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EFFICACY OF INSECTICIDES AGAINST BRINJAL SHOOT AND FRUIT BORER, *Leucinodes orbonalis* GUENEE ON BRINJAL

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ABSTRACT

Field experiment was conducted during Kharif-2013 to evaluate the efficacy of the efficacy of six insecticides viz., flubendiamide 480 SC at 48 g a.i/ha, thiacloprid 240 SC at 120 g a.i/ha, â-cyfluthrin + imidacloprid 300 OD at 30 g a.i/ha, thiodicarb 75 WP at 1000 g a.i/ha, spinosad 45 SC at 75 g a.i/ha and profenophos 50 EC at 500 g a.i/ha against brinjal shoot and fruit borer. All the insecticidal treatments were found significantly superior to untreated control in reducing damage caused by shoot and fruit borer on brinjal. Spinosad 45 SC at 75 g a.i/ha was adjudged as the best and effective treatment in checking shoot damage on number basis, fruit damage on number basis and fruit damage weight basis, followed by flubendiamide 480 SC at 48 g a.i/ha and profenophos 50 EC at 500 g a.i/ha, and also resulted in higher fruit yields, respectively.

Key words : *Leucinodes orbonalis, kharif, fruit damage, spinosad and flubendiamide.*

The vegetable brinjal, Solanum melongena Linn. (Solanaceae), is often referred to as eggplant or aubergine in other regions of the world and is grown for its fleshy fruit. Brinjal is grown in all the seasons and it is attacked by number of insect pests right from seedling stage till harvest. Among the all brinjal shoot fruit borer, Leucinodes orbonalis Guenee, (*Lepidoptera: Pyralidae*) is the most obnoxious, detrimental and ubiquitous pest. Larval stage of the pest causes the damage ranging from 11 to 93 per cent in India (1). The young larvae bore into nearest tender shoots or fruits. Soon after boring into shoots or fruits, they plug the entrance hole plug with excreta. Larval feeding inside the fruits results in destruction of fruit tissues making them unfit for marketing. The increased dependence on pesticides , calendar based sprays by the farmers and short residual action of certain group of insecticides have not only lead to higher costs of production but also have not resulted in adequate control of pests. The extensive and indiscriminative use of pesticides for shoot and fruit borer management has leads to several problems like resurgence of secondary pests, health hazards and edible fruits (2). The objective of the present investigation was to test the efficacy of insecticides for management of shoot and fruit borer on brinjal.

MATERIALS AND METHODES

A field experiment was carried out at Student farm, college of Agriculture, Rajendranagar, Hyderabad during kharif, 2013-14 in Randomized Block Design with seven treatments and three replications for evaluating the relative efficacy of the insecticides against brinjal shoot and fruit borer. Insecticides were sprayed through knap-sack sprayer. The treatments were: flubendiamide 480 SC at 48 g a.i/ha, thiacloprid 240 SC at 120 g a.i/ha, â-cyfluthrin + imidacloprid 300 OD at 30 g a.i/ha, thiodicarb75 WP at 1000 g a.i/ha, spinosad 45 SC at 75 g a.i ha-1 and profenophos 50 EC at 500 g a.i/ha and control. An economic threshold level (ETL) of 5 % shoot damage and 10% fruit damage was considered for making spray decisions. The insecticides were sprayed thrice, first spray at ETL and second and third spray at 20 days gap interval after first spray. Data on the shoot and fruit infestation were recorded at one day before spraying as pre-treatment count and at 5 days after spraying as post treatment counts. The observations were recorded on five randomly selected plants which were tagged in each plot leaving the border rows. During the vegetative growth at each observation the number of shoots damaged to the total number of shoots per cent was recorded for the selected 5 plants per plot of the experiment. At fruit bearing, the number and weight of infested fruits to the total number and weight of each plot of the experiment was recorded separately at each harvest. The observations recorded from the field were subjected to statistical analysis (RBD) to know the significance of difference among different treatments. The cumulative per cent infestation in different treatments was calculated at the end of experiment.

Table-1 : The cumulative effect of various treatments on the incidence of Leucinodes orbonalis.

