

## OBSERVATIONS ON WHEAT CROPS ENTOMOFAUNA COLLECTED AT SOIL TRAPS TYPE BARBER

### OBSERVAȚII ASUPRA ENTOMOFAUNEI DIN CULTURILE DE GRÂU COLECTATĂ LA CAPCANELE DE SOL

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**Abstract** The increase grain production is possible through the application of technology that involves the use of varieties with high yield, soil fertilization to provision according to their requirements, full mechanization of work and measures to prevent and combat specific pests and weeds. Regarding pests of grain crops grasses, they can cause annual havoc 13.8% compared to 11.6% produced by pathogens and weeds due to 9.5%. This paper presents the research on the epigenous entomofauna of wheat crops in 2016, in Focșani area used the traps type Barber and collecting biological material was conducted from May to July. The collection of the biological material was performed periodically on the following dates: 23.05; 07.06; 23.06; 07.07 using 18 traps belonging to the three experimental variants: •Variant 1 - wheat after sunflower; • Variant 2 - wheat after wheat; • Variant 3 - wheat after rape. The most commonly species found in this period are following the order: Coleoptera, Hymenoptera, Orthoptera, Heteroptera, Diptera, Colembolla etc. They were collected in addition to insects, and species belonging to the Crustacea class with the Isopods order, and the Arachnida class with the Araneae order.

**Key words:** entomofauna, wheat , traps type Barber

**Rezumat:** Creșterea producției de cereale este posibilă prin aplicare unor tehnologii care presupune folosirea soiurilor cu mare capacitate de producție, fertilizarea corespunzătoare a solurilor în funcție de cerințele acestora, mecanizarea completă a lucrărilor și prin măsuri de prevenire și combatere a buruienilor și dăunătorilor specifici. În ceea ce privește dăunătorii din culturile de cereale graminee, aceștia pot produce pagube anuale de 13,8% față de 11,6% produse de către agenții patogeni și față de 9,5% datorită buruienilor. În lucrarea de față sunt prezentate cercetările asupra entomofaunei epigeice din culturile de grâu în anul 2016, din zona Focșani, cu ajutorul capcanelor de tip Barber, iar colectarea materialului biologic s-a realizat din luna mai până în luna iulie. Colectarea materialului biologic s-a realizat periodic la următoarele date: 23.05; 07.06; 23.06; 07.07 utilizând 18 capcane ce aparțin celor trei variante experimentale: •Varianta 1 – grâu după floarea soarelui , • Varianta 2 – grâu după grâu, • Varianta 3 – grâu după rapiță. Speciile cel mai frecvent întâlnite în această perioadă aparțin următoarelor ordine: Coleoptera, Hymenoptera, Orthoptera, Heteroptera, Diptera, Colembolla etc. Au mai fost

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*colectate în afară de insecte, și specii aparținând clasei Crustacea, ord. Izopoda, dar și clasei Arachnida, ord. Araneae.*

**Cuvinte cheie:** entomofauna, grâu, capcane de tip Barber

## INTRODUCTION

Regardless of the agricultural production potential agricultural losses caused by diseases, insects, nematodes and weeds are less than 30% in countries with developed agriculture (average loss of 35% is considered) (Perju and Ghizdavu, 2001). If crops or in a forest, great damage is caused by a wide range of pests, which often are not specific to a single plant or plant families, and species that are found particularly in an ecosystem, which actually produce great damage (Antonescu *et al*, 2012). We must also remember that a number of pests, consider hunger, even if not all species of farm attacks, are common and cause damage of economic importance to a large number of crops.

## MATERIAL AND METHOD

To collect material were used Barber soil traps. They were placed in wheat area from Tișița in Vrancea country, 6 traps in each variant, namely:

- Untreated wheat for consumption during the growing season, only seed;
- Wheat for consumption on treatments that were applied during the growing season against pathogens and pests;
- Wheat seed which was applied technology to do so.

