Scientific Papers. Series B, Horticulture. Vol. LXIX, No. 2, 2025
Print ISSN 2285-5653, CD-ROM ISSN 2285-5661, Online ISSN 2286-1580, ISSN-L 2285-5653

RESEARCH ON THE STRUCTURE, ROLE AND ECOLOGICAL INDICATORS OF EPIGEIC ARTHROPOD SPECIES FOUND IN SOME SWEET CHERRY OCHARDS IN THE RĂDUCĂNENI AREA, IAȘI COUNTY, DEPENDING ON THE APPLIED CHEMICAL TREATMENTS

Romeo Ciprian BALINT[1], Monica HEREA[1], Ion MITREA[2], Renate SIPOS[1], Mihai TĂLMACIU[1]

[1]"Ion Ionescu de la Brad" Iaşi University of Life Sciences,
3 Mihail Sadoveanu Alley, Iași, Romania
[2]University of Craiova, 19 Libertății Street, Craiova, Romania

Corresponding author email: monica.herea@iuls.ro

Abstract

The research was conducted for a period of three years , in a cherry plantation in Răducăneni area, Iași County. The material was collected using Barber soil traps, inside the traps using a 2.5% NaCl solution to capture arthropod species. The collected material was cleaned, brought to the laboratory where the species were identified by harvest date, traps and variants. A number of 12 traps were used, installed in two rows at a distance of 12 m between rows and 6-8m between traps per row. In 2022, seven collections were made from May to October, and the most frequently collected species were: Harpalus distinguendus; Anisodactylus binotatus. In 2023, collections of arthropods from Barber traps were made and the most frequently collected species were: Anisodactylus signatus, Anisodactylus binotatus, Pseudophonus pubescens; Calathus fuscipes. In 2024, a total of 6 collections were made and the most frequently collected species were those belonging to the genera: Amara, Anisodactylus, Harpalus, Calathus, all belonging to the Carabidae family. In addition to insects, species of arachnids and millipedes were also collected.

Key words: *ecological indicators, sweet cherry ochards, arthropod species, chemical treatments.*

INTRODUCTION

Epigeal arthropods play an essential role in agricultural ecosystems by influencing the dynamics of pest populations and contributing to the maintenance of ecological balance. In fruit plantations, these communities are affected by a range of abiotic and biotic factors, including phytosanitary treatments applied to protect crops (Herea et al., 2010; 2011).

This study aims to investigate the structure, role, and ecological indicators of epigeal arthropods in cherry orchards in Iași County, depending on the chemical treatment regime used. It seeks to evaluate species diversity, abundance, and relevant ecological indicators to understand how these agricultural practices influence arthropod communities.

Research in this field is particularly important, given the need to develop sustainable crop protection strategies that minimize negative impacts on beneficial entomofauna (Perju et al., 2021). Through a comparative analysis of different types of treatments applied in cherry orchards, the study could contribute to the development of integrated pest management measures with a reduced impact on local biodiversity.

The impact of pests on fruit and vine crops results from the interaction between a specific host/parasite system and the local environmental and cultural conditions (Talmaciu et al., 2011). Due to the expansion of organic farming, changes have occurred in the spectrum of diseases and pests in agricultural crops, compared to conventional farming systems where chemical treatments are applied (Tezcan C. and Gülperçin N., 2024).

Since 1990, environmental protection, biodiversity conservation, and habitat preservation issues have gained a new dimension, resulting in the identification of new areas with productive potential in the horticultural, viticultural, and fruit-growing sectors. The need for biological and ecological knowledge in this field has become increasingly significant, especially since between 18,000 and 55,000 species disappear worldwide each year.

Beetles have various beneficial functions for humans; they are good indicators and can serve as one of the main tools in solving cadastral and integrated ecological monitoring problems. Based on their presence and frequency in ecosystems, various mathematical models of the dynamics of economically significant animals could be developed, and principles and pathways for predicting and managing different agricultural and forestry pests could be created.
Considering the position and role of beetles in different types of horticultural ecosystems, this research was necessary in two distinct types of ecosystems: fruit-growing and viticulture (Mitrea, 2011).

MATERIALS AND METHODS

The soil traps type Barber were used to collect the biological material. These consisted in the introduction into the soil of recipients in which a salt solution (2.5%) (Herea M., 2010).
The experience was organized in a sweet cherry orchard cultivated with Stela cultivar, which belongs to the Răducăneni stationary.
The location of the traps has been done on two rows at a distance of 12 m between the rows and 6 meters from the traps by three per row (Tălmaciu M., 2011).
The gathering of the entomological material was done between May of August at intervals of 10-20 days in each year of observations 2022, 2023, 2024.
At each harvest, the insects collected from each trap were put into gauze cloth, each sample separately, and the liquid in the trap was replaced or filled. The material was then labeled, on the label specifying: the date of collection; trap number and the variant.
In the laboratory, the material was cleaned from plant debris and then washed under the jet of water, selected by order or species.
As for the data interpretation, a number of ecological indices have been calculated as follows: abundance, constancy, dominance, and ecological significance.
Abundance (A) - Expresses the number of collected specimens.
Constancy (C) - represent the number of samples in which the species appears, based on the number of samples taken, according to the formulate:

$$C_A = \frac{N_P \cdot A \cdot 100}{N_P}$$

CA - constance of species
NpA - The number of traps in which species A appears;
Np - Total number of traps,
with 4 classes of constants:
C1 - Accidental species (1-2%);
C2 - Accessory species (25.1-50%);
C3 - Constant species (50.1-75%);
C4 - Euconstant species (75.1-100%).

