Indian Journal of Agriculture and Allied Sciences
A Refereed Research Journal

ISSN 2395-1109
Volume: 2, No.: 1, Year: 2016

Received: 09.03.2016, Accepted: 15.03.2016

EFFICACY OF DIFFERENT INSECTICIDES AGAINST LEAFHOPPER ON OKRA, *Abelmoschus esculentus*

R. S. Meena, M. A. Laichattiwar, M. Raghuraman and V. Sravan Kumar
Department of Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi-221 005, Uttar Pradesh, INDIA, E- mail: lmukesh932@gmail.com, Corresponding Author: M. A. Laichattiwar

Abstract: *The Field experiment was conducted at Vegetable Research Farm, Banaras Hindu University, Varanasi to evaluate the efficacy of different insecticides against Leafhoppers, Amrasca biguttula biguttula (Ishida)* in okra. *The overall mean efficacy of the four observations recorded at one, five, ten and fifteen days after two sprayings indicated that imidacloprid (71.47 %) recorded highest reduction of leafhopper population and remained significantly superior over all the other treatments and was followed by thiocloprid and acetamiprid which recorded, 60.55 and 59.66 per cent (respectively) reduction over control. They are at par with each other. These treatments were closely followed by thiamethoxam and cartap hydrochloride being at par and showed >50 per cent reduction over control by recording, 51.94 and 51.83 per cent reduction, respectively. The next best treatment in the decreasing order of their efficacy was spinosad with 10.56 per cent reduction of population. Novaluron was the least effective with only 9.30 per cent reduction over control. However, all treatments showed significant reduction in leafhopper population over control.*
Keywords: *Abelmoschus esculentus, Amrasca biguttula biguttula and Insecticides.*

Introduction: Among the constraints for low production in okra, the damage caused by pests is important one. Many of the pests occurring on cotton are found to ravage okra crop as it belongs to same family. As many as 72 species of insects have been recorded on okra [1], of which, the sucking pests comprising of aphids (*Aphis gossypii* Glover), leafhopper (*Amrasca biguttula biguttula* Ishida), whitefly (*Bemisia tabaci* Gennadius) and thrips (*Thrips Tabaci* Linderman) cause significant damage to the crop.

Leafhoppers are important pest in the early stage of the crop which suck the cell sap from plants, making them weak which results in reduced flowering and poor fruit set ultimately reduction in yield. The loss in marketable yield has been estimated at 50-94%, depending up on the stage of crop growth at which the infection occurs. Failure to control these pests in the initial stage causes a yield loss upto 54.04 per cent [2]. About 40-56 per cent losses in okra due to leafhopper [3]. In order to overcome these problems and keeping in view, the importance of okra crop, the present study were undertaken to test the efficacy of different insecticides against leafhopper in okra.

Materials and Methods

The field trial was conducted at Vegetable Research Farm, Banaras Hindu University, varanasi, during *kharif season*, 2011-12. The experiment was laid in a Randomized Block Design (RBD), replicated thrice. Variety Kashi Pragati (VRO-6) was chosen for the experiment Sowing was done in plots of 4m ×3m size with a spacing of 45cm between the rows and 30cm between the plants. Recommended agronomical practices except plant protection were followed for raising the crop. Two sprays were given at fortnightly interval. The first spray was given when the infestations of leafhoppers were noticed to cross ETL in experimental plots. And second spray was given after 15 days of the first spray. The treatment included T_1 Thiocloprid 10SC @ 0.3 ml/L, T_2 Acetamiprid 20SP @ 0.5 ml/L, T_3 Spinosad 45SC @ 0.2 ml/L T_4 Imidacloprid 17.8SL @ 0.3 ml/L, T_5 Thiamethoxam 25WG @ 0.1 g/L, T_6 Novaluron 10EC @ 1 ml/L, T_7

Cartap hydrachloride @ 1.2 g/L and T_8Untreated check. The population of nymphs and adults of leafhopper was recorded in early morning when insects were generally inactive. The population assessment was made in ten plants pre-tagged at random. In each plant, three leaves one each from top, middle and bottom region were selected. Thus, in all 30 leaves from 10 plants were observed every time per plot. The insect population is counted from three leaves of every randomly selected plant in every plot and population per 10 plants is noted. After that mean of three replications is calculated for each treatment. And the same is done with the untreated plot. Then percentage reduction is calculated by using the following formula

$$\text{Per cent reduction in population} = \frac{\text{Population in treatment} - \text{Population in control}}{\text{Population in control}} \times 100$$

Results and Discussion

The results represented in table 1 reveals that the leafhopper population in different treatments 1 day before spraying of insecticides did not differ significantly. Significant reduction in leafhopper population was noticed at 1, 5, 10 and 15 days after application of insecticides compared to untreated control at the time of both spray.

