

## Field evaluation of various biopesticides against chilli thrips (*Scirtothrips dorsalis* Linn.)

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### Abstract

The experiment will be carried out at horticultural research farm of BTC CARS, Bilaspur during *Rabi* 2019-20. A field experiment will be laid in randomized block design (RBD) with six different bio-pesticide treatments and an untreated control, replicated three times. The result revealed that the Acetamiprid @ 20 SP (0.004%) was proved to be most effective treatment against chilli thrips, as it was recorded least population (10.18 thrips/plant) whereas, Karanj (*Pongamia pinnata*) @ 5% Leaf extract (0.25%) was observed the least effective treatment as compared to other treatments, as it was recorded maximum thrips population (17.06 thrips/plant).

**Keywords:** biopesticides, *Scirtothrips dorsalis*, treatments

### Introduction

Chilli (*Capsicum annuum* L.) is an important vegetable cum spice crop grown in almost all parts of tropical and subtropical regions of the world. It belongs to the family Solanaceae and originated from South and Central America where it was domesticated around 7000 BC. The genus *Capsicum* includes 30 species, five of which are cultivated: *Capsicum annuum* L., *C. frutescens* L., *C. chinense* Jacq, *C. pubescens* R. & P. and *C. baccatum* L. (Bosland and Votava, 2000 [2]; and Wang and Bosland, 2006) [9].

Chilli serves both the purposes of vegetable and spice. It contains plenty of vitamin A, B and C along with phosphorous, potassium and protein. 100g of green chilli contains as much as 3 mg of vitamin C.

Thrips is a major pest which attacks the buds, leaves and flowers of chilli plant. (Kalshoven, 1981) [5]. The attack of thrips on chili plants starts from a mild attack to heavy. Mild attack begins from damage symptoms on leaves marked with silvery white color. Furthermore, the silvery color changed to be brown. It causes chilli leaf curling to the upward. Paroxysm attack occurs when thrips act as vectors of viruses that cause disease in chilli (Ananthkrishnan, 1993) [1].

The insect pests cause significant damage to the chilli crop. There are 39 genera and 51 species of insects and mite attacking chilli in the field, and in the storage. Aphids (*Aphis gossypii* Glover), Thrips (*Scirtothrips dorsalis* Hood), and Jassids (*Amrasca bigutulla bigutulla*) are the major insect pest of chilli (Jadhav *et al.*, 2004) [4].

### Material and methods

A field experiment will be laid in randomized block design (RBD) with seven treatments including untreated control, replicated three times (Table 1). The crop was transplanted

in first week of November 2019 in plot size of 4.2 m X 3.15 m with 60 cm row to row distance and 45 cm plant to plant distance. The calculated quantity of each bio pesticide will be sprayed with the help of hand operated knapsack sprayer. The spraying will be done two times.

Six different bio-pesticide treatments will be evaluated and an untreated control for the assessment of their comparative performance against chilli thrips. The observation on the thrips incidence will be recorded 1 day before spray as pretreatment count and 3, 5, 7, 10 and 15 days after spraying as the post treatment counts. The population of both nymphs and adults of thrips will be counted during early morning on terminal three leaves *viz.*, upper, middle and lower from 5 randomly selected plants in each plot. The thrips population will be counted with the help of 10x magnification power. Similar observations will also be recorded after the second application of bio-pesticides (Deole and Yadu, 2018) [3].

### Result and discussion

After combined analysis of the first and second spray data the result revealed that the Acetamiprid @ 20 SP (0.004%) was proved to be most effective treatment against chilli thrips, as it was recorded least population (10.18 thrips/plant). The second best treatment was *Metarrhizium anisopliae* @ 1.15% WP ( $1 \times 10^7$  CFU/gm) (13.69 thrips/plant) followed by *Lecanicillium lecanii* @ 1.15% WP ( $1 \times 10^7$  CFU/gm) (0.0115%) (14.26 thrips/plant), *Beauveria bassiana* 1.15% WP ( $1 \times 10^7$  CFU/gm) (14.47 thrips/plant), Azadiractin (Nimbecidine) 0.03 EC (0.00015%) (16.25 thrips/plant). While Karanj (*Pongamia pinnata*) @ 5% Leaf extract (0.25%) was observed the least effective treatment as compared to other treatments as, it was recorded maximum thrips population (17.06 thrips/plant) (Table 2).

**Table 1:** Details of different biopesticide treatments

Trt.	Name of treatment	Strain/ Chemical Name	Formulation/co ncentration	Dose/ lit.
T1	<i>Beauveria bassiana</i> 1.15% WP ( $1 \times 10^7$ CFU/gm)	<i>Beauveria bassiana</i>	1.15% WP ( $1 \times 10^7$ CFU/gm) (0.0115%)	10 gm
T2	<i>Metarrhizium anisopliae</i> 1.15% WP ( $1 \times 10^7$ CFU/gm)	<i>Metarrhizium anisopliae</i>	1.15% WP ( $1 \times 10^7$ CFU/gm) (0.0115%)	10 gm
T3	Azadiractin (Nimbecidine)	Azadiractin	0.03EC (0.00015%)	5ml
T4	Karanj ( <i>Pongamiapinnata</i> )	Karanjin	5% Leaf extract (0.25%)	50 ml

T5	<i>Lecanicillium lecanii</i> 1.15% WP ( $1 \times 10^7$ CFU/gm)	<i>Lecanicillium lecanii</i>	1.15% WP ( $1 \times 10^7$ CFU/gm) (0.0115%)	10 gm
T6	Acetamiprid	Acetamiprid	20@SP (0.004%)	0.2 ml
T7	Control	-	-	-

