

ICHNEUMON WASPS FROM NATURA 2000 PROTECTED SITES MÂRZEȘTI AND BÂRCA GRASSLANDS (IAȘI COUNTY, ROMANIA)

ICHNEUMONIDAE DIN SITURILE PROTEJATE NATURA 2000, MÂRZEȘTI ȘI BÂRCA (JUD. IAȘI, ROMANIA)

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Abstract.

The evaluation of the entomofauna biodiversity in Natura 2000 protected sites was carried out in the Mârzești and Bârca meadows, collecting samples from both the protected area and their buffer zones. 10 specimens of ichneumonids were collected, from 9 genera: Barylypa pallida, Cryptus viduatorius, Diplazon laetatorius, Promethes sulcator, Barichneumon albicaudatus, Colpotrochia cincta, Acropimpla pictipes, Itopectis alternans and Pimpla turionellae. We establish the existence of a host-parasitoid relationship in the Bârca-buffer zone. Acropimpla pictipes (Grav.) is hosted by the defoliator Anacampsis populella Cl. (Gelechiidae, Lepidoptera), whose larvae feed on Populus and Salix leaves, found in neighbouring habitats.

Key words: Natura 2000, Ichneumonidae, host-parasitoid relationship.

Rezumat.

Evaluarea biodiversității entomofaunistice din zone practice aflate în situri protejate Natura 2000, s-a făcut studiind pajiștea Mârzești și fânețele Bârca, colectând probe atât din aria protejată cât și din zona tampon. S-au colectat 10 exemplare de ichneumonide, din 9 genuri: Barylypa pallida, Cryptus viduatorius, Diplazon laetatorius, Promethes sulcator, Barichneumon albicaudatus, Colpotrochia cincta, Acropimpla pictipes, Itopectis alternans și Pimpla turionellae. Stabilim existența unei relații gazdă - parazitoid în zona Bârca-tampon. Acropimpla pictipes (Grav.) are drept gazdă defoliatorul Anacampsis populella Cl. (Gelechiidae, Lepidoptera), ale cărei larve se hrănesc cu frunze de Populus și Salix, aflate în habitate învecinate.

Cuvinte cheie: Natura 2000, Ichneumonidae, relații gazdă-parazitoid.

INTRODUCTION

Biodiversity assessment in grassland areas located in Natura 2000 protected sites was done by studying the Mârzești and Bârca meadows, collecting samples from the actual protected areas and from their buffer zone, for comparison. Over

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time, entomological studies were carried out in these protected areas, but from an ichneumonological point of view, the reports were very few, almost non-existent.

MATERIAL AND METHOD

We followed the qualitative and quantitative analysis of the entomofauna and the study of the diversity of the ichneumonid fauna (*Hymenoptera*, *Ichneumonidae*) from the four stations studied: the Mârzești meadows - the protected area and the buffer zone, as well as the Bârca meadows - the protected area and the buffer zone.

The collecting were made between June 21-22, 2023. The entomological net was used for capturing the insects. The mowing method (x100) was used. The insects collected from the entomological net were placed in special zippered bags, in which we previously put alcohol to neutralize the insects. In each bag we inserted a label with the day, place and type of vegetation where the collection was made. One bag constituted a sample. Thus, to study the arthropod fauna from the studied stations, four samples were obtained, which were then studied in the laboratory. Each sample was cleaned of plant debris, then the hymenoptera, especially the ichneumonids, were separated. They were identified using the magnifying glass, the Olympus binocular, using determination keys and the comparison method. The faunal material obtained was subjected to microscopic study and sorted into systematic groups, the most important ones being analysed down to families. For each station studied, it was recorded, sample by sample, drawing up arthropod inventory sheets and the relative abundance of the systematic groups of arthropods was calculated.

RESULTS AND DISCUSSIONS

It were collected 279 arthropods (araneids and insects), belonging to the following orders: *Aranea* (*Arachnida* Class), *Collembola*, *Orthoptera*, *Thysanoptera*, *Heteroptera*, *Homoptera*, *Coleoptera*, *Lepidoptera*, *Diptera* and *Hymenoptera* (*Insecta* Class), the entomofauna representing 86.38% of these systematic groups, the remaining 13.62% being araneids.

In tables no. 1 – 4, we present the relative abundance of the arthropod fauna in the four studied meadows.

Table 1

The arthropod fauna from the Mârzești station, protected area, Iasi county, 22.06.2023

Systematic category		Nr. of individuals	Abundance %	
Order	Inferior systematic category		A	B
<i>Aranea</i>		8	100,0	10,39
<i>Collembola</i>		2	100,0	2,60
<i>Orthoptera</i>		11	100,0	14,29
<i>Thysanoptera</i>		-	-	-
<i>Heteroptera</i>		4	100,0	5,19
<i>Homoptera:</i>		2	100,0	2,60
	<i>Cicadidae</i>	2	100,0	2,60
	<i>Aleyrodidae</i>	-	-	-
	<i>Aphididae</i>	-	-	-
<i>Coleoptera</i>		16	100,0	20,78
		11	68,75	14,28

