

SEASONAL INCIDENCE OF CORN EARWORM, *HELICOVERPA ARMIGERA* IN RELATION TO ABIOTIC PARAMETERS ON MAIZE

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Abstract: The field experiment was conducted at Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.) during *kharif* 2019, to know the seasonal incidence of corn earworm, *Helicoverpa armigera* infesting maize. Corn earworm appeared during 31stSMW i.e. 28th July-5th August (2nd week). The peak population of corn earworm was observed in the first week of September with a mean population of 1.10 larvae/plant. The correlation between corn earworm, *Helicoverpa armigera* and weather parameters during *kharif* 2019 results indicated that the population demonstrated a significant positive correlation with maximum temperature ($r = 0.577$). The regression equation being $y = 2.805x + 26.97$ indicating that within increase in 1^oC maximum temperature there will be increase in population by 2.805.

Keywords: Correlation, *Helicoverpa armigera*, Incidence, Maize

INTRODUCTION

Maize (*Zea mays* L.) is the most important staple food crop in India and is predominantly grown by smallholder farmers. However, the production of this crop and consequently the livelihood of the growers are threatened by the invasion and widespread infestation of the insect-pests in maize crop.

In maize crop there are various types of insect-pests which damages the crop throughout the crop period. Some insects are termites, whitegrubs, cutworm, leafhopper, thrips, aphid, locust, armyworm, corn earworm, mites and fall armyworm etc. Here are described about the corn earworm which damage the crop with heavy losses. Fall armyworm is a new insect-pest which is damaging the maize crop severely through the maize growing areas in India and abroad. It was first reported in late 2016 in West Africa and it rapidly spread to different parts of the continent. Currently, its occurrence has been officially reported in 44 African countries

In the American, there are two races of FAW, namely the rice strain (R-strain), which is most consistently found in millet and grass species associated with pasture habitats, whereas the corn strain (C-strain) prefers maize. The two strains of FAW have also been reported in Africa

Documented a total of 353 FAW larval host plant species belonging to 76 plant families, with the greatest number of host taxa in the family Poaceae (106 taxa), followed by Asteraceae and Fabaceae (31 taxa each). Due to its ability to rapidly spread and inflict widespread damage across multiple crops, FAW poses a serious threat to the food and nutrition security and livelihoods of millions of farming households in sub-Saharan Africa (SSA)

MATERIALS AND METHODS

The experiment was conducted at Research-Cum-Instructional Farm of the Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.) during *kharif* 2019. In the field experiment, each treatment was demarcated during the seasons with the following technical program.

In a plot size of 5x3 m² area, maize variety "JKMH-502" was sown. Observations of fall army worm and other insect pests population was recorded from their appearance on plants till harvest at different intervals. Ten plants were selected randomly at per plot for the study of fall army worm and many other insect pest by the direct visual counting method at weekly interval during morning hours, without disturbing the pest fauna. The observed populations were correlated with the meteorological data during the study period.

RESULTS AND DISCUSSION

Seasonal incidence of corn earworm, *Helicoverpa armigera* in relation to abiotic parameters.

The *Helicoverpa armigera* was first appeared during 31stSMW i.e. 28th July-5th August with a mean larval population of 0.4 larvae/plant. The population build up gradually and reached to its peak in the 6th -14th September (36th SMW) with a mean larval population of 1.1 larvae/plant. When, the maximum atmospheric temperature, minimum atmospheric temperature, total rainfall and relative humidity were 29.9^oC, 23.2^oC, 18.2 mm and 84.5 per cent, respectively. Then, the population declined and reached to its minimum level of 0.5 larvae/plant during 24th oct-1st November (42nd SMW).

The larval stage of *Helicoverpa armigera* damage showed significant positive correlation with

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maximum temperature ($r = 0.577$). The regression equation being $y = 2.805x + 26.97$ indicating that with increase in 1°C maximum temperature there will be increase in population by 2.805.

