Vegetable Science (2016) 43 (1) : 28-30

Effect of weather variable on incidence of *Earias vittella* in okra

HK Gautam, NN Singh and AB Rai*

Received: May 2015 / Accepted: December 2015

Abstract

An experiment was conducted at Indian Institute of Vegetable Research , Varanasi (India) Research field during summer and *Kharif* of 2008 and 2009 to know the infestation of shoot and fruit borer, *Earias vittella* (Fab.) on okra c.v. Parbhani Kranti. Maximum and minimum relative humidity during *Kharif* 2008, sunshine during summer 2008 and 2009 with shoot damage, maximum temperature during the 2008 summer with fruit damage showed significant positive correlation. Maximum and minimum temperature during *Kharif* 2009, maximumum and minimum relative humidity during summer 2008 and 2009, showed non-significant negative correlation on fruit damage. The significant negative effect of maximum and minimum relative humidity during summer 2008 and 2009, sunshine during *Kharif* 2008 on shoot damage observed while rainfall during summer 2008 and 2009, maximum temperature during *Kharif* 2008 and 2009, minimum temperature during summer 2008 and 2009, and sunshine during *Kharif* 2009 showed non-significant negative correlation with shoot damage.

Key Words: Weather variables, infestation, okra, shoot and fruit borer.

Introduction

The shoot and fruit borer, *Earias vittella* Fab. (Lepidoptera: Noctuidae) is an important and serious pest of okra [*Abelmoschus esculentus* (L.) Moench]. Damage due to fruit borer account for nearly 45 % in Karnataka (Srinivasan and Krishnakumar, 1983) and 25.93 to 40.91 % in Madhya Pradesh (Dhamdhere *et al., 1985*).The larva of *Earias vittella* bores the growing shoot of okra plant prior to fruit formation resulting in withering and drying of shoot (Rai *et al*., 2014(a)(b); Halder *et al*., 2015, 2016). On availability of fruit larva starts feeding to the okra fruit and thus causes direct loss of yield. The climatic factors decide the major role in insect – pest infesting the crop (Halder *et al*., 2017). It is very difficult to isolate a single factor effect on insect-pest. Todays change in climate direct affect the living world, so the need to develop a forecasting model. The present study was aimed towards these correlations.

Department of Vegetable Science, Punjab Agricultural University, Ludhiana, Punjab

Material and Methods

The okra variety Parbhani Kranti was grown at Indian Institute of Vegetable Research (IIVR), Varanasi, Uttar Pradesh following recommended package and practices except plant protection measures. Seeds were sown on the first week of July during *Kharif* and the first week of March during the summers of the years 2008 and 2009. Plant to plant and row to row distance were 60 x 30 cm, respectively. The observations were recorded at weekly interval by counting total shoot and fruit of ten randomly selected plants from five plots and calculate percent damage. In order to study the influence of various abiotic factors on the population build-up of okra shoot and fruit borer simple correlation coefficients were computed. The weekly average population was correlated with average weekly minimum and maximum temperature, relative humidity (RH) and rainfall. The daily weather data recorded throughout the crop season from the meteorological observatory adjacent to the field.

Results and Discussion

The study carried out on incidence of *E. vittella* in summer and *Kharif* of 2008 and 2009 revealed that the activity of shoot and fruit borer on shoot start from beginning of April during summer, whereas from 5th August in *Kharif* towards the end of the crop. The maximum shoot damage observed in the third week of April 2008 (26.5%) and second week of 2009 (30.2%), respectively, in the summer crop whereas in *Kharif* 2008 and 2009 its peak observed in third week of August, 37.2 % and 41.2%, respectively.

The infestation of *E.vittella* on okra fruits appeared in first week of April in summer crop and second week of August in *Kharif* crop during both year of study. The maximum damage recorded in the third week of may 2008 and 2009 *viz.,* 27.2 % and 28.2 %, respectively on summer crop, whereas 41.3 % and 42.6 % on second and ninth September of 2008 and 2009, respectively.

