
**BIO-EFFICACY OF BIOPESTICIDE, *Verticillium lecanii* (Zimmerman)
VIEGAS AGAINST APHID IN CORIANDER**

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ABSTRACT

The bio-efficacy of *Verticillium lecanii* (Zimmerman) Viegas was evaluated against aphid infesting coriander as alone and in combination with neo-nicotinoid insecticides during *rabi* 2010 at College of Agriculture, Junagadh Agricultural University, Junagadh under laboratory condition. Considering the effectiveness of different treatments, *V. lecanii* @ 2.0 g/lit + dimethoate 0.015 per cent, *V. lecanii* @ 4.0 g/lit and *V. lecanii* @ 2.0 g/lit + imidaclopride 0.0025 per cent were found to be the most effective by reregistering 84.32, 82.31 and 81.15 per cent mortality of aphid at seven days after feeding.

KEYWORDS: Bio-efficacy, *Hyadaphis coriandari* (Das), *Verticillium*, Coriander.

INTRODUCTION

Coriander (*Coriandrum sativum* Linnaeus), commonly known as *Dhania*, is an important spice crop. It is probably the first spice to be used by men as common flavouring substances. The grains are considered as carminative, diuretic, stomachic, antibilious, refrigerant and aphrodisiac (Butani, 1984). It also serves as a flavouring agent for bakery preparations and tobacco products (Raju, 1990).

This is an annual crop native of the Mediterranean region of the tropics and belongs to the family Apiaceae. Besides India, it is cultivated in Morocco, USSR, Rumania, France, Italy, Spain, Holland, Burma, Pakistan, Turkey, Mexico and USA. (Pruthi, 1976). In India, 90 per cent produce of the total

world it is mainly cultivated in Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Orissa, Karnataka, Bihar, Uttar Pradesh and Haryana (Anonymous, 1990). Area under coriander cultivation in India is 348.9 million hectare with total production of 248.0 million tonne (Anonymous, 2007a) while it is cultivated in 8.67 thousand hectare with total production of 18.42 thousand tonne in Gujarat (Anonymous, 2007b). Among the various insect pests attacking coriander, aphid, *Hyadaphis coriandari* (Das) is the major insect pest causes loss of 18.9 per cent in grain yield of coriander (Meena *et al.*, 2011).

MATERIALS AND METHODS

A laboratory experiment was carried out to determine the bio-efficacy of *Verticillium lecanii* (Zimmerman) Viegas against aphid infesting coriander during *rabi* 2010 in complete randomized design (CRD) with ten treatments and it was replicated four time. The fresh coriander leaves collected from unsprayed coriander field was washed properly with clean water and air-dried. The petiole of the leaf was wrapped with cotton wool and applied 2 ml water daily so as to keep leaf fresh and turgid for longer period of time. The spray of each treatment was applied uniformly on coriander leaves separately with the help of baby sprayer. Treated leaves were allowed to dry under ceiling fan for 2 hour. The treated leaves were kept in 10cm x 1.7cm glass petri dish. The care was taken to maintain humidity in the petri dish by placing a wet blotting paper at the bottom of petri dish. Twenty five nymph of *H. coriandari* per treatment in each replication were released on treated leaves with the help of fine camel hairbrush and keep inside the petri dish individually. The nymph was provided with fresh untreated leaves after 24 hr of feeding on the treated leaves. Mortality counts were recorded at 1, 3, 5, 7 and 10 days after the treatment. Moribund nymphs were considered as dead. The percentage mortality was corrected by using modified formula given by Henderson and Tilton (1955) and they were transformed into arcsine percentage before statistical analysis.

RESULTS AND DISCUSSION

The data on mortality of aphid one day after spraying indicated (Table 1) that the treatment of dimethoate 0.03 per cent recorded significantly the highest mortality (28.33%) which was on par with the treatments of *Verticillium lecanii* @ 2.0 g/ lit + dimethoate 0.015 per cent

(27.47 %). The treatments of imidaclopride 0.005 per cent, acetamipride 0.004 per cent, and *V. lecanii* @ 2.0 g/lit. + imidaclopride 0.0025 per cent were at par with each other and significantly differed from the rest of treatments by giving 21.40, 20.37 and 20.27 per cent mortality, respectively. The data depicted in table 1 on mortality of aphid, three day after spraying showed that the treatment dimethoate 0.03 per cent noticed highest mortality (65.82 %) which was statistically on par with imidacloprid 0.005 per cent (63.59 %). The treatments of acetamipride 0.004 per cent, *V. lecanii* @ 2.0 g/lit. + dimethoate 0.015 per cent, *V. lecanii* @ 2.0g/lit. + imidaclopride 0.0025 per cent and *V. lecanii* @ 2.0 g/lit. + acetamipride 0.002 per cent were significantly differed from the rest of treatments by giving 58.32, 51.47, 45.62 and 42.74 per cent mortality, respectively.

