

Original Research Article

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## Integrated Pest Management of Okra (*Abelmoschus esculentus* L.)

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### ABSTRACT

A field experiment was conducted as a part of on farm trial in farmer's field of Tinsukia district under Krishi Vigyan Kendra during 2015-2016 to manage major insect pests of okra through Integrated Pest Management (IPM). Ten different IPM treatments (including control) were followed against the target pests. The experiment was conducted under randomized block design with three replications. Results showed that amongst the treatments, application of malathion 50 EC @ 0.05%+ YST was found to be the best in reduction of both white fly and jassids population to 2.08 and 3.98 per cent after three weeks of appearance of the initial pest population as compared to the control. The treatment also recorded the highest yield of okra (92 q/ha).

#### Keywords

On farm trial, IPM, Okra jassids, White fly, YST

#### Article Info

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### Introduction

Among various vegetables, Okra (*Abelmoschus esculentus* L.) belongs to family Malvaceae, commonly known as Lady's finger, is the most common and extensively grown all over the country and occupies an important place in the food basket of Indian consumers. Okra is an excellent resource for overcoming global malnutrition and rural poverty. Pests and diseases are major constraints to the quality and quantity

of okra produced with total losses of about 35–40 %. Mostly farmers rely on the use of synthetic pesticides for the control of pests thereby endangering environmental and public health (Gandhi *et al*, 2016).

Like other crops, Okra is also suffering from number of biotic and abiotic factors, including insect pests and diseases (Jiskani, 2006). The crop is attacked by a number of phytophagous insects, diseases and mites during different growth stages (Gulati, 2004). Aphid, Jassids,

Whitefly, Thrip, Spotted bollworms, Mites, Whitefly are the most important insect pest of okra crop from sowing to harvesting. These pests are damaging crop by sucking the sap directly and by transmitting a large number of viral diseases indirectly (Basu, 1995). Jassids was found a very damaging sucking insect pest of many crops in the majority areas of the growing countries of the world and has been found damaging many crops in the world. It has been observed that both adults and nymphs cause damage while sucking sap of plants. Due to sucking, the color becomes grayish or by injecting toxic saliva into the plant tissues of okra crops and fall down (Crinkling) which is the characteristic feature of jassids attack (Lohar, 2001).

In order to overcome this problem of pest and disease infestation, it is necessary to adopt IPM strategies for the management of insect. Several IPM trials have been conducted all over the World and found that integration of all these control measures along with the application of pesticides reduces the pest problem to a great extent (Islam *et al*, 1999; Patnaik and Singh, 1997). The incorporation of biopesticides and IPM technology is also gaining importance in recent years (Kumar and Steffen, 2000; Bajpai *et al*, 2005).

Farmers are producing a huge quantity of vegetables like okra, brinjal, tomato, cabbage, cauliflower, knoll khol etc in different pockets of Tinsukia district. During the visit of farmer's field, KVK scientist observed the problem of sucking pests like jassids and white flies in okra which reduced their yield considerably. Hence, farmers are tended to discontinue the cultivation of okra in the area. Thus an attempt has been made to evaluate various components of Integrated Pest Management (IPM) for the control of soft bodied insects of okra.

## Materials and Methods

The present study on IPM of okra was conducted in farmer's field of Dholla area of Tinsukia district of Assam during 2015- 2016 as part of on farm trial. There were 10 treatments. The details of the treatments were as follows-

Target pests: white fly, okra jassids

## Treatments

- T<sub>1</sub>: Yellow Sticky trap (YST) @ 10/ha
- T<sub>2</sub>: Soil treatment with carbofuran 3G @ 10 kg/ha
- T<sub>3</sub>: Soil treatment with carbofuran 3G @ 10 kg/ha +YST
- T<sub>4</sub>: Endosulfan 35EC @ 0.07%
- T<sub>5</sub>: Endosulfan 35EC @ 0.07%+YST
- T<sub>6</sub>: Paddy straw mulching
- T<sub>7</sub>: Neem Gold @ 2.5 ml/ha +YST
- T<sub>8</sub>: Malathion 50 EC @ 1%
- T<sub>9</sub>: Malathion 50 EC @ 1%+ YST
- T<sub>10</sub>: Control (farmers practice)

Crop	: Okra
Variety	: Prabhani Kranti
Sowing time:	: Sept-Oct.
Seed rate:	: 700-800 g/ha
Plot size	: 4 m x 3 m
Design	: RBD

The variety was grown in the villages following all the recommended package of practices. Spray was initiated at the time of appearance of the pest at 30-35 days after sowing and subsequently at 15 days interval. Maximum 2 sprays were given before fruiting of the crop.

