Short communication

EVALUATION OF INSECTICIDES AGAINST SUCKING INSECT PESTS OF COWPEA IN GIRD REGION OF MADHYA PRADESH

ABSTRACT

A field experiment conducted at Research Farm, Rajmata Vijyaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh during *Kharif* season 2022-23 forEvaluation the efficacy of 7 treatments *viz*., T_1 - Dimethoate 30 EC (1000 ml), T_2 - Imidachloprid 17.8 SL (125 ml), T_3 - Acetamiprid 20 SP (125 gm), T_4 -Flubendiamide 480 SC (500 ml), T_5 - Emamectin benzoate 5 SG (100 gm), T_6 - Fipronil 15% SC (2000 ml) and T_7 - Un-treated.The observations were made three, seven, and fifteen days following the first and second insecticide sprayings. The results data showed that among the six insecticides, Imidachloprid 17.8 SL @ 125ml ha^{-1} was the most effective, revealing to be better in controlling sucking insect like: Aphid [*Aphis craccivora*(Koch)], thrips [*M.distalis*(Karny)],whitefly [*A. rachipora*(Singh)] and jassid [*E. kerri*(Pruthi)] incidence in cowpea. While Acetamiprid 20 SP was found least effective against sucking insect pests.

Keywords: Cowpea, sucking pest and insecticide

INTRODUCTION

One of the main tropical pulse crops, cowpea [*Vigna unguiculata* (Linn.) Walp] is also known as southern pea, black eyed bean, chala or choli, chavli and lobia. It is a member of the leguminaceae family. It may be utilised as a crop for green manure, a vegetable, a green legume, and fodder (Kumar *et al.*, 2017). Cowpea seeds provide a rich source of proteins and calories, as well as minerals and vitamins. A seed can consist of 23-25% protein, 50-67% carbohydrates, 8-9% moisture and it has very low 3.99% fat content (Rangel *et al*., 2003). In India, pulses occupied nearly 29.99 million hectares area with a production of 25.23 million tonnes during the year 2018-19 (Anonymous, 2018). Cowpea is infected with 21 insect pests, including aphids, *Aphis craccivora* (Koch); leaf hoppers, *Empoascakerri* (Pruthi); thrips, *Megaleurothrips distalis* (Karny); tobacco caterpillar, *Spodoptera litura* (Fab.), and spotted pod borer, *Maruca vitrata* (Geyer) which cause 65-100 percent losses. The study aimed in order to find out the correlation of

aphid, *A. craccivora*,jassid, *E. fabae*, whitefly, *B. tabaci* and its natural enemies in Cowpea ecosystem with the abiotic parameters. Suitable understanding of the seasonal incidence of sucking insect pests is important due to variation in the weather conditions and changing sucking insect pest scenario on the cowpea.

MATERIALS AND METHODS

The experiment was carried out at the research farm, College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh, India. Randomized Block Design (RBD) with 3 replications was deployed during *Kharif*, 2021. The plot size was5.0 m X 3.6 m. For recording observations of insect-pest, five plants were randomly selected and tagged in each net plot area. The Observations will be recorded at seven days after second spray. Observations on insect pests of cowpea will be recorded at pre and post treatments. Pre-treatment observations will be recorded at 24 hrs. before spray and post treatment will be recorded at 7, 15, and 25 days after spraying on 5 plants selected randomly from each plot. Then experimental data were subjected to statistical analysis using analysis of variance (ANOVA).

RESULTS AND DISCUSSION

Aphid, *Aphis craccivora*(Koch)

After the first spray of insecticide indicated in Table 2 that the population of aphid (*A. craccivora*)is decreased significantly at 3rd day and at 7th day of spray but started increasing at 15th day of spray. After first spray, Treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (9.07 aphid/plant) and at 7th day (3.87 aphid/plant) in comparison to the un-treated population (23.42 and 23.19 at 3rd and 7th day, respectively). The population to be found increasing at 15th day after first spray. After second spray, Treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (4.95 aphid/plant) and at 7th day (1.10 aphid/plant) in comparison to the un-treated population (26.34 and 26.34 at 3rd and 7th day, respectively). The population of aphid at 15th day after second spray found stable. The results for the objective evaluation of insecticides against aphid on cowpea crop are supported by Srinivasan (2008) studied that the efficacy of insecticide. The effective control of *M. vitrata*was manifested with the marked increase in yields. Saha *et al.* (2009) reported that the newer insecticides in the field against insects pest. Panduranga *et al.* (2011) reported that foliar spray of acetamprid 20 SP @ 0.002 per cent was found to be the most effective treatments. Iqbal *et al.* (2013) conducted field

study to evaluate one combination of seed treatment with imidacloprid.That showed a significant difference with one another, regarding their effectiveness.

