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Original Research Article

Assessment of Efficacy of Broadspectrum Insectcide (Propargit 50%+Bifenthrin 5 %SE) on the Management of Sucking Pests in Okra

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A B S T R A C T

The present experiment was conducted at Farmers field Condition during *kharif* season of 2019, to evaluate the efficacy of broad-spectrum insecticide Propargit 50%+Bifenthrin 5 % SE against sucking pests i.e. Mite, White fly and Jassid population in okra crop. In order to prevent the losses due to these insects, on farm testing at farmers field was conducted by assessing the technology in application of Propargite 50% + Bifenthrin 5% SE (621+ 62.1 g. a.i. /ha) 1250 ml/ha. in two spray first in 35 days and second spray at 50 days after sowing at vegetative and flowering stage of okra crop in effectively control of sucking Pest (Mites, Whitefly and Jassids) as against the farmers practice of farmers practices (Use in foliar application of Lamdacyhalothrin 4.9CS @ 250 ml/ha.).The assessed technology (T-3) reduced the incidence of average sucking pests population (Number) /three terminal leaves in okra crop Mites (27.2),White fly (19.8) and Jassid (17.6) and gave an yield of 112.11 q/ha with net returns of Rs 83784 per ha as compared to Farmers Practice (T-2) which recorded the average mean of sucking pest population (Number) of Mites (47), White fly (34.4) and Jassids (32.7) per three terminal leaves and thus reduction in yield by 90.44 q per ha. with net returns of Rs. 66352 per ha.

Keywords

Okra, sucking pests, broad-spectrum insecticide

Introduction

Okra (*Abelmoschus esculentum* (L.) Moench) plant belongs to the family Malvaceae. Okra or Ladies finger, which is locally known as 'Bhendi', is one of the important vegetables of India. It is a native crop of Africa, South East Asia and North Australia to the pacific (Boswell and Reed, 1962). It is grown throughout the tropical and sub-tropical regions and also in the warmer parts of the temperate regions. The nutritional value of 100 g of edible okra is characterized 1.9 g protein, 0.2 g fat, 6.4 g carbohydrate, 0.7 g minerals and 1.2 g fibers. Okra has a good potential as a foreign exchanger crop and accounts for 60% of the export of fresh vegetables (Sharman and Arora, 1993).

India ranks first in okra production and area in the world and occupies prime position among the vegetable excluding potato and tomato. In India the production was about 5708.710 thousand metric tons from 503.712 thousand hectares of area during 2015(71.3 % of total world production) of lady finger okra(NHB 2015).In India major leading state in okra producing is West Bengal, Gujrat, Bihar, Odisha, and Jharkhand with a production of 882.390,857.490, 762.900, 571.730 and 452.120 thousand metric tons, respectively (NHB, 2015).

Whitefly (*Bemisia tabaci* Green) are major pest and cause 17.46 per cent yield loss in okra (Sarkar *et al.,* 1996). Aphid, leafhopper and whitefly are important pests in the early stage of the crop which desap the plants, make them weak and reduce the yield (Krishnaiah, 1980). The whitefly is most notorious among top hundred insect pests having a pandemic distribution and damaging many important crops including vegetables, tubers, fiber crops and ornamentals (Touhidul and Shunxiang, 2007 and Abdel- Baky and Al-Deghairi, 2008). The white fly Bemisia tabaci Gen. is of considerable importance because not any does it cause damage by direct feeding also transmits yellow mosaic virus Shastri and Singh 1974. Reported 93.80 percent yield loss in okra where as in general the overall damage due to insect pests are 48.97 percents loss in fruit yield (Kanwar and Ameta 2007).

Jassids (*A.biguttula biguttula*) both nymphs and adults suck the cell sap usually from the ventral surface of the leaves and while feeding inject toxic saliva into plant tissues, affected leaves turn yellowish and curl (Singh *et al.*,2008).The sucking pest complex of okra consisting of aphids, leaf hopper, white flies, thrips and mites causes 17.46 %yield loss and if failure to control them in initial stages, damage was reported to caused 54.04 % yield loss (Chaudhary and daderch 1989 and Anithaand Nandihalli 2008). Jassid and mites are consider major threat to okra cultivation and application of pesticides have shown effective control toward these threat Adalbart *et al.,* (2013). Bishnoi *et al.,* (1996) reported that Jassid incidence was observed at vegetative stage and population increase with the advancement of the season attack in peak at maximum leaf area stage. population buildup of Jassid were maximum at 27 to 34^{o} Cand 55 to 82 per cent relative humidity. Spider mites (*Order Acarina*) are the meager problem is most Indian okra production areas. Mites infestation which develop quickly can cause substantial reduction in yield, if not controlled. Krishnaiah 1980 Reported about 40 to 60 per cent yield loss in okra due to sucking pest. Their reduction of 49.8 and 45.1 per cent in height and number of leaves respectively due to attack of leaf hopper (Rawat and Sadu 1973). Apart from their direct damage by sucking plant sap, it is also known as the vector for deadly 'yellow vein mosaic virus'. Due to its rapid movement from one plant to another, high reproductive potential and its living habitat, management of the pest is very difficult (Fouly *et al.,* 2011).

