OBSERVATIONS REGARDING THE BIODIVERSITY OF ENTOMOFAUNA IN SOME RAPE CULTURES OF NORTHERN MOLDAVIA

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Abstract

Rape (*Brassica napus* ssp *oleifera* L) is a plant native to the Mediterranean, with a extensive use in the Middle Asia in Central and Nordic Europe countries because of oil from seeds, used both in food and for lighting. In the period of vegetation rapeseed is attacked by many pests that can cause serious damage up to 50-60%. In the conditions of Northern Moldavia, signifies presence rapee beetle (*Meligethes aeneus*), turnip sawfly (*Athalia rosae*) turnip flea beetle and striped turnip flea beetle (*Phyllotreta atra, Phyllotreta nemorum*), rape seed weevil (*Ceutorrhynchus assinilis*), etc. In totally, in the two ecosystem, orders *Coleoptera* is dominant. The species with the largest number of samples collected were: *Meligethes aeneus* F. followed by *Phyllotreta atra* L., *Phyllotreta vittula* F., *Epicometis hirta* Poda and *Baris chlorizans* P. In the two ecosystems, in untreated variant were collected most samples (344 respectively 302 samples) compared to the treated variant (187 respectively 100 samples).

Key words : repessed culture**,** entomofauna, chimical treatments

Rape (*Brassica napus* ssp *oleifera* L) is a plant native to the Mediterranean, with a extensive use in the Middle Asia in Central and Nordic Europe countries because of oil from seeds, used both in food and for lighting.

The canadian specialists consider the current rapeseed oil by plant improvers invented genetically by conventional methods and to distinguish it from traditional rapeseed and were named canola (canadian oil law erucic acid).

The high content of oil seed rape, between 43 and 52% in cultivars of "00" and hybrids, and protein content of 21-24% among rape within oleoproteic plants. Therefore, rape enjoys special attention in the European Union, which recommends increasing the area occupied by this plant, but not at the expense of food crops.

In the period of vegetation rapeseed is attacked by many pests that can cause serious damage up to 50-60%. In the conditions of Northern Moldavia, signifies presence rapee beetle (*Meligethes aeneus*), turnip sawfly (*Athalia rosae*) turnip flea beetle and striped turnip flea beetle (*Phyllotreta atra, Phyllotreta nemorum, Phyllotreta vittula*), rape seed weevil (*Ceutorrhynchus assinilis*), etc.

The pests attack from foliar lever culture and continuing foliar organs of fructification in some years causing significant from economically damage (Barbulescu, A. et al., 1993, 2002 ; Boguleanu, G., 1994; Paulian, F. et al., 1974, 1979; Popov, C., 2003; Manole Liliana et all. 2009; Talmaciu M. Et all. 2010, Tălmaciu Nela, 2010).

MATERIAL AND METHODS

Research on entomofauna were made in rapeseed culture to farm S.C. AGRO IND COM S.R.L. Botoşani and S.A. Moldova" Ţigănaşi, Iaşi, fron 2011. Were used in two variants:

- a variant one (V1) rapeseed culture, and seed treatments carried out at the during the period of vegetation;
- variant two (V2), rapeseed of volunteers increased from without and seed treatments during the growing season.

Collecting material using the beating method (shaking plants) was performed in 2 stationary: Botoşani and Iaşi. Each sample was constituted by the sudden shaking of a plant, number of shots of 5 shots/plant (figure 1). In laboratory insects have been classified into orders and families, and groups of harmful and useful arthropods.

The material thus collected was then cleaned of scrap plant then was kept in a solution in alcohol concentration of about 20%. In some situations, especially if coleopteres determination was made to species level, in other cases the determination was made to family, less to species using different catalogues for determining breeds „Guide des colepters d'Europe" (Chatened du Gaetan, 1990), "Fauna germanica" (Reitter, vol. I, 1908), Panin (1951), „Determinator pentru coleopterele din Romania" (Bobarnac, Stanoiu, Nastase, 1994) or other materials: Romanian Hymenoptera guide, entomophagous insects and their use in the integrated protection of agricultural ecosystems; entomophagous insects and their use

in the integrated protection of horticultural ecosystems.

