

EFFECT OF *TRICHOGRAMMA EVANESCENS* WEST. RELEASE IN RICE STEM BORER CONTROL

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ABSTRACT

Rice stem borer, *Chilo agamemnon* Bles. is the key insect pest of rice in Egypt . Symptoms of dead hearts and white heads are troublesome to the rice growers , while reflect reduction in rice yield. Thus, the growers, tend to use insecticides to control this pest. However, biological control, using *Trichogramma evanescens* West. Release, was practised in rice fields at Rasheed District, Beheira Governorate in 2009 and 2010 rice seasons in fields sown with the cultivar Giza 178., the susceptible cultivar to the borer. The parasitoid was released twice, each at a rate of 30,000 parasitoids/ Feddan. Dead hearts, due to the parasitoids release, were reduced by 49.30-63.36% while white heads were reduced by 63.15-65.18% . The parasitoid release proved to be effective in controlling the rice stem borer, with no need to use insecticides.

INTRODUCTION

In Egypt, rice contributes 20% to the per capita cereal consumption, and occupies about 25 % of the cultivated area in the summer season (Sherif *et al* 1999). Because of shortage in wheat production, there is a crucial need to produce more and more rice to cover the gap between cereal production and consumption. Thus , the growers are highly interested to intensify inputs to increase rice productivity. One of the main inputs is the nitrogenous fertilizers. Unfortunately, the high doses of nitrogenous fertilizers in association with the insect susceptible rice varieties enhances the insect pest dilemma (Sherif *et al* 1999).

The major insect pest of rice, in Egypt, is the rice stem borer, *Chilo agamemnon* (Soliman and Ewaise 1997). This insect pest results in dead heart and white head symptoms which reflect yield reduction (Anonymous 2006). The biological control of rice stem borers was found successful by several investigators, e. g. Asaady and Navai (1995) and Anonymous (2006). In Egypt , Soliman and Ewaise (1997) released *Trichogramma evanescens* West. in rice fields at a rate of 28.000 parasitoids / fed, which successfully controlled *C. agamemnon*. And obtained 80% insect control In Iran , Rani (1998) released *Trichogramma* in flood water in rice fields. *Trichogramma japonicum* Ashmead, .combined with three *Telenomus* species parasitized 56 % of eggs of the white stem borer , *Scirpophaga innotata* (Walker), and multiple parasitism occurred in 61% of parasitized egg masses (Litsinger *et al* 2006).

The current study was undertaken to evaluate the role of *T. evanescens* release in suppressing infestation of *Chilo agamemnon* in rice fields.

MATERIALS AND METHODS

The current investigation was carried out at Rasheed region, Beheira Governorate, during 2009 and 2010 rice seasons. The field was sown with the rice cultivar Giza 178 which is susceptible to rice stem borer, *Chilo agamemnon* infestation (Anonymous 2012). Rice nursery was sown with pregerminated rice grain on 5th of May in both seasons. One month later, the seedlings were transplanted in the permanent field at the recommended spaces of 20x20 cm . All recommended cultural practices were applied, but without insecticides and fungicides. *Trichogramma evanescens* West. wasps , generously obtained from the biological control laboratory at Rice research and Training Center (RRTC), Sakha Agricultural Research Station, was released in the rice plots at a rate of 30,000 wasps/ feddan twice ; 15th July and 10th August (40 and 60 days after transplanting, respectively). Another area, about 100 m apart was left without parasitoid release to act as a check.

Symptoms of *C.agamemnon* infestation were monitored, and both dead hearts and white heads were counted, to find the percentages of both symptoms due to the borer attack . The dead hearts were recorded two and three weeks after the first release, while white heads were recorded three and two weeks before harvest.

RESULTS AND DISCUSSION

Data presented in Table (1) show the effect of *Trichogramma evanescens* release on reduction of dead hearts in both rice seasons; 2009 and 2010. The parasitoid was released at a rate of 30,000 wasps / feddan twice; 40 and 60 days after rice transplanting.

