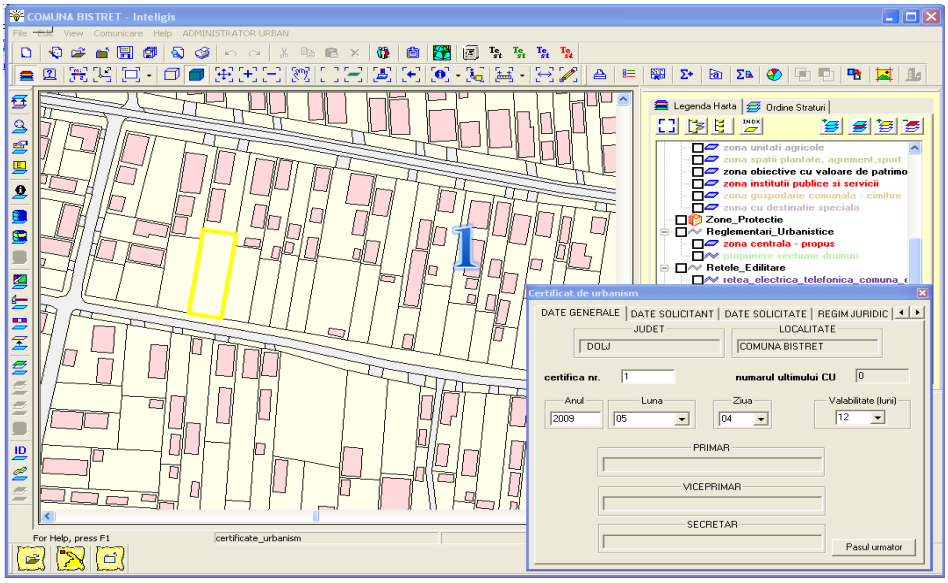
4. Urban regulations: - central area – proposed, area with definitive interdiction for building, propose for road expansion and change, area with propose for intersection arrangement, roads proposed for modernization – asphalting, roads proposed for modernization – pavement.

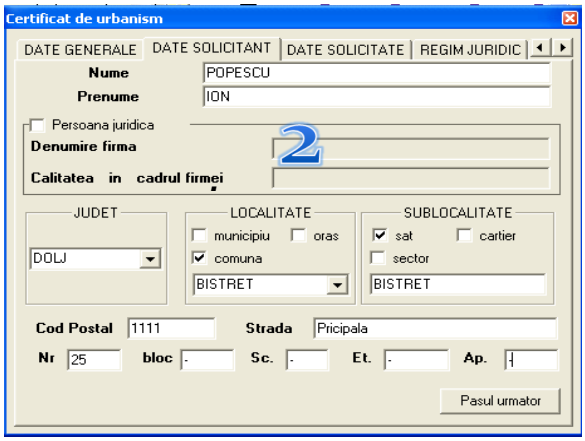
5. Regulations network utilities: - existent network utilities, proposed network utilities.

6. Ownership of land: land from private domain, for exchange, land to be passed in private domain of administrative units, land to be passed in public domain, land in private property of natural or corporal person, land in private property by county interest, land in private property by local interest, land in private property by national interest, land in public property by county interest, land in public property by local interest, land in public property by national interest, land in dispute.

Generation of urbanism certificate is one of the strength points of the application.

Is standing at the user disposal a “witch” that assists in operations unroll. The generation way for urbanism certificates is presented, on steps, as following:





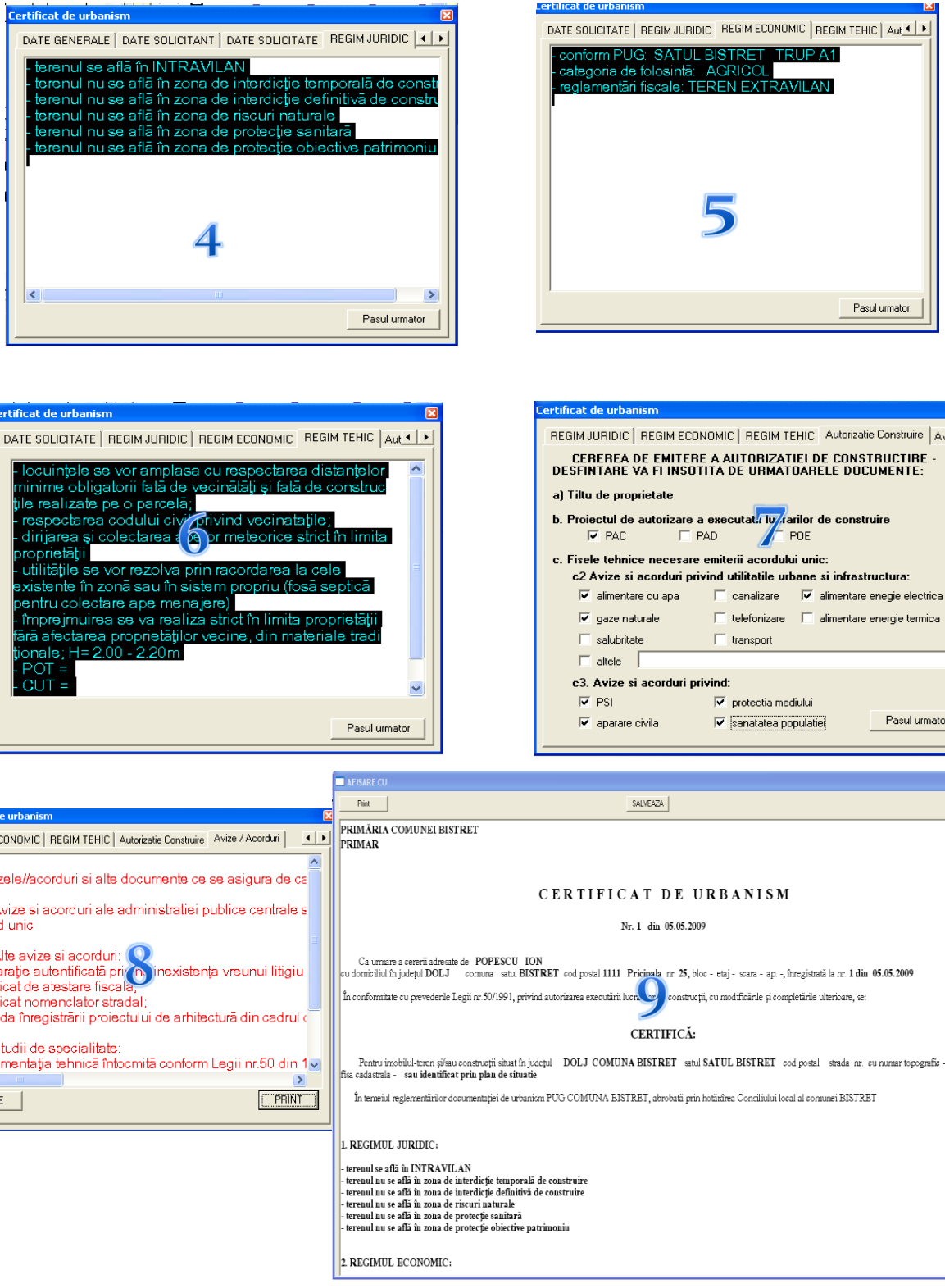


Figure 4. Steps for PUG generation

CONCLUSIONS

1. A geographical informational system allows joining many data tips, which are based on geographical and location composition. Unlike a static map, a GIS may expose many levels of information.

2. The user may integrate, view, manage, solve and present information in a new way. Links between data will become obvious and held data more valuable.

3. GIS technology offer the possibility to create maps, to integrate information, to view scenarios, to solve complex problems, to show strong ideas and develop effective solutions that never been realized until now.

4. Advantages of a GIS system consist in: higher level of interactivity (quality, level, speed); availability and accessibility; benefits for users: cost savings, real time of action, efficient using of staff; reorganization of government process; open system; a high level of transferability.

5. Geographical informational system technology is in continuous development, a computerized instrument for map execution and analyses of every elements existing on earth, also events that happen. GIS is an instrument used by individuals and organizations, schools, governments and business in searching of innovating ways for solving the problems.

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INFRASTRUCTURA TEHNICO-EDILITARĂ ŞI STRUCTURILE TERITORIALE ALE AGROTURISMULUI DIN JUDETUL ALBA

TECHNICAL-UTILITIES INFRASTRUCTURE AND TERRITORIAL STRUCTURES OF AGROTOURISM IN ALBA COUNTY

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Key words: agrotourism, farm, agrotouristical pension, tourist flow

REZUMAT

Lucararea a urmarit determinarea si fundamentarea valorii turistice a arealului ce apartine judetului Alba, alături de direcțiile, mărimea şi structura activităților agroturistice, fiind analizate elemente ca: nivelul de ocupare a locuințelor rurale; infrastructura tehnico-edilitara; capacitatea de cazare; circulatia turistica; etc. Din punct de vedere agroturistic, Valea Arieşului este cea mai dezvoltată zonă a județului Alba numită şi Țara Moților. Munții Apuseni, locuiți la mari înălțimi reprezintă o zona etnografică diversă şi o natură ce oferă posibilități pentru recreere - aici se află una din cele mai importante regiuni carstice din România - Ghețarul de la Scărişoara, Peştera lui Ionele, cheile Ordancuşii, defileul Ariesului etc. Locații importante pentru vacanțe în Apuseni sunt la Arieşeni, Abrud, Albac, Avram Iancu, Horea, Scărişoara sau Vidra unde se pot vizita biserici de lemn, gospodării tradiționale.

ABSTRACT

The paper followed to determine the tourist value of the area that belongs to Alba County, with directions, size and structure of agrotouristical activities, being analyzed elements as: the employment of rural housing, utilities and technical infrastructure, capacity of accommodation, tourist flow, etc.. From agrotouristic point of view, Aries Valley is the most developed area of Alba County, also called Moților Country. Apuseni Mountains, inhabited at great heights is a diverse ethnographic area and provide opportunities for recreation - here is one of the most important carstic areas in Romania - Glacier Scărişoara Ionele's Cave, Ordancuşii keys, the Aries pass. Important locations for holiday in Apuseni Mountains are: Arieseni, Abrud, Albac, Avram Iancu, Horia, Scarisoara, or Vidra, where you can visit wooden churches, traditional households.

INTRODUCTION

Located in the area where are meeting the Plateau of Transylvania,the Apuseni Mountains and Southern Carpathians, on the middle of the river Mures, Alba County is a symbol, a special land where can admire many beauties. Occupies an area of 6242 square km, respectively 2.6% of the country, of which over half is a mountain area, having in the year 2008, a population of nearly 416,000 inhabitants. Apuseni Mountains are found in west and north west and have a complex geological structure with rich and varied resources that play an important role in county's economy. Underground resources - ferrous ores (copper, lead, and zinc) and precious metals (gold, silver) are complemented by terrestrial resources - arable land (mostly pastures and meadows) and forests. Mures Valley is favorable to growing grain and vegetables, also livestock. Also, depression is the main corridor for road and rail roads, favoring an intense intern and international traffic. The Sebes Mountains extending towards the southern district, with altitudes exceeding 2,000 m, also important hydrographic network, forestry and tourism resources. Almost one quarter of the county's area is covered by Târnavelor Plateau, with rich agricultural resources (especially cereals and vineyards) and natural gas deposits. Human settlements

in Alba County have a uniform structure, the rate of urban / rural population (55.4% urban population) is above the country average.

The climate is continental and varies depending on terrain units, falling into 2 major sectors: in the mountain is a cold and more humid climate and in the hills, something warmer and drier.

The touristic potential of the county lies in the many vestiges of millenary history, the historical monuments, architecture and art, as well as varied and beautiful landscapes and the unique natural reservations in Romania and in Europe.

Popular customs and traditions are also a point of interest for Romanian and foreign tourists. Among these traditions Girls'Fair on Gaina Mountain organized every year on July 20, of St. Elijah. The places of interest are many and interesting: in Alba Iulia - the fortress built between 1715 - 1738, inside they find the Catholic Cathedral built in the XIII th century; Batthyanaeum library founded in 1794 and containing 60,000 volumes; Orthodox Cathedral, Union Hall, National Museum of the Union, city buildings from Abrud with a very well preserved medieval architecture, in Rosia Montana the Mine Museum famous for wax tablets written in Latin, in Sebes there is a medieval fortress of the XIV th century and in Aiud a fifteenth-century city. Blaj city is an important cultural and religious center of Transylvania.

MATERIAL AND METHODS

Alba County is part of the Center Development Region along with the counties Brasov, Covasna, Harghita, Mures and Sibiu. The administrative center of this region is Alba Iulia, the city with most important historical and administratative significance of the region. With an area of 34 100 square kilometers, representing 14.3 % of Romanian territory, Center Region occupy 5 rank among the 8 development regions. By its geographical position, makes connections with other 6 from 7 development regions, registering approximately equal distances from its central area to the border crossing points.

The tourism is one of the most dynamic economic sectors, which however has not reached the required development for the important tourism potential of the region. In 2006, the Center region has managed to attract 1.164 million accommodated tourists, becoming the first region of the country as a tourist destination and in 2007 the number of accommodated tourists increased to 1.330 million. Contribution of the tourism to the regional gross domestic product amounted to 2.95 % in 2005. The main forms of tourism practiced in the Center Region are mountain tourism, health tourism, cultural tourism and agrotourism.

Permanent, when shall consider the introduction and / or monitoring of tourism activities in rural areas, is the question of economic substantiation and therefore a primary operational record. For it requires adequate system methodologies and indicators by which to illustrate aspects of agrotouristic activity in time and space. The different forms of structuring the indicators of tourism activity in rural areas require knowledge of the geographical distribution of agrotouristic resources.

The paper followed to determine the tourist value of the area that belongs to Alba County, with directions, size and structure of agrotouristical activities.

In the research were analyzed the following indicators:

- the potential and technical infrastructure that refer to indicators concerning: quantification of agrotouristic products offer, the accommodation, existence of utilities in localities and agrotouristic units;
- agrotouristic capitalization involve specific indicators concerning the agrotouristic movement.

RESULTS AND DISCUSSIONS

From agrotouristic point of view, Aries Valley is the most developed area of Alba County, also called Moților Country. *Apuseni Mountains, inhabited at great heights is a diverse ethnographic area and provide opportunities for recreation - here is one of the most important carstic areas in Romania - Glacier Scărişoara, Ionele's Cave, Ordancuşii keys, the Aries pass. Important locations for holiday in Apuseni Mountains are: Arieseni, Abrud, Albac, Avram Iancu, Horia, Scarisoara, or Vidra, where you can visit wooden churches, traditional households.* Ampoita, Salciua de Jos and Rimetea are other places where there is accommodation in agrotouristic system being placed in areas of high tourist interest in the Trascăului Mountains.

In agrotourism, rural house by degree of equipment and modernization is considered the main factor in attracting tourists. Also the features of the housing delimit the functional classification of rural settlements.

Thus, for Alba County area is required to consider a variety of items as close to the reality of necessary resources, with particular reference to how to use them. In table 1 is shown the occupation level of rural housing in the county in the year 2006, in the administrative territorial structure.

Table 1.

The structure of housing in rural areas by the usage

Region/county	Unoccupied houses					
	Total		Permanent houses		Seasonal or secondary houses	
	No.	%	No.	%	No.	%
Country total	575,587	*100.0*	47,621	*100.0*	527,966	*100.0*
Region 7 - Center total	678,063	*11.78*	9,305	*19.54*	58,498	*11.08*
Alba County	10,048	*1.75*	1,108	*2.32*	8,940	*1.69*

Unoccupied houses in the examined area are 10,048, representing 1.75 % of national level, while permanent unoccupied houses have an average share of 2.32%. Seasonal or secondary houses have a share of 11.08 % over the whole region, Alba County by 1.69 percent of national total has a medium level of usage of them.

Technical-utilities infrastructure in rural area is a very important motivational trigger in agrotouristic attraction. References to water and gas supply, the existence of the sewerage system, etc.., presented by appropriate indicators reveals elements of agrotourism attraction but also the life level and village civilization. Thus, drinking water supply network in rural areas in the region, in 2006, is reproduced in table 2.

Table 2.

The drinking water supply network in rural area

Administrative frame	No. communes with drinking water facilities			Total length of water distribution network			Water supplied to consumers		
	No. communes	% toward total region	% toward total national	km	% toward total region	% toward total national	thousand cubic meters	% toward total region	% toward total national
Country total	1620	790.2	100.0	22606	911.2	100.0	145116	519.8	100.0
Center Region total	205	100.0	12.6	2481	100.0	10.9	27916	100.0	19.2
Alba County	40	19.5	2.4	325	13.1	1.4	1400	5.0	0.9

Rural sewerage system, gas and heat distribution even considered indicators of comfort seek by any tourist, in Alba County are not at a favorable level, in table 3 are presented these indicators.

Table 3.

The sewerage system, gas and heat networks

Administrative frame	Communes with sewerage system			Communes with gas distribution			Communes with heat distribution		
	No.	% toward total region	% toward total national	No.	% toward total region	% toward total national	No.	% toward total region	% toward total national
Country total	387	601,6	100,0	525	*293,3*	*100,0*	26	*1300*	*100,0*
Center Region total	61	*100,0*	*15,8*	179	*100,0*	*34,1*	2	*100,0*	*7,7*
Alba County	5	*8,2*	*1,3*	21	*14,7*	*4,0*	-	-	-

Number of municipalities with public sewerage facilities in the county in number of 5, represents only 1.3 % from country total, regarding the gas distribution, 21 municipalities in Alba is 14.7 % from regional level. The distribution of heat (thermal energy) is a comfort criterion considered completely lacking in Alba County.

Table 4.

The accommodation capacity and tourist circulation

	Years	Accommodation capacity		Arrivals (thousands)	Overnights stays (thousands)
		Existent (places)	In operation (thousand places-days)		
Alba County	2005	1179	362.0	49.0	94.6
	2006	1544	489.4	50.6	103.2
	2007	1830	558.8	54.1	117.7
Center Region	2005	35479	9422.2	1067.9	2782.1
	2006	37025	9947.6	1164.0	2930.4
	2007	35380	10477.2	1330.1	3177.4

Capacities of existing accommodation in the county (1830 places in 2007) are less diversified, and the degree of modernization is low. Capacities of utilization in operation is low, namely 21.0 % versus 30.0 % (average for the region).

The agrotouristical pensions in Alba County are recorded from 2002 and after, reason for such structures to occupy a much lower share toward total region (table 5.).

Table 5.

The accommodation structures in agrotouristical pensions

Agrotouristical pensions				
Administrative frame	**2004**	**2005**	**2006**	**2007**
Center Region total	393	418	573	583
Alba County	3	3	4	25

Due to the attractiveness of the relief in the Apuseni Mountains, inhabited at high altitude and many tourist attractions (natural reservations and monuments), the agrotourism has encountered favorable conditions for practice, even before 1990. The classified pensions are from previous years, but the recording in official statistics as the number of places offered to tourists and accommodation capacities in operation are reported only since 2006. It is estimated that at present they may cover about 300 pensions with over 800 double rooms. There has been a significant increase in the number of tourists at classified pensions, with reference to a level of 40 – 45 % foreign tourists.

Table 6.

Farms in which are engaged agrotouristical activities

Legal status of farm	UM	Total farms in Center Region	Alba County
Total farms	No.	383	66
	%	100.0	17.2
Individual farms	No.	361	60
	%	100.0	16.6
Units with legal personality	No.	22	6
	%	100.0	27.4

The tourist can be involved, more or less, in the traditional activities of that area or households. The tourist can participate in harvesting the grapes, to milking sheep or picking apples. In the table 6 is presented the number of farms where unfolds agrotourism activities. Of the total farm with agrotourism activities (in number of 383), 17.2 % are presented in Alba County.

Existence of tourist capacities is a characteristic of the whole side of tourism activities, which must be completed by the system, forms and level of use of these capacities. Yet, all these are expressed in consumer of agrotouristic services behavior by arrivals and overnight stays. In table 7 are presented levels of arrivals and overnights in 2006 year.

Table 7.

Number of arrivals and overnights in agrotouristic pensions

Specification	Arrivals			Overnights		
	Number	From which:		Number	From which:	
		% toward country total	% toward region total		% toward country total	% toward region total
Country total	217020	100,00	362,54	459344	100,00	305,90
Center Region total	59861	27.58	100.00	150159	32.69	100.00
Alba County	4582	2.11	7.66	8381	1.82	5.58

Within this framework of analysis shows that the studied area holds 2.11 % arrivals and 1.82 % overnight stays from country total in agrotourism boarding-houses.

CONCLUSIONS

1. Aries Valley is the most developed area of Alba County also called Moților Country. Apuseni Mountains is an ethnographic area offering opportunities for knowledge, with important places for holidays in Arieşeni, Abrud, Albac, Avram Iancu, Horea, Scărişoara or Vidra where you can visit wooden churches, traditional households**.** Ampoita, Salciua de Jos and Rimetea are other places with accommodation places in agrotouristic system being placed in areas of high tourist interest in the Trascăului Mountains.

2. Unoccupied houses in the examined area are 10,048, representing 1.75 % of national level, while permanent unoccupied housing have an average share of 2.32 %. Seasonal or secondary houses with a share of 11.08 % over the whole region; Alba County by 1.69 percent of national total has a medium level of usage of them.

3. References to water and gas supply, the existence of the sewerage system represents indicators that highlight the low level of life and civilization of rural population.

4. The existing accommodation capacities in the county (1830 places in 2007) are less diversified, and the degree of modernization is low. The utilization of capacities in operation index is low, namely 21.0 % versus 30.0% (average of the region).

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RIDICAREA TOPOGRAFICA A DRUMURILOR AFLATE PE TERITORIUL COMUNEI MELINEŞTI - JUDETUL DOLJ ÎN VEDEREA EXECUTĂRII REȚELEI DE CANALIZARE ŞI A STAȚIEI DE EPURARE A APELOR

ROAD SURVEYING FROM MELINESTI COMMUNE TERRITORY – DOLJ COUNTY FOR EXECUTION OF THE SEWERAGE NETWORK AND WATER TREATMENT STATION

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Key words: ***network of support, details, profiles, plans***

REZUMAT

Comuna Melineşti, nu a dispus până în prezent de un sistem centralizat de canalizare a apelor uzate menajere şi nici de o stație de epurare a acestora. Obiectivul principal al lucrării a constat în ridicarea unei rețele de îndesire şi sprijin în vederea asigurării densității punctelor şi a ridicării detaliilor şi în reprezentarea grafica a tuturor elementelor măsurate şi determinate. La stabilirea cotelor de teren natural şi teren amenajat s-au avut în vedere ridicările topo-cadastrale. Întreaga suprafață a fost reprezentată grafic pe două planuri de amplasament şi delimitare, pentru fiecare sat - Melineşti şi Bodăieşti la scara 1:5000, 11 planuri de situație, pe tronsoane la scara 1:1000 4 profile longitudinale, pe tronsoane de 13 Km de drum, la scara 1:1000 / 1:100.

ABSTRACT

Melinesti commune not had until now a centralized system of sewage for waste water or a water treatment station. The main objective of the work was to raise a support network to ensure density of the points and details surveying and also the graphic representation of all the measured and determined elements. For determining the heights of natural land and arranged land was used the topo - cadastral surveying. The entire area was graphically represented on two location and delimitation plans, for each village – Melinesti and Bodaiesti at the scale 1:5000, 11 situation plans, on sections at the scale 1:1000, 4 longitudinal profiles, on 13 km of road sections, at the scale 1:1000/1:100.

INTRODUCTION

Melinesti (latitude: $44^{0}57^{'}$ longitude: $23^{0}57^{'}$) is a locality from Dolj County, Oltenia, Romania, crossed from north to south by the Amaradia river.

Residents of Melinesti commune (villages Melinesti and Bodaesti) are facing major economic and social problems, and the dynamic of economic development of these localities and the human development is low. Melinesti commune not had until now a centralized system of sewage for waste water or a water treatment station.

For determining the heights of natural land and arranged land was used the topo - cadastral surveying.

Cadastre is a unitary and mandatory system by evidence and systematic inventory of all real estate in the country in terms of quantity, quality and legal, no matter who is in possession of goods, and their representation in cadastral plans in land registry documents, and in the land book to achieve real estate advertising.

The cadastral measurements are made in accordance with Cadastre and real estate advertising law No. 7 / 1996. These measurements are made for each immovable property and aim to highlight it by shape, size and attributes.

MATERIAL AND METHODS

The main objective of the work was to raise a support network to ensure density of the points and details surveying and also the graphic representation of all the measured and determined elements.

Were collected data and materials on:

• planimetric and altimetric network: inventory of coordinates and heights for network points, topographic description of the points, the Stereo 70 reference system, the accuracy of determining the coordinates x, y, z;

• Cartographic materials: topographic and cadastral plans at various scales, status of plans, zonal urban plan (PUZ) and general urban plan (PUG) of those localities

To achieve the objectives of the work were used these methods:

• The planimetric and leveling traversing methods (closed and supported);
• The tour d'horizon method;
• Analytical calculation of areas
• Drawing up of the location plan from rectangular coordinates;
• Representation of the relief – the profiles method

RESULTS AND DISCUSSION

Planimetry includes all topographic design work, measurements, calculations and reporting for representation of natural and artificial details from earth's surface at a certain scale.

Topographical work consisted in determination of the mutual positions of characteristic points defining details, in the horizontal plane of projection and heights of characteristic points. Station points have been evidenced by metal pickets.

The support and thicken network was made from several traversing to ensure the points thickening for areas represented on the location and delimitation plans, namely:

- Main closed traversing I (figure 1) on the Simireci Hill Pyramid, with guidance visa on Bodaesti church, Melinesti Church and Spineni Church. The traversing pass trough 21 stations: Simireci Pyramid-1D-2D-3D-4D-5D-6D-7D-8D-9D-10D-11D-12D-13D-14D-15D-16D-17D-18D-19D-1K from which bowed with more supported traversing:
  1. Supported traversing I on station points Simireci Hill Pyramid and 3D from closed traversing I and included 8 stations: PMSIM-1C-2C-3C-4C-5C-6C-3D;
  2. Supported traversing II on station points 15D and 1K from closed traversing I. This includes 5 stations: 15D-1J-2J-3J-1K;
  3. Secondary closed traversing on station point 19D with 15 stations: 19D-21D- 22D-23D-24D-25D-26D-27D-28D-29D-30D-31D-32D-33D-20D.
- Main closed traversing II (figure 2) on the Salciile Pyramid, with guidance visa on Melinesti Church, Negoiesti Church, Crucii Church and High Thermal Cart, includes 9 stations: Salciile Pyramid-2A-3A-5A-8A-7A-6A-4A-1A from which were executed:
  1. secondary closed traversing I, from station 2A trough stations 8A-10A-11A-13A-15A-16A-18A-17A-14A-12A-9A;
  2. secondary closed traversing II, from station 18A (point from secondary closed traversing I) trough stations 18A-19A-23A-22A-20A.

The tour d'horizon method, a common method for details surveying was used to determine the coordinates of characteristic points, being measured following stations:

- from station 1D was determined station 1R;
- from station 2D was determined station 2R;
- from station 9D was determined station 3R;
- from station 12D was determined station 4R;

- from station 13D was determined station 5R;
- from station 15D was determined station 8R;
- from station 1J was determined station 6R;
- from station 16A was determined station 1B;
- from station 17A was determined station 2B;
- from station 18A was determined station 21A;
- from station 23A was determined station 24A.

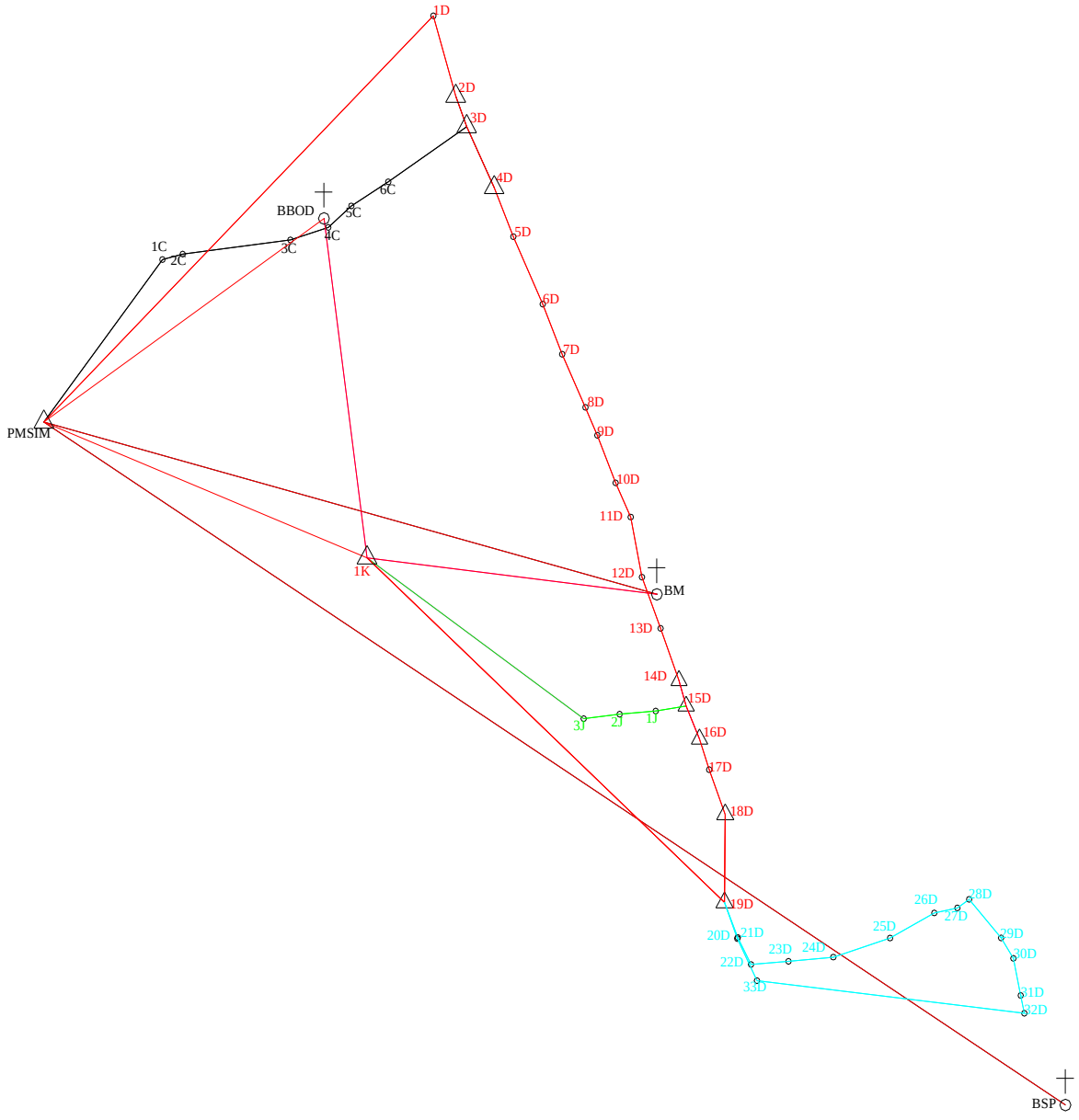

Figure 1. Support network – Main closed traversing I

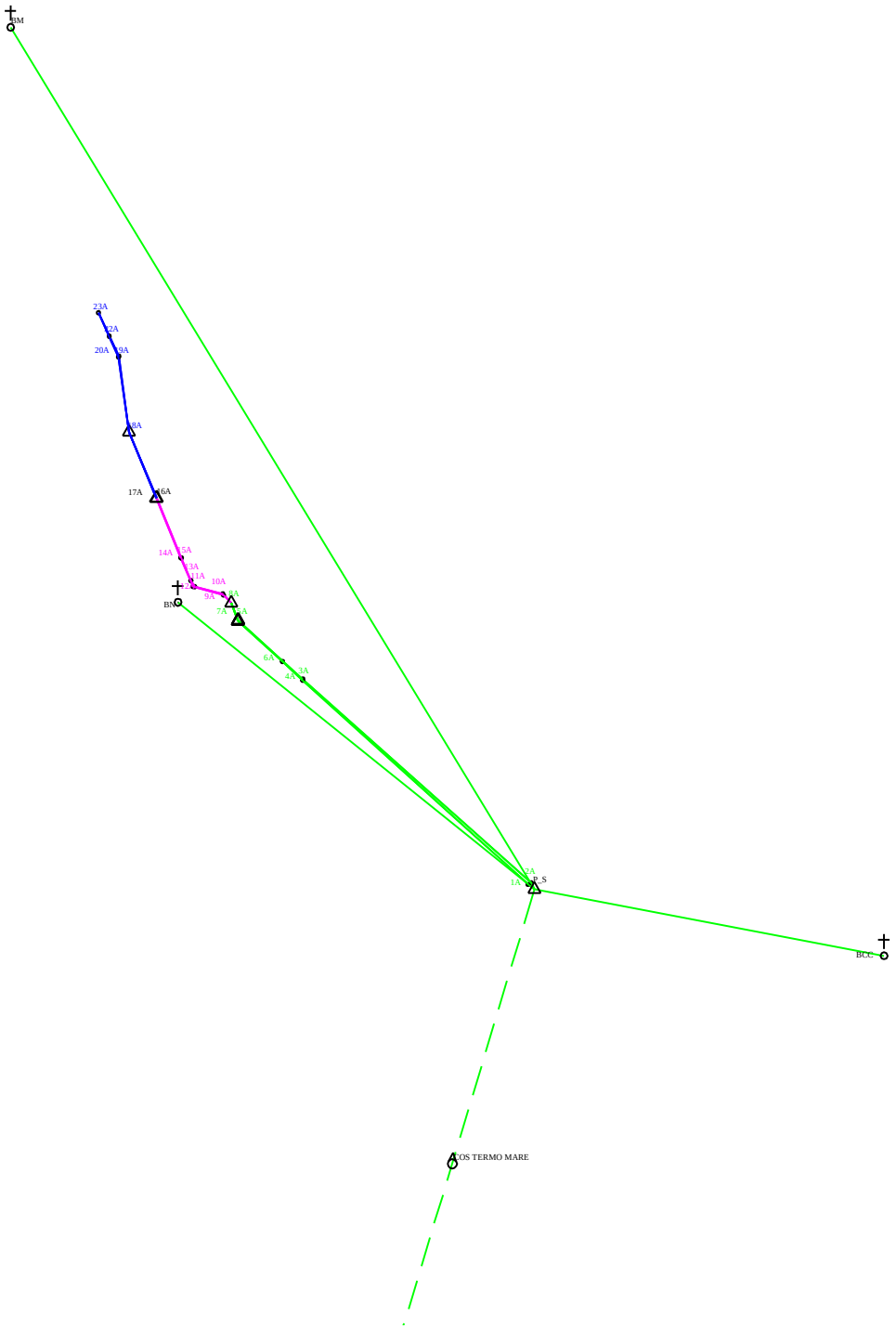

Figure 2. Support network – Main closed traversing II

From stations: 1D, 1R, 2D, 2R, 3D, 4D, 5D, 6D, 7D, 8D, 9D, 3R, 10D, 11D, 12D, 4R, 13D, 5R, 14D, 15D, 8R, 16D, 17D, 18D,19D, 3C, 4C, 5C, 6C ,3D,1J, 6R, 2J, 3J , 22D, 23D, 24D, 25D, 27D, 28D, 29D, 30D,31D, 8A, 10A, 15A, 16A, 17A, 14A, 12A, 18A, 21A,

19A, 23A, 24A and 22A were determined all detail points, 9756 points used for drawing of 2 location and delimitation plans and 11 situation plans on sections.

The plain rectangular coordinates of station points and details points were obtained by Toposys 4.4. computer program, using the elements measured on the ground (distances and angles). The location and delimitation plans, also the situation plans were made using rectangular coordinates of support network and 9756 detail points.

For determining the heights of natural land and arranged land was used the topo - cadastral surveying. To get an overview of the field and designed works have drawn 4 longitudinal profiles, on road sections of 13 km, at the scale 1:1000 / 1:100.

The entire area was graphically represented on two location and delimitation plans, for each village – Melinesti and Bodaiesti at the scale 1:5000 and 11 situation plans, on sections at the scale 1:1000. The plans are exact representations of the land areas reduced at scale.

Through this documentation can design and implement sewerage networks and the wastewater treatment station, with automatic operation.

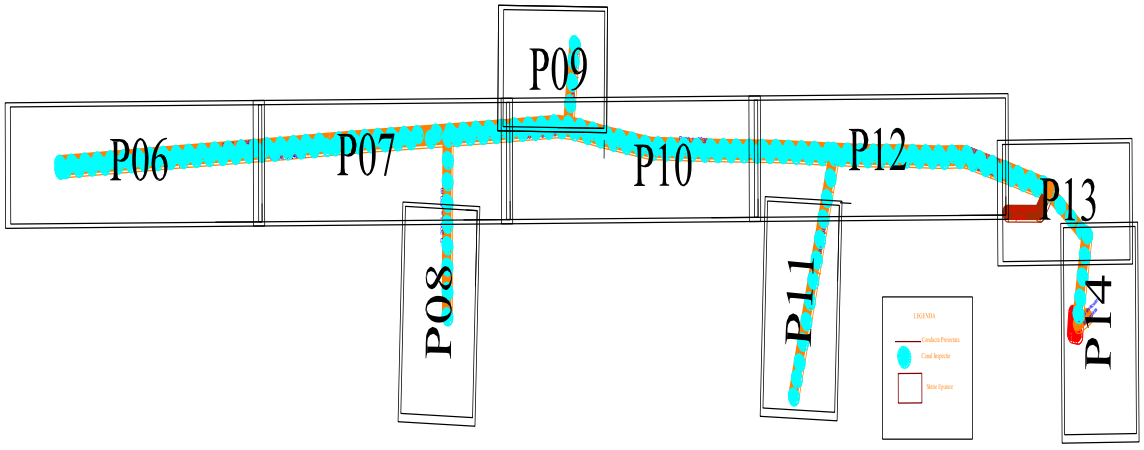

Figure 3. Situation plan – Melinesti commune

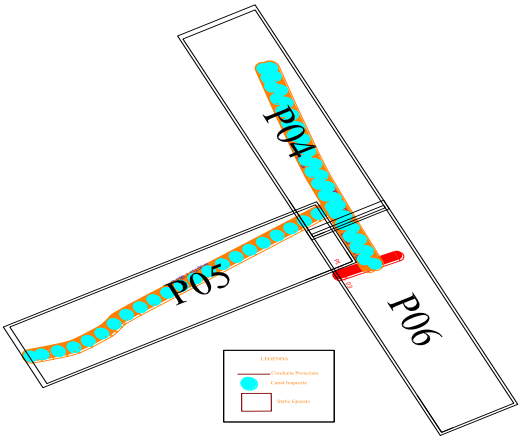

Figure 4. Situation plan – Bodaiesti village

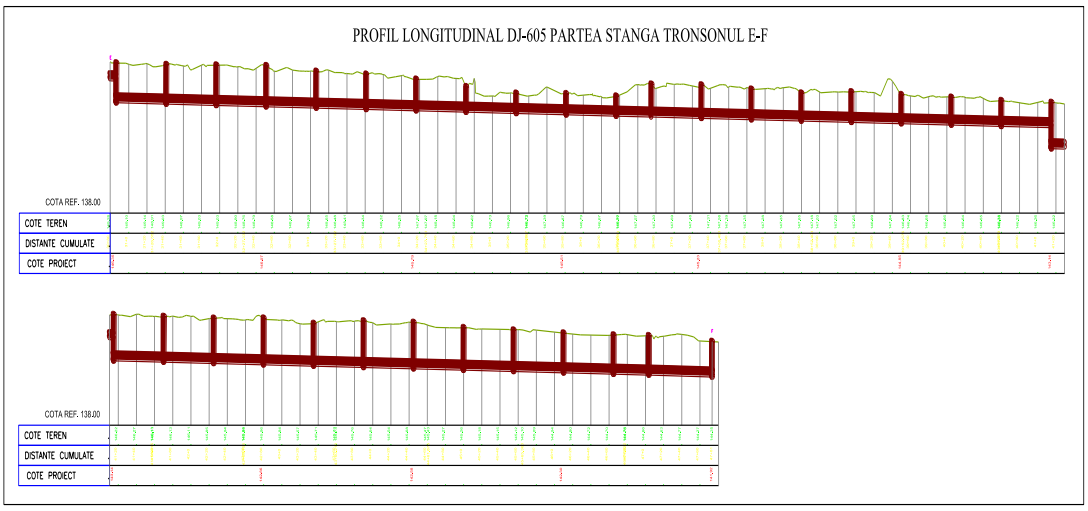

Figure 5. Longitudinal profile - section E-F

CONCLUSIONS

1. The support network was realized by: 2 main closed traversing, 2 supported traversing and 3 secondary closed traversing. From points of support network were measured 9756 detail points.

2. For determining the heights of natural land and arranged land was used the topo - cadastral surveying. To get an overview of the field and designed works have drawn 4 longitudinal profiles, on road sections of 13 km, at the scale 1:1000 / 1:100.

3. The entire area was graphically represented on two location and delimitation plans, for each village – Melinesti and Bodaiesti at the scale 1:5000 and 11 situation plans, on sections at the scale 1:1000. The plans are exact representations of the land areas reduced at scale. Through this documentation can design and implement sewerage networks and the wastewater treatment station, with automatic operation.

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DETERMINAREA UNOR PARAMETRII FUNCȚIONALI AI MAŞINII DE ERBICIDAT EEP-600 ME

DETERMINATION OF FUNCTIONAL PARAMETERS OF THE SPRAYING MACHINE EEP-600 ME

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Key words: spraying machines, control unit, distribution of uniformity, pump.

REZUMAT

Având în vedere importanța maşinilor de ierbicidat, normele europene în domeniu au elaborat directivele, norme sau recomandări în scopul de a contribui la siguranța utilizatorilor (EN 907) şi pentru a limita impactul negativ asupra mediului(EN 12762; EN 13700). Ca rezultat al colaborării între USAMV Cluj-Napoca si SC Tehnofavorit SA, Bonțida, o maşină de ierbicidat (EEP-600 ME) a fost proiectată şi realizată, care este în conformitate cu normele UE. Experimentele au arătat că, odată cu schimbarea înălțimii de aplicare, uniformitatea de distribuție este influențată în mod semnificativ. Debitul pompei (pentru pompacu membrana si piston) este modificat în funcție de turaț ia arborelui prizei de putere. Presiunea nu influențează în mod semnificativ debitul.

ABSTRACT

Due to the importance of the spraying machines, the European Norms in the field have elaborated directives, rules or recommendations in order to contribute to the safety of users (EN 907) and to limit the negative impact upon the environment (EN 12762; EN 13700). As a result of collaboration between USAMV Cluj Napoca and SC Tehnofavorit SA, Bontida, a spraying machine (EEP-600 ME) was designed and developed which is in accordance with the EU rules. Te experiments showed us that along with the change of height application the distribution uniformity is influenced significantly. The pump flow (for membrane and piston pumps) is modified according to the rpm of the PTO shaft. The pressure does not influence significantly the flow.

INTRODUCTION

Testing machines for plant protection treatments will become mandatory in our country, as already applies in some EU countries.

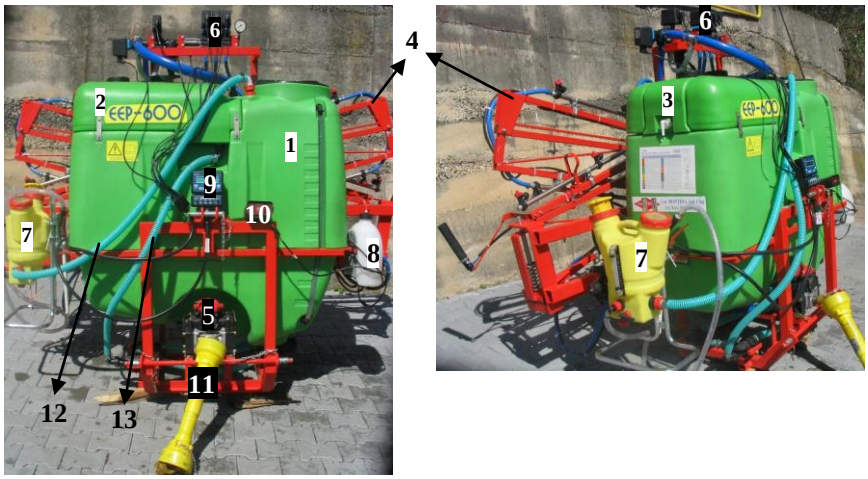
The introduction of such rules in the EU can be explained by the fact that the spraying machines, if they are not in good working order can cause a further increase of environmental pollution and waste present in the end product.

Periodic testing (one or two years) of these machines is made in order to be rehabilitated, to remove defects and in particular to ensure a uniform spray solution on the soil surface.

EEP 600 ME was tested on a stand of German construction (TEST-1000), in order to determine the nozzles IDK 120-02 flow and the uniformity of distribution across the working width and pump flow variation.

MATERIAL AND METHOD

Test were carried out on the EEP 600M EEP machine (fig. 1). This machine meets European standards, and is an upgraded version of the old EEP 500 machine.



/ A-front view, B-side view

Fig. 1 Construction equipment herbicides EEP-600 ME:
1 - main reservoir solution; 2 - pre-wash tank; 3 - washing hands tank; 4 – boom section; 5 – pump; 6 - distribution platform; 7 - tank for incorporation and mixing of the solution; 8 -- foaming tank installation; 9 - computer process; 10 - switch control (left-right) of the installation of foaming; 11 - Cardan transmission; 12 - hose connection between incorporation tank and main tank; 13 - hose connection between pre-wash tank and pump.

Main tank solution is centrally located and has a volume of 600 liters, equipped with a rotating nozzle to wash out with clean water inside walls of the tank.

Pre-wash tank is positioned at the top of the main reservoir. It is usewd to store a volume of 65 liters of clear water needed to wash the inside of the main reservoir.

Tank for washing hands has a volume of 10 liters and do not communicate with other reservoirs of equipment.

Tank for mixing and incorporation is located to the left of the main tank. At the bottom of the tank there is an incorporation device ejector device that makes the transfer of the active substance in the main tank. It is equipped with a filling hole, a device for washing bottles and a spear to absorb pesticides from greater containers.

The equipment EEP-600M has a foaming device to mark the edge of the treated area and facilitate proper driving of the machine. Foaming device is located on the right main tank.

Electronic installation - consists of the distributor platform, speed transducer and computer process.

Distribution ramp is located at the top of the machine and the main parts are shown in figure 2.

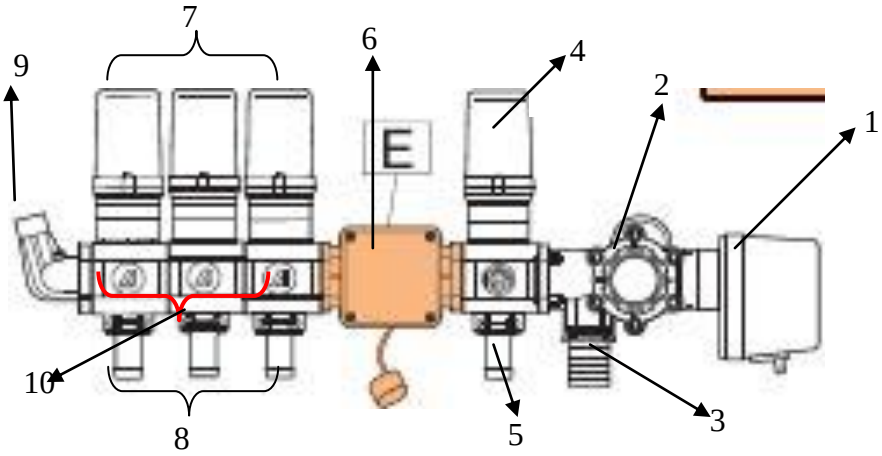


Fig. 2 Components of the ramp distribution

1 - the main solenoid, 2 - solenoid used to regulate the maximum pressure in the system; 3 - hose connection to return, 4 - solenoid control, 5 - connection to the return hose, 6 - meter, 7 - solenoid for opening boom sections, 8 - fittings for sending the solution to boom sections; 9 - connection for pressure gauge or sensor, 10 - calibrated returns .

All solenoids, flow meter and speed sensor are conected to the process computer, where they are ordered.

The computer process is Bravo 180 type and provides control to the user to adjust the parameters that influence the speaying process. It can work both automatically and manually. It is mounted in the cab of the tractor, while working indicates the amount of solution delivered and the working speed.

The main keys are shown in figure 3.

Fig.3 BRAVO 3 computer process 180

1 - the computer screen; 2 - key for setting the amount of sollution per hectare; 3-key to change auto / manual mode; 4 - keys to increase or decrease the selected value; 5 - confirmation key (OK) and stop key (ESC); 6 - switches for the foam marker; 7-switch for the main solenoid, 8 - switches for boom section; 9 – switch for distribution control solenoid.

In order to determine the uniformity of distribution there were used antidrift nozzles IDK 120-02 at a pressure of 2 bar and heights of 30, 50 and 70 cm.

To determine the influence of speed on the working pressure there were used two membrane and piston pumps: D 80 (80 l / min) and D 113 (110 l / min), both manufactured by Italian IMOVILI.

To test the uniformity across the working width a German construction test equipment was used that has the following parts:

- equipment for testing uniformity of distribution;
- equipment for nozzles testing;
- equipment for testing pumps and — gauges;
- connectors for all types of pumps and nozzles currently available on the market;
- canvas for collecting water used to determine uniformity distribution.

RESULTS AND DISCUSSION

Changes in uniformity distribution across the working width using nozzles IDK 120-02, at different heights, are shown in figure 4.

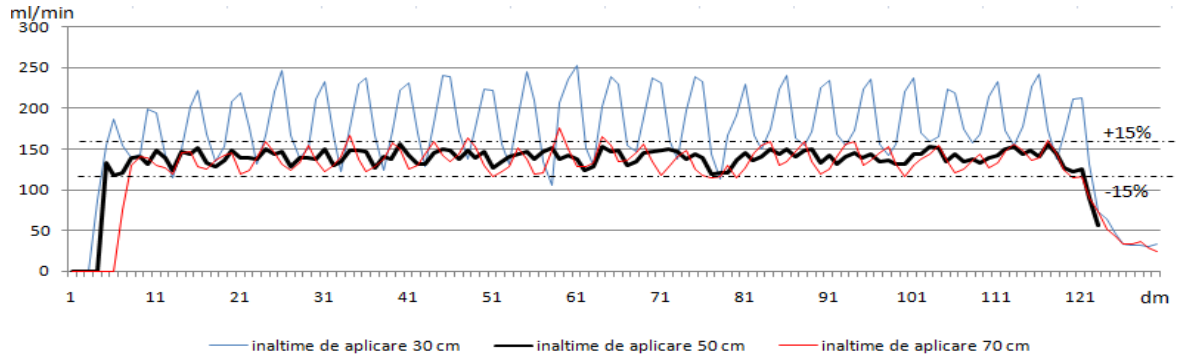


Fig.4 Uniformity of distribution nozzles 4 IDK 120-02

As one can see, the uniformity of distribution across the working width for IDK 120-02 is optimal for the height of 50 cm. At this height the graph of the uniformity distribution is within the range of ± 15%. The coefficient of variation for this height was 4.7% and does not exceeds the limits on any measurement interval (measurement interval has a width of 10 cm).

At the height of 30 cm, the uniformity of distribution is unacceptable. The coefficient of variation for this application was 20.74%. There were 68 measurement intervals that exceeded limits.

The coefficient of variation for 70 cm working height was 9.85%, resulting in a satisfactory uniform distribution. There were 15 exceedances of the limits permitted in every measurement.

One can notice that the height of application has a great influence on the uniformity of distribution.

For pumps that can equip this spraying machine the variation of the flow in the corelation with PTO rpm and working pressure was determined.

Results of the flow variation depending the pump rpm are shown in figure 5.

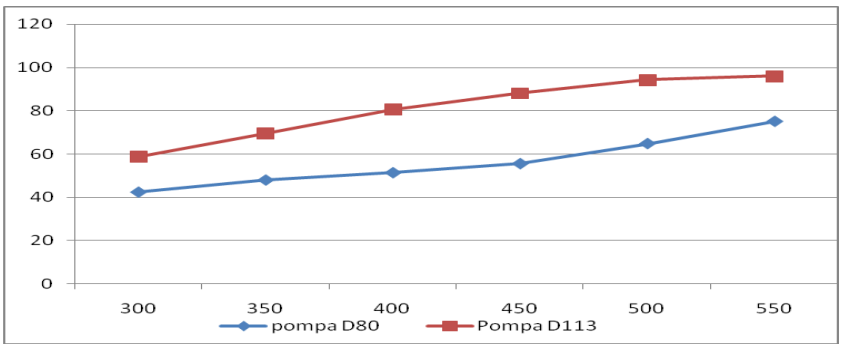


Fig. 5 The influence of pump rpm on the flow

Analyzing figure 5 can be seen that the speed greatly affects the flow pump. If for D80 pump, the flow speed for 300 rpm is 42.4 l / min, it increased to 75.2 for speed of 550 rpm.

Pump D113 has a higher rate, registering a difference of 37.2 l / min between extreme PTO speeds. For speed of 300 rpm pump has a flow rate of 58.8 l / min, it raised to 96 l / min at a speed of 550 rpm.

Analyzing the graph we notice that pump speed has great influence on the flow of the solution wich reaches nozzles.

Results of the flow changes depending on the pressure pump are shown in figure 6.

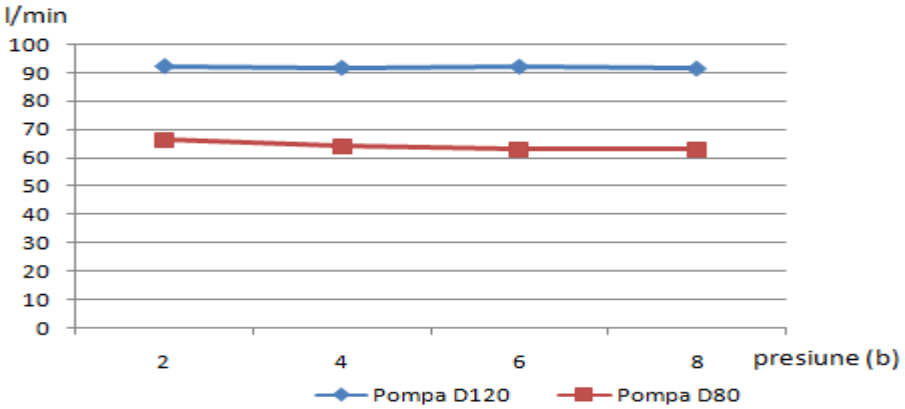


Fig. 6 Variation of pressure based flow speed of 500 rpm

As one can see, the pressure does not affect essentialy the flow rate. At a speed of 500 rpm, the pump pressure of 2 bar D80 record 66.3 l / min, reaching 62.9 l / min at 8 bar pressure. The difference recorded is 3.4 l / min.

D113 at a pump, the speed of 500 rpm and 2 bar pressure, recorded a rate of 92.3 l / min, decreasing to 91.4 l / min at 8 bar pressure.

CONCLUSIONS

1. To reduce environmental pollution and increasing qualitative indicators of the working width machines for plant protection treatments, regular testing is necessary using specialized equipment.
2. For IDK 120-02 nozzles the distance from the ramp to the target greatly affects the uniformity of distribution across the working width.
3. Diaphragm and piston pump flow rate capacity is influenced largely by the size and PTO speed pump and to a lesser extent by pressure.

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STUDII TEORETICE ŞI ÎNCERCĂRI EXPERIMENTALE PRIVIND TEHNOLOGIA DE TURNARE ŞI REPARARE A UNOR PIESE FOLOSIND METODA RAPID PROTOTYPING-RP

THEORETIC STUDIES AND EXPERIMENTAL TESTS CONCERNING THE CASTING AND REPAIRING TECHNOLOGY OF SOME PIECES USING THE RAPID PROTOTYPING-RP METHOD

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Key words: Prototyping, 3D model, design, solidification, dimensional precision

REZUMAT

In articol este prezentatã tehnologia de realizare a modelelor utilizate la obținerea pieselor folosite la construcția diferitelor masini si instalatii rapid prin prototyping. Este tratat procedeul imprimarii 3D, plecand de la crearea modelului virtual si terminand cu obtinerea modelului fizic.

INTRODUCTION

The creation technology of the models used to obtain the pieces employed in the rapid construction of different machines and equipments by prototyping is presented in this article.

In the 90s a third group of technologies was added to the well-known technologies used until the beginning of 90s, those of processing by material removing (lathing, milling, adjustment, electro erosion, laser technology, ultrasounds) and those of processing by material redistribution (forging, punching, drawing, extrusion, casting). Those technologies differ from the other ones because they are based on a new principle for pieces materialization, *the rapid creation technologies of prototypes*, technologies known under the name of Rapid Prototyping- RP which create the piece adding the material as much as it is necessary and where it is necessary.

The 3D prototypes different materials, without resorting to the usual machine-tools which remove the material but guarantee the product's performances are created through rapid prototyping.

The procedure presents the advantage of being able to practically create pieces irrespective of their shape. These procedures allow even the creation of colored objects, being able to evidence some details of the object, of the model, or of the respective work.

MATERIAL AND METHOD

The 3D models are the most efficient way of presenting a project before even existing in the real world. The utilization of the 3D models brings many advantages both in designing and in presenting it to a potential client.

If the presentation of a project is wanted to be as realistic as possible we can use the fourth dimension: the time.

The models come to life and allow an easier understanding of the work or the analysis of the technical and esthetical impact that those can bring on the environment where they will exist and function.

To the great majority of RP systems the model's creation process is completely mechanized so that the operator can let the machine working alone even during the night. The process lasts for several hours depending on the dimension, the geometrical complexity and the number of pieces simultaneously created.

The rapid prototyping is also accessible to the industrial utilization. These technologies become more and more efficient and accessible because many machines were developed in this direction. Among the users of rapid prototyping we can include the sculptors, the art foundry-worker, the dentists, the designers, the architects etc.

The majority of rapid prototyping techniques are based on material addition. These are the most often used methods to create in a very short period of time prototypes with complex configurations both inside and outside of them, and also niches and cavities (pieces often impossible to create with the traditional procedures).

The ideology of a piece rapid creation (prototype) is based on the computerized design in 3D-CAD, the preview on the computer, the optimization of the building according to the designer's demands and the functional characteristics, the complete modification of the three-dimensional model in models with two coordinates and many layers, the verification of the reproduction possibility of this amount of layers models, namely the materialization of this model as an entity, as a solid physical piece (fig.1).

