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RESEARCH ON HARMFUL ARTHROPOD SPECIES AND THEIR ANTAGONISTS IN SEVERAL RAPESEED CROPS

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Abstract

Research on arthropods associated with rapeseed crops was conducted at the Ezăreni Research and Student Training Station of "Ion Ionescu de la Brad" Iași University of Life Sciences during the 2025 growing season. Sampling employed yellow pan traps, Barber-type pitfall traps, sweep nets, and direct plant observations. All collected material was labeled with the sample number, collection method, and experimental variant. In the laboratory, specimens were cleaned of soil, plant debris, and other impurities, then preserved in ~20% ethanol until identification. Taxonomic determination was performed using standard keys, to class, order, family, and species levels. Collected taxa belonged to Arachnida, Insecta, and Crustacea. The most abundant and diverse class was Insecta, with species from Coleoptera, Diptera, Hymenoptera, Heteroptera, Homoptera, Lepidoptera, and others. Coleoptera was the dominant order in both abundance and species richness. Frequently collected beetle species included Ontophagus ovatus, Pseudophonus pubescens, Amara familiaris, Opatrum sabulosum, Coccinella septempunctata, Harpalus calceatus, Tanymecus palliatus, Idiocroma dorsalis, Amara aenea, Anisodactylus spp., and Pterostichus spp., reflecting the key Coleoptera fauna of rapeseed agroecosystems. This version keeps all essential details while staying concise and clear.

Key words*: yellow pan traps, rapeseed crops, harmful arthropod.*

INTRODUCTION

Oilseed crops, particularly rapeseed (*Brassica napus* L.), have had and continue to have a special importance for human society, representing one of the most valuable groups of cultivated plants. Rapeseed is a fundamental source of vegetable oil for human consumption and an important component in animal nutrition, while also providing raw material for various industrial uses, including the production of biodiesel. In recent years, the expansion of rapeseed cultivation has been closely linked to the increasing demand for renewable energy and sustainable agricultural systems (Zheng et al., 2020; Obermeier et al., 2022). In this context, achieving high, stable and superior quality yields in rapeseed cultivation is a constant concern, with major implications for food security and the development of the agri-food industry.

Insect pests have a significant impact on rapeseed crops, causing considerable damage by affecting plant metabolism and interfering with essential physiological processes, which ultimately leads to both quantitative and qualitative yield losses (Williams, 2010; Zhang et al., 2017). Among the most damaging species are those that attack during key phenological stages, such as emergence, flowering and pod formation, when plants are particularly vulnerable (Hausmann, 2021; Thöming et al., 2020). The intensity of pest attacks is strongly influenced by environmental conditions and agricultural practices, which can either favor or limit pest development (Zheng et al., 2020).

To reduce these negative effects, various control strategies are applied, including chemical control through the use of pesticides, as well as biological control methods based on the use of natural enemies such as pathogenic fungi, bacteria, viruses and protozoa, alongside parasites and predators of harmful species (Sekulic & Rempel, 2016; Williams, 2010). However, the intensive use of insecticides has raised concerns regarding environmental impact, pollinator decline and the development of pest resistance, which highlights the importance of integrated pest management strategies (Cook & Jędryczka, 2024; Obermeier et al., 2022).

In this context, the present work aims to highlight the diversity of arthropods associated with a rapeseed crop and to emphasize the role of beneficial species in reducing pest pressure, contributing to the development of more sustainable and environmentally friendly agricultural practices (Zheng et al., 2020; Zhang et al., 2017).

MATERIALS AND METHODS

The observations were carried out in several rapeseed (*Brassica napus* L.) crops located within the perimeter of the Ezăreni Teaching and Research Station, belonging to the "Ion Ionescu de la Brad" Iași University of Life Sciences. The research was conducted on a total area of approximately 3 hectares, divided into three experimental plots, each covering 1 hectare. The study focused on the dynamics of harmful arthropod species and the beneficial entomofauna associated with rapeseed crops throughout the entire vegetation period.

