Int.J.Curr.Microbiol.App.Sci (2019) *8*(9): 1953-1957

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 8 Number 09 (2019)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2019.809.225

Study on the Seasonal Incidence of Shoot and Fruit borer *Earias vittella* (Fab) of Okra [*Abelmoschus esculentus* (L.) Moench] and its Correlation with Weather Parameters

Apparaju Sai Sri Vastav[1*] and Priyanka Yadav[2]

[1]Department of Entomology, [2]Department of Plant Pathology, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad-211007(U.P.), India.

**Corresponding author*

Keywords

Seasonal Incidence, Correlation, Eariasvittella, insecticides, abiotic factors.

Article Info

Accepted:
20 August 2019
Available Online:
10 September 2019

A B S T R A C T

A field experiment was conducted during *kharif* season of 2017-18 at Central Research Field, Department of Entomology, SHUATS, Allahabad, (U.P) to study the seasonal incidence of shoot and fruit borer [*Earias vittella* (Fab)]on okra during *kharif* season of 2017 in Allahabad region. The incidence of shoot and fruit borer recorded during 2017- 2018 in the *kharif* season of okra crop variety Kashi Pragathi (VRO-6) has been presented in table 4.1 and fig. 4.1 (a) along with key abiotic factors viz., maximum and minimum temperatures, relative humidity and rainfall. Weekly observations on shoot damage were recorded as soon as infestation started, while fruit damage was recorded at each picking till the last picking of the crop. Okra shoot and fruit borer, *E. vittella* (Fab.) were recorded infesting okra shoots and fruits during the study.

Introduction

Amongst the various vegetable grown Okra *Abelmoschus esculentus* L. (Moench) belongs to family Malvaceae, is an economically important vegetable crop grown in tropical and sub-tropical parts of the world. It is grown commercially in India, Turkey, Iran, Western Africa, Yugoslavia, Bangladesh, Afghanistan, Pakistan, Burma, Japan, Malaysia, Brazil, Ghana, Ethiopia and the Southern United States. Globally India ranks first in okra production (72% of the total world production) having area of 533 hectares with an annual production of 6346 million tons and productivity of 11.9 million tons/ha. In Uttar Pradesh area, production and productivity of okra is 12.19 ha, 148.64 tones, 12.2 metric tons per hectare.

Nutritional value per 100 g of okra contains carbohydrates (1.5%), protein (2.0 g), total fat

(0.1 g), dietary fiber (9%), folates (88 mcg), niacin (1.00 mg), pantothenic acid (0.245 mg), pyridoxine (0.215 mg), riboflavin (0.060 mg), thiamin (0.200 mg), vitamin C (21.1 mg), vitamin A (375 IU), vitamin E (0.36 mg), vitamin K (53 mcg), sodium (8 mg), potassium (303 mg), calcium (81 mg), copper (0.094 mg), iron (0.80 mg), magnesium (57 mg), phosphorus (63 mg), selenium (0.7 mcg), zinc (0.60 mg), carotene (225 mcg) and lutein and zeaxanthin (516 mcg) (source: USDA National Nutrient data base).

Biology and Lifecycle of *Earias vittella* (Fab)

It is widely distributed throughout India. Also infests cotton and other malvaceans plants. Pest is active throughout the year and prefers high temperature. During the rainy season borer damage is relatively less. The Moth is yellow green and measures about 2.5cm across the wings. It is having a narrow light longitudinal green band in the middle of forewing. The full grown caterpillars are dull-green in colour and are 2cm long having tiny stout bristles and a series of longitudinal black spots on the body.

The female moth lays 200-400 eggs at night singly on flower buds, bracts and tender leaves of Okra plants. Incubation period of eggs are 3-4 days and caterpillar pass through 6 stages, becoming full grown in 10-16 days. They pupate either on plants or on ground among fallen leaves and the moth emerge in 8-14 days in summer and 18-23 days in winter. Lifecycle is completed in 17-29 days. Several overlapping generations are completed in a year.

