

## STUDY ON THE INSECTS CAUGHT IN A VEGETABLE GARDEN OF THE PĂUȘEȘTI VILLAGE, VÂLCEA COUNTY

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**Abstract.** The aim of the study was to identify the useful and harmful fauna by collecting insects from a vegetable garden in the Păușești village, Valcea county, where 5 Barber traps were installed, one in each crop (onions, garlic, beans, peppers and potatoes). Following the determination and systematic classification, we reported the following orders of insects: Coleoptera, Orthoptera, Diptera, Dermaptera, Hemiptera, Lepidoptera and Hymenoptera. The traps were installed in May 2021 and in 2022 the 2021 traps ran until September. Samples were taken during five months (May and September) in 2021 and in 2022 from May to present when the crops were in full vegetation. Insects were collected from traps weekly during a growing season, preserved, labelled and determined using specialized determiners. A total of 275 specimens were collected, most species were caught from onion crops totalling 75 specimens. Following the determinations and the analysis of the captured species, we can conclude that 73.4% of the captured insects belonging to the useful entomofauna are the most numerous and the species that cause damage to agricultural crops represent 26.6% and are crop-specific pest species.

**Keywords:** insects, vegetable garden, Păușești village, Vâlcea county.

**Rezumat. Studiu privind insectele prinse în grădina de legume a satului Păușești, județul Vâlcea.** Scopul studiului a fost de a identifica fauna utilă și dăunătoare prin colectarea insectelor din grădina de legume din comuna Păușești, județul Vâlcea, în care au fost instalate 5 capcane Barber, câte una în fiecare cultură (ceapă, usturoi, fasole, ardei și cartofi). În urma determinării și clasificării sistematice am semnalat următoarele ordine de insecte: Coleoptera, Orthoptera, Diptera, Dermaptera, Hemiptera, Lepidoptera și Hymenoptera. Capcanele au fost instalate în luna mai a anilor 2021 și 2022. Probele au fost prelevate pe parcursul a cinci luni (mai-septembrie) în anul 2021 și în anul 2022 din luna mai până în iunie. Insectele au fost extrase din capcane săptămânal pe parcursul unui sezon de vegetație, fiind conservate, etichetate și determinate cu ajutorul determinatoarelor de specialitate. Au fost colectate 275 de exemplare iar cele mai multe specii au fost capturate din cultura de ceapă, totalizând 75 de exemplare. În urma determinărilor și analizei speciilor capturate, putem concluziona faptul că 73,4% din insectele capturate aparțin entomofaunei utile - sunt cele mai numeroase, iar speciile care produc pagube culturilor agricole reprezintă 26,6% și sunt specii dăunătoare specifice fiecărei culturi în parte.

**Cuvinte cheie:** insecte, grădina de legume, comuna Păușești, județul Vâlcea.

### INTRODUCTION

Arthropods are the most diverse group of animals, comprising more than two-thirds of the living world's species. Of these, insects have achieved specific adaptations that have allowed them to conquer all living environments (STUGREN, 1982). The number of described species exceeds one million, and the inventory is not yet complete. Of these, the insect category alone accounts for three quarters of the arthropods. Moreover, these invertebrates, in particular insects, have managed to colonize most natural habitats, adapting to a large number of life forms (BAICU & SĂVESCU, 1986; BOGULEANU, 1994).

The global alteration of the environment through human activity leads to a reduction in biodiversity with extremely complex ecological consequences; first of all, through the disappearance of some species and the introduction of foreign species, essential ecosystem processes (material and energy flows) are disrupted, relationships between species are altered, trophic cycles are disrupted, etc. (BRADY & WEIL, 2009; BUCUR & ROȘCA, 2011). In a word, these changes lead to a decrease in the resilience and productive capacity of ecosystems (GHIZDAVU et al., 1997). Biodiversity values need to be preserved in the process of conservation. One of the quick strategies for quantifying biodiversity is to focus on certain taxonomic groups called bioindicators or biological indicators (CIOCHIA & MOISE, 2005).