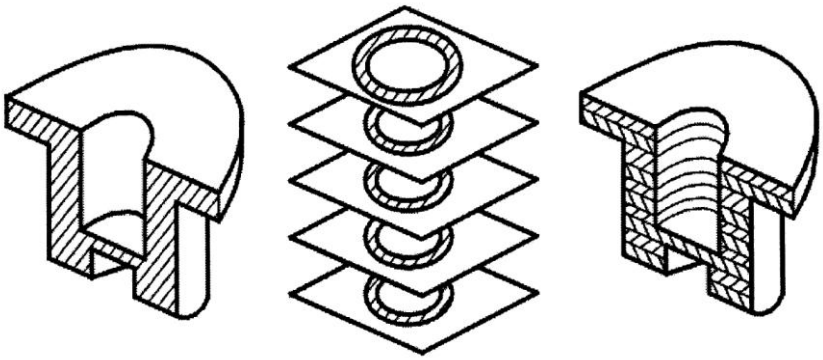

Figure 1. The main stages of the RP method: a- the 3D-CAD model; b- the amount of 2D-CAD models; c- the piece made of layers

All the technological procedures from the Rapid Prototyping concept follow the same basic stages, namely:

-the CAD model creation which contains a complete description of the piece using a program and a method adequate to those technologies;

-the CAD model transfer to the division processor;

The division can be made, in many cases, just by the CAD program used for modification. The most commune method is the model's approximation with triangular plane elements.

-the model's triangularization so that would be prepared for division and for creation.

These can represent two different operations or the division can be made during the creation. The last parameter, the sections' thickness, is introduced in the system in order to be created.

-the creation raises a series of problems, and the solution particularizes each process, as follows:

- The type of the material and under what form this will be used;
- The way of support for the model during its creation;
- The way of addition of a new layer;
- The way of fixation of the new layer on the previous one;
- The way of marking the forms for each section;
- The way of marking the area between the external and internal form of a section.

- cleaning and facing are operations where the clamps used for building and the material surplus or other operations of processing (including the mechanics) are eliminated by

means of which it is followed the improvement of dimensional precision and of surfaces' quality.

In order to obtain a 3D folder one of the already existing 3D programs can be used as a starting point. The STL, VRPL and PLY formats are international standard formats which are used by the majority of software engineers.

The principle of 3D printing

There are several techniques of rapid prototyping including the 3D printing.

The procedure, like all the methods of rapid Prototyping, allows, in several hours, the creation of three-dimensional physical models of the designed objects starting directly from the 3D CAD/CAM electronic format, the 3D printer being the only machine used as it can be seen in the figure 2.

Figure 2. The principle of a model creation on a 3D printer

The printer creates 3D physical prototypes by the solidification of the deposited layers of powder using binder liquid. By definition 3DP is an easy and an adaptable process, creating geometries of a various complexity in hundreds different applications, supporting many types of materials.

The general schema can be observed in figure 3. A charged roller with multiple channels similar to that from an ink-jet printer is moved in the xy coordinates on the platform's surface. Instead of the printer's ink, this charged roller drops grains of adhesives from the tank, which will consolidate in contact with the material particles deposited in a thin layer on the working platform.

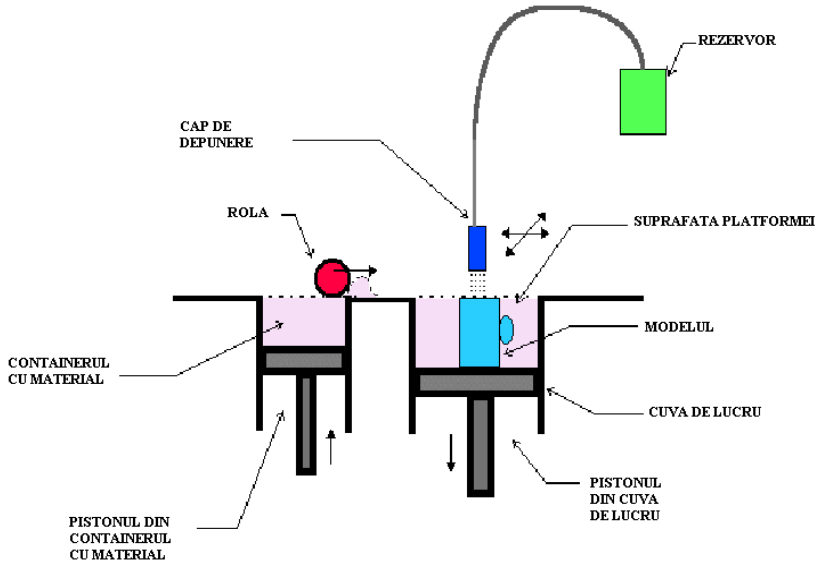

Figure3 . The general schema of the three-dimensional printing procedure

Once a layer is finished, the piston from the working vat descends with an increment the platform, the piston from the material container will lift, and after that the roll will lay down another material layer on the working platform.

The charged roller will place the adhesive in the zones corresponding to the section among the piece, created in that moment. The process continues in a similar way until the complete materialization of all sections. (fig.4)

Figure 4. The principle of a model creation

After the finalization of the creation process layer by layer, the piston rises and the piece is extracted from the mass of powder remained unused.

A 3D printer creates physical models by digitalization in several hours instead of days. It is quick and simple, allowing the engineers to produce a chain of ideas of models and tests of functional elements, at a reasonable price. This printer is based on a monochromatic prototyping system. It quickly prints and it easily creates complex geometries, very thin sides of walls, as well as very small surfaces.

The principle subcomponents of a type of printer are: the charged roller, the working platform, the tank of adhesive, the piston, the working vat, the material container and the role which lay down the material layer.

CONCLUSIONS

- The models created by rapid prototyping represent the future technology, the procedure that allows obtaining in a few hours complex models, starting directly from the design dates.
- The prototypes improve the communication between the specialists because the understanding of three-dimensional objects is made more easily, this thing leading to costs and time economies.
- The creation planning is made more easily because as the same time as the product's mark is created the packing technology can be designed before the product's creation.
- The prototypes are also used to test a certain product in order to verify if it is working properly and in this way some improvements can be brought.

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REALIZAREA MODELULUI PENTRU PIESE OBȚINUTE PRIN IMPRIMARE 3D ÎN METODA RAPID-PROTOPYING

THE CREATION OF THE MODEL FOR PIECES OBTAINED BY 3D PRINTING USING THE RAPID-PROTOTYPING METHOD

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Key words: virtual objects, stereo lithography, prototyping method

REZUMAT

În lucrare se prezintă posibilitati de folosire a metodei de turnare RP pentru obtinerea unor piese. Procedeul, asemeni altor metode de prototipaj rapid, permite realizarea în câteva ore de modelele fizice tridimensionale ale pieselor proiectate pornind direct de la formatul electronic 3D CAD/CAM, unicul utilaj folosit fiind imprimanta 3D.

Imprimanta creează prototipuri fizice 3D prin solidificarea straturilor de pudră depuse utilizând binder lichid. Prin definiție 3DP este un proces uşor şi uşor adaptabil, realizând geometrii de o complexitate variată în sute de aplicații diferite, suportând multe tipuri de materiale.

ABSTRACT

Some possibilities of using the RP casting method in order to obtain some pieces are presented in this work. The procedure, similar to other rapid prototyping methods allows the creation in a few hours of physical three-dimensional models of the designed pieces starting from the 3D CAD/CAM electronic format, the 3D printer being the only machine used.

The printer creates 3D physical prototypes through the layers solidification of the deposited powder using binder liquid. By definition 3DP is an easy and an adaptable process creating geometries of a various complexity in hundreds of different applications, supporting many types of materials.

INTRODUCTION

1. The CAD model creation

The creation of a 3D model demands to follow the five basic stages:

In the beginning the piece which will be created is shaped using the soft packet Computer-Aided Design (CAD). All the processes start with the designing of the internal and external piece's surfaces, with the exact indication of all the geometrical elements in one of the 3D designing environments.

The designer can use an already existing CAD folder or can create one intentionally with the object of prototyping, a process identical for all the rapid prototyping techniques.

The machines' software system accepts solid models created in: .stl, .3ds, .ZCP, .VRML and .PLY format.

The programs and the explorer systems which are the bottom of the printer accept the majority of folders' format: .sty, .wry, .ply and .six; by means of which the 3D programs can be exported in order to be read by the printer.

After the folder which contains the solid is exported, it opens, representing the printer's interface. His role is to cut the solid object in layers, creating a 2D imagine for each piece of 0.1 to 0.16 mm along the z-axis.

2. SLT file conversion

The diversity of CAD packages uses a number of different algorithms to represent the solid, virtual objects. The SLT (Stereo lithography, the first RP process) format was used to make the conversion, representing the standard format for the prototyping industry. Thus, the second step is the conversion of CAD file into SLT format. This format is a 3D surface like an assembly or plane triangles, "like the sides of a cut jewel".

Therefore, the SLT format is a 3D surface which comprises numerous plane geometric figures. The folder contains the coordinates of each point of the geometric figures. Raising the number of geometric figures improves the precision, but, on the other hand, it increases the folder size.

The functions implemented by the producers in the various CAD systems, used in practice, are utilized when working with folders.

MATERIAL AND METHOD

The sides of CAD model are discriminated into triangles, the information being extracted and transferred in the system data base.

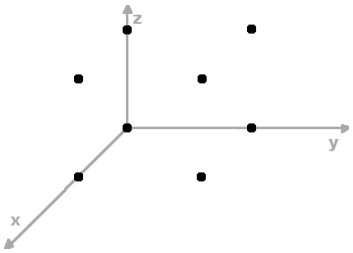


Figure 1. The vertexes position which form the triangle and the sides.

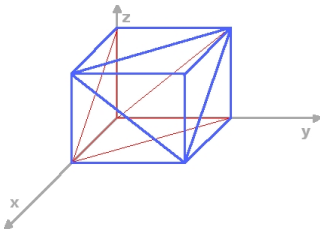


Figure 2. The discrimination of the sides of CAD model into triangles

The hierarchical structure of topologic data, shown in figure 8, comprises 3 levels: component, sides, and edges.

These are separated into two categories:

- geometric information of vertexes position in 3D space (fig. 1);
- information about the vertexes intersection of the triangles (fig. 2).

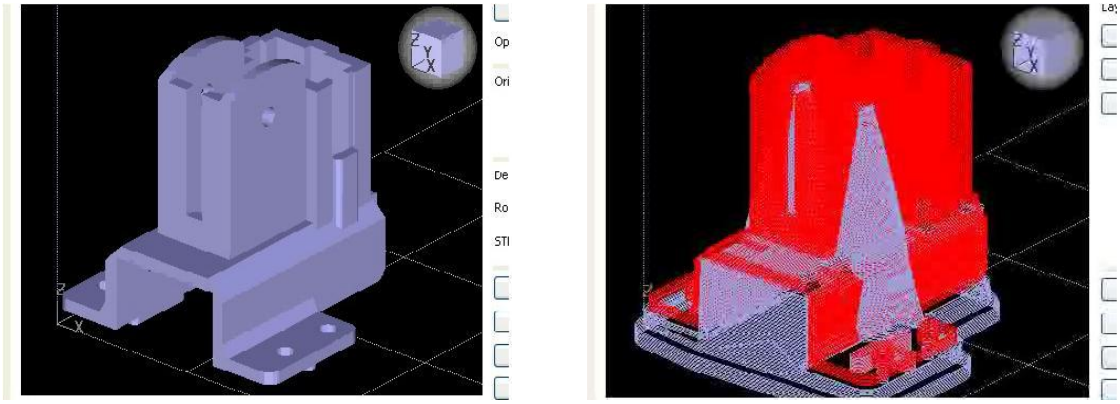
The model edges are formed by intersecting the vertexes.

The structure components are linked as follows: the piece is a set of surfaces, and the surface is an set of tessellation and edges (fig. 3).

The folder comprises the coordinates of the vertical line and the exterior normal line of each triangle.

Figure 3. The hierarchical model structure

Figure 4, illustrates the piece triangulation whose virtual model is obtained on the basis of a CAO program.



a b

Figure 4. The model triangulation: a-the model of the virtual piece; b-the piece triangulation

Since the SLT folders use plane elements, they cannot represent exactly the curve surfaces. Raising the triangles number, the approximation improves, but the folder size is also bigger. (fig.5.). The processing and creation of more complicated folders require much time, so the designer must balance the accuracy and the management in order to build useful STL folders.

a b

Figure 5. Examples of triangulations: a-with squares, b-with triangles

The resolution is configured to reduce the scale effects.
The high precision and reproducibility of built surfaces are achieved by increasing the number of triangles in triangulation.

3. The conversion of STL folder

When the user wants to print the object, he must use 2D images in the sections and, then, send them to the 3D printer, like any program which sends images or documents to a 2D printer. The settings are installed in ten minutes.

To convert the STL folder, a specialized program is needed to build each layer of the folder. The program prepares the SLT folder in order to be created and allows the user to adjust the size, the location and the orientation of the model, which proves to be very useful when building many models simultaneously.

Since the program interface is intuitive and the procedure is simple, anyone can use the 3D printer, thus, a specialized operator is not needed.

The model's properties range from one coordinate direction to another. The models are less precise in the z- vertical direction than in the xy-horizontal plane (fig. 6.).

Usually, the smallest dimension is oriented towards z direction to reduce the number of layers, thus, reducing the building time by using a smaller quantity of powder.

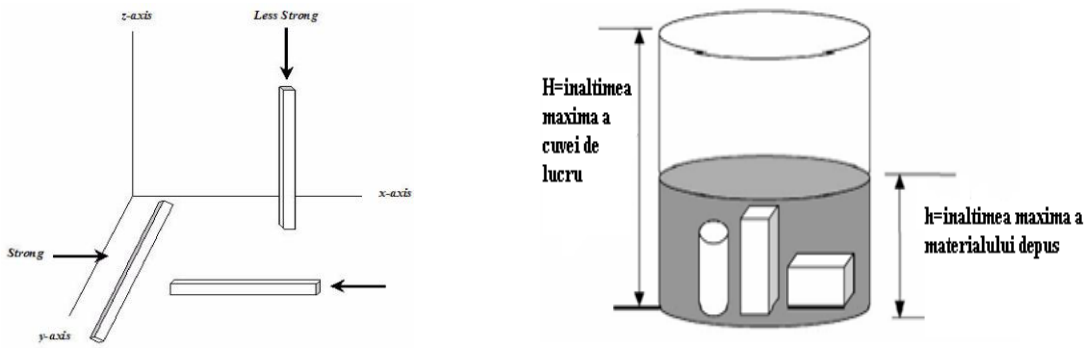


Fig.ure 6. The comparison of the total volume – the volume used

The model orientation in the working area plays an important role in achieving the accuracy and the quality of the final product surface. If we choose an efficient orientation, we can estimate the quantity of consumed material and the cost of the model.

The pre-processing soft links the user and the RP machine and cuts the SLT model into layers of widths between 0.01 mm and 0.7 mm. The smaller the layer's width, the higher quality has the final piece.

In fact, this program will split the piece into layers and will forward the data to the machine which will know to process the piece layer by layer. The entire process of making a piece with these types of machines was previously described.

It is advisable to have a smaller layer width to avoid levelled image. A folder with a high resolution combined with the prototype creation through layers of a very fine powder brings the best authentic model. Thus, the prototype building time and the price will rise.

RESULTS AND DISCUSSION

The creation of 3D model

The application is set up by opening the File menu and selecting 3D Print Setup. All the creation parameters can be examined thanks to the 2D visualization. Anytime, one can go back to correct or change the folder size.

It is selected the measure to create the model and the scale to create the piece.

The program can generate a support structure to sustain the instable forms which come into view during the creation process.

The supports are incorporated into the piece and are shaped into very fine nets which will be easily removed once the piece is generated. During 3D printing, the bulk powder becomes also a support for the model which is still in the building process.

The most used material in the 3D printing is the powder which includes various categories and the following are the most important:

- plaster powder, the most used material in 3D processes which allows building prototypes with a high resolution
- the powder with a high resolution is more expensive than the plaster powder, but more resistant and has a better resolution.

The machine applies the layers successively following a very precise process of the printer. After building the first layer of the piece, the model adjusts the height by lowering the platform to create the next layer. This process repeats until the whole model will be finished.

The program given together with the printer analyse the STL document to create every part of the model (fig. 7).

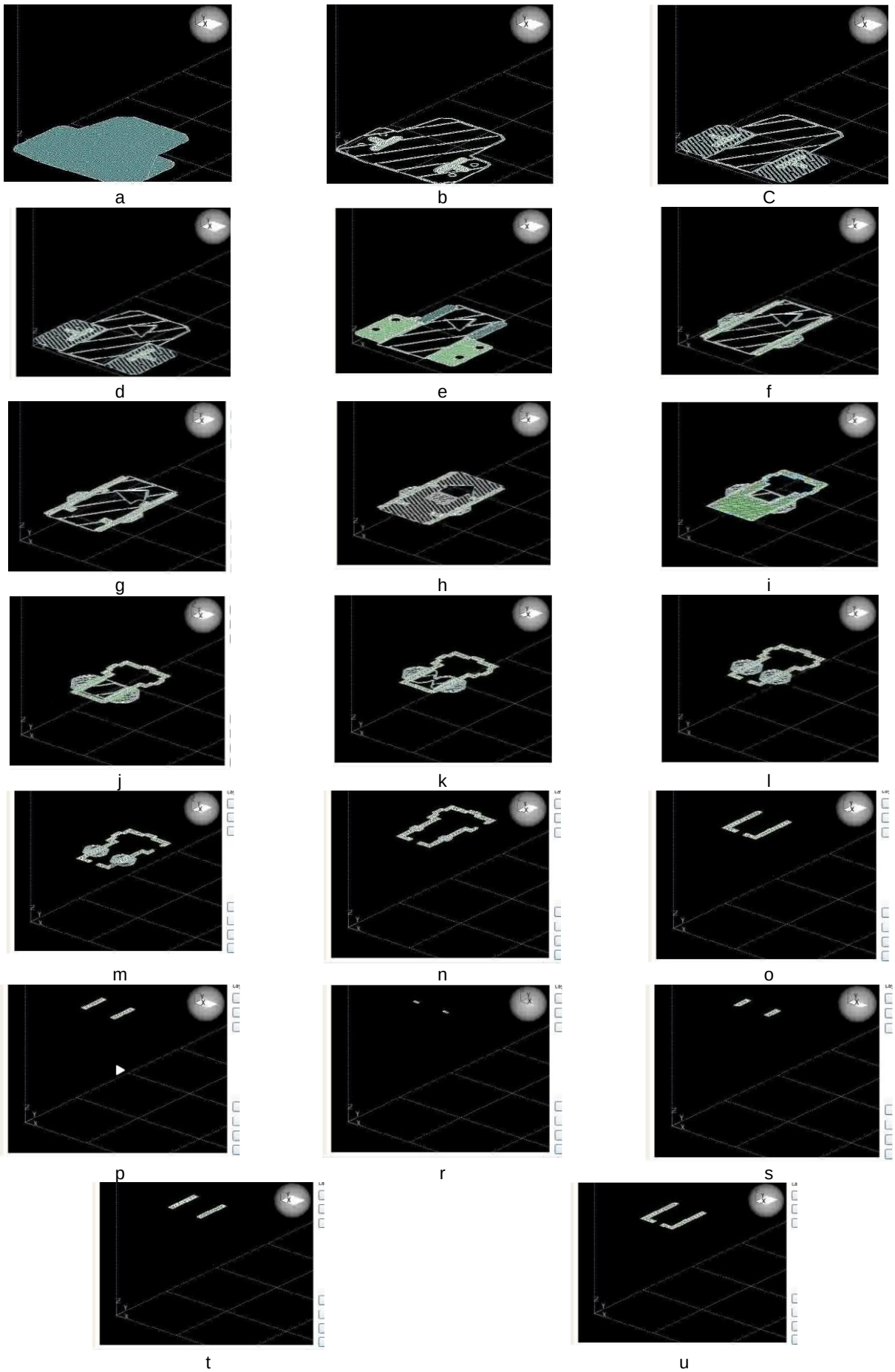


Figure 7. Some snapshots from the layers succession needed for the piece creation

In figure 8, it can be noticed that, for a constant layer width, the levelled image is visible when the angle of inclination is very small compared to the horizontal plane.

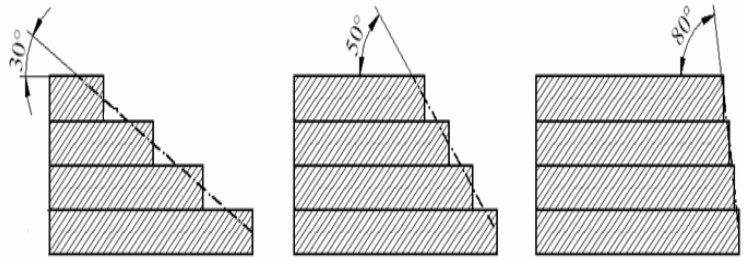


Figure 8. The influence of the angle of inclination of the levelled image

The levelled image appears especially at the curve surfaces and inclined planes. The model also requires an analyse of the levelled image, the piece being infiltrated with a perform ant resin to give it resistance, durability and to improve its aspect.

CONCLUSIONS

- The fast manufacture won't replace other manufacturing techniques in the big production series where the mass production is more economical.
- The fast manufacture is much cheaper for small production series because it does not require tools. It is perfect for the manufacturing of ordered pieces following the exact demands of the client.
- It is possible to create pieces which cannot be manufactured through mechanic processing or distortion processes such as the objects with a complex form, interior and stratified void.
- All the manufacture processes require special skills and costs of the applied work, specialized software programs in order to generate the cut folders and to project the support structures.
- The fast prototyping main objective is the production of physical models (model, layout, tool, form, work of art) in a short time, at a low price and a minimum number of stages and equipments of the creation process.
- The excessive powder (not included in the forms volume manufactured through 3D printing) which represented technological supports during the piece creation can be reused in proportion of 90% by selecting and sorting after extracting the manufactured piece.

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PROCESUL DE LUCRU ŞI PRINCIPALII PARAMETRI DETERMINAȚI PENTRU MĂRUNȚIRE, UTILIZAȚI ÎN PRELUCRAREA SEMINȚELOR DE CEREALE

WORKING PROCESS AND MAIN PARAMETERS DETERMINATION FOR CRUSHERS USED IN PROCESSING CEREAL SEEDS

GĂGEANU P, VLĂDUȚ V., PĂUN A.

REZUMAT

Principalul element din cadrul echipamentelor moderne de mărunțit este axul, al cărui organe de lucru sunt compuse din perechi de role de şlefuire de diametre şi lungimi diferite.

Procesului de măcinare este influențat de mai mulți factori, cum ar fi:

- *proprietățile fizico-chimice şi structurale a semințelor de cereale;*
- *parametrii constructivi şi funcționali ai rolelor;*
- *condițiile de muncă alese (modul de alimentare şi încărcare specific, etc).*

Lucrarea prezintă câteva aspecte ale procesului tehnologic al cilindrilor dublu orizontali şi unele elemente teoretice legate de modul de determinare a principalilor parametri constructive şi funcționali ai acestora. Lucrarea prezintă, de asemenea schema procesului de mărunțire pentru o pereche de role, schema de lucru pentru camera de procesare şi sistemul de calcul pentru momente diferite. Principalele operații care pot fi executate de către moară, pot fi grupate după cum urmează:

- *operația de zdrobire (şlefuire grosieră);*
- *operația de eliberare a materialului;*
- *operațiunea de măcinare;*
- *operația de uniformizare.*

ABSTRACT:

The main equipment unit within the modern milling equipment is the shaft, whose bodies of work are composed of pairs of roller grinding of different diameters and lengths.

Milling process is influenced by several factors such as:

- physicochemical and structural properties of cereal seeds;
- constructive and functional parameters of the rollers;
- the chosen work conditions (feeding and loading specific mode, etc).

The paper presents several aspects of the technological process of double horizontal rollers and some theoretical elements related to how to determine their main constructive and functional parameters. The paper also presents a milling process scheme for a pair of rollers, the working scheme for the work room and the calculation scheme for different moments.

Main operations that can be executed by the crusher can be grouped as follows:

- groating operation (coarse grinding);
- disengaging operation;
- milling operation;
- flattening operation.

INTRODUCTION

Since the grinding operation is one of the most costly operation to streamline the process and thus reduce costs, many studies have been developed for determining the factors influencing either shredding or to improve equipment.

Mainly energy consumption for grinding depends on the physico-mechanical type of application in grinding process (compression, shear, etc.) And the degree of grinding.
Energy consumed in grinding is only useful in the rest relate to the production elastic-plastic deformations, the friction between them and their bodies seed assets of equipment (shafts) and the internal mechanical losses such equipment.

MATERIAL AND METHODS

To achieving low energy consumption, to carry out the task of crushing should be taken into account by setting strict dimensions by which to make grinding and appropriate choice of kinematic scheme and dimensions necessary to achieve the machine according to the physico - mechanical seed to be processed (crushed).

RESULTS OF RESEARCH

a) by trapping and shooting angle

Rotating in opposite directions the two cylinder, horizontally placed, come and lead them in the space between particles of material (seed), as Figure 1.

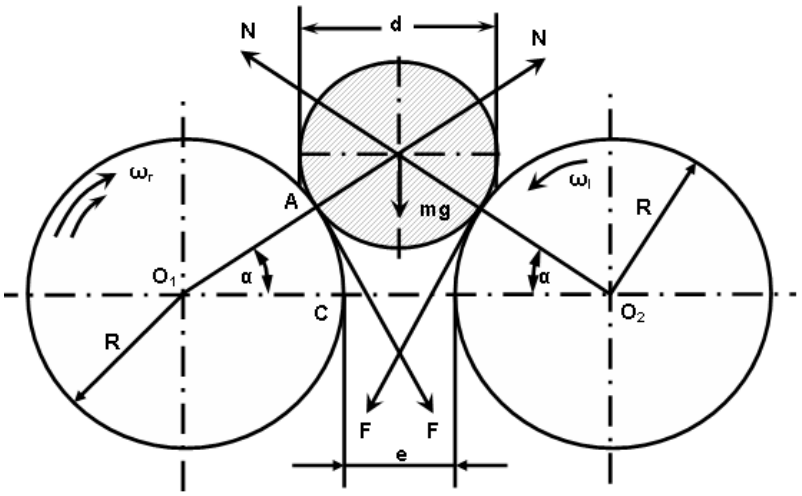

Fig. 1 - Scheme of crushing

Clamping angle α is defined by the line O_1O_2 centers and rays taken at points of contact of cylinders with the particle material.

The forces acting on the particle due to contact pressure are normal force *N* and tangential force of friction *F*. Once the individual has had contact with two cylinders of grinding it is forced to enter into a space that is increasingly diminishing increasingly, until it comes equal to the minimum distance between cylinders '*e*'. Over the space defined by the angle α, the particle continuously deforms constantly going through an arc equal *Rα*.

There was a tendency to pull the particle through cylinders must condition:

$$\alpha<\varphi \qquad (1)$$

where *φ* is the angle of friction between the particle and cylinder.

b) Diameter of roller (cylindrical) grinding

It is one of the parameters that directly influence the process and, in particular, the intensity of grinding. The calculation is done in roller diameter case that entry into the work area, particle size is *d*, and out she goes through a space of dimension *e*.

Given Figure 1, we can write:

$$2R\cos\alpha + d\cos\alpha = 2R + e \qquad (2)$$

From relation (2) calculation can be inferred relationship roller diameter:

$$D = (d\cos\alpha - e) / (1 - \cos\alpha) \qquad (3)$$

Considering the coefficient of friction between particles and rollers surface with friction coefficient $\mu = 0.39$ (for wheat), results in a friction angle $\varphi = 160^{o}41'57''$.

For an angle $\alpha = 12^{o} < \varphi$ is obtained for wheat (d ≈ 3.5 mm) at a nearby $e = 0.35$ *mm*, a diameter of roller grinding D ≈ 141 mm.

Generally rollers grinding diameters ranging between 220 and 250 mm diameters less between 300 and 350 mm (especially milling rye).

c) The angle of inclination of flutes

The rollers grinding of rolls may be smooth or corrugated surface depending on where they are held in the technological flow of mill. In modern milling facilities, is only corrugated cylinders from groats passages and last passages of grinding. The flutes inclined generators for their action on the particle to be progressive and as intense. The inclination is greater with the shear number of points is larger particles and to torque roller shaft more evenly.

It is considered R_1R_1' flute, the roller grinding rapidly, forming with its generator the angle ψ and flute R_1R_1', slow grinding of the cylinder forming the same angle ψ with the generator (Fig. 2.).

In point of intersection of the two flutes acting the normal forces P_r respectively P_l. Components, perpendicular to the generator N_1 and N_2 are pointing in opposite directions, but have the same direction and cutting out material particles. Longitudinal components T_1 and T_2, horizontal, have the same direction and same direction. They tend to move particles along of generator.

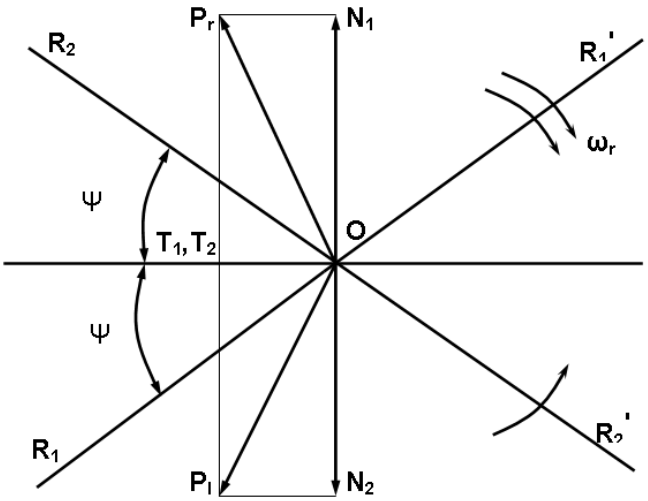

Fig. 2 - Inclination of flutes

To cancel their action should:

$$T_1 + T_2 - \mu P_r \cos\psi - \mu P_l \cos\psi \leq 0 \quad (4)$$

where: $P_r = P_l = P$ *şi* $T_1 = T_2 = T$.

In view of this and substituting in equation (4), we obtain:

$$\psi \leq \varphi \quad (5)$$

Therefore, to ensure intensity milling process requires that the angle of inclination of flutes be less than or equal to the angle of friction of particles rollers, φ.

In general, in practice, moving along flutes not occur because the angle of inclination of flutes, ψ is between 6 and 12% (3÷7°) in the classical schemes and 8÷14° in modern technological schemes being established according the passage in the pair of roller working. Thus, if the first groats, where it is desirable to obtain as large particles of endosperm, use less inclination, which increases to last groats.

An important factor directly influencing the grinding process is the number of flutes a linear inch circumference, as well as position flutes influencing the quantity and quality meal giving the groats. Most of the companies recommended position "edged on edged"

but there are companies that consider that for semiflint grain or flour is more advantageous position "back on back" to all parts of the crushing.

d. Area map in the process of grinding the material particle is a particle path at the time of grinding contact with rollers to leave her work area.

It is measured vertically, the magnitude of the influence of roller diameter: the diameter of the cylinder is greater space will go higher.

Approximating the arc of a circle on the particle is in contact with the cylinder, the corresponding chord (Fig. 3) we can write:

$$\cos\alpha = (D + e) / (D + d); \quad \sin\alpha = 2l / D \tag{6}$$

which shows:

$$l = D/2\ [(D + d)^2 - (D + e)^2]^{1/2} / (D + d) \tag{7}$$

where D is the diameter of grinding cylinders.

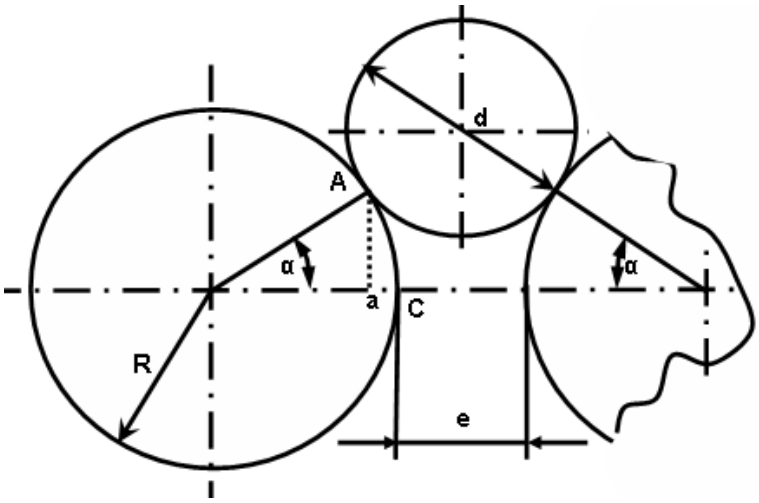

Fig. 3 - The space of work between rollers

Because the flutes frequency in area of grinding is proportional to the intensity work that directly affects the size of cylinder diameter on the process, the length of the route traveled by the particle.

What size cylinder diameter remains constant in the work, the intensity of grinding depends largely on the distance is between the cylinder, which is adjustable within certain limits, depending on her position in the technological shaft of the mill.

e***) Energy consumption*** for each cylinder is calculated knowing the amount of resultant forces, R_1 and R_2 (fig.4)

It is considered the focal point of the particle and fast roller with the center O_1. At this point previously determined work forces: normal N_1 and friction F_1.

In the process of crushing, the relative velocity of the particle is driven in reverse roller peripheral speed of grinding and, thus, otherwise friction F_1. Similarly, the focal point of the particle *B* with slow roller will work forces: Normal N_2 and friction F_2.

For the coordinate systems x_1Ay_1 respectively x_2By_2, moments of forces acting on the particle, compared with two roller centers O_1 and O_2, are:

$$M_{O1} = R_1a = X_1R\sin\alpha + Y_1R\cos\alpha$$

$$M_{O2} = R_1b = X_2R\sin\alpha + Y_2R\cos\alpha \tag{8}$$

Because peripheral roller speed is faster than the slow roller, roller for corrugated surface, we can say that $M_{O1} > M_{O2}$ for the two roller flutes action on the particle is different. Power required to drive each roller, if the forces are known results on the two roller, to obtain the relations:

$$P_1 = M_1a\omega_r = R_1a\omega_r = (N_1 / \cos\varphi_1)\ \omega_rR\sin\varphi_1$$

(9)

$$P_2 = M_2 a\omega_l = R_2 b\omega_l = (N_2 / \cos\varphi_2)\ \omega_l R \sin\varphi_2$$

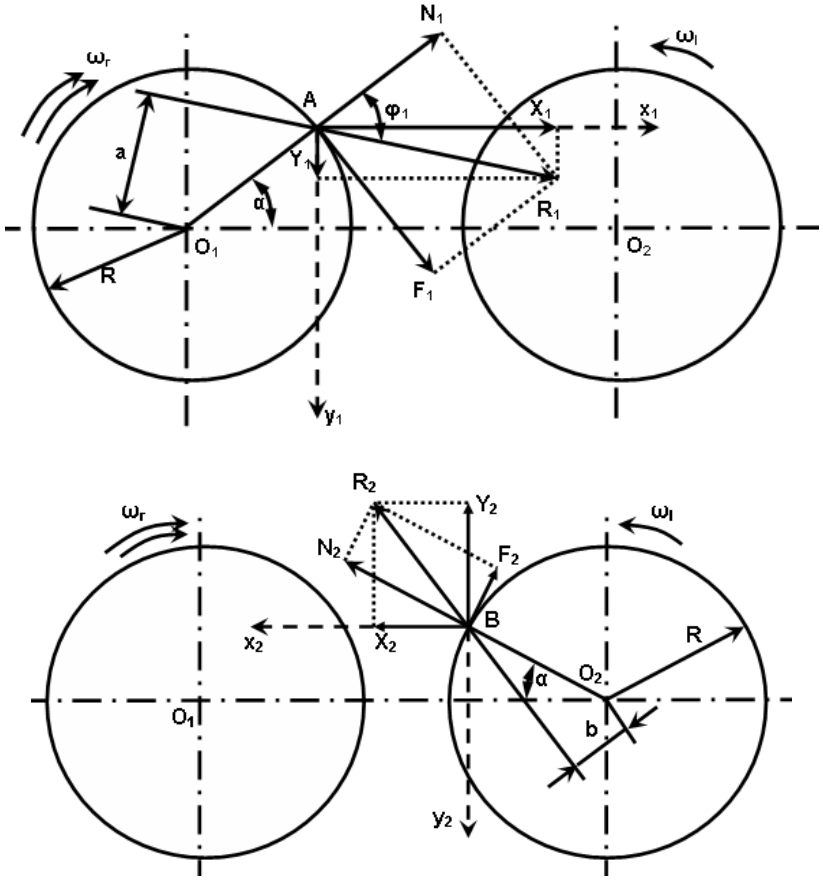

Fig. 4 - Scheme for calculating the moments

Dependent upon the cinematic drive used, ie how to drive the roller grinding, grinding power required for a material can be calculated with relations:

$$P = P_1 + P_2 \quad (10)$$

for the rollers operated for two electric motors (one for each cylinder), or:

$$P = P_1 - P_2 \quad (11)$$

for the rollers powered by a single electric motor, movement between the two roller sending through the inclined tooth cylindrical gear.

Recognizing that the reaction of $N_1 = N_2 = N$ and knowing that $R\omega_r = v_r$ and $R\omega_1 = v_1$, then the power required to grind when acting cylinders from a single electric motor (in most cases), is obtained by the difference between the two powers rollers:

$$P = P1 - P2 = Nvrtg\varphi1\ [1 - (v1/vr)\ (tg\varphi2/tg\varphi1) \quad (12)$$

As in most cases, $tg\varphi_2 = tg\varphi_1 = \mu$ (especially at rollers smooth), resulting:

$$P = Nv_r\mu\ (1\text{-}v_l/v_r) \quad (13)$$

The number of seeds at a moment time in the area of the cylinder is determined by the relationship:

$$Z_s = L/l_s\ k_u\ k_{si} \quad (14)$$

where: L is the length of this cylinder, l_s length of a seed k_u, filling factor, *Ksi*, coefficient of simultaneity.

In general, the calculation of energy consumption is the most unfavorable case, in this case is appropriate grist roller pair *I*, whole grains arriving in other cases energy consumption is lower.

In general, peripheral speeds of the grinding cylinders are different in all parts of the crushing, except germ separation passages.

The wheat and rye groating use reports $k = v_1/v_r = 1 / 2,5 \div 1 / 3$, while the sales and grinding ratio value k is between 1 / 1, 5 ÷ 1 / 2.

În general, vitezele periferice ale cilindrilor de măcinare sunt diferite la toate pasajele de mărunțire, cu excepția pasajelor de separare a germenilor.

CONCLUSIONS

Process parameters work and rollers with horizontal mount rollers are influenced by a number of factors that make roller action on particles to be quite complex. The calculation is done for the most disadvantageous situation and corresponding generally I of Schedule grist mill technology it serves.

An important factor that directly influence the intensity of grinding is the distance between the roller to be done from a distance adjustment of the roller quickly (fixed) and slow roller (mobile).

Also, the amount of space between the roller affects the intensity of shearing and the number of flutes acting on particles in the maximum zone near the roller.

The number of seeds influences the amount of energy consumption required for grinding process.

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AESTHETIC QUALITY OF THE FOOD PRODUCTS

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Key words: aesthetic quality, food product.

ABSTRACT

Nowadays, we assess the achievement of quality is 80% a management problem and 20% a problem of execution. The consumers associate the note of „product quality" with what looks good, appreciating the aesthetic quality of the food product.

INTRODUCTION

Elements of the food products that defines the aesthetic quality:

In the comprising sphere of the goods' aesthetic, they are contained the characters of the food products aesthetic quality, which are merged with the practical utility that provides more and more satisfactions to the consumers. The scientific solution of the products' aesthetic quality position it initiates from the consideration the man and its ambient environment posses qualities and features of aesthetic nature that develops in the framework of some defined relationships.

Out of the different issues raised by the food products quality improvement, the aesthetic qualities have a significant place, probably owe to their defective approach in the food technology, and in the food literature. O the other side, the aesthetic characteristics is a precious improvement reserve for the food products quality and their development of competitive on the domestic and international markets.

In the conditions of the market economy development, the more and more exigency of the consumers mass ask for the implementation of this industrial aesthetic in the food products technology, in the framework of the two factors: product and package.

The aesthetic elements of the food products that define the aesthetic quality of the product-package system can be grouped in the relationships:

- Concerning the food product technique, by the means of the relation between shape-structure, shape-composition, shape-color, and shape-ornament.
- Concerning the look and finishing, by means of look and finishing, by means of the exterior and interior look, of the section, color, package look, products' exhibition, finishing of the exterior and interior surface, design, expression of the product, and of the trade mark, proportion and harmony.

MATERIAL AND METHOD

The entirety of these aesthetic elements, the taken into consideration of all elements, it removes the subjectivity in expressing the aesthetic value of the food products. It is required to underline that in frequent cases the creation understood and implemented the aesthetic elements in a more narrow vision, resuming at the exterior aspect and packaging.

Of course these elements have their significance, but the aesthetic quality of the food products cannot resume to the "attracting exterior look" or "pleasant packaging". This simplistic understanding of the aesthetic features leaded to the emergence on the domestic market of products of whose aspect was the reason of the costumers' objections. The consumers associate more and more the concept of "product quality" with that of attractive, appraising the aesthetic quality of the food product.

The development and modernizing of the food technology, the use of the newest scientific knowledge occur not only in the production area, but also in the consumption

area, the request of food products progressively leading towards new products, having a high nutritive value, and aesthetic characteristics according to the necessity of satisfying all the modern needs. At these they also promote the continuous development of the culture degree, and the influence of the "Western food products" that causes a selection of tastes, demands, requests, and preference too which the consumer of the present has for the food products.

Of course, the composition of the consumer mass aesthetic abilities in relation with the technical industrial developments, it is a complex process that occurs in time and space, in each stage of the social economical development, by the absolute rejection of the qualitative non conformable and unaesthetic products. Therefore the whole developed activity from the moment of the product design until the moment when it is consumed, it has to be orientated towards the nutritive value maintenance of the sensory and aesthetic features.

The adoption of the food and package notion in the concept of physical-chemical system with multiple functions it highlights the complex interactions among different components which define in a new vision the food product concept, the fabrication receipt and technology, its package and aesthetic.

The food package and packaging is a complex part from the technical, aesthetic, and operating point of view. The package aesthetic exercises a considerable influence over the marketing action to determine the costumer to buy. So, it makes itself conspicuous the function of the package in the food products' marketing process. The achievement of some aesthetic packaging it supposes the design of some packaging with higher technical economical markers that satisfy the requests of the relation aesthetic-useful-functional-efficient.

An attracting packaging doesn't have to infringe with anything on the function it fulfills, because the beautiful is linked to the useful and efficient, allowing in the same time the positive appraisal of the food product. The packaging aesthetic is get adequately applying the plastic art elements: shape, color and design.

The shape of the packaging is in a tight dependence with the product, its shape and state of aggregation, packing material, applied technology and the correlation necessity of displaying selling-off packaging sizes with the transport encasement. For some products (tins, beverages, chicken) the shape must be chosen a manner that allows the sealed encasing and keeping the quality and integrity of the food.

In case of the used packaging for the food product portioning or for getting together f some product without a constant shape, the packaging shape doesn't depend of that of the product. The settlement of the shape and size are tightly associated to the static balance laws, to the requests of the trading companies: acceleration of the circulation speed, possibility to exhibit the food products in show windows, racks, the racking in stores, etc. Obviously the shape choice doesn't have to neglect the necessity to save the used packaging materials, so that to be satisfied the optimum correlation shape-price.

The color is a significant aesthetic, independent, which also contributed to the achievement of other aesthetic-design elements. By its physical and psychological characteristics, the color allows an easy detection of the product, of its freshness, of the packaging and respectively of the packed food product. For the consuming people the colors express the most ordinary form of the aesthetic sense, these having distinct physiologic effects. (Table 1).

The sampling form the commerce it demonstrated that to a product the consumer firstly approaches the color, than the design and the drawing, and third the mark. The design completes the aesthetic description of the product and package through the artistic imagination of the designer who can use the photo, drawings, and suggestive text, well linked with the food nature.

Table 1

Physiologic and Neuropsychic Effects of the Colors

Color	Effects	
	Physiologic	**Neuropsychic**
Red	- it increases the blood pressure, - it rises the muscular tonus, - it activates the breath	- worm color - general stimulus - sensation of closeness in space
Orange	- it accelerates the heart pulsation - it maintains the blood pressure - it favorite the gastric secretion and digestion	- worm color - emotional stimulus - very ample closeness sensation in space
Yellow	- it actions the normal activity of the cardio-vascular system	- worm and cheerful color - it stimulates the seeing - sensation of closeness in space - relaxant of the neuropsychosis
Green	- it reduces the blood pressure, - it enlarges the capillary tubes	- cold and relaxing color - freshness feeling, - it favors the nervous relaxation
Blue	- it decreases the blood pressure and muscular tonus - it calms the breath and pulse frequency	- cold and relaxing color - remoteness sensation in space
Purple	- it increase the cardio-vascular strength - it increases the lungs strength	- cold and anxious, discouraging color - sensation of very intense closeness in space

Source: I. Diaconescu – Food products science of commodities

For the packages it is suggested a design simple, synthetic, expressive. The illustration, design must be linked to the food product. Skillfully using the shape, the letters' disposal and color, these can transform in decorative elements, bearers of optical message, visualizing the product, and informing the consumer.

Harmoniously blending the shape, color and design it reached the achievement of the seduction type package, which represents a real industry a range of developed countries. In the same time, in other countries it carry on an organized battle against the false seduction package, which isn't a lasting success with the public, and in the same time it depreciates the food product. The food product introduced in a too striking seduction package is analyzed in laboratory, and the results are given to the public by the agency of the specialty media.

RESULTS AND DISCUSSIONS

- But what is the essence of the quality?
- What is the factor which acts the most on the building-up of the costumer's opinion?
- The purchased product or service is f good quality?

At the complexity which it represents the definition of those terms build-up the product quality itself, for the costumers it subjoins the fact the quality doesn't limit only to the question if the product or service really represents the qualities claimed to be comprised. The quality modern concept especially emphasizes the manner how the organization complies with the costumers, including the approaching manner by phone calls, the respond speed of the personnel answering to a costumer's request, or the rapidity to make an offer (device) for a costumer or to answer to its claims.

The researches performed by the Forum Corporation concerning the reasons why it was lost a part of the custom of some important industrial and services enterprises, it shows that:

• About 15% of the costumers who left, did it because they found “a better product” (with less failures or with a lower failure index);
• Another 15% because they found “a cheaper product”;
• 20% because of the “lack of personal contact and attention” from the former supplier’s side;
• 50% because the "relations with the supplier’s personnel were of bad quality".

The conclusion is evident: every costumer wants to get a product or service owing some minimum determined characteristics but finally the highest influence on the way of the quality perception is the manner how it is handled.

The quality from the enterprise point of view it has another shade too. For the enterprise “quality” means the adjustment of its activities depending on the manner it is defines the function the respective enterprise’s leaders want the enterprise to play on the market. The enterprises leadership or the organization that operates on the market search the economic success and, from this point of view, it could be said the enterprise operates with the quality product when it gets the respective success. From this reason we can assert that to get the quality from the enterprise’s point of view it implies:

- To offer attractive product for the own costumers by:
  I. Identification of their needs;
  II. Manufacture of products according to that requests.
- Accomplishment of profitable marketing**,** namely of whose prices higher than the costs.

Getting the best benefits from market efficiently producing, namely producing with minimum costs, that supposes to use the resources in an efficient manner or to avoid the losing of human resources, materials, respective the elimination of the useless actions, that don’t concur to the satisfaction of the external costumer needs. We will return to quality-price correlation analysis in order to remark the quality pattern of the products and services in concordance with the price.

CONCLUSIONS

Wrong perceptions, politics, and conceptions concerning the quality:

- The governments from many developing countries, taking into consideration the difficulties generated by the lack of the international competition, and a protectionist economy, they take now decisions for some corrective actions. There is a multitude of other similar factors which rather directly concern the industry instead the market condition. These factors are very significant also including the failure in implementation of the modern leading methods, and they accentuate the short term economic development instead the long term economic development. The greatest disadvantage in the quality improvement in the developing countries however is the lack of knowledge concerning the economic benefits brought by that. The quality is approached as a desirable social objective, but it is neglected its contribution to the efficiency of the economic activities. All these are the result of a wrong conception about the quality.

- Examples of wrong conceptions:

1. The higher quality costs more.

This is the widely diffused “belief” concerning the quality. The newest valuations of the “manufacture” mechanism shown not always the higher quality costs more. It is important to understand how it is achieved the quality of a product in the modern serial production. Based on the market’s requests, the quality is drafted on paper. This draft is then used for

the practical achievement of the product using the corresponding production means. The investment of bigger resources in the research and development area can lead to a significant increase of the products' quality. In the same time, through the improvement of the production process it can obtained adjustments of the overall costs per product. These facts were fully demonstrated in Japan and in the West European countries, concerning the production of industrial and commercial goods.

The industry of IT, electronics and time-saving devices is a very good example; so in the last two decades the quality of those products progressively improved, and their price decreased.

2. Accentuation the quality will lead to the decrease of efficiency.

There is a widely spread wrong mentality among the production managers, namely the quality can be achieved only at the price of the quantity. This mentality is an inheritance of the time when the quality examination consisted only in a physical inspection of the end product. Therefore if in such situation entailed more exact inspection conditions, this fact usually caused a higher amount of scraps. In the modern vision of the quality inspection, the accent moved on the prevention action during the projecting and production, so that from the beginning it is removed the possibility of inappropriate products manufacturing. Therefore the efforts for maintaining the quantity and improving the quality became complementary, because the quality improvement generally leaded towards the increase of the efficiency. For instance, one of the most important activities in providing the quality is the project analysis before introduction into production. This project analysis establishes if the project is capable to satisfy the user requests. Also this analysis of the project can emphasize if the product can or cannot be manufactured with the existing means. If the case some parts of the project can be altered, so that the product can be achieved by the most economic production process. From the above mentioned can be found the fact the activities that concern the quality, directly or indirectly cause an increase of the efficiency.

3. The quality is not affected by the manner the labour force perceive the "cult of work".

The manufacturers from the developing countries frequently complain about the low quality of the manufactured products in their countries, and they assign it to the lack of consciousness in the labor process. However a close analysis of this kind of affirmations leads to the conclusion the worker can be culpable for the products quality absence.
An objective assessment of the most manufacture units from the developing countries it emphasizes their leadership didn't make these actions at the most of the working places. In these kinds of situations, the companies must search for their weakness of the leadership systems.

4. The quality can be provided through a rigorous inspection.

The inspection was the first quality formal control mechanism at the beginning of the XX century. The most majority of the manufacturers still believe the quality can be improved only with a rigorous inspection. Only the inspection itself cannot improve the quality of the manufactured products. More than that, recent studies shown that 60-70% of the all emerged defects in the manufacturing process are directly or indirectly due to the existing deficiencies in the design, technologic and supply process. About all the quality inspection and control activities address to the manufacturing departments.

It has to be underlined the fact the quality control activity isn't exclusively a developed activity by the quality department. In order to be efficient, it has to be present in the activities developed by all departments, including those responsible for marketing, design, technology, supply, manufacture, packaging, delivery, and transport. Actually the

quality control must contain both the raw materials suppliers, and the costumers. It is very significant to be known and understood the costumers requests, and to get an adequate feedback concerning their perception on the received products.

5. Fulfillment of the quality requests only for the products allocated for export.

The manufactured products for export by the enterprises from the developing countries can be grouped in two large categories:

- Products of low quality appropriate for export in other developing countries;
- Products of high quality appropriate for export in developed countries.

Because in the developing countries the sale of the products is mainly performed on price basis, for the manufacturer is much easier to export in the other developing countries from the same reasons they can sell in their own countries. Anyway this approach manner cannot be applied for the export of the products allocated for USA or Europe where the products quality must be much higher. For this reason firstly they have to be modernized the exporting enterprises, so that the manufactured products are internationally competitive.

In order to be successfully on the external market it is essential to have a well planed quality leading system having the aim: “zero unconformities”, no matter if the products are for export or for the domestic market. In the developing countries because the life level of the locals is in a continuous increasing, soon they will be high requests concerning the quality of the products. The consumers will agree to pay higher prices for the products of a higher quality. Thus, in the coming years the price criterion will not be taken into consideration so much.

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EVOLUTION OF THE EUROPEAN AND AMERICAN ORGANIC FARMING CONCEPT

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Key words: organic food, food-safety, organic-farming.

ABSTRACT

The European and American markets; evolution followed a similar path. At the beginning, the organic sector was defined by the offer, the organic products being brought on the market by the farmers. Nowadays the consumers became the "engine" of the organic markets. The consumers have the same reasons justifying their increased interest with the organic food, on the first place being the food safety and health. A significant side concerning the organic food consumers is represented by the "alimentary fears" that can change the request for certain products. The European consumers complied with some alimentary fears worse than those of the Americans, generated by the man caw disease, dioxin contaminated fodder for birds, cancerigenous food colouring etc.

INTRODUCTION

The cultural perspectives, but also the ecological nature (green) policy influences it had also an impact on request of the European consumers for agricultural products, who expressed their opposition against the biotechnology products, and the genetic modified food. Instead, the American consumers, much better informed of the biotechnological food implementation, have objected very slightly at the implementation in the market of the genetic modified. Anyway, the Final Regulation of the American Department for Agriculture didn't classified until now as organic, the food obtained with genetic modified ingredients. Both American and European consumers meet similar barriers in purchasing the organic products. For the American consumers the price of the products is in the first place on the restriction list, followed up by the availability of the organic products.

In Europe the main barriers are: the prices, inefficient distribution of the products, narrow difference of quality, lack of information concerning the nature of the organic products and doubts concerning the organic integrity of the products.

The most of the organic products are sold at a much higher price than that for the conventional products, widely due to the raised costs of manufacturing, processing, purchasing, and distribution. Another factor of the raised price is the balance between the request and offer of organic products that bring increased benefits to the organic farmers. In the EU framework the raised prices varies from a country to another and from a process to another.

MATERIAL AND METHOD

Concerning the agricultural policy, there are significant differences between the EU and USA. The USA policy concentrates on request, through the organic national standards and certification, comprising a limited amount of federal subventions which support the research, education and marketing of the organic products.

The EU countries, in order to persuade that the organic farming affords benefits, they implemented strategies designed to expand the organic cropped area, the European programs supporting at first the organic sector offer, comprising national organic standards and certification, payments for the conversion of the conventional farming into organic farming, and to support the farmers who crop organically, strategies of research, education and marketing. The organic farming policy is a subject of the general agro-environment

policy, where the European Union offers the framework for its development and co-financing. Each country decides about the organic farming policies, some member states adopting strategies which follow up the free market approach, aligned strategies to the American policy, while many states facilitate the organic farming according to the European pattern.

The organic standards are framed by the governments of the EU countries and USA, registering differences concerning attestation and certification of the organic farms, of the organic (ecologic) products manufacturers and merchants. An international group, the International Federation of Organic Farming Movements (IFOAM) tried to design an international standard, but without any result until now.

According to IFOAM, the organic farming "contains all the agricultural systems which facilitate the production of food and healthy fibers for the environment, society and economy. These systems consider that the local soil fertility is the key for the success of the harvest. Observing the natural capability of plants, animals, and landscape, the organic farming pursues the quality optimization in all respects of the agriculture and environment, considerably decreasing the external inputs of synthetic fertilizers, pesticides and pharmaceutical agents, on the other hand, stimulating the action of the natural laws to increase both the agricultural production, and the resistance to diseases. The organic farming adheres to the universal accepted criteria, implemented in the socioeconomic, geoclimatic, and cultural communities."

According to the Codex Alimentarius, the "organic farming grounds on unitary production management systems, that forward and improve the agro-ecosystem health, biodiversity, biologic cycles, and the soil's biologic activity, emphasizing the use of the management practices instead of inputs from outside the farm, taking into account the regional condition, which ask for locally adapted systems. This is accomplished using as much as possible cultural, biologic, and mechanic methods but synthetic materials, in order to fulfill any function specific for the system."

The Codex Alimentarius standards "offer an accepted framework at the international level through which are sold the organic food at an international scale. If among countries can raise misunderstandings concerning the equivalence of the organic foods, the prescriptions from the Codex can be used as a reference in the commercial issues".

The European Union recognizes the national authority from each member state as an organism designed to certify the organic products according to the EU regulations. Legally, if a producer of manufacturer is certified by one of the EU approved certification organisms, the certification is available in all the EU member states, although some certification organisms insist on more severe standards than those from the EU legislation. In the EU the legislation concerning the obtaining the organic vegetable products is provided by the Regulation (EC) No. 2092/1991, enforced since 1993, and that of the organic products of animal origin by the Regulation (EC) No. 1804/1999, enforced since 2000. the vegetable and animal organic products, processed organic food, imported in EU, can be labeled as organic only if they conform to the enforced provisions.

The Regulations stipulate minimum rules of production, labeling, and marketing for the whole Europe, but each country is responsible with the rules approach and implementation, as well as with the assertion, monitoring, and checking of their affixation.Organic products labeling in EU it is complex. In 2001 the EU set a voluntary sigla for the labeling of the organic products which can be used in UE by those which obeyed the regulations (Figure 1).

In some member states there are public labels (Figure 2), and in other states the private certifiers have their own labels, some of them being well known to the consumers (for instance, KRAV in Sweden, Knospe in Switzerland, Skal in the Netherlands, Soil Association in he Great Britain).

Figure 1 - Until now a few companies apply the EU sigla.

Figure 2 – Brands for the organic products in Europe

(Danemarca = Denmark; Franța = France; Germania = Germany; Austria = Austria; Belgia = Belgium; Elveția = Switzerland; Suedia = Sweden; Olanda = the Netherlands.)

a) Governmental brand; b) Half-governmental brand;

c) Brand of the umbrella organization for the circulation of the organic farming;

d) Labels of the private organizations for organic products certification.

In the most of European countries the private certifiers who have own standards, are forced by the law to certify the producer according to the European Union Regulations, if they are asked so, and in this case the producer can use the EU and the member states sigla. The use of multiple labels still makes confusion among the consumers. In some countries only a sigla is laid down and recognized, and in others they are laid down a wide range of labels, siglum and brands. Several countries of the European Union adjusted their own national regulations and brands for the organic products.

RESULTS AND DISCUSSIONS

In 1889, in the USA, the Department of Agriculture, through the Organic Foods Production Act (OFPA), it has been authorized to frame the national standards for the American organic products, because the organic industry was concerned by the consumers' confusion about meaning of organic. The OFPA objectives, established by the legislation, provide the use of standards for the marketing of the organic obtained products, providing the consumers that the organic products comply with the standards and facilitate the interstate marketing.

In the European Union the major policies of the organic farming are included in the agro-environment program of the Communitary Agricultural Policy since 1992 (Regulation (EC) No. 2078/1992) that provides to the member states of the European Union the political sustainment framework of the organic farming. According to the 2000 Agenda, the policies of the organic farming were included in the program of rural development. In 2001,

EUR 500 millions were spent for the organic fields, the organic farms receiving an average subvention of EUR 183-186/ha, comparatively to EUR 89/ha for the conventional farms.
The objectives concerning the organic cropped land surface are followed up by the EU member states, and the action plans for the organic farming drafted by several member states follow up to expand the surfaces for organic farming up to 20% in the 2010s.