Materials and Methods

The experiment was conducted during the *kharif* season 2017 at SHUATS, Central research field, Allahabad, is situated at The research farm is situated at 20^0 and 15^0 North, 60^0 03 east longitude city and is about 129.2 cm above sea level. The site selected was uniform, cultivable with typical sandy loam soil having good drainage. The climate is typically semi-arid and subtropical. The maximum temperature reaches up to 49^0C in summer and drops down to 1.5^0C in winter. The observations were made at weekly intervals throughout the cropping season. To assess the incidence of shoot and fruit borer (*Earias vittella*), on shoot, the infestation was recorded by observing the infested shoots and the total number of shoots (plants)and on fruits, the observations were recorded by observing the damaged (infested)fruits and healthy fruits at weekly intervals on5 randomly selected plants. The incidence was determined by correlating weather parameters and shoots and fruit borer (*Earias vittella*).

Results and Discussion

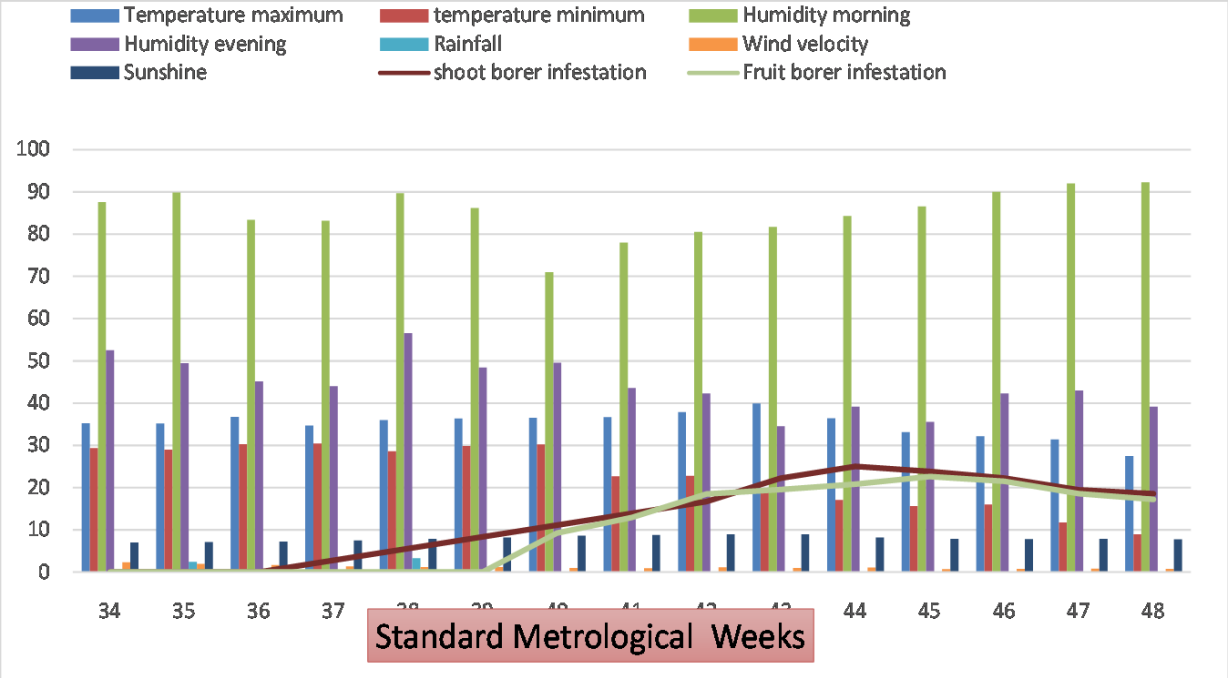
Incidence of shoot and fruit borer on the shoots of okra crop

