OBSERVATIONS ON THE EPIGEOUS FAUNA IN SOME FRUIT APPLE ORCHARDS IN THE PERIOD 2018-2019

OBSERVAȚII CU PRIVIRE LA FAUNA EPIGEE DIN UNELE PLANTAȚII POMICOLE DE MĂR ÎN PERIOADA 2018-2019

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Abstract. *During the research period at the Vasile Adamachi station in Iaşi, an apple orchard was studied during two years of research. In order to draw up the structure and ecological parameters representative of the invertebrate entomofauna in the plantation, six Barber-type soil traps were set, and during the research species belonging to the orders Coleoptera (Dermestes laniarius, Polydrosus amoenus, Tomoxia biguttata, Anisodacty) were collected. Harpalus distinguendus, Armadillidium vulgare, Galeruca pomonae, Pseudophonus rufipes), Hymenoptera (bees, wasps, ants), Arahnida, Heteroptera (Pyrhocorris sp.), Lepidoptera, Gastropoda (snails) and Isoptera. Following the centralization of the number of specimens and the species collected, it could be observed that the values obtained were significantly close in the two years of research, in the plantation under study.*
Key words: Barber soil traps, entomophagous, apple orchard

Rezumat. *În perioada de cercetare la staționarul Delesti Vaslui a fost luată în studiu o plantatie pomicola de măr pe parcursul a doi ani de cercetare. Pentru intocmirea structurii şi 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. În urma centralizării numărului de exemplare şi a speciilor colectate s-a putut observa faptul că valorile obținute au fost sensibil apropiate în cei doi ani de cercetare, in plantația luata in studiu.*
Cuvinte cheie: capcane de tip Barber, entomofagi, livezi de măr.

INTRODUCTION

The orchards as a type of agroecosystem, comprise complex biocenoses, with a high degree of organization, with multiple intra- and interspecific relationships, due primarily to the permanence of crop plants and secondly to the large volume of vegetative mass, thus approaching ecosystems. represented by forests. However, they are artificial ecosystems, which include unsaturated biocenoses, so they are susceptible to attack by pests and phytopathogens, and the

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technological link of phytosanitary protection has an important role in achieving high and constant production (Minoiu *et al* 1987).

Thus, it is known that the production potential of these horticultural systems can be reduced by 20-30% or sometimes totally compromised due to the attack of diseases and pests (Lăcătuşu *et al*.1980).

The control of diseases and pests in apple and hair orchards only with the help of pesticides in order to keep them below the economic threshold of damage, requires the application of a number of 10-12 simple or combined treatments during a calendar year.

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 recipients has been placed a solution of formalin (40%) diluted with water to a concentration of 5% (fig.1 and fig. 2) (Minoiu and Lefter, 1987).

Fig. 1 Soil trap type Barber (original)

Fig. 2 Entomofauna collected with the Barber soil trap

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 (2018 and 2019) 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 (Herea M. 2019). 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

In 2018, following the ten harvests, a number of 2858 beetle specimens resulted, in the seven experimental variants (tab. 1): V1 - existing vegetal carpet (control), totaled a number of 511 beetle specimens; V2 - vegetal carpet overseeded with guinea fowl (*Lotus corniculatus*), totaled a number of 412 beetles; V3 - vegetated carpet overgrown with white clover (*Trifolium repens*) totaled a number of 451 beetles; V4 - overgrown vegetable carpet with red clover (*Trifolium pretense*) totaled a number of 229 beetles; V5 - overgrown seedbed with alfalfa (*Medicago sativa*) totaled a number of 618 beetles; V6 - overseeded vegetable carpet with a mixture of the four legume species,

totaled a number of 414 beetle specimens; V7 - black field, totaled a number of 223 beetles.