Systematic category		Nr. of individuals	Abundance %	
<i>Coccinellidae</i>		5	31,25	6,49
Others				
<i>Lepidoptera</i>		-	-	-
<i>Diptera</i> :		18	100,0	23,37
	<i>Brachycera</i>	2	11,11	2,59
	<i>Nematocera</i>	16	88,89	20,78
<i>Hymenoptera</i> :		16	100,0	20,78
	Aculeata	12	75,0	15,58
	<i>Apidae</i>	1	8,34	1,29
	<i>Vespidae</i>	2	16,66	2,59
	<i>Formicidae</i>	9	75,0	11,68
	Parasitica	4	25,0	5,19
	<i>Braconidae</i>	-	-	-
	<i>Ichneumonidae</i>	3	75,0	3,89
	<i>Chalcidoidea</i>	1	25,0	1,29
TOTAL		77		

A = the relative abundance related to the systematic category

B = the relative abundance related to the total number of individuals collected

Table 2

The arthropod fauna from the Mârzești station, buffer zone, Iasi county, 22.06.2023

Systematic category		Nr. of individuals	Abundance %	
Order	Inferior systematic category		A	B
<i>Aranea</i>		11	100,0	12,65
<i>Collembola</i>		4	100,0	4,59
<i>Orthoptera</i>		7	100,0	8,05
<i>Thysanoptera</i>		2	100,0	2,30
<i>Heteroptera</i>		4	100,0	4,59
<i>Homoptera</i> :		6	100,0	6,89
	<i>Cicadidae</i>	4	66,68	4,59
	<i>Aleyrodidae</i>	1	1,66	1,15
	<i>Aphididae</i>	1	1,66	1,15
<i>Coleoptera</i>		19	100,0	21,84
<i>Coccinellidae</i>		9	47,37	10,84
Others		10	52,63	11,49
<i>Lepidoptera</i>		8		9,20
<i>Diptera</i> :		8	100,0	9,20
	<i>Brachycera</i>	-	-	-
	<i>Nematocera</i>	8	100,0	9,19

Systematic category		Nr. of individuals	Abundance %	
<i>Hymenoptera</i> :		18	100,0	20,69
	<i>Aculeata</i>	13	72,22	14,94
	<i>Apidae</i>	1	7,69	1,15
	<i>Vespidae</i>	2	15,38	2,30
	<i>Formicidae</i>	10	76,93	11,49
	<i>Parasitica</i>	5	27,78	5,74
	<i>Braconidae</i>	1	20,0	1,15
	<i>Ichneumonidae</i>	2	40,0	2,30
	<i>Chalcidoidea</i>	2	40,0	2,30
TOTAL		87		

A = the relative abundance related to the systematic category

B = the relative abundance related to the total number of individuals collected

Table 3

The arthropod fauna from the Bârca station, protected area, Iasi county, 21.06.2023

Systematic category		Nr. of individuals	Abundance %	
Order	Inferior systematic category		A	B
<i>Aranea</i>		11	100,0	20,37
<i>Collembola</i>		2	100,0	3,70
<i>Orthoptera</i>		4	100,0	7,40
<i>Thysanoptera</i>		1	100,0	1,85
<i>Heteroptera</i>		3	100,0	5,56
<i>Homoptera</i> :		3		5,56
	<i>Cicadidae</i>	3	100,0	5,56
	<i>Aleyrodidae</i>	-	100,0	-
	<i>Aphididae</i>	-		-
<i>Coleoptera</i>		8	100,0	14,82
	<i>Coccinelidae</i>	5	62,5	9,26
	Others	3	37,5	5,56
<i>Lepidoptera</i>		1	100,0	1,85
<i>Diptera</i> :		6	100,0	11,11
	<i>Brachycera</i>	4	66,67	7,40
	<i>Nematocera</i>	2	33,33	3,70
<i>Hymenoptera</i> :		15	100,0	27,78
	<i>Aculeata</i>	11	73,34	20,37
	<i>Vespidae</i>	2	18,18	3,70
	<i>Formicidae</i>	9	81,82	16,67
	<i>Parasitica</i>	4	26,66	7,40
	<i>Braconidae</i>	1	25,0,33	1,85
	<i>Aphidiidae</i>	-	-	-
	<i>Ichneumonidae</i>	3	75,0	5,56
	<i>Chalcidoidea</i>	-	-	-
TOTAL		54		

A = the relative abundance related to the systematic category

B = the relative abundance related to the total number of individuals collected

Table 4

The arthropod fauna from the Bârca station, buffer zone, Iasi county, 21.06.2023

Systematic category		Nr. of individuals	Abundance %	
Order	Inferior systematic category		A	B
<i>Aranea</i>		8	100,0	13,11
<i>Collembola</i>		1	100,0	1,64
<i>Orthoptera</i>		5	100,0	8,20
<i>Thysanoptera</i>		1	100,0	1,64
<i>Heteroptera</i>		4	100,0	6,55
<i>Homoptera:</i>		3		4,92
	<i>Cicadidae</i>	3	100,0	4,92
	<i>Aleyrodidae</i>	-	-	-
	<i>Aphididae</i>	-	-	-
<i>Coleoptera</i>		11		18,03
	<i>Coccinelidae</i>	5	45,45	8,20
	Others	6	54,55	9,83
<i>Lepidoptera</i>		9	100,0	14,75
<i>Diptera:</i>	<i>Brachycera</i>	6		9,83
	<i>Nematocera</i>	2	33,33	3,27
		4	66,67	6,55
<i>Hymenoptera:</i>		13		21,31
	Aculeata	10	76,92	16,39
	<i>Vespidae</i>	3	30,0	4,92
	<i>Formicidae</i>	7	70,0	11,47
	Parasitica	3	23,08	4,91
	<i>Braconidae</i>	1	33,33	1,64
	<i>Ichneumonidae</i>	2	66,67	3,27
	<i>Chalcidoidea</i>	-	-	-
TOTAL		61		

A = the relative abundance related to the systematic category

B = the relative abundance related to the total number of individuals collected

We found that in the buffer zones of the two studied areas, the abundance of arthropods is higher than in the strictly protected area, this fact being explained by the presence of some insects in the passage, due to the proximity to other habitats such as forest, hayfield, pasture, etc.

