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OBSERVATIONS ON THE EXISTING FAUNA IN APPLE ORCHARD

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ABSTRACT

The observations were made in an apple orchard in Nechit, Neamț county.To collect the studied entomofauna, Barber-type soil traps were used, which were placed in the plantation in number of 12. The traps were placed in two rows at a distance of 6-8 m per row and 8-10 m between rows. The traps operated from June to September in 2024. Periodic collections of the collected material were made at intervals of about 14 days. At each collection, the NaCl solution was replaced with a concentration of 25g/l, and each sample was labeled specifying the date of collection and the number of the trap. The samples thus collected were brought to the laboratory where they were cleaned of plant remains and the epigean entomofauna was selected, as well as species of crustaceans, myriapods and arachnids. The determination of the species was done with the help of the determinants and the images on the specialized websites. The most frequently collected insect species were: Poecilus cupreus, Amara spp., Pseudophonus pubescens.

INTRODUCTION

Globally, in 2011, there were 360,000 described species of beetles, and estimates indicate a total of 1.5 million beetle species existing in the world (Berrie A.and Cross J. 2006, Nigel E. et all 2015). Beetles represent approximately 25% (350,000 - 400,000 species) of all described species (1.5 million species), making them the richest order of insects known on Earth. Many beetle species are considered major pests of agricultural plants as well as stored products. They attack all parts of plants, as well as processed fibers, grains, and wood products. Scarabaeidae are beneficial insects acting as decomposers and recyclers of organic nutrients (Mitrea I., 2002). The vast majority are phytophagous, some are predatory, others are detritivores, and some are parasitic, etc. Predatory species, such as lady beetles, are important biological agents for controlling aphids and mites, among others. (Oltean I, 2011) They are considered predatory species on pest insects. In current integrated pest management strategies, especially in fruit plantations, a cost-effective and ecological alternative is the application of biological control methods, where predatory insect species play a particularly important role. (Amzăr V., 2005)

MATERIAL AND METHODS

In the studied biotope, 12 traps were placed in two rows, installed from the edge toward the interior, at a distance of 10 meters between rows and 6 meters between traps in each row. Sample collection was conducted throughout the year 2024, from July to September, at intervals of approximately 14-16 days. (Tălmaciu M., 2010). The establishment of the experimental plot was implemented in an intensive apple orchard with an area of 1.6 hectares, cultivated with apple trees at a density of 2600 trees per hectare.

The collection of entomological material from Barber-pitfall traps was carried out on the following dates: Sample I: July 10, Sample II: July 22, Sample III: July 31, Sample IV: August 14, Sample V: August 28, and Sample VI: September 11. The collected material was sorted by order or species and identified with the help of identification keys from the discipline of Entomology (Perju T and Rogojanu V., Panin S., Reitter E., Gidei P. and Popescu I.) as well as specialized websites.

Figure 1. Location of Barber soil traps at the beginning of the vegetation period (original)

In the laboratory, the material was cleaned of plant debris, then washed under running water and subsequently preserved in 70% medicinal alcohol.

Figure 2. Determination of the material collected (original)

RESULTS AND DISCUSSIONS

During the collection on July 10, 2024 (Table 1), a total of 428 beetle specimens belonging to 32 species were collected. Pterostichus cupreus was the most abundant species, with 295 specimens, representing 68.93% of the total specimens collected on that date. A relatively high number of specimens were also recorded for the species Onthophagus ovatus with 19 specimens, Dermestes laniarius with 15 specimens, Agriotes ustulatus with 14 specimens, and Staphylinus caesareus with 13 specimens. The other species had between 1 and 6 specimens.

