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Management of brinjal fruit and shoot borer (*Leucinodes orbonalis Guenne.*) through the use of pheromone trap and insecticides

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ABSTRACT

A field experiment was conducted to study the effect of pheromone traps and use of pesticide in management of Brinjal fruit and shoot borer in five nearby villages of North 24 Parganas during 2015-16 from rainy season to winter season. The experiment was conducted with three different treatment combinations along with farmer's practice in five different adoptive villages in Randomized Block Design. The study revealed that Installation of Pheromone trap, mechanical removal of branches and fruit along with two application of insecticide at 45 and 60 days after planting was found most effective (Technology option III). The highest total yield of 20.79t ha^{-1} along with lowest percentage of shoot and fruit borer damage of 4.69 per cent was recorded in Technology option III.

Keywords **:** Brinjal, fruit and shoot borer, pheromone trap

Brinjal (*Solanum melongena Linn.*) is one of the most important and popular vegetables of West Bengal as well as India. Its cultivation provides an important source of income particularly for small and resource poor farmers. It is grown in an area of 680 thousand ha in India with a production of 12706 thousand tonnes during the year 2014-15 (Horticulture Statistics: at a Glance, 2015). The biggest constraint of its production throughout India is the chronic and widespread infestation of the fruit and shoot Borer (*Leucinodes orbosnalis Guenne*.) throughout the year (Mandal *et al.*, 2010 ; Sardana *et al*, 2004) and the pest has become resistance against insectides in recent times (Kabir *et al.*, 1996). In West Bengal the frequency of spraying pesticide to control this pest is more than three per week and which shares maximum expenditure of production cost. Considering this factor along with pesticide residues, insecticide resistance and cost of production, the study was designed on management of fruit and shoot borer by using pesticide as well as lucin lure trap and conducted at different adoptive villages of Krishi Vigyan Kendra, North 24 Parganas.

MATERIALS AND METHODS

The field experiment was conducted during *kharif* to winter season of 2015 -16 in sandy loam soil of five adoptive villages of North 24 Parganas Krishi Vigyan Kendra namely Pithiba, Cola, Goaldaha, Babpur and Ichhapur, West Bengal, which are situated at the 230N latitude and 890E longitude, at an elevation of 9.75 m above mean sea level (approximately) to study the effect of pheromone traps and use of pesticide in management of Brinjal fruit and shoot borer.The crop received total rainfall of about 1415 mm during growing season of 2015-16. The maximum and minimum temperatures during that period were 35^0C and 26^0C, respectively. The experiment was laid out in a Randomized Block Design with the following four treatments replicated eight times considering one farmer as one replication. Agro ecological situation of the experimental villages are more or less homogeneous in nature.

Treatments details are as follows

Farmers' practice : non judicious use of pesticide with 22-25 pesticide sprays

Technology option I: Placement of pheromone traps lucin lure @ 45 nos.per hectare

Technology option II: Mechanical removal of shoots and fruits + installation of traps

Technology option III: Mechanical removal of shoots and fruits + installation of trap + spraying of insecticides two times at 45 and 60 days after transplanting.

The mechanical removals of lower branches were followed up to 45 days. With the commensurate of flowering (45 DAP) the pheromone trap were installed 10-12m apart and just above the crop canopy. Brinjal (Variety - Makra) were planted maintaining a plant spacing of 60 × 60 cm in experimental plot size of 4 × 3 m. The recommended fertilizer dose of 120 kg nitrogen 40 kg phosphorous (P_2O_5) and 60 kg potash (K_2O) was applied.The fruits were harvested at weekly interval beginning from 58-60 DAP. The data on infested shoot was recorded by direct counting but the infested fruit as percentage of fruit harvested was calculated by using the formula in each farmer's field as number of fruits harvested in each plucking/number of infested fruit in

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Table 1: Performance of the crop during *kharif* Season of 2015-16

Treatments	Total catch trap^{-1} up to 6th week	Shoot damage (%)	Fruit damage (%)	Yield (t ha^{-1})	Cost of cultivation (Rs. ha^{-1})	Gross return (Rs. ha^{-1})	B:C Ratio
Farmer's Practice (FP)	-	5.02	26.55	18.95	1,37,500	2,08,428.00	1.52
Installation of trap @ 45nos. ha-1 (TO-I)	35.5	8.47	29.55	15.12	1,05,575	1,66,276.00	1.57
Mechanical removal of branches and fruits + Trap (TO-II)	34.7	6.32	28.75	17.76	1,10,720	1,95,338.00	1.76
Mechanical removal of branches and fruits + Trap + Spraying of Pesticide at 45 and 60 DAP (TO-III)	28.7	4.69	25.72	20.79	1,15,725	2,28,646.00	1.98
SEm(±)	**-**	**0.22**	**0.96**	**1.20**	**-**	**-**	**-**
LSD (0.05)	**-**	**0.67**	**2.95**	**3.69**	**-**	**-**	**-**
CV		**26.47**	**10.09**	**18.75**			

each plucking x 100.The statistical analysis of the observed data was done using the method suggested by Gomez and Gomez (1984) for interpretation.

RESULTS AND DISCUSSION

It reveals from the data presented in the (Table-1) that percentage of shoot damage, percentage of fruit damage and yield (t ha^{-1}) of brinjal were significantly influenced by the treatments. Installation of pheromone trap, mechanical removal of branches and fruits and two application of insecticides at 45 and 60 DAP *i.e*. TO-III was found most effective in respect of reduction in shoot damage (4.69%) and fruit damage (25.72%) followed by Farmers' practice with 5.02 per cent shoot damage and 26.55 per cent fruit damage where almost 22-25 insecticides sprayings were done and they were statistically at par. The highest yield of 20.79 t ha^{-1} was obtained from TO-III followed by Farmers' Practice with 18.95 t ha^{-1}, but they were statistically at par. However, the lowest yield of brinjal was recorded in TO-I where installation of trap @ 45 nos. ha^{-1} was done. This might be due to the better integrated management of brinjal fruit and shoot borer which is a major concern of the farmers. This is at par with the findings of Chatterjee, 2009.

The maximum gross return (Rs. 2,28,646.00 ha^{-1}) and B:C ratio (1.98) were recorded incase of TO-III treatment while the B:C ratio was minimum in case of Farmers' Practice because of the fact that the cost of spraying of pesticide is very high which resulted in higher cost of cultivation as compared to other treatments.

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