STUDY OF COLEOPTERA IN SOME VEGETABLE CROPS IN SOUTHERN OLTENIA

Felicia BÎRZANU [1], I. MITREA[2]
[1] University of Craiova, [2] University of Craiova, Faculty of Horticulture,
Corresponding author e-mail : birzanu_felicia@yahoo.com

Abstract. *The order Coleoptera is considered to be the order with the most useful and predatory species. The research was carried out in the Amărăștii de Jos stationary in 2020 in solanaceous vegetable crops (peppers, tomatoes and aubergines). The proposed objectives were to know the current state of research on the useful and harmful fauna of the order Coleoptera in the crops that were studied. The study methods used were: the shaking method, the Barber trap method and the entomological net method. Determination of coleopteran entomofauna was carried out in the Entomology Laboratory of the Faculty of Horticulture within the University of Craiova using coleopteran determinant factors (Bobîrnac B., Stănoiu I., Năstase A., 1994), Chimișliu C., 2002). The insect collection was systematically classified into 6 families as follows: family Cantharidae, family Chrysomelidae, family Coccinelidae, family Carabidae, family Cetoniidae and family Scarabaeidae. In 2020, the results obtained led to the identification of 23 species belonging to the order Coleoptera, species totalling 218 specimens. Of the total number of species collected, a very large number are coleopteran pests, with only 10 useful species. Among the useful species encountered, we find: Coccinella septempunctata, Carabus violaceus, Carabus ulrichi, Adalia bipunctata, Coccinella 12-punctata, the species with the highest number of specimens is Harpalus affinis Schrank.*

Keywords: *coleoptera, pests, useful, vegetables*

INTRODUCTION

Today, around 2 million insect species are known worldwide and they play an important role in both nature and human life (CRIȘAN A.,1999).

Coleoptera is an order totalling more than 350 species, found in all ecosystems – from equatorial to polar regions.

Insects of the order *Coleoptera* are good indicators, serving as one of the main objectives in solving certain integrated ecological monitoring and cadastral problems (TĂLMACIU M, 2004, 2011).

They are found in all ecosystems, from equatorial forests to polar regions, so anthropogenic influence is changing the diversity of coleoptera.

Professor Leon C. Cosmovici publishes the first work on entomology (1901) developed in a higher education institution, a paper published in the first issue of the University Annals.

This work shows 332 species of coleoptera, which are divided into 38 families and represent 195 genera.

N. Săvulescu also contributed to the study of the coleopteran entomofauna in his work entitled "*Contributions à l'etude de la faune des Coléoptères du sud-ouest de la Dobrogea*" and over time the author Chimișliu (2005) brings new data about the knowledge knowledge in Romanian coleoptera.

In Oltenia, in 1928, O. Marcu publishes the first note entitled *"Contribuţii la cunoaşterea Coleopterelor Olteniei".*

Cornelia Chimișliu has also carried out other studies on the coleoptera fauna in the Oltenia area, publishing various papers on the systematics and ecology of coleoptera.

Macovei Elvira brings new contributions on the study of coleoptera in Romania in her paper published in 2011 where she elaborates on the history of entomofauna research of the order *Coleoptera*.

This paper aims to provide scientific data on the coleoptera entomofauna in the crops that were included in the study.

In Dolj County, a county with a strong economic area, research has been carried out on the coleoptera entomofauna of some vegetable crops.

In this region of southern Romania, research on the entomofauna of the area has been carried out by BOBÎRNAC B. (1982), MITREA I., STAN C., ȚUCĂ O., (2002, 2010), PANIN S. (1951).

This paper aims to contribute with scientific data obtained from research on the coleopteran entomofauna of some vegetable crops in southern Oltenia.

The importance of vegetable crops is due to their nutritional, gustatory and therapeutic value as well as their high economic value.

The main objectives were: to know the current studies conducted on the coleoptera fauna of some vegetable crops in the area of Amărăștii de Jos, Dolj County, to identify and present the main characteristics of coleoptera species, their role and their effect on vegetable crops (COSTACHE M., 2001).

MATERIALS AND METHODS

Three entomofauna collection methods were used in 2020 namely entomological net method, the shaking method and Barber ground trap method (BAYSAL F., 2007).

The collection with the help of the entomological net was done individually, the net having the opening upwards, almost in a horizontal position.

For the shaking method, the collection of biological material consisted in collecting insects in bags or sacks and by shaking the plants (CHIMIȘLIU C., 2002).

The observations were made in the crops of peppers, tomatoes and eggplants, vegetables that were grown on large areas in the Stationary in Amărăștii de Jos, in 2020.

Sampling was done periodically, depending on the growing season of the crops and the research method.

The study included stationaries which comprised 8 traps in a row of plants from the edge inwards in a straight line, 15 metres from the edge and 6-8 metres between traps per row.

