



Efficacy of *Trichogramma chilonis* Ishii against sugarcane early shoot borer, *Chilo infuscatellus* Snellen under sugar factory operational areas of coastal Andhra Pradesh

CH. V. NARASIMHA RAO, N. VENUGOPALA RAO and B. BHAVANI

Department of Entomology, Regional Agricultural Research Station

Anakapalle, 531 001, Andhra Pradesh, India

E-mail: Challavnrao@yahoo.co.in

ABSTRACT: Multiplication of *Trichogramma chilonis* Ishii and its host insect, *Corcyra cephalonica* (Stainton) was undertaken in the IPM laboratory, Regional Agricultural Research Station, Anakapalle since 1999. The activity was intensified during 2003-04 with an objective to supply 'Trichocards' to sugarcane farmers for the control of sugarcane early shoot borer, *Chilo infuscatellus* Snellen. During the year 2004-05, about 130 million *T. chilonis* parasitoids were produced in the laboratory and supplied as Trichocards (6,500 Trichocards) to the farmers through Sugar factories. Impact of *T. chilonis* on early shoot borer in factory operational areas of M/s Sri Sarvaraya Sugars Ltd., Chelluru (AP) was studied. The results indicate that the *T. chilonis* released plots recorded less incidence (0.16%) of early shoot borer in sugarcane compared to the untreated plots (3.33%). The *T. chilonis* released plots recorded a cane yield of 120.3 t/ha and 19.0 per cent juice sucrose.

KEY WORDS: *Chilo infuscatellus*, field evaluation, sugar factory operational areas, *Trichogramma chilonis*.

Sugarcane early shoot borer, *Chilo infuscatellus* Snellen is one of the major insect pests causing 30 - 40 per cent losses to sugarcane crop during early stages of crop growth under rainfed condition. Incorporation of biocontrol as component of integrated pest management of early shoot borer acquires immense prominence in recent days. Among different biocontrol agents, the egg parasitoid, *Trichogramma chilonis* Ishii proved to be effective in regulating the pest population at egg stage (Misra and Pawar, 1987). Management of early shoot borer with egg parasitoid, *T. chilonis* seems to have economic proposition because of the low cost production of this parasitoid.

Inundative release of these parasitoids has been attempted in many parts of the country and the demand for these parasitoids has been increased. Field release of *T. chilonis* in the form of 'Trichocards' is recommended @ 50,000 parasitoids/ha/release starting from 35 days after planting. And 4-6 such releases at 7-10 days interval could effectively check the borer population at the early stages of the crop. Hence, large-scale production of *T. chilonis* in the IPM laboratory, Regional Agricultural Research Station, Anakapalle was taken up with an objective to supply 'Trichocards' to sugarcane farmers through Sugar factories during 2004-05 season.

Standard procedure was adopted for mass multiplication of host insect, *C. cephalonica* and the egg parasitoid, *T. chilonis* in the IPM laboratory of Regional Agricultural Research Station, Anakapalle.

Field releases

Field release of *T. chilonis* in the form of 'Trichocards' was made @ 50,000 parasitoids/ ha/ release starting from 35 days after planting and four such releases at 7-10 days intervals were made in the sugarcane fields under sugar factory operational areas (Table 1).

Data on incidence of early shoot borer at 45, 60, 90 and 120 days were recorded on whole plot basis in the *Trichogramma* released plots in sugar factory areas and also in the Research Station. The data were recorded in untreated control also for comparison. Data on juice sucrose and cane yield were recorded at the time of harvest. The canes from a square meter area were harvested in treated and untreated plots at random and weight was recorded. For making juice analysis, ten canes from treated and untreated plots at random were collected and analysed in the laboratory for per cent juice sucrose by using polarimeter.

During the year 2004-05, about 130 million *T. chilonis* parasitoids were produced in the IPM laboratory of Regional Agricultural Research

Station, Anakapalle and supplied through 6,500 Trichocards to the farmers through Sugar factories (Table 1). Impact of *T. chilonis* on early shoot borer in factory operational areas of M/s. Sri Sarvaraya Sugars Ltd., Chelluru was studied. Data on the incidence of early shoot borer were recorded in these factory areas and the results are presented in Table 2.

