

**EVALUATE THE APPLIED OF THE EGG PARASITOID *Trichogramma evanescens* WEST. TO REDUCE THE INFESTATION OF THE LESSER WORM, *Spodoptera exigua* HB. IN SUGAR BEET FIELDS AT EL-AIAT, REGION, GIZA GOVERNORATE.**

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**ABSTRACT**

Four releases of egg-parasitoid *Trichogramma evanescens* West (Hymenoptera: Trichogrammatidae) to control *Spodoptera exigua* Hb. were applied. Releases were carried out during March throughout the two seasons (2005/2006 and 2006/2007) in sugar beet fields at El-Aiat, Giza Governorate. The four releases of the parasitoid successfully suppressed the infestation with *S. exigua* on sugar beet plants. The percentage of reduction in larvae population of this insect were 83.8% in the first season and 80.0% in the second season.

**INTRODUCTION**

Sugar beet, *Beta vulgaris* L. as sugar crops received a great attention in Egypt because of its strategic and industrial values. In 2009, Egypt produced 1.61 million tons of sugar, 1.013 million tons produced from cane and 0.597 million tons from beet, while the consumption reached 2.72 million tons that created 1.11 million tons gap which is filled by importation from the international market (report of central council for sugar crops 2009). Sugar beet plants are attacking by many serious insect pests causing a great economic damage to this crop. Among these pests, the lesser worm *Spodoptera exigua* Hb. (Lepidoptera: Noctuidae) which considered as common pest on various agricultural crops in many different parts of the world. It is a periodic pest attacking the roots as well as the foliage of sugar beet (Longe, 1971). It became a destructive pest for sugar beet causing high economic damage (Loomis, 1966; Gurguis, 1986; Hussein, 2001). It was recorded among the economic insects in Egypt, (Willcocks 1922). Chemical insecticides are usually used to control the sugar beet pests (Kasza, 1996 and Sabluk *et al.* 2002). EL-Husseini *et al.* (2004) stated that the intensive use of chemical pesticides in sugar beet suppressed the role playing by the natural enemies in the agroeco-system (Tron 1985). Release of parasitic wasps of the genus *Trichogramma* is an alternative control method to control this pest. *Trichogramma* species are the most frequently used natural enemy for control of lepidopteran pests of fruits, cereals and stored product moths in agriculture (Banit, 1980; Steidle *et al.* 2001). The use of parasitoid *Trichogramma* reduced insecticide applications by significant amount (Abdel-Hafez and Nada, 2000; Abdel Hafez 2004). *Trichogramma* was recorded

among the natural enemies found in sugar beet field (Tron, 1985). It parasitizes on eggs of different lepidopterous species (Stern, Venon and Shorey 1968, He *et al.* 2002). Also, *T. evenescens* was released in sugar-cane fields to control the lesser sugar-cane borer, *Chilo Agamemnon* Bles. (Abbas *et al.* 1989). Recently about 18 species of *Trichogramma* being mass-reared to control pests on corn, sugar cane, pepper and forests in more than 23 countries (Hassan. 1992). In 2003, Ministry of Agriculture and Land Reclamation established 18 laboratories at different Governorates for producing *Trichogramma* with the aim of controlling cotton bollworms and several Lepidopterous pests on vegetables and other crops (Alia 2006). Also, Egyptian Sugar & Integrated Industries Company, (E.S.I.I.C.) established (8Lab.) at all their factories in upper Egypt for controlling insect borers of sugar-cane (Egyptian Society of Sugar Technologists, 2001). Therefore, the aim of the current investigation to evaluate the effect of egg-parasitoid *Trichogramma evanescens* West to reduce the infestation of *S. exigua* Hb. on sugar beet plants.

## MATERIALS AND METHODS

This experiment was carried out at El-Aiat, Giza Government throughout The two successive seasons (2005/2006 and 2006/2007). Two areas of about ½ fadden were chosen at a distance of 500m between them, the distance was determined on the basis of prior experience and reported literature as adequate to prevent migration of *Trichogramma* wasps from site of release to site of unreleased (Bigler, 1986) both areas were cultivated with sugar beet, *Beta vulgaris* L. Raspoly var. at 15<sup>th</sup> Sept. and harvest at late of following May.

The reduction among larval population of *S. exigua* Hb. in the field was calculated by using the formula of Henderson and Tilton, (1955) :-

$$Ta \times Cb$$

$$\% \text{ population reduction} = 1 - \left( \frac{\quad}{Tb \times Ca} \right) \times 100$$

Where :-

Ta=number of larvae after release.(treated).

Tb=number of larvae before release.(treated).

Ca=number of larvae after release.(control).

Cb=number of larvae before release.( control).