We consider interesting the presence of insects from the orders *Collembola*, *Thysanoptera* and *Hemiptera*, with species that can be harmful to plants but also with useful predatory species, which can be considered indicator species.

According to some classifications, *Collembola* are considered to be a separate class. They have a saprophagous and phytophagous diet, feeding on decaying plant matter, pollen grains, spores or fungi mycelium etc. They are useful insects, having an important role in the degradation of plant residues and the formation of humus in the soil. But there are also species that, by feeding, can cause damage to some crop plants, especially during the period of seed germination and plant emergence [Bellinger *et. al.*, 1996-2023].

Thysanoptera are phytophagous insects, only exceptionally a few forms are zoophagous (predators). The phytophagous species sting the plants by sucking the sap and are considered harmful insects to cultivated plants, spontaneous plants, fruit trees, vine, greenhouse plants. They produce galls, and transmits viruses to plants [Manolache and Boguleanu, 1982].

Hemiptera represents a suborder of *Heteroptera*, popularly known as flat bugs (field bug, forest bug, grain bug, bed bug, etc.). The mouthparts of the *heteroptera* are adapted for stinging and sucking. *Heteroptera* are common insects, widespread in terrestrial and aquatic biotopes. Most heteroptera are phytophagous on various plants. They have considerable practical importance, many species being harmful to plants. Predatory species are useful, attacking various pest insects. *Reduvius personatus*, is a predatory species that attacks other insects by sucking their body contents. Some species lead a parasitic life in birds or mammals, often transmitting agents of serious diseases [Kis, 1984]. Their presence in these habitats, especially in the Mârzești resorts, is explained by the fact that there we found that, although it is a protected site, intensive grazing was practiced. On the date of collection, we found the presence of a herd of sheep in the protected area.

Comparing the abundance of entomofauna in the studied areas, we observe that in Mârzești meadow, this parameter is higher than in Bârca meadow: 60.2%, respectively 39.8% of the total insects collected, excluding spiders. The useful entomofauna in the studied areas is represented by insects from the orders *Coccinellidae*, *Diptera* (*Brachycera*) and *Hymneoptera* (*Parasitica*). Figure 1 presents these insects, in each station.

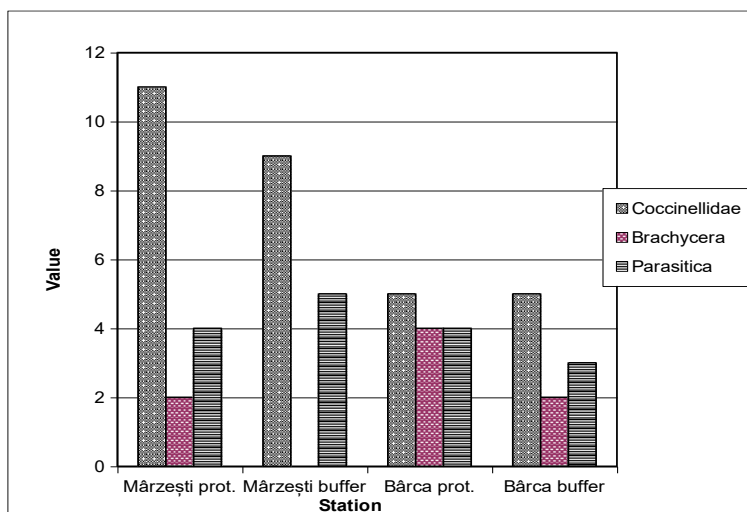


Fig. 1. Useful entomofauna in the studied areas

We reported a fairly significant number of pest insects in all four stations, which implies the presence of a high number of useful insects. These were present in the

studied areas to parasitize larvae of pests, to feed or were in transit from neighboring areas. The four stations studied have as a common element the specific pests (*Lymantriidae*, *Geometridae*, *Tortricidae* etc.) as well as the parasitoids (hymenoptera parasitoids such as *Ichneumonidae*, *Braconidae*, *Chalcidoidae*) and the predators of these pests (*Coccinellidae*).

We notice the presence of *Thysanoptera* and a high number of *Homoptera*, among the pest insects, as well as the presence of hymenoptera parasitoid. After *Hymenoptera*, with 62 specimens, of which 17 specimens are hymenoptera parasitoid, the order *Homoptera* has a large presence, with 14 specimens. Their presence, especially of *Cicadidae* and *Aphidae*, seems to be closely linked to the agricultural crops in the vicinity. Of the 279 specimens of arthropods collected, the useful entomofauna represent 19.35%. *Coccinellidae* (30 specimens), *Brachycera Diptera* (8 specimens) and hymenoptera parasitoid (16 specimens) comprise 54 specimens, comparing to pests, which comprise 94 specimens. Parasitoid *Hymenoptera* were collected as follows: 4 specimens from Mârzești protected area, 5 from Mârzești buffer zone, 4 from Bârca protected area and 3 from Bârca buffer zone (Figure 2).

