



Assessment of Bio-efficacy of Insecticides against Mites and Thrips Insect Pest of Chilli

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJECC/2021/v11i530412

Editor(s):

(1) Dr. Wen-Cheng Liu, National United University, China.

Reviewers:

(1) Cristina Amor M. Rosales, Batangas State University, Philippines .

(2) Durmus Cetinkaya, Cukurova University, Turkey.

(3) Katherin Jossenka Silva Leon, Universidad Tecnica De Manabi, Ecuador.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/71852>

Received 18 May 2021

Accepted 19 July 2021

Published 20 July 2021

Original Research Article

ABSTRACT

A field experiment was conducted during kharif 2018-19 in Samajik Vigyan Kendra, Dr. B.R. Ambedkar University, Bordi, Sehore (M.P.) – INDIA. To assess the bio-efficacy of insecticides against mites and thrips insect pest of chilli pests. The bio-efficacy of three different insecticides, namely (i) Chlorfenapyr 240 SC - spray four time with different-different doses, (ii) Fipronil 5% SC and (iii) Imidacloprid 17.8 SL. One untreated plot was also used to investigate against Mites and Thrips. Among these insecticides, Chlorfenapyr 240SC doses 288 g.a.i/hac gram active ingredient per hectare) has reduced maximum mites and thrips population and it is most effective insecticides in chilli. The highest reduction of mites population recorded in treatment T₄- (97.17%) followed by T₃- chlorofenapyr (95.13%), T₆- Imidacloprid (91.67%), T₅- Fipronil 5% SC (85.35%), T₂- chlorofenapyr (85.27%) and it was least in T₁- chlorofenapyr (81.40%). Further, the thrips number was maximum reduced in treatment T₄- chlorofenapyr (90.69%) followed by T₃- chlorofenapyr (89.80%), T₅- Fipronil 5% SC (89.51%), T₆- Imidacloprid (74.18%), T₂- chlorofenapyr (69.74%) and T₁- chlorofenapyr (68.44 %). Hence, present study was clearly indicated that the treatment T₄- chlorofenapyr 240SC@288 proved, the most effective insecticides. The cost benefit ratio was noted higher in Fipronil 5% SC@ 10 g.a.i ha⁻¹ (3.20) followed by imidacloprid 17.8 SL @ 50 g.a.i ha⁻¹ (2.99).

Keywords: Chilli; Polyphagotarsonemus latus; Scirtothrips dorsalis hood; hybrid; bio-efficacy.

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1. INTRODUCTION

Chilli (*Capsicum annum* Linnaeus) has a place with the family Solanaceae is one of the imperative business vegetable, yield developed in all over India [1-5]. Being a harvest of tropical and sub-tropical area, it requires a warm damp atmosphere. It is a local of tropical America and West Indies and accepted to have been acquainted with India by the Portuguese amid seventeenth century [5-11]. Nutritionally, It is rich wellspring of Vitamin A, C, and E. It is a fundamental element of Indian curry, which is described by enticing shading and titillating sharpness. India is the world's greatest creator of Chilli and the collect is grown wherever all through the country, has a region of 875 thousand ha with a production of 1591 thousand tones. India contributes about 38% to the complete world generation. In India Andhra is the biggest maker of chilli and contributes about 29% to the complete territory under chilli pursued by MH. (17%), KN. (13%), Orissa (11%), and Madhya Pradesh, chilli possesses a region of 57810 ha with a creation of 98730 MT of chilli (Anonymous, 2015). Insecticides application can substantially reduce yield losses caused by sucking pests. Bioefficacy of insecticides and some selected biorationals need to be studied for formulating effective and economical management strategies of insect pests [12,13].

2. MATERIALS AND METHODS

Investigation on field evaluation of many doses of insecticides against chilli insect pests infesting chilli was carried out in kharif period of 2018-19 at Samajik Vigyan Kendra DR. B.R. Ambedkar University, Bordi Sehore (M.P.). The experiment was laid out in a Randomized Block Design with three replication having the plot size of 198.45 m². For the purpose Chilli Hybrid F1 variety NHC-886 (Priya) was raised at 45 X 45 cm spacing. All the Recommended agronomical practices except plant protection were followed for raising the crop. First spray application of respective insecticides was given on the appearance of the pests and subsequently two sprays were given using manually operated knapsack sprayer having nozzle with slight moisture stage. The observation on the population of mites and thrips were recorded by selecting five plants randomly from net plot area of each plot and tagged. From five leaves of tagged plants. The sucking insect pest's population was recorded before as well as 1, 3, 5, 7 and 10 days after each spray. The yield of chilli natural

products got from various treatment kg/ plot recorded aimed every picking the yield information acquired were changed over into per ha. Yield and exposed to factual investigation.