The traps were placed in two rows, 3 each in turn to the distance between them between 6 and 8 m and between two rows distance of about 10 m. To capture the species collected using a solution of formalin into the item concentration of 4 -5 %. Traps have worked from May until late June (Tălmăciu *et al*, 2007). The harvesting collected material was done at intervals of between 10 and 20 days during 2016. At each harvest species collected from each arm and traps were placed in gauze, previously eliminating crop residues or soil particles other impurities. Such evidence is in this way was then labeled, the label specifying:

- Date of collection;
- Variant;
- Trap number.

The material was then brought to the laboratory after being washed under running water species has been identified or counted specimens collected per trap, the variants and species.

The determination was made using the German Identification Manual (Reitter, 1908), another manual for identification (Panin, 1951; Manolache *et al*, 1982), and another source for the internet to compare different species pictures.

## RESULTS AND DISCUSSIONS

In total, the 3 variants were collected 5694 specimens belonging to 115 species (taxa). On variants situation is as follows (tab. 1, fig. 1):

- The consumption of untreated wheat were collected copies 2656 belonging to a 69 species;

- Wheat consumption treated specimens were collected in 1534 in total, belonging to a number of 64 species (taxa);

- Wheat seed were collected in 1504 samples in total, belonging to a number of 76 species (taxa);

A total of 32 species collected were common in the 3 experimental variations. These include: *Pentodon idiota* Hbst, *Opatrum sabulosum* L., *Pseudocleonus cinereus*, *Diptere*, *Dermestes lanarius* L., *Arahnide*, *Phyllotreta nemorum*, *Epicometis hirta* Poda, *Agriotes lineatus* L., *Amara aenea* Dejean, *Himenoptere* (wasp), *Tanymecus dilaticollis* Gyll., *Formicomus pedestris* Rossi, *Pleurophorus caesus* Panz., *Pterostichus marginalis* Dejean, *Colembole*, *Himenoptere* (ants), *Gryllus campestris* Gyll., *Harpalus distinguendus* Duft, *Homoptere* (cycads), *Blaps mortisaga* L., *Conosoma bipunctata*, *Ortoptere* (locust), *Homoptere* (aphids), *Anthicus antherinus* L., *Heteroptere* (bedbugs), *Armadillidium vulgare* Latreille, *Coccinella 7 punctat*, *Anthicus floralis*, *Colodera nigrata* Mnnh., *Hypnoidus pulchellus* Linnaeus, *Pteryngium crenatum* Fabricius.

A number of 69 species were collected in one variant, they were: *Ceuthorrhynchus punctiger*, *Pseudophonus rufipes*, *Pterostichus lepidus*, *Cassida nobilis*, *Anthicus humilis*, *Cryptophagus dentatus*, *Orchestes fagi*, *Otiorrhynchus singularis*, *Calosoma inquisitor*, *Necrophorus antennatus*, *Callistus lunnatus*, *Anthicus gracilis*, *Eurygaster integriceps*, *Anisoplia segetum*, *Oxyporus rufus*, *Coccinella quatuordecimpustulata*, *Crypticus quisquilius*, *Broscus cephalotes*, *Coccinella 5 punctata*, *Onthophagus taurus*, *Stomodes gyrosicollis*, *Anobium punctatum* Deg., *Aphodius fimetarius*, *Staphylinus caesareus*, *Staphylinus caesareus*, *Calathus rufipes*, *Astenus filiformis*, *Mycetophagus populi*, *Cephus pygmaeus*, *Oulema melanopa* L., *Psammobius porcicollis* Illiger, *Chrysopa perla* L., *Anisodactylus binotatus* F., *Ophonus azureus*, *Harpalus smaragninus* Duft, *Paramecosoma melanocephalum* Hrbst, *Tanymecus palliatus* F., *Atomaria fuscicollis*, *Bidessus geminus* F., *Amara eurynota* Panz., *Hister quadrimaculatus* Illiger, *Brachynus explodens* Duft, *Ophonus sabulicola* Panz., *Harpalus cupreus* Dejean, *Cantharis fusca*, *Calathus fuscipes* Goeze, *Tachyusa constricta*, *Scirtes hemisphaericus* L., *Anthicus quadriguttatus* Haldeman, *Selatosomus latus* F., *Cercyon lateralis* Marsh., *Cryptophagus dorsalis* Sahlberg, *Cartodere ruficollis* Marsh, *Paederus limnophilus* Erichson, *Cerylon ferrungineum* Steph., *Paradons quadrisignatus*, *Melanotus brunnipes* Germ.

