Efficacy of certain chemicals and botanicals against shoot and fruit borer, *Leucinodes orbonalis* (Guenee) on Brinjal (*Solanum melongena* L.)

ABSTRACT

The field trial was conducted at Central research farm , SHUATS, Prayagraj, U.P during *Kharif season* 2023 in randomized block design (RBD) with three replications consisting of eight treatment *viz*, Neem oil 2%, Chlorantraniliprole 18.5% SC , Spinosad 45%SC, Flubendiamide 480 SC, Indoxacarb 14.5% SC, Pangomia + Flubendiamide, Neem oil + Flubendiamide, and untreated Control, The result revealed that all insecticidal treatments were significantly superior to reduce the incidence of shoot and fruit damage of brinjal compared to untreated control. The plot treated with Chlorantraniliprole 18.5% SC recorded the lowest % of shoot and fruit damage 4.03% and 3.20 % in first and second sprays, respectively followed by spinosad 45% SC (4.43% and 4.15% respectively). The yield ranged from 85 to 225.50 q/ha in all treatments. The highest yield was recorded in Chlorantraniliprole 18.5 % SC (225q/ha) followed by spinosad 45% SC (190q/ha), Flubendiamide 480 SC (17.50q/ha), Indoxacarb 14.5 SC (160.35q/ha), Pangomia + Flubendiamide (140.33q/ha), Neem oil + Flubendiamide (132.40q/ha) and Neem oil 2% (120.50q/ha) as compared to control (85.00q/ha). When cost benefit worked out the best and most economical treatment was Chlorantraniliprole 18.5% SC (1:10.3) followed by Spinosad 45% SC (1:8.5) , Flubendiamide 480 SC (1:7.5), Indoxacarb14.5 SC (1:7.4), Pangomia + Flubendiamide (1:6.0), Neem oil + Flubendiamide (1:5.5) and Neem oil 2% (1:5.4) as compared to control (1:4.2).

Key words : Cost Benefit Ratio, Insecticides, *Leucinodes orbonalis, Solanum melongena,* Yield

Introduction

Brinjal (*Solanum melongena* Linnaeus) belongs to the family Solanaceae.Originated from India and now grown as a vegetable throughout the tropical, sub-tropical and warm temperate areas of the world. Brinjal is attacked by more than 70 insect pests, among the insect pest infesting brinjal, the major ones are shoot and fruit borer, *Leucinodes orbonalis* (Guen.) The larvae bore into tender shoots in the early stage resulting in drooping shoots, which are readily visible in the infested fields. At the later stage, caterpillars bore into flower buds and fruits, rendering the fruits unfit for consumption and marketing, resulting in direct yield losses. Although insecticidal control is one of the common means against the fruit borer, many of the insecticides applied are not effective in the satisfactory control of this pest.

Materials and Methods

The trial was conducted for the management of Brinjal shoot and fruit borer using variety Pusa kranti purple Round and treatments Neem oil 2%, Chlorantraniliprole 18.5% SC ,

Spinosad 45% SC, Flubendiamide 480 SC, Indoxacarb 14.5% SC, Pangomia + Flubendiamide, Neem oil + Flubendiamide, were used at Central Research Farm (CRF), SHUATS, Uttar Pradesh during *Kharif,* 2023. The evaluation of insecticides was done in randomized block designe with 3 replications. The insecticidal spray solution of desired concentration as per each treatment was freshly prepared every time at the experimental site just before the start of spraying operation. All the sprays were given during the evening hours by hand compression sprayer which was used for imposing the treatments. Two sprays was done during entire crop season when pest infestation reached economic threshold level, Firs spray was done on 10th September 2023 and second on 26th September 2023. The observation was recorded at 5 randomly selected plants in each treatment plot, The observation were investigated one day prior to insecticidal application and 3rd , 7th and 14th day after application for two sprays. For assessing the Brinjal fruit and shoot borer damage. The yield data in each treatment was recorded separately and subjected to statistical analysis in which cost benefit ratio in various treatment was calculated.

Result of discussion

All the insecticidal treatments were significantly superior to the untreated control in reducing the infestation of shoot damage on Brinjal after 1st insecticidal application. The % shoot damage recorded one day prior to spray range between 5.82 to 7.12 % (Table 1). After 3rd , 7th and 14th day of first spray lowest mean % of shoot damage was recorded in spinosad 45% SC (4.43) which was less effective than the check treatment Chlorantraniliprole 18.5% SC (4.03) followed by Flubendiamide 480 SC (4.65) Indoxacarb 14.5% SC(5.45), Pangomia + Flubendiamide (5.65), Neem oil + Flubendiamide (6.24) and the Neem oil 2%(6.40) was found to be least effective.

The data on the percent infestation of fruit borer on brinjal 3rd, 7th and 14th day after second spray revealed that all the chemical treatments were significantly superior over control. Among all the treatments lowest percent fruit infestation was recorded in spinosad 45% SC (4.15) which was less effective than the check treatment Chlorantraniliprole 18.5% SC (3.20) followed by Flubendiamide 480 SC (4.58) Indoxacarb 14.5% SC (5.33), Pangomia + Flubendiamide (5.95), Neem oil+Flubendiamide (6.46), and the Neem oil 2% (6.74) was found to be least effective. (Table 1).

