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SEASONAL INCIDENCE OF FALL ARMY WORM *SPODOPTERA FRUGIPERDA* IN MAIZE

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ABSTRACT

The fall army worm *Spodoptera frugiperda* (J E Smith) is a polyphagous invasive pest, initially reported from Karnataka. A roving survey was conducted during two cropping seasons at fortnightly interval during kharif and rabi of 2019-20 to know the status of the pest in Haveri district. The results revealed that the larval counts and % infestation was 0.30 to 0.44 larvae/ plant and 23.10 to 33.77%, respectively. Parasitisation by two larval parasitoids viz., *Campoletis chlorideae* (Hymenoptera: Ichneumonidae) and *Exorista xanthaspis* (Diptera: Tachinidae) and infection by an entomopathogenic fungi, *Metarhizium rileyi* were also observed.

Key words: *Spodoptera frugiperda*, maize, Karnataka, natural enemies, parasitoids, entomopathogenic fungi, kharif, rabi, population dynamics, correlation coefficients

Maize (*Zea mays*) is an important cereal crop equally known for its use as food for man and fodder for animals. Yields of cereals are lower in India due to various factors, among which, insect pests are the most important as constraint. As many as 141 insect pests cause damage to maize from sowing to harvesting (Reddy and Trivedi, 2008). The fall army worm *Spodoptera frugiperda* has been very recently reported on maize from Karnataka as invasive in India (Sharanabasappa et al., 2018). There is chance that this pest may migrate to neighboring states in India as well as other Asian countries. The main explanation for its rapid spread may be its efficient ability to travel and migrate long distances in short time. The invasion of this pest may contribute to serious losses. The present study evaluates the status of *S. frugiperda* in the major maize growing areas of Haveri district in which maize is being cultivated under rainfed condition.

MATERIALS AND METHODS

Roving surveys were conducted in four villages in Haveri district, and from each village five randomly selected fields were observed at fortnightly interval to record infestation of *S. frugiperda* in maize. In each field, twenty plants were randomly selected and observations on the number of plants damaged as well as number of larvae/ plant were recorded. Mean no. of larvae/ plant and % infestation were worked out, and the incidence data were subjected for correlation coefficient and regression analysis with weather data. Twenty number of *S. frugiperda* larvae were collected randomly from each field for the observation of larval parasitisation after rearing under laboratory conditions. Further, these parasitoids were preserved in 70% ethyl alcohol and got identified, with % parasitisation computed for these. Also the cadaver of larvae were collected in butter paper covers, preserved under cold storage, before diluted in distilled water and smeared over suitable growth media for pathological studies of fungi. The fungi involved were got identified.

RESULTS AND DISCUSSION

The survey was conducted on two cropping seasons at fortnightly intervals in seven talukas of Haveri district during kharif and rabi 2019-20. The larval load and % infestation was observed to range between 0.30 to 0.44 larvae/ plant and 23.10 to 33.77%, respectively. Maximum larval load and % infestation was noticed in Savanur taluka and the least in Hirekerur taluka (Fig. 1). Waddill et al. (1981) observed that heavy rainfall was lethal to the pest as rain drops accumulates in whorls which creates suffocation to larvae. Kumar et al. (2020) also observed a significant negative correlation of rainfall with incidence. The late sown maize crop (last week of July) suffered more as compared to the early sown (last week of May) or timely sown crop

(first week of June). The infestation ranged from 6.00 to 100% in Karnataka (Mallapur et al., 2018a) and 35 to 70% in Chhattisgarh (Painkra et al., 2019). Two species of parasitoids viz., *Campoletis chlorideae* and *Exorista xanthaspis* were observed with maximum parasitization being observed in Savanur taluka (1.21 and 0.29%, respectively), and the least in Hirekerur taluka (0.83 and 0.22%, respectively). however, the peak % parasitization coincided with peak *S. frugiperda* infestation. There are other egg parasitoids viz., *Telenomus* sp., *Trichogramma* sp. (Shylesha et al., 2018); and larval parasitoids, *C. chlorideae* (Shylesha et al., 2018), *Coccygidium melleum, C. chlorideae, Eriborus* sp., *E. sorbillans*, *Odontepyris* sp. (Sharanabasappa et al., 2018) and *E. xanthaspis* (Navik et al., 2020) known on *S. frugiperda.* An entomopathogenic fungi *Metarhizium rileyi* was also observed during kharif, and not during rabi, with maximum infection being in Hirekerur taluka (3.56 %). The infection of *M. rileyi* ranged from 1.87 to 18.30% in northern Karnataka (Mallapur et al., 2018b) and 10 to 15% in August (Sharanabasappa et al., 2019). The incidence of larvae showed positive correlation with the maximum and minimum temperature in all the seven talukas during kharif; relative humidity and rainfall were negatively correlated, while the rainfall (r = -0.889) was only parameter having significantly negative effect (Fig. 2). In rabi all the weather parameters correlated negatively except maximum temperature which was

