PRELIMINARY STUDIES REGARDING THE USEFUL AND PEST ANIMAL SPECIES FROM DIFFERENT VARIANTS OF MAIZE IN TIMIS, CALARASI AND BRAILA COUNTIES

STUDII PRELIMINARE PRIVIND SPECIILE DE ANIMALE BENEFICE SI DĂUNĂTOARE PREZENTE IN DIFERITE VARIANTE DE PORUMB DIN JUDEȚELE TIMIŞ, CĂLĂRAŞI ŞI BRĂILA

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Abstract: *In last time the attention of specialists is trended on finding of solutions in plant protection against pest species and protecting of useful species. The pro-against opinions existent actually on genetically modified plants convinced us to make studies regarding the effect of Bt maize on animal species who lives in maize crops. So, it were studied number of useful species and pest from soil, on plant and on traps, in comparative variant-conventionally maize and Bt maize, in some counties (Timiş, Călăraşi şi Brăila) from our country. During 2008 year we obtained some preliminaries data. These studies are needed to follow in next years (2 at least). The structure and composition of invertebrate's fauna from the three pedoclimatically zones were analyzed by using specifically methods, detailed in lab and studies direct observations in crop maize. The representative species in the samples were follow classes: Nematoda, Arachnida, Miriapoda, Insecta. In soil samples in Bt maize and in conventionally maize, too the most of species were useful (Carabidae). Among pest species, dominants were nematodes, especially in conventionally maize. Following the directly observations, a great percent of the attack of plants was registered at species from Phyllotreta genus, especially in conventionally maize (56.3%). Following the readings of the traps (Timiş) we can mentioned that in conventionally maize Diabrotica adults were greater (398,3ad.) than in Bt maize (146,33ad.). The results were obtained by financially and material support of international research Project MADR/MAKIS, 2008-2010.*

Rezumat: *În ultimul timp atenția specialiştilor se îndreaptă spre găsirea unor soluții care să protejeze cât mai bine planta împotriva atacului de dăunători si care să protejeze speciile utile. Părerile pro si contra, în ceea ce privește planta modificată genetic, existente la ora actuală în lume ne-a determinat să studiem efectul porumbului modificat genetic asupra organismelor animale prezente în agroecosistemele de porumb. În acest sens s-a determinat numărul de specii de animale utile şi dăunătoare prezente în sol, pe sol, plantă sau pe capcane speciale, în variante comparative cultivate cu porumb convențional şi porumb modificat genetic, în câteva județe din țară (Timiş, Călăraşi şi Brăila). Pe parcursul anului 2008 am obținut câteva date preliminarii, cercetările necesitând o continuare, cel puțin 2 ani. Structura şi compoziția faunei de nevertebrate în culturile amplasate în cele trei zone pedoclimatice au fost determinate prin metode specifice şi studii detaliate de laborator precum şi vizualizare macroscopică direct în câmpurile experimentale. Reprezentante în probe au fost clasele: Nematoda, Arachnida, Miriapoda, Insecta. În probele de sol au predominat carabidele (specii benefice), atât în varianta Bt cât şi în varianta cu porumb convențional. Dintre speciile dăunătoare, nematodele au fost preponderente în variante, valori maxime înregistrându-se în varianta cu porumb convențional. În urma observațiilor directe, un procent ridicat al puricilor din genul Phyllotreta, mai ales în varianta cu porumb convențional (56,3%). În urma citirilor capcanelor (Timiş) în PC specia Diabrotica a preponderat (398,3ad.) față de porumbul Bt (146,33ad.). Rezultatele prezentate sunt obținute prin suportul financiar si material al contractului de cercetare internațional de tip MADR-MAKIS, 2008-2010.*

Key words**:** *useful and pest animal species, maize, Timis, Calarasi, Braila*
Cuvinte cheie**:** *specii, animale, utile, daunatoare, porumb, Timis, Calarasi, Braila*

INTRODUCTION

Maize (*Zea mays L.*), the world's third leading cereal crop following wheat and rice, is grown commercially in over 25 countries (PERSHING, 2004). The maize is one of the most important crops from our country, too. In these crops are live a lot of animal species (GROZEA et. col., 2006). One of these is very dangerous for maize plants and another is useful. So we tried to make known what are the dangerous insects.