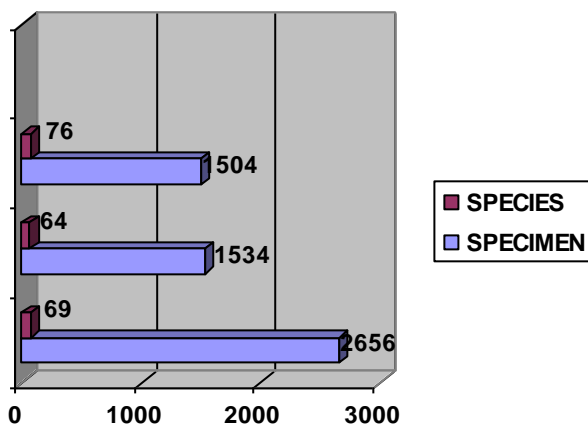
The structure and abundance of the collected entomofauna from the wheat crops

| No. | Name of species (taxa)                          | Variant                         |                   |                | Total |
|-----|---|---------------------------------|-------------------|----------------|-------|
|     |   | Untreated wheat for consumption | Wheat consumption | Wheat for seed |       |
| 1   | <i>Pentodon idiota</i>                          | 29                              | 35                | 9              | 73    |
| 2   | <i>Cetonia aurata</i>                           | 1                               | 1                 | -              | 2     |
| 3   | <i>Opatrum sabulosum</i>                        | 69                              | 47                | 27             | 143   |
| 4   | <i>Pseudocleonus cinereus</i>                   | 2                               | 4                 | 1              | 7     |
| 5   | Diptere   | 50                              | 88                | 53             | 191   |
| 6   | <i>Dermestes lanarius</i>                       | 32                              | 22                | 56             | 110   |
| 7   | <i>Ceutorhynchus punctiger</i>                  | 2                               | -                 |                | 2     |
| 8   | <i>Drasterius bimaculatus</i>                   | 115                             | 31                | -              | 146   |
| 9   | Arahnide  | 198                             | 287               | 150            | 635   |
| 10  | <i>Phyllotreta nemorum</i>                      | 21                              | 112               | 6              | 139   |
| 11  | <i>Epicometis hirta</i>                         | 78                              | 99                | 18             | 195   |
| 13  | <i>Agriotes lineatus</i>                        | 11                              | 9                 | 12             | 32    |
| 14  | Himenoptere (wasp)                              | 25                              | 25                | 13             | 63    |
| 15  | <i>Amara aenea</i>                              | 1                               | 4                 | 2              | 7     |
| 16  | <i>Tanymecus dilaticollis.</i>                  | 25                              | 15                | 12             | 52    |
| 17  | <i>Pedinus femoralis</i>                        | 23                              | 6                 |                | 29    |
| 18  | <i>Formicomus pedestris</i>                     | 41                              | 22                | 37             | 100   |
| 19  | <i>Pleurophorus caesus</i>                      | 4                               | 8                 | 14             | 26    |
| 20  | <i>Pterostichus marginalis</i>                  | 1                               | -                 | 259            | 260   |
| 21  | <i>Pseudophonus rufipes</i>                     | 6                               | -                 |                | 6     |
| 22  | Colebole  | 1198                            | 150               | 68             | 1416  |
| 23  | <i>Anthicus humeralis</i>                       | 13                              | -                 | 4              | 17    |
| 24  | <i>Metabletus truncatulus</i>                   | 5                               | 5                 |                | 10    |
| 25  | Himenoptere (ants)                              | 128                             | 230               | 210            | 568   |
| 26  | <i>Gryllus campestris</i>                       | 5                               | 21                | 17             | 43    |
| 27  | <i>Pterostichus lepidus</i>                     | 3                               | -                 |                | 3     |
| 28  | <i>Harpalus distinguendus</i>                   | 16                              | 10                | 7              | 33    |
| 29  | <i>Cassida nobilis</i>                          | 2                               | -                 | 2              | 4     |
| 30  | <i>Anthicus humilis</i>                         | 6                               | -                 | 3              | 9     |
| 31  | Miriapode                                       | 2                               | 2                 | -              | 4     |
| 32  | <i>Haplothrips tritici</i>                      | 140                             | 5                 | -              | 145   |
| 33  | Homoptere (cycads)                              | 204                             | 32                | 19             | 255   |
| 34  | <i>Cryptophagus dentatus</i>                    | 21                              | -                 | -              | 21    |
| 35  | <i>Blaps mortisaga</i>                          | 2                               | 1                 | 1              | 4     |
| 36  | <i>Pyrrhocoris apterus</i>                      | -                               | 51                | 2              | 53    |
| 37  | <i>Conosoma bipunctata</i>                      | 11                              | 4                 | 233            | 248   |
| 38  | <i>Corticaria longicornis</i>                   | 3                               | -                 | 3              | 6     |
| 39  | <i>Orchestes fagi</i>                           | 7                               | -                 | 1              | 8     |
| 40  | <i>Aphthona euphorbia</i>                       | 10                              | -                 | 2              | 12    |
| 41  | <i>Otiorrhynchus laevigatus</i>                 | 6                               | 2                 | -              | 8     |
| 42  | <i>Otiorrhynchus singularis</i>                 | 2                               | -                 | 1              | 3     |
| 43  | <i>Pterostichus aterrimus</i> var. <i>niger</i> | 1                               | 1                 | -              | 2     |

