



FIELD EVALUATION OF ALPHACYPERMETHRIN (10% SC) AGAINST INSECT PESTS OF OKRA AND THEIR PHYTOTOXIC EFFECTS ON PLANTS

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ABSTRACT

Field trials were conducted for testing the efficacy of new formulation of synthetic pyrethroid (alphacypermethrin 10% SC) for pest management in okra during *kharif* 2005–06. Alphacypermethrin 10% SC @ 35 and 30 g a.i./ha proved to be highly effective. The treatment alphacypermethrin 10% SC @ 15 g a.i./ha proved least effective. The maximum yield of marketable okra fruits (60.00 q/ha) was obtained in the plots treated with alphacypermethrin 10% SC @ 35 g a.i./ha, whereas minimum (28.25q/ha) in alphacypermethrin 10% SC @ 15 g a.i./ha. No phytotoxic symptoms were observed at lower doses of alphacypermethrin 10% SC @ 25 to 35 g a.i./ha. However, at higher doses *viz.*, 60 and 120 g. a.i./ha showed symptoms as few lesions on leaves.

Key words: Alphacypermethrin 10% SC, insect pests, phytotoxicity, okra

Okra [*Abelmoschus esculentus* (L.) Moench] an important vegetable crop of family Malvaceae is cultivated throughout the year in an area of 0.36 million hectares with an annual production of about 3.52 million tons in India (Anonymous, 2003). The crop is infested by several insect pests, but jassids and the fruit borer are more serious. The seasonal activity of these pests varies from region to region due to ecological differences. When jassid infestations are severe, particularly at the seedling stage, there is a drastic reduction (40–60%) in yield (Lal, 1940 and Narke and Suryawanshi, 1987). It has been estimated that if insecticidal application was not provided, there would be yield loss up to 54.04 per cent due to fruit borer damage (Choudhary and Dadheech, 1989); an average fruit damage of 35–76 per cent has also been estimated by Narke and Suryawanshi (1987) and Hafeez and Rizvi (1994). In order to prevent the loss caused by these pests and to obtain good quality crop, it is essential to manage the pest at the appropriate time with suitable measures. The present study was undertaken to find out the comparative efficacy of different doses of alphacypermethrin (10% SC) against these pests on okra.

MATERIALS AND METHODS

The experiment was conducted at the Horticulture Farm, Rajasthan College of Agriculture (MPUA&T), Udaipur to evaluate the efficacy of different doses of newer

formulation of synthetic pyrethroid (alphacypermethrin 10% SC) for the control of insect pests of okra. The trial was laid out in randomized block design (RBD) with seven treatments (including control), each treatment replicated three times. Okra (variety Prabhani Kranti) was sown in plots measuring 5 X 4.5 m (22.50m²) having 45cm X 30 cm row to row and plant to plant distance, respectively. Pre-calibrated knapsack sprayer (spray fluid 475 litres/ha during early stage and 600 litres /ha during later stage of crop growth) was used for spraying the insecticides on the crop. First spray was done when sufficient build up of jassid population and initiation of shoot borer infestation was recorded. The second and third sprays were given with the initiation of fruit infestation.

For observation of jassids, the whole plant was taken as a single unit in early growth period and then three leaves (one each from top, middle and bottom) from every tagged plant were observed as described by Rawat and Sahu (1973). The population was counted from the 5 randomly selected and tagged plants in each plot one day before and 1, 3, 7 and 14 days after each spray application. The data on jassid population at definite time intervals thus collected were transformed to arc sign value and subjected to analysis of variance. The fruit borer infestation was recorded on the basis of per cent infested fruits (on number and weight basis). All the marketable fruits were removed one day before spray and, after spray the fruits were picked

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Table 1. Bioefficacy of alphacypermethrin (10% SC) against *Amrasca biguttula biguttula* (Ishida) on okra during *kharif*, 2005