The present findings of positive correlation between mean temperature with *Helicoverpa armigera* incidence irrespective of seasons are in line with the reports of Panwar and Sarup (1980) who also reported that the minimum temperature favored the development of *Helicoverpa armigera* in maize crop. Zafar and Chaudhry (1979) also observed moth populations of the *Helicoverpa armigera* were highest

in March and October, moths also emerged in February and November in both 1972 and 1973. Deole *et al.*, (2016) who observed five insect species viz., pink stem borer (*Sesamia inferens*), green stink bug, black aphid (*Rhopalosiphum maidis*) and maize cob borer (*Helicoverpa armigera*) were as major insect pests on maize at Raipur region. Patra *et al.*, (2013) who recorded twenty four insect pests, among these, stem borer (*Chilo partellus* Swin.) cob borer (*Stenachroia elongella* Hamp.) and shoot fly (*Atherigona soccata* Rond.) were found to be as major pests in Meghalaya region.

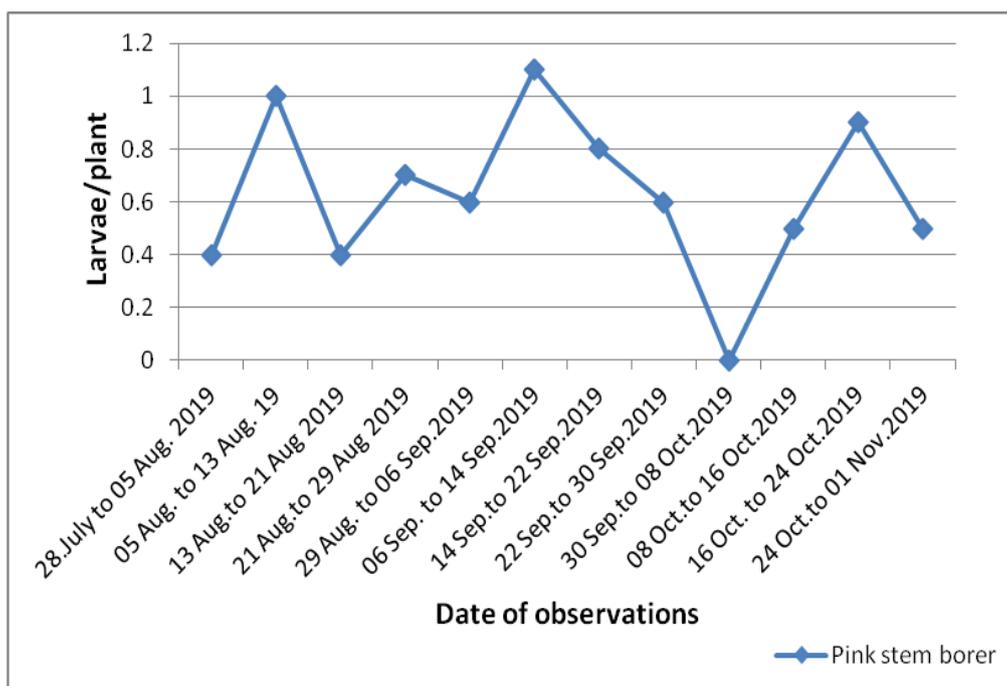


Fig 1: Population of corn earworm, *Helicoverpa armigera* during Kharif, 2019.

