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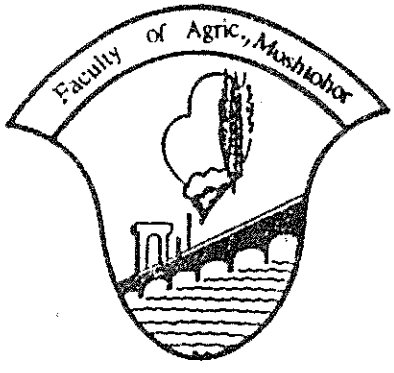

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EFFICACY OF A MICROBIAL INSECTICIDE (DIPEL ES) AND DELTAMETHRIN AGAINST THE CABBAGEWORM PIERIS RAPAE (LEPIDOPTERA : PIERIDAE) ON CABBAGE PLANTS.

BY

Shams El-Dine, A.M.

Faculty of Agriculture, Moshtohor, Zagazig University.

ABSTRACT

The joint action of the pyrethroid insecticide Decis (deltamethrin)and the bioinsecticide Dipel ES (Bacillus thuringiensis) against the cabbageworm P.rapae was assessed by field plot tests.

Protection of the crop and yield obtained from plots treated with several of reduced dosage mixtures were nearly similar to those recorded in plots treated with Decis or Lannate at their full rate, demonstrating a feasible procedure for reducing the amount of chemical insecticide applied without damaging the crop. Low concentrations of decis frequently enhanced the effect of B.thuringiensis against P.rapae on cabbage plants.

INTRODUCTION

The cabbage worm Pieris rapae is an important ubiquitous pest of cabbage and several cruciferous plants in Egypt. Several chemical insecticides are registered for use to control this insect. On the other hand Bacillus thuringiensis has been investigated as a possible biological agent against some Lepidopterous larvae (Dulmage et al., 1978; Johnson 1982 and Salama et al., 1987)

Field studies have indicated that protection may be enhanced by application of microbial and chemical insecticides as mixtures or as sequential combinations in crop protection programs (Jaques, 1972 & 1977, Lublinkhof et al., 1979 and Salama et al., 1990 a,b), and also in programs for forest protection (Morris, 1977).

In the present study, field tests were carried out to

pyrethroid insecticide "Decis" against P.rapae on ge plants in katta village, Giza xx Governorate.

MATERIALS AND METHODS

ormulations of B.thuringiensis variety kurstaki (Dipel mulsifiable suspension used in field tests were 17.600 national units of potency per mg.

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lots were replicated three times in randomized blocks. ments were applied between August 4th and September by a compressed Knap-sac sprayer.

ates of application of the bioinsecticide were 1,2 and tres/Feddan. Decis and Lannate were used in the rate of 0.1 and, 0.25 litre/Feddan and 215 g/Feddan, respec- y. In all treatments 0.01% of tween 80 (spreader) was to the water used.

fficacy of insecticides was assessed by several crite- (Jaques and Laing, 1977). Those included the numbers of e, damage to foliage determined by counting the number eeding holes, in four outside and two wrapper leaves of nts per replicate plot before harvest and numbers and ts of heads that were not damaged or slightly damaged, ntages of larval reduction were estimated according to and Lynch (1978). Data were analysed by Duncan's mul- range test (1951).

RESULTS AND DISCUSSION

The effectiveness of mixtures of chemical and microbial insecticides against P. rapae on cabbage.

Feddan	Pest population / 10 plants				Larval reduction (%)		Feeding holes / 10 plants	Head quality		Yield Tones/F
	Pre-spray	Post-spray						% Not damaged	% Marketable	
		7 days	10 days		7 days	10 days				
	25.1	9.8	3.2		80	90	42	52	73	10.6
	28.3	8.3	2.6		83	92	35.3	62	86	12
	27.9	5.4	1.6		89	95	28.2	66	87	14
	20.1	5.3	3.5		88	89	31.8	64	86	13.3
	21.4	4.4	1		91	97	27.1	83	93	17.3
	21	0.9	0.1		98	99	11.8	90	96	21.3
cis (0.05 lit)	20.7	7.8	2.2		84	93	23.5	65	89	10.7
cis (0.1 lit)	22.3	6.4	1.6		87	95	26.6	78	95	14.7
cis (0.05 lit)	26	4.7	1.1		90	96	18.9	82	94	13.5
cis (0.1 lit)	22.8	4	0.3		91	99	15.4	89	99	16.6
cis (0.05 lit)	24.1	2	0.4		95	99	*	*	*	*
cis (0.1 lit)	23.5	1.5	0		97	100	*	*	*	*
	23.5	0.7	0.2		98	99	25.1	89	96	22
	22.9	49	32		-	-	52	35	62	8

calculated.

