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Field Evaluation of Exotic Larval Parasitoid, *Allorhogas pyralophagus* Marsh Against the Larvae of *Scirpophaga excerptalis* Walker

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ABSTRACT

Field evaluation of the exotic larval parasitoid, *Allorhogas pyralophagus* Marsh was carried out under field conditions at the Indian Institute of Sugarcane Research (IISR) farm (Lucknow), Simbhaoli (Ghaziabad) and Majethia Farm (Sardarnagar) against the larvae of the top borer, *Scirpophaga excerptalis* Walker. The recovery of the released parasite was poor and only a few cocoon masses of released parasite were recovered at IISR farm and Simbhaoli. The parasite, in spite of repeated releases for many years could not be established in the released areas. Parasitisation and emergence behaviour of the wasp was also studied under laboratory conditions using field-collected top borer - infested canes. The wasp parasitised the top borer larva in the cane through the silken covering present over the slit formed during feeding of host larva. The wasp, after completing its development on host larva, emerged through the same slit.

KEY WORDS : *Allorhogas pyralophagus,* field evaluation, *Scirpophaga excerptalis*

Allorhogas pyralophagus Marsh was reported by Bennett *et al.* (1983) from *Eoreuma loftini* (Dyar) infesting Johnson grass (*Sorghum halepense*) and was supplied to various countries for experimental release against sugarcane borers. Recoveries of the parasite from experimentally released fields have been made from *Diatraea* spp. in Trinidad (Des Vignes, 1983), *Scirpophaga excerptalis* Walker in Lampung (Indonesia) (Harsanto and Sunaryo, 1986), *E. loftini* in Texas (Smith *et al.*, 1987; Hawkins *et al.*, 1987) and *Chilo auricilius* Dudgeon in India (Varma and Nigam, 1989). The present study was undertaken to evaluate the effectiveness of *A.pyralophagus* as a biological control agent against the top borer, *S.excerptalis* Walker at IISR Farm (Lucknow), Simbhaoli (Ghaziabad) and Sardarnagar (Gorakhpur).

MATERIALS AND METHODS

A.pyralophagus was mass multiplied on the laboratory - reared larvae of *C.auricilius* and field-collected larvae of *Chilo partellus* Swinhoe and *S.excerptalis* under laboratory conditions (26 ± 2°C; R.H. 60-70%) using modified straw pipe technique of Avasthy and Tewari (1982). The parasites were released (Table 1) at the Indian Institute of Sugarcane Research (IISR) Farm, Lucknow in a 0.2 ha plot with the varieties CoLk 8001 and CoS 767 during 1989-91. The parasites were released in farmers field at Simbhaoli (Ghaziabad) during 1988-89 and at Majethia farm (Sardarnagar) during 1986-88. Each release was made at ten different spots. Observations on parasite recovery from host larvae were recorded in III, IV and V brood of top borer at IISR farm, in V brood at Simbhaoli and Majethia farm by collecting more than 400 infested cane tops from five spots i.e. four from corners and one from the centre.

Preliminary observations on parasitisation and emergence behaviour of the wasp were recorded under labortory conditions.

Two types of top borer - infested canes containing the larvae were selected from the field, one with exit hole covered with silky covering only, while the other with exit hole as well as slit formed during the feeding of top borer larvae on the outer margin of cane. The slit was also covered with a thin silky covering. Under laboratory conditions 10 adults (7 males and 3 females) were released in a glass chimney. Cotton swabs soaked in 1:1 honey and water were provided inside the chimney. Both the ends of the chimney were closed with muslin cloth. In each chimney, 4 cane tops, two with exit hole and two with exit hole as well as slit were placed for parasitisation of larvae. The experiment was conducted at 26.0 ± 2°C with three replications. The cane tops were removed after 24 h and placed individually in test tubes (38 x 200 mm) for emergence of parasite/moth.

RESULTS AND DISCUSSION

An indicated in Table 1, in 1989-90 crop season, the parasite was recovered from V brood larvae. The extent of parasitisation was 0.94 per cent. In 1990-91 crop season, the parasite was recovered from III brood. However, per cent parasitisation was very low (0.75) and no parasite could be recovered from IV and V broods. The parasite was recovered at Simbhaoli from V brood (0.60 per cent). But no cocoon could be recovered at Majethia farm (Sardarnagar).

