The Pharma Innovation Journal 2022; SP-11(5): 149-151

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(5): 149-151

www.thepharmajournal.com
Received: 04-03-2022
Accepted: 06-04-2022

Anil Kumar Saroj
Department of Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

PS Singh
Department of Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

Corresponding Author
Anil Kumar Saroj
Department of Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

Efficacy of newer insecticides against whitefly, *Bemisia tabaci* in urdbean

Anil Kumar Saroj and PS Singh

Abstract
Two field trial was conducted during *Kharif* season of 2018 and 2019 at Agricultural Research Farm, Banaras Hindu University, Varanasi to evaluate the efficacy of Imidacloprid 17.8 SL @ 20g a.i./ha, Thiamethoxam 25 WG @ 25g a.i./ha, Emamectin benzoate 5 SG @ 11g a.i./ha, Spinosad 45 SC @ 73g a.i./ha, Azadirachatin 0.03% WSP @ 2500 g/ha, Chlorantraniliprole 18.5 EC @ 20g a.i./ha, untreated control against whitefly, *Bemisia tabaci* in blackgram. The results of the two years field trial revealed that Thiamethoxam 25 WG @ 25g a.i./ha was most effective in reducing the population of whitefly followed by Imidacloprid 17.8 SL @ 20g a.i./ha and Azadirachatin 0.03% WSP @ 2500 g/ha.

Keywords: Efficacy, whitefly (*Bemisia tabaci*), urdbean, insecticides

Introduction
Urdbean (*Vigna mungo* L.) also known as blackgram, mash, urd, mashkalai black mapte, etc, belongs to the family Leguminosae; sub family Papilionaceae. It is short duration grain legume crop with wide adaptability, low input requirement, and can improve soil fertility by fixing atmospheric nitrogen, so it is used as a green manure crop. It also acts as a cover crop and its deep root system protects the soil from erosion. Blackgram is native to the Indian subcontinent (Nene, 2006) [8]. In India during 2016-17 blackgram was cultivated over an area of 4.48 Mha and recorded production of 2.83 Mt at a productivity level of 632 kg/ha (Anonymous, 2018) [1]. Blackgram contains 24% protein, 59.60% carbohydrate, 154mg calcium, 9.1 mg iron, and 38mg β- carotene per 100gm of split dhal (Bakr *et al*., 2004)[2]. It is also used as cattle feed along with roughage crops. Urd differs from other pulses in its peculiarity of attaining a mucilaginous pasty character when soaked in water. According to Nayar *et al.* (1976) [7], the crop is attacked by more than 20 insect pest species. Among the various insect pests jassid, whitefly, aphid, spotted pod borer, and gram pod borer is serious pests attacking plant parts like leaves, buds, flowers, and pods of blackgram. During the vegetative stage, the whitefly, *Bemisia tabaci* is the major sucking insect occurring in blackgram. According to Chhabra and Kooner, (1981) [4] whitefly is a serious pest and also acts as a vector of yellow mosaic virus and which causes 30-70 percent yield loss in India (Marimuthu *et al*. 1981) [6]. The Yellow mosaic disease is the most destructive disease on black gram both in *Kharif* and *Rabi* seasons. Management of yellow mosaic virus primarily involves the management of whitefly which is the vector of this virus. The present study was carried out to evaluate insecticides against whitefly on urdbean under field conditions.

Material and Methods
The field experiment was conducted during the *Kharif* season of 2018 and 2019 at Agricultural Research Farm, Banaras Hindu University, Varanasi to evaluate the efficacy of some newer insecticides against whitefly, *Bemisia tabaci* in blackgram. The experiment was laid out in Randomized Block Design with seven treatments including control and these treatments were replicated thrice in 3 × 2 m plot size. Blackgram variety Shekhar-2 was grown with the spacing of 30 × 10 cm. The crop was raised under normal agronomic practices, except plant protection measures. At regular intervals, monitoring was done for the incidence of whitefly. The first spraying of treatments was done 35 days after sowing (DAS) and the second spraying at 15 days after the first spray. The population of whitefly was recorded with the help of a rectangular split-cage. The observations on the whitefly population were recorded a day before spray (DBS) and 1, 3, 7, and 10 days after each spray.

