Asian Journal of Environment & Ecology

Volume 23, Issue 7, Page 139-142, 2024; Article no.AJEE.114605
ISSN: 2456-690X

Effect of Soil Application of Cyazypyr 20% SC, New Anthranilic Diamide Insecticide against Whitefly, *Bemisia tabaci* Genn. in Brinjal

P. Chand [a*], S. K. Mandal [a], Abhishek Pati Tiwari [b] and Ankit Yadav [c]

[a] Department of Agricultural Entomology, B C K Viswavidyalaya, Nadia, West Bengal, India.
[b] Department of Seed Science & Technology, C S A University of Agri. & Tech., Kanpur, India.
[c] Department of Soil Science & Agri. Chem., C S A University of Agri. & Tech., Kanpur, India.

Authors' contributions

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

Article Information

DOI: https://doi.org/10.9734/ajee/2024/v23i7570

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/114605

Short Research Article

Received: 28/03/2024
Accepted: 02/06/2024
Published: 05/06/2024

ABSTRACT

Brinjal *Solanum melongena* L. is an herbaceous, tropical perennial plant, belongs to the family Solanaceae which is grown for its edible fruit. Among the different major insect pests infesting brinjal, whitefly, *Bemicia tabaci* (Genn.), is very important under West Bengal condition. The experiment was conducted during the 2013 and 2014 in the University farm at Kalyani, West Bengal state of India. Cv 'Muktakeshi' was grown in plots measuring 5 m×5 m, at spacing of 1 m x 0.75 m with three replication. The plots were set out in a randomized block design with six treatments including an untreated check. Five doses of cyazypyr 20% SC (4.5 MAT ,6.0 MAT, 7.5 MAT, 9.0

**Corresponding author: E-mail: drpcshastri82@gmail.com;*

Cite as: Chand, P., S. K. Mandal, Abhishek Pati Tiwari, and Ankit Yadav. 2024. "Effect of Soil Application of Cyazypyr 20% SC, New Anthranilic Diamide Insecticide Against Whitefly, Bemisia Tabaci Genn. In Brinjal". Asian Journal of Environment & Ecology 23 (7):139-42. https://doi.org/10.9734/ajee/2024/v23i7570.

MAT and, 12 MAT in both year 2013 and 2014) were sprayed every year for their efficacy, After 50 days of treatment cyazypyr 20% SC @ 9.0 and 7.5 MAT (3.33 and 6.87 whiteflies / 5 leaves, respectively) maintained their superiority in controlling whiteflies, while @ 6.0 and 4.5 MAT (7.93 and 8.40 whiteflies / 5 leaves, respectively) and this treatment failed to show any significant difference from untreated control.

Keywords: Brinjal; tropical perennial plant; soil application.

1. INTRODUCTION

"Brinjal *Solanum melongena* L. is an herbaceous, tropical perennial plant, belongs to the family Solanaceae which is grown for its edible fruit. Brinjal is known as Bazinga in Egypt, aubergine in France and England, eggplant in the United States, and brinjal in India" [1]. "It is also referred to as guinea squash or King of vegetables and India and Indochina are considered the centers of origin" [2]. "Being the top ten vegetables in the world, it is extensively grown in India, Pakistan, China, Philippines, Bangladesh, Egypt, France, Italy, Middle East, Far East, and the U.S.A. It is rich in nutrients like dietary fiber, ascorbic acid, vitamin K, folate, niacin, vitamin B6, pantothenic acid, potassium, iron, magnesium, manganese, phosphorus, and copper" [3]. "It is native of India and second largest brinjal producing country after China with 27.1 % share. It is an important vegetable grown in all the seasons" [4-7].

"Its fruits are wide range in size, display variation in fruit shape ranging from oval or egg-shaped to long club-shaped and color depending on the varieties, fruits may be black, purple, purple white, white, yellow or purple. It has two main groups: long (called Bride) and oval or spherical (called Romy)" [8]. "Among the insect pests infesting brinjal, the major ones are epilachna beetle, *Epilachna vigintioctopunctata* (Fab.), shoot and fruit borer, *Leucinodes orbonalis* (Guen.), whitefly, *Bemicia tabaci* (Genn.), leafhopper, *Empoasca flavescens* (Distant), and non insect pest, red spider mite, *Tetranychus macfurlanei*. Among the different major insect pests infesting brinjal, whitefly, *Bemicia tabaci* (Genn.), is very important under West Bengal condition. To avoid the crop loss by this insect, the frequent use of toxic chemical insecticides has been a common practice to the brinjal growers. The new generation of pesticide molecules have been claimed to be effective as well as safer for non-target organisms" [9-11,3, 12,13]. The use of insecticides could be more effective depending on selection of chemicals, doses, method and time of application. Hence, keeping the above point in view, present investigation was carried to evaluate the bio-efficacy of cyazypyr 20% SC on whitefly, *Bemicia tabaci* (Genn.), under field condition.

