

DIVERSITY OF USEFUL ENTOMOFAUNA IN RYE CULTURE FROM THE HORODNIC DE JOS LOCALITY, SUCEAVA COUNTY

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ABSTRACT

From the investigated rye culture, 243 specimens of useful insects were collected and analyzed and 38 taxa were identified, which belonged to the orders: Hemiptera-Suborder Heteroptera, Thysanoptera, Neuroptera, Diptera, Hymenoptera and Coleoptera. At the level of order of insects, the abundance with the highest value was found in the case of Hymenoptera, which held 48.56% of the total useful analyzed insects. The smallest abundance held it the order Neuroptera (1.24%).

Maximum of activity of this ecological category of insects was recorded in May-June, varying as period and duration from one group of insects to another.

Regarding the efficiency of predators *Chrysopa carnea*, *Cantharis rustica*, *Tachyporus* sp., *Coccinella 7 – punctata*, *Propylea 14 – punctata*, Nabidae and Syrphidae, the number of individuals of these species registered in this culture, in one place, reduced the number of aphids daily by 2.090 individuals. The number of individuals *Cantharis rustica*, *Chrysopa carnea* and Sirfidae registered in this culture, in one place, destroyed 250 numbers of Tizanopteras daily.

Key words: Rye culture, useful entomofauna, dynamics of the useful entomofauna, efficiency of some predatory insect species in reducing the number of aphids and tripods.

Introduction

Rye, a cereal grain, native to Central and South-West of Asia, is of major importance in the nutrition of the human being and animals, especially in the countries of northern Europe. It is also used in the pharmaceutical industry. In Romania, this plant is grown, especially in the northern part of the country, where the environmental conditions are more favorable to the culture of this plant. It makes good use degraded land, less suitable for the cultivation of other plant species. Due to its importance, knowledge of the pest and predatory and parasitoid insect complex is of great importance for the protection of this crop.

Material and method

The collectings of the entomological material were made from the rye plants, from the culture of Horodnic de Jos, Suceava county, during the April-July 2014 period. In total, 6 collectings were made, the one collected in April and July, and two in May and June.

The collectings were made with the entomological fillet, at each sampling, 100 mowings was performed with the fillet, 50 mowings on the plants at the edge of the crop, and another 50 mowings in the middle of it.

The collected material was stored in 80% ethyl alcohol, brought to the laboratory where it was identified and processed.

Results and discussions

In Romania no systematic research has been done regarding the entomofauna in rye culture. On the other hand such investigations has been carried out on other species of rare cereals, mainly wheat, by various researchers with numerous studies, of which only some works (1, 2, 4, 5, 6, 7)

From the investigated rye culture, in those 6 samples, 243 specimens of useful insects were collected and analyzed and 38 taxa were identified, which belonged to the orders: Hemiptera-Subordinul Heteroptera, Thysanoptera, Neuroptera, Diptera, Hymenoptera and Coleoptera (Table 1).

At the level of order of insects, the abundance with the highest value was found in the case of Hymenoptera, which held 48.56% of the total useful analyzed insects, followed by the Orders Thysanoptera (18,11%) and Diptera (15,23%). The smallest abundance held it the order Neuroptera (1,24%) (Table 1). The largest biological diversity is presented by the order Hymenoptera. (23 taxa), followed by the order Coleoptera (6 taxa) (Table 1). The predatory entomofauna was represented by *Orius niger*, Nabidae, *Aeolothrips intermedius*, *Chrysopa carnea*, *Tachyporus* sp., *Cantharis*

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rustica, *Dolichosoma lineare*, *Coccinella 7-punctata*, *Adonia variegata*, *Propylea 14 – punctata*, Syrphidae, Anthomyiidae, Sarcophagidae, Dolichopodidae, Sciomyzidae and Formicidae, and the parasitic one by the taxa: Ichneumonidae, Braconidae, *Tryoxis brevicornis*, Cynipidae, *Mesopolobus* sp., *Pachyneuron* sp., *Callitula* sp., *Asaphes* sp., *Polynema* sp., *Pteromalinae*, Encyrtidae, Eulophidae, Diapriidae, Scelionidae, *Trissolcus* sp., *Telenomus* sp., Scelionidae,

Platygastridae, *Inostemma* sp., *Synopeas* sp., Ceraphronidae and Megaspilidae. In the case of the predatory entomofauna, most individuals belonged to the species *Aeolothrips intermedius* (44 individuals), and in the case of parasitoid insects, most abundant were Eulophidae, which represented 23.73% of the Parasitoid Hymenoptera, followed by *Mesopolobus* (22.89%), and at the opposite pole was *Trissolcus* sp., *Synopeas* sp. and *Pteromalinae* (Table 1).