Regarding the method of barber type soil traps, a number of 15 collections were made in the Stationary of Amărăștii de Jos, in 2020.

The observations were made at an interval between 5-8 days, the installed traps were put on 3 june 2020, the first collection was made on 9 june and the last collection was on 29 august 2020.

Labels were placed on the biological material collected and the date of collection was specified for each vegetable crop.

The collected biologic material was brought to the Faculty of Horticulture where it was determined with the help of the specialized determinant factors: STĂNOI I., NĂSTASE A. (1998).

The species collected were divided by family down to species level.

RESULTS AND DISCUSSION

The results obtained in 2020 concerning the coleoptera entomofauna of southern Oltenia include the identification of 23 species belonging to the order *Coleoptera*, with a total of 218 specimens collected (*Table 1*.).

Table 1

The structure of coleoptera species in some vegetable crops in 2020
(Amărăștii de Jos Stationary, Dolj County)

No.	Order	Family	The name of the species	Abundance
1.	Coleoptera	Chysomelidae	*Leptinotarsa decemlineata*	28
2.			*Cassida nebulosa L.*	5
3.			*Phyllotreta atra L.*	11
4.			*Phyllotreta nemorum L.*	14
5.		Cantharidae	*Canthars fusca L*	2
6.		Carabidae	*Harpalus affinis* Schrank	16
7.			*Carabus violaceus*	13
8.			*Carabus ulrichi*	11
9.			*Carabus cancellatus*	7
10.			*Calosoma sycophanta*	5
11.			*Amara crenata*	14
12.		Coccinelidae	*Adalia bipunctata*	10
13.			*Coccinella septempunctata*	13
14.			*Adonia variegata*	8
15.			*Coccinella 12-punctata*	11
16.		Scarabaeidae	*Melolontha melolontha L.*	9
17.			*Anoxia vilosa Fabr.*	5
18.			*Rhizotrogus aeqinoctialis*	7
19.			*Polyphylla fullo L.*	6
20.			*Oryctes nasicornis*	9
21.		Cetoniidae	*Tropinota (Epicometis) hirta* Poda,	3
22.			*Oxythyrea funesta* (Poda	6
23.			*Cetonia aurata L*	5

Once collected, the insects were systematically classified into 6 families, namely: Family *Chysomelidae*, Family *Cantharidae*, Family *Carabidae*, Family *Coccinelidae*, Family *Scarabaeidae* and Family *Cetoniidae*.

Following the analysis of the data obtained referring to the coleoptera fauna from some vegetable crops in southern Oltenia in Amărăștii de Jos stationary, it appears that the largest share is 26% and it is represented by the family *Carabidae* followed by the family *Scarabaeidae* with 22%, then the families *Chrysolmelidae* and *Coccinelidae*, each with 18%, the family *Cetoniidae* with 13% and the last place is occupied by family *Cantharidae* with 3%.

From the total number of useful coleoptera species that were collected from some vegetable crops in the area of Amărăștii de Jos, 2 families are identified, namely: Family *Carabidae* with 6 species and Family *Coccinelidae* with 4 species *(Table 2).*

The species *Harpalus affinis* contains the most specimens, and the species *Carabus violaceus* and *Coccinella septempunctata* are equal, each with 13 specimens.

The species *Calosoma sycophanta* accounts for the fewest specimens, namely, a total of 5 specimens, a species belonging to the *family Carabidae (Figure 1).*

Table 2

The structure of the useful coleoptera species included in the 2 families identified in some vegetable crops in southern Oltenia

Nr. crt	Order	Family	The name of the species	Abundance
1.	Coleoptera	Carabidae	*Harpalus affinis* Schrank	16
2.			*Carabus violaceus*	13
3.			*Carabus ulrichi*	11
4.			*Carabus cancellatus*	7
5.			*Calosoma sycophanta*	5
6.			*Amara crenata*	14
7.		Coccinelidae	*Adalia bipunctata*	10
8.			*Coccinella septempunctata*	13
9.			*Adonia variegata*	8
10.			*Coccinella 12-punctata*	11

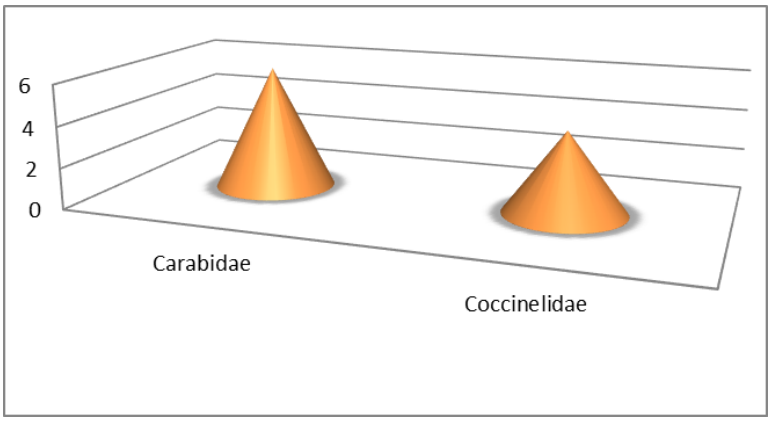

Figure 1. The structure of the coleoptera species per families (Carabidae and Coccinelidae)

The places are occupied, among others, by *Adalia bipunctata* with 10 specimens, *Adonia variegata* with 8 specimens and *Carabus cancellatus* with 7 specimens.