As shown in Table (1), the average rate of P.rapae estation per 10 plants before treatment in the cultivated a of cabbage ranged between 20.1 and 28.3 larvae with no nificant difference between different plots. Treatments h B.thuringiensis caused significant reductions in the val count 7 and 10 days after treatment as compared to control. In this respect, spraying Dipel at the rate of itres/Feddan reduced the larval counts to 5.4 and 1.6 per plants, 7 and 10 days after treatments, respectively. s indicates respective reductions in larval population ch amounts to 89 and 95%. With low doses of B. uringiensis (1 lit/f), the percentage of larval reduction nificantly decreased being 80 and 90%, 7 and 10 days er application.

Treatments with Decis showed a similar trend in reducing larval counts. The percentage of larval reduction ranged ween 88% and 89% at a dosage of 0.05 lit/feddan 7 and 10 s after treatment and reached up to 98 and 99%, when the e of application was raised to 0.2 lit/feddan. The above a indicated the progressive decrease in the larval count h increase of the insecticide concentration.

The larval reduction was almost similar (96 to 100), 10 s after spraying with sequential combinations of huringiensis (4 or 2 litres) with decis (0.1 or 0.05 t). Even on using a combination of B. thuringiensis and is at the lowest tested dose (1 lit + 0.05 lit), an obvi- reduction in larval count (93%) was observed, 10 days ter treatment.

Feeding holes by lepidopterous larvae on outer leaves wrapper leaves of cabbage plants in all plots treated th reduced dosage mixtures was less than in the nontreated eck plot (Table 1). Feeding in plots treated with some of e mixtures was nearly similar to that in plots treated th decis applied alone at the full rate. One mixture .t.2 lit + decis 0.1 lit) performed better than did the ne rate of decis applied alone. Damage was significantly ss in plots treated with, B.t. (1 litre) mixed with decis .05 litre) than in plots treated with the corresponding sage of B.t or decis alone. This indicates enhancement of

preparation or chemical insecticide alone, as shown in table (1), indicated an enhanced effectiveness of mixtures in protection of the crop. The proportion of nondamaged heads in plots treated with the bioinsecticide (2 litres) mixed with Decis (0.1 litre) was nearly to the proportion of nondamaged heads in plots treated with Decis or Lannate at the full rate. Methomyl (Lannate) is the recommended insecticide for controlling this pest. Similarly, proportions of heads that were marketable (heads damaged slightly but acceptable for consumption) in plots treated with mixtures, were similar to proportions of marketable heads harvested from plots treated with full concentration of the chemical insecticide (Table 1).

Weighing the crop yield obtained from the treated and untreated plots indicated increases in the final yield by 1.33-2.75 folds in the former case (Table 1). Also, treatment with mixtures of Dipel and the chemical insecticide enhanced obtaining higher yields than those obtained by spraying the bioinsecticide. This confirms the compatibility of mixing both compounds for obtaining better results. While, on the other hand, the rate of increase in crop yield due to application of Dipel and Decis mixtures was nearly similar to that obtained by spraying the chemical insecticides Decis or Lannate at their full rate.

However, it is noticeable that the highest yield in tons was obtained by the use of Lannate 215 g followed by Decis 0,2 lit/feddan then Decis 0.1 lit/feddan, all these treatments with chemical insecticides resulted in higher yields than the most efficient B.t . insecticides mixture (B.t.2 liters + Decis 0.1 liter). This may be taken to indicate the importance of determining the effects of chemical treatments on the final crop rather than depend on the estimation of pest population or signs of damage.

The results presented in this investigation are in accordance with compatibility of other mixtures reported previously by Greighton and Mc Fadden (1975), Jacques and Laing (1978), Luttrel et al (1979) and Salama et al (1990).

In conclusion, it may be recommended to use combinations

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