Table 1

Collection summary from July 10, 2024

No.	Species	Barber pitfall												Total
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	
1	Absidia pilosa	-	-	-	-	-	-	-	-	-	-	1	-	1
2	Agriotes atterimus	-	-	-	-	-	-	-	-	2	-	-	-	2
3	Agriotes ustulatus	1	1	1	2	-	2	-	2	1	-	4	-	14
4	Amara aenea	-	-	-	-	-	-	-	1	-	-	-	-	1
5	Amara crenata	-	1	-	-	1	3	-	-	-	-	-	-	5
6	Bembidion varium	-	-	-	-	-	-	-	1	-	-	-	-	1
7	Brachynus crepitans	-	1	-	-	-	-	-	1	-	-	2	-	4
8	Carabus coriaceus	-	-	1	1	-	-	-	-	-	-	-	-	2
9	Chrysomela geminata	-	-	-	-	-	-	-	-	1	-	-	-	1
10	Cicindela campestris	-	-	-	-	-	-	-	1	-	-	-	-	1
11	Cicindela hybrida	1	-	-	-	-	3	-	-	-	-	-	1	5
12	Cicindela germanica	-	1	-	-	-	-	-	-	-	1	-	1	3
13	Cleonis punctiger	-	-	-	-	-	-	-	1	-	-	-	-	1
14	Clivina fossor	-	-	-	-	-	-	1	-	-	-	-	-	1
15	Clytra humeralis	-	-	1	-	-	-	-	-	-	-	-	-	1
16	Dermestes laniarius	1	-	-	3	-	-	-	1	-	-	10	-	15
17	Drypta dentata	-	1	-	-	-	-	-	-	-	-	-	-	1
18	Harpalus tardus	-	-	-	-	-	1	-	-	-	-	-	-	1
19	Hister funestus	-	-	-	-	-	-	-	-	-	-	2	-	2
20	Hister neglectus	-	-	-	-	-	-	-	-	1	-	2	-	3
21	Oiceoptoma thoracium	-	-	-	-	1	-	-	-	-	-	-	-	1
22	Onthophagus ovatus	-	1	3	-	1	2	-	-	2	3	6	2	20
23	Onthophagus vacca	-	-	-	-	4	-	-	-	1	-	-	-	5
24	Pseudophonus pubescens	-	-	1	-	-	-	-	-	1	-	-	2	4
25	Pterostichus cupreus	8	28	12	-	37	54	8	13	20	56	50	9	295
26	Pterostichus lepidus	-	1	2	-	-	3	-	-	-	-	-	-	6
27	Quedius cruentus	-	-	-	-	-	-	-	1	-	-	4	-	5
28	Silpha carinata	-	1	-	-	-	-	-	-	-	-	-	-	1
29	Silpha obscura	-	-	-	-	1	-	-	-	-	2	2	-	5
30	Sphenophorus piceus	-	-	-	-	-	-	-	-	1	-	-	-	1
31	Staphylinus caesareus	-	1	-	-	5	1	-	-	-	3	3	-	13
32	Staphylinus olens	-	2	2	-	-	-	-	-	-	-	-	1	5
		11	39	23	6	50	69	9	22	30	65	86	16	426

During the second collection on July 22, 2024 (Table 2), a total of 112 beetle specimens belonging to 19 species were collected. The species Poecilus cupreus had the highest number of specimens collected, with 64, which represents 57,15% of the total beetles collected on that date. A relatively high number of beetles were

also recorded for the species Acylophorus glaberrimus, with 8 specimens, followed by Dermestes laniarius and Necrophorus vespillo, each with 6 specimens. The other species had between 1 and 4 specimens.

