E-ISSN: 2618-0618
P-ISSN: 2618-060X

www.agronomyjournals.com
2025; SP-8(1): 237-240
Received: 16-10-2024
Accepted: 21-11-2024

Devare KD
PG Scholar, Department of Entomology, College of Agriculture, Latur, Maharashtra, India

Jayewar NE
Principal Agriculture Technical School, Nanded, Maharashtra, India

Dahiphale KD
Jr. Entomologist, Oilseeds Research Station, Latur, Maharashtra, India

Corresponding Author:
Devare KD
PG Scholar, Department of Entomology, College of Agriculture, Latur, Maharashtra, India

Bio-efficacy of insecticidal spray schedule against chilli thrips

Devare KD, Jayewar NE and Dahiphale KD

DOI: https://doi.org/10.33545/2618060X.2025.v8.i1Sd.2379

Abstract
The investigations on "Bio-efficacy of insecticides against thrips on chilli" was carried out at research farm, Department of Agricultural Entomology, College of Agriculture, Latur (Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani) Maharashtra-India during *kharif* 2022 using Teja-4 (MHCP-310) variety. The significant difference among the effect of different insecticides spray schedule against chilli thrips indicated that all the insecticides were found to be significantly superior in recording minimum number of thrips over untreated control. The results indicated that the effect of different insecticides spray schedule after all the sprays indicated that among these schedule of insecticides *i.e.* fipronil 0.5 SC +tolfenpyrad 15 EC + cyantraniliprole 10.50 OD was found most effective sprays schedules at all four spray to reduce the population of thrips and it was at par with lambda-cyhalothrin 5 SC + diafenthiuron 50 WP + emamectin benzoate 0.5 SG followed by spinosad 45 SC + broflanilide 300G/L SC + flubendamide 20 WG in pooled data.

Keywords: Thrips black thrips, chilli, spray schedule

Introduction

Chilli (*Capsicum annuum* L.) belonging to family solanaceae is rightly called as wonder spice or universal spice originated from South Central America and is an important spice cum vegetable crop commonly used in Indian dietary and grown throughout India as well as in almost all parts of the tropical and subtropical regions of the world as a economically important vegetable, spice cum cash crops (Siri *et al*., 2020) [7]. Chilli is grown for its fruit, which is valued for its color, flavor, spice and vegetable nutrition, which is provided in its various products (Kumar *et al.*, 2006) [6]. Based on the utility, different varieties are cultivated differing in flavour, pungency and colour. Chillies are a good source of nutrients like Vitamin A, Vitamin C, Vitamin B6, Potassium, Iron and Magnesium. Vitamin C was noticeably high in green chillies than in red chillies (Sparky, 2006) [18]. Red chillies are rich source of iron, potassium, magnesium, vitamin C, vitamin B6 and contain a small amount of beta-carotene (Idrees *et al*., 2020) [4]. *Capsaicin*, an active component of chilli, is responsible for the burning sensation and is used for medicinal purposes, having analgesic properties (Bosland *et al*., 2012) [2].

Thrips alone can cause the yield loss of 30-50 percent (Bhede *et al*., 2008) [1]. The level of infestation however depends upon the number of abiotic factors (temperature, relative humidity, sunshine hours and wind velocity) and biotic factors (natural enemies). Thus, it becomes necessary to formulate economically effective insect pest management strategy. Pesticides are considered as powerful tools to provide protection against insect pests but excessive use of pesticides also induces resistance development in target pests as well as killing beneficial organisms such as pollinators and natural enemies (Pedigo and Rice, 2006) [15].

When few products are labelled for an individual pest within a particular crop system, chemical control options are limited. Therefore, the same products are used repeatedly and continues selection pressure is placed on the target pest. There are both financial and environmental losses associated with the development of resistant populations. More often use of synthetic chemicals is one of the most common and popular methods of controlling major insect pests of chilli crop and in recent times, a large number of newer insecticides are available in the market for use in this class (Manjunatha *et al*, 2018) [10]. Therefore it is necessary to study the effect of different insecticides and evaluate them in spray schedules for formulating effective and economical management strategies of insect pests. Thus, the present investigation is designed to evaluate the effect of different insecticides by formulating spray schedule against major pests of chilli with reference to the Bio-efficacy of insecticides against chilli thrips".

