e-planet **16** (2): 153-155 (December 2018)

Management of fruit and shoot borer, (*Leucinodes orbonalis)* in brinjal

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Date of Receipt: 06.07.2018 Date of Acceptance: 18.12.2018

ABSTRACT

The experiment was carried out during *rabi* 2015-16. Five crops viz. maize, sesamum, broad bean, niger and buckwheat were used as border crop in brinjal field. It was compared with alternate spray of dimethoate (0.05%) and lambda cyhalothrin (0.005%). Dimethoate was sprayed at 80 and 100 DAT and lambda cyhalothrin was sprayed at 90 and 110 DAT. Lowest incidence in brinjal was recorded in alternate spray of chemical pesticides. Amongst the different crop used as border crop, maize as border crop recorded significantly lower incidence of *L. orbonalis* than the other border crops. Farmers can adopt the practice of intercropping with maize to reduce the population of fruit borer and shoot borer of brinjal.

Key words: Dimethoate, intercropping, *Leucinodes orbonalis*, lambda cyhalothrin, *Solanum melongena*

INTRODUCTION

Brinjal or egg plant *(Solanum melongena* L, $2n = 2x = 24$) is an important solanaceous vegetable crop in many countries particularly India, Japan, Indonesia, China, Bulgaria, Italy, France, USA and several African countries. It is one of the most important vegetable crops in Africa, probably the fourth one after tomato, onion and okra (Grubben and Denton, 2004). Fruits are rich in essential vitamins and minerals, which are good for health (Fayemi, 1999; Yahia et al., 2011). India produces almost thirteen per cent of world's vegetable output occupying second position in brinjal production. India accounts for about 8.7 million MTs with an area of 0.53 million hectares under cultivation.

In West Bengal total area under brinjal production is 161 thousand ha, and the total production is 2965 MT (NHPD, 2015). Amongst the insect pests of egg plant, the shoot and fruit borer (*Leucinodes orbonalis* Guen.) is the most serious insect pest and is responsible for severe damage to fruit and at severity yield loss reached to 20-70% (FMANR, 1996; Degri et al., 2013; Degri, 2014; Greene et al., 2018).

Farmers currently use pesticides heavily, and borer is vulnerable to sprays for a few hours before it bores into the plant, forcing farmers to spray insecticides as often as every 2-3 days intervals (AVRDC, 2018). Heavy use of synthetic pesticides leads to environmental pollution and poses problem for human health. Effect of intercropping on pest problems have been studied or reviewed by many authors (Vandermeer, 1989; Prasad et al., 2007; Hailu et al., 2018; Liu et al., 2018). Intercropping practice is of economic benefit and one of the best cultural practices that have potential of reducing insect pest infestation by increasing crop diversity (Willey, 1985; Trenbath, 1993; Prasad et al., 2007; Hailu et al., 2018).

To study the influence of intercropping; an experiment was carried out during *rabi,* 2015-16. Five crops viz. maize, sesamum, broad bean, niger and buck wheat, were used as border crop in brinjal field in reducing the incidence and damage of fruit and shoot borer in brinjal.

MATERIAL AND METHODS

The experiment was conducted at College Farm, College of Post Graduate Studies, Barapani

under Central Agricultural University, Imphal, Manipur in the year 2015-16. The main aim of the study was to assess the influence of trap cropping/ mixed cropping/ intercropping of different crops on brinjal (egg plant) on the level of incidence and damage of fruit and shoot borer (*Leucinodes orbonalis*). Observations were recorded on twenty randomly tagged plants in each treatment of brinjal in which maize, sesamum, broad bean, niger and buck wheat were used as border crops.

The crop was transplanted on 30 days after sowing at 60 × 60 cm spacing with each plot measuring 4 m^2. The intercrops-maize, sesamum, broad bean, niger and buck wheat were sown twenty days prior to transplantation of brinjal in the field. It was compared with alternate spray of dimethoate (0.05%) and lambda cyhalothrin (0.005%). Dimethoate was sprayed at 80 and 100 DAT and lambda cyhalothrin was sprayed at 90 and 110 DAT. The incidence of *Leucinodes orbonalis* in shoot was recorded from twenty randomly selected plants in each treatment and fruit damages were recorded as number of infested fruit in twenty randomly selected fruit in each plot. Observations were converted into percent infestation. Both the observations were converted into per cent infestation. The values were expressed as means ± standard error of means.