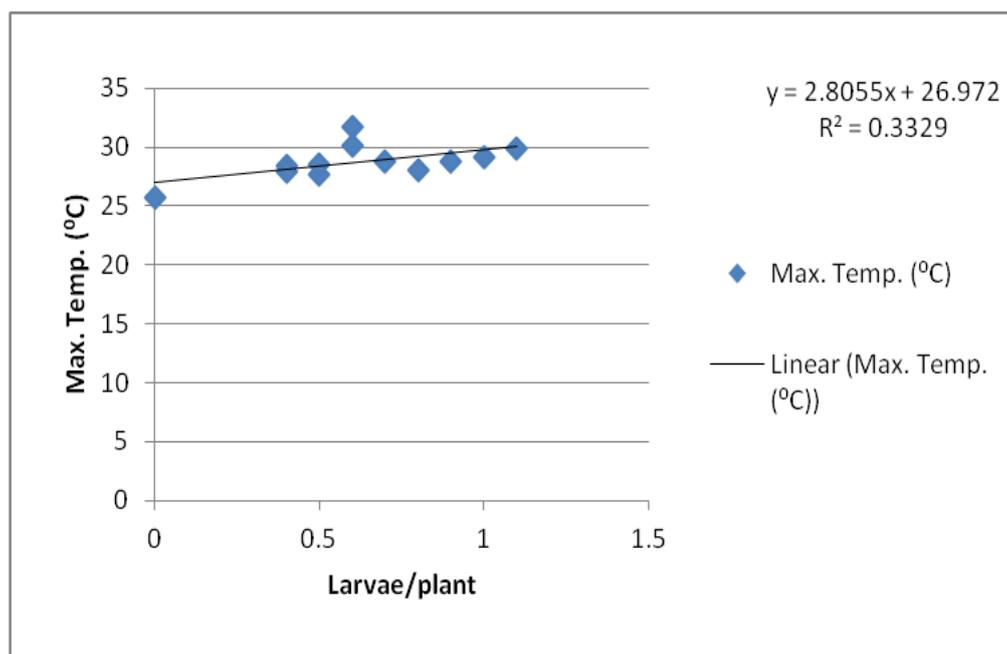


Fig. 2: Regression of corn earworm, *Helicoverpa armigera* larval population on abiotic parameters (2019-20).

Table 1. Seasonal incidence of corn earworm, *Helicoverpa armigera* infesting maize crop during Kharif, 2019 and correlation coefficient between different dependent and independent variables.

SMW	Duration	Average no. of larvae of <i>Helicoverpa armigera</i> larvae/ plant	Max. Temp. (°C)	Min. Temp. (°C)	Rain Fall (mm)	RH (%) Mor.	RH (%) Eve.	Wind Velocity (Km/h)	Sun Shine (hours)
31	28.July to 05 Aug. 2019	0.4	28.4	22.6	4.3	94.7	78.1	4.6	2.7
32	05 Aug. to 13 Aug. 19	1	29.1	22.9	33.9	96.0	79.4	3.2	1.8
33	13 Aug.to 21 Aug 2019	0.4	27.9	22.2	87.2	97.0	82.3	3.6	4.3
34	21 Aug.to 29 Aug 2019	0.7	28.8	22.1	85.7	97.1	78.3	2.7	3.3
35	29 Aug. to 06 Sep.2019	0.6	30.1	22.8	101.6	96.6	71.6	1.9	4.4
36	06 Sep. to 14 Sep.2019	1.1	29.9	23.2	18.2	92.9	76.1	3.0	4.0
37	14 Sep.to 22 Sep.2019	0.8	28.1	22.2	65.5	96.0	75.9	4.2	4.9
38	22 Sep.to 30 Sep.2019	0.6	31.7	22.1	6.3	88.3	61.7	2.7	7.9
39	30 Sep.to 08 Oct.2019	0	25.7	20.4	91.4	97.6	87.7	4.8	0.9
40	08 Oct.to 16 Oct.2019	0.5	27.7	20.3	19.2	96.6	75.9	3.2	5.5
41	16 Oct. to 24 Oct.2019	0.9	28.8	18.2	40.3	94.7	56.3	1.7	7.6
42	24 Oct.to 01 Nov.2019	0.5	28.5	17.7	38.6	93.1	64.8	1.8	6.4
Correlation of coefficient(r) for <i>Helicoverpa armigera</i> population and abiotic factor			0.577*	0.238	- 0.318	- 0.255	- 0.378	-0.448	0.257

*Significant at 5% level of significance, **Significant at 1% level of significance

CONCLUSION

The highest number of *Helicoverpa armigera* was seen during 6th -14th September (36th SMW) with a mean larval population of 1.1 larvae/plant. When, the maximum atmospheric temperature, minimum atmospheric temperature, total rainfall and relative humidity were 29.9°C, 23.2°C, 18.2 mm and 84.5 per cent, respectively. Then, the population declined and reached to its minimum level of 0.5 larvae/plant during 24th oct-1st November (42nd SMW). The population of *Helicoverpa armigera* ranged between 0.4 to 1.1 larvae/plant during crop period. The larval stage of *Helicoverpa armigera* damage showed significant positive correlation with maximum temperature ($r = 0.577$). The regression equation being $y = 2.805x + 26.97$ indicating that within increase in 1°C maximum temperature there will be increase in population by 2.805.

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