The results indicate that the *T. chilonis* released plots recorded less incidence (0.16%) compared to the untreated plots (3.33%). The number of dead hearts in untreated control was 20 times more than that observed in *Trichogramma* released fields.

Data on the incidence of early shoot borer were recorded at Regional Agricultural Research Station, Anakapalle and are presented in Table 3. *T. chilonis* released (50,000/ ha) plots registered less cumulative incidence of early shoot borer (2.52 % dead hearts), less intensity of internode borer (0.83%) and more juice sucrose than control plot (Early shoot borer 4.02% dead hearts; internode borer 10.02%; 16.77% juice sucrose) (Table 3). An additional cane yield of 4.02 t/ ha was also increased due to the release of *T. chilonis*. It can be concluded that the egg parasitoid, *T. chilonis* may be the effective candidate in the management of early shoot borer in sugarcane ecosystem. Management

Table 1. Details of trichocards supply to different sugar factory areas of Coastal Andhra Pradesh

Sl. no.	Name of the Factory	Area covered (ha)	No. of trichocards supplied	Parasitoid population (Millions)
1	M/s. Varalakshmi Sugars (GMR Technologies), Sankili	100	1000	20
2	M/s. Sri Sravaraya Sugars Ltd., Chelluru	300	3000	60
3	M/s. Deccan Sugars, Samalkot	120	1200	24
4	M/s. The Etikoppaka Co-operative Sugars Ltd., Darlapudi	70	700	14
5	M/s. The Thandava Co-operative Sugars Ltd., Payakaraopeta	30	300	6
6	M/s. The Chodavaram Co-operative Sugars Ltd., Govada	30	300	6
	Total	650	6500	130

* Four trichocards (each containing 20,000 parasitoids) per 0.4 ha were supplied.

Table 2. Impact of *T. chilonis* on early shoot borer in factory operational areas of M/s. Sri Sarvaraya Sugars Ltd., Chelluru

Sl. no.	Zone	Incidence of Early Shoot Borer (%)		Sucrose (%)		Cane yield (t/ha)	
		Treated	Untreated	Treated	Untreated	Treated	Untreated
1	Kadium	0.14	3.78	19.60	15.50	126.50	98.00
2	Dulla	0.20	3.02	18.40	14.50	115.50	86.00
3	Bommuru	0.15	3.20	19.00	16.80	119.00	79.50
	Mean	0.16	3.33	19.00	15.60	120.33	87.83
	't' test	3.29	3.82	4.13	1.48	15.89	0.41

* Four samples per 0.4 ha per village in each zone were drawn for recording ESB.

Table 3. Field evaluation of *T. chilonis* for the control of Sugarcane early shoot borer at Regional Agricultural Research Station, Anakapalle

Treatment	Cumulative incidence of ESB (% dead hearts)	Internode borer (%)	Sucrose (%)	Cane yield (t/ha)
<i>Trichogramma chilonis</i> released plot	2.52	0.83	19.72	82.50
Control plot	4.02	10.02	16.77	78.48
't' test	3.02	2.98	3.86	0.52

of early shoot borer with egg parasitoid, *T. chilonis* proved to have economic proposition because of the low cost production of this parasitoid. The cost of trichocard (containing 20,000 population) is Rs.35/- and cost of four releases put together worked out to be Rs. 140/- per 0.4 ha. Whereas the cost of insecticidal application worked out to be five times more than that of biological control using *T. chilonis*. The results are also in agreement with Rao (1980), who observed reduction in early shoot borer damage in the plots where *T. chilonis* was released synchronizing with egg stage of the pest. Maninder and Varma (1982) suggested that field releases of *T. chilonis* was very effective against the eggs of *C. infuscatellus*. Manjunath (1983) demonstrated that release of 50,000 adults of *T. chilonis* per hectare every week from the fourth to the eleventh month of the crop can give substantial control of *Chilo* spp. in sugarcane. Misra *et al.*

(1986) and Misra and Pawar (1987), also obtained effective control of early shoot borer with mass multiplication and synchronized releases with egg stage of this borer.

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