BIOLOGICAL CONTROL OF PLUM FRUIT MOTH (CYDIA FUNEBRANA) TR.

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Abstract: *Biological control is a prospective control method that contributes to the diminution of chemical pollution. Using the entomophagous wasp Trichogramma embriophagum Htg. The pheromone traps ATRAFUN we determined the flight curve of the pest Cydia funebrana (plum fruit moth) in order to apply control treatments. Results concerned the efficacy of the bio-preparation Trichotim used by launching during the 1st and 2nd generations of the plum fruit moth worm (Cydia funebrana) at a rate of 300,000 wasps/ha. Data show that applying the bio-preparation Trichotim in an intensive plum plantation (the cultivar Anna Späth) reduced the frequency of fruits attacked with 50% compared to the control (not treated). Yield results were evaluated after the previous use of the foliar fertiliser Nutrient Express, in which we obtained an increase in yield of 140 kg/ha compared to the control variant.*

Key words: *plum tree, trichotim, atrafun, feromoni, foliar fertilizer*

INTRODUCTION

The first researches in Banat for plum fruit moth (*Cydia funebrana*) control were carried out between 1986 and 1990, in the Station for Research and Fruit Production Caransebeş, in the case of the variety Annä Spath, with the utilization of the entomophagous wasp *Trichogramma embriophagum* Htg. and of the sex pheromones traps ATRAFUN, in order to determine pest's flight curve for an optimal control. For each generation, we launched cards in tree coronas with *Sitotroga cerealella* eggs parasitized by *Trichogramma embriophagum*. The cards were purchased from the Biofactory of *Trichogramma* from Strejeşti – Olt, these ones being used for plum fruit moth (*Cydia funebrana*) control.

MATERIAL AND METHOD

We applied the biopreparation Trichotim, with the emtomophagous wasp *Trichogramma sp.* as principle, on the plum variety Anna Späth.

Trichotim is a Romanian product, approved in 2000, used for pest control in cereal and cabbage crops, and orchards and vineyards, too.

Figure 1 Trichotim source:http://danbotoman.blogspot.ro/2011/05/la-timisoara-inceput-lupta-impotriva.html

Trichogramma is a wasp whose size does not overtake 0.5 mm, and who lays its eggs in parasites' eggs, destroying them before affecting plants. It is efficient in the control of 500 parasitical species, but the product made of Deraton S.R.L. was approved only for cabbage moth, the European grapewine moth and in orchards, for fruit moth (*Cydia sp.*).

One gram of product contains about [illegible]ity is efficient for the treatment of 1 ha crop.

Nutrient express may be applied in doses of 2.5 kg/ha for foliar treatments in the following crops: potato, tomato, onion, sweet melon, grapevine, eggplant, cucumber and in orchards.

It is recommended to apply 2 – 4 treatments at 14-day intervals, during the period of intense plant growing and fruit formation.

The content of a 100 g package will be dissolved in 5 l water. The solution achieved may be used in the treatment of 400 m^2.

Nutrient Express is compatible with most of the phyto-sanitary products, but it is not compatible with mineral oils and with strongly alkaline products containing copper or calcium sulphate.

ATRAFUN pheromone

Produced at the Institute for Chemistry Cluj-Napoca, they are sex pheromones that capture the butterflies (adults) of the pest *Cydia funebrana*; they will be installed in tree corona, to determine the flight curve maximum, and the entomophagous *Trichogramma* sp. will be launched in the orchard according to this.

Anna Späth plum variety

It is originating in Germany, obtained in 1860 and rather well spread in our country. The tree presents a sub-medium – small vigour, inversely pyramidal corona, the trunk and branches' bark is smooth, shiny and grey. It is pretentious in terms of soil and temperature, resistant to frost, pests and diseases. The ripening takes place between 15th of September and 15th November. Being a rustic variety, it has good results from field to hills and it is precocious, very productive, resistant to *Polystigma sp.*, to moth, and sensible to brown rot. It may be grafted on Mirobolan or on the new wax cherry parent stock Mirobolan V5 and Mirobolan dwarf. The variety is partially self-fertile and a good pollenizer. Its pollenizers are the varieties D'Agen, Stanley, Vânăt românesc.

