OBSERVATION ON THE STRUCTURE AND ECOLOGICAL PARAMETERS OF THE POPULATION OF INVERTEBRATES IN PLUM ORCHARDS

OBSERVAȚII PRIVIND STRUCTURA ŞI PARAMETRII ECOLOGICI AI POPULAȚIEI DE NEVERTEBRATE ÎN PLANTAȚIILE POMICOLE DE PRUN

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***Abstract**: During the research in Vasile Adamachi Iasi stationary were studied two plum plantation, one represented by the Rivers early variety and other Stanley varieties.To prepare the structure and ecological parameters representative entomofauna of invertebrates from the plantation, were set six traps soil type Barber and during the research were collected species belonging to the orders: Coleoptera (Dermestes laniarius, Polydrosus amoenus, Tomoxia biguttata, Anisodactylus binotatus, Harpalus distinguendus, Armadillidium vulgare, Galeruca pomonae, Pseudophonus rufipes), Hymenoptera (bees, wasps, ants), Arahnida, Heteroptera (Pyrhocorris sp.), Lepidoptera, Gastropoda (snails) and Isoptera. Larger differences, appear significant from year to year which shows that the greatest influence on entomofauna have in general environmental conditions from one year to another in this case were very different.*
***Key words**: Coleoptera, plum plantation, useful entomofauna*

***Rezumat**: În perioada de cercetare la staționarul Vasile Adamachi Iaşi au fost luate în studiu doua plantatii de prun, una reprezentată de soiul Rivers timpuriu, iar cealalta de soiul Stanley.Pentru intocmirea structurii si a parametrilor ecologici reprezentativi entomofaunei de nevertebrate din plantație, au fost fixate şase capcane de sol de tip Barber, iar pe parcursul cercetărilor au fost colectate specii apartinând ordinelor: Coleoptera (Dermestes laniarius, Polydrosus amoenus, Tomoxia biguttata, Anisodactylus binotatus, Harpalus distinguendus, Armadillidium vulgare, Galeruca pomonae, Pseudophonus rufipes), Hymenoptera (albine, viespi, furnici), Arahnida, Heteroptera (Pyrhocorris sp.), Lepidoptera, Gastropoda (melci) şi Isoptera. Diferențe mai mari, semnificative apar de la un an la altul ceea ce denotă ca influența cea mai mare asupra entomofaunei o au în general condițiile de mediu care de la un an la altul în cazul de față au fost foarte diferite.*
***Cuvinte cheie**: Coleoptera, plantații de prun, entomofauna utilă.*

INTRODUCTION

Plum tree characterized as the tree of life or hope, is spread from the plains to the hills and sometimes to the Carpathian foothills. Over the years, its products have established plum and livelihood of farmers while contributing to the country's reputation. High adaptability to different climates and soil, made plum tree grow and produce spontaneously or cultivated area of distribution and variety is virtually

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limitless variety. In this context, Romania has become the country with the largest fruit production in the Balkans and in Europe. Current level protection requirements is not only save the crop, but the fight must be carried out to increase the percentage of fruit quality, perfectly healthy, with no accumulation of toxic residues in fruits and their preparations (Minoiu and Lefter, 1987, Lăcătuşu and Pisică, 1980)

MATERIAL AND METHOD

For the collection of the biological material were used soil traps type Barber. This consisted of placing in the soil of 6 recipinte has been placed a solution of formalin (40%) diluted with water to a concentration of 5% (Minoiu and Lefter, 1987).

The location of traps was made on two rows at a distance of 12 meters between the rows and 6 meters between traps by 3 traps per row.

The sampling procedure was done in each of the three years of observation (2013, 2014 and 2015) in the period from May to August, at intervals of about 10-20 days. At each harvest the collected insects were placed in gauze cloth, each sample separately and replaced or supplemented then the liquid in the trap. The material was then tagged, of the label specifying: data collection, the number of traps , the stationary and variety. In laboratory the material was cleaned of plant debris and then washed under running water, it is selected the order or species.

RESULTS AND DISCUSSIONS

The centralizing results useful and harmful entomofauna found in plum groves of stationary Vasile Adamachi, jud. Iasi at the two varieties studied Rivers timpuriu and Stanley, during the three years using soil traps type Barber.

