

INSECTICIDE EFFECTS OF SOYBEAN EXTRACTS

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Abstract: This paper presents the insecticide and phyto-toxic effects of the two plant products: Aphigun a.i.10% and Lemiex a.i. 20%, based on the esthers and fat acids as biologic active substances, extracted from Soya. The observations carried out in the apple orchard of RDIPP Bucharest showed a very good insecticide effect on the 1-2 age larvae of *Tetranychus urticae* as well as on *Aphis pomi* adults. Under greenhouse conditions the bio-insecticide products showed no phyto-toxic effects on the plants.

Key words: plant products, efficacy and phytotoxicity

INTRODUCTION

The excessively usage of chemical products on the field crops aiming at plant protection, among other effects, lead to higher limits of chemical residues, with negative effects on human and animal health (Butler and Henneberry, 1990; Butler et al.1994; Johnson 1985).

To avoid these undesired effects, the researches were focused on getting new products , using a variety of plant extraction methods, extracts with high biological potential.

Some international and national scientific studies in the field have shown good insecticide activity of Soya oilseeds (Hesler and Plapp 1986; Angello et al. 1994) and dill seeds extract (Alexandra Alexandrescu et al. 1997) etc.

This paper presents the results on the efficacy and phytotoxicity of two plant products : Aphigun 10% and Lemiex 20% based on the esthers and fat acids as active biological compounds from Soya extracts.

The observations were carried out in greenhouse and field conditions. The standard controls were products based on the Deltametrin (Decis 2,5 EC) and Amitraz (Mitac 20 EC).

MATERIAL AND METHOD

The following insects were used as biological material: *Hyphantria cunea* Drurr., *Aphis pomi* De Geer., *Trialeurodes vaporariorum* Westw., and *Tetranychus urticae* Koch.

Tests against fallen webworm (*Hyphantria cunea*) and green apple aphid (*Aphis pomi*) were carried out as to establish the control efficacy of these biological products, in the apple orchard of RDIPP, Bucharest. By the linear method were established the four variant experimental plots: two plots representing concentrations already tested before, one is standard control and another variant is an etalon/standard untreated plot. Each experimental variant included three replicate (one replicate is one tree).

The tomatoes infested by adults greenhouse whitefly (*Trialeurodes vaporariorum*) and respectively eggplants infested by larvae and adults of red mite (*Tetranychus urticae*) were treated. For these two species of insects the tests were carried out under greenhouse conditions, randomized, each variant including three recurrence replicate (one replicate is one plant pot). The treatments were applied during the vegetation period. The observations were carried out before and after the first, third and seventh day of treatment application, both for the control standard plot and for the treated plots as well.

The treatment efficacy on fallen webworm (*Hyphantria cunea*) was assessed according to the Henderson Tilton formula and for the other species of insects, based on Sun Shepard formula.

Phyto-toxicity was carried out in greenhouse conditions on nine plant species, during the 2-4 stages of true leaves. The treatments were applied in recommended as well as in double and triple concentrations.

The observations were carried out on 1, 3, 7, 14 and 21 days following treatment application and the data were recorded as:

- 0 - free of phyto-toxicity
- + - slightly phyto-toxic, the plants recover easily
- ++ - phito-toxicity, the plants recover with difficulty
- +++ - very phyto-toxic, the plants die.

RESULTS

The Table 1 shows two plant products efficacy in the control of *Hyphantria cunea* larvae (L_1 , L_2) in apple orchard.

Table 1

Plant products efficacy on *Hyphantria cunea* Drurr. Control. (1-2 age larvae)

Name of product	Concentration (%)	% Efficacy		
		1 day	3 days	7 days
Aphigun	0,2	100,00	100,00	100,00
	0,5	100,00	100,00	100,00
Lemiex	0,2	100,00	100,00	100,00
	0,5	100,00	100,00	100,00
Decis 2,5 EC (etalon/standard control)	0,025	100,00	100,00	100,00
Untreated plot (alive nr of larve /varriant)	-	263	263	263

The data presented in the previous table showed a very good control of the tested plant products (100%) in controlling of *Hyphantria cunea* – L_{1-2} with both applied concentrations during the entire period of observation. The plant products efficacy showed the same level as the control standard plot with Decis 2,5 EC. These results were obtained under the same conditions with untreated etalon/standard plot, which showed a strong infestation.