Table 1 - Abundance and dominance of the predatory and parasitoid entomofauna collected from the rye from Horodnic de Jos, Suceava county, during April-July, 2014

Nr	Taxon	Sampling data						Total	
		17 April	11 May	25 May	10 June	26 June	12 July	nr	%
	ORD. HEMIPTERA	1	1	1	2	11	2	18	7,41
	SUBORD. HETEROPTERA	1	1	1	2	11	2	18	7,41
1.	Nabidae	1	1			11	1	14	5,77
2.	<i>Orius niger</i>			1	2		1	4	1,65
	ORD. THYSANOPTERA	2	10	11	16	3	2	44	18,11
3.	<i>Aeolothrips intermedius</i>	2	10	11	16	3	2	44	18,11
	ORD. NEUROPTERA	1				1	1	3	1,24
4.	<i>Chrysopa carnea</i>	1				1	1	3	1,24
	ORD. DIPTERA		2	1	4	22	8	37	15,23
5.	Syrphidae				3	11	2	16	6,59
6.	Anthomyiidae			1		9	4	14	5,77
7.	Sarcophagidae		1			2		3	1,24
8.	Dolichopodidae		1				2	3	1,24
9.	Sciomyzidae				1			1	0,42
	ORD. HYMENOPTERA	15	12	18	31	27	15	118	48,56
10.	Ichneumonidae	1		1	1		2	5	2,06
11.	<i>Tryoxis brevicornis</i>		2			4	3	9	3,71
12.	Braconidae		1			1		2	0,83
13.	Cynipidae	4	3	3				10	4,12
14.	<i>Mesopolobus</i> sp.	3		1	17	4	2	27	11,12
15.	<i>Callitula</i> sp.				2	4		6	2,47
16.	<i>Pachyneuron</i> sp.			1	1			2	0,83
17.	<i>Asaphes</i> sp.				1		1	2	0,83
18.	<i>Pteromalinae</i>	1						1	0,42
19.	Encyrtidae					1		1	0,42
20.	Eulophidae	5	3	10	2	4	4	28	11,53
21.	<i>Polynema</i> sp.		1					1	0,42
22.	<i>Platygaster</i> sp.			1		2	1	4	1,65
23.	<i>Inostemma</i> sp.				1		1	2	0,83
24.	<i>Synopeas</i> sp.				1	1	1	3	1,24
25.	<i>Trissolcus</i> sp.			1				1	0,42
26.	<i>Telenomus</i> sp.					1		1	0,42
27.	Diapriidae				1	1		2	0,83
28.	Scelionidae		1		1			2	0,83
29.	Platygastridae		1		2			3	1,24
30.	Ceraphronidae				1	1		2	0,83
31.	Megaspilidae	1				2		3	1,24

32.	Formicidae					1		1	0,42
	ORD. COLEOPTERA	4	3	6	6	2	2	23	9,47
33.	<i>Tachyporus sp.</i>			1	2			3	1,24
34.	<i>Cantharis rustica</i>	2				1	1	4	1,65
35.	<i>Dolichosoma lineare</i>				2			2	0,83
36.	<i>Coccinella 7-punctata</i>	1	1	3	1	1		7	2,88
37.	<i>Adonia variegata</i>		1	1			1	3	1,24
38.	<i>Propylea 14-punctata</i>	1	1	1	1			4	1,65
	TOTAL INSECTS	23	28	37	59	66	30	243	

Regarding at Coccinellides, only three species have been identified in the rye culture in this area: *Coccinella 7-punctata*, *Adonia variegata* and *Propylea 14-punctata*.

Regarding to the dynamics of the useful entomofauna, the important groups of entomophages were already present in the culture in the middle of April, (first survey), maximum of activity, in the case of the species *Aeolothrips intermedius* it has been registered since the first half of May to the first half of June, in the case of Hymenoptera, the highest number of individuals were registered from the second half of May until the end of June, in the case of Coleoptera from the second half of the month May more until the first half of June (Table 1).

Regarding the efficiency of predators *Chrysopa carnea*, *Cantharis rustica*, *Tachyporus sp.*, *Coccinella 7-punctata*, *Propylea 14-punctata*, Nabidae și Syrphidae, based on the data provided by Malschi and Mustea (1999)(6), regarding the daily ration of prey, in the case of the rye culture analyzed by us, the number of individuals of these species of predators registered in this culture, in one place, reduced the number of aphids daily (*Sitobion avenae* and *Schizaphis graminum*) by 2,090 individuals. The number of individuals *Cantharis rustica*, *Chrysopa carnea* and Sirfidae registered in the investigated culture, in one place, destroyed 250 numbers of Tizanopteras daily (Table 2).

