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THE STRUCTURE AND ABUNDANCE OF INVERTEBRATE FAUNA IN WHEAT CROP

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Abstract
The observations were made in 2015 in wheat crops in three variants:
• V 1 - untreated wheat consumption
• V2 - treated wheat for consumption
•V 3 - treated wheat seed
The material was harvested using Barber soil traps, in which was placed a solution of NaCl in a concentration of 8-10%.
The harvesting of the all 15 traps for each variant was done at the following dates: 17.05, 29.05, 13.06 and 27.06.
There were collected a number of 103 coleoptera species with 2360 specimens, the colembolas species with a total of 1732 specimens, 736 specimens of arachnids, 660 specimens of himenoptera, 282 specimens of aphids, 208 specimensof diptera, 55 specimens of orthoptera, 24 specimen of heteroptera , 7 specimen of mites, dermaptera with one copy.

Keywords: coleopteran, invertebrates, variants, wheat.

1. INTRODUCTION

In the present context, in our country there is a special emphasis on the development of agriculture, which implies getting production as big as possible but qualitatively at a lower production cost.
According to the FAO 2014, crop-related crops and crops losses amount to about 35% of world production, and therefore more rigorous. The plant protection measures are required, even to the extent that the productive potential of agricultural plants The base would remain stationary.
Even in these conditions, in Romania, with all the protective measures taken against the pests, the damages produced by them are very high.

2. MATERIALS AND METHODS

Vrancea is a county of Romania with an area of 4.863 km² and the residence is the municipality of Focsani.
The agricultural lands of Vrancea County lie on the strip between the right bank of the Siret and the foothills of the sub-Carpathian hills of the Vrancea Mountains.
The observations were made in Tisita stationary from Vrancea County, from May to the end of July when the wheat was harvested and the coleopterans were collected using Barber soil traps, in which a solution of NaCl in a concentration of 8-10% was placed.

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The sampling was done at 12 days for the three variants at the following dates: 17.05, 29.05, 13.06, and 27.06.
The collected material was labeled with the date of collection, the trap number and the experimental variant, and was then washed from the vegetal debris.
A number of 15 traps were installed, in 3 variants, 5 each for each variant:
• Variant 1 - Untreated consumption wheat,
• Variant 2 - Treated consumption wheat,
• Variant 3 - Treated seed wheat.
As a methodological and theoretical-scientific support for the investigations carried out, they served the fundamental works and research of the specialist authors (Reitter, 1916; Zubovschi, 1917; Panin, 1951).

3. RESULTS AND DISCUSSIONS

Following the determinations, the 3 variants resulted in a total of 2360 specimens of invertebrates, and the situation is as follows (table 1):
- at Variant 1 a number of 654 specimens belonging to 57 species were harvested;
- a number of 698 specimens belonging to 47 species were harvested at Variant 2;
- at Variant 3 a number of 1008 specimens belonging to 64 species were harvested.

Table 1. The structure and abundance entomofauna gathered belonging to Ord. Coleoptera

No.	The scientific name		Variant			Total
			1	2	3	
1.	*Conosoma bipunctata*	Predatory	11	4	264	**279**
2.	*Pterostichus marginalis*	Predatory	3	3	259	**265**
3.	*Drasterius bimaculatus*	Predatory	115	31	-	**146**
4.	*Dermestes laniarius*	Predatory	28	19	60	**107**
5.	*Formicomus pedestris*	Predatory	41	22	37	**100**
6.	*Colodera nigrita*	Predatory	10	28	15	**53**
7.	*Harpalus distinguendus*	Predatory	16	10	7	**33**
8.	*Coccinella 7 punctata*	Predatory	12	5	1	**18**
9.	*Tachyporus ruficolis*	Predatory	3	-	15	**18**
10.	*Ityocara rubens*	Predatory	1	-	12	**13**
11.	*Microletes maurus*	Predatory	-	7	5	**12**
12.	*Metabletus truncatelus*	Predatory	5	5	-	**10**
13.	*Hypnoidus pulchellus*	Predatory	4	5	1	**10**
14.	*Idiochroma dorsalis*	Predatory	1	-	8	**9**
15.	*Oxyporus rufus*	Predatory	9	-	-	**9**
16.	*Amara aenea*	Predatory	1	4	2	**7**
17.	*Pseudophonus rufipes*	Predatory	6	-	-	**6**
18.	*Corticaria longicornis*	Predatory	3	-	3	**6**
19.	*Harpalus tardus*	Predatory	4	2	-	**6**
20.	*Brachynus explodens*	Predatory	-	-	6	**6**
21.	*Cartodere ruficollis*	Predatory	-	-	6	**6**
22.	*Ophonus sabulicola*	Predatory	-	-	4	**4**
23.	*Pterostichus lepidus*	Predatory	3	-	-	**3**
24.	*Anisodactylus binotatus*	Predatory	-	-	3	**3**
25.	*Harpalus smaragninus*	Predatory	-	-	3	**3**