## Results and Discussion

From the experiment, it was observed that integration of different control measures proved to be the best in reducing the pest attack. The results revealed that among the insecticides, malathion 50 EC 0.05% + YST was found to be the most effective treatment in reduction of both jassids and white fly population (2.08 and 3.98) followed by endosulfan 35 EC @ 0.035% + YST (2.23 and 3.70) (Table 1 & 2). The highest yield (92 q/ha) of okra was recorded in malathion 50 EC 0.07% +YST treated plot and lowest (75 q/ha) in control plots. Similarly, paddy straw mulching was found to be the least effective treatment compared to other treatments in reducing the population of both jassids and white fly.

In conclusion, a farmer’s choice of which crops to plant and thus the ability to select

disease and pest resistance ones has always been a cornerstone of IPM. The adoption of IPM application is still low owing to a number of socio-economic, institutional and policy constraints. IPM strategy comes as a direct tool that includes several old and new techniques with alternatives like botanicals, parasitoids and resistant cultivars to cut down on pest infestation. Crop varieties with disease and pest resistant characteristics which include GM crops have gained quite a controversy. At the same time there is an emerging consensus that modern petrochemical- based farming is unsustainable and there is a need to develop and promote ecological approaches to food production. The current scenario of IPM in okra can have a great scope for getting higher yield of the crop with low pest infestation. There is a need for massive extension training and demonstration trial for motivating the farmers of the district to adopt IPM strategies.

**Table.1** Reduction of Jassids population in weekly interval (year 2015-16)

Treatment	Pre treatment count	Mean jassids population in weekly interval			Yield (q/ha)
		I	II	III	
T <sub>1</sub>	5.58	5.6	5.34	3.88	80.00
T <sub>2</sub>	5.97	5.04	4.75	3.20	82.00
T <sub>3</sub>	5.56	5.60	4.79	3.14	84.00
T <sub>4</sub>	5.93	4.70	4.75	3.09	86.00
T <sub>5</sub>	6.03	4.77	3.29	2.23	89.00
T <sub>6</sub>	6.02	5.91	5.48	3.30	78.00
T <sub>7</sub>	6.43	4.69	3.98	2.75	88.50
T <sub>8</sub>	5.43	5.05	4.20	3.03	87.25
T <sub>9</sub>	5.02	3.44	3.07	2.08	92.00
T <sub>10</sub>	6.24	5.98	5.52	4.20	75.00
CD at 5%	NS	0.424	0.751	0.849	0.87
CD at 1%		0.581	1.029	1.163	1.19

T<sub>1</sub>: Yellow Sticky trap (YST) @10/ha; T<sub>2</sub>: Soil treatment with carbofuran 3G @ 10 kg/ha; T<sub>3</sub>: Soil treatment with carbofuran 3G @ 10 kg/ha +YST; T<sub>4</sub>: Endosulfan 35EC @ 0.07%; T<sub>5</sub>: Endosulfan 35EC @ 0.07%+YST; T<sub>6</sub>: Paddy straw mulching; T<sub>7</sub>: Neem Gold @ 2.5 ml/ha +YST; T<sub>8</sub>: Malathion 50 EC @ 1%; T<sub>9</sub>: Malathion 50 EC @ 1%+ YST and T<sub>10</sub>: Control (farmers practice)

**Table.2** Reduction of white fly population in weekly interval (year 2015-16)

Treatment	Pre treatment count	Mean white fly population in weekly interval		
		I	II	III
T <sub>1</sub>	8.52	7.86	7.27	6.01
T <sub>2</sub>	10.82	7.80	7.79	5.42
T <sub>3</sub>	9.95	6.95	6.86	4.90
T <sub>4</sub>	13.54	7.55	6.29	5.10
T <sub>5</sub>	12.94	6.03	5.76	3.70
T <sub>6</sub>	12.63	8.0	8.00	6.00
T <sub>7</sub>	12.04	6.1	5.92	4.98
T <sub>8</sub>	10.13	6.86	6.03	5.09
T <sub>9</sub>	8.42	4.56	4.06	3.98
T <sub>10</sub>	13.94	9.19	10.28	6.92
CD at 5%	NS	1.33	1.06	1.01
CD at 1%		1.82	1.45	1.38

T<sub>1</sub>: Yellow Sticky trap (YST) @10/ha; T<sub>2</sub>: Soil treatment with carbofuran 3G @ 10 kg/ha; T<sub>3</sub>: Soil treatment with carbofuran 3G @ 10 kg/ha +YST; T<sub>4</sub>: Endosulfan 35EC @ 0.07%; T<sub>5</sub>: Endosulfan 35EC @ 0.07%+YST; T<sub>6</sub>: Paddy straw mulching; T<sub>7</sub>: Neem Gold @ 2.5 ml/ha +YST; T<sub>8</sub>: Malathion 50 EC @ 1%; T<sub>9</sub>: Malathion 50 EC @ 1%+ YST and T<sub>10</sub>: Control (farmers practice)

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