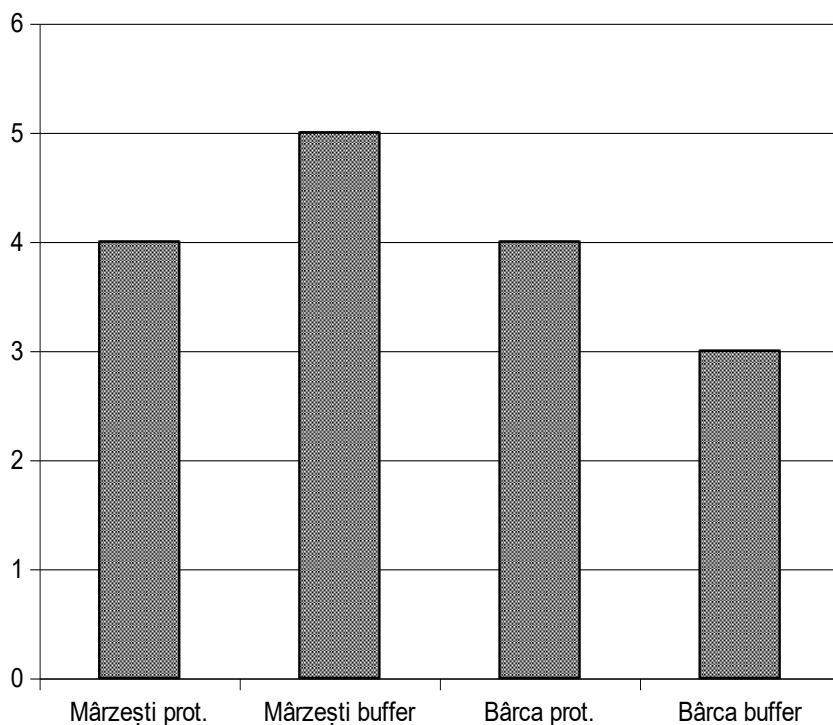


Fig. 2. Distribution of parasitoid Hymenoptera in the studied areas

We collected 10 specimens of ichneumon wasps (3.58% of the total arthropods), from nine genera, belonging to 6 subfamilies: *Anomaloninae*, *Cryptinae*, *Diplazontinae*, *Ichneumoninae*, *Metopiinae* and *Pimplinae*. Table no. 5

presents the nine species of ichneumonids as well as their hosts reported in the literature [Pisică, 2001]. A significantly higher number of ichneumonids was collected from the buffer zones than in the protected areas.

Table 5

The ichneumonological fauna from the Mârzești and Bârca protected areas, Iași county

	Species	Station				Hosts
		Mârzești Protected area	Mârzești Buffer zone	Bârca Grassl and	Bârca Buffer zone	
1.	Subfam. Anomaloniinae <i>Barylypa pallida</i>			1		<i>Malacosoma neustria</i> L. (Lep., Lasiocampidae), <i>Helicoverpa armigera</i> Hb., <i>Spodoptera exigua</i> Hb. (Lep., Noctuidae)
2.	Subfam. Cryptinae <i>Cryptus viduatorius</i>		1			Polyphagous species
3.	Subfam. Diplazontinae <i>Diplazon laetatorius</i>			1	1	Polyphagous species parasitizing Lepidoptera, Diptera, Hymenoptera, Coleoptera and Homoptera species
4.	<i>Promethes sulcator</i>		1			<i>Chorthophila brassicae</i> Bche. (Anthomiidae, Dipt.), <i>Pieris brassicae</i> (Pieridae, Lep.), <i>Melanostoma mellinum</i> L., <i>Spharophoria rueppeli</i> Wied., <i>Platycheirus scutatus</i> Meig. (Syrphidae, Dipt.), <i>Oscinella frit</i> (Chloropidae, Dipt.), <i>Adimonia rustica</i> Hw. (Chrysomellidae, Col.)
5.	Subfam. Ichneumoninae	1				<i>Paracelypha rivulana</i> Scop.

	Species	Station				Hosts
		Mârzești Protected area	Mârzești Buffer zone	Bârca Grassl and	Bârca Buffer zone	
	<i>Barichneumon albicaudatus</i>					(Lep., <i>Tortricidae</i>)
6.	Subfam. Metopiinae <i>Colpotrochia cincta</i>	1				<i>Leucania turca</i> L. (<i>Noctuidae</i> , Lep.)
7.	Subfam. Pimplinae <i>Acropimpla pictipes</i>				1	<i>Choristoneura murinana</i> Hb., <i>Neosphaleroptera nubilana</i> Hb., <i>Parasyndemis histrionana</i> Frol., <i>Tortrix viridana</i> L. (<i>Tortricidae</i> , Lep.), <i>Anacampsis populella</i> Cl. (<i>Gelechiidae</i> , Lep.), <i>Larentia fluctuata</i> L. (<i>Geometridae</i> , Lep.). In Romania it was obtained from <i>Hedya nubiferana</i> Hw. and <i>Spilonota ocellana</i> Schiff. (2, 3)
8.	<i>Itopectis alternans</i>		1			Polyphagous species. In Romania, it was obtained, among others, from: <i>Tortrix viridana</i> L., <i>Hedya dimidioalba</i> Retz., <i>Laspeyresia pomonella</i> L., <i>Archips podana</i> Scop., A. <i>xylosteara</i> L, <i>Yponomeuta</i> sp. etc.