Treatments details

S. No.	Treatment details	Dose/hac	
		a.i Formulations (mi org)	Water volume (lit)
1	T1-Chlorfenapyr 240SC	144 600	500
2	T2-Chlorfenapyr 240SC	192 800	500
3	T3-Chlorfenapyr 240SC	240 1000	500
4	T4-Chlorfenapyr 240SC	288 1200	500
5	T5-Fipronil 5% SC	10 200	500
6	T6-Imidacloprid 17.8SL	50 250	500
7	T7-Untreated control	- -	-

3. RESULTS AND DISCUSSION

Data in pre-treatment recorded on population of major sucking pests namely mites and thrips on chilli at different days after treatments are presented under different sub headings below.

3.1 Mites (*Polyphagotarsonemus latus*)

Day before initiation of spraying showed that there was uniform distribution of mites in the plots. The results revealed that all the treatments were significantly found superior over the control. The general decrease in mites population over, pre-treatment population of 1st application to the last calculation of 3rd spray (Table 1) was determine in pre treatment 9.27 to 10.59 in pre treatment observation. After first spray The percent decrease in mites population from last perception of first spray over, pre-treatment checked determined. Mites uncovered that the most elevated decrease population was recorded, T4-chlorfenapyr (80.73%) trailed by T3-chlorfenapyr (70.32%).The least decrease in parasite's population was seen in T1-chlorfenapyr (37.49%).After second spray the percent decrease in mite's population from last perception of second spray over, pre treatment check was determined. It was uncovered that the most noteworthy decrease in population was recorded in T4-chlorfenapyr which was trailed by T3-chlorfenapyr (63.86%), T5-Fipronil 5% SC 20 (59.65%), T2-chlorfenapyr (52.63%), T1-chlorfenapyr (51.68%).The least was seen in T6- Imidacloprid (46.63%). Third spray it was uncovered that most noteworthy decrease in population was recorded T4-55.39% which was trailed by T3-(55.01%), T6-(51.61%), T5-(44.54%), T2-(43.80%).The least decrease in parasite's population was seen in T1-(38.51%). Overall we have noticed The outcome uncovered, that the most astounding decrease, in population was

Table 1. Effect of treatments after three sprays against chilli Mites

Treatments	Dose g.a.i ha ⁻¹	Mites population after						Average population reduction	Overall population reduction (%)	
		1 st spray		2 nd spray		3 rd spray				
		Pretreatment	10 DAS	Population reduction (%)	10 DAS	Population reduction (%)	10 DAS			Population reduction (%)
T1-Chlorfenapyr 240SC	144	10.59 (3.32)	6.73 (2.67)	37.49	3.31 (1.93)	51.68	2 (1.57)	38.41	42.52	81.4
T2-Chlorfenapyr 240SC	192	10.25 (3.28)	5.8 (2.49)	44.49	2.8 (1.79)	52.73	1.62 (1.42)	43.7	46.96	85.17
T3-Chlorfenapyr 240SC	240	9.27 (3.12)	2.86 (1.8)	70.22	1.25	63.86	0.56 (0.98)	55.01	63.03	95.13
T4-Chlorfenapyr 240SC	288	13.01 (3.39)	2.92 (1.73)	80.63	0.95 (1.16)	66.36	0.48 (0.94)	55.59	67.46	97.17
T5-Fipronil 5%SC	10	9.49 (3.16)	4.18 (2.14)	57	1.75 (1.47)	59.65	1.6 (1.41)	44.54	53.73	85.35
T6-Imidacloprid 17.8SL	50	10.17 (3.27)	5.15 (2.36)	52.8	2.9 (1.77)	46.73	0.9 (1.14)	51.61	50.47	91.67
T7-Untreated Control	...	9.87 (3.19)	10.1 (3.23)	...	10.47 (3.29)	...	10.7 (3.34)	...	...	...
S Em±	...	0.2	0.08	...	0.04	...	...	...	...	...
CD at 5%(p=0.05)	NS	0.4	0.31	...	0.11	...	...	...	...	...
CV%	...	9.48	8.31	...	5.12	...	...	...	...	...