Table 1. Brinjal shoot and fruit borer, *Leucinodes orbonalis* infestation in different border cropped in brinjal field in Meghalaya

Treatment	Per cent damage by *Leucinodes orbonalis*													
	90 DAT		100 DAT		110 DAT		120 DAT		130 DAT		140 DAT		Mean	
	Shoot	Fruit	Shoot	Fruit	Shoot	Fruit	Shoot	Fruit	Shoot	Fruit	Shoot	Fruit	Shoot	Fruit
Maize	3.33 (10.47)	3.33 (10.47)	3.33 (10.47)	5 (12.92)	3.33 (10.47)	6.67 (15)	1.67 (7.49)	10 (18.44)	1.67 (7.49)	11.67 (20)	1.67 (7.49)	13.33 (21.39)	2.50 (9.10)	8.33 (16.74)
Sesamum	3.33 (10.47)	6.67 (15)	3.33 (10.47)	10 (18.44)	3.33 (10.47)	10 (18.44)	3.33 (10.47)	15 (22.79)	5.00 (12.92)	13.33 (21.39)	3.33 (10.47)	18.33 (25.33)	3.61 (10.94)	12.22 (20.44)
Niger	3.33 (10.47)	8.33 (16.74)	3.33 (10.47)	16.67 (4.12)	5.00 (12.92)	13.33 (21.39)	3.33 (10.47)	16.67 (24.12)	5.00 (12.92)	16.67 (24.12)	3.33 (10.47)	13.33 (21.39)	3.89 (11.39)	14.17 (21.97)
Buck-Wheat	3.33 (10.47)	8.33 (16.74)	5.00 (12.92)	10 (18.44)	3.33 (10.47)	8.33 (16.74)	15 (22.79)	13.33 (21.39)	5.00 (12.92)	16.67 (24.12)	5.00 (12.92)	20 (26.56)	4.17 (11.83)	12.78 (20.96)
Broad bean	3.33 (10.47)	6.67 (15)	3.33 (10.47)	8.33 (16.74)	3.33 (10.47)	6.67 (15)	3.33 (10.47)	11.67 (20)	5.00 (12.92)	16.67 (24.12)	3.33 (10.47)	20 (26.56)	3.61 (10.94)	11.67 (20)
Chemical	1.67 (7.49)	3.33 (10.47)	1.67 (7.49)	5.00 (12.92)	1.67 (7.49)	1.67 (7.49)	1.67 (7.49)	3.33 (10.47)	0.00	3.33 (10.47)	0.00	1.67 (7.49)	1.39 (6.80)	3.06 (3.19)
Control	3.33 (10.47)	10 (18.44)	3.33 (10.47)	10 (18.44)	3.33 (10.47)	15 (22.79)	3.33 (10.47)	16.67 (24.12)	5.00 (12.92)	16.67 (24.12)	5.00 (12.92)	18.33 (25.33)	3.89 (11.39)	14.45 (22.38)
SEd(±)	6.09	3.79	5.32	2.89	7.49	3.57	5.79	2.81	2.30	3.04	3.64	3.94	1.32	7.1
$CD_{0.05}$	NS	NS	NS	6.30	NS	7.75	NS	6.13	5.01	6.63	7.93	8.59	NS	13.91

RESULTS AND DISCUSSION

The incidence of *Leucinodes orbonalis* in shoot was recorded from twenty randomly selected plants in each plot and fruit damages were recorded as number of infested fruit in twenty randomly selected fruit in each plot. Lowest incidence of pest was recorded in alternate spray of chemical pesticides (dimethoate (0.05%) and lambda cyhalothrin (0.005%) i.e., 1.39 per cent shoot and 3.05 per cent fruit infestation. Among the different crop used as border crop, maize as border crop recorded significantly lower incidence of *L. orbonalis* (2.50 per cent shoot and 8.30 per cent fruit infestation) than the other crops. Incidence of *L. orbonalis* in the plots with sesamum, niger, broad

bean and buck wheat were comparable with untreated control. In another study, Prasad et al. (2007) found that roselle and sowa as intercrop in brinjal were effective in reducing the shoot damage to the extent of 65 and 63.3%, respectively over brinjal (sole), followed by marigold and maize. Similarly, Hailu et al. (2018) observed the benefit of intercropping in brinjal than the sole crop.

CONCLUSION

The results indicate that intercropping has significant influence on brinjal in reducing the incidence and damage of the fruit and shoot borer. Damage in the intercrop was significantly lower from that of the plant in the sole crop. There was also significant yield advantage of intercropping in brinjal with maize. Incidence of insect pest in the plots with sesamum, niger, broad bean and buck wheat were comparable with untreated control. It is therefore recommended that farmers in this agro ecological region can adopt the practice of intercropping in brinjal with maize to minimize fruit and shoot borer infestation and increase its production.

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