Jassid,*Empoascakerri*(Pruthi)

The data recorded on Jassid after the first spray of insecticide during *Kharif*, 2022 presented in Table 2 indicated that the population of jassid (*E. kerri*) is decreased significantly at 3rd day and at 7th day of spray but started increasing at 15th day of spray. After first spray, treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (3.75 thrips/plant) and at 7th day (2.25 jassid/plant) at 15th day (3.62 jassid/plant) in comparison to the un-treated population (6.70, 10.12 and 7.68 jassid/plant at 3rd day, 7th day and 15th day, respectively). After second spray, treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (1.43 jassid/plant), 7th day (1.11 jassid/plant) and 15th day (1.30 jassid/plant) in comparison to the un-treated population (6.75 and 6.20 at 3rd and 7th day, respectively). The population of aphid at 15th day after second spray found stable. The Jessid population showed positive significant correlation with temperature, While negative correlation with rainfall and humidity. These findings are in close agreement with Sarode *et al.* (2003) observed that Jassids population was found to be significantly influenced by the minimum temperature and morning relative humidity (RH). These supported by Singh *et al.* (2018) and Saini *et al.* (2023)

Thrips,*Megalurothrips distalis* (Karny)

Observation after the first spray of insecticide indicated that the population of thrips (*M. distalis*) is decreased significantly at 3rd day and at 7th day of spray but started increasing at 15th day of spray. After first spray, Treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (1.58 thrips/plant) and at 7th day (0.92 thrips/plant) at 15th day (1.19 thrips/plant) in comparison to the un-treated population (2.57 and 2.43 thrips/plant at 3rd day and 7th day, respectively). The population to be found increasing at 15th day after first spray. After second spray, Treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (1.65 thrips/plant) and at 7th day (1.06 thrips/plant) in comparison to the un-treated population (6.75 and 6.20 at 3rd and 7th day, respectively). The population of aphid at 15th day after second spray found stable. The results for the objective evaluation of insecticides against thrips on cowpea crop are supported by Swarupa *et al.* (2019) s conducted to test the efficacy of seed

treatment chemicals against sucking pests *viz*., thrips infesting cowpea. The effective management of thrips showed lowest thrips population. The present results are in accordance with the results of Shobharani*et al.* (2017) who reported that imidacloprid 60 FS @ 10 ml / kg of seeds effectively reduced the sucking pest population in the blackgram field. Soundarajan and Chitra (2011) reported that seed treatment with imidaclprid recorded the lowest incidence of the sucking pests in blackgram.

Whitefly,*Acaudaleyrodesrachipora*(Singh)

The data presented after the first spray of insecticide indicated in Table 1 revealed that the population of whitefly (*A. rachipora*) is decreased significantly at 3rd day and at 7th day of spray but started increasing at 15th day of spray. After first spray, treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (3.33 whitefly/plant) and at 7th day (2.12 whitefly/plant) at 15th day (1.97 whitefly/plant) in comparison to the un-treated population (5.12 and 4.68 thrips/plant at 3rd day and 7th day, respectively). The population to be found increasing at 15th day after first spray. After second spray, Treatment T_2(Imidachloprid 17.8 SL) was found significantly controlled population at 3rd day (1.10 whitefly/plant) and at 7th day (1.09 whitefly/plant) in comparison to the un-treated population (3.75 and 3.12 at 3rd and 7th day, respectively). The population of aphid at 15th day after second spray found stable. These similar results were earlier reported by Yadav *et al.* (2015), imidacloprid was found more effective (1.14 jassid/6 leaves) in control of whitefly by Singh *et al.* (2018) and Sharma *et al.* (2019).

CONCLUSION

From the results, it was concluded that treatment T_2 (Imidachloprid 17.8 SL) was found significantly more effective at 3rd, 7th and 15th day after two spray. It was concluded that Imidachloprid 17.8 SL @ 125ml was found to be better in controlling Aphid [*Aphis craccivora*(Koch)], thrips [*M.distalis*(Karny)],whitefly [*A. rachipora*(Singh)] and jassid [*E. kerri*(Pruthi)] incidence in cowpea.

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Table 1: Efficacy of various insecticides against aphid, *Aphis craccivora*(Koch) of cowpea in *Kharif* season.