Coleopteran pests have been systematically classified into 4 families, namely: the family *Chrysomelidae*, the family *Cantharidae*, the family *Scarabaeidae* and the family *Cetoniidae*.

The abundance of coleopteran pest species collected and classified by family shows that the family *Scarabaeidae* has the highest share with 5 species, followed by the family *Chrysomelidae* with 4 species, the family *Cetoniidae* with 3 species and the last place is held by the family *Cantharidae* with only one species.

If we refer to the structure of coleoptera species classified by families, the species *Leptinotarsa decemlineata* has 28 specimens, far from it there is *Phyllotreta nemorum L.* with 14 specimens, then the species *Phyllotreta atra* with 11 specimens is next, the species *Melolontha melolontha* and *Oryctes nasicornis* are tied with 9 specimens each, and on the last place there is the species *Canthars fusca* with only 2 specimens *(Table 3).*

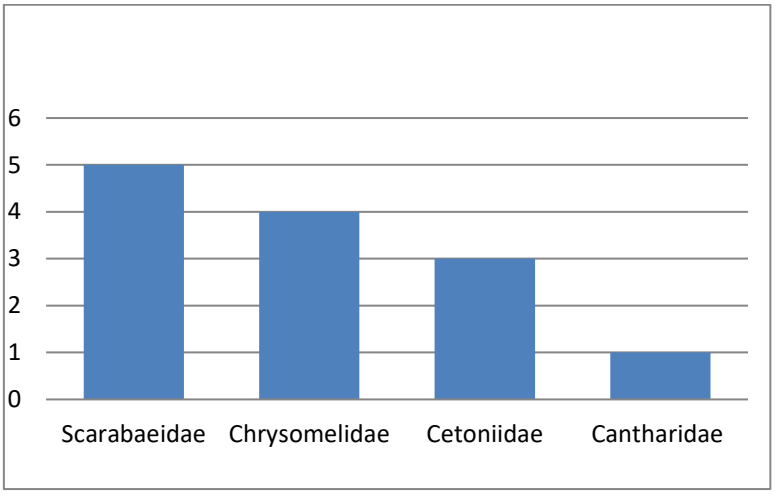

Figure 2. Pest species of coleoptera collected from some vegetable crops in Amărăștii de Jos Stationary, Dolj

Table 3

The structure of coleopteran pest species collected from some vegetable crops in 2020 (Amărăștii de Jos Stationary, Dolj County)

Nr. crt	Order	Family	The name of the species	Abundance
1.	Coleoptera	Chysomelidae	*Leptinotarsa decemlineata*	28
2.			*Cassida nebulosa L.*	5
3.			*Phyllotreta atra L.*	11
4.			*Phyllotreta nemorum L.*	14
5.		Cantharidae	*Canthars fusca L*	2
6.		Scarabaeidae	*Melolontha melolontha L.*	9
7.			*Anoxia vilosa Fabr.*	5
8.			*Rhizotrogus aeqinoctialis*	7
9.			*Polyphylla fullo L.*	6
10.			*Oryctes nasicornis*	9
11.		Cetoniidae	*Tropinota (Epicometis)*	3
			Oxythyrea funesta	6
			Cetonia aurata L	5

The species *Rhizotrogus aeqinoctialis* has 7 specimens, the species *Polyphylla fullo L.* and *Oxythyrea funesta* are tied with 6 specimens, followed by *Cassida nebulosa L.*, *Anoxia vilos*, and *Cetonia aurata* with 5 specimens, and the penultimate species is *Tropinota (Epicometis)* with 3 specimens.

CONCLUSIONS

The scientific research was carried out in 2020 in the Amărăștii de Jos Stationary, Dolj County, where 218 insects were collected, totalling the identification of 23 species belonging to the order *Coleoptera*.

The methods used to collect insects were: the shaking method, the Barber ground trap method and the entomological net method.

The species fall into 6 families: *family Chrysomelidae, family Cantharidae, family Carabidae, family Coccinelidae, family Scarabaeidae* and *family Cetoniidae*.

