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MANAGEMENT OF *Helicoverpa armigera* WITH DIFFERENT INSECTICIDES.

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Cotton known as silver fibre in Pakistan, enjoys a unique position among cash crops and is the life blood of foreign exchange earning. In order to find out an effective and economical control on *Helicoverpa armigera*, a notorious pest of cotton, an investigation was carried out during 2003. It was observed that *Helicoverpa armigera* might have been resistant to conventional insecticides, so there should be new insecticides which can manage the pest in more efficient and economical manner. Deltaphos 360 EC, Tracer 240 SC, Steward 150 EC, Emamectin 1.9 SC, Lorsban 40 EC and Curacron 500 EC were used to control *Helicoverpa armigera*. According to the result Tracer 240 SC was found to be the most effective for the control of *Helicoverpa armigera*.
Key words: Silver fibre, management, population, chemical control.

INTRODUCTION

Cotton is an important cash crop of Pakistan. Raw cotton and cotton based products are the main export items of the country. In addition to meet the basic human needs, it is the major source of income for million of families of Pakistan engaged in farming and foreign exchange earning. It provides food in the form of edible oil and cotton seed cake. Over the years area under cotton crop increased from 1237 hectare in 1947 to 2793.6 hectare in 2003 with a corresponding increase in per hectare yield from 166 kg/h to 622 kg/h (GOP, 2003)

Plant protection mainly revolves around greater use of insecticides. Due to green succulent leaves large open flower nectaries on every leaf and abundance of fruits attract and support a great variety of insect pests. Lepidopterous larvae are especially dangerous because of great variety of food stuff, they feed upon and digest. In the larval stages they are very serious pests of this crop. Most notorious of them is *Helicoverpa armigera*.

Abdul *et.al.* 2003 reported that among the insecticides tested Spinosad (Tracer) and Indoxacarb (Steward) were highly effective against *Helicoverpa armigera*, while Endosulfan was found to be the least effective insecticide.

David *et.al.* 2005, conducted the field experiment in Australia to evaluate the efficacy of new insecticides for management of *Helicoverpa armigera* in grain crops. They concluded that Indoxacarb and Spinosad were consistently superior to other tested products. These findings are quite comparable with those of Noorani *et.al.* 1994 and Rajasekhar *et.al.* 1994.

Ma *et. al.* 2000 reported about a field trial on upland cotton in which they assessed the toxicity of several pesticides and chemicals to *Helicoverpa armigera* as well as major predators through the use of ordinary sprayers at Dolby Queensland Australia. Moderate control was obtained in plots treated with neem. Plots treated with Talstar (bifenthrin) showed best results. The other researchers had also reported almost similar results (Ahmad, *et. al.*1999 & Attique, *et. al.* 1998).

MATERIALS AND METHODS

The project was planned to use different insecticides against *Helicoverpa armigera* to manage this insect pest. The insecticides used, were Deltaphos 360 EC, Tracer 240 SC, Steward 150 EC, Emamectin 1.9 SC, Lorsban 40 EC and Curacron 500 EC. The cotton variety CIM473 was sown in randomized complete block design at chak No.273/R.B abadi Sadiqabad Distt. Faisalabad during June 2003.

There were seven treatments including control and each treatment was replicated three times. Regular pest scouting was done twice a week after the germination of crop for the assessment of economic threshold level of *Helicoverpa armigera*. The pest attained the economic threshold level in the month of August and the control measures were adopted. Zig-Zag method of pest scouting was adopted which was done twice a week. The application of insecticides started from 21-08-2003 and second spray was done on 14-09-2003. Hydraulic Knapsack hand sprayer was used for insecticide application. After every spray, population of *Helicoverpa armigera* was recorded from different parts of plants i.e. squares, flowers and bolls from the upper 1.5 foot. The selected plants were tagged to avoid the repetition. All these recorded observations were analyzed statistically to draw definite conclusion.

RESULTS AND DISCUSSION

Deltaphos 360 EC, Tracer 240 SC, Steward 150 EC, Emamectin 1.9 SC, Lorsban 40 EC and Curacron 500 EC were tested to find out their comparative effect on the population of *Helicoverpa* armigera.The results so obtained are presented below.

Table 1. Number and %age mortality of *Helicoverpa armigera* larvae/5 plants, after two different sprays.