Protecting agricultural crops is one of the major concerns of agricultural specialists to prevent crops from returning to the biosphere food chains.

Research on the various parameters that characterize the structure and composition of epigeal fauna in agricultural crops as well as pests of agricultural ecosystems have been published over time in various specialized journals (COYLE et al., 2017; FLORESCU et al., 2021; MANOLE et al., 2009; MOCANU et al., 2017; MOISE, 2014; STANCĂ-MOISE, 2014, 2016, 2017, 2019, 2020; STANCĂ-MOISE & DIACONEASA, 2021; VARVARA & GĂLUȘCĂ, 2007; VARVARA, 2016). The aim of this study was to identify epigeal insects, harmful and useful, captured from different ecosystems using soil traps, from a household in the Păușești village, Vâlcea County in the climatic conditions of 2021-2022.

## MATERIALS AND METHODS

In the 1500 sq m vegetable garden located in the Păușești village on 21 May 2021 and 1 April 2022 we installed a set of 5 soil traps aimed at collecting insect populations from vegetable crops (onions, garlic, peppers, beans and potatoes). A set of 5 traps, one in each vegetable crop was installed to capture insects from the vegetable beds. In the vicinity of the garden according to geographical coordinates were the following areas: N- neighbour's farm, E- broadleaf forest, S- grassland, W- own farm.

The traps used in setting up the experiment (Fig.1) were made of plastic bottles of two sizes. A 2-l bottle is the protective vessel to which holes have been made for water drainage, into which the 1.5 l bottle representing the collecting vessel is inserted.



Figure 1. Traps installed in the following ecosystems (original photo).

Each trap consisted of a protective vessel with a few holes at the bottom to avoid stagnation of water from rainfall, then a smaller collecting vessel with a smaller capacity was placed in which water and detergent (to lower the surface tension of the water) were placed. The two traps were placed in a pit dug in the ground, then the soil was arranged as well as possible to avoid the small area being bypassed by the epigeous fauna, and a funnel made of thin, dark PVC film was placed over the mouth of each trap.

The collection of the caught material was done periodically, with the catches being taken from each trap in PVC bags with the appropriate label. At each collection the date, time, air temperature, atmospheric humidity and rainfall were noted in the field notebook according to Table 1. The collected material was already dead and placed in glass containers in sanitary alcohol, with determinations being made at the end of the study period. The traps have been in operation from the beginning of May to the present day in 2021, and the collection of catches will continue until the winter diapause, and the data obtained will be used in the dissertation. The diameter of the collection hole is 12 cm,

with a possible catch area of 226.08 cm<sup>2</sup>, thus occupying 29.37% of the circle circumference. In order to make some interpretations, a series of statistical calculations, dominance, abundance and systematic classification of the collected species were made. These data are just a start of the research we want to carry out in this biotope for at least three years.

Table 1. Insect collection data from vegetable crops.

Day of collection of entomological material	Hour	Temperature (°C)	Humidity (%)	Precipitation (%)
07.05.2021	16:30	21	45	35
12.05.2021	12:00	25	30	3
18.05.2021	17:35	28	3	0
21.05.2021	14:06	30	12	15
03.06.2021	18:05	25	59	100
11.06.2021	13:49	24	80	51
14.06.2021	13:15	27	54	10
18.06.2021	10:12	21	62	8
25.06.2021	15:08	30	39	12
09.04.2022	15:12	14	58	50
29.04.2022	17:10	16	49	40
09.05.2022	09:23	9	87	48
12.05.2022	11:25	12	60	20
14.05.2022	11:22	15	61	15

## RESULTS AND DISCUSSIONS

Following the determination of the captured species we can conclude that they come from 8 insect orders, Coleoptera (8 families), Hemiptera (3 families), Dermaptera (1 family), Orthoptera (3 families), Diptera (3 families), Lepidoptera (3 families), Blattode (1 family), Hymenoptera (2 families).