2. MATERIALS AND METHODS

The experiment was conducted during the 2013 and 2014 in the University farm at Kalyani, West Bengal state of India. Cv 'Muktakeshi' was grown in plots measuring 5 m×5 m, at spacing of 1m x 0.75m with three replication during the period from mid- April to July, two year, following recommended package of practices. The plots were set out in a randomized block design with four doses of cyazypyr 20% SC, 4.5, 6.0, 7.5 and 9.0 MAT (Milligram active ingredient per target) were applied in soil at the base of the plant twice; first at time of planting and after 15 days of planting. There were altogether 5 treatments including untreated control with 3 replications. Control plots were treated with equal amount of water only.

Data on whiteflies (adults) was recorded at 10 days interval starting from 30 days after planting up to 60 days after planting from 5 randomly selected plants / plot following the same method as in the previous experiment.

3. RESULTS AND DISCUSSION

In the season 2013, whitefly population recorded in different treatments, showed significant reduction in plots treated with cyazypyr 20% SC @ 9.0, 7.5, 6.0 and 4.5 MAT (0.80,1.33, 2.87 and 4.53 whiteflies / 5 leaves, respectively) as compared to untreated control (10.53 whiteflies / 5 leaves). After 40 days of treatment, cyazypyr 20% SC @ 9.0, 7.5, 6.0 and 4.5 MAT (2.87, 3.27, 4.73 and 7.80 whiteflies / 5 leaves, respectively) as compared to untreated control (11.60 whiteflies / 5 leaves). After 50 days of treatment cyazypyr 20% SC @ 9.0 and 7.5 MAT (3.33 and 6.87 whiteflies / 5 leaves, respectively) maintained their superiority in controlling whiteflies, while @ 6.0 and 4.5 MAT (7.93 and 8.40 whiteflies / 5 leaves, respectively) and this treatment failed to show any significant

Table 1. Number of whitefly / 5 leave due to different treatment

Treatment	2013				2014			
	30 DAS	40 DAS	50 DAS	60 DAS	30 DAS	40 DAS	50 DAS	60 DAS
Cyazypyr 20% @ 4.5 MAT	4.53 (2.12)	7.80 (2.79)	8.40 (2.89)	9.93 (3.15)	1.80 (1.34)	4.40 (2.10)	6.07 (2.46)	7.40 (2.71)
Cyazypyr 20% @ 6.0 MAT	2.87 (1.68)	4.73 (2.16)	7.93 (2.81)	9.93 (3.15)	0.93 (0.96)	2.27 (1.49)	3.13 (1.76)	7.40 (2.71)
Cyazypyr 20% @ 7.5 MAT	1.33 (1.14)	3.27 (1.80)	6.87 (2.62)	7.53 (2.74)	0.40 (0.62)	2.07 (1.43)	2.93 (1.71)	6.47 (2.54)
Cyazypyr 20% @ 9.0 MAT	0.80 (0.89)	2.87 (1.69)	5.33 (2.31)	6.80 (2.61)	0.27 (0.51)	1.00 (1.00)	2.07 (1.44)	4.93 (2.21)
Untreated Control	10.53 (3.25)	11.60 (3.40)	8.33 (2.88)	9.93 (3.15)	16.80 (4.09)	10.47 (3.23)	13.20 (3.63)	7.40 (2.70)
CD	0.36	0.32	0.38	0.32	0.30	0.39	0.29	NS

Values within parentheses are square root transformedMAT- milligram ai per target*

difference from untreated control (8.33 whiteflies / 5 leaves). After 60 days of treatment cyazypyr 20% SC @ 6.0 and 4.5 MAT showed similar results (9.93 whiteflies / 5 leaves). Cyazypyr 20% SC @ 9.0 and 7.5 MAT (6.80 and 7.53 whiteflies / 5 leaves), these treatments decreased pest population as compared to untreated control (9.93 whiteflies / 5 leaves) Vivek et al. [14] also found that "whitefly mortality in different treatments ranged between 62 and 96% for cyantraniliprole, and 95–100% for combination treatments. No phytotoxicity was observed for any treatment". Christian and Nabil [15] found that **"**Cyantraniliprole showed better results relative to spiromesifen, spirotetramat, tolfenpyrad, sulfoxaflor, and flupyradifurone treated plots. After the fifth application, cyantraniliprole was able to reduce the whiteflies eggs' populations by 23.69% and 42.47% in greenhouses 1 and 2, respectively; whereas whiteflies nymphs' populations were reduced by 76.25% in greenhouse". *Chand* et al*.* [4]. The most effective treatment was cyazypyr 10% OD @ 105 g a.i./ha followed by cyazypyr 10% OD @ 90 g a.i./ha.

In the season 2014, after 30 days of planting all the doses of cyazypyr 20% SC had significantly lower population of whitefly than untreated control. Cyazypyr 20% SC @ 9.0 and 7.5 MAT showed to be superior significantly lowering the whitefly population than the two lower doses of the same insecticide.

