

INVESTIGATIONS CONCERNING THE ARTHROPOD FAUNA OF SOME SOYBEAN VARIETES

CERCETĂRI PRIVIND FAUNA DE ARTROPODE A UNOR SOIURI DE SOIA

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Abstract: It presents the results concerning the study of the arthropod fauna structure of soybean genetically, modified and classic varieties. From the carried out investigations results that modified genetically varieties were less attacked by the mites (Acari). The insect attack was generally reduced or almost equally in comparison with classic varieties. The abundance of the zoophagous insects was not reduced on the modified genetic varieties.

Rezumat: Sunt prezentate rezultatele privind studiul structurii faunei de artropode a unor soiuri de soia modificate genetic și celor clasice. Din cercetările efectuate rezultă că soiurile modificate genetic au fost mai puțin atacate de acarieni (Acari). Atacul insectelor a fost în general mai redus sau aproape egal la soiurile transgenice în comparație cu soiurile clasice. Abundența insectelor zoofage nu a fost mai redusă la soiurile modificate genetic.

Key words: soybean, genetically, modified varieties arthropod, fauna.
Cuvinte cheie: soia, soiuri modificate genetic, fauna, artropode.

INTRODUCTION

The arthropod fauna of soybeans cultures contains a great number of damaging species (Hygley & Boethel, 1994), (Čamprag, Kereši & Sekulić, 1996). In Romania the soybean damaging arthropod fauna were investigated by Manolache C.I. and all (1949-1961), Hulea et al (1977), Hatman et al (1986), Pălăgeșiu et al (1992).

In present time the soybean culture have an important number of genetically modified varieties cultivated in many countries in the entire world. The problem of the genetically engineered organisms, the benefits and risks were discussed (Fingham & Ravetz, (1991), (Minkessen et al., 1996), also impact on the environment (Rogers & Kirbers, 1995). An important aspect less investigated is the resistance of transgenic plants to the damaging insect attack (Couteaudier & Riba, 1998), (Badea & Săndulescu, 2001) and the possibility of the genetically modified organisms use in plant protection (I. Pălăgeșiu, 2001).

In this way the paper presents the results regarding the arthropod fauna structure of some soybean classic and genetically modified varieties cultivated in conditions of the Didactic Station from Banat's Agricultural Sciences University Timișoara.

MATERIAL AND METHODS

The arthropod fauna was collected from soybean cultures of Didactic Station Timișoara in 2004 and 2005.

The insects were collected with standard entomological net, with 50 randomized cuts from the investigated areas. The 100 soybean leaves were collected from every investigated area for determination of spider (Acari) incidence the collected material was prepared and then determined in the laboratory of Entomology.

In 2004 were investigated the classic variety *Avila* variety and *Roundup Ready* (MGO-s) variety and in 2005 the *Avila* variety and 9191 RR (MGO-s) line.

RESULTS AND DISCUSSIONS

In 2004 the soybean arthropod fauna of the *Avila* variety were represented by species from two classes, eight orders, ten families and 12 species (Table 1).

Table 1

Arthropod fauna collected from the soybean variety *Avila* – S.D. Timișoara 2004

Class	Order	Family	Species	Nr. ex
Arachnida	Acari	Tetranychidae	<i>Tetranychus</i> sp. Koch.	43
Insecta	Orthoptera	Catantopidae	<i>Calliptamus italicus</i> L.	3
		Tetrigidae	<i>Tetrix bipunctata</i> L.	5
	Heteroptera	Miridae	<i>Lygus pratensis</i> L.	4
			<i>Adelphocoris lineolatus</i> Goeze.	7
		Anthocoridae	<i>Anthocoris nemorum</i> L.	2
	Homoptera	Aphrophoridae	<i>Phyllaenus spumarius</i> L.	4
	Hymenoptera	Vespidae	<i>Polistris aptabilis</i> Kohl.	1
	Planipennia	Chrysopidae	<i>Chrysopa cornea</i> Steph.	1
			<i>Chrysopa</i> sp.	10
	Lepidoptera	Noctuidae	<i>Heliothis virescens</i> Hb.	1
	Diptera	Agromyzidae	<i>Agromyza</i> sp.	2

In 2004 the soybean arthropod fauna of the Roundup Ready variety (GMOs) were represented by the species from two classes, eight orders, nine families and 11 species (Table 2).