Maximum and minimum temperature during *Kharif* 2009, maximum and minimum relative humidity during summer 2008 and 2009, showed non- significant negative correlation on fruit damage (Table 1 and 2). Meena *et al* (2010) reported that maximum and minimum temperatures were negatively correlated with fruit borer infestation. However, Gupta *et al*. (1998) reported the positive correlations with minimum temperature, morning relative humidity, evening relative humidity and total rainfall and negative correlation with maximum temperature.

The significant negative effect of maximum and minimum relative humidity during summer 2008 and 2009, sunshine during *Kharif* 2008 on shoot damage observed. Kadam and Khaire (1995) reported a significant negative correlation between *E. vittella* incidence and RH.

The rainfall during summer 2008 and 2009, maximum temperature during *Kharif* 2008 and 2009, minimum temperature during summer 2008 and 2009, and sunshine during *Kharif* 2009 showed non-significant negative correlation with shoot damage. Meena *et al* (2010) reported minimum temperature and relative humidity had a significant negative correlation with shoot borer infestation.

Maximum and minimum relative humidity during *Kharif* 2008, sunshine during summer 2008 and 2009 with shoot damage, maximum temperature during 2008 summer with fruit damage showed significant positive correlation. Shukla *et al*. (1997) reported that mean maximum temperature and percent fruit damage were significantly positively correlated. Sharma *et al* (2010) showed that *Earias* population was negatively correlated with the mean temperature and mean relative humidity but non-significantly and negatively correlated with rainfall in terms of larval population and percentage of infested plants.

The other climatic factor non- significantly positive correlated with shoot and fruit borer during both years. Patel *et al* (1997) reported that no significant relation between weather and *E. vittella* (Table 1 and 2).

Table 1. Effect of different abiotic factors on shoot damage by shoot and fruit borer during different season.

Abiotic factor	Summer, 2008	*Kharif*, 2008	Summer, 2008	*Kharif*, 2008
Max.Temp(^{0}C)	0.469	-0.492	0.205	-0.107
Min. Temp(^{0}C)	-0.084	0.420	-0.361	0.389
Max.R.H. (%)	-0.578*	0.776*	-0.650	0.208
Min.R.H. (%)	-0.639*	0.729*	-0.601	0.540
Rainfall (mm)	-0.141	0.481	-0.242	0.052
Sunshine hours	0.559*	-0.639*	0.585*	-0.369

*Signifcant at P=0.05 level

Table 2: Effect of different abiotic factors on fruit damage by shoot and fruit borer during different season

Abiotic factor	Summer, 2008	*Kharif*, 2008	Summer, 2008	*Kharif*, 2008
Max.Temp(^{0}c)	0.728*	0.295	0.487	-0.221
Min. Temp(^{0}c)	0.414	0.483	0.371	-0.139
Max.R.H.(%)	-0.508*	0.028	-0.028	0.455
Min.R.H.(%)	-0.541*	0.034	-0.099	0.379
Rainfall(mm)	0.174	0.283	0.068	0.543
Sunshine hours	0.332	0.325	0.491	0.123

