SUMMARY

Coleopterans are insects with high ecological plasticity, being found in all ecosystems, from the polar regions to the equatorial forests, presenting a diverse diet of vegetable or animal food. Numerically, coleopterans are superior to other groups of insects, representing the majority of ecosystems over 80% of existing insect species. Every year experts in entomology discover and describe new species and, according to the latest data from the literature in the world, currently, there are known about 2 million species of insects.

The pest impact on orchards and vineyards is the result of interaction between a particular host system / parasite and the local microclimate and culture. Due to the expansion of organic farming, there were changes in the spectrum of diseases and pests of horticultural crops compared with a conventional culture system, which is usually applied to a series of chemical treatments.

Coleopterans have different functions useful for humans, being good indicators which can serve as one of the main objects to solve problems of cadastre and integrated environmental monitoring. Based on their presence and frequency in many ecosystems, it could be constructed mathematical models of the various animals' dynamics of economic interest, developed principles and ways of forecasting and control various dangerous pests in agriculture and forestry.

Given the position and role of coleopterans in different types of horticultural ecosystems, the current research necessarily imposed in two distinct ecosystems: fruit growing and vineyards in southern Oltenia, knowing the fact that this has been less studied.

The PhD thesis "**THE STUDY OF COLEOPTERAN IN SOME HORTICULTURAL CROPS IN SOUTHERN OLTENIA**" aims to study and identify the main species of coleopteran found in the studied ecosystems, fruit growing and vineyards ecosystems.

The study covers 211 pages, it is realized according to the norms that are in force in that moment of time. It consists of two main parts:

- **The first part** covers page 34 and includes two chapters:

CAPTHER I. THE CURRENT STATE OF THE RESEARCH ON FAUNA MET IN THE STUDIED HORTICULTURAL ECOSYSTEMS contains two chapters Worldwide and Nationally; here are synthesized information gathered from the literature regarding the biology and ecology studies on coleopterans, structure, dynamics, abundance and diversity indices.

CAPTHER II. GENERAL CONSIDERATIONS REGARDING COLEOPTERAN ORDER includes information about the knowledge of harmful and helpful species, their characteristics, role, type of food, etc.

- **The second part** covers 177 pages and includes personal researches; this part contains 266 tables and 8 figures and 7 original photos and it is divided into four chapters:

CAPTHER III. CHARACTERIZATION OF THE NATURAL AND CLIMATIC CONDITIONS OF THE STUDIED AREA contains information about the three areas studied, Didactic Station Banu Maracine Craiova, fruit growing plantation Podari and the vineyard Galicia. It describes the natural environment of each site, geographical location, climatic conditions, fauna, flora, etc.

This chapter also presents some weather-related data from the period 2011 – 2013, found in southern Oltenia, information taken from the Meteorological Station Craiova.

CAPTHER IV. MATERIALS AND RESEARCH METHODS presents information relating to the purpose and objectives of the research, proposed activities for goal setting, methods and research techniques used, the system of sampling of the material and methods of interpreting the results.

The purpose and objectives of present research are related to identification of the main coleopteran, their classification in harmful, helpful and indifferent, for determining the structure of the families, reaching the stage of species, abundance and dynamics determination and calculation of ecological and biodiversity indices.

Regarding the proposed activities, they refer to: application of traps, collecting biological material, identification and analysis of damaging, useful and indifferent species, setting the structure, the abundance and the dynamics of species.

The research methods and techniques - used in the three plantations studied: Didactic Station Banu Maracine Craiova, fruit growing plantation Podari and the vineyard Galicia - are Barber traps and beating method. The traps were distributed in the three different points of each plantation, each point contained .... traps, in total on each plantation were placed .... Barber traps.

The results interpretation was made using mathematical analysis which showed abundance, dynamics, constancy, dominance, ecological significance index, but also with indicators of biodiversity, using Biodiv program: diversity index, Shannon diversity index, Simpson diversity index, equity for Shannon.

CAPTHER V. RESULTS AND DISCUSSION includes the structure, dynamics, abundance and ecological indices of coleopterans found on every plantation in part, over the three-year study, from 2011 to 2013.

Within the vineyard Banu Mărăcine:

The total number of coleopterans collected during the 3-year study was 39 species that were classified systematically in 9 families; species were classified according to their characteristics in harmful, helpful and indifferent species.

Regarding *harmful species*, they had a constant abundance in the 3 years of study (15 species), which are classified into 5 families; the dynamics shows that in 2011, there were collected a total number of 427 individuals and in the next years the number of individuals slightly increased from 430 (2012) to 465 individuals (2013).