Dominance (D) Is the total number of samples relative to the total number of individuals harvested according to the formula:

$$D_A = \frac{N_A \cdot 100}{N_t}$$

DA - constance of the A;
NA - total number the samples of A species;
Nt - total number of samples for all species,
with 5 dominance classes:
D1 - subrecedent (sub 1.1%);
D2 - recedent (1.1-2%);
D3 - subdominant (2.1-5%);
D4 - dominant (5.1-10%);
D5 - eudominant (above 10%).

The Significance Ecological Index (W) by formulate:

$$W_A = \frac{C_A \cdot D_A \cdot 100}{10000}$$

WA - ecological significance index of the A species;
CA - constance of the A species;
DA - dominance of the A species,
with 5 clases:
W1 - Less than 0.1% (Accidental species);
W2 - 0.1-1%;
W3 - 1.1-5% (Accompanying species);
W4 - 5.1-10%;
W5 - aove 10% (Edifying species).

The Ecological Significance Index (W) is used to deepen the interrelationships between constancy and dominance, emphasizing even more clearly the structure of some species, reflecting its importance in the analyzed community.

RESULTS AND DISCUSSIONS

To achieve the proposed objectives and following the activities carried out, seven harvests were conducted at the Răducăneni station using six soil traps, with a total of 84

such traps being used. These traps collected 428 specimens belonging to the epigeic fauna in the cherry plantation in 2022.
To achieve this goal, the sinecological analysis of fauna on sweet cherry orchards was performed to assess the ratio of each species in the analyzed biocenosis.

The material obtained from the observations was mathematically processed to obtain a series of ecological indicators: abundance (A), dominance (D), constancy (C) and ecological significance index (W).

Table 1.Species composition of arthropods collected in soil traps in 2022 in the cherry orchard

No.	Name of species	Harvested							Number of traps	Total samples
		I	II	III	IV	V	VI	VII		
1.	*Phalangium opilo*	0	19	24	9	20	13	14	32	99
2.	*Anisodactylus binotatus*	30	21	9	15	2	0	2	27	79
3.	*Harpalus distinguendus*	29	18	4	8	4	1	1	30	65
4.	*Dermestes laniarius*	4	5	2	1	6	1	0	14	17
5.	*Harpalus tardus*	6	8	2	0	1	0	0	7	17
6.	*Licinus cassideus*	0	0	0	0	0	6	7	10	13
7.	*Amara aenea*	4	3	2	0	2	0	0	8	11
8.	*Amara apricaria*	0	9	0	0	1	1	0	5	11
9.	*Carabus coriaceus*	0	3	2	2	0	0	3	7	10
10.	*Anisodactylus signatus*	0	0	0	0	9	1	0	5	10
11.	*Pseudophonus pubescens*	0	0	0	0	2	4	3	7	9
12.	*Cartodere elongata*	0	0	0	0	0	1	8	4	9
13.	*Ophonus azureus*	4	2	0	0	1	1	0	6	8
14.	*Chromatoiulus unilineatus*	3	2	0	0	3	0	0	5	8
15.	*Armadilidium vulgare*	3	0	0	0	0	1	3	7	7
16.	*Amara familiaris*	4	0	0	0	1	0	0	3	5
17.	*Forficula auricularia*	0	1	3	0	0	0	0	3	4
18.	*Ophonus puncticollis*	0	0	0	4	0	0	0	2	4
19.	*Pseudophonus griseus*	2	1	0	0	0	0	0	3	3
20.	*Brachynus crepitans*	2	0	0	0	0	0	0	2	2
21.	*Harpalus calceatus*	1	1	0	0	0	0	0	2	2
22.	*Amara similata*	0	0	2	0	0	1	0	2	3
23.	*Amara crenata*	0	0	0	1	0	0	1	2	2
24.	*Blaps mortisaga*	0	0	0	1	1	0	0	2	2
25.	*Leistus ferrugineus*	0	0	0	2	0	0	0	1	2
26.	*Metabletus truncatellus*	0	0	0	1	1	0	0	2	2
27.	*Ophonus sabulicolla*	0	0	0	1	0	1	0	2	2
28.	*Harpalus rufus*	0	0	0	0	0	1	1	1	2
29.	*Otiorrhynchus pinastri*	0	0	0	0	0	2	0	2	2
30.	*Quedus cinctus*	0	0	0	0	0	0	2	1	2
31.	*Amara eurynota*	1	0	0	0	0	0	0	1	1
32.	*Colodera aethiops*	1	0	0	0	0	0	0	1	1
33.	*Tachyporus abdominalis*	1	0	0	0	0	0	0	1	1
34.	*Pentodon idiota*	0	1	0	0	0	0	0	1	1
35.	*Carabus violaceus*	0	0	1	0	0	0	0	1	1
36.	*Lathrobium quadratum*	0	0	1	0	0	0	0	1	1
37.	*Lathrobium multipunctatum*	0	0	0	0	0	1	0	1	1
38.	*Pterostichus cupreus*	0	0	1	0	0	0	0	1	1
39.	*Sericus bruneus*	0	0	1	0	0	0	0	1	1
40.	*Calathus fuscipes*	0	0	0	1	0	0	0	1	1
41.	*Cypticus quisquilius*	0	0	0	0	1	0	0	1	1
42.	*Ontophagus ovatus*	0	0	0	0	1	0	0	1	1
43.	*Opatrum sabulosum*	0	0	0	0	1	0	0	1	1
44.	*Panagaeus crux-major*	0	0	0	0	1	0	0	1	1
45.	*Staphilinus caesareus*	0	0	0	0	1	0	0	1	1
46.	*Harpalus autumnalis*	0	0	0	0	0	1	0	1	1
47.	*Calathus melanocephalus*	0	0	0	0	0	0	1	1	1
48.	*Pterostichus nigrita*	0	0	0	0	0	0	1	1	1
49.	*Triplax lepida*	0	0	0	0	0	0	1	1	1
Total 49 species		95	94	54	46	59	37	48		427