**Table 2:** Field evaluation of different biopesticides against chilli thrips (*Scirtothrips dorsalis* Linn.) during rabi 2019-20

Treat.	Insecticide	Formulation	Dose/ lit.	Average no. of thrips/three leaves/ plant												Overall I mean
				I Spray						II Spray						
				Pretreat.	3 DAS	5 DAS	7 DAS	10 DAS	15 DAS	Pretreat.	3 DAS	5 DAS	7 DAS	10 DAS	15 DAS	
T1	<i>Beauveria bassiana</i>	1.15% WP ( $1 \times 10^7$ CFU/gm)	10g	20.5 (4.6)	18.9 (4.4)	18.3 (4.4) <sup>bc</sup>	16.5 (4.2) <sup>bc</sup>	14.6 (3.9) <sup>bc</sup>	8.1 (3.0) <sup>c</sup>	22.7 (4.6)	19.5 (4.5) <sup>ab</sup>	15.3 (4.0) <sup>bc</sup>	15.1 (4.0) <sup>b</sup>	9.9 (3.3) <sup>c</sup>	8.5 (3.1) <sup>bc</sup>	14.47 (3.80) <sup>c</sup>
T2	<i>Metarhizium anisopliae</i>	1.15% WP ( $1 \times 10^7$ CFU/gm)	10g	17.5 (4.3)	18.1 (4.3)	15.8 (4.1) <sup>c</sup>	16.6 (4.2) <sup>b</sup>	13.3 (3.8) <sup>c</sup>	8.9 (3.1) <sup>c</sup>	19.6 (4.2)	18.5 (4.4) <sup>bc</sup>	13.2 (3.7) <sup>c</sup>	12.9 (3.7) <sup>c</sup>	10.3 (3.4) <sup>c</sup>	9.3 (3.2) <sup>bc</sup>	13.69 (3.70) <sup>c</sup>
T3	Azadiractin (Nimbecidine)	0.03EC (0.00015%)	5ml	19.4 (4.5)	19.1 (4.4)	20.9 (4.7) <sup>a</sup>	17.8 (4.3) <sup>b</sup>	17.9 (4.3) <sup>a</sup>	9.8 (3.3) <sup>b</sup>	21.5 (4.7)	19.5 (4.5) <sup>ab</sup>	18.0 (4.4) <sup>ab</sup>	16.6 (4.2) <sup>b</sup>	13.2 (3.7) <sup>b</sup>	9.7 (3.3) <sup>b</sup>	16.25 (4.03) <sup>b</sup>
T4	Karanj ( <i>Pongamia pinnata</i> )	5% Leaf extract (0.25%)	50 ml	18.1 (4.4)	19.5 (4.5)	20.7 (4.6) <sup>a</sup>	18.1 (4.4) <sup>b</sup>	17.1 (4.2) <sup>a</sup>	13.7 (3.8) <sup>ab</sup>	19.4 (4.1)	21.9 (4.8) <sup>b</sup>	16.5 (4.2) <sup>b</sup>	17.1 (4.2) <sup>b</sup>	14.7 (4.0) <sup>b</sup>	11.3 (3.5) <sup>b</sup>	17.06 (4.13) <sup>b</sup>
T5	<i>Lecanicillium lecanii</i>	1.15% WP ( $1 \times 10^7$ CFU/gm)	10g	18.2 (4.4)	18.1 (4.3)	16.3 (4.2) <sup>b</sup>	16.9 (4.2) <sup>b</sup>	14.9 (4.0) <sup>b</sup>	9.5 (3.2) <sup>bc</sup>	21.7 (4.4)	19.3 (4.5) <sup>ab</sup>	14.9 (4.0) <sup>bc</sup>	14.8 (3.9) <sup>bc</sup>	10.2 (3.3) <sup>c</sup>	7.7 (2.9) <sup>c</sup>	14.26 (3.78) <sup>c</sup>
T6	Acetamiprid	20@SP (0.004%)	0.2 ml	16.5 (4.2)	15.5 (4.0)	11.1 (3.5)	11.7 (3.6) <sup>c</sup>	7.8 (3.0) <sup>cd</sup>	6.2 (2.7) <sup>d</sup>	23.7 (4.8)	18.1 (4.4) <sup>c</sup>	9.5 (3.2) <sup>d</sup>	9.2 (3.2) <sup>d</sup>	8.2 (3.0) <sup>d</sup>	4.5 (2.3) <sup>cd</sup>	10.18 (3.19) <sup>d</sup>
T7	Control	-	-	19.8 (4.5)	19.9 (4.5)	20.3 (4.6) <sup>a</sup>	22.3 (4.8) <sup>a</sup>	21.9 (4.8) <sup>a</sup>	25.2 (5.1) <sup>a</sup>	28.4 (5.0)	26.6 (5.3) <sup>a</sup>	30.5 (5.6) <sup>a</sup>	32.9 (5.8) <sup>a</sup>	31.1 (5.7) <sup>a</sup>	29.1 (5.5) <sup>a</sup>	25.98 (5.10) <sup>a</sup>
		SEM <sub>±</sub>		0.12	0.21	0.129	0.206	0.189	0.226	0.15	0.149	0.174	0.152	0.164	0.132	0.431
		CD at 5%		ns	ns	0.403	0.641	0.189	0.705	ns	0.466	0.543	0.474	0.512	0.413	4.67

Note: Figure in parentheses are square root transformed values; Average number of larvae / five plants; NS = Non Significant, DAS = Days after spraying

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