RESEARCHES CONCERNING THE TOXICITY OF SOME INSECTICIDES TOWARDS THE POLINATING BEES FROM ALFAALFA CULTIVATIONS

CERCETĂRI PRIVIND TOXICITATEA UNOR INSECTICIDE ASUPRA ALBINELOR POLENIZATOARE DIN CULTURILE DE LUCERNĂ

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Abstract: *Researches were carried out for the determination of some insecticides toxicity used actually on large scale in the agricultural practice, towards the pollinating bees from the alfalfa cultivation, under the condition from the South-Western part of Romania. The previous researches in our country were performed by CÂRNU, CIURDĂRESCU, PAULIAN et al., BURA et all. The researches were made under field conditions, in the alfaalfa from the experimental field of the Didactic Station Timişoara, during 2007-2008. There were used insulators with an area of 1 m^2. Sprayings with insecticides were performed; 50 bees were introduced in each insulator and the mortality was supervised after 4, 8, 24 and 48 hours. The following insecticides were used: Fastac 10 EC (alfa-cypermethrin) - 0.15 l/ha, Sinoratox 35 CE (dimethoate) 1.5 l/ha, Decis 2.5 EC (deltamethrin)- 0.3 l/ha. Each variant was performed in three replications and compared with the untreated control variant. A moderate toxicity presented Fastac 10 EC. The researches on the toxicity of some insecticides to alfalfa pollinators have not been subject to such investigations in the South-Western part of Romania. The results achieved represent original contributions to the knowledge regarding the pollinating insects and their protection for obtaining an increased alfalfa qualitative and quantitative seed yield.*

Rezumat: *Cercetările au fost efectuate pentru determinarea toxicităţii unor insecticide utilizate actual pe scară largă în practica agricolă asupra albinelor polenizatoare din cultura de lucernă în condiţiile din Sud-Vestul României. Cercetări asemănătoare în ţara noastră au fost efectuate de CÂRNU, CIURDĂRESCU, PAULIAN şi colab., BURA şi colab. Cercetările au fost efectuate în condiţii de câmp pe lucerna, din câmpul experimental al Staţiunii Didactice Timişoara în perioada 2007-2008. Au fost utilizate izolatoare cu suprafaţa de 1 m^2. Stropirile cu insecticide au fost efectuate pe 50 de albine care au fost introduce în fiecare izolator, iar mortalitatea a fost urmărită după 4, 8, 24 şi 48 de ore. Au fost utilizate următoarele insecticide: Fastac 10 EC (alfa-cypermethrin) - 0.15 l/ha, Sinoratox 35 CE (dimethoat)- 1.5 l/ha, Decis 2.5 EC (deltamethrin)- 0.3 l/ha. Fiecare variantă a fost realizată în trei repetiţii şi comparată cu martorul netratat. O toxicitate moderată a prezentat Fastac 10 EC. Cercetările privind toxicitatea unor insecticide asupra polenizatorilor lucernei, nu a fost cercetată până acum în condiţiile din Sud-Vestul României. Rezultatele obţinute reprezintă contribuţii originale privind protecţia insectelor polenizatoare pentru obţinerea unei producţii de sămânţă superioare din punct de vedere calitativ şi cantitativ.*

Key words: *Toxicity, insecticides, bees alfaalfa*
Cuvinte cheie: *Toxicitate, insecticide, albine şi lucernă.*

INTRODUCTION

Utilization of insecticides has negative effects on all useful insects, on the whole, and especially on pollinators. Chemical control has a great importance for the protection of seed alfalfa crops, but the danger of pollinating bees intoxication is great under such conditions. That is why some researches are necessary to determine the toxicity degree of some insecticides used at the moment in the agricultural practice on pollinating populations, especially on bees, under the conditions from the South-West of Romania.

