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Population dynamics of *Earias vittella* and *Helicoverpa armigera* of okra

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Abstract
The shoot and fruit borer, *Earias vittella* first time observed in 41th SMW recorded 0.4 larvae/ plant thereafter it was build up continuously and reached its peak level in 41 SMW noted 5.2 larvae/ plant. The infestation of fruit borer, *Helicoverpa. armigera* noticed from 33 SMW to 43 SMW i.e. up-to last picking and the peak level of fruit borer reached in 39 SMW and observed 1.6 larvae/ plant. Weather parameters viz, maximum temperature showed positive non-significant correlation with both borers, minimum temperature showed negative significant correlation in *E. vittella* and non-significant in *H. armigera*, morning relative humidity exhibited negative non-significant correlation with *E. vittella* and positive non-significant with *H. armigera*. While rainfall expressed negative non-significant correlation with both borers.

Keywords: population dynamics, *Earias vittella*, *Helicoverpa armigera* and okra

Introduction
Okra (*Abelmoschus esculentus*) or ladies finger is one of important vegetable of the tropical countries and most popular in India, Cameroon, Nigeria, Pakistan, Iraq and Ghana. Though, it is virtually not grown in Europe and North America, yet, lot of people in these countries have started liking this vegetable because of good source of vitamin A and folic acid, besides phosphorus, carbohydrates and magnesium. The productivity of okra is low due to many factors and one of the most important constraints in production is the attack of insect pests. Aphid (*Aphis gossypii*), shoot and fruit borer, *Earias insulana* (Boisduval) and *E. vittella* and jassid, *A. biguttula biguttula* are most serious pests of okra and cause 45.00 to 57.10% damage to fruits (Shrinivasan and Krishna Kumar, 1983 and Nderitu *et al*., 2008) [12, 7]. The incidence and spread of insect pests and their natural enemies are controlled by different weather parameters viz., temperature, rainfall, wind direction and relative humidity. Data on interaction of weather parameters with insect development can play vital role in pest surveillance, forecasting, monitoring and management of pest population by timely taking management practices. Hence, an attempt have been made to study the population dynamics of insect pests and their natural enemies in relation to prevailing weather parameters, which would give an idea about peak period of pests activity so that the information can effectively be utilized in formulating pest management programme.

Material and Methods
The research work was carried out at field of Department of Agricultural Entomology, College of Agriculture, Badnapur during *kharif* 2019. The susceptible variety of okra was sown in 100 m^2 plot for conduct a field trail on population dynamics. The periodical observations on okra crop for the population dynamics of insect pests were recorded throughout the growing season of crop. It was initiated at seedling emergence of crop and continued till the final harvest of crop. Total number of healthy and damaged fruits were observed from 10 randomly selected plants. Collected fruits were cut open to count larvae of shoot & fruit borer. Fruit borers were directly counted on selected plants and percent damage was worked out.

Results and Discussion
The results and observations were obtained during the research work are presented under the following heads

Shoot and fruit borer *Earias vittella* (Fab)

The data related to *E. vittella* (Table 1) revealed that inception of pest was commenced in 33rd standard week and continuously increased till the last picking in the 43rd standard week. It was observed that the infestation of okra shoot and fruit borer was started in the middle of August with an average larval population 0.4 larvae/ plant and during last picking 43rd SMW it was 3.9 larvae/ plant. Peak incidence noticed 5.2 larvae/ plant during 41st MW.

The result of present investigation are in accordance with the findings of Prasad *et al*., (2011) [9] reported that the maximum damage of 43.52% and 42.31% in 41st and 33rd standard weeks respectively during both the years were caused by *E. vittella*. Akhila *et al.,* (2019) [2] noticed that the shoot and fruit borer population increased with increase in maximum temperature and decrease in minimum temperature between 35th standard weeks to 42nd standard week. Selvaraj *et al.,* (2010) [10] reported that the peak incidence of *E. vittella* was observed from 37th standard week.

Fruit borer (*Helicoverpa armigera*)

The data presented in Table 1 revealed that incidence of *Helicoverpa armigera* on okra was in the range of 0.4 to 1.6 larvae/plant. Inception started from 33rd standard week 0.4 larvae / plant that increased up to 1.6 larvae/plant in 43rd standard week and declined there after. Bhavani *et al.,* (2010) [3] reported that the peak incidence of fruit borer was recorded in 38th and 39th standard week. Agurla *et al.,* (2017) [1] recorded the incidence of *H. armigera* on okra in 35th standard week. Nath *et al.* (2011) [6] reported that infestation of larvae of *H. armigera* appeared on the crop between third and fourth week of August reaching its peak densities on second and third week of September, these findings were partially support the present findings.

Table 1: Seasonal incidence of major borers of okra

MW	Larvae/ plant		Weather parameters				
	E. Vittella	*H. armigera*	Temperature (^{0}C) Max	Min.	Rainfall (mm)	R.H (%) Morn.	Even.
29	0	0	33.85	24.15	0.00	83.64	61.27
30	0	0	29.52	23.53	0.00	87.44	76.43
31	0	0	27.35	22.85	36.40	91.14	86.02
32	0	0	28.78	22.49	17.40	90.86	80.91
33	0.4	0.4	31.10	22.47	22.50	89.70	69.27
34	1.9	1.0	32.00	22.88	0.00	85.68	67.19
35	1.5	0.8	30.56	22.90	48.00	90.03	73.98
36	1.3	1.1	28.52	22.79	0.00	91.60	83.05
37	2.1	1.2	29.00	22.52	2.74	91.22	80.65
38	2.2	0.8	30.65	22.92	55.00	91.95	77.91
39	3.5	1.6	30.11	22.53	0.00	91.62	72.20
40	4.0	0.9	32.71	21.91	31.60	90.06	73.63
41	5.2	0.7	31.57	21.71	23.60	87.48	63.77
42	4.5	0.9	29.55	21.11	0.00	87.36	68.73
43	3.9	0.6	28.15	21.47	0.00	92.74	83.24

Correlation coefficient *E. vittella* & *H. armigera* of okra with weather parameters.