The shoot damage was noticed when the crop was in vegetative stage. The data presented in table 4.1 revealed that the infestation of shoot and fruit borer on shoots of okra commenced in the 37^{th} week i.e 3^{rd} week of September (2.77%), three weeks after sowing which gradually increased and reached to peak (25%) in the fourth week of October at 36.46^0 C and 17.07^0C maximum and minimum temperatures, 84.29% and 39.14% morning and evening relative humidity and 00.0 mm rainfall. That showed significant positive correlation with minimum temperature (r= 0.432) and negative correlation with evening humidity (r= -0.592), wind speed (-0.338), sunshine hours/day (0.-624) while remaining abiotic factors showed non-significant effect on shoot infestation. As soon as the fruiting started, the incidence of this insect pest on the shoots started to decline from shoots during 45^{th} SMW.

Table.1 Seasonal incidence of shoot and fruit borer [*Earias vittella* (Fab)] during Kharif season in 2017

Standard week	Shoot Borer (%infestation)	Fruit Borer (%infestation)	Temperature		Humidity %		Rainfall (mm)	Wind Velocity	Sunshine (hr/day)
			Max.	Min.	Morning	Evening			
34th	00.00	00.00	35.25	29.34	87.57	52.48	0.6	2.35	7.02
35th	00.00	00.00	35.14	29.00	89.85	49.47	2.43	1.95	7.11
36th	00.00	00.00	36.77	30.31	83.43	45.14	0	1.64	7.21
37th	2.77	00.00	34.72	30.40	83.14	44.00	0	1.37	7.51
38th	5.55	00.00	36.00	28.60	89.71	56.57	3.31	1.22	7.89
39th	8.33	00.00	36.40	29.82	86.14	48.46	0.14	1.22	8.21
40th	11.11	9.25	36.53	30.23	71.00	49.57	0	0.99	8.63
41st	13.88	12.96	36.64	22.69	78.00	43.57	0	0.89	8.79
42nd	16.66	18.51	37.83	22.77	80.57	42.29	0	1.14	8.91
43rd	22.22	19.56	39.86	18.86	81.71	34.57	0	0.99	8.97
44th	25.00	20.83	36.46	17.07	84.29	39.14	0	1.07	8.22
45th	23.82	22.64	33.14	15.62	86.57	35.57	0	0.76	7.91
46th	22.19	21.48	32.14	15.97	90	42.29	0	0.75	7.83
47th	19.44	18.57	31.40	11.71	92.00	43.00	0	0.82	7.90
48th	18.55	17.24	27.48	8.94	92.24	39.14	0	0.73	7.72
Shoot infestation	**R**		0.596	0.432	-0.212	-0.592	-0.371	-0.338	-0.624
	F-test		**NS**	**S**	**NS**	**S**	**NS**	**S**	**S**
Fruit infestation	**R**		**0.535**	**0.432**	**-0.212**	**-0.592**	**-0.371**	**-0.338**	**-0.620**
	F-test		**NS**	**S**	**NS**	**S**	**NS**	**S**	**S**
T-test	**T cal**		**0.743**	**5.647**	**0.071**	**4.32**	**1.936**	**5.176**	**2.66**
	T tab		**2.16**	**2.16**	**2.16**	**2.16**	**2.16**	**2.16**	**2.16**
Results			**NS**	**S**	**NS**	**S**	**NS**	**S**	**S**

Fig.1 Graphical representation of seasonal incidence of Shoot and Fruit Borer [*Earias vittella*(Fab)] during *kharif* season in 2017.



Incidence of shoot and fruit borer on the fruits of okra crop

The infestation of pest on fruits started in the 1st week of October i.e. 40th SMW (9.25%) which gradually increased and reached to peak (22.64%) in the 2nd week of November i.e. 45th SMW at 33.14^{0}C maximum temperature and 15.62^{0}C minimum temperature, 86.57% morning and 35.57% evening relative humidity and 00.0 mm rainfall.

