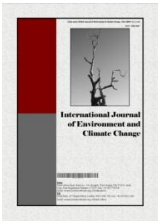

International Journal of Environment and Climate Change

11(5): 138-142, 2021; Article no.IJECC.71893
ISSN: 2581-8627
(Past name: British Journal of Environment & Climate Change, Past ISSN: 2231–4784)

To Assess the Impact of Insecticidal Spray on Leaf Curling Caused Due to Sucking Pest and Phytotoxic Effect of Higher Doses of Insecticides in Chilli

Deepak Thakur[1*], V. R. Upadhyay[1] and Sumit Mukati[1]

[1]School of Agriculture and Rural Development, Dr. B. R. Ambedkar University of Social Science, DR. Ambedkar Nagar (Mhow), India.

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/v11i530413
Editor(s):
(1) Dr. Wen-Cheng Liu, National United University, China.
Reviewers:
(1) Zamorzaeva Irina, Moldova.
(2) Gyula Oros, Hungary.
Complete Peer review History: https://www.sdiarticle4.com/review-history/71893

Original Research Article

Received 17 May 2021
Accepted 18 July 2021
Published 20 July 2021

ABSTRACT

The investigation was carried out at Samajik Vigyan Kendra, Dr. B.R. Ambedkar University, Bordi, Sehore (M.P.)-INDIA during kharif 2018-19. To assess the impact of insecticidal spray on leaf curling caused due to sucking pest and phytotoxic effect of higher doses of insecticides in chilli.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 leaf curl and phytotoxic effect on chilli. Among these insecticides, Chlorfenapyr 240SC doses 288 g.a.i/hac (gram active ingredient per hactare) has least leaf curl indications (9.68%). It's most effective insecticides in chilli. The least impact of leaf curl recorded in treatment T4- (9.68%) followed by T3- chlorofenapyr (11.88%),T5- Fipronil 5% SC (14.46%), T6- Imidacloprid (16.68%), T2- chlorofenapyr (17.69%) and the most elevated twisting in T7- untreated control (56.29). Further, the phytotoxic effect of treatment T1 - chlorfenapyr and T2 - chlorfenapyr were connected contrasting and T3 - untreated control. In these tried portions no phytotoxic impact likes chlorosis, Epinasty, Necrosis, Scorching , wilting and hyponasty were seen at various interim of perceptions against Chilli crop. The chilli yield was also noted highest in

**Corresponding author: E-mail: deepaka012@gmail.com;*

highest dose of T4 (16.0 tonnes ha^{-1}) followed by second highest dose of T3 (15.4 tonnes ha^{-1}), however, it was recorded lowest in untreated control (8.0 tonnes ha^{-1}). The C:B benefit ratio was noted higher in T5- fipronil 5% SC@ 10 g.a.i ha^{-1} (3.20) followed by T6- imidacloprid 17.8 SL @ 50 g.a.i ha^{-1} (2.99).

Keywords: Chilli; leaf curling; phytotoxic effect; hybrid; bio-efficacy.

1. INTRODUCTION

The chilli is a fruit of plants belongs to the family of "Solanaceae" and genus of "Capsicum". The chilli is also being termed as "Chili Pepper" in many parts of world. Chilli is one of the most important and the largest produced spice crop in Asia. The fruit is actually called "chilli". Chili have been a part of the human diet in the Americas since at least 7500 BC. There is archaeological evidence at sites located in a tropical lowland area of southwestern Ecuador that chili peppers were domesticated more than 6000 years ago, the chilli grains show that peppers were among the oldest domesticated foods in the hemisphere and is one of the first cultivated crops in the Central and South Americas. India is the world leader in chilli production followed by China and Pakistan. A large demand for chilli comes from several chilli- consuming countries such as India, China, Mexico, Thailand, USA, UK, Germany and Sweden. The crop has got great export potential besides huge domestic requirement but a number of limiting factors have been attributed for low productivity 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 (Dey et al. 2001). One of the practical means of increasing chilli production is to minimize losses caused by major sucking pests like mites and thrips [1]. Economic yield loss due to these pests may be 11-75% quantitatively and 60-80% qualitatively in the event of serious infestation [2-11].