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26.	*Amara eurynota*	Predatory	-	-	3	**3**
27.	*Pterostichus aterrimus var. niger*	Predatory	1	1	-	**2**
28.	*Coccinulla quatuordecimpustulata*	Predatory	2	-	-	**2**
29.	*Pterostichus cupreus*	Predatory	-	1	1	**2**
30.	*Cantharis fusca*	Predatory	-	-	2	**2**
31.	*Calathus fuscipes*	Predatory	-	-	2	**2**
32.	*Calosoma inquisitor*	Predatory	1	-	-	**1**
33.	*Callistus lunatus*	Predatory	1	-	-	**1**
34.	*Broscus cephalotes*	Predatory	1	-	-	**1**
35.	*Coccinella spp.*	Predatory	1	-	-	**1**
36.	*Staphylinus caesareus*	Predatory	-	1	-	**1**
37.	*Calathus rufipes*	Predatory	-	1	-	**1**
38.	*Ophonus azureus*	Predatory	-	-	1	**1**
39.	*Bidessus geminus*	Predatory	-	-	1	**1**
40.	*Hister quadrimaculatus*	Predatory	-	-	1	**1**
41.	*Harpalus cupreus*	Predatory	-	-	1	**1**
42.	*Tachyusa constricta*	Predatory	-	-	1	**1**
43.	*Metabletus foveatus*	Predatory	-	-	1	**1**
44.	*Harpalus spp.*	Predatory	-	-	1	**1**
Total predatory species			**283**	**149**	**726**	**1158**
1.	*Epicometis hirta*	Phytophagus	58	111	18	**187**
2.	*Opatrum sabulosum*	Phytophagus	73	70	36	**179**
3.	*Phyllotreta nemorum*	Phytophagus	21	108	6	**135**
4.	*Pentodon idiota*	Phytophagus	33	40	18	**91**
5.	*Tanymecus dilaticollis*	Phytophagus	20	15	9	**44**
6.	*Agriotes lineatus*	Phytophagus	11	9	12	**32**
7.	*Pedinus femoralis*	Phytophagus	23	6	-	**29**
8.	*Pleurophorus caesus*	Phytophagus	4	8	14	**26**
9.	*Phyllotreta atra*	Phytophagus	-	17	5	**22**
10.	*Phyllotreta nodicornis*	Phytophagus	-	17	5	**22**
11.	*Silpha obscura*	Phytophagus	-	1	12	**13**
12.	*Aphthona euphorbia*	Phytophagus	10	-	2	**12**
13.	*Otiorrhynchus laevigatus*	Phytophagus	6	2	1	**9**
14.	*Orchestes fagi*	Phytophagus	7	-	-	**7**
15.	*Pseudocleonus cinereus*	Phytophagus	2	3	-	**5**
16.	*Anobium punctatum*	Phytophagus	-	5	-	**5**
17.	*Tanymecus palliatus*	Phytophagus	-	-	5	**5**
18.	*Ceuthorrhynchus punctiger*	Phytophagus	2	-	-	**2**
19.	*Cassida nobilis*	Phytophagus	2	-	-	**2**
20.	*Otiorrhynchus singularis*	Phytophagus	2	-	-	**2**
21.	*Zabrus blapoides*	Phytophagus	1	1	-	**2**
22.	*Curculionide*	Phytophagus	1	-	-	**1**
23.	*Anisoplia segetum*	Phytophagus	1	-	-	**1**
24.	*Oulema melanopa*	Phytophagus	-	1	-	**1**
25.	*Cerylon ferrungineum*	Phytophagus	-	-	1	**1**
26.	*Melanotus brunnipes*	Phytophagus	-	-	1	**1**
27.	*Zabrus tenebrioides*	Phytophagus	-	-	1	**1**