The Table 2 shows the plant products efficacy in the control of *Aphis pomi* in apple orchard

Table 2

Plant products efficacy in *Aphis pomi* De Geer. control

Name of product	Concentration (%)	% Efficacy		
		1day	3 days	7 days
Aphigun	0,2	97,33	98,00	95,40
	0,5	100,00	100,00	98,66
Lemiex	0,2	97,84	98,75	93,16
	0,5	100,00	100,00	98,83
Decis 2,5 EC (etalon control)	0,03	100,00	100,00	99,00
Untreated plot(alive nr of sp./variant)	-	1100	1165	1285

Looking to the efficacy results on green apple aphid application treatment, concentration of 0,2% Aphigun on the first day showed 97,33% control, on third day 98% and on 7th days 95,40%. Concentration of 0,2% Lemiex showed a good biological effect, after 1, 3 and 7 days from treatment application, respectively the efficacy was 97,84%, 98,75% and 93,16%. Concentration of 0,5% of the product showed 100% protection during the first 3 days and 98,83% after 3 days. It was noted a relatively low remnant product and it was recommended to repeat treatment application, after 7 days. Both products efficacy results are compatible with those showed by standard plot of Decis 2,5 EC.

The Table 3 shows the products insecticide effect in the control of greenhouse whitefly adults (*Trialeurodes vaporariorum*).

Table 3

Raw extracts insecticide effect in the control of *Trialeurodes vaporariorum* Westw. (adults)

Name of product	Concentration (%)	% Efficacy		
		1day	3 days	7 days
Aphigun	0,2	35,20	19,15	10,33
	0,5	55,77	47,00	21,10
Lemiex	0,2	38,14	22,38	18,66
	0,5	63,75	58,40	37,05
Decis 2,5 EC (control)	0,05	90,23	88,00	85,83
Untreated plot (alive nr.of adults/variant)	-	235	263	287

Looking at the two plant products data recorded in the table, under experimental conditions, a low efficacy is observed compared to the etalon/standard variant plot.

The table 4. also shows the results of Aphigun and Lemiex low insecticide effect on the red mite *Tetranychus urticae*.

Tabelul 4

Raw extracts insecticide effect in the control of *Tetranychus urticae* Koch. (larvae and adults)

Name of product	Concentration (%)	% Efficacy		
		1	3	7
Aphigun	0,2	31,87	29,48	25,58
	0,5	65,20	53,18	48,75
Lemiex	0,2	56,43	48,35	40,83
	0,5	70,18	66,18	51,30
Mitac 20 EC (control)	0,2	98,00	97,78	95,89
Untreated plot (alive nr.of adults/var.)	-	203	240	265

Aphigun 0,5% concentration shows an efficacy control between 48,75% to 65,20% on the larvae and adults of common red mite, and Lemiex between 51,30% and 70,18%; data observed from 1 to 7 days, the values being under the level registered by the etalon/standard variant plot.

The phyto-toxicity of Aphigun and Lemiex insecticides was assessed in greenhouse conditions on nine different plant species such as: wheat, barley, corn, beans, lettuce, tomatoes, cabbage, pepper, and cucumber.

The temperature during the observation period ranged between 25 – 30°C and humidity was between 65 –90%.

As etalon/standard product: Decis 2,5 EC (0,05%), (0,1) and (0,15%) concentrations. All variant plots showed no toxicity effect.

CONCLUSIONS

- Aphigun a.i. 10% and Lemiex a.i. 20% showed a very good biological effect (100%) in the control of *Hyphantria cunea*, for 0,2% and 0,5%, and on *Aphis pomi* for 0,5%.
- The two insecticides showed a low efficacy on *Trialeurodes vaporariorum* and *Tetranychus urticae*.
- The products under observation showed no phyto-toxic effect.

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