

Bio-efficacy of bio-pesticides against *Caryedon serratus* (Olivier) in stored groundnut

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Out of three bio-pesticides, spinosad was proved an excellent ovipositional deterrent bio-pesticide as it gave 79.5 per cent mortality of *C. serratus* adults after three days of seed treatment when used @ 2.0 mg (a.i.)/50 g seeds. *Beauveria bassiana* and *Verticillium lecanii* were found equal in its efficacy and less effective as compared to spinosad.

Key words : Bio-pesticides, *C. serratus*, Groundnut

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INTRODUCTION

In Gujarat the only primary pest *C. serratus* of stored pods became a major problem in 1990s. In Saurashtra, farmers use to store their rainy season produce for the summer planting and next rainy season (about 8 to 10 month's storage). Now, due to bruchid, farmers are unable to store their produce. A good post harvest pest management based on good storage practices is the most vital solution. In particular, the discovery of insect resistance to methyl bromide and phosphine, the most common fumigants, has intensified the pressure to minimize the use of conventional insecticides against post-harvest pests. Though approach like application of bio-pesticides has come up into vogue. Keeping in view the above facts, the present study was undertaken to find out the best biopesticide.

RESEARCH METHODOLOGY

Three biopesticides viz., *Beauveria bassiana* and *Verticillium lecanii* were tested @ 1, 1.5 and 2 g and Spinosad @ 1, 1.5 and 2 mg (a.i.) per 50 g seeds. Spinosad was applied by dilution method. 50 g kernels of groundnut were treated with the respective treatments and kept in each Petri dish. Five pairs of 1 to 2 days old adults were released in each Petri dish and were allowed to feed or move on the treated kernels for 24 hrs. Then they were transferred into another Petri dish which contained 50 g untreated kernels for further rearing until their death.

Observations on adult mortality were recorded daily up to 100 per cent mortality of bruchid beetle. Corrected per cent mortality was calculated as per the equation given by Henderson and Tilton (1955) and then the statistical analysis was carried out.

RESULTS AND ANALYSIS

During study, it was found that the adults became inactive and sluggish when released in spinosad treatment, while in case of *Beauveria bassiana* and *Verticillium lecanii* treatments they remained active. The oviposition was not observed in spinosad treatment.

Bio-efficacy after three days:

Data presented in Table 1 revealed that the treatment spinosad @ 2.0 mg (a.i.)/50 g seeds proved to be significantly superior to the rest of treatments as it gave 79.5 per cent mortality of *C. serratus* adults. Results further showed that same bio-pesticide @ 1.5 mg (a.i.)/50 g seeds proved superior as it imparted 60.1 per cent mortality of *C. serratus* adults. In case of treatment spinosad @ 2.0, 1.5 and 1 mg (a.i.)/50 g seeds 100 per cent mortality was observed after fourth and fifth days of treatment, respectively. From above the results it was proved that spinosad was good ovipositional deterrent bio-pesticide and when used @ 2.0 mg (a.i.)/50 g seeds it gave 79.5 per cent mortality of *C. serratus* adults in stored groundnut after three days of seed treatment and

Table 1: Percentage mortality of *C. serratus* adults in different bio-pesticides after three days of seed treatment

Treatments	Doses (/50 g seeds)	Adult mortality (%)
<i>Beauveria bassiana</i>	1.0g	30.28* (25.4) **
	1.5 g	28.07 (22.1)
	2.0g	28.77 (23.2)
	Mean	29.03 (23.6)
	1.0 mg (a.i.)	26.06 (19.3)
	1.5 mg (a.i.)	50.83 (60.1)
Spinosad	2.0 mg (a.i.)	63.09 (79.5)
	Mean	46.65 (52.9)
	1.0 g	36.13 (34.8)
<i>Verticillium lecanii</i>	1.5 g	32.99 (29.6)
	2.0 g	33.20 (30.0)
	Mean	34.10 (31.4)
Control	-	09.09 (02.5)
Bio-pesticides (B) S.E. ±	-	04.81
Bio-pesticides C.D. at (P=0.05)	-	14.19
Doses (D) S.E. ±	-	03.21
Doses C.D. at (P=0.05)	-	09.46
Control Vs rest S.E.	-	06.41
C.D. at (P=0.05) for control Vs rest	-	13.38
Control Vs rest C.V. %	-	28.42

* Arcsin transformation

** Figures in parentheses are retransformed values

Table 2: Percentage mortality of *C. serratus* adults in different bio-pesticides after 5, 7 and 10 days of seed treatment

Treatments	Doses (g/50 g seeds)	Adult mortality (%)		
		5	7	10
<i>Beauveria bassiana</i>	1.0	54.94* (67.00) **	61.09 (76.60)	78.95 (96.30)
	1.5	64.24 (81.10)	65.31 (82.60)	79.37 (96.60)
	2.0	65.31 (82.60)	70.00 (88.30)	84.61 (99.12)
	Mean	61.49 (77.20)	65.46 (82.70)	80.97 (97.50)
<i>Verticillium lecanii</i>	1.0	68.46 (86.50)	68.46 (86.50)	72.29 (90.70)
	1.5	75.00 (93.30)	77.01 (94.90)	78.21 (95.80)
	2.0	75.88 (94.00)	80.10 (97.00)	84.77 (99.17)
	Mean	73.10 (91.60)	75.18 (93.40)	78.42 (96.00)
Control	-	12.09 (04.40)	14.60 (06.40)	18.03 (09.60)
Bio-pesticides S.E. ±	-	10.99	11.12	09.52
Bio-pesticides C.D. at (P=0.05)	-	33.35	33.73	26.93
Doses S.E. ±	-	07.77	07.86	06.73
Doses C.D. at (P=0.05)	-	23.58	23.86	20.42
Control Vs rest S.E.	-	13.45	13.61	11.65
C.D. at (P=0.05) for control Vs rest	-	28.85	29.19	24.99
Control Vs rest C.V. %	-	49.02	52.03	45.37

* Arcsine transformation

** Figures in parentheses are retransformed values.

N.B. : Spinosad was not taken in statistical analysis because of unequal number of treatments as well as replications.

100 per cent mortality was achieved after fourth days of seed treatment.

Bio-efficacy after 5, 7 and 10 days:

Data in Table 2 revealed that the mean percentage mortality ranged from 67.00 to 82.60, 76.60 to 88.30, 96.30 to 99.12 and 86.50 to 94.00, 86.50 to 97.00, 90.70 to 99.17 per cent after 5, 7, 10 days of treatment in *Beauveria bassiana* and *Verticillium lecanii*, respectively, which was used at 1, 1.5 and 2 g/50 g seeds. Results from same table showed that the *Beauveria bassiana* and *Verticillium lecanii* were also at par with each other as

they gave 77.20 and 91.60, 82.70 and 93.40, 97.50 and 96.00 per cent mortality of *C. serratus* adults after 5, 7 and 10 days of treatment, respectively. Thus, there was no difference between these two bio-pesticides.

LITERATURE CITED

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