In 1995 Denmark notified the transformation of 7% of the land in organic field certificated until the year 2000, objective reached in 2004, the purpose of this country was to have 12% of the field organically cropped, percent not fulfilled. Also other EU member states scheduled significant increasing of the organic cropped field, of 10% until 2005 in the Netherlands, Wales, 3% in France, and 20% in Sweden and Belgium, until 2010.

In the United States of America the most recent (year 2002) politic effort materialized in the organization of an Organic Committee in the Houser of Representatives, having the mission to promote solid development strategies of the organic farming and marketing which are suppose to be implemented in the test of the future agricultural legislation.

CONCLUSIONS

In conclusion, although there are differences between the European Union and United States of America concerning the level and type of direct political support of the organic farming, it can be stated the organic farming is dynamic in the both important agricultural regions of the world (EU and USA). Some growers choose the organic farming method due to philosophic reasons, others because they are stimulated to do so by the governmental policies, especially in Europe, and others due to the additional prices and higher benefits in USA.

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CERCETĂRI EXPERIMENTALE PENTRU DETERMINAREA EFICACITĂŢII SISTEMELOR ELECTRONICE DE REGLARE AUTOMATĂ A PARAMETRILOR DE LUCRU LA MAŞINILE DE STROPIT
EXPERIMENTALLY RESEARCHES FOR ESTABLISHING THE EFFICIENCY OF ELECTRONIC AUTOMATIC ADJUSTING SYSTEMS OF WORKING INDEX AT SPRINKLING MACHINES

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Key words: adjusting system, liquid rate

REZUMAT

Asigurarea stabilităţii normei de lichid la hectar reprezintă una dintre cerinţele majore impuse maşinilor de stropit. Cercetările experimentale efectuate asupra sistemelor electronice de corelare automată a debitului de lucru cu viteza de deplasare evidenţiază funcţionalitatea acestora şi importanţa echipării maşinilor de stropit cu astfel de sisteme de reglare.

ABSTRACT

To ensure the stability of liquid rate represent one of the most important demands imposed to sprinkling machines. Experimentally researches made about on electronic adjusting systems for ensure the corelation between liquid flow and displacement velocity reveals the functionallity of these and the importance of equipping sprinkling machines with such adjusting systems.

INTRODUCTION

The ensurance the value of liquid rate at a constant level (in accordance with agrotechnically specifications) is one of the most important demands imposed to the working process at sprinkling machines. Theoretically researches made for project and achieve a electronic adjusting system for ensure the corelation between liquid flow and displacement velocity, manage to define and materialize the components of the system, and also the work method used.

EXPERIMENTAL AND METHODS

For achieve the experimentations in real work conditions were mounted the components of the adjusting system (speed transducer, flowmetter with flow transducer, electronic block, adjusting valve) on the structure of a MET 1200 sprinkling machine [1].

Experimentally researches of system behavior rely on: collecting the particles distributed on a established surface; achievement of quantitative analyse of samples test, through weighting and processing the information[2].

The experimentations in real work conditions were made after a method which establish the following work quality index:

- *the average liquid quantity* distributed on samples test (S = 0,16 m^2), established with the relation:

$$g_m = \frac{\sum_{i=1}^{n} g_i + g_{0i}}{n} - g_{0m};\ g_{om} = \frac{\sum_{i=1}^{n} g_{0i}}{n}[g] \qquad (1)$$

where: g_i is the liquid quantity distributed on a single sample test, in g;
g_{0i} – the weight of the samples test in initial conditions, in g;
g_{0m} – initial average weight of the samples test, in g;

n – the number of tests.

- *the uniformity of distribution (U_{dl})* on displacement direction, established with relation:

$$U_{dl} = 100 - C_V = 100 - \frac{\sqrt{\sum_{i=1}^{n}(g_i - g_m)^2}}{g_m} \cdot 100 [\%] \quad (2)$$

where C_v is the variation coefficient of uniformity distribution, on displacement direction, in [%].

- *the stability of liquid rate (S_N),* applied on a hectar, established with relation:

$$S_N = 100 - I_N = 100 - \frac{\sqrt{\sum_{i=1}^{n}(N_i - N_m)^2}}{N_m} \cdot 100 \quad (3)$$

where: I_N is the the unsteady of liquid rate, on displacement direction, in [%];

N_i – momentary liquid rate, in l(kg)/ha;

N_m – average liquid rate, in l(kg)/ha.

The devices for measuring and processing the informations are represented by: PC 486/250 MHz, electronic balance Mettler PM 6000, power supply, absorbing samples paper (for collect the liquid particles) [1].

The mode to lay on soil the samples test (square shape with l=40 cm) is presented in figure 1.

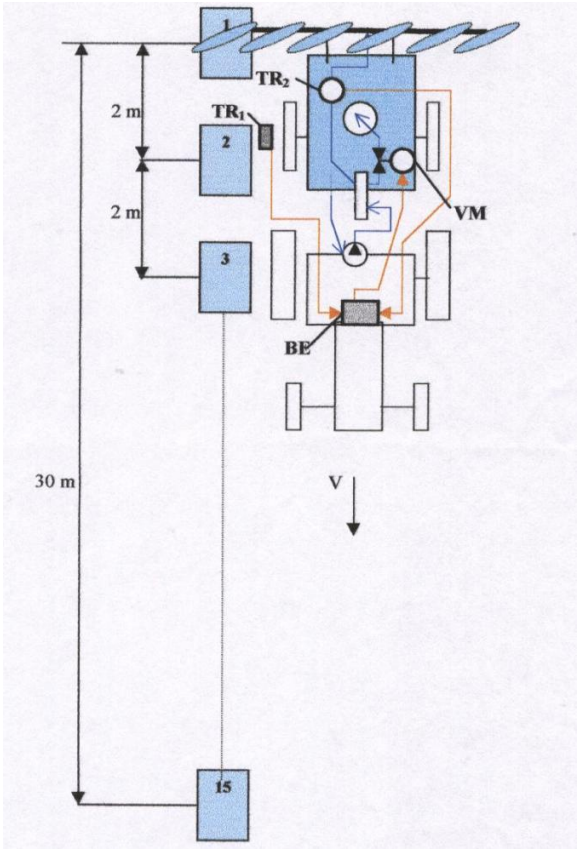

Fig. 1. Setting mode of saples test at experimentations; ensemble view of the setting mode of adjustig system components: TR_1-speed transducer; TR_s-flowmetter with impoulses transducer; BE-electronic block; VM-controle valve.

Before the beggining of the experimentations, each sample is weighted. The obtained values are recorded into the computer with a specialised soft. This soft allow to

record maximum 120 measured values (through cumulating the values in order of their establishig with electronic balance) [1].

For establishing the distribution characteristics on the machine displacement direction and the work quality index were achieve 4 tests (in conditions of a variable displacement velocity, specifically for the working process). The first two tests were achieve with the adjusting system in position „OFF", and the other second tests, with the system in position „ON" (regarding to ensure with stricness the values of speed and distances from the first two tests – control tests). In this mode we can observe the evolution of the work process with/without the action of the adjusting system.

The specifically conditions to proceed the tests are the following:

TEST I:

- first interval (distance of 8 m) was traversed in time t_1=8/1,11=7,2 s, with a constant speed of 4 km/h (uniform displacement);
- the second was traversed in time t_2=5 s, time in which the speed was increased of 4 km/h (1,11 m/s) at 5 km/h (1,38 m/s); the lengh of interval is $x=v^2-v_0^2/2a=6,2$ m (uniform accelerated displacement, with $a = \Delta v/\Delta t=0,054$ ms^{-2});
- the third interval (which has a lengh of 15,8 m) was traversed with a constant speed of 5 km/h, in time t_3=11,4 s (uniform displacement).

TEST II:

- first interval (distance of 8 m) was traversed with a constant speed of 5 km/h in time t_1=5,7 s (uniform displacement);
- the second was traversed in time t_2=5 s, time in which the speed was decreased of 5 km/h (1,38 m/s) at 4 km/h (1,11 m/s); the lengh of this interval is x=6,2 m (uniform deccelerated displacement);
- the third interval (which has a lengh of 15,8 m) was traversed with a constant speed of 4 km/h, in time t_3=14,2 s (uniform displacement).

The work pressure was increased at 2,4 barr, for ensure the imposed liquid rate (300 l,kg)/ha).

RESULTS AND DISCUTIONS

In table 1 are presented the adequate values (for the 4 tests), obtained through compare values ($g_i + g_{0i}$) with g_{0i}.

Table 1

The quantity of solution gathered for each sample test

Number of sample test	Adequate value [g]			
	TEST I	TEST II	TEST III	TEST IV
1	4,7	4,7	4,6	4,6
2	4,6	4,8	4,7	4,7
3	4,8	4,7	4,8	4,6
4	4,8	4,6	4,7	4,7
5	4,4	5,0	4,2	5,1
6	4,0	5,3	3,9	5,5
7	3.5	5,7	4,3	5,2
8	3,4	5,8	4,6	4,9
9	3,4	5,7	4,7	4,7
10	3,5	5.9	4,8	4,8
11	3,4	5,8	4,7	4,8
12	3,5	5,8	4,8	4,6
13	3,6	5,7	4,9	4,7
14	3,4	5,6	4,8	4,8
15	3,5	5,7	4,9	4,9

The graphic representation of the obtained values allow to rise the longitudinally distribution characteristic, achieved by the sprinkling machine, in conditions of the tests (figure 2,3).

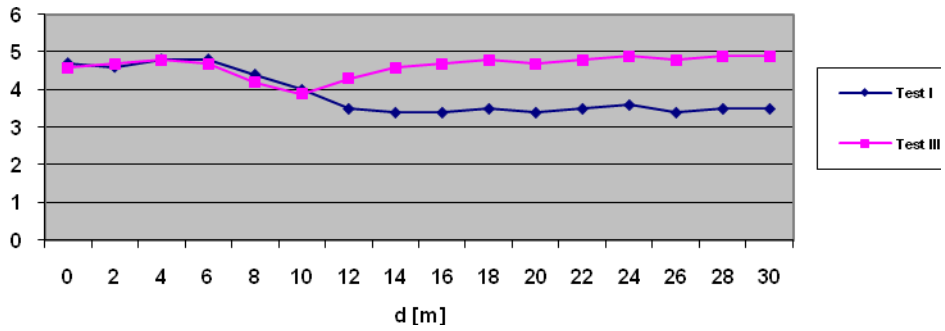

Fig.2. The dependance between the liquid quantity administered on unit surface and distance, for test I and III.

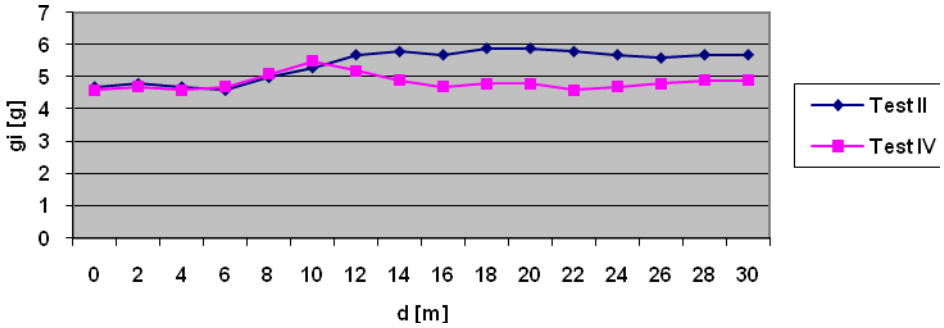

Fig.3. The dependance between the liquid quantity administered on unit surface and distance, for test II and IV.

The analyse of obtained results put in evidence the following:

- the stability of liquid rate is ensure in case of tests I and II (control tests) only on the interval 0...8 m, when are respected the admisible values (28,5...31,5 g/m^2); after the first interval (when the displacement became uniform varied) it can observe that the variation of liquid quantity distributed is upside down proportionally with the variation of displacement velocity;
- in case of tests III and IV, the action of the adjusting system establish the adequate modification of liquid quantity, just to the value necessary for ensuring the imposed liquid rate.

The values of the work quality index are presented in table 2.

Table 2

The values of the main quality index

Test number	g_m [%]	U_{dl} [%]	S_N [%]
I	3,90	85,0	85,0
II	5,30	84,5	84,5
III	4,58	93,9	93,9
IV	4,84	94,3	94,3

CONCLUSIONS

1. Adequate implemantation of physic model of the automatic adjusting system on MET 1200 sprinkling machine, allow to achieve the settled objectives for experimentally researches in real work conditions.
2. For checking the efficiency of the automatic adjusting system were achieve experimentations with system in booth positions („OFF”and „ON”); in booth cases were ensured the same values for the input parameters: rate of distribution, respectively the mode of displacement velocity variation.
3. The efficiency of the adjusting system is materialized through increasing the uniformity of distribution (on displacement direction) and the stability of liquid rate

from 84,5% at 94,3%; also the economic, social and medium protection aspects, which must have taken in consideration plead for equipping these sprinkling machines with such adjusting systems.

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ECONOMIA RURALA IN ROMANIA

RURAL ECONOMY IN ROMANIA

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Key words: rural, development, space, potential, region, agricultural, non-agricultural, natural.

REZUMAT

Dezvoltarea economiei rurale în România, ca țară membră a Uniunii Europene, presupune o abordare metodologică multidisciplinară, intersectorială şi teritorială (regională). O primă prioritate care s-a impus în acest nou context o reprezintă necesitatea de a îmbunătăți capacitatea instituțională şi legislativă de implementare a programelor de dezvoltare, printr-o abordare integrată bazată pe scheme de dezvoltare la nivel național şi regional.

Problema dezvoltării economiei rurale este una extrem de complexă şi constituie o temă de mare angajament a contemporaneității, datorită faptului că, punctul culminant presupune realizarea unui echilibru între cerința de conservare a spațiului rural economic, ecologic şi social-cultural al țării, pe de o parte, şi tendința de modernizare a vieții rurale, pe de altă parte.

ABSTRACT

Developing the rural economy in Romania, as member country of the European Union, involves a methodological, multidisciplinary, intersectional and territorial (regional) approach. A first priority which was required in this new context is the need to improve the legislative and institutional capacity for implementation of development programs through an integrated approach based on development schemes at national and regional level.

The issue of developing the rural economy is an extremely complex subject and is a big commitment subject of contemporaneousness due to the fact that the climax involves a balance between the requirement of conservation of the economic, ecological and socio-cultural countryside space of the country, on the one hand, and the modernization trend of rural life, on the other hand.

INTRODUCTION

The rural development is a worldwide priority, and the new European context requires restructuring of the countryside under new conditions and unitarily to reduce the existing disparities between the old Member States, the new Member States and particularly the states candidating for adhesion (Zahiu Letitia et al, 2006). For Romania rural development bases on the fact that present Romania is to a significant extent, a rural Romania because: 93.7% of the territory is rural area; in rural areas are nowadays living 47% of Romanians; 40% of those who work are employed in activities located in rural area; the participation of agriculture (main activity of rural space) in the establishment of GDP has always been high (at the level of the year 1990 it was of 21.2%).

The rural economy comprises all economic processes, their extra-economic social connotations carried out in rural areas and especially, in rural communities, and the main rural activity is agriculture (Dinu Gavrilescu et al, 2000). The Gross added value (VAB) to agriculture was 12.1% of GDP and 13.6% of total VAB (INS, 2006).

Rural areas have a substantial growth potential and a vital social role. As defined by national law [9], rural areas of Romania cover 87.1% of the country, comprising 45.1% of the population (on the 1st of July 2005, according to indicators of the National Institute of Statistics[10]), namely 9.7 million inhabitants. The average population density in rural areas has relatively remained constant for years (at about 45.1 inhabitants/km^2). The OECD definition for the concept of rural areas[11] leads to slightly different figures, but it allows comparisons on international level (PNDR, 2008). The economic and social development and the general appearance of the national territory is due to the work submitted for revaluation of resources and its complex and balanced development integrated to the general development of Romania (Bold I. et al, 2003). The countryside - regarding area and population - has not a share as high in all 8 regions of development[12]. The most sprawled rural area is in the North-East area (94.0% of the surface) and the most numerous rural population in the South region (58.6% of the population) (Table 1).

The main features of the rural area in the eight development regions.

Table no.1

Region	Surface (thousands of square km)	Rural population (thousands inhabitants)	Population Density (inhabitant/ square km)	Common figures	% of region's rural surface	% of region's rural surface
North – East	36,8	2216,8	62,1	497	94,0	56,4
South – East	35,7	1283,1	39,5	350	90,8	44,5
South	34,4	2003,3	63,0	509	91,8	58,6
South– West	29,2	1294,0	49,7	408	89,1	52,8
West	32,03	748,3	26,9	276	86,8	36,3
North - West	34,1	1346,4	44,9	398	88,4	47,2
Centre	34,09	1047,8	36,8	354	83,4	40,0
Bucharest	1,8	246,2	164,1	35	84,3	9,4

Source: Statistical yearbook, 2006 Edition.

A particular case is the Bucharest region, in which there is also the municipality Bucharest-the capital of Romania. It concentrates 88.8% of the entire population in the region. The rural population surrounding the capital represents only 9.4% of region's population.

From this analysis one notices the fact that Romania's population has a more pronounced level of rural compared to other EU countries, where rural settlements are less populated and on a smaller scale, as an alternative to the urban concentrations. In

[9] Din punct de vedere administrativ, teritoriul României este organizat, la nivel NUTS 5, în 319 localități (dintre care 103 municipii – cele mai importante oraşe), care formează zona urbană, şi 2.851 comune, care constituie zona rurală (la 31 decembrie 2005), conform Legii 350/2001 privind amenajarea teritorială şi urbanismul şi Legii 351/2001 referitoare la aprobarea Planului Național de Amenajare Teritorială. La rândul lor, comunele sunt, în majoritatea lor, formate din mai multe sate (existând, în total, 12.946 sate), care nu au responsabilități administrative. Pentru ca o comună să devină oraş, trebuie aprobată o lege specifică. Oraşele şi comunele sunt grupate în județe (nivel NUTS3), care au funcții administrative. Cele 42 județe sunt grupate în 8 regiuni de dezvoltare (NUTS2), care nu au funcții administrative.

[10] Currently, Romania has a database which contains the relevant indicators of rural areas, as defined under national law.

[11] The OECD definition, which takes into account the population density at local level, classifies as rural the state administrative units at the local level with less than 150 inhabitants/km^2. Then it identifies three categories of areas (NUTS3 or NUTS2 level): major rural areas(with over 50% of the population in rural communities), intermediate areas(between 15 and 50% of the population in rural communities) and major urban areas (with less than 15% in rural communities).

[12] There are specific territorial entities with no administrative status and no legal status which follow the European System on the Nomenclature of Statistical Territorial Units(NUTS). Within this framework, one can devise, apply and evaluate the development regional policy and the programs for economic and social cohesion.

conclusion one can appreciate that Romanian rural aspect is the main depositary of the great majority of economic resources: raw materials, agricultural, forestry, tourism and resort resources

In this context, the work was meant to present a thorough analysis of economic phenomena and processes that are manifested in the Romanian countryside, through which there is grounded the need for developing rural economy, under the multitude of its components.

The economic growth level registered in the Romanian countryside

The economic results reported in the economic activities performed in rural areas show that agricultural activity is the central axis of rural economy's development, holding the vast majority of the territory and the occupied population, but in some rural areas, an increasing share belongs to other fields of activity(forestry, agrarian sector, rural tourism).

The level of economic development registered by agricultural activities

The agriculture represents the backbone of rural economy and has more than 36% of total population employed in the economy. However, Romania's agriculture presents many issues that pose problems. The starting point in analyzing the economic potential of agriculture is the land fund[13], referred to as the form of ownership and soil quality, the structure of agricultural exploitations and the obtained production.

The fund area of the country includes 23.8 million hectares, of which private property is of 92%, the difference belonging to the public domain. The agricultural area amounts to 14.7 million ha [14], of which 96% are privately owned and only 4% belong to the public domain. The forest area covers 6.2 million ha, of which 25% are privately owned, and 75% are in public ownership.

The use of agricultural land is relatively constant, except areas occupied by orchards, which in the time period 2002-2005 were reduced by 24%.

The individual farming holdings/households use 61.8% of the agricultural area, 40.5% of the area occupied with meadow and pasture, and 65.3% of permanent crops.[15].

The economic activity within the agricultural sector has been undertaken by 4256.1 thousands agricultural exploitations [16], organized according to the land fund law in the form of individual households, family associations without legal status and agricultural companies with legal status [17]. Of all these agricultural units, the individual holdings/households (without legal status) amount to 4237.8 thousand units, which means a share of 99.5%, while trade companies that produce for the market, amount to only 18,3 thousand units, owning a share of only 0.42%, but working 44% of the utilized agricultural area (UAA)[18]. The average agricultural area which lies on a farm using agricultural land was in 2005 of only 3.4 hectares, compared with the European average, amounting to over

[13] It includes all lands, regardless of destination, the title of property which are owned either by public or private domain, where they belong. In 2002, it included an area of 23839.1 thousand hectares.

[14] Romania is the second largest agricultural producer in Central and Eastern Europe after Poland, and an average level in Europe; it has an agricultural potential similar with France

[15] The General Agricultural Census. Preliminary results, in June 2006, p.3.

[16] The activity of agricultural exploitations in Romania is regulated by EGO 108/2001 and H.G. 49/2002, which approves the methodological rules for the application of GEO 108/2001; the Minister Order 62/2002 approves the Regulation of accreditation for natural persons who can lead and manage agricultural holdings.

[17] In recent years there were found nonconformities to this structure of agricultural holdings, as it is difficult to compare their evolution over time, thus affecting the quality of some conclusions. The statistical data on the evolution of agricultural holdings under numerical aspect and of agricultural areas occupied, that derive from various sources are contradictory, a situation which is generated by the different grading and classification of land areas under the administration of former state farms, and the lack of published data on the areas leased by individual households for subsistence of large trade workings.

[18] They include units with legal status that use agricultural land and/or have animal stocks.

18 hectares. Among these categories, the agricultural area which lies on a farm is highly differentiated.

In value of agricultural production, the agricultural production was highlighted by annual permanent growths, with oscillations in both sectors- vegetable and animal. In the plant production, in almost all cultures, the average yields are less than 2-3 times compared to countries with a developed agriculture, including those made in the EU, which gives the Romanian agriculture a character of subsistence.

Regarding the live-stock sector, Romania holds a tradition for centuries in animal breeding and the reorganization at the level of 2005, 30.4% of total agricultural production, in the last period there were registered increases of herds and production with values contained between 1,5-28% but which continue yet to be far from the levels for which in Romania the conditions are most favorable.

Also, statistics indicate an inappropriate use of services essential for agricultural activities: mechanization, chemification, irrigation, etc., which is reflected in the reduced inputs with such factors of production, with implications on the economic effects. In 2005, the share of agricultural services, calculated according to EUROSTAT methodology, it was only 1.2% of total agricultural production of goods and services[19].

The level of economic development recorded by nonagricultural activities

The economic analysis of the forestry sector has shown that work productivity in the sector is growing and is expected to have risen by 43% during 2000-2005, within the sector of wood working and wood products working and by 33% in the furniture industry (INS, 2006). The sector of wood processing has an important growth potential, although it has a number of significant constraints related to capacity. The availability of raw materials, the relatively low cost of labor and the proximity to major Western European markets is at the bottom of the development potential of wood industry in Romania (USDA-FAS 2006). The largest part (75%) of the total 15,761 m3 harvested in 2005 has been sold, the remaining part of 25% is for own consumption (INS, 2006). The main user of this raw material is the sector for primary processing of wood (including furniture manufacturers), that employs over 84,000 people (INS, 2006). Labor productivity in this sector is growing and is expected to have risen by 43% during 2000-2005, within the sector of wood working and wood products working and by 33% in the furniture industry (INS, 2006).

The level of economic results in the food industry has increased significantly, but one requires adopting specific measures regarding reorganization, to help the sector become competitive and comply with EU standards of food safety and quality of products, and to establish efficient trading links between the food industry and the vast majority of farmers. Food is an important sector of the Romanian economy; in 2002, it represents about 17% of the total production of manufacturing industries, 9% of total national production and 7% of the VAB. The evolution of production in the time interval 1998-2005 ranged from a product category to another; so there had been increases in meat products (+55%), canned meat (+62.9%), fresh milk products (+73.9%), edible oils (+34.4%), cheese (+39.3%) and decreases in: meat (-29.2%), canned fruit and vegetables (-2.7 %), milk (-16.5%), wheat flour and rye (-69.0%) (INS, 2006), which suggests an orientation towards high-value products in recent years as response to the growing request.

Compared to 1989, the number of craft activities and services was reduced to a significant proportion. Despite the increasing trend of private entrepreneurs in rural area, the number of those performing non-agricultural activities is still low. Some of these crafts have acquired, over time, a cultural load based on folklore and ethnographic traditions

[19] Statistical yearbook 2006, pag. 383.

characterizing the Romanian rural area, turning in a small handicraft industry – pottery, fabric, wood and metal working, etc.

A non-agricultural activity that expanded in rural area is tourism. By its geographical position, Romania has a significant tourism potential, with natural and cultural resources of great diversity and harmoniously assigned, which can practice a full range of tourism aspects, from the classic ones (mountain, sea, spa, cultural) until the latest news as rural tourism, eco-tourism and adventure tourism.

Romania has not a clearly designed image as a tourist destination, and the internal promotion is insufficient and undersized compared to the demand. At present neither foreign tourists nor Romanian tourists have on their disposal specialized promotion centers and information centers to obtain information on tourist attractions, cultural or business events, archaeological sites, information on accommodation places, where you can dine, what pleasure opportunities they have, etc. (PNDR, 2008).

RESULTS AND DISCUSSIONS

By the enforcement of the Land Fund Law, at the end of 1991, 92% of agricultural land was privately owned which caused radical changes in rural area, expressed as a high-level division of agricultural land, the allocation of significant agricultural land areas to people who do not work in agriculture, and who are in most cases domiciled in urban areas, as well as elderly people.

The processing industry in Romania is still poorly connected with the vast majority of farmers and it remains, therefore, sensitive to fluctuations of supply and to the unstable quality of raw materials, compared with the competing processing sectors of other member states. Strengthening the link between producers and processing factories by jointing some raw materials of uniform quality, in parallel with the support of technical advice and management services, could help overcome these problems. A better integration of these factors within food industry would lead to the increase and stabilization of farmers' incomes.

The craft and handicraft work faces problems regarding: the lack of financial resources to modernize production; the lack of apprentices who learn and take over home village traditions; the poor representation of public service- the maintenance and repair of items and household and domestic equipment; troubleshooting Radio-TV, hairdresser’s, shoemaker’s shops, tailor’s shops, house works and chemical cleaners, etc.

The increase of the attractiveness of rural environment, by a corresponding development of infrastructure and broadening the access to financial sources in the banking system and rural cooperatives system will also contribute to the establishment of SMEs and other non-farming activities, thus contributing to the changing of economic and social situation in rural areas.

The diversity of components in the physical and geographical environment justifies the presence of a natural tourist potential very varied and complex, grounding on whihc one can carry out a variety of tourism activities. This tourist potential is localized mainly in the mountainous area, on the Black Sea coast and in the Danube Delta, but also in areas of hills, plains and plateaus. The mountainous area offers the most varied and most important tourist potential, showing interest for its landscape value, its highly diversified flora and fauna. In mountainous areas there is a hunting and fishing background characterized by a great diversity of species-bear, wild boar, deer, fallow deer, blackcock. To these are added the forested hill and plains areas, where roebucks, fallow deer and wild boars live, and the miraculous Danube Delta, which is the paradise of birds and fish, and not only.

CONCLUSIONS

From the aspects presented one points out a "portrait" of the Romanian agriculture at the beginning of the millennium and shortly after joining the European Union not very optimistic.

The Romanian rural economy is dominated to a large extent by agriculture, characterized by:

-the quasi-predominant existence of subsistence and semi-subsistence agricultural exploitations whose economic results are intended for self-consume and only marginally for the market.

-the excessive fragmentation of ownership and the lack of association between farmers diminishes the competitiveness of the agricultural sector.

There is an important potential in the forestry sector to contribute to national economic growth and development of the rural sector through the area covered by forest for Romania to 32%, and the fact that wood industry is not working to its capacity.

In Romania there are protected natural areas of national interest and monuments of nature, which by their scientific and instructional-educational interest create the support for the conduct of scientific tourism, and ecotourism as well[20].

A wide range of non-agricultural activities can be developed in rural areas subject to increasing the absorption capacity of financial funds provided by various programs implemented by EU or international financial institutions.

There is an important potential in the forestry sector to contribute to national economic growth and development of the rural sector through the area covered by forest for Romania to 32%, and the fact that wood industry is not working to its capacity.

In order to improve the economic activities carried out in rural areas one has in mind the following directions of action:

-the superior exploiting of area's natural potential, through efficiency, restructuring and diversification of economic activities, stimulating small and medium enterprises with private capital;

-the removal from isolation of some villages by improving the technical equipment and integration of the area in the networks of major infrastructure (transportation routes by road, rail and air transport, electric power supply, communications);

-stabilizing the population by providing a framework of living comparable to other country areas;

-protection of the natural patrimony, built for the sustainable development of the area and the performing rural tourism.

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[20] By Law 5/2000 there were identified 17 protected natural areas of national interest, which include: biosphere reserves, national and natural parks, scientific reserves, natural reserves (botanical, zoological, forestry, geological-geomorphological, paleontological, mixed) and monuments of nature, located in particular in the Carpathian Mountains, in the Danube Delta and on the Danube.

O NOUĂ TEORIE PRIVIND DEPLASAREA VRAFULUI PE SCUTURĂTORUL CU CAI DISPUŞI PE DOUĂ AXE LA COMBINELE CONVENȚIONALE DE RECOLTAT CEREALE

A NEW THEORY REGARDING THE VEGETAL MATTER DISPLACEMENT ON SHAKER STRAW WALKERS DISPOSED ON TWO AXES AT CONVENTIONAL CEREAL HARVESTING COMBINES

GHEORGHE IVAN, IOAN GANEA

Key words: harvesting combines, strawwalkers shaker, new theory;

REZUMAT

Combinele convenționale de recoltat cereale au în componență un sistem de scuturare (scuturător) care separă semințele din vraful rezultat de la aparatul de treier.

Capacitatea de lucru a sistemului de scuturare şi implicit a combinei de recoltat depinde de configurarea şi regimul cinematic a acestuia. Articolul prezintă o nouă teorie privind deplasarea vrafului pe scuturător.

ABSTRACT

The conventional harvesting combines for cereal comprise a shaker aiming (strawwalkers) to separate the seeds out of straws coming from the threshing apparatus. The working capacities of the strawwalkers and implicitely of harvesting combine depend on the configuration and kinematic regime of shaker. Within the following paper a new theory of straw displacement on the shaker is presented.

INTODUCTION

The conventional cereal harvesters have as specific working organs the tangential thresher, the sieve shaker with horses on two axes and the cleanup system.

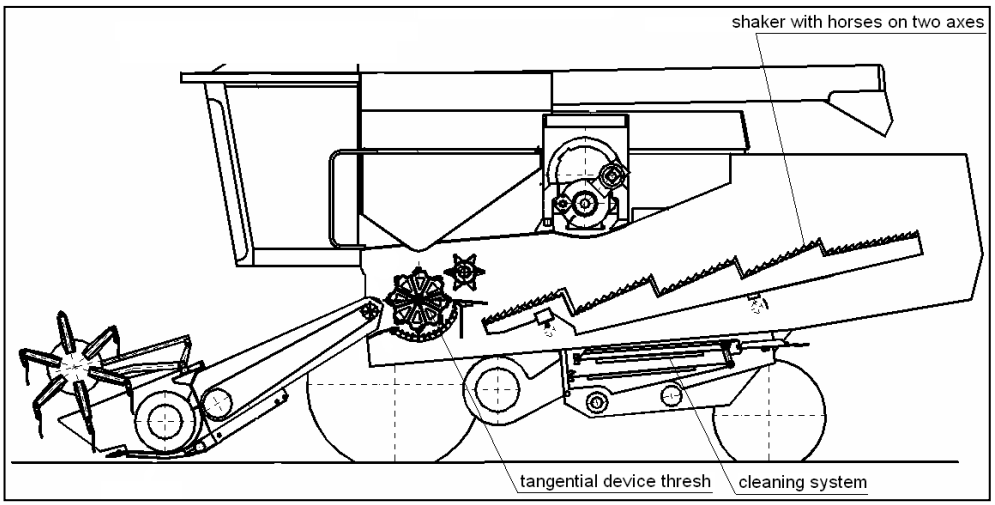

Fig.1. Main bodies of work of a conventional combine for harvesting grain

These combines use the shaker with horses on two axles because it is simple from the constructive point of view, effective in technological terms, needs low power for operation and no damage seed.

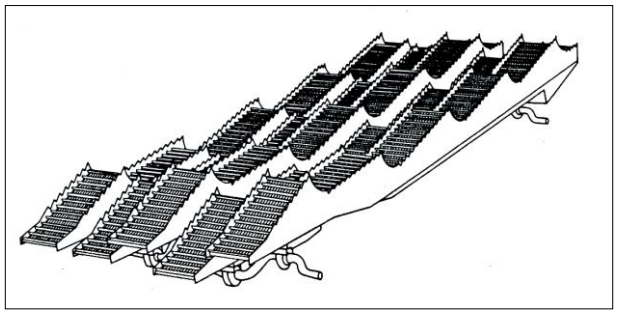

Fig.2. Shaker with horses on two axes

At present conventional combines, the shaker with horses on two axes consist in 4 ... 8 shaking elements (called horses) and two crankshafts (called axes), of which the posterior is operating the shaker. The shaking elements have 4 ... 11 cascades, 5 ... 12 separation sieves for seeds from stack and are usually in cross section in the form of gutter. Gutter has side walls with jagged edges for retaining the stack on the shaking and the advance of it in the sense of evacuation from the combine. If the shaking elements items are not provided with gutters, below them there is a chute for directing the separate components of the stack to the oscillatory plan of combine. The separation sieves are made of perforated sheet and can be with flat surface or thresholds.

The elements of shaker makes a plain-parallel motion, any point doing circles wich radius is equal with the radius of layout crankpin of the shaker crankshafts. This motion produces a stack movement on shaker to the evacuation of combine and the separation seeds from stack. These elements of shaker have three functional areas: feeding, separation and evacuation. Functional areas have specific constructive characteristics.

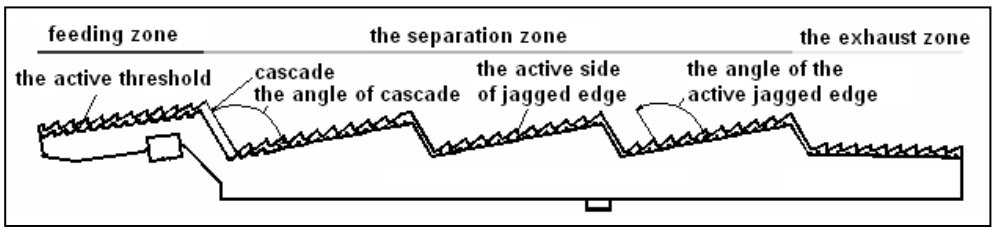

Fig.3. Representation of functional areas of an shaking element

The shakers with horses on two axes can be with grouped horses or with independent horses.

The shaker with grouped horses is composed of two groups of shaking elements delayed usually with 180^0. This type of shaker is effective in case of stack with long straws. The shaker with independent horses has the shaking elements delayed with different angles, each acting only on the stack out over him. This type of shaker is indicated in the case of the stack with short straws and it is specific to present combines.

MATERIAL AND METHOD

Current theory on the stack movement on the straw walkers shaker on two axes does not cover all aspects of the movement and:

- is not showing the importance of the first cascade and it is not studied the stack movement on the shaking element under its action;
- there is no study on the influence of angles made by cascades, the active side of jagged edges of troughs and thresholds of sieves in relation to the corresponding plan of sieves on the characteristics of stack movement;

- there is not a methodology for calculating the height of the first cascade, the active site of jagged edges and thresholds of sieves and also the optimal kinematic regime of the shaker. According to current theories the moving speed of the stack on shaker depends on the rotative speed of shaker operation, radius of disposal of crankpins on crankshafts and on the angle of separation sieves relative to the horizontal.

The proposed theory added to these factors the angle δ of cascades, the active edges of jagged troughs and thresholds of sieves in relation to the corresponding sieves plan, as the main factor in defining the movement stack on shaker [4].

In figure 4 is shown the trajectory of stack movement on the separating area of a shaking element, for a complete rotation of the crankshaft, for a cascade and the active edges of jagged troughs which make an angle with the separation sieve of $90^0+\delta$.

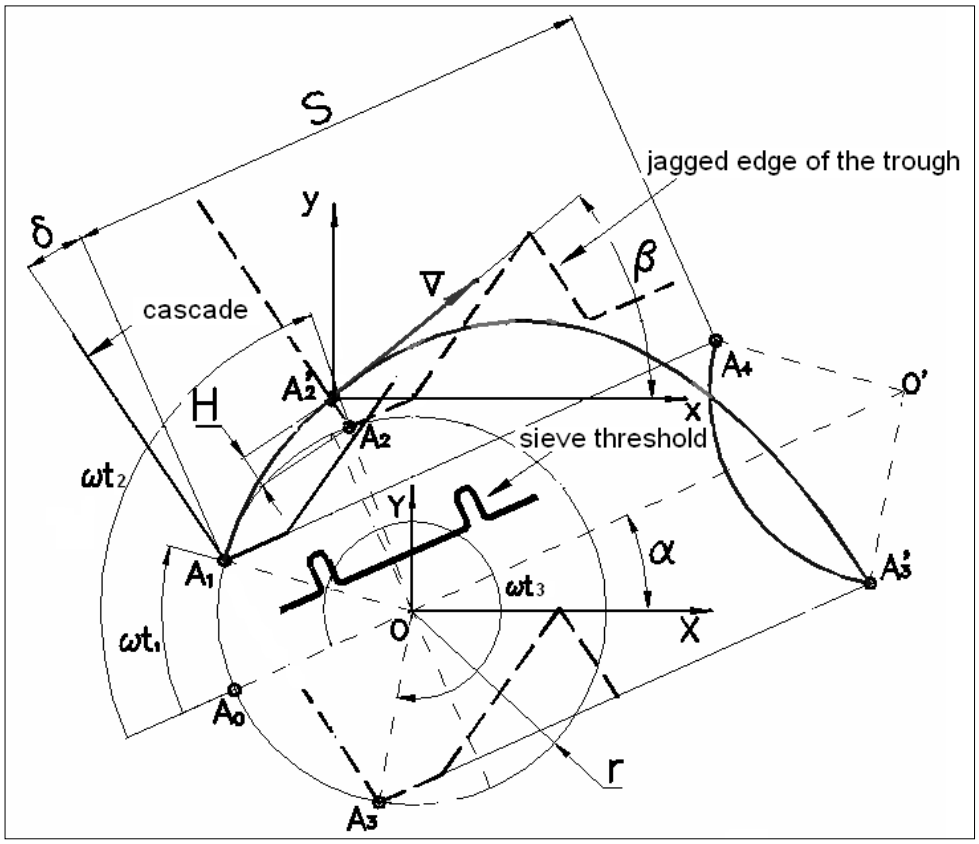

Fig.4. Stack movement trajectory on the separation zone of a shaking element

A_3 A_1 – stack is on the shaking element;

A_1 A_2 – stack detaches from sieve and slides on the cascade;

A_2 A_3 – stack jumping;

According to the proposed theory the trajectory of the stack movement on a shaking element with independent shaking elements is determined by using the following relations:

1. crankshaft angle at which takes place the stack separation from sieve:

$$\omega t_1 = \arcsin \frac{\cos(\alpha+\delta)+f\sin(\alpha+\delta)+f\sqrt{k^2\ 1+f^2\ -\ \cos(\alpha+\delta)+f\sin(\alpha+\delta)^{\ 2}}}{k\ 1+f^2} -\delta$$

where: ωt_1 is the crankshaft angle at which takes place the separation of stack from sieve;

α – angle of separation sieve relative to horizontal;

δ – angle between the cascade and the active jagged edges site in relation to sieve;

k – kinematical regime of shaker, $k = \frac{\omega^2 r}{g}$;

ω – angular speed of the driving crankshaft of the shaker;
r – layout radius of crankpin of crankshaft;
g – gravitational acceleration;
f – coefficient of friction between stack and the element of shaker;

2. crankshaft angle at which takes place the jump of the stack from the element of shaker:

$$\omega t_2 = 90^0 - \delta + \arcsin\frac{\sin(\alpha+\delta)}{k};$$

3. crankshaft angle at which take place the fall of the stack on the shaker element:

$$\omega t_3 = \omega t_2 + A_{(\delta)} + \sqrt{A_{(\delta)}^{\ 2} + B_{(\delta)}};$$

$$A_{(\delta)} = k\sqrt{1+c_{(\delta)}^{\ 2}+2c_{(\delta)}\cos\ \omega t_2+\delta}\ \frac{\sin\ \beta-\alpha}{\cos\alpha};$$

$$B_{(\delta)} = \frac{c_{(\delta)}k\cos\delta}{\cos\alpha}\ \omega t_2-\omega t_1\ -\frac{2k}{\cos\alpha}\ \sin\omega t_3-\sin\omega t_2;$$

$$\beta = \alpha+90^0-\omega t_2+\arcsin\frac{c_{(\delta)}\sin\ \omega t_2+\delta}{\sqrt{1+c_{(\delta)}^{\ 2}+2c_{(\delta)}\cos\ \omega t_2+\delta}};$$

4. length jump of stack on functional zones S_{zone}:

$$S_{zone} = \frac{r}{\cos\alpha}\left[\ \omega t_3-\omega t_2\ \sqrt{1+c_{(\delta)}^{\ 2}+2c_{(\delta)}\cos\ \omega t_2+\delta}\ \cos\beta+\cos\ \omega t_3-\alpha\ -\cos\ \omega t_2-\alpha\ -\frac{c_{(\delta)}}{2}\ \omega t_2-\omega t_1\ \sin\ \alpha+\delta\ \right]$$

Considering that the maximum separation intensity of seed corresponds to the maximum total duration of stack jumps on the separation zone of element of shaker, it can be achieved the optimal kinematic regime for driving the shaker.

5. total duration of stack jumps on the separation zone:

$$T_{jumps} = \frac{L_{\text{sieves in separation zone}}}{S_{\text{separation zone}}}\frac{\omega t_3-\omega t_2}{\omega};$$

where $L_{\text{sieve separation zone}}$ is the total length of the sieves from area of separation;

6. the optimal kinematic regime of shaker driving system:

$$T'_{jumps} = \left(\frac{L_{\text{sieves in separation zone}}}{S_{\text{separation zone}}}\frac{\omega t_3-\omega t_2}{\omega}\right)' = 0 \Rightarrow k_{optim};$$

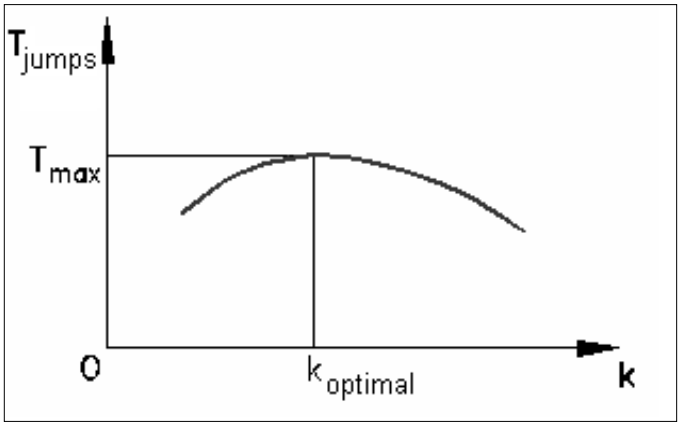

Fig.5 The total duration of stack jumps on the separation zone according to the cinematic regime of the shaker.

For the harvesting combine C110, the theoretical optimal kinematic regime is k = 2.14.

RESULTS AND DISCUSSIONS

For experimental verification in the field of this value was used the Romanian harvesting combine C110 equipped in two variants: with old shaker from the production series and with new shaker.

Fig.6 Harvesting combine C110

The main biological characteristics of the harvested culture of wheat were as follows:

- biological mass 0,9232 kg/m^2;
- index of straw contents λ = 0,58;

Speed of movement of the harvesting combine was set at 6 km / h, to obtain a flow of feeding with vegetal mass of combine of 5.44 kg / s, and the kinematic regimes of operation of the two straw walkers shakers were in the range: 2.06...2.82.

The main improvements of the constructive characteristics of the new shaker, relative to the series shaker characteristics were as follows:

- height of the first cascade higher than the older one by 29.2%;
- surface of separating sieve of seeds in the feeding area greater than the older by 62%;

Table 1.

Losses of seeds to harvesting combine C110 equipped with shaker from series

Index name	*u.m.*	*values*				
the kinematic regime	-	2.06	2.14	2.37	2.69	2.82
losses from shaking	%	0.68	0.62	0.66	0.68	0.77
total loss of seeds of combine	%	2.69	2.63	2.67	2.69	2.78

Table 2.

Losses of seeds to harvesting combine C110 equipped with new shaker

Index name	*u.m.*	*values*				
the kinematic regime	-	2.06	2.14	2.37	2.69	2.82
losses from shaking	%	0.57	0.52	0.55	0.57	0.64
total loss of seeds of combine	%	2.58	2.53	2.56	2.58	2.65

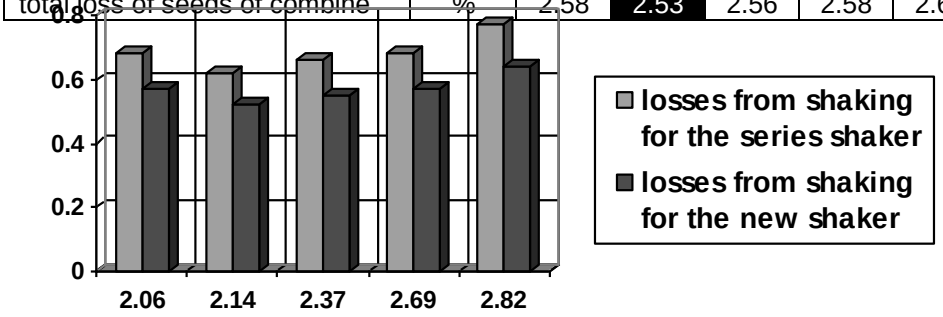

Fig.7.Chart losses from shaking to harvesting combine C110, equipped with series shaker and new shaker

CONCLUSIONS

a. Experimental research has confirmed the theoretical value of optimum kinematic regime of the two shakers that equipped the harvesting combine C110.

b. Total seeds loss of harvesting combine under the permissible limit of 3 % and losses from shaking over the permissible limit of 0.5 % require the identification of improvements to the constructive characteristics of the shaker to optimize its functioning. A solution could consist in increasing the length of the separation area of shaking elements detrimental to the zone length of straw disposal.

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CERCETĂRI PRIVIND SPORIREA PRODUCŢIEI PAJIŞTII NATURALE DE LA PREAJBA – GORJ SUB INFLUENŢA ÎNGRĂŞĂMINTELOR CHIMICE ŞI ORGANICE

RESEARCH ON INCREASING PRODUCTION FROM NATURAL FIELDS PREAJBA - GORJ UNDER INFLUENCE OF CHEMICAL AND ORGANIC FERTILIZERS

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Key words: meadow, production, fertilization

ABSTRACT

Currently, in Romania to increase the productive potential of permanent grasslands and improve the quality of feed produced are issues of great importance, given the necessary assurance green table feed for the animals.

Know is that the productivity of permanent grassland and their ability to produce biomass is determined by a range of abiotic factors, biotic and anthropogenic. Of them have a particularly important the floristic composition, stationary conditions, the work of care and service and the management of grasslands.

The technology to improve grasslands diversified by type of vegetation, environmental conditions and its use. Measures to be applied on lawns, in order to achieve increased production and quality are numerous and vary from one situation to another. Some measures act more or less on the layer of celery, without destroying the old vegetation and aim to create better conditions for valuable plants from meadows and are called surface measures (improving moisture regime, application of fertilizers, destruction of molehill, removal of woody vegetation, weed control, overseeding etc.), others seek the complete destruction of existing vegetation and prepare the ground for the creation of temporary grasslands, is known as radical measures.

MATERIAL AND METHOD

The experience were located at the Experimental Center Preajba - Gorj on a permanent meadow and some of the targets were: the influence of fertilizers on production; the number of UNL and UNC obtained on the permanent grace land.

For experience the location was selected to be representative as ground surface in terms of floristic composition and land geography, which is located by the method randomized blocks, with 7 variations and 3 repetitions.

1. Un-fertilize,
2. N_{100} annual,
3. $N_{100}P_{50}$ annual,
4. $N_{100}P_{50}K_{50}$ annual
5. 40 t/ha manure at 3 years
6. 20 t/ha manure at 2 years
7. 20 t/ha manure + $N_{50}P_{50}$ annual

Well fermented manure is applied as late autumn, autumn apply phosphorus, nitrogen and potassium spring.

RESULTS AND DISCUSSION

Experience on permanent grassland in the Experimental Center for Agricultural grasslands of Preajba - Gorj, was located by randomized blocks method. The significance of the results by differences calculated limit is presented in table 2

Influence of chemical and organic fertilizers on the production of *Agrostis capillaris* permanent Fields of Preajba - Gorj in 2007

Table 2

Variant	Production t/ha d.s.	Relative production (%)	Difference (±) t/ha d.s.	Significance
0	1,26	100	-	witness
N_{100}	2,37	188	+1,11	***
$N_{100}P_{50}$	3,23	256	+1,97	***
$N_{100}P_{50}K_{50}$	3,20	254	+1,94	***
40t/ha manure	2,00	159	+0,74	**
20t/ha manure at 2 years	1,77	140	+0,51	*
40t/ha manure + $N_{50}P_{50}$	2,80	222	+1,54	***

DL 5% = 0,39 t/ha
DL 1% = 0,55 t/ha
DL 0,1 % = 0,77 t/ha

In the data table 2 we see that most production is recorded for the variant fertilized with N100P50, (3.23 t / ha su) who knows a positive difference to the witness of 1.97 t / ha su, followed by the variant fertilized with N100P50K50, where the production is 3.2 t / ha su (1.94 t / ha su), the variant fertilized with 40 t / ha manure and N50P50 with a production of 2.8 t / ha su (1.54 t / ha su) and the N100 variant fertilized with production being 2.37 t / ha su. The lowest production was obtained when applying manure 20 t / ha every two years (1.77 t / ha su), difference from witness being 0.51 t / ha su

Meanings are always positive: very significant doses N100, N100P50, N100P50K50 and manure 40 t / ha + separate N50P50 significant dose of manure 40 t / ha and significant variant in which we apply manure a every 2 years.

In Table 3, we find the calculation of the number of units nutritious milk (UNL) you get per hectare, given that the scythe I, 1 kg dry weight is equivalent to 0.97 UNL, and at the second scythe with 0.85 UNL .

The number of units nutritious milk

Table 3

Variant	Total UNL/ha	first scythe		second scythe	
	CI+CII	UNL/ha	%	UNL/ha	%
Witness	3459	1164	33,65	2295	66,35
N_{100}	6370	3395	53,30	2975	46,70
$N_{100}P_{50}$	9038	5723	63,32	3315	36,68
$N_{100}P_{50}K_{50}$	8880	5820	65,54	3060	34,46
40t/ha manure	5292	1552	29,33	3740	70,67
20t/ha manure at 2 years	4685	1455	31,06	3230	68,94
40t/ha manure + $N_{50}P_{50}$	7584	3589	47,32	3995	52,68

Table 4 shows the number of units nutritious meat per hectare depending on transforming factors that are at scythe I - 0.94 UNC and at the second scythe of - 0.79 UNC, per kg of dry substance.

The number of units nutritious meat

Table 4

Variant	Total UNC/ha CI+CII	first scythe		second scythe	
		UNC/ha	%	UNC/ha	%
Witness	3261	1128	34,59	2133	65,41
N_{100}	6055	3290	54,33	2765	45,67
$N_{100}P_{50}$	8627	5546	64,29	3081	35,71
$N_{100}P_{50}K_{50}$	8484	5640	66,48	2844	33,52
40t/ha manure	4980	1504	30,20	3476	69,80
20t/ha manure at 2 years	4412	1410	31,96	3002	68,04
40t/ha manure + $N_{50}P_{50}$	7191	3478	48,37	3713	51,63

CONCLUSIONS

Analyzing the production levels obtained on permanent meadow of *Agrostis capillaris* from Preajba Gorj in 2007, we come of to the following conclusions:

1. Most production is recorded when nitrogen fertilization is in combination with phosphorus (3.23 tons dry matter per hectare) and when is fertilized with nitrogen phosphorus and potassium (3.20 tones dry matter per hectare) and lowest when applying organic fertilizers (1.77 tones dry matter per hectare - the dose of 20 t / ha manure applied every two years).

2. Concerning the nutrients number units of milk produced, it was from the 3459 UNL / ha value obtained for the witness, 6370 UNL / ha for the dose of N100, 9038 UNL / ha for variant fertilized with N100P50, 8880 UNL / ha in doses N100P50K50, 5292 UNL / ha when applied 40 t / ha manure, 4685 UNL / ha for a dose of 20 t manure applied every two years and 7584 UNL / ha for a combined dose of 40 tonnes manure per hectare plus N50P50.

3. When referring to the number of units nutritious meat, we see that they are growing from 3261 UNC / ha for the witness, to 4412 UNC / ha for variant fertilized with manure 20 t / ha in two years, 4980 UNC / ha for doses of manure 40 t / ha, reaching the 8627 UNC / ha for fertilization with N100P50.

4. One can finally appreciate that fertilizers have a positive influence on production, both chemical and organic ones bringing significant quantitative increases but improving the quality of feed produced. To increase production of green mass and dry matter that is obtained by natural meadow, it is necessary correlation with the applied technology and testing costs arising under efficient recovery.

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ASPECTE ECONOMICE ALE PRODUCȚIEI PAJIŞTII DE *AGROSTIS CAPILLARIS* SUPRAÎNSĂMÂNȚATE DE LA PREAJBA – GORJ

ECONOMIC ASPECTS OF PRODUCTION FOR *AGROSTIS CAPILLARIS* FIELDS OVERSEEDED FROM PREAJBA - GORJ

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ABSTRACT

Grassland, grass vegetation that are occupied and used as pasture or meadow in our country occupies a considerable area of over 4.8 million hectares. About two thirds of this area is used by pasture animals and the rest, the third, using the mower to get hay.

Share grasslands to the country's total area is 20.4% and from the agricultural area of Romania, by 32.9%.

In terms of production and quality grassland in our country is characterized by great diversity. If in some areas there are valuable grasslands, with high production and good quality, the higher areas of degraded grasslands meet, low productivity, whose role in the forage is more symbolic.

Over 42% of the permanent grasslands in Romania meets in the hilly region, where in fact, climatic conditions correspond largely herbaceous species requirements. Here, the meadows are the most valuable source of feed and most economical livestock sector which has developed high compared to other areas.

MATERIAL AND METHOD

Research has been conducted in the period 2007 - 2009 at the Experimental Center Preajba belonging to the University of Craiova, in a degraded grassland of *Agrostis capillaris* to know the overseeding effect on output and economic efficiency.

Experience has been located by random method, with 7 variations and 3 repetitions.

8. Unfertilized witness,
9. N_{100} annual,
10. $N_{100}P_{50}$ annual,
11. $N_{100}P_{50}K_{50}$ annual
12. 40 t/ha manure at 3 years
13. 20 t/ha manure at 2 years
14. 20 t/ha manure + $N_{50}P_{50}$ annual

Indicators determined were the following: efficiency cost of production, total profit and rate of profitability.

RESULTS AND DISCUSSIONS

Average 3 years of permanent grassland of *Agrostis capillaris* over seeded and fertilized, gave a yield of 1.24 t / ha d.s (Table 1).

Chemical or organic fertilizer treatments increased production of over seeded fields with 0.16 to 4.93 t / ha d.s., most proved very significant increases.

The maximum production of 6.17 t / ha d.s. was obtained in the treatment mixed organ mineral, with 20 t / ha manure applied annually with 50 kg / ha N, 50 kg / ha P_2O_5.

High amounts of feed were made and to variants 5 and 6, fertilized with manure in doses of 40 t / ha in 3 years (5.59 t / ha d.s) or 20 t / ha to 2 years (5.11 t / ha d.s) which, compared to the unfertilized variant increase from 3.87 to 4.35 t / ha, very significant.

Has made very significant growth and chemical fertilization variant with full formula (100N, $50P_2O_5$, $50K_2O$), by 2.07 t / ha d.s, but its output at a lower level (3.31 t / ha d.s.) to the variations treated with manure (5, 6 and 7).

Table 1

Influence of chemical and organic fertilizers on the permanent over seeded fields of *Agrostis capillaris* (average 2007 to 2009 t / ha d.s.)

Nr. ctr.	Variant	Production t/ha d.s.	Relative production (%)	Difference (±) t/ha d.s.	Significance

1	Witness	1,24	100	-	Witness
2	N_{100}	1,40	113	0,16	-
3	$N_{100}P_{50}$	2,94	237	1,70	*
4	$N_{100}P_{50}K_{50}$	3,31	267	2,07	***
5	40t/ha manure	5,59	451	4,35	***
6	20t/ha manure at 2 years	5,11	412	3,87	***
7	40t/ha manure + $N_{50}P_{50}$	6,17	497	4,93	***

DL 5% = 0,57 t/ha DL 1% = 0,76 t/ha DL 0,1 % = 1,00 t/ha

Treatment with nitrogen and phosphorus (var. 3) gave a small increase, from 1.70 t d.s. significant, and at 100 kg / ha N a derisory increase by 0.16 t and a production of (only 1 , 40 t / ha su) proved not suitable for over seeded meadow with legumes.

Table 2 presents summary of economic efficiency indicators for the period 2007 to 2009 for the over seeded meadow from Preajba Gorj County.

The average yield per hectare (lei) has increased dramatically in 2008 compared with previous term of dynamic range (outrun by 3.46 times), after which the level of 2009 is a sharp decrease from previous period (-53.53%) .