Materials and Methods

The field experiments was conducted at Research Farm, and laboratory of Division of Agriculture Entomology, College of Agriculture, Latur (MS), India during *Kharif* 2022 in Randomized Block Design with 7 treatment and 3 replication. Latur is situated at 18^0 23'5. 65'' North Latitude, 76^0 34' 51.50'' East Longitude and at an Altitude of 515 m above the mean sea level (MSL) and has subtropical climate. The place lying in Northern transitional zone (Zone -8) with hot dry summer and cool winter.

Table 1: The details of the insecticides in spray schedules

Treatments	Spray 1	Spray 2	Spray 3
T_1	Fipronil 0.5 SC	Tolfenpyrad 15 EC	Cyantraniliprole 10.50 OD
T_2	Imidacloprid 70 SC	Spinetoram 11.7 SC	Spinosad 45 SC
T_3	Dimethoate 30 SC	Chlorantraniliprole 18.50 SC	Profenophos 50 EC
T_4	Spinosad 45 SC	Broflanilide 300G/L SC	Flubendamide 20 WG
T_5	Lambda-cyhalothrin 5 SC	Diafenthiuron 50 WP	Emamectin benzoate 0.5 SG
T_6	Acephate 75 SP	Flonicamide 50 WG	Novaluron 10 EC
T_7	Control	Control	Control

The observations on thrips was recorded regularly in the treated as well as in control plot throughout the period of investigation in all experiments just before first spraying (Pre) and 1, 3, 5, 7 and 14 days after spraying (DAS). Observations were recorded to assess thrips population from five leaves, one from top and two each from middle and bottom of randomly selected five plants from each net plot for whereas from five terminal leaves for thrips (Pathipati *et al.* 2012) [14].

Results and Discussion

The findings obtained in the present investigations on different aspects of studies on bio-efficacy of insecticides against chilli thrips was undertaken at Department of Agricultural Entomology, College of Agriculture, Latur (Maharashtra) during *Kharif* 2022. Data from Table 1 on thrips, (*S. dorsalis*) population recorded before spray revealed non-significant difference among different treatments which indicated uniform distribution of in all the experimental plots.

Over all pooled data from table no. 2 and presented in fig 1 (pooled over periods and spray schedule) data indicated that minimum population of thrips was recorded in plots sprayed with fipronil 0.5 SC + tolfenpyrad 15 EC + cyantraniliprole 10.50 OD (1.25 thrips per leaf) followed by spinosad 45 SC + broflanilide 300G/L SC + Flubendamide 20 WG (1.52 thrips per leaf), imidacloprid 70 SC + spinetoram 11.7 SC + spinosad 45 SC (1.61 thrips per leaf). These insecticides found most effective against thrips as they exhibited significantly less number of the pest over rest of the insecticides. Next best treatment were lambda-cyhalothrin 5 SC + diafenthiuron 50 WP + emamectin benzoate 0.5 SG (1.95 thrips per leaf), acephate 75 SP + flonicamide 50 WG + novaluron 10 EC (2.28 thrips per leaf) and dimethoate 30 SC + chlorantraniliprole 18.50 SC + profenophos 50 EC (2.78 thrips per leaf) were recorded significantly less thrips population than untreated control plots (5.81 thrips per leaf).

Incidence of black thrips on chilli in flowering stage was noticed for first time in marathwada region. Black thrips infestation was observed during flowering stage *ie*. during fourth to sixth spray. Data from table 03 on black thrips, *Parvispinus* karny population recorded before spray revealed non-significant difference among different treatments which indicated uniform distribution of pest in all the experimental plots.

