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FIELD EFFICACY OF DIFFERENT INSECTICIDES AGAINST SPOTTED POD BORER, *MARUCA VITRATA* (GEYER) INFESTING GREENGRAM

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ABSTRACT

A field experiment was conducted to evaluate the efficacy of different insecticides against *Maruca vitrata* (Geyer) infesting greengram at Junagadh Agricultural University campus, Junagadh during kharif 2008. The results revealed that spinosad 0.009 per cent, indoxacarb 0.0075 per cent, profenophos 0.05 per cent and cypermethrin 0.009 per cent were found the most effective in reducing the *M. vitrata* population. The highest yield was recorded in the treatment indoxacarb 0.0075 per cent (1516 kg/ha) with minimum pod damage of 9.58 per cent, followed by spinosad 0.009 per cent (1467 kg/ha), cypermethrin 0.009 per cent (1420 kg/ha) and profenophos 0.05 per cent (1385 kg/ha). The highest cost benefit ratio was obtained in the treatment of cypermethrin 0.009 per cent (1:15.29) followed by profenophos 0.05 per cent (1:12.54).

INTRODUCTION

Greengram (*Vigna radiata* (L.) Wilczek) is an important and favourable legume of many people of India. In India, the area under greengram was 30.41 lakh hectares with production and productivity of 11.73 lakh tonne and 389 kg/ha, respectively. Gujarat, covers an area of about 1932 ha with production of 670 MT with an average productivity being 347 kg/ha while, in Junagadh kharif greengram occupy 29 ha under cultivation and produces about 10 MT of grain with an average productivity being 347 kg/ha (Anonymous, 2008). Among the various insect pests, *Maruca vitrata* (Geyer) is the most formidable and potential pest of greengram. The infested flowers and pods webbed together and larvae feed on webbed plant parts by remaining hidden within the nest. Sometimes larva may also bore into pod and feed on seeds and migrate from one pod to another by drawing adjacent pod, which is plugged with plenty of excreta. It has been estimated that nearly 30 per cent pod damage is caused by this pest. Information on chemical insecticides for the control of spotted pod borer on greengram particularly under Junagadh condition is meagre and hence, the present investigation was carried out at Junagadh.

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MATERIAL AND METHODS

A field experiment to evaluate the relative efficacy of insecticides against spotted pod borer of greengram (Var. GM-4) was conducted at Instructional Farm, College of Agriculture, JAU, Junagadh during kharif, 2008. The crop was grown at spacing of 45 cm X 10 cm with four replications and total ten treatments with control (Table 1) in Randomized Block Design. Two applications of insecticides were carried out with the help of knapsack sprayer. First application was done when pest appeared (50 per cent flowering stage) and second at 15 days after first spray. The observations on larval population were recorded at 24 hours before spraying and one day, three and seven days after spraying of different insecticidal treatments. The data on larval count was converted to per cent mortality by using the following formula given by Henderson and Tilton (1955).

$$\text{Per cent mortality} = 100 \times \left(1 - \frac{Ta \times Cb}{Tb \times Ca}\right)$$

Where,
Tb = number of pod borers observed before treatment, Ta = number of pod borers observed after treatment, Cb = number of pod borers observed from untreated control plot before treatment, Ca = number of pod borers observed from untreated control plot after treatment

RESULTS AND DISCUSSION

The data on per cent mortality of spotted pod borer (Table 1) recorded at one, three and seven days after first spray revealed that among the different insecticidal treatments, spinosad 0.009 per cent proved to be the most effective and recorded 88.04, 89.07, 89.31 per cent mortality of this pest, respectively. However, it was statistically at par with indoxacarb 0.0075 per cent, profenophos 0.05 per cent and cypermethrin 0.009 per cent as they registered 87.68, 82.07 and 83.22 per cent mortality after first day, 88.45, 85.28 and 84.69 per cent mortality after three days, 88.02, 86.12 and 83.39 per cent mortality after seven days of first spray, respectively. The remaining treatments of quinalphos 0.05 per cent, monocrotophos 0.04 per cent and endosulfan 0.07 per cent were found moderately effective treatments 75.18, 70.95 and 71.81 per cent mortality after first day, 73.93, 73.42 and 74.30 per cent mortality after three days and 75.75, 73.26 and 73.09 per cent mortality after seven days of first spray, respectively. The treatments of NSKE 5 per cent and imidacloprid 0.005 per cent were found least effective for the control of spotted pod borer.

The data on per cent mortality of spotted pod borer (Table 1) recorded at one, three and seven days after second spray revealed that among the different insecticidal treatments, spinosad 0.009 per cent found to be the most effective and recorded 88.44, 89.42, 89.89 per cent mortality of this pest, respectively. However, it was statistically at par with indoxacarb 0.0075 per cent, profenophos 0.05 per cent and cypermethrin 0.009 per cent as they registered 88.04, 88.36 and 84.86 per cent mortality after first day, 89.38, 88.41 and 87.06 per cent mortality after three days, 88.33, 87.78 and 86.26 per cent mortality after seven days of first spray, respectively. The remaining treatments of quinalphos 0.05 per cent, monocrotophos 0.04 per cent and endosulfan 0.07 per cent were found moderately effective treatments 75.23, 74.97 and 72.32 per cent mortality after first day, 76.55, 75.33 and 74.59 per cent mortality after three days and 76.59, 76.03 and 73.28 per cent mortality after seven days of second spray, respectively. The treatments of NSKE 5 per cent and imidacloprid 0.005 per cent were found least effective for the control of spotted pod borer. According to Lakshmi *et al.* (2002), spinosad (0.009%) was the most effective insecticide recording the highest mean per cent reduction of *M. vitrata* larval population. Mittal and Ujagir (2005) reported that spinosad (45% SC) was the best treatment against this pest. Srihari and Patnaik (2006) found that indoxacarb (0.0075%), spinosad (0.015%) and profenophos (0.05%) gave the greatest reduction in larval population.