The data in Table 1 reflect the seasonal variations of the captured arthropod fauna, highlighting maximum activity during the spring months when the highest number of captures were recorded.

In 2022, in the cherry orchard in Răducăneni, 427 arthropod specimens were collected, belonging to 49 species, using soil traps. The most frequent species were *Phalangium opilo* (99 specimens), *Anisodactylus binotatus* (79 specimens), and *Harpalus distinguendus* (65 specimens). The highest catches were recorded in the first two samplings (95 and 94 specimens), while the lowest occurred in the sixth sampling (37 specimens). This high diversity suggests a stable and balanced habitat, influenced by climatic factors and the specific nature of the cherry orchard agroecosystem. The obtained data can contribute to future strategies for sustainable ecosystem management, maintaining biodiversity and promoting beneficial species.

Table 2. Species composition of arthropods collected in soil traps in 2022 in the cherry orchard

No.	Name of species	Number of traps	Abundance	Constancy		Dominance		W	
				%	***	%	***	%	***
1.	*Phalangium opilo*	32	99	38,1	C2	23,1	D5	8,801	W5
2.	*Anisodactylus binotatus*	27	79	32,1	C2	18,5	D5	5,938	W4
3.	*Harpalus distinguendus*	30	65	35,7	C2	15,2	D5	5,426	W4
4.	*Dermestes laniarius*	14	17	1,7	C1	4,0	D3	0,008	W1
5.	*Harpalus tardus*	7	17	8,3	C1	4,0	D3	0,332	W2
6.	*Licinus cassideus*	10	13	11,9	C1	30,4	D5	3,618	W3
7.	*Amara aenea*	8	11	9,5	C1	2,6	D3	0,247	W2
8.	*Amara apricaria*	5	11	6,0	C1	2,6	D3	0,156	W2
9.	*Carabus coriaceus*	7	10	8,3	C1	23,3	D5	1,934	W3
10.	*Anisodactylus signatus*	5	10	6,0	C1	23,3	D5	1,398	W3
11.	*Pseudophonus pubescens*	7	9	8,3	C1	2,1	D3	0,174	W3
12.	*Cartodere elongata*	4	9	4,7	C1	2,1	D3	0,099	W1
13.	*Ophonus azureus*	6	8	7,1	C1	1,9	D2	0,134	W2
14.	*Chromatoiulus unilineatus*	5	8	6,0	C1	1,9	D2	0,144	W2
15.	*Armadilidium vulgare*	7	7	8,3	C1	1,6	D2	0,132	W2
16.	*Amara familiaris*	3	5	3,5	C1	1,2	D2	0,042	W1
17.	*Forficula auricularia*	3	4	3,5	C1	0,9	D1	0,031	W1
18.	*Ophonus puncticollis*	2	4	2,4	C1	0,9	D1	0,021	W1
19.	*Pseudophonus griseus*	3	3	3,5	C1	0,7	D1	0,024	W1
20.	*Brachynus crepitans*	2	2	2,4	C1	0,5	D1	0,012	W1
21.	*Harpalus calceatus*	2	2	2,4	C1	0,5	D1	0,012	W1
22.	*Amara similata*	3	2	3,5	C1	0,5	D1	0,017	W1
23.	*Amara crenata*	2	2	2,4	C1	0,5	D1	0,012	W1
24.	*Blaps mortisaga*	2	2	2,4	C1	0,5	D1	0,012	W1
25.	*Leistus ferrugineus*	1	2	1,2	C1	0,5	D1	0,006	W1
26.	*Metabletus truncatellus*	2	2	2,4	C1	0,5	D1	0,012	W1
27.	*Ophonus sabulicolla*	2	2	2,4	C1	0,5	D1	0,012	W1
28.	*Harpalus rufus*	1	2	1,2	C1	0,5	D1	0,006	W1
29.	*Otiorrhynchus pinastri*	2	2	2,4	C1	0,5	D1	0,012	W1
30.	*Quedus cinctus*	1	2	1,2	C1	0,5	D1	0,006	W1
31.	*Amara eurynota*	1	1	1,2	C1	0,2	D1	0,002	W1
32.	*Colodera aethiops*	1	1	1,2	C1	0,2	D1	0,002	W1
33.	*Tachyporus abdominalis*	1	1	1,2	C1	0,2	D1	0,002	W1
34.	*Pentodon idiota*	1	1	1,2	C1	0,2	D1	0,002	W1
35.	*Carabus violaceus*	1	1	1,2	C1	0,2	D1	0,002	W1
36.	*Lathrobium quadratum*	1	1	1,2	C1	0,2	D1	0,002	W1
37.	*Lathrobium multipunctatum*	1	1	1,2	C1	0,2	D1	0,002	W1
38.	*Pterostichus cupreus*	1	1	1,2	C1	0,2	D1	0,002	W1
39.	*Sericus bruneus*	1	1	1,2	C1	0,2	D1	0,002	W1
40.	*Calathus fuscipes*	1	1	1,2	C1	0,2	D1	0,002	W1
41.	*Cypticus quisquilius*	1	1	1,2	C1	0,2	D1	0,002	W1
42.	*Ontophagus ovatus*	1	1	1,2	C1	0,2	D1	0,002	W1
43.	*Opatrum sabulosum*	1	1	1,2	C1	0,2	D1	0,003	W1
44.	*Panagaeus crux-major*	1	1	1,2	C1	0,2	D1	0,002	W1
45.	*Staphilinus caesareus*	1	1	1,2	C1	0,2	D1	0,002	W1
46.	*Harpalus autumnalis*	1	1	1,2	C1	0,2	D1	0,002	W1
47.	*Calathus melanocephalus*	1	1	1,2	C1	0,2	D1	0,002	W1
48.	*Pterostichus nigrita*	1	1	1,2	C1	0,2	D1	0,002	W1
49.	*Triplax lepida*	1	1	1,2	C1	0,2	D1	0,002	W1
Total 49 species		84	428						