No.	Predators	Af destroyed/daily/ of 1specimen pr (nr) (1)	Tr destroyed/daily/ of 1specimen pr (nr) (1)	Nr predatory	Af destroyed	Tr destroyed
1	Nabide	60	-	14	840	-
2	<i>Chrysopa carnea</i>	30	10	3	90	30
3	Sirfidae	25	10	16	400	160
4	<i>Cantharis sp.</i>	40	15	4	160	60
5	<i>Tachyporus sp.</i>	30	-	3	90	-
6	<i>Coccinella 7-punctata</i>	50	-	7	350	-
7	<i>Propylea 14-punctata</i>	40	-	4	160	-

Table 2 - Number of adult aphids and tripods destroyed daily by predators in the rye culture in the locality Horodnic de Jos, Suceava county, in 2014

(1) – after D. Malschi and D. Mustea, 1999; Af – afids; pr – predators; expl - specimen; Tr – tripes

Conclusions

1. From the investigated rye culture, 243 specimens of useful insects were collected and analyzed, 38 taxa were identified, which belonged to the orders Hemiptera-Subordinul Heteroptera, Thysanoptera, Neuroptera, Diptera, Hymenoptera and Coleoptera. Dominant were Hymenopters, followed by the Orders Thysanoptera and Diptera.

2. The predatory entomofauna was represented by the taxa: *Orius niger*, Nabidae, *Aeolothrips intermedius*, *Chrysopa carnea*, *Tachyporus sp.*, *Cantharis rustica*, *Dolichosoma*

lineare, *Coccinella 7-punctata*, *Adonia variegata*, *Propylea 14-punctata*, Syrphidae, Anthomyiidae, Sarcophagidae, Dolicipodidae, Sciomyzidae and Formicidae. Most individuals belonged to the species *Aeolothrips intermedius*

3. The parasitic entomofauna was represented by: Ichneumonidae, Braconidae, *Tryoxis brevicornis*, Cynipidae, *Mesopolobus sp.*, *Pachyneuron sp.*, *Callitula sp.*, *Asaphes sp.*, *Polynema sp.*, *Pteromalinae*, Encyrtidae, Eulophidae, Diapriidae, Scelionidae, *Trissolcus sp.*, *Telenomus sp.*, Scelionidae, Platygastriidae, *Inostemma sp.*,

Synopeas sp., Ceraphronidae and Megaspilidae. Abundance with the highest value presented it Eulophids.

4. Maximum of activity of this ecological category of insects was recorded in May-June, varying as period and duration from one group of insects to another.

5. Regarding the efficiency of predators, all the individuals of *Chrysopa carnea*, *Cantharis rustica*, *Tachyporus* sp., *Coccinella 7 – punctata*, *Propylea 14 – punctata*, Nabidae and Syrphidae, in one place, reduced the daily number of aphids with 2,090 individuals. The number of individuals of *Cantharis rustica*, *Chrysopa carnea* and Sirfidae destroyed 250 individuals of Tripes daily.

Rezumat

S-au colectat și analizat 243 exemplare de insecte utile și s-au identificat 38 de taxoni, din ordinele: Hemiptera-Subordinul Heteroptera, Thysanoptera, Neuroptera, Diptera, Hymenoptera și Coleoptera. Entomofauna prădătoare a fost reprezentată de: *Orius niger*, Nabidae, *Aeolothrips intermedius*, *Chrysopa carnea*, *Tachyporus* sp., *Cantharis rustica*, *Dolichosoma lineare*, *Coccinella 7- punctata*, *Adonia variegata*, *Propylea 14 – punctata*, Syrphidae, Anthomyiidae, Sarcophagidae, Dolicopodidae, Sciomyzidae și Formicidae, iar cea parazitoidă de: Ichneumonidae, Braconidae, *Tryoxis brevicornis*, Cynipidae, *Mesopolobus* sp., *Pachyneuron* sp., *Callitula* sp., *Asaphes* sp., *Polynema* sp, *Pteromalinae*, Encyrtidae, Eulophidae, Diapriidae, Scelionidae, *Trissolcus* sp., *Telenomus* sp., Scelionidae, Platygastriidae, *Inostemma* sp., *Synopeas* sp., Ceraphronidae și Megaspilidae.

Maximum de activitate s-a constatat, în general, în mai-iunie, variind ca perioadă și durată de la un grup de insecte la altul.

În ce privește eficiența prădătorilor *Chrysopa carnea*, *Cantharis rustica*, *Tachyporus* sp., *Coccinella 7 – punctata*, *Propylea 14 – punctata*, Nabidae și Syrphidae, toți indivizii la un loc, au redus zilnic efectivele de afide cu 2090 de exemplare, iar indivizii de *Cantharis rustica*, *Chrysopa carnea* și Sirfide, la un loc, au distrus zilnic 250 de exemplare de Tizanoptere.

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