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Total phytophagus species			**277**	**414**	**146**	**837**
1.	*Anthicus antherinus*	Indifferent species	13	57	13	**83**
2.	*Pteryngium crenatum*	Indifferent species	8	9	62	**79**
3.	*Anthicus floralis*	Indifferent species	5	5	31	**41**
4.	*Cryptophagus dentatus*	Indifferent species	21	-	-	**21**
5.	*Anthicus humeralis*	Indifferent species	13	-	4	**17**
6.	*Anthicus gracilis*	Indifferent species	11	-	-	**11**
7.	*Cercyon lateralis*	Indifferent species	-	-	7	**7**
8.	*Anthicus humilis*	Indifferent species	6	-	-	**6**
9.	*Blaps mortisaga*	Indifferent species	2	1	1	**4**
10.	*Emphilus glaber*	Indifferent species	1	1	2	**4**
11.	*Cetonia aurata*	Indifferent species	2	-	1	**3**
12.	*Stomodes gyrosicollis*	Indifferent species	-	3	-	**3**
13.	*Paramecosoma melanocephalum*	Indifferent species	-	-	3	**3**
14.	*Aphodius fimetarius*	Indifferent species	-	2	-	**2**
15.	*Anthicus quadriguttatus*	Indifferent species	-	-	2	**2**
16.	*Paradons quadrisignatus*	Indifferent species	-	-	2	**2**
17.	*Necrophorus antennatus*	Indifferent species	1	-	-	**1**
18.	*Crypticus quisquilius*	Indifferent species	1	-	-	**1**
19.	*Onthophagus taurus*	Indifferent species	-	1	-	**1**
20.	*Astenus filiformis*	Indifferent species	-	1	-	**1**
21.	*Mycetophagus populii*	Indifferent species	-	1	-	**1**
22.	*Psammobius porcicollis*	Indifferent species	-	1	-	**1**
23.	*Atomaria fuscicollis*	Indifferent species	-	-	1	**1**
24.	*Scirtes hemisphaericus*	Indifferent species	-	-	1	**1**
25.	*Selatosomus latus*	Indifferent species	-	-	1	**1**
26.	*Cryptophagus dorsalis*	Indifferent species	-	-	1	**1**
27.	*Paederus limnophilus*	Indifferent species	-	-	1	**1**
Total indifferent species			**84**	**82**	**133**	**299**
TOTAL SAMPLES			**644**	**645**	**1005**	**2294**

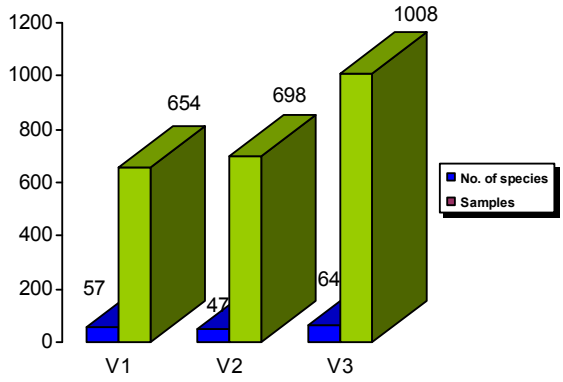

Figure 1. Number of samples and number of species collected in three variants

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Within the three variants during the research period, the Coleoptera species were collected, which numbered 98 species with a number of 2294 specimens. All these species of Coleoptera that have been identified in fields cultivated with wheat were organized into three large groups, namely:

- the predatory insect group
- the group of phytophagous insect
- the group of indifferent insects (this group includes the Coleoptera species that do not belong to the predatory insect group, but neither in the group of the phytophagus insect can be classified because it does not cause significant damage that impose the application of chemical treatments).

Following the determinations made and the inventory of the species of Coleoptera, we included a number of 44 species with a total of 1158 specimens representing 50.48% in the predatory coleoptera group. In the group of insects with phytophagus diet, a number of 27 species was included in a total number of 837 specimens, representing 36.48% of the total number of Coleoptera, and in the group of the indifferent insects, number of 27 species with a total of 299 specimens.