From an ecological perspective, the data in Table 2 reflect the diversity and structure of the species community observed in a specific area, likely within a faunistic-ecological study. These species are evaluated based on four main indicators: abundance (A), constancy (C), dominance (D), and ecological significance index (W).

Abundance represents the total number of specimens for each species. The most abundant species are *Phalangium opilio*, *Anisodactylus binotatus*, and *Harpalus distinguendus*, suggesting a clear dominance of these species in the studied ecosystem. These species can be considered indicators of a stable environment favorable to their development.

Constancy reflects the frequency of occurrence of each species in a significant number of traps throughout the study. Species with higher constancy (such as *Phalangium opilio*, *Anisodactylus binotatus*, and *Harpalus distinguendus*) are considered the most constant, indicating that these species are more resilient and better adapted to local ecological conditions.

Dominance indicates the proportion of the species within an ecosystem and is a measure of its ecological influence. Species with high dominance, such as *Phalangium opilio* (23.1%), *Anisodactylus binotatus* (18.5%), and *Harpalus distinguendus* (15.2%), play a significant role in the ecological structure of the studied area. These species, with a large proportion of the total number of specimens, significantly influence resource dynamics, interspecific relationships, and predation.

The ecological significance index (W) reflects the global ecological importance of each species and is calculated based on abundance, constancy, and dominance. Species with high values, such as *Phalangium opilio* (8.801), *Anisodactylus binotatus* (5.938), and *Harpalus distinguendus* (5.426), are the most ecologically influential. These species have a considerable impact on the ecosystem's balance, affecting available resources and interactions with other species. On the other hand, species such as *Dermestes laniarius* (W=0.008) and *Harpalus tardus* (W=0.332) have much lower ecological values, suggesting that they have a reduced ecological impact and lower adaptability compared to others.

The arthropod community in the cherry plantation is dominated by a few key species, particularly *Phalangium opilio*, which is both highly abundant (W5) and dominant (D5). This species contributes significantly to the community structure, accounting for 23.1% of total abundance. Other important species include *Anisodactylus binotatus* and *Harpalus distinguendus*, both classified as C2 (Accessory species) and D5 (Eudominant), with moderate abundance (W4). Most species are C1 (Accidental species) and D1 (Subrecedent), contributing less than 1.1% of the total abundance. These species are sporadically present and have minimal ecological impact. Overall, a few dominant species shape the ecosystem, while many others appear occasionally with little contribution to total abundance.

Following the centralization of the data collected in 2023 from the cherry plantation in the Răducăneni station, the epigeal entomofauna was represented by 49 species, with 499 specimens from the 132 traps used between May and September.