RESULTS AND DISCUSSIONS

Agricultural Society "Moldova" Tiganasi, Iaşi, has a total area of agricultural land currently operated by 4,300 ha and is structured in four farms in the three that give specific crop production and the fourth is zootechnical having as specific cows. In 2011 in the rapeseed culture in farm S.C. MOLDOVA Ţigănaşi S.A. Iaşi, were effectuates a number of 7 collected thus:

At treated variant, the situation on the harvesting is as follows (Table 1):

- at the 1st harvest, ou the 06.05, there were collected 13 exemplary belonging to orders *Coleoptera,* species *Meligethes aeneus*(12 samples) and *Epicometis hirta* (1 saple);
- at the seconds harvest, ou the 10.05, there were collected 58 exemplary belonging to 2 orders and 4 species: *Meligethes aeneus* (50 samples), *Epicometis hirta* (6 saples), *Cantharis fusca* (6 samples) and *Athalia rosae* (on sample).
- at the third harvest, ou the 19.05, there were collected 12 exemplary belonging to the following 3 species: *Meligethes aeneus* (3 samples), *Epicometis hirta* (on saples) and *Cantharis fusca* (8 saples);
- at the fourth harvest, ou the 30.05, there were collected 27 exemplary belonging to the following order *Coleoptera* on 2 species *Epicometis hirta* (12 saples) and *Meligethes aeneus* (12 samples); order *Diptera*, *Heteropteta* and *Arachnida* on species.
- at the fifth harvest, ou the 09.06, there were collected 17 exemplary belonging to 3 species *Meligethes aeneus* (14 samples), *Epicometis hirta* (2 saples) and *Cantharis fusca* (on saples);
- at the sixth harvest, ou the 15.06, there were collected 36 exemplary belonging to species *Meligethes aeneus*;
- at the seventh harvest, ou the 22.06, there were collected 24 exemplary belonging to species *Meligethes aeneus* (22 samples) and family *Anthomyidae* (2 saples).

Table 1

Species collected in treated rape cultures from SC Ţigănaşi Iaşi

No. harvesting	Data of colection	Order	Species /family	No. samples	Total
1	6.05.2011	Coleoptera	Meligethes aeneus	12	13
			Epicometis hirta	1	
2	10.05.2011	Hymenoptera	Athalia rosae	1	58
		Coleoptera	Meligethes aeneus	50	
			Epicometis hirta	6	
			Cantharis fusca	1	
3	19.05.2011	Coleoptera	Meligethes aeneus	3	12
			Epicometis hirta	1	
			Cantharis fusca	8	
4	30.05.2011	Diptera	Anthomyidae	1	27
		Arachnida	Arachnidae	1	
		Heteroptera	Euridema ventralis	1	
		Coleoptera	Epicometis hirta	12	
			Meligethes aeneus	12	
5	9.06.2011	Coleoptera	Meligethes aeneus	14	17
			Epicometis hirta	2	
			Cantharis fusca	1	
6	15.06.2011	Coleoptera	Meligethes aeneus	36	36
7	22.06.2011	Coleoptera	Meligethes aeneus	22	24
		Diptera	Anthomyidae	2	

Figure 1. **The material collection on the field**

At **untreated variant**, the situation on the harvesting is as follows(Table 2): 344
- at the 1st harvest, ou the 10.05, there were collected 61 exemplary belonging to orders *Coleoptera,* on 3 species *Meligethes aeneus* (23 samples), *Phylotreta atra* (31 saples) and *Epicometis hirta* (1 saple), order *Hymenoptera*, *Homopteta* and *Arachnida* by 2 species;
- at the seconds harvest, ou the 30.05, there were collected 45 exemplary belonging to 2 orders and 4 species: *Meligethes aeneus* (32 samples), *Epicometis hirta* (6 saples), *Phylotreta atra* (8 saples) and *Baris chlorizans* (2 samples) and on family *Cicadellidae*;
- at the third harvest, ou the 09.06, there were collected 62 exemplary belonging to the following 2 orders and 4 species: *Meligethes aeneus* (24 samples), *Phylotreta vittula* (14 saples), *Phylotreta atra* (22 saples) and *Euridema oleracea* (2 saples);
- at the fourth harvest, ou the 15.06, there were collected 45 exemplary belonging to the following order *Coleoptera* on 2 species *Phylotreta atra* (17 saples) and *Meligethes aeneus* (23 samples); order *Hymenoptera*, and *Heteroptera*.
- at the fifth harvest, ou the 19.06, there were collected 63 exemplary belonging to order *Coleoptera* on 3 species *Phylotreta atra* (17 saples), *Phylotreta vittula* (5 saples) and *Meligethes aeneus* (38 samples); order *Homoptera*, and *Heteroptera*.
- at the sixth harvest, ou the 22.06, there were collected 68 exemplary belonging to order *Coleoptera* on 2 species *Phylotreta atra* (21 saples) and *Meligethes aeneus* (38 samples); order *Hymenoptera*, family *Formicidae* (4 samples) and *Heteroptera* on species *Euridema oleracea* (3 saples) and family *Miridae* (2 samples).