The summary of obtained results in two varieties stationary of Vasile Adamachi Iasi in 2013. After to applying the method in the two varieties were collected a total of 30 species with a total of 393 samples (Table 1). Of the 30 species collected, a total of 10 species were common in both varieties. They were *Dermestes laniarius*, *Heteroptera* (bedbugs) *Polydrosus sericeus* Schall, *Coccinella 7punctata*, *Homoptera* (cycads) *Polydrosus amoenus* Schall, *Tomoxia biguttata*, *aenea Amara*, *Harpalus calceatus* Duft., *Anisodactylus binotatus* F .. The species with the highest number of samples collected were: *Dermestes laniarius*, with 70 samples, *Heteroptera* (bugs) with 66 samples, *Coccinella septempunctata* L. and *Polydrosus sericeus* Schall.cu 41 samples, *Cyanis cinerea*, 34 samples, *Tomoxia biguttata* with *Homoptera* (cycads) with 15 samples and *calceatus Harpalus* Duft with 14 samples, *Harpalus distinguendus* with 12 samples, 11 samples obtain *Polydrosus amoenus* Schall and *Amara aenea* with a total number are 10 samples. The other species have been collected a number between 2 and 7 samples. In 2014, the two were collected plum plantation of 45 species with a total of 1,094 samples (Table 2). Of the 51 species collected species (Chatened du Gaetan, 1990, Panin, 1951, Safavi, 1968), numbers 22 species were common in both plantations. They were: *Araneide*, *Diptera* (adults), *Hymenoptera* (wasps), *Harpalus distinguendus*, *Hymenoptera* (bees), *Pseudophonus griseus*, *Coccinella conglobata*, *Anisodactylus binotatus*, *Calathus fuscipes*, *Carabus coriaceus*, *Adalia bipunctata*, the species with the largest number of specimens collected were: *Orthoptera* (120), *Hymenoptera* (bees (106)), *Pseudophonus rufipes* (86), *Harpalus distinguendus* (81),

Hymenoptera (ants (53)) *Lepidoptera* (51), *Hymenoptera* (wasps (48)), *Pseudophonusgriseus* (46) *Araneide* (42), *Homoptera* (cycads) (36), *Diptera* (adults) (31) *Galeruca tanaceti* (30), *Amara aenea* (29), *Coccinella conglobata* (28), *Anisodactylus binotatus* (25) Opatrum sabulosum (26), *Ontophagus ovatus* (20). Another species collected were recorded from 2 to 20 samples.

Table 1

The structure of collected species in 2013

No.	Name of species	V. Adamachi stationary		Total samples
		Rivers	Stanley	
1.	*Dermestes laniarius*	42	28	70
2.	*Heteroptera(plosnite)*	38	28	66
3.	*Cyaniris cyanea F.*	34	-	34
4.	*Polydrosus sericeus Schall*	26	15	41
5.	*Coccinella septempunctata*	14	27	41
6.	*Homoptera(cicade)*	12	2	14
7.	*Polydrosus amoenus Schall*	9	2	11
8.	*Tomoxia biguttata*	8	7	15
9.	*Chilopoda longitarsis*	7	-	7
10.	*Amara aenea*	7	3	10
11.	*Harpalus distinguendus*	12	-	12
12.	*Cymindis vaporariorum L.*	6	-	6
13.	*Hymenoptera (viespi)*	5	-	5
14.	*Ophonus azureus*	5	-	5
15.	*Necrophorus vespillo L.*	3	-	3
16.	*Harpalus calceatus*	3	11	14
17.	*Armadillidium vulgare*	3	-	3
18.	*Anisodactylus binotatus F.*	2	3	5
19.	*Balaninus glandium*	2	-	2
20.	*Podonta nigrita F.*	2	-	2
21.	*Galeruca pomonae*	2	-	2
22	*Halyzia 22 punctata*	-	4	4
23	*Stomodes gyrisicollis*	-	4	4
24	*Anisodactylus signatus*	-	3	3
25	*Amara eurynota*	-	3	3
26	*Calathus melanocephalus*	-	3	3
27	*Coccinella hieroglyphica*	-	2	2
28	*Ontophagus ovatus*	-	2	2
29	*Lixus iridis Ol*	-	2	2
30	*Eremotes ater L*	-	2	2
Total 49 species		**242**	**151**	**393**

