OBSERVATIONS ON THE USEFUL AND HARMFUL ENTOMOPHAGUS EXISTING IN THE APPLE TREE ORCHARDS

OBSERVAŢII ASUPRA ENTOMOFAUNEI UTILE ŞI DĂUNĂTOARE EXISTENTE ÎN PLANTAŢIILE POMICOLE DE MĂR

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Abstract. *In this paper there are presented the results of observations made on the useful and harmful entomofauna existing in some apple tree orchards. The collection of the material was done using the soil trap type Barber method, permanently located from May to September in 2017 in an intensive apple orchard belonging to the S.C. Loturi Service SRL from Deleşt, Vaslui country. The samples were collected periodically at intervals of 10-14 days. The several variants were used, depending on the composition of the existing or over-planted vegetal carpet with different grass species. At each sample collection, all collected material was stored gauze and labeled, with each sample specifying: date of harvest, trap number and variant. The collected material belongs to several pendants, Arthropoda, Nematoda, clasa, Hexapoda, Crustacea, Arachnida etc., order, Coleoptera, Hymenoptera, Collembolla, Diptera, Orthoptera etc. Among the collected species we mention: Opatrum sabulosum L., Epicometis hirta Poda, Gryllus spp L.., Otiorrhynchus spp.Germar., Pterostichus spp Bonelli , Pseudophonus rufipes De Geer.*
Key words: soil trap, apple tree orchards, entomophauna

Rezumat. *În prezenta lucrare sunt prezentate rezultatele în urma observaţiilor făcute cu privire la entomofauna utilă şi dăunătoare existentă în unele plantaţii pomicole de măr. Colectarea materialului s-a făcut utilizând metoda capcanelor de sol tip Barber, care au fos amplasate în permanenţă , din luna mai până în luna septembrie, în anul 2017. Recoltare probelor s-a făcut periodic, la intervale de 10-14 zile.Au fost utilizate mai multe variante, în funcţie de compoziţia covorului vegetal existent sau supraânsămânţat cu diferte specii de graminee. La fiecare recoltare a probelor, tot materialul colectat a fost pus în tifon şi etichetat, pe fiecare probă specificându-se: data recoltării, numărul capcane şi varianta. Materialul colectat aparţine la mai multe încrengături, Arthropoda, Nematoda etc., clase, Hexapoda, Crustacea, Arachnida etc, ordine, Coleoptera, Hymenoptera, Collembolla, Diptera, Orthoptera etc. Printre speciile colectate amintim: Opatrum sabulosum L., Epicometis hirta Poda, Gryllus spp., Otiorrhynchus spp., Pterostichus spp , Pseudophonus rufipes etc.*
Cuvinte cheie: capcana de sol, plantatie pomicla de măr, entomofauna

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INTRODUCTION

Of all human activities, agriculture is the most complex biological system operating in the natural environment. The way in which agricultural systems take into account natural conditions and how they integrate into them also depends on the environmental status of the environment. Organic fruit growing aims to bring the soil to its natural potential of assuring the needs of plants with nutrients by mineralizing organic matter or by degradation of soil minerals by physical or microbiological factors.

"Fertilization" is not done directly for the plant and for the mobilization of the microbiological complex in the soil, in order to release through biological processes the nutrients that the plants have during the vegetation period. The annual and perennial legumes, the symbiotic fixtures of nitrogen-nitrogen, occupy an important role, the nitrogen fixed by them releasing into the soil slowly, as mineralization of the organic matter resulting from the body of the fixative microorganisms (Miller and Zubovski, 1917; Malcolm and Bell, 1997; Talmaciu *et al.*, 2016).

MATERIAL AND METHOD

Using this method (beeting method) samples were collected by shaking the branches of the trees and shoots with a wooden stick protected with a rubber sleeve in an entomological mesh.