Table 2

Species collected in untreated rape cultures from SC Ţigănaşi Iaşi

No. harvesting	Data of colection	Order	Species /family	No. samples	Total
1	10.05.2011	Coleoptera	Meligethes aeneus	23	61
			Epicometis hirta	1	
			Phylotreta atra	31	
		Hymenoptera	Formicidae	2	
		Arachnida	Arachnidae	2	
		Homoptera	Cercopis vulnerata	2	
2	30.05.2011	Heteroptera	Miridae	2	45
		Coleoptera	Meligethes aeneus	32	
			Phylotreta atra	8	
			Baris chlorizans	2	
		Homoptera	Cicadellidae	1	
3	9.06.2011	Coleoptera	Meligethes aeneus	24	62
			Phylotreta atra	22	
			Phylotreta vittula	14	
		Heteroptera	Euridema oleracea	2	
4	15.06.2011	Coleoptera	Meligethes aeneus	23	45
			Phylotreta atra	17	
		Hymenoptera	Formicidae	3	
		Heteroptera	Euridema oleracea	1	
			Miridae	1	
5	19.06.2011	Coleoptera	Meligethes aeneus	38	63
			Phylotreta atra	17	
			Phylotreta vittula	5	
		Homoptera	Cicadellidae	2	
		Heteroptera	Miridae	1	
6	22.06.2011	Coleoptera	Meligethes aeneus	38	68
			Phylotreta atra	21	
		Heteroptera	Miridae	2	
			Euridema oleracea	3	
		Hymenoptera	Formicidae	4	

In 2011 in the rapeseed culture in farm S.C. AGRO IND COM S.R.L. Botoşani, were effectuates a number of 5 collected thus:

At treated variant, the situation on the harvesting is as follows (Table 3):
- at the 1st harvest, ou the 06.05, there were collected 12 exemplary belonging to orders *Coleoptera,* species *Meligethes aeneus*;
- at the seconds harvest, ou the 12.05, there were collected 25 exemplary belonging to 3 species *Meligethes aeneus* (23 samples), *Epicometis hirta* (1 saple), *Cantharis pulicaria* (1 sample).
- at the third harvest, ou the 23.05, there were collected 18 exemplary belonging to the following 3 species: *Meligethes aeneus* (13 samples),

Epicometis hirta (2 saples) and *Apion hookeri* (3 saples);
- at the fourth harvest, ou the 31.05, there were collected 13 exemplary belonging to the following 2 species *Epicometis hirta* (1 saple) and *Meligethes aeneus* (12 samples);
- at the fifth harvest, ou the 03.06, there were collected 32 exemplary belonging to species *Meligethes aeneus*.

Table 3

Species collected in treated rape cultures from S.C. AGRO IND COM S.R.L. Botoşani

No. harvesting	Data of colection	Order	Species /family	No. samples	Total
1	6.05.2011	Coleoptera	Meligethes aeneus	12	12
2	12.05.2011	Coleoptera	Meligethes aeneus	23	25
			Epicometis hirta	1	
			Cantharis pulicaria	1	
3	23.05.2011	Coleoptera	Meligethes aeneus	13	18
			Apion hookeri	3	
			Epicometis hirta	2	
4	31.05.2011	Coleoptera	Epicometis hirta	1	13
			Meligethes aeneus	12	
5	3.06.2011	Coleoptera	Meligethes aeneus	32	32