Table 1

Number of samples of harmful and useful species collected in 2018 from the 7 experimental variants

Data of harvesting	V 1	V2	V3	V4	V5	V6	V7	TOTAL
I 25.05.2018	0	0	26	7	39	28	17	117
II 07.06.2018	154	99	99	65	111	76	0	604
III 20.06.2018	68	65	79	33	90	97	31	463
IV 04.07.2018	49	45	64	37	91	58	80	424
V 16.07.2018	24	5	24	10	46	0	0	109
VI 31.07.2018	58	68	34	28	87	75	73	423
VII 12.08.2018	44	34	43	23	48	48	3	243
VIII 23.08.2018	95	84	66	19	51	0	0	315
IX 12.09.2018	6	5	0	3	11	3	0	28
X 26.09.2018	13	7	16	4	44	29	19	132
TOTAL	**511**	**412**	**451**	**229**	**618**	**414**	**223**	**2858**
Average per variant	**408**							

It is observed that the largest number of specimens collected in 2018, were registered by the variants V 5 with 618 copies, V1 with 511 copies and V 3 with 451 copies. The lowest number of specimens collected were V 2, V4, V 6 and V 7, which recorded between 223 and 414 specimens of beetles (fig. 1)

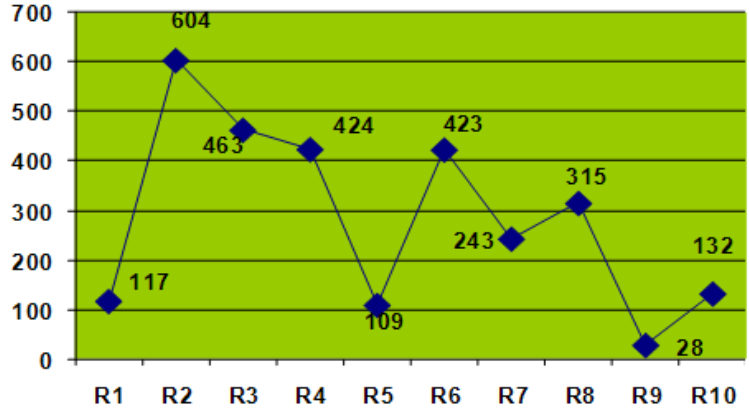

Fig. 1 Graphical representation of the beetles collected at the 10 harvests

The control variant V1, existing vegetal carpet, had 511 specimens collected, representing 125.24% compared to the average number of specimens collected in the 7 experimental variants which was 408.

In 2018, for all 7 experimental variants and all 10 harvests, a number of 2826 specimens belonging to 138 species were collected.

These had a variable number of specimens being between 1 and 566. The species with the highest number of specimens collected, over 100, were: *Anysodactilus binotatus* (566 specimens), *Harpalus distinguendus* (417 specimens), *Dermestes laniarius* (325 specimens), *Otiorrhynchus pinastri* (325 specimens) and *Harpalus tenebrosus* (141 specimens). A number of 44 species had only one specimen.

In 2019, in all 7 experimental variants and in all 10 harvests, a number of 2616 specimens of epigeous fauna of beetles belonging to 51 species were collected (tab. 2)

These had a variable number of specimens being between 1 and 636. The species with the highest number of specimens collected, over 100, were: *Harpalus calceatus* (636 specimens), *Anysodactilus binotatus* (434 specimens), *Harpalus tenebrosus* (412 specimens), *Harpalus distinguendus* (315 specimens), *Harpalus pubescens* (300 specimens) and *Harpalus griseus* (173 specimens). A number of 12 species had only one specimen.

Table 2

Structure, dynamics and abundance of beetle species collected from apple orchards in 2019