	Species	Station				Hosts
		Mârzești Protected area	Mârzești Buffer zone	Bârca Grassl and	Bârca Buffer zone	
9.	<i>Pimpla turonellae</i>				1	Polyphagous species, parasitizing over 100 species of phytophagous insects.
Total		10				

The ichneumonid species collected from the buffer zones (60% of total) were in transit through the respective areas, other habitats being nearby. However, we can focus our attention on the species *Acropimpla pictipes* (Grav.), collected from the Bârca buffer zone. This species has as host the defoliator *Anacampsis populella* Cl. (*Gelechiidae*, *Lepidoptera*), whose larvae are known to feed on leaves of *Populus* and *Salix* species, found in neighbouring habitats. We can thus establish the existence of a host-parasitoid relationship in the Bârca station-buffer zone. We present the synopsis of the ichneumonid species collected from the four stations.

Order **HYMENOPTERA** Linnaeus, 1758

Suborder **APOCRITA** Gerstaecker, 1867

Superfamily **ICHNEUMONOIDEA** Viereck, 1916

Subfamily **ANOMALONINAE** Viereck, 1918

I. Genus **BARYLYPA** Förster, 1869

1. ***Barylypa pallida*** Gravenhorst, 1829, ♂

Material: 1 ♂, 21. VI. 2023, Bârca, buffer zone, Iași county.

Hosts: *Malacosoma neustria* L. (Lep., Lasiocampidae), *Helicoverpa armigera* Hb., *Spodoptera exigua* Hb. (Lep., Noctuidae).

Geographical distribution: Egypt, Western Europe, Russia (European and Siberian), Kazakhstan. In Romania is a rare species, being previously reported from Mehadia [A. Mocsáry, 1918], Strâmbu – Brăila county, Valu lui Traian, Constanța county [M. Constantineanu, 1967], Bârlad, Zorleni, Vaslui county [I. Petcu, 1990], all authors cited by Pisić, 2001.

Subfamily **CRYPTINAE** Kirby, 1837

I. Genus **CRYPTUS** Fabricius 1804

2. ***Cryptus viduatorius*** Fabricius 1804, ♀

Synonyms:

1865 *Cryptus germari* Taschenberg, Zeit. Ges. Naturwiss., **25** (1,2): 1-142.

1851 *Cryptus vulgivagus* Spinola, Zoologia, **6**: 473-522, in: Gay "Historia fisica y politica de Chile".

1965 *Cryptus zeravshanicus* Maljavin, Izv. Akad. Nauk. Tadzh. SSR (Biol.), **4** (21): 39-43.

1847 *Cryptus zygaenarum* Ratzeburg, Ent. Zeit. Stett., **8** (2): 58-61.

Material: 1 ♀, 22. VI. 2023, Mârzești, buffer zone, Iași county.

Body length = 10 mm.

Hosts: *Alsophila aescularia* Schiff., *Biston* sp., *Eupithecia oxycetrata* Rbr. (Lep., Geometridae), *Nonagria typhae* Thunb. (Lep., Noctuidae), *Loxostege sticticalis* L. (Lep., Pyraustidae), *Sparganotis pilleriana* Schiff. (Lep., Tortricidae) and *Saperda populnea* L. (Col., Cerambycidae).

Geographical distribution: Switzerland, Hungary. In Romania, it is a common species, being previously reported from Pir, Satu Mare county, Sfântu Gheorghe, Covasna county, Mehadia, Văliug, Caraș-Severin county [A. Mocsáry, 1918], Ineu, Arad county, Sănnicolau de Beiuș, Bihor county, Hodod, Satu Mare county, Ocna Sibiului, Sibiu county, Ciceu-Cristur, Bistrița-Năsăud county, Ighiel, Albă county, Bocșa Montană, Caraș-Severin county [A. Kiss, 1922-1924], Sebeș mountains, Gușterița, Cislădie, Sibiu county, Beclean, Bistrița-Năsăud county, Saschiz, Mureș county [A. Kiss, 1929-1930], Bucegi mountains, Prahova county [A. Kiss, 1931-1932], Vișan, Iași county [M. Constantineanu, 1927], Agigea, Eforie, Constanța county, Babadag, Tulcea county [M. Constantineanu, 1961], Sibiu, Ocna Sibiului, Măgura Sibiului, Turnișor, Sibiu county, Teleajen, Prahova county [M. Constantineanu, 1961], Valea Mraconia, comuna Ogradena, jud. Mehedinți [M. Constantineanu & all, 1975], Caraorman, “Danube Delta” Biosphere Reserve, Tulcea county, Natural Reserve “Ponoare” and “Frumoasa”, Suceava county [M. Constantineanu, M. Voicu, 1980], Agigea, Eforie Nord, Constanța county, Valea Timișului, Brașov county, Natural Reserve “Valea lui David”, Moisești, Deleni, Iași county, Sânpetru, Codlea, Prejmer, Perșani mountains, Brașov county, Slobozia, Ialomița county [V. Ciochia, 1979], all authors cited by Pisciă, 2001.

Subfamily **DIPLAZONTINAE** Hopper, 1959

I. Genus **DIPLAZON** Nees, 1818

3. **Diplazon laetatorius** (Fabricius) 1781, ♀

Material: 1 ♀, 21. VI. 2023, Bârca, protected area; 1 ♀, 21. VI. 2023, Bârca, buffer area, Iasi county.

Body length = 5 mm.