In the onion crop, 75 insect specimens were caught, and four orders were identified: Coleoptera, Diptera, Hemiptera and Orthoptera. The Coleoptera order with five families (Coccinellidae, Carabidae, Scarabeidae, Chrysomelidaesi and Curculionidae) and 9 species was the best represented (Table 2), followed by the Hemiptera order with three families (Pentatomidae, Coreidae and Pyrrhocoridae), the Orthoptera order with two families (Gryllotalpidae, Acrididae), and the Diptera order with the family Calliphoridae and one species (Table 1).

The majority of 56.26% is held by the Coleoptera species, followed by Hemiptera with 18.75%, Orthoptera 12.5% and Diptera 12.49%.

Table 2. Insects caught in the onion crop.

No. Crt.	Order	Family	Species	Date of collection	Body length	Number of specimens
1	I. Orthoptera	Gryllotalpidae	<i>Gryllotalpa gryllotalpa</i> Latreille, 1802	3.06.2021 9.05.2022	20 mm	4
2		Acrididae	<i>Chrysochraon dispar</i> Germar, 1831	18.06.2021	13 mm	3
4	II. Hemiptera	Pentatomidae	<i>Pentatoma rufipens</i> (Linnaeus, 1758)	29.04.2022	16 mm	6
5		Coreidae	<i>Coreus marginatus</i> (Linnaeus, 1758)	9.05.2022	10 mm	3
6		Pyrrhocoridae	<i>Pyrrhocoris apterus</i> (Linnaeus, 1758)	3.06.2021 14.05.2022	10 mm	8
7	III. Coleoptera	Coccinellidae	<i>Coccinella septempunctata</i> Linnaeus, 1758	11.06.2021	6 mm	4
8		Carabidae	<i>Carabus violaceus</i> Linnaeus, 1758	14.06.2021	12 mm	5
9		Carabidae	<i>Oodes helopioides</i> (Fabricius, 1792)	10.06.2021	11 mm	6
10		Carabidae	<i>Perostichus melanarius</i> (Illiger, 1798)	12.05.2022	20 mm	3
11		Carabidae	<i>Carabus glabratus</i> Paykull, 1790	14.05.2022	22 mm	2
12		Scarabeidae	<i>Aphodius fossor</i> (Linnaeus, 1758)	25.06.2021		3

13		Chrysomelidae	<i>Leptinotarsa decemlineata</i> Say, 1824	9.04.2022	9 mm	15
14		Curculionidae	<i>Donus comatus</i> (Boheman, 1842)	9.04.2022	9 mm	2
15		Curculionidae	<i>Hylobius abietis</i> (Linnaeus, 1758)	9.04.2022	12 mm	9
16	IV.Diptera	Calliphoridae	<i>Calliphora vicina</i> Robineau-Desvoidy, 1830	29.04.2022	12 mm	2
<b>Total</b>						<b>75</b>

In the garlic crop, 72 insect specimens of five orders were identified: Coleoptera, Lepidoptera, Diptera, Hemiptera and Orthoptera. The best represented was the Coleoptera order with 4 families (Cerambycidae, Carabidae, Chrysomelidae and Curculionidae) and 8 species (Table 3), followed by the Orders Orthoptera with three families (Acrididae, Gryllidae and Gryllotalpidae), and a single family of the following Orders: Diptera, Hymenoptera and Lepidoptera (Nymphalidae) (STANCĂ-MOISE et al., 20023) and a single species (Table 3).

The majority of 57.14% is held by the Coleoptera species, followed by Orthoptera with 21.43%, and the Orders Diptera, Hymenoptera and Lepidoptera with 7.14% each.

Table 3. Insects caught in the garlic crop.