Materials and Methods

The experiment was conducted to evaluate the efficacy of broad-spectrum insecticide Propargit 50%+Bifenthrin 5 % SE against of sucking pests i.e. White fly, Mite and Jassid population in okra crop during kharif season of 2019 at Farmers field, condition in district in Satna MP. The experiment was laid out in randomized block design with 3 treatments and 10 replications in 5m x 6m plot with a spacing of 45cm x 45cm. The okra variety Kashi pragati was sowing 30 June (hybrid variety) was taken for the experiment. The crop was raised under standard agricultural practices with a fertilizer dose of 120:60:60 kg NPK/ha.

Two different insecticide (Propargite 50% + Bifenthrin 5% SE @1250 ml/ha. and Lamdacyhalothrin 4.9 CS @ 250 ml / ha.) were sprayed two times at 35 days and 50 days after sowing an interval of 15 days. Observations on the target pests population (whitefly, Mite, Jassid) were made one day before spraying and after three, seven and fourteen days of spray. During observation five plants were selected randomly from each plot and three terminal leaves from each plant were selected. Finally, mean population of

Whitefly, Mite, Jassid/three terminal leaf was worked out at three, seven and fourteen days after spray. Observations on Whitefly, Mite, Jassid adults were recorded without disturbing the plants in early morning to minimize the observational errors.

Okra green fruits were collected at each picking and weight (kg) separately from each net plot area. At the end of last picking, total yield from each net plot was calculated and computed on hectare basis (t/ha).

Results and Discussion

To evaluate the efficacy of broad-spectrum insecticide Propargit 50%+Bifenthrin 5 % SE against of sucking pests i.e. White fly, Mite and Jassid population in okra crop during kharif season of 2019 at Farmers field, condition in district in Satna MP.

Observed Treatment -3 Whitefly insect population (Number) in 72.7 Mean of 10 replications as per three terminal leaves without application of insecticide. Treatment-2 use in farmers practice of foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml / ha. than after observed Whiteflies population (Number) in 34.4 /three terminal leaves (Mean of 10 replication).Treatment-3use in foliar application of broad-spectrum insecticide in Propargite 50% + Bifenthrin 5% SE (621+ 62.1 g. a.i. /ha) 1250 ml/ha. Observation at three, seven and fourteen days after spray after result in insect population(Number) 19.8 /three terminal leaves(Mean of 10 replication).Observations on Whitefly adults were recorded without disturbing the plants in early morning to minimize the observational errors. Ameta *et al.,* (2008) also reported the effectiveness of Bifenthrin 5% SE in controlling the Whitefly population. ObservedTreatment-3Mite pest population (Number) in 78.00 Mean of 10 replication as per three terminal leaves without application of insecticide. Treatment-2use in farmers practice of foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml /ha.than after Observed Mite pest population (Number) in 47.00/three terminal leaves (Mean of 10 replication). Treatment-3use in foliar Application of broad spectrum insecticide Propargite 50% + Bifenthrin 5% SE (621+ 62.1 g. a.i. /ha) 1250 ml/ha. Observation at three, seven and fourteen days after spray pest population(Number)27.20 /three terminal leaves (Mean of 10 replication).The Observations on Mite adults were recorded without disturbing the plants in early morning to minimize the observational errors. Similar results were observed by Chinnaiah and Ali (2000) have showed the efficacy of Bifenthrin 5 % on the mite pests of okra. Also reported the efficiency of Propargite 50% in management of spider mites have been well documented by Singh and Singh (2014). Hence it is obvious that the mixture of Propargit 50 % and Bifenthrin 5 % showed efficacy in suppressing the mite population and conversely increased the yield of okra fruits.