Hosts: *Allograpta fracta* O. S., *Allograpta obliqua* Say, *Allograpta exotica* Wied., *Baccha clavata* Walk., *Baccha lemur*, *Baccha lugens* Lw., *Eupeodes volucris* O. S., *Ischiodon scutellaris* F., *Lasiophthicus topiarius* Mg., *Melanostoma mellinum* L., *Mesogramma* sp., *Mesograpta polita*, *Metasyrphus luniger* Meig., *Metasyrphus frequens* Mats., *Metasyrphus corollae* F., *Metasyrphus nitens* Zett., *Metasyrphus americanus* Wied., *Metasyrphus annulipes* Zett., *Episyrphus balteatus* DeG., *Paragus bicolor* F., *Paragus tibialis* Fall., *Paragus quadrifasciatus* Mg., *Sphaerophoris cylindrica* Say, *Sphaerophoris scripta* L., *Sphaerophoris rüPELLI* Wd., *Sphaerophoris robusta* Curr., *Pipiza noctiluca*, *Meliscaeva auricollis* Meig., *Meliscaeva cinctella*

Zett., *Orphnabaccha erratica* Wied., *Melangyna novaezelandiae* Macq., *Scaeva pyrastris* L., *Syrphus ribesii* L., *Syrphus serarius* Wied., *Syrphus torvus* O. S., *Syrphus viridiceps* Macq., *Syrphus vitripennis* Mg., *Syrphus wiedmanni* Johns., *Syrphus ortas*, *Syrphus rectus* O. S., *Syrphus vittafrons* Shann. *Syrphus braueri* Egger (Dipt., *Syrphidae*), *Laspeyresia pomonella* L., *Zeiraphera griseana* Hb., *Zeiraphera diniana* Güen., *Paralobesia viteana*, *Ancylis comptana* (Froel) (Lep., *Tortricidae*), *Lymantria dispar* L., (Lep., *Lymantriidae*), *Plutella maculipennis* Curt. (Lep., *Plutellidae*), *Depressaria heracliana* L. (Lep., *Oecophoridae*), *Ostrinia nubilalis* Hb. (Lep., *Pyraustidae*), *Gilpinia polytoma* Htg., *Ardis bipunctata* (Kl.) (Hym., *Tenthredinidae*), *Galeruca pomonae* Scop., *Galeruca interrupta* (Col., *Chrysomelidae*), *Hyalopterus arundinis* F. and *Aphis jacobaeae* (Hom., *Aphidae*) [Pisică, 2001].

Geographical distribution: It is a ubiquitous species, found in almost all zoogeographic regions of the globe (Indo-Australian, Ethiopian, Holarctic, Neotropical). In Romania it is a common species, having been previously reported by A. Mocsáry (1918) and by A. Kiss (1922-1924, 1925-1926, 1929-1930, 1931-1932) from 13 localities in Transilvania, all authors cited by Pisică, 2001. Constantineanu R., 1972 reported this species from 33 localities from 12 counties in Moldova, Muntenia, Dobrogea, Oltenia, Transilvania and Banat.

II. Genus **PROMETHES** Förster, 1968

4. **Promethes sulcator** (Gravenhorst, 1829), ♀

Synonyms:

1829 *Bassus sulcator* Gravenhorst, Ichn. Eur., **3**: 1-1097.

1856 *Bassus areolatus* Holmgren, Svensk. Vet. -Akad. Handl., **75**: 1-104.

1865 *Orthopelma anomalus* Taschenberg, Zeit. Ges. Naturwiss., **25** (1-2): 1-142.

1883 *Bassus longicornis* Provancher, Faun. Canad. Hym., Nat. Canad., **14**: 3-20.

1906 *Promethus dodsii* Morley, Trans. Roy. Ent. Soc. London, **4**: 419-438.

1964 *Promethes splendidus* ssp. *Sulcator* Dasch, Mem. Amer. Ent. Inst., **3**: 1-304.

Material: 1 ♀, 22. VI. 2023, Mârzești, buffer zone, Iași county.

Body length = 6 mm.

Hosts: *Cnephasia longana*, *Sphaerophoria robusta* Curran, *Melanostoma mellinum* L., *Syrphus* sp. (Dipt., *Syrphidae*), *Delia brassicae* Bouché (Dipt., *Anthomyidae*), *Pieris brassicae* L. (Lep., *Pieridae*) and *Plutella maculipennis* Curt. (Lep., *Plutellidae*) [Pisică, 2001].

Geographical distribution: It is the most common species of the genus *Promethes* and one of the most common species of ichneumonids, being reported from the Holarctic and Indo-Australian regions. In Romania it is a common species, having been previously reported from Ineu, Arad county, Ocna Dej, Cluj county, Bocșa Română, Caraș-Severin county, by Kiss A. (1924, 1925 - 1926 and 1931 - 1932), from Porțile de Fier, by Constantineanu M. et al. (1975), from natural reserves "Bălteni"

and "Hârboanca", Vaslui county, by Constantineanu M. and Țâțan L. (1973), from natural reserves "Frumoasa" and "Ponoare", Suceava county, by Constantineanu M. and Voicu M. (1976 - 1977), from Stânca Costești, Botoșani county, by Constantineanu R. (1982), from Cocoara hill, Câmpulung Moldovenesc, Suceava county, by Constantineanu R. and Istrate G. (1971), from Independența, Enisala, Popina isle, Gorgova, Tulcea county (1993), from Surduc mountain, Ghilcoș and Pârăul Oii, Neamț county, by Constantineanu R. (1981) and from natural reserves from national parks in Retezat mountain and Valea Cernei, by Constantineanu R. (1997), all authors cited by Pisiță, 2001.