When collecting the useful and damaging species from the tree crown, the frayage method consisted in the sudden shaking of two branches of 10 trees in each variation. The sampling was made of ten trees, five constantly observed and marked at the beginning of the season and five trees chosen at random. The beeting method has been used to collect the biological material from the tree crown (shaking plants) in various vegetation phenophases.

Samples of harvested biological material were taken to the laboratory where they were subjected to inventory and were cleaned, and then the collected insects were determined.

According to the working methodology established at the establishment of the experimental group, it included 7 variants:

V-1, existing vegetal carpet from the spontaneous flora (witness),
V-2, the *Lotus corniculatus*,
V-3 vegetal carpet, (*Tifolium repens*),
V-4, vegetation overgrown with red clover (*Trifolium pratense*),
V-5 vegetal overlay with lucerne (*Medicago sativa*),
V-6, vegetal oat overlay with a mixture of 4 leguminous species,
V-7 black field.

Fig. 1 Beeting method

RESULTS AND DISCUSSIONS

To establish the structure and dynamics of the entomofauna, from the SC Loturi Service SRL Delesti apple orchards in in 2017.

At Variant number 1, Existing vegetal carpet from the spontaneous flora (witness) were collected specimens of entomofauna belonging to a number of 25 species,8 order in total, 212 samples. A number of 107samples belonging to harmful fauna, and 105 samples belonging to useful fauna (tab. 1).

At Variant number 2, Vegetable carpets over-sown with guides, were collected specimens of entomofauna belonging to a number of 25 species,8 order in total, 90 samples. A number of 13 samples belonging to harmful fauna, and 75 samples belonging to useful fauna (tab. 2).

At Variant number 3, Vegetable carpets over-chopped with white clover, sample of entomofauna belonging to a number of 21 species and families were collected in total, 176 samples. A number of 106 samples belonging to harmful fauna, and 70 samples belonging to useful fauna (tab. 3).

At Variant number 4, Vegetable carp topped with red clover, samples of entomofauna belonging to a number of 8 order were collected, in total 106 samples. The most samples species belonging to useful fauna (75), and 31 samples belonging to harmful fauna (tab. 4).

At Variant number 5, Vegetable carpets overgrown with alfalfa, the colected species beloning of 15 families were collected, with a total of 92 samples. The most samples species belonging to useful fauna (54), and 38 samples belonging to harmful fauna (tab. 5).

At Variant number 6, vegetable carp topped with the 4 species of grasses and legumes were collected in total, 97 samples. A number of 42 samples belonging to harmful fauna, and 55 samples belonging to useful fauna (tab. 6).

At Variant number 7, Black field, specimens of entomofauna belonging to a number of 17 species and families were collected, in total, 91 samples. . A number of 51 samples belonging to harmful fauna, and 40 samples belonging to useful fauna (tab. 7).

Table 1

The situation concerning the collection epigenous entomofauna V1 variant

Order	No.	Name of species/Families	06.05	18.05	05.06	25.06	14.07	28.07	18.08	07.09	Total	Type of fauna
Coleoptera	1	*Otiorrynchus ovatus*	2								2	D
	2	*Stethourus punctillum*	3	1			5	1	6	4	20	Pd
	3	*Omias rotundum*		1							1	D
	4	*Cartodere elongata*				1				8	9	Pd
	5	*Coccinella 7 punctata*								1	1	Pd
	6	*Longitarsus jacobae*								5	5	D
Homoptera	1	*Cicadelidae*	1		6			2		3	12	D
	2	*Membracidae*			1					8	9	D
	3	*Aphididae*				30	30	3		7	70	D
Hymeoptera	1	*Ichneumonidae*	1								1	Pz
	2	*Encyrtidae*	1			5			2	6	14	Pz
	3	*Eulophydae*				1					1	Pz
	4	*Platygasteridae*				3					3	Pz
	5	*Scelionidae*				1	1				2	Pz
	6	*Formicidae*				1	18				19	Pd
	7	*Braconidae*						1			1	Pz
	8	*Aphidiidae*	3	3		3					9	Pz
Diptera	1	*Syrphidae*	4			3	1				8	Pd
	2	*Anthomyiidae*		3		2					5	D
	3	*Cecidomyiidae*				2					2	D
Heteroptera	1	*Nabiidae*	1							2	3	Pd
Lepidoptera	1	*Gelechiidae*				1					1	D
Araea	1	*Araneidae*	3	3							6	Pd
Thysanoptera	1	*Aeolothripidae*		3							3	Pd
	2	*Thripidae*						2	11		13	Pd
8 order	25 de families		19	14	7	53	55	9	19	36	212	107 D 105 U

