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FIELD EFFICACY OF FLUBENDIAMIDE 480SC AGAINST BRINJAL SHOOT AND FRUIT BORER (*LEUCINODES ORBONALIS*)

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ABSTRACT

The field experiments were conducted at Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal during 2012 and 2013 to evaluate the field efficacy of flubendiamide 480SC against shoot and fruit borer (*Leucinodes orbonalis*) of brinjal. Seedlings of variety Muktakeshi were transplanted in plots of 25 m^2 area with a spacing of 60 x 45 cm. The experiment was designed in randomized block design (RBD) with four replications, and treatments *viz*., flubendiamide 480SC at 90 g, 72g and 60 g a.i./ha; thiodicarb 75 SP (750 g a.i./ha); quinalphos 20 EC (200 g a.i./ha); and water as untreated control. The insecticides were applied twice at 7 days interval. Results revealed that all the treatments gave significant reduction in infestation. It was evident that flubendiamide 480 SC @ 72 and 90 g a.i./ ha was very effective with only 1.64 and 1.03% shoot, and 9.11 and 4.44% fruit infestation, respectively along with significant increase in yield.

Key words: Field efficacy, flubendiamide, thiodicarb, quinalphos, *Leucinodes orbonalis*, shoot and fruit infestation, fruit yield

Among the insect pests infesting brinjal, the major ones are shoot and fruit borer, *Leucinodes orbonalis* (Guenée), whitefly, *Bemicia tabaci* (Genn.), leafhopper, *Amrasca biguttula biguttula* (Ishida). Of these, shoot and fruit borer, *L. orbonalis* (Lepidoptera: Pyraustidae) is considered to be the main constraint. The yield loss due to this had been accounted to the tune of 70-92% (Rosaiah, 2001; Reddy and Srinivasa, 2004; Jagginavar et al., 2009; Chakraborti and Sarkar, 2011). To manage this many insecticides are being recommended, of which few result in hazards like pollution. This has necessitated the development of new, safer, quickly degradable insecticides. The present study evaluates the field efficacy of flubendiamide 480 SC (novel insecticide) against the shoot and fruit borer of brinjal and its effect on the natural enemies associated with brinjal ecosystem.

MATERIALS AND METHODS

The field experiments were conducted at Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Nadia, West Bengal during 2012 and 2013. Brinjal (variety Muktakeshi) seedlings were transplanted in plots of 25 m^2 area with a spacing of 60 x 45 cm. The experiment was designed in randomized block design (RBD) with four replications with standard agronomic practices followed. Six treatments *viz*., flubendiamide 480SC (at 90, 72 and 60 g a.i./ha), thiodicarb 75 SP (750 g a.i./ha), quinalphos 20 EC (200 g a.i./ha) and water as untreated control were the treatments, with insecticides applied twice at 7 day interval (at the ETL of 5% shoot and fruit damaged) with knapsack sprayer @500 l/ha. Observations on the borer incidence on shoots were recorded from ten randomly selected plants/replication on 3rd, 5th and 7th day after each application and the number of infested and healthy fruits counted at each picking. The data were subjected to necessary transformation and the critical difference (CD) at 5% level of significance worked out.

RESULTS AND DISCUSSION

Observations obtained with shoot infestation presented in Table 1 reveal that the least infestation was in flubendiamide 480 SC @ 90 g a. i./ha with 1.30 and 0.75% infestation during 2012 and 2013, respectively; it is followed by its dose @ 72 g a.i./ha

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Table 1. Effect of flubendiamide 480SC on shoot and fruit borer infestation, yield and natural enemies in brinjal (2012, 2013)

