SEASONAL INCIDENCE OF FALL ARMY WORM
SPODOPTERA FRUGIPERDA (J E SMITH) ON MAIZE

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ABSTRACT

Investigation on seasonal incidence of fall army worm *Spodoptera frugiperda* on maize was undertaken at the Department of Entomology, VNMKV, Parbhani. The studies were done during kharif on the maize variety Komal. Laval incidence was observed from 31st SMW (Standard Meteorological Week) i.e. fifth week of July and to till 43rd SMW i.e. fourth week of October with a peak incidence observed (4.05 larvae/ plant) during 39th SMW. Thereafter larval count showed declining trend (1.9 larvae/ plant) during 42nd SMW. Larval infestation also recorded in %age and under observation highest infestation 38.98% during 39th SMW i.e. fourth week of September. The correlation between larval incidence and weather parameters was showed negatively non-significant with minimum temperature, evening relative humidity and rainfall, whereas positive relationship was observed with maximum temperature and bright sunshine hours. The correlation with morning relative humidity evaporation with FAW population wee positively and negativity significant respectively evaporation was negative significant.

Key words: Seasonal incidence, *S. frugiperda*, fall armyworm, maize, weather parameters, temperature, humidity, *Zea mays*, rainfall, evaporation, standard meteorological week

Fall armyworm (FAW) *Spodoptera frugiperda* (J E Smith) (Lepidoptera: Noctuidae) is native to tropical and subtropical regions of the America. It is a serious pest of corn but also known to attack more than 100 hosts. In India, it was reported for first time on maize from Shivamogga district of Karnataka during May-June, 2018 (Sharanabasappa et al., 2018). Subsequently, it has spread to most of the maize growing states of India. According to recent studies, this pest can cause maize yield losses ranging from 8.3 to 20.6 million tons/ year in absence of management practices (Day et al., 2017). This pest being new to Marathwada region have a wide scope for further research on various aspects. This lower ending stock is due to fall in production because of 10-20% crop damage by emerging pest Fall armyworm and increase in domestic consumption that supported Indian maize prices. (Anonymous, 2018). The present study on seasonal incidence of FAW on maize grow under kharif condition will provide information of its distribution that will be helpful to managing the pest as per the incidence. The correlation with weather parameters will provide an idea for predicting pest abundance and generating a basic dataset of information about pests in the Marathwada region of Maharashtra. This will help extension workers, subject specialists, and farmers detect and manage pests.

MATERIALS AND METHODS

The study was conducted at the farm of the Department of Agricultural Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra during kharif 2019. The maize variety Komal (Mahagujarat Seeds Pvt. Ltd.) was shown manually in kharif 2019 with a spacing 60 x 30 cm and total plot size was 10 x 10 m plot. The crop was raised using all suggested agronomic techniques, with the exception of plant protection. Five plants were chosen from each plot and marked with tags to track the pest population. Beginning with germination and continuing through crop maturity, numbers of larvae were counted during the early morning hours at regular intervals of one week. For the study of % larval infestation total plants were observed and out of that infested plants were used for per cent larval infestation. Observations were recorded at weekly interval starting from crop emergence to harvesting. This allowed for the calculation of the typical population of larvae/ plant and % larval incidence. The incidence data were subjected to regression analysis and correlation coefficient testing with meteorological data.

RESULTS AND DISCUSSION

Seasonal incidence data revealed that the occurrence

of *S. frugiperda* was started from last week of July till harvest. *S. frugiperda* was active from early vegetative stage to late kernel development stage of maize crop and the maximum activity was recorded late whorl stage to pre-tassel stage in vegetative growth and dough stage on reproductive growth (Fig. 1). The pest was first observed during 31st SMW (0.4 larvae/ plant) and its population was continuously increasing and peaked during 39th SMW (4.05 larvae/ plant). Thereafter larval count showed declining trend (1.9 larvae/ plant) during 42nd SMW. Larval infestation was also recorded in % age and it was observed that from first appearance of pest it was continuously increasing from 3.85% (31st SMW) to (39th SMW). Thereafter infestation was rapidly declined to 18.29% during 42nd SMW. The trend of *S. frugiperda* incidence on maize as observed in the present investigation are more or less similar to those reported by other research workers like Paul and Deole (2020) who reported population of *S. frugiperda* was appeared during 37th SMW i.e. 2nd week of September with a mean population of 0.12 larva/ plant. The peak population was observed in the fourth week of September with a mean population of 0.56 larva/ plant. Thereafter, the population declined gradually and reached to a minimum level of 0.16 larva/plant during 4th week of October (42nd SMW). Anandhi et al. (2020) also recorded population of *S. frugiperda* during 2019 -2020 at kharif and rabi seasons at six locations. The larval population was maximum during kharif (0.99 to 3.66 larvae/ plant) compared to rabi (0.66 to 2.60 larvae/ plant) in all the locations. Vijayaakshaya et al. (2020) noticed the peak incidence of *S. frugiperda*, during the rabi season. Meena et al. (2019) observed that the *S. frugiperda* incidence on maize during the monsoon and its infestation was 19± 3.35 to 20± 5.59 plants/ 100 m².