The biological material was collected using an entomological net, applying the sweep netting method, with 25 double sweeps performed at each sampling point. Within each plot, 5 observation points were established, arranged diagonally to ensure a good representativeness of the samples. The collections were complemented by direct observations on plants, monitoring the main phenological stages: emergence, rosette development, stem elongation, flowering, and pod formation.

In 2025, 10 successive samplings were carried out at intervals of 10-15 days, during the period March-July, corresponding to the critical development stages of the rapeseed crop (Tălmaciu, 2024). In total, approximately 150 entomological samples were analyzed (3 plots × 5 sampling points × 10 samplings).

The material collected from the field was labeled (date, plot, sampling point), cleaned of plant debris, and preserved in a 40% ethyl alcohol solution (Sipos, 2024). Subsequently, the samples were analyzed in the laboratory, where arthropods were sorted and identified using a binocular magnifying glass (10×–40× magnification), based on specialized entomological identification guides and updated taxonomic keys.

The identification process targeted both phytophagous species of economic importance and the complex of entomophagous arthropods (predators and parasitoids) involved in the natural regulation of pest populations. For each sample, numerical abundance (number of individuals per species) and species frequency were determined.

Statistical data processing included the analysis of variance (ANOVA), used to highlight significant differences between plots, sampling periods, and functional groups of arthropods. Statistical tests were performed at a significance level of $p < 0.05$, and when significant differences were identified, post-hoc tests (Tukey type) were applied for mean comparisons.

Species diversity of the entomofauna was assessed by calculating the Shannon-Wiener index (H'), according to the formula:

$$H = -\sum_{j=1}^{S} p_i \ln p_i$$

where:

-p_i represents the proportion of individuals belonging to species i out of the total number of collected individuals, and S is the total number of identified species.

This index allowed the evaluation of both species diversity and the evenness of species distribution within the studied agroecosystem.

The obtained results were used to assess the structure of arthropod communities and their role in maintaining biological balance, contributing to the development of integrated pest management strategies in rapeseed crops (Barascou, 2022; Zheng et al., 2020).

RESULTS AND DISCUSSIONS

Data analysis highlights significant variations in the abundance and structure of the entomofauna during the seven collections carried out in the rapeseed crop in 2025 (Tabel 1). The total number of arthropods collected was 5210 individuals, with an uneven distribution between the harvest periods.

A progressive increase in abundance is observed in the first three collections, from 560 individuals on 15.05 to a maximum of 2261 individuals on 24.06, followed by a sharp decrease in the following period (750

individuals on 07.07 and only 117 on 22.07), and then a slight recovery towards the end of the vegetation period (665 individuals on 21.08). This dynamics is closely correlated with the phenology of the rapeseed crop and with the climatic conditions favorable to the development of arthropods in the early summer.
The structure of the collected fauna highlights a clear dominance of phytophagous species during the peak period (June), especially of harmful dipterans and coleopterans. Species such as *Delia brassicae* (789 individuals) and *Dasineura brassicae* (712 individuals) recorded the highest values, being responsible for a large part of the pest pressure on the crop. Also, the presence of the species *Psylliodes attenuata* (63 individuals) and *Phyllotreta nemorum* (23 individuals) indicates specific attacks in the early and middle phases of vegetation.
In parallel, a significant development of useful entomofauna was noted, especially predators from the families Carabidae and Staphylinidae, as well as spiders (Araneae). Dominant species such as *Brachinus crepitans* (633 individuals), *Calodera aethiops* (309 individuals), *Xysticus cristatus* (242 individuals) and *Zelotes electus* (203 individuals) indicate a high potential for biological regulation of pest populations.
Also, the presence of parasitoids, such as *Trissolcus grandis* (72 individuals), *Aphidius rhopalosiphi* (20 individuals) and *Aphelinus abdominalis* (19 individuals), suggests the existence of well-developed trophic relationships and a natural pest control mechanism. The increase in their number during the peak period of phytophagous populations (June-July) confirms the ecological synchronization between hosts and antagonists.
An important aspect is the high share of species from the Carabidae family (e.g. *Amara eurynota* - 187 individuals, *Harpalus distinguendus* - 128 individuals), which significantly contribute to the reduction of biological reserves of pests. At the same time, the high diversity of spiders (*Pardosa agricola, Phalangium opilio*) reflects the stability of the agricultural ecosystem and its self-regulation capacity.
The sharp decrease in the total number of individuals in July-August can be explained by the maturation of the crop, the reduction of trophic resources and less favorable climatic conditions, which determine the migration or decrease of arthropod populations.
Overall, the results highlight a complex structure of the entomofauna, characterized by a relative balance between harmful and beneficial species. This aspect suggests a high potential for natural biological control in the studied rapeseed crop, emphasizing the importance of conserving biodiversity within agroecosystems.

