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FIELD EFFICACY OF CHITIN INHIBITORS AGAINST *CHRYSODEIXIS ACTUA* (WALK.) INFESTING SOYBEAN

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ABSTRACT

The field efficacy of different doses of chitin inhibitors *viz.*, Iufenuron 5 EC and Diflubenzuron 25 WP was evaluated under field conditions against *Chrysodeixis actua*, (Walker) infesting soybean. Application of lufenuron 500ml and diflubenzuron 350 g. per hectare proved potential in reducing the larval infestation of test insect (0.81 and 0.75) as compared to control (3.39). Higher seed yield (16.76 and 16.87q) against absolute control (10.72q) per hectare as well as maximum monetary return (Rs. 4604 and 5100) and incremental cost benefit ratio (3.29 and 4.86) were also obtained with lufenuron 500 ml and diflubenzuron 350gm in soybean eco-system.

Key words: Chitin inhibitors, green semilooper, lufenuron, diflubenzuron and soybean.

The green semilooper, *Chrysodeisix acuta* (Walker) is a predominant defoliator infesting soybean. It also feeds on buds, flowers and even on young pods reflecting substantial losses in seed yield (Singh *et al.*, 1990). The control by means of chemical insecticides particularly through triazophos, endosulfan and chlorpyriphos have been effective against foliage feeders. The indiscriminate and non-judicious use of chemical insecticides not only leads to development of resistance in insect pests but also pollutes the environment and natural eco-system. Chitin synthesis inhibiting insecticides may provide better alternative against lepidopteran insect pests (Liew *et al.*, 1994). To overcome the dependency on toxic chemical insecticides, eco-friendly chitin inhibitors like diflubenzuron 25 WP and lufenuron 5 EC, were evaluated under field conditions against the semi-looper infesting soybean crop.

MATERIALS AND METHODS

Field experiments were carried out at Agricultural Research Station, Ummedganj, Kota during *kharif* 2001 and 2003 in randomized block design with four replications and eight treatments along with absolute control. Variety "JS 335" of soybean was sown in 10.5 sqm plot at 30 cm row spacing. Treatments were applied at peak larval incidence of insect pest. Observation on number of larvae per metre row length was recorded from 3 places per plot after 5 days of treatment applications, using vertical beat sampling technique; seed yield was recorded at harvesting. The data on semi-looper population and yield thus obtained were subjected to statistical analysis. Pooled analysis of data has been used for interpretation of the results. Net return and incremental cost benefit ratio was also worked out for optimization of the dose by comparison of the protection cost of respective doses and net monetary gain over the absolute control.

RESULTS AND DISCUSSION

Results of field experiments (Table 1) revealed that during 2001 the larval population of green semilooper, *C. acuta* was lowest in Chlorpyriphos @ 1.5 lit/ha. However, it was statistically at par with higher doses of both Chitin inhibitors. Similarly in 2003, it was significantly superior only over lowest doses of both chitin inhibitors. On the basis of pooled analysis of two years data, if could be inferred that all the doses of chitin inhibitors were significantly superior over control in reducing the larval population that varied from 0.62 – 1.02 larvae in per metre row length. However, among the different doses of chitin inhibitors and synthetic chemical insecticide no significant difference was observed. Liew *et al.* (1994) obtained more than 90 per cent reduction in lepidopterous larvae with application of lufenuron. Qu *et al.* (1987) also observed effective control of *C. acuta* infesting soybean with diflubenzuron.

Table 1. Effect of Chitin inhibitors on larval population of *Chrysodeixis actua* and seed yield on soybean

S. No.	Treatment	Dose (g/ha)	Green Semilooper (mrl)			Seed yield (q/ha)		
			2001	2003	Pooled	2001	2003	Pooled
1.	Lufenuron	400 ml	1.17	0.87	1.02	11.60	17.73	15.39
2.	Lufenuron	500 ml	1.00	0.62	0.81	12.79	17.97	16.76
3.	Lufenuron	600 ml	0.91	0.71	0.70	15.02	17.61	16.29
4.	Diflubenzuron	300 g	1.04	0.87	0.95	13.38	18.92	15.22
5.	Diflubenzuron	350 g	0.79	0.70	0.75	14.72	17.61	16.87
6.	Diflubenzuron	400 g	0.71	0.65	0.67	14.72	18.92	16.26
7.	Chlorpyriphos	1.5 lt	0.62	0.62	0.62	16.21	17.77	17.51
8.	Control	–	3.37	3.42	3.39	9.96	11.42	10.72
	SEm ±		0.08	0.07	0.15	0.38	0.44	0.79
	CD P (0.05)		0.25	0.22	0.43	1.12	1.30	2.35

Table 2. Net return and incremental cost benefit ratio of different doses of chitin inhibitors on soybean

Treatment	Pooled seed yield (q/ha)	Additional yield over control (q/ha)	Additional gross return over control (Rs./ha)	Cost of chitin inhibitor (Rs./ha)	Net Return (Rs./ha)	ICBR
Lufenuron 400 ml	15.39	4.67	4670	1120	3550	3.17
Lufenuron 500 ml	16.76	6.04	6004	1400	4604	3.29
Lufenuron 600 ml	16.29	5.57	5570	1680	3890	2.32
Diflubenzuron 300 g	15.22	4.50	4500	900	3600	4.00
Diflubenzuron 350 g	16.87	6.15	6150	1050	5100	4.86
Diflubenzuron 400 g	16.26	5.54	5540	1250	4340	3.62

Soybean = Rs. 1000/q, Lufenuron = Rs. 2800/lit and Diflubenzuron = Rs. 3000/kg

The seed yield (10.72–17.51q) per hectare in all treatments was significantly superior over control but all treatments were statistically at par. However, among the doses, higher seed yield was obtained with lufenuron 500ml (16.76q) and diflubenzuron 350gm (16.87q) which reflected maximum net returns (Rs. 4604 and 5100) as well as highest incremental cost benefit ratio (3.29 and 4.86) for lufenuron (500 ml) and diflubenzuron (350 g), respectively hence realized the potential and effectiveness of chitin inhibitors in the management of target insect-pest on soybean.

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