Among the useful species it can be mentioned Aranae (*Agelena sp., Argiope bruennichi, Theridion impressum, Theridion pictum, Enoplognatha latimana, Achaearanea tepidariorum, Xisticus sp*.), Asilidae and *Tettigonia viridissima* were found to prey on *D. v. virgifera* adults. Aranae (*Lepthyphantes sp. Oedothorax apicatus, Pardosa sp., Trochosa spinipalpis*), Carabidae (*Amara similata, Brachinus crepitans, Pseudoophonus (Harpalus) rufipes, Trechus quadristiatus*), several Formicidae, and *Gryllus campestris* were found to prey on larvae (TOEPFER et. al, 2009). From beneficial species can be notice spiders: Theridion impressum (Araneae: Theriidae), Argiope bruennichi (Araneae: Araneidae), Speira diademata (Araneae: Araneidae), Pseudophomus rufipes (Coleoptera: Carabidae) (GROZEA et al., 2007).

The most important pest species frecvent in maize fields from western part of country were follows: *Tanymechus dillaticolis, Diabrotica virgifera virgifera, Oulema melanopa, Opatrum sabulosum, Ostrinia nubilalis and Aphis maidis* (GROZEA et al., 2007).

MATERIAL AND METHODS

The researches were carried during 2008 year, in three experimental fields. Each of them was parted in 2 variants: I – conventionally maize and II – Bt maize.

The samples have taken from experimental fields to each 20 days, in June – September main studies period. The samples data were follows: June 9, June 28, July 17, August 6, August 26 and September 10. It has taken 2 samples/variant. The main studies have make by detail in laboratory and direct in crops maize from Gataia-Timis, Calarasi and Racovita (Braila).

The structure and composition of invertebrate's fauna from the three pedoclimatically zones were analyzed by using specifically methods: soil traps for hypogeic fauna, pheromone traps type Csalomon VARL, Csalomon VARs+ (♂, ♀), pheromone traps type Csalomon (♂) and yellow traps Trécé Pherocon for epigeic fauna. The samples were transported in laboratory for scientific and systematically determination (species, genus, order, class). After that activity the data obtained were centralized and statistically processed. For founding the right places of traps it was used a GPS. In evaluation of yield losses were analyzed 40 cobs by determination of weight using the analytical balance type Kern, long, grain number, humidity, amidon and protein.

RESULTS AND DISCUSSIONS

The animal species that were observed in experimental variants has below the follows Phyllum: Nemathelminthes, Annelida, Arthropoda si Chordata (Vertebrata) and the classes: Nematoda, Arachnida, Miriapoda and Insecta. The representative orders were follow: Opisthopora, Araneae, Megadenopoda, Protura, Diplura, Collembola, Homoptera, Coleoptera, Lepidoptera, Diptera and Rodentia. The most important family from samples were: Aphididae, Cicadellidae, Elateridae, Chrysomelidae, Curculionidae, Noctuidae, Pyraustidae, Microtidae.

In soil sampling from Gataia maize variants (in conventionally maize and Bt maize, too) were observed many usefully species from Carabidae family (table 1, chart 1).

Among species that abide in maize crops from Calarasi experimental fields were mark out those from Collembola, Nematoda ad Carabidae family. The greater number of Carabidae was observed in Bt maize variants comparative with conventionally variants. The species from Miriapoda was no observed (table 2, chart 1).

Regarding the observations made in Racovita on sample from those two variants us founding that just usefully species of Carabidae was present the other species were missing (table 3, chart 1). The explanation could be the using of irrigation system in studied zone.

Relative with western part of country, in south-east part (table 2,3).

Table 1

Number of animal species from soil samples from Gătaia

Variant	Month	No. of species (mean/repetition I, II, III)			
		Collembola	Nematodes	Carabidae	Myriapods
I Conventionally maize	June	3,5	9,6	10,5	2,3
	July	6,3	7,75	26,3	5,1
	August	5,2	6,1	10,2	3,0
	Means	5,0	7,82	15,66	3,47
II Bt maize	June	5,4	6,0	12,8	1,3
	July	6,0	4,2	22,0	0,0
	August	1,0	1,7	7,5	1,0
	Means	4,13	3,97	14,1	0,77

Table 2

Number of animal species from soil samples from Calarasi

Variant	Month	No. of species (mean/repetition I, II, III)			
		Collembola	Nematodes	Carabidae	Myriapods
I Conventionally maize	June	5,5	4,0	5,3	0,0
	July	4,6	5,2	6,0	0,0
	August	5,3	4,1	2,2	0,0
	Means	5,13	4,43	4,5	0,0
II Bt maize	June	0,0	3,0	8,8	0,0
	July	0,0	3,2	2,0	0,0
	August	0,0	1,8	5,5	0,0
	Means	0,0	2,66	5,43	0,0