Table 1. Structure of useful and harmful insect species collected in rapeseed crops in 2025

No	Name of species	15.05	03.06	24.06	07.07	22.07	02.08	21.08	Total
1.	*Actobius cinerascens*	6	-	-	-	-	-	-	6
2.	*Acylophorus glaberrimus*	-	2	-	1	-	-	-	3
3.	*Afide*	-	-	-	20	5	-	5	30
4.	*Agriotes ustulatus*	1	-	-	2	-	-	-	3
5.	*Aleochara lanuginosa*	6	-	27	-	-	-	-	33
6.	*Amara aenea*	14	16	1	6	4	-	1	42
7.	*Amara eurynota*	1	5	57	16	8	3	97	187
8.	*Amara familiaris*	1	5	2	-	-	-	-	8
9.	*Amara similata*	-	-	-	1	-	-	-	1
10.	*Aneuclis melanaria*	1	-	-	9	-	-	-	10
11.	*Anisodactylus binotatus*	3	9	26	-	1	-	-	39
12.	*Anisodactylus signatus*	-	1	-	4	1	-	-	6
13.	*Anthicus flavipes*	8	2	2	-	-	-	1	13
14.	*Aphanogmus abdominalis*	-	-	2	10	12	-	2	26
15.	*Aphelinus abdominalis*	1	-	6	6	1	2	3	19
16.	*Aphidus rhopalosiphi*	1	-	4	13	2	-	-	20
17.	*Athalia rosae*	-	-	-	-	3	-	-	3
18.	*Atheta trinotata*	3	-	-	4	-	-	-	7
19.	*Baris chlorizans*	10	14	11	8	-	-	-	43
20.	*Brachinus crepitans*	1	80	176	45	3	9	319	633
21.	*Brachyserphus parvulus*	2	-	1	-	-	-	-	3