Result and Discussion

Effect of different newer insecticides on whitefly population

Data recorded during the *Kharif* season of 2018 presented in Table-1 revealed that the population of whitefly recorded a day before the first spray was found to be non-significant among the different treatments, which indicated that the infestation of whitefly was in homogenous condition throughout the experimental field and ranged from 7.67 to 8.07 whitefly / cage. Further, post-treatment showed significant differences among various treatment after 1, 3, 7, and 10 days after spray. The data of post-treatment population recorded at 1 day after spray (DAS) indicated that T2- Thiamethoxam 25 WG recorded the lowest whitefly population (4.67 whitefly / cage) followed by T1- Imidacloprid 17.8 SL (5.27 whitefly / cage), T5- Azadirachatin 0.03% WSP (5.80 whitefly / cage) and the maximum population was recorded in T7- Control (9.53 whitefly / cage). The same trend was followed at 3 DAS and 7 DAS. The data recorded at 10 DAS indicated that the lowest whitefly population was found in T2- Thiamethoxam 25 WG (1.53 whitefly / cage) followed by T1- Imidacloprid 17.8 SL (2.27 whitefly / cage), T4- Spinosad 45 SC (4.53 whitefly / cage) and the highest population was recorded in T7- Control (13.60 whitefly / cage).

Mean data over periods (1, 3, 7 and 10 DAS) indicated that the minimum whitefly population was recorded in T2- Thiamethoxam 25 WG (2.75 whitefly / cage) followed by T1- Imidacloprid 17.8 SL, T5- Azadirachatin 0.03% WSP, T4- Spinosad 45 SC, T6- Chlorantraniliprole 18.5 EC, and T3- Emamectin benzoate 5 SG recorded 3.52, 4.68, 5.60, 6.47, 6.70, whitefly / cage, respectively. The maximum population of whitefly (11.38 whitefly / cage) was found in T7- control.

Data recorded a day before the second spray indicated that the population of whitefly varied from 3.73 to 14.93 whitefly / cage. At 1 DAS lowest whitefly population was recorded in T2 (2.20 whitefly / cage) followed by T1 (3.13 whitefly / cage), T5 (5.80 whitefly / cage). The same trend was followed at 3, 7, and 10 DAS. Mean data over periods (1, 3, 7, and 10 DAS) indicated that the minimum whitefly population was recorded in T2 (1.23 whitefly / cage) followed by T1, T5, T4, T6, and T3 recorded 2.03, 4.03, 4.92, 5.85, and 6.25 whitefly / cage, respectively. The maximum whitefly population was recorded in T7- control (12.23 whitefly / cage).

During the *Kharif* season of 2019, a day before the first spray the population of whitefly was ranged from 9.67 to 10.07 whitefly / cage (Table-2). At 1 DAS, whitefly population was less in T2- Thiamethoxam 25 WG (4.87 whitefly / cage) followed by T1- Imidacloprid 17.8 SL (5.67 whitefly / cage), T5- Azadirachatin 0.03% WSP (6.93 whitefly / cage) while in the control 10.93 whitefly / cage were observed. The same trend was followed at 3 and 7 DAS. The data recorded at 10 DAS showed that the lowest whitefly population was recorded in T2- Thiamethoxam 25 WG (1.33 whitefly / cage) followed by T1- Imidacloprid 17.8 SL (2.60 whitefly / cage), T4- Spinosad 45 SC (4.60 whitefly / cage) and the highest population was recorded in T7- Control (14.07 whitefly / cage).

Mean data of 1, 3, 7 and 10 DAS showed that the minimum whitefly population was recorded in T2- Thiamethoxam 25 WG (2.97 whitefly / cage) followed by T1- Imidacloprid 17.8 SL, T5- Azadirachatin 0.03% WSP, T4- Spinosad 45 SC, T6- Chlorantraniliprole 18.5 EC, and T3- Emamectin benzoate 5 SG recorded 3.88, 5.18, 6.03, 6.75, and 7.17 whitefly / cage, respectively. The maximum population of whitefly (12.12 whitefly / cage) was found in T7- control.

Data recorded a day before the second spray stated that the population of whitefly varied from 4.53 to 15.93 whitefly / cage. At 1 DAS lowest whitefly population was recorded in T2 (2.27 whitefly / cage) followed by T1 (3.53 whitefly / cage), T5 (7.13 whitefly / cage). The same trend was followed at 3, 7, and 10 DAS. Mean data of 1, 3, 7 and 10 DAS showed that the minimum whitefly population was recorded in T2 (1.15 whitefly / cage) followed by T1, T5, T4, T6, and T3 recorded 2.07, 4.33, 5.15, 5.92, and 6.65 whitefly / cage, respectively. The maximum whitefly population was recorded in T7- control (12.62 whitefly / cage). The present findings are conformity with Sharma and Singh (2015) [9], Yadav *et al.* (2015) [11], Chavan and pagire (2013) [3], Sujatha and Bharpoda (2016) [10], and Javalage *et al.* (2019) [5] who reported that Thiamethoxam 25 WG was most effective in reducing whitefly population. Sharma and Singh (2015) [9] and Sujatha and Bharpoda (2016) [10] reported that Imidacloprid was the second most effective treatment against whitefly.

