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DIVERSITY OF IDENTIFIED BEETLES SPECIES IN WHEAT CROPS AND THE SPECTRUM OF THEIR FOOD

KEYWORDS: diversity, beetles, wheat, useful fauna, harmful fauna.

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ABSTRACT The observations were made in a wheat crop, located in the Galati county of Romania. For collection has been used soil traps type Barber. The Coleopterans gathered in this way have been identified, then grouped by species, families and depending on the range of food. Observations were made using three variants: Wheat for consumption without treatment (V1), Wheat consumption with treatment of seed and in the field (V2), Wheat seed treatments applied to the seed and in the field and with increased doses of fertilizers (V3). In total, were collected beetles belonging to 96 species, totaling 2295 samples.The collected beetles are as follows: Unharmful species in the number of 39, totaling 747 samples of beetles; The 29 harmful species, totaling 850 samples of beetles; Useful species number 28, with a total of 698 samples.

Introduction

The total number of species of the animal that populate the earth, the insects rests with about 70%. Every year specialists and entomologists describe discovers hundreds and thousands of new species, and according to the latest literature in the world are about 2 million known species of insects.

Having great ecological plasticity, beetles are found in all ecosystems - from the polar regions to the equatorial forests. They are common in almost all types of habitats, feeding on any kind of food. Numerically, beetles are superior to other groups of insects, being in most ecosystems over 80% of all existing species of insects.

The Coleopterans performs different useful functions for humans, are good indicators can serve as one of the main objects in solving the cadastre and on Integrated Ecological Monitoring (Elena Baban) [1] .

In this paper are presented the species of beetles found in a wheat crop in eastern area of the Romania, in Galati County, the coleoptera fauna of this area remains weak studied so far.

Material and methods

The data in this study were obtained after the observations made in 2016 in a crop of wheat located in Galati city.

Galati city is located in the south of Moldova, Siret Valley, crossed the Danube. It is located in the eastern part of Romania, Moldova southern edge of the plateau at 45 ° 27 'north latitude and 28 ° 02' east longitude. Located on the north bank of the Danube, it covers an area of 246.4 km2 at the confluence of Siret (west) and Prut (east), Lake Brateş, about. 80 kilometers from the Black Sea. The nearest town is Braila, just 15 kilometers south.

Galati County is under the influence of continental air masses eastern and southern least, lacking almost entirely the influence of western air is stopped firewall Carpathians. The average of temperature in summer is 21.3°C. In winter, over the county Galați come from the north and northeast producing cold air decreases temperature between 0.2°C and -3°C. Distribution annual rainfall is uneven, the largest quantities of water fall in summer season, in the form of showers.

The observations were made in October after the plants have emerged to the end of July when the wheat was harvested, the captured beetles were collected from soil traps type Barber.

Totally they were installed a total of 15 traps in three variants, each 5 for each variant:

- Wheat for consumption without treatment, V1
- Wheat consumption with treatment of the seed and in the field, V2
- Wheat seed treatments applied to the seed and in the field and with increased doses of fertilizers, V3

Sampling has been made every 15 days, when the material has been placed on traps in gauze, noting each sample as follows:

- the date of collection;
- the number of traps (1 to 5);
- the experimental variant.

The material such labeled we were brought into the lab, it was then cleaned of all debris plant, and then the collected materials were selected only the species of beetles.

As support for methodological and theoretical the investigations carried out, have served fundamental research works and authors: E. Csiki [2],[3], and S. Panin, N. Savulescu [11], and A. Matalin, Z. Neculiseanu [7], M. Tălmaciu et al. [13,14,15,16,], M. Varvara [17].

The data from methodological working papers of E. Miller and N. Zubovschi [6], M. Ienistea [4] ,S. Panin [9], N. Savulescu [11], E. Reitter [12], P. Gîdei [8], I. Stefan and Elena Iulia Iorgu Pisică[5], have been used by us to collect, determination, inventory and classification of existing beetles.

For research which relates the structure, dynamics and other aspects of species of beetles have been used M.Varvara[17] authors' works, I. Stefan and Elena Iulia Iorgu Pisică[5], M.Tălmaciu et al [13,14,15,16,].

Results and discution

They were collected in total 2295 specimens belonging to 96 species of beetles from the 3 experimental variations.
On the variants, situation is as follows:

- The version V1, a number of copies 643;
- The version V2, the number of copies 646;

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- The variant V3, a number of copies 1006.

