J. Farm Sci., 36(3):(321-323) 2023

RESEARCH NOTE

Studies on population dynamics of major pests of okra

LAKSHMIKANTHA D H[1], VEERANNA R[1], GURUPRASAD G S[1] AND BABU P[1]

[1]Department of Agricultural Entomology, College of Agriculture, Dharwad, University of Agricultural Sciences, Dharwad - 580 005, Karnataka, India
E-mail:lakshmikantha.gowda97@gmail.com

(Received: January, 2023; Accepted: September, 2023)

DOI: 10.61475/JFS.2023.v36i3.18

Abstract: Okra [*Abelmoschus esculentus* (L.) Moench] is known to be infested by many insect pest among them the most important ones are sucking pests like aphids, leafhopper, whitefly and fruit borers like *Earias vitella* and *Helicoverpa armigera.* Controlling these pests is very much important to obtain good yield, hence knowledge about these pest incidence needed for taking up management practices. In this context, okra was sown during last week of November (*rabi* 2020-21) and observations were recorded at weekly interval. Peak incidence of aphid (23.44 aphids/3 leaves) and leafhopper (16.97 leafhopper/3 leaves) noticed during last week of December, whitefly (12.70 whiteflies/3 leaves) during second week of March. Fruit borers during third week of February and second week of March with per cent fruit damage of 44.9 (*Earias vitella*) and 13.59 (*Helicoverpa armigera*).Sucking pests incidence more up to 10th week old crop, there after the population declined. In case of fruit borers, they persisted upto end of the season.

Key words: Fruit borers, Okra, Sucking pests

Introduction

In the recent decade, vegetable cultivation has become more important in our country. Among them, Okra [*Abelmoschus esculentus* (L.) Moench] is an important crop belonging to the family Malavaceae. It is an annual vegetable, commonly known as Bhendi, Lady's finger, Bamia, Okro or Gumbo at different places in the world. It is believed to be originated in Ethiopia (Vavilov, 1951) and mainly grown in tropical and subtropical belt of the world. In india it is cultivated in an area of 0.51 m hectares with annual production of 6.21 m MT. In Karnataka okra is grown in an area of 11.14 thousand hectares with the production of 96.27 thousand MT (Anon, 2019). Bhendi is known for its medicinal and nutritional values as it is a good source of carbohydrate (6.4%), minerals (0.7%), fibre (1.2%), protein (1.9%), fat (0.2%) and moisture (89.6%). Its tender pods are used as vegetable and its muscilage for thickening gravies and soups, the roots and stem are very useful in cleaning the cane juice (Chauhan, 1972). It contains high content of ascorbic acid (30 mg/100g), iron (1.5 mg/100 g), calcium (90 mg/100 g) and also minerals like potassium, magnesium, vitamin A and B. it also found to be used in paper industry because of its stem and fully ripened fruits contains high fibre. It was reported that yield loss of about 50 per cent due to jassid in okra (Krishnaiah, 1980). Jassid and aphid are known to infest during early stage of the crop growth which may cause yield loss about 54.04 per cent (Chaudhary and Dadeech, 1989). YMV (yellow vien mosaic virus) one of the important viral disease known to spread by a vector whitefly, *Bemisia tabaci* (Genn.) is responsible for the yield loss of about 80 to 90 per cent. During recent past no work has been done on this in Dharwad area hence in this context, an attempt was made to document the population dynamics of major insect pests of okra.

Material and methods

The investigation was carried out during *rabi* 2020-21 at Main Agricultural Research Station, Dharwad. Observations were recorded at weekly interval to document the pest incidence. For sucking pests five plants were randomly observed for infestation of leafhopper, aphids and whitefly by counting total number of insects in top, middle and bottom three leaves, then expressed in number of insects per three leaves. Data on fruit infestation was calculated by counting damaged and undamaged fruits from randomly selected five plants, percentage fruit infestation was calculated by dividing the damaged fruits by total number of fruits and multiplying it with hundred. The species of pest attacking the fruit was recorded by destructive sampling.

$$\text{Per cent fruit infestation} = \frac{\text{Number of infested fruits}}{\text{Total number of fruits}} \times 100$$

Results and discussion

Population dynamics of above mentioned pests is depicted in Table1.