Table 3. Species composition of arthropods collected in soil traps in 2023 in the cherry orchard

No.	**Name of species**											**Number of traps**	**Total samples**
		II	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**		
1.	*Phalangium opilio*	39	33	15	47	11	4	13	9	3	4	68	175
2.	*Anisodactylus binotatus*	36	0	8	10	20	7	2	0	0	0	31	81
3.	*Harpalus atratus*	0	24	0	0	0	0	0	0	0	0	7	24
4.	*Dermestes laniarius*	6	4	3	3	1	0	0	0	2	0	16	19
5.	*Harpalus distinguendus*	6	2	6	3	2	0	0	0	0	0	13	19
6.	*Harpalus tardus*	0	11	2	2	0	3	0	0	0	1	12	19
7.	*Amara aenea*	8	8	0	0	0	0	0	0	0	0	8	16
8.	*Pseudophonus pubescens*	1	0	0	0	0	0	4	5	0	4	9	14
9.	*Ophonus azureus*	1	1	0	1	2	4	1	2	0	1	12	13
10.	*Amara similata*	8	1	0	1	1	0	0	0	0	0	6	11
11.	*Brachynus crepitans*	3	0	0	0	2	3	2	0	0	0	8	10
12.	*Licinus cassideus*	1	1	0	0	1	2	1	0	0	2	8	8
13.	*Amara familiaris*	6	0	0	0	2	0	0	0	0	0	3	8
14.	*Amara apricaria*	5	0	1	1	0	0	0	0	0	0	5	7
15.	*Amara crenata*	4	0	0	0	1	0	0	0	0	1	4	6
16.	*Chromoloulus unilineatus*	5	0	1	0	0	0	0	0	0	0	4	6
17.	*Carabus coriaceus*	0	4	0	1	0	0	0	0	0	1	6	6
18.	*dermaptere*	0	1	0	3	0	1	0	0	0	0	6	6
19.	*Anisodactylus signatus*	0	0	0	4	0	0	0	0	2	0	2	6
20.	*Amara eurynota*	4	0	0	0	0	0	0	0	0	0	2	4
21.	*Brachynus explodens*	0	0	0	0	0	1	1	1	0	0	3	3

22.	*Opatrum sabulosum*	0	2	1	0	0	0	0	0	0	0	2	3
23.	*Calathus fuscipes*	0	1	0	0	1	0	0	0	0	0	2	2
24.	*Harpalus calceatus*	0	1	0	0	0	0	0	0	1	0	2	2
25.	*Blaps mortisaga*	0	0	0	1	0	0	0	0	1	0	2	2
26.	*Leistus ferrugineus*	0	0	0	1	1	0	0	0	0	0	2	2
27.	*Armadilidium vulgare*	0	0	0	0	1	0	0	0	0	1	2	2
28.	*Pterostichus cupreus*	0	0	0	0	2	0	0	0	0	0	1	2
29.	*Bledius talpa*	1	0	0	0	0	0	0	0	0	0	1	1
30.	*Forficula auricularia*	1	0	0	0	0	0	0	0	0	0	5	1
31.	*Harpalus hirtipes*	6	0	0	0	0	0	0	0	0	0	6	1
32.	*Harpalus neglectus*	1	0	0	0	0	0	0	0	0	0	1	1
33.	*Staphylinius pedator*	1	0	0	0	0	0	0	0	0	0	1	1
34.	*Pentodon idiota*	0	1	0	0	0	0	0	0	0	0	1	1
35.	*Metabletus truncatellus*	0	0	1	0	0	0	0	0	0	0	1	1
36.	*Ophonus sabulicola*	0	0	1	0	0	0	0	0	0	0	1	1
37.	*Airaphilus corsicus*	0	0	0	1	0	0	0	0	0	0	1	1
38.	*Otiorhynchus pinastri*	0	0	0	0	1	0	0	0	0	0	1	1
39.	*Staphylinus caesareus*	0	0	0	0	1	0	0	0	0	0	1	1
40.	*Crypticus quisquilius*	0	0	0	0	0	0	0	1	0	0	1	1
41.	*Staphylinus olens*	0	0	0	0	0	0	0	1	0	0	1	1
Total 41 species		143	96	39	79	50	25	24	19	9	15	132	499

The data in Table 3 reflect the structure of the arthropod fauna collected in soil traps from the cherry orchard in 2023. The most abundant species are *Phalangium opilio* (175 specimens), followed by *Anisodactylus binotatus* (81 specimens), and (16 specimens). These species are dominant and present throughout several samplings, suggesting that the habitat is favorable. On the other hand, many species have a small number of specimens, indicating a rarer presence in the ecosystem. A total of 41 species were identified, with a diversity ranging from common and abundant species to some that are rarer and have a very limited distribution.