No. Crt.	Order	Family	Species	Date of collection	Body length	Number of specimens
1	I.Orthoptera	Acrididae	<i>Calliptamus italicus</i> , (Linnaeus,1758)	3.06.2021	13 mm	2
2		Gryllidae	<i>Gryllus campestris</i> Linnaeus, 1758	11.06.2021 12.05.2022	12 mm	4
3		Gryllotalpidae	<i>Gryllotalpa gryllotalpa</i> Latreille, 1802	14.05.2022	24mm	3
4	II.Lepidoptera	Nymphalidae	<i>Melanargia galathea</i> (Linnaeus, 1758)	11.06.2021		1
5	III. Hymenoptera	Vespidae	<i>Vespa crabro</i> Linnaeus, 1758	18.06.2021	20 mm	2
6	IV.Diptera	Calliphoridae	<i>Calliphora vicina</i> Robineau-Desvoidy, 1830	29.04.2022	12 mm	2
7	V.Coleoptera	Cerambycidae	<i>Nothorhina punctata</i> (Fabricius, 1798)	14.06.2021		2
8		Carabeidae	<i>Pterostichus niger</i> , (Schaller, 1783)	25.06.2021	10 mm	8
9		Carabeidae	<i>Carabus convexus</i> Fabricius, 1775	9.04.2022	10 mm	6
10		Carabeidae	<i>Agonum muelleri</i> (Herbst, 1784)	9.04.2022	9 mm	3
11		Carabeidae	<i>Carabus glabratus</i> Paykull, 1790	9.05.2022 29.04.2022	22 mm	5
12		Carabeidae	<i>Perostichus melanarius</i> (Illiger, 1798)	14.05.2022	22 mm	7
13		Chrysomelidae	<i>Leptinotarsa decemlineata</i> Say, 1824	9.04.2022	9 mm	21
14		Curculionidae	<i>Hylobius abietis</i> (Linnaeus, 1758)	12.05.2022	12 mm	6
<b>Total</b>						<b>72</b>

In the bean culture, 37 insect specimens were captured, and seven orders were identified: Coleoptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera, Blattodea and Orthoptera. The best represented were the Coleoptera and Orthoptera Orders with two families each, while the other 7 orders are represented by one family and one species (Table 4).

Coleoptera species dominate, holding 46.15%, followed by Orthoptera with 15.38%, while the orders Diptera, Hemiptera, Hymenoptera, Lepidoptera, Blattodea are represented by 7.69% each.

Table 4. Insects caught in the bean crop.

No. Crt.	Order	Family	Species	Date of collection	Body length	Number of specimens
1	I.Orthoptera	Gryllotalpidae	<i>Gryllotalpa gryllotalpa</i> Latreille, 1802	3.06.2021 9.04.2022 9.05.2022	40mm ♂, 25 mm ♀, 23 mm, 15 mm	3
2		Gryllidae	<i>Gryllus campestris</i> Linnaeus, 1758	11.06.2021 9.05.2022	8 mm	4
3	II.Blattodea	Cryptocercidae	<i>Cryptocercus punctulatus</i> Scudder, 1862	25.06.2021	20 mm	2
4	III.Hemiptera	Pyrrhocoridae	<i>Pyrrhocoris apterus</i> (Linnaeus, 1758)	14.06.2021	6mm	4
5	IV.Diptera	Muscidae	<i>Musca domestica</i> Linnaeus, 1758	29.04.2022	8 mm	2
6	V.Coleoptera	Carabidae	<i>Carabus violaceus</i> Linnaeus, 1758	11.06.2021	10 mm	3
7		Carabidae	<i>Carabus convexus</i> Fabricius, 1775	9.04.2022	12 mm	4
8		Carabidae	<i>Carabus monilis</i> Fabricius, 1792	29.04.2022	27 mm	5
9		Carabidae	<i>Agonum muelleri</i> (Herbst, 1784)	9.05.2022	9 mm	2
10		Carabidae	<i>Harpalus rufipes</i> (Degeer, 1774)	12.05.2022	12 mm	3
11		Pyrochroidae	<i>Pyrochroa coccinea</i> Linnaeus, 1762	29.04.2022	17 mm	2
12	VI.Lepidoptera	Pieridae	<i>Pieris brassicae</i> (Linnaeus, 1758)	14.05.2022	14 mm	1
13	VII.Hymenoptera	Apidae	<i>Apis mellifera</i> Linnaeus, 1758	14.05.2022	12 mm	2
<b>Total</b>						<b>37</b>

In the bean crop, 22 insect specimens were caught, and five orders were identified: Coleoptera, Diptera, Hemiptera, Lepidoptera and Orthoptera. The best represented was the Coleoptera order with 3 families and 4 species. The Orthoptera and Diptera orders included two families each while the Hemiptera and Lepidoptera orders were represented by only one family and one species (Table 5).