No.	Species	Harvesting										To tal
		I	II	II	IV	V	VI	VII	VIII	IX	X	
1.	Harpalus calceatus	57	165	24	96	96	51	99	15	24	9	636
2.	Anysodactilus binotatus	59	150	49	63	87		9		10	7	434
3.	Harpalus tenebrosus			21		126	36	87	87	45	10	412
4.	Harpalus distinguendus	42	30	52	39	60	33	20	8	18	13	315
5.	Harpalus pubescens	33	42	13	75	6	54	51	21	5		300
6.	Harpalus griseus	14	78	24	30	6		8			13	173
7.	Otiorrhynchus pinastri		9		25	30	10	10	12			96
8.	Harpalus tardus		12	17						18	6	53
9.	Harpalus aenesus	24						3	3			30
10.	Hister purpurascens	9		9								18
11.	Metabletus truncatelus	3			3	3		9				18
12.	Oxypora vittata										8	8
13.	Rinomias forticornis							8				8
14.	Scymnus auritus		3					3			2	8
15.	Dermestes laniarius					7						7
16.	Longitarsus tabidus							7				7
17.	Amara aenea					3			3			6
18.	Aphthona euforbiae				1				5			6

19.	Harpalus azureus	3	3									6
20.	Acylophorus glaberrinus					5						5
21.	Cianirys cianea						3		2			5
22.	Coccinella 7 punctata								3	2		5
23.	Tachyporus hypnorum					5						5
24.	Pentodom idiota				1	3						4
25.	Aleochara ruficornis							3				3
26.	Amara crenata									3		3
27.	Apion apricans								3			3
28.	Chysomela marginata								1	2		3
29.	Malachius bipustulatus		3									3
30.	Otiorrhynchus porcatus	3										3
31.	Tachyusa constricta				3							3
32.	Agriotes ustulatus								2			2
33.	Anthicus floralis				2							2
34.	Apion virens								2			2
35.	Blaps letifera									2		2
36.	Carabus coriaceus							2				2
37.	Elater nigrinus					2						2
38.	Meligetes subrugosus	1	1									2
39.	Pteryngium crenatum						2					2
40.	Acrulia inflata					1						1
41.	Anthicus humeralis				1							1
42.	Bembidion ruficolle				1							1
43.	Ceuthorynchus obsoletus								1			1
44.	Ceuthorynchus troglodytes					1						1
45.	Gymnetron pascuorum							1				1
46.	Meligetes maurus			1								1
47.	Mordela aculeata										1	1
48.	Othius punctulatus							1				1
49.	Oxypora alternans										1	1
50.	Tanymechus dilaticollis		1									1
TOTAL		**248**	**497**	**210**	**340**	**441**	**189**	**321**	**168**	**129**	**70**	**2616**

In the two years of research, in all 7 experimental variants and in all 10 harvests, a number of 5441 specimens of beetles belonging to 152 species were collected.

These had a variable number of specimens being between 1 and 1000. The species with the highest number of specimens collected, over 100, were: *Anysodactilus binotatus* (1000 specimens), *Harpalus distinguendus* (732 specimens), *Harpalus calceatus* (730 specimens).), *Harpalus tenebrosus* (553 specimens), *Dermestes laniarius* (332 specimens), *Harpalus pubescens* (324 specimens), *Otiorrhynchus pinastri* (281 specimens) and *Harpalus griseus* (213 specimens). A number of 115 species had few specimens, being between 1 specimen and 10 specimens collected.

CONCLUSIONS

1. During the research period 2018-2019, 7 variants of soil maintenance in the apple orchard were experimented as follows

- V1- existing vegetal carpet (control);
- V2- vegetal carpet overseeded with guinea fowl (*Lotus corniculatus*);
- V3- vegetated carpet overgrown with white clover (*Trifolium repens*);
- V4- overgrown vegetable carpet with red clover (*Trifolium pretense*);
- V5- overgrown seedbed with alfalfa (*Medicago sativa)*;
- V6- overseeded vegetable carpet with a mixture of the four legume species;
- V7- black field;

2. In 2018, for all 7 experimental variants and all 10 harvests, were collected a number of 2826 specimens of beetles belonging to 138 species.

3. In 2019, in all 7 experimental variants and in all 10 harvests, were collected a number of 2616 specimens of beetles belonging to 51 species.

4. In the two years of research, in all 7 experimental variants and in all 10 harvests, a number of 5441 specimens of beetles belonging to 152 species were collected.

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