The treatment dimethoate 0.03 per cent was found significantly superior over rest of the treatments on 5th day after spraying and it was on par with *V. lecanii* @ 2.0 g/lit + dimethoate 0.015 per cent by giving 77.56 and 77.29 per cent mortality of aphid, respectively.

The data on mortality after seven day after spray shows the treatments *V. lecanii* @ 2.0 g/lit + dimethoate 0.015 per cent recorded the highest mortality (84.23%) and it was significantly superior over rest of the treatments. The next effective treatment was *V. lecanii* @ 4 g/lit. (82.31%) which was on par with treatment *V. lecanii* @ 2.0 g/lit. + imidaclopride 0.0025 per cent (81.15%). Similar trend for efficacy of different treatments were obtained on ten day after spraying.

Looking to the overall results, it can be concluded that the treatments *V. lecanii* @ 2.0 g/lit. + dimethoate 0.015 per cent, *V. lecanii* @ 4.0 g/lit., *V. lecanii* @ 2.0 g/lit. + imidaclopride 0.0025 per cent and dimethoate 0.03 per cent were the most effective in controlling the aphid on coriander. Easwaramoorthy *et al.* (1978) reported that the application of a combination of the fungus *V. lecanii* with a low dose of insecticide increased the mortality of aphids. Singh and Lok Nath (2003) found that dimethoate 0.03% was the most effective as it reduced the aphid population to the extent of 95.46, 96.25, 96.95 and 99.59% after 1, 3, 5 and 7 day of spray, respectively. Thus, the present finding is in agreement with the earlier work.

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Table 1. Efficacy of *V. lecanii* alone and in combination with different insecticides against *H. coriandari* infesting coriander

Sr. No.	Treatment	Nymphal mortality (%) (Days After Feeding)				
		1	3	5	7	10
1	<i>V. lecanii</i> @ 3.0 g/lit	0.00* (0.00)	19.04 (10.65)	40.68 (42.48)	49.27 (57.43)	45.92 (51.60)
2	<i>V. lecanii</i> @ 3.5 g/lit	0.00 (0.00)	22.38 (14.50)	46.42 (52.48)	53.84 (65.19)	57.19 (70.64)
3	<i>V. lecanii</i> @ 4.0 g/lit	0.00 (0.00)	25.04 (17.92)	54.80 (66.78)	65.13 (82.31)	68.10 (86.09)
4	<i>V. lecanii</i> @ 2.0 g/lit + Imidaclopride 0.0025 %	26.76 (20.27)	42.49 (45.62)	56.99 (70.32)	64.27 (81.15)	63.78 (80.49)
5	<i>V. lecanii</i> @ 2.0 g/lit + Acetamipride 0.002 %	25.24 (18.18)	40.83 (42.74)	52.26 (62.54)	56.47 (69.48)	56.26 (69.15)
6	<i>V. lecanii</i> @ 2.0 g/lit + Dimethoate 0.015 %	31.61 (27.47)	45.84 (51.47)	61.54 (77.29)	66.67 (84.32)	69.74 (88.01)
7	Imidaclopride 0.005 %	27.56 (21.40)	52.88 (63.59)	58.21 (72.24)	58.08 (72.04)	57.31 (70.82)
8	Acetamipride 0.004 %	26.82 (20.37)	49.78 (58.32)	52.83 (63.51)	52.33 (62.66)	51.43 (61.14)
9	Dimethoate 0.03 %	32.16 (28.33)	54.22 (65.82)	61.72 (77.56)	61.23 (76.84)	60.19 (75.29)
10	Control	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
	S. Em. $\pm$	0.57	0.51	0.41	0.61	0.66
	C.D. at 5 %	1.68	1.50	1.20	1.81	1.94
	C.V. %	5.79	2.5	1.45	2.02	2.15

* Arc sine transformation used

Figures in parentheses are retransformed values.