Over all pooled from Table no.3 and Fig 2 (pooled over periods and spray schedule) data indicated minimum population of thrips i.e.1.13 thrips per three flower, in plots sprayed with spinosad 45 SC + broflanilide 300G/L SC + flubendamide 20 WG, followed by lambda-cyhalothrin 5 SC + diafenthiuron 50 WP + emamectin benzoate 0.5 SG (1.90 thrips per 3 flower) and fipronil 0.5 SC + tolfenpyrad 15 EC + cyantraniliprole 10.50 OD (1.97 thrips per three flower). These insecticides found most effective against thrips as they exhibited significantly less number of the pest over rest of the insecticides and at par with each other. In respect of least thrips incidence next best spray schedule was acephate 75 SP + flonicamide 50 WG + novaluron 10 EC (2.19 thrips per three flower) followed by imidacloprid 70 SC + spinetoram 11.7 SC + spinosad 45 SC (2.41 thrips per three flower). Dimethoate 30 SC + chlorantraniliprole 18.50 SC + profenophos 50 EC (2.51 thrips per three flower) highest black thrips population among the spray schedule. Whereas these treatments recorded significantly less thrips population than untreated control (3.05 thrips per three flower).

Above finding similar to Muralimohan *et al*. (2023) [11] assessed the bio-efficacy of new generation molecules and biorationals against *T. parvispinus*. The results suggested that new molecules *viz*., broflanilide 30 SC (18.60g a.i/ha) and fluxametamide 10 EC (40 g a.i/ ha) were found highly effective in reducing the thrips population on chilli crop, followed by spinetoram 11.7 SC (60 g a.i/ha) and tolfenpyrad 15 EC (150 g a.i/ha). Lakshmi and Kumar (2021) [8] proved that on the basis of mean percentage reduction over control in thrips population, the treatment spinosad (91.41%) proved to be most effective treatments followed by imidacloprid 0.05 ml/lt (87.62%), Pymetrozine 0.2 ml/lt (83.98%), emamectin benzoate 0.4g/lt (80.59%), Acetamiprid 0.05g/lt (70.62%) andacephate 0.75 g/lt (62.67%). Nagaraju and Kumar (2022) [12] revealed that among the different treatments Fipronil 5 percent SC (94.06%) proved to be the most effective treatment followed by spinosad 45 percent SC (93.16%), imidacloprid 17.8 percent SL (92.27%), profenophos 50 percent EC (84.37%).

Mandal and Mondal (2022) [9] proved that the lowest population of thrips was observed in Broflanilid 20 percent SC @ 25 g a.i. ha^{-1} and it was statistically superior over Dinotefuran 20 percent SG @ 30 g a.i. ha^{-1}, Profenofos 50 percent EC @ 500 g a.i. ha^{-1} and Azadirachtin 3 percent @ 15 g a.i. ha^{-1}.While, non-significant differences in insect populations were recorded among spinosad 45 percent SC @ 73 g a.i. ha^{-1}, Fipronil 5 percent SC @ 50 g a.i. ha^{-1}, Spirotetramat 15.31 percent OD @ 60 g a.i. ha^{-1}, tolfenpyrad 15 percent EC @ 150 g a.i. ha^{-1}, imidacloprid 17.80 percent SL @ 25 g a.i. ha^{-1}, Thiamethoxam 25 percent WG @ 25 g a.i. ha^{-1}, λ-cyhalothrin 5 percent EC @

15 g a.i. ha^{-1} and Difenthiuron 50 percent WP @ 300 g a.i. ha^{-1}, respectively. The newer molecule, Broflanilid 20 percent SC @ 25 g a.i. ha^{-1} was found most efficacious against the chilli thrips among the treatments, and this molecule can be recommended to effectively manage the chilli thrips.

Kumar *et al*. (2016) [5] revealed that, the spinosad 45 SC @ 0.4 ml was found most effective in reducing the population thrips @ 0.55/plant and it give highest marketable green chilli yield. Shinde *et al.* (2018) [16] results revealed that the spinosad 45 SC 0.014% was recorded highest reduction of *Scirtothrips dorsalis* population i.e. 1.41 mean thrips population per plant. Patil *et al.* (2018) [13] reported that the spinosad 0.5ml /lt recorded highest reduction of thrips population (79.79%) followed by Imidachloprid 0.5ml /lt (76.81%) Kumavat *et al.* (2015) [7] results revealed that two sprays of imidacloprid 17.8 SL at 22.5 g a.i./ha at seven days interval was most effective and significantly superior to all other treatments which caused 91.05 percent mean reduction in aphid population. Ghosh *et al*. (2020) [3] revealed that the imidacloprid resulted the best suppression of whitefly population (81.48% suppression).