Table 2

Collection summary from July 22, 2024

No	Name of species	Barber pitfall												Total
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	
1	Aclypea alpicola	-	-	-	1	-	-	1	-	-	-	1	-	3
2	Acylophorus glaberimus	-	-	-	3	2	1	1	-	-	-	-	1	8
3	Agriotes ustulatus	-	-	-	-	-	-	-	-	1	-	-	-	1
4	Aphanisticus pusillus	-	1	-	-	-	-	-	-	-	-	-	-	1
5	Athous haemorrhoidalis	-	1	1	-	-	-	-	-	-	-	-	-	2
6	Cicindela germanica	-	-	-	1	-	-	-	-	-	-	-	-	1
7	Dermestes laniarius	-	-	-	2	1	2	-	-	1	-	-	-	6
9	Harpalus marginellus	1	-	-	-	-	-	-	-	-	-	-	-	1
10	Hister ruficornis	-	1	-	-	1	-	-	-	-	-	-	-	2
11	Hister vernalis	1	-	-	-	-	-	-	-	-	-	-	-	1
12	Mordellistena parvula	-	-	1	-	-	-	-	-	-	-	-	-	1
13	Necrophorus vespillo	-	1	-	1	-	-	3	-	1	-	-	-	6
14	Onthophagus ovatus	-	1	-	-	1	-	-	-	-	-	-	-	2
15	Poecilus cupreus	19	5	4	4	3	8	-	2	-	-	12	7	64
16	Pseudophonus pubescens	-	-	-	1	-	1	1	-	-	-	1	-	4
17	Silpha carinata	-	-	1	-	-	-	-	-	-	-	-	-	1
18	Staphylinus caesareus	1	-	-	-	-	-	-	-	-	-	-	-	1
19	Typocerus attenuatus	-	-	-	-	-	-	-	-	-	1	-	-	1
Total		22	10	7	13	8	12	6	2	3	1	14	8	106

During the third collection on July 31, 2024, a total of 39 beetle specimens belonging to 10 species were collected. The species with the highest number of specimens was Poecilus cupreus, with 29 specimens collected, representing 74.36% of the total specimens collected. The other species had between 1 and 2 specimens.

During the fourth collection on August 14, 2024 (table 4), a total of 26 specimens belonging to 7 species were collected. The species with the highest number of specimens collected was Poecilus cupreus, with 14 specimens, representing 53.85% of the total specimens collected. This was followed by the species Anisodactylus signatus, with 7 specimens, representing 26,93% of the total

specimens collected on that date. The other species each had a single specimen.

Table 3

Collection Summary from July 31, 2024

No	Name of species	Barber pitfall												Total
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	
1	Acylophorus glaberrimus	-	-	-	-	-	-	-	-	1	-	-	-	1
2	Anisodactylus binotatus	-	-	-	-	-	-	-	1	-	-	-	-	1
3	Cylindera germanica	-	-	-	-	-	-	-	-	1	-	-	-	1
4	Dermestes laniarius	-	1	-	-	-	-	-	-	-	-	-	-	1
5	Galeruca pomonae	-	-	1	-	-	-	-	-	-	-	-	-	1
6	Necrophorus vesipllo	-	1	-	-	1	-	-	-	-	-	-	-	2
7	Onthophagus ovatus	1	-	-	-	-	-	-	-	-	-	-	-	1
8	Poecilus cupreus	12	-	1	1	3	5	2	-	-	-	1	4	29
9	Quedius unicolor	-	-	-	-	-	-	-	-	1	-	-	-	1
10	Silpha carinata	1	-	-	-	-	-	-	-	-	-	-	-	1
Total		14	2	2	1	4	5	2	1	3	-	1	4	39

Table 4

Collection Summary from August 14, 2024

No.	Name of species	Barber pitfall												Total
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	
1	Anisodactylus signatus	-	-	-	-	-	-	1	6	-	-	-	-	7
2	Dermestes laniarius	-	-	-	-	-	-	-	1	-	-	-	-	1
3	Harpalus tardus	-	-	-	-	-	-	-	-	1	-	-	-	1
4	Hister purpurascens	-	-	-	-	-	-	-	-	1	-	-	-	1
5	Poecilus cupreus	-	-	1	-	1	-	1	1	5	-	5	-	14
6	Pseudophonus griseus	-	-	-	-	-	-	1	-	-	-	-	-	1
7	Silpha obscura	-	-	-	-	-	-	-	-	-	-	1	-	1
Total		-	-	1	-	1	-	3	8	7	-	6	-	26

During the fifth collection (table 5), 8 beetle specimens belonging to 6 species were collected. The species with the highest number of specimens was Poecilus cupreus, with 4 specimens, representing 50% of the total species collected. The other species each had a single specimen.