Table 2

The situation concerning the collection epigenous entomofauna V2 variant

Order	No.	Name of species/Families	06.05	18.05	05.06	25.06	14.07	28.07	18.08	07.09	Total	Tupe of fauna
Coleoptera	1	*Psylliodes dulcamarae*	1								1	D
	2	*Cantharis spp*	1								1	D
	3	*Stethourus Punctillum*	1				1	1	1		4	Pd
	4	*Olibrus flavicornis*	1								1	D
	5	*Cartodere elongata/*		1							1	Pd
	6	*Coccinella 7 punctata*					1				1	Pd
	7	*Otiorrynchus obvatus*		7							7	Pd
	8	*Apion apricans*								1	1	D
Homoptera	1	*Aphididae*	1								1	D
	2	*Cicadellidae*				1	6	1			8	D
Hymeoptera	1	*Encyrtidae*	1								1	Pz
	2	*Platygasteridae*	1								1	Pz
	3	*Aphidiidae*		2		7	2			1	12	Pz
	4	*Ichneumonidae*				1					1	Pz
	5	*Pteromalidae*				1			2		3	Pz
	6	*Formicidae*					7				7	Pd
	7	*Braconidae*					1				1	Pz
Diptera	1	*Anthomyiidae*	1	2							3	D
	2	*Syrphidae*	1			2		1			4	Pd
Heteroptera	1	*Pyrrhocoridae*				5					5	Pd
	2	*Miridae*					1			2	3	Pd
Neuroptera	1	*Chrysopa spp*							3		3	Pd
Araea	1	*Araneidae*	5								5	pd
Thysanoptera	1	*Aeolothripidae*	3	2				4			9	Pd
	2	*Thripidae*				3			3		6	Pd
8 order		25 families	17	14	-	20	19	7	9	4	90	16d 74 u

Table 3

The situation concerning the collection epigenous entomofauna V3 variant

Order	No.	Name of species/Families	06.05	18.05	05.06	25.06	14.07	28.07	18.08	07.09	Total	Type of fauna
Coleoptera	1	*Attagenus unicolor*	8								8	Pd
	2	*Cartodere elongata*	17	4					1		22	Pd
	3	*Otiorrynchus obvatus*	4	1							5	D
	4	*Stethourus punctillum*		1			1		1		3	Pd
	5	*Apion nigritarse*		2							2	D
Homoptera	1	*Aphididae*		18	24	6	4	2	2		56	D
	2	*Cicadelidae*	4	1							5	D
Hymeoptera	1	*Encyrtidae*	1			1	1		1	1	5	Pz
	2	*Eulophidae*		3		2					5	Pz
	3	*Aphidiidae*			5		1		3	1	10	Pz
	4	*Chalcididae*					1				1	Pz
Diptera	1	*Anthomyiidae*	4	4	2		2	1		2	15	D
	2	*Syrphidae*			2						2	Pd
	3	*Tachinidae*			2						2	Pd
Heteroptera	1	*Nabidae*	3			1					4	Pd
	2	*Pentatomidae*			3		5			5	13	D
Neuroptera	1	*Chrysopa spp*		1				1		3	5	Pd
Lepidoptera	1	*Pluttelidae*				1					1	D
	2	*Noctuidae*							1		1	D
Araea	1	*Araneidae*					2			1	3	Pd
Thysanoptera	1	*Thripidae*	4	4							8	D
9 order		21 families	45	39	38	11	17	4	9	13	176	106 D 70 U