Table 2

Arthropod fauna collected from the soybean variety *Roundup Ready* – S.D. Timișoara 2004

Class	Order	Family	Species	Nr. ex
Arachnida	Acari	Tetranychidae	<i>Tetranychus</i> sp. Koch.	6
Insecta	Orthoptera	Catantopidae	<i>Calliptamus italicus</i> L.	1
			<i>Lygus pratensis</i> L.	9
	Heteroptera	Miridae	<i>Calocaris</i> sp.	1
		Pyrrochoridae	<i>Pyrrochoris apterus</i> L.	1
	Homoptera	Aphrophoridae	<i>Phyllaenus spumarius</i> L.	6
	Hymenoptera	Ichneumonidae	<i>Mesochorus rufipes</i> Grav.	1
	Coleoptera	Chrysomelidae	<i>Diabrotica virgifera virgifera</i> Le Conte	2
			<i>Chrysopa cornea</i> Steph.	1
	Planipennia	Chrysopidae	<i>Chrysopa</i> sp.	8
	Lepidoptera	Noctuidae	<i>Heliothis virescens</i> Hb.	2

In 2005 the soybean arthropod fauna of the *Avila* variety were represented by species from two classes, nine orders, 18 families and 23 species (Table 3).

Table 3

Arthropod fauna collected from the soybean variety *Avila* – S.D. Timișoara 2005

Class	Order	Family	Species	Nr. ex
Arachnida	Acari	Tetranychidae	<i>Tetranychus</i> sp. Koch.	42
Insecta	Orthoptera	Tetrigonidae	<i>Tetrigonia viridissima</i> L.	1
		Catantopidae	<i>Calliptamus italicus</i> L.	10
		Tetrigidae	<i>Tetrix bipunctata</i> L.	2
		Gryllidae	<i>Gryllus campestris</i> L.	2
		Acrididae	<i>Docostaurus maroccanus</i> Thumb.	2
			<i>Lygus pratensis</i> L.	3
	Heteroptera	Miridae	<i>Adelphocoris lineolatus</i> Goeze.	7
		Scutelleridae	<i>Eurygaster austriaca</i> Sch.	1
		Pentatomidae	<i>Eurydema oleracea</i> L.	5
		Aphrophoridae	<i>Phyllaenus spumarius</i> L.	22
			<i>Macrostelus</i> sp.	1
	Homoptera	Jassidae	<i>Psamotettix striatus</i> L.	3
			<i>Aphis fabae</i> Scop.	16
		Aphididae	<i>Acyrtosiphum onobrydis</i>	3
			<i>Apis mellifica</i> L.	1
	Hymenoptera	Apidae	<i>Apis mellifica</i> L.	1
	Coleoptera	Chrysomelidae	<i>Phyllotreta</i> sp.	1
		Curculionidae	<i>Sitona crinitus</i>	1
	Planipennia	Chrysopidae	<i>Chrysopa cornea</i> Steph.	3
	Lepidoptera	Noctuidae	<i>Plusia</i> sp.	1
			<i>Agromyza</i> sp.	17
			<i>Opomyza</i> sp.	1
	Diptera	Agromyzidae	<i>Lyriomyza</i> sp.	1

The arthropod fauna of the 9191 RR line (MGO-s) were represented by insects from two classes, eight orders 17 families and 22 species (Table 4).

It results that arthropod fauna of the soybean varieties were almost similar but with a reduced number of families and species on the genetically modified varieties.

Table 4

Arthropod fauna collected from the soybean variety 9191 R.R. – S.D. Timișoara 2005

Class	Order	Family	Species	Nr. ex	
Arachnida	Acari	Tetranychidae	<i>Tetranychus sp. Koch.</i>	18	
		Tetranychidae	<i>Tetranychus sp. Koch.</i>	17	
Insecta	Orthoptera	Catantopidae	<i>Calliptamus italicus L.</i>	3	
		Acridae	<i>Doclostaurus maroccanus Thumb.</i>	1	
		Miridae	<i>Lygus pratensis L.</i>	10	
	Heteroptera	Miridae	<i>Adelphocoris lineolatus Goeze.</i>	13	
			<i>Phyllaenus spumarius L.</i>	18	
			<i>Aphrophora ulmi Fall.</i>	1	
	Homoptera	Aphrophoridae	<i>Aphrophora ulmi Fall.</i>	1	
		Jassidae	<i>Psamotettix striatus L.</i>	2	
		Aphididae	<i>Aphis fabae Scop.</i>	9	
	Hymenoptera	Aphididae	<i>Acyrtosiphum sp.</i>	3	
			<i>Torymus sp.</i>	1	
			<i>Aphidius sp.</i>	2	
			<i>Sphecidae</i>	<i>Trypoxylon sp.</i>	1
			<i>Vespidae</i>	<i>Vespa germanica L.</i>	1
			<i>Elateridae</i>	<i>Agriotes usulatus Schol.</i>	2
			<i>Chrysomelidae</i>	<i>Chrysomela sp.</i>	1
	Coleoptera	Chrysomelidae	<i>Phyllotreta sp.</i>	1	
			<i>Curculionidae</i>	<i>Sitona crinitus L.</i>	2
			<i>Noctuidae</i>	<i>Agrotis sp.</i>	5
	Lepidoptera	Noctuidae	<i>Agrotis sp.</i>	5	
	Diptera	Agromyzidae	<i>Lyriomyza sp.</i>	5	
			<i>Agromyza sp.</i>	3	