Treatments	Dosage ga.i./ha	Shoot damage on number basis		Fruit damage on number basis		Fruit damage on weight basis		Yield
		5DAS (%)	Reduction over control	5DAS (%)	Reduction over control	5DAS (%)	Reduction over control	(t/ha)
T_1 = Flubendiamide 480 SC	48	10.15 (18.58)	46.85	20.24 (26.73)	46.72	20.04 (26.59)	47.86	17.30
T_2 = Thiacloprid 240 SC	120	15.14 (22.89)	20.74	28.77 (32.43)	24.27	24.17 (29.44)	37.12	12.75
T_3 = (α-cyfluthrin + Imidacloprid) 300 OD	30	14.31 (22.23)	25.05	25.49 (30.32)	32.89	23.18 (28.78)	39.68	14.29
T_4 = Thiodicarb 75 WP	1000	12.88 (21.03)	32.56	22.79 (28.51)	40.01	21.94 (27.93)	42.91	14.83
T_5 = Spinosad 45 SC	75	8.93 (17.38)	53.26	19.36 (26.10)	49.04	18.70 (25.62)	51.36	17.70
T_6 = Profenophos 50 EC	500	12.11 (20.36)	36.59	21.32 (27.49)	43.88	20.91 (27.21)	45.60	15.83
T_7 = Water spray(Control)	—	19.10 (25.91)	0.00	37.99 (38.05)	0.00	38.44 (38.31)	0.00	9.71
SEm		0.40		0.26		0.29		0.41
C.D (5%)		1.23		0.79		0.90		1.29

RESULTS AND DISCUSSION

Cumulative effects of three sprays on brinjal shoot infestation by shoot and fruit borer

The results on cumulative effect at five days after each of the three sprays revealed that the per cent shoot damage by all the insecticidal treatments were superior over control. The most effective treatments were spinosad at 75 g a.i/ha and flubendiamide at 48 g a.i/ ha, at 48 g a.i/ha with cumulative per cent shoot damage at five days after three sprays were 8.93 and 10.15, respectively. And these treatments were on par with each other and significantly different from all other treatments. The next effective treatments were profenophos at 500 g a.i/ha, thiodicarb at 1000 g a.i/ ha and â-cyfluthrin + imidacloprid at 30 g a.i/ha with per cent shoot damage by brinjal shoot and fruit borer were 12.11,12.88 and 14.31, respectively and these three treatments were on par with each other. The highest per cent shoot damage was recorded in thiacloprid at 120 g a.i/ha (15.14) and was on par with â-cyfluthrin + imidacloprid at 30 g a.i/ha. The data on cumulative effect of different treatments at five days after each of the three sprays revealed that highest per cent reduction of shoot damage over control was recorded in spinosad at 75 g a.i/ha (53.26), followed by flubendiamide at 48 g a.i/ ha, profenophos at 500 g a.i/ ha, thiodicarb at 1000 g a.i/ha, â-cyfluthrin + imidacloprid at 30 g a.i/ha and thiacloprid at 120 g a.i/ ha with 46.85, 36.59, 32.56, 25.05 and 20.74 per cent reduction of shoot damage over control, respectively.

Cumulative effect of three sprays on per cent fruit damage on number basis by brinjal shoot and fruit borer

The results on cumulative effect at five days after each of the three sprays revealed that the per cent fruit damage on number basis by all the insecticidal treatments were superior over control. The data revealed that spinosad at 75 g a.i/ha showed superior results by recording 19.36 per cent fruit damage on number basis and was on par with flubendiamide at 48 g a.i/ha with 20.24 per cent fruit damage.

The next best treatments flubendiamide at 48 g a.i/ha and profenophos at 500 g a.i/ha with per cent fruit damage of 20.24 and 21.32, respectively were on par with each other at five days after each of the three sprays. The treatment profenophos at 500 g a.i/ha and thiodicarb at 1000 g a.i/ha were on par with each other with per cent fruit damage of 21.32 and 22.79, respectively. The least effective treatments, â-cyfluthrin + imidacloprid at 30 g a.i/ha and thiacloprid at 120 g a.i/ha were on par with each other with per cent fruit damage of 25.49 and 28.77, respectively. The data on cumulative effect of different treatments at five days after each of the three sprays revealed that highest per cent reduction of fruit damage on number basis over control was recorded in spinosad at 75 g a.i/ha (49.04), followed by flubendiamide at 48 g a.i/ha, profenophos at 500 g a.i/ha, thiodicarb at 1000 g a.i/ha, â-cyfluthrin + imidacloprid at 30 g a.i/ha and thiacloprid at 120 g a.i/ha with 46.72, 43.88, 40.01, 32.89 and 24.27 per cent reduction of fruit damage over control, respectively.

