Seasonal incidence of insect pests on soybean in relation to weather parameters

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ABSTRACT

An experiment was carried out at ICAR Entomology Farm at Umaim, Meghalaya in kharif season during 2011 with the aim to study seasonal incidence of insect pests on soybean (Glycine max (L.) Merrill). Six insects species, viz., stem fly (Ophiomyiaphaseoli Tryon), soybean leaf folder (NacoleiavulgalisGuen.), white spotted flea beetle (MonoleptasignataOliv.), jassids (EmpoascakerriPuthi), aphids (Aphis glycines Matsumura) and southern green stink bug (Nezaraviridula Linn.) were recorded. Among them stem fly and soybean leaf folder were found to be major pests. The population level of these insect pests was fully observed during 2nd week after sowing with a peak during July and August. Correlation studies indicated that only stem fly and soybean leaf folder were significantly correlated with abiotic factors viz., the minimum temperature and rainfall that favoured the development of stem fly whereas sunshine hours for the leaf folder.

Key words: Abiotic factors, Glycine max, Insect pest, Kharif. Seasonal incidence.

Soybean is one of the important crops in the world, with great economic and social value. The low productivity of soybean is attributed to drought, weeds, insect pests and diseases. Rawat et al. (1969) recorded over two dozen species of arthropod pests on soybean but now the situation has changed. As the cultivation has expanded in the world, soybean was exposed to different environmental and biotic stress that favours pest infestations. Among these temperature is a key abiotic factor that regulates insect population dynamics, developmental rates and seasonal occurrence. Keeping these points in view the experiment was carried out to study the incidence of pest on soybean and their correlation with the environmental factors like temperature, rainfall and sunshine hour.

The experiment was conducted during kharif season, 2011 under the field condition at medium altitude hills in Meghalaya at ICAR Entomology Farm at Umaim, to study the seasonal incidence of insect pests on soybean (Glycine max (L.) Merrill). Soybean variety “Bragg” was sown with a spacing of 40 cm × 20 cm in the plots having an area of 3 m × 3 m on 5th July for one season. In order to know the seasonal incidence of pests, data were recorded from ten plants at weekly interval and the plots under experiment were free from insecticidal application throughout the crop season. They were counted by using suitable techniques for different insects as shown in Table 1. The weekly meteorological data on [ambient temperature (°C), relative humidity (%), rainfall (mm), wind speed (kmph) and sunshine hour] during the crop growing period from July to October, were collected from the Division of Agricultural Engineering, ICAR Research Complex for NEH region, Umiam, Meghalaya. With a view to study the impact of different weather factors on pest incidence, correlation between the pest population of pest and weather parameters was carried out and simple regression line was fitted to know the impact of independent variables on the dependent variables.

During the course of study, six insect species, viz., stem fly (Ophiomyiaphaseoli Tryon), soybean leaf folder (NacoleiavulgalisGuen.), white spotted flea beetle (MonoleptasignataOliv.), jassids (EmpoascakerriPuthi), aphids (Aphis glycines Matsumura) and southern green stink bug (Nezaraviridula Linn.) were recorded. Amongst these, stem fly and soybean leaf folder were observed to be major pests causing damage at various stages of crop. The population level of these insect pests was fully observed with greater or lesser extent during 2nd week after sowing (Table 1). Initially the population level of jassids gained maximum number to 4.12 jassids/plant on July 26, 2011 i.e. 21 days after sowing. The peak incidence of stem fly, aphids, white spotted flea beetle, leaf folder and stink bug were noticed during August 2011, with 50.60% plant infestation of stem fly on August 2, 33.55 aphids/apical shoot/plant on August 9, white spotted flea beetle and soybean leaf folder reached to its peak with a population of 3.88 adults/plant, 9.07% plant infestation on August 16 and 2.16 stink bugs/plant during August 30, respectively. The present findings are in conformity with the findings of Babu and Samanathan (2002) who reported that the highest infestation of jassids was found during July to September. Azad Thakur and Gangwar (1989) which stated that the fly first appeared in 15 to 20 days after spray (DAS) and acquired its peak in 30 to 35 DAS. Ragsdale et al. (2004) observed that the aphid populations did not reach significant levels until late July or early August, nearly 60 days after planting. Singh and Singh (2002) revealed that M. signata was active throughout vegetative stage to

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maturity. Gangwar and Azad Thakur (1991) reported that soybean leaf beetle was serious pests from July to September and the pest infestation ranged from 2.12 to 9 leaf folders/plant which was similar to the present findings. Green stink bug results are in line with the finding of Thippeswamy (1990) who observed *N. virudula* from early June to late August with an incidence ranging from 1.0 to 3.0 bugs per plant.

The correlation matrix indicated that only two species, stem fly and soybean leaf folder were significantly correlated with weather parameters (Table 2). The significant negative influence of bright sunshine hours on leaf roller activity is substantiated by work of Butani and Verma (1976).

**CONCLUSION**

Studies on seasonal incidence of these insect pests hold a promising opportunity for the development of management tactics relevant to the control of these insect species. For example, knowing the vulnerability in the life cycle i.e., seasonal cycle, overwintering potential, behaviour etc play an important role in suppressing the pest density. During the experiments peak incidence of these insect pests were noticed in *kharif* crop. Therefore, detailed investigations on the impact of weather conditions in relation to insect pests in soybean ecosystem assume practical importance.

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