Research Paper :

Bioefficacy of some botanicals and in combination with insecticide against *Leucinodes orbonalis* (Guenee) in brinjal under Allahabad agro-climatic condition

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SUMMARY

In order to determine the bioefficacy of some botanicals (NSE 5%, BLE 5% Neem oil 2%)and in combination with.Endosulfan 0.035% and alone 0.07%, against brinjal shoot and fruit borer, *Leucinodes orbonalis*, field trial was conducted during *Kharif* season 2009-10 at Allahabad (U.P.). The insecticides were used at their field recommended doses along with an untreated control. The effective treatment was Endosulfan (0.07%) followed by NSE (5%) + Endosulfan (0.035 %),Neem oil (2 %) + Endosulfan (0.035),BLE (5%) + Endosulfan (0.035)were found effective in reducing shoot and fruit borer whereas NSE 5%, BLE 5% and Neem oil 2 % existed in middle order. The maximum yield was obtained in Endosulfan (0.07%), followed by NSE + Endosulfan, (0.035),BLE (5%) + Endosulfan (0.035), Neem oil (2 %) + Endosulfan0.035, whereas all the treatments were significant to over control.

Key words : Botanicals, Shoot and fruit borer, Endosulfan, Insecticide, *Leucinodes orbonalis*

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Brinjal or egg plant is considered as one of the most important vegetable crops due to its rich source of vitamin B, calcium, phosphorus and iron is grow throughout the country. Brinjal shoot and fruit borer, *Leucinodes orbonalis* (Guenee) is known to cause 18.8 to 80 per cent damage (Peshwani and Lal, 1964 and Mehto *et al*., 1979). Brinjal fruit in India is a limiting factor in successful cultivation of the crop. The larva confines its feeding activities on shoot in the early stage of crop and later on, on fruits, which become unfit for human consumption. A large number of insecticides have been tried against this borer (Singh and Kavadia, 1989; Roy and Pande, 1994) with varying degrees of control. The incorporation of botanicals and bio-pesticides in pest management programme is gaining importance in recent years pertaining to environment and health hazard posed by synthetic insecticides.

MATERIALS AND METHODS

The trial was conducted in *Kharif* season 2009-10 at the research farm, Sam Higginbottom Institute of Agriculture, Technology and Sciences, (Formerly Allahabad Agricultural Institute, Deemed-to-be University), Allahabad (U.P.). Trial was laid out in a randomized block design consisting of eight different insecticide formulations with one recommended concentration and thus, the total number of treatments was eight. Each treatment was replicated thrice, plot size (3x2 = 6 m^2) and brinjal variety Neelam was used for study. After observing a sufficient level of insect population, spraying was undertaken. Five spray operations were given at 15 days interval. Observations on number of larvae per plant (shoot and fruit) were recorded. An average was taken of three replications of five randomly selected plants. The data were subjected to statistical analysis. The yield per plot was also recorded and expressed as tons per hectare.

RESULTS AND DISCUSSION

The data presented in Table 1 reveal that, all the treatments were significantly superior over control (plot T_8). The minimum infestation was recorded 9.66 treated with Endosulfan 0.07% on shoot, 17.24 on number basis and 16.59 on weight basis and it was significantly superior over all the treatments. Temurde *et al*. (1992) reported that Endosulfan treatment gave better performance against the shoot and

Table 1 : Effect of treatments on population Brinjal shoot and fruit borer during 2009-10