Treatments	Doses g. a.i./ha.	Population Reduction (%) after											
		First spray			Second spray			Third spray					
		1 DAT	3 DAT	7 DAT	14 DAT	1 DAT	3 DAT	7 DAT	14 DAT	1 DAT	3 DAT	7 DAT	14 DAT
Alphacypermethrin 10%SC	15	33.50* (35.35)	35.00 (36.23)	38.40 (38.25)	29.15 (32.62)	36.22 (36.97)	40.20 (39.34)	43.76 (41.41)	30.32 (33.40)	35.00 (36.27)	38.43 (38.31)	38.54 (38.37)	31.40 (34.08)
Alphacypermethrin 10% SC	20	43.34 (41.17)	46.33 (42.89)	48.30 (44.02)	32.75 (34.88)	45.50 (42.42)	49.35 (44.63)	51.00 (45.57)	41.55 (40.13)	44.20 (41.67)	47.94 (43.82)	49.60 (44.77)	40.00 (39.23)
Alphacypermethrin 10%SC	25	67.90 (55.55)	68.60 (55.95)	71.66 (57.86)	56.94 (49.00)	69.00 (56.17)	70.12 (56.86)	72.00 (58.05)	57.34 (49.22)	69.72 (56.63)	71.64 (57.83)	73.50 (59.02)	63.20 (52.66)
Alphacypermethrin 10%SC	30	69.70 (56.63)	70.00 (56.85)	73.00 (58.76)	57.00 (49.04)	70.00 (56.79)	71.00 (57.42)	73.20 (58.82)	58.10 (49.66)	69.79 (56.66)	72.00 (58.07)	74.00 (59.35)	65.00 (53.73)
Alphacypermethrin 10% SC	35	70.43 (57.06)	71.12 (57.51)	73.84 (59.25)	58.44 (49.90)	72.00 (58.05)	72.55 (58.40)	74.00 (59.34)	60.20 (50.89)	70.40 (57.05)	73.42 (58.97)	75.10 (60.07)	66.53 (54.65)
Alphacypermethrin 10% EC	25	57.60 (49.38)	59.00 (50.22)	61.00 (51.37)	47.78 (43.71)	50.10 (45.06)	53.74 (47.15)	56.67 (48.84)	47.23 (43.41)	56.00 (48.45)	61.00 (51.40)	62.80 (52.44)	54.67 (47.69)
Untreated control	—	—	—	—	—	—	—	—	—	—	—	—	—
Sem ±		0.87	1.02	0.88	1.03	1.06	1.24	1.11	0.68	0.79	1.08	0.78	0.78
CD (P=0.05%)		2.60	3.06	2.64	3.10	3.17	3.73	3.31	2.05	2.38	3.24	2.33	2.34

#Figures in parentheses are angular transformation values; *Mean of three replications; DAT: Days after treatment.

Table 2. Bioefficacy of alphacypermethrin (10% SC) against *Earias* sp. on okra along with yield during *kharif*, 2005

Treatments	Doses g a.i./ha.	Fruit Infestation (%) after												Yield** q/ha
		First spray				Second spray				Third spray				
		3 DAT	7 DAT	10 DAT	3 DAT	7 DAT	10 DAT	3 DAT	7 DAT	10 DAT	3 DAT	7 DAT	10 DAT	
Alphacypermethrin 10% SC	15	15.22* (22.96)	14.00 (21.97)	15.10 (22.86)	12.38 (20.59)	11.20 (19.53)	12.38 (20.60)	12.00 (20.26)	11.21 (19.55)	9.82 (18.26)	28.25			
Alphacypermethrin 10% SC	20	14.20 (22.13)	12.50 (20.49)	13.77 (21.76)	11.09 (19.45)	10.50 (18.89)	12.00 (20.26)	11.73 (20.00)	10.00 (18.43)	9.00 (17.43)	34.20			
Alphacypermethrin 10% SC	25	9.00 (17.45)	7.00 (15.26)	7.55 (15.94)	7.33 (15.70)	6.34 (14.54)	9.16 (17.61)	7.36 (15.72)	6.18 (14.35)	5.20 (13.02)	56.50			
Alphacypermethrin 10% SC	30	8.73 (17.18)	6.14 (14.33)	7.50 (15.82)	7.13 (15.48)	6.00 (14.15)	9.00 (17.44)	7.32 (15.69)	6.03 (14.19)	5.00 (12.64)	57.75			
Alphacypermethrin 10% SC	35	8.70 (17.15)	5.70 (13.79)	7.29 (15.66)	6.92 (15.22)	5.68 (13.77)	8.70 (17.15)	6.88 (15.19)	5.78 (13.88)	4.62 (12.35)	60.00			
Alphacypermethrin 10% EC	25	11.10 (19.45)	8.20 (16.62)	9.13 (17.57)	8.12 (16.56)	7.55 (15.93)	10.00 (18.43)	8.00 (16.43)	7.19 (15.52)	7.00 (15.29)	53.15			
Untreated control	-	21.72 (27.78)	19.55 (26.24)	20.50 (26.92)	23.70 (29.13)	22.00 (27.95)	24.00 (29.33)	27.12 (31.38)	26.00 (30.66)	25.10 (30.06)	20.30			
S. Em. ±		0.90	0.94	0.76	0.78	0.76	0.92	0.68	0.85	0.78	1.10			
CD (P=0.05%)		2.70	2.83	2.28	2.34	2.27	2.75	2.03	2.54	2.32	3.36			

