

ICHNEUMON FLIES (HYMENOPTERA, ICHNEUMONIDAE) FROM AGRICULTURAL AREAS OF THE DANUBE DELTA BIOSPHERE RESERVE

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The paper presents 14 species of ichneumon wasps, three of them being reported for the first time from the Danube Delta Biosphere Reserve. Research has been carried out in some agricultural areas of the Danube Delta Biosphere Reserve. There are being reported representatives of arthropod fauna (Insecta and Araneida) from four stations: Murighiol (barley culture), Sarinasuf (alfalfa culture, the shores of Lake Razelm), Beștepe (sunflower culture) and Beștepe (colza culture). One particular interest was the identification of the ichneumon wasps species in these areas.

Keywords: Arthropods, Ichneumon flies, agriculture, Danube Delta Biosphere Reserve, Romania.

INTRODUCTION

The Danube Delta Biosphere Reserve is located in South-Eastern Romania, in the historical province of Dobrogea. So far, there is no assessment of the number of ichneumon flies species in Danube Delta. Following the present study, a catalogue of Ichneumonidae species from the Danube Delta will be released. However, about 650 species have been reported in Dobrogea's ichneumonological fauna, in more than 50 scientific papers, including a synthesis of the ichneumon flies (Pisică, 1998–1999).

MATERIAL AND METHOD

We performed the qualitative and quantitative analysis of the entomofauna and the diversity study of the ichneumon wasps fauna (Hymenoptera, Ichneumonidae) in four agricultural areas: Murighiol, Sarinasuf, Beștepe-sunflower and Beștepe-colza. The vegetation on these station was very weak represented:

1. Murighiol, *Hordeum vulgare* L. culture;
2. Sarinasuf, *Medicago sativa* L. culture, on the shores of lake Razelm;

3. Beștepe, *Helianthus annuus* L. culture (sunflower);

4. Beștepe, *Brassica napus* L. culture (colza).

The insect collecting was made on 6th June 2017 (Murighiol and Sarinasuf) and 12–13th July 2018 (Beștepe). For the collection, the entomological net was used. The mowing method (x100) was used in the agricultural areas surveyed. Insects collected by the entomological net have been moved into special zipper bags, in which we have pre-loaded alcohol to neutralize the insects. In each zipper bag we introduced a label with the day, place and type of vegetation from where the collection was made. Each zipper bag has constituted a sample. Thus, for studying the arthropod fauna in the surveyed stations, four samples were obtained, which were studied in the laboratory later. Each sample was cleared of vegetal remains, then the arthropods, particularly insects, were separated by scientific order. The insects were identified using the Olympus binocular magnifier, determination keys and comparison method. The faunal material obtained was subjected to the microscopic study and was classified by systematic groups, the most important being analyzed up to families. For each station studied, was recorded sample by sample, drawing inventory sheets and calculating the relative abundance of the arthropod systematic groups.

RESULTS

It were collected 120 arthropods (Araneidae and Insecta), belonging to the following orders: Aranea (Arachnida), Collembola, Orthoptera, Thysanoptera, Heteroptera, Homoptera, Coleoptera, Lepidoptera, Diptera and Hymenoptera (Insecta), entomofauna representing 85,84% of systematic groups, the rest of 14,16% being araneids.

Comparing the present study with earlier studies, it is noted that the arthropod fauna (Araneida and Insecta) in salty areas of the Danube Delta, is much lower than in agricultural crops or plantations. This is due to the type of station, like salty and sandy meadows with low vegetation areas, that do not provide the right environment for the development of parasitoid hymenoptera and their hosts (Lungu-Constantineanu, 2016).

The presence of parasitic hymenoptera varied in each station, as follows: 2 individuals at Murighiol and Sarinasuf (2,18%), 3 individuals at Beștepe-sunflower (3,27%) and 4 individuals at Beștepe-colza (4,37%).

It were collected 9 individuals (10,58% of total collected arthropods), belonging to 9 genera, from 8 subfamilies: Acaenitinae, Campopleginae, Cremastinae, Cryptinae, Diplazontinae, Ichneumoninae, Metopiinae and Pimplinae.