Table 4. Species composition of arthropods collected in soil traps in 2023 in the cherry orchard

No.	**Name of species**	**Number of traps**	**Abundance**	**Constancy**		**Dominance**		**W**	
				%	***	%	***	%	***
1.	*Phalangium opilio*	68	175	51,5	C3	35,1	D5	18,076	W5
2.	*Anisodactylus binotatus*	31	81	23,5	C1	16,2	D5	3,807	W3
3.	*Harpalus atratus*	7	24	5,3	C1	4,8	D3	0,254	W2
4.	*Dermestes laniarius*	16	19	12,1	C1	3,8	D3	0,459	W2
5.	*Harpalus distinguendus*	13	19	9,8	C1	3,8	D3	0,372	W2
6.	*Harpalus tardus*	12	19	9,1	C1	3,8	D3	0,345	W2
7.	*Amara aenea*	8	16	6,1	C1	3,2	D3	0,195	W2
8.	*Pseudophonus pubescens*	9	14	6,8	C1	2,8	D3	0,190	W2
9.	*Ophonus azureus*	12	13	9,1	C1	2,6	D3	0,237	W2
10.	*Amara similata*	6	11	4,5	C1	2,2	D3	0,099	W1
11.	*Brachynus crepitans*	8	10	6,1	C1	2,0	D2	0,122	W2
12.	*Amara familiaris*	3	8	2,3	C1	1,6	D2	0,036	W1
13.	*Licinus cassideus*	8	8	6,1	C1	1,6	D2	0,096	W1
14.	*Amara apricaria*	5	7	3,7	C1	1,4	D2	0,042	W1
15.	*Amara crenata*	4	6	3,0	C1	1,2	D2	0,036	W1
16.	*Anisodactylus signatus*	2	6	1,5	C1	1,2	D2	0,018	W1
17.	*Carabus coriaceus*	6	6	4,5	C1	1,2	D2	0,054	W1
18.	*Chromoloulus unilineatus*	4	6	3,0	C1	1,2	D2	0,036	W1
19.	*dermaptere*	6	6	4,5	C1	1,2	D2	0,054	W1
20.	*Amara eurynota*	2	4	1,5	C1	0,8	D1	0,012	W1
21.	*Brachynus explodens*	3	3	2,3	C1	0,6	D1	0,014	W1
22.	*Opatrum sabulosum*	2	3	1,5	C1	0,6	D1	0,009	W1
23.	*Armadilidium vulgare*	2	2	1,5	C1	0,4	D1	0,006	W1
24.	*Blaps mortisaga*	2	2	1,5	C1	0,4	D1	0,006	W1
25.	*Calathus fuscipes*	2	2	1,5	C1	0,4	D1	0,006	W1
26.	*Harpalus calceatus*	2	2	1,5	C1	0,4	D1	0,006	W1
27.	*Leistus ferrugineus*	2	2	1,5	C1	0,4	D1	0,006	W1
28.	*Pterostichus cupreus*	1	2	0,8	C1	0,4	D1	0,006	W1
29.	*Airaphilus corsicus*	1	1	0,8	C1	0,2	D1	0,002	W1
30.	*Bledius talpa*	1	1	0,8	C1	0,2	D1	0,002	W1
31.	*Crypticus quisquilius*	1	1	0,8	C1	0,2	D1	0,002	W1
32.	*Forficula auricularia*	5	1	3,7	C1	0,2	D1	0,007	W1
33.	*Harpalus hirtipes*	6	1	4,5	C1	0,2	D1	0,009	W1
34.	*Harpalus neglectus*	1	1	0,8	C1	0,2	D1	0,002	W1
35.	*Metabletus truncatellus*	1	1	0,8	C1	0,2	D1	0,002	W1

36.	*Ophonus sabulicola*	1	1	0,8	C1	0,2	D1	0,002	W1
37.	*Otiorhynchus pinastri*	1	1	0,8	C1	0,2	D1	0,002	W1
38.	*Pentodon idiota*	1	1	0,8	C1	0,2	D1	0,002	W1
39.	*Staphylinius pedator*	1	1	0,8	C1	0,2	D1	0,002	W1
40.	*Staphylinus caesareus*	1	1	0,8	C1	0,4	D1	0,006	W1
41.	*Staphylinus olens*	1	1	0,8	C1	0,2	D1	0,002	W1
Total 41 species		132	499						

In the cherry orchard, in 2023 (Table 4) the structure of the arthropod fauna collected in soil traps was dominated by only a few species, but with a high diversity of species. *Phalangium opilio* was the most abundant species, with 175 individuals, followed by *Anisodactylus binotatus* with 81 individuals. These species were also the most constant (C3 and C1) and had the highest dominance class (D5), significantly impacting the ecological structure of the orchard ecosystem.

âMany species, such as *Amara aenea*, *Dermestes laniarius*, and *Amara similata*, had low abundance, indicating high ecological diversity but with dominance concentrated around a few species.

Most species were rare, with only a few specimens, suggesting that they do not significantly influence the community dynamics.

