GAU Res. J., 34 (1) : 65-69 (2009)

Comparative efficacy of various insecticides against fruit and shoot borer, *Earias vittella* (Fabricius) on okra

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Abstract

Among the different nine insecticides tested for their efficacy against this pest, the treatment of fenvalerate 0.015 per cent was found best followed by treatments of cypermethrin 0.009 per cent, endosulfan 0.07 per cent and roket 0.088 per cent for the control of okra fruit and shoot borer.

Keywords : Okra, efficacy, insecticides, fruit and shoot borer

Introduction

Okra (*Abelmoschus esculentus* (L.) Moench) is a popular vegetable in India. The crop is subjected to ravage by a wide array of insect pests through out its growth period. Among these, fruit and shoot borer, *Earias vittella* Fab. is one of the most serious pests which causes 67% damage to fruits (1) and 50% loss to fruit yield (2). Several insecticides have been recommended in the past and being used by the farmers for controlling the fruit and shoot borer of okra. But newer insecticides are slowly replacing conventional insecticides and more emphasis is now given on use of specific, eco- friendly and safer insecticides effective at low doses. Numbers of new formulations of conventional insecticides from different insecticidal firms are on the scene, hence the periodic evaluation for their effectiveness is essential. With this view the present experiment was planned for studying their bio efficacy against the spotted boll worm of okra.

Materials and methods

To determine the comparative efficacy of various insecticides against fruit and shoot borer, *E. vittella* on okra a field experiment was conducted at College Farm, College of Agriculture, Junagadh Agricultural University, Junagadh.during *Kharif* 2003 in plots having size of 5 x 3 m(Gross) keeping 60 x 30 cm row to row and plant to plant spacing. Gujarat Okra-2 variety was tested for this purpose. Ten (10) treatments were replicated three times in randomized block design. All agronomic practices and crop husbandry were adopted as per scientific recommendations.The spraying of insecticides was done with the help of knapsack sprayer. Three sprayings of insecticides were carried out at an interval of 15 days. The first spraying was done at fruit formation stage and second at 15 days after first spray. Similarly, the third spraying was done at 15 days after second spraying.In order to evaluate the efficacy of different insecticides under study, the observations on number of healthy and infested okra fruits were recorded from the ten randomly selected and tagged plants from net area of each plot before 24 hrs of first spraying. Subsequently, the observations on infested and healthy okra fruits were also recorded at 7 days after each spraying. The yield of healthy okra fruits was also recorded at each spraying.

On the basis of number of damaged and healthy okra fruits, the percentage infestation of okra fruits after each spraying as well as mean percentage infestation of all the three spraying were calculated and the data thus obtained were statistically analyzed.

Results and discussion

Shoot infestation

The data (Table 1) indicated that all the insecticides were significantly superior over control in reducing the per cent infestation to shoots of okra due to *E. vittella*. The minimum (4.32 per cent) infestation was in the

Table 1. Efficacy of different insecticides for the protection of okra shoots and fruits against E. vittella.

Sr. No.	Treatment	Conc. used (%)	Per cent shoot infestation	Per cent fruit infestation			
				After first spray	After second spray	After third spray	Mean
1	Monocrotophos	0.04	3.16*(10.00)	32.70**(29.19)	28.47**(22.72)	25.63**(18.71)	29.24**(23.86)
2	Carbaryl	0.2	2.97(8.81)	30.76(26.16)	27.61(21.47)	24.92(17.75)	27.94(21.96)
3	Azadirachtin	0.5	2.78(7.70)	27.66(21.55)	23.47(15.86)	21.42(13.34)	24.33(16.97)
4	Endosulfan	0.07	2.08(4.32)	19.19(10.81)	15.52(7.16)	14.23(6.05)	16.45(8.02)
5	Imidacloprid	0.006	2.52(6.37)	26.12(19.39)	22.94(15.19)	19.95(11.64)	23.14(15.44)
6	Cypermethrin	0.009	2.08(4.32)	17.93(9.48)	15.50(7.14)	14.82(6.54)	16.14(7.73)
7	Roket (profenofos 40 % + cypermethrin 4 %	0.088	2.33(5.43)	19.19(10.81)	15.75(7.37)	15.10(6.78)	16.78(8.33)
8	Profenofos	0.1	2.58(6.67)	24.92(17.75)	22.34(14.44)	19.47(11.11)	22.34(14.45)
9	Fenvalerate	0.015	2.08(4.32)	17.29(8.84)	15.36(7.02)	12.82(4.93)	15.26(6.93)
10	Control	-	4.08(16.66)	49.91(58.53)	57.27(70.76)	45.00(50.00)	50.62(59.74)
	S. Em. ±	0.22	2.03	1.74	1.41	0.81	
	C.D. at 5 %	0.64	5.83	5.00	4.05	2.32	
	C.V. %	14.36	13.21	12.31	11.42	5.77	

