

CONTRIBUTIONS TO THE STUDY OF THE COMPOSITION AND DYNAMICS OF THE ARTHROPOD FAUNA FROM SOME CORN CROPS IN THE N-E REGION OF MOLDOVA

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Abstract

In order to maintain biodiversity on intensively exploited agricultural land, the monitoring of harmful and useful species is extremely important, as it provides information on the quality of the land and, why not, can provide predictions on the stability of agroecosystems.

The observations regarding the structure of the arthropod entomofauna were made between April and July in the year 2021 in a corn crop in the town of Ghigoiesti.

The research carried out aimed to determine the structure and composition of the entomofauna, its abundance and diversity as well as their behavior in the maize crops in the station under observation, and the research was based on the use of Barber-type soil traps, a total of 6, placed in 3 in a row, which have as fixing solution a salt solution (NaCl) with a concentration of 20% for each of the three variants studied.

The collected material is represented by species belonging to the arthropod fauna that systematically fall into the following orders: Coleoptera, Hymenoptera, Orthoptera, Diptera, Arachnida s.a.

Key words: *corn culture, arthropods, Barber traps.*

INTRODUCTION

Everywhere in the world, development and well-being cannot be conceived without having food sources available, and corn is one of the most important (over 130 million ha). Its many uses place this crop on the podium, next to grass cereals and rice.

The knowledge of harmful entomofauna in corn agroecosystems contributes to the support of global attitudes towards the environment for a sustainable exploitation of natural resources. The management of combating resistance to insecticides through their rational use is a continuous concern of all participants in the field (researchers, farmers, manufacturers of plant protection products, authorities, etc.) (Ciochia, 1986).

The climate change also challenges farmers to adopt measures and tillage

systems that contribute to improving soil quality and conserving soil water. Conservative measures, of course, have undeniable advantages, but they also contribute to the multiplication of pest populations. At the same time, conventional, intensive agriculture has a simultaneous negative impact on the development of resistance to the mode of action of some active substances, of certain species, but also on the environment in general (Malschi, 1993).

MATERIALS AND METHODS

A good knowledge of populations, species, number and diversity of fauna gives us a lot of information about the stability of that agrosystem.

The irrational use of plant protection products leads to the development of pest

outbreaks, and in certain regions, due to the destruction of natural predators of harmful species, significant production losses have been reached. (Trotuș, 2011) Through this experience, we set out to study the situation of the entomofauna in maize crops in relation to the preceding plant under conventional farming conditions (variant V1 maize in monoculture; variant V2 maize after sunflower; variant V3 maize after wheat), crops belonging to the farm from Ghigoiesti locality, Stefan cel Mare com, Neamt county.

To carry out the taxonomic study, the ecological requirements and the distribution, we will use the material from the ground collected by means of the Barber-type soil traps, a method that allows the capture of several species of arthropods.

The use of Barber-type soil traps consisted in inserting 500 ml plastic containers with a diameter of 8 cm and a height of 10 cm into the soil, which were buried at ground level, in which a NaCl preservative solution was placed (20%). (Tălmăciu, 2010)

The samples were collected between April and July, at intervals of about 7-15 days. At each harvest, the contents were sieved, and each individual sample was labeled with the date of harvest, labeled, and transferred to the laboratory for identification.

RESULTS AND DISCUSSIONS

The study presents observations on the structure and dynamics of the entomofauna collected in the inpatient at the Ghigoiesti inpatient facility. To carry out the research on the entomofauna collected from the corn crop, the soil traps type Barber were used, from April to July.

The experience was organized in 3 variants:

- V1 corn in monoculture;
- V2 corn after sunflower;
- V3 corn after wheat;

The situation of the harvests collected entomofauna with the soil traps -type Barber from corn crops in the V1 variety, corn in monoculture in the year 2021, at the Ghigoiești station, Neamț county

For the year 2021, the samples were collected on the following dates: 29.04.2021; 17.05.2021; 29.05.2021; 13.06.2021 and 01.07.2021

In total, during the observation period, 1322 specimens belonging to 59 species (taxa) were collected at traps 1-6. The most specimens were collected at the first harvest 649, followed by the second harvest, respectively 328 specimens. At harvest number three we collected 130 specimens, 121 specimens at the last harvest. The fewest specimens were harvested in the fourth harvest, namely 94.