Table 1: Efficacy of some newer insecticides against Whitefly, *Bemisia tabaci* in blackgram during *Kharif* 2018

Tr. No.	Treatments Detail	Dose (a.i./ha)	Mean Population of Whitefly per cage											
			First spray						Second spray					
			DBS	1DAS	3DAS	7DAS	10DAS	Mean	DBS	1DAS	3DAS	7DAS	10DAS	Mean
T1	Imidacloprid 17.8 SL	20g	7.80 (2.88)	5.27 (2.40)	3.87 (2.09)	2.67 (1.78)	2.27 (1.66)	3.52 (2.00)	5.00 (2.35)	3.13 (1.91)	2.07 (1.60)	1.60 (1.45)	1.33 (1.35)	2.03 (1.59)
T2	Thiamethoxam 25 WG	25g	7.87 (2.89)	4.67 (2.27)	3.13 (1.91)	1.67 (1.47)	1.53 (1.43)	2.75 (1.80)	3.73 (2.06)	2.20 (1.64)	1.13 (1.28)	0.87 (1.17)	0.73 (1.11)	1.23 (1.32)
T3	Emamectin benzoate 5 SG	11g	8.07 (2.93)	7.60 (2.85)	7.20 (2.77)	6.40 (2.63)	5.60 (2.47)	6.70 (2.68)	8.20 (2.95)	7.60 (2.85)	6.60 (2.66)	5.60 (2.47)	5.20 (2.39)	6.25 (2.60)
T4	Spinosad 45 SC	73g	8.00 (2.92)	7.13 (2.76)	6.00 (2.55)	4.73 (2.29)	4.53 (2.24)	5.60 (2.47)	7.67 (2.86)	6.60 (2.66)	5.20 (2.39)	4.00 (2.12)	3.87 (2.09)	4.92 (2.33)
T5	Azadirachatin 0.03% WSP	2500 g/ha	7.73 (2.87)	5.80 (2.51)	4.67 (2.27)	3.60 (2.02)	4.67 (2.27)	4.68 (2.28)	7.20 (2.77)	5.80 (2.51)	4.40 (2.21)	3.13 (1.91)	2.80 (1.82)	4.03 (2.13)
T6	Chlorantraniliprole 18.5 EC	20g	7.67 (2.86)	7.27 (2.79)	6.67 (2.68)	6.00 (2.55)	5.93 (2.54)	6.47 (2.64)	8.00 (2.92)	7.40 (2.81)	6.40 (2.63)	5.33 (2.41)	4.27 (2.18)	5.85 (2.52)
T7	Control	-	8.00 (2.92)	9.53 (3.17)	10.47 (3.31)	11.93 (3.53)	13.60 (3.75)	11.38 (3.45)	14.93 (3.93)	14.53 (3.88)	13.87 (3.79)	11.93 (3.53)	8.60 (3.02)	12.23 (3.57)
S.Em.±		-	-	0.10	0.07	0.14	0.14	-	-	0.10	0.09	0.09	0.14	-
C.D at 5%		-	NS	0.33	0.24	0.43	0.44	-	-	0.33	0.30	0.30	0.43	-

Figures in parentheses are $\sqrt{x + 0.5}$ transformed values, DBS- A Day before spraying, DAS- Days after spraying, NS- Non-significant

Table 2: Efficacy of some newer insecticides against Whitefly, *Bemisia tabaci* in blackgram during *Kharif* 2019