The majority of 40% is held by the Coleoptera species, followed by Orthoptera and Diptera with 30%, while the orders of Hemiptera and Lepidoptera are represented with 15% each.

Table 5. Insects captured from pepper culture.

No. Crt.	Order	Family	Species	Date of collection	Body length	Number of specimens
1	I.Coleoptera	Cerambycidae	<i>Morimus funereus</i> Mulsant, 1863	3.06.2021	35 mm	1
2		Carabidae	<i>Carabus violaceus</i> Linnaeus, 1758	11.06.2021	11 mm	2
3		Curculionidae	<i>Donus comatus</i> (Boheman, 1842)	9.04.2022	9 mm	2
4		Carabidae	<i>Perostichus melanarius</i> (Illiger, 1798)	12.05.2022	21 mm	4
5	II.Orthoptera	Gryllidae	<i>Gryllus campestris</i> Linnaeus, 1758	25.06.2021 9.05.2022	8 mm	2
6		Gryllotalpidae	<i>Gryllotalpa gryllotalpa</i> Latreille, 1802	9.05.2021 9.05.2022	24 mm ♀, 35 mm ♂	3
7		Bibionidae	<i>Biblio nigriventris</i> Haliday, 1833	29.04.2022	10 mm	1

8	III.Diptera	Muscidae	<i>Musca domestica</i> Linnaeus, 1758	14.05.2022	11 mm	2
9	IV.Lepidopteraa	Noctuidae	<i>Mamestra brassicae</i> (Linnaeus, 1758)	29.04.2022	16 mm	1
10	V.Hemiptera	<u>Pyrrhocoridae</u>	<i>Pyrrhocoris apterus</i> (Linnaeus, 1758)	9.05.2022 12.05.2022	10 mm	4
<b>Total</b>						<b>22</b>

In the potato crop, 69 insect specimens were caught, and four orders were identified: *Coleoptera*, *Dermaptera*, *Hemiptera* and *Orthoptera*. The best represented was the *Coleoptera* order with 6 families (*Coccinellidae*, *Carabidae*, *Lucanidae*, *Pyrochroidae*, *Chrysomelidae*, and *Curculionidae*) followed by *Hemiptera* with 3 families and 3 species (Table 6). The Orders of *Orthoptera* with two families (*Gryllotalpidae*, *Gryllidae*), and the Order of *Dermaptera* with one family (Table 6).

The majority of 58.82% is held by the *Coleoptera* species, followed by the *Hemiptera* order with 17.65%, *Orthoptera* 12.76% and *Dermaptera* with 10.77%. Among the species collected from the studied ecosystem, the protected species *Lucanus cervus* was identified (STANCĂ-MOISE, 2021, STANCĂ-MOISE et al., 2021).

Table 6. Insects caught in the potato crop.