The infestation of *Earias vittella* (Fab.) on fruits of okra showed significant positive correlation with minimum temperature(r = -0.432) and negative correlation with evening humidity (0.592)wind speed (-0.338), sunshine hours/day (0.-620) while remaining abiotic factors showed non-significant effect. Graphical representation on the seasonal incidence of fruit and shoot borer [*E.vittella* (Fab)] on okra crop is clearly pictured and mentioned. The shoot damage was noticed when the crop was in vegetative stage.

The revealed that the infestation of shoot and fruit borer on shoots of okra commenced in the 37th week i.e 3rd week of September (2.77%), three weeks after sowing which gradually increased and reached to peak (25%) in the fourth week of October. Pest incidence increased with maximum temperature and decreased with decline in maximum temperature.

The infestation of pest on fruits started in the 1st week of October i.e. 40th SMW (9.25%) which gradually increased and reached to peak (22.64%) in the 2nd week of November i.e. 45th SMW and as soon as the fruiting started, the incidence of this insect pest on the shoots started to decline from shoots during 46thSMW.

References

Aziz, M.A., Hasan, M.U. and Ali, A. (2011).Impact of Abiotic Factors on Incidence of Fruit and Shoot Infestation of Spotted Bollworms *Earias* spp. on Okra (*Abelmoschus esculentus* L.).*Pakistan Journal of Zoology*,43(5): 863-868.

Mandal, S. K., Sattar, A.Sah, S. B. and Gupta, S. C. (2006).Prediction of okra shoot and fruit borer (*Earias vittella* Fab.) incidence using weather variables at Pusa, Bihar.*International Journal of Agricultural Sciences*,2(2): 467-469.

Meena, N.K., Meena, B.L. and Kanwat, P.M. (2010).Seasonal occurrence of shoot and fruit borer on okra in semi-arid region of Rajasthan.*Annals of Plant Protection Sciences*,4(18): 504-506.

Ministry of Agriculture (2015-16). Indian Horticulture Data Base-2011, Ministry of Agriculture, Government of India, Gurgaon, 1-296.

Nalini, C. and Kumar, A. (2016). Population dynamics and comparative efficacy of certain chemicals and biopesticides against okra shoot and fruit borer (*Earias vittella*). *The bioscan*,11 (3): 1589-1592.

Prasad, L. C. S., Tiwari, G. N. and Kumar, A. (2011).Impact of weather parameters on major insect pests of okra prevailing western Uttar Pradesh.*Vegetos*, 24(2): 152-156.

Radke, S.G. and Undirwade, R.S. (1981).Seasonal abundance and insecticidal control of shoot and fruit borer, *Earias*spp. on okra, *Abelmoschus esculentus*(L.)Moench.*Indian Journal of Entomology*, 43: 283-287.

Sharma, R.P., Swaminathan, R. and Bhati, K.K. (2010).Seasonal incidence of fruit and shoot borer of okra along with climatic factors in Udaipur region of India; *Asian journal of agriculture research*,4(4); 232-236.

Shingh, H.P., Vijaya, V. B. and Chamroy, T. (2015).Seasonal incidence and field efficacy of insecticides against shoot and fruit borer, *Earias vittella* (fab.) on okra (*Abelmoschus esculentus*).*Plant Archives*,15(1):389-392.

Yadav, J.B., Singh, R.S., Singh, H.P. and Singh, A.K. (2009).Effect of Abiotic and Biotic factors on Jassid and Fruit and Shoot borer in Kharif Okra crop. *International Journal of Plant Protection*.8(2): 119-122.

How to cite this article:

Apparaju Sai Sri Vastav and Priyanka Yadav 2019. Study on the Seasonal Incidence of Shoot and Fruit borer *Earias vittella* (Fab) of Okra [*Abelmoschus esculentus* (L.) Moench] and its Correlation with Weather Parameters. *Int.J.Curr.Microbiol.App.Sci.* 8(09): 1953-1957.
doi: https://doi.org/10.20546/ijcmas.2019.809.225