The abundance of *helpful species* collected was 15, classified in 3 families, on each year of study (2011 to 2013); all individuals collected in 2011 was 358, followed in 2013 by 368 individuals and in 2012 there were 397 individuals.

During the 3 years of study, the *indifferent species* to the culture of the vine (harmful to other crops or spontaneous) were collected in number 9 (classified in three families) each year; their dynamics slightly oscillating, in 2011 were collected 101 individuals, in 2013 -105 individuals and in 2012 there were collected 110 individuals.

From the synthesis results, the three-year study of all coleopterans species found in vineyard Banu Mărăcine concluded as follows:

- **The abundance** points out that species: *Amara crenata* and *Anomalous dubia* were **very abundant**; *Carabus violaceus*, *Anomala solida* and *Adoxus obscures* species were **abundant**; *Carabus cancellatus*, *Coccinella tessulata* and *Phyllopertha horticula* species were **slightly rare**; *Blaps letifera*, *Lema melanopa* and *Phyllotreta nemorum* species were **rare** species.

- **The dynamics** of species highlights the fact that in 2011 there were collected 886 individuals (32%), in 2012 and 2013 the number of individuals is 937, respectively 938, each representing 34% of the total.

- **The constancy** highlights the presence of 15 recedent species and 24 species subdominant.

- *The dominance* of species highlights the existence of 18 accidental species and 21 accessories.

- *The ecological significance index* highlights the 38 accessories species and one accidentally species.

Within the vineyard Galicea:

The total number of coleopterans collected during the 3-year study was 38 species, systematically classified in 9 families; they were divided according to their characteristics of harmful, helpful and indifferent species, each category being treated separately.

Regarding the *harmful species* it has been proved a constant abundance, collecting 15 individuals each year, but the dynamics of these species varied among years as follows: in 2011 and 2012 the specimens collected were 362 and, respectively, 361, while in 2013 the number of specimens collected increased to 448.

The *helpful species* showed the same abundance during the years 2011 and 2012 (13 species), in 2013 the number of identified species was 14. Dynamics reveals that the year with the fewest specimens collected was 2011 (345 individuals), followed by 2012 with 357 individuals and 2013 with 377 individuals.

The *indifferent species* to this culture, there were observed small variations from 8 species identified in 2011 and 2013 to 9 species in 2012. Dynamics is approximately constant ranging from 68 individuals in 2011 to 77 individuals in 2013, reaching 88 individuals in 2012.

Summarizing the results, the three-year study of all coleopterans species collected and identified from vineyard Banu Mărăcine revealed that:

- **The abundance** highlights that: *Amara crenata* and *Amphimallon solstitialis* species were **very abundant**; species *Adalia bipunctata* and *Byctiscus betulae* were **abundant**; *Carabus cancellatus* and *Coccinella tessulata* species were **slightly rare** and *Phyllotreta nemorum* and *Adonia variegate* were **rare**.

- **The dynamics** of species shows that in 2011 there were collected 775 individuals (31%), in 2012 were 806 individuals (33%) and in 2013 the number of individuals was 902 (36%).

- **The dominance** highlights 5 subrecedente species, 10 recedente species and 25 subdominant species.

- *The constancy* highlights the presence of 19 accidentally species and 19 accessories species.

- *The ecological significance index* highlights the 32 accessories species and 6 accidentally species.

Within the fruit-growing plantation Banu Mărăcine:

The total number of coleopterans collected during the 3-year study was 52 species systematically classified into 11 families, differentiated by their characteristics in harmful, helpful and indifferent species, each category being treated separately.

The abundance of *harmful species* was as follows: in 2011 the number of pest species identified was 20, in 2012 the number decreased to 18, in 2013 it dropped to 17 identified species, all framed in 4 families. Dynamics of species shows that in 2012 the number of individuals collected was the lowest (418), in the following years showed slight increases, 492 in 2013 and 551 in 2011.

Analyzing abundance of *helpful species* it was observed a slight variation in the number of collected species, in 2012 was the highest (21), followed by 2011 with 20 species and 2013 the number of species was 18, classified in three families. The dynamics of these species varied slightly, in 2011 the number of individuals collected was 616, in 2013 the number dropped to 535 individuals and in 2012 reached 519.

The *indifferent species* showed a diversified abundance, in 2011 it was collected a total of 11 species belonging to four families, in the coming years the number of species identified ranged from 9 species in 2012 to 10 species in 2013, which are classified into 3 families. Dynamics has slight variations in growth from 167 individuals in 2012 to 179 individuals in 2013 and 201 individuals in 2011.