Observed Treatment – 3Jassid population (Number) in 70.8 Mean of 10 replication as per three terminal leaves without application of insecticide. Treatment -2 use in farmers practice of foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml/ha. than after observed Jassid population (Number)in 32.7 00/three terminal leaves (Mean of 10 replication).Treatment- 3 use in foliar application of broad spectrum insecticide Propargite 50% + Bifenthrin 5% SE (621+ 62.1 g. a.i. /ha) 1250 ml/ha. Observation at three, seven and fourteen days after spray mean of Jassid population17.6 /three terminal leaves (Mean of 10 replication).

Table.1 Observation of sucking pest (Whiteflies,Mites and Jassid) population after foliar application of Propargite 50% + Bifenthrin 5% SE (621+ 62.1 g. a.i. /ha) @ 500 ml/acre and farmer practice use in foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml / ha.

		Treatment -1 (Control)			Treatment-2			Treatment-3		
S.No.	Replication	Observation of Insect population without spray /three terminal leaves			Observation of insect population/three terminal leaves use in foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml / ha.			Observation of insect population/three terminal leaves use in foliar application of Propargite 50% + Bifenthrin 5% SE @ 1250 ml/acre		
		White fly	Mite	Jaissid	White fly	Mite	Jaissid	White fly	Mite	Jaissid
1	F-1	70	75	68	33	40	29	20	25	15
2	F-2	68	78	71	35	31	33	17	27	19
3	F-3	74	80	73	36	48	30	24	30	17
4	F-4	75	77	74	42	45	34	25	25	20
5	F-5	78	82	70	35	51	35	20	26	19
6	F-6	71	75	71	36	47	38	22	30	20
7	F-7	72	79	70	30	52	33	16	28	17
8	F-8	70	76	68	32	49	30	15	31	16
9	F-9	74	80	73	28	54	35	19	25	15
10	F-10	75	78	70	37	53	30	20	25	18
	Average	**72.7**	**78**	**70.8**	**34.4**	**47**	**32.7**	**19.8**	**27.2**	**17.6**

T-1, (Control) Not use in any broad spectrum insecticide against sucking pest.
T-2, Use in foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml /ha. against sucking pest
T-3, Use in foliar application of Propargite 50% + Bifenthrin 5% SE @ 1250 ml/ha. against sucking pest

Table.2

Detail of economic evaluation in okra crop														
Yield(q/ha)			Cost of cultivation			Gross returns(Rs/ha)			Net returns(Rs/ha)			B:C ratio		
T-1	T-2	T-3	T-1	T2	T3	T-1	T-2	T3	T-1	T-2	T-3	T-1	T-2	T-3
48.5	93.6	110.5	13400	23200	26250	48500	93600	110500	35100	70400	84250	3.5	4	4.2
40.3	90.3	114.3	12430	22850	28580	40300	90300	114300	27870	67450	85720	3.2	3.9	4
45.1	92.4	112.3	14550	24500	28430	45100	92400	112300	30550	67900	83870	3	3.7	3.9
43.2	86.3	110.6	13650	23640	29200	43200	86300	110600	29550	62660	81400	3.1	3.6	3.7
41.4	86.8	115.3	12650	24540	30210	41400	86800	115300	28750	62260	85090	3.2	3.5	3.8
46.5	88.2	112.4	14750	24360	28420	46500	88200	112400	31750	63840	83980	3.1	3.6	3.9
42.5	90.4	114.1	12850	24940	28840	42500	90400	114100	29650	65460	85260	3.3	3.6	3.9
45.2	90.6	108.6	14340	24450	28200	45200	90600	108600	30860	66150	80400	3.1	3.7	3.8
40.4	91.3	110.6	13150	23840	27530	47400	91300	110600	27250	67460	83070	3	3.8	4
41.2	94.5	112.4	12950	24560	27600	60200	94500	112400	28250	69940	84800	3.1	3.8	4
43.43	**90.44**	**112.11**	**13472**	**24088**	**28326**	**46030**	**90440**	**112110**	**29958**	**66352**	**83784**	**3.1**	**3.7**	**3.92**

T-1, (Control), Notuse in any broad spectrum insecticide against sucking pest in okra crop
T-2, Use in two foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml /ha. against sucking pest in okra crop
T-3, Use in foliar application of Propargite 50% + Bifenthrin 5% SE @ 1250 ml/ha. against sucking pest in okra crop