No	Name of species	15.05	03.06	24.06	07.07	22.07	02.08	21.08	Total
22.	*Bryocharis analis*	-	1	1	-	-	-	-	2
23.	*Calodera aethiops*	8	10	267	24	-	-	-	309
24.	*Cantharis fusca*	1	1	1	-	-	-	-	3
25.	*Cantharis obscura*	5	-	-	-	-	-	-	5
26.	*Cantharis pellucida*	2	-	-	-	-	-	-	2
27.	*Cantharis rustica*	1	3	-	-	-	-	-	4
28.	*Ceraphron bispinosus*	-	-	4	8	-	4	32	48
29.	*Ceutorhynchus obstrictus*	1	-	7	3	-	-	-	11
30.	*Ceutorhynchus pallidactylus*	1	1	-	3	-	-	-	5
31.	*Chorthippus vagans*	-	-	-	-	-	2	-	2
32.	*Coccinella septempunctata*	-	26	2	-	-	-	-	28
33.	*Conosoma pubescens*	-	-	4	-	-	-	-	4
34.	*Conostigmus rufescens*	2	2	3	12	-	1	-	20
35.	*Dasineura brassicae*	30	140	414	99	25	1	3	712
36.	*Delia brassicae*	121	123	463	74	1	1	6	789
37.	*Dolycoris baccarum*	-	1	3	-	-	1	1	6
38.	*Epyris niger*	-	-	3	1	1	-	5	10
39.	*Eurydema ornata*	-	-	2	1	1	6	8	18
40.	*Eurygaster integriceps*	-	1	2	-	1	-	3	7
41.	*Forficula auricularia*	2	-	-	-	1	-	1	4
42.	*Formicomus pedestris*	87	9	22	21	4	-	20	163
43.	*Geophilus flavus*	2	-	-	-	1	-	-	3
44.	*Gryllus campestris*	3	-	9	14	-	1	7	34
45.	*Harpalus aeneus*	-	-	6	9	-	-	-	15
46.	*Harpalus distinguendus*	14	4	79	25	-	1	5	128
47.	*Harpalus tardus*	2	-	-	-	-	-	-	2
48.	*Hister purpurasecens*	1	-	-	-	-	-	-	1
49.	*Hister quadrimaculatus*	-	-	2	-	-	-	-	2
50.	*Hister stercorarius*	1	1	9	-	-	-	2	13
51.	*Idiochroma dorsalis*	27	208	117	37	2	2	5	398
52.	*Lathrobium quadratum*	3	-	8	-	-	-	-	11
53.	*Locusta migratoria*	-	-	-	-	-	-	1	1
54.	*Longitarsus lycopi*	-	-	2	2	2	-	1	7
55.	*Meligethes aeneus*	4	1	12	5	-	-	-	22
56.	*Metabletus truncatellus*	-	-	8	3	-	-	1	12
57.	*Micromus variegatus*	6	-	-	-	-	-	-	6
58.	*Necremnus tidius*	-	-	1	3	-	-	-	4
59.	*Nephus redtenbacheri*	1	-	-	-	-	-	-	1
60.	*Ocydromus decorus*	-	-	-	1	-	-	-	1
61.	*Ocypus ophthalmicus*	1	-	-	-	-	-	-	1
62.	*Ommatoiulus sabulosus*	1	1	-	-	-	-	-	2
63.	*Opatrum sabulosum*	38	1	43	14	-	-	-	96
64.	*Ophonus azureus*	1	2	1	-	-	-	1	5
65.	*Oxytelus sculptus*	-	-	5	-	-	-	-	5
66.	*Paederus riparius*	-	-	1	-	-	-	-	1
67.	*Parallelomorphus terricola*	-	-	-	1	-	-	-	1
68.	*Pardosa agricola*	30	18	49	24	-	6	14	141
69.	*Parophonus maculicornis*	1	-	-	-	-	-	-	1
70.	*Peirates hybridus*	2	1	1	-	-	-	1	5
71.	*Phalangium oplio*	-	-	10	38	-	-	-	48
72.	*Phygadeuon trichops*	-	-	2	8	-	-	-	10
73.	*Phyllotreta nemorum*	15	-	4	2	1	1	-	23
74.	*Poecilus dimidiatus*	-	4	-	-	-	-	-	4
75.	*Pseudophonus griseus*	-	-	8	2	-	-	-	10
76.	*Pseudophonus pubescens*	1	5	7	1	6	1	22	43
77.	*Psylliodes attenuata*	-	4	9	4	5	19	22	63
78.	*Psylliodes chrisocephala*	14	-	9	2	1	-	-	26
79.	*Pterostichus cupreus*	7	4	42	1	-	3	18	75
80.	*Pterostichus niger*	-	-	-	-	-	-	9	9

No	Name of species	15.05	03.06	24.06	07.07	22.07	02.08	21.08	Total
81.	*Quedius lateralis*	-	2	40	-	-	-	-	42
82.	*Rhagonycha fulva*	-	-	-	3	-	-	-	3
83.	*Scopaeus laevigatus*	-	-	-	-	1	-	-	1
84.	*Sipalia circellaris*	3	-	32	-	-	-	-	35
85.	*Sitona lineatus*	1	-	-	-	-	-	-	1
86.	*Sminthurus viridis*	1	1	-	-	-	-	-	2
87.	*Staphylinus caesareus*	2	-	1	-	-	-	1	4
88.	*Stenomalina gracilis*	2	-	-	-	-	-	-	2
89.	*Stibeutes curvispina*	1	-	-	3	3	-	-	7
90.	*Tachyporus hypnorum*	7	7	12	2	-	-	-	28
91.	*Tachyusa thoracica*	-	-	20	-	-	-	-	20
92.	*Tanymecus palliates*	3	8	1	1	-	-	-	13
93.	*Tenuiphantes tenuis*	2	-	-	-	-	-	-	2
94.	*Trechus quadristriatus*	1	1	1	-	-	-	1	4
95.	*Trissolcus grandis*	2	2	8	43	10	3	4	72
96.	*Trybliographa rapae*	-	3	2	7	-	-	--	12
97.	*Xysticus cristatus*	25	33	90	50	4	-	40	242
98.	*Zelotes electus*	15	27	97	54	7	-	3	203
	Total samples	560	790	1261	750	117	67	665	3958