There are a only a few researches performed on the toxicity of some insecticides on alfalfa pollinators, and no one in the field crops from the Western Romania. Researches, under the conditions in our country, were performed by CÂRNU et all.(1982), CIURDĂRESCU (1972, 1977, 1980), PAULIAN (1981), VARGA and CIURDĂRESCU (1967), BURA et all. (2003).

In this context, the work makes some contributions with regards to the toxicity of some insecticides used in the current agricultural practice on the bees pollinating alfalfa crops in the Western Plain.

MATERIALS AND METHODS

The researches were performed under field conditions, in the alfalfa crops belonging to the Didactic Station Timişoara (D.S.T.) between 2007-2008.

Were used insulators covered with gauze, with the height of 1 m and area of $1m^2$. Were performed sprayings with insecticides, with the help of a manual sprayer. We introduced 50 bees in each insulator and supervised mortality after 4, 8, 24 and 48 hours. Each variant was performed in three replications and compared with the untreated control variant. The pesticides used for the field test in the alfalfa crop were: Sinoratox 35 CE (dimethoate) - 1.5 l/ha, Decis 2.5 EC (deltamethrin) - 0.3 l/ha, Fastac 10 EC (alfa-cypermethrin) - 0.15 l/ha.

RESULTS AND DISCUSSIONS

The researches aimed at the determination of bee mortality under the insecticides used in alfalfa crop protection, and also its dynamics during two experimental years.

Table 1

Bee mortality in the alfalfa crop DST 2007

Insecticide	Replication	No. of dead bees:				Total dead bees (no.)	Mortality %
		4 hours	8 hours	24 hours	48 hours		
Sinoratox 35 CE 1.5 l/ha	R I	23	12	5	5	47	94 %
	R II	19	16	6	5	46	92 %
	R III	25	16	7	2	50	100 %
Decis 2.5 EC 0.3 l/ha	R I	22	12	10	6	50	100 %
	R II	27	9	12	2	50	100 %
	R III	27	11	10	2	50	100 %
Fastac 10 EC 1.5 l/ha	R I	20	14	7	4	45	90 %
	R II	21	10	9	0	40	80 %
	R III	21	9	7	5	42	84 %
Untreated control variant	R I	0	0	0	0	0	0 %
	R II	0	0	0	0	0	0 %
	R III	0	0	0	0	0	0 %

In table 1 may be notice that, successive to pesticide treatments in the alfalfa crop, high mortality was recorded in the case of the treatments with Decis 25 EC (100%), followed by the treatments with Sinoratox 35 CE (92-100%), and the lowest mortality was recorded in the case of the treatments with Fastac 10 EC (between 80-90%).

Table 2

Bee mortality in the alfalfa crop DST 2008

Insecticide	Replication	No. of dead bees:				Total dead bees (no.)	Mortality %
		4 hours	8 hours	24 hours	48 hours		
Fastac 10 EC 1.5 l/ha	R I	22	12	6	4	44	88 %
	R II	18	15	10	0	43	86 %
	R III	19	13	7	5	44	88 %
Decis 2.5 EC 0.3 l/ha	R I	30	13	7	0	50	100 %
	R II	32	11	5	2	50	100 %
	R III	28	11	9	2	50	100 %
Sinoratox 35 CE 1.5 l/ha	R I	23	14	6	4	47	94 %
	R II	21	13	10	2	46	92 %
	R III	21	15	7	0	43	86 %
Untreated control variant	R I	0	0	0	0	0	0 %
	R II	0	0	0	0	0	0 %
	R III	0	0	0	0	0	0 %

In table 2 may be observe that, successive to pesticide treatments in the alfalfa crop, the highest mortality was recorded in the case of the treatments with Decis 25 EC (100%), followed by the sprayings with Sinoratox 35 CE (86-94%), and the lowest mortality was recorded successive to the utilization of Fastac 10 EC (between 86-88%). In two years a high mortality were registered with Decis 2.5 EC and a moderate toxicity with Fastac 10 EC (table 3).