Table 5

Collection Summary from August 28, 2024

No.	Name of species	Barber pitfall												Total
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	
1	Aleochara moerens	-	-	1	-	-	-	-	-	-	-	-	-	1
2	Anisodactylus binotatus	-	-	-	-	-	-	-	-	1	-	-	-	1
3	Aptinus bombarda	-	-	-	-	-	1	-	-	-	-	-	-	1
4	Dermestes laniarius	-	-	1	-	-	-	-	-	-	-	-	-	1
5	Poecilus cupreus	1	-	1	1	-	1	-	-	-	-	-	-	4
6	Quedius unicolor	-	-	-	-	-	-	1	-	-	-	-	-	1
Total		1	-	3	1	-	2	1	-	1	-	-	-	9

During the sixth collection on September 11, 2024 (table 6), a total of 20 specimens belonging to 9 species were collected. The species with the highest

number of specimens was Poecilus cupreus, with 11 specimens, representing 55% of the total beetles collected during this collection. The species Pterostichus niger had 2 specimens, while 7 species had a single specimen each.

Throughout the entire observation period, a total of 626 specimens belonging to 59 species were collected. The species with the highest number of specimens collected was Poecilus cupreus, with 417 specimens, representing 66.62% of the total specimens.

Table 6

Collection Summary from September 11, 2024

No.	Name of species	Barber pitfall												Total
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	
1	Barynotus obscurus	-	-	-	-	1	-	-	-	-	-	-	-	1
2	Calathus fuscipes	1	-	-	-	-	-	-	-	-	-	-	-	1
3	Dermestes laniarius	-	1	-	-	-	-	-	-	-	-	-	-	1
4	Harpalus calceatus	-	-	-	-	-	-	-	-	1	-	-	-	1
5	Notaris bimaculatus	-	-	-	1	-	-	-	-	-	-	-	-	1
6	Philonthus coruscus	-	-	-	-	-	-	-	-	1	-	-	-	1
7	Plagiodera versicolora	-	-	1	-	-	-	-	-	-	-	-	-	1
8	Poecilus cupreus	1	-	-	1	-	1	-	-	-	3	2	3	11
9	Pterostichus niger	-	-	-	-	-	-	-	-	1	-	-	1	2
Total		2	1	1	2	1	1	-	-	3	3	2	4	20

A relatively large number of specimens were recorded for the species Dermestes laniarius, with 25 specimens, and Ontophagus ovatus, with 23 specimens. A total of 28 species had only one specimen collected (table 7).

Table 7

Centralized summary of beetle species collected in 2024 in the apple orchard of the Nechit area- Suceava

No.	Name of species	Harvest and no of samples						Total
		I	II	III	IV	V	VI	
1.	Absidia pilosa	1						1
2.	Aclypea alpicola		3					3
3.	Acylophorus glaberimus		8	2				10
4.	Agriotes atterimus	2						2
5.	Agriotes ustulatus	14	1					15
6.	Aleochara moerens					1		1
7.	Amara aenea	1						1
8.	Amara crenata	5						5
9.	Anisodactylus binotatus			1		1		2

No.	Name of species	Harvest and no of samples						Total
		I	II	III	IV	V	VI	
10.	Anisodactylus signatus				7			7
11.	Aphanisticus pusillus		1					1
12.	Aptinus bombarda					1		1
13.	Athous haemorrhoidalis		2					2
14.	Barynotus obscurus						1	1
15.	Bembidion varium	1						1
16.	Brachynus crepitans	4						4
17.	Calathus fuscipes						1	1
18.	Carabus coriaceus	2						2
19.	Chrysomela geminata	1						1
20.	Cicindela campestris	1						1
21.	Cicindela germanica	3	1	1				5
22.	Cicindela hybrida	5						5
23.	Cleonis punctiger	1						1
24.	Clivina fossor	1						1
25.	Clytra humeralis	1						1
26.	Dermestes laniarius	15	6	1	1	1	1	25
27.	Drypta dentata	1						1
28.	Galeruca pomonae			1				1
29.	Harpalus calceatus						1	1
30.	Harpalus marginellus		1					1
31.	Harpalus tardus	1			1			2
32.	Hister funestus	2						2
33.	Hister neglectus	3						3
34.	Hister purpurascens				1			1
35.	Hister ruficornis		2					2
36.	Hister vernalis		1					1
37.	Mordellistena parvula		1					1
38.	Necrophorus vesipillo		6	2				8
39.	Notaris bimaculatus						1	1
40.	Oiceoptoma thoracium	1						1
41.	Onthophagus ovatus	20	2	1				23
42.	Onthophagus vacca	5						5
43.	Philonthus coruscus						1	1
44.	Plagiodera versicolor						1	1
45.	Poecilus cupreus	295	64	29	14	4	11	417
46.	Pseudophonus griseus				1			1
47.	Pseudophonus pubescens	4	4					8
48.	Pterostichus lepidus	6						6
49.	Pterostichus niger						2	2
50.	Quedius cruentus	5						5
51.	Quedius unicolor			1		1		2