Treatments	Dose	Mean shoot damage (%)	Mean fruit damage (%) on no basis	**Mean fruit damage (%)on weight basis
T_1 (Neem seed extract 5 %)	25 kg/ha	13.27 (3.64)*	23.43 (4.84)*	23.64 (4.86)*
T_2 (Beshram leaf extract 5 %)	20 kg/ha	17.52 (4.18)*	23.22 (4.81)*	25.14 (5.01)*
T_3 (Neem oil 2 %)	10 lit/ha	13.84 (3.72)*	23.81 (4.87)*	24.73 (4.97)*
T_4 (NSE 5% + Endosulfan 0.035%)	25 kg + 500 ml/ ha	10.51 (3.24)*	17.98 (4.24)*	18.56 (4.30)*
T_5 (BLE 5% + Endosulfan 0.035%)	20 kg + 500 ml/ ha	11.50 (3.39)*	19.53 (4.41)*	20.77 (4.55)*
T_6 (Neem oil 2 % + Endosulfan 0.035%)	10 lit + 500 ml/ ha	11.00 (3.31)*	18.97 (4.35)*	19.74 (4.44)*
T_7 (Endosulfan 0.07 %)	1000 ml /ha	9.66 (3.10)*	17.24 (4.15)*	16.59 (4.07)*
T_8 (Control)	Water spray	27.10 (5.20)*	32.42 (5.69)*	30.86 (5.55)*
S.E.±	0.89		1.38	1.12
C.D. (P=0.05)	1.91		2.97	2.42

*Figure in parenthesis are square root transform value.
**Mean data are from all five pickings

fruit borer infestation than Neem product. The next better treatment was of combination of botanicals and Endosulfan. T_4 (NSE 5% + Endosulfan 0.035%), T_6 (Neem oil 2% + Endosulfan 0.035%), T_5 (BLE 5% + Endosulfan 0.035%). The treatment were followed to these were T_1 (NSE 5%), T_3 (Neem oil 2%), T_2 (BLE 5%). The effectiveness of Endosulfan against the borer might be due to the quick knock down effect and it was a relevant from the present result that in general all the three botanicals provided satisfactory control of *L.orbonalis.*

Benefit cost ratio:

The effect of pest control in crop by the pest agents are known to ensure higher crop yields by reducing the yield losses exhibiting in additional monitory benefit (Table 2). In the present investigation, considering the fruit yield of brinjal recorded in Endosulfan which was the most effective against *L.orbonalis* as the maximum yield (325.33). The application of botanicals in combination was from 266.33-317.33 q/ha and from alone botanicals 248.86-261.83 q/ha.

The cost benefit analysis of different insecticidal application relevant the highest monitory benefit (Rs. 88114.00/ ha) with maximum (BCR 1:41.01 was of NSE 5% + Endosulfan) which was followed by all other treatments and were significantly superior and effective in suppressing the incidence shoot and fruit borer and significantly increase yield as compared to untreated control of both the parameters of number and weight.

Conclusion:

Considering all the above parameters together, on the basis of overall performance of botanicals and

Table 2 : Economics and incremental cost benefit ratio of treatments on cabbage yield

Treatments	Approximate cost of insecticides + Labour (Rs.)	Average total yield (q/ha)	Increased yield over control	Approximate sale price (Rs./q)	Value of increased yield/ha	Approximate net profit (Rs./ha)	Incremental cost benefit ratio
Neem seed extract 5%	2775	261.83	49.33	800.00	39464.00	36689.00	1:13.22
Beshram leaf extract 5%	900	252.16	39.66	800.00	31728.00	30828.00	1:34.25
Neem oil 2%	6900	248.86	36.36	800.00	29088.00	22188.00	1:3.21
NSE 5% + Endosulfan 0.035%	2900	317.33	104.83	800.00	83864.00	80964.00	1:27.91
BLE 5% + Endosulfan 0.035%	1025	266.33	53.83	800.00	43064.00	42039.00	1:41.01
Neem oil 5+Endosulfan 0.035%	7025	294.48	81.98	800.00	65584.00	58559.00	1:8.33
Endosulfan 0.07%	2150	325.33	112.83	800.00	90264.00	88114.00	1:40.98
Control	-	212.50	-		-	-	-

Rate of insecticide:
1. Labour charge Rs 150/day 2.spray pump charge Rs 30 / day 3. Cost of Endosulfan 35 EC 250Rs/ lit
4. Cost of Neem seed 15 kg 5.Cost of Neem oil 120Rs/ lit

Endosulfan in management of *L. orbonalis*, Endosulfan alone followed by combination of botanicals + Endosulfan were more effective and economical treatment and were as compatible as the use of recommended chemical insecticide in combination with Endosulfan 0.07 per cent for the management of shoot and fruit borer (*L. orbonalis*) on brinjal.

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