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The largest number of specimens collected there the species: Conosoma bipunctata Kraatz. 279 specimens, Pterostichus marginalis Dejean with 265 specimens, Epicometis hirta Poda with 187 pieces, Opatrum sabulosum L.cu 179 specimens, Drasterius bimaculatus Rossi with 146 specimens, Formicomus pedestris Rossi with 100 specimens. (Table 1)

Table 1 The structure and abundance of species existing in wheat area Galati

Nr. crt.	The scientific name	Variant			Total
		1	2	3	
1.	Conosoma bipunctata Kraatz.	11	4	264	**279**
2.	Pterostichus marginalis Dejean	3	3	259	**265**
3.	Epicometis hirta Poda	58	111	18	**187**
4.	Opatrum sabulosum L.	73	70	36	**179**
5.	Drasterius bimaculatus Rossi	115	31	-	**146**
6.	Phyllotreta nemorum L.	21	108	6	**135**
7.	Dermestes laniarius L.	28	19	60	**107**
8.	Formicomus pedestris Rossi	41	22	37	**100**
9.	Pentodon idiota Hbst	33	40	18	**91**
10.	Anthicus antherinus L.	13	57	13	**83**
11.	Pteryngium crenatum Fabricius	8	9	62	**79**
12.	Colodera nigrita Mnnh.	10	28	15	**53**
13.	Tanymecus dilaticollis Gyll.	20	15	9	**44**
14.	Anthicus floralis L.	5	5	31	**41**
15.	Harpalus distinguendus Duft	16	10	7	**33**
16.	Agriotes lineatus L.	11	9	12	**32**
17.	Pedinus femoralis L.	23	6	-	**29**
18.	Pleurophorus caesus Panz.	4	8	14	**26**
19.	Phyllotreta nodicornis Marsh.	-	17	5	**22**
20.	Phyllotreta atra Fabricius	-	17	5	**22**
21.	Cryptophagus dentatus Herbst	21	-	-	**21**
22.	Tachyporus ruficolis Gravenhorst	3	-	15	**18**
23.	Coccinella 7 punctata L.	12	5	1	**18**
24.	Anthicus humeralis Gebler	13	-	4	**17**
25.	Silpha obscura L.	-	1	12	**13**
26.	Ityocara rubens Erichson	1	-	12	**13**
27.	Microletes maurus Sturm. Sturm	-	7	5	**12**
28.	Aphthona euphorbia Schrank	10	-	2	**12**
29.	Anthicus gracilis Panz.	11	-	-	**11**
30.	Metabletus truncatelus L.	5	5	-	**10**
31.	Hypnoidus pulchellus L.	4	5	1	**10**
32.	Oxyporus rufus L.	9	-	-	**9**
33.	Otiorrhynchus laevigatus Fabricius	6	2	1	**9**
34.	Idiochroma dorsalis Pontopp.	1	-	8	**9**
35.	Orchestes fagi L.	7	-	-	**7**
36.	Cercyon lateralis Marsh.	-	-	7	**7**
37.	Amara aenea Dejean	1	4	2	**7**
38.	Pseudophonus rufipes De Geer	6	-	-	**6**
39.	Harpalus tardus Panzer	4	2	-	**6**
40.	Corticaria longicornis Herbst	3	-	3	**6**
41.	Cartodere ruficollis Marsh	-	-	6	**6**
42.	Brachynus explodens Duft	-	-	6	**6**
43.	Anthicus humilis Germ.	6	-	-	**6**
44.	Tanymecus palliatus F.	-	-	5	**5**
45.	Pseudocleonus cinereus Schrank	2	3	-	**5**
46.	Anobium punctatum Deg	-	5	-	**5**
47.	Ophonus sabulicola Panz.	-	-	4	**4**
48.	Emphilus glaber Gyll	1	1	2	**4**
49.	Blaps mortisaga L.	2	1	1	**4**
50.	Stomodes gyrosicollis Boheman	-	3	-	**3**
51.	Pterostichus lepidus Leske	3	-	-	**3**
52.	Paramecosoma melanocephalum Hrbst	-	-	3	**3**
53.	Harpalus smaragninus Duft	-	-	3	**3**
54.	Cetonia aurata L.	2	-	1	**3**
55.	Calathus fuscipes Goeze	-	1	2	**3**
56.	Anisodactylus binotatus F.	-	-	3	**3**
57.	Amara eurynota Panz.	-	-	3	**3**
58.	Zabrus blapoides Sturrn.	1	1	-	**2**
59.	Sipalia circularis Grav. Maulwurf	-	1	1	**2**
60.	Pterostichus cupreus L.	-	1	1	**2**
61.	Pterostichus aterrimus var. niger Herbst	1	1	-	**2**
62.	Parabens quadrisignatus L.	-	-	2	**2**
63.	Otiorrhynchus singularis Germar	2	-	-	**2**
64.	Coccinulla quatuorde cimpustulata sinensis Wse	2	-	-	**2**
65.	Ceuthorrhynchus punctiger Gyll	2	-	-	**2**
66.	Cassida nobilis L.	2	-	-	**2**
67.	Cantharis fusca L.	-	-	2	**2**
68.	Aphodius fimetarius L.	-	2	-	**2**
69.	Anthicus quadriguttatus Haldeman	-	-	2	**2**
70.	Zabrus tenebrioides Goeze.	-	-	1	**1**
71.	Tachyusa constricta Erichson	-	-	1	**1**
72.	Staphylinus caesareus Cederhjelm	-	1	-	**1**
73.	Selatosomus latus F.	-	-	1	**1**
74.	Scirtes hemisphaericus L.	-	-	1	**1**
75.	Psammobius porcicollis Illiger	-	1	-	**1**
76.	Paederus limnophilus Erichson	-	-	1	**1**
77.	Oulema melanopa L.	-	1	-	**1**
78.	Ophonus azureus F.	-	-	1	**1**
79.	Onthophagus taurus Scrib	-	1	-	**1**
80.	Necrophorus antennatus Reitter	1	-	-	**1**
81.	Mycetophagus populii F.	-	1	-	**1**
82.	Metabletus foveatus Fourc.	-	-	1	**1**
83.	Melanotus brunnipes Germ	-	-	1	**1**
84.	Hister quadrimaculatus Illiger	-	-	1	**1**
85.	Harpalus cupreus Dejean	-	-	2	**2**
86.	Cypticus quisquilius L.	1	-	-	**1**
87.	Cryptophagus dorsalis Sahlberg	-	-	1	**1**
88.	Coccinella 5 punctata L.	1	-	-	**1**
89.	Cerylon ferrungineum Steph.	-	-	1	**1**
90.	Calosoma inquisitor L.	1	-	-	**1**
91.	Callistus lunatus F.	1	-	-	**1**
92.	Broscus cephalotes L.	1	-	-	**1**
93.	Bidessus geminus F.	-	-	1	**1**
94.	Atomaria fuscicollis Mrsh.	-	-	1	**1**
95.	Astenus filiformis Latreille	-	1	-	**1**
96.	Anisoplia segetum Herbst	1	-	-	**1**
TOTAL		643	646	1006	2295