T/t	Treatment	First Spray				Second Spray			
		Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray	Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray
T_1	Dimethoate 30 EC	20.67	13.00	6.11	10.42	19.51	6.43	2.11	2.16
T_2	Imidachloprid 17.8 SL	19.67	9.07	3.87	9.95	18.50	4.95	1.10	1.07
T_3	Acetamiprid 20 SP	20.67	14.09	6.75	11.45	21.85	8.34	3.30	3.38
T_4	Flubendiamide 480 SC	20.67	10.11	5.53	9.08	19.15	7.14	2.31	2.14
T_5	Emamectin benzoate 5	19.33	12.75	7.33	13.75	17.55	7.65	3.04	3.07
T_6	Fipronil 15% SC	22.00	11.19	5.97	9.86	18.15	7.23	2.50	2.55
T_7	Un-treated	21.00	23.42	23.19	29.00	30.42	26.34	26.26	26.84
S.Em. ±		**1.187**	**2.251**	**1.921**	**2.329**	**1.742**	**0.934**	**1.700**	**1.427**
CD %		**NS**	**6.937**	**5.919**	**7.175**	**5.366**	**2.880**	**5.239**	**4.398**

Table 2: Efficacy of various insecticides against thrips, *M. distalis* (Karny) of cowpea in *Kharif* season.

T/t	Treatment	First Spray				Second Spray			
		Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray	Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray
T_1	Dimethoate 30 EC	2.78	1.97	1.51	1.98	3.25	1.88	1.29	2.57
T_2	Imidachloprid 17.8 SL	2.76	1.58	0.92	1.19	2.87	1.35	0.9	1.88
T_3	Acetamiprid 20 SP	2.72	1.76	1.25	1.56	3.12	1.65	1.06	2.2
T_4	Flubendiamide 480 SC	2.73	2.12	1.77	2.21	3.38	2.63	2.22	3.56
T_5	Emamectin benzoate 5	2.74	1.89	1.37	1.81	3.15	1.77	1.21	2.45
T_6	Fipronil 15% SC	2.75	1.68	1.1	1.33	3.05	1.5	0.97	1.99
T_7	Un-treated	2.77	2.57	2.43	3.91	6.90	6.75	6.2	6.6
S.Em. ±		**0.03**	**0.04**	**0.04**	**0.06**	**0.10**	**0.07**	**0.07**	**0.13**
CD %		**NS**	**0.11**	**0.14**	**0.19**	**0.30**	**0.21**	**0.22**	**0.40**

Table 3: Efficacy of various insecticides against jassid, *E. kerri* (Pruthi) of cowpea in *Kharif* season.

T/t	Treatment	First Spray				Second Spray			
		Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray	Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray
T_1	Dimethoate 30 EC	5.25	3.90	2.68	3.96	4.90	1.77	1.38	1.59
T_2	Imidachloprid 17.8 SL	5.27	3.75	2.25	3.62	4.75	1.43	1.11	1.30
T_3	Acetamiprid 20 SP	5.22	4.12	3.10	4.11	4.92	1.94	1.51	1.72
T_4	Flubendiamide 480 SC	5.21	4.87	4.14	4.99	5.10	2.36	2.44	2.21
T_5	Emamectin benzoate 5	5.20	4.52	3.85	4.52	5.23	2.12	1.90	1.85
T_6	Fipronil 15% SC	5.24	3.88	2.56	3.85	4.80	1.55	1.22	1.40
T_7	Un-treated	5.26	6.70	10.12	7.68	6.65	8.20	9.60	7.40
S.Em. ±		**0.15**	**0.11**	**0.17**	**0.23**	**0.18**	**0.09**	**0.07**	**0.09**
CD %		**NS**	**0.35**	**0.53**	**0.70**	**0.54**	**0.29**	**0.21**	**0.26**

Table 4: Efficacy of various insecticides against whitefly, *A. rachipora*(Singh) of cowpea in *Kharif* season.

T/t	Treatment	First Spray				Second Spray			
		Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray	Pre spray (24 hours before)	3 Day after spray	7 Day after spray	15 Days after spray
T_1	Dimethoate 30 EC	5.80	3.66	2.66	2.48	3.71	1.47	1.51	2.05
T_2	Imidachloprid 17.8 SL	5.77	3.33	2.12	1.97	3.45	1.10	1.09	1.63
T_3	Acetamiprid 20 SP	5.78	3.52	2.49	2.30	3.56	1.30	1.38	1.92
T_4	Flubendiamide 480 SC	5.81	3.99	3.15	2.83	3.78	2.34	2.22	2.61
T_5	Emamectin benzoate 5	5.79	3.79	2.87	2.55	3.82	2.21	1.90	2.37
T_6	Fipronil 15% SC	5.75	3.47	2.35	2.11	3.50	1.27	1.22	1.78
T_7	Un-treated	5.78	5.12	4.68	5.40	5.12	3.75	3.12	3.60
S.Em. ±		**0.23**	**0.13**	**0.10**	**0.08**	**0.09**	**0.06**	**0.07**	**0.10**
CD %		**NS**	**0.39**	**0.31**	**0.25**	**0.29**	**0.20**	**0.21**	**0.32**