Table 2

Summary of economic efficiency indicators of Agrostis capillaris over seeded meadow from Preajba – Gorj (average annual variations)

Variants	2007			2008			2009			AVERAGE 2007 - 2009		
	Effect.	Dynamics		Effect.	Dynamics		Effect.	Dynamics		Effect.	Dynamics	
		Ibf	Ibm		Ibf	Ibm		Ibf	Ibm		Ibf	Ibm
Medium Yield Lei/ha	573,60	100	100	1989,45	3,46 times	3,46 times	924,60	161,19	46,47	1162,55	2,03 times	125,73
Cost per productive unit Lei/ha	428,30	100	100	1389,60	3,24 times	3,24 times	680,75	158,94	48,99	832,90	194,46	122,35
Productive cost Lei/t	208,90	100	100	220,20	105,41	105,41	254,00	121,59	115,35	226,35	108,35	89,11
Profit per productive unit Lei/ha	145,30	100	100	599,85	4,13 times	4,13 times	243,35	167,48	40,57	329,65	2,27 times	135,46
Profit rata, %	33,92	100	100	43,16	127,24	127,24	35,75	105,39	82,83	39,58	116,69	110,71

Productive unit costs (lei/ha), is characterized by an uneven evolution over time, the minimum is specific for 2007 and the maximum occurs in 2008 (outruns of 3.24 times above the limit of dynamic range) due to high production and hence the extra costs incurred for the collection and handling of plant mass.

Year 2009 appear as average with an excess of 1.58 times the first basis for comparison, but was lower by 51.01% from the second. Average period reached 832.90 lei being supra unitary both to 2007 and compared with 2009 (+94.46 and +22.35% respectively).

Production cost (lei/t), is characterized by an average of 226.35 lei (8.35 and -10.89% compared with terms of reference - the average since 2007 for the index with fixed base and 2009 for index with the mobile base), evolution is strictly ascending in the range

from 2007 to 2009. Thus the first term of the dynamic range is exceeded by 5.41 and 21.59% in 2008 and 2009 and the second with 15.35% in 2009 - Figure 1.

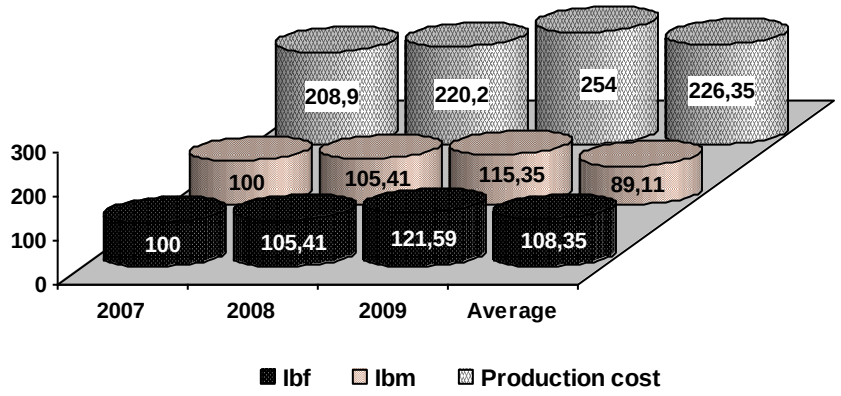

Figure 1 Changes in the cost of production at over seeding meadow fertilized with chemical and organic fertilizers in the period 2007 to 2009 (lei/t)

Profit per unit production (lei/ha) presents an uneven trend over time, higher growth in 2008 (4.13 times compared to 2007), being followed by a substantial decrease in 2009 (-59.43%). As a result the average period reached 329.65 lei, representing outruns of 2.27 and 1.35 times of comparison terms - Figure 2.

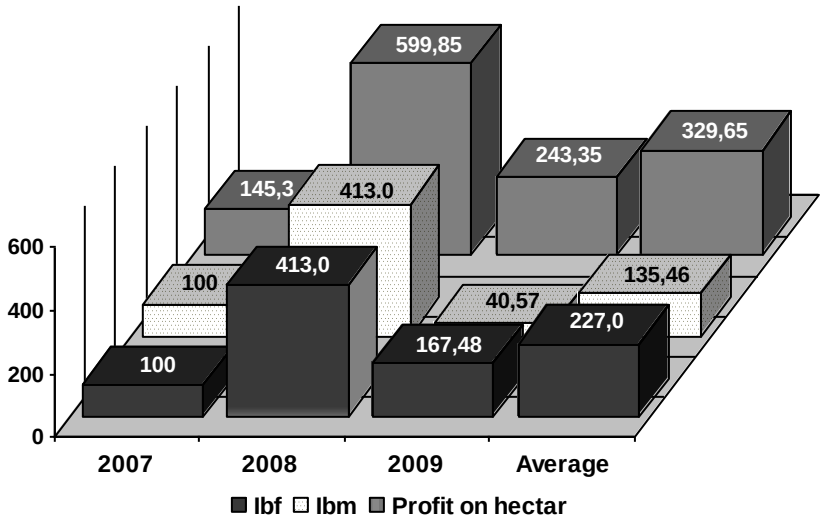

Figure 2 Profit per productive unit on over seeded meadow fertilized with chemical and organic fertilizers in the period 2007 to 2009 (lei/ha)

Yield rate (%) increased by 27.24% in 2008 compared to 2007, then in 2009 it falls by 17.17% compared with the previous period of dynamic range (from 5.39% in 2007). Under these conditions the average period stood at a level of 39.58%, which translates as outrun level for reporting bases of 1.16 and 1.10 times - Figure 3.

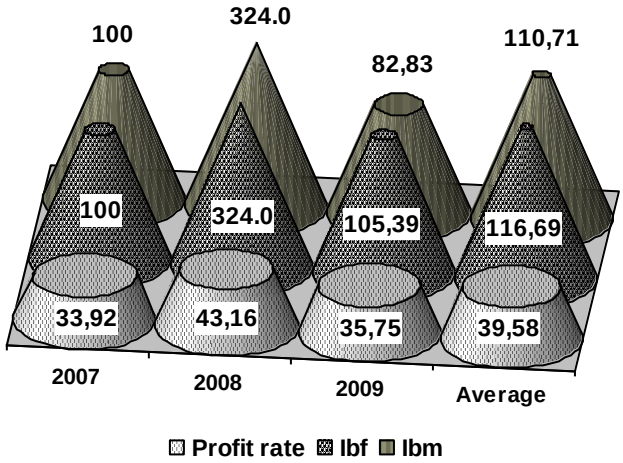

Figure 3 Rates of profit for the Agrostis capillaris meadow over seeded in the period 2007 - 2009 (%)

CONCLUSIONS

Analyzing annual average of economically, it is noted that economic indicators have sinuous trends (higher growth in 2008 and fall 2009), excluding the cost of production which have a strictly increasing trend. These issues are related to a complex of factors, which have critical influence on the aspects of economic efficiency, but also the inflation recorded in the period 2007 – 2009 interfere;

In average of three years, beside the production of over seeded variant and unfertilized, of 1.24 t / ha d.s. were noted treatment 40 t ha manure at 3 years (5.59 t/ha) and in particular the treatment with 20 t/ha manure + 50N $50P_2O_5$ to which the production of dry substance exceeded 6 t/ha.

It was noted that the over seeded fields production increased and have higher quality, but only in terms of fertilization with chemical and organic fertilizers. For meadows of the Carpathian foothills of Oltenia, the over seeding be seen as the primary method of improving the fields.

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STUDY OF WATER PARTICLES TRAJECTORIES FROM THE JET OF WETTING SPRINKLERS

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Key words: kynematics, dynamics, particle, sprinkling device, optimization, working qualitative indexes.

ABSTRACT

The paper presents the study of kynematics and dynamics of the water particle belonging to flow which runs through the spraying tube of a sprinkling device, aiming to contribute to the optimization of sprinkling device qualitative working indexes. The absolute rate of the respective particle leaving the spraying tube determines the water flow trajectory (the water flow being formed of an infinity of partcles) which determines at its turn the working qualitative indexes of irrigation process of agricultural fields.

INTRODUCTION

The sprinkling device are hydromechanical devices constituting the irrigation installations by watering (sprinklyng) which ensure the turning of under pressure water into drops, which than are distributed onto the irrigating surface. The sprinkling is performed by means of working pressure, water jet speed through the sprinkling device nozzle and, at the same time depending on nozzle form and geometrical parameters.

The sprinkling device structure is very diversified at the present moment, nowadays a large range being manufactured starting from simple nozzles or perforated tubes and finishing with controlled operating sprinkling devices.

In figure 1 are shown several sprinkler types with rotation in horizontal plan with shock vanes, whose rotative motion is determined by the shocks generated by a jet breaking vane (blade). View their very simple construction, the majority of sprinkling devices, which are nowadays manufactured on a world level is of the type above. The Romanian sprinklers ASS-1M, ASM-1, ASM-2 and ASM-3 also frame in this category.

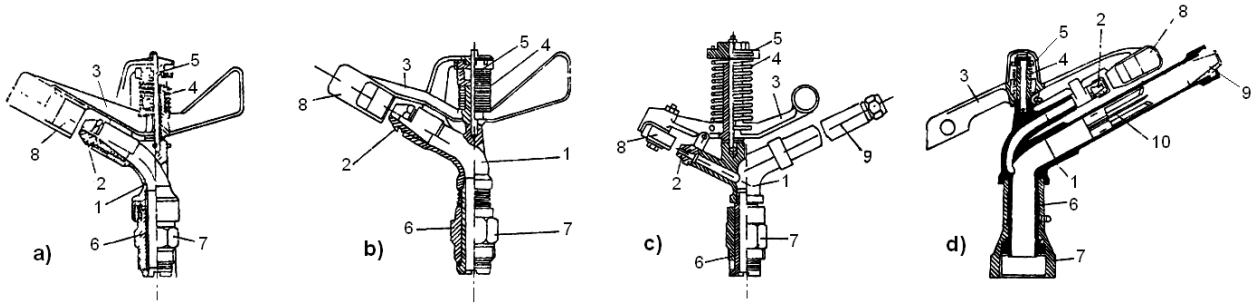

Fig. 1 Shock blade sprinklers: a) ASJ-1M; b) ASM-1; c) ASM-2; d) ASM-3
1-upper body; 2-nozzle; 3-swing arm; 4-spring; 5-fixing ring; 6-pivot (axle); 7-lower body; 8-deflector; 9-long jet nozzle; 10-laminating device

KYNEMATIC ANALYSIS OF SPRAYING ASSEMBLY

The mechanical model shown in figure 2 is kynematically analysed as for the speed and acceleration distribution of a particle belogning to a water flow.

The study must take into account the fact that the sprinkler is mounted on a track rolling with the conveying velocity V_1^t= steady and, therefore its acceleration is cipher a_1^t=0. The irrigation assembly (by sprinkler or water jet dropping) performs a circular-pendular motion in horizontal plan, conveying velocity V_2^t. At these velocities (V_1^t and V_2^t)

it is added up the water particle relative velocity in relation with the spraying tube V_r , so the absolute velocity of a water particle is:

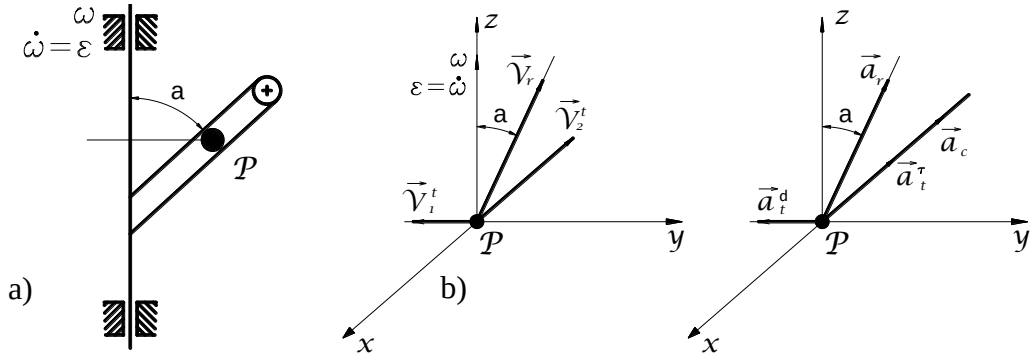

Fig. 2 a) Mechanical model; b) velocity and acceleration distribution

$$\vec{V}_a = \vec{V}_1^{\,t} + \vec{V}_2^{\,t} + \vec{V}_r \qquad (1)$$

If the relation (1) is drafted on P_{xyz} mark axles, it results in :

$$V_x = -V_2^{\,t} = \omega y; \quad V_y = V_r \sin\alpha - V_1^{\,t}; \quad V_z = V_r \cos\alpha \qquad (2)$$

The absolute velocity of an water particle from the water stream is :

$$V_a = \sqrt{\omega^2 y^2 + (V_r \sin\alpha - V_1^{\,t})^2 + (V_r \cos\alpha)^2} \qquad (3)$$

The absolute velocity of the particle coming out of the spraying tube determines the water flow trajectory (which is formed of an infinity of particles), which, at its turn defines the working qualitative indexes of agricultural field irrigation. In order to optimize this process, we must establish the values of following parameters: $V_1^{\,t}$ – conveying velocity of sprinkler carrying truck, respectively fixing its displacement; *ω(t)* – swinging angular speed of spraying tube ; y=l – length of spraying tube; α – inclination angle of the spraying tube in comparison with the vertical plan and, finally the relative velocity of water particle in comparison with the tube through which it circulates.

The analysis of acceleration distribution emphasizes the following components: $a_t^{\,\partial}$ – regular acceleration in conveying motion determined by the angular velocity *ω* being $\omega_t^{\,\partial} = \omega^2 y$; $a_t^{\,\tau} = \varepsilon y$ - contingence acceleration in conveying motion, determined by angular acceleration, $\varepsilon = \dot{\omega}$; ; $a_c = 2\omega V_r \sin\alpha$; a_r – acceleration of a water particle depending on the spraying tube size. Therefore, the absolute acceleration of a water particle is:

$$\vec{a}_a = \vec{a}_t + \vec{a}_r + \vec{a}_c \qquad (4)$$

If relation (4) is drafted on P_{xyz} cartezian mark axles, it results in:

$$a_x = -\varepsilon y + 2\omega V_r \sin\alpha; a_y = a_r \sin\alpha; a_z = a_r \cos\alpha ; \qquad (5)$$

The absolute acceleration of a water particle in water flow is:

$$a_a = \sqrt{(-\varepsilon y + 2\omega V_r \sin\alpha)^2 + (a_r \sin\alpha)^2 + (a_r \sin\alpha)^2} \qquad (6)$$

The absolute acceleration of a particle coming out of the spraying tube determines the water flow behaviour, concerning the particle dispersion as rain drops – in comparison with segments.

We should notice that, in comparison with the velocity distribution study, the swinging angular acceleration …has to be emphasizedin the horizontal plan of irrigation device and, respectively, the relative acceleration a_r belonging to water particle during the flow running.

DYNAMIC STUDY OF WATER PARTICLE MOTION FOR OBLIQUE VERSION OF RISING PIPE

The mechanical study model is shown in Figure 3

The fundamental equation of particle relative motion is,

$$m\vec{a}_r = \vec{\mathcal{F}} + \vec{\mathcal{F}}_t + \vec{\mathcal{F}}_c \quad (7)$$

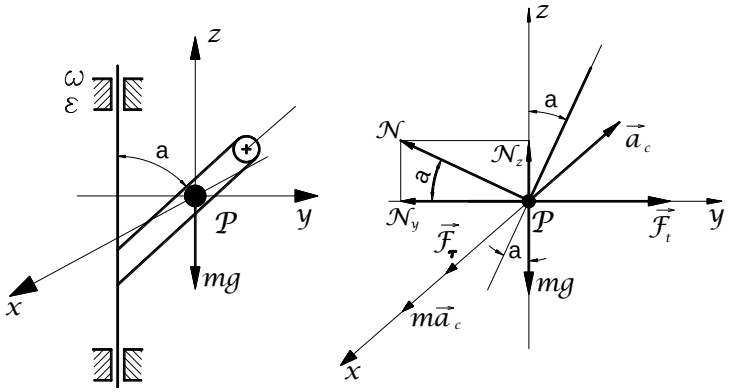

Fig. 3. Mechanical study model – sprinklyng device oblique version

By using P_{xyz} reference system the force components result in:

$$\vec{\mathcal{F}} = -\mathcal{N}_y\vec{j} + (\mathcal{N}_z - mg)\vec{k} \quad (8)$$

$$\vec{\mathcal{F}}_t = m\omega^2 y\vec{j} - m\varepsilon y\vec{i} \quad (9)$$

$$\vec{\mathcal{F}}_c = 2m\omega\mathcal{V}_r \sin\alpha \cdot \vec{i} \quad (10)$$

By drafting the motion equation on the mark axles it results in:

$$\begin{cases} m\ddot{x} = -m\varepsilon y + 2m\varepsilon \cdot \mathcal{V}_r \sin\alpha \\ m\ddot{y} = -\mathcal{N}y + m\omega^2 y \\ m\ddot{z} = (\mathcal{N}_z - mg) \end{cases} \quad (11)$$

DYNAMIC STUDY OF WATER PARTICLE MOTION FOR HORIZONTAL VERSION OF RISING PIPE

This study has a simply theoretical value, in practice zero pitching angle sprinklers being inexistent (meaningly horizontal ones). The mechanical study model for this version is shown in figure 4.

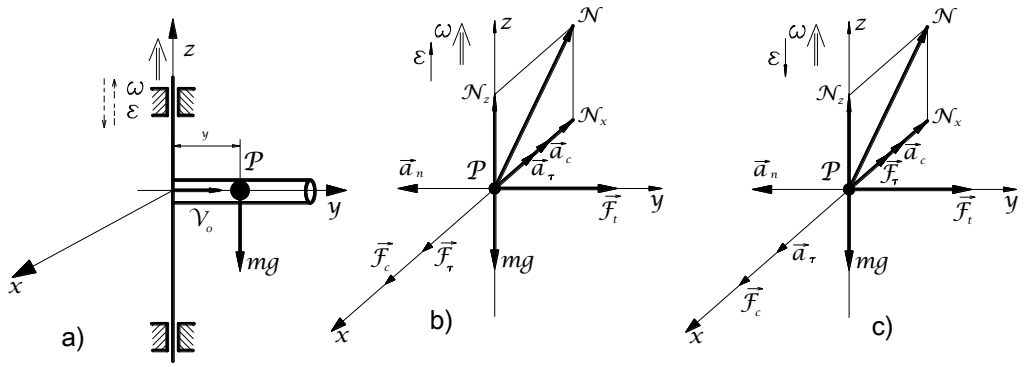

Fig. 4. Mechanical study model – sprinkler horizontal version

The fundamental motion equation is:

$$m\vec{a}_r = \vec{\mathcal{F}} + \vec{\mathcal{F}}_t + \vec{\mathcal{F}}_c \quad (12)$$

where:

b) $\begin{cases} \vec{F} = -\mathcal{N}_x \vec{i} + (\mathcal{N}_z - mg)\vec{k} \\ \vec{F}_t = m\omega^2 y\vec{j} + m\varepsilon y\vec{i} \\ \vec{F}_c = 2m\omega \dot{y}\vec{i} \end{cases}$ (13) c) $\begin{cases} \vec{F} = -\mathcal{N}_x \vec{i} + (\mathcal{N}_z - mg)\cdot\vec{k} \\ \vec{F}_t = m\omega^2 y\vec{j} - m\varepsilon y\vec{i} \\ \vec{F}_c = 2m\omega \dot{y}\vec{i} \end{cases}$ (14)

Projecting the relation (12) on the mark axles, it results in differential equation system:

b) $\begin{cases} m\ddot{x} = -\mathcal{N}_x + m\varepsilon y + 2m\omega\ddot{y} \\ m\ddot{y} = m\omega^2 y \\ m\ddot{z} = \mathcal{N}_z - mg \end{cases}$ (15) c) $\begin{cases} m\ddot{x} = -\mathcal{N}_x - m\varepsilon + 2m\omega\dot{y} \\ m\ddot{y} = m\omega^2 y \\ m\ddot{z} = \mathcal{N}_z - mg \end{cases}$

(16)

But the relative acceleration has components only on y axle, so $\ddot{y} \neq 0;\ \ddot{x} = 0;$ $\ddot{z} = 0$

The differential equation system becomes:

b) $\begin{cases} 2m\omega\dot{y} + m\varepsilon y = \mathcal{N}_x \\ \ddot{y} - \omega^2 y = 0 \\ \mathcal{N}_z - mg = 0 \end{cases}$ (17) c) $\begin{cases} 2m\omega\dot{y} - m\varepsilon y = \mathcal{N}_x \\ \ddot{y} - \omega^2 y = 0 \\ \mathcal{N}_z - mg = 0 \end{cases}$ (18)

The motion law is obtained by solving the equation $\ddot{y} - \omega^2 y = 0$, whose solution is of the form:

$$y = C_1 e^{\omega t} + C_2 e^{-\omega t}$$
$$\dot{y} = \omega C_1 e^{\omega t} - \omega C_2 e^{-\omega t} \quad (19)$$

The integrating constant is defined in case of initial conditions for *t=0*; *y=0*; *y=V*

It results in:

$$\begin{cases} 0 = C_1 + C_2 \\ \mathcal{V} = \omega C_1 - \omega C_2 \end{cases} \rightarrow \begin{cases} C_1 = -C_2 \\ \mathcal{V} = \omega C_1 + \omega C_1 \end{cases} \Rightarrow C_1 = \frac{\mathcal{V}}{\omega}; C_2 = -\frac{\mathcal{V}}{\omega} \quad (20)$$

The equation of particle trajectory depending on the tube is:

$$y = \frac{\mathcal{V}}{\omega}(e^{\omega t} - e^{-\omega t}) = \frac{2\mathcal{V}}{\omega} sh\omega \cdot t \quad (21)$$

respectively

$$\dot{y} = \mathcal{V}(e^{\omega t} + e^{-\omega t}) = 2\mathcal{V}Ch\omega \cdot t \quad (22)$$

Reaction components N are:

$$\mathcal{N}_x = 2m\omega \cdot 2\mathcal{V}Ch\omega t \pm m\varepsilon \frac{2\mathcal{V}}{\omega} sh\omega \cdot t; \quad (23)$$

As $\mathcal{N}_z = mg$ it is obtained:

$$\mathcal{N} = m\sqrt{(4\omega\mathcal{V}Ch \cdot \omega t \pm \varepsilon \frac{2\mathcal{V}}{\omega} sh\omega \cdot t)^2 + g^2} \quad (24)$$

If $\varepsilon = 0$ it results in:

$$\mathcal{N} = \sqrt{(4\omega \cdot \mathcal{V} \cdot Ch \cdot \omega t)^2 + g^2} \quad (25)$$

STUDY OF TRAJECTORY OF JET WATER COMING OUT OF THE SPRINKLER

For the study of trajectory of jet water coming out of the sprinkling device we consider this one comprising segments which are launched from the sprinkler with initial velocity V_0 under an angle α of about 32°. The mathematical mechanical angle is shown in figure 5, in

which the segment is displace into certain plan (O_{xy}), by performing a plan parallel motion defined by the generalized coordinates q_1, q_2 representing the distances which determine C mass centre pozition and coordinate q_3 which represents the angle defining the segment position in comparison with horizontal axle.

The method, generally suitable for this study is based on HAMILTON's canonical equations.

The kinetic energy of segment at a certain moment is:

$$\mathcal{E} = \frac{1}{2}\mathcal{M}(\dot{q}_1^2 + \dot{q}^2{}_2) + \frac{1}{2}\mathcal{J}\dot{q}_3^2 \tag{26}$$

The force function has the expression:

$$\mathcal{U} = -\mathcal{M}gq_2 + C \tag{27}$$

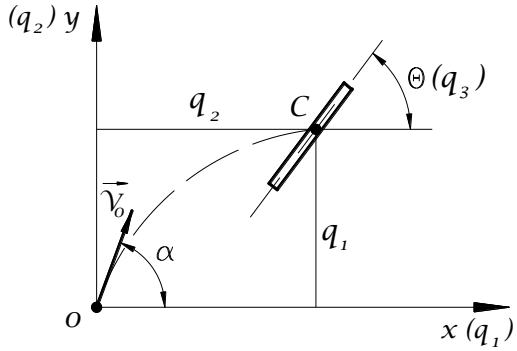

Fig. 5. Mathematical mechanical model of water jet trajectory coming out of sprinkling device

Using Lagrange function (potentially kinetic) the generalised impulses result in:

$$p_1 = \frac{\partial \mathcal{L}}{\partial \dot{q}_1} = \mathcal{M}\dot{q}_1; \qquad p_2 = \frac{\delta L}{\delta \dot{q}_2} = M\dot{q}_2; \qquad p_3 = \frac{\delta L}{\delta \dot{q}_3} \tag{28}$$

HAMILTON's function given by the relation

$$\mathcal{H} = \sum_{k=1}^{h} p_k \dot{q}_k - \mathcal{L}(q_k, p_k, t) \;;\; k = \overline{1,h} \tag{29},$$

has the expression

$$\mathcal{H} = p_1\dot{q}_1 + p_2\dot{q}_2 + p_3\dot{q}_3 - \frac{1}{2}\mathcal{M}(\dot{q}_1{}^2 + \dot{q}_2{}^2) - \frac{1}{2}\mathcal{J}\cdot\dot{q}_3{}^2 + \mathcal{M}gq_2 + C \tag{30}$$

Eliminating the generalized velocities $\dot{q}_k$ on the basis of defining relations of generalized impulses it results in the form $\mathcal{H}(q_k, p_k)$ of HAMILTON's function:

$$\mathcal{H} = \frac{p_1{}^2 + p_2{}^2}{2\mathcal{M}} + \frac{p_3{}^2}{2\mathcal{J}} + \mathcal{M}gq_2 + C \tag{31}$$

HAMILTON's canonical equations based on

$$\frac{\partial \mathcal{H}}{\partial p_k} = \dot{q}_k \;;\; \frac{\partial \mathcal{H}}{\partial q_k} = -\dot{p}_k \quad (k = \overline{1,h}) \tag{32}, \text{ it}$$

rezults :

$$\begin{cases} \dfrac{p_1}{\mathcal{M}} = \dot{q}_1; \dfrac{p_2}{\mathcal{M}} = \dot{q}_2; \dfrac{p_3}{\mathcal{J}} = \dot{q}_3; \\ 0 = -\dot{p}_1; \mathcal{M}g = -\dot{p}_2; 0 = -\dot{p}_3 \end{cases} \tag{33}$$

By integrating the obtained equations it results in:

$$p_1 = C_1; p_2 = -\mathcal{M}gt + C_2; p_3 = C_3; \quad (34)$$

$$q_1 = \frac{C_1}{\mathcal{M}}t + C_4; q_2 = -\frac{1}{2}gt^2 + \frac{C_2}{\mathcal{M}}t + C_5; q_3 = \frac{C_3}{\mathcal{J}}t + C_6 \quad (35)$$

The initial conditions for q_1, q_2, q_3 coordinates at t=0 are:

$$q_1 = 0; q_2 = 0; q_3 = \omega_{30} \quad (36)$$

$$p_1 = \mathcal{M}\dot{q}_1 = \mathcal{M}\mathcal{V}_0 \cos\alpha; p_2 = \mathcal{M}\dot{q}_2 = \mathcal{M}\mathcal{V}_0 \sin\alpha; \dot{p}_3 = \mathcal{J}\dot{q}_3 = \mathcal{J}\omega_{30} \quad (37)$$

Following these conditions the integrating constants have been found out, so:

$$q_1 = \mathcal{V}_0 t\cos\alpha; q_2 = -\frac{1}{2}gt^2 + \mathcal{V}_0 t\sin\alpha; q_3 = \omega_0 t + \omega_{30}, \quad (38)$$

$$p_1 = \mathcal{M}\mathcal{V}_0\cos\alpha; p_2 = \mathcal{M}(-gt + \mathcal{V}_0\sin\alpha); p_3 = \mathcal{J}\omega_0, \quad (39)$$

where $\mathcal{J}$ is the moment of inertia.

The trajectory of mass centre of jet segment is obtained by eliminating the parameter between the generalized coordinates:

$$q_3 = \frac{g\dot{q}_1^2}{2\cdot\mathcal{V}_0^2\cos^2\alpha} + q_1\cdot tg\alpha \quad (40)$$

CONLUSIONS

The absolute velocity of particle coming out of the spaying tube determines the water flow trajectory (this one being formed of an infinity of particles) which at its turn defines the working qualitative indexes of agricultural field irrigation process.

During the jet segment motion they uniformlly rotate alongside with angular velocity around their mass centre, the trajectory being a theoreticalparabola, according to results of water jet trajectory study, which come out of the sprinkler.

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ALIMENTAREA ALTERNATIVĂ A MOTOARELOR DIESEL CU ULEIURI VEGETALE CRUDE – O OPȚIUNE ABORDABILĂ

ALTERNATIVE SUPPLY OF DIESEL ENGINES WITH RAW VEGETABLE OIL - AN ACCESIBLE OPTION

MIRCEA ADRIAN NICOLESCU, IULIAN VOICEA

Key words: vegetable oils, Diesel engines, policarburation

REZUMAT

În zilele noastre, omenirea continuă să se confrunte cu problemele economice şi de mediu legate de folosirea carburanților de origine petrolieră. În aceste condiții, găsirea de biocombustibili pentru alimentarea motoarelor Diesel reprezintă o preocupare majoră pe plan mondial, dar varianta „naturală" a utilizării biocarburanților de primă generație pare să fi părăsit zona de maxim interes. Prezenta lucrare încearcă să readucă în atenție oportunitățile reale oferite de varianta folosirii uleiurilor vegetale crude în alimentarea motoarelor Diesel. În contextul tratării sumare a problemelor legate de această practică, este prezentată o realizare practică de alimentare a tractoarelor agricole cu uleiuri vegetale crude şi primele rezultate ale încercărilor pentru validarea acesteia.

ABSTRACT

Today, mankind continues to face economic and environmental problems related to the use of petroleum origin fuels. Under these conditions, finding biofuels to power Diesel engines is now a major concern worldwide, but „natural" alternative of first – generation biofuels seems to have left the area of focus. This paper tries to return the attention to the real opportunities given by alternative use of crude vegetable oils in feeding Diesel engines. In the context of summary treatment of these practice problems, a practical realization of supply on agricultural tractors with raw vegetable oils and first results of tests to validate it are presented.

GENERAL CONSIDERATIONS

A look around. The European Union road transport sector, currently in continuous development, is the user of more than one third of the energy consumed at its level. Meanwhile, the sector is dependent on the rate of about 98% of petroleum origin derived fuels, largely from imports which, in turn, are the subject of specific disruptions in the global market. In addition to road transport sector, other sectors, which are also in development processes, requires large amount of petroleum fuels - and we got to the operation of a large number of working machines (in agriculture, construction, etc.) and coverage of local energy needs in an independent system. As a result, statistics show that over 50% of energy consumed in the European Union comes from the combustion of petroleum and should be noted that this combustion occurs primarily on internal combustion engines.

Beyond the economics associated with significant share of petroleum fuels in covering energy needs of the Union, we note some key issues that concern the use of these fuels, contribute to the deterioration of ecological balance in the earth's atmosphere. Thus, fossil fuel combustion, and hence of the oil, causing, in addition the local issue of substances considered harmful to the living environment (so-called „noxes"), increase global carbon load of the atmosphere by fossil fuel carbon introduction into the natural carbon atmospheric content. It is estimated that, at EU level, about 90% of the increase in carbon dioxide emissions in the period 1990 to 2010 can be attributed to road transport sector development.

As part of the European Union, Romania is included in the upper described picture. At the same time, particular issues pertaining a mediocre economic power and the imperative need to accelerate the development, makes some of the general state of affairs in acute national problems. In that context, we indicate, as examples, increased efficiency in fuel use (by modernizing and renewing the fleet of auto-vehicles and work machines, development and modernization of transport infrastructures, increased capability of mechanization of agriculture etc.) and low external bill for purchasing imported fuel. At the same time, Romania must participate in an appropriate proportion of its economic weight on the joint efforts made by mankind to limit the rate of growth of air pollution.

An „at hand" solution. Developments manifested in recent decades in the petroleum fuel market – generated by the accelerating pace of increasing the global economy, accompanied by corresponding increases in demand for fuel - and the realization that mankind must become more „careful" with the environment - resulting forced by the perception, sometimes tragic, of the effects which various forms of air pollution has on terrestrial climate evolution - have brought to the attention of specialists, but also a fairly large public issues of alternative fuels produced from organic materials known as **biofuels**.

Like any area located within an „effervescent" state, bio-fuels field have generated emulation in wider circles than those of specialists, of this phenomenon - in positive essence, - resulting not only in naturally solid research directions, but also a certain „fashion" results of which are some dilettante approaches of the problems accompanied, of course, with the circulation of some achievements rather with „folk" value than science one. We here in the well-known fact that some approaches that seem to have immediate success contain, in their depth, seeds of problems that will occur after longer periods of latency.

A bit of history. Concern for obtaining and using alternative fuel for engines is not new. We can even say that the use of alternative fuels - even bio-fuels - is included in the "genetics" of internal combustion engines. Thus, looking at things from a historical perspective, we can state that at the Universal Exposition of 1900 in Paris, Rudolf Diesel himself made demonstrations with a copy of the operating engine he invented running on peanut oil. Moreover, if sensing problems and concerns about today's field of alternative fuels for engines, the same Rudolf Diesel said in 1911, that **„The engine can run with vegetable oil and this could be a considerable aid to the agriculture of those countries"** and in 1912 declared that **„Using vegetable oil to power engines may be insignificant today, but they can become, over time, as important as oil and coal now"**. Also, in their long period of production, located in the first decades of the last century, many series of famous cars Ford Model T was equipped with engines designed to be powered by ethanol.

Other periods of concern for an alternative supply of engines were driven by "distortion" of history. Thus, during the Second World War in Germany - dominated by sea and unable to win the Caucasian oil – a technology was created for obtaining synthetic gasoline by chemical processing of lignite (GW IG Farben Industry, 1943). Also, according to some reports, in the last months of the war, Japanese quotas that were operating in conditions of isolation, in Southeast Asia, have lengthened their bellicose agony practicing supply of Diesel engines with oil from eucalyptus. Unfortunately, the conditions under which Japan surrendered and th priorities related to the effective end of hostilities as quickly as possible, meant that any issues with the experimental value of this practice remain unknown.

More recently, under pressure from the oil crisis - politically orchestrated – in the beginning of the eighth decade of last century, the major motor vehicles companies (General Motors in the USA, Audi and Daimler-Benz in Europe) tested vehicles whose engines **were equipped with fuel injection devices especially designed for oil use**.

The results of these attempts were satisfying, the only problem being the precipitation of gums in the injection installations and in the cylinders. Unfortunately, relatively rapid exit of said oil crisis, followed by an unprecedented dismissal of oil resources, led to the abandonment of the research "visible" in this direction.

Nowadays, restricted use of alternative vegetal oils in tractor fuelling is conducted in the United States, Germany and France, using a technology in which de-gummed oils are heated by the engine's cooling agent. Such practices are somewhat controversial because the heating to approximately 100°C does not sufficiently reduce the oil viscosity or the increase of charges in injection devices due to high viscosity, and it often causes the engine to malfunction.

ASPECTS OF THE VEGETABLE OILS USE TO SUPPLY DIESEL ENGINES

From a practical perspective, using vegetable oil to power diesel engines designed to run on diesel fuel requires the existence of interference between oils obtained and used. These interventions may target oil processing and bringing to the compatible properties with the engine or engine adjustment to crude oil properties.

The current version of the vegetable oils processing to bring the properties compatible with diesel engine is biodiesel production. The generic name of **biodiesel** is given to some fuels designed to feed the compression ignition engines (Diesel) which have as major components some methylic esters of faty acids obtained by the methanolisis of (simple) triglycerides out of vegetable oils.

Generally, the biodiesel meets the requirements of combustion within engines in a resembling way as with the Diesel fuel. So, the bio-diesel has some physical properties resembling those of Diesel fuel, so it presents the same behavior during the injection process. The biodiesel's low caloric power is relatively close to that of the Diesel fuel, which, permits keeping, within acceptable limits, the engine power without modifications on adjustments as regarding the average dose of injected fuel. Therefore, substitution of diesel fuel with biodiesel can be made without engine modifications.

For extraction, the biodiesel supposes the existence of some accessible resources, generally on a local level, whose size may be relatively fast modified by the suitable dimensioning of oil plant productions in agriculture. At the same time, in order to that the bio-Diesel extraction should be economically profitable, the process of chemical processing the raw oils should be performed in industrial facilities having relatively high capacities, which should integrate into the process of obtaining bio-diesel with producing glycerin(e), organic solvents, etc. The rhythm of selting up such units, determined by the profitability level presumed for these, is the main factor currently modeling the rhythm of extending the use of biodiesel as an alternative solution for feeding the Diesel engines.

Vegetable oils suitable for use as engine fuel have the advantage of mature and environmental technologies for the biodiesel process, may be applied sequentially. Specifically, to obtain vegetable oil we should take only steps of extraction from oil seeds and purification by processes of release of water content, sedimentation and filtration. In addition, the profitability of these operations is not the subject to the size of production and maintaining a continuous flow of it. Therefore, production of vegetable oils for use as engine fuel can be held, without affecting sensitive profitability, in local areas, located near users and designed in accordance with their needs. Vegetable oils can partially substitute - by using mixtures of them with diesel fuel - or even all - by adopting technologies for pre-feeding conditioning - petroleum fuels used in Diesel engine power.

Practical options of intervention to power Diesel engines with vegetable oil consist in adaptation of injection installation or in pre-feeding conditioning of fuel. The first option requires replacement of the engine injection equipment with one designed for oil injection. It is understood that in this version, the engine is one dedicated to this mode of supply.

The second option - workable for supply with vegetable oil or mixtures of vegetable oil with diesel fuel - requires fuel pre-heating before engine injection installation. This option allows the engine to be operated under a poly-carburation conditions, that can be fed at will, diesel, vegetable oil or mixtures of vegetable oil with diesel.

An inventory of possible approach to alternative supply Diesel engines with vegetable oils is summarized in Figure 1.

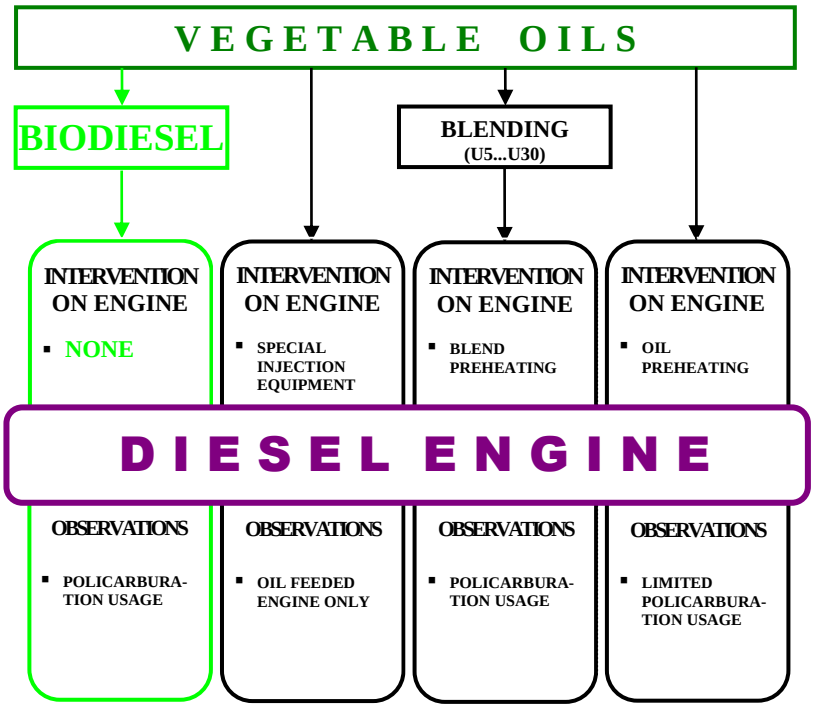

Fig. 1. The alternative supply possibilities for vegetable oil Diesel engines

Historical validation of potential supply of compression ignition engines with vegetable oil and relative ease of obtaining them seem to indicate that variant as the most comfortable way of substitution of petroleum fuels. In support of this assertion come and some findings related to chemical structure and physical properties of vegetable oils, such as the following:

- chemical structure of vegetable oils is comprised from about 10% oxygen, which favors a more complete burn of its in engine;
- vegetable oils contain no sulfur, so the exhaust gases to engine operation contains no sulfur oxides, thus reducing a component of air pollution responsible for acid rain occurrence;
- vegetable oils have a superior lubrication capability of the diesel, so promoting the growth of the terms of service for the injection parts equipment in terms of direct wear.

Naturally, as in any attempt to promote, this solution should be viewed with caution, as some properties of vegetable oils differ substantially from those of diesel oil and can influence in unintended ways some aspects of engine operation. Tests conducted in this area have highlighted the following problems for which the research have to find solutions:

- vegetable oils show, like biodiesel, an aggressively toward the elements in rubber from the engine supply systems;
- viscosities of vegetable oils at ambient temperature are much higher than the viscosity of Diesel oil and this adversely affects the dynamic process of injection;

- values of surface tensions of oils are higher than the corresponding amount of Diesel oil, which attract a quality reduction of spraying process accompanying injection of fuel;
- the cetane number of vegetable oils is substantially lower than the that of Diesel oil, making it hard to start engines and, after starting, adversely affect the self-ignition processes in terms of duration, leading to unwanted changes of combustion dynamics.

The first of these disadvantages can easily be solved by replacing concerned components with some made out of compatible materials, also with vegetable oils and Diesel oil. Regarding other inconveniences, we note that their manifestation aim the disruption of self-ignition and combustion processes which are primarily responsible for operating the engine yields. Therefore, treating these inconveniences will be done in an integrated way under some researches showing solutions for keeping the quality of self-ignition and combustion processes to an acceptable level.

PRACTICAL ACHIEVEMENTS

In 2009, in the National Institute of Research-Development for Machines and Installations Designed to Agriculture and Food Industry - INMA Bucharest, has made a **"Pre-heating installation of the raw vegetable oil for Diesel engines"** for equipping agricultural tractors with power up to 100 HP .

Fig. 2. Equipping the U650M tractor with a Diesel engine vegetable oil pre-heating system

In essence, the plant provides diesel engine start and, after its heating, feeding switches on preheated raw vegetable oil. Pre-heating oil is mainly from the engine cooling fluid and rigorous control of temperature is made by means of electrical resistance powered by the tractor electrical installation. The plant made the subject of a patent application with OSIM registered under number A/00784 (authors: Pirna Ion, Voicu Emil, Voicea Iulian and Mihai Marin). How to install it on a tractor U 650M is shown in the images in Figure 2.

Energy Performance of raw vegetable oil powered tractor, compared with performances on diesel fuel power, are shown in the diagrams in Figure 3.

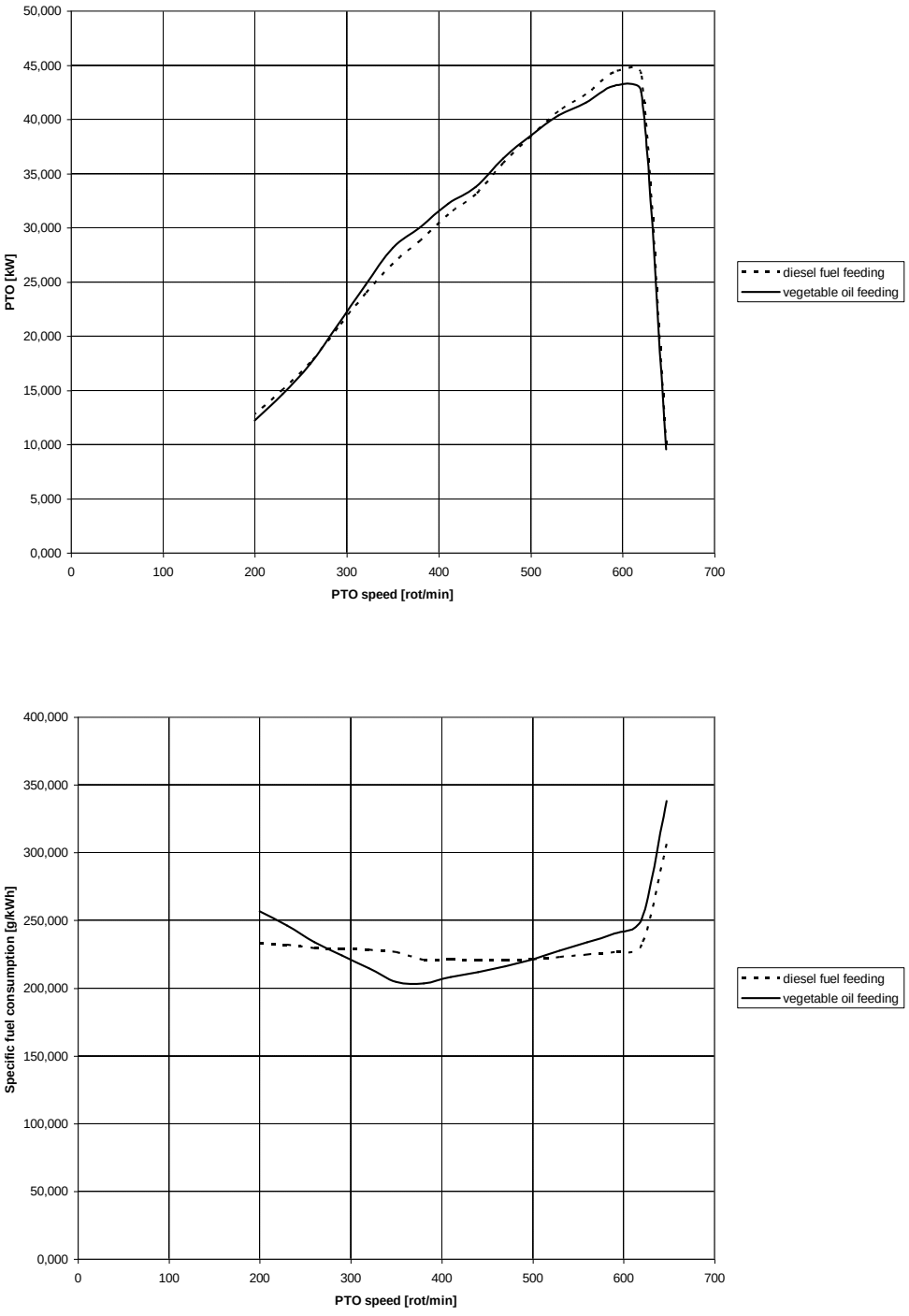

Fig. 3. The comparative behavior of the U650M tractor, equipped with a D110 engine, for Diesel fuel and vegetable oil

In the following period, the tractor equipped with this add-on will be subjected to tests of endurance for running safety assessment accompanying this practice.

CONCLUSIONS

Crude vegetable oils are, probably, an accessible solution for service Diesel engines policarburation. Several solutions for alternative supply of Diesel engines with crude vegetable oils are expecting for the research profile final confirmation. Beyond some

controversy on intimate aspects of engine operation (the deposition of gums, lubricating oil contamination, increases the injection installation stresses, etc.), this solution is of interest, at least locally. Especially in agriculture, the practice of using vegetable oils, produced in own administration, may provide users with energy independence working solution, in terms of efficiency and in terms of environmentally friendly behavior.

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EVOLUȚIA EFECTIVELOR LA PRINCIPALELE SPECII DE ANIMALE ÎN REGIUNEA DE DEZVOLTARE SUD-VEST OLTENIA

THE POPULATION FOR MAIN SPECIES OF ANIMALS IN SOUTH-WEST OLTENIA DEVELOPING REGION

PÂNZARU R.L., MEDELETE D.M., ŞTEFAN G., NICULESCU MARIANA

Key words: bovine, ovine, porcine, caprine, effective

ABSTRACT

The paper referring to main animal numbers for South-West developing region Oltenia during 2004-2006 period. In this context it present total effectives to cattle, pigs, sheep and goats, issues examined in the context of national existence, seeking to highlight the region's position.

METHOD AND MATERIAL

The paper was accomplished for the 2004-2006 period. The documentation included consultation of inventory book for agricultural statistical data and the selection of data as needed. Bureau phase was accomplished trough data ordering and usage – as working method – of time comparison.

RESULTS AND DISCUSSIONS

For South-West is presented the total effectives (share at national level and dynamics) and the county structure of effectives by species and it's evolution during analyzed period.

Table 1. presents regional effectives of animals for the main species and their proportion nationwide.

SOUTHWEST REGION. The effectives of the main animal species share in national total (2004 - 2006)

Table 1.

Nr. crt.	Species	2004		2005		2006		Average 2004 – 2006	
		Heads	% from National level	Heads	% from national level	Heads	% from national level	Heads	% from national level
1	Cattle	299657	10,34	301594	10,74	304980	10,66	302077	10,58
2	Swine	892263	17,34	892672	13,74	918011	13,86	900982	14,80
3	Sheep	605380	8,13	653336	8,80	645406	8,48	634707	8,47
4	Goat	145203	21,42	144082	21,80	150735	21,94	146673	21,72

Herd showed variations from 299,657 head in 2004 to 304,980 heads in 2006 when the average period being 302,077 head - given that 2005 was characterized by an effective regional of 301,594 heads (Fig. 1.).

National region owned shares of: 10.34, 10.74, 10.66 and 10.58% for 2004, 2005, 2006 and the average period (Fig.2.).

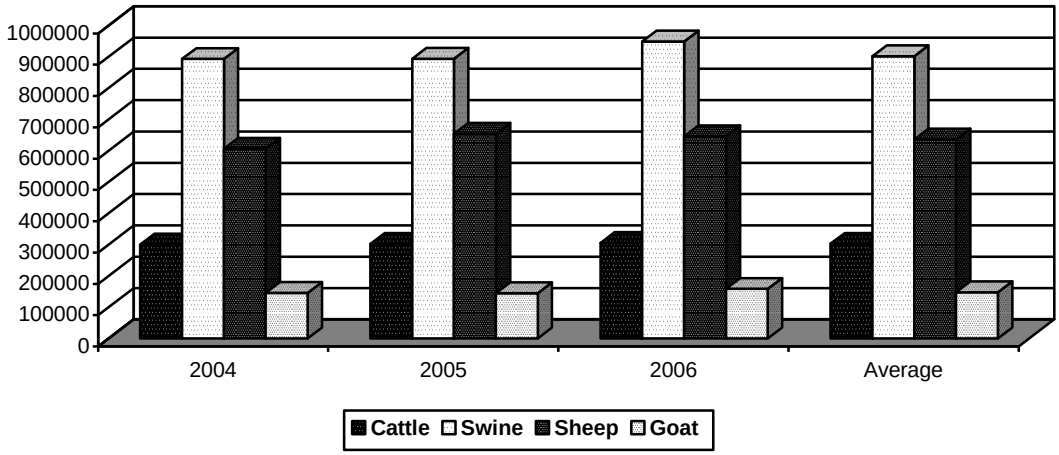

Fig 1. SOUTHWEST REGION. Total Number of animals - head

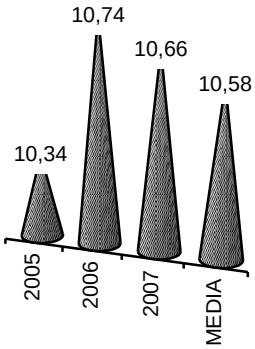

Fig.2. SOUTHWEST REGION. Number of cattle, national share (%)

The region is characterized by a total number of swine between 892,263 head in 2004 and 918,011 in the year 2006, the average period being 900,982 head - 892,672 head in 2005 (Fig. 1.). In the national level of the indicator, the region owned shares of 17.34% in 2004, 13.74% for 2005, 13.86% for 2006 and 14.80% for average period analyzed (Fig. 3 .).

Regarding total sheep number, the region was between 8.13 and 8.80% of their levels - in 2004 and 2005 respectively (605,380 and 653,336 head), while the period average share was 8.47% - 634,707 heads (8.48% in 2006 respectively 645,406 head - Figures 2 and 4).

If goats actually recorded the total region between 144,082 (21.80% below the national indicator) in 2005 and 150,735 head in the year 2006 (21.94% compared to the national level), the average period being 146,673 heads (21.72% compared to the national level) - given that 2004 saw a total of 145,203 heads that actually 21.42% of the national level (Fig. 2 and 5.).

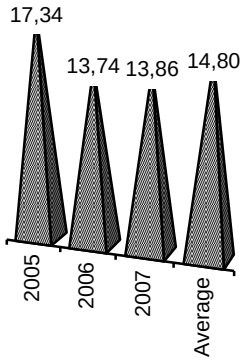

Fig.3. SOUTHWEST REGION. The pig,
national share -%

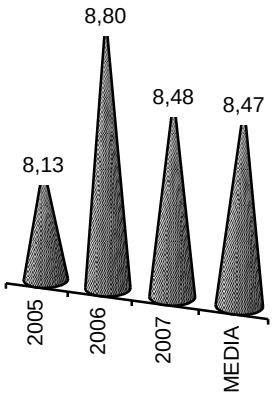

Fig.4. SOUTHWEST REGION. number of sheep,
national share -%

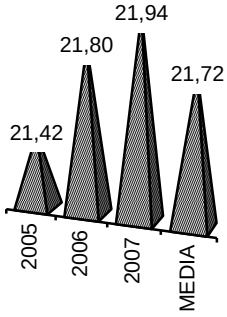

Fig.5. SOUTHWEST REGION. The goat,
national share -%

In the table 2. presented dynamic number of anime for South-West Region.

Cattle have an upward trend for the reporting. Dynamics is dominated by the component index values supra unitary, exceptions are those with the mobile base for the average period - 99.0%. Outrund for comparison terms were 0.6% in 2005, 1.8 and 1.1% for 2006 and 0.8% for the average period (fig.6.).

SOUTHWEST REGION. Dynamics for

main species of animals numbers
2004 – 2006 Table 2.

Crt. No.	Species	2004		2005		2006		Media 2004 – 2006	
		I_{bf}	I_{bm}	I_{bf}	I_{bm}	I_{bf}	I_{bm}	I_{bf}	I_{bm}
1	Cattle	100	100	100,6	100,6	101,8	101,1	100,8	99,0
2	Swine	100	100	100,1	100,1	102,9	102,8	101,0	98,1
3	Sheep	100	100	107,9	107,9	106,6	98,8	104,8	98,3
4	Goats	100	100	99,2	99,2	103,8	104,6	101,0	97,3

The numbers of pigs is growing. Deviations reference bases were 0.1% in 2005, 2.9 and 2.8% for 2006 and 1.0% on average compared with the 2004 year - 98.1% compared to 2006 (Fig 6.)

When referring to the sheep find their uneven increase. Indicator increased by 7.9% in 2005 compared to 2004, then decreased by 1.2% in 2006 (+6.6% compared with 2004). For period average values of the fixed and mobile indices were 104.8 and respectively 98.3% (fig.6.).

For goat effectives is recorded a decrease of 0.8% in 2005, growth for 2006 (+3.8 and +4.6% of the bases of reporting). Under these conditions the average period ahead by 1.0% the level from 2004, but is lower by 2.7% compared to 2006 (fig.6.).

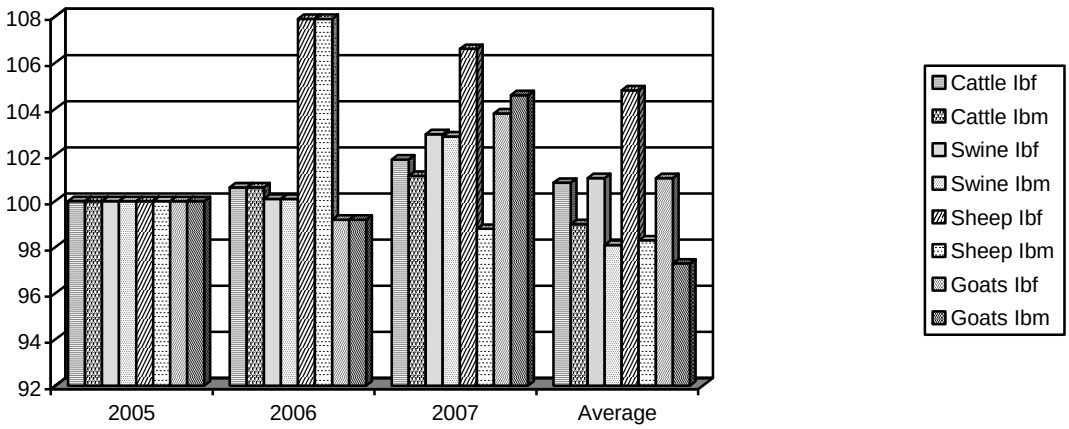

Fig.6. SOUTHWEST REGION.
Dynamics of livestock

CONCLUSIONS

1. South-West holds 10.58% of the national numbers of cattle, 14.80% of the pig, 8.47% and 21.72% of total for sheep and goat - to note the situation on goat and pigs.

2. At the regional level species have a tendency to trend upward - in general - in terms of number (which is obvious for cattle and swine), the downward trend is only recorded for sheep. It noted, however, that the indicator changes are not significant for any of the species.

3. South-West is an area with medium to low importance in the national herd animals and therefore for animal production level – excepting goats. There are, however, noted the existence of rural communities that revolve around livestock production branch. Appears as a need the exploitation of positive experiences of these communities, to reconsider the livestock - particularly cattle and pigs that can grow at least 20-25% of the

current state of facts, taking into account the potential vegetal sector in terms of available feeding.

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SCHIMBURILE COMERCIALE MONDIALE CU OREZ

COMMERCIAL WORLD TRADE WITH RICE

PÂNZARU R.L., MEDELETE D.M., ŞTEFAN G.. NICULESCU MARIANA

Key words: Rice imports, trade balance, exports, deficit, surplus

ABSTRACT

The paper refers to the global rice exchanges conducted during 2004-2006, both overall and in each continental units. Shall monitor the imports, exports and trade balance, highlighting the cases of excess or deficit manifested.

METHOD AND MATERIAL

The paper was accomplished for the 2004-2006 period. The documentation included consultation of inventory book for agricultural statistical data and the selection of data as needed. Bureau phase was accomplished trough data ordering and usage – as working method – of time comparison.

RESULTS AND DISCUSSIONS

World imports of rice. Table 1 shows the global importance of rice to the actual values recorded in the period 2004 to 2006, taking into account the global and continental levels: Africa, America, Asia, Europe and Oceania.

World imports of rice
2004 – 2006

Table 1

Crt. No.	Specification	2004		2005		2006		Average 2004 – 2006	
		tone	Str. %	tone	Str. %	tone	Str. %	tone	Str. %
1	AFRICA	17378	0,89	52773	2,60	68208	3,66	46119,67	2,37
2	AMERICA	1461719	75,36	1535154	75,58	1495615	80,15	1497496	76,97
3	ASIA	295770	15,25	320194	15,76	171443	9,19	262469	13,49
4	EUROPE	163678	8,44	122908	6,05	130568	6,99	139051,33	7,15
5	OCEANIA	1174	0,06	2	0,01	260	0,01	478,67	0,02
6	TOTAL	1939719	100,0	2031031	100,0	1866094	100,0	1945614,67	100,0

In 2004, for the Oceania continent has recorded the lowest levels of import of 1174 tonnes (representing 0.06% of world total), the highest value being imported to America with 1461719 tons of rice (75.36% of total imports World of 1939719 tons). The other continents have recorded in 2004 imports of 295,770 tons for Asia (15.25% of world total), 163678 tons of rice for Europe (8.44% of the world) and 17378 tonnes for Africa (0.89% of total).