The Table 1 presents the 9 species of ichneumon flies, as well as their hosts reported in literature (Pisică, 2001).

Table 1

Ichneumonological fauna from some agricultural areas in Danube Delta, Tulcea county

No.	Ichneumonidae species	Station				Hosts
		Murighiol	Sarinasuf	Beștepe-sunflower	Beștepe-colza	
1	Subfam. Acaenitinae <i>Phaenolobus saltans</i> (Gravenhorst, 1829)		1			<i>Chamaesphecia palustris</i> Ktz. (Aegeriidae, Lep.), <i>Oberea erythrocephala</i> (Cerambycidae, Coleoptera).
2	Subfam. Campopleginae <i>Sinophorus xanthostomus</i> (Gravenhorst, 1829)			1		<i>Pieris brassicae</i> L. (Pieridae, Lepidoptera), <i>Loxostege sticticalis</i> L. (Pyraustidae, Lepidoptera), <i>Caradrina exigua</i> , <i>Heliothis dipsacea</i> L. (Noctuidae, Lepidoptera)
3	Subfam. Cremastinae <i>Temelucha interruptor</i> (Gravenhorst, 1829)			1		<i>Rhyaciomia buoliana</i> Schiff. (Tortricidae, Lepidoptera), <i>Exoteleia dodecella</i> L. (Gelechiidae, Lep.), <i>Yponomeuta evonymella</i> (Yponomeutidae, Lepidoptera)
4	Subfam. Cryptinae <i>Trichosis atripes</i> (Gravenhorst, 1829)				1	Unknown
5	Subfam. Diplazontinae <i>Diplazon laetatorius</i> (Fabricius, 1781)	1				Polyphagous species that parasitizes some Lepidoptera, Diptera, Hymenoptera, Coleoptera and Homoptera species.
6	<i>Diplazon deletus</i> (Thomson, 1890)		1			Unknown

Table 1 (continued)

No.	Ichneumonidae species	Station				Hosts
		Murighiol	Sarinasuf	Beștepe-sunflower	Beștepe-colza	
7	Subfam. Ichneumoninae <i>Virgichneumon albosignatus</i> (Gravenhorst, 1829)				1	<i>Abraxas grossulariata</i> L. (Geometridae, Lepidoptera), <i>Dasychira pudibunda</i> L. (Lymantriidae, Lepidoptera).
8	Subfam. Metopiinae <i>Colpotrochia cincta</i> (Scopoli, 1863)	1				<i>Leucania turca</i> L. (Noctuidae, Lepidoptera).
9	Subfam. Pimplinae <i>Acropimpla pictipes</i> (Gravenhorst, 1929)				1	<i>Choristoneura murinana</i> Hb., <i>Neosphaleroptera nubilana</i> Hb., <i>Parasyndemis histrionana</i> Frol., <i>Tortrix viridana</i> L. (Tortricidae, Lepidoptera), <i>Anacampsis populella</i> Cl. (Gelechiidae, Lepidoptera), <i>Larentia fluctuata</i> L. (Geometridae, Lepidoptera). In Romania, it was obtained from <i>Hedya nubiferana</i> Hw. and <i>Spilonota ocellana</i> Schiff. (Pisică, 2001).
Total		9				

It is observed that the ichneumonological fauna is also very weak, because there is no direct link between the collected ichneumonid species and the pest (hosts) species or plants. We interpret that the ichneumonid species collected were in the passage, not finding there hosts to parasitize or plant species to provide them the pollen or nectar necessary for feeding. Plants of the Poaceae family are attacked by representatives of the order Heteroptera, which are not parasitized by ichneumonids. Heteroptera were present in the four stations, but in a very small number, in total six individuals: two at Murighiol and Beștepe-colza, one at Sarinasuf and Beștepe-sunflower. The rest of the plants, are attacked by nematodes, which are also not parasitized by ichneumonids.