The parasitoid, *T. evenescens* was reared on eggs of the grain moth *Sitotrga cerealla*(Ol.) according to the method described by Li (1986) produced releasing cards included about 3000 parasitized eggs/ card. Each card contains three age groups each of about 1000 parasitized eggs, allowing adult emergence of *Trichogramma* along a period of one – week post card installation in the plant filed. The releasing card was placed at the plant and by 10m distances, i.e. 4 card/ Fadden/ release = 12000 *Trichogramma*

adults, Marie, (2004), Four, releases were carried out, in March (1,10,20,30/March) in both seasons. The parasitoid release started by the presence of the first instars on the plant ten Sugar-beet plants randomly chosen from treated and untreated fields. Plants were examined 10 days intervals the inspections were conducted before and after releasing.

## RESULTS AND DISCUSSION

Obtained results revealed that the numbers of *S.exigua* larvae on sugar beet plants were obviously reduced during the two tested seasons compared to population in untreated area (control). Average larval numbers in treated field during the 1<sup>st</sup> and 2<sup>nd</sup> seasons were 17.6 and 18.4 respectively, while in untreated field were (79.9 and 88.9) respectively as shown in Table (1) and Figs.(1&2). In the first season the numbers of larvae were 42,42,25,20,10,9,9,8,7 and 4 in the treated field while they were 36,72,76,79,80,81,90,92, 95 and 98 in the control field. It is clear from obtained results in Table (1) and Fig.(1) that the larvae population level of *S.exigua* in treated field was lower than in control field. The overall average of reduction in larvae population of *S.exigua* Hb. was 83.8% and this may be due to releasing of the egg parasitoid *T. evanescens* West.

In the second season, data presented in Table (1) and Fig.(2) show also, that all four releases of *T. evanescens* West. reduced the number of *S. exigua* Hb. larvae compared with their numbers in control fields.

**Table (1): Percentage of reduction in *Spodoptera exigua* Hb. larvae after release of *Trichogramma evanescens* in sugar beet fields during (2005/2006) (2006/2007) seasons at El-Aiat Giza Governorate.**

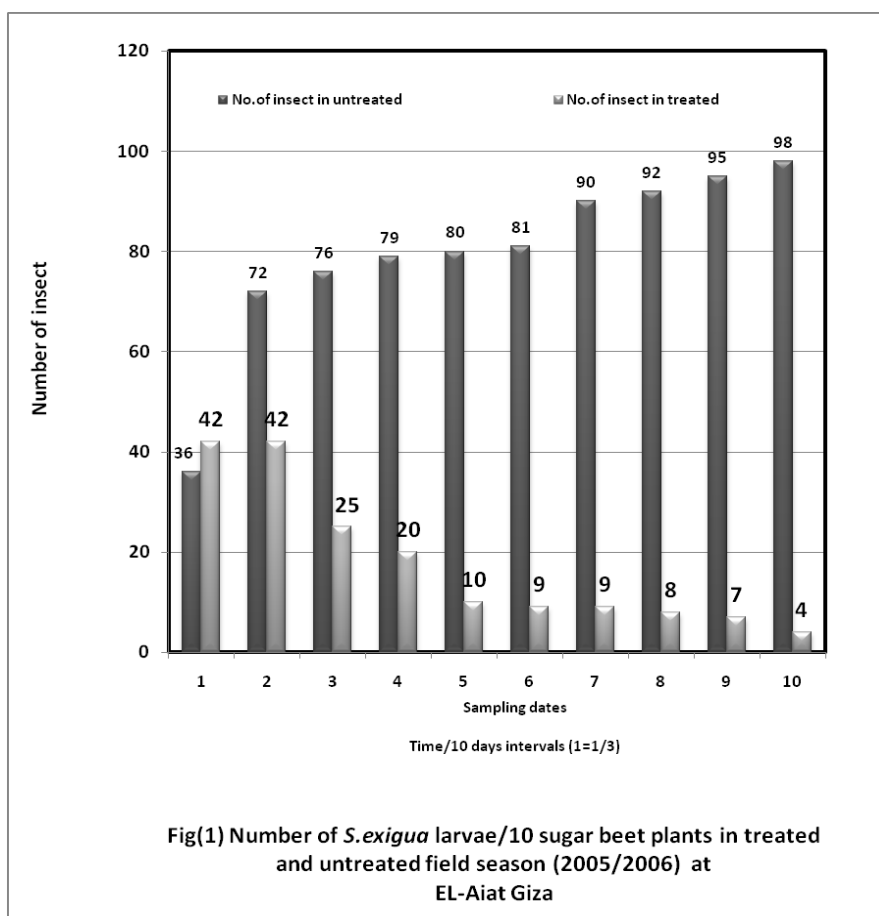
Seasons						
Dates	2005/2006			2006/2007		
	No. of <i>S. exigua</i>		%Reduction	No. of <i>S. exigua</i>		Reduction %
Untreated	Treated	Untreated		Treated		
1/3*	36	42	0	29	30	0
10\3*	72	42	50.0%	68	30	57.4%
20\3*	76	25	71.8%	75	28	64%
30\3*	79	20	78.3%	80	20	75.9%
10\4	80	10	89.3%	95	18	81.7%
20\4	81	9	90.5%	100	15	85.5%
30\4	90	9	91.5%	105	13	86.6%
10\5	92	8	92.6%	110	12	89.5%
20\5	95	7	93.7%	114	10	91.5%
30\5	98	4	96.5%	113	8	95.3%
Total	799	176	-	889	184	-
Average	79.9	17.6	83.8%	88.9	18.4	80.8%
SE±	17.9	14.3	30	26.6	8.3	28.3