Table 1: Evaluation of insecticidal spray schedule against chilli thrips

Tr. No.	Treatments	Mean no of chilli thrips /leaf							
		BS	Ist Spray	IInd Spray	IIIrd Spray	IVth Spray	V th Spray	VI th Spray	Pooled mean
T_1	Fipronil 0.5 SC + Tolfenpyrad 15 EC + Cyantraniliprole 10.50 OD	3.50 (1.98)*	1.48 (1.41)	1.13 (1.28)	1.37 (1.36)	1.49 (1.41)	1.05 (1.24)	1.01 (1.23)	1.25 (1.32)
T_2	Imidacloprid 70 SC + Spinetoram 11.7 SC + Spinosad 45 SC	3.40 (1.97)	1.57 (1.44)	2.24 (1.66)	1.44 (1.39)	1.59 (1.44)	1.74 (1.50)	1.08 (1.26)	1.61 (1.45)
T_3	Dimethoate 30 SC + Chlorantraniliprole 18.50 SC + Profenophos 50 EC	3.50 (2.00)	3.21 (1.92)	3.57 (2.81)	2.44 (1.71)	2.64 (1.77)	2.87 (2.39)	1.97 (1.57)	2.78 (1.81)
T_4	Spinosad 45 SC + Broflanilide 300G/L SC + Flubendamide 20 WG	3.40 (1.97)	1.30 (1.34)	1.03 (1.24)	2.56 (1.75)	1.45 (1.40)	0.95 (1.21)	1.86 (1.54)	1.52 (1.42)
T_5	Lambda-cyhalothrin 5 SC + Diafenthiuron 50 WP + Emamectin benzoate 0.5 SG	3.63 (2.02	2.37 (1.69)	1.19 (1.30)	1.53 (1.42)	2.42 (1.71)	1.09 (1.26)	1.15 (1.29)	1.95 (1.56)
T_6	Acephate 75 SP + Flonicamide 50 WG + Novaluron 10 EC	3.43 (1.98)	2.90 (1.84)	2.40 (1.70)	2.29 (1.67)	2.37 (1.70)	1.99 (1.58)	1.73 (1.49)	2.28 (1.66)
T_7	Untreated control	3.53 (2.01)	5.14 (3.20)	5.31 (2.41)	5.62 (2.47)	5.89 (3.42)	6.31 (3.55)	6.62 (3.63)	5.81 (2.56)
	SE±		0.06	0.11	0.11	0.08	0.11	0.09	0.06
	CD 5%	NS	0.18	0.33	0.3	0.24	0.29	0.25	0.15
	CV %		7.98	8.97	9.87	7.86	8.97	8.99	6.547

*Figures in parentheses are square root transformed values $(\sqrt{x}+0.5)$, N.S.: Non-significant