* Square root transformed values ** Angular transformed values
Figures in parenthesis indicates the retransformed values

treatment of fenvalerate 0.015 per cent, cypermethrin 0.009 per cent and endosulfan 0.07 per cent. However, they were at par with roket 0.088 per cent, imidacloprid 0.006 per cent, profenofos 0.1 per cent as they registered 5.43, 6.37 and 6.67 per cent shoot infestation, respectively. The insecticidal treatment of monocrotophos 0.04 per cent recorded maximum (10.00 per cent) shoot infestation. However, it was at par with carbaryl 0.2 per cent and azadirachtin 0.5 per cent by registering 8.81 and 7.70 per cent shoot infestation.

Fruit infestation

After first spray

The data on per cent fruit infestation (Table 1) recorded at 7 days after first spraying of various insecticides indicated that all the insecticides were significantly superior over control on minimizing the fruit infestation due to *E. vittella*. Among the various insecticides tested, fenvalerate 0.015 per cent gave significantly lowest fruit infestation as it recorded 8.84 per cent infestation to fruits. However, it was at par with treatments cypermethrin 0.009 per cent (9.48 per cent infestation) and roket 0.088 per cent (10.81 per cent infestation). The next best treatments were profenofos 0.1 per cent, imidacloprid 0.006 per cent and azadirachtin 0.5 per cent exhibiting 17.75, 19.39 and 21.55 per cent fruit infestation. The treatments carbaryl 0.2 per cent and monocrotophos 0.04 per cent were found less effective as they recorded 26.16 and 29.19 per cent fruit infestation.

After second spray

Perusal of data (Table 1) indicated that the fenvalerate 0.015 per cent recorded lowest (7.02 per cent) fruit infestation to this pest on fruits. However, it was at par with cypermethrin 0.009 per cent, endosulfan 0.07 per cent and roket 0.088 per cent with recording 7.14, 7.16 and 7.37 per cent infestation to fruits, respectively. The treatment of profenofos 0.1 per cent showed 14.44 per cent fruit damaged and remained at par with treatments imidacloprid 0.006 per cent (15.19 per cent infestation) and azadirachtin 0.5 per cent (15.86 per cent infestation). The treatment of monocrotophos 0.04 per cent was found less effective among all the insecticidal treatments but it was recorded (22.72 per cent infestation) significantly lower fruit infestation over control. However, it was at par with carbaryl 0.2 per cent as it registered 21.47 per cent fruit damaged.

After third spray

It can be seen from the data (Table 1) that the lowest per cent of fruit infestation (4.93 per cent) was recorded from the treatment of fenvalerate 0.015 per cent. However, it was at par with endosulfan 0.07 per cent, cypermethrin, 0.009 per cent and roket 0.088 per cent as they registered 6.05, 6.54 and 6.78 per cent fruits damage, respectively. The next best treatments were profenofos 0.1 per cent (11.11 per cent infestation) and imidacloprid 0.006 per cent (11.64 per cent infestation). The treatment of monocrotophos 0.04 per cent was found less effective as it recorded 18.71 per cent fruit infestation. However, it was at par with carbaryl 0.2 per cent and azadirachtin 0.5 per cent as they showed 17.75 and 13.34 per cent fruits damaged, respectively. It was also observed that all the insecticidal treatments were found superior in reducing fruit infestation over control.