Shoot and fruit borer (*E. vittella*)

Data pertaining to shoot and fruit borer of okra (Table 2) showed positive non-significant correlation with maximum temperature (r= 0.215) and minimum temperature (r= -0.736) showed negative and significant correlation. Morning RH (r= -0.065) and evening RH (r= -0.480) exhibited non-significant negative correlation besides rainfall also showed non-significant negative correlation (r= -0.052) with larval population of *E. vittella.*

The results are in concurrence with the findings of Akhila (2019) [2] revealed that the correlation between minimum temperature and shoot and fruit borer incidence indicated a negative significant relationship (r=-0.553*). Harinkhere (2014) [4] revealed that the population of *E. vittella* was significant negative correlation with minimum temperature and negatively correlated to relative humidity. Padwal and Sharma, (2015) [8], Singh *et al.,* (2015) [11] also reported similar findings related to the population of *E. vittella.*

Fruit borer (*Helicoverpa armigera*)

It is evident from Table 2 that mean larval population was positively correlated with maximum temperature (r= 0.022), negatively correlated with minimum temperature (r= -0.376), positively correlated with morning RH (r= 0.303), negatively correlated with evening RH (r= -0.052) and negatively correlated with rain fall (r= -0.137). *H. armigera* showed no any significant relationship with weather parameters.

Agurla *et al.* (2017) [1] revealed that the maximum temperature was positively correlated with larval population and fruit damage. Minimum temperature, relative humidity and rainfall were negatively correlated with larval population of *H. armigera* and fruit damage. The study of Jagtap *et al.,* (2008) [5] and Bhavani *et al.,* (2010) [3] also justify the present investigation.

Table 2: Correlation coefficient *E. vittella* & *H. armigera* of okra with weather parameters.

Name of Pests	Correlation coefficients (r)				
	Temperature		Relative humidity		Rainfall
	Max.	Min.	Morn.	Eve.	
E. Vittella	0.215	-0.736	-0.065	-0.480	-0.052
H. armigera	0.022	-0.376	0.303	-0.052	-0.137

**(r= 0.716) is significant at 1%

Reference

1. Agurla R, Reddy NC, Kumari A, Srinivasa CD. Influence of prevailing weather parameters on population dynamics of fruit borer (*Helicoverpa armigera*, Hubner) in okra during *kharif* Season. Bulletin of Environment Pharmacology 2017.
2. Akhila D, Anitha Kumari M, Nayak H, Vijay D. Population Dynamics of pests in okra Cv. Arka Anamika in relation to weather parameters. Int. J Pure App. Biosci 2019;7(1):405-411.
3. Bhavani B, Bapuji Rao B, Venugopala Rao N, Narasmha Rao HV. Impact of climate change on Population dynamics of okra shoot and fruit borer, *E. vitella* Fab. In North coastal zone of Andhra Pradesh. Pestology 2010;(34):34-38.
4. Harinkhere S. Studies on insect pest complex of okra (*Abelmoschus esculentus* (L.) Moench) and their chemical control M.Sc (Ag.) thesis, JNKVV, Jabalpur, Madhya Pradesh. 2014, 20-56.
5. Jagtap CR, Shetgar SS, Nalwandikar PK. Population dynamics of lepidopterous pests of okra in relation to weather factors during summer. Journal of Maharashtra Agric. Universities 2008;33(2):201-203.
6. Nath L, Prasad CS, Tiwari GN, Kumar A. Impact of weather parameters on major insect pests of okra prevailing in western Uttar Pradesh. Vegetos 2011;24:152-156.
7. Nderitu JH, Kasina JM, Kimenju JW, Malenge F. Evaluation of synthetic and neem based insecticides for managing aphids on okra (*Malvaceae*) in Eastern Kenya. Journal of Entomology 2008;(5):207-212.
8. Padwal KG, Sharma SK. Population dynamics of *Earias vittella* of okra. Ann. Pl. Prot. Sci. 2015;23(2):390-417.
9. Prasad LCS, Tiwari GN, Kumar A. Impact of weather parameters on major insect pests of okra prevailing western Uttar Pradesh. Vegetos 2011;24(2):152-156.
10. Selvaraj S, Adiroubane D, Ramesh V. Population dynamics of important insect pest of bhindi in relation to weather parameters. Pestology 2010;34:35-39.
11. Singh HP, Bajad VV, Chamroy T. Seasonal incidence and field efficacy of insecticides against shoot and fruit borer, *Earias vittella* (Fab.) on okra (*Abelmoschus esculentus* l.) *Plant Archives* 2015;15(1):389-392.
12. Srinivasan K, Krishna Kumar MK. Studies on the extent loss and economics of pest management in okra. Tropical Pest Management 1983;(29):363-370.