Table 3

Mean bee mortality successive to insecticide treatments DST 2007-2008

Insecticide	**Dead bees DST 2007**		**Dead bees DST 2008**	
	Number	**Percentage (%)**	**Number**	**Percentage (%)**
Sinoratox 35 CE (1.5 l/ha)	47.66	95.33	45.33	90.66
Decis 2.5 EC (0.3 l/ha)	50	100	50	100
Fastac 10 EC (1.5 l/ha)	42.33	84.66	43.66	87.33

Variation of mean mortality of the bees treated with insecticides has lead to high mortality values in both experimental years in the case of the product Decis 2.5 EC, and the smallest values in the case of the insecticide Fastac 10 EC (figure 1).

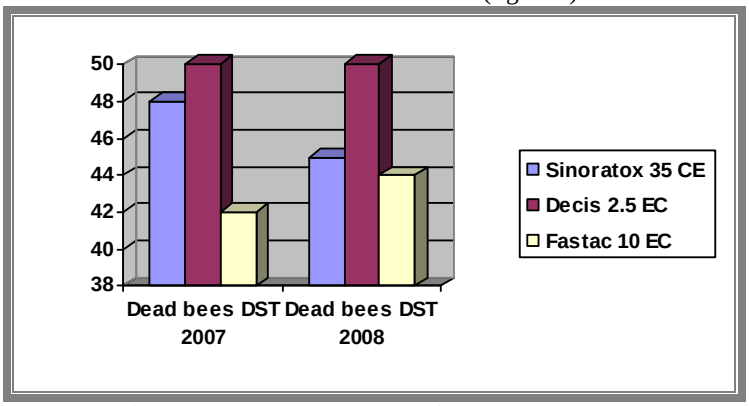

Figure 1. Variation of mean bee mortality in the case of insecticide treatments DST 2007 - 2008

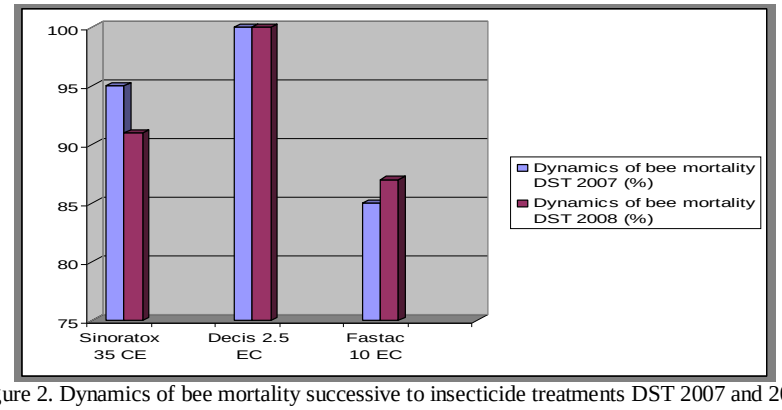

Figure 2. Dynamics of bee mortality successive to insecticide treatments DST 2007 and 2008

During the two experimental years, we may observe that the mortality was constantly high in the case of the insecticide Decis 2.5 EC. Bee mortality values decreased in the case of the insecticide Sinoratox 35 CE and increased in the case of Fastac 10 EC in the second experimental year, compared with the first year of research (figure 2).

The results achieved represent original contributions to the knowledge regarding the entomophil pollination in the Western Romania and to the increase of seed yield under conditions of pollinators protection.

CONCLUSIONS

Bee mortality in 2007 presented the highest values successive to the utilization of Decis 2.5 EC (100%), and the lowest values in the case of the product Fastac 10 EC (80-90%).

In 2008, bee mortality presented the highest values in the case of the insecticide Decis 2.5 EC (100%), and the lowest values in the case of Fastac 10 EC (86-88%).

During the two experimental years, the mean mortality values presented the lowest values in the case of the insecticide Fastac 10 EC, and the highest ones in the case of Decis 2.5 EC.

For the protection of alfalfa pollinating bees, the best results were obtained in the case of Fastac 10 EC1.5 l/ha.

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