

**UTILIZATION OF *TRICHOGRAMMA EVANESCENS* WEST.  
TO CONTROL THE LESSER SUGAR-CANE BORER,  
*CHILO AGAMEMNON* BLES. IN SUGAR CANE FIELDS  
IN EGYPT. 3 : THREE-WAVE RELEASE TECHNIQUE.**

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**ABSTRACT**

*Trichogramma evanescens* West, was reared in the laboratory on eggs of *Ephestia kuehniella* Zell. Rearing took place in a conditioned room at  $26 \pm 2^{\circ}\text{C}$  and  $60 \pm 70\%$  R.H. The parasite was released in 100-feddan of sugar-cane in Menya Governorate at a rate of 20.000 adults/feddan. After release, parasitism % ranged 66.7-100 % in the released area while it ranged 0.80% in the control. At harvesting, rates of infestation in the released area were 21.7% in the stalks and 3.4% in the joints. The respective figures in the control area were 47.7% and 9.3%.

**INTRODUCTION**

The sugar-cane borer, *chilo agamemnon* Bles. is considered the main insect pest of sugar-cane in Egypt causing considerable loss in the yield of sugar. Infestation of sugar-cane by *C. agamemnon* was restricted to Delta region and Middle Egypt until 1967 but some changes in the environmental conditions in Upper Egypt after the establishing of the high dam led to a gradual expanding of the infestation until reaching Aswan Governorate in 1974 (Issa, 1979).

Trials were made to control such a pest in sugar-cane fields by chemical insecticides but the results were not satisfactory (Issa, 1979). El-Sherif (1974) reported that the egg parasite, *Trichogramma evanescens* West. seemed to be a reliable biocontrol agent against *Chilo* eggs as the parasite occurred in sugar-cane fields and percentages of parasitism might reach up to 90% late in the season. Abbas et al. (1989) reported that *T. evanescens* was released against

*C. agamemnon* in 3-feddan of sugar-cane in 1985. El-Heneidy (1988) released *Trichogramma* in 15-feddan of sugar-cane in 1987.

The present investigation deals with the results of releasing *T. evanescens* in 100-feddan of sugar-cane in Menya Governorate. Percentages of parasitism on *Chilo* eggs during the whole season together with rates of infestation in the stalks and joints at harvesting were estimated in the released area and in a non-released plot (control).

## MATERIAL and METHODS

### *Rearing of the host :*

The Mediterranean flour moth, *Ephestia kuehniella* was used as a laboratory host for *Trichogramma evanescens*. Culturing of *Ephestia* started from infested flour obtained from mills. The infested flour was kept in glass jars until emergence of moths which were collected by means of a modified vacuum-cleaner. The moths were transferred to oviposition cages made of Zinch, about 18 cm high and 8 cm diameter. The eggs were glued onto paper cards, about 100 eggs/card, and removed to glass jars containing wheat flour as food for the hatched larvae until pupation.

### *Rearing of Trichogramma :*

The parasite was maintained in the laboratory from parasitized eggs of *C. agamemnon* collected from sugar-cane fields. Eggs of *E. kuehniella*, 1-2 day old, were introduced to the wasps in glass vials, 13 x 5 cm, covered with pieces of cotton-cloth. After 24 h the parasitized eggs were removed to similar vials and other eggs were exposed to the wasps instead. Rearing of both *Trichogramma* and *Ephestia* took place in a conditioned room at 26°C and 60-70% R.H.

### *Procedure of release :*

The parasite was released in 100-feddan of sugar-cane in Menya Governorate (70 feddan in Abou Korkas and 30 feddan in Samaloote districts). The paper cards that contained the parasitized eggs were put in carton-paper vials, 8 x 2 cm, with the top and bottom covered with wire screen to allow the parasite to pass out and to prevent any predators getting into. The vials were attached to sugar-cane leaves using pieces of wire. Each vial contained three different ages of parasitized eggs so that adult parasites emerged in three waves, 1, 4, and 7 days after attaching to the plants. Rate of release was 20,000 wasps/feddan with a total of 2 million wasps in 100-feddan. The

release was carried out on May 30 and June 30, 1988 in Abou-Korkas and Samaloote, respectively.