Table 3

Number of animal species from soil samples from Racovita

Variant	Month	No. of species (mean/repetition I, II, III)			
		Collembola	Nematodes	Carabidae	Myriapods
I Conventionally maize	June	0,0	0,0	12,3	0,0
	July	0,0	0,0	10,0	0,0
	August	0,0	0,0	12,4	0,0
	Means	0,0	0,0	11,57	0,0
II Bt maize	June	0,0	0,0	13,8	0,0
	July	0,0	0,0	9,6	0,0
	August	0,0	0,0	12,0	0,0
	Means	0,0	0,0	11,8	0,0

Table 4

Number of *Helicoverpa armigera* and *Diabrotica virgifera virgifera* adults in experimental field from Gătaia

Variant	Month	No. of species (mean/repetition I, II, III)	
		Diabrotica virgifera virgifera (No. of adutlts/trap)	Helicoverpa armigera (No. of adutlts/trap)
I Conventionally maize	June	42,3	0,0
	July	398,3	2,8
	August	265,0	6,1
	Means	235,2	2,97
II Bt maize	June	30,0	0,0
	July	289,0	2,3
	August	120,0	5,2
	Means	146,33	2,5

Table 5

Number of *Helicoverpa armigera* and *Diabrotica virgifera virgifera* adults in experimental field from Calarasi

Variant	Month	No. of species (mean/repetition I, II, III)	
		Diabrotica virgifera virgifera (No. of adutlts/trap)	Helicoverpa armigera (No. of adutlts/trap)
I Conventionally maize	June	0,0	0,0
	July	0,0	10,0
	August	0,0	22,2
	Means	0.0	10,73
II Bt maize	June	0,0	0,0
	July	0,0	9,5
	August	0,0	15,0
	Means	0,0	8,17

Table 6

Number of *Helicoverpa armigera* and *Diabrotica virgifera virgifera* adults in experimental field from Racovita

Variant	Month	No. of species (mean/repetition I, II, III)	
		Diabrotica virgifera virgifera (No. of adutlts/trap)	Helicoverpa armigera (No. of adutlts/trap)
I Conventionally maize	June	0,0	0,0
	July	0,0	7,5
	August	0,0	9,0
	Means	0,0	5,5
II Bt maize	June	0,0	0,0
	July	0,0	2,2
	August	0,0	3,1
	Means	0,0	1,77

Following the readings of the traps (Timiş) we can mentioned that in conventionally maize *Diabrotica* adults were greater (398,3ad.) than in Bt maize (146,33ad.). Regarding *Helicoverpa armigera* species in both variants was registered close values of the number of adults/trap (2,5 respectively 2,97 ad/trap) (table 4-6).

In south part of country the *Diabrotica* adults were missing.

