



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2018; 6(5): 192-195

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Received: 01-07-2018

Accepted: 02-08-2018

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## Field efficacy of some insecticides against chilli thrips (*Scirtothrips dorsalis* (Hood)) in Allahabad (U.P.)

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### Abstract

The present field study was conducted during *Kharif* 2017 to determine the Field efficacy of some insecticides against chilli thrips (*Scirtothrips dorsalis* Hood) in Allahabad (UP.) at central agriculture field, SHUATS (Sam Higginbottom University of Agriculture, Technology and Sciences), Allahabad, Uttar Pradesh (India). Seven treatments were evaluated against *Scirtothrips dorsalis* i.e., T<sub>1</sub> Imidachloprid 17.8 SL @ 0.2ml/l, T<sub>2</sub> Chlorfenapyre 10 SC @ 125gm/kg, T<sub>3</sub> Cypermethrin 25 EC @ 1.8ml/l, T<sub>4</sub> Fipronil 5 SC @ 2ml/l, T<sub>5</sub> Lambda cyhalothrin 5 EC 1ml/l, T<sub>6</sub> Thiachloprid 12.7 SC @ 0.2ml/l, T<sub>7</sub> Spinosad 45 EC @ 0.2ml/l and untreated control reduce the infestation as compared to the untreated control. Result revealed that maximum mean pest population recorded in control and all the treatments were found effective in reducing the population of thrips as compared to control. T<sub>4</sub> Fipronil 5SC (1.02) was the most effective treatment indicating recorded lowest population of thrips (*Scirtothrips dorsalis* Hood), followed by T<sub>7</sub> Spinosad (1.77) and T<sub>1</sub> imidachloprid (2.29). T<sub>5</sub> Lambda cyhalothrin (2.54) and T<sub>3</sub> Cypermethrin (2.98) are found stastically at par with each other then T<sub>6</sub> Thiachloprid (3.01) and T<sub>2</sub> Chlorfenapyre (3.11) is found least effective among all treatments. Among the treatments the best and most economical treatment was T<sub>4</sub> Fipronil (1:7.30) followed by T<sub>7</sub> Spinosad (1:6.86), T<sub>1</sub> Imidachloprid (1:6:24), T<sub>5</sub> Lambda Cyhalothrin (1:6.21), T<sub>2</sub> Chlorfenapyr (1:6:06), T<sub>3</sub> Cypermethrin (1:5:26), T<sub>6</sub> Thiachloprid (1:4:77) as compared to T<sub>0</sub> Control.

**Keywords:** *Capsicum annum*, C: B ratio, Efficacy, Insecticides, *Scirtothrips dorsalis*

### Introduction

Chilli (*Capsicum annum* L.) belongs to the family Solanaceae is an important spice cum vegetable crop commonly used in Indian dietary. It is grown throughout the year as a cash crop and used in green and red ripe dried stage for their pungency, colour and other ingredients in all culinary preparations of rich and poor alike to impart taste, flavour and colour. Nutritionally, it is a rich source of vitamin A, B and C. Capsaicin an alkaloid responsible for pungency in chillies has medicinal properties and it prevents heart attack by dilating the blood vessels [5]. It is popularly known as 'mirch' in Hindi. This species is the most common and extensively cultivated of the five domesticated capsicums.

Though there are many factors responsible for low yields, the major constraint is the regular occurrence of insect pests. The crop is ravaged by many insect pests right from nursery till harvest. The pest spectrum of chilli crop is complex with more than 293 insects and mite species debilitating the crop in the field as well as in storage [1].

The major pest profile of chilli consists of thrips, *Scirtothrips dorsalis* (Hood), yellow mite, *Polyphagotarsonemus latus* (Banks), aphids, *Aphis gossypii* (Glover) as sucking complex and tobacco caterpillar, *Spodoptera litura* (Fabricius) and pod borer, *Helicoverpa armigera* (Hubner) as pod borers [11].

The various factors are responsible for low yield of chilli, among which insect and mite pests are of prime importance which significantly affects both the quality and production of chilli. The yield losses range from 50-90 per cent due to insect pests of chilli [8, 11].

Chilli thrips, it multiplies appreciably at a faster rate during dry weather periods and the yield loss caused by the thrips is reported to range from 30-90% [3, 17]. Chilli thrips have relatively short life cycle due to which they can complete several generation on a crop and cause loss. Economic yield loss may be 11-75% quantitatively and 60-80% qualitatively in the event of serious infestation [5]. Some times more than 90% yield reduction was reported in chilli because of thrips infestation [9].

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Chilli thrips affected leaves curl 'upward' and 'downward' resulting in typical damage known as "leaf curl syndrome" and it is also called as "murda complex".