In 2015, the two stationary were collected a total of 51 species with a total of 1936 samples (Table 3). Of the species collected species, numbers 22 species were common to both varieties (Chatened du Gaetan, 1990, Panin 1951, Rogojanu and Perju, 1979). They were *Dermestes laniarius*, *Coleoptera* (larvae), *Hymenoptera* (wasps), *Heteroptera* (*Pyrrhocoridae*) *Polydrosus sericeus* Schall., *Calathus fuscipes* Goeze., *Gastropoda* (snails), *Adalia bipunctata*, *Coccinella septempunctata*, *Anisodactylus binotatus*, *Orthoptera* (grasshoppers), *Homoptera* (cycads), *Hymenoptera* (bees), *Harpalus distinguendus* Duft.

Table 2

The structure of collected species in 2014

No.	Name of species	V. Adamachi stationary		Number of samples
		Rivers	Stanley	
1	*Pterostichus niger Schall*	3	-	3
2	*Araneida*	33	9	42
3	*Diptera (adulți)*	23	8	31
4	*Opatrum sabulosum*	26	-	26
5	*Hymenoptera (viespi)*	36	12	48
6	*Harpalus distinguendus*	13	68	81
7	*Gastropoda (melci)*	13	2	12
8	*Tomoxia biguttata*	12	-	12
9	*Hister purpurascens*	10	-	10
10	*Hymenoptera (albine)*	92	14	106
11	*Galeruca tanaceti*	25	5	30
12	*Harpalus calceatus*	12	7	19
13	*Lepidoptera (larve)*	37	14	51
14	*Dermestes laniarius*	18	-	18
15	*Hymenoptera (furnici)*	33	20	53
16	*Armadillidium vulgare*	3	-	3
17	*Ortoptere (lăcuste)*	87	33	120
18	*Diptera (larve)*	17	-	17
19	*Ceutorhynchus crucifer*	3	-	3
20	*Blaps lutifera*	6	-	6
21	*Ortoptere (Gryllus)*	3	3	6
22	*Onthophagus taurus*	17	-	17
23	*Polydrosus sericeus Schall*	16	-	16
24	*Homoptera (cicade)*	31	5	36
25	*Carabus scabriusculus*	5	-	5
26	*Leipidoptere (adulți)*	9	3	12
27	*Amara aenea*	11	18	29
28	*Pseudophonus griseus*	8	38	46
29	*Coccinella conglobata*	21	7	28
30	*Anisodactylus binotatus*	7	18	25
31	*Calathus fuscipes Gaeze*	4	4	8
32	*Polydrosus amoeus*	12	-	12
33	*Carabus coriaceus L*	6	2	8
34	*Onthophagus ovatus.*	20	-	20
35	*Homoptera (afide)*	8	-	8
36	*Collembole*	2	-	2
37	*Adalia bipunctata*	3	4	7
38	*Heteroptera (ploşniție)*	10	-	10
39	*Pseudophonus rufipes*	-	86	86
40	*Carabus scabriusculus*	-	5	5
41	*Coccinella 7 punctata*	-	5	5
42	*Chilocorus longitarsis*	-	2	2
43	*Coleoptere(larve)*	-	2	2
44	*Podagrica fuscicornis*	-	3	3
45	*Stafilinide*	-	2	2
Total 51 species		**695**	**399**	**1094**