## LUCRĂRI ȘTIINȚIFICE SERIA HORTICULTURĂ, 59 (2) / 2016, USAMV IAȘI

|    |   |    |    |    |    |
|----|---|----|----|----|----|
| 44 | <i>Calosoma inquisitor</i>              | 1  | -  | 1  | 2  |
| 45 | <i>Necrophorus antennatus</i>           | -  | 1  |    | 1  |
| 46 | <i>Callistus lunatus</i>                | -  | 1  | -  | 1  |
| 47 | Homoptere (aphids)                      | 20 | 5  | 3  | 28 |
| 48 | Ortoptere (locust)                      | 9  | 2  | 1  | 12 |
| 49 | <i>Anthicus antherinus</i>              | 13 | 57 | 13 | 83 |
| 50 | Heteroptere (bedbugs)                   | 8  | 9  | 7  | 24 |
| 51 | Himenoptere(parasit wasp)               | 7  |    |    | 7  |
| 52 | <i>Anthicus gracilis</i>                | 11 |    |    | 11 |
| 53 | <i>Ityocara rubens</i>                  | 1  | -  | 12 | 13 |
| 54 | <i>Harpalus tardus</i>                  | 4  | 2  |    | 6  |
| 55 | <i>Armadillidium vulgare</i>            | 5  | 25 | 21 | 51 |
| 56 | Curculionide                            | 1  |    |    | 1  |
| 57 | <i>Eurygaster integriceps</i>           | 2  |    |    | 2  |
| 58 | <i>Anisoplia segetum</i>                | 1  |    |    | 1  |
| 59 | <i>Idiochroma dorsalis</i>              | 1  | -  | 8  | 9  |
| 60 | <i>Coccinella 7 punctata</i>            | 9  | 5  | 1  | 15 |
| 61 | <i>Anthicus floralis</i>                | 5  | 5  | 28 | 38 |
| 62 | Himenoptere (bees)                      | 2  | 1  |    | 3  |
| 63 | <i>Colodera nigrita</i>                 | 4  | 30 | 15 | 49 |
| 64 | <i>Hypnoidus pulchellus</i>             | 4  | 5  | 1  | 10 |
| 65 | <i>Pteryngium crenatum</i>              | 8  | 9  | 59 | 76 |
| 66 | <i>Oxyporus rufus</i>                   | 9  |    |    | 9  |
| 67 | <i>Zabrus blapoides</i>                 | 1  | 1  |    | 2  |
| 68 | <i>Coccinulla quatuordecimpustulata</i> | 2  |    |    | 2  |
| 69 | <i>Tachyporus ruficolis</i>             | 3  |    | 8  | 11 |
| 70 | <i>Crypticus quisquilius</i>            | 1  |    |    | 1  |
| 71 | <i>Emphilus glaber</i>                  | 1  | 1  | 2  | 4  |
| 71 | <i>Broscus cephalotes</i>               | 1  |    |    | 1  |
| 72 | <i>Coccinella 5 punctata</i>            | 1  |    |    | 1  |
| 73 | <i>Silpha obscura</i>                   | -  | 1  | 12 | 13 |
| 74 | <i>Onthophagus taurus</i>               | -  | 1  |    | 1  |
| 75 | <i>Phyllotreta atra</i>                 | -  | 7  | 5  | 12 |
| 77 | <i>Stomodes gyrosicollis</i>            | -  | 3  |    | 3  |
| 78 | <i>Anobium punctatum</i>                | -  | 5  |    | 5  |
| 79 | <i>Aphodius fimetarius</i>              | -  | 2  |    | 2  |
| 80 | <i>Phyllotreta nodicornis</i>           | -  | 5  | 5  | 10 |
| 81 | <i>Staphylinus caesareus</i>            | -  | 1  |    | 1  |
| 82 | <i>Microletes maurus</i>                | -  | 7  | 5  | 12 |
| 83 | Acari (spider)                          | -  | 4  | 3  | 7  |
| 84 | <i>Calathus rufipes</i>                 | -  | 1  |    | 1  |
| 85 | <i>Astenus filiformis</i>               | -  | 1  |    | 1  |
| 86 | <i>Mycetophagus populii</i>             | -  | 1  |    | 1  |
| 87 | <i>Cephus pygmaeus</i>                  | -  | 1  |    | 1  |
| 88 | <i>Pterostichus cupreus</i>             | -  | -  | 1  | 1  |
| 89 | <i>Oulema melanopa</i>                  | -  | 1  |    | 1  |
| 90 | <i>Sipalis circularis</i>               | -  | 1  | 1  | 2  |
| 91 | <i>Psammobius porcicollis</i>           | -  | 1  |    | 1  |
| 92 | <i>Chrysopa perla</i>                   | -  | -  | 2  | 2  |