Fig.1

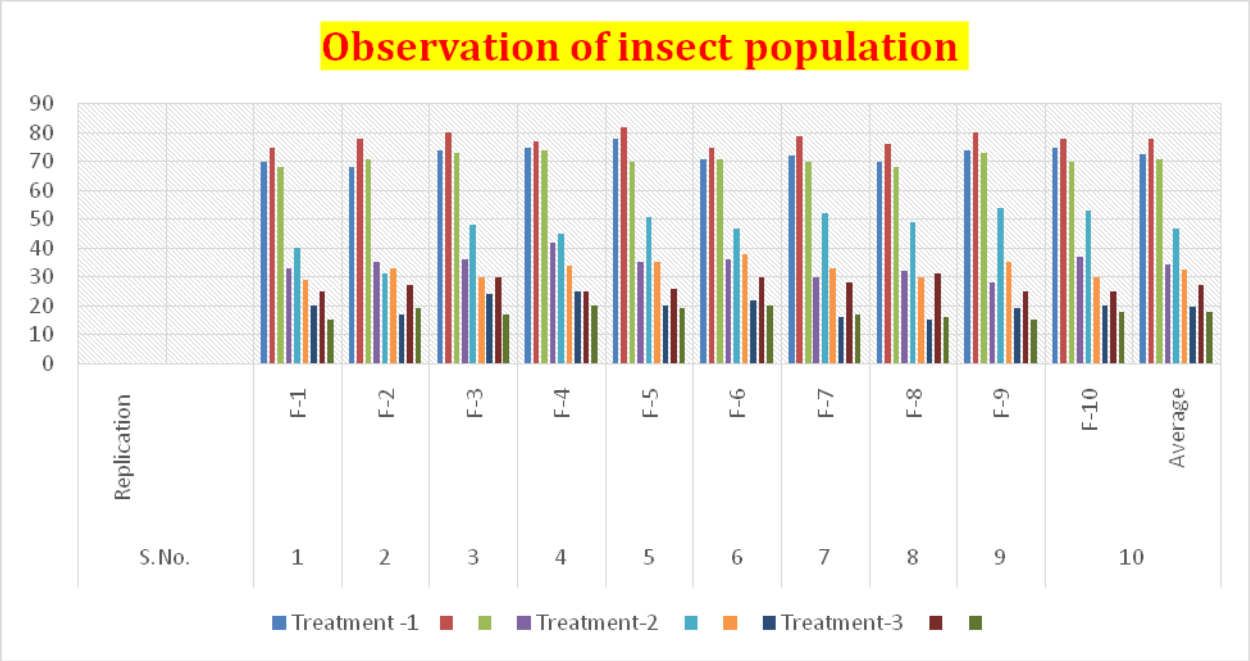

Fig.2 Use in foliar application of broad spectrum insecticide

Observations on Jassid adults were recorded without disturbing the plants in early morning to minimize the observational errors. Similar results were observed by Rawat, RK *et al.*,(2016). The overall efficacy of the insecticides revealed that Propargite 50% + Bifenthrin 5% SE (621+62.l g a.i/ha) was the most effective newer insecticide mixture in providing protection to okra crop against sucking pest (jassid, whitefly and mite). Lambdacyhalothrin 4.9 CS recorded the lowest reduction in jassid, whitefly and mite

population over control. On fruit yield represented in table 2 shows that all treatments gave significantly higher green fruits yield of okra over untreated control (43.4 q/ha).

However, highest yield of okra fruits (112.11q /ha) was obtained from plots foliar application of Propargite 50% + Bifenthrin 5% SE (621+ 62.1 g. a.i. /ha) 1250 ml/ha. and green fruits yield of okra use in foliar application of Lamdacyhalothrin 4.9 CS @ 250 ml /ha.90.44 q/ha.

It is evident from the experiment that the plots foliar spray with showed excellent control of Whiteflies, Mites and Jassids, of okra along with significant increase in yield. However, considering the cost of inputs, it would be better to suggest 50% + Bifenthrin 5% SE (621+ 62.1 g. a.i. /ha) 1250 ml/ha.for the better management of the three pests of okra.

References

Abdel-Baky N F and Al-Deghairi M A 2008. Role of host plantson the biological aspects and parasitism levels of Ertemocerusmundus Mercet (Hymenoptera: aphelinidae), a parasitoid of Bemisia tabaci (Gennadius) (Hemiptera: Aleyrodidae). Journal of Entomology 5 : 356-368.

Adalbert, B., L. A. Szla, C. Z. Feren and J. A. Gupta, (2013). Managing Thrips on Roses with Combinations of Neonicotinoide and Biological Insecticides. Journal of Agricultural and Urban Emology 29, 16-24

Adalbert, B., L. A. Szla, C. Z. Feren and J. A. Gupta, (2013). Managing Thrips on Roses with Combinations of Neonicotinoide and Biological Insecticides. Journal of Agricultural and Urban Entomology 29, 16-24

Adalbert, B., L. A. Szia. C. Z. Feren and J. A. Gupta(2013). Managing Thrips on Roses with combination of Neonicotinoide and Bilogical Insecticide. Journal of Agricultural and Urban Entomology 29,16-24.