2. MATERIALS AND METHODS

Investigation on field evaluation of impact of insecticidal spray on leaf curling caused due to sucking pest and phytotoxic effect of higher doses of chlorfenapyr 240SC on chilli. 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 m^2. 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 moister stage. The observation on the impact of insecticidal spray on leaf curling caused due to sucking pest (Mites and Thrips) and phytotoxic effect were recorded by selecting five plants randomly from net plot area of each plot and tagged. From five leaves of tagged plants. and note-down impact of insecticidal spray and phytotoxic effect after each spray with different-different day. 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 or g)	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	-	-	-

Treatments for Phytotoxicity observation

Tr No	Treatment details	Does/ha		
		g.a.i.	Formulation(ml)	water volum (L)
T1	Chlorfenapyr 240SC	240	1000	500
T2	Chlorfenapyr 240SC	480	2000	500
T3	Untreated control			

3. RESULTS AND DISCUSSION

3.1 Insecticidal Spray Effect on Leaf Curling

The results presented in (Table 1) revealed that all spray schedules were significantly superior in reducing the leaf curl disease at 30, 50 and 70 days after sowing. The minimum leaf curl was observed in Following ten days of first spray the leaf curling was fundamentally most important in untreated control (44.68%). It was least in T4-chlorofenapyr (21.67%) and at standard with T3-chlorofenapyr (24.15%) trailed by T5-Fipronil 5% SC (28.55%), T6- Profenophos (29.89%), T2-chlorofenapyr (30.39%) and T1-chlorofenapyr (32.08%).

In second spray the most elevated leaf curling was noted in T7-51.49% was essentially high over every one of treatment. leaf curling was seen in T4-chlorofenapyr-17.26%, which demonstrated important distinction plus T3-chlorofenapyr (18.77%) trailed by T5-Fipronil 5% SC (21.56%), T6-Imidacloprid (23.69%), T2-chlorofenapyr (25.48%) and T1-chlorofenapyr (27.63%).

In third spray T4-chlorofenapyr demonstrated best with least leaf curling side effects (9.68%) which was at standard with T3-chlorofenapyr (11.88%) trailed by T5-Fipronil 5% SC (14.46%), T6-Imidacloprid (16.68%), T2-chlorofenapyr (17.69%) and T1-chlorofenapyr (19.48%).The most elevated curling was recorded in T7-56.29.Hossain et. al. (2016) reported that spraying of chlorphenapyr (Intrepid 10SC) @ 1 ml/litre of water + white sticky trap @ 40 traps/ha resulted negative correlation of thrips and mite population with Chlorophyll Concentration Index of leaf. However, the lowest percentage of upward (19.05%) and downward leaf curl (21.08%) was also obtained from chlorphenapyr + white sticky trap treated plot. Pandey et al. (2010) studied the management of chilli leaf curl disease management by insecticides, imidacloprid 17.8 SL (0.003%) was most effective than spinosad 48 EC

Table 1. Insecticidal spray effect on leaf curling

Treatments	Dose/ha	Pre - treatment Count	Per cent leaf curling		
			After Spray		
			1st Spray	2nd Spray	3rd Spray
			10 DAS	10 DAS	10 DAS
T_1-Chlorfenapyr 240	144	39.69 (39.02)	32.08 (34.48)	27.63 (31.71)	19.48 (26.16)
T_2-Chlorfenapyr 240	192	41.09 (39.84)	30.39 (33.43)	25.48 (30.32)	17.69 (24.86)
T_3-Chlorfenapyr 240	240	36.8 (37.38)	24.15 (29.39)	18.77 (25.51)	11.88 (20.03)
T_4-Chlorfenapyr 240	288	35.58 (36.47)	21.67 (27.63)	16.26 (23.47)	9.68 (17.57)
T_5- Fipronil 5% SC	10	33.76 (39.1)	28.55 (32.57)	21.56 (27.61)	14.46 (22.34)
T_6- Imidacloprid 17.8SL	50	40.08 (39.25	29.89 (33.12)	23.69 (29.07)	16.68 (23.99)
T_7-Uncontrol	----	41.69 (40.2)	44.68 (41.9)	51.49 (45.81)	56.29 (48.6)
S Em±		**1.58**	**1.05**	**1.33**	**1.37**
CD at 5 % (p=0.05)		**NS**	**3.21**	**4.09**	**4.21**
CV %		**7.03**	**5.44**	**7.52**	**9.01**

The values in parentheses are angular transformed (arc sin) values
DAS- Days After Spray