At untreated variant, the situation on the harvesting is as follows (Table 4):
- at the 1st harvest, ou the 12.05, there were collected 70 exemplary belonging to orders *Coleoptera,* belonging to 3 species: *Meligethes aeneus* (25 samples), *Phylotreta vittula* (41 saples) and *Phylotreta atra* (4 saples);
- at the seconds harvest, ou the 23.05, there were collected 89 exemplary belonging to 3 species/family. The species collected belonging to 2 orders: *Hymenoptera* and *Coleoptera*;
- at the third harvest, ou the 30.05, there were collected 36 exemplary belonging to 2 species, orders *Coleoptera*: *Meligethes aeneus* (24 samples) and *Phylotreta atra* (4 saples) and on family, orders *Diptera*: family *Anthomyidae* (8 saples);
- at the fourth harvest, ou the 03.06, there were collected 39 exemplary belonging to 4 orders: orders *Coleoptera* on 2 species *Meligethes aeneus* (12 samples) and *Phylotreta atra* (4 saples); orders *Hymenoptera* on speies *Athalia rosae* (2 samples); orders *Heteroptera* on species *Pyrrochoris apterus* (5 samples); orders *Diptera* on family *Anthomyidae* (11 saples);
- at the fifth harvest, ou the 09.06, there were collected 68 exemplary belonging to orders *Coleoptera* on 3 species *Meligethes aeneus* (58 samples), *Phylotreta atra* (4 saples) and *Baris chlorizans* (6 samples).

Table 4

Species collected in untreated rape cultures from S.C. AGRO IND COM S.R.L. Botoşani

No. harvesting	Data of colection	Order	Species /family	No. samples	Total
1	12.05.2011	Coleoptera	Meligethes aeneus	25	70
			Phylotreta vittula	41	
			Phylotreta atra	4	
2	23.05.2011	Heteroptera	Euridema oleracea	2	89
		Coleoptera	Meligethes aeneus	25	
			Phylotreta atra	56	
			Phylotreta vittula	6	
3	30.05.2011	Coleoptera	Meligethes aeneus	24	36
			Phylotreta atra	4	
		Diptera	Anthomyidae	8	
4	3.06.2011	Coleoptera	Meligethes aeneus	15	39
			Phylotreta atra	6	
		Hymenoptera	Athalia rosae	2	
		Heteroptera	Pyrrochoris apterus	5	
		Diptera	Anthomyidae	11	
5	9.06.2011	Coleoptera	Meligethes aeneus	58	68
			Phylotreta atra	4	
			Baris chlorizans	6	

In 2011 in the rapeseed culture in farm S.C. MOLDOVA Ţigănaşi S.A. Iaşi, at treated variant were collected 187 exemplary belonging to 5 orders: *Coleoptera, Hymenoptera, Diptera, Arachnida,* and *Heteroptera*. The species with the most number of samples were: *Meligethes aeneus* (149 samples), *Epicometis hirta* (22 saples) and *Cantharis fusca* (10 samples). The other species have a small number of samples (table 5).

At untreated variant were collected 344 exemplary belonging to 5 orders: *Coleoptera, Hymenoptera, Homoptera, Arachnida* and

Heteroptera. The species with the most number of samples were: *Meligethes aeneus* (178 samples), *Phylotreta atra* (116 saples), *Phylotreta vittula* (19 saples), *Baris chlorizans* (2 samples) and *Epicometis hirta* (on saple). The other species/family have a small number of samples, between 9 to 2 samples (table 6).

Table 5

The dynamic and abundances the species collected in treated rape cultures from SC Ţigănaşi Iaşi

Order	Species /family	No. of samples/harvesting							Total
		1	2	3	4	5	6	7	
Coleoptera	Meligethes aeneus	12	50	3	12	14	36	22	149
	Epicometis hirta	1	6	1	12	2	-	-	22
	Cantharis fusca	-	1	8	-	1	-	-	10
Hymenoptera	Athalia rosae	-	1	-	-	-	-	-	1
Diptera	Anthomyidae	-	-	-	1	-	-	2	3
Arachnida	Arachnidae	-	-	-	1	-	-	-	1
Heteroptera	Euridema ventralis	-	-	-	1	-	-	-	1
Total		13	58	12	27	17	36	24	187