The largest share among them is the species *Epicometis hirta* with a number of 172 individuals collected, followed by *Agriotes lineatus*, with 140 individuals collected, *Dermestes lanarius* (102 specimens), *Formicomus pedestris* (105 specimens), *Tanymecus dilaticollis* (83 specimens), but also the presence of the species *Harpalus aeneus* (37 specimens), *Pterostichus cupreus* (73 specimens), *Opatrum sabulosum* (67 specimens), *Hymenoptera* (ants) (52 specimens), the rest of the specimens had values between 48 and 1 specimen.

For large groups of taxa, the situation of the collected species is as follows (fig. 1):

- *Coleoptera* are the most numerous, representing 93.04% of the total, followed by *Hymenoptera* with 4.08% of the total;

- *Homoptera* (0.54%), *Heteroptera* (0.08%) and *Myriapoda* (0.15%) had the smallest shares, under 1%.

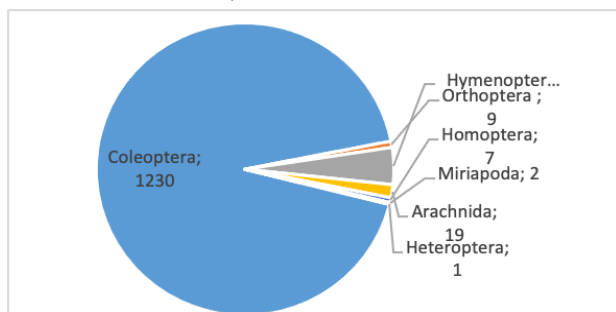


Fig. 1. The share of species collected from corn crops to V1

The situation of the entomofaunal harvests collected with the help of the Barber-type soil traps from the V2 corn crops, corn with sunflower the preceding plant, in the year 2021, at the Ghigoiești station, Neamț county. During the 5 harvests, 890 specimens belonging to a number of 53 species (taxa) were collected, the species with the highest number of specimens collected: *Agriotes lineatus* with 179 specimens collected, *Tanymecus dilaticollis* (96 specimens), *Epicometis hirta* (68 specimens), *Pterostichus cupreus* (55 specimens), *Opatrum sabulosum* (52 specimens), the other species recorded between one and 48 specimens, the highest percentage in terms of the number of specimens of the species compared to the total number of specimens was the species: *Epicometis hirta* Poda (55.66%), *Pterostichus cupreus* L (18.01%), *Heteroptera* (*Pyrrhocoris*) (4.54%), *Harpalus distinguendus* Duft (2.57%), *Dermestes lanarius* L L. (1, 28%), *Anthicus antherimus* and *Gryllus campestris* L (1.81%), *Arachnida* and *Phyllotreta vittula* (1.12 %) and *Opatrum sabulosum* L. (1 %). The other species had a percentage between 0.049% and 0.78%. If we refer to antagonists (useful fauna) from the total of 890 specimens collected, 25.85% is represented by this.

Thus, 230 specimens belonging to a number of 21 species were collected. Three species had the highest share, *Pterostichus cupreus* (20.75%), *Harpalus distinguendus* (18.11%) and (11.32%). The rest of the species (18) had values between 0.38 and 7.55%.

For large groups of taxa, the situation of the collected species is as follows (fig. 2):

- coleoptera are the most numerous, representing 92.36% of the total followed by arachnids with 3.37%. Orthoptera and heteroptera had the smallest share, below 1%.

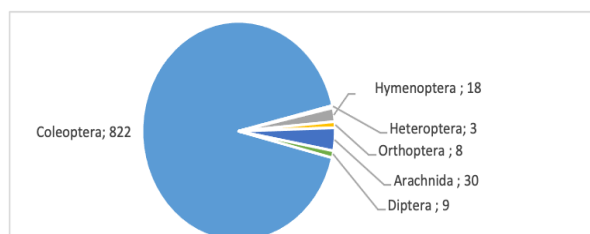


Fig. 2. The share of species collected from maize crops to V2

In total, in the V3 variant (fig.3), 903 specimens belonging to several groups of species (taxa) were collected.