The families *Carabidae* and *Coccinelidae* comprise the useful coleoptera species, with 10 species, namely: *Harpalus affinis Schrank, Carabus violaceus, Carabus ulrichi, Carabus cancellatus, Calosoma sycophanta, Amara crenata, Adalia bipunctata, Coccinella septempunctata, Adonia variegata*.

The most specimens are found in the species *Harpalus affinis Schrank* and the fewest are in the species *Calosoma sycophanta*.

The families *Chysomelidae, Cantharidae, Scarabaeidae, Cetoniidae* comprise pest species of coleoptera, totalling 13 species, namely: *Cassida nebulosa L., Phyllotreta atra L., Phyllotreta nemorum L., Canthars fusca L, Melolontha melolontha L., Anoxia vilosa Fabr., Rhizotrogus aeqinoctialis, Polyphylla fullo L., Oryctes nasicornis, Tropinota (Epicometis), Oxythyrea funesta, Cetonia aurata L*, the highest number of specimens was in the *Leptinotarsa decemlineata* species (28 specimens) and the lowest was in the *Canthars fusca* species (2 specimens).

BIBLIOGRAPHY

BAYSAL, F., CINAR, A., 2007 - Determination of phytopathologicaal and entomological problems and using plant protection methods in organic tomato growing in Turkey.Acta Horticulturae, vol,729, p.459-462,Turkey.

BOBÎRNAC, B., STĂNOIU, I., NĂSTASE, A., 1994 - Determinator pentru Coleopterele din România. pag. 1-49, Muzeul Olteniei Craiova.

BOBÎRNAC, B., MATEI, I., 1983 - Contribuții la studiul entomofaunei unor culturi horticole din Oltenia. Lucr.Șt.A III Conf.Nat.Entomologie, Iași.

CHIMIȘLIU, C., 2005 - Contribuţii la cunoaşterea istoricului cercetărilor faunei de Coleoptere (Insecta) din România, Studii şi comunicări, Vol. XXI, Muzeul Olteniei Craiova.

CHIMIȘLIU, C., 2002 – Colectarea, prepararea şi conservarea materialului biologic. Editura Sitech, Craiova.

COSMOVICI, L.C., 1990 - Contribuții la studiul faunei entomologice din România, Analele Universității,Iași.

COSTACHE, M., ROMAN T., 2001- Ghid pentru recunoaşterea şi combaterea bolilor şi dăunătorilor la plantele floricole şi ornamentale. Editura Geea,București.

CRIȘAN, A., MUREȘAN, D., 1999 – Clasa Insecte. Manual de entomologie generală. Universitatea „Babeş-Bolyai“, Presa Universitară Clujeană, Cluj-Napoca.

PANIN, S., 1951 – Determinatorul coleopterelor dăunătoare şi folositoare din Republica Populară Română. Ministerul Agriculturii în colaborare cu Editura de Stat pentru Literatura Ştiinţifică şi Didactică, Bucureşti.

MACOVEI, E., 2011 - Contribuții la studiul istoricului cercetărilor entomofaunistice ale familiei Cantharidae (Insecta, Coleoptera) România, Buletin Științific, Revista de etnografie, Științe ale naturii și Muzeologie, Nr. 12 (25), Fascicula: Științele Naturii, pag 64-72, ISSN 1857-0054, Chișinău.

MARCU, O. 1928 - Contribuţii la cunoaşterea faunei Olteniei, Arhiva Olteniei, An VII, nr. 39-40,P. 473-487. 30.

MITREA, I., STAN, C., ȚUCĂ, O., 2010 – Entomologie generală, Editura Reprograph, Craiova.

MITREA, I., MATEI, I., STAN, C., ȚUCĂ, O. 2002 - Contribuţii la dezvoltarea entomologiei horticole din Oltenia Anale. Univ. Craiova., Seria Biol., Hortic., TPPA, Vol.VII (XLIII): 373-380.

ROTARI, E., TĂLMACIU, M., TĂLMACIU, N., 2011 – Comparative research on useful entomofauna from vegetable crops. Lucrări ştiinţifice, U.Ș.A.M.V. Iaşi, seria Agronomie, vol. 54, supliment, p. 69-72.

SĂVULESCU, N. 1959 - Contributions à l'etude de la faune des Coléoptères du sudouest de la Dobrogea // Lucrările sesiunii ştiinţifice a Staţiunii Zoologice Marine "Ion Borecea". Agigea", P. 503-510. 40.

STĂNOI, I., NĂSTASE, A., 1998 - Insecte din Romania, Ed. Dova, Craiova

TĂLMACIU, M., TĂLMACIU, N, GEORGESCU, T., 2004 – Structura, abundenţa şi dinamica speciilor de Coleoptere din culturile de legume din cadrul fermei V. Adamachi, aparţinând S.D.Iaşi, jud. Iaşi. Lucrări ştiinţifice, U.Ş.A.M.V. Iaşi, seria Agronomie, vol. 47, p. 530-533