In 2004 the mites incidence in the soybean arthropod fauna on the Avila variety was 51.80% and on the Roundup Ready variety was only 15.78% (Figure 1).

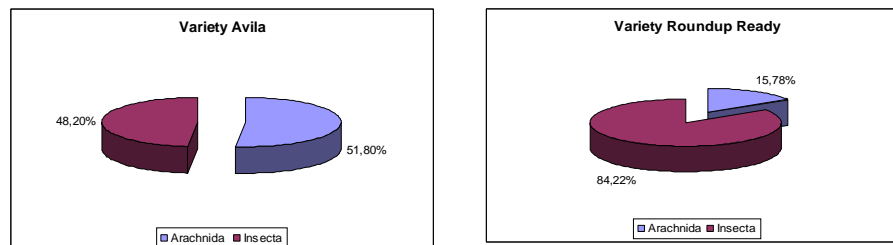


Figure 1. Incidence of damaging arthropods in some soybean varieties fauna S.D. Timișoara 2004

In 2005 on the Avila variety the mites represented 28.76 from soybean arthropod fauna and on the 9191 RR line 15.25% (Figure 2).

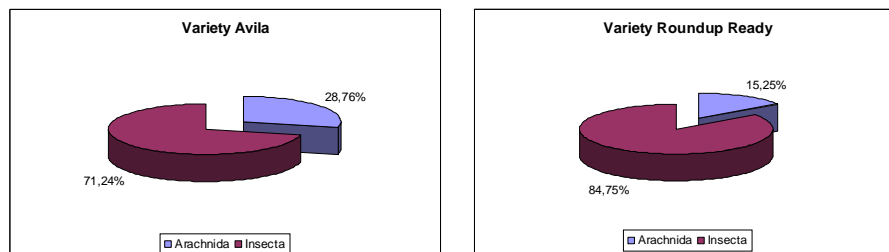


Figure 2. Incidence of damaging arthropods in some soybean varieties and lines S.D. Timișoara 2005

It results that on the genetically modified varieties the presence of the mites is evidently lower in comparison, with the presence on the classic variety.

In 2004 the structure of damaging insects from different orders showed that the soybean entomofauna from Avila variety contained in majority species from orders *Heteroptera* (46.42%), *Orthoptera* (28.57%) and *Homoptera* (14.28%) and from Roundup Ready variety the species from orders *Heteroptera* (50.0%) and *Homoptera* (41.59%). The *Orthoptera* species was only 4.54% (Figure 3).

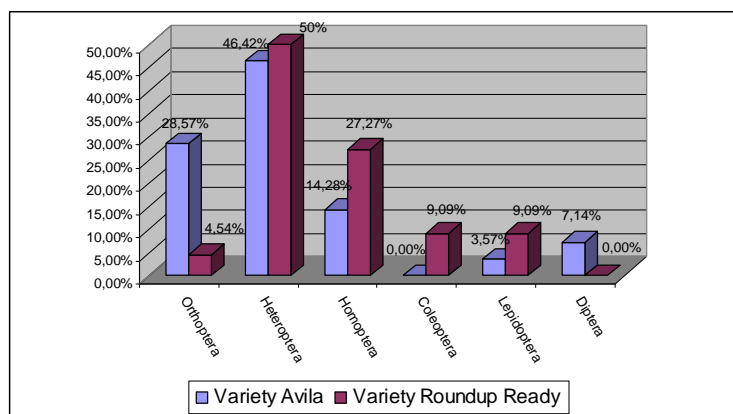


Figure 3. Structure of the damaging insect fauna of some soybean varieties S. D. Timișoara 2004

The structure of damaging insects from the insect orders in 2005 showed that the soybean entomofauna from the Avila variety contained in majority species from *Homoptera* (45.0%), *Orthoptera* (17%), *Heteroptera* 16% and from the 9191 RR line from *Homoptera* (34.73%), and *Heteroptera* (24.21%) (Figure 4).