Table 4

The situation concerning the collection epigenous entomofauna V4 variant

Order	No.	Name of species/Families	06.05	18.05	05.06	25.06	14.07	28.07	18.08	07.09	Total	Type of fauna
Coleoptera	1	*Cartodere elongata*	4		3			1			8	Pd
	2	*Stethourus punctillum*	1	3	17	1			2	3	27	Pd
	3	*Coccinella bipunctata*				1					1	Pd
	4	*Cantharis spp*					2			1	3	D
Homoptera	1	*Aphididae*	2		3	3		1		8	17	D
Hymeoptera	1	*Ichneumonidae*		1			1				2	Pz
	2	*Pteromalidae*				4	1				5	pz
	3	*Braconidae*	1								1	Pz
Diptera	1	*Anthomyidae*	1						1		2	D
	2	*Chloropidae*			2					1	3	D
	3	*Tipulidae*		2							2	Pd
Heteroptera	1	*Miridae*	2	10	2	1	3	3	1		22	Pd
Araea	1	*Araneidae*			2			2	3		7	Pd
Orthoptera	1	*Acrididae*				1	4		1		6	D
7 order		14 de families	11	16	29	11	11	7	8	13	106	31D 75 U

Table 5

The situation concerning the collection epigenous entomofauna V5 variant

Order	No.	Name of species/Families	06.05	18.05	05.06	25.06	14.07	28.07	18.08	07.09	Total	Type of fauna
Coleoptera	1	*Stethourus punctillum*		1						4	5	Pd
	2	*Cartodere elongata*	1						1		2	Pd
Homoptera	1	*Coccidae*	2			2			1		5	D
	2	*Aphididae*	10		8	1	1			4	24	D
Hymeoptera	1	*Braconidae*		3	1		1				5	Pz
	2	*Formicidae*			4		4	9	1		18	Pd
	3	*Aphidiidae*	1	1		3				3	8	Pz
Diptera	1	*Chloropidae*	1		1				1		3	D
	2	*Tipulidae*		1			3			1	5	D
	3	*Cecidomyiidae*				1					1	D
Heteroptera	1	*Lygaeidae*		1							1	Pd
	2	*Miridae*						1		4	5	Pd
	3	*Pyrrhocoridae*										Pd
Neuroptera	1	*Chrysopa spp*	1						1		2	Pd
Araea	1	*Araneidae*	1		2			2		3	8	Pd
7 order	15 families		17	6	16	7	9	12	5	19	92	38 D 54U

Table 6

The situation concerning the collection epigenous entomofauna V6 variant

Order	No.	Name of species/Families	06.05	18.05	05.06	25.06	14.07	28.07	18.08	07.09	Total	Type of fauna
Coleoptera	1	*Stethourus Punctillumi* Coccinelidae				1			6	12	19	d
	2	*Longitarsus apicalis*/Chrysomelidae							1		1	D
Homoptera	1	*Coccidae*	5								5	D
	2	*Aphididae*	17		2		3				22	D
	3	*Cicadelidae*		1		1	2	1	1	1	7	D
Hymeoptera	1	*Braconidae*	1								1	Pz
	2	*Pteromalidae*	1	1						2	4	Pz
	3	*Chalcididae*	1								1	Pz
	4	*Encyrtidae*		1							1	Pz
	5	*Scelionidae*					4				4	Pz
	6	*Formicidae*					1				1	Pd
	7	*Eurytomidae*					1				1	Pz
	8	*Eulophydae*								2	2	Pz
	9	*Aphidiidae*						3			3	Pz
Diptera	1	*Syrphidae*			2						2	Pd
	2	*Anthomyiidae*					2				2	D
	3	*Tachinidae*						1			1	Pd
	4	*Cecidomyiidae*							3		3	D
Heteroptera	1	*Miridae*				1		1			2	Pd
	2	*Nabiidae*							2		2	Pd
	3	*Pyrrhocoridae*							3		3	Pd
Neuroptera	1	*Chrysopa spp*			1						1	Pd
Lepidoptera	1	*Gelechiidae*				1					1	D
	2	*Tortricidae*					1				1	D
Araea	1	*Araneidae*				1					1	Pd
Thysanoptera	1	*Thripidae*		1			1			4	6	Pd
9 order		26 families	25	4	5	5	15	6	16	21	97	42 D 55 U