No.	Name of species	Harvest and no of samples						Total
		I	II	III	IV	V	VI	
52.	Silpha carinata	1	1	1				3
53.	Silpha obscura	5						
54.	Sphenophorus piceus	1						1
55.	Staphylinus caesareus	13	1					14
56.	Staphylinus olens	5						5
57.	Typocerus attenuatus		1					1
Total		425	106	39	26	9	20	626

Summary of Results Obtained in 2024

In 2024, following the six collections, a total of 626 beetle specimens were obtained (Tab. 7):

- Collection No. 1 - totaled 426 beetle specimens;
- Collection No. 2 - totaled 106 beetle specimens;
- Collection No. 3 - totaled 39 beetle specimens;
- Collection No. 4 - totaled 26 beetle specimens;
- Collection No. 5 - totaled 9 beetle specimens;
- Collection No. 6 - totaled 20 beetle specimens.

It is observed that the highest number of specimens collected in 2024 was recorded during the first collection, while the lowest number of specimens was recorded during the fifth collection (Fig.1). The recorded collection values varied widely, ranging from 426 specimens to 9 specimens.

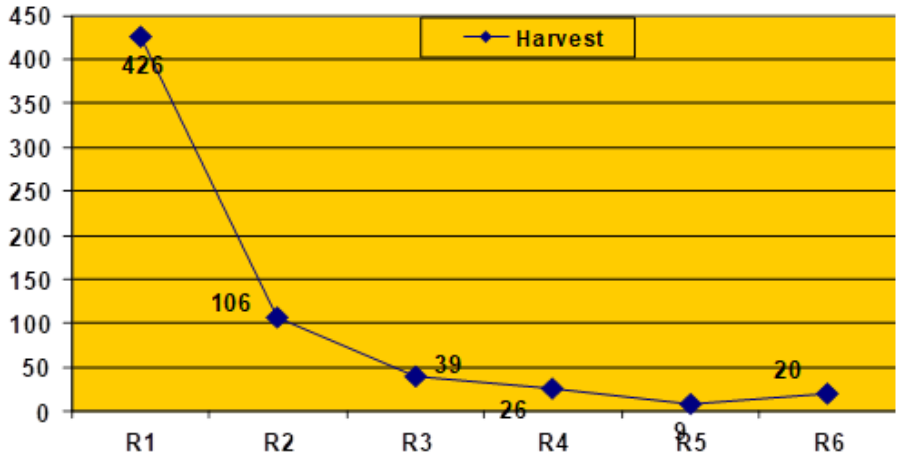

Figure. 1. Graphical representation of the number of beetle samples collected after the 6th harvests in 2024

CONCLUSIONS

Observations were made in an apple orchard in the Nechit area, Neamț County, during the year 2024, with entomological material collected using Barber-type soil traps, retaining only beetle species.

A total of 6 collections were made at intervals of approximately 14-16 days from July to September. The highest number of specimens collected was recorded during the first collection (426), while the fewest specimens were collected during the third collection, totaling 9 specimens.

Throughout the entire observation period, beetles belonging to 59 species were collected. The species with the highest number of specimens collected were: Poecilus cupreus with 47 specimens, Dermestes laniarius with 25 specimens, Onthophagus ovatus with 23 specimens, and Agriotes ustulatus with 125 specimens. A total of 28 species had only a single specimen.

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