

Potential Biocontrol of Sugarcane Stem Borers with Exotic Egg Parasitoid, *Trichogramma chilonis* Ishii

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ABSTRACT

Egg parasitoid, *Trichogramma chilonis* was released in the stem borer affected replicated plots at various dosage rates in splits viz 2.0 lakh, 3.0 lakh, 4.0 lakh and 6.0 lakh wasps/ha per season. Parasitoids released during both first and second broods of stem borers gave better results than released only during first brood of the pest. All the four treatments were significantly different from the check proving the parasitoid a potential biocontrol agent. The dosages @ 4.0 lakh/ha and 6.0 lakh/ha satisfactorily controlled the pest and the lower dosage of former one seemed economical. However, the experiment needs to be repeated for final recommendation.

Key words : Sugarcane stem borer, egg parasitoid, *Trichogramma chilonis*.

INTRODUCTION

Two spp. of stem borer, viz. *Chilo tumidicostalis* Hampson and *Chilo auricilius* Dudgeon, attack sugarcane stems, the former one is considered as a major pest (Anon. 1979) and its incidence is inhabitable every year. Its appearance ragnes from May to harvest of the crops and cause considerable damage. Gupta and Avasthy (1960) reported as high as 70 percent in cane yield and 0.5 to 3.5 unit loss in sugar recovery by *C. auricilius* which is a major pest and its prevalence is noticed every year.

There is no recommended chemical against sugarcane stem borers in Bangladesh. The only important suggested mechanical control (removal of infested stems) is not instantly adopted by the farmers because of reluctance in cutting and destroying semi-mature to mature cane plants when the operation needs to be followed.

Several attempts have been taken in different countries to control this pest through biological control methods, particularly, with egg parasitoids. Trichogrammatids are efficient egg parasitoids throughout the world and Entomologists reported its potentials in controlling sugarcane borers (Alba and Estioko, 1981; Alam *et al.* 1966; Shenhmar and Brar, 1996 and Mishra *et al.* 1997).

The study was undertaken to find out effective dosages and time of liberation of *T. chilonis* for the control of sugarcane stem borers.

MATERIALS AND METHODS

A replicate field trial was conducted at the Bhabanipur farm of North Bengal Sugar Mills Ltd. during the season 1995-96. A randomized complete block design with four replications was laid out comprising the following treatments considering various recommendations in other countries. The variety was Isd 16.

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- T₁ - 200000 parasitoids / ha (1st brood only)
 T₂ - 300000 parasitoids/ha (1st brood only)
 T₃ - 400000 parasitoids/ha (1st +2nd broods)
 T₄ - 600000 parasitoids/ha (1st +2nd broods)
 T₀ - Check.

Unit plot size was 100 square meter (10 x 10m). A five meter distance was maintained between plot to plot, between block to block and surrounding the experiment (border) to avoid movement of parasitoids from one plot to another and else.

T. chilonis were produced in the laboratory on eggs of Rice meal moth, *Corcyra cephalonica* Stainton glued on paper strips and were released during the first brood (T₁ and T₂) and during first and second broods (T₃ and T₄) in splits.

RESULTS AND DISCUSSION

Table 1 shows that *Trichogramma chilonis* released at different doses significantly controlled stem borer. The rates of 4.0 lakh and 6.0 lakh per hectare gave good controls (about 60%) of the target pest.

Table 1. Efficiency of *Trichogramma chilonis* Ishii in controlling sugarcane borers (Bhabanipur farm, NBSM Ltd., Natore, Bangladesh), 1996.

Treatments (dosages)	September, 1996		October, 1996	
	Mean (%)	% Efficiency	Mean (%) infestation	% Efficiency
2.0 lakh parasitoid/ha	4.97b*	46.79	5.59b	40.97
3.0 lakh parasitoid/ha	4.43b	52.57	5.48ab	42.13
4.0 lakh parasitoid/ha	3.99b	57.28	3.68b	61.14
6.0 lakh parasitoid/ha	3.73b	60.06	4.16b	56.07
Check (No parasitoid)	9.34a	-	9.47a	-
S.E	0.1991		0.2312	

Figures accompanied by same letters are not significantly different.

In Bangladesh Miah *et al.* (1985) reported 97.10% sugarcane stem borer egg parasitism in the laboratory by *T. chilonis* and Alam *et al.* (1986) found 95.38% parasitism under similar condition. Miah *et al.* (1986) achieved 60.65% control when the parasitoid was released @ 1.2 lakh/ha, where Anon. (1989) reported 30.21%, 32.89% and 36.01% control when the parasitoid was released @ 1.0 lakh/ha 1.5 lakh/ha and 2.0 lakh/ha respectively. Biswas *et al.* (1992) also reported 32.87% control with the dosage 2.0 lakh/ha.

Alba and Estioko (1980) reported that among three imported *Trichogramma* spp. in the Philippines only *T. chilonis* was found to be established in sugarcane field against sugarcane borer. In South Africa, weekly release of *T. chilonis* @ 4,40,000/ ha reduced borer by 50% (Anon. 1983). Pan (1984) in Taiwan experimentally found that *Trichogramma* released @ 1,00,500/ ha for a period of 7-10 months during 1972-73 and 1975-76 controlled sugarcane borers from 37.3 to 54.5 percent. Khanzada (1996) reported that in Pakistan 4-8 *Trichogramma* cards (each containing 1000-2000 individuals) controlled 30 to 75% *Chilo infuscatellus*.

In India, Shenhmar and Brar (1996) found that in *T. chilonis* released plots (@ 3,00,000/ha) shoot-borer infestation was only 5.0% compared to 22.0% in the check plot. Similarly, Mishra *et al.* (1997) conducted large scale field trials with *T. chilonis* on the control of sugarcane borers during 1994 and 1995. The rate of release was 52,000/ha week starting from 21 DAP to 210 DAP.

In 1994, the range of shoot borer infestation was 1.8 to 2.7% in the treated fields compared to 9.8% in the check and that of stalk borer infestation was 3.6 to 4.8% in the treated compared to 11.9% in the check. In 1995, shoot borer infestation was 2.11 to 3.4 in the treated as compared with 12.6% in the check, the respective figures of infestation by stalk borer were 2.8 to 4.3% in treated plots and 13.7% in check plot.

The present results supports the reviewed results and indicates that *T. chilonis* is an effective egg parasitoid in controlling sugarcane stem borers (Table 1). The results also projects its potentials for its future prospect as a biocontrol agent against the pest.

Mass production and use of *Trichogramma* is already in practice in the Philippines (Alba and Estioko, 1981); Taiwan (Anon., 1980; Anon., 1996), South Africa (Anon. 1987; Mishra *et al.* 1997) India, Pakistan. Sugar mills and research institutes/centres have mass rearing programmes in laboratories.

Previous and present experiment conducted in Bangladesh reveal that *T. chilonis* could be a potential biocontrol agent against sugarcane stem borers. Biological control method is the most important component of Integrated Pest Management (IPM). Biological control of stem borers with *Trichogramma* is now recommended in many sugarcane growing countries. The present study revealed that sugarcane stem borer can be satisfactorily controlled through releasing *Trichogramma* @ 4.0 lack and 6.0 lack/ha. This is a demand driven technology in Bangladesh. However, before final recommendation of effective dosage large scale field trial on its inundative release is suggested to study the feasibility of commercial production and economics.

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