Table 7

The situation concerning the collection epigenous entomofauna V7 variant

Order	No.	Name of species/Families	06.05	18.05	05.06	25.06	14.07	28.07	18.08	07.09	Total	Type of fauna
Coleoptera	1	*Coccinella 7 punctata*	2	2			3			1	8	Pd
	2	*Phyllotreta vittula*								1	1	D
	3	*Stethourus Punctillum*							4		4	D
	4	*Cantharis* spp.			1					1	2	D
Homoptera	1	*Aphididae*	14		4	2		8			28	D
	2	*Cicadelidae*	1	3			3				7	D
Hymeoptera	1	*Ichneumonidae*	1			1					2	Pz
	2	*Pteromalidae*				1		1			2	Pz
	3	*Braconidae*							1		1	Pz
	4	*Apidae*		1		2	1		2		6	U
	5	*Formicidae*	1		2	1		5			9	Pd
Diptera	1	*Tipulidae*		1	1					1	3	D
	2	*Cecidomyidae*							1		1	D
	3	*Chloropidae*			1					4	5	D
	4	*Anthomyidae*					1			1	2	Pd
Heteroptera	1	*Pyrrhocoridae*	2						2		4	Pd
	2	*Miridae*					4				4	Pd
Araea	1	*Araneidae*	1							1	2	Pd
6 order	17 families		22	7	9	7	12	14	10	10	91	51D 40 U

In graphical representation we can observe the percentage obtained by the species belonging to the useful entomofauna recorded in each working variant.

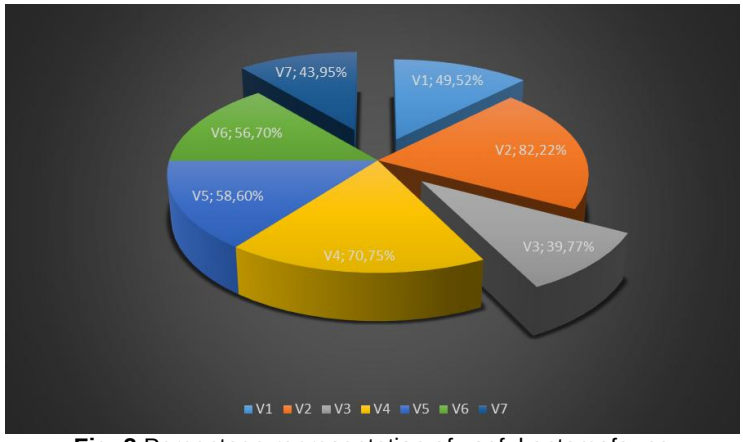

Fig. 2 Percentage representation of useful entomofauna on variants

CONCLUSIONS

1. Following the eight harvests that took place in May 2017, 510 samples, of entomofauna were collected in total.
2. The situation of the collections on variants is as follows:
► V1 were collected 11 species with a total of 14 specimens.
► A total of 11 species with a total of 55 specimens were collected at V2.
► At V3 a total of 14 species were collected with a total of 30 specimens.
► A total of 9 species were collected at V4 with a total of 109 specimens.
► A total of 19 species were collected at V5 with a total of 214 specimens.
► A total of 19 species were collected at V6 with a total of 14 specimens.
► A total of 7 species with a total of 10 specimens were collected at V7.
3. The most common and common species of coleopterans were *Dermestes laniarius* Ill. *Harpalus calceatus, Harpalus distinguendus, Amara eurynota, Phyllotreta nemorum, Opatrum sabulosum* and *Omias rotundus*.

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