Adalbert, B., L. A. Szla, C. Z. Feren and J. A. Gupta, (2013). Managing Thrips on Roses with Combinations of Neonicotinoide and Biological Insecticides. Journal of Agricultural and Urban Entomology 29, 16-24

Adalbert, B., L. A. Szla, C. Z. Feren and J. A. Gupta, (2013). Managing Thrips on Roses with Combinations of Neonicotinoide and Biological Insecticides. Journal of Agricultural and Urban Entomology 29, 16-24

Adalbert, B., L. A. Szla, C. Z. Feren and J. A. Gupta, (2013). Managing Thrips on Roses with Combinations of Neonicotinoide and Biological Insecticides. Journal of Agricultural and Urban Entomology 29, 16-24

Adalbert, B., L. A. Szla, C. Z. Feren and J. A. Gupta, (2013). Managing Thrips on Roses with Combinations of Neonicotinoide and Biological Insecticides. Journal of Agricultural and Urban Entomology 29, 16-24

Anitha, K. R and Nandihalli, B. S. 2008. Seasonal incidence of sucking pests in okra ecosystem. Karnataka Journal of Agricultural Sciences, 21(1): 137-138.

Bishnoi,O P., Singh, Mohan, Rao,V. U. M., Ni was, Ram and Sharma. P. D.,1996 Population Dynamics of cotton pest of cotton pest in relation to weather parameter Indian J.Ent.58(2); 103-107.

Boswell, V. R and Reed, L. B. 1962. Production Technology of Vegetable Crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, pp: 661-663

Chaudhury, H. R. and Daderch, L. N. 1989.

Incidence of insects attacking Okra and the avoidable losses caused by them. *Ann. Arid zone*, 28: 305-307.

Chinnaiah.C and K. A. Ali 2000, Relative efficacy of insecticides / acaricides against sucking pest of okra. Pest Managt. And Econ Zool.Vol.2:111-116.

Fouly A H, Al-Deghairi M A and Abdel-Baky N F 2011.Biological aspects and life tables of Typhlodromips swirskii (Acari: Phytoseiidae) fed Bemisia tabaci (Hemiptera:Aleyrodidae). Journal of Entomology 8 : 52-62.

Krishnaiah, K. (1980). Methodology for assessing crop losses due to pests of vegetables "Assessment of crop losses due to pest and diseases". USA Tech. Series no. 33: 259-262.

Kanwar N, and Ameta O P(2007). Assessment of loss caused by insect pests of okra, *Abelmoschus esculentus* (L.) Moench. Pestology,; 31 (5): 45-47.

Nzanza, B., (2012). Control of whiteflies and aphids in tomato (*Solanum lycopersicum* L.) by fermented plant extracts of neem leaf and wild garlic. African Journal of Biotechnology 3, 45-53.

Nayer, K. K.; Ananthakrishnan, T. N. and David, B. V. (1976). General and appled entomology. Tata McGraw Hill publishing company limited. New Delhi.268-269.

NHB,2015.www.hortibiziidia.org.

Rawat, R. K. (2016). Management of major sucking pests of okra with insecticide mixtures. M. Sc. (Ag.) Thesis, Entomology and Agricultural Zoology publisher Institute of Agricultural Sciences, Banaras Hindu University.

Rawat, R. R. and Saha, H. R. 1973. Estimation of losses in growth and yield of okra due to Empoasca devantans Dis. And Earias sp. Indian Journal of Entomology, 35(3): 252-254.

Sastry, K. S. M. and Singh, S. J.1974. Effect of yellow vein mosaic virus infection on growth and yield of okra crop. *Indian phytopathology*. 27:294-297.

Sharma, B. R.; Arora, S. K.; Dhanju, K. C. and Ghai, R. R.1993. Performance of okra cultivar in relation to yellow vein mosaic virus and yield. Indian J.Virol.;9(2);139-142.

Swaroop Singh, Choudhary, D. P, Sharma, H. C, Mahla, R. S, Mathur, Y. S. and Ahuja, D. B. 2008. Effect of Insecticidal modules against jassid and shoot and fruit borer in okra. Indian Journal of Entomology. 70(3): 197-199.

Touhidul M and Shunxiang R 2007. Development and reproduction of Bemisia tabaci on three tomato varieties. Journal of Entomology 4 : 231-236