From the synthesis results, the three-year study of all coleopterans species found in fruit growing plantation Banu Mărăcine concluded as follows:

- The abundance shows that the **very abundant species** were: *Rhynchites bacchus* and *Carabus cancelatus*, while **abundant** species were: *Oligota flavicornis*, *Rhynchites aequatus*, **slightly rare** species identified were: *Malachius bipustulatus*, *Adonia variegata*, the lowest number of specimens collected, representing **rare** species were *Phyllopertha horticola* and *Mylabris variabilis*.

- **Dynamics** of species shows that in 2011 there were collected 1335 individuals (37%), in 2012 were 1143 individuals (31%) and in 2013 the number of individuals is 1150 (32%).

- *The* **dominance** of species highlights 11 subrecedente species, 23 recedente species and 18 subdominant species.

- *The* **constancy** highlights the presence of 27 accidentally species, 23 accessories species and 2 constant species.

- **The ecological significance index** highlights 32 accessories species and 6 accidentally species.

Within the fruit-growing plantation Podari:

The total number of collected coleopterans during the 3-year study was 68 species systematically classified into 11 families, differentiated by their characteristics in harmful, helpful and indifferent species, each category being treated separately.

The abundance of *harmful species* was as follows: in 2011 the number of pest species identified was 24, in 2012 the number increased to 21, in 2013 it dropped to 18 identified species, all framed in 4 families. Dynamics of species shows that in 2012 the number of individuals collected was the lowest (418), in the following years showed slight increases, 492 in 2013 and 551 in 2011.

The abundance of *harmful species* was varied, in 2011 the number of pest species identified was 24, slightly dropping in the coming years from 22 (in 2012) and 21 (2013). The dynamics of these species varied across years and climate conditions as follows: specimens collected in 2011 were 696 in number, being first, followed by 2013 with 618 copies, and 2012 with 547.

The helpful species showed a different abundance: in 2011 a total of 26 species belonging to four families, in the coming years the number of species increased from 28 (in 2012) to 29 (2013), these species were classified as 5 families. Dynamics revealed differences in the number of specimens collected, 685 in 2012, followed by 2011 with 734, and 754 in 2013 individuals.

In the case of the *indifferent species* to this culture, they showed small variations from 15 species identified in 2011, belonging to 5 families, to 13, respectively, 12 species in 2012 and 2013, which are classified into four families. Dynamics varies from 184 individuals in 2012 to 227 individuals in 2013 peaking at 268 individuals in 2011.

Synthesis of the results obtained in the three-year study of all coleopterans species, found in vineyard Podari, is as follows:

- The **abundance** outlines that: *Scolytus mali, Xyleborus dispar* and *Anisandrus dispar* species were **very abundant**, *Harpalus distinguendus, Amara similata* and *Oligota flavicornis* species were **abundant**, *Calosoma sycophanta* and *Blaps mortisaga* species were **slightly rare** and *Hypera campestris* and *Phyllopertha horticola* species were **rare**.
- The **dynamics** of species reveals that in 2011 were collected 1708 individuals (36%), 1589 (34%) in 2013 and 1416 individuals (30%) in 2012.

- *The* **dominance** of species highlights 18 subrecedente species, 37 recedente species and 13 subdominant species.
- *The* **constancy** highlights the presence of 40 accidentally species, 25 accessories species and 19 constant species.
- **The ecological significance index** highlights 61 accessories species and 7 accidentally species.

To quantify the indicators of biodiversity in the studied ecosystems there were conducted analysis on major indices characterizing biodiversity: Biodiversity Index (IB), Simpson index (D), Shannon index, Equity for Shannon.

The total biodiversity indicators obtained for vineyards (Banu Mărăcine and Galicia) had different values depending on years of study and stationary as: biodiversity index was 39 species for stationary and 38 species Banu Mărăcine for inpatient Galicea; index Simpson's was 0.030 for Banu Mărăcine and 0.032 for Galicea, Shannon index was 3.580 for Banu Mărăcine and 3,517 for Galicea; Equity for Shannon was 0.970 for Banu Mărăcine and 0.967 for Galicia.

In case of fruit growing plantation (Banu Mărăcine and Podari) biodiversity indicators presented different values depending on years of study and stationary as: biodiversity index was 52 species for Banu Mărăcine and 68 species for Podari, Simpson index was 0.023 for Banu Mărăcine and 0.018 for Podari, Shannon index was 3.852 for inpatient Banu Mărăcine and 4116 for Podari; Equity for Shannon was 0.975 for Banu Mărăcine and 0,976 for Podari.