Next year the situation of rice imports was likewise, registering a share of 1535154 tonnes imported rice for America (75.58% of total world 203,031 tons), Asia 320194 tons of rice (15.76% of world imports), Europe 122908 tons (representing 6.05% of the total), Africa with a level of imports of 52,73 tons of rice (2.60% of the world), the lowest level of imports was recorded for Oceania with only 2 tons (0, 01% of world total).

The year 2006 presented in terms of imports maximum levels for America 1495615 tons of rice (80.15% of those registered globally) and minimum for the Oceania continent with 260 tonnes imported (0.01% of total world 1866094 tons imported rice), Asia held

171443 tons of rice (9.19% of world total), Europe participating in the total level with 130568 tonnes (6.99%) and Africa with 68208 tonnes (3.65% of total).

For the average period (Fig.1.) Total world rice imports was 1,945,614.67 tons, which was based on continental participation:

- 1497496 tons for America (76.97% of total);
- 262469 tons for Asia (13.49% of the total);
- 139,051.33 tonnes for Europe (7.15% of the global total);
- 4611967 tons of rice imported from Africa (2.37% of total);
- 47867 tonnes for Oceania (0.02% of total).

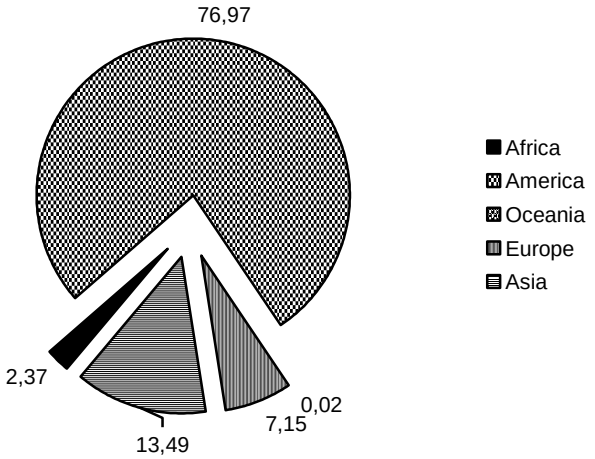

Fig.1. Imports of rice - Average of the period (% of total)

World exports of rice. Data on exports of rice - the effective levels - recorded in the period 2004 - 2006, and the dynamics for the fixed-base indices are presented in table 2.

In 2004, total rice exports recorded worldwide was 1,630,745 tons, continents participating with levels of 19 tonnes Oceania (0.01% from the world), Africa in 2017 tonnes (0.12% from the world) , 71675 tons Asia (4.39% from world total), 74,095 tonnes Europe (4.54% of total), the highest level being reached in the American continent with 1482939 tonnes exported (90.94% of total).

World exports – rice
2004 – 2006

Table 2.

Crt. No.	Specification	2004		2005		2006		Average 2004 – 2006	
		tone	Str. %	tone	Str. %	tone	Str. %	tone	Str. %
1	AFRICA	2017	0,12	8775	0,44	3356	0,19	47,16	0,27
2	AMERICA	1482939	90,94	1797586	91,42	1588398	92,78	1622944,33	91,70
3	ASIA	71675	4,39	89580	4,55	43456	2,56	68374,33	3,86
4	EUROPE	74095	4,54	70381	3,58	76456	4,46	73644	4,16
5	OCEANIA	19	0,01	5	0,01	1	0,01	8,34	0,01
6	TOTAL	1630745	100	1966327	100	1712079	100	1769717	100

In the year 2005, the highest level of exports was recorded on the American continent with 1797586 tonnes (representing 91.42% of total world 1966327 tons), followed at long-range by Asia, where the export was 89,580 tonnes (4,55% of total), then Europe, which exported 70,381 tons of rice (3.58% of total), Africa exported 8775 tonnes (0.44% of total) and Oceania with 5 tons of rice exported in 2005 (0.01% from the total).

Next year the situation encountered at the continental level has remained largely unchanged, the highest level of exports was achieved by American continent with 1588398 tons (92.78% of total), than Europe, which exported 76,456 tons of rice (4, 46% of total), Asia with 4,868 tons of rice (2.56%), Africa exporting 3356 tons of rice (0.19% of total) and Oceania with only one tonne (0.01% of the world).

Average period (Fig. 2.) recorded a total of 1769717 tons of rice exported by the continents like:

- 8.34 tonnes Oceania (0.01% of total);
- 4716 tonnes Africa (0.27% of total);
- Asian 68,374.33 tonnes (26.82% of total);
- Europe 73,644 tonnes (4.16% of world total);
- 1,622,944.33 tonnes America (91.70% of the world).

Trade balance of global exchanges with rice. In table 3 (Fig.3.) Analyzed trade balance achieved for rice during the period 2004 - 2006, both globally and for the continents (taking into account the annual reference price level marketing).

Thus we can say that in African continent the situation was bad for the whole period, the level of exports being below the level of imports, the deficit increasing from 5750 thousand $ in 2004, to 13.437 thousand $ in 2005, while in 2006 to reach 23.228 thousand $. Period average for the African continent recorded a deficit of 1413834 thousand $.

On the American continent, the trade balance for exchanges with rice had a weak character in 2004, with a level of -13.252 thousand $ and in the next years America record a surplus of 34.725 thousand $ in 2005 and 9.522 thousand $ in 2006, the average period tilting the balance for exports with 1033167 thousand $.

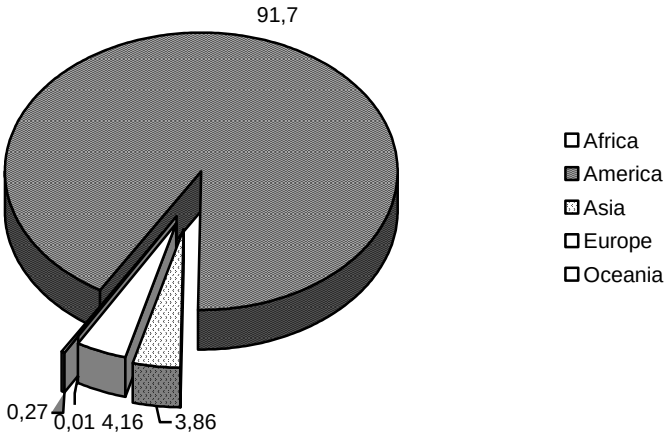

Fig.2. Exports of rice - the average period (% of total)

Trade balance of global exchanges with rice (2004 - 2006)

Table 3

Crt. No.	Specification	2004	2005	2006	Average 2004 – 2006

		±	±	±	±
1	AFRICA	-5750	-13437	-23228	-14138,34
2	AMERICA	-13252	+34725	+9522	+10331,67
3	ASIA	-64926	-100229	-47048	-70734,34
4	EUROPE	-42445	-33181	-29746	-35124
5	OCEANIA	-1361	+1	-137	-498,99
6	TOTAL	-127734	-112121	-90637	-110164

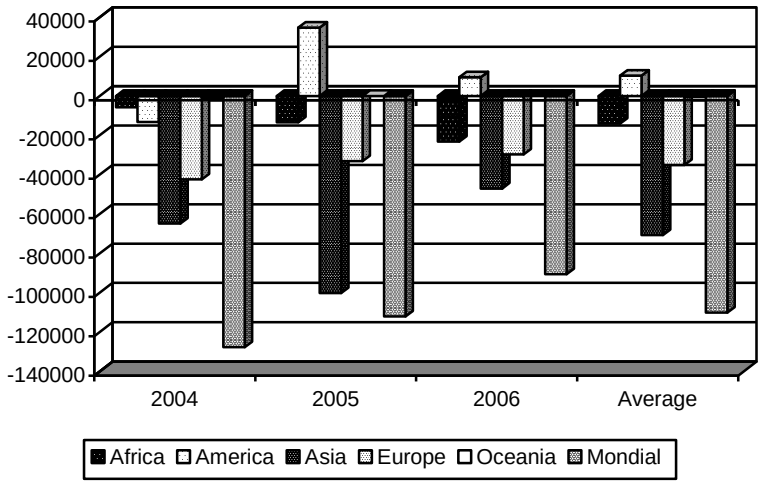

Fig.3. Trade balance of exchanges with rice (± thousand $)

Trade balance for the Asian continent, was poor for the entire period under review, the deficit ranging from -64926 thousand $ in 2004 to -100229 thousand $ in 2005 and -47048 thousand $ in 2006 (period average by recording a deficit of -70.73434 million $).

The situation encountered in the European continent was similar to that of Asia, rice exports are lower than imports for the entire period under review: -42.445 thousand $ deficit in 2004, -33.181 thousand $ deficit in 2005, -29.746 thousand $ deficit in case of 2006 year and an average of -35.124 thousand $ for the period tacked in consideration.

Oceania continent was record a deficit in 2004 (-1361 thousand $) in 2006 (-137 thousand $) and for the period average (-498.89 thousand $) and record a surplus of one thousand dollars in 2005.

Total world rice trade has recorded only deficits for the analyzed period:

-127734 thousand $ for the year 2004;

-112121 thousand dollars in the year 2005;

-90637 thousand $ for 2006;

-110164 thousand $ deficit for the period average.

CONCLUSIONS

Analyzing actual importation of rice in the world, it is noted that the values registered by it increased from 1939719 tons in 2004 to 2,031,031 tons in 2005, and at the 2006 year to a record level of 1866094 tons. Among continents, the largest imports were made in America, which in 2005 recorded a level of 1535154 tons of imported rice (75.58% of the world that year), the lowest rate of imports was recorded in Oceania with 2 tons in 2005 (0.01% of annual) and 260 tonnes in 2006.

With regard to exports is observed that 2005 was the most favorable in the world with 1966327 tonnes exported (20.57% compared to 2004), the highest level being reached in America with 1797586 tons of rice exported (91.42% of year's total), followed in distant by Asia with a level in 2005 of 98580 thousand tons of rice (4.55% of the year).

The lowest were found in the continent Oceania, with only 1 tonne exported in 2006 (0.01% of annual), 5 tons in 2005 and 19 tonnes for 2004;

Trade balance of global rice exchanges was a loss in the period under review, our exports being less than imports, the deficit of 127734 thousand $ in 2004, of 112121 thousand $ in 2005 and 90.637 thousand $ for 2006. The best situation meets in the American continent with a surplus of 34725 thousand $ in 2005 and 9.522 thousand $ in 2006. Worst year was 2004 when all the continents had deficits, the maximum being reached in Asia with -64.926 thousand $ and Oceania with minimum -1.361 thousand $.

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CARACTERISTICILE PIEȚEI CĂRNII

FEATURES OF THE MEAT MARKET

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Key words: market, offer, demand, consumption

REZUMAT

In perioada 2000-2006, producția românească de carne a crescut cu un procent de doar 24%, trendul fiind însă unul sinuos, după o scădere puternică între 2000 şi 2002, producția de carne a crescut în următorii ani, reuşind să recupereze scăderea din intervalul 2000-2002. Față de anul 1993, producția de carne a companiilor româneşti a scăzut la aproape jumătate în anul 2006 (de la 626 mii tone la 322 mii tone). O evoluție se remarcă de asemenea şi în cazul conservelor din carne, a căror producție, in anul 2006, se situa la un nivel de aproape trei ori mai mare comparativ cu anul 2000, 28 mii tone, față de doar 11 mii tone. Ca şi producător de carne, România ocupa în anul 2007, conform datelor furnizate de Eurostat locul 11 în UE la producția de carne de porc şi vită, locul 7 la producția de carne de pui şi locul 5 la carnea de oaie.

ABSTRACT

During the period 2000-2006, the Romanian meat production has increased with 24%, with a sinuous trend: after a decrease during the period 2000-2002, meat production increased in the following years, filling in the gap developed during the previous interval. Compared to 1993, meat production of the Romanian companies decreased to almost 50% in 2006 (i.e., from 625.000 t to 322,000 t). There has also been an evolution in the case of canned meat whose production reached, in 2006, a level almost three times higher compared to 2000, i.e. 28,000 t compared to only 11,000 t. As a meat producer, according to the data supplied by Eurostat, Romania ranged, in 2007, 11 in the European Union in pork and beef production, 7 in chicken, and 5 in mutton.

INTRODUCTION

Valorising animal production according to market requirements is ensured by different systems specific to each product or group of products. The wide variety of systems and forms of raising animals in Romania has determined a diversity of forms from the point of view of live animals and meat markets.

MATERIAL AND METHOD

During the period 2000-2006, the Romanian meat production has increased with 24%, with a sinuous trend: after a decrease during the period 2000-2002, meat production increased in the following years, filling in the gap developed during the previous interval. Compared to 1993, meat production of the Romanian companies decreased to almost 50% in 2006 (i.e., from 625.000 t to 322,000 t).

In the case of meat products, the positive evolution was more spectacular during the analysed period (2000-2006), meat products almost tripling their volume starting with the beginning of the period mentioned above and increasing steadily year after year.

There has also been an evolution in the case of canned meat whose production reached, in 2006, a level almost three times higher compared to 2000, i.e. 28,000 t compared to only 11,000 t.

As a meat producer, according to the data supplied by Eurostat, Romania ranged, in 2007, 11 in the European Union in pork and beef production, 7 in chicken, and 5 in mutton.

Increasing meat products and canned meat production show a new trend in the meat industry in Romania, i.e. manufacturing products with higher added value, which develops the premises for increasing the profit of the producing companies, provided raw matter prices and finite products prices shall not follow an unfavourable evolution in the following period.

Compared to 2006, beef production increased in 2007 from 19,000 t to 39,000 t, in pork from 100,000 t to 192,000 t, and in chicken from 194,000 t to 300,000 t (i.e. an increase of 50%). Salami and sausage production increased with 19% while canned meat decreased with 7%. Meat production per inhabitant during the period 2001-2006, oscillated between 63,2 kg and 64,9 kg, with the highest meat production per inhabitant in 2003 (i.e. 78,2 kg).

Table 1.

Meat production, 2006-2007

	Meat production (t)							
	2006	**2007**	**2006**	**2007**	**2006**	**2007**	**2006**	**2007**
EU-15	-	-	1808,5034	18,987	7299,426	7348,808	1024,412	1001,379
Belgium	-	-	1006,217	1063,277	268,919	272,863	1,404	1,361
Bulgaria	107,005	-	75,010	41,236	22,753	5,920	23,468	9,134
The Czech Republic	-	-	358,505	360,318	79,712	79,328	1,623	1,646
Denmark	185,000	-	1748,576	1802,195	128,702	129,986	1,743	1,783
Germany	1199,953	-	4662,221	4985,367	1192,954	1185,232	43,854	44,364
Estonia	12,500	11,500	35,078	37,797	14,482	14,696	0,532	0,581
Ireland	-	-	209,000	205,300	572,200	580,800	70,300	65,900
Greece	16,900	-	122,813	121,610	60,687	57,691	114,407	111,322
Spain	-	-	3229,623	3513,449	671,199	657,996	238,250	227,081
France	1792,800	1862,300	2262,789	2281,263	1509,525	1531,840	129,149	126,676
Italy	984,000	-	1556,059	1603,279	1110,630	1126,651	61,902	61,319
Cyprus	26,925	29,262	52,512	54,978	4,003	3,921	6,908	7,106
Latvia	-	-	37,812	40,433	20,684	22,755	0,439	0,493
Lithuania	-	-	106,217	99,288	47,323	55,977	0,611	0,801
Luxembourg	-	-	9,834	9,923	9,333	9,213	0,076	0,056
Hungary	386,030	376,170	489,127	499,437	33,546	34,521	1,143	0,875
Malta	-	-	8,218	8,017	1,398	1,385	0,005	-
Holland	-	-	1264,897	1289,935	383,649	385,571	15,719	17,767
Austria	108,600	-	505,278	530,923	214,585	215,567	-	-
Poland	-	-	2071,335	2090,618	355,329	364,876	1,472	1,512
Portugal	289,000	318,000	338,631	364,073	105,309	91,254	12,585	13,558
Romania	264,300	303,500	468,100	491,300	194,600	211,200	64,400	73,140
Slovenia	-	-	33,262	66,187	37,908	36,203	0,119	0,135
Slovakia	95,200	83,400	122,258	113,825	21,413	22,990	1,201	1,166
Finland	-	-	208,100	213,320	87,051	88,572	0,624	0,746
Sweden	-	-	264,448	264,869	137,404	133,533	4,211	4,604
Great Britain	1535,000	-	696,549	738,984	874,281	882,040	330,189	324,843

Source*: Eurostat*

The price of meat products and of meat preparations on the Romanian market are closely related to the price evolution at international level, since most of the meat used in preparing meat preparations come from imports. In Romania, pork production is much

below the processing industry, ensuring only 30% of the necessary amounts resulting in no other options than imports.

Meat and meat products in Romania are below the European average, but it is steadily increasing. Pork is the most consumed of all meats, followed by chicken. Pork, as in most European countries, shares almost 50% of the meat consumption, while chicken shares only about 25-30%, though steadily increasing. Beef shares less than 15%, while mutton is almost negligible. Annual pork consumption is 30-35 kg per inhabitant, while the European average is almost 85 kg per inhabitant. Romania's beef consumption per inhabitant is decreasing, despite the high level of self-consumption in rural areas. In 2007, Romania consumed 6.8 kg of beef per inhabitant. Chicken consumption in Romania is twice as lower as that in Western Romania and three times lower than that of the United States.

Another characteristic of the Romanian meat market is self-consumption. The high share of the rural area and raising animals on one's own farm is a barrier in really assessing the Romanian meat market. The rural area almost no longer contributes to the meat market. There is, though, a descending trend of self-consumption these last years, which resulted in 78,000 t of self-consumed chicken in 2006, 61,000 t of self-consumed chicken in 2007, and 49,000 t of self-consumed chicken in 2008.

Pork and pork products share the highest sales, but there are changes of the consumption behaviour due to mainly the economic crisis and to the decrease of the purchase power of the consumers. There is an increasing concern for consumers' health; therefore most of these changes concern healthier and safer products with less fat, gradually replacing pork with chicken and turkey. Despite the increase of chicken consumption, there are still parts of the country where consumers are rather conservatives.

Another remarkable trend at the level of consumer behaviour is the increase of refrigerated meat consumption compared to frozen meat consumption.

Until 1990, Romania was definitely an exporter of agricultural and agro-alimentary products; it later decreased its exports steadily, year after year.

As for beef exports to the countries outside the European Union, Romania ranges 7, before such countries with long-lasting traditions such as Spain (4,322 t), Ireland (4,358 t) or Denmark (2,809 t). Romania is outrun by such countries as Germany (29,804 t), France (17,338 t), Holland (13,217 t), Italy (11,881 t), Poland (11,881 t) and Austria (10,601 t). Romania's beef exports is overwhelmingly (99.7%) dominated by living animals destined to slaughtering, while only 0.3% is represented by meat products.

In 2008, Romania's total imports of beef, including living animals (both from European Union countries and from non-European Union countries) reached 13,000 t, i.e. 2,300 more t than in 2007, but decreasing compared to 2005 and 2006, when we imported 27,100 t and 43,000 t, respectively.

Romania is the most important exporter of mutton of the European Union to the markets outside the European Union.

Romania ranges fourth in the European Union from the point of view of the number of sheep after Great Britain, Spain and Greece. Most of Romania's mutton exports, 1,252 t, were made as living animals destined to slaughtering, while another 321 t of mutton were marketed outside the European Union as fresh carcass (318 t) or frozen carcass (3 t).

Romania's mutton imports from countries outside the European Union reached 108 t during the first six months of 2009, i.e. 3 t less compared to the similar period of 2008. These imports consisted of frozen mutton bowels (22 t) and of other products (86 t). At the level of the European Union, Romanian imports of mutton from countries outside the European Union represent only 0.07% of the total imports of mutton and sheep of the European Union, reaching, in the first semester of 2009, 149,629 t.

RESULTS AND DISCUSSIONS

Pork market is the most significant segment of meat production, perpetuated due to consumption traditions and to species increase.

Chicken market has a lower capacity than those of other species, because Romania's chicken market is supplied almost exclusively by integrated industrial producers and from imports.

Beef market is characterised by the fact that it is not a distinct sector in Romania, separated from other markets, beef being considered a secondary product to milk and dairy products.

Mutton is predominated by multifunctional characteristics of the production systems (meat, milk and wool) to which seasonal mutton consumption is added.

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IMPACT OF EU ROMANIAN INTEGRATION WITH THE LASTING AGRICULTURE AND FOOD INDUSTRY DEVELOPMENT

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Key words: CAP – community agriculture politics, EFOGA – European fund for orientation and guarantee agriculture.

ABSTRACT

For Romania a lasting development means management and essential natural resources preservation as soil, water, plants, animal genetic resources, environment and orientation to the next generation, the agriculture and feeding sphere development with the European Union market as well as the institutional training for getting European funds. For a lasting development it is very important the quantitative and qualitative feeding security that requires a new feeding politics, according to the agricultural politics and, in the same time, with the community for reconciliation between economy and environment using a new way of development to support the human progress far in the future.

INTRODUCTION

Romania adheration to European Union will cause a series of positive and negative effects with the economy, but the adheration impact will not be felt overnight, emphasized the Business Media Group officials.

At the macroeconomics level the European integration will have to provide a transition of the internal output, and an economic development in the first 5-7 years from the adheration, higher than in the old EU members.

Taking as the example of the states which adhered in 2004, we can appreciate that after the adheration the prices, wages, inflation can register a push, subsequently following these markers to come back at the normal levels.

The experts assert the positive effect of the adheration will be felt in the next 2-3 years from the adheration through the improvement of the services, of the health and education system or building-up some efficient markets.

Concerning the EU adheration impact per branches, it is important to note the fact that out of the 19 analyzed sections about a half of them will feel the adheration impact after the first year from the integration.

Among these sections they are the leasing, small and middle sized enterprises, telephony, internet, hardware industry, software industry, etc. at the opposite side there are fields which will feel the adheration effects after 3 years (for instance the capital market, banking industry, tourism or HR industry), but also on a longer period of 5 years, like the case of agriculture.

The impact of the Romania's EU adheration with the local industry will be able to be felt after 2 years from the adheration moment. The most significant challenge will be the development of the competition and efficiency so that the Romanian companies can face the competition from the European community. As an adheration effect it is possible an increase of the pay packet costs (detectable between 5 months and 2 years), and a relative decrease of the purchasing power of the population, that will cause a stagnation of the industrial product request. The adheration impact with the agricultural markets and the Central and Eastern European countries incomes is difficult to assess. Certainty are the negotiation results which allow the drawing of some possible evolutions of the markets from this area. So, as a study consequence of the impact with the agricultural markets and

incomes of the Central and Eastern European countries, the General Board for Agriculture of the European Commission reached in 2002 the following conclusions:
- the chicken output could increase as a consequence of the price rising after adheration;
- the pork output will decrease with 0.9-1 million tones compared to the current one;
- the cereal harvest will increase with about 92-97 millions tones, namely with 10-14 tones more than in the case the adheration didn't take place.

The implementation of the direct payment diagram will determine a redeployment of the lands designated for the cereals and oleaginous crops, this way stimulating these crops. So, it will be registered a cereals price rising, and especially of the strong wheat's price, positively acting on this crop's profitability; the livestock will increase, and especially due to the beef output influence which will be mainly defined as a consequence of the milk quotas establishment. The milk quotas will mainly impact the production orientated towards the market, while the subsistence sector, (of the self consumption) will remain unaffected.

MATERIAL AND METHOD

• *Implementation effects with the agriculture and food industry*

The implementation effects of the Commune Agricultural Politics in Romania must be analyzed from more angles. The agricultural growers will have to comply with the EU quality standards, sanitary and phytosanitary provisions if they want to access the market (either the national market, or the EU market). For sure the enforced conditions to the growers will be very tough. Not complying with these conditions will determine the propagation of the existent situation: without complying with the EU standards the farmers will not be able to sell the obtained products, and this way they will be not able to purchase the needed financial resources for the farms profitability and standards' implementation. The obtained output will be not used but only for self consumption, and the emerged benefits from rising the price the agricultural products (due to the fact the intervention price is superior to the actual level of the prices of the Romanian market) will be not possible to capitalize because EFOGA will not purchase but only the conformable products to the EU standards. This way, the agricultural growers' financial capability will stay humble, and they will be not able to support the CAP standards implementation's costs.

CAP will surely have a significant effect with the Romanian agriculture also due to the predominance of the arable surface over the integral agricultural surface (63%), to the overweight of the private property (63% out of the wholly agricultural surface is in private property), and to the relative reduced size of the agricultural exploitations (about 2 hectares). The most part of the connected costs with the EU Romania adheration concerning the agriculture and the agriculture politics it derives from the low competition and development degree of the Romanian agriculture by comparison to the Community standards. The sanitary and phytosanitary standards are another issue of the Romania alignment with EU. The most concerned by the implementation of the new sanitary and phytosanitary standards are the small size agricultural exploitations. In these conditions it is necessary the development of program to find the support measure of the subsistence farms, those of small size, which will become viable. This step will impose a category of "compulsory investments" needed to increase the competition capability of the Romanian agriculture, and to form the conditions for the capitalization of the derived benefits coming from the EU member state.

The main adheration costs can be assorted as it follows: Romania's alignment to CAP also included the redefinition of the Romanian agriculture supporting system on criteria of efficiency and of stimulating nature of the agricultural exploitations' size development. Taking into account the supporting mechanism adopted by Romania, (similar of the European one), it supposes supporting instruments by the agency of the price, the budgetary involvement are obviously in cost terms. In the field of agriculture the

institutional building-up is just at the beginning. There are opinions according to which it has been started at once with the SAPARD Agency, and with the institutional mechanisms for the program implementation. At their turn, the associated costs with the attendance to the SAPARD program can be measured in linked terms with the co-financing duties sizes from the Romania's side, as well as in costs associated to the low use degree of these funds and with the delays in the development of the program, quantifiable as losing for the Romanian agriculture. The time extension of these costs has as a deadline the adheration moment (2007). The institutional building-up process is still developing and it had already as effect the building-up of new institutions, needed for the management, after adheration, at a national level of CAP (for instance the Agricultural Bookkeeping Informing Network, Romanian Agency for Food Safety, etc). These costs will progressively diminish until 2007, the deadline until when the institutional building-up process must be finalized.

On the other hand, after 2007 will emerge other costs linked to the maintenance and running of these new institutional structures, according to the EU requests adoption and implementation costs of the quality standards for the agricultural products, and processed agricultural products, of the quality certification systems, of the sanitary and phytosanitary standards, etc.

The associated prices with these activities implementation consisted in:

- at the microeconomic level, especially due to some manufacturers' quality standards of some quality and production standards higher than those existent in the present;
- at the macroeconomic, as a consequence of the specific legislation adopting necessity, of building up of the products' quality etc. due to the fact the most of the agricultural output it is get in the private agricultural enterprises (91% of the cereals harvest in 2002), it can be assessed the majority of the costs for the implementation of the provided sanitary and phytosanitary standards in the framework of CAP will set at the level of the small sized private agricultural exploitations.

The afferent cost elements for the CAP implementation will be directly carried by the agricultural growers and especially by those with small sized exploitations. Otherwise said, the most affected, in relative terms, will be the small farmers, due to their small financial capability which doesn't allow them simultaneously the implementation of the CAP standards, and increasing of the production's efficiency.

The recent assessments show the fact for the period 2004-2007 the total expenses for the development of the institutional framework, including those designated to raise the quality standards of the products and to assist for the sanitary and phytosanitary norms accomplishment, they will come to EUR 538.02 millions, out of which about 80% only for the veterinary sanitary area.

RESULTS AND DISCUSSIONS

• *Implementation costs of the commune agricultural politics*

In the very next period it will become visible a series of costs connected to the new provision implementation, to the need for achievement of some institutional re-definitions at the local and regional level, as well as costs of the costs at the microeconomic level, mainly determined by the characteristics of the agricultural sector, and of the rural environment from Romania. Additionally, the achievement of the member state by Romania will involve funds transfer from the Community budget to support these politics. These amounts, which are supposed to be transferred, in their thoroughness from the Community budget, will be fully available qonly from 2013, when it is assessed the national contribution of the new members will reach the established maximum limit.

This concluson imply the fact Romania will have to provide own financing resources for the implementation of the CAP specific provisions at least until 2013.

The effects of the infrastructure improvement will be felt on a long term (3-10 years). The most concerned by the adheration to EU will be the food industry, the

commerce and the retail industries, and the most favoured will be the sectors with high export potential, which benefits of low prices (generic medicine industry, oil and refining industries, car and spear parts industry, rough materials manufacturers).

• *Romania's integration to EU will bring benefits in a few areas, while others will suffer.*

To the good: the trade and investments. Among the benefits is the development of the trade activities, a sustained economic development, increment of the foreign investments, most of them resulting due the EU funds infusion. The losses will be registered especially in the sector of the small and average sized enterprises, agriculture, and food industry.

Integration in European Union will be inopportune for the undertakers who didn't adjust the quality management systems or the environment standards. The foreground objectives aimed through the Romanian Government Program for the period 2004 – 2008 follow and widely overlay with the CAP objectives. These are the development of the efficiency in the agricultural sector and of the agro-alimentary products, increasing of the agricultural growers' incomes and the lasting development of the rural area without damaging the environment, with the purpose to build up a competitive sector, able to answer to the requests imposed by the common market.

The assumed responsibility by the Government of Romania is one supporting the agriculture production, in the limits of the existent budgetary resources; besides the recognition of these supporting politics (unsubstantially in out opinion), due to the limited budgetary resources, as well as the low interest for agriculture in general), the Government of Romania officially considers to apply a privatization and reorganizing politics of agriculture, which unfortunately is applied very slowly. With all these, one of the positive measures is the liberalization of the commerce with agro-alimentary products.

The lasting development strategy has a vital contribution in the EU politics, being reflected in the long term objectives of the European Strategy of Lasting Development from Göteborg. The analysis of the current situation it shows the acceleration need of the restructuring and modernizing process from agriculture, rural development and fishing, having in view their economic and social significance for the provision of an integrated and lasting economic development of the rural area.

The lasting development of the rural area is grounded on the implementation of some integrated economic systems which has to be implemented in the rural areas, following up the supporting of some non-agricultural activities to absorb the labour force surplus, and to imply the much more the youth people in handwork activities, services, agro-tourism, cultivation / harvesting of forest fruits, sericulture, apiculture. The new agriculture coordinates lead to the research involvement in the lasting development of the rural territories and in the lasting alimentary systems, complying with the quality and safety terms. The mobilization of the technical agricultural education, the continuous training, applied experimentation and research activity, social and vocational integration will decisively contribute to the lasting development.

• *In the agronomic higher education, his amount of the mixed research units will contribute to the particularization of the lasting development concept.*

It will be accentuated the continuous training of the agriculturalists, having in view the knowledge of regulations and of the enforced conditions for the lasting development.
It will pay a special attention to the permanent information of the rural population about the lasting development measures, and for its deployment as an active attendant in the developed actions for this purpose.

Also in the future it will keep its function of lasting development politics maker, and it will monitor the effects of this politics. Together with its partners – the peasants, vocational

organizations, cooperatives, agro-alimentary enterprises, service companies, associations, ministry will have to keep a tight collaboration to emphasize the lasting development stake. In this moment, the ground occupation of the rural space locals limits to the agricultural activities. However they also emerged signs of the activity reorientation towards the alternative sources of incomes. It is about the non-agricultural activities (for instance the agro-tourism and traditional handicrafts), that could be the stakes.

• *The rural area development and increasing of the interest for investors will be supported through the investments orientation towards:*

- promotion of some non-agriculture activities concerning the handicrafts, micro-enterprises (wood processing, hand-made object manufacturing, ceramics, embroidery, woollies, processing of leather, bulrush and osier, traditional music instruments), of hardware equipments and software products designated for the productive process, building-up of specific touristic information stations, development of the market networks for the traditional products (souvenirs);
- stimulation of agro-tourism and of the "green tourism", relative to the following types of activities in this field: building of the infrastructure at a small scale, as like the information stations and orientation areas for the tourists, recreation infrastructure which offers access to the natural areas, development and settlement of the touristic products market in relation with the tourism, the building and modernizing of the rural touristic boarding houses;
- support for the building up and development of the micro-enterprises with the aim to promote the partnerships among the entrepreneurs, and the development of the economic structure;
- development of the ground services for the population from the economic and agricultural compartments, as like: rural and forestry infrastructure (hygienic sanitary services, accommodation comfort, specialized education units, libraries), communal roads to provide the access among villages and among the commune residence and villages, connection to the facilities of the electric power providing system of those homes which develop agricultural activities;
- junction of the villages to the distribution network (but without being fastened the homes);
- rehabilitation and development of villages, preservation and rebuilding of the rural patrimony;
- accession of an integrated regional economy.

Diversification of the rural economy with the exception the primary activities, it is a key issue of any rural development politics, and especially for Romania which asks for a strict coordination with the parallel urban development politics. In the coming years, the rural area capability to keep or form places of work will have a major impact with the unemployment rate and/or migratory flows.

The development of the rural areas will result in the abridgement of the inequalities between rural and urban, absorption of the labour force from the rural area in non-agricultural branches (services, agricultural products industrialization, agro-tourism etc.), development of the infrastructure etc. in the same time the rural developments one of the prioritary axes of the Romania's agricultural policies for the following years, that it agrees with the CAP priorities.

For the rural development, Romania get about EUR 2.3 billions more, about EUR 0.8 billions for projects financed from the structural funds (EFOGA Orientation).

The increase of the agricultural output will be mainly determined by the agricultural products' prices rising after the adheration, inclusively through the subventions system, that will build up a strong stimulus for the agricultural growers. In the framework of the negotiations, the eligible basis agricultural surface for subventions is 7 million hectares. Also for the zootehnic area it was given a special attention in the framework of the

adheration negotiations. For this one they were obtained subventions for all the livestock for which there are intervention diagrams in EU too, although their level is inferior of those asked by Romania. The negotiation of some quotas level doesn't automatically represent a guarantee of their keeping after the adheration.

More exactly, if in two years after the adheration these quotas are not fulfilled, they will be automatically diminished at the real output level. Therefore it is absolute necessary an increasing of the competitiveness and especially of the efficiency. Additional they have been obtained several transition periods and arrangements in negotiations, grounded the considerations delivered y the growers who presented modernizing plans of the agricultural exploitations. Some of them will offer an additional time to the growers and processers from the areas of meat, milk, etc. in order to comply with the Community standards.

The free circulation of the agricultural products and the communitarian mechanism of price guarantee. For these however the Romanian products must comply with the quality, sanitary and phytosanitary standards of EU, and only the production units accredited by EU (list A) will be able to sell on the European market. For a part of the production units it has been agreed, in the framework of the Common Position Document, a grace period for restructuring and modernizing (list B), but if they will not succeed to reach the needed standards, they will have to close the gates in the very next day after the term goes on.

The building up and development of the market mechanisms. The building up of some similar institutions to those from EU, as like the development of the vocational associations, will lay a very significant function for the running and organizing of the markets, using an improved management and control, this way conditioning the emergence of some benefits for the producers, as well as for the consumers (items concerning the alimentary safety, but also more reasonable prices).

Financial supporting of the agricultural policy from the Community budget/ Romania will receive EUR 4 billions for the period 2007-2009, and other about EUR 0.8 million, estimated as financing from the structural funds. The new legislation concerning the food hygiene will be applied in the non-EU countries too. For all the aliments it is applied the general principle according to which the product fulfills the European standards or their equivalents. Additionally, according to the enforcing arrangements, to be able to export products of animal origin in EU, the country must be accepted for the appropriate commodity.

They are kept the lists at the level of the EU and countries and institutions from where the imports are allowed. The countries and institutions approved in this manner are known as "listed". In order to be "listed", a non EU country must warrant the exports in EU fulfills the standards or the equivalent of the prescribed standards in the EU legislation

There is no standardization of the manner the warranties are presented. The warranties are checked in a randomized manner by the Alimentary and Veterinary Office of the European Community. According to the EU laws, these examinations cover now only the veterinary and alimentary sectors in the third countries. The law extends this office's function in order to include also the examinations in the field of food and plants health.

The third countries which intend to export goods in EU will have to deliver all the needed information concerning the general organization and the management of the sanitary checking systems operated by the competent authority of the third country. This information will be connected to the results of the national examinations of the products assigned for export in EU, as well as the written registration of these examinations implementation.

CONCLUSIONS

The lasting development is conceived as a reconciliation necessity between the economy and the environment, on a new development path to support the human progress, for a far future.

In the framework of the lasting development a significant function is the alimentary safety of the quantitative and qualitative fulfillment of the population alimentary needs, which needed the adoption of a new alimentary policy, correlated with agricultural policies and in the same time the concordance with the Community's acquis through which it is aimed:

- Production of sufficient aliments concerning the quantity, structure, and quality to fulfill the alimentation needs;
- Accessibility to the food of the whole population, including of that under-privileged, the combining of the equity criteria with those of economic efficiency in production and food capitalization with a trend towards the continuous improvement of efficiency ;
- Getting the agro-alimentary products as much as possible nutritional compound, clean, of good quality, at the international standards.
- Fulfillment of the population's alimentary needs it depends not only on the existence of the alimentary availability, but also by the solvable request of the population, a consequence of the gross product and of the alimentary costs level.
- The lasting development of agriculture, implicit under the aspect of the alimentary safety, it becomes more obvious following the embracement without any retention by the member states of the European Union.

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SISTEME DE LUCRARE A SOLULUI ADAPTATE CONDIȚIILOR LOCALE DIN SUDUL OLTENIEI, ORIENTATE SPRE PROTECȚIA STĂRII AGROFIZICE A SOLULUI ŞI A CONSERVĂRII APEI

JOB SYSTEM ADAPTED TO LOCAL CONDITIONS OF SOIL THE SOUTH OF OLTENIA, AIMED AT PROTECTING CHECK AGROFIZICS SOIL AND WATER CONSERVATION

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Key words: management; indicators; structure; erosion; retention of nutrients

REZUMAT

Lucrarea a fost realizată având ca punct de plecare harta solurilor din partea de sud a Olteniei, prelucrate cu ajutorul SIG. Zona de sud a județului Dolj, prin poziția sa geografică se află sub influența excesivă a unui sol natural cu temperaturi medii anuale, care sunt destul de ridicate, cu media anuală de precipitații de 400-500 mm şi valoarea mică a indexului de ariditate ceea ce o fac să fie una dintre zonele cele mai predispuse la procesul de degradare a solului din cauza fenomenul de secetă – ariditate - deşert. Este recomandabilă îmbunătățirea şi conservarea solurilor.

ABSTRACT:

The paper was realised having as departure point the map of soils from the South of Oltenia, processed with the aid of SIG. The South area of district Dolj, though its geographical position it is situated under the influence of an excessive natural ground with annual average temperatures that are high enough, average annual precipitation of 400-500 mm and the value of the small aridity index is considered to be one of the most predisposed areas at the process of soil degradation due to drought phenomenon of drought – aridity – desert. Work of improvement and preservation of the soils must be advisable realised.

INTRODUCTION

The management of soil quality refers to the selection of the adequate agricultural practices, correspondent to the modality of usage of the agricultural field, depending on soil types for the territory of each agricultural exploitation.

The evaluation of the management of the soil quality represents the process of measuring the changes that took place in the quality of the soil, as a result of the agricultural practices adopted for the improvement of the economical performances obtained for the same field surface.

For the identification of the properties or the key attributes of the soil, sensible to exchange the function of the soil will be recommended the research of a minimum set of indicators, of primordial interest for the farmer.

Indicators selected for evaluation of the management of soil quality must show which are the present performances of the soil and how can be preserved and improved their functions for future usage.

The selected indicators can refer to physical, chemical, biological characteristics or at processes that took place at the level of the soil. In chart 1 is presented a set of indicators regarding the main characteristics of the health status of the soil:

Table 1

Indicators of the soil quality

Indicator	Relationship with the main characteristics of the soil status health
Organic mater from the soil	Fertilization of the soil, structure, erosion, retention of nutrients
Physical: structure of the soil, capacity of infiltration of the water, capacity of durable maintenance of the water, apparent density.	Retention and transportation of the soil and the nutrients; compaction degree, porosity, hob of the plough, depth at which can be plough
Chemical: pH, electrical conductance, supply with nutrient elements	Available level of fertility, degrees regarding the requirements of the main cultures regarding the reaction of the soil, threshold of biological and chemical activity
Biological: High degree of ensuring with N, the degree of the soil.	Measuring the microbiological activities, productivity of the soil and the degree of satisfaction with N

Processing according to Larson and Pierce, 1994 and Seybold 1994

MATERIAL AND METHOD

The paper was realised having as departure point the map of soils from the South of Oltenia, processed with the aid of SIG. The drought is a natural phenomenon that in the past affected periodically the S-W and S-E of Romania, being able to mention the period of severe drought: 1894-1905; 1942-1945; and the most recent 1981-2001. The South area of district Dolj is not an exception regarding these drought phenomena.

Though its geographical position it is situated under the influence of an excessive natural ground with annual average temperatures that are high enough, average annual precipitation of 400-500 mm and the value of the small aridity index is considered to be one of the most predisposed areas at the process of soil degradation due to drought phenomenon of drought – aridity – desert.

The process of degradation of the soil, due to this phenomenon is defined as the actual or potential loss of productivity or the utility of the soil of the natural and atrophic factors. The main processes that can aid the development of the phenomenon of degradation – desert can be identified in:

- biological degradation through the loss of organic substance;
- physical degradation due to structure

The degradation of the soil through the reduction of the content of organic substance has as main factors that can be identified: excessive use of the agricultural works or of others measures of agro-techniques measures, accelerated erosion of the soil, due to long periods of activity of the wind in this area, excessive and inadequate application of other measures of agro techniques, the accelerated erosion of the soil due to long periods of activity of the wind in this area, excessive and inadequate application of chemical fertilisers, herbicides and insecticides.

The massive content of organic matter can be associated with the intensive usage of the tillage, of leaving the uncultivated field during summer time, burning the stubble filed, etc. The influence of the texture on the processed of soil degradation is presented through at least 2 reasons:

- the size and the modalities of disposure of the soil particles that at vulnerable at the action of the wind and water;
- the modification of the potential of retention of the water, making possible surface drainages.

The main factors that are responsible for the degradation of the sandy soils from the South of Oltenia, can be considered:

- the uncontrolled and excessive tillage;
- using on a large scale of the breeding cultures that involve a high degree of mechanization of the culture technology;
- aeolian deflation;

- soil contamination by excessive usage of the chemical fertilizers.

In the same time, the soil represents the main source of herbs in the cultures, due to the reserve of herbs seeds from the soil, reserve that can be used for the realization of the green areas, of protection of the cultures through Aeolian deflation, by application of some specific technologies in that area and leaving some unprocessed surfaces in which high herbs will be developed up to the blossom period, when will be destroyed.

The determination of the total reserve of seeds of grass in the soil on the layer of 0-10 cm, was realized taking into account the application of the basic works of the soil in the classical system and in the minimal system of works. The results obtained after the determination realized show that the reserve of seeds of grass from the soil is influenced by the system of applied works.

Figure. 1 - Aspects on the sandy soils on the south in Jud. Dolj

Figure. 2 - Aspects on the sandy soils ploughing on the south zone in Jud. Dolj

Figure. 3 - Aspects protection bands trip, in the spring


Figure. 4 - Protection soil used of the folio band


Figure. 5 - Protection soil used of the folio band tunnel

CONCLUSIONS

1. Work of improvement and preservation of the soils must be advisable realised.
2. It is imposed that a part of these fields, with reduced fertility capacity be passed in the forester filed and to facilitate the foundation of protection curtains.
3. From the agro technical point of view, grasses that will be developed on these soils can be used the foundation of green areas for the protection of the cultures.
4. Studyes offer a support the possibility of promotion of new - village technology, with an efficient management.

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EFECTUL FOLOSIRII INCORECTE A LUCRĂRILOR AGRICOLE MECANIZATE ÎN TEHNOLOGIA UNEI CULTURI

EFFECT ON INCORRECT USING OF THE AGRICULTURAL WORKS MECHANIC IN THE TECH NOLOGY OF SOME CULTURE

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Key words: erosion, performances, soil quality, soil degradation

REZUMAT

Evaluarea managementului calității solului reprezintă procesul de măsurare a schimbărilor intervenite în calitatea solului a urmare a practicilor agricole adoptate pentru îmbunătățirea performanțelor economice obținute de pe aceiaşi suprafață de teren.

In lucrare este exemplificat un set de indicatori cu referire la principalele caracteristici ale stării de sănătate ale solului.

ABSTRACT

The evaluation of the management of the soil quality represents the process of measuring the changes that took place in the quality of the soil, as a result of the agricultural practices adopted for the improvement of the economical performances obtained for the same field surface. In work is presented a set of indicators regarding the main characteristics of the health status of the soil.

INTRODUCTION

The South area of district Dolj, though its geographical position it is situated under the influence of an excessive natural ground with annual average temperatures that are high enough, average annual precipitation of 400-500 mm and the value of the small aridity index is considered to be one of the most predisposed areas at the process of soil degradation due to drought phenomenon of drought – aridity – desert. Work of improvement and preservation of the soils must be advisable realised

The management of soil quality refers to the selection of the adequate agricultural practices, correspondent to the modality of usage of the agricultural field, depending on soil types for the territory of each agricultural exploitation.

For the identification of the properties or the key attributes of the soil, sensible to exchange the function of the soil will be recommended the research of a minimum set of indicators, of primordial interest for the farmer.

Indicators selected for evaluation of the management of soil quality must show which are the present performances of the soil and how can be preserved and improved their functions for future usage. The selected indicators can refer to physical, chemical, biological characteristics or at processes that took place at the level of the soil.

MATERIAL AND METHOD

Though its geographical position land S-V it is situated under the influence of an excessive natural ground with annual average temperatures that are high enough, average annual precipitation of 400-500 mm and the value of the small aridity index is considered to be one of the most predisposed areas at the process of soil degradation due to drought phenomenon of drought – aridity – desert and mechanical works.

The process of degradation of the soil, due to this phenomenon is defined as the actual or potential loss of productivity or the utility of the soil of the natural and atrophic factors.

Indicators of the soil quality

- Relationship with the main characteristics of the soil status health.
- Fertilization of the soil, structure, erosion, retention of nutrients.
- Retention and transportation of the soil and the nutrients; compaction degree, porosity, hob of the plough, depth at which can be plough.
- Available level of fertility, degrees regarding the requirements of the main cultures regarding the reaction of the soil, threshold of biological and chemical activity.
- Measuring the microbiological activities, productivity of the soil and the degree of satisfaction with N.

The main processes that can aid the development of the phenomenon of degradation – desert can be identified in:

- biological degradation through the loss of organic substance;
- physical degradation due to structure

The degradation of the soil through the reduction of the content of organic substance has as main factors that can be identified: excessive use of the agricultural works or of others measures of agro-techniques measures, accelerated erosion of the soil, due to long periods of activity of the wind in this area, excessive and inadequate application of other measures of agro techniques, the accelerated erosion of the soil due to long periods of activity of the wind in this area, excessive and inadequate application of chemical fertilisers, herbicides and insecticides.

The massive content of organic matter can be associated with the intensive usage of the tillage, of leaving the uncultivated field during summer time, burning the stubble filed, etc.

The influence of the texture on the processed of soil degradation is presented through at least 2 reasons:

- the size and the modalities of disposure of the soil particles that at vulnerable at the action of the wind and water;
- the modification of the potential of retention of the water, making possible surface drainages.

The main factors that are responsible for the degradation of the sandy soils from the South of Oltenia, can be considered:

- the uncontrolled and excessive plowing, figure 1.

Figure 1. Plowing excess moisture

- aeolian deflation, figure 2.
- soil contamination usage of the cover with folio, figure 3.

Figure 2. The action of spring wind on the sandy soils

Figure 3. Soil contamination usage of the cover with folio

Figure 4. Fug. Rests of folio on the surface of pouching soil

CONCLUSIONS

1. **Basic agricultural work carried out on sandy soils should be carried out in spring in the system without overthrowing the swath or a few days before crop establishment.**
2. **Cover with foil to make mulch so that the amount of soil to use for small to avoid îmburuienării land.**
3. **Mulch foil to provide the possibility of recovery on the ground.**
4. Before setting mulch foil is appropriate to execute treatment plant soil.

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LEGĂTURA DINTRE INFORMAȚIA CONTABILĂ, MANAGEMENTUL RISCURILOR ŞI ASIGURĂRILE AGRICOLE – O ABORDARE TEORETICĂ

THE LINK BETWEEN ACCOUNTING INFORMATION, RISK MANAGEMENT AND AGRICULTURAL INSURANCE – AN THEORETICAL APPROACH

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Key words: ***accounting information, agricultural insurance, IAS/IFRS***

REZUMAT

In lucrarea noastră am prezentat legătura directă şi importantă care există între informația contabilă, managementul riscurilor şi asigurările agricole. Evoluția asigurărilor agricole, caracteristicile informației contabile, evoluția procesului de standardizare din domeniul contabilității, precum şi acțiunile organismelor profesionale implicate a influențat, influențează şi va influența acestă legătură.

ABSTRACT

In our work we present direct and important relationship that exists between accounting information, risk management and agricultural insurance. Evolution of agricultural insurance, characteristics of accounting information, the evolution process of accounting standards and professional bodies involved actions influence, affect and will influence this relation.

INTRODUCTION

Global warning has contributed to a greater frequency of extreme weather events represented by heat waves, severe drought or floods. Agriculture is one of the most exposed sector climate change triggered risks and it faces sever difficulties in addressing those risks (Cristea M., Dracea R and Buziernescu R., 2006). That is why it is important to provide an argument for more intense governmental involvement in agricultural risk management, based upon several factual and theoretical reasons (Nastase M., Radulescu C.V. and Ioan I., 2009). As the negative effects of climatic warning are more and more obvious, the demand of insurance solutions to cover the costs resulting from weather whims shall increase in direct relation with risk exposure. Concern for risks that stifle investment and contribute to vulnerability of the rural poor is a driving force behind various types of agricultural insurance (Mitu N.E., 2008).

In agriculture it is assumed that the introduction of accounting will improve agricultural management and produce better agricultural performance. It is well known the limited use of accounting in agriculture, that could lead to think that it is no useful for decision making. But accounting makes a significant contribution to explaining and predicting agricultural viability. Policymakers and agents involved in agriculture will get greater efficiency and effectiveness in their decisions when they base them in accounting-based information of the agriculture (Argilés J.M., 1998). Accounting information can assist in achieving sustainability of agriculture development projects (ADP) by providing information to support decision making, assisting in setting and allocating resources to prioritized areas, promoting industrial relations and cost reduction in the ADPs'system

(Toluyemi T., 1999). Even if accounting information provides management with broad resources for product cost management, in agricultural practice, managers do not take an advantage of it. The reasons can be a lack of qualified employees in this area, and a lack of financial resources for realization of other possibilities (Kučera M, Škorecová E and Szovics P., 2003).

In the process of ameliorating the plight of the agriculture, a vital role it's played by the agricultural accounting and all information involved. (Dharminder S.U. and Pasricha J.S., 2004). The information in general-purpose external financial reports should be understandable to financial statement users who have a reasonable knowledge of business and economic activities and accounting and a willingness to study the information with reasonable diligence (Tallberg A., 2006)

Accounting information could be more effective and support insurance companies' activity to detect fraud when material compensation must be paid (Rejesus R.M., Bertis B.L., Lovell A.C., 2004). A balanced agricultural insurance system needs reliable and detailed databases in order to limit to the minimum possible level the malfunctioning due to asymmetric information that leads to adverse selection and to some extent to moral hazard: if premium rates are determined with a coarse geographic detail, only farmers with a high risk level will buy the insurance (European Commission, 2005).

In order to resolve all important risks and problems, to use accounting information, in economic environment appears a new Business Performance Management (BPM), which is a set of integrated, closed-loop management and analytic processes, supported by technology, that address financial as well as operational activities (Walker T., 2006). BPM together with XBRL (eXtensible Business Reporting Language):

- bridge the gap between systems, accounting standards and global reporting;
- enables standard way of tagging financial information for structure, content and meaning;
- direct comparability of internal and external financial information;
- essential part of making IFRS data globally accessible, consistent and comparable.

Using performing technology and analytic processes, the accounting information help the risk management system in agricultural field. A properly-designed risk management system is thus essential for protecting farm operators and reinforcing rural development (Bente C., 2007). Equilibrium production behavior is characterized for a farmer facing a stochastic technology and stochastic markets. This characterization holds regardless of the farmer's attidues towards risk (Chambers R.G., 2007). Risk management in agriculture is important and likely to become more so in the future and the tools to manage risk are many, with agricultural insurance being only one of them (Blarel B, 2008).

Tools for risk management in agriculture are classified in two groups: strategies concerning on-farm measures and risk sharing strategies. The main risk management tools in Europe are Calamities Funds, Mutual Funds and Insurances. Insurance is probably the best-known risk pooling tool (Bielza Diaz-Caneja M., Conte C.G., Gallego Pinilla F.J., Stroblmair J., Catenaro R. and Dittmann C., 2009).

In a report on agricultural risk management and insurance schemes, experts from the EU's Joint Research Centre state that Europe should limit its action to encouraging the organization of insurance coverage at member state level (Vernet L., 2009).

Costing in the agri-food sector is an enigmatic business, due to its unusual characteristics. Complex supply chains, a largely fragmented production base and a shortage of accounting expertise, all contribute to a lack of visibility of costs at various stages of the supply chain from the farm gate to the diner's plate. Producers also have to contend with the relative concentration of power with the large retailers; and with the vagaries of weather and disease (CIMA, 2009).

During the last few years, at the international level, a variety of new financial mechanisms present the capacity of solving many issues related to the traditional projection of agricultural insurances. New instruments operate based on the configuration of the insurance indemnity payment, thus it will be paid when it reaches a certain level determined by statistic calculations and designed as the "index" (Mitu N. E., 2007).

Regarding the relationship between the technical efficiency measures and the accounting information derived from the traditional economic-financial ratios analysis, the findings provided evidence that the efficiency measures group together reasonably well the information coming from the ratios. So, the measures obtained through DEA (Data Envelopment Analysis) can be an appropriate complement to entrepreneurial analysis (Guzman I. and Arcas N., 2008). All these analysis are made on the basis of information provided by agricultural accounting and accounting of insurance companies. To obtain relevance and comparable information from one country to another is important the same value used for insurance contracts. The International Accounting Standards Board (IASB) has concluded that fair value should be used in accounting for insurance contracts (Klumpes P.J.M., O'Brien C.D. and Reibel A., 2009). But, in this times of financial crisis, the using of fair value is a controversial issue. That's why, IASB worked and continue today, together with other professional organisms to resolve the problem.

IASB promulgated the International Financial Reporting Standards (IFRS), which contain elements of accounting standards from a variety of countries, based on accounting principles and information. The IFRS are potentially very useful for harmonization of agricultural income calculations (Boone J.A., 2009) and for insurance schemes.

Insurance and agricultural firms need operational, tactical and strategically information for product cost management to succeed in competitive environment. Financial and managerial accounting are their sources, which provides information for processing and utilization to the firm's information system.

MATERIAL AND METHOD

Taking into account many practice studies developed in agricultural field we try to make an theoretical approach on this problem. Because nobody try (from our knowledge) to establish the link between accounting information, agricultural and insurance fields in the context of risk management, we consider that we can use our experience in accounting field and demonstrate that accounting information can be use to making costs, budgets, analysis and decisions in order to realize an competitive environment in this period of financial crisis.

In the beginning of our study, we present a brief characterization of agricultural insurance in Europe and Romania because we try to emphasize the main responsibilities of people involve in the process of making decisions. Even they are agricultural or insurance people or supervisors, they all use accounting information. The characteristics and development of accounting information has an important role in the development of these fields. To emphasize this role, we taking in considerations the efforts made by the professional organisms involved in the process of development of accounting information presented in financial statements.

So, our paper consists of the following main objectives:

- Analyzing the information for product cost management provided by financial and managerial accounting at insurance and agricultural companies level ;
- Describing the link between accounting information, risk management and agricultural insurance;
- Outlining the advantages of using real accounting information useful and comparable to agricultural risk management.

The research method is quantitative with qualitative elements and it is based on:

·The analysis of all information provides financial and managerial accounting and other involved professional organism in insurance and agricultural fields;
·The analysis of accounting or IFRS revolution, the involvement of professional organisms in order to provide better, reliable and useful information for all the users;
·The review of the statistic data offered by the specialized organisms in the field.

Our research support includes the following:
· Specific normative acts;
· Specialized articles and books;
· Analysis and studies in the reference field;
· Reports and press releases of the organisms from the field.

Through our study we wanted to bring our own contribution to the following levels of scientific research in the field:
· Theoretical – the analysis of some significant contributions of accounting information for insurance and agricultural companies in their risk management process;
· Practical - decisional support for the management authority and practitioners (insurance and agricultural companies).

Disregard both the concrete conditions of each country and company, and also the overall approach to the issues brought up by our paper, will outline the theoretical and practical limits of our research. Knowing the limits of our theoretical approach in this paper, we propose a continuation of our work in-depth study of this link at the factors involved.

RESULTS AND DISCUSSIONS

The agricultural insurance in Europe and in Romania

The agricultural field is characterized by a strong exposure to risk. They are unique or have something in common with other businesses. The risks (production or yield, human or personal, asset, institutional, price, financial) are often interrelated and they have an effect on the income situation of a farm household. As Europe reviews recent changes in agricultural policies, the risks specialists discover risk management instruments for agricultural commodities (strategies concerning on-farm measures and risk-sharing strategies). Among the risk management tools, agricultural insurance receiving more and more attention.

There is considerable diversity in the range of agricultural insurance schemes available in members states throughout Europe. Some of these are subsidized by members' states and others purely privately founded. The best known toll for risk management is insurance. Systemic risks (i.e. a lot of people of farms suffer losses at the same time) obliged insurance companies to charge very high premiums (which are often unaffordable for some) if state contributions are not available. That is why, comprehensive agricultural insurance schemes need strong support from the public sector. The EU has mostly classic insurance schemes (mainly single-risk and combined insurance, but also yield insurance – see Table no 1). The level of development of the agricultural insurances in each country is linked to risk level and economical support to the insurance systems. Some governments do offer or subsidize insurance while others provide aid ex-post given on an ad-hoc basis, through compensation schemes, calamity funds or futures markets existing in Europe.