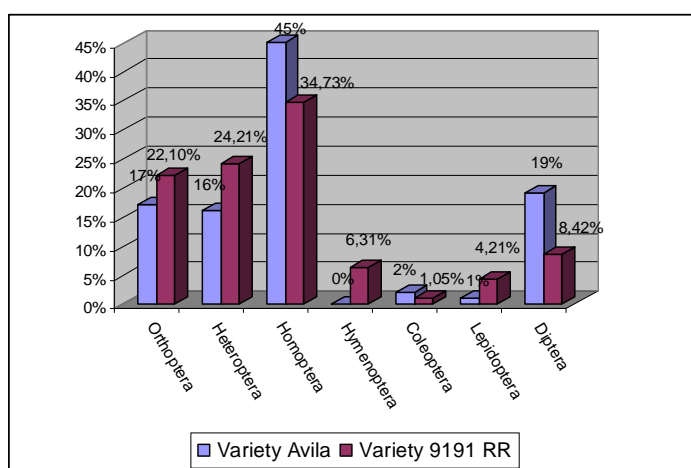


Figure 4. Structure of damaging insects fauna of the soybean varieties and lines S. D. Timișoara 2005

In 2004 and 2005 the insects of the orders *Homoptera* and *Heteroptera* were most abundant in all varieties.

In 2004, the zoophagous insects represented 30.76%, from the soybean insect fauna on the *Avila* variety and 31.25% on the Roundup Ready variety (Figure 5).

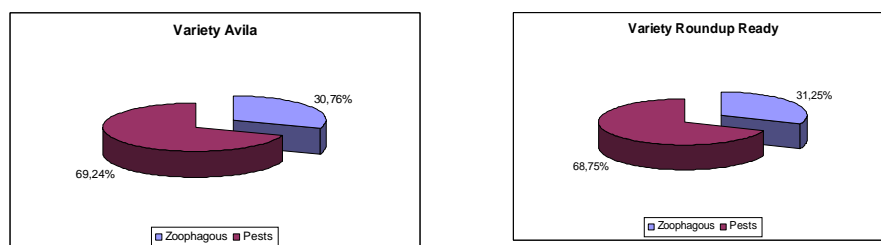


Figure5 Incidence of zoophagous insects in the insect fauna of soybean varieties S.D. Timișoara 2004

In 2005 the zoophagous insects represented 41% from the *Avila* variety insect fauna and 5.15% from the 9191 RR line (Figure 6).

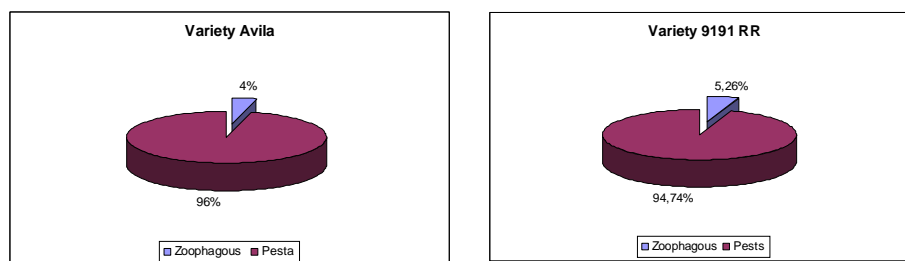


Figure 6. Incidence of zoophagous insects in insect fauna of soybean varieties and lines S.D. Timișoara 2005.

The results show that the natural enemies were not evidently different on the genetically modified soybean varieties in comparison in the classic varieties.

These are only first investigations concerning the arthropod fauna from different soybean varieties but it must be continued.

CONCLUSIONS

The arthropod fauna of the soybean varieties were almost similar on the classic and genetically modified varieties but with a few families and species on the genetically modified varieties.

The mite incidence was reduced on the genetically modified varieties.

The *Homoptera* and *Heteroptera* orders were most abundant on all investigated soybeans varieties.

The zoophagous insects were not evidently different on the classic and genetically modified soybean varieties.

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