The data presented in Table 1 revealed that the per cent pod damage to the greengram caused due to pod borer varied from 9.58 to 24.83 per cent in the different insecticidal treatments, while highest pod damage 29.48 per cent was found in control. Among the nine insecticides evaluated, indoxacarb 0.0075 per cent recorded the minimum pod damage of 9.58 per cent which was at par with spinosad 0.009 per cent which recorded the pod damage of 11.90 per cent. The remaining treatments viz., cypermethrin 0.009 per cent, profenophos 0.05 per cent, quinalphos 0.05 per cent, monocrotophos 0.04 per cent, endosulfan 0.07 per cent, NSKE 5 per cent and Imidacloprid 0.005 per cent recorded 13.90, 14.41, 15.42, 17.49, 17.92, 19.66 and 24.83 per cent pod damage, respectively. Mittal and Ujagir (2005) found that spinosad (45%SC) was proved to be the effective insecticide against spotted pod borers and recorded lowest pod damage (2.9%) and supports the

Table 1. Efficacy of different insecticides against spotted pod borer, *M. vitrata* infesting greengram.

S. No.	Treatments	Per cent mortality of spotted pod borer after spraying						Pod damage %	Yield (kg /ha)	CBR
		First spray			Second spray					
		1 DAS	3 DAS	7 DAS	1 DAS	3 DAS	7 DAS			
1	Cypermethrin 10% EC (0.009%)	65.82* (83.22)	66.97 (84.69)	65.95 (83.39)	67.10 (84.86)	68.92 (87.06)	68.25 (86.26)	21.89* (13.90)	1420	1:15.29
2	Endosulfan 35% EC (0.07%)	57.93 (71.81)	59.54 (74.30)	58.75 (73.09)	58.26 (72.32)	59.73 (74.59)	58.88 (73.28)	25.04 (17.92)	1085	1:5.32
3	Imidacloprid 17.8% SL (0.005%)	42.54 (45.71)	44.86 (49.75)	43.13 (46.73)	42.39 (45.45)	45.43 (50.75)	43.71 (47.74)	29.88 (24.83)	971	1:2.68
4	Indoxacarb 15% EC (0.0075%)	69.45 (87.68)	70.13 (88.45)	69.75 (88.02)	69.76 (88.04)	70.98 (89.38)	70.03 (88.33)	18.03 (9.58)	1516	1:7.54
5	Monocrotophos 36% EC (0.045%)	57.39 (70.95)	58.97 (73.42)	58.86 (73.26)	59.98 (74.97)	60.22 (75.33)	60.68 (76.03)	24.72 (17.49)	1142	1:7.19
6	NSKE (5.00%)	47.59 (54.51)	49.33 (57.54)	49.14 (57.21)	48.02 (55.27)	49.61 (58.01)	49.18 (57.27)	26.32 (19.66)	1032	1:3.03
7	Profenophos 50% EC (0.05%)	64.95 (82.07)	67.44 (85.28)	68.13 (86.12)	70.05 (88.36)	70.09 (88.41)	69.54 (87.78)	22.31 (14.41)	1385	1:12.54
8	Quinalphos 25% EC (0.05%)	60.12 (75.18)	59.30 (73.93)	60.50 (75.75)	60.15 (75.23)	61.04 (76.55)	61.06 (76.59)	23.12 (15.42)	1182	1:6.23
9	Spinosad 45% SC (0.009%)	69.77 (88.04)	70.69 (89.07)	70.92 (89.31)	70.17 (88.49)	71.01 (89.42)	71.46 (89.89)	20.18 (11.90)	1467	1:5.55
10	Control	-	-	-	-	-	-	32.89 (29.48)	858	-
	S.Em.±	2.94	2.99	2.97	2.97	2.98	2.95	1.31		
	C. D. at 5%	8.61	8.74	8.68	8.69	8.72	8.63	3.80		
	C. V.%	10.99	10.91	10.89	10.88	10.70	10.67	10.72		

* Arc sine transformed value. Figures in the parentheses are retransformed values.
DAS= Days after spraying.

present findings.

The data on grain yield of greengram obtained from various insecticidal treatments (Table 1) revealed that highest grain yield (1516 kg/ha) was obtained from the treatment of indoxacarb 0.0075 per cent. However, it was at par with spinosad 0.009 per cent, cypermethrin 0.009 per cent and profenophos 0.05 per cent which recorded the yield 1467 kg/ha, 1420 kg/ha and 1385 kg/ha, respectively. The rest of the treatments also gave the higher grain yield of greengram as compared to control. Considering the cost benefit ratio of these insecticides, cypermethrin 0.009 per cent gave the highest cost benefit ratio of 1:15.29 followed by profenophos 0.05 per cent (1:12.54). Rest of the treatments gave the cost benefit ratio of 1:7.19 to 1:2.68 (Table 1). Thus, two sprays of cypermethrin 0.009 per cent or profenophos 0.05 per cent or indoxacarb 0.0075 per cent or monocrotophos 0.04 per cent or quinalphos 0.05 per cent or spinosad 0.009 per cent per cent first at the time of 50 per cent flowering and second at 15 days after first spray can be suggested to the farmers for controlling the spotted pod borer on greengram and getting more benefit during kharif season.

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