Subfamily **ICHNEUMONINAE** Latreille, 1802

I. Genus **BARICHNEUMON** Thomson, 1893

5. ***Barichneumon albicaudatus*** Fonscolombe, 1847

Body length: 7 - 11 mm.

Material: 1 ♂, 22. VI. 2023, Mârzești, protected area, Iași county.

Hosts: *Paracelypha rivulana* Scop. (Lep., *Tortricidae*) [Pisiță, 2001].

Geographical distribution: England, Spain, Germany, France, Hungary, Russia (European and Siberian parts), Kazakhstan. In Romania is a common species, been previously reported from the counties Mehedinți, Hunedoara, Sibiu, Mureș, Suceava, Botoșani, Iași, Bacău, Vaslui, Galați and Tulcea [Pisiță, 2001].

Subfamily **METOPINAE** Förster, 1869

I. Genus **COLPOTROCHIA** (Holmgren, 1855)

6. ***Colpotrochia cincta*** (Scopoli, 1863)

Synonyms: *Colpotrochia affinis* Vollenhoven, 1875; *Colpotrochia elegantula* (Schrank, 1781); *Colpotrochia interstitialis* (Constantineanu, 1929); *Colpotrochia mandator* (Fabricius, 1787); *Colpotrochia mundator* (Thunberg, 1822); *Colpotrochia notata* (Kriechbaumer, 1894); *Colpotrochia postfurcalis* (Constantineanu, 1932).

Material: 1 ♂, 22. VI. 2023, Mârzești, protected area, Iași county.

Hosts: Lepidoptera species such as *Leucania turca* L., *Axylia putris* (L.), *Acronicta aceris* (L.), *Papestra biren* (Goeze) (Noctuidae) [Pisiță, 2001].

Geographical distribution: Palaearctic region [Yu *et. al.*, 2012], Iran [Amiri *et. al.*, 2015]. In Romania is a common species, been previously reported from Danube Delta: Uzlina, Hașmacu Mare, Caraorman, C.A. Rosetti and Mehedinți, Vaslui, Suceava, Bihor, Botoșani, Sălaj, Cluj, Bistrița-Nădăud, Sibiu, Mureș, Hunedoara, Brașov, Prahova counties [Pisiță, 2001].

Subfamily **PIMPLINAE** Wesmael, 1845

I. Genus **ACROPIMPLA**

7. ***Acropimpla pictipes*** (Gravenhorst, 1929), ♀. 1 ♀, Enisala, 7.06.2017

Synonyms: 1829 *Pimpla pictipes* Gravenhorst, 1829; *Acropimpla pictipes* Aubert, 1966; *Scambus pictipes* Constantineanu & Ciochia, 1967.

Material: 1 ♀, Bârca, buffer zone, 21.06.2023.

Body length: 10 mm.

Hosts: *Choristoneura murinana* Hb., *Neosphaleroptera nubilana* Hb., *Parasindesmis histrionana* Fröl., *Tortrix viridana* L., *Hedia nubiferana* Hb. (Lep., Tortricidae), *Anacampsispopulella* Cl. (Lep., Gelechiidae), *Larentia fluctuata* L., *Spilonota ocellana* Schiff. (Lep., Geometridae) [Pisică, 2001].

Geographical distribution: Europe, Russia (European and Siberian), Japan. In Romania is a common species, been previously reported from Danube Delta: Periteașca [Constantineanu, 1995] and from Pir, Satu Mare county [Kiss, 1925-1926], Dumbrava Sibiului and Sibiu, Sibiu county, Agârcia and Bicaz, Neamț county [Constantineanu, 1958], Agigea, Constanța county (Constantineanu *et. al.*, 1958), Baia Mare, Maramureș county, Bucium – Iași, Tâmpa mountain, Timișu de Jos, Brașov county, Nicșeni, Botoșani county [Constantineanu and Pisică, 1959], Pângărați, Neamț county [Constantineanu and Pisică, 196]), Iași [Constantineanu and Pătrășcanu, 1966], Vârghiș, Caraș – Severin county [Constantineanu and Ciochia, 1967], Poiana Cârnelui, Bicaz, Neamț county [Constantineanu and Voicu, 1980], natural reserve “Frumoasa”, Suceava county [Constantineanu and Pisică, 1960], Bicaz Chei, Neamț county [Constantineanu and Pisică, 1962], all authors cited by Pisică, 2001.

II. Genus *ITOPLECTIS* Förster, 1868

8. *Itopectis alternans* (Gravenhorst, 1929)

Material: 1 ♂, 21. VI. 2023, Mârzești, buffer zone, Iași county.

Hosts: polyphagous species. In Romania was obtained mainly from lepidoptera pest species [Pisică, 2001].

Geographical distribution: Palaearctic and Oriental Regions [Kasparyan, 1973; Yu *et. al.*, 2012], Turkey [Okyar and Yurtcan, 2007], Iran [Mohammadi *et. al.*, 2013]. In Romania is a common species.

III. Genus *PIMPLA* Fabricius, 1804

9. *Pimpla turionellae* (Linnaeus, 1758), ♂

Synonyms:

1758 *Ichneumon turionellae* Linnaeus, Syst. Nat., ed. 10-a, 1: 564, ♀.

1804 *Pimpla examiner* Fabricius, Syst. Piez., 439 + 32 pp.; 1829 Gravenhorst, Ichn. Eur., 3: 207, ♀♂.