No. Crt.	Order	Family	Species	Date of collection	Body length	Number of specimens
1	I.Coleoptera	Carabeidae	<i>Poecilus cupreus</i> (Linnaeus, 1758)	3.06.2021 18.06.2021	11 mm	4
3		Carabeidae,	<i>Carabus glabratus</i> Paykull, 1790	9.04.2022 12.05.2022	20 mm	2
4		Carabeidae	<i>Agonum muelleri</i> (Herbst, 1784)	9.04.2022 9.05.2022 12.05.2022	14 mm	3
5		Chrysomelidae	<i>Leptinotarsa decemlineata</i> Say, 1824	11.06.2021 29.04.2022 (5 ex.)	10 mm	28
6		Coccinellidae	<i>Coccinella septempunctata</i> Linnaeus., 1758	11.06.2021 9.04.2022 14.05.2022	7 mm	5
7		Pyrochroidae	<i>Pyrochroa coccinea</i> Linnaeus, 1762	29.04.2022, (2 ex.)	10-11 mm	4
8		Cerambycidae	<i>Saperda scalaris</i> (Linnaeus, 1758)	29.04.2022	16 mm	2
9		Cerambycidae	<i>Rhamnusium bicolor</i> Latreille, 1829	14.05.2022	14-16 mm	1
10		Lucanidae	<i>Lucanus cervus</i> Linnaeus, 1758	9.05.2022 (2 ex.)	50 mm ♂	1
11		Curculionidae	<i>Hylobius abietis</i> (Linnaeus, 1758)	12.05.2022 14.05.2022	7-10 mm	2
12		II.Hemiptera	Pyrrhocoridae	<i>Pyrrhocoris apterus</i> (Linnaeus, 1758)	3.06.2021	10 mm
13	Pentatomidae		<i>Pentatoma rufipes</i> (Linnaeus, 1758)	11.06.2021	15 mm	2
14	Pentatomidae		<i>Palomena prasine</i> (Linnaeus, 1761)	9.04.2022	13 mm	3
15	III.Dermaptera	Forficulidae	<i>Forficula auricularia</i> Linnaeus, 1758	14.06.2021	21 mm	2
16	IV.Orthoptera	Gryllotalpidae	<i>Gryllotalpa gryllotalpa</i> Latreille, 1802	25.06.2021	35 mm ♀	3
17		Gryllidae	<i>Gryllus campestris</i> Linnaeus, 1758	9.05.2022	13 mm	2
<b>Total</b>						<b>69</b>

Following the determination of the captured species we can conclude that they come from 8 insect orders, *Coleoptera*, *Hemiptera*, *Dermaptera*, *Orthoptera*, *Diptera*, *Lepidoptera*, *Blattode*, *Hymenoptera* according to the data in Table 7.



Table 7. Systematic classification of insect capture species from the vegetable garden in Paușești commune, Vâlcea county.

Ordin	Family	Species
<b>I.Coleoptera</b>	Carabeidae	<i>Poecilus cupreus</i> (Linnaeus, 1758)
	Carabeidae	<i>Perostichus melanarius</i> (Illiger, 1798)
	Carabeidae	<i>Pterostichus niger</i> (Schaller, 1783)
	Carabeidae	<i>Carabus glabratus</i> Paykull, 1790
	Carabeidae	<i>Carabus violaceus</i> Linnaeus, 1758
	Carabidae	<i>Carabus convexus</i> Fabricius, 1775
	Carabidae,	<i>Carabus monilis</i> Fabricius, 1792
	Carabeidae	<i>Agonum muelleri</i> (Herbst, 1784)
	Carabidae	<i>Harpalus rufipes</i> (Degeer, 1774)
	Carabidae	<i>Carabus violaceus</i> Linnaeus, 1758
	Carabidae	<i>Oodes helopioides</i> (Fabricius, 1792)
	Chrysomelidae	<i>Leptinotarsa decemlineata</i> Say, 1824
	Coccinellidae	<i>Coccinella septempunctata</i> Linnaeus., 1758
	Scarabeidae	<i>Aphodius fossor</i> (Linnaeus, 1758)
	Pyrochroidae	<i>Pyrochroa coccinea</i> Linnaeus, 1762
	Cerambycidae	<i>Saperda scalaris</i> (Linnaeus, 1758)
	Cerambycidae	<i>Rhamnusium bicolor</i> Latreille, 1829
	Cerambycidae	<i>Morimus funereus</i> Mulsant, 1863
	Cerambycidae	<i>Nothorhina punctata</i> (Fabricius, 1798)
	Lucanidae	<i>Lucanus cervus</i> Linnaeus, 1758
Curculionidae	<i>Donus comatus</i> (Boheman, 1842)	
Curculionidae	<i>Hylobius abietis</i> (Linnaeus, 1758)	
<b>II.Hemiptera</b>	Pyrrhocoridae	<i>Pyrrhocoris apterus</i> (Linnaeus, 1758)
	Pentatomidae	<i>Pentatoma rufipes</i> (Linnaeus, 1758)
	Pyrochroidae	<i>Pyrochroa coccinea</i> Linnaeus, 1762
	Coreidae	<i>Coreus marginatus</i> (Linnaeus, 1758)
	Pentatomidae	<i>Palomena prasine</i> (Linnaeus, 1761)
<b>III.Dermaptera</b>	Forficulidae	<i>Forficula auricularia</i> Linnaeus, 1758
<b>IV.Orthoptera</b>	Gryllotalpidae	<i>Gryllotalpa gryllotalpa</i> Latreille, 1802
	Gryllidae	<i>Gryllus campestris</i> Linnaeus, 1758
	Acrididae	<i>Calliptamus italicus</i> (Linnaeus, 1758)
	Acrididae	<i>Chrysochraon dispar</i> Germar, 1831
<b>V.Diptera</b>	Bibionidae	<i>Bibio nigriventris</i> Haliday, 1833
	Muscidae	<i>Musca domestica</i> Linnaeus, 1758
	Calliphoridae	<i>Calliphora vicina</i> Robineau-Desvoidy, 1830
<b>VI.Lepidoptera</b>	Noctuidae	<i>Mamestra brassicae</i> (Linnaeus, 1758)
	Pieridae	<i>Pieris brassicae</i> (Linnaeus, 1758)
	Nymphalidae	<i>Melanargia galathea</i> (Linnaeus, 1758)
<b>VII. Blattode</b>	Cryptocercidae	<i>Cryptocercus punctulatus</i> Scudder, 1862
<b>VIII. Hymenoptera</b>	Apidae	<i>Apis mellifera</i> Linnaeus, 1758
	Vespidae	<i>Vespa crabro</i> Linnaeus, 1758