*Signifcant at P=0.05 level

सारांश

भिण्डी की प्रजाति प्रभनी क्रान्ति में प्ररोह एवं फल बेधक (*इरियास विट्टेल्ला*) कीट के प्रकोप को ज्ञात करने के लिये भा.कृ.अनु.प.– भारतीय सब्जी अनुसंधान संस्थान, वाराणसी में एक प्रयोग ग्रीष्म तथा खरीफ मौसम के वर्ष 2008 एवं 2009 में किया गया। अधिकतम एवं निम्नतम सापेक्ष आर्द्रता खरीफ 2008, ग्रीष्म काल 2008 तथा 2009 में दिनमान का प्ररोह नुकसान में सार्थक धनात्मक सहसम्बंध पाया गया। अधिकतम तथा निम्नतम तापमान वर्ष 2009 खरीफ, अधिकतम व निम्नतम सापेक्ष आर्द्रता वर्ष 2008 तथा 2009 में असार्थक ऋणात्मक सहसम्बंध फल बेधन में पाया गया। अधिकतम तथा निम्नतम सापेक्ष आर्द्रता का वर्ष 2008 व 2009 ग्रीष्मकाल में सार्थक ऋणात्मक प्रभाव, वर्ष 2008 खरीफ मौसम में दिनमान का प्ररोह नुकसान वर्षा 2008 व 2009, अधिकतम तापमान खरीफ 2008 व 2009, निम्नतम तापमान ग्रीष्म 2008 व 2009 और दिनमान खरीफ 2009 में दिनमान से असार्थक ऋणात्मक सहसम्बन्ध फल बेधक कीट के साथ पाया गया।

References

Dhamdhere SV, Bahadur J, Mishra VS (1985) Studies on occurrence and succession of pest of okra at Gwalior. Ind J Pl Prot 12(1): 9-12.

Gupta SC, Prasad GS, Sarfaraj A, Ahmad S (1998) Weather factors and incidence of *Earias vittella* (Fab.) on okra, *Abelmoschus esculentus* (L.) Moench. J Res Birsa Agric Uni 10 (1): 12-15.

Halder J, Deb D, Kushwaha D, Rai AB. (2017) Effect of weather parameters on sporadic incidence of cucumber moth, *Diaphania indica* (Saunders) (Pyralidae: Lepidoptera) in bitter gourd ecosystem. J Agrometeorology 19(1): 67-70.

Halder J, Kushwaha D, Pragya Ranjan, Rai AB and Gupta S (2016) Record of Hollyhock as an important alternate host of *Earias vittella* (Fab.) (Lepidoptera: Noctuidae) in eastern Uttar Pradesh. Pest Manage Horticul Ecosys 22(1): 96-98.

Halder J, Sanwal SK, Rai AK, Rai AB, Singh B, Singh BK (2015) Role of physico-morphic and biochemical characters of different Okra genotypes in relation to population of okra shoot and fruit borer, *Earias vittella* Fabricius (Noctuidae: Lepidoptera). Indian J Argic Sci 85(2): 278-282.

Kadam JR, Khaire VM (1995). Raining and relative humidity: Key factor to suppress *Earias vittella* (Fab.) in infestation on okra crop. J Entomol Res 19(3): 201-205.

Meena BL, Kanwat PM (2010) Seasonal occurrence of shoot and fruit borer on okra in semi-arid region of Rajasthan. Annls Pl Prot 18(2): 504-506.

Patel KI, Patel JR, Jayani DB, Shekh AM, Patel NC (1997) Effect of seasonal weather on incidence and development of major pests of okra (*Abelmoschus esculentus*). Indian J Agric Sci 67(5): 181-183.

Rai AB, Loganthan M, Halder J, Venkataravanappa V, Naik PS (2014a). Eco-friendly approaches for sustainable management of vegetable pests. IIVR Technical Bulletin-53. Indian Institute of Vegetable Research, Varanasi, Uttar Pradesh, pp 104.

Rai AB, Halder J, Kodandaram MH (2014b). Emerging insect pest problems in vegetable crops and their management in India: An appraisal. Pest Manage Horticul Ecosys 20(2): 113-122.

Sharma RP, Swaminathan R, Bhati KK (2010) Seasonal incidence of fruit and shoot borer of okra along with climatic factors in Udaipur region of India. Asian J Agric Res 4(4): 232-236.

Shukla A, Pathak SC, Agrawal RK, Shukla A (1997) Seasonal incidence of okra shoot and fruit borer, *Earias vittella* Fab. and effect of temperature on its infestation level. Adv Pl Sci 10(1): 169-172.

Srinivasan K, Kumar, K (1983) Studies on the extent of loss and economics of pest management in okra. Tropical Pest Manag 29(4): 363-370.