#Figures in parentheses are angular transformation values; *Mean of three replications; DAT: Days after treatment; ** Extrapolated data of yield on the basis of per plot yield

Table 3. Phytotoxic effects of different doses of alphacypermethrin 10% SC on okra (*Abelmoschus esculentus*)

Treatment	Doses g a.i./ha	Intensity of phytotoxicity	Indication marks
Untreated control	–	No phytotoxicity	–
Alphacypermethrin 10% SC	25	No phytotoxicity	–
Alphacypermethrin 10% SC	30	No phytotoxicity	–
Alphacypermethrin 10% SC	35	No phytotoxicity	–
Alphacypermethrin 10% SC	60	Mild	+
Alphacypermethrin 10% SC	120	Moderate	++

on 3rd, 7th and 10th day. After each picking, the healthy and damaged fruits were separated, counted and percent infestation calculated that was transformed to angular values and statistically analyzed. The population of different natural enemies was also recorded from five tagged plants at different time intervals after each spray.

Phytotoxicity: To study the phytotoxic effects, okra was grown in pots replicated five times and alphacypermethrin (10% SC) 30, 60 and 120g a.i. ha⁻¹ was sprayed. Burning symptoms such as lesions on leaves, dryness of plants and other similar reactions were recorded and classified into four categories (Gupta and Kavadia, 1968):

1. Mild (+): Few lesions on leaves or less than 20 per cent fruit showing burning symptoms,
2. Moderate (++) : Between 20–50 per cent fruits showing burning symptoms,
3. Severe (+++) : More or less all the leaves showing burning symptoms (50–100%)
4. Most severe (++++): Complete mortality of the plant

RESULTS AND DISCUSSION

The data presented in Table 1 on jassids reveal that the maximum reduction of jassid population, at all doses of alphacypermethrin (10% SC) as well as alphacypermethrin (10% EC) was noticed after third spray. The maximum reduction (75.10%) in jassid population was recorded when alphacypermethrin (10% SC) was used at 35g a.i. /ha followed by alphacypermethrin (10%SC) at 30 and 25 g a.i. /ha (population reduction being 74.0 and 73.50%, respectively). The lowest fruit borer infestation (5.70 and 5.68%) was recorded from plots treated with alphacypermethrin (10%SC) at 35g a.i./ha after the first and second spray, respectively; whereas, 4.62 per cent infestation was noticed 10 days after third spray. The maximum infestation of fruit borer at 10th day of treatment (15.22% after first spray, 12.38% after second spray and 9.82% after third spray) was recorded in the treatment alphacypermethrin (10% SC) at a dose of 15g a.i. /ha. The maximum yield of okra fruits (60.00q/ha) was obtained in

the plots treated with alphacypermethrin (10% SC) at 35g a.i./ha (Table 2). Similar records were made on brinjal by Ashok Kumar *et al.* (2008) .

The foliar application of alphacypermethrin (10% SC) at 25 to 35g a.i. /ha showed no phytotoxic symptoms on the leaves and fruits of okra (Table 3); however, at higher doses (60g a.i. /ha and 120g a.i./ha) mild to moderate phytotoxic symptoms were observed on the leaves of okra. The assessed doses of alphacypermethrin (15, 20, 25, 30 and 35 g a.i. /ha) did not cause any adverse effect on the population of different natural enemies.

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