Table 1. Efficacy of different treatments against LEAFHOPPERS

Treatments	Dose ml/L	Pre spray population / 10 plants	Percentage reduction of population								
			First spraying				Second spraying				
			1 DAT	5 DAT	10 DAT	15 DAT	1 DAT	5 DAT	10 DAT	15 DAT	Mean Efficacy
T_1	0.3	76.67	45.81 (42.59)	88.76 (70.41)	81.56 (64.56)	35.24 (36.41)	41.23 (39.94)	81.54 (64.55)	77.21 (61.48)	33.12 (35.13)	60.55 (51.09)
T_2	0.5	73.33	41.80 (40.28)	92.53 (74.13)	80.60 (63.86)	32.01 (34.45)	38.75 (38.49)	85.29 (67.44)	77.27 (61.52)	28.19 (32.06)	59.60 (50.53)
T_3	0.2	75.67	16.83 (24.22)	13.71 (21.73)	9.83 (18.27)	3.87 (11.34)	13.28 (21.37)	15.29 (23.01)	7.42 (15.80)	4.32 (11.99)	10.56 (18.96)
T_4	0.3	74.00	68.52 (55.87)	85.20 (67.37)	88.15 (69.87)	52.37 (46.35)	62.12 (52.01)	81.84 (64.77)	80.12 (63.52)	53.45 (46.97)	71.47 (57.71)
T_5	0.1	79.67	32.95 (35.03)	80.47 (63.77)	70.27 (56.95)	30.33 (33.41)	28.72 (32.40)	75.30 (60.19)	65.13 (53.80)	32.42 (34.70)	51.94 (46.11)
T_6	1	78.33	11.02 (19.38)	14.00 (21.97)	9.29 (17.74)	5.47 (13.52)	8.29 (16.73)	11.35 (19.68)	8.12 (16.55)	6.91 (15.24)	9.30 (17.75)
T_7	1. 2	74.67	33.31 (35.25)	80.51 (63.80)	70.45 (57.07)	30.33 (33.41)	33.31 (35.25)	72.25 (58.21)	64.92 (53.68)	29.57 (32.94)	51.83 (46.04)
T_8		74.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F test		NS	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	
SEm±			1.31	0.43	0.53	2.00	0.57	0.52	0.22	0.32	
CD (P=0.05)			3.98	1.29	1.62	6.06	1.72	1.59	0.68	0.98	

Values in parentheses are transformed values; Sig.: Significant; NS: Non Significant; DAT: Days After Treatment

The overall mean efficacy of the insecticides in reducing leafhopper population recorded at 1, 5, 10 and 15 days after two sprayings clearly revealed the superiority of imidacloprid over rest of treatments which offered 71.47 per cent reduction. These results are in conformity with the findings [4] who reported that imidacloprid 70 WS @ 5 g/kg seed and imidacloprid 17.8 SL @ 125 ml/ha were statistically at par and recorded mean leafhopper population of 1.3 and 0.6 hoppers per leaf, respectively at 45 DAS on okra. Observed that imidacloprid @ 0.004 % was effective [5] and recorded an average population of 3.70 hoppers per leaf. Reported that stem application of imidacloprid (1:20) recorded [6], 84.33, 84.33 and 52.28 per cent reduction in population of *A. biguttula biguttula* over control at 5, 10 and 15 DAT, respectively on okra.

The next best treatments were thiacloprid and acetamiprid, being at par with 60.55 and 59.60 per cent reduction of leafhopper population over untreated control. The results obtained in present investigation was in accordance with the findings [7] who reported thiacloprid 10 SC @ 20 g/ha reduced the leafhopper, *A. biguttula biguttula* population to just 0.40 hoppers per leaf. Acetamiprid at all the tested dosages proved superior to the conventional insecticides in controlling the pests [8]. Two applications of acetamiprid 20 SP as foliar spray @ 15 g a.i/ha on ETL basis protected the crop upto 60 days effectively [9].

This is followed by thiamethoxam with 51.94 per cent and cartap hydrochloride with 51.83. And they were at par with each other. With more than 50 per cent reduction of population they were far superior to rest of the treatments. The effectiveness of thiamethoxam (Actra 25 WG) against leafhopper, *A. biguttula biguttula* [10]. The next best treatments in decreasing order of efficacy were spinosad (10.56%) and novaluron (9.30%) and they were least effective treatments. The poor efficacy of two treatments *viz.,* spinosad and novaluron was probably due to their limited systemic action.

References

1. Srinivasa Rao and Rajendran, R. (2003). Joint action potential of neem with other plant extracts against the leafhopper Amrasca devastans (Distant) on okra. *Pest Mangt. And Econ. Zool.*, 10:131-136.
2. Chaudhary, H. R. and Dadeech. (1989). Incidence of insect attacking okra and the available losses caused by them. *Ann. Arid Zone.* 28(3): 305-307.
3. Krishnaiah, K. (1980). Methodology for assessing crop losses due to pests of vegetable.
4. Day, P.K., Jana, S.K., Chakraborty, G. and Somuchoudhury, A.K. (2005). Evaluation of imidacloprid (70 WS and 20 SL) against sucking pest complex of okra. *J. Ent. Res.*, 29: 215-218.
5. Nemade, P. W., Wadnerkar, D. W., Shinde, B. D., Bansod, R. S. and Zanwar, P. R. (2007). Evaluation of seed treatment and foliar application effects of Imidacloprid against sucking pests of okra. *Pestology* 31(3): 23-28.
6. Michaelraj, S. (2001). Efficacy of some selected insecticides by stem application against the pests of okra (*Abelmoschus esculentus* (L.). M. Sc. (Ag) Thesis Acharya N G Ranga Agricultural University, Hyderabad.
7. Sinha, S.R. and Sharma, R. K. (2007). Efficacy of Neonicotinoids against okra insect pests. *Pesticides Research Journal* 19(1): 42-44.
8. Kumar, V.D.V.N.H., Ramanath Subramanian and Natarajan, P. (1999). Evaluation of acetamiprid–a new insecticidal compound against cotton aphids, *Aphis gossypii* and jassids *Amrasca biguttula biguttula*. *Pestology*, 23(3): 29-33.
9. Patil, I.V., Bheemanna, M., Badariprasad, P.R., Gowdar, S.B. and Kumar, V.D.V.N.H. (2001). Bioefficacy of acetamiprid 20 SP against early sucking pests in irrigated cotton. *Pestology*, 25(9): 29-33.
10. Misra, H. P. (2002). Field evaluation of some newer insecticides against aphids (*Aphid gossypii*) and jassids (*Amrasca biguttula biguttula*) on okra. *Indian Journal of Entomology*, 64(1): 80-84.