After 40 days of treatment, cyazypyr 20% SC @ 9.0 MAT recorded superiority over rest of the treatments in controlling whitefly population. Result achieved with cyazypyr 20% SC @ 6.0 and 7.5 MAT was statistically homogeneous (2.27 – 7.40 and 2.07 – 6.47 whitefly / 5 leaves).

4. CONCLUSION

The use of insecticides could be more effective depending on selection of chemicals, doses, method and time of application. Cyazypyr 20% SC had significantly lower population of whitefly than untreated control. Cyazypyr 20% SC @ 9.0 and 7.5 MAT showed to be superior significantly lowering the whitefly population than the two lower doses of the same insecticide.

ACKNOWLEDGEMENT

The author is thankful to M/S. E I DuPont India Private Limited, Gurgaon, Haryana for the financial assistance given for testing of its new product cyantraniliprole (HGW 86) 20 % SC (Cyazypyr).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Zayed GA, Abdo AA, Hammam HB, Khafagi EY. Cultivation and production of pepper and eggplant in Egypt. Technical issue No. 15, General Administration of Agricultural Culture, Ministry of Agriculture, Egypt; 2017.
2. Vavilov NI. The origin, variation, immunity, and breeding of cultivated plants. 1951; 72(6):91-99.
3. Sathe TV, Patil SS, Bhosale AM, Devkar SS, Govali CS, Hankare SS. Ecology and Control of Brinjal insect pests from Kolhapur region, India. Bio-life. 2016;4(1): 147-154.

4. Chand P, Vishwakarma R, Mandal SK, Chandra U. Bio-Efficacy of Cyazypyr 10% OD, New Anthranilic Diamide Insecticide, against whitefly *Bemisia tabaci* and Jasid *Empoasca flavescens* on brinjal Bull. Env. Pharmacol. Life Sci. 2018;7(10):124-131.
5. Misra HP. New promising insecticides for the management of brinjal shoot and fruit borer, *Leucinodes orbonalis* Guenee. Pest Manage. Hort. Ecosys. 2008;14 (2):140–147.
6. Muthukumar M, Kalyanasundaram M. Efficacy of certain insecticides against major suckine insects of brinjal (*Solanum melongena* L.). South Indian brinjal (*Solanum melongena* L.). South Indian. 2003;51:207-13.
7. Patel JJ, Patel BH, Bhatt HV, Maghodia AB, Bhalala MK. Bioefficacy of diafenthiuron 50 WP against sucking pests of brinjal (*Solanum melongena* L.). Indian Journal of Entomology. 2006;68(3):272-73.
8. Abd-Elgawad MM. Biological control of nematodes infecting eggplant in Egypt. Bulletin of the National Research Centre. 2021;45(1):1-9.
9. Sontakke BK, Das N, Swain LK. Bioefficacy of emamectin benzoate against boll worm complex in cotton. Ann. Pl. Protec. Sci. 2007;15(1):371–376.
   Tonishi MH, Nakao T, Furuya A, Seo H, Kodama K, Tsubata S, Fujioka H, Kodama T, Hirooka T, Nishimatsu T. Flubendiamide, a novel insecticide highly active against lepidopterous insect pests. J. Pestic. Sci. 2005;30:354–360.
10. Borad PK, Patel HM, Chavda N, Patel JR. Bio-efficacy of endosulfan and cypermethrin mixture against insect pests of brinjal (*Solanum melongena*). Indian Journal of Agricultural Sciences. 2002;72: 685-88.
11. Mandal SK. Bio-Efficacy of Cyazypyr 10% OD, a New Anthranilic Diamide Insecticide, against the Insect Pests of Tomato and Its Impact on Natural Enemies and Crop Health Acta Phytopathologica et Entomologica Hungarica. 2012;47(2):233–249.
12. Biswas RK, Chaterjee M. Effectiveness of some systemic insecticides against the whitefly, *Bemisia tabaci* (Gennadius), on brinjal and the jassid, *Amrasca biguttula* biguttula Ishida, on okra. Pest Management and Economic Zoology. 2008; 16(1):37-42
13. Hall T. Ecological effects assessment of flubendiamide. Pflanz. -Nach, Bayer. 2007; 60(2):167–182.
14. Kumar V, Kakkar G, Cindy L McKenzie, Lance S Osborne. Effect of Soil Application of Cyantraniliprole on *Bemisia tabaci* (MED Whitefly) and mblyseius Manda, l S, Singh, N.J, Konar A. (2010). Efficacy of synthetic and botanical insecticide against whitefly (*Bemicia tabaci*) and shoot and fruit borer (*Leucinodes orbonalis*) on brinjal (Solanum melongena L.); 2016.
15. Kareh C, Nemer N. Evaluation of Insecticides in the Management of Whiteflies (*Bemisia tabaci* Gennadius) and their Impacts on Yield of Eggplants, Universal Journal of Agricultural Research. 2023;11(4):715-722.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/114605