Tr. No.	Treatments Detail	Dose (a.i./ha)	Mean Population of Whitefly per cage											
			First spray						Second spray					
			DBS	1DAS	3DAS	7DAS	10DAS	Mean	DBS	1DAS	3DAS	7DAS	10DAS	Mean
T1	Imidacloprid 17.8 SL	20g	9.73 (3.20)	5.67 (2.48)	4.47 (2.23)	2.80 (1.82)	2.60 (1.76)	3.88 (2.09)	6.67 (2.68)	3.53 (2.01)	2.47 (1.72)	1.33 (1.35)	0.93 (1.20)	2.07 (1.60)
T2	Thiamethoxam 25 WG	25g	9.87 (3.22)	4.87 (2.32)	3.73 (2.06)	1.93 (1.56)	1.33 (1.35)	2.97 (1.86)	4.53 (2.24)	2.27 (1.66)	1.20 (1.30)	0.67 (1.08)	0.47 (0.98)	1.15 (1.28)
T3	Emamectin benzoate 5 SG	11g	10.07 (3.25)	8.60 (3.02)	7.20 (2.77)	6.73 (2.69)	6.13 (2.58)	7.17 (2.77)	9.00 (3.08)	8.13 (2.94)	7.27 (2.79)	6.20 (2.59)	5.00 (2.35)	6.65 (2.67)
T4	Spinosad 45 SC	73g	10.00 (3.24)	7.80 (2.88)	6.20 (2.59)	5.53 (2.46)	4.60 (2.26)	6.03 (2.56)	8.33 (2.97)	7.20 (2.77)	5.80 (2.51)	4.40 (2.21)	3.20 (1.92)	5.15 (2.38)
T5	Azadirachatin 0.03% WSP	2500 g/ha	9.67 (3.19)	6.93 (2.73)	5.00 (2.35)	4.00 (2.12)	4.80 (2.30)	5.18 (2.38)	9.20 (3.11)	7.13 (2.76)	4.93 (2.33)	3.13 (1.91)	2.13 (1.62)	4.33 (2.20)
T6	Chlorantraniliprole 18.5 EC	20g	9.93 (3.23)	8.60 (3.02)	7.53 (2.83)	6.00 (2.55)	4.87 (2.32)	6.75 (2.69)	7.93 (2.90)	7.27 (2.75)	6.40 (2.63)	5.60 (2.47)	4.40 (2.21)	5.92 (2.53)
T7	Control	-	9.93 (3.23)	10.93 (3.38)	11.33 (3.44)	12.13 (3.55)	14.07 (3.82)	12.12 (3.55)	15.93 (4.05)	16.00 (4.06)	15.27 (3.97)	11.20 (3.42)	8.00 (2.92)	12.62 (3.62)
S.Em.±		-	-	0.08	0.11	0.11	0.10	-	-	0.12	0.13	0.09	0.23	-
C.D at 5%		-	NS	0.26	0.35	0.35	0.33	-	-	0.39	0.41	0.29	0.73	-

Figures in parentheses are $\sqrt{x + 0.5}$ transformed values, DBS- A Day before spraying, DAS- Days after spraying, NS- Non- significant

Conclusion

Based on two years trial, it can be concluded that all insecticidal treatments were found effective and significantly superior over control. Order of superiority among different insecticidal treatments over control are T2 (Thiamethoxam 25 WG @ 25g a.i./ha) > T1 (Imidacloprid 17.8 SL @ 20g a.i./ha) > T5 (Azadirachatin 0.03% WSP @ 2500 g/ha) > T4 (Spinosad 45 SC @ 73g a.i./ha) > T6 (Chlorantraniliprole 18.5 EC @ 20g a.i./ha) > T3 (Emamectin benzoate 5 SG @ 11g a.i./ha).

References

1. Anonymous. Annual Report DPD Bhopal 2018-19, 18p.
2. Bakr MA, Afjal MA, Hamid A, Haque MM, Aktar MS. Blackgram in Bangladesh. Lentil, Blackgram and Mungbean Development Pilot Project. Publication No. 25, Pulse Research Centre. BARI, Gazipur, 2004, 60p.
3. Chavan VM and Pagire KS. Effect of newer insecticides against whitefly (*Bemisia tabaci* Genn.), a vector of Yellow Vein Mosaic Virus on Okra. Journal of Agriculture Research and Technology. 2013;38(1):059-063.
4. Chhabra SK, Kooner BS. Field resistance in blackgram (*Vigna mungo* L.) against insect-pest complex and yellow mosaic virus. Indian Journal of Entomology 1981;43:288-293.
5. Javalage SP, Kolhe AV, Naikwadi BV. Bio efficacy of new insecticides against major sucking pests and effect on their natural enemies of Bt cotton BG II. Journal of Entomology and Zoology Studies. 2019;7(5):424-431.
6. Marimuthu T, Subramanian CL, Mohan R. Assessments of yield losses due to yellow mosaic infestation in mungbean. Pulse Crop Newsletter. 1981;1:104.
7. Nayar KK, Anomthakrishnan TN, Devid BV. General and Applied Entomology, Tata Mc Graw Hill Pub. Co. Ltd., New Delhi, 1976, 589p.
8. Nene YL. Indian pulses through the millennia. Asian Agri-History. 2006;10:179-202.
9. Sharma SR, Singh DP. Competitive studies of insecticides for the control of sucking pests in urdbean (*Vigna mungo*) in relation to yield. International Journal of Plant Protection. 2015;8(2):393-396.
10. Sujatha B, Bharpoda TM. Evaluation of Insecticides against sucking pests in green gram grown during summer. Trends in Biosciences. 2016;9(13):745-753.
11. Yadav SK, Patel S, Meena A, Bisht RS. Efficacy of insecticides and bio-pesticides against sucking pests in Black gram. Annals of Plant Protection Sciences. 2025;23(2):223-226.