The situation on the traps at the five harvests is as follows - at trap one, five harvests were made during the vegetation period and 32 species (taxa) were collected with a total of 167 specimens. The most specimens were collected at the first harvest, 79 specimens, followed by the second harvest with 36 specimens. The fewest specimens were collected during harvests II, V and IV, between 9-26 specimens.

If we refer to the antagonists collected, of the total number (903) of specimens collected for this variant, 26.14% is represented by this one. Thus, 236 specimens belonging to a number of 16 species were collected. The two species *Dermestes lanarius* (27.66%) and *Harpalus distinguendus* (18.18%) had the highest share. The rest of the species (15) had values between 0.79 and 7.11%

Referring to the number of traps in which each species was collected, in the year 2021 in version V3, it can be seen that the species had the highest percentage in terms of the number of specimens of the species compared to the total number of specimens : *Agriotes lineatus* (16,96%), *Tanymecus dilaticollis* (9,09%), *Epicometis hirta* (8,43%), *Dermestes lanarius* (7,76%), *Harpalus distinguendus* (5,1%), *Anthicus antherinus* (4,99%), *Opatrum sabulosum* (4,55%), *Dorcadion pedestre* (2,32%), *Phyllotreta vittula* (2,99%), *Formicomus pedestris* și *Silpha obscura* (2,22%), *Pterostichus cupreus* (2%). *Coccinella 7-punctata* (1,88%), *Arahnide* (1,88%), *Pseudocleonus cinereus*, *Pseudophonus rufipes* și *Tanymecus palliatus* (1,55%), *Pentodon idiota* (1,33%), *Phyllotreta ondulata* (1,11%) and *Gryllus campestris* (1%). The other species had a percentage between 0,11 % and 0,89%.

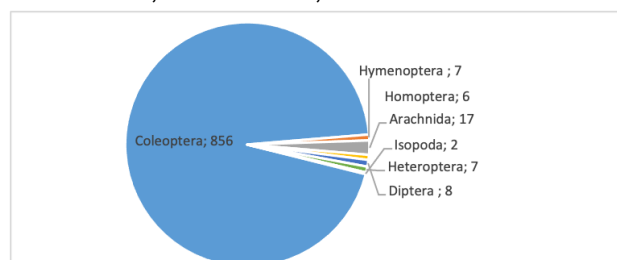


Fig. 3. The share of species collected from maize crops to V3

Overall, the highest number of specimens was recorded at the end of April, at the first harvest, when 1448 specimens were collected from all 3 variants, and the fewest in July, at the last harvest, respectively 294 samples (table 1).

The species with the highest number of specimens were: *Agriotes lineatus* (472 samples), *Epicometis hirta* (316 samples), *Tanymecus dilaticollis* (261 samples), *Dermestes lanarius* (188 samples), *Opatrum sabulosum* (160 samples), *Pterostichus cupreus* (146 samples), *Harpalus distinguendus* (142 samples) etc. A number of 7 species had one specimen collected each.

Table 1. The dynamics of the entomofauna collected in 2021 for the three variants

Variant	Harvest dates					Total
	29.Apr	17.May	29.May	13.Jun	01.Jul	
V 1	649	328	130	94	121	1322
V 2	312	140	186	170	82	890
V 3	487	173	54	98	91	903
Total	1448	641	370	362	294	3115

CONCLUSIONS

In the observation period of 2021 at the 3 variants, 97 species and taxa were collected with a total of 3155 specimens of which: 1322 specimens at V1, 890 specimens at V2, 903 specimens at V3. Looking at the 3 preceding plant variants as a whole, it can be seen that the number of specimens collected in the case of variant V1, maize in monoculture, represents 42% of the total species, 28% in the case of variant V 2, maize after sunflower and 28% in the case of the V3 variant, maize after winter wheat.

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