Treatments	Dose/Acre	Large live larvae/5 plants				%age mortality over control				% age
		1st spray		2nd spray		1st spray		2nd spray		
		3DAA	7DAA	3DAA	7DAA	3DAA	7DAA	3DAA	7DAA	
Control	UTC	9.7	12.7	15.0	13.7	0	0	0	0	0
Deltaphos 360 EC	600 ml	2.3	5.0	3.0	3.0	76	61	80	78	74
Tracer 240 SC	80 ml	0.3	1.6	0.7	1.0	97	87	95	93	93
Steward 150 EC	175 ml	1.0	2.3	1.7	1.3	90	82	89	90	88
Emamectin 1.9 SC	200 ml	1.3	2.0	1.3	2.0	87	84	91	85	87
Lorsban 40 EC	1000 ml	2.7	3.7	2.7	4.7	72	71	82	66	73
Curacron 500 EC	1000 ml	2.7	4.7	3.7	4.0	72	63	75	71	70

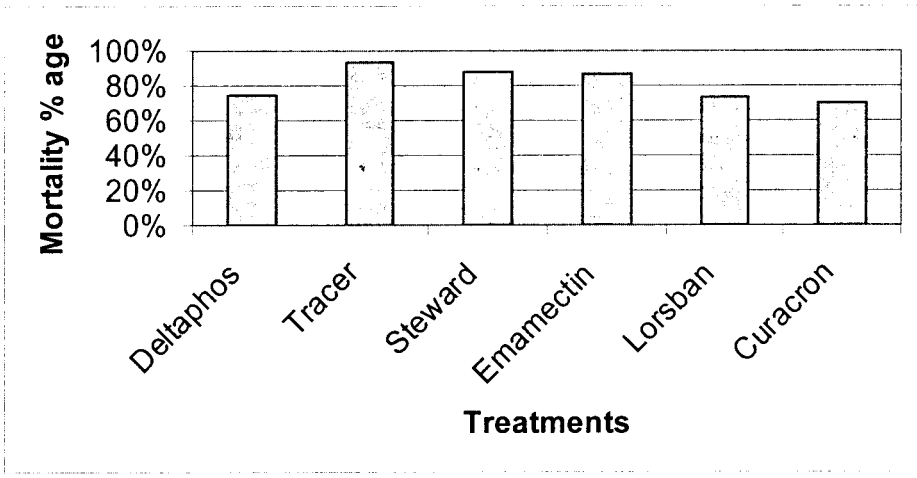

Fig. 1. Impact of different insecticides on %age mortality of *Helicoverpa armigera* during 2003.

Table 2. Effect of different insecticides on *Helicoverpa armigera* larvae population

Treatments	Average No. of live larvae per 5 plants	
Control	12.75	a
Deltaphos 360 EC	3.33	b
Tracer 240 SC	0.92	c
Steward 150 EC	1.58	c
Emamectin 1.9 SC	1.67	c
Lorsban 40 EC	3.42	b
Curacron 500 EC	3.75	b

The data in Table 1 shows number and %age mortality of *Helicoverpa armigera* after three and seven days of first and second spray. Tracer 240 SC,showed maximum 93% mortality against *Helicoverpa armigera* larvae followed by 88% by Steward 150 EC, 87% by Emamectin 1.9 SC, 74% by Deltaphos 360 EC, 73% by Lorsban 40 EC, and 70% by Curacron 500 EC.

Table 2 shows that the maximum control against *Helicoverpa armigera* was found in plots treated with Tracer 240 SC which is statistically similar to that of plots treated with Steward 150 EC and Emamectin 1.9 SC, with 0.92, 1.58, and 1.67 larvae per 5 plants respectively. These were statistically at par from all other treatments. Plots treated with Deltaphos 360 EC, Lorsban 40 EC, and Curacron 500 EC were statistically similar having population 3.33, 3.42 and 3.75 larvae per 5 plants but statistically different with those treated with Tracer 240 SC, Steward 150 EC, Emamectin 1.9 SC and control. Maximum population i.e. 12.75 of *Helicoverpa armigera* larvae was found in untreated plots which were statistically different from all the insecticides. These findings are similar with those of Abdul *et. al.* 2003, Ahmad *et. al.* 1999, David *et. al.* 2005, Noorani *et. al.* 1994, Satyavani *et. al.* 1991 and Jadhav *et. al.* 1996, who got effective control of

Helicoverpa armigera after adopting different techniques.

Insecticide resistance has undermined any control programme that fails to take account of this evolutionary process and, therefore represents a considerable challenge to the industry, farmers and research community. Many tools for managing resistance have been developed; one of them is new insecticide chemistry. Keeping all the results in view, it can be safely said that new insecticides gave excellent mortality than old insecticides and can play an important role in managing this insect pest.

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