In the dataset, *Phalangium opilio* is the dominant and most abundant species (C3, D5, W5), significantly shaping the community. Most species are C1 (Accidental), with low constancy and abundance, indicating infrequent presence and minimal ecological impact. Species like *Anisodactylus binotatus* and *Harpalus atratus* are D5 (Eudominant) but still have lower overall presence, while others like *Amara similata* and *Brachynus explodens* are D1 (Subrecedent), contributing little to the community. Overall, the community is mainly composed of sporadic, low-impact species, with a few dominant ones.

In the third year of observation regarding the epigeal fauna in the cherry orchards, a total of 6 samplings were carried out using 72 traps.

Table 5. Species composition of arthropods collected in soil traps in 2024 in the cherry orchard

No.	**Name of species**	**Harvested**						**No. of traps**	**Total samples**
		I	**II**	**III**	**IV**	**V**	**VI**		
1.	*Phalangium opilio*	23	35	20	62	31	9	47	180
2.	*Forficula auricularia*	1	0	19	0	1	0	7	21
3.	*Pseudophonus pubescens*	0	0	2	7	6	5	14	20
4.	*Harpalus distinguendus*	8	7	1	0	0	0	9	16
5.	*Anisodactyls binotatus*	0	4	0	7	3	0	6	14
6.	*Harpalus tardus*	5	5	0	0	0	0	8	10
7.	*Amara familiaris*	5	1	0	0	1	0	6	7
8.	*Amara aenea*	1	0	1	2	2	0	6	6
9.	*Anisodactyls signatus*	4	0	0	0	0	0	1	4
10.	*Amara eurynota*	2	0	0	0	0	0	2	2
11.	*Dermestes laniarius*	2	0	0	0	0	0	2	2
12.	*Chromoloulus unilineatus*	2	0	0	1	0	0	1	2
13.	*Otiorrhyncus scaber*	2	0	0	0	0	0	1	2
14.	*Pseudophonus pubescens*	2	0	0	0	0	0	2	2
15.	*Pterosticus vulgaris*	1	0	0	0	0	0	1	1
16.	*Rhynchites pausillus*	1	0	0	0	0	0	1	1
17.	*Calathus fuscipes*	0	1	0	0	0	0	1	1
18.	*Harpalus rufus*	0	1	0	0	0	0	1	1
19.	*Apion rufirostre*	0	0	1	0	0	0	1	1
20.	*Harpalus calceatus*	0	0	1	0	0	0	1	1
21.	*Dorcus paralelipipedes*	0	0	0	1	0	0	1	1
22.	*Ontophagus orlatus*	0	0	0	1	0	0	1	1
23.	*Ophonus diffinis*	0	0	0	1	0	0	1	1
24.	*Carabus coriaceus*	0	0	0	1	0	0	1	1
25.	*Ophonus puncticalis*	0	0	0	1	0	0	1	1
26.	*Poecilus cupreus*	0	0	0	1	0	0	1	1
Total 26 species		59	54	45	81	47	15		72

The Table 5 shows species distribution across different sampling periods. *Arahnids* dominates with high numbers, especially in periods I and II. *Forficula auricularia* and *Pseudophonus pubescens* appear sporadically, with notable presence in the III, IV, and V harvest. Species like *Harpalus distinguendus* and *Anisodactyls binotatus* show peaks in specific periods. *Amara familiaris***,** *Amara aenea*, and *Anisodactyls signatus* are less frequent, appearing in select periods. Other species, such as *Dermestes laniarius* and *Otiorrhyncus scaber*, are rare, found only in a few periods. Species distribution is uneven, with some dominating and others appearing irregularly.

Table 6. Species composition of arthropods collected in soil traps in 2024 in the cherry orchard

No.	Name of species	No. of traps	Abundance	Constancy		Dominance		W	
				%	***	%	***	%	***
1.	*Phalangium opilio*	47	180	65,2	C3	59,8	D5	38,989	W5
2.	*Forficulla auricularia*	7	21	9,7	C1	7,0	D4	0,679	W2
3.	*Pseudophonus pubescens*	14	20	19,4	C1	6,6	D4	1,280	W3
4.	*Harpalus distinguendus*	9	16	12,5	C1	5,3	D4	0,662	W2
5.	*Anisodactyls binotatus*	6	14	8,3	C1	4,6	D3	0,381	W2
6.	*Harpalus tardus*	8	10	11,2	C1	3,3	D3	0,369	W2
7.	*Amara familiaris*	6	7	8,3	C1	2,3	D3	0,0190	W2
8.	*Amara aenea*	6	6	8,3	C1	2,0	D2	0,166	W2
9.	*Anisodactyls signatus*	1	4	1,4	C1	1,3	D2	0,018	W1
10.	*Chromoloulus unilineatus*	2	3	2,8	C1	1,0	D1	0,028	W1
11.	*Amara eurynota*	2	2	2,8	C1	0,7	D1	0,019	W1
12.	*Dermestes laniarius*	2	2	2,8	C1	0,7	D1	0,019	W1
13.	*Otiorrhyncus scaber*	1	2	1,4	C1	0,7	D1	0,009	W1
14.	*Pseudophonus pubescens*	2	2	2,8	C1	0,7	D1	0,019	W1
15.	*Pterosticus vulgaris*	1	1	1,4	C1	0,3	D1	0,004	W1
16.	*Rhynchites pausillus*	1	1	1,4	C1	0,3	D1	0,004	W1
17.	*Calathus fuscipes*	1	1	1,4	C1	0,3	D1	0,004	W1
18.	*Harpalus rufus*	1	1	1,4	C1	0,3	D1	0,004	W1
19.	*Apion rufirostre*	1	1	1,4	C1	0,3	D1	0,004	W1
20.	*Harpalus calceatus*	1	1	1,4	C1	0,3	D1	0,004	W1
21.	*Dorcus paralelipipedes*	1	1	1,4	C1	0,3	D1	0,004	W1
22.	*Ontophagus orlatus*	1	1	1,4	C1	0,3	D1	0,004	W1
23.	*Ophonus diffinis*	1	1	1,4	C1	0,3	D1	0,004	W1
24.	*Carabus coriaceus*	1	1	1,4	C1	0,3	D1	0,004	W1
25.	*Ophonus puncticalis*	1	1	1,4	C1	0,3	D1	0,004	W1
26.	*Poecilus cupreus*	1	1	1,4	C1	0,3	D1	0,004	W1
Total 28 species		72	301						