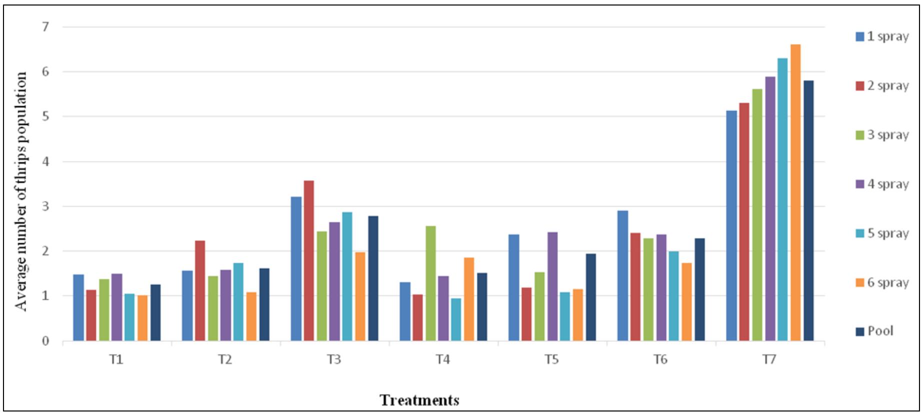

Fig 1: Evaluation of insecticidal spray schedule against chilli thrips

Table 2: Evaluation of insecticidal spray schedule against chilli black thrips

Tr. No.	Treatments	Mean no of Thrips per three flower				
		BS	Ist Spray	IInd Spray	III Spray	Pool
T_1	Fipronil 0.5 SC + tolfenpyrad 15 EC + cyantraniliprole 10.50 OD	1.97 (1.56)*	1.81 (1.52)	2.24 (1.66)	1.86 (1.54)	1.97 (1.56)
T_2	Imidacloprid 70 SC + spinetoram 11.7 SC + spinosad 45 SC	1.87 (1.53)	2.02 (1.59)	3.43 (1.98)	1.80 (1.51)	2.41 (1.70)
T_3	Dimethoate 30 SC + chlorantraniliprole 18.50 SC + profenophos 50 EC	1.87 (1.54)	2.07 (1.60)	3.36 (1.97)	2.11 (1.62)	2.51 (1.74
T_4	Spinosad 45 SC + broflanilide 300G/LSC + Flubendamide 20WG	2.00 (1.58)	1.79 (1.51)	1.96 (1.57)	1.94 (1.56)	1.13 (1.27)
T_5	Lambda-cyhalothrin 5 SC + diafenthiuron 50 WP + emamectin benzoate 0.5 SG	1.83 (1.52)	1.71 (1.49)	2.15 (1.63)	1.86 (1.54)	1.90 (1.55)
T_6	Acephate 75 SP + flonicamide 50 WG + novaluron 10 EC	1.93 (1.56)	2.14 (1.63)	3.20 (1.92)	2.14 (1.63)	2.19 (1.66)
T_7	Untreated control	1.97 (1.57)	2.18 (1.64)	4.53 (2.24)	2.46 (1.72)	3.05 (1.88)
	SE±		0.03	0.06	0.03	0.10
	CD 5%	NS	0.10	0.18	0.09	0.32
	CV %		6.85	8.89	6.94	6.21

*Figures in parentheses are square root transformed values $(\sqrt{x}+0.5)$

N.S.: Non-significant

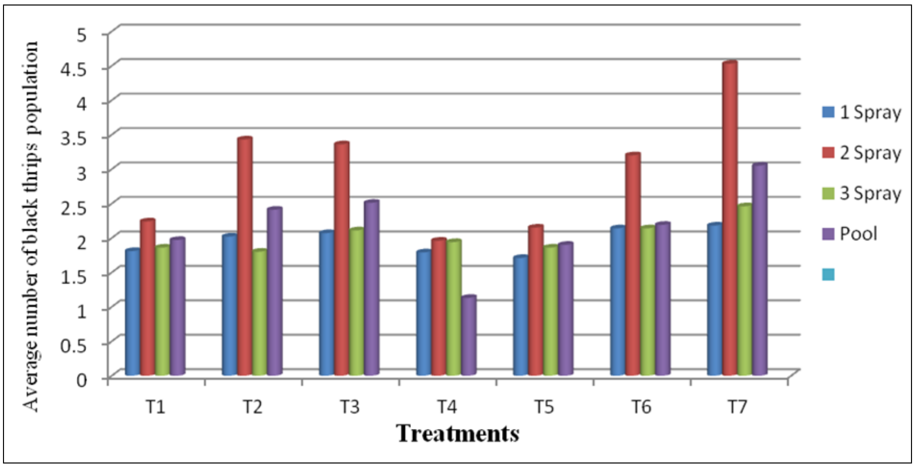

Fig 2: Evaluation of insecticidal spray schedule against chilli black thrips

Conclusion

The study on the bio-efficacy of insecticides against chilli thrips revealed that the spray schedule involving fipronil 0.5 SC, tolfenpyrad 15 EC, and cyantraniliprole 10.50 OD was the most effective in reducing thrips population. It performed better than other insecticide combinations, including spinosad 45 SC + broflanilide 300G/L SC + flubendamide 20 WG. These treatments significantly reduced thrips infestation, supporting their use for effective pest management in chilli cultivation.