Cumulative effect of three sprays on per cent fruit damage on weight basis by brinjal shoot and fruit borer.

The per cent fruit damage on weight basis due to brinjal shoot and fruit borer at five days after each of the three sprays indicated that all the insecticidal treatments

were superior over control .The most effective treatment spinosad at 75 g a.i/ha was recorded fruit damage (18.70) and significantly different from all other treatments. The treatments, flubendiamide at 48 g a.i/ha and profenofos at 500 g a.i/ha were on par with each other with per cent fruit damage of 20.04 and 20.91, respectively. The treatment profenophos at 500 g a.i/ha and thiodicarb at 1000 g a.i/ha with per cent fruit damage of 20.91 and 21.94 and these treatments were on par with each other at five days after each of the three sprays.

The treatment thiodicarb at 1000 g a.i/ha and â-cyfluthrin + imidacloprid at 30 g a.i/ha with per cent fruit damage on weight basis were 21.94 and 23.18, respectively and these treatments were on par with each other. The least effective treatments â-cyfluthrin + imidacloprid at 30 g a.i/ha and thiacloprid at 120 g a.i/ha were on par with each other with per cent fruit damage on the weight basis by shoot and fruit borer on brinjal during five days after all the sprays were 23.18 and 24.17, respectively. The data on cumulative effect of different treatments at five days after each of the three sprays revealed that highest per cent reduction of fruit damage on weight basis over control was recorded in spinosad at 75 g a.i/ha (51.36), followed by flubendiamide at 48 g a.i/ha (47.86), profenophos at 500 g a.i/ha (45.60), thiodicarb at 1000 g a.i/ha (42.91), â-cyfluthrin + Imidacloprid at 30 g a.i/ha (39.68) and thiaclporid at 120 g a.i/ha (37.12).

Effect of insecticides on yield of brinjal

The data presented in the table that revealed that all the insecticidal treatments were found superior over control in terms of the yield. The data revealed that spinosad at 75 g a.i/ha exhibited highest yield by recording 17.70 t/ha and found superior to all other insecticidal treatment like flubendiamide at 48 ga.i/ha (17.30 t/ha), profenophosat 500 ga.i/ha (15.83 t/ha), thiodicarb at 1000 ga.i/ha (14.83 t/ha), â-cyfluthrin + imidaclopridat 30 g a.i/ha (14.29 t/ha) and thiaclporid at 120 ga.i/ha (12.75 t/ha). The treatment spinosad at 75 ga.i/ha and flubendiamide at 48 ga.i/ha were significantly superior over all the other treatments with respect to yield. The yield in the treatments of profenophos at 500 g a.i/ha and thiodicarb at 1000 ga.i/ha were on par with each other. The treatment thiodicarb at 1000 g a.i/ha and â-cyfluthrin + imidacloprid at 30 g a.i/ha were on par with each other but significantly different from thiacloprid at 120 g a.i/ ha in terms of yield. The present investigation revealed that the treatments spinosad at 75 g a.i/ha and flubendiamide at 48 g a.i/ha were most effective in reducing the per cent shoot damage on number basis, fruit damage on number and weight basis by brinjal shoot and fruit borer. The results were in conformity with (3) who reported that among different insecticides the lowest per cent mean shoots infestation (7.47) and fruit infestation (9.88) was recorded in the plots treated with spinosad 2.5 EC 50 g a.i./ha. (4) reported that flubendiamide 480 SC @ 90 and 72 g a.i./ha were recorded lowest per cent shoot damage (11.43 and 16.21, respectively), (5) reported that profenophos at 0.1 per cent and thiodicarb at 75 SP @750 g a.i/ha were effective against shoot and fruit borer on brinjal. The present findings revealed that the treatment spinosad at 75 g a.i/ha was recorded highest yield. These findings were in accordance with the results of (3) who reported that the highest marketable fruit yield of 14 t/ha was recorded in spinosad treatment. The next highest yield was recorded in the treatment with flubendiamide at 48 ga.i/ha. The results were in agreement with (4) who reported that the yield in the treatment, flubendiamide 480 SC @ 90 g a.i/ha was recorded 29.42 t/ha.

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