In the provided table no. 6, the *Phalangium opilio* stands out as the most abundant species with high constancy (C3) and dominance (D5), having a significant ecological impact (W5). It is a key species, dominating the community both in terms of numbers and relative frequency.

Other species, such as *Forficula auricularia, Pseudophonus pubescens,* and *Harpalus distinguendus*, show moderate abundance and constancy (C1), with dominance ranging from D4 to D3, contributing notably but less than *Phalangium opilio*. These species fall into the W2 to W3 categories, indicating their presence as important but not overwhelming contributors to the ecosystem.

Most other species, including *Amara familiaris, Anisodactylus binotatus*, and *Amara aenea*, show low constancy and dominance (C1, D2, D3), with very low ecological impact (W1). These species contribute minimally to the community and have sporadic occurrences.

Overall, the community is dominated by a few species with high abundance and ecological relevance, while many others are sporadic and contribute minimally to the structure of the ecosystem.

The graph shows the evolution of the number of individuals for different species between 2022 and 2024. *Phalangium opilio* is the most abundant species in all three years, with a significant increase in 2023 and maintaining a high number in 2024. Other species, such as *Anisodactylus binotatus* and *Harpalus distinguendus*, show fluctuations, with some experiencing significant declines in 2024. New species also appear, such as *Forficula auricularia* and *Pseudophonus pubescens*, which were previously absent or present in very small numbers. This variation may indicate environmental changes or ecological factors influencing these populations.

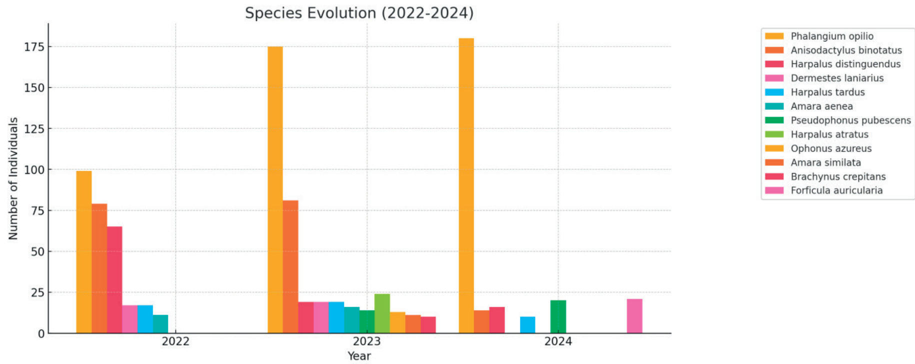

Figure 1. Comparative representation of the number of individuals for the most abundant species in the period 2022-2024

CONCLUSIONS

It was found that *Phalangium opilio* is the most abundant species, with high constancy (C3) and high dominance (D5), having a significant ecological impact (W5), being essential for the community structure and significantly influencing the orchard ecosystem.

Following the analysis of ecological indices, it was confirmed that species such as *Forficula auricularia*, *Pseudophonus pubescens*, and *Harpalus distinguendus* have moderate abundance and constancy (C1), with dominance ranging from D4 to D3, having a moderate ecological impact (W2-W3). These species play an important role but are not dominant in shaping the ecosystem.

Many species, such as *Amara familiaris*, *Anisodactylus binotatus*, and *Amara aenea*, have low constancy and dominance (C1, D2, D3), with very low ecological impact (W1), contributing minimally to community dynamics and being rarely present.

The arthropod species collected and identified in the cherry plantation are characterized by high species diversity, but with a small number of dominant species that form the main structure of the ecosystem, while most species have a low impact on it. It can be observed that the dominance of species such as *Phalangium opilio* suggests a stable and favorable habitat for their development, while the rest of the species play a smaller role in maintaining the ecological balance of the plantation.

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