References

1. Bhede BV, Suryawanshi DS, More DG. Population dynamics and bio-efficacy of newer insecticide against chili thrips, *Scirtothrips dorsalis* (Hood). Indian J Entomol. 2008;70(3):223-226.
2. Bosland PW, Votava EM. Peppers: vegetable and spice capsicums. Vol. 22. CABI; c2012.
3. Ghosh SK. Environmentally sound approach for management of tomato whitefly (*Bemisia tabaci* Genn.). J Entomol Zool Stud. 2020;8(6):814-818.
4. Idrees S, Hanif MA, Ayub MA, Hanif A, Ansari TM. Chili pepper. In: Medicinal Plants of South Asia. Elsevier; c2020. p. 113-124.
5. Kumar A, Chinniah C, Manisegaran S, Irulandi S, Mohanraj P. Effect of biorationals against the thrips, *Scirtothrips dorsalis* Hood infesting chili. Int J Plant Protect. 2016;9(1):158-161.
6. Kumar S, Kumar R, Singh J. Cayenne/American pepper (*Capsicum* species). In: Peter KV, editor. Handbook of Herbs and Spices. Woodhead Publishing, Cambridge, UK; c2006. p. 299-312.
7. Kumawat M, Sharma US, Lal J, Nagar R. Bio-efficacy of some insecticides against insect pests of chili. Indian J Appl Entomol. 2015;29(2):132-137.
8. Lakshmi KSI, Kumar A. Efficacy of selected insecticides against chili thrips, *Scirtothrips dorsalis* (Hood) on chili, *Capsicum annuum* Linnaeus. J Entomol Zool. 2021;9(1):126-130.
9. Mandal L, Mondal P. Bioefficacy of some newer generation insecticides against chili thrips, *Scirtothrips dorsalis* Hood. Int J Bio-resour Stress Manag. 2022;13(11):1130-1140.
10. Manjunatha KL, Srinivasa N, Prasannakumar NR. Holistic way of using conventional and newer insecticides for promising control of chili thrips, *Scirtothrips dorsalis* (Hood) in southern Karnataka. J Entomol Zool Stud. 2018;6(6):278-283.
11. Muralimohan K, Anandmurthy T, Kumar ND, Archana B. Bio-efficacy of novel insecticides and biorationals against invasive thrips, *Thrips parvispinus* (Karny) (Thripidae: Thysanoptera) on chili. Pest Manag Hortic Ecosyst. 2023, 29(1).
12. Nagaraju R, Kumar A. Comparative field efficacy of selected insecticides against chili thrips (*Scirtothrips dorsalis* Hood) on chili at Naini, Prayagraj (UP). The Pharma Innovation J. 2022;2389-2392.
13. Patil VM, Patel ZP, Gurav SS, Patel RK, Thorat SS. Bioefficacy of various insecticides against chili thrips (*S. dorsalis* Hood). Int J Chem Stud. 2018;6(1):313-316.
14. Pathipati VL, Lakshmi TV, Ramana CV, Kumari SS, Naidu LN. Evaluation of certain new acaricides/insecticides for the management of chili mite in Andhra Pradesh. Pest Manag Hortic Ecol. 2012;18(1):111-113.
15. Pedigo LP, Rice ME. Entomology and pest management. 5th ed. Prentice Hall; c2006.
16. Shinde BD, Mokal AJ, Sanap PB, Naik KV, Mehendale SK, Golvankar GM, *et al*. Field evaluation of insecticides against chili thrips (*Scirtothrips dorsalis* Hood). Int J Chem Stud. 2018;6(5):2817-2820.
17. Siri C, Patil RP, Suma AAT, Kenganal M. Influence of different agrochemicals on yield attributes & yield of chili (*Capsicum annuum* L.) grown under HK region of Karnataka. Int J Commun Syst. 2020;8(1):2629-2631.
18. Sparky F. Sparky boy enterprises. Planet Natural; c2006. p. 1-6.