## CONCLUSIONS

Following the determinations of the captured species, we can conclude that they come from 8 orders of insects, Coleoptera (8 families), Hemiptera (3 families), Dermaptera (1 family), Orthoptera (3 families), Diptera (3 families), Lepidoptera (3 families), Blattode (1 family), Hymenoptera (2 families). After centralizing the data, we concluded that 275 specimens of insects belonging to 41 species, from 24 families were collected.

The highest abundance is found in insects belonging to the Coleoptera Order, of which there are 8 families. These insect species are entomophagous and feed on small insects, larvae and eggs of other insects or are mixophagous, scavenging and saprophagous species with an essential role in the studied ecosystem, being considered important ecological indicators.

The Orthoptera Order is represented by three families and three species, being phytophagous insects (crickets), with a useful role in the ecosystem, but there are also harmful species (grasshoppers), and some of them are predatory species.

The Hymenoptera Order are omnivorous species with a wide range of food but are mainly insects, pollinators and nectar feeders.

Of the Hymenoptera Order, two species belonging to two families have been identified, most species are phytophagous, species of the Apidae feed on nectar, pollen, leaves and sweet juices, while species of the *Viespidae* Family are predatory and feed on larvae or are egg parasites. The adult *Vespa crabro* is useful as a nectarivore but also as a predator to feed its larvae. But they can also damage ripe fruit and gnaw the bark to build nests, in these cases they become pests.

The insect species captured belonging to the Lepidoptera Order are represented by three families (Noctuidae, Nymphalidae and Pieridae) which include three species, all of which feed on nectar and pollen and are pollinators of garden crops.

The Diptera Order was represented by three families and three species, in the adult stage they are important pollinators alongside bees.

The Dermaptera Order was represented by one family and one species, *Forficula auricularia*, which is a mixophagous species that feeds on a wide variety of insects and plants. The captured species is considered to be harmful to some crops in the ecosystem studied.

The Hemiptera Order, with three families and five species, is the dominant order after Coleoptera. Of this order, most species are phytophagous and are harmful to agricultural crops in the studied ecosystem.

The identified pests were: *Leptinotarsa decemlineata* Say, 1824 specific to potato crop; *Gryllotalpa gryllotalpa* and *Forficula auricularia*.

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