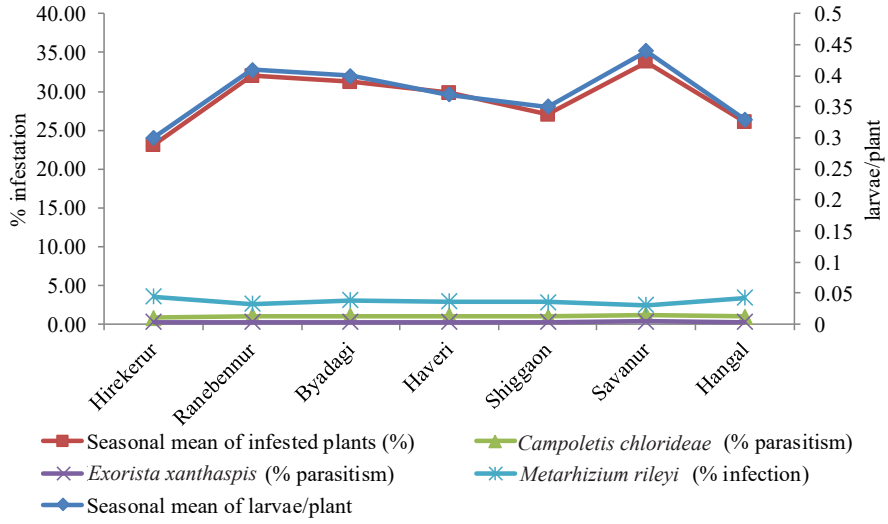

Fig. 1. Incidence of *S. frugiperda* and its natural enemies (Haveri district)

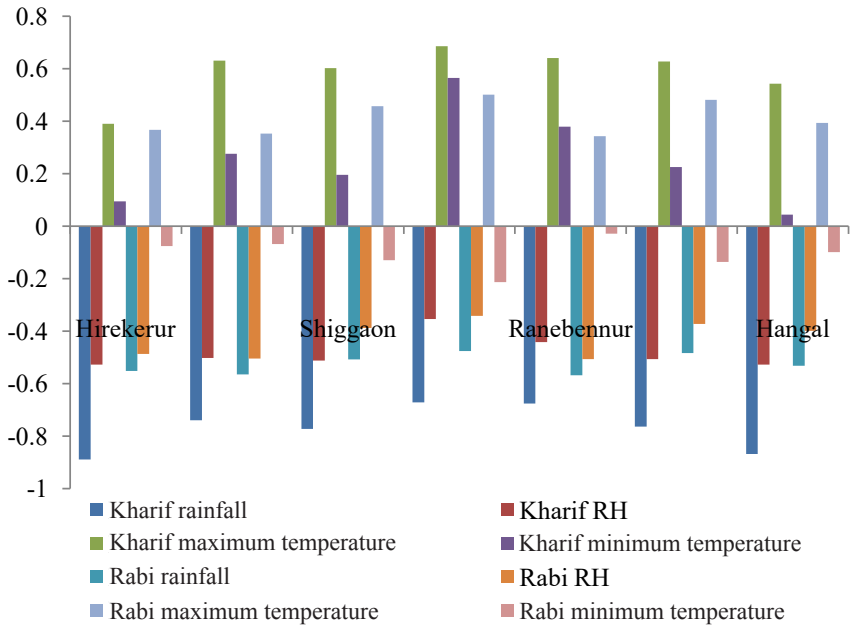

Fig. 2. Population dynamics of *S. frugiperda* (Haveri district- kharif and rabi, 2019-2020)

positively correlated. These observations corroborate with those of Waddill et al. (1981) and Kumar et al. (2020) on the effect of heavy rainfall.

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