Table 1

Agricultural insurance in Europe

Country	Single risk Ins.	Com-bine Insu-rance	Yield Ins.	Market pene-tration (%)	Insu-red Area (1000 ha)	Pre-mium amount (mil.€)	Pre-mium/ insured value (%)	Ave-rage indem-nities (mil.€)	Insurance subsidies (mil.€/%)
Austria	PS	PS	PS	78	1,054	52,0	2,6	32,0	24/46%
Belgium	P	-	-	n.d.	n.d.	49,0	n.d.	n.d.	0
Bulgaria	P	P	-	52	1,276	6,6	4,8	4,5	0
Cyprus	GC	GC	-	(100)	112	8,7	7,2	4,5	4,4/50%
Czech Rep.	PS	PS	-	35	1,074	32,0	1,8	24,0	7/30%
Denmark	P	-	-	n.d.	n.d.	n.d.	n.d.	n.d.	0
Estonia	P	-	-	<1	n.d.	0,1	n.d.	n.d.	0
Finland	P	P	-	<1	n.d.	1,8	n.d.	1,1	0
France	P	P	PS	n.d.	3,507	211,0	1,7	n.d.	5/2,4%
Germany	P	-	-	43	7,265	129,2	1,2	104,5	0
Greece	P	GC+ GS+G	-	(100)	n.d.	n.d.	2,5-3	218,0	n.d.
Hungary	P	P	-	52	n.d.	43,5	n.d.	30,7	0
Ireland	P	-	-	n.d.	n.d.	n.d.	n.d.	n.d.	0
Italy	PS	PS	PS	8	976	271,2	7,4	166,2	180/67%
Latvia	PS	-	-	<1	n.d.	0,1	n.d.	n.d.	0,05/50%
Lithuania	PS	-	-	1	9	1,1	4,3	1,1	0,55/50%
Luxembourg	PS	PS	PS	45	26	1,3	2,3	1,0	0,65/50%
Netherlands	P	-	-	n.d.	n.d.	75,0	n.d.	30,7	0
Poland	P(S#)	-	-	7	n.d.	9,9	n.d.	6,3	0
Portugal	PS	PS	-	22	298	46,9	8,4	30,2	32/68%
Romania	PS	PS	-	12	812	14,0	n.d.	4,4	7/50%
Slovakia	PS	PS	-	n.d.	n.d.	n.d.	n.d.	n.d.	-/50%
Slovenia	PS	P	-	17	n.d.	9,5	7,6	13,8	4,3/45%
Spain	PS	PS	PS	26	5,850	564,7	6,3	388,3	232/41%
Sweden	P	P	-	60	1,500	n.d.	n.d.	n.d.	0
UK	P	-	-	7	370	11,1	0,8	n.d.	0
Total						1,538		1,061	497/32%

Legend:

- : Not existing
n.d. : no data
: Pilot experience
S : Subsidised
P : Private non-subsidised
PS: Private partially subsidised
G : Public non - subsidised
GS: Public partially subsidised
GC: Public compulsory partially subsidised

Source: JRC European Commission

Countries like France, Italy, Austria and Luxembourg have well-developed insurance systems and most risks are covered depending on the insurance scheme. Instead, all the Spanish insurance companies operate in a pool known as a co-insurance regime. A comparison of premium rates expressed their variability from a low level of about 1% in Germany and the UK to about 6-8% in Portugal, Italy and Spain. In most European countries exist other risk management tools, such as ad hoc and compensations payments (see Table no 2).

Table 2

Ad hoc and funds payments in the last years

Country	Years available	Total payment (million €)	Average payments/ year (million €)	Comments
Austria	1995-2004	56	5,6	Frost, drought, flood
Belgium	1985-2002	309	17,2	Livestock dioxin, frost, drought, rain, pests
Bulgaria	2000-2004	2	0,4	Insect pest control fund & others
Cyprus	2001-2004	29	7,2	-
Czech Rep.	1995-2004	369	36,9	Flood, drought, frost
Denmark	-	-	-	Storm & forest storm damage
Estonia	-	0	0	No payments
Finland	1996-2005	114	11,4	Crop damage compensation scheme
France	1996-2005	1.556[1]	155,6[1]	Drought 67%, frost 19%, rain 13%
Germany	2004-2006	337	112,3	Flood 2004 more than 240 million €; livestock diseases and preventive measures
Greece	1995-2004	701	70,1	-
Hungary	1999-2002	49	12,2	Frost, drought
Ireland	1999-2004	401[1]	66,8[1]	Livestock disease
Italy	2001-2006	680	113,3	Drought and others not covered by insurance
Latvia	2000-2005	19	3,2	Frost, drought, rain
Lithuania	2000-2005	16	2,6	Frost, drought, rain
Luxembourg	-	-	-	No ad hoc aids for crops. No other data
Netherlands	1998	250	-	Excessive rain; aid not permitted any more
Poland	-	10	10,0	Epidemic diseases
Portugal	last 10 years	30[2]	3,0[2]	-
Romania	last 5 years	57	11,4	Drought, frost, floods
Slovakia	-	-	-	No data
Slovenia	1995-2004	98	9,8	Drought, hail, frost
Spain	2000-2005	22	3,7	Frost, drought, rain
Sweden	-	-	-	Infectious diseases
UK	2001-2005	1898	379,5	Livestock disease
Total			919,9	
(Croatia)	1997-2004	-	2,5	54 million € in 2003 for drought
(Turkey)[3]	1996-2005	52,67	5,26	Animal disease control aid not included

Legend:

[1] - of this amount, 50% comes from the sector's private contributions, through taxes on agricultural insurances (France) or from levies on commercialization of the product (Ireland)

[2] - Portuguese farmers also contribute to the calamities fund but the amount refers to government contributions

[3] - Exchange rate taken into consideration: 1 € = 1674000 TRL (former Turkish lira, 2005)

Source: JRC European Commission

According to the data from the last table, about 50% of the ad hoc payments are given for natural disasters like drought, frost and excessive rain. These risks are insurable in countries providing yield insurance.

According to the official data published (see Table no 3 bellow), during 2007-2008 the agricultural insurance market in Romania went through a stagnation phase, while the unfavorable weather events of 2007 generated considerable damages paid to the agricultural producers by the insurance companies and the state companies.

Table 3

The evolution of agricultural insurance in Romania (2007-2008)

Companies	Gross premiums written			Claims paid		Market share
	% in portofolio	2008 (mil.€)	2007 (mil.€)	2008 (mil.€)	2007 (mil.€)	2008 (%)
FATA Asigurari	47,58	3,32	2,63	0,18	0,60	29,41
ASIROM	1,89	2,07	5,10	0,25	1,51	18,34
OMNIASIG	0,94	1,57	0,28	0,08	0,04	13,92
ALLIANZ-TIRIAC	0,65	1,23	4,52	0,51	6,04	10,94
ARDAF	1,54	0,92	1,72	0,07	0,36	8,13
GENERALI	1,17	0,67	1,31	0,11	0,89	5,98
ASTRA-UNIQUA	0,67	0,46	0,23	0,00	0,18	4,10
ASIBAN	0,52	0,43	0,33	0,11	0,01	3,80
EUROINS	2,21	0,41	0,00	…	…	3,60
BCR Asigurari	0,24	0,17	0,24	0,10	0,06	1,50
CARPATICA Asigurari	0,27	0,03	0,04	0,02	…	0,27
TOTAL	0,98	11,28	16,41	1,45	9,70	100,00

Source: www.primm.ro

Agricultural insurance companies have special responsibilities, especially in the current period of financial crisis, for:

✧ Estimating the correct amount of gross premiums written for non-life or life insurance;

✧ Correct identification of the damages that must be paid;

✧ Appliance the prudential principles in the risks underwriting operations in the determination of key financial strength data (i.e., solvency margin minimal and available, liquidity rate);

✧ Promote and improve portfolio segmentation programs;

✧ Establishing technical reserves, specially technical reserve for unit-linked contracts and for contracts disposed to reinsurance;

✧ Determining and explaining technical account (for non-life and life insurance) and non-technical account;

✧ Impose quality standards for the post-sales through a more efficient control and administration of the claims solving processes;

✧ Making reliable estimates for certain items of assets and liabilities (i.e., technical reserves for non-life and life insurance; part of the technical reserves, due to reinsurance contracts; accounts receivable from insurance operations; accounts payable from reinsurance operations; foreign exchange gains/ losses; premiums ceded; commissions for agents and brokers; deferred acquisition costs) at the balance sheet date;

✧ Focus on knowing the present and potential clients needs and expectancies and on identifying the most innovative solutions for responding to these needs, thus guaranteeing products and services at the highest quality standards, etc…

By the nature of its activities, the Company is subject to various risks, among which insurance risk, market risk, interest rate risk and liquidity risk. The management is taking measures against potential adverse effects that these risks would determine to the Company's financial position.

Accounting information in insurance and agricultural companies

In order to perform better insurance schemes for agricultural companies, to obtain reliable data for making important decisions, to record an appropriate solvency margin and an significant liquidity rate according Solvency II rules, insurance companies must use real and comparable accounting information. The goals of any insurance company are focused on maintaining and consolidating the position on the insurance market without neglecting the profitability. Therefore, in the future, the prudential principles will be rigorously applied in the risks underwriting operations. All operations are reflected in the financial statements, which are prepared in compliance with the accounting policies harmonized with the European Directives. In Romania these accounting policies were approved by the Insurance Supervision Commission's Order No. 3129/2005 and in compliance with the Accounting Law No. 82/1991, republished, with its updates.

At the same time, in order to obtain efficient expenses related to gross premiums written paid and better revenues related to claims collected, to maintain and consolidate the position on the agricultural market, an agricultural company must use current and relevant accounting information.

Using the accounting information is getting an crucial role in these crisis period. In order to improve the management of crisis situations in Romanian agriculture, the decision factors from the field of insurances, together with those interested, shaped some guidelines within the National Conference of Agricultural Insurance from Bucharest (11th March 2009), out of which we mention the following:

- The modification of the Law no. 381/2002 on granting damages in case of occurrence of natural disasters (through the inclusion of the list of risk factors stipulated in the insurance contracts), on the fond of stability of the regulatory framework;
- The compulsory insurance of the agricultural crops starting with the 1st of January 2010;
- Step-by-step transition to the insurance system based on climate indexes;
- The financing of the insurance premiums for the insured catastrophic risks;
- Holding the public authority and the private sector responsible if some events occur (in the sense of division of paid damages) through public-private type strategic partnerships;
- Setting up a reinsurance company in public-private partnership and accessing European funds for taking over a part of the catastrophic risks from the accredited companies;
- Protection of farmers against obtaining insufficient incomes (through actuarial tariffs on each category of risks);
- The study of market volatility for the increase of premium tariffs in compliance to the frequency and intensity of the risks manifested, introduction of the "malus" system and enlargement of the insurance products range, etc...

An important role in applying the measures previously mentioned have the organization and compilation of accounting data contained in the explanatory documents drafted by the insurance companies. The examination and verification of documents and operations issued or carried out by these legal entities (related to legality, promptness, efficiency, economic character, and their accordance to reality) is made through the internal control. This allows us to know and to discover frauds and undue payments in insurances, and the shortcomings of financial-accounting and administration.

In order to understand the important role of accounting information (both for agricultural and insurance companies in their risk management activity) we must emphasize its qualitative characteristics (see Figure no 1 below)

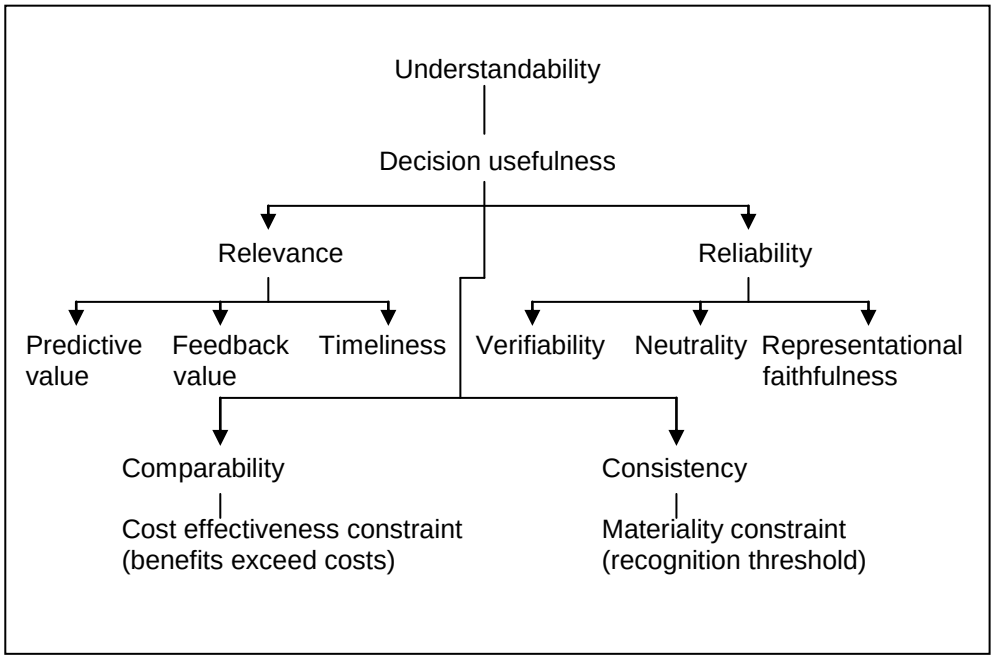

Figure 1 Hierarchy of Desirable Characteristics of Accounting Information

So, accounting information must be understandable to users, which are generally assumed to have a reasonable knowledge of business and economic activities. Regarding our field bring in discussion with our paper, an agricultural company must have understandable accounting information in order to budgeting the activities, to estimating the results of their activities. In the same time, an insurance company must have understandable accounting information to make the decisions in the fulfillment of business.

Also, accounting information must be relevance. This implies that it must assist a user to form, confirm and revise a view or a context in the process of making a decision (i.g., Should I invest in an insurance policy to protect my business from further damages? – a typical question for an agricultural company; I will handle future payments of compensation in the event of damage? – a typical question for an insurance company).

If consistency implies consistent treatment of similar items and application of accounting policies, comparability implies the ability for users to be able to compare performance over time (i.g., Using the same inventory method for stocks, can I compare the work productivity and the damages over the last two years? or Using the same method to determine the solvency margin can I compare the risk management over the last two years?).

Also, accounting information must be truthful, accurate, complete and capable of being verified, but it is not biased towards a particular user group or vested interest (i.g. Using the amounts from the financial statements - for agricultural or insurance company – can I take the better decisions to reduce the expenditures and to increase the revenues, in order to face the consequences of actual financial crisis?)

Regarding our subject, an insurance contract gives the right, for an agricultural company (i.g. a farmer), to an indemnity that is normally triggered by specific events (single-peril insurance) or by a fall of yields (multi-peril insurance). The quantity is linked to some calculation of the losses. The high costs of offering insurance contracts are associated with information asymmetries. Moral hazard occurs when it is impossible or excessively costly to write a contract based upon everything an agricultural company might do that would affect his yields. Adverse selection occurs when contracts based on all the

relevant environmental parameters are unfeasible. Area yield insurance provides indemnities based on the average yield of a suitably wide area, eliminating the moral hazard problem and potentially reducing adverse selection. This is done at the cost of adding basis risk to be borne by the agricultural company. Similar arguments can be made about weather index insurance. Revenue insurance is a popular concept because it directly addresses the combined price and production risk that is actually faced by agricultural companies. This revenue insurance increase the welfare impact of a given expenditure on price or production risk management.

Risks that are highly correlated cannot be easily pooled and can generate large potential losses with very large liabilities for the insurer. Because these large scale liabilities are expensive to reinsure, there must be information available in order to evaluate the financial costs associated with each event. Estimating the distribution of risk is needed in order to be able to calculate the correct premium.

Accounting information is of utmost importance for insurance supervisors. It is used for prudential and financial analysis of insurance companies and it also serves as input for solvency calculations and other analysis tools used by supervisors.

In order to obtain relevant information, agricultural and insurance companies must used financial accounting. But, it is very difficult to receive relevant information from financial accounting to manage efficiency and effectiveness of output. Their source is the managerial accounting helps management to control processes, to compare real values with plan, to anticipate future development and to evaluate accuracy of accepted decisions. Managerial accounting has a task to create a suitable system of information for in-plant value management of concrete processes. Costing and budgeting belong to the basic information tools for effectively and efficiency management of out-puts. Important role is given to in-plant prices and structuralized in-plant reports. Managerial accounting should be kept in such a way that management information tools of product costs must be ready on time and unbiased.

Even it is well known all the benefits of using managerial accounting, it is not used in the insurance field. In the same time, there are still reserves in exploitations of costing for the effectively and efficiency management and long prosperity of the agricultural companies. These reserves are quite huge in primary agricultural companies and smaller in agri-food processing companies. There are still agricultural firms, which do not deal with costing. Some companies compile final costing, but the results are not used in management. Some agri-food processing companies with foreign property use non-traditional methods of costing, mainly costing of variable costs and hardly ever activity based costing. There are several factors which influence unbiased-ness of costing. One of it is process of matching direct and overhead costs, in which some costs are ranked among overhead costs, the value of different overheads is not always settled, pricing of in-plant services is very problematic, entries correcting expenditures and revenues are not always precisely determined. In formulating expenditures costing it is important to take into account the different requirements imposed by accounting, taxation and price legislation. Because of this, sale price determination it is needed to check each accounting cost, whether is it a tax recognized expenditure or legitimate, which has an important impact on profit and loss statement as well as the value of income tax.

Agricultural companies prepare costing based on classical costing formula adjusted for concrete conditions, so called absorption costing. Another companies use automated costing which results are not reflect the reality. This inconvenient can be resolve in paying attention to the software selection and collaboration with the software company.

Information tool for cost management are budgets. To set up budgets is a difficult task especially in agricultural production. Biological character of agricultural production and its determination with natural conditions causes the limits of this budgeting processing.

That's why in budgeting process we must use estimations, which will be compare to real data at the final of agricultural process.

Accounting information are presented in the financial statements. In order to harmonize financial reporting standards for European listed companies, the European Commission has required the adoption of IAS/IFRS. These particular events in accounting environment has typical influence upon agricultural an d insurance companies.

IAS/IFRS revolution for agricultural and insurance companies

In the International Accounting Standards (IAS) are enforced the importance of accounting information for product cost management. If budgeting and internal reporting are in the account classification framework for closing accounts, in some accounting standards (i.g., IAS 1, IAS 11, IAS 14, IAS 18 and IAS 36), cost quantification in connection to output of the company and importance of pricing is described in another accounting standards (i.g., IAS 2, IAS 4, IAS 11, IAS 14, IAS 16, IAS 18, IAS 23, IAS 24, IAS 38, IAS 41). Also, economic effects quantification connected to individual outputs are in another accounting standards (i.g., IAS 14, IAS 35, IAS 36). We must emphasize that all accounting standards mentioned above are used by agricultural and insurance companies.

We do not emphasize in our paper the results of IAS implementation to agricultural companies because this is not subject of our paper. We believe that the evolution in insurance field has an important influence in establish the cost of agricultural insurance. We try to establish the link for accounting information only regarding this process.

For insurance companies, the changes are dramatic and drawn out in a special accounting project for insurance contracts that struggles to allow firms to better understand their risks. The IASB admitted that it was not achievable to complete a comprehensive project to outline accounting standards for insurance contracts in time for application in 2005 by insurance companies in European Union. So, it crack its project into two phases. Phase I of the project represented by IFRS 4 "Insurance Contracts" was established to avert unnecessary disturbance for preparers and users of insurance company financial statements until IASB completed Phase II on the project. In fact, IFRS 4 "Insurance Contracts" defined an insurance contract and recorded both insurance contract assets and liabilities at their current exit value (CEV). Because the IASB has split the insurance project in two parts, the change to fair-value-like accounting for liabilities has grown into a challenging task. Phase I of IFRS 4 "Insurance Contracts" setted a specific definition of insurance and reinsurance contracts, introduced important changes to the accounting for insurance contracts (e.g., to account and record the embedded derivates at "fair value", to eliminate the equalization and catastrophe reserves used in some countries) and demanded increased disclosure related to future cash flows and risks exposures (e.g., increased disclosure related to the explanation of reported amounts, including information on accounting policies, fundamental assumptions and material changes to insurance liabilities, reinsurance assets and DAC[21]). These changes generated the reclassification of certain contracts from insurance contracts to financial instruments and tried to concentrate on the application of CEV's for liabilities.

Moreover, the IASB publish an Exposure Draft of its proposal in the third quarter of 2009, with the final standard in place by the end of 2010, and implementation by two years afterward. The long time is due to complications arising from the lack of a liquid market for those liabilities from which to obtain an observable price. We must emphasize that, in determining CEV, insurance companies will need to provide current estimates of the future cash flows from the contract, apply an appropriate discount rate for the time value of money and estimate the margin that market participants would require for bearing the risk (risk margin) and for providing other services, if any exist (named service margin).

[21] DAC = deferred acquisition costs

Additionally, the cash flows must be explicit, as consistent as possible with observable market prices, incorporate all available information about the timing and uncertainty of cash flows arising from the contractual obligations in an unbiased way and be current based on conditions at the end of the reporting period.

Regarding to the specific requirements outline in Phase I and II of IFRS 4 Insurance contracts, insurance companies reporting under IFRS must adhere to IFRS 7 and IAS 32 (related to the disclosure and presentation of financial instruments), and also IAS 39 (related to the recognition and measurement of financial instruments). All these standards aim to improve transparency around pricing, profitability, risk management and investments. Also these standards will redefine the rules by which insurance companies compete.

a) insurance product design

By accounting for features such as embedded derivates, calculating risk and service margin, improving the sophistication of their modeling techniques and conducting sensitivity analyses around the performance of their insurance assets and liabilities, it is likely that companies will be able to make strategic decisions about whether or how to continue offering specific product lines.

Many insurance companies focuses their efforts on reducing volatility in financial reporting, that's why the demand for reinsurance products may increase. But, because IFRS represents a change in the classification of financial reinsurance products (from insurance products to financial instruments), this reclassification may have a negative impact on reinsures accounting (the contracts will no longer show premium income and it will be accounted like a loan on the balance sheet).

b) price and offerings

In Europe, several insurers moved toward offering products that pass on greater insurance and investments risk to policyholders, such as unit-linked products. Unfortunately, today, the use of unit-linked products raise serious challenges to insurance companies.

Some European insurers have modified their product design to offer less valuable or risky guarantees by instead offering smaller fixed guarantees. Other insurers have moved to offering products such as variable annuities with customized guarantees or options that are mapped more explicitly to prices.

c) risk management practices

The implementation of IFRS will enable insurers to review the profitability to their business portfolios and help them attain a better understanding of the risks and uncertainties associated with individual business lines. Regulatory mandates such as XBRL will reinforce the trend toward improved management of the business. By bringing a consistent taxonomy for data items across the reporting supply chain and across software products, XBRL will provide greater transparency to Boards, timely compliance analyses to creditors, improvements in internal controls. Furthermore, IFRS will present companies with the prospect of centralizing and standardizing all reporting processes from local subsidiaries to the consolidated entity, potentially reducing inconsistencies and errors related to data and metrics. Meanwhile, solvency-related trends will reinforce the trend toward improved risk management in insurance companies. In Europe, the parallel evolution of IFRS and the Solvency II framework will brink about increased disclosure of risk management practices and risk margins, therefore driving consistency to risk management practices from a capital adequacy perspective.

d) securitization

The implementation of Phase II of IFRS 4 may be a key catalyst in fostering growth in the market for insurance-linked securitization (ILS), including for example the securitization of closed books of business such as life insurance policies. Current securitization revolves around high severity, low probability risks in both life (e.g., swine

flu) and non-life (e.g., hurricanes or earthquakes). Securitization has transformed the banking industry through the development of various forms of asset-backed securities. But, the sub-prime credit crisis has raised questions about how the ILS market may grow in such a way that the risks are mitigated. IFRS may not solve all the risks, but IFRS requires substantial disclosure about risk management practices, which may entail securitization. We must emphasize that attaining an off-balance sheet treatment of securitized assets or liabilities is much more difficult under IFRS, because there is no concept of a qualified special purpose entity and most securitization special purpose entity must be consolidated and then evaluated for derecognition. IFRS allows proportional layoff of the risk of insurance cash flows and insurers may be able to derecognize a portion of their liabilities.

e) mergers and acquisitions (M&A) activity

Firms seeking capital for M&A activities may find that reporting under IFRS will provide greater access to foreign capital markets (e.g. Asian or European markets) and potentially open up securitizations as a source of financing. IFRS introduces to some markets new measures of accountability of the performance of acquired assets. So, IFRS requires the separation of intangible assets and goodwill, the carrying of goodwill on the balance sheet with no amortization and annual testing for impairment, along with substantial disclosure related to the performance of acquired assets.

CONCLUSIONS

The development of information systems, the increasing price of correct information, the necessity of graphical interpretation of selected indicators and so on represents only some of the opportunities given by financial and managerial accounting to present accounting information. We believe that it is a direct link between accounting information, risk management and agricultural insurance. The real problem is that, in agricultural practice, managers do not take an advantage of it. The reasons are not important, because we must observe the results of using accounting information in agricultural and insurance companies.

The insurances represent an essential tool for the development and support of agriculture and for the protection of agricultural producers and farmers. The solutions for achieving these desiderates are the adoption of a common front among the insurers, insured entities, surveillance bodies, public-private partnerships, the active involvement of re-insurers, development of complex and complete insurance policies, which have to offer real protection of all involved stakeholders.

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O ANALIZĂ COMPARATIVĂ ÎNTRE SISTEMUL CONTABIL AL FADN ŞI SISTEMUL CONTABIL (APLICABIL) AL ASIGURĂRILOR

AN COMPARATIVE ANALYSIS BETWEEN ACCOUNTING SYSTEM APPLIED OF THE FARM ACCOUNTANCY DATA NETWORK AND INSURANCE ACCOUNTING SYSTEM

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Key words: ***FADN, accounting system, insurance (and agricultural) companies***

REZUMAT

In lucrarea noastră am prezentat câteva diferențe dintre sistemul contabil aplicat de FADN şi sistemul contabil aplicabil asigurărilor (implicit şi companiilor din agricultură). Lucrarea noastră se bazează pe o cercetare recentă, care se va amplifica în perioadele următoare.

ABSTRACT

In our work we presented some differences between the accounting system applied by FADN and insurance accounting system (also for agricultural accounting system). Our work is based on recent research, which will increase in subsequent periods.

INTRODUCTION

Farm accounting has not received much attention from accounting researchers, practitioners or standard setters and in spite of its potential usefulness for farmers and external stakeholders financial statements are generally not very satisfactory or not even prepared at all (Tonea E., Butnariu M., Ruset C. and Tonea C., 2008). There is a gap between the importance given to accounting and the low level of bookkeeping and accounting practice in the agricultural sector. Current general accounting rules do not adapt very well to the particularities of farming and are difficult and expensive to implement (Argilés J.M., Slof J., 2001). That's why farmers are more reluctant to prepare accounting reports (Poppe K.J. and Breembroek J.A., 1992).

The analytical accounting system enables specific costs for every single activity or enterprise to be separated and provides some parameters to allocate overhead costs. There are different methods for this and they depend on the management information used on the farm. If a farmer keeps detailed records of the use of various farm resources, those records will likely form a sufficient basis for allocation. However, it is difficult to record and track data in agricultural holdings and, so, other allocation indicators must be used. This is the case for FADN accounts, which are not based on analytical accounting (Cesaro L., Marongiu S., Arfini F., Donati M. and Capelli M.G., 2008).

FADN data collection is not structured as an accounting cycle but as an extensive questionnaire. This questionnaire refers to assets, liabilities, revenues and expenses, and seems to try to obtain a "true and fair view" of the financial performance and condition of the farms it surveys. However, the definitions used in the questionnaire and the way data is aggregated flawed from an accounting perspective (Argilés J.M., Slof J., 1998).

FADN applies specific accounting rules and principles during the evaluation of income of agricultural holdings (Csajbók I., 2009). The special accounting rules of FADN arise a numerous practical evaluation problems and results in a different final picture of the viability, profitability of farms (Csajbók I., 2005).

MATERIAL AND METHOD

Agriculture is inherently risky. One of the main risk management tools is insurance.

In our paper we outline an comparative analysis between accounting system applied on the FADN and insurance accounting system, in order to emphasize the important of accounting to all parts implicated in these fields.

The research method is quantitative with qualitative elements and it is based on the analysis of all information provides financial accounting and other involved professional organism in insurance and agricultural fields.

Our research support includes the following:

· Specific normative acts;

· Specialized articles and books;

· Analysis and studies in the reference field;

· Reports and press releases of the organisms from the field.

Because our study is only in the beginning stage, we wanted to bring our own contribution to the theoretical level of scientific research in the field which is the analysis of some significant differences between accounting system of the FADN and the other for insurance (and also for agricultural) companies. After we will develop our research, we hope that we will bring or contribution to the practical level, as a decisional support for the management authority and practitioners (insurance and agricultural companies).

Being a recently started study we know our theoretical and practical existing limits of our research. Knowing its, we propose a continuation of our work in-depth study of this link at the factors involved.

RESULTS AND DISCUSSIONS

Agriculture is the most important field of an economy, because of many reasons (e.g., it provides us food, raw materials to our industries, it has been and continues to be a main source of livelihood). In spite of its relatively high importance in the economy of the country and its growing interrelationship with other sectors, agriculture has not received much attention from accounting researchers, practitioners and standard setters. Consequently, current accounting principles typically do not respond very well to the particular characteristics of agriculture business and the information needs of farmers and their stakeholders. The productivity and efficiency of the agriculture sector is deplorably low in all aspects and factors in some countries compared with others. The reasons for this low productivity may be many but lack of accounting records by the farmers. Accounting brings rationality in the efforts and endeavors of the farmers in carrying out their agricultural activities and enables them to have a cost benefit analysis of what they do.

In Europe, the Common Agricultural Policy(CAP) has been cornerstone of the economic and political integration process and in this context was created the Farm Accountancy Data Network (FADN) by the European Economic Community. The accounting data collected by FADN concerns assets, liabilities, revenues and costs and is summarized in reports similar to balance sheet and income statement. Some additional financial indicators are also created like specification of farm capital or changes in net worth. The contents and valuation methods are quite different in the FADN from ones that are applied in financial accounting.

The Farm Accountancy Data Network of the European Union gathers accountancy data from farms for the determination of financial performance, for business analysis of agricultural holdings, to measure the impact of the EU's agricultural policy and to support the on-farm decision making process. The responsibility for FADN data collection rests with the Liaison Agencies. The agency from Romanian part is Ministry of Agriculture and Rural Development.

Accounting in Romania is regulated by the provisions of Law 82/1991, republished in 2008. Accounting regulations issued require a specific chart of accounts and specific

reporting disclosure contents and formats for entities. From 1 January 2006, MoF Order 1752/2005 provides the applicable base to be followed in two accompanying regulations:

- Accounting regulations for compliance with the 4th Directive of the European Economic Communities and
- Accounting regulations for compliance with the 7th Directive of the European Economic Communities.

MoF Order 1752/2005 (used by the agricultural companies) stipulates that the following general principles apply:

- *Accruals basis* – Transactions and other events are recognized when they arise and are entered in the accounting records and reported in the financial statements for the related period.
- *True and fair view* – Annual financial statements are to be prepared to give a true and fair view of the assets, liabilities, financial position and period results of an entity in accordance with the provisions indicated in MoF Order 1752/2005.
- *Comparative figures* are to be disclosed for all statements prepared.
- *Going concern* – The entity is presumed to be carrying on its business as a going concern. If this principle is not appropriate and the administrator(s) are aware of this, there is a doubt on the ability of an entity to continue its activities. This should then be disclosed in the explanatory notes.
- *Consistency* – There should be an application of valuation rules on a consistent basis from year to year.
- *Prudence* – In particular:
    - only profits made at the balance sheet date are to be included.
    - includes all liabilities relating to financial year or previous years, even if such liabilities become apparent or become known between the balance sheet date and the date of completion of preparation.
    - all depreciation (value adjustments) is to be included irrespective of whether the result for the financial year is a loss or a profit.
- *Independence* – Income and charges relating to the financial year are recorded irrespective of the date of receipt or payment.
- *Separation* – Components of asset and liability items are valued separately.
- *Intangibility* – Opening balance sheet for each financial year must correspond to the closing balance sheet for the previous financial year.
- *No offset* – Offset between asset and liability items in the period end balance sheet is not allowed.
- *Economic substance and reality of events* – Carrying values and transactions should be considered and not only the legal form and/or substance.
- *Materiality* - Any item that has a significant value should be presented separately in the annual individual financial statements.

All the mentioned principles are also used by the insurance companies. These principles assure the desirable characteristics of accounting information. FADN used the same accounting principles. So, these principles are common for all EU member states, but each country develops their own data gathering, checking and storage system taking into account EU and national needs.

Regarding insurance companies, we must emphasize that, apart from QIS 4[22], CEIOPS[23] is focusing on preparing the implementation of the principle of proportionality. This new principle means that the future quantitative and qualitative solvency requirements should be compatible with the nature, scale and complexity of the risks inherent in a company's activity. This principle will help the harmonization of the content and format of

[22] QIS = Quantitative Impact Study
[23] CEIOPS = Committee of European Insurance and Occupational Pensions Supervisors

information produced for public disclosure or for the purpose of supervision of insurance companies. Agricultural field involves risks, we appreciate that FADN could consider this principle in the collection of data accounts.

Even so, the accounting system of the FADN appears to be quite different from the one used in financial accounting (i.e., understandability, relevance, reliability, comparability, consistency). If reliability is the key characteristic of financial accounting, relevance, comparability and the usefulness are more important for FADN in the process of making decisions at European level.

Compared with financial accounting, the cost accounting offer information more comparable. That's why, this method (current cost accounting) is applied in the FADN. The reports prepared in this system helps all the agricultural companies involved because the actual market value of all the assets, products and animals support the decision process making.

The accounting data collected by the FADN (concerns assets, liabilities, revenues and costs) are summarized in reports similar to balance sheet and income statement. The balance sheet in the FADN (see Table no 1) is similar to the one applied in financial accounting of agricultural companies.

Table 1

Structure of FADN balance sheet

BALANCE SHEET
ASSETS
Fixed assets
Land and permanent crops
Buildings
Machinery
Breeding livestock
Current assets
Non-breeding livestock
Stock agricultural products
Other circulating capital
Net worth
LIABILITIES
Long and medium-term loans
Short-term loans

The balance sheet obtain by an insurance company is different, because the type the activity is different, but in general it present assets and liabilities in a perfect balance.

The income statement prescribed by EU regulation (see Table no 2) determines three types of income: gross farm income, net value added and family farm income.

Table 2

Structure of FADN Income Statements

Total output (by type of production)
+ Subsidies on production and costs
- Intermediate consumption
a) Specific costs
Seeds and plants Fertilizers Crop protection Other crop specific costs Feed grazing livestock Feed pigs and poultry Other livestock specific costs
b) Overheads
Machinery and building costs Energy Contract work Other direct inputs
- Taxes and VAT balance
= Gross Farm Income or Gross value added
- Depreciation
= Farm net value added
+ Investment grants and subsidies
- External factors
Wages paid
Rent paid
Interest paid
= Family farm income

Regarding to "other output" category, it includes all the items that don't relate to the former output categories (i.e., forestry products, leased land ready for sowing, receipts of tourism, receipts relating to previous accounting years, production of fixed assets.

Regarding to "taxes" category, it incorporates all types of direct farm taxes, other duties and taxes and other charges on land and buildings. Indirect taxes (like personnel income tax) are not part of the annual report as they have no close relation with agricultural activity.

Specific costs and overheads are called together "intermediate consumption" and they are taken into account on accrual basis.

Because farm net value added relates to the payment of fixed factors of production, it result from subtracting depreciation from gross farm income.

The FADN accounting system is, in general, a special managerial system, because we do not need to keep all the accounting record rules like it is describe in the accounting law. Regarding this problem, I agree with the proposal of Mrs.Csajbók I., which consist in using an "Event diary". This "diary" is the basic of the bookkeeping and it's using help all the users.

The method of the FADN accounting system is the double entry bookkeeping made by an accounting software. Because of using different software version from one bookkeeping office to another, in order to obtain the similar results and comparable data is better to have an uniform software version. Agricultural and insurance companies has the same problem regarding accounting software. But, according to accounting rules and principles, the results included in the financial statements are the same.

The financial statements include financial indicators. Some additional financial indicators are created like specification of farm capital or changes in net worth. The contents and valuation methods are different in the FADN from the ones that are applied in financial accounting of agricultural and insurance companies. One main characteristic of the FADN is the actual market value. According our accounting rules, the agricultural and insurance system are compatible with the EU requirements (only for the companies listed). Until recently, many companies used the historical costing. This method used historical costs for direct material and direct labour while overhead costs and indirect costs are charged using a predetermined overhead rate per activity measure. The amount of overheads is obtained multiplying this rate by the quantity of activity measure. This historical cost were replaced by the fair value, which is debated and used by International Accounting Standard (IAS) 41 "Agriculture". IAS 41 was issued for the first time an extensive standard typical for agricultural sector and for the first time were included in the income statement, independently from the sales transactions, incomes from variations of the fair value of an asset. Because of this last aspect, IAS 41 can be considered an important standard, because it represents the starting point of a consistent transition from the purchase cost principle towards a fair value accounting. In insurance field, as a consequence of the fair value valuation paradigm, reporting will be on the basis of closed cohorts of contracts.

Unfortunately, the evaluation methods in FADN and accounting system used by agricultural and insurance companies is not the subject of our paper. But, we had to admitted that mentioned subject together with the subject of this paper represent a part of an research in progress developed by the accounting and marketing departments of our Faculty. This research starts in this academic year and it'll be develop in the following months.

CONCLUSIONS

Our paper intended emphasizing some differences between accounting system applied by the FADN and insurance accounting system. In our opinion, we must develop an accounting system based on the same rules, principles and evaluation to provide information for all the users. Even if Romania is an important participant to FADN only from July 2007, we must try to develop an accounting system which help both agricultural and insurance field, the supervisors, the government, but most of all the people direct involve in the process of making decision.

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POSIBILITĂȚI DE ADAPTARE A ÎNTREPRINDERILOR AGRICOLE LA NOILE TENDINȚE ÎN DISTRIBUȚIA PRODUSELOR AGROALIMENTARE

POSSIBILITIES OF ADAPTING THE AGRI-FOOD ENTERPRISES TO THE NEW TRENDS IN THE DISTRIBUTION OF FOOD PRODUCTS

MIHAI TALMACIU

Key words: distribution, Food chain, Wholesalers, Retailers, agri-food system, agricultural holdings

REZUMAT

În ciuda importanței economice a distribuției produselor agroalimentare, rolul său nu a fost clar şi bine înțeles. Firmele specializate în comercializarea produselor agroalimentare îndeplinesc un rol important în filiera produselor agroalimentare: studierea şi interpretarea evoluției preferințelor consumatorilor, influențarea acestei evoluții, îmbunătățirea caracteristicilor produselor, dezvoltarea de noi produse sau servicii alimentare etc.

Sectorul distribuției produselor agricole şi alimentare înregistrează o serie de schimbări determinate de tendințele şi problemele care se manifestă pe piață: fuziuni sau achiziții de companii, creşterea valorii alimentelor solicitate de consumatori, schimbările înregistrate în preferințele consumatorilor şi schimbările demografice, modificarea canalelor tradiționale de comercializare, creşterea importanței canalelor directe de marketing.

Spre deosebire de țările dezvoltate, unde distribuția produselor agricole şi alimentare este bine organizată, în România putem constata o serie de probleme în oganizarea piețelor produselor agroalimentare, care dezavantajează producătorii agricoli. În condițiile în care agricultura românească se bazează pe exploatații agricole de mici dimensiuni se impune o mai bună organizare a comercializării produselor obținute în acestea, pentru a nu pune producătorii agricoli în poziție dezavantajată în raport cu procesatorii , angrosiştii şi detailiştii. Identificarea unor soluții pentru organizarea producătorilor agricoli în vederea comercializării propriilor produse permite o mai bună adaptare a acestora la tendințele care se manifestă în distribuția produselor agroalimentare, dar şi posibilitatea implementării unor reguli stricte privind producția, care să permită creşterea competitității produselor pe piețele interne şi externe, prin asigurarea unei calități superioare şi uniforme.

ABSTRACT

In spite of the economic importance of the distribution of agroalimentary products, its role was not clear and well understood. The companies specialized in marketing of food goods has an important function in agroalimentary chain: study and interpretation of evolution of the consumer`s choice, the influence of this evolution, improvement of the characteristics of the products, the development of the new products or food services.

The sector of food marketing knows a series of changes determinates by tendencies and problems which appear in the market: great fusions and acquisitions of the companies, increase in the requested food value of the consumers, exchanges in the preferences of the consumers and changes demographic, "the jamming" of traditional channels of marketing, increase in importance of direct channels of marketing.

Unlike developed countries, where the distribution of agricultural products and food is well organized, in Romania, we found some problems concerning the organization of markets of food products, which penalizes farmers. Given that Romanian agriculture is based on

small agricultural farms, is necessary a better organization of marketing of their products, to not put farmers in disadvantaged position in relation to processors, wholesalers and retailers. Identification of solutions for marketing of romanians agricultural products allow better adaptation to the trends that are evident in the distribution of food products, and also the possibility of implementing strict rules on production, enabling products to be competitive on internal and external markets, by providing a superior and uniform quality.

INTRODUCTION

The turning to good account of one's own products in conditions of economic efficiency is one of the determining factors for the increase of profitability of agri-food enterprises, regardless of their size. Given the present situation of the national and international market, the agricultural producers will not manage to sell their products in advantageous conditions without using the instruments offered by the modern marketing.

One of the most serious problems encountered by the Romanian agricultural producers is the distribution of products obtained in their own enterprises which supposes selling these in conditions of increased economic efficiency, in the internal or external markets by means of the retail or wholesale networks. The main goal of distribution is bringing products as closer as possible to the productive or final consumers so that they might find them in the place, at the moment, under the form and in the desired quantities.

Theoretically, the agri-food products may be transmitted to the final consumer by multiple ways (figure 1)

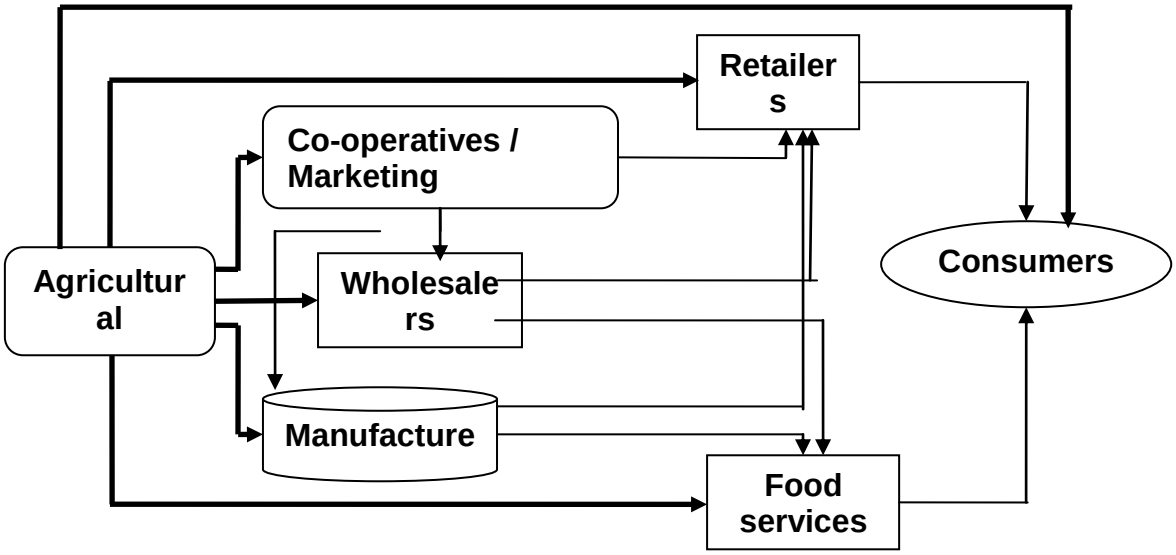

Figure 1 Structure of agri-food system

In figure 1 we notice that the possibilities of turning to good account of an agro-food product are reduced when the commercial intermediary is closer the consumer. Thus, the agriculturist has at its disposal six possible distribution channels (marketing associations, food industry, wholesalers, retailers, collective consumers, final consumers), and in spite of all these it encounters big trading problems.

MATERIALS AND METHODS

The elaboration of this paper relied on studies regarding the structure of the agri-food systems and the trends registered in the distribution of agricultural products in the developed countries (USA, Canada, UE), studies on the structure of agricultural exploitations and particularities of the distribution of agri-food products in Romania, statistical data regarding the ways to turn to good account the agricultural production supplied by Eurostat in Romania and the European Union.

RESULTS OF RESEARCHES

Distribution comprises a set of activities (transport, conditioning, storage, trading, information etc) by which the raw agricultural products or the industrially processed products are presented to consumers (households, public alimentation units – canteens, restaurants etc, units from the food industry).

As compared to other categories of products, the distribution of agri-food products has a series of particularities determined by their nature but also by the characteristics of the production processes. These particularities are the following:

- the high level of perishability supposing a high operability in the trading of these products and ensuring some special transport and storage conditions to keep the commercial aspect and the food qualities until the moment of consumption;
- relatively high volume and the relatively small value that together with perishability lead to the increase of distribution expenses;
- the seasonal character of production for most products meant for fresh consumption which associated to their perishability lead to the shortening of the sale period to population;
- division by areas of the agricultural production and dispersion of the consumption demand supposing the dispersion of sale network on the entire country territory;
- the mandatory requirement, in the trade with agri-food products, to comply with the regulations of the competition market that disadvantages the agricultural producers as against the manufacturers and distributors but also the imported products entering the Romanian market at very low costs;
- the possibilities of horizontal and vertical commercial integration in the agri-food products both between producers and distributors, under the pressure of agri-food market.

Despite the economic importance held by the distribution sector its role has not always been clear and well understood. Its influence manifests through the entire food chain, from the consumption markets up to the food manufacturers and up to the agricultural producers (the distribution/supply process intervenes in all the pints of agri-food network). Thus, the firms specialized in the food distribution play a more and more important role: supervising and interpreting the evolution of consumers' preferences, influencing this evolution (education of consumer), the improvement of existing products or services and developing new food products and services. This way, the distribution sector contributes indirectly to the modeling of organization and competition behaviour of the sectors from the agricultural system.

The distribution of agri-food products contains three big sub-sectors: wholesale distribution, retail distribution and the sub-sector of food services. In each of them there occurs a series of changes determined by the new trends and problems manifesting in the market:

- the tendency to concentrate the trading enterprises by making retailer chains that has as consequences: the increase of the negotiation power with wholesalers and producers, the elaboration of strong IT systems, the obtaining of advantages in terms of competition position, the increase of possibilities to offer price reductions and more attractive service packages, limitation of competition (all these work havoc among the freelance retailers);
- the appearance and extension of the new forms of retail trade that threaten the traditional forms;
- modification of traditional relationships between suppliers and retailers by the latter's assuming of more active role in the satisfaction of the changing requirements of consumers;
- the increase of importance of distributor's trademark or the control trademarks is one of the sources for the increase of influence of retailers within the distribution channels;
- the enforcement of the initiative known under the name of "Continuously improved efficiency" by which they intend to reduce the external costs of the distribution system by a better coordination of the actions of all participants (retailers, wholesalers, producers etc) to better answer consumers' demands and to eliminate useless costs and inefficiencies appearing within the distribution channel. This initiative supposes the elimination of isolation

and mistrust concomitantly with the promotion of communication, cooperation and integration among the participants in the distribution channel.

- extension of rapid and comfortable solutions of meal preparation determined by the reduction of the free time and women's participation in extra-family activities may represent a strategy by which retailers may increase their market share to the detriment of the public alimentation units (restaurants) but presents more problems: investments, supplementary costs (manual labour), the need to train employees, changes in the organizational culture, finding a supplier;
- extension of commercial expenses or allowances for promotion destined to retailers – these consist in bonifications, allowances and reductions and represent sums ceded by producers for: the purchase of a large goods volume, the efforts of promoting the product name and favorable purchase conditions;
- mergers and purchases (the tendency to concentrate) to extend in new markets, to reinforce the position held in the exiting markets, to diversify activities or to vertically integrate;
- reorientation of assets by sale or liquidation of marginal activities;
- diversification of the activity portfolio to reduce the risk of exposure to the effects of the economic crises;
- integration downstream or upstream (vertical) to increase the profit margins;
- expansion of the large cross-border companies following the globalization phenomenon and their tendency to dominate the national markets;
- extension and diversification of the service offer with value added by offering some facilities to customers: delivery of some good lots in emergency situations without asking for price increases, adaptation of the packing manner according to consumers' requirements, application of some IT management systems that may allow the rapid delivery of orders and the fast transmission of all information necessary to the other members of the distribution channel.
- application of the new technologies in the wholesale distribution – it is a plus contributing to the improvement of operators' performances and consists in the introduction of electronic systems of order launching and control of stocks, the increase of automation degree of all activities in the wholesale storehouses.

In these conditions, the sector of agri-food product distribution had to transform from a passive sector, regarded a s a simple place of sale situated upstream the production, into a key sector with an increasing influence on the internal and international markets and on the trading relations from the entire agri-good system. As the distribution sector from the Romanian agri-food system will consolidate, the influence of the large networks of wholesalers, retailers and food service suppliers will continuously grow.

The Table 1 show the structure of food chain operators. The table data show the large number of agricultural holdings in Romania, representing 29.3% of the total number of farms across the EU27. This causes an average area of 3.3 ha per holding. Another important aspect is that of the 6.7 million farms below 1 ESU in the EU27, about 3 million are in Romania. The value added per person employed in agriculture is the lowest compared with other parts of the food chain: 2415.2 euros the agricultural farms, 6514.1 euros the food industry, 6104.2 euros the Wholesalers, 2629.5 euros retailers and 2472.3 euros per person employed in food services. In fact, the value added per person employed in Romania agriculture is 2415.2 euros, compared to 11,726.2 euros in the EU27.

Food chain structure

Tabelul 1 (2005)

r. crt.		Country	Agricul. holdings	Food manuf.	Wholesalers	Retailers	Food services
	Number of operators	UE 27	14406090	309702	214007	983505	1392298
		Ro	423	10	8219	715	166

		mania	0190	820		24	51
	Number of persons employed	UE 27	127 15590	46 88100	18359 00	654 2900	666 3400
		Ro mania	259 5590	20 3840	95835	238 066	743 63
	Value added (mil euro)	UE 27	149 106	18 8214	71672	134 929	109 526
		Ro mania	626 9	13 28	585	626	184

Source: Processing by Eurostat Pocketbooks – Food from farm to fork statistics, 2008 Edition

The sale of small quantities of products obtained in individual households is more difficult to solve on one's account than the production itself. In the conditions of the current structure of property in our country, the solving of the problem of efficient turning to good account of agricultural products is of essential importance. Otherwise, the impossibility to find some markets for the products obtained in the small agricultural enterprises represents a cause for the large uncultivated lands and, consequently, of Romania's excessive dependence on the agricultural product imports. The reasons for which the sale on one's account is not efficient for the small manufacturer are:

- the peasant does not know very well the market and the best sale techniques;
- by sale on one's own account there is a waste of time that might be used to increase the production in one's own farm;
- the distance to the market is large and the tradable lots are small, thus the logistic expenses grow;
- they do not comply with the quality standards and technologies that may lead to the obtaining of a production of a superior quality, hence the non-uniform quality of the agricultural products and the choice by manufacturers and traders of the import products;
- due to the unfavourable situation of the market there appears sometimes the need to store products and these may deteriorate unless there are adequate storage spaces;
- the trading expenses grow when sale is made in small lots.

- the negotiation power with the downstream enterprises is low, thus the prices obtained do not even cover the production costs.

On the other hand, appealing to intermediaries also presents problems for the following reasons:

- the small lots sold by the small producers and their non-uniform quality make the intermediaries or manufacturer choose the import products;

- the low negotiation power with the downstream economic agents triggers the impossibility to obtain advantageous prices that may cover the costs and ensure supplementary financial resources for making investments in enterprises;

- the low competitiveness of the Romanian products as compared to the European ones;

- the weak support from the state of the agricultural sector in the post-communist period, both by coherent policies that may lead to the increase of enterprise and a better organization of the agricultural product markets and by the enterprise subsidies.

CONCLUSIONS

The problem of small farmers in the effective sell of their products is not a new one. This was reported by Vintilă I. Bratianu in 1904 at the conference held at the Congress of Co-operatives's Banks in 1904 from Focsani. The small quantities of agricultural products obtained by Romanian peasants were not a price, because there is not an entity to collect them for marketing purposes.

A possible solution for the effective use of farms products in our country, in the benefit of agricultural holdings, is the diversification of routes to recovery, through the

establishment in rural areas of associative structures (co-operatives of processing agricultural products and marketing associations). This would achieve multiple benefits: first it is possible to obtain additional income from processing and selling at higher prices on the market, secondly these associations could provide a tool to improving the quality of agricultural products obtained by associate members and to improve the technology, thirdly these associations can ensure the supply of inputs and services.

We believe that the establishment of marketing associations in agriculture is beneficial for the following reasons:

- can achieve scale economies, which results the greater market power;
- can made available to members suitable structure for conditioning, storage and marketing;
- they give to asociates members more secure in selling their products;
- can provide the adjustment of offer to market demand;
- can be established and applied common rules of production that leads to achieving better product quality;
- can contribute to improving the production technology in the members holdings;
- can use the expertise of specialists in marketing of agricultural products;
- can provide to members processing capacities of their products.

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PROBLEME ACTUALE DE MEDIU ÎN PROCESUL DEZVOLTĂRII ECONOMICE DIN *„ȚARA SEVERINULUI”*

ACTUAL ENVIRONMENTAL PROBLEMS IN THE PROCESS OF ECONOMIC DEVELOPMENT IN *„ȚARA SEVERINULUI”*

CRISTIANA VÎLCEA

Key words: environmental protection, economic development, pollution, improvement of negative effects, environment policies and strategies

REZUMAT

În lucrarea de față se încearcă o identificare a cauzelor problemelor actuale de mediu şi analizarea impactului acestora asupra procesului dezvoltării economice din „Țara Severinului”.

Dezvoltarea economică în această regiune s-a bazat în principal pe exploatarea şi valorificarea resurselor naturale locale. Intervenția antropică asupra mediului s-a manifestat în primul rând prin apariția, din cele mai vechi timpuri, şi dezvoltarea activităților de exploatare a resurselor forestiere şi a celor subsolice (cărbune, calcar, metale). Totuşi activitățile industriale s-au dezvoltat cu precădere în jurul celor două centre urbane ale regiunii (Drobeta Turnu Severin şi Bara de Aramă), apărând astfel centrele industriale de prelucrare şi producție (construcții navale, produse laminate, anvelope, mase plastice, agroalimentare, confecții, țesături, apă grea, producția cărbunilor inferiori). În cea mai mare parte a regiunii analizate predominantă este agricultura şi creşterea animalelor.
Industrializarea excesivă din ultimii 50 de ani, politicile agricole aplicate fără fundamentare ştiințifică riguroasă şi dezvoltarea economico-industrială din ultimii ani au dus la poluarea resurselor de apă şi sol. Disfuncționalitățile de mediu sunt date de: poluarea aerului, poluarea solului şi a apei cu noxe; degradarea terenurilor în urma presiunii antropice excesive, dar şi de peisajele inestetice create de apariția construcțiilor cu stiluri diferite care diferă de stilul tradițional.

În prezent regiunea analizată nu beneficiază de infrastructura corespunzătoare pentru protecția mediului şi nici de o educație civică la nivelul cerințelor europene. În acest sens, o dată cu identificarea problemelor de mediu existente în regiune, se încearcă elaborarea unor programe de ameliorare a efectelor negative care, în acelaşi timp, să contribuie şi la dezvoltarea economică în condițiile protecției mediului conform normelor europene.

ABSTRACT

In this study we will try to identify the causes for the actual environmental problems and to analyze their impact over the process of economic development in „Țara Severinului”.

The economic development within this region was based mainly on the exploitation and processing of local natural resources. The human impact on the environment manifested, first of all, once the occurrence and development of the exploitation activities of forest and underground resources (coil, limestone, metals). Still, the industrial activities developed mainly around the two urban centers of the region (Drobeta Turnu Severin şi Bara de Aramă), and therefore there appeared the industrial processing and production centers (naval constructions, mill work factories, tire factory, plastics factories, confection factories, heavy water plant, production of inferior coils). In most part of the analyzed region the agriculture and husbandry are predominant.

The excessive industrialization from the last 50 years, the agricultural policies applied without any rigorous scientific basis and the economical-industrial development during the last few years caused the pollution of the water and soil resources. The environmental disfunctions are given by: the pollution of air, soil and water with noxes; land degradation due to excessive human pressure, but also by the inaesthetic landscapes created by the constructions with modern styles, different from the traditional one.

In the present the analyzed region does not benefit of a corresponding infrastructure for the protection of the environment or by a civic education at the level of the European requests. In this respect, once the existing problems within the region are identified, one will try to issue certain programs to improve the negative effects which, in the same time, should also contribute to the economic development in the conditions of the environmental protection according to the European regulations.

INTRODUCTION

The excessive industrialization from the last 50 years, the agricultural policies applied without any rigorous scientific basis and the economical-industrial development during the last few years caused the pollution of the water and soil resources. The environmental disfunctions are given by: the pollution of air, soil and water with suspensions; land degradation due to excessive human pressure, but also by the inaesthetic landscapes created by the constructions with modern styles, different from the traditional one.

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Though the economic development within this region was based mainly on the exploitation and processing of local natural resources, the biggest part of the analyzed region the agriculture and husbandry are predominant.

MATERIALS AND METHODS

The main materials used to perform this study are represented by the laws in the domain, the information and statistical data obtained by inquiries or by drawing up questionnaires applied to people living within the studied region, performed during the field investigations, data taken from the surveying and measure network or from the administrative reports.

And last, but not least, I interpreted the data and analyzed the results obtained. Therefore all data collected during the previous research stages had been processed and analyzed using various software (ArcGIS 9.3, Microsoft Excel, Adobe Flash CS3 Professional, AutoCAD 2007) in order to obtain the final maps and charts.

But, this data collection method also has a series of inconveniencies, as the “bottom-up” direction for the data flow (fig. 1) produces certain difficulties in ensuring the quality of the data. Also, the existence of several institutions which activate in the domain of the environment, whose responsibilities are not always clearly defined, generate many data processing structures, and the information they release in the end is sometimes incomplete or redundant. The occurrence of errors is also of great importance, as they can appear at the registration of data taken from different institutions, due to the data processing and their mediation, due to the way of interpreting the results or errors of subjective nature generated by the application of questionnaires. And finally, the lack of geographical references obstructs the use of data for simulations and integrations in different specific domains (water, air, sol, biodiversity).

