



OCCURRENCE OF SUGARCANE SCALE INSECT *MELANASPIS GLOMERATA* (GREEN) AND ITS NATURAL ENEMIES IN BIHAR

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ABSTRACT

Parasitoids and predators are organisms responsible for the biological regulation of insect pests. The natural enemies associated with scale insect *Melanaspis glomerata* (Hemiptera: Diaspididae) included *Adelencyrtus mayurai* (Hymenoptera: Encyrtidae), *Selitrichodes* sp. (Hymenoptera: Eulophidae), *Chilocoris nigrita* and *Pharoscyrnus horni* (Coleoptera: Coccinellidae) and *Cybocephalus* sp (Coleoptera: Cybocephalidae). The parasitoid *Selitrichodes* sp. and predator *Cybocephalus* sp. were recorded for the first time against scale insect in sugarcane agroecosystem in Bihar. However, the natural enemies are of prominent importance as they aid in biological pest control.

Key words: Biological control, scale insect, Diaspididae, parasitoids, predators, Hymenoptera, Coleoptera,

Sugarcane, *Saccharum officinerum* L. is one of the important agricultural crop of India. The low yield of sugarcane is attributed to various abiotic and biotic factors among which the damage caused by pests and diseases are significant. In India, around 211 species of pests have been reported to infest sugarcane, of which 18 species have achieved significant pest status (David and Nandgopal, 1986). Among insect pests, *Melanaspis glomerata* (Green) is a serious pest of sugarcane. In India, severe and periodic occurrence of *M. glomerata* was reported at Coimbatore and it has been reported from Bihar (Pruthi and Rao, 1942; Agarwala, 1956). Symptoms are noticed only after heavy population build-up. In case of heavy infestation, the whole stem is covered by scale encrustation that gives black scaly appearance (Rao, 1951). *M. glomerata* cause losses in terms of quality and quantity parameters wherein the weight of cane, percentage of sucrose in juice and brix were reduced by 32.60, 44.89 and 32.98%, respectively, as compared to the healthy cane (Rao et al., 1991). The pest survives in the stubble after harvest of the main crop and serves as a primary source of infestation in ratoon crops. It has adapted to a wide range of climatic conditions, varying from high temperature and humidity to moderately warm and humid conditions. Infestations commence prior to the monsoon in early planting and ratoon. The population of the *M. glomerata* is regulated by various kind of natural enemies viz; parasitoids and predators. According to Gustafsson (1971), *Adelencyrtus mayurai* was the most common

and prevalent natural enemy found in various states of the country. However, even in the sugarcane producing regions, only a little information is available regarding the natural enemies of *M. glomerata*. Knowledge of biological control agents is crucial for pest management and can be used in integrated pest management in sugarcane ecosystem. Thus, the objective of this study was to survey the *M. glomerata* and its natural enemies in Bihar agro-ecosystem.

MATERIALS AND METHODS

The survey was conducted at monthly interval during 2022-23 in sugarcane variety Rajendra Ganna-1. Sugarcane was planted in 0.25 hectare area according to the recommended agronomical practices except pesticides application at Kalyanpur Farm under Sugarcane Research Institute, Dr. Rajendra Prasad Central Agricultural University Pusa, Samastipur, Bihar. The farm is situated at altitude of 53 meter from mean sea level, 25° 98' N latitude and 85° 64' E longitudes. The *M. glomerata* were collected together with the infested parts of sugarcane plants where they were found. Parasitoids and predators were preserved in 70% ethanol. The specimens were first examined under stereo zoom microscope to identify them up to genus or tribe level. For identification up to species level the specimens were examined under microscope and compared with reference collection as per the standard identification keys. The predatory beetles

were sent to Dr J Poorani, NRC (Banana), Tamil Nadu and parasitoids were sent to Dr Shahid Biz Zeya, Department of Zoology, Aligarh Muslim University, Aligarh, Uttar Pradesh for identification.

RESULTS AND DISCUSSION

This study was aimed to survey *M. glomerata* and their natural enemies associated with sugarcane in Bihar. The data on the mean infested *M. glomerata* (%) during 2022-23 showed that the population started to build up from August (4.2%) and then there was steady increase in the % incidence and reached the peak during November month (9.4%) when the maximum and minimum temperatures (°C) were 29.3 and 14.1, respectively, and the maximum and minimum relative humidity (%) as 96 and 48, respectively. There was no rainfall during the peak period of incidence. Thereafter, gradually decreasing trend was observed. Simple correlation was worked out between weather factors and % incidence of scale insect during 2022-23. It was observed that maximum, minimum temperature and rainfall showed non-significant negative correlation with % incidence of scale insect of sugarcane and relative humidity (morning) showed highly significant positive correlation. While, relative humidity (evening) was non-significant positive relation. However, the natural enemies started appearing in the field in the month of August and continued up to January, when temperature decline and relative humidity increase. Five species of natural enemies were collected which comprises of two species of parasitoids *A. mayurai* and *Selitrichodes* sp. and three species of predators viz., *Chilocoris nigrita*, *Pharoscygnus horni* and *Cybocephalus* sp. The parasitoids *A. mayurai* and *Selitrichodes* sp. belongs to family Encyrtidae and Eulophidae, respectively and predator *C. nigrita* and *P. horni* belong to the family Coccinellidae and the species *Cybocephalus* sp from Cybocephalidae. *Selitrichodes* sp. and *Cybocephalus* sp. were recorded for the first time against *M. glomerata* in Bihar. Similarly, three parasitoids were recorded Nigam, (1984) and four

coccinellid predators *P. horni*, *C. nigrita*, *C. cacti* and *S. madagassa* by Ansari et al. (1987).

Hence, the above survey summarizes that parasitoids and predators are important natural enemies of *M. glomerata* that regulate population fluctuation in the field. When the population of parasitoids and predators appeared in the field, the population of *M. glomerata* started to decline. The knowledge of these natural enemies will contribute to planning of biological control strategies for integrated management of pests of sugarcane.

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AUTHOR CONTRIBUTION STATEMENT

AK and VJ carried out the survey. A K curated the data and prepared the original draft of the manuscript. The manuscript is approved by both the authors.

CONFLICT OF INTEREST

No conflict of interest.

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Adelenyrtus mayurai



Selitrichodes sp.



Chilocoris nigrita



Pharoschimnu shorni



Cybocephalus sp.

Fig. 1

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