### Material and Method

The field trial was conducted in the Central agricultural field, SHUATS, Allahabad. The alluvial soils of this geographical region in general are reported to be flat, well drained and moderately being less in available nitrogen and medium in available phosphorus and potash. The normal pH varies from 7.2 – 8.4. The climate of this region is typically sub-tropical which is characterized by extremes of weather conditions particularly during summer and winter seasons. Seedlings of chilli variety Suryamukhi Seed rate 1-1.5kg/ha. Sowing was done 16 July 2017. The seedlings of the 35 days will transplant. Row to row and plant to plant spacing was 45 X 30 cm. was maintained between seedlings. Seedling was transplanted on 21 August 2017. The population of thrips were recorded from top, middle and bottom leaf of the five randomly selected plant per plot and mean number per plant was calculated. Pretreatment count were taken one day prior to spraying and post treatment count were taken at three, seven and fourteen days after each spraying. Periodical observations were taken to see the incidence of chilli thrips (*Scirtothrips dorsalis* H.) to first spray application. First application was made as soon as the infestation of (*Scirtothrips dorsalis* H.) was noticed above ETL (Economic threshold level) (1 thrips/leaf) and application of treatments was undertaken at 10 days interval as shown below. The observations on the number of thrips were made on the five randomly selected and tagged plants from each plot. The number of thrips per leaf was calculated based on the number of insects on three leaves, each taken from top, middle and bottom of each plant. The observations are made a day before followed by 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> days after spraying. Observations were recorded without disturbing the plants to minimize the observational errors. Population of sucking pest was recorded from each net plot and the population was worked out per Gross returns were calculated by multiplying total yield with market price of the produce. Cost of cultivation and cost of treatments was deducted from the gross returns, to find out returns and cost benefit of ratio.

### Result and Discussion

In the experiment, eight different treatments were taken, consisting of T1-Imidachloprid T<sub>2</sub> – Chlorfenapyr T<sub>3</sub>-Cypermethrin T<sub>4</sub>- fipronil T<sub>5</sub>-lambda-cyhalothrin T<sub>6</sub>-Thiachloprid T<sub>7</sub>-Spinosad T<sub>0</sub>-control were tested to compare the efficacy against (*Scirtothrips dorsalis* H.). And their Influence on yield of chilli. The results obtained here are discussed here with available literature in this chapter below. The data of population of chilli thrips (*Scirtothrips dorsalis* H.). On first and second spray revealed that all the treatments were significantly superior control the treatment Fipronil was found significantly superior (1.02) followed by all Spinosad (1.77) and Imidachloprid (2.29). Lambda cyhalothrin (2.54) and Cypermethrin (2.98) are found statically at par with each other than Thiachloprid (3.01) and Chlorfenapyre (3.11) is found least effective among all treatments. Thrips

(*Scirtothrips dorsalis* H.) and pro All the treatments were found to be significantly superior control. Fipronil was found to be as most effective treatment with the following author's findings Vanisree *et al.* (2008-09) reported that Fipronil 5%EC was most effective treatments of chilli thrips. Maity *et al.* (2012) reported that Fipronil 5%EC was proved most promising in keeping the thrips population much lower as compare to control and producing the higher yield. Ahmed *et al.* (2009) found significantly superior in controlling the chilli thrips. Chiranjeevi *et al.* (2002) [4] reported that Fipronil 5% EC was most effective in chilli ducing the high yield. Patel *et al.* (2009) was the next most effective percent in control chilli thrips. Vanisree *et al.* (2013) [16] reported that spinosad0.015% was most effective treatments of chilli thrips. All the treatments were found to be significantly superior control. Fipronil was found to be as most effective treatment with the following author's findings Vanisree *et al.* (2013) [16] reported that Fipronil 5%EC was most effective treatments of chilli thrips. Maity *et al.* (2012) [13] reported that Fipronil 5%EC was proved most promising in keeping the thrips population much lower as compare to control and producing the higher yield. Ahmed *et al.* (2009) [2] found significantly superior in controlling the chilli thrips. Chiranjeevi *et al.* (2002) [4] reported that Fipronil 5% EC was most effective. All the treatments were found to be significantly superior control. Fipronil was found to be as most effective treatment with the following author's findings Vanisree *et al.* (2013) [16] reported that Fipronil 5%EC was most effective treatments of chilli thrips was most effective in chilli in chilli.

**Table 1:** Field efficacy of some insecticides against chilli thrips (*Scirtothrips dorsalis* (Hood)) during Kharif season of 2017 (Overall mean).