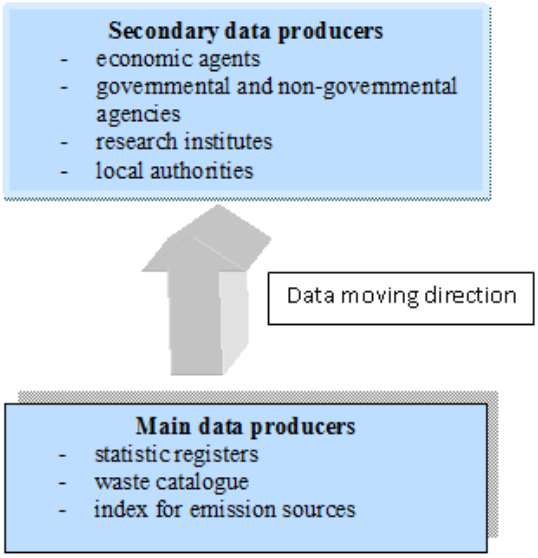

Fig. 1 Sources for obtaining environmental data

RESULTS

After analyzing the data obtained from different sources and pursuant to field observations made in the region studied, there had been identified several critical areas, in respect to the environmental quality, respectively:

a. *critical areas regarding the pollution of atmosphere* where the main polluting factors are: the industrial platform Romag-Termo; the eastern industrial platform – CILDRO, DELIGNIT, CELROM; the south-west industrial platform – ROTRAS, FORSEV, LAMDRO, SEVERNAV, COMCEREAL.
b. *critical areas regarding the pollution of surface and underground water*; the main polluting factors being: the north industrial platform (ROMAG chemical plant, TERMO HALÂNGA; AGROMEC ŞIMIAN area, the Goods Station and S.N.P. PETROM; the refuse dump in Mărăşeşti village, Baia de Aramă city with sub-products of copper flotation – complex ore and heavy ores; the refuse dump near the Topolnița river; the waste dump near the discharge of the Topolnița river into the Danube).
c. *critical areas regarding the aspect of soil deterioration* (the areas around Huşnicioara commune and around the Zegujani mining area from Floreşti commune; the area of the fertilizer deposits from the ex-I.A.S. and C.A.P. which, by demolition of the buildings, hand been and still are exposed to rains which wash and infiltrate into the soil, thus polluting the underground water).

The main activities which generated the factors responsible for the occurrence and existence of these critical areas concerning the quality of the environment are the industrial activities, the agricultural ones and the zooculture. Further I will try to identify the causes of the actual environmental problems and to analyze their impact upon the process of economic development within *Țara Severinului*.

So, the direction of the economy in *Țara Severinului* toward a durable development according to the national interests and to the integration strategy, imposes the deep implication of industry within this process, as it has a great contribution in reaching the general objectives of the industrial policy.

Pursuant the transformations occurred after 1989, during the last period, the industrial activity from the studied region fills the effects of the world and national economic crisis. Thus, besides finding a resolution for the existent environmental problems, nowadays ones tries to launch again the industry within this region, mainly by increasing the work productivity as an effect of the continuous support of modernization

and retechnologisation process. The use of modern machines is efficient in meeting the laws of environment and within the activity to protect the environment.

The slow process of development and modernization of industry is caused by the existence of certain objective factors which impair the investors to act, factors as: poor quality of access roads, the great distance to operative airports (Craiova, Timişoara), the delay in normalizing the traffic on the Danube, the lack of natural gases. The last mentioned problem represents an important element which may contribute to the modernization of industrial production by using the natural gas as a replacer for the black oil in the combustion process where the ooster coil is now being used. The use of natural gas will raise the caloric value, will lower the cost of technological steam and, the most important, it will reduce the pollution of the environment.

One of the strategic objectives for meeting the European requirements for the environmental protection is to reduce the polluting factors from the industry (to reduce the air and the water resources pollution). The nonobservance or the deviation from these European requirements can cause the cancellation of the licences and closing of industrial agents. The retechnologization and modernization process implies, not only financial resources, but also the amendment of production plans, the management and the business plans in order to produce only goods that have the market already contracted and provided, and renounce to the production for stocks.

Below (fig. 2) it is evidenced the way of operation for an industrial platform and its impact upon the environment. The environment supplies the resources (raw material and energy) which represent the core of the processing industrial activity. The supply is done for two reasons: for the production of goods and services for consume. Both from the production and the consume result waste material which is evacuated in the environment.

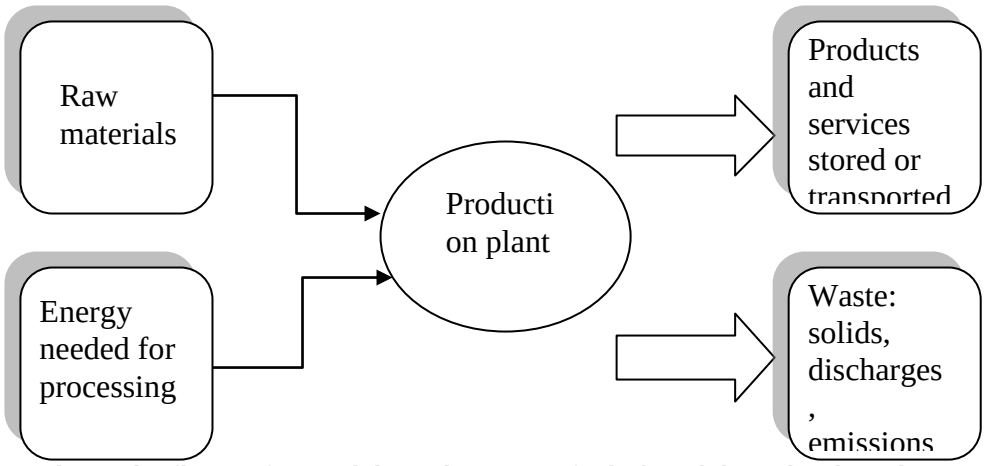

Fig. 2 The flows of materials and energy of a industrial production plant

The exploitation of forests is one of the main causes for the erosion of the soil by massive deforestations and destruction of spontaneous activity for changing the destination of the lands. The biggest deforestations, which affected large surfaces, are found in Corcova commune. These areas are exposed to the risk of landslides, as they have slopes over 40%. Most of the exploitations had been done on the direction of the level curves. The forests in this area play a protection role for the settlements, for waters and soils, as they are located on the direct slopes of the Coşuştea river, which are characterized by an accentuated degree of torentiality. These slopes are vulnerable because of the lithology and as a result, they are subjected to destabilization. The slopes over 30 degree, which are missing the protection provided by the forest, will be subjected to an intense process of erosion.

In the south-east third of *Țării Severinului*, the natural vegetation had been replaced in a percentage of approximate 90% with lands intercalated with small areas of wood or shelter belts, which are now being deforested.

The vegetation had suffered important transformations as a result of human activity who deforested large areas covered with forests in order to use the land for agriculture and pastures for husbandry.

Regarding the agriculture of the region and the environmental problems caused by the way of agricultural exploitation, we must mention the fact that, after 1989, the agriculture registered a strong involution which started with the liquidation of cooperative units, but also due to the bankruptcy and disappearance of farms dealing with vegetal production, viticulture and zooculture which belonged to the I.A.S. Pursuant to the returning process, the lands had been divided in small surfaces, which are now being hardly worked by the existent agricultural machines, which had been designed for working large surfaces. In this context, the tractors and machine plants are not prepared from the technological point of view, as they still produce heavy machines, which are not suitable for small agricultural lands. The transformation occurred during the last two decades, as well as the new requirements regarding the use of fertilizers, the selected seeds for increased productivity or the technical equipment found the new land owners unprepared, not only financially, but also concerning the documentation regarding the modern agricultural exploitation, as they must meet, in the same time, the requirements for the environmental protection.

Regarding the irrigation system and the surfaces irrigated (these surfaces reduced approximately by 50% after 1989) they must be redesigned and the installations performed to be suitable for small surfaces.

The above mentioned facts are the main perturbing factors which caused the substantial decrease of the production and quality of agricultural products. The irrational use of fertilizers, the intense exploitation of lands until the destruction of soil layer caused by the desorganized use of agricultural machines and irrigations, as well as overpasturing have a significant negative impact upon the surrounding environment, causing the decrease in quality and quantity for the products obtained, thus resulting a subsistence agriculture.

We can also observe modifications concerning the land use at the level of the region, observing a reduction of the cultivated land surfaces, but also a reduction of the surfaced cultivated with vineyards and fruit trees (fig. 3a and 3b).

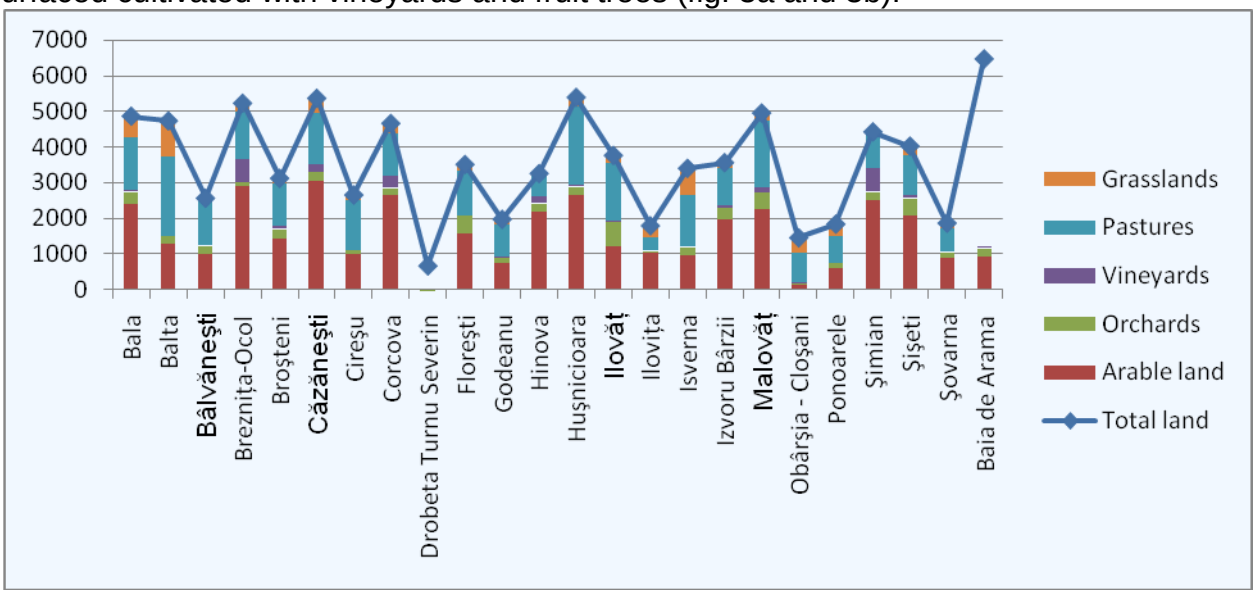

Fig. 3a Land use in Țara Severinului in 1977

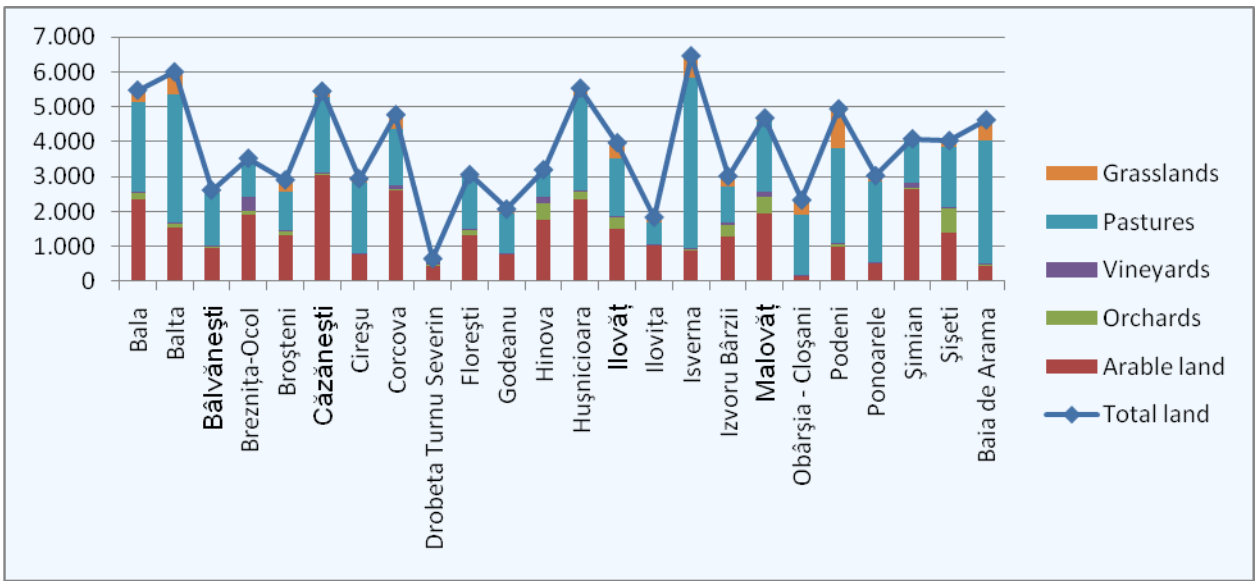

Fig. 3b Land use in Țara Severinului in 2007

During the last 3 years, the surfaces cultivated with vineyards reduced, but there are hopes that the foreign investors who took over the vineyards will continue the plantations and the modernizations of the existent exploitations.

Thus, for the development of agriculture in order to have a rational exploitation and to protect the environment there are to be imposed measures like: financial support in order to encourage the association of farmers; granting subventions for the purchase of seeds and agricultural products with an increased biological value; the use of high performance agricultural machines, capable to work small land surfaces with a reduce consume of fuels; to encourage the production of ecological agricultural products; to encourage the production of technical and medicinal plants; to issue programs, at the regional level, for the modernization of farms and agricultural exploitation using European funds and funds from the state budget, etc.

Thus in the context of the new requirements, the zooculture, the zootechnical farms and the entire process of growing and caring for animals must be practiced meeting the new norms and regulations, as they must meet the technological norms imposed at the European level. Therefore, for the development of a durable agriculture which meets the norms of environmental protection, each village or commune must own automate cleaning systems, waste disposing systems and their own butchery units which should function according to the European exploitation norms.

CONCLUSIONS

The conception of durable development does not treat the economy separately from the environment anymore. But, as the economy policies must be drawn depending on their impact over the environment, in the same way the environment policies must take into consideration the economic implications. This integration became nowadays a basic problem when issuing the environment policies.

The approach of environmental problems is necessary to benefit by the advantages offered to a company by the development based on the environmental protection, as well as to simulate the promotion of durable development of the region. But, one must not neglect the most important aspect, when drawing up these environmental policies, which refer to the environmental costs. There also must be calculated the depreciation rate for these environment costs, which may be quite high, especially for retechnologizations. But, once this modernization process is performed, the environment costs will reduce significantly.

Within the Regional Operational Program drawn up at the county level, but which also includes the region analyzed, the scope is to reduce and diminish the negative effects, as well as to optimize the positive effects upon the environment by implementing the projects financed through the priority axis.

Therefore, in order to modernize the industry and exiting producing units, which are functional or not, there are foreseen activities to rehabilitate the polluting industrial sites which are not being used anymore and to prepare them for new activities, because the location of old industries are affecting the environment from the nodal areas of the territory, as most of the industrial areas had been created in the most favorable geographical places in respect to the distance to the roads and houses. The rehabilitation of these industrial areas favors not only the environmental protection, but, in the same time, it represents an advantage for the efficiency of new investments, as they already have an infrastructure which only has to be improved and not entirely renewed. The image of industrial units where the economic activity has been stopped, in urban, as well as in rural areas, has a negative impact upon the decision of potential investors when considering the possibility to locate in these areas. The rehabilitation of polluting industrial sites represents one of the fundamental problems from *Țării Severinului,* because of the polluting activities performed in the past for which the person responsible for the pollution is not known. The rehabilitation of these sites will favor the local economies by creating conditions for new investments in productive activities. The reintroduction of the industrial sites within the economic circuit will be performed by depolluting, cleaning activities and rehabilitation in order to be transformed in structures to support the business and the new activities.

In the context of a durable development, for a plant it is compulsory to identify those aspects of the environment, namely the “entrances” (input) and “exits” (output) which generate effects upon the environment. Pursuant the identification of these aspects, by analysis there can be determined the ways to reduce their effects concomitant with the benefits (increasing the environment performances result the increase of the business performances).

Regarding the increase of competition of agriculture within *Țara Severinului*, it is necessary that, in the future, in every commune to exist a Center of Agricultural Assistance having experts in agriculture and which should make available to the farmers strategies and production plans, feasible and suitable for the existent soil and climate conditions.

There are also projects to modernize the settlements from the rural area, so that until 2013, almost all villages and communes from *Țara Severinului* to benefit of water supply systems, sewerage systems, waste water treatment plants and standard equipments for collecting, loading, recycling and ecological disposal of waste.

The impact of economic activities or of natural phenomena upon the environment implies the depletion or the discovery of some natural resources, changes in the concentrations for some polluting agents, the deterioration or the improvement of life standards within the human settlements. These actions can be detrimental or benefic. The results obtained, pursuant to the collection and analysis of data, are ment to prevent or to reduce the impacts upon the environment and to generate benefic actions.

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UTILIZAREA SISTEMELOR DE AUTOMATIZARE ŞI COMPUTERIZARE ÎNTR-O INSTALAȚIE DE MĂCINARE A CEREALELOR DESTINATE OBȚINERII FURAJELOR COMBINATE

THE UTILIZATION OF AUTOMATIC AND COMPUTERIZED SYSTEMS IN THE PROCESS OF GRINDING CEREALS FOR MIXED FODDERS

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Key words: mixed fodders, grinding, technological process, automation, computerization

REZUMAT

Obiectivul principal al României în această perioadă constă în realizarea unei economii de piață funcționale. Pentru atingerea acestui obiectiv toate echipamentele si instalatiile utilizate trebuie să respecte condițiile de securitate şi sănătate prevăzute de legislația în vigoare, prin integrarea lor în fazele de concepție, fabricație şi utilizare.

In aceasta lucrare se prezintă unele considerații ale procesului tehnologic de preparare a nutrețurilor combinate cu accent pe faza de măcinare si se analizeaza anumite probleme care apar, urmarind posibilitatile de imbunatatire a acestei activitati prin utilizarea unor sisteme de automatizare si computerizare.

Instalația automatizată pentru măcinarea cerealelor este destinată utilizării în fabrici de nutrețuri combinate, în special în cele la care măcinişul rezultat este transferat la faza următoare de prelucrare prin transport mecanic (elevatoare sau transportoare cu melc).

ABSTRACT

The main objective of Romania in this period is to create a functional market. To achieve this purpose all the equipments and installations that are used have to respect the essential conditions of health and security, imposed by the in force legislation, by integrating them in the stages of conception, fabrication and utilization.

In this paper there are presented some aspects of technological process of making mixed fodders, emphasizing the grinding stage, and there are analyzed certain problems that can appear, following the ways of improving this activity by the use of some automatic and computerized systems.

The automatic installation for grinding cereals is meant to be used in factories of mixed fodders, especially in those where the final grist is transferred to the next step of processing by mechanic transport (elevators or snail-conveyors).

INTRODUCTION

Vital national interest of Romania should develop a competitive economy through quality, able to cope with current trends of international trade. Our country should have in the development of all branches of the economy in line with EU requirements and standards. Among other things, this fact requires the alignment of all products – both industrials and consuming – in accordance with the community rules referring to quality, security and environment.

To achieve this purpose all the equipments and installations that are used have to respect the essential conditions of health and security, imposed by the in force legislation, by integrating them in the stages of conception, fabrication and utilization. It is also necessary refurbishment of most capacity, equipping them with modern equipment, efficient, highly mechanization, automation and computerization.

MATERIAL AND METHOD

1. Aspects about grinding cereals in FNC and the importance of combined fodders

In this period, the globe population has overran the 6,4 thousand millionth people with a rate of growth of 1,2 – 1,3%. The population migration from village to town, phenomena that can be seen in our country also, leads to an increased growth of animal products, that must be supplied by a fewer number of animal farms, but with bigger productive capacities.

In the first and second graphics is showed the evolution of global population and also the evolution of global production of mixed fodders, and in the third figure, as a result from the other two, the medium consumption of mixed fodders per capita, in the last 30 years.

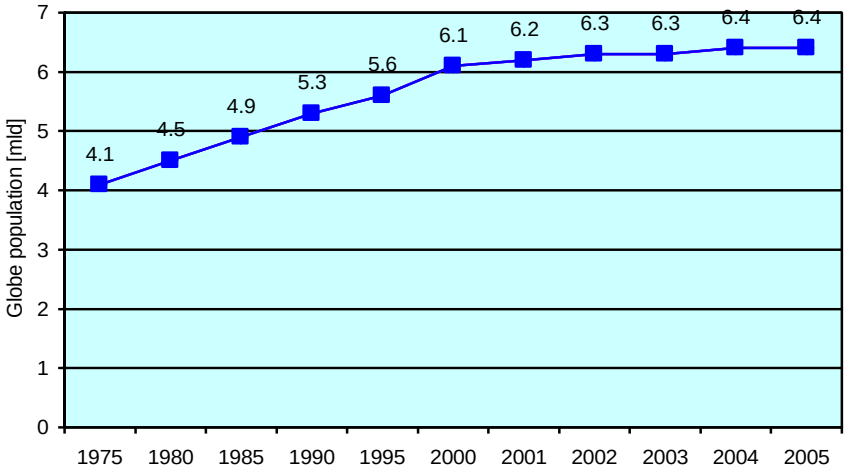


Fig. 1 The evolution of globe population

It comes out that by the year of 2000 the world wide production of combined fodders has been growing as slowly as population, while the consumption of mixed fodders has established at 96-97 kg per capita. On extended areas , the differences are though big as in concerns both production and consumption.

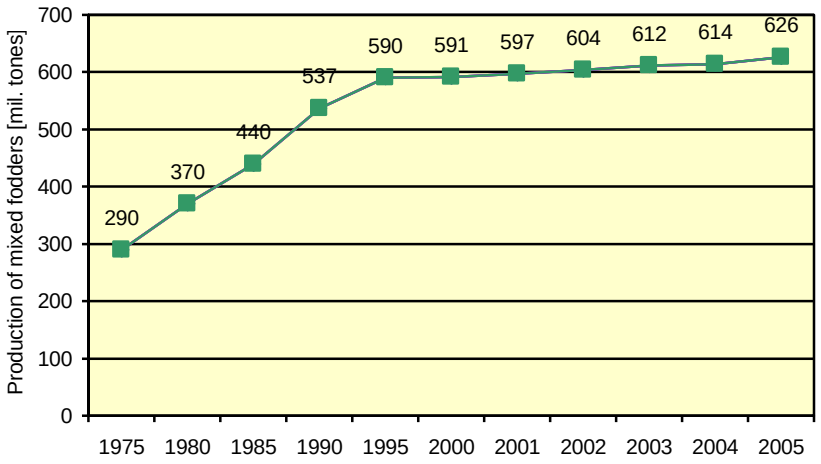


Fig. 2 Evolution of world wide production of mixed fodders

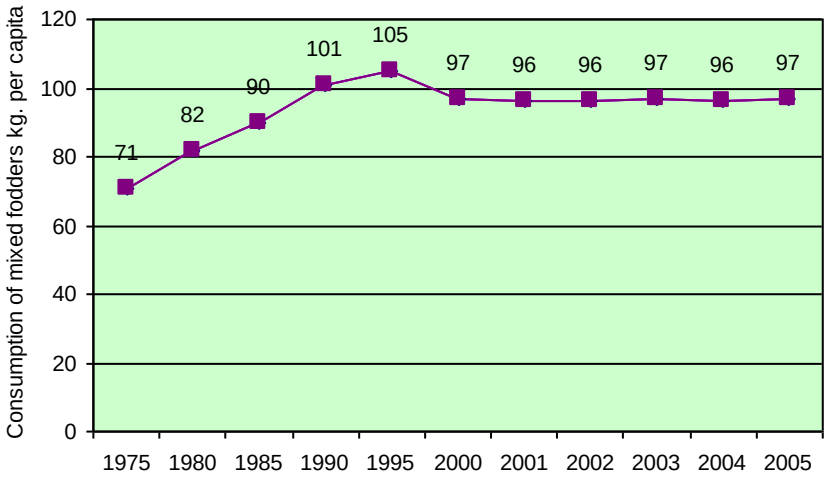


Fig. 3 Evolution of mixed fodders consumption

In 2005 the world wide production of combined fodders made industrially was about 626 mil. Tones, the biggest part of it, of 150,2 mil. Tones being produced in USA. Having a production of 2,8 mil Tones, our country is over the world wide average of mixed fodders production per capita, but still much under the agricultural possibilities of supplying raw material and of the zootechnical sector to use them. The European Union on the whole is the second world wide producer of mixed fodders, with a 141,6 mil. Tones production.

2. The technological process of making combined fodders

Combined fodders are mixtures obtained by mixing certain animal and vegetal fodders with mineral salts, antibiotics, vitamins, enzymes, medicinal substances, using some formulae that want to correspond to physiological necessities of different categories of animals. The main advantage of using mixed fodders in feeding animals consists in reducing costs of animal products.

Generally, the cereals used for feeding animals appears in the shape of grains of different size and dimensions. To realize nutritive mixtures as homogeneous as possible , the preliminary grinding of grains is necessary, operation which in factories of mixed fodders is realized in the very first step of the process, in mills with hammers.

The main stages of technological process of making combined fodders are:

- Receiving row materials
- Processing row materials
- Grinding row materials
- Dosation as in the formula
- Homogenization of row materials
- Granulation (for factories technological stage is imposed)
- Packing and delivering the final product.

Each of these stages need a series of equipments and professional utilities, bunkers for storing the product, auxiliary equipments, etc. In modern factories, the whole technological flux is watched and commanded by an operator.

In dosing stage, the concentrate PVM must be added (a complex of proteins, vitamins and minerals) which can be prepared or received from another supplier.

The quality of the product must be controlled after each stage, depending on preestablished criteria, to assure the quality of the final product and the mixed fodder delivered to the beneficiary.

From among these technological phases , for the actual study, the phase of grinding the grain presents the largest interest, which is one of the factors influencing the

quality of the final product. It is very important that cereals, which represent the largest component of a compound feed/fodder to be grinded as uniform as possible and that the amount of feed powder to be as small as possible. Milling operation is performed in hammer mills (..... Fig. 4), this process continuing to repeat until the particles reach a sufficiently small size to allow them to pass through the holes of the hamer mill's sive.

It has been found that the share of different categories of grinding mass fractions, for the same size of sieve's mesh, are substantially similar, their average value being shown in the graph of figure 4.

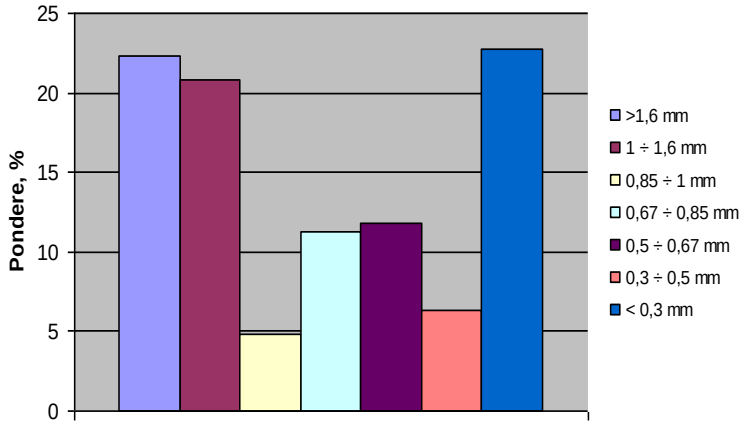


Fig. 4 - The share of fragments/fractions in the grinding mass

As it can be seen the particles with the smallest size,under 0.3 mm, have an important share, of over 20%. In this part there are many particles with extremely reduced sizes that, inevitably, when manipulated, are involved in the air as dust, phenomenon that should be avoided.

3. Specific problems of grain milling process

All grain processors, including those who produce compound fodder, must constantly pursue the following objectives if they wish to maintain their position on the market:

- reduction of production costs of the finished product;
- maintenance of product quality according to customer standards or requirements;
- compliance of regulations in forms on environment safety and protection.

3.1. Reducing production costs

For any technological process, therefore also for the production of compound feed, the production costs include several components, the main ones being the cost of installation/equipment, that is the initial investment and the operating costs.

In the case of the crushing of grain, reduction of costs is reflected in the growth of the capacity of milling(tons / hour) ,along with the reduction of the specific energy consumption (kWh / tonne), these being the parameters which define the efficiency of grinding facility in question. In this way the following versions of technology to increase milling capacity and reducing costs can be presented:

A. Reduction of grinding raw materials costs, technological phase with the highest consumption of energy ,can be achieved in two ways:
a) with two machines for grinding: a roller mill for crushing coarse grains and a hammer mill for fine grinding, in order to ensure a continuous operation (Fig. 5);

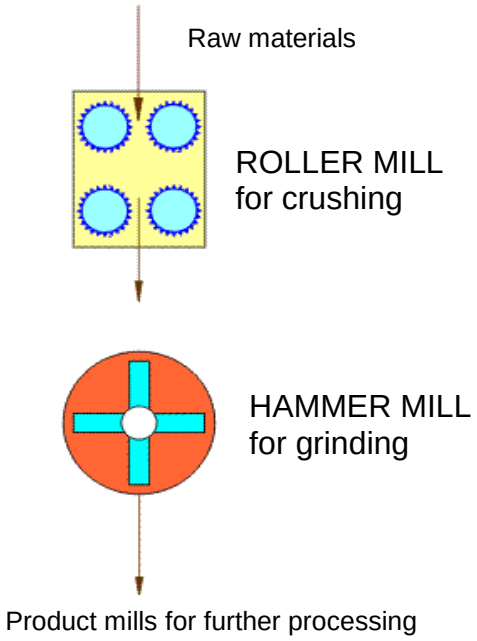


Fig. 5 - Grinding with two mills

b) with a single grinding mill, which can work:
- in charge: first a coarse grinding followed by fine adjustment of the mill and another grinding of charge
- in continuous flow, by sieving the crushed product and recycling the refusal grid (Fig. 6).

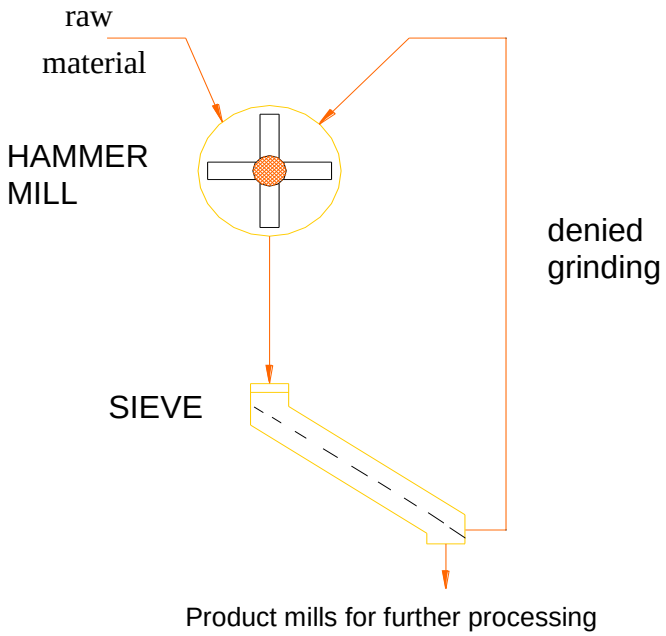


Fig. 6 - Grinding with a die,with sifting and recycling of the denials

B. The increase of the capacity of grinding of a hammer mill can also be obtained by:
- reducing the clogging of holes of hammer mill's sieve, a very important operation,

especially for sites with small holes. This requires the existence of an air current that helps the particles to pass through the sieve's holes, or the use of a fan to pick up the mill;
- recovery of fine particles of grinding that tend to get out in ambient air and their direct return to the basic product with the help of one bunker for decantation and of an air filter.

The two solutions presented above are complementary and can be combined in the grinding scheme presented in Fig. 7.

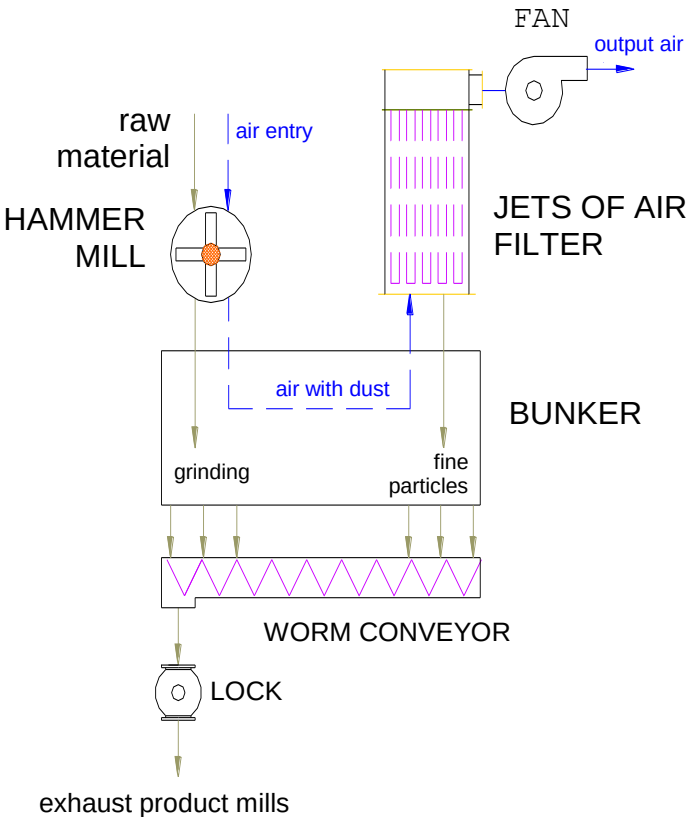


Fig. 7 - Layout of grinding with integrated system of suction and filtration

3.2. Temperature problem

In the hammer mills the electricity from the engine is converted into mechanical energy between hammers and sites in order to crush the grain cereals and to evacuate the grinding from the mill. Inevitably, a part of this energy is lost as heat during the collision of particles with hammers and sites. But it is necessary that this energy loss, namely the increased temperature (Δt) in the grinding chamber does not exceed a minimum value because:
- it can degrade the nutritional components of ground product;
- it leads to: clogging holes sieve, reducing the capacity of grinding and increasing the specific consumption of electricity;
- after getting out the flour from the mill, a part of the water evaporates and produces condensation in transmission systems.

It is not recommended that, during the grinding, the product temperature increases with more than 5 oC, nor that it presents unusual changes, and therefore measures should be taken for the evacuation of the heat from the grinding chamber with an air flow, and limitation of the temperature rise Δt.

3.3. The problem of dust

Flour dust leaving the hammer mill tends to be discharged into the atmosphere, and if it is not accepted immediately and it discharges in the precincts , hall pollution and air contamination occurs, endangering operators' health. By discharging into the atmosphere,

the air with dust in its suspension provokes the pollution of some larger areas and endangers of a large number of people. That is why, both inside the country and in EU there are rules and laws , becoming more and more stringent, limiting the emission of particulate matter in the atmosphere, including dust, in order to conduct an adequate environmental protection.

If a limit concentration is exceeded, organic dust can ignite or even cause an explosion in the presence of an open fire, a spark or of an electrostatic discharge.

Thus, dust retention from the technological air, before its disposal into the atmosphere, represents a need that has to be considered especially at equipment and facilities assimilation for the processing of grain.

RESULTS AND DISCUSSIONS

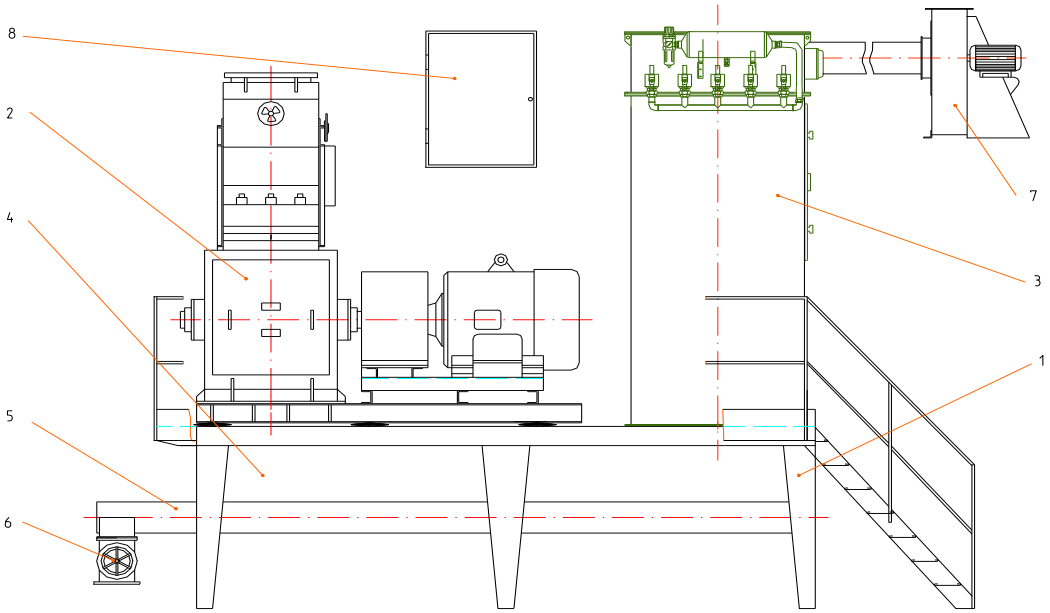
Introducing an automated installation for grinding the grain

Being given the requirements outlined above, a facility for grinding grain forage within a fodder kitchen or FNC must go through the following technological flux:

- grinding grain in a single step, with a hammer mill;
- aspiration of the hammer mill with a suction fan to limit warming grinded product and increasing the capacity of grinding;
- filtering the air before being discharged into the atmosphere;
- using a bunker for collecting the grindingfrom the hammer mill and the fine flour retained by the filter.

Grinding plant consists of (Fig. 8):

1. Platform with ladder access, on which technological equipment is mounted;
2. Hammer mill;
3. air filter with FJA 25;
4. Bunkers for collecting the ground product from the mill and fodder dust retained by the filter and shook by the jets of air;
5. Drag product for taking ground product from the bunker;
6. Lock suction system to ensure tightness of hammer mill;
7. Centrifugal fan to create necessary airflow ;
8. Plant automation for the control of electric engines/motors driving the moving bodies, which also contains the automatic plant for cleaning of the filtered elements.



1. Trestle - 2. Hammer mill - 3. FJA jets of air filter 25 to 4. Bunkers product collection - 5. Truck worm - 6. Vocal - 7. Fan - 8. Plant automation

Fig. 21- Sketch grain milling plant

CONCLUSIONS

To achieve a functioning market economy according to EU requirements is necessary to use modern equipment, efficient, highly mechanization, automation and computerization, with high productivity and low specific consumption.

Manufacturers of compound feed production facilities seeking to improve the technical and functional parameters. Thus, although differences between manufacturing firms, most manufacturers try to solve problems with a grain of suction and air filtering through the mill.

An automated facility for grinding cereals for use in compound feed factories, especially those where grist result is transferred to the next stage of processing by mechanical transport (elevators and conveyor worm).

Milling plants can be used in mixed fodder factory can adapt to new or existing plants to increase productivity, improve operating conditions of the hammer mill and reducing the quantity of dust discharged into the atmosphere by limits. But these facilities may be used in any area where it is necessary grinding of cereals, such as breweries and malt, alcohol and yeast factories, etc..

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11. *** * *** - Prospecte ale firmei româneşti ***S.C. BEGA TEHNOMET S.A.;***

NECESITATEA PRODUCERII SI UTILIZARII FURAJELOR PENTRU HRANA ANIMALELOR

THE NECESSITY OF FORAGE PRODUCTION AND UTILIZATION FOR ANIMALS' FOOD

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Key words: cereals, compound feed, grind, installation, automation.

REZUMAT

În această lucrare se prezintă unele considerații despre procesul tehnologic de preparare a nutrețurilor combinate şi despre stadiul actual al dezvoltării echipamentelor utilizate pe plan mondial şi național în vederea alegerii soluțiilor optime în construirea bucatariilor furajere, a FNC-urilor sau micro FNC-urilor.

Nutrețurile combinate sunt amestecuri obținute prin asocierea de furaje de origine vegetală şi animală cu săruri minerale, antibiotice, vitamine, preparate enzimatice şi substanțe medicamentoase, astfel dozate încât să răspundă necesităților fiziologice ale diferitelor categorii de animale. Avantajele utilizării nutrețurilor combinate în hrana animalelor sunt numeroase şi acționează pe multiple planuri, dar toate pot fi exprimate printr-un singur indicator, şi anume reducerea costurilor produselor animaliere.

ABSTRACT

In this paper there are presented some considerations about technological preparation process of compound forage and about the present stage of the development of utilized equipments on a worldwide and national scale with a view to choosing the best solutions for the construction of forage kitchens, "FNCs" or "micro FNCs".

Compound feed is a mixture obtained by associating vegetable and animal origin forage with mineral salts, antibiotics, vitamins, enzyme preparations and drug substances, dosed in a way that corresponds to physiological needs of the different animal categories. The advantages of utilizing compound forage in animals' food are numerous and they take action in multiple plans, but all of them can be expressed through one indicator only, namely the reduction of animal product costs.

INTRODUCTION

Long-term objectives of the national economy are the realization of a real market economy and its integration in European Union's structures, even though, at present, it is established that there is a decline of most of the productive branches. This requires, among others, the alignment of both industrial and consumer products to the community provisions. The achievement of this target requires an almost integral improvement of the technology of the production capacity, including in machinery manufacturing industry for zootechny, by endowing them with modern, performant equipments, with a high degree of mechanization and automation, with high productivity and low specific consumption.

Zootechny represents "the continuous fire branch" of agriculture and, at the same time, it is the true indicator of the entire economy, with important repercussions over the population's living standards, reflected in the consumption of products from livestock sector.

One of the important ways that can contribute to the development of zootechny is the complete and complex mechanization, the introduction of automation in the context of industrialization of this sector, in order to obtain some flexible, performant installations,

with adequate capacity, for the production of concentrated forage in farms with zootechnical profile. Such installations minimize transport costs, assure a solid, fresh food and avoid loss of raw materials, also creating the possibility that, depending on the specific of the recipe, to be able to introduce various ingredients in the stage of homogenization of the resulted flour (e.g. microelements, vitamins, animal flour, mineral salts etc).

World wide compound forage production has been of approximately 630 million tons. In the last 5 years, compound forage market has increased in average with 1,8%/year. Geographically, the areas where compound forage production and consumption have increased the most are Asia and South America, due to major changes and demands that took place in Brazil and in China in the recent years (in 2005, these countries were world leaders in terms of growth rate of compound forage production).

MATERIAL AND METHOD

1. Romanian industry of compound feed in worldwide and EU context

World wide compound forage production has been of approximately 630 million tons. In the last 5 years, compound forage market has increased in average with 1,8%/year. Geographically, the areas where compound forage production and consumption have increased the most are Asia and South America, due to major changes and demands that took place in Brazil and in China in the recent years (in 2005, these countries were world leaders in terms of growth rate of compound forage production).

In figure no.1 a graphic statistics is represented, which refers to the repartition of compound forage consumption, by animal species. Thus, knowing the consumptions from previous periods, it can be remarked that, in terms of evolutions of species, the largest increases have been recorded for poultry and porcine, while compound forage production for cattle tends to decrease.

Compound forage production for aquaculture has known important increases in the last two years, especially because of the decrease of oceanic fish stocks and because of the bird flu crisis.

In the coming years, it is estimated that the compound forage production will increase worldwide, with an average of 1%, and greater increases, over the average, are expected to be recorded in the countries from South America's region, due to fact that the price of ingredients utilized in the preparation recipes will increase in the other regions of the world.

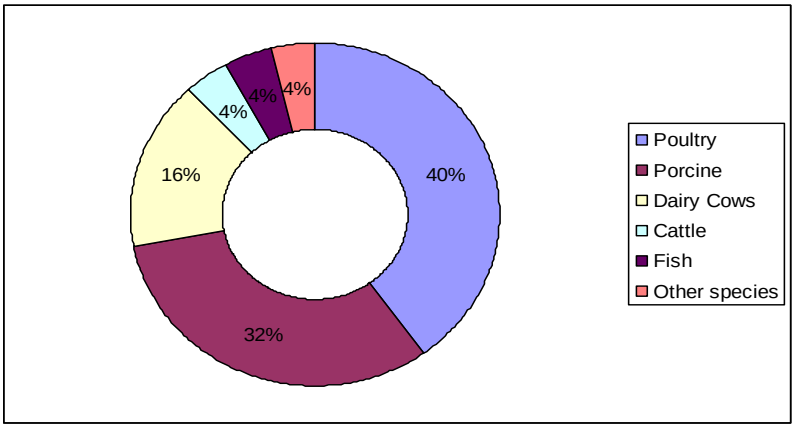


Fig.1 Repartition of compound forage consumption, by animal species

Towards the agricultural area existing in EU, which represents 41% from the total surface of the Union, Romania is advantaged by the fact that it owns a much larger share of the agricultural area, of 62%. In these conditions, Romania has an essential advantage compared to the other EU countries, namely a much larger share of agricultural land from the country area.

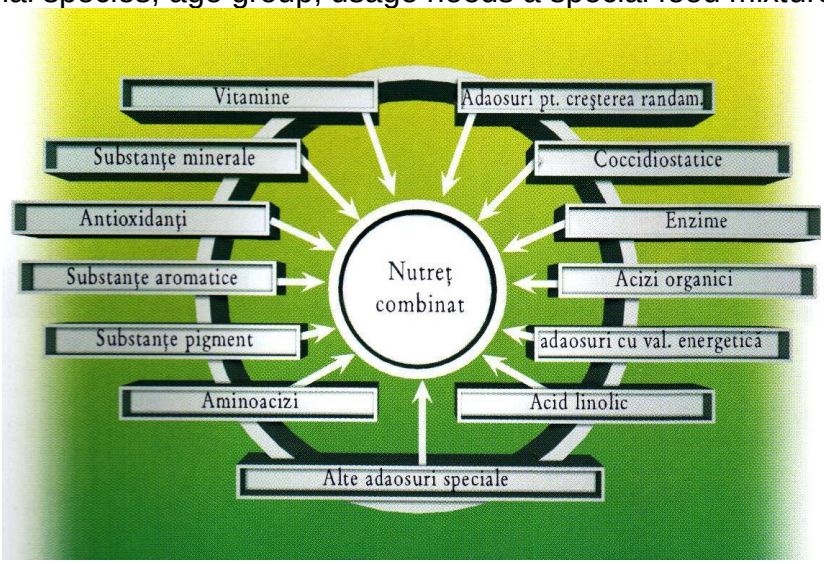
In terms of grains and oilseeds annual production, and taking into account Romania's agricultural potential, our country could mean one of the most important cereal, corn purveyor with the largest weight in compound forage.

With all these favorable conditions (geographical configuration and climate are favorable to obtain some very profitable vegetable and, implicitly, animal production), our country belongs to the category of countries that are forced to import substantial quantities of aliments. Normally, on Romania's agricultural area, there can be obtained sufficient quantities of vegetable and animal products so as to satisfy food needs of a population twice and a half larger than its own's.

For the supply of the world rapidly growing population, for the concentrated production and the efficiency of protein resources – meat, milk, eggs and fish – nowadays only intensive breeding can offer a solution. Satisfying the consumer demands must be effectuated in a profitable way and safely in terms of ecology, quality and quantity.

The success of intensive breeding is based on several issues: animal species of large genetic capacity, modern breeding technology, carefully controlled sanitary-veterinary conditions and competent management.

Besides these criteria, a decisive importance is constituted by a high-quality and profitable feeding. Modern feeding can be effectuated only with total value of compound feed. Every animal species, age group, usage needs a special feed mixture.



where: Vitamine = Vitamins
Substante minerale = Mineral substances
Antioxidanti = Antioxidants
Substante aromatice = Aromatic substances
Substante pigment = Pigment substances
Aminoacizi = Amino
Alte adaosuri speciale = Other special additions
Acid linolic = Linoleic acid
Adaosuri cu valoare energetica = Value-added energy
Acizi organici = Organic acids
Enzime = Enzymes
Coccidiostatice = Coccidiostats
Adaosuri pt cresterea randamentului = Additions for efficiency increase

Forage contains the vitamins, the mineral substances, the protein, amino and energy additions that are indispensable to animal development, as well as, if necessary, medicines, substances for improvement of the efficiency, flavoring material and other additions.

2. Types of instalations used for preparation of compound provenders.

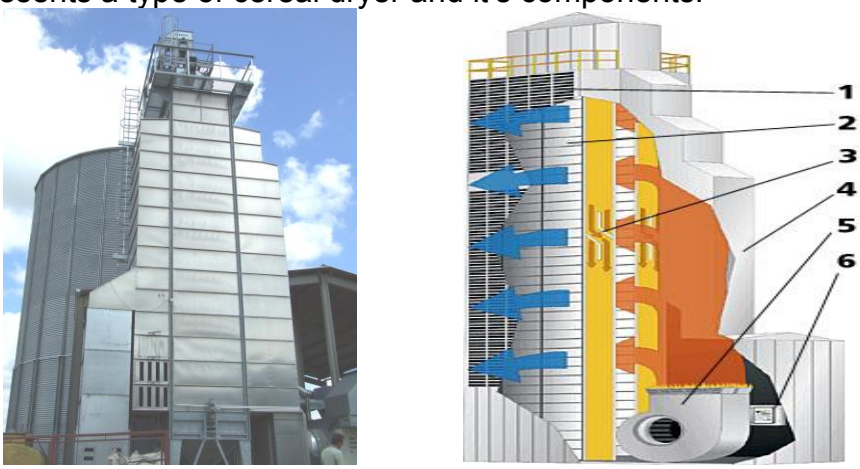
Compound provenders can be obtained either by mingleing different kinds of cereal flour, or by milling the whole grains mixt in order to obtain feed flour. Milling concentrate provenders is a process which consumes a big amount of energy. The machines used in this process ought to satisfy the following requests :

- to ensure the milling of different types of concentrate provenders;
- to ensure the possibility of choosing the size of the granules at the same machine,
- so that the quantity of flour dust obtained is minimum, according to the zootechnical requests;
- to ensure the milling of concentrate provenders (grains) in conditions of moisure
- up to 18%, without damading the productivity or the quality of the product;
- the temperature of the resulted product is not to rise more than 2-8^{0}C during the
- process, comparing to the initial temperature;
- the active parts of the machine must be lasting and not clame long repetated
- overhauling;
- the machines construction must be simple for an easy maintenance, repair and
- usage.

The machines and equipments used for preparing provenders mixes are :

1. Equipments for drying cereals.

Picture 2 presents a type of cereal dryer and it's components.



Pic.2 Layout of a hot and cold air dryer – GSI Company
1 – product input; 2 – humid air evacuation; 3 – metallic walls of the drying column; 4 – drying batteries; 5 – warm air fan; 6 – warm air generator.

2. Machines for milling provenders (mills)

Picture 3 presents a milling equipment.

Pic.3 – Milling equipment with two hammer-mills

3. Machine's filtration system (picture 6)

Pic.6 – Air jet filter FJA25

4. Mixers used to obtain combined provenders (picture 7)

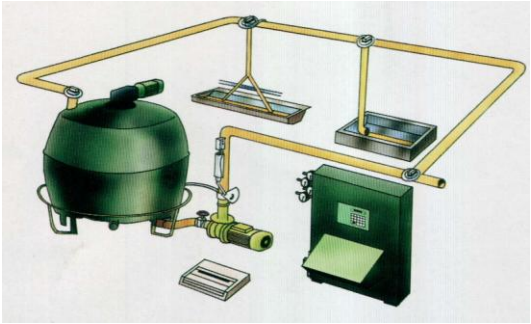
Pic.7 – Provenders mixer AF 1500

5. Provenders dither machines (picture 8)

Pic.8 – Dithering equipment (general view) the grainer itself

6. Equipments for paste food (liquid)

Picture 9 presents such an equipment for preparing and transporting liquid food.



Pic.9 – Distribution equipment

RESULTS AND DISCUSSIONS

The date of January 1st 2007 found Romania as the country with most farmers, about 37% of the total active population. These represent almost 40% of the number of existent farmers in the EU at present, where the share of active population in agriculture from the total number of active citizens is only 5,3%. The level of technical equipment in agriculture is precarious, for every 60 ha having only one tractor, compared to 12,7 ha/tractor, how the European average is. This, along with other causes, has caused low average yields per hectare, representing less than 50%, compared to the main EU countries.

The Romanian compound forage industry has entered the EU with an annual compound forage production of over 2,3 million tons, whereas in the 90s, this branch of national economy has known dramatic decreases: from 10 million tons in the year 1990, to only 1 million tons in the period of the second part of the 90s. The decrease of grain and livestock production from these recent years brought us in the paradoxical situation to import meat, when in fact, we should export it.

There are, though, chances that in the coming years the compound forage industry to record a growth rate of 5-7%/year. These growths will take place on fund support granted through common agricultural policy and productivity gains expected as a result of investments.

In our country there are enterprises which produce machines and equipments in the field of preparing compound provenders for different species and categories of animals, such as S.C. AZOMA S.A. in Arad and S.C. TEHNOFAVORIT S.A.- BONTIDA in Cluj-Napoca.

CONCLUSIONS

Great producer companies offer everything from manual feeding equipments, to full automatised technologies where all processes are commanded and supervised by a central computer unit.

Generally the equipments are the same, with only few differences concerning the materials used in some components, the number and the capacity of the containers, the construction of the scale and the level of automatisation of the whole process. These equipments are usually adapted to the conditions of the beneficiary.

When you analise a provenders kitchen, a FNC or a micro FNC, you need to look it's price and keep in mind the constructive and functional detailes of the components or the factors which influence the milling and mixing effect of the final product.

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STUDII PRIVIND ABSORBȚIA FONDURILOR STRUCTURALE PRIN MĂSURA 121 A FEADR ÎN REGIUNEA 4 – OLTENIA

STUDIES ON STRUCTURAL FUNDS ABSORPTION THROUGH 121 EAFRD MEASURES IN REGION 4 - OLTENIA

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Key words: structural funds, EAFRD, Region 4, absorption

REZUMAT

După aderarea României la UE, fermierii români pot accesa fonduri nerambursabile destinate modernizării exploatațiilor agricole în baza Programului Național de Dezvoltare Rurală (PNDR) finanțat prin Fondul European Agricol pentru Dezvoltare Rurala (FEADR).

PNDR este un program complex întocmit de reprezentanții Ministerului Agriculturii, Pădurilor şi Dezvoltării Rurale (MAPDR) în urma consultărilor cu reprezentanți ai organismelor, organizațiilor şi partenerilor sociali care activează în acest domeniu şi aprobat, după mai multe runde de negocieri de către Comisia Europeană.

FEADR sprijină dezvoltarea rurală cu ajutorul fondurilor europene continuând practic Programul SAPARD, având o structură şi un mod de implementare similare.

ABSTRACT

After Romania's EU accession, Romanian farmers can access grants to upgrade agricultural holdings in the National Rural Development Program (NRDP) financed by the European Agricultural Fund for Rural Development (EAFRD).

NPRD is an complex programme designed by representatives of the Ministry of Agriculture, Forestry and Rural Development (MAFRD) in consultation with representatives of agencies, organizations and social partners active in this area and approved, after several rounds of negotiations by the European Commission.

EAFRD support the rural development through European funds continuing the SAPARD programme, having a structure and a similar implementation.

MATERIAL AND METHOD

This study is a statistic one and was done on the projects submitted by beneficiaries in the region 4 - Oltenia selected for funding under the project submissions sessions conducted in March-December 2008 period.

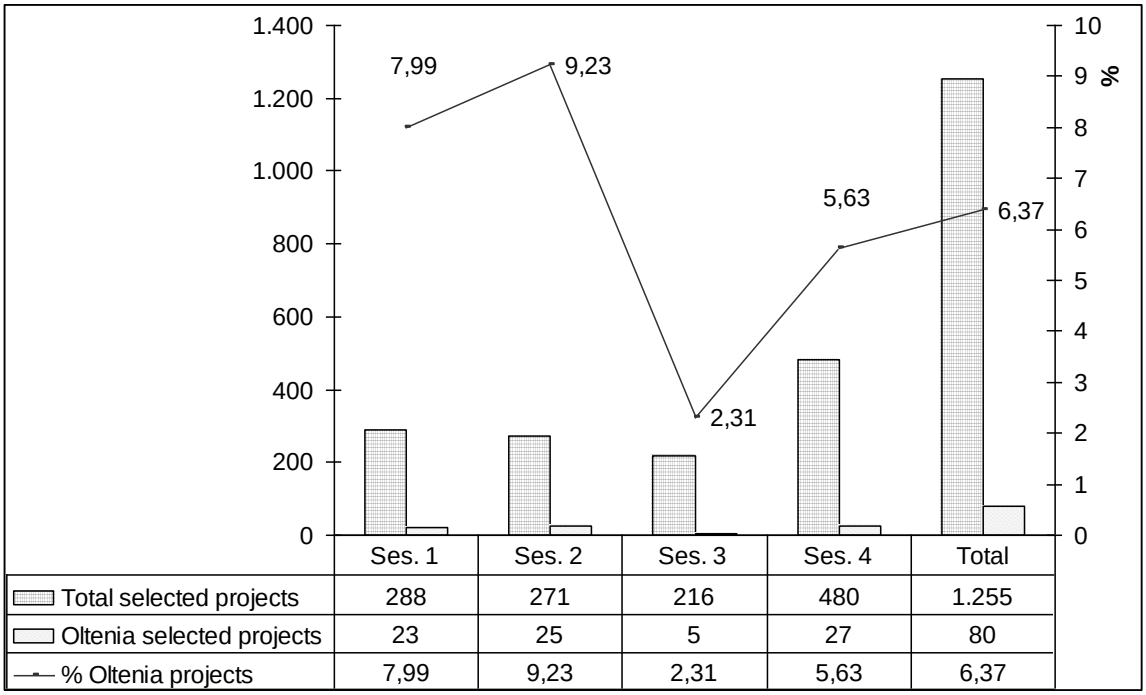
In the year 2008 under Measure 121 "Modernization of agricultural holdings", 4 projects sessions were organized, namely March, April, May and November-December, which is one of the first measures launched by the APDRP in the framework of EAFRD.

Oltenia region includes five counties in south-western Romania, respectively Dolj, Gorj, Olt, Mehedinți and Vâlcea.

Results for each of the 4 national selection session implemented during 2008 was published on the official website of the Agency for Payments, Rural Development and Fishing (APDRP), - www. apdrp.ro, on more than 90 days after the end of each session for submission of projects

RESULTS AND DISCUSSIONS

Situation number of projects selected under measure 121 sessions during the year 2008 is shown in Figure 1.



