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Natural enemies of rice stem borers in Kangra valley of Himachal Pradesh

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ABSTRACT: Among the different rice stem borer species, *Scirpophaga innotata* (Walker), *S. incertulas* (Walker) and *Sesamia inferens* (Walker) are predominant borers recorded in the rice ecosystem in Kangra valley of Himachal Pradesh. Seven species of parasitoids and five species of predators have been recorded on these borers.

KEY WORDS: Parasitoids, predators, stem borers

Rice ecosystem comprises of a complex set of insect pests and their natural enemies. The rice stem borers are generally considered to be the serious pests of paddy. About 16 different stem borers have been found to attack paddy (Rao, 1964; Rao and Israel, 1967). *Scirpophaga innotata* (Walker) and *S. incertulas* (Walker) and *Sesamia inferens* (Walker) are dominant stem borers in the Kangra valley of Himachal Pradesh (Kumar, 1996).

About 100 species of natural enemies including parasitoids, predators and pathogens have been recorded from the rice stem borers in Asia (Yasumatsu, 1976). These natural enemies play a major role in regulating abundance of pest population. Emphasis is shifting towards the development and implementation of integrated pest management (IPM) approaches in controlling the insect pests of paddy. Unless and until biocontrol agents present in the area are known, an effective IPM system can not be developed. The study was undertaken to find out the potential natural enemies associated with the stem borers in rice ecosystem in Himachal Pradesh, India.

Studies were undertaken at Himachal Pradesh Krishi Vishva Vidyalaya, Rice Research Station, Malan during 1994 and 1995. The area falls in the mid hill sub-humid zone (Zone-II) of Himachal Pradesh. Populations of natural enemies were

assessed with the help of sweep net collected at weekly interval. Sweeping was done at three locations 500 metres apart selected at random. At each location, sweeping was done across the unsprayed field from one corner to other diagonally for half an hour. Sweeping collections were sorted out for presence of parasitoids and predators.

A number of natural enemies were found associated with the rice stem borers (Table 1). Most of the parasitoids observed were hymenopterans. Population of the natural enemies fluctuated depending upon the developmental stages of the borers. Among the parasitoids, most abundant species was *Apanteles* sp., which was observed during July when rice was at tillering stage. *Argiope* spp. was the most dominant species among the predators. Maximum populations of parasitoids and predators were observed during September, when second generation of borers occurred. During last week of September, when borers larvae were in the fifth instar, population of *Bracon chinensis* (Szep.) increased considerably.

In the present study, it was observed that the natural enemies in rice ecosystem could keep the population of borers at natural equilibrium. Hence, there is a need to conserve these natural enemies by judicious use of safer pesticides.

Table 1. Parasitoids and predators collected from rice ecosystem (1994-95)

Natural enemies	Order	Family
Parasitoid		
Apanteles spp.	Hymenoptera	Braconidae
Bracon chinensis (Szep.)	Hymenoptera	Braconidae
Eriborus argenteopilosus (Cam.)	Hymenoptera	Ichneumonidae
E. erythrogaster (Ashmead)	Hymenoptera	Ichneumonidae
Trathala flavo-orbitalis (Cam.)	Hymenoptera	Ichneumonidae
Xanthopimpla flavolineata (Cam.)	Hymenoptera	Ichneumonidae
Xanthopimpla punctata (Fabr.)	Hymenoptera	Ichneumonidae
Predator		
Argiope spp.	Arannae	Araneidae
Oxyopes sp.	Arannae	Oxypidae
Salticus sp.	Arannae	Oxypidae
Conocephalus longipennis (de Haan)	Orthoptera	Tettigoniidae
Coccinella septempunctata (Lin.)	Coleoptera	Coccinellidae

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