Correlation coefficients revealed a negatively non-

significant correlation with evening relative humidity (r=-0.002), minimum temperature (r=-0.402), rainfall (r=-0.092) and wind velocity (r=-0.224) whereas positively non-significance with maximum temperature (r=0.032) and BSS/ hr (r=0.365). A positive and significant correlation was observed with while positive significant with morning relative humidity (r=0.548). The correlation between evaporation (r=-0.678) and FAW was negatively significant; positively significant relation with morning relative humidity (r=0.533), bright sunshine hours (r= 0.492) and wind velocity (r=0.602). The % damage shows negative non-significance relation with minimum temperature (r=-0.419), evening relative humidity (r=-0.021), rainfall (r=-0.124) and evaporation (r=-0.262), whereas positive non-significant relation with maximum temperature (r=0.042). More or less similar results were also reported by Vijayaakshaya et al. (2020) reported that the occurrence of *S. frugiperda* in kharif season, was positively correlated with minimum and maximum temperature while it was negatively correlated with relative humidity and rainfall. Whereas, Paul and Deole (2020) worked out correlation between *S. frugiperda* and abotic parameter during kharif 2018 and documented that the FAW population demonstrated a significant positive correlation with maximum temperature.

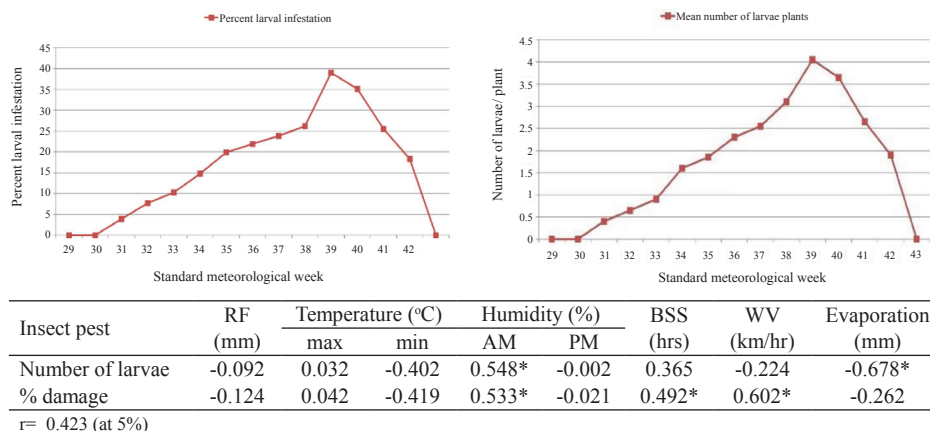| Insect pest	RF (mm)	Temperature (°C)		Humidity (%)		BSS (hrs)	WV (km/hr)	Evaporation (mm)
		max	min	AM	PM			
Number of larvae	-0.092	0.032	-0.402	0.548*	-0.002	0.365	-0.224	-0.678*
% damage	-0.124	0.042	-0.419	0.533*	-0.021	0.492*	0.602*	-0.262

r= 0.423 (at 5%)

Fig. 1. Seasonal incidence of *S. frugiperda* on maize

AUTHOR CONTRIBUTION STATEMENT

Patil S A and Kadam D R conceived and designed the research, Patil S A conducted research and analyzed the data, Bankar D R and Patil S A wrote the manuscript which was guided by Kadam D R.

CONFLICT OF INTEREST

No conflict of interest.

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