The analysis of the data obtained from the seven sampling sessions carried out in the rapeseed crop in 2025 highlights significant differences in both the numerical dynamics and the structure of arthropod communities. The total number of individuals (3958) (Tabel 2) showed pronounced variations between sampling dates, with a maximum recorded on June 24 (1261 individuals) and a minimum on August 2 (67 individuals), indicating an uneven distribution influenced by crop phenology and environmental conditions.

The analysis of variance (ANOVA) revealed statistically significant differences between sampling periods ($p < 0.05$), confirming that the timing of sampling had a significant effect on the total abundance of arthropods. Post-hoc tests (Tukey) indicated significant differences between the June 24 sampling and those from the later part of the growing season (July 22 and August 2), reflecting a clear population peak in June followed by a sharp decline.

The faunal structure during the peak period was dominated by phytophagous species, particularly *Delia brassicae* and *Dasineura brassicae*, which contributed substantially to the increase in total abundance. ANOVA applied to functional groups (phytophagous vs. entomophagous) showed statistically significant differences ($p < 0.05$), indicating a significant dominance of pest species during the peak period. However, the consistent and diverse presence of beneficial entomofauna, including predators (*Brachinus crepitans, Amara eurynota, Xysticus cristatus, Zelotes electus*) and parasitoids (*Trissolcus grandis, Aphidius* spp.), suggests the existence of effective natural biological regulation mechanisms.

The Shannon diversity index (H') ranged between approximately 2.10 and 3.25, and statistical analysis revealed significant differences between sampling dates ($p < 0.05$). Higher values recorded during the early sampling periods (May-early June) indicate high diversity and a relatively even distribution of species, whereas the decrease in H' during June–July reflects the dominance of certain phytophagous species. The statistically significant differences in H' values confirm structural changes in the arthropod community throughout the growing season.

Overall, the results demonstrate that the studied agroecosystem exhibits a complex dynamic, with statistically significant variations in both abundance and faunal diversity. Although periods of high pest pressure were observed, the presence of beneficial arthropods and the increase in diversity toward the end of the growing season indicate a tendency toward ecological rebalancing. These findings support the importance of implementing integrated pest management strategies based on the conservation of natural biological control and the reduction of chemical inputs.

Table 2. Structure of the collected species by order, family, and ecological characterization