|               |                             |      |      |      |      |
|---------------|-----------------------------|------|------|------|------|
| 93            | Anisodactylus binotatus     | -    | -    | 3    | 3    |
| 94            | Ophonus azureus             | -    | -    | 1    | 1    |
| 95            | Harpalus smaragninus        | -    | -    | 3    | 3    |
| 96            | Paramecosoma melanocephalum | -    | -    | 3    | 3    |
| 97            | Tanymecus palliatus         | -    | -    | 3    | 3    |
| 98            | Atomaria fuscicollis        | -    | -    | 1    | 1    |
| 99            | Bidessus geminus            | -    | -    | 1    | 1    |
| 100           | Amara eurynota              | -    | -    | 3    | 3    |
| 101           | Hister quadrimaculatus      | -    | -    | 1    | 1    |
| 102           | Brachynus explodens         | -    | -    | 5    | 5    |
| 103           | Ophonus sabulicola          | -    | -    | 4    | 4    |
| 104           | Harpalus cupreus            | -    | -    | 1    | 1    |
| 105           | Scirtes hemisphaericus      | -    | -    | 1    | 1    |
| 106           | Anthicus quadriguttatus     | -    | -    | 2    | 2    |
| 107           | Selatosomus latus           | -    | -    | 1    | 1    |
| 108           | Cercyon lateralis           | -    | -    | 7    | 7    |
| 109           | Cryptophagus dorsalis       | -    | -    | 1    | 1    |
| 110           | Cartodere ruficollis        | -    | -    | 2    | 2    |
| 111           | Paederus limnophilus        | -    | -    | 1    | 1    |
| 112           | Melanotus brunnipes         | -    | -    | 1    | 1    |
| 113           | Metabletus foveatus         | -    | -    | 1    | 1    |
| 114           | Harpalus spp.               | -    | -    | 1    | 1    |
| 115           | Zabrus tenebrioides         | -    | -    | 1    | 1    |
| Total species |                             | 2656 | 1534 | 1504 | 5694 |