Table 2. Phytotoxic effect of higher doses of chlorfenapyr 240SC in chilli

Treatment	Dose g.a.i./hac	Chlorosis	Necrosis	Wilting	Scorching	Hyponasty	Epinasty
T1-Chlorfenapyr 240 SC	240	0	0	0	0	0	0
T2-Chlorfenapyr 240 SC	480	0	0	0	0	0	0
T3- Untreated Check	.	0	0	0	0	0	0

(0.02%), malathion 50 EC (0.05%), acephate 75 SP (0.1%) and methyl-demeton 25EC (0.025%). Management of chilli leaf curl was done by seed extract of plants and insecticides at different concentrations. These findings are in support of present study.

3.2 Phytotoxic Effect

In present investigation (Table 2) the higher portion as treatment T1 - chlorfenapyr and T2 - chlorfenapyr were connected contrasting and T3 - untreated control. In these tried portions no phytotoxic impact likes Chlorosis, rot, Necrosis, hyponasty, Scorching, Wilting and epinasty were seen at various interim of perceptions against Chilli crop. Sontakke et. al. (2007) reported that chlorfenapyr 240SC in chilli showed no any phytotoxic effect on plants. Sarkar and Samanta [2] stated that chlorfenapyr did not produce any phytotoxic symptoms in chilli.

4. CONCLUSION

Treatment T4- chlorofenapyr 240SC @288 proved, the most effective with least leaf curling symptoms--9.68% which at par with T3- chlorofenapyr 240SC @240 (11.88%) followed by T5- Fipronil 5% SC @10 (14.46%) and The maximum leaf curling was noted in T7-Untreated control (56.29%) and no phytotoxic effect of higher does of chlorfenapyr 240SC on chilli.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Berke T, Sheih SC. Chilli peppers in Asia. Capsicum and Egg Plant. News Letter. 2000;19:38-41.
2. Sarkar PK, Sudarsan C, Rai P. Effectiveness of pre-mix formulation fipronil 15% + emamectin benzoate 5% WDG against thrips (Scirtothrips dorsalis hood) and fruit borer Helicoverpa armigera (hübn) of chilli. Journal Entomology Research. 2015;39(2):135-139.
3. chatterjee ML, Mondal S. Sustainable management of some Key Lepidopteran insect pests of vegetables. Journal of Acta Horticulture. 2012;2(1):1-20.
4. David PM. Influence of insecticidal spray on the resurgence of yellow mite, *Polyphagotarsonemus latus* Bank on chillies. Resurgence of sucking pest. In Proceeding of National Symposium (Ed.).TNAU, Coimbatore. 1986;65-72.
5. Laishana L, Ghosal A, Senapati AK, Chatterjee ML. Bioefficacy of some biorational insecticides against fruit borer infestation on tomato under West Bengal Condition Agric.: Towards a New Paradigm of Sust. 2013;64.
6. Pandey SK, Mathur AC, Srivastava M. Management of leaf curl virus of chilli. Int. J.of Viro. L, 2010;6:246-250.
7. Reddy AV, Sriharianda G, Kumar K. Evaluation of certain new Insecticides against chilli thrips (*Scirtothrips dorsalis*) and mites (*Polyphagotarsonemus latus*) The Asian J. of Horti. 2007;2(2):8-9.
8. Seal DR, Cinoperlism M, Richard ML, Klassen W. Comparative effectiveness of chemical insecticides aginst the chilli thrips Dorsilaus hood (thysanoptera: thripidae) on pepper and their compatability with natural enimes. Journal of Crop Protection. 2006;25:949-955.
9. Treacy M, Miller T, Black B, Gard I, Hunt D, Hollingworth RM. Un coupling activity and pesticidal properties of pyrroles. Biochemical Society Transaction. 1994; 22:244-247.
10. Vanishree K, Upendhar S, Rajasekhar P. Toxicity of certain novel insecticides against chilli Scirtothrips dorsalis (Hood). Resistant Pest Management Newsletter. 2013;21:17-21.

11. Awasthi MD, Ahuja AK, Sharma D. Contamination of horticulture ecosystem: Ochard soil and water bodies with pesticide residue. Proceeding of National Symposium on Integrated Pest Management (IPM) in Horticulture Crops: New Molecules. Biopesticide and Environment. Bangalore. 2011;117.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/71893