Regarding the families belonging to the species collected, all specimens were collected belonging to 20 families.

The families best represented as the number of copies were the family Carabidae 387 specimens, representing 16.86%, Staphylinidae family with 381 specimens, representing 16.60% Scarabidae family with 311 specimens, representing 13.55% Anthicidae family 260 specimens, representing 11.31%, with 212 copies Tenebrioidae family, representing 9.23% Elateridae family with 190 specimens, representing 8.27% Cryptophagidae family with 109 specimens, representing 4.74%, with 107 family Dermatidae specimens representing 4.66%.

As the number of collected species, the situation for families is as follows:

- Carabidae family with a total of 25 species (Table 2).
- Staphylinidae families with a total of 12 species .

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- Curculionidae family, with many Anthicidae Scarabeidae and 7 species.
- Cryptophagidae family with 6 species.
- Elateridae families and Crysomelidae by 5 species.
- Coccinellidae family and Tenebrioidae with 3 species.
- Hydrophilidae family with 2 species.
- Families Dermestidae, Silphidae, Anobiidae, Mycetophagidae, Dytiscidae, Histeridae, Cantharidae, Scirtidae and Lathridiidae by 1 species.

Table 2 The structure and abundance of species in the Carabidae family

Nr crt	The scientific name	Variant			TOTAL
		1	2	3	
1.	Pterostichus marginalis Dejean	3	3	259	**265**
2.	Harpalus distinguendus Duft	16	10	7	**33**
3.	Microletes maurus Sturm.	-	7	5	**12**
4.	Metabletus truncatelus L.	5	5	-	**10**
5.	Idiochroma dorsalis Pontopp.	1	-	8	**9**
6.	Amara aenea Dejean	1	4	2	**7**
7.	Pseudophonus rufipes De Geer	6	-	-	**6**
8.	Harpalus tardus Panzer	4	2	-	**6**
9.	Brachynus explodens Duft	-	-	6	**6**
10.	Ophonus sabulicola Panz.	-	-	4	**4**
11.	Pterostichus lepidus Leske	3	-	-	**3**
12.	Anisodactylus binotatus F.	-	-	3	**3**
13.	Harpalus smaragninus Duft	-	-	3	**3**
14.	Amara eurynota Panz.	-	-	3	**3**
15.	Calathus fuscipes Goeze	-	1	2	**3**
16.	Pterostichus aterrimus var. niger Hrbst.	1	1	-	**2**
17.	Zabrus blapoides Sturrn.	1	1	-	**2**
18.	Pterostichus cupreus L.	-	1	1	**2**
19.	Calosoma inquisitor L.	1	-	-	**1**
20.	Callistus lunatus F.	1	-	-	**1**
21.	Broscus cephalotes L.	1	-	-	**1**
22.	Ophonus azureus F.	-	-	1	**1**
23.	Harpalus cupreus Dejean	-	-	2	**2**
24.	Metabletus foveatus Fourc.	-	-	1	**1**
25.	Zabrus tenebrioides Goeze.	-	-	1	**1**
TOTAL		44	35	308	**387**

