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EFFICACY OF BIORATIONAL INSECTICIDES AGAINST SPOTTED BOLL WORM *EARIAS* SPP. IN OKRA

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ABSTRACT

Experiment was carried out at the farmer's field in the districts of Amritsar and Jalandhar to evaluate the efficacy of chlorantraniliprole 18.5SC, pyridalyl 10 EC and emamectin benzoate against the fruit borer *Earias vitella* in okra during 2019. The results revealed that after 7 and 10 days of treatment, chlorantraniliprole 18.5SC (125 and 150 ml/ ha) were found significantly superior and at par with pyridalyl 10EC (500 and 625 ml/ ha) and emamectin benzoate (175 g/ ha). Similar results were obtained with fruit yield wherein chlorantraniliprole 18.5SC (125 and 150 ml/ ha) was at par with pyridalyl 10EC (500 and 625 ml/ ha) and emamectin benzoate (175 g/ ha). Thus, chlorantraniliprole 18.5SC (125 ml/ ha) and pyridalyl 10EC (500 ml/ ha) can be alternative to the usually recommended insecticides against *E. vitella*.

Key words: Okra, *Earias vitella*, chlorantraniliprole18.5SC, pyridalayl 10EC, emamectin benzoate 5%SG, efficacy, alternatives, fruit yield

Vegetables are the most important components of balanced diet (Ratan et al., 2017), and okra *Abelmoschus esculentus* (L.) is a popular amongst these (Yadav et al., 2017). In India, okra is grown on an area of 513,000 ha with an annual production of 6170,000 mt (NHM, 2020). Around 72 insect pests infest okra (Rao and Rajendran, 2003), and amongst these, the spotted bollworm (*Earias insulana, E. vitella*) is the most serious. The larva feeds on terminal growing shoots, floral buds, flowers and fruits of okra resulting in 24.6 to 26.0% damage to shoots (Pareek et al., 1986; Zala et al., 1999) and 40 to 100% loss to fruits (Dhawan and Sidhu, 1984; Shah et al., 2001; Shinde et al., 2007; Brar et al., 1994; Rawat and Sahu, 1973). Various isnecticides are used against this pest (Samuthiravelu and David, 1991; Manjanaik et al., 2002; Aziz et al,. 2012; Kranthi et al., 2002). But indiscriminate use of these lead to development of insecticide resistance, outbreak of secondary pests, destruction of natural enemies and environmental pollution (Mahapatro and Gupta, 1998). To avoid these, biorational insecticides are required and this study evaluates two of these along with standard check (emamectin benzoate).

MATERIALS AND METHODS

The insecticides evaluated include chlorantraniliprole 18.5SC at 100, 125 and 150 ml/ ha and pyridalyl 10EC at 375, 500 and 625 ml/ ha compared with emamectin benzoate at 175 g/ ha as check. The experiment was done at the farmer's field in Amritsar and Jalandhar districts during rainy season of 2018-19, laid out in randomized block design (RBD). There were four treatments including untreated control replicated thrice and in plot size of 100 m^2 and row to row spacing of 45 cm and plant to plant spacing of 15 cm. The variety Punjab Suhavani was used, with sowing done in the first week of July, 2018. One foliar spray of all the treatments was given by using knapsack sprayer. Number of infested and total fruits was recorded from 10 randomly selected plants/ plot as pretreatment and post treatment counts taken at 3, 7 and 10 days, and from these % infestation was calculated; damaged fruits were separated based on the presence of exit holes or on the basis of distorted shape of the fruits. In case of doubt, fruits were cut open to see the larvae. The weight of healthy fruits was pooled to work out the yield as q/ ha. The data of infested fruit damage was calculated as % reduction following Abbott's formula (Yogeeswarudu and Venkata Krishna, 2014). The data were subjected to ANOVA comparing the treatment means using Duncan multiple's range test (p=0.05).

RESULTS AND DISCUSSION

The results given in Table 1 reveal that *E. vitella* on okra was ranging from 8.33-14.28% in pretreatment, and chlorantraniliprole 18.5SC led to maximum reduction with increase in concentration and days after application; 100% reduction was observed at maximum

Table 1. Efficacy of insecticides against *Earias vitella* in okra

S. No.	Treatment	Dose (g/ ml)/ ha	Amritsar district % reduction in larvae over control			Yield (q/ ha)	Jalandhar district % reduction in larvae over control			Yield (q/ ha)
			3DAT	7DAT	10DAT		3DAT	7DAT	10DAT	
1.	Chlorantraniliprole	100	49.79	79.25	86.94	101.68	69.76	83.86	93.52	111.33
	18.5SC	125	78.30	100.00	100.00	117.93	82.86	100.00	100.00	123.33
		150	79.10	100.00	100.00	121.08	91.89	100.00	100.00	124.68
2.	Pyridalyl 10EC	375	55.19	79.09	84.80	96.25	57.17	71.10	73.79	114.00
		500	70.57	100.00	100.00	111.68	83.95	100.00	100.00	120.68
		625	74.85	100.00	100.00	118.75	84.33	100.00	100.00	122.00
3.	Emamectin benzoate	175	79.59	100.00	100.00	121.08	83.85	100.00	100.00	122.68
4.	Control	-	-	-	-	81.25	-	-	-	99.33
	df		2,6	2,6	2,6		2,6	2,6	2,6	
	Mean sum square (Treatment)		447.08	309.78	143.69		409.81	402.87	288.00	
	Mean sum square (Error)		15.14	0.62	1.71		3.19	2.24	1.13	
	F value		29.54	93.00	83.93		128.18	179.94	255.41	
	CD (p=0.05)		6.92	1.41	2.33		3.18	2.66	1.88	

Means within a column followed by same letters not significantly different at α =0.05(Duncan's Multiple Range Test)

dose of 150 ml/ ha after 7 and 10 days of spray, also with 125 ml/ ha. Reddy et al (2019) also observed the superiority of chlorantraniliprole 18.5SC at 0.3 ml/ l. Similarly, imidacloprid @ 3 g ai/ kg followed by a foliar spray of λ-cyhalothrin @ 50 g ai/ ha at 50 days of sowing were the most effective, with increase in yield over control. After 3 days of spraying while, there was no damage with pyridalyl 10E at 500 ml/ ha; and with emamectin benzoate @ 175 g/ ha it was 2.61% after 3 days of spraying, and nil damage after 7 and 10 days of spraying. Thus, chlorantraniliprole 18.5SC @ 125 ml/ ha and pyridalyl 10 EC @ 500 ml/ ha gave promising results. The fruit yield was maximum (121.08 q/ ha) with chlorantraniliprole 18.5SC at 150 ml/ ha followed by pyridalyl 10 EC (118.75 q/ ha) @ 625 ml/ ha. These results obtained at Amritsar were found to agree with those obtained at Jalandhar. The treatment of chlorantraniliprole 18.5 SC was found effective at 100, 125 and 150 ml/ ha, respectively after 3 days of insecticide application, and no damage was observed at 7 and 10 days of applying the insecticide at 125 and 150 ml/ ha. Similar results were obtained with pyridalyl 10 EC used at 500 and 625 ml/ ha. Emamectin benzoate was found to be superior over pyridalyl in terms of fruit damage. Maximum fruit yield (123.33 q/ ha) was obtained when chlorantraniliprole 18.5 SC was used at 125 ml/ ha.

Thus, chlorantraniliprole may be used at the lower dose to reduce the cost of spraying. Similar findings were observed by Reddy et al. (2019) with significantly superior fruit yield.

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