Table 2. The structure of invertebrates Entomofauna in 2015

First variant		
No. crt	**The Order**	**Total**
1.	Colembola	1445
2.	Arahnida	224
3.	Himenoptera	193
4.	Homoptera	224
5.	Diptera	42
6.	Orthoptera	14
7.	Heteroptera	8
TOTAL V1		**2150**
Second variant		
1.	Colembola	219
2.	Arahnida	310
3.	Himenoptera	238
4.	Homoptera	35
5.	Diptera	97
6.	Orthoptera	23
7.	Heteroptera	9
8.	Acari	4
TOTAL V2		**935**
Third variant		
1.	Colembola	68
2.	Arahnida	202
3.	Himenoptera	229
4.	Homoptera	23
5.	Diptera	69
6.	Orthoptera	18
7.	Heteroptera	7
8.	Acari	3
9.	Dermaptera	1
TOTAL V3		**620**
TOTAL		**3705**

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The whole report shows that both the number of species and the percentage representing the number of useful species is higher than that of the harmful species or the indifferent species.
From the study of the composition of order of wheat entomofauna, in 2015, the predominance of Colemboles, Arachnids and Hymenoptera is found.

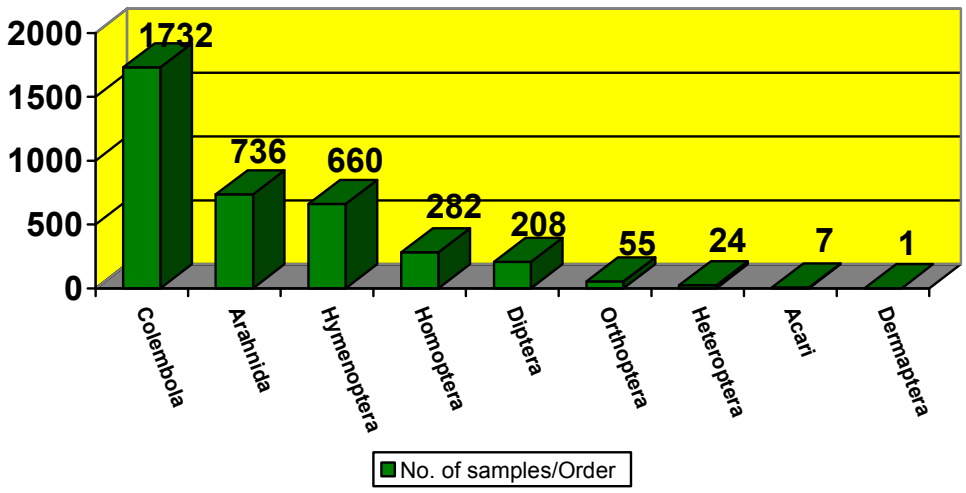

Figure 2. ***Structue of the invertebrates entomofauna in 2015***

In figure 2 shows clearly that the orders collembola, arachnids, hymenoptera, homoptera has the largest share.
The most representative invertebrates determined in the three variants of the wheat culture in the Tisita area, Vrancea county were: *Conosoma bipunctata* with 279 specimens, *Pterostichus marginalis* with 265 specimens, *Epicometis hirta* with 187 specimens, *Opatrum sabulosum* with 179 *Drasterius bimaculatus* with 146 specimens, *Phyllotreta nemorum* with 135 specimens, *Dermestes laniarius* with 107 specimens, *Formicomus pedestris* with 100 specimens.

4. CONCLUSIONS

1. Following the collection of samples from the 15 traps, the specimens collected from 98 species of Coleoptera, in total of 2294 specimens, 1732 specimens of Colembola, 736 specimens of Arachnida, 660 specimens of Hymenoptera, 282 specimens of Homoptera , 208 specimens of Diptera, 55 specimens of Orthoptera, 24 specimens of Heteroptera, 7specimens of Acari and one single sample of Dermaptera.
2. Following the determinations, of the 5999 specimens of invertebrates, a total of 654 specimens belonging to 57 species were harvested at V1, a number of 698 specimens belonging to 47 species were harvested at V2; A number of 1008 specimens belonging to 64 species were harvested.
3. From the study of the composition of the order of the wheat entomofauna, in 2015, the predominance of *Colembola*, *Arachnida* and *Hymenoptera* is found.
The *Colembola*, *Arachnida*, *Himenoptera* and *Homoptera* order have the highest weight, and the most representative invertebrates in the three variants were: *Conosoma bipunctata* with 279

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