1918 *Pimpla padellae* Torka, Ent. Rundschau, 33, ♀♂.

1960 *Coccygomimus turionellae* Townes, U. S. Nat. Mus. Bull., 216(2): 323.

Material: 1 ♂, 22. VI. 2023, Bârca, zona tampon, jud. Iași.

Body length: 7 mm.

Hosts: it is a polyphagous species, parasitizing over 100 species of phytophagous insects [Pisică, 2001].

Geographical distribution: Holarctic and Indo-Australian Regions [Yu *et. al.*, 2012]. In Romania is a common species.

Most of the identified ichneumonid species are primary parasitoids of major pests in meadows and forests. These pests are defoliators, xylophagous or gallicol insects belonging to the orders: *Lepidoptera* (families *Tortricidae*, *Lymantriidae*, *Geometridae*) and *Coleoptera* (family *Cerambycidae*, family *Curculionidae* – subfamily *Scolytinae*). We have not identified ichneumonids that act as secondary parasitoids.

CONCLUSIONS

The diversity of arthropod fauna in protected areas and their buffer zones in Iași County is quite rich; but it is slightly lower than in other previously studied areas, such as agricultural polders or forest ecosystems. It is, however, richer than in halophilic areas.

279 arthropods (araneids and insects) were collected, belonging to the following orders: *Aranea* (*Arachnida*), *Collembola*, *Orthoptera*, *Thysanoptera*, *Heteroptera*, *Homoptera*, *Coleoptera*, *Lepidoptera*, *Diptera* and *Hymenoptera* (*Insecta*), entomofauna representing 86.38% of these systematic groups, the remaining 13.62% being araneids.

The ichneumonids fauna is represented by 10 individuals from 9 species, belonging to 6 subfamilies: *Anomaloninae*, *Cryptinae*, *Diplazontinae*, *Ichneumoninae*, *Metopiinae* and *Pimplinae*;

We report the existence of a parasitoid-host relationship at Bârca, the buffer zone: the ichneumonid *Acropimpla pictipes* (Grav.) parasitizes the defoliating lepidopteran *Anacamptis populella* Cl., which feeds on the leaves of *Salix* and *Populus* species.

Some ichneumonid species identified in the buffer zones studied were in passage from neighboring ecosystems.

Ichneumonids contribute to the regulation and stability of grassland and hayfield ecosystems, but also of neighbouring ecosystems.

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REFERENCES

1. Amiri A., Talebi A. A., Riedel M., Rakhshani E., Hajiqaanbar H., 2015. A Survey of *Metopiinae* (Hymenoptera: Ichneumonidae) in Southern Iran, with three new records, J. Crop. Prot., 4(4): 519-531.
2. Bellinger P.F., Christiansen K.A., Janssens, F., 1996-2023 - Checklist of the *Collembola* of the World. <http://www.collembola.org>.
3. Constantineanu M., Pătrășcanu Elena, 1966 - Contribuții la cunoașterea *Ichneumonodelor* parazite pe insecte dăunătoare mărului din regiunea Iași, Stud. și Cercet. Biol. Ser. Zool., 18: 221-235, București
4. Constantineanu M. I., Pisică C., 1977 - Familia *Ichneumonidae*, Subfamiliile *Ephialtinae*, *Lycorininae*, *Xoridinae* și *Acaenitinae*, Fauna R. S. R., Insecta, Hymenoptera, 9 (7): 1 - 310, Ed. Acad. Rom. , București.
5. Constantineanu R., 1972 - Contribuții la studiul *Tryphonoidelor* (Hym., *Ichneum.*) din R. S. România. Doctoral thesis, Univ. "Al. I. Cuza" Iași.

6. **Constantineanu, R., Constantineanu, I., 1997** - *Ichneumonide (Hymenoptera, Ichneumonidae) din parcurile naționale Retezat și Valea Cernei* (Editor: Dr. L. Rákossy), 233 pp., Cluj-Napoca.
7. **Kasparyan D.R., 1973** - *A review of the Palearctic Ichneumonids of the tribe Pimplini (Hymenoptera, Ichneumonidae). The genera Itoplectis Foerster and Apechthis Foerster*, Entomological Review 52: 444-455.
8. **Kis B., 1984** - *Heteroptera. Partea generală și suprafamilia Pentatomoidea, Fauna Republicii Socialiste România. Insecta. 8(8)*, Ed. Acad. Rom., București.
9. **Manolache C., Boguleanu Gh., 1982** - *Tratat de zoologie agricolă. Dăunătorii plantelor cultivate. 2*, Ed. Acad. Rom., București.
10. **Mohammadi, A., Talebi, A.A., Zwakhals, K., 2013** - *A study of the subfamily Pimplinae (Hymenoptera: Ichneumonidae) in the north of Iran, with eleven new species records*. Entomofauna **34**(2), 29-56, ISSN 0250-4413.
11. **Okyar Z., Yurtcan M., 2007** - *Phytophagous Noctuidae (Lepidoptera) of the Western Black Sea Region and their ichneumonid parasitoids*, Entomofauna **28**(28): 377-388.
12. **Pisică, C., 2001** - *Ichneumonidele (Hymenoptera, Insecta) din România și gazdele lor*. Catalog, 406 pp., Edit. Univ. "Al. I. Cuza" Iași.
13. **Yu D. S., Achterberg K. van, Horstmann K., 2012** - *World Ichneumonoidea 2011*. Taxapad 2012, accessed in 2023.