Figures in parentheses are square root transformed values DAS-Days After Spraying

Table 2. Effect of treatments after three sprays against chilli Thrips

Treatments	Dose g.a.i ha ⁻¹	Thrips population after						Average population reduction	Overall population reduction (%)	
		1 st spray		2 nd spray		3 rd spray				
		Pretreatment	10 DAS	Population reduction (%)	10 DAS	Population reduction (%)	10 DAS			Population reduction (%)
T1-Chlorfenapyr 240SC	144	6.22(2.58)	3.47(1.97)	39.15	2.28(1.66)	40.5	1.98 (1.54)	46.96	42.2	68.68
T2-Chlorfenapyr 240SC	192	5.99 (2.54)	3.72 (2.04)	38.25	2.05 (1.58)	45.9	1.84 (1.52)	10.1	31.41	69.9
T3-Chlorfenapyr 240SC	240	6.19 (2.58)	2.79 (1.81)	55	1.08 (1.23)	52.1	0.68 (1.06)	53.58	53.56	89.8
T4-Chlorfenapyr 240SC	288	6.10 (2.56)	2.79(1.75)	54.88	1.19 (1.27)	57.3	0.62 (1.04)	50.23	54.13	90.69
T5-Fipronil 5%SC	10	6.00 (2.55)	3.87 (2.05)	36.1	1.39 (1.36)	65.12	0.67 (1.07)	52.81	51.34	89.94
T6-Imidacloprid 17.8SL	50	6.20 (2.58)	3.65(2.03)	41.4	1.68 (1.46)	56.92	1.64 (1.45)	5.98	34.76	74.18
T7-Untreated Control	...	6.04 (2.51)	6.38 (2.61)	...	7.09(2.74)	...	8.64 (3.01)	...	...	...
S Em±	...	0.17	0.09	...	0.06	...	...	...	...	...
CD at 5%(p=0.05)	NS	0.51	0.27	...	0.18	...	...	...	...	...
CV%	...	12.01	9.21	...	6.26	...	...	...	...	...

Figures in parentheses are square root transformed values DAS- Days After Spraying

seen in treatment T4-97.17% trailed by T3-95.13%, T6-Imidacloprid-91.67%, T5-Fipronil 5% SC-85.35%, T2-chlorofenapyr -85.27% and least level of decrease in mites, population was noticed in T1-81.40%.

3.2 Thrips (*Scirtothrips dorsalis* Hood)

The population of thrips ranged at a day before spray indicating uniform distribution and it differ non significantly among the different treatments .The outcome further demonstrated that general decrease in thrips, population after three uses of treatments over, pre treatment population of 1st application to the last calculation of 3rd spray was determined (Table 2). The thrips population was recorded in the range of 5.9 to 6.2 in pre treatment observation. Population decrease in percent was determined after last perception of 1st spray over pre-treatment check. It was uncovered that the most astounding decrease in population was recorded in T3-chlorofenapyr-55.00% trailed by T4-chlorofenapyr-54.88%, T6-Imidacloprid-41.60%, T1-chlorfenapyr 39.15%, T2-chlorofenapyr -36.10%. The least decrease in thrips population was seen in T5-36.10%. second spray It was seen that the most astounding decrease in thrips population was seen in treatment T5 (65.12%) trailed by T4-chlorfenapyr 57.30%, T6-Imidacloprid 56.92%, T3-chlorofenapyr 52.10%, T2-chlorofenapyr 45.90% and T1-chlorofenapyr 40.50%. after third spray The population decrease was recorded in most, elevated T3-53.58% trailed by T5-52.81%, T4-50.23, T1-46.96% and T2-10.10. The least decrease was noted in T6-5.98%.The outcome uncovered that the most elevated decrease in population was seen in treatment T4-chlorofenapyr (90.69%) trailed by T3-chlorofenapyr (89.80%), T5- Fipronil 5% SC (89.94%) T6- Imidacloprid (74.18%) T2-chlorofenapyr (69.90%) and T1-chlorofenapyr (68.68%)

4. CONCLUSIONS

The largest reduction in mites population was recorded in tr. T4- chlorofenapyr 240SC@ 288 (91.91%) followed by T3- chlorofenapyr 240SC (88.21%), T5- Fipronil 5% SC (87.48%) and other treatments. The highest note down reduction in thrips number was recorded in the treatment T4- chlorofenapyr 240SC@ 288 g.a.i. (90.17%) followed by T3- chlorofenapyr 240SC (95.13%), T5- Fipronil 5% SC (91.67%) and rest of the treatments .

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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