Tr. No.	Treatment	1 <sup>st</sup> spray	2 <sup>nd</sup> spray	Pooled mean
T1	Imidachloprid 17.8%SL	2.33 (8.85)	2.24 (8.62)	2.32 (8.74)
T2	ChlorfenaSpryr 10%SC	3.11 (10.14)	2.90 (9.82)	3.01 (9.98)
T3	Cypermethrin 25%EC	3.03 (10.04)	2.86 (9.73)	2.92 (9.88)
T4	Fipronil 5%EC	1.67 (7.40)	1.52 (7.15)	1.59 (7.27)
T5	Lambda cyhalothrin 5%EC	2.71 (9.51)	2.33 (8.81)	2.54 (9.17)
T6	Thiochloprid 21.7%SC	3.21 (10.33)	2.97 (9.88)	3.08 (10.11)
T7	Spinosad 45%EC	1.87 (7.88)	1.60 (7.36)	1.74 (7.57)
T0	Control	7.27 (15.65)	12.41 (20.63)	9.82 (18.29)
F test		S	S	S
S. Ed. (±)		0.48	0.36	0.27
CD (5%)		1.44	1.09	0.81

Figure in parenthesis are Arc sine transformed value.

**Table 2:** Economics of cultivation

Tf. No:	Treatment	Yield of q/ha	Cost of yield / Rs/q	Total cost of yield (Rs.)	Common cost (Rs.)	Treatment cost (Rs.)	Total cost in Rs	Net Return in Rs	C:B ratio
T1	Imidachloprid (17.8%SL)	172.68	1,500.00	259020	33475	2420	35895	223125	1:6:24
T2	Chlorfenapyr (10%SC)	164.75	1,500.00	247125	33475	1498	34973	212152	1:6:06
T3	Cypermethrin (25%EC)	147.39	1,500.00	221085	33475	1800	35275	185810	1:5:26
T4	Fipronil (5%EC)	197.64	1,500.00	296460	33475	2240	35715	260745	1:7:30
T5	Lambda cyhalothrin (5%EC)	168.92	1,500.00	253380	33475	1480	34955	218425	1:6:21
T6	Thiachloprid (21.7%SC)	143.57	1,500.00	215355	33475	3820	37295	178060	1:4:77
T7	Spinosad (45%EC)	195.43	1,500.00	293145	33475	3800	37275	255870	1:6:86
T0	Control	92.68	1,500.00	139020	33475	0.00	33475	105545	1:3:15

Cost of yield Rs/q-1500

The yields among the treated treatments were significant. The highest yield was recorded in T<sub>4</sub> Fipronil (197.64 q/ha), followed by T<sub>7</sub> Spinosad (195.43 q/ha), as compared to control T<sub>0</sub> (92.68 q/h). When cost benefit ratio was worked out, interesting result was achieved. Among the treatment studied, the best and most economical treatment was T<sub>4</sub> Fipronil (1:7:30), followed by T<sub>7</sub> Spinosad (1:6:86), as compared to control T<sub>0</sub> (1:3:15).

Vanisree *et al.* (2013) <sup>[16]</sup> reported that Fipronil 5%SC found to be most effective in reducing the population of Chilli Thrips (*Scirtothrips dorsalis* H.) as well as in increasing yield. Ahmed *et al.* (2009) <sup>[2]</sup> reported that fipronil 5%SC yield of chilli Fruit revealed that, all the insecticidal treatments have effectively control the thrips in chilli crop which ultimately reflected by increase in yield. It observed that fipronil 0.0015% treated plot record highest yield Maity *et al.* (2012) <sup>[13]</sup>. Reported that fipronil 5%EC which also gave this result supported by Patel *et al.* (2009) <sup>[15]</sup> followed by spinosad 45%SC next cost benefit ratio and most effective reducing population of chilli thrips as well as in increasing yield. Samota *et al.* (2014) <sup>[16]</sup> reported that Imidachloprid 17.8%SL maximum yield of chilli. Kandasamy *et al.* (1990) <sup>[8]</sup> reported that imidachlorid 17.8%SL highest percent increase in chilli yield. Mandi *et al.* (2009) <sup>[14]</sup> reported that Imidachloprid 17.8% SL highest percent in green chilli yield.

### Conclusion

Among all the treatments fipronil 1ml/litre proved to be the best treatment followed by Spinosad 1ml/litre., Imidachloprid 1ml/litre, Lambda cyhalothrin 1ml/litre and Cypermethrin 0.3ml/litre, Thiachloprid 0.1ml/litre, Chlofenapyr 125gm/kg also effective in managing (*Scirtothrips dorsalis* H.) reduction. Recommended dose of chemicals may be useful in devising proper integrated pest management strategy against chilli thrips.

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