Table 3

The structure of collected species in 2015

No.	Name of species	V. Adamachi Stationary		Number of samples
		Rivers	Stanley	
1.	*Dermestes lardarius*	41	21	62
2.	*Lepidoptera (larve)*	89	38	127
3.	*Lepidoptera (adulți)*	12	9	17
4.	*Coleoptere (larve)*	6	8	14
5.	*Hymenoptera (viespi)*	122	165	278
6.	*Cymindis vaporariorum*	14	-	14
7.	*Nothyophylus palustris*	11	-	11
8.	*Diptera (larve)*	51	-	51
9.	*Araneida*	144	151	259
10.	*Heteroptera (ploşnițe)*	5	-	5
11.	*Heteroptera (Pyrrhocoridae)*	19	27	46
12.	*Polydrosus sericeus Schall.*	3	85	88
13.	*Copris lunaris*	8	-	8
14.	*Calathus fuscipes Goeze.*	11	25	36
15.	*Anatis ocellata*	12	-	12
16.	*Chrysopa*	8	-	8
17.	*Gasteropode (melci)*	50	14	54
18.	*Adalia bipunctata*	20	3	23
19.	*Coccinella 7 punctata*	12	5	17
20.	*Anysocactylus binotatus F.*	30	10	40
21.	*Homoptera (afide)*	12	5	17
22.	*Galeruca pomanae*	31	15	46
23.	*Harpalus calceatus Duft.*	46	-	46
24.	*Collembole*	3	-	3
25.	*Chilopora longitarsus*	12	-	12
26.	*Ortoptere (Gryllus)*	29	26	55
27.	*Ceutorhynchus crucifer*	3	-	3
28.	*Tomoxia biguttata*	9	14	23
29.	*Ontophagus ovatus*	15	-	15
30.	*Diptera(adulți)*	9	11	20
31.	*Hymenoptera (furnici)*	48	38	86
32.	*Ortoptere (lăcuste)*	80	34	114
33.	*Galeruca tanaceti*	11	-	11
34.	*Homoptera (cicade)*	6	19	25
35.	*Hymenoptera (albine)*	33	23	56
36.	*Opatrum sabulosum L.*	6	-	6
37.	*Hister purpurascens*	15	-	15
38.	*Armadillidium vulgare*	33	-	33
39.	*Miriapode*	3	-	3
40.	*Blaps letifera*	11	-	11
41.	*Pseudophonus rufipes*	36	-	36
42.	*Carabus coriacus L.*	2	-	2
43.	*Amara aenea*	9	-	9
44.	*Coccinella 14 punctata*	9	-	9
45.	*Harpalus distinguendus Duft.*	3	3	6
46.	*Pterostichus niger Schall.*	-	5	5
47.	*Ceuthorrhynchus crucifer*	-	6	6
48.	*Pedinus femoralis*	-	2	2
49.	*Coccinella conglobata*	-	21	21

50.	*Chilocorus similis*	-	4	4
51.	*Stomodes gyrisicollis*	-	3	3
	Total: 51 species	**1146**	**790**	**1936**

The species with the largest number of collected samples were: *Hymenoptera* (wasps) (278), *Lepidoptera* (larvae) (127) *Orthoptera* (grasshoppers) (114) *Polydrosus sericeus* (88), *Hymenoptera* (ants) (86) *Dermestes laniarius* (62), *Hymenoptera* (bees) (56), *Orthoptera* (*Gryllus*) (55) *Gastropoda* (snails) (54), *Diptera* (larvae) (51) *Harpalus calceatus* Duft. and *Galeruca pomanae* (46) *Anysodactylus binotatus* (40), *Calathus fuscipes* and *Pseudophonus rufipes* (36), *Armadilidium vulgare* (33). Other species have been collected from 2 to 25 samples.

In the research period (2013-2015) were collected 3964 specimens belonging to nine systematic order. The highest number of specimens collected was recorded in 2015 with 2301 copies and lowest number samples was recorded in 2013 (415). In 2014 were collected 1266 samples. A rate of 5,81%, followed by the group of *Diptera* with a total 128 samples representing 3,12% and a total of 48 samples at a rate of 1,19% was registered isopod insect group.

In total, in the two orchards from Vasile Adamachi Iasi stationary and two varieties during the research were collected 4091 samples.

CONCLUSIONS

Research was conducted in plum orchards in the period 2013-2015 in two plantations, namely: the *Rivers timpuriu* variety and the *Stanley* variety.

It was studied invertebrate fauna belonging to different classes and phyla, most collected species belonging to the class *Hexapoda* (insects) using soil traps type Barber;

In the period 2013-2015 at the two varieties situation on the number of collected samples separately for each order is as follows: *Coleoptera* with 38,37%, *Hymenoptera* with 22,21%, *Orthoptera* with 12,58%, *Homoptera* 4,37, *Arahnida* 8,34%, *Heteroptera* 3,3%, *Lepidoptera* 5,81%, *Diptera* 3,12% and isopods with 1,19%.

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