Table 6

The dynamic and abundances the species collected in untreated rape cultures from SC Ţigănaşi Iaşi

Order	Species /family	No. of samples/harvesting						Total
		1	2	3	4	5	6	
Coleoptera	Meligethes aeneus	23	32	24	23	38	38	178
	Epicometis hirta	1	-	-	-	-	-	1
	Phylotreta atra	31	8	22	17	17	21	116
	Baris chlorizans	-	2	-	-	-	-	2
	Phylotreta vittula	-	-	14	-	5	-	19
Homoptera	Cercopis vulnerata	2	-	-	-	-	-	2
	Cicadellidae	-	1	-	-	2	-	3
Hymenoptera	Formicidae	2	-	-	3	-	4	9
Arachnida	Arachnidae	2	-	-	-	-	-	2
Heteroptera	Miridae	-	2	-	1	1	2	6
	Euridema oleracea	-	-	2	1	-	3	6
Total		61	45	62	45	63	68	344

In the rapeseed culture in farm S.C. AGRO IND COM S.R.L. Botoşani, at treated variant, were collected 100 exemplary belonging to orders *Coleoptera.* The species *Meligethes aeneus* had the largest number of samples - 92 (table 7).

Table 7

The dynamic and abundances the species collected in treated rape cultures from S.C. AGRO IND COM S.R.L. Botoşani

Order	Species /family	No. of samples/harvesting					Total
		1	2	3	4	5	
Coleoptera	Meligethes aeneus	12	23	13	12	32	92
	Epicometis hirta	-	1	2	1	-	4
	Cantharis pulicaria	-	1	-	-	-	1
	Apion hookeri	-	-	3	-	-	3
Total		12	25	18	13	32	100

In the untreated variant, were collected 302 exemplary belonging to 4 orders: *Coleoptera, Hymenoptera, Diptera* and *Heteroptera.* Orders *Coleoptera* contains the most number of species (274 samples). The species *Meligethes aeneus* had the largest number of samples - 147 (table 8).

Table 8

The dynamic and abundances the species collected in untreated rape cultures from S.C. AGRO IND COM S.R.L. Botoşani

Order	Species /family	No. of samples/harvesting					Total
		1	2	3	4	5	
Coleoptera	Meligethes aeneus	25	25	24	15	58	147
	Phylotreta atra	4	56	4	6	4	74
	Phylotreta vittula	41	6	-	-	-	47
	Baris chlorizans	-	-	-	-	6	6
Hymenoptera	Athalia rosae	-	-	-	2	-	2
Diptera	Anthomyidae	-	-	8	11	-	19
Heteroptera	Pyrrochoris apterus	-	-	-	5	-	5
	Euridema oleracea	-	2	-	-	-	2
Total		70	89	36	39	68	302

CONCLUSIONS

In 2011 in the rapeseed culture in farm S.C. MOLDOVA Ţigănaşi S.A. Iaşi, in the treated variant were effectuates a number of 7 collected and were collected 187 samples belonging to 5 orders: *Coleoptera, Hymenoptera, Diptera, Arachnida,* and *Heteroptera*.

At untreated variant were effectuates a number of 6 collected and were collected 344 exemplary belonging to 5 orders: *Coleoptera, Hymenoptera, Homoptera, Arachnida* and *Heteroptera*.

The most frequently species collected belonging to orders *Coleoptera*.

In the rapeseed culture in farm S.C. AGRO IND COM S.R.L. Botoşani, at treated variant, were effectuates a number of 5 collected and were collected 100 exemplary belonging to orders *Coleoptera.*

In the untreated variant, were effectuates a number of 5 collected and were collected 302 exemplary belonging to 4 orders: *Coleoptera, Hymenoptera, Diptera* and *Heteroptera.* Orders *Coleoptera* contains the most number of species (274 samples).

In totally, in the two ecosystem, orders *Coleoptera* is dominant. The species with the largest number of specimens collected were: *Meligethes aeneus* F. followed by *Phyllotreta atra* L., *Phyllotreta vittula* F., *Epicometis hirta* Poda and *Baris chlorizans* P.

In the two ecosystems, in untreated variant were collected most samples (344 respectively 302 samples) compared to the treated variant (187 respectively 100 samples).

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