However, we can turn our attention to the species *Acropimpla pictipes* (Grav.), collected from Beştepe-colza. This species has as host the defoliator *Anacamptis populella* Cl. (Gelechiidae, Lepidoptera), about whose larvae are known to feed on the leaves of the species *Populus* and *Salix* (Lungu-Constantineanu, 2018), being in the vicinity. We can thus establish the existence of a host-parasite relationship in the Beştepe-colza station area.

We present the ichneumonid species collected from the four stations.

Order HYMENOPTERA Linnaeus, 1758
Suborder Apocrita Gerstaecker, 1758
Family Ichneumonidae Latreille, 1802

Subfamily ACAENITINAE Kirby, 1837

Phaenolobus saltans (Gravenhorst, 1829), ♂. 1 ♂, Sarinasuf, 6.06.2017.

Subfamily CAMPOPLEGINAE Förster, 1869

Sinophorus xanthostomus (Gravenhorst, 1829), ♀. 1 ♀, Beştepe-sunflower, 7.06.2017.

Subfamily CREMASTINAE Förster, 1869

Temelucha interruptor (Gravenhorst, 1829), ♀. 1 ♀, Beştepe-sunflower, 7.06.2017.
New species for the „Danube Delta” Biosphere Reserve.

Subfamily CRYPTINAE Kirby, 1837

Trichosis atripes (Gravenhorst, 1829), ♀. 1 ♀, Beştepe-colza, 7.06.2017. New species for the „Danube Delta” Biosphere Reserve.

Subfamily DIPLAZONTINAE Viereck, 1918

Diplazon laetatorius (Fabricius, 1781), ♀. 1 ♀, Murighiol, 6.06.2017.

Diplazon deletus (Thomson, 1890), ♂. 1 ♂, Sarinasuf, 6.06.2017. New species for the „Danube Delta” Biosphere Reserve.

Subfamily ICHNEUMONINAE Latreille, 1802

Virgichneumon albosignatus (Gravenhorst, 1829), ♂. 1 ♂, Beştepe-colza, 7.06.2017.

Subfamily METOPIINAE Förster, 1869

Colpotrochia cincta (Scopoli, 1863) ♂. 1 ♂, Murighiol, 6.06.2017.

Subfamily PIMPLINAE, Wesmael, 1845

Acropimpla pictipes (Gravenhorst, 1829), ♀. 1 ♀, Beştepe-colza, 7.06.2017

We note that from the four collection stations we collected a small, approximately equal number of ichneumon wasps: two at Murighiol, Sarinasuf and Plopu, respectively three at Enisala.

Three species of ichneumon wasps are reported for the first time from the Danube Delta Biosphere Reserve: *Temelucha interruptor* (Grav.), *Trichosis atripes* (Grav.) și *Diplazon deletus* (Thoms.).

CONCLUSIONS

The diversity of arthropod fauna in agricultural crops and plantations in the Danube Delta is richer in comparison with that in the salted areas of the Danube Delta Biosphere Reserve.

It were collected 120 arthropods (Araneidae and Insecta), belonging to the following orders: Aranea (Arachnida), Collembola, Orthoptera, Thysanoptera, Heteroptera, Homoptera, Coleoptera, Lepidoptera, Diptera and Hymenoptera (Insecta), entomofauna representing 85,84% of systematic groups, the rest of 14,16% being araneids.

The ichneumonological fauna is represented by 9 individuals from 9 species, belonging to 8 subfamilies: Acaenitinae, Campopleginae, Cremastinae, Cryptinae, Diplazontinae, Ichneumoninae, Metopiinae and Pimplinae.

Three ichneumonid species are reported for the first time from the Danube Delta Biosphere Reserve: *Temelucha interruptor* (Grav.), *Trichosis atripes* (Grav.) and *Diplazon deletus* (Thoms.).

We report a parasite-host relationship in Beștepe-colza station: the ichneumon wasp *Acropimpla pictipes* (Grav.) parasites the defoliating lepidopterous *Anacamptis populella* Cl., which feeds on *Salix* and *Populus* leaves.

Some ichneumon wasps species in passage from neighboring ecosystems.

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