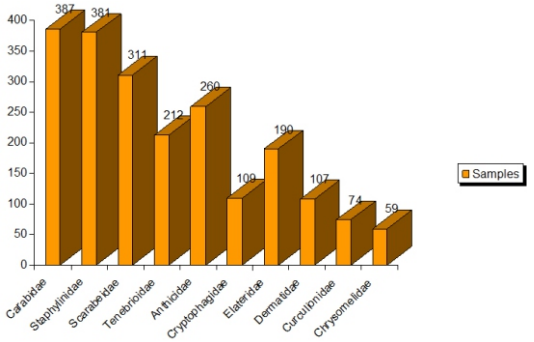

Fig. 1- Representation of the number of the collected specimens from the main families of beetles.

Depending on the food they consume the species coleoptera were grouped into 3 categories:

- Useful species are predators, feeding on insects and other invertebrates;
- Species cited in the literature as harmful to some crops;
- Species of beetles that do not cause damage to the crop, but having a system fitofagus of food.

From the analysis of the collected material in connection with the spectrum of the food, the situation is as follows :

- A number of 38 species with 747 samples of coleoptera species are referred to in the literature as being harmful, representing 32.54%, the most numerous were: Drasterius bimaculatus Rossi with 146 samples, Dermestes laniarius L. 107 samples, Formicomus pedestris Rossi with 100 samples, Anthicus antherinus L cu 83 samples.

- A number of 29 species of Coleoptera totaling 850 samples are cited in literature as harmful, representing 37.03%, most common were: Epicometis hirta Poda 187 samples, 179 samples of Opatrum sabulosum L., Phyllotreta nemorum 135 samples, Pentodon idiota Hbst. 91 samples.

- Useful species coleoptera belonging to a number of 28, with a total of 698 specimens, representing 30,41% of the total, most common were: Conosoma bipunctata Kraatz. 279 samples, Pterostichus marginalis Dejean. with 265 samples and Phyllotreta nemorum with 135 samples.

Conclusions

1. In total, at the 3 variants were collected from wheat Coleoptera belonging to a total of 96 species totaling 2295 copies; the variants situation is as follows:

- The version V1, a number of 643 samples;
- The version V2, the number of 646 samples;
- The variant V3, a number of 1006 samples.

2. The species of the gathered coleoptera belonging to 20 families. The families with the highest number of specimens and species gathered were: Carabidae, Staphylinidae, Curculionidae, Scarabaeidae, Anthicidae, Chrysomelidae, Tenebrionidae and Elateridae. A total of nine families were represented by a one species.

3. The highest number of samples they may have had following species: Conosoma bipunctata Kraatz. with 279 samples, Pterostichus marginalis Dejean with 265 samples, Epicometis hirta Poda with 187 samples, Opatrum sabulosum L. with 179 samples, Drasterius bimaculatus Rossi with 146 samples, Phyllotreta nemorum L. with 135 samples, Dermestes laniarius L. with 107 samples and Formicomus pedestris Rossi 100 samples.

4. As regards the the spectrum of food, the situation is as follows:
- A totaling number of 38, 747 samples coleoptera species are quoted in the literature as being harmful, representing 32.54%.

Among these the most numerous were Drasterius bimaculatus Rossi with 146 samples, Dermestes laniarius L with 107 samples, Formicomus pedestris Rossi with 100 samples, Anthicus antherinus L. with 83 samples and 79 samples belooning to Pteryngium crenatum Fabr..

- A number of 29 species of coleoptera totaling 850 samples are quoted in literature as harmful, representing 37.03%.

  The most common were: Epicometis hirta Poda with 187 samples, 179 samples beloning Opatrum sabulosum L., Phyllotreta nemorum L. with 135 samples, Pentodon idiota Hbst. With 91 samples and Tanymecus dilaticollis Gyll. With 44 samples.

- Useful species of Coleoptera belonging to a number of 28 species, with a total of 698 samples, representing 30,41% of the total.

The most common were: Conosoma bipunctata Kraatz. 279 samples, 265 samples belonging Pterostichus marginalis Dejean, Phyllotreta nemorum L., with 135 samples, Colodera nigra Mnnh. With 53

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samples and Tanymecus dilaticollis Gyll. with 18 copies.

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