**Fig.1** The number of collected specimens and species at the three variants

The largest number of collected specimens from the 3 variants, over 50 specimens have played a total of 14 species. These were (tab. 2): *Conosoma bipunctata*, 248 samples representing 4.35% of the total; *Pterostichus marginalis*, with a total of 260 specimens, representing 4.56% of the total; *Epicometis hirta*

Poda, with a total of 195 specimens, representing 3.42 % of the total; *Opatrum sabulosum* L., with a total of 143 specimens, representing 2.51% of the total; *Haplothrips tritici*, with a total of 145 specimens, representing 2.54% of the total; *Drasterius bimaculatus* Rossi, with a total of 146 specimens, representing 2.56% of the total; *Phyllotreta nemorum*, with a total of 139 specimens, representing 2.44% of the total; *Dermestes lanarius* L., with a total of 110 specimens, representing 1.93% of the total; *Formicomus pedestris* Rossi, with a total of 100 specimens, representing 1.75% of the total; *Pentodon idiota* Hbst, with a total of 73 specimens, representing 1.28% of the total; *Anthicus antherinus* L., with a total of 83 specimens, representing 1.45% of the total; *Pteryngium crenatum* Fabricius, with a total of 76 specimens, representing 1.33% of the total; *Pyrrhocoris apterus* Firebug, with a total of 53 specimens, representing 0.93% of the total; *Colodera nigrita*., with a total of 49 specimens, representing 0.86% of the total.

Table 2

**The structure of species (taxa) with the largest number of specimens collected**

| No.          | Name of species (taxa)         | Total       | %    |
|--------------|--------------------------------|-------------|------|
| 1            | <i>Conosoma bipunctata</i>     | 248         | 4.35 |
| 2            | <i>Pterostichus marginalis</i> | 260         | 4.56 |
| 3            | <i>Epicometis hirta</i>        | 195         | 3.42 |
| 4            | <i>Opatrum sabulosum</i>       | 143         | 2.51 |
| 5            | <i>Haplothrips tritici</i>     | 145         | 2.54 |
| 6            | <i>Drasterius bimaculatus</i>  | 146         | 2.56 |
| 7            | <i>Phyllotreta nemorum</i>     | 139         | 2.44 |
| 8            | <i>Dermestes lanarius</i>      | 110         | 1.93 |
| 9            | <i>Formicomus pedestris</i>    | 100         | 1.75 |
| 10           | <i>Pentodon idiota</i>         | 73          | 1.28 |
| 11           | <i>Anthicus antherinus</i>     | 83          | 1.45 |
| 12           | <i>Pteryngium crenatum</i>     | 76          | 1.33 |
| 13           | <i>Pyrrhocoris apterus</i>     | 53          | 0.93 |
| 14           | <i>Colodera nigrita</i>        | 49          | 0.86 |
| <b>TOTAL</b> |                                | <b>5694</b> | -    |

## CONCLUSIONS

1. In the 3 variants were collected a number of 5694 samples belonging to a total of 115 invertebrate species of wheat. The situation, on the variants is as follows:

- In the variant, the consumption of untreated wheat were collected in a total of 2656 samples 69 belonging to a number of species (taxa);
- The variant number 2 treaty wheat consumption have been collected 1534 specimens belonging to a number of 64 species (taxa);
- The variant number three, wheat for seed the samples were collected from to 1504 belonging to 76 one species (taxa).

2. During the period of observations, a number of 32 species were common to the three variants while a total of 69 species were collected from a single experimental variant.

3. A number of 14 species had more than 50 specimens. The species with the highest number of specimens were *Conosoma bipunctata*, with 248 specimens, representing 4.35% of the total; *Pterostichus marginalis*, with 260 specimens, representing 4.56% of the total; *Epicometis hirta* with 195 pieces, representing 3.42 % of the total, *Opatrum sabulosum* 143 specimens, representing 2.41% of the total, with 145 samples *Haplothrips tritici*, representing 2.54% of the total; *Dermestes lanarius*, with 110 specimens, representing 1.93% of the total and *Phyllotreta nemorum* 139 specimens, representing 2.44% of the total.

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