Incidence of aphids on okra which was sown during last week of November, 2020 started from second week of December with population of 9.85 aphids per three leaves and peak population of 23.44 aphids per three leaves was attained during last week of December. From second week of December to secondweek of January there was gradually increase in population but after January second week population showed decreasing trend upto last week of March 2021 (1.23 aphids/3 leaves).These finding are inline with the findings of Jayaswal and Sundaramurthy (1992) in south zone reported that more aphid population during November to January in cotton crop and similar observation made by Patel and Rote (1995) in cotton crop reported that in January there was increase in aphid population and later decreased.

Leafhopper appeared during second week of December then gradually increased until last week of December where, it reached the peak population of 16.97 leafhopper per three leaves from there after the population shown a decreasing trend upto last week of March with population of 1.19 leafhopper three leaves. Second highest population was found during third week of December (16.70 leafhopper/3 leaves). These results shows that the relative preference of leafhopper changes with the stages of the crop. These findings are in line with Senapati and Khan (1978) who reported that okra at 7-14 weeks was most suitable for leafhopper and plant around maturity stage appears to be more susceptile than other stages and also present findings are conformity with the Senapati and Mohanty (1980) increase in the population of leafhopper from second week of December reaching a peak during first week of January, there after it declined.

Table 1.Population dynamics of major pests of okra and their natural enemies from December 2020 to March 2021

Months/year	SMW	Sucking pests (mean no. of nymphs and adults /3 leaves)			Fruit borer (% fruit damage)	
		Aphid	Leafhopper	Whiteflies	*H. armigera*	*E. vitella*
December - 20	49	0.00	0.00	0.00	0.00	0.00
	50	9.85	6.45	0.00	0.00	0.00
	51	22.00	13.67	6.53	0.00	0.00
	52	22.71	16.70	6.89	0.00	0.00
	53	23.44	16.97	6.70	0.00	0.00
January -21	01	23.20	16.69	7.44	3.47	11.88
	02	23.14	15.66	8.16	5.34	28.7
	03	18.94	11.20	7.94	4.66	29.24
	04	17.64	10.53	7.97	5.28	30.56
February - 21	05	14.70	9.79	7.68	6.76	32.44
	06	12.16	8.96	8.26	9.45	32.79
	07	9.67	8.19	8.51	10.47	44.9
	08	8.64	6.70	12.66	9.85	41.57
March - 21	09	6.65	5.67	12.70	11.26	38.47
	10	4.64	3.66	10.84	13.59	40.5
	11	3.78	2.64	8.69	12.48	41.45
	12	1.23	1.19	7.70	11.4	42.24
Mean		14.69	9.82	8.02	6.28	10.62

Pest appeared from third week of December sowing with the population of 6.53 whiteflies per three leaves afterwards it shown a constant population. Peak incidence was seen during first week of March with population of 12.70 whiteflies per three leaves. Whereas second highest population was recorded during last week of February with a population of 12.66 whiteflies per three leaves. Population increased during last week of February and first two week of March due to increased egg laying influenced by more temperature and these findings are in close agreement with Watson *et al.* (2003) reported that above 30^0 C egg laying will be increased and above 40^0 C life cycle length will be reduced in cotton and these findings are in closely agreement with Threhan (1994), reported that high temperature and low rainfall are known to increase the pest population. *Helicoverpa armigera* Crop was free from this pest during first five weeks, its incidence started from first week of January and reached its peak incidence during second week of March with infestation of 13.59 per cent of fruit damage followed by 12.48 per cent of fruit infestation during third week of March, next highest is recorded during first week of same month (11.26 %). *Helicoverpa* population on chickpea showed its highest and lowest population during the 11th and 52nd standard meteorological week, third week of April and last week of December as reported by Spoorthi *et al.*(2017) and the findings of present investigation found to be in close proximity with the above findings with highest and lowest damage during 9th and 53rd standard meteorological week.

Earias vitella damage started from sixth week after sowing (11.88%) then the damage increased substantially and reached the peak damage of 44.9 per cent during third week of February 2021. Next highest per cent of fruit damage was recorded during fourth week of March (42.24%). *Earias vitella* was there before infesting fruits as shoot borer, as soon as the pod formation initiated it started to infest the fruits also from first week of January then it gradually increased up to March. These findings are in closely agreement with Mondal *et al*. (2019) in okra showed that maximum damage during second fortnight of March.The results of the present study explore that management for sucking pests should be taken up from sowing to around 11th week old crop and for fruit borers until the end of the cropping season.

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