Order	Family	Name of species	Type of food	No of samples
1	**2**	**3**	**4**	**5**
Araneae	Lycosidae	*Pardosa agricola*	Predators	141
	Total samples of family			**141**
Coleoptera 2	Anthicidae	*Anthicus flavipes*	Saprofag	13
	Total samples of family			**13**
	Anthicidae	*Formicomus pedestris*	Saprofag	163
	Total samples of family			**163**
	Cantharidae	*Cantharis fusca*	Predators	3
	Cantharidae	*Cantharis obscura*	Predators	5
	Cantharidae	*Cantharis pellucida*	Predators	2
	Cantharidae	*Cantharis rustica*	Predators	4
	Total samples of family			**14**
	Carabidae	*Amara aenea*	Omnivores	42
	Carabidae	*Amara eurynota*	Omnivores	187
	Carabidae	*Amara familiaris*	Omnivores	8
	Carabidae	*Amara similata*	Omnivores	1
	Carabidae	*Anisodactylus binotatus*	Omnivores	39
	Carabidae	*Anisodactylus signatus*	Omnivores	6
	Carabidae	*Brachinus crepitans*	Predators	633
	Carabidae	*Harpalus aeneus*	Omnivores	15
	Carabidae	*Harpalus distinguendus*	Omnivores	128
	Carabidae	*Harpalus tardus*	Omnivores	2
	Carabidae	*Metabletus truncatellus*	Predators	12
	Carabidae	*Ocydromus decorus*	Predators	1
	Carabidae	*Ophonus azureus*	Omnivores	5
	Carabidae	*Parallelomorphus terricola*	Predators	1
	Carabidae	*Poecilus dimidiatus*	Predators	4
	Carabidae	*Pseudophonus griseus*	Omnivores	10
	Carabidae	*Pseudophonus pubescens*	Omnivores	43
	Carabidae	*Pterostichus cupreus*	Predators	75
	Carabidae	*Parophonus maculicornis*	Omnivores	1
	Total samples of family			**1213**
	Chrysomelidae	*Idiochroma dorsalis*	Phytophagous	398
	Chrysomelidae	*Longitarsus lycopi*	Phytophagous	7
	Chrysomelidae	*Phyllotreta nemorum*	Phytophagous	23
	Chrysomelidae	*Psylliodes attenuata*	Phytophagous	63
	Chrysomelidae	*Psylliodes chrysocephala*	Phytophagous	26
	Total samples of family			**517**
	Coccinellidae	*Coccinella 7punctata*	Predators	28
	Coccinellidae	*Nephus redtenbacheri*	Predators	1
	Total samples of family			**29**
	Curculionidae	*Baris chlorizans*	Phytophagous	43
	Curculionidae	*Ceutorhynchus obstrictus*	Phytophagous	11
	Curculionidae	*Ceutorhynchus pallidactylus*	Phytophagous	5
	Total samples of family			**59**
	Elateridae	*Agriotes ustulatus*	Phytophagous	3
	Total samples of family			**3**
	Histeridae	*Hister purpurascens*	Predators	1
	Histeridae	*Hister quadrimaculatus*	Predators	2
	Histeridae	*Hister stercorarius*	Predators	13
	Total samples of family			**16**
	Nitidulidae	*Meligethes aeneus*	Phytophagous	22
	Total samples of family			**22**
	Staphylinidae	*Actobius cinerascens*	Predators	6
	Staphylinidae	*Acylophorus glaberrimus*	Predators	3
	Staphylinidae	*Aleochara lanuginosa*	Parasitoids	33
	Staphylinidae	*Atheta trinotata*	Predators	7

	2	3	4	5
	Staphylinidae	*Bryocharis analis*	Predators	2
	Staphylinidae	*Calodera aethiops*	Predators	309
	Staphylinidae	*Lathrobium quadratum*	Predators	11
	Staphylinidae	*Oxytelus sculptus*	Saprofag	5
	Staphylinidae	*Paederus riparius*	Predators	1
	Staphylinidae	*Conosoma pubescens*	Predators	4
	Staphylinidae	*Ocypus ophthalmicus*	Predators	1
	Total samples of family			**382**
	Tenebrionidae	*Opatrum sabulosum*	Phytophagous	96
	Total samples of family			**96**
Dermaptera	Forficulidae	*Forficula auricularia*	Omnivores	4
	Total samples of family			**4**
Diplopoda	Julidae	*Ommatoiulus sabulosus*	Detritivor	2
	Total samples of family			**2**
Diptera	Cecidomyiidae	*Dasineura brassicae*	Phytophagous	712
	Anthomyiidae	*Delia brassicae*	Phytophagous	789
	Total samples of family			**1501**
Geophilomorpha	Geophilidae	*Geophilus flavus*	Predators	3
	Total samples of family			3
Hemiptera	Aphididae	Afide	Phytophagous	30
	Pentatomidae	*Dolycoris baccarum*	Phytophagous	6
	Pentatomidae	*Eurydema ornata*	Phytophagous	18
	Reduviidae	*Peirates hybridus*	Predators	5
	Scutelleridae	*Eurygaster integriceps*	Phytophagous	7
	Total samples of family			**66**
Hymenoptera	Aphelinidae	*Aphelinus abdominalis*	Parasitoids	19
	Total samples of family			**19**
	Bethylidae	*Epyris niger*	Parasitoids	10
	Total samples of family			**10**
	Braconidae	*Aphidius rhopalosiphi*	Parasitoids	20
	Total samples of family			**20**
	Ceraphronidae	*Aphanogmus abominalis*	Parasitoids	26
	Ceraphronidae	*Ceraphron bispinosus*	Parasitoids	48
	Total samples of family			**74**
	Eulophidae	*Necremnus tidius*	Parasitoids	4
	Total samples of family			**4**
	Ichneumonidae	*Aneuclis melanaria*	Parasitoids	10
	Ichneumonidae	*Phygadeuon trichops*	Parasitoids	10
	Total samples of family			**20**
	Megaspilidae	*Conostigmus rufescens*	Parasitoids	20
	Total samples of family			**20**
	Proctotrupidae	*Brachyserphus parvulus*	Parasitoids	3
	Total samples of family			**3**
	Tenthredinidae	*Athalia rosae*	Phytophagous	3
	Total samples of family			**3**
Neuroptera	Hemerobiidae	*Micromus variegatus*	Predators	6
	Total samples of family			**6**
Opiliones	Phalangiidae	*Phalangium opilio*	Omnivores	48
	Total samples of family			**48**
Orthoptera	Acrididae	*Chorthippus vagans*	Phytophagous	2
	Acrididae	*Locusta migratoria*	Phytophagous	1
	Total samples of family			**3**
	Gryllidae	*Gryllus campestris*	Omnivores	34
	Total samples of family			34
Total samples	**General = 3958**	**Phytophagous =1737**	**Predators=170**	**Omnivoreses = 428**	**Parasitoids=125**