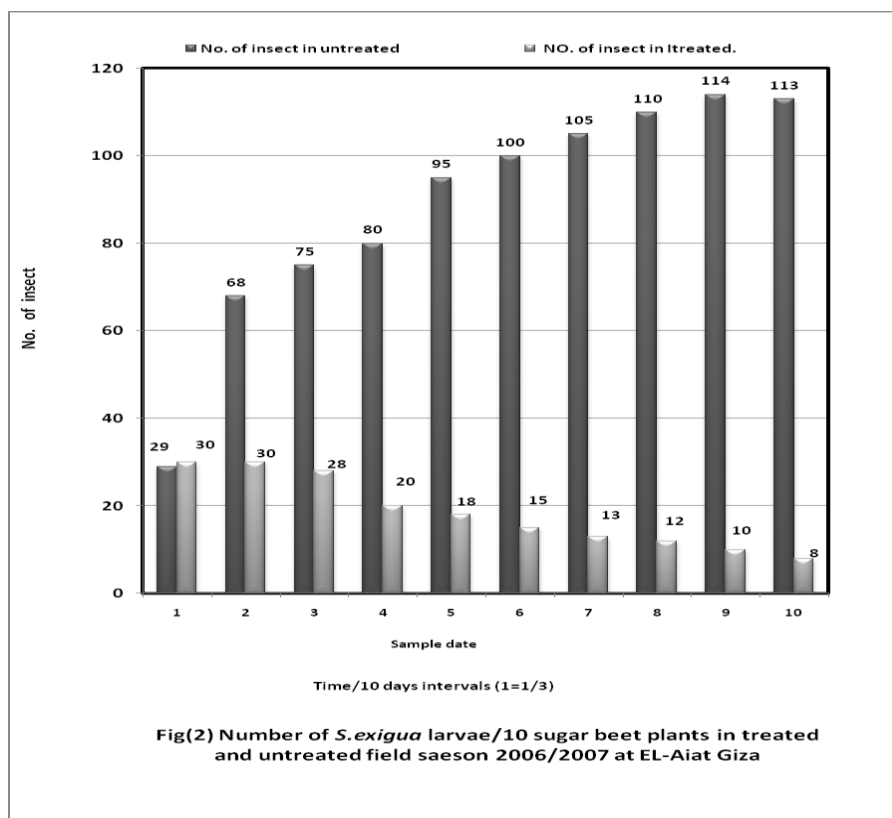
\*Date of release.

The numbers of larvae in the treated area were 30,30,28,20,18,15,13,12,10, and 8, while they were 29,68,75,80,95,100,105,110,114, and 113 in the control area with overall average numbers of larvae (18.4) in treated area and

(88.9) in control fields. Obtained data revealed that the number of *S.exigua* larvae on sugar beet plants were obviously reduced as a result of the four releases of *T. evanescens*. The overall average of percentage reduction in the second season was (80.8%).

It is quite obvious that release of egg parasitoid, *T. evanescens* West in fields planted with sugar beet resulted in decreasing in the infestation level of *S. exigua* Hb. Our results are in agreement with many findings of several authors who used *Trichogramma spp.* to control different Lepidopterous insect pest. Abd El- Hafez and Nada (2000) used this parasitoid against *Pectinophora gossypiella* (Saund). While Marie (2004) released it to control *Scrobipalpa ocellatella* (Ol.). Also, Ebaid (2001) obtained good results when he try to control *Ostrinia nubilalis* Hb. eggs and larvae by using *Trichogramma* and *Bacillus thuringiensis*. Also, Sayad (2009) mentioned that the egg parasitoid, *T. evanescens* suppressed the population of pomegranate butterfly, *Virachola (Deudorix) livia* (Klug).





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**تقييم الاستخدام التطبيقي لطفيل التريكوجراما في خفض الإصابة بدودة ورق القطن الصغرى في حقول بنجر السكر في منطقة العياط محافظة الجيزة.**

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في تجربة أجريت على مدى موسمين متتاليين (٢٠٠٦/٢٠٠٥ و ٢٠٠٦/٢٠٠٥) في مركز العياط بمحافظة الجيزة تم إطلاق طفيل التريكوجراما لمكافحة دودة ورق القطن الصغرى في حقول بنجر السكر حيث تم إطلاق هذا الطفيل خلال شهر مارس على ٤ دفعات (إطلاقات). وقد أدى ذلك إلى نجاح ملحوظ في خفيض درجة الإصابة بهذه الحشرة حيث وصلت نسبة الخفض في أعداد يرقات هذه الحشرة إلى ٨٣.٨% في الموسم الأول وإلى ٨٠.٨% في الموسم الثاني على التوالي .

**قام بتحكيم البحث**

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