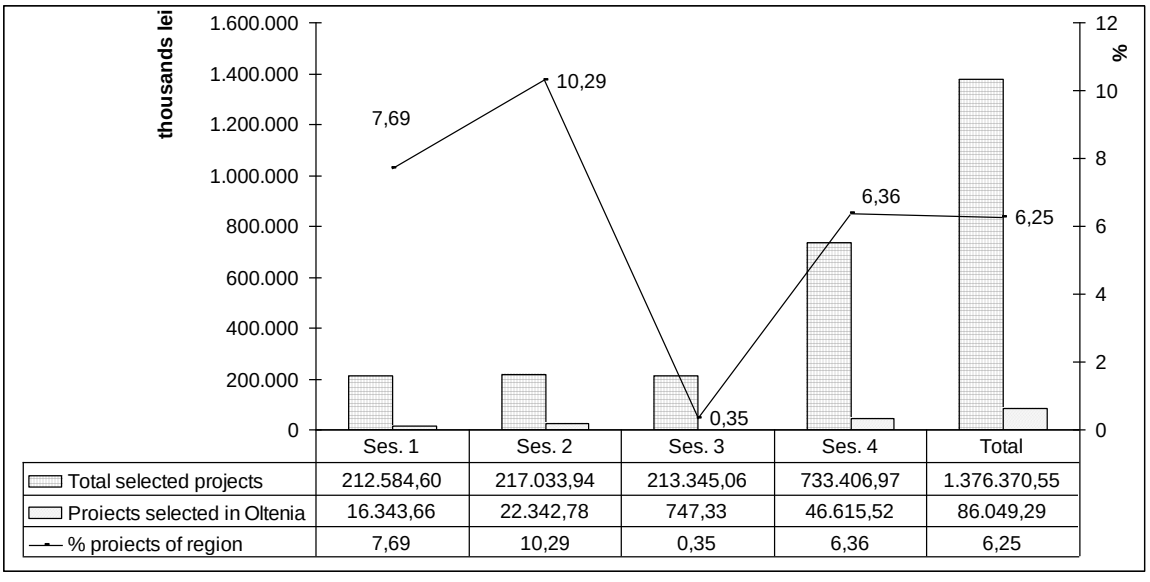
	Ses. 1	Ses. 2	Ses. 3	Ses. 4	Total
Total selected projects	288	271	216	480	1.255
Oltenia selected projects	23	25	5	27	80
% Oltenia projects	7,99	9,23	2,31	5,63	6,37

Figure 1 - Situation of selected projects number under Measure 121 sessions in 2008

It can be noted that region 4 - Oltenia obtained during the selection process under 10% in each session held so far, averaging 6,37% of the projects selected at national level.

It also notes that in the third session, held during May, the percentage of participation at national and regional level was very low, which is due on the one hand the amount allocated for this session and on the other hand, the fact that farmers were in the summer campaign.

Situation value of projects selected under measure 121 sessions during the year 2008 is shown in Figure 2.



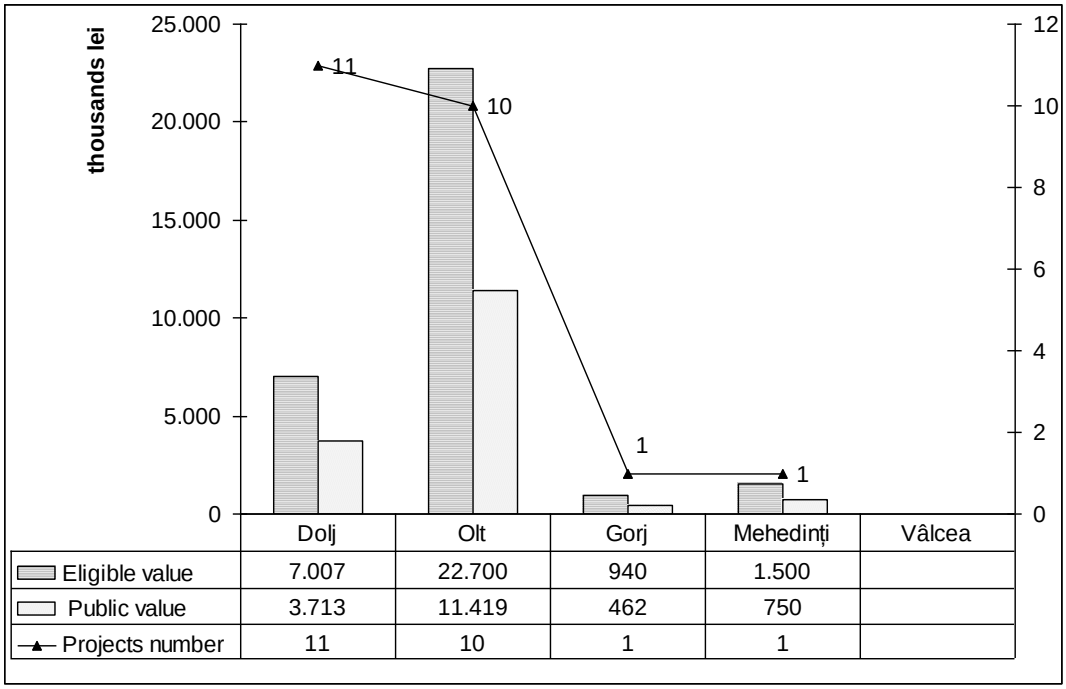
	Ses. 1	Ses. 2	Ses. 3	Ses. 4	Total
Total selected projects	212.584,60	217.033,94	213.345,06	733.406,97	1.376.370,55
Proiects selected in Oltenia	16.343,66	22.342,78	747,33	46.615,52	86.049,29
% proiects of region	7,69	10,29	0,35	6,36	6,25

Figure 2 – Situation of selected projects value under Measure 121 sessions in 2008

The eligible amount of the selected projects presents a similar situation to the numeric one, the lowest amount attracted Region 4 Oltenia being recorded in the third session.

In the first projects session organized, at national level have been received 712 projects of which 288 were selected for contracting. Of these, 23 belonged to beneficiaries from the Oltenia region (fig. 3).

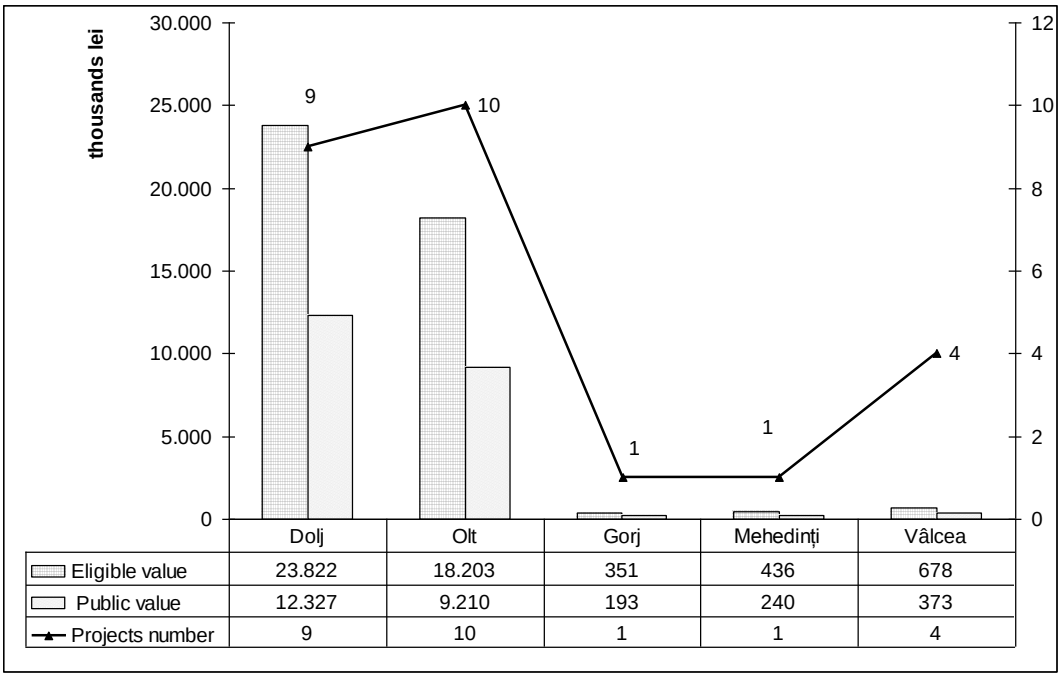
Thus, from the 23 projects selected, 11 belonged to the Dolj county, Olt county were 10, Mehedinți and Gorj counties participating each with one project. In this session, was not selected any project from Vâlcea county.



	Dolj	Olt	Gorj	Mehedinți	Vâlcea
Eligible value	7.007	22.700	940	1.500	
Public value	3.713	11.419	462	750	
Projects number	11	10	1	1	

Figure 3 – Situation of projects selected in Region 4 Oltenia in session March 2008 of the 121 Measure

In value terms, it can be noted that the projects selected in Olt County absorbed about 50% of funds raised by private beneficiaries from Oltenia region in this session.
In Figure 4 is presented the results of the second session of the projects carried out in April 2008.



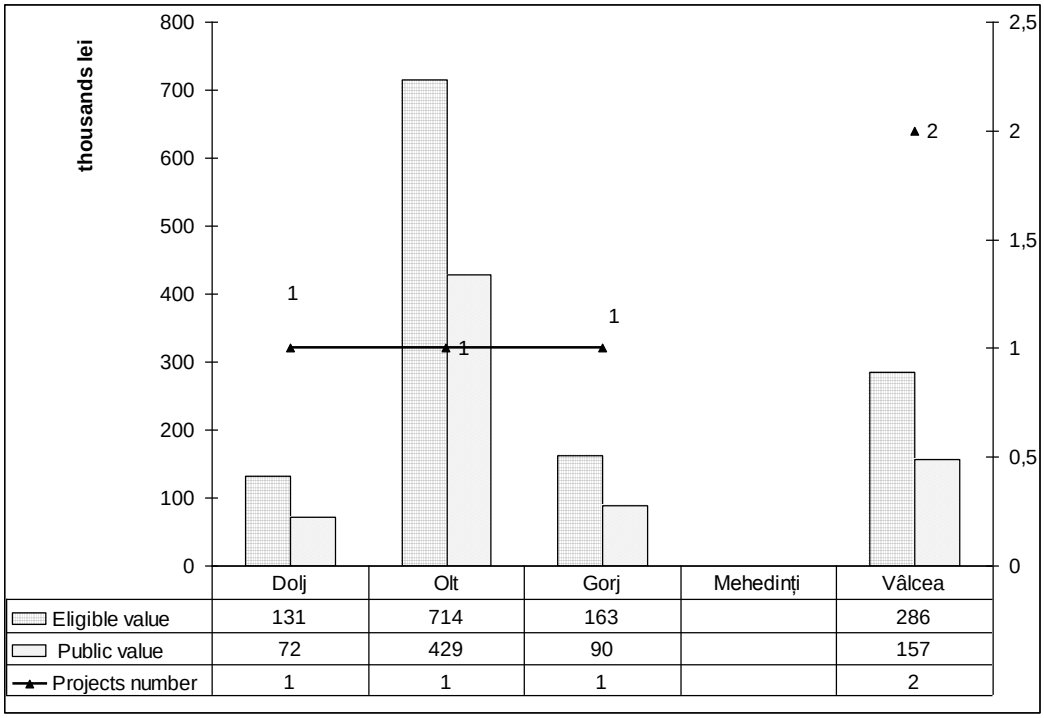
	Dolj	Olt	Gorj	Mehedinți	Vâlcea
Eligible value	23.822	18.203	351	436	678
Public value	12.327	9.210	193	240	373
Projects number	9	10	1	1	4

Figure 4 – Situation of projects selected in Region 4 Oltenia in session April 2008 of the 121 Measure

It may be noted that Dolj and Olt are again competitive position both in terms of number of projects and in value terms. This time, from 25 projects, 10 were selected in Olt County, 9 county of Dolj, Vâlcea County 4 and in Mehedinți and Gorj one project each.

The value of projects submitted in Dolj County was over 50% of the selected projects in the region, Gorj county beeing on the last place.

In the course of the third session of projects carried out in May 2008, very few projects were selected from Oltenia region 4, respective 5 (Fig. 5).



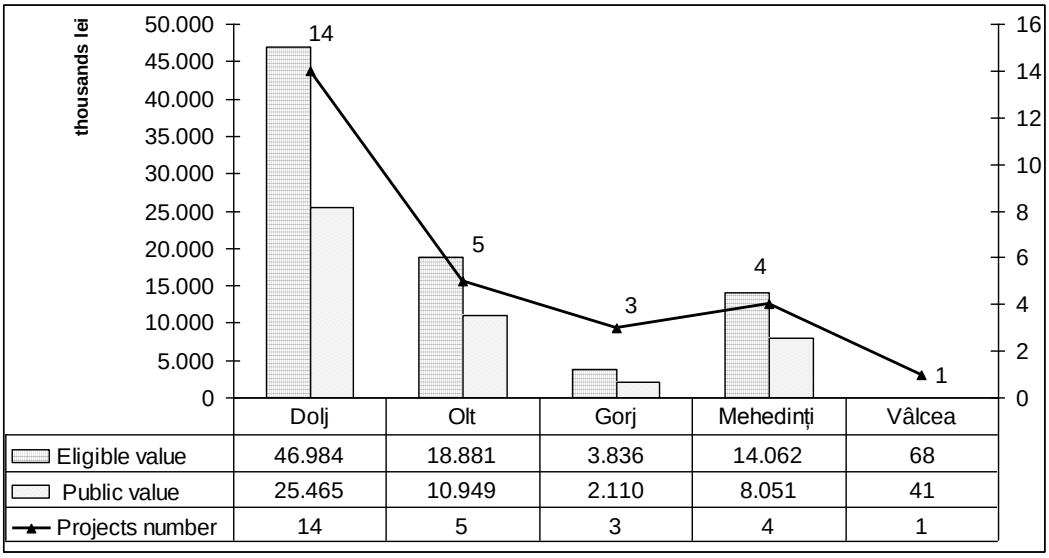
	Dolj	Olt	Gorj	Mehedinți	Vâlcea
Eligible value	131	714	163		286
Public value	72	429	90		157
Projects number	1	1	1		2

Figure 5 – Situation of projects selected in Region 4 Oltenia in session May 2008 of the 121 Measure

Among them, 2 belonged to the county Vâlcea, Dolj, Olt and Gorj each with one project selected, Mehedinți county having none selected project.

In terms of funds raised in the Oltenia region 4 by accessing funds run by 121 in the session May 2008 Olt County is the leader, followed by Vâlcea and Dolj.

In the course of the fourth session within 121 measure conducted in November-December 2008, in 4 Oltenia region 27 projects were selected (Fig. 6).



	Dolj	Olt	Gorj	Mehedinți	Vâlcea
Eligible value	46.984	18.881	3.836	14.062	68
Public value	25.465	10.949	2.110	8.051	41
Projects number	14	5	3	4	1

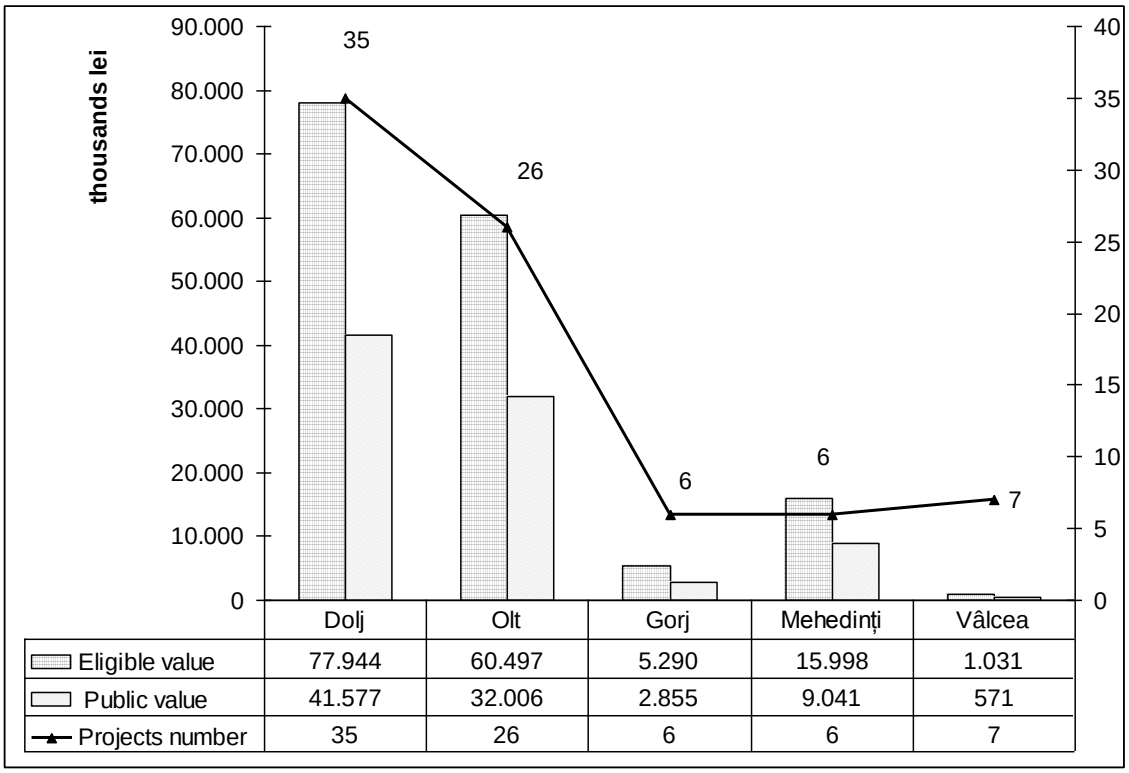
Figure 6 – Situation of projects selected in Region 4 Oltenia in session November-December 2008 of the 121 Measure

Of these, 14, representing over 50% of the region, belonged to the county of Dolj, followed by Olt (5), Mehedinți (4), Gorj (3) and Vâlcea (1).

In terms of funds raised, the situation is identical to the third session, in the first place topping Dolj county with funds of over 50% of the region.

The general situation of projects selected generală a proiectelor selectate la nivelul regiunii 4 Oltenia în cadrul Măsurii 121 în anul 2008 este prezentată în figura 7.

Overview of selected projects in the region of Oltenia in 4 Measure 121 in 2008 is shown in Figure 7.



	Dolj	Olt	Gorj	Mehedinți	Vâlcea
Eligible value	77.944	60.497	5.290	15.998	1.031
Public value	41.577	32.006	2.855	9.041	571
Projects number	35	26	6	6	7

Figure 7 – Situation of projects selected in Region 4 Oltenia under Measure 121 in 2008

During 2008, Dolj County presented the best indicators of the region both in terms of number of projects selected adjudecându-and 43,75% of the total number of projects of the region and in terms of value of projects eligible.

In the next place is situated Olt county occupying 32,50% of the projects selected under this measure in the region, followed by Vâlcea 8,75% and Gorj and Mehedinți with 7,50% each one.

As to the eligible amount of public contribution, the selected projects in the region of Oltenia situation is similar to situation number of projects submitted.

Thus, Dolj County ranks first in the region with 48,48% of the eligible projects selected in region and 48,32% of the public contribution attracted, followed by Olt 37,63% / 37,20%, Mehedinți 9,95% / 10,51%, Gorj 3,29% / 3,32% and Vâlcea 0,64% / 0,66%.

Level and low value recorded in the region 4 Oltenia, especially in countyes of Vâlcea, Gorj and Mehedinți, in the projects sessions undertaken during 2008 for Measure 121 is probably due to the lack of consultants, financing conditions of the EAFRD (reimbursement program) but also to insufficient information to potential beneficiaries about the benefits involved accessing development funds run by 121 so far.

It can be noted that the low rate funds absorbtion recorded in the countyes of Vâlcea, Gorj and Mehedinți can be also explained through the local condition, especially the high relief forms presente, which is not very favourable to develop large agricultural explotations but agritouristic and forestry bussiness funded through other measures not included in this research.

CONCLUSIONS

During the year 2008, Region 4 Oltenia absorbed 6,25% of funds allocated at national level through Measure 121 of NRDP, with 80 selected projects representing 6,37% of national selection.

The regional situation of selected projects under this measure situate Dolj County on first place in the region with 48,48% of the regional eligible projects selected and 48,32% of the public contribution attracted, followed by Olt 37,63% / 37,20%, Mehedinți 9,95% / 10,51%, Gorj 3,29% / 3,32% and Vâlcea 0,64% / 0,66%.

Level and low value recorded in the region 4 Oltenia, especially in countyes of Vâlcea, Gorj and Mehedinți, in the projects sessions undertaken during 2008 in the framework of Measure 121 is probably due to the lack of consultants, financing conditions of the EAFRD (reimbursement program) but also to insufficient information to potential beneficiaries about the benefits involved accessing development funds run by 121 so far.

Another possible reason for the low rate funds absorbtion recorded in the countyes of Vâlcea, Gorj and Mehedinți can be also represented by the local condition, especially the high relief forms presente, which is not very favourable to develop large agricultural explotations but agritouristic and forestry bussiness funded through other measures not included in this research.

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UTILITATEA UNEI PLATFORME MOBILE DE ÎNCERCARE A AMORTIZOARELOR IN CONFORMITATE CU NORMELE DE SIGURANȚĂ ALE AUTOVEHICULELOR

THE UTILITY OF A DAMPER MOBILE TEST PLATFORM ACCORDING TO THE VEHICLE SAFETY PROCEDURES

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Key words: dampers, test table, auto vehicle safety.

REZUMAT:

Prezenta lucrare îşi propune identificarea unor soluții în vederea proiectării şi realizării unei platforme de încercare a amortizoarelor, *care să permită înregistrarea şi ridicarea diagramelor Forță-Timp, Forță-Viteză sau Forță-Deplasare, cât şi efectuarea de teste de încercare la oboseală. Utilitatea unei platforme compacte de testare a amortizoarelor, care sa ofere posibilitatea afişării caracteristicii elastice în timp real şi să permită efectuarea unor probe de anduranță asupra acestora, deriva din folosirea amortizoarelor în cele mai variate domenii, dar mai ales în industria echipamentelor tehnice mobile, unde reprezintă o componenta importanta care contribuie la siguranța si confortul pasagerilor sau mărfurilor. Având în vedere costurile ridicate pe care le implică la momentul actual testarea amortizoarelor este oportună proiectarea şi realizarea unei platforme compacte pentru încercarea dinamică a acestora, care va avea un consum de energie şi costuri de întreținere reduse.*

ABSTRACT

This paper aims at identifying solutions to design and realize of a damper test platform, which will permit the recording and building of the diagrams: Force-Time, Force-Speed, or Force-Travel, as well as tests performed on fatigue. The utility of this compact type of platform, which will offer the possibility of posting the elastic characteristics in real time and will permit the making of endurance tests over them, derives from the use of dampers in the most varied domains, but especially in the mobile technical equipment industry, where it represents an important component that contributes to the safety and comfort of the passengers or of the shipments. Taking in mind the high costs which are implied at present times for the damper test, it is opportunistic to think of a compact platform for the dynamic testing of dampers, which will have an energy consumption and maintenance costs low.

INTRODUCTION

The new European legislation regarding the safety of auto vehicles will impose hard standards for the producers. The European Union Council and the European Parliament have finalized a legislative package regarding the safety level of auto vehicles The new General Regulation of Safety started from a proposition of the European Committee (EC) from 2008. Gunter Verheugen, the European Commissioner for industry, says there are three important effects:

- legislation simplification;
- upgrading the road safety
- making fuel consumption efficient.

This regulation will replace the multitude of directives regarding car safety, will ensure a bigger harmonization degree and would simplify things in the auto industry, according to Ian Knowles, EC General Director for Industry Official.

- So, in the context of the elements described above, the role of dampers in all of the vehicle's geometry is very important. The fact that the use of dampers that do not respect the present rules often leads to accidents with tragic consequences. Although, now, in our area the testing and determination of the damper parameters are made on installations called "Hidropuls" with a high consumption of electric energy and other materials, the damper is an element of great importance for the safety and performance of technical equipment. Also, because it is conceived as an integrated part of the suspension system, any made modification has unexpected effects over the car's general characteristics.
- The damper's main function is to control between the static masses of technical equipments (chassis, body, engine, passengers, load, etc) and the moving ones (wheels, envelopes, brakes, etc) in the course of it's life. In working time, these masses produce, through terrain irregularities or direction changing, continual mechanical shocks which are transmitted to the running system, passengers, direction, etc. The damper role is exactly to absorb this mechanical energy, owed to the vertical launching of the technical equipment, and the dissipation in the surrounding environment under the form of thermal energy, creating the vehicle trajectory stabilization.

MATERIALS AND METHODS

Dampers

The dampers used in the auto vehicle suspension have the role to rapidly dissipate the vertical oscillation energy of the auto vehicle's body and wheels through its transformation into caloric energy spread out into the environment.

- the dampers are placed in parallel with the primary elastic elements of the suspension and represents a base element in the insurance of comfort and safety in circulation.
- In modern vehicles, the most frequently used dampers are telescope hydraulic dampers. The work principle of these dampers consts of the following: at relative travel of the suspended mass towards the unsuspended mass, the viscous liquid from the damper's body is obligated to pass through small section orifices. Due to liquid friction that appears at it's passing through calibrated orifices, the oscillation energy transforms into caloric energy.
- The dependency between the F damper resistance force, (the opposite liquid force at it's passing through calibrated orifices) and the relative speed between the suspended and unsuspended mass (Vp damper piston speed) defines the damper characteristic. The resistance force of the telescope damper is given by the following relation:

$$F = CV^{-1},$$

in which C is the damper resistance coefficient, i – speed exponent.

According to the i speed exponent, the damper characteristic can be linear (i=1), regressive (i<1) and progressive (i>1).

The regressive damper advantage consists of the lower value resistance forces at high oscillation speeds and thus the passing of low forces to the frame or the body. The ones with progressive characteristic have an advantage; the resistance forces are of low value and at low oscillation speeds (travel with low speed or travel on paths with fine slopes) and rise rapidly with the rise of the oscillation speed. The optimal characteristic is a square characteristic (i=2), which ensures a good comfort. Also, the bridge oscillation is amortized rapidly after a square law and a higher circulation safety is obtained.

According to the report between the damper resistance coefficients at compression displacement (masses gathering displacement) and the relaxation displacement Cd (distance masses displacement) , the telescope dampers can be:

with double effect and symmetrical characteristic, $C_c=C_d$;
with double effect and asymmetrical characteristic, $C_c \neq C_d$;
with simple effect, $C_c=0$; $C_d \neq 0$;

The vast majority of dampers are with a double effect and an asymmetrical damper characteristic with $C_d=(2\div5)\ C_c$

The use of such characteristics is motivated by the tendency to lower the shock effect at the wheels traveling over bumpy spaces, through a smaller amortize at the compression displacement.

If Cc is high, at the wheel's passing through the roadway bumps, the speed of the unsuspended mass rises and through the damper a large force will be transferred, and at the passing over whole type bumps, the transferred forces are low. If, Cd is too big though, Cd is too large, travelling through a bumpy road the wheel can lose contact with the road, it can co pass a hole without touching the bottom.

At travelling on roads with irregular surface, high differences are recommended between Cc, and Cd coefficients. In the case of travelling over long bumpy but fine roads, a small difference between Cc and Cd is recommended.

The damper resistance coefficient C is defined by the relation:

$C = 1/2(C_c + C_d)$.

The C coefficient is picked so that the damper effect towards the oscillations will ensure the passenger's comfort and the protection of shipment in the condition that the vehicle is travelling on irregular surfaces.

In the case of dampers with progressive characteristic, for reducing the forces that are transmitted through the damper, discharge valves are installed (compression, relaxation). When the relative speeds between the two masses reach a level, a so called critical speed (Vcr), the discharge valves opem and the liquid passing sections get bigger. So, the damper effect force will slowly rise. It is recommended that the damper should work with the discharge valves closed until the correspondent speeds of the low frequency oscillations, with equal amplitude with the suspension displacement until the limitator's coupling. This speed is:

$$V_{cr} = h_r \times \omega_0 \approx 0{,}2 - 0{,}4 \text{ [m/s]}$$

Where:

h_r is the wheel displacement until the limitators coupling, is determined from the elastic characteristic of the suspension.

ω_0 suspension own pulsation.

In figure 1 the characteristic of damper effect for an asymmetrical damper with double effect. The curves 01 and 01' are the progressive characteristics for relaxation, respectively compression, with closed discharge valves. The abscissa of points 1 and 1' determine the critical speeds at which the discharge valves open. At higher piston speeds, higher than critical speeds, the resistance forces F_d and F_c will not rise above the interrupted line, but slower, after the continuous lines 12 and 1'2'.

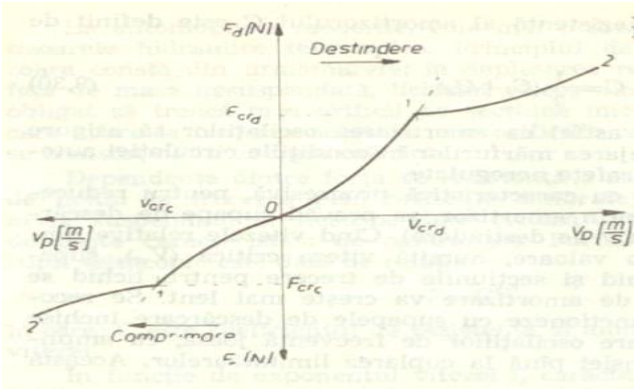

Fig.1 The amortization characteristic for the double effect asymmetrical damper

To ensure a sufficient depreciation of amortization forces, it is recommended that the correspondent portion of open valves be regressive.

The critical forces of amortization are between the limits of: F_{crd}=2000÷3000N for the relaxation displacement and F_{crc}=400÷700N for the compression displacement. Between the two forces the following relation is recommended:

F_{crd} = (1/4…1/3) F_{crd},

The value is taken lower if the roads to which the vehicle is destined to circulate are of good condition.

In table 1, there are a series of vehicles, the medium values of the damper resistance coefficient: [1,2,3]

Tabel 1

Recommended values for the damper resistance coefficients

Vehicle	C_c		C_d		C			
	With closed valves				With closed valves		With open valves	
	Front	Rear	Front	Rear	Front	Rear	Front	Rear
Vehicles with:								
-micro-displacemet	360	450	3000	3310	1680	1880	1090	1570
-small and medium displacement	1030	900	3380	4110	2455	2500	970	950
-large displacement	1380	920	4440	4470	2890	2695	1540	1380
Trucks:								
$G_a<90x10^3$ N	1110	-	5870	-	3490	-	2060	-
$G_a>90x10^3$ N	1660	1530	14300	11700	7980	6615	5650	4500
Buses:								
$G_a>10^5$ N	860	900	13800	13400	7330	7150	3960	4400

Trial Stand models of damper characteristics

For the calculus and vehicle oscillation study, the damper characteristic is required and it represents the F resistance force dependency to the V damper piston travel speed. The damper characteristic is shaped on the basis of building of more work diagrams obtained at piston constant work and at oscillations with variable frequencies.

The “forward-backwards” alternative movement of the damper piston is realized with the help of an eccentric with a tuning arm (adaptable to different displacement values), through the help of a guided slide on two vertical columns, of which the lower head of the damper is placed. The top half of the damper is placed on the stand frame through the help of a force transducer, the signal of which is amplified and introduced in the recording and visualizing system (oscilloscope). The relative movement of the two damper parts is managed with the help of an inductive movement transducer, the signal of which is amplified in the same way and transmitted to the recording machine, either directly, or after passing through a difference amplifier, of which characteristic drops quickly at bigger frequencies than the signal’s (for filtering the perturbation signals); in this way, the signal from the movement transducer is proportional either with the displacement, or with the rod speed of the damper. Simultaneously introducing the two signals form the transducers X and Y of an oscilloscope or recorder X-Y the work diagram and the damper characteristic represented by the dependency force-displacement and force-speed.

In our country the damper testing for vehicles and special uses are realized at INMA – Bucharest with the help of HIDROPULS group (fig.2). According to the beneficiary request, the test can contain the test of damper function, shock testing of the valves, tests

of grips and tampons. These tests assume the determination of the amortizing characteristics (characteristic F-V or F-S), the valve resistance verification at instantaneous overpressure, the anti-cavity limit, the static and dynamic tests of the grip. According to the situation, the amortizing characteristic is made through processing the data papers recorded on the course of one or more cycles (force papers and movement papers according to time).

Fig. 2 – Stand for damper testing – INMA – Bucharest

The fluid dampers with magnetoreological fluid (MR) are tested in the state at The Institute if Solid Mechanics (IMS) of Romanian Academy. In order to obtain the damper answer to different excitations, a series of measures of the hydraulic stand take place. A first set of measures was made out of determining the damper answer to cyclical solicitations of different amplitudes (10÷20mm), frequencies (1÷2,5HZ) and different constant values of alimentation current between 0 and 2A. The stand on which the damper characteristics test is executed is represented in the following figure 3.

Fig. 3 – General view of the stand

The suspended mass of the system is 100kg, correspondent to the total weight of the chair and the driver, being suspended by 4 springs with a total rigidity k=33360N/m of a fixed rigid frame on a vibration hydraulic exciter. The own oscillation frequency of the suspended mass is aprox.. 3Hz, having a typical value for suspension of a vehicle chair. The vertical movement of the suspended mass is guided by 4 rods that block the movement horizontally, ensuring a very tight level of friction forces on a vertical direction.

The used MR damper is the experimental model made in IMS, which generates amortization forces of aprox three times smaller than the MR damper, type RD1005, thus

permitting the amortization control of an oscillatory system of relatively low dimensions, so as it is presented in figure 4.

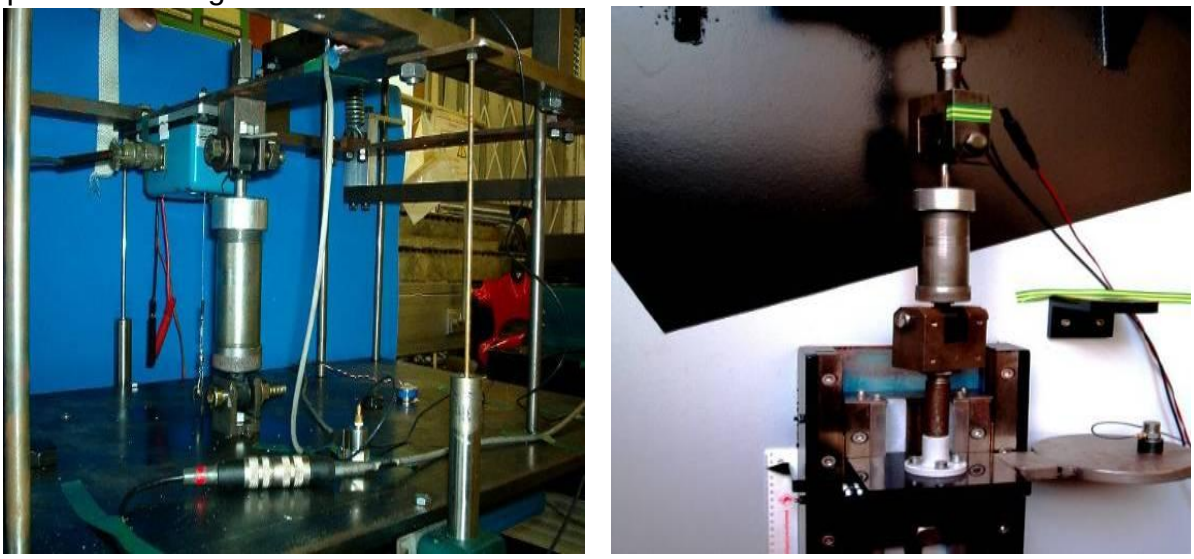

Fig.4 – The fixation module of the MR damper and of the acceleration transducers, speed, movement and testing of the MR damper model testing on the IMS stand

The variation in time of the amortization forces, determined experimentally on a specialized stand from IMS (fig.5), are represented in fig.5, for a sinusoidal movement imposed with the amplitude $\hat{x} = 20mm$ and the frequency $f = 1.5Hz$. As it can be seen from these diagrams, for values in the domain 0÷1A of the control current, the amortization forces can be raised by aprox. four times. This rise is practically linear until 0.6A, certain saturation could be observed for bigger control current values.

The control current is given by a converter tension- current realized in IMS, which necessitates a supply source with the power of 24W (12V X 2A). This device permits the tuning of the manual control current with the help of a potentiometer or automat through external control tension (0-5V). This tension is generated through measurement and processing signals of system answer, according to the adopted control strategy.

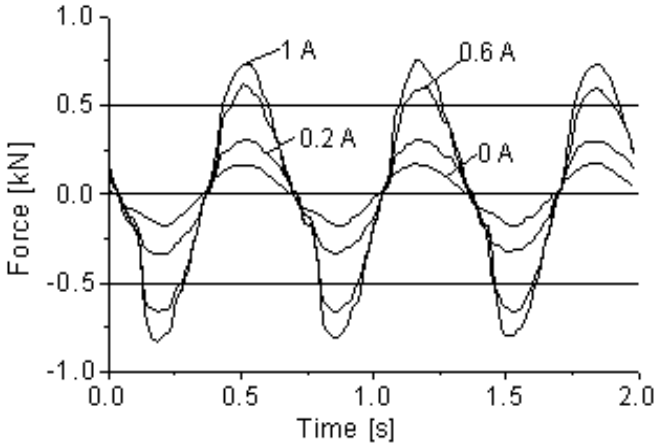

Fig.5 - The amortizing force variation in time for different constant values of control current

Abroad, the damper test is realized on hydraulic stands with low energy consumption and a high efficiency due to the fact that the damper tests 6,8,10,12, and 20 can be performed at the same time. An example is MTS Landmark which is specialized in hydraulic stands creation for damper testing and in specialized software for result interpretation. The stand for damper test produced by MTS is represented in fig. 6 [4].

Fig. 6 – Stand for damper test produced by MTS Landmark

The platform's main parts for damper testing from fig.6 are the tensometrical dose, chassis, grip system for the platform made out of a large and stable plate and a vibration isolation system, command panel, hydraulic action system, the two guiding columns, outlets, grip screws, automatic positioning system of the grip device, grip device of the damper that must be at the same time rigid and light.

The command panel is designed to maintain the attention of the operator high in tests and permits his intervention at any time. The testing system delivers a high security level that is according to the European Union. The automatic positioning of the damper grip top gives a strict control in the operations of lifting and lowering during tests, ensuring a safe operation and at the same time la reduction of the time necessary for the test. A hydraulic cylinder speed limitation circuit restricts its speed, preventing unexpected movement that can lead to work accidents.

CONCLUSIONS

Following the established analysis the main damper quality verification methods have been obtained,, according to the standards. Also a parallel between the platforms used for damper testing from Romania and abroad has been made. So, on platforms from our country, the tests are difficult, with high energy consumption, which leads to a low economical reliability for the tests if the number of dampers subjected to tests is low. For example, in the case of the INMA Bucharest damper test stand, the electrical energy needed for the test of a single damper is 40-45kWh, this being determined by high energy consumption needed for starting HIDROPULS system with which the tests are made. Comparatively, there have been presented specially designed platforms for the foreign damper quality verification, the construction of which leads to low energy consumption, easy maneuverability, and the probe preparation time is low to minimum, tests 4, ,8, 12, 20 being able to take place, fact that would lead to the reduction of the time needed for the tests.

The present research paper searches the identification and realization of a test method different from the conventional ones for technical equipment dampers. For obtaining this a mobile damper test platform will be made, in which the reduction of present existing energy costs and time needed for tests will be the main objective.

The test platform will be equipped with fast coupling systems, which will simulate the grip systems on damper technical equipments, so obtaining the realization of a test equipment that reproduces the work conditions.

Through the test equipment, tests in simulated and accelerated regime will be made, a good thing for test activity and for damper designing activity, respectively the activity of prototype testing, because so we can verify both if the produce corresponds to the project specifications and if there are work problems. So we can test a damper at endurance in a shorter time period, reproducing the normal use solicitations, obtaining relevant data both for the designer and for the user. Also there are special types of dampers of which the proper working is essential for the safety and security of users, from the installation to exploitation. So there running time can be calculated, before entering in exploitation, verifying the suspect noise presence, the good functioning of the damper and classifying it in the producer's specifications.

The equipment will reproduce different reference signals for damper activation, under different forms, with different frequencies and amplitudes, so reproducing the entire vibration palette and tasks to which the dampers are subjected through daily use and the solicitations that must be subjected for tests, stipulated in standards and regulations. On such a platform we can make destructive tests on the dampers, with the purpose of calculating the maximum solicitation points on which they are subjected, or the points until the exploitation safety is ensured.

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DISTRIBUŢIA ŞI CONSERVAREA SPECIEI *JUGLANS NIGRA* L. ÎN FONDUL FORESTIER AL JUDEŢULUI ARAD

DISTRIBUTION AND CONSERVATION OF *JUGLANS NIGRA* L. SPECIES IN THE FOREST AREA OF ARAD COUNTY

SĂRAC IOAN, VIŞOIU DAGMAR, HERNEA CORNELIA

Key words: Black walnut, distribution, conservation
Cuvinte cheie: Nucul negru, distribuţie, conservare

REZUMAT

Introducerea în cultură a speciilor lemnoase exotice se face prin urmărirea însuşirilor silvotehnice cum sunt: producţia de biomasă, calitatea lemnului, a furnirului care realizează valori semificative comparativ cu speciile forestire indigene, plasticitatea şi adaptabilitatea la condiţiile staţionale.

Nuciferele sunt specii producătoare de lemn, fructe, taninuri, eploat'nd terenuri degradate care au fost introduse în Europa în anul 1629, iar în ţara noastră în urmă cu opt decenii mai ales în judeţele Timiş, Arad, Bihor, în culturi forestiere iar ca specii decorative în parcuri cum sunt: Timişoara, Bazoş, Săvârşin, Macea.

În cadrul Ocolului Silvic Ceala se constată o creştere a suprafeţei cu nuc negru de la 376,3 ha în anul 1991 la 457,1 ha în anul 2001.

ABSTRACT

The introduction in culture of the exotic woody species can be made following the forest and technique features as: plasticity and adaptability to the stational conditions, biomass production, wood quality, veneer quality that is significantly more valuable comparing with the aborigines ones.

The walnut trees species are wooden, fruits and tannins producing, exploiting degraded fields. These species have been introduced in Europe in 1629 and eight decades ago in our country, especially in the Timiş, Arad and Bihor counties, where they were set as forestier cultures or as decorative species in parks as Timişoara, Bazoş, Săvârşin and Macea.

In the forest area of O.C. Ceala an increasing of black walnut area was ascertained from 376,3 ha in 1991 to 457,1 ha in 2001.

INTRODUCTION

Introduction of new woden species in the botanical parks and in the forests started in the 18th-19th centuries, since the woody species started to be studied from the scientific point contributing to collection enrichment. In Romania, as in other european coutries, exist many wooden species with a very high economical value. But exotic wooden species introduction would increase the sylvicultural characteristics, as the wooden mass yield, the wood quality, the appurtenance products, the damaged fields breeding.

Introduction in culture of exotic species requires the study of the species qualities, the knowledge of the species ecology, the species plasticity, and the adaptation capacity to the new stationary conditions.

BLACK WALNUT ORIGINS AND SPREADING

The Eastern Black walnut (*Juglans nigra*) is a species of flowering tree in the hickory family, Juglandaceae, that is native to eastern North America. It grows mostly in

riparian zones with 700-1000m altitude together with other wooden species, rarely as pure stands.

World spresding

The black walnut grows frecvently in the mixt mesophytic woods where can be found isolated between other wooden species. It can constitute massifs on small areas, especially in the skirts of a forest, at 700 to 1000 m altitude.

While its primary native region is the midwest and east central United States, the black walnut was introduced into Europe in 1629. It is cultivated there and in North America as a forest tree for its high quality wood.

Black walnut spreading in our country

In our country black walnut was introduced eight decades ago both in parks designs and in forest cultures. In Transilvania and Banat first black walnut cultures were realized in the following counties: Timiş (O.S.Timişoara and O.S. Lunca Timişului); Arad (O.S. Ceala); Bihor (O. S. Secuieni). When cultured in good soil conditions the black walnut develops very well. It is a specie that regenerates very easily and plentiful from seeds, that justifies its vitality in the favorable stations.

Last evaluations emphasised that in Romania 500.000 black walnut exemplars can be found, the number of black walnut trees continuously increasing.

Black walnut spreading in Arad county

In the forest area of O.S. Ceala (7014,2ha) the black walnut occupies an area of 457,1ha representing 8% of the existent species in this wood area, has a yielding class of 2,6 in average, a stand age of 26 years old; a consistence of 0,8 and a volume per hectare of about 122 m^3/ha.

Analyzing the black walnut area it was observed that in 1991 the black walnut cultured area was 376,3 ha, that represents 5,3% from the entire O.S. Ceala area whilst 10 years later the black walnut cultured area increased with 121,472%, namely to 457,1ha, that represents 6,5% from the entire forest surface.

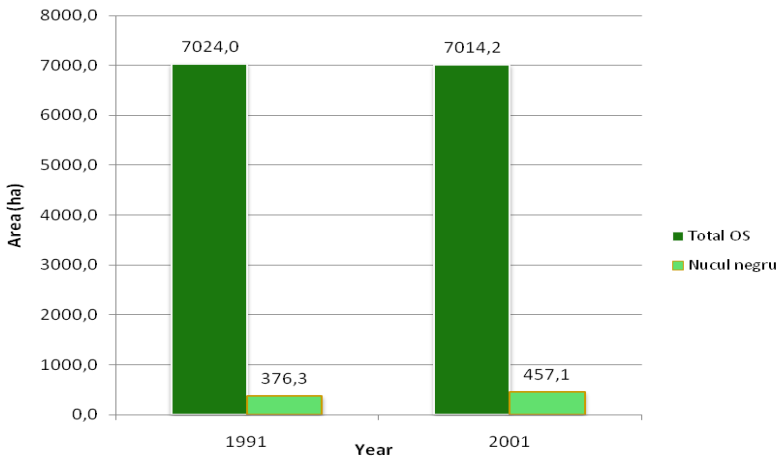

Fig. 1 Black walnut area evolution

IMPORTANCE OF NUTS CROP (GENUL *JUGLANS)*

The actual and long-term problems regarding the covering of walnut wood necessities depending of the furniture industry development determines increasing of black walnut culture areal. The progresses that are realized in the furniture industry reclaim a permanently preoccupation, having the aim of ensuring sufficiently quantities and in a continuously increasing staple necessities.

The wood, indifferent of the wooden specie, but most of all of the black walnut, has a very high demand worldwide and also in our country.

In order to remedy this situation, the decree 134/1954 regulated walnuts cutting with the observance of some restrictive rules, regarding the irrational cutting of the black walnut. The H.C.M. 305/1964 established that in 15 years eight millions walnuts has to be planted (until 1980), which of five millions should be cultured in the agricultural area and three millions in the forest area (in massif and in alignment).

BLACK WALNUT DISTRIBUTION IN O.S. CEALA

A significant increasing of black walnut area was observed in the last period from **10,1 ha (4,8%)** for the stand of ages between 21-40 years to **117,0 ha (56%)** for the stands with ages between 1-20 years, that proves the increasing interest that the black walnut culture is rising up.

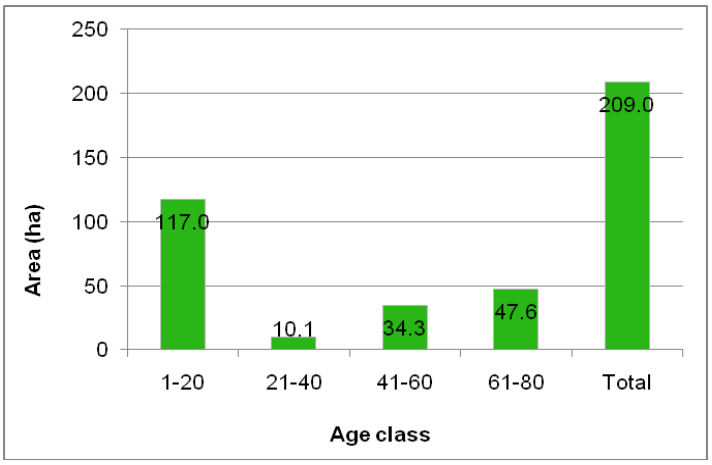

Fig. 2 Black walnut distribution in O.S. Ceala, U.P. III Rata-Vaida depending on the age classes

In the forest area of O.S. Ceala there have been constituted several administration subunits as follows:

S.U.P.”A” – regular forest – usual assortments;
S.U.P.”E” – forests under integral protection;
S.U.P.”M” – forests under special preservation regime;
S.U.P.”K” – forests under seeds reservation regime

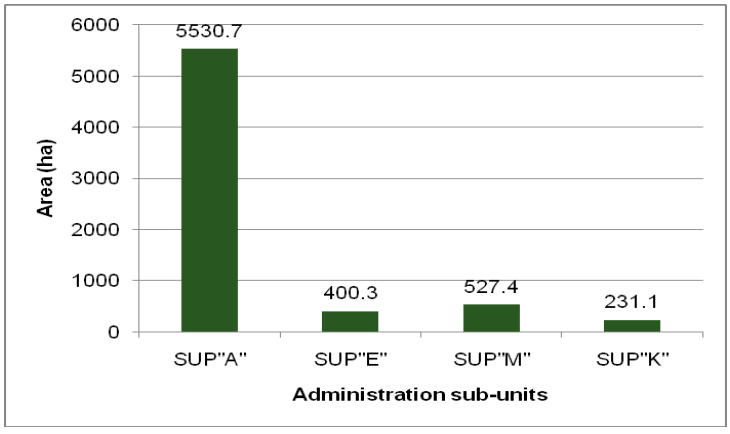

Fig. 3 Administrations sub-units in O.S. Ceala

Data presented in the following figure (fig.4) emphasized that the black walnut under integral protection regime area is about 3,9ha (1%) in the O.S. Ceala reservation.

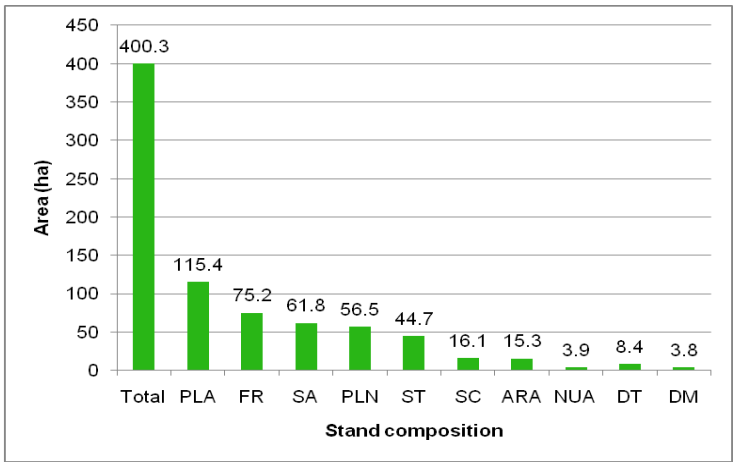

Fig. 4 S.U.P.”E” - forests under integral protection

The black walnut under special preservation regime zone is 21,1ha in the O.S. Ceala reservation that represents 4% of the entire area cultured with different wooden species (fig.5). This means the forth culture, as surface, in the area cultured under special preservation regime, showing the importance that this wooden specie represents as economical value.

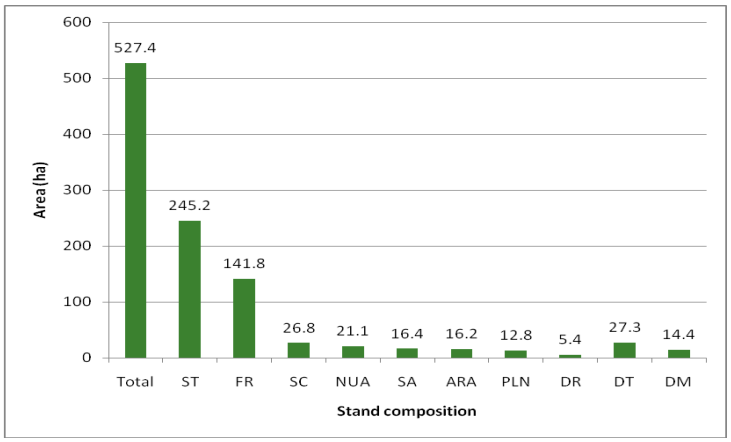

Fig. 5 S.U.P.”M” - forests under special preservation regime

Even if in the S.U.P.”K” of O.S. Ceala, the black walnut area under seed reservation regime is only 7,2 ha (3,1%), the black walnut culture still represents the third specie cultured for seed production.

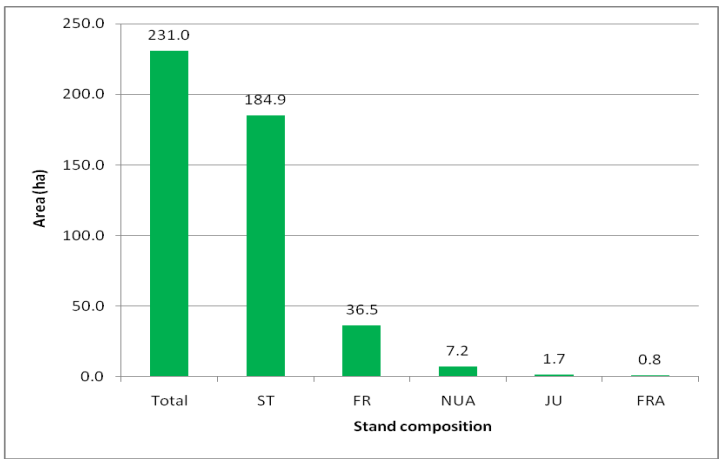

Fig. 6 S.U.P."K" –forests under seed reservation regime

Analyzing the data hereinbefore presented it can be observed that in the forest area of O.S. Ceala there are enough samples of black walnut trees that would may satisfy the future needs of walnut wood for veneer. The areas under seed reservation regimes assure the need of seeds used for biological material production that would be necessary for afforestations in the sylvic units with stational conditions that correspond to this specie.

Under the scientific aspect the idea that not only the aboriginal species has to be protected, conserved, promoted and valuated but the species from other regions.

CONCLUSIONS

The black walnut is characterised by the very valuable wood, rapid growth, is a large deciduous tree attaining heights of 9.1–12 m. Exploitation of this specie can emphasize a wooden mass wiht a substancial volume, a superior wood price comparing to the others wooden species. Constitutes the object of conservation together with other wooden species because of its ecological value, economical value, ornamental value and also alimentary value

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MODERN MEANS OF MAKING FOR FIELD SOIL STUDYNG

GHEORGHE IOSIF

As a result of the progresses that technology has made the equipment in the field of terrestrial measurements in the last years it has concluded that it is necessary to realize a digital model of the continuous terrain and with a precision of 20 cm, which requires the use of modern means, especially laserscan technique, combined with GPS, video cameras, sensors. To mention that classic fotogrametic models cannot me used alone. For completing the job in good quality conditions, the FLI-MAP method is recommended.

Acquiring data necessary for efficient topographical studies using classical techniques and/or fotogrametric techniques is difficult, lengthy, insufficient and, in certain cases, does not assure the required precision because of the interpolation of two measurements. Practically, between two profiles the terrain can be in any way. With the aid of the described system, the information is complete and rigorous; furthermore, the productivity is about 1—km per day. The high density of lasers offers, in the particular case of soils, all the necessary information to identify and classify all the physical and chemical elements.

Fig. 3. Fli-Map applications

Sensors

The airborne high density LiDAR technology is a innovation of long range sensor detecting techniques that has broken all the barriers of traditional flying. The FLI-MAP(Fast Laser Imaging and Mapping Airborne Platform) system, can offer sufficient precision in topography and engineering. The high density of laser dots (10-30 dots/m^2) , the very precise date of the FLI-MAP, together with the imgae covering of the are flown over, allow the cartography of all the data which exist on any existing or theoretic corridor .

FLI-MAP

The acronym FLI-MAP means Fast Laser Imaging and Mapping Airborne Platform. The concept of cartography with the FLI-MAP system was developed and tested for the first time with a scanning laser a on autogiro in the year 1992. After analyzing data, it was obvious that objects could be identifiable in the LiDAR data.

FLI-MAP became fuctional in 1995 as a static system mounted on a Schweizer helicopter. FLI-MAP 2, a mobile system fit for a variety of helicopter models, replaced the first generation in 1999.

System description

The FLI-MAP system integrates some high-tech components into a very efficient instrument for areal measurements.

The two components can be differentiated: the airborne unit and the ground unit. Both are of extreme importance for the FLI-MAP operations.

Fig. 4. the airborne unit and the ground unit

The airborne unit

The airborne component of the FLI-MAP system is a frame attached to a helicopter, a computing unit and a pilot interface.

The ground unit of the FLI-MAP component consists of a few base stations and computers for processing. The base stations contain a antenna and GPS receptor, provide electricity and allow uploading data. During the flight these stations upload GPS date into reference points with known coordinates.

Sensors

The airborne component of the FLI-MAP system is equipped with the flowing sensors:

GPS

The LFI-MAP frame is equipped with two arms on which are the GPS antennas. Next to the GPS antennas is a separate Omnistar antenna. Omnistar is a service created by Fugro that provide accurate D-GPS corrections in real time.

INS

The altitude of the system is determined at a speed of 200 times per second by a IMU (Inertial Measuring Unit) system. IMU is mounted on the FLI-MAP frame and is capable of accurately determining the orientation of the system by measuring the rotations of the three spatial axes(Roll, Pitch and Heading) and also the speeds and accelerations in the three dimensions.

The Laser Scanner

The FLI-MAP system uses two scanning lasers that provide the redundancy and guarantee the precision and quality of the data.

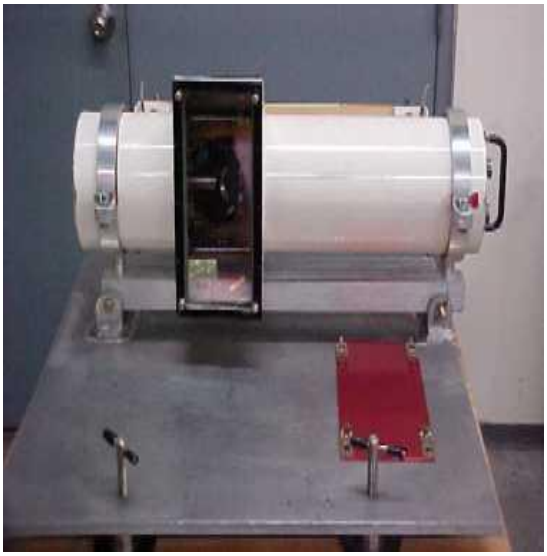

Fig. 6.the laser scanner

Video

Two digital cameras, well mounted, are used in the system to identify objects along the fly path.

Fig.Video

Photo cameras

Tow high resolution ½" CCD digital photo cameras are placed besides the video cameras being oriented in front and down.

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