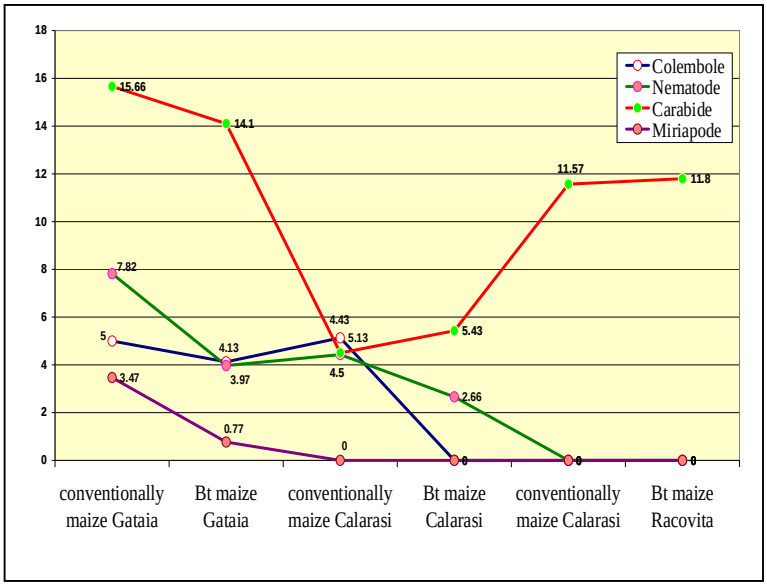

Chart 1. Dynamics of species from soil samples from those three locations

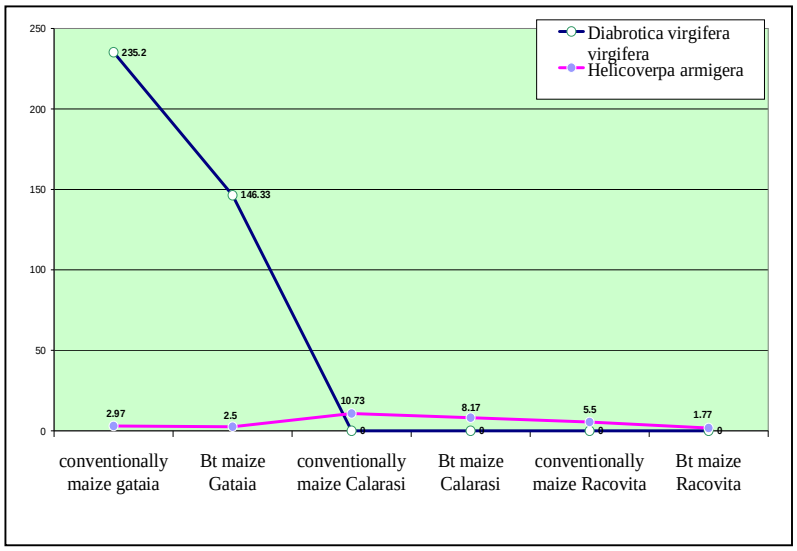

Chart 2. Dynamics of *Helicoverpa armigera* and *Diabrotica virgifera virgifera* adults from those three locations

Following the directly observations in maize fields from Gataia (table 4), a great percent of the attack of plants was registered at species from *Phyllotreta* genus, especially in conventionally maize (56.3%). The same situation was registered in Racovita and Calarasi. In Bt variants from Calarasi in those three locations the attack of Ostrinia n. larvae was missing

(table 7-9). On the other hand, in conventionally variant the values of attack was great (Gătaia - 19,8%, Călăraşi- 26,33**%,** Racovița - 17,67%).

Table 7

The percent of attacked plants by *Ostrinia* n., *Phyllotreta* sp. and *Oulema* m. in maize variants from Gătaia

Variant	Month	Percent of attacked plants (mean/repetition I, II, III) 200 analyzed plants)		
		Ostrinia nubilalis	*Phyllotreta sp.*	*Oulema melanopa*
I Conventionally maize	June	0,0	42,0	0,0
	July	22,1	59,3	6,0
	August	37,3	67,6	14,3
	Means	19,8	56,3	6,76
II Bt maize	June	0,0	31,2	0,0
	July	0,0	42,3	5,1
	August	0,0	45,8	10,2
	Means	0,0	39,77	5,1

Table 8

The percent of attacked plants by *Ostrinia* n., *Phyllotreta* sp. and *Oulema* m. in maize variants from Calarasi

Variant	Month	Percent of attacked plants (mean/repetition I, II, III) 200 analyzed plants)		
		Ostrinia nubilalis	*Phyllotreta sp.*	*Oulema melanopa*
I Conventionally maize	June	0,0	35,0	0,0
	July	31,0	50,0	0,0
	August	48,0	51,6	1,0
	Means	26,33	45,53	0,33
II Bt maize	June	0,0	30,2	0,0
	July	0,0	55,3	0,0
	August	0,0	45,8	10,2
	Means	0,0	39,77	5,1

Table 9

The percent of attacked plants by *Ostrinia* n., *Phyllotreta* sp. and *Oulema* m. in maize variants from Racovița

Variant	Month	Percent of attacked plants (mean/repetition I, II, III) 200 analyzed plants)		
		Ostrinia nubilalis	*Phyllotreta sp.*	*Oulema melanopa*
I Conventionally maize	June	0,0	25,0	0,0
	July	24,0	27,3	3,6
	August	29,0	30,0	13,0
	Means	17,67	27,43	5,53
II Bt maize	June	0,0	10,0	0,0
	July	0,0	12,5	0,0
	August	0,0	18,0	3,0
	Means	0,0	13,5	1,0

CONCLUSIONS

The representative species in the samples were follow classes: Nematoda, Arachnida, Miriapoda, Insecta.

In soil samples in Bt maize and in conventionally maize, too the most of species were useful (Carabidae). Among pest species, dominants were nematodes, especially in conventionally maize.

Following the directly observations, a great percent of the attack of plants was registered at species from Phyllotreta genus, especially in conventionally maize (56.3%).

In Bt variants from Calarasi in those three locations the attack of Ostrinia n. larvae was missing.

Following the readings of the traps (Timiş) we can mentioned that in conventionally maize Diabrotica adults were greater (398,3ad.) than in Bt maize (146,33ad.).

In south part of country the *Diabrotica* adults were missing.

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