All the treatments were found to be superiorly over control on first and second spray and revealed that Chlorantraniliprole 18.5 % SC was superior in reducing the population of shoot and fruit borer the result are similar to finding made by **Reddy and Kumar (2022) and Saumya *et al.,* (2023)**. Next most effective treatment was Spinosad 45% SC which was similar to the finding made by **Mane and Kumar 2020 and Chandar *et al.,* (2020).** Next effective Treatment was recorded in Flubendiamide 480 SC which was similar to the finding made by **Reddy *et al.,* (2022) and Saumya and Tayde (2023) .** followed by Indoxacarb 14.5% SC which is similar to the finding made by **Sankar and Kumar (2022)** and **Mane *et al.,*(2020) .** Also Pangomia + Flubendiamide the result was similar to finding made by **Verma *et al.,*(2021)** Next effective was Neem oil + Flubendiamide which was similar to

finding made by **Pooja and Kumar(2022).** Next least effective was T1 Neem oil 2% similar to finding made by **Danish and Alexander (2022).**

The highest yield and cost benefit ratio was recorded in Chlorantraniliprole 18.5% SC (225.50q/ha) and (1:10.3) as respectively. The result is supported by the finding of **Reddy and Kumar (2022) Tripura *et al*., (2017).** followed by Spinosad 45% SC (190.30 q/ha) and (1:8.5) which is similar to findings made by **Mane and Kumar 2020 and Devi *et al.*, (2015).** Flubendiamide 480 SC (170.50q/ha) and (1:7.5) in similar to findings made by **Sowmya *et al.*, (2015).** Indoxacarb 14.5% SC (160.35q/ha) and (1:7.4) **Sankara and kumar (2022)** and **Dwivedi *et al.*,(2014).** Pangomia + Flubendiamide (140 .33q/ha) and (1:6.0) are similar to findings made by **Shobharani and Nandihalli (2010)** and **Verma *et al.*,(2021).** Neem oil + Flubendiamide (132.40q/ha) and (1:5.5) similar to findings made by **Patra *et al.*,(2016)** Neem oil 2% (120q/ha) and (1:5.4) is similar to findings made by **Sharma *et al.*, (2017).**

From the present study, the results showed that Chlorantraniliprole 18.5% SC is most effective treatment against brinjal shoot and fruit borer producing maximum yield and recorded highest cost benefit ratio compared to other treatments. While Spinosad 45% SC, Flubendiamide 480 SC, Indoxacarb 14.5% SC and Pangomia + Flubendiamide has shown average results. Neem oil + Flubendiamide and Neem oil 2% has least effectiveness in managing *Leucinodes orbonalis*. Botanicals are the part of integrated pest management in order to avoid indiscriminate use of pesticides causing pollution in the environment and not much harmful to beneficial insects.

Table 1. Assesment of different insecticides and botanicals on the percent infestation ,yield,CBR of shoot and fruit borer in Brinjal.

	Treatment	Doses	1st Spray					2nd Spray				Yield q/ha	C:B Ratio
			Percent shoot infestation					Percent fruit infestation					
			1DBS	3 DAS	7DAS	14 DAS	Mean	1DBS 3DAS	7DAS	14DAS	Mean		
T_1	Neem oil 2%	20ml/L	6.01	6.54	6.37	6.69	6.40	6.83	6.44	6.97	6.74	120.50	1:5.4
T_2	Chlorantraniliprole 18.5% SC	0.4ml/L	7.12	3.03	2.54	3.43	4.03	3.46	2.86	3.29	3.20	225.50	1:10.3
T_3	Spinosad 45% SC	0.5ml/L	5.82	4.35	2.97	4.59	4.43	4.24	3.54	4.67	4.15	190.30	1:8.5
T_4	Flubendiamide 480 SC	1ml/L	5.94	4.59	3.43	4.66	4.65	4.34	4.14	5.26	4.58	170.50	1:7.5
T_5	Indoxacarb 14.5% SC	0.5ml/L	6.03	5.35	4.66	5.78	5.45	5.42	4.75	5.82	5.33	160.35	1:7.4
T_6	Pangomia oil +Flubendiamide	40ml + 0.5ml/L	6.06	5.89	4.71	5.97	5.65	5.98	5.70	6.18	5.95	140.33	1:6.0
T_7	Neem oil 2% +Flubendiamide	20ml+ 0.5ml/L	5.86	6.38	6.20	6.54	6.24	6.56	6.14	6.68	6.46	132.40	1:5.5
T_8	Control		6.17	6.69	6.95	7.23	6.76	7.32	7.38	8.15	7.56	85	1:4.2
	F- test		NS	S	S	S	S	S	S	S	S		
	S. Ed. (±)		0.40	0.50	0.18	0.27	0.61	0.50	0.56	0.75	0.18		
	C. D. (P = 0.05)		-	1.07	0.37	0.57	1.27	1.07	1.19	1.61	1.27		

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