The researches on the biological control of plum fruit moth with the biopreparation Trichotim were carried out in the intensive plum tree plantation belonging to the Experimental Didactic Base – Farm no. 3 Lugoj, belonging to the Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I" from Timisoara.

To fight against plum fruit moth (*Cydia funebrana)* in the variety Annä Spath, we performed three launches with the product TRICHOTIM: in the first variant – two launches in the first pest generation, at 7-day interval, with an entire norm of 120.000 wasps/ha at the first launch and 130.000 wasps/ha at the second.

15 days before the application of Trichotim, we carried out a foliar treatment with Nutrient Express, the first launch in 8th of May 2014, and the second in 18th of May 2014.

In the second pest generation, we performed one single launch of 50.000 wasps/ha. On the whole, in the first variant we launched 300.000 wasps.

In the second variant, in the first pest generation we performed two launches of 120.000 wasps/ha at the first launch and 130.000 wasps/ha at the second.

In the second pest generation, we performed one single launch of 100.000 wasps/ha, totalizing 350.000 wasps/ha in the second variant.

The launch of the entomophagous *Trichogramma* sp. (the biopreparation Trichotim) was carried out in 23rd of May 2014 and 2nd of June 2014 in the first generation, and in 10th of July 2014 in the second generation, successive to the determination of the flight curve maximum in the case of both plum moth generations (*Cydia funebrana*) with the help of the pheromone traps ATRAFUN, installed within tree coronas 10 days after petal falling.

In order to observe the efficiency of the product Trichotim, we carried out determinations 10 days before fruit reaping.

RESULTS AND DISCUSSIONS

Table 1. presents the results on the Trichotim efficiency in plum fruit moth (*Cydia funebrana*) control, using 300.000 wasps/ha, in the plum variety Anna Späth.

Table 1

Trichotim efficiency in plum fruit moth (*Cydia funebrana*) control, in the Experimental Didactic Base, Farm no. 3 Lugoj, in 2014, first variant

Generation	*Launch no.*	*Norm of wasps/ha*	*Launch date*	*No. of fruit observed*	*No. of fruit attacked*	*F%*
I-a	1	120.000	26.05.2014	P_1 – 100	6	x
				P_2 – 100	5	
				P_3 – 100	8	
	2	130.000	3.06.2014	**Total – 300**	**19**	**5,33**
	Untreated control variant			P_1 – 100	14	
				P_2 – 100	18	
				P_3 – 100	14	
				Total – 300	**46**	**15,33**
II-a	1	100.000	15.07.2014	P_1 – 100	18	
				P_2 – 100	16	
				P_3 – 100	16	
				Total – 300	**50**	**15,66**
	Untreated control variant			P_1 – 100	33	

			P_2 – 100	39	
			P_3 – 100	37	
			Total – 300	**109**	**36,66**
Total wasps 350.000 wasps/ha					