#### *Evaluation of the release :*

Percentages of parasitism on *C. agamemnon* eggs were determined in the treated area and in an untreated area (2 km far from the treated one) until the end of the season. Two hundred plants from each area were examined weekly for this study. At harvesting, rates of infestation in the stalks and joints were assessed. The evaluation was carried out in Abou-Korkas district.

### RESULTS and DISCUSSION

#### *Percentages of parasitism (Table I and Fig. 1).*

In general, percentages of parasitism on eggs of *C. agamemnon* were always higher in the released area than in the non-released one (control). Just before release of *Trichogramma* parasitism % was 0 in both areas. After release, the parasitism % averaged 66.7% in June and increased gradually to reach a maximum of 100% in October and November. No *Chilo* eggs could be found in December. In the control area, parasitism % was 0 in June but reached 50% in July. It increased to almost 60% during August-October and reached a maximum of 80% in November.

#### *Rates of infestation (Table II).*

Rates of infestation in both stalks and joints were estimated at harvesting. In the treated area, rates of infestation were 21.7% in the stalks and 3.4% in the joints. The respective figures in the control area were 47.7% and 9.3%.

As a conclusion, it could be mentioned that release of *T. evanescens* in sugar-cane fields at a rate of 20,000 adults/feddan resulted in 54.4% and 64.6% reduction in rates of infestation in the stalks and joints, respectively. Such results are almost in agreement with those reported by El-Heneidy et al. (1988) who found that release of *T. evanescens* in sugar-cane fields at a rate of 60,000 adults/feddan resulted in 47.2% and 48.8% reductions in rates of infestation in the stalks and joints, respectively.

TABLE I

Parasitism % on egg of *C. agamemnon* collected from 200 plants in treated plots of sugar-cane in Menya Governorate in 1988.

Date	Treated plot		Untreated plot	
	No. of egg-clusters collected	Parasitism %	No. of egg-clusters collected	Parasitism %
31.5.88	5	0	5	0
7.6.88	4	50.0	4	0
14.6	6	66.7	4	0
21.6	4	50.0	4	0
28.6	4	100	2	0
Average	4.5	66.7	3.5	0
5.7	8	87.5	10	40.0
12.7	14	85.7	14	42.9
19.7	10	80.0	8	50.0
26.7	17	76.0	12	66.7
Average	12.3	81.3	11.0	50.0
2.8	18	88.9	14	64.3
9.8	17	88.2	10	40.0
17.8	18	77.7	12	66.7
23.8	19	84.2	10	60.0
30.8	12	83.3	14	64.3
Average	16.8	84.50	12.0	60.0

TABLE I (Cont.)

Date	Treated plot		Untreated plot	
	No. of egg-clusters collected	Parasitism %	No. of egg-clusters collected	Parasitism %
6.9.88	13	92.9	17	58.8
13.9	11	90.9	13	61.5
20.9	9	100	10	70.0
27.9	6	100	7	71.4
Average	9.8	94.9	11.8	63.8
4.10	4	100	5	60.0
11.10	4	100	6	66.7
18.10	5	100	3	66.7
25.10	3	100	2	50.0
Average	4.0	100	4	62.5
1.11	5	100	3	66.7
8.11	2	100	2	50.0
15.11	4	100	2	100
22.11	3	100	2	100
29.11	1	100	1	100
Average	3	100	2	80.0

TABLE II

Rates of infestation in sugar-cane in plots treated with *T. evanescens* and in an untreated plot at harvesting.

	No. of stalks examined	Infestation %	No. of joints examined	Infestation %
Treated plot	750	21.7	10236	3.4
Untreated plot	300	47.7	4223	9.6

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