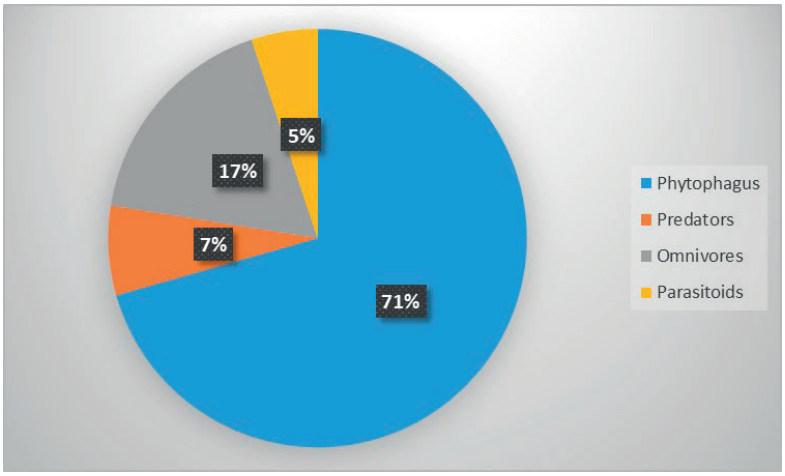

Figure 1. Percentage distribution of species according to ecological characterization

The graph (Figure 1) highlights a clear dominance of phytophagous species (1737 individuals), which indicates a high pest pressure on the rapeseed crop. Beneficial entomofauna groups are represented in smaller proportions, with 170 predators and 125 parasitoids, but they play an essential role in the biological regulation of pest populations.

Omnivorous species (428 individuals) occupy an intermediate position, contributing to the stability of the ecosystem through trophic flexibility. Overall, the distribution shows a relative imbalance in favor of phytophagous species, but also the existence of a potential for natural biological control.

CONCLUSIONS

The dynamics of arthropod populations are strongly influenced by crop phenology and climatic conditions, with a clear peak in abundance in June, followed by a sharp decline in July-August.

There are statistically significant differences between sampling periods ($p < 0.05$), confirming that the timing of sampling has a major impact on the abundance and structure of the entomofauna.

Phytophagous species dominate during the peak period, especially *Delia brassicae* and *Dasineura brassicae*, generating high pest pressure on the rapeseed crop.

Beneficial entomofauna (predators and parasitoids) are well represented and ecologically synchronized with pests, suggesting the presence of effective natural biological control mechanisms.

Species diversity (Shannon index) varies significantly throughout the season, being higher at the beginning of the growing period and decreasing during the dominance of phytophagous species.

The agroecosystem shows a high potential for self-regulation, despite the temporary imbalance in favor of phytophagous species, supporting the need for integrated pest management strategies based on biodiversity conservation.

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