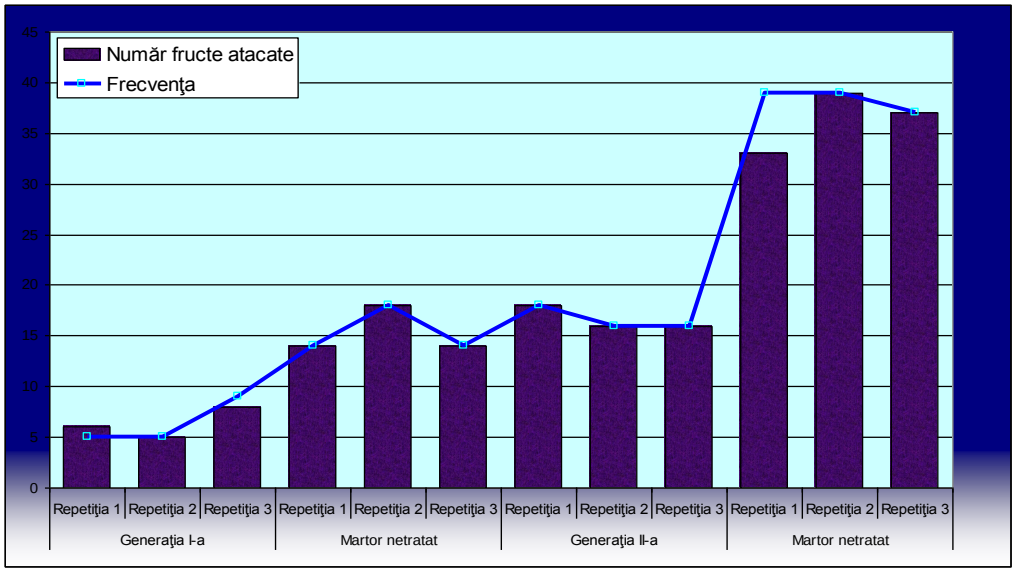

Figure 1**.** Trichotim efficiency in plum fruit moth (*Cydia funebrana*) control, in the Experimental Didactic Base, Farm no. 3 Lugoj, in 2014, first variant

The data presented in Table1show that, successive to the application of Trichotim in plum fruit moth (*Cydia funebrana*) control, in an intensive plum tree plantation – the variety Anna Späth, with a norm of 350.000 wasps/ha (250.000 wasps at the first pest generation and 100.000 at the second one), the frequency of fruit attacked got reduced from 36.66% in the untreated control variant to 15.66%, in the treated variant.

Figure 2. Plum tree plantation at Experimental Didactic Base, Farm no. 3 Lugoj

Source: original

Table 2.

Trichotim efficiency in plum fruit moth (*Cydia funebrana*) control, in the Experimental Didactic Base, Farm no. 3 Lugoj, in 2014, second variant

Generation	***Launch no.***	***Norm of wasps/ha***	***Launch date***	***No. of fruit observed***	***No. of fruit attacked***	***F%***
I-a	1	120.000	23.05.2014	P_1 – 100	6	
				P_2 – 100	5	
				P_3 – 100	4	
	2	130.000	2.06.2014	**Total – 300**	**15**	**5,00**
	Untreated control variant			P_1 – 100	15	
				P_2 – 100	15	
				P_3 – 100	16	
				Total – 300	**46**	**15,33**
II-a	1	50.000	10.07.2014	P_1 – 100	13	
				P_2 – 100	15	
				P_3 – 100	15	
				Total – 300	**43**	**14,33**

	Untreated control variant		P_1 – 100	37	x
			P_2 – 100	39	
			P_3 – 100	40	
			Total – 300	**116**	**38,66**
Total wasps: 300.000 wasps/ha					