Treatments	Dose (g a.i. / ha)	Mean of infestation						Mean yield (q/ha)	Mean % reduction/ increase (+) of predators					
		Shoot infestation (%)			Fruit infestation (%)				*Menochilus* sp.			*Chrysoperla* sp.		
		2012	2013	Mean	2012	2013	Mean		2012	2013	Mean	2012	2013	Mean
Flubendiamide 480SC	60	3.65 (10.82)	2.54 (9.13)	3.10 (10.14)	20.09 (26.53)	7.82 (15.97)	13.96 (21.94)	33.25	2.40 (8.91)	4.44 (12.16)	3.42	3.28 (10.43)	6.04 (14.23)	4.66
Flubendiamide 480SC	72	2.08 (8.17)	1.20 (6.25)	1.64 (7.36)	13.74 (21.70)	4.47 (12.03)	9.11 (17.57)	36.88	2.84 (9.70)	4.96 (12.87)	3.90	3.84 (11.30)	6.96 (15.30)	5.40
Flubendiamide 480SC	90	1.30 (6.48)	0.75 (4.93)	1.03 (5.82)	6.19 (14.33)	2.70 (9.42)	4.44 (12.16)	38.88	3.60 (10.94)	5.92 (14.08)	4.76	4.04 (11.60)	7.92 (16.35)	5.98
Thiodicarb 75 SP	750	5.98 (14.00)	2.87 (9.69)	4.43 (12.15)	20.53 (26.74)	7.41 (15.52)	13.97 (28.95)	32.80	58.88 (50.12)	64.80 (53.61)	61.84	68.52 (55.87)	73.80 (59.21)	71.16
Quinalphos 20 EC	200	5.77 (13.74)	2.63 (9.27)	4.20 (11.83)	19.22 (25.77)	7.11 (15.18)	13.16 (21.27)	33.25	78.72 (62.53)	83.28 (65.86)	81.00	84.80 (67.05)	88.00 (69.73)	86.40
Untreated Control (Water spray)	-	16.78 (23.85)	11.43 (19.27)	14.11 (22.06)	35.28 (36.17)	17.49 (24.32)	26.38 (30.90)	24.63	+64.94 (0.00)	+49.20 (0.00)	+57.07	+24.84 (0.00)	+18.96 (0.00)	21.90
C.D. at 5%		0.19	0.13	0.16	0.22	0.16	0.17	0.14	0.23	0.22	-	0.10	0.15	-

Figures in parentheses angular transformed values

(2.08 and 1.20%, respectively); even at lower dose (60 g a.i./ha) it gave reductions in infestation (3.65 and 2.54%). In the the standard checks infestation was more: thiodicarb (5.98 and 2.87%) and quinalphos (5.77 and 2.63%) during 2012 and 2013, respectively. Cumulative values the least with flubendiamide @ 90 g a.i./ha (1.03%) followed by its next dose i.e. @72 g a.i./ha (1.64 %). Even at its lowest dose i.e. flubendiamide (@60 g a.i/ha) was observed to be at par with standard checks.

The perusal of data in Table 1 on the fruit infestation and yield reveal the following: During 2012, all the treated plots gave significant reduction in infestation; flubendiamide @ 90 g a.i/ha (6.19% fruit infestation) proved highly effective, and at 72 g a.i/ha also it was effective; both these treatments were significantly superior in terms of fruit damage as well as increasing yield (37.50 and 35.75 q/ha, respectively). Its lowest dose i.e. 60 g a.i/ha (20.09% infestation) was at par with those of standard checks (thiodicarb and quinalphos). Almost similar trend was noticed during 2013 too, with flubendiamide 480 SC @ 90 g a.i/ ha (2.70% fruit infestation) being the best. It is closely followed by its next higher dose @ 72 g a.i/ha (4.47% fruit infestation). Highest yield was obtained with flubendiamide @ 90 g a.i./ha (40.25q/ha) followed by its dose @ 72 g a.i./ha (38.00q/ha). Cumulative values also reveal that flubendiamide was highly effective.

As regards some important natural enemies associated with brinjal ecosystem, it was observed that flubendiamide was extremely safe to the two common predators, *Menochilus* sp., and *Chrysoperla* sp.. Reductions in their population @ 60-90 g a.i./ha were: *Menochilus* sp. -3.42-4.76% and *Chrysoperla* sp.- 4.66-5.98% (Table 1)

Flubendiamide is a selective chemical for lepidopterous insects and non-toxic to other beneficial insects (Latif et al., 2010). Flubendiamide proved to be an excellent insecticide against brinjal shoot and fruit borer with minimum shoot and fruit infestation and highest marketable fruit yield. These results are in agreement with Jagginavar et al. (2009) who reported that flubendiamide 480 SC @ 72 g a.i./ha could be efficiently used. The present findings are also in conformity with Latif et al. (2010) and Chakraborti and Sarkar (2011).

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