Overall mean

Looking to the overall mean per cent fruit infestation (Table 1) after all the three spraying, the insecticidal treatment fenvalerate 0.015 per cent was found superior over all the treatments as it recorded 6.93 per cent infestation to fruits due to this pest. However, it was at par with cypermethrin 0.009 per cent, endosulfan 0.07 per cent and roket 0.088 per cent, which registered 7.73, 8.02 and 8.33 per cent fruit infestation, respectively. The next best treatments were profenofos 0.1 per cent (14.45 per cent infestation), imidacloprid 0.006 per cent (15.44 per cent infestation) and azadirachtin 0.5 per cent (16.97 per cent infestation). Among all the insecticidal treatments, the treatment of monocrotophos 0.04 per cent was recorded maximum (23.86 per cent) fruit infestation. However, it was at par with carbaryl 0.2 per cent which showed 21.96 per cent fruit damaged. Thus, the present findings are in close agreement with the results obtained by Krishakumar and Srinivasan(3); Dhamdhere et al.,(4) Sinha and Chakrabrati(5); Ratanpara and Bharodia(6); and Badaya and Deshpande (7).

Yield

The data (Table 2) indicate that the fenvalerate 0.015 per cent gave the maximum yield (5351.85 kg/ha) of health fruits. However, the treatments cypermethrin 0.009 per cent, endosulfan 0.07 per cent and roket 0.088 per cent were remain at par with fenvalerate 0.015 per cent and they recorded 5240.74, 5111.11 and

Table 2. Effect of various insecticidal treatments on the yield of okra fruits.

Sr. No.	Treatment	Conc. used (%)	Av. yield of healthy okra fruits (kg/ha)	Per cent increase in yield over control
1	Monocrotophos	0.04	3351.85*	66.05
2	Carbaryl	0.2	3444.44	70.64
3	Azadirachtin	0.5	3981.48	97.25
4	Endosulfan	0.07	5111.11	153.21
5	Imidacloprid	0.006	4194.44	107.80
6	Cypermethrin	0.009	5240.74	159.63
7	Roket (profenofos 40 % + cypermethrin 4 %)	0.088	4981.48	146.79
8	Profenofos	0.1	4250.00	110.55
9	Fenvalerate	0.015	5351.85	165.14
10	Control	-	2018.52	-
	S. Em. ±	172.05		
	C.D. at 5 %	495.38		
	C.V. %	7.11		

* Average of three replication

4981.48 kg/ha yield of healthy fruits, respectively. The next best treatments were profenofos 0.1 per cent, imidacloprid 0.006 per cent and azadirachtin 0.5 per cent as they were equally effective by registering 4250.00, 4194.44 and 3981.48 kg/ha yield of healthy fruits, respectively. The treatment of monocrotophos 0.04 per cent and carbaryl 0.2 per cent were recorded minimum (3351.85 and 3444.44 kg/ha healthy fruits, respectively) yield than all the other insecticidal treatments, however, they were found better than the control.

Now, looking to the per cent increase in the yield of healthy fruits over control due to insecticidal treatments, the fenvalerate 0.015 per cent gave 165.14 per cent increase in yield. The next effective treatments in regards to the per cent increase in yield over control were cypermethrin 0.009 per cent, endosulfan 0.07 per cent, roket 0.088 per cent, profenofos 0.1 per cent, imidacloprid 0.006 per cent, azadirachtin 0.5 per cent, carbaryl 0.2 per cent and monocrotophos 0.04 per cent in decreasing order which registered 159.63, 153.21, 146.79, 110.55, 107.80, 97.25, 70.64 and 66.05 per cent increase in yield over control, respectively .

On the basis of per cent fruit infestation and increase in yield over control, the insecticide fenvalerate 0.015 per cent was the best followed by cypermethrin 0.009 per cent, endosulfan 0.07 per cent and roket 0.088 per cent. More or less similar observations were also reported by Mote and Pokharkar(8), Krishakumar and Srinivasan (3), Sinha and Chakrabrati (5), Ratanpara and Bharodia (6), Sarkar and Nath (9) and Badaya and Deshpande (7).

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