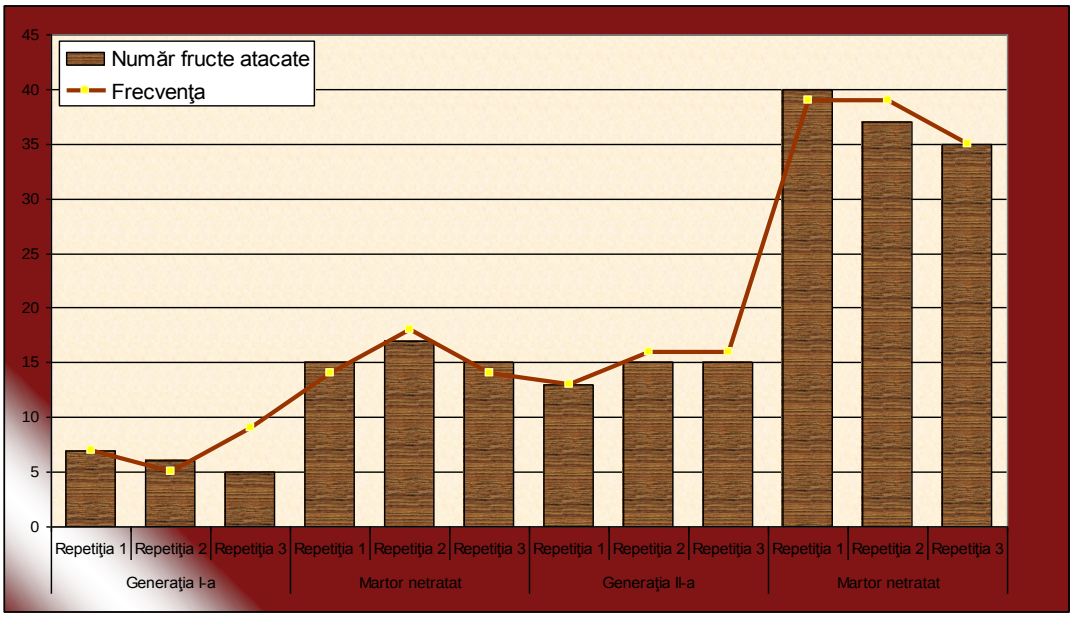

Figure 3. Trichotim efficiency in plum fruit moth (*Cydia funebrana*) control, in the Experimental Didactic Base, Farm no. 3 Lugoj, in 2014, second variant

Table 2. presents the results on Trichotim efficiency in plum fruit moth (*Cydia funebrana*) control, using 300.000 *Trichogramma* sp. wasps/ha, in the case of the plum tree variety Anna Späth.

The data presented in Table 4.2. show that, successive to the application of Trichotim in plum fruit moth (*Cydia funebrana*) control, in an intensive plum tree plantation – the variety Anna Späth, with a norm of 300.000 wasps/ha (250.000 wasps at the first pest generation and 50.000 at the second one), the frequency of fruit attacked got reduced from 38.66% in the untreated control variant to 15.3%, in the treated variant.

On the experimental area of 0.10 ha, the plum yield achieved, in the case of the variety Anna Späth, with application of the foliar fertilizer Nutrient Express, was 850 kg /ha, and in the variant without foliar treatment, it was 710 kg /ha.

The yield difference in the variant treated with Nutrient Express in doses of 2.5 kg/ha was 140 kg/ha.

We applied 3 treatments with the product Nutrient Express, after petal falling, at 14-day intervals.

CONCLUSIONS

- The biopreparation Trichotim, based on the entomophagous wasp *Trichogramma* sp., was applied with good results in plum fruit moth (*Cydia funebrana*) control, in the

intensive plum tree plantation – the variety Anna Späth, belonging to the Farm no. 3 Lugoj, Experimental Didactic Base –Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I" from Timisoara.

- The biological product Trichotim, produced by S.C. DERATON S.R.L. Timişoara, was launched in plantation in the two pest generations 2-3 days after the determination of the flight curve maximum of the plum fruit moth (*Cydia funebrana*).
- The flight curve of *Cydia funebrana* was deetrmiend with the help of the pheromone traps ATRAFUN, installed within the plum tree plantation after petal falling.
- In 2014, good results in the biological plum fruit moth (*Cydia funebrana*) control were achieved when we used 250.000 wasps/ha in the first pest generation, applied in two launches of 120.000 wasps, respectively 130.000 wasps, at an interval of 7 days.
- In the second plum fruit moth (*Cydia funebrana*) generation, the *Trichogramma* wasps were launched for one time only, 2-3 days after the determination of pest's flight curve, in two variants of 50.000 wasps/ha, respectively 100.000 wasps/ha.
- Successive to the application of the product Trichotim, in both generations with 300.000 wasps/ha in the first variant and 350.000 wasps/ha in the second variant, we achieved a reduction of the frequency of plum fruit moth (*Cydia funebrana*) attack to 15.33% in the first variant and 15.66% in the second one.
- We did not record any obvious efficiency differences between the first and second variants, in which we used 300.000 – 350.000 wasps/ha.
- The efficiencies observed reccommend the utilization of the biopreparation TRICHOTIM (*Trichogramma* sp.) for the plum fruit moth (*Cydia funebrana*) control, with a norm of 300.000 wasps/ha, of which 250.000 wasps/ha in the first generation, in two launches, and 50.000 wasps/ha in the second generation.

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