The poor recovery as revealed in the present study has indicated that the wasp, in spite of their repeated releases could not be established in released areas. Castilho *et al.* (1989) while evaluating the parasite against *Diatraea saccharalis*F. in Brazil have also concluded that the braconid was ineffective in controlling the pyralid under field conditions.

Under laboratory conditions, the wasp parasitised the top borer larvae through the slit formed on the outer edge of cane and the wasp after completing the development emerged through the same slit because the emergence of the wasp was observed only in the cane tops having slit as well as exit hole while the cane tops having only exit hole showed no emergence of the wasp. The wasp emerged by making small holes in silken covering present over the slit. The wasp may not be able to parasitise the top borer larva through the exit hole because of short ovipositor and presence of many silken discs in between the exit hole and the top borer larva. It appeared to be the limiting factor in the success of this parasite. Hawkins *et al.*

Table 1. Release and recovery of *A.pyralophagus* in different broods of top borer at IISR farm, Simhbaoli and Majethia farm

Year	Brood and per cent top borer infestation	No.of parasites released		No.of infested canes split open	No.of cocoon masses recovered	Per cent parasitisation
		male	female			
IISR farm (Lucknow)						
1989-90	V 33.3	537	3018	424	4	0.94
1990-91	III 23.3	190	1411	400	3	0.75
	IV 40.6	279	1599	435	-	-
	V 37.5	241	1472	983	-	-
Simbhaoli (Ghaziabad)						
1988-89	V 55.0	300	2032	500	3	0.60
Majethia farm (Sardarnagar)						
1986-87	V 36.0	145	723	500	-	-
1987-88	V 43.21	1083	4810	786	-	-

(1987) also suggested that larvae of *E.loftini* that tunnel deep in stalks are generally beyond the reach of parasites because of the constraints imposed by its ovipositor length and behaviour of its host.

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REFERENCES

AVASTHY,P.N. and TEWARI,N.K. 1982. Annual Report, I.I.S.R. Lucknow, p 85.

BENNETT,F.D., COCK,M.J.W. and DIAZ,C.F.A. 1983. *Allorhogas* sp.n. (Braconidae) a potential biological control agent for graminaceous stem borers from Mexico. *ISSCT Ent. Newsl.*, **14**, 9-12.

CASTILHO,H.Z., BOTELHO,P.S.M., MACEDO,N. and ARANJO,J.R. de, 1989. Evaluation of *Allorhogas pyralophagus* (Marsh, 1984). (Hymenoptera : Braconidae) as an ecto-parasitoid of the sugarcane borer *Diatraea saccharalis* (Fabricius, 1794) (Lepidoptera : Pyralidae). *Anais da Sociedade Entomologica do Brasil*, **18**, 75-89.

DES VIGNES,W.G. 1983. Rearing, releases and recovery of *Allorhogas* sp. n. (Hymenoptera : Braconidae) - a potential biological control agent of *Diatraea* spp. in Trinidad. *Ent. Newsl.*, **14**, 34.

HARSANTO, UBANDI AND SUNARYO, 1986. Introduction of *Allorhogas pyralophagus* Marsh (Braconidae) in Lampung (Indonesia) with preliminary notes on its biology. *Proc. Int. Soc. Sug. Cane Technol.*, **19**, 563-567.

HAWKINS,B.A., BROWNING,H.W. and SMITH,J.W. 1987. Field evaluation of *Allorhogas pyralophagus* (Hym. : Braconidae) imported into Texas for biological control of the stalk borer *Eoreuma loftini* (Lep. : Pyralidae) in sugarcane. *Entomophaga*, **32**, 483-491.

SMITH,J.W., BROWING,H.W. and BENNETT,F.D. 1987. *Allorhogas pyralo- phagus* (Hym. : Braconidae), a gregarious external parasite imported into Texas, USA, for biological control of the stalk borer *Eoreuma loftini* (Lep. : Pyralidae) on sugarcane. *Entomophaga*, **32**, 477-482.

VARMA, ASHOK and NIGAM,H. 1989. Field releases and recoveries of an exotic parasite, *Allorhogas pyralophagus* Marsh against sugarcane stalk borer, *Chilo auricilius* Ddgn. *Indian J. Ent.*, **51**, 136-138.