Table (1) : Effect of *Trichogramma evanescens* release in rice fields on dead hearts caused by rice stem borer, *Chilo agamemnon*, at Rasheed District, Beheira Governorate

Date of examination	2009 season			2010 season		
	Non-release	release	Reduction %	Non-release	release	Reduction %
25 th , July	4.38	1.77	59.59	2.99	1.70	43.14
10 th, August	3.54	0.81	77.12	2.02	0.90	55.44
Average			68.35			49.29

Dead heart reduction :

Rice plants were examined two and three weeks after the parasitoid release, i.e. on 25th of July and 10th of August. In 2009 season, dead hearts in the first examination averaged 4.38 and 1.77 % in non-release and release plots, respectively , which equals 59.59 % reduction in dead hearts due to *C . agamemnon*. The second examination (conducted on 10 th of August) revealed that the borer infestation was reduced by 77.12 % due to parasitoid release. Average of both examinations showed that the borer infestation was reduced by 68.36 % in 2009 rice season.

In 2010 rice season , the borer infestation reduction accounted for 43.14 % at the first examination, and 55.45% dead heart reduction after the second examination. However average of borer infestation reduction accounted for 49.30%.

White head reduction :

Data in Table (2) show the effect of *T. evanescens* release on *C. agamemnon* infestation

In 2009 season, examination, carried out two weeks before harvest, showed that the borer infestation averaged 3.13% in non-release plots , and 1.14 % in release ones. Thus, the borer infestation was reduced by 63.57 % in white heads.

Table (2) : Effect of *Trichogramma evanescens* release in rice fields on white head caused by rice stem borer, *Chilo agamemnon*, at Rasheed District, Beheira Governorate

Date of examination	2009 season			2010 season		
	Non-release	release	Reduction %	Non-release	release	Reduction %
Three week before harvest	2.65	0.88	66.79	3.99	1.53	61.65
Two weeks before harvest	3.13	1.14	63.57	3.38	1.19	64.79
Average			65.18			63.22

Reduction infestation calculated three weeks before harvest averaged 66.79 %. Average reduction in stem borer infestation in both seasons was 65.18 %.

In 2010 season, the borer infestation reductions averaged 64.79 and 61.65 % due to *Trichogramma* release, with an average of both examination, of 63.22% .

The current data show the efficiency of *T. evanescens* release in reducing infestation of *C. agamemnon* these results are in line with those reported by Sherif et al (2008) who reported that release of *T. evanescens* at a rate of 30,000 parasitoids twice, reduced *C. agamemnon* infestation by 48.03 % as dead hearts, and by 69.71 % as white heads. In Iran, Rani (1998) concluded that 80% of rice stem borer control could be achieved by *Trichogramma* release. Other than rice , Abbas et al (1989) found that release of *T. evanescens* at a rate of 50,000 parasitoids/ feddan reduced *C. agamemnon* infestation in sugar-cane field by 54- 64 %.

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REFERENCES

Abbas, M. S., A. H. El-Heneidy, M. M. Embaby and M. A. Ewaise (1989). Utilization of *Trichogramma evanescens* to control *Chilo agamemnon* in sugar-cane fields in Egypt. Three wave release technique. Proc. 1st Int. Conf. Econ. Ent., Vol. 2.

Anonymous.(2006). Control of the white stem borer using *Trichogramma japonicum* Ashmead. Organic Farming Information Network. Philippine

- Council for Agriculture, and Natural Resources. Research and Development (PCARRD).
- Anonymous.(2012). Rice Research and Training Center , Annual Report of Entomology Department, Field Crops Research Institute, Agricultural Research Center.
- Asaady, H.B. and I. N. Navai (1995). Effects of rearing conditions on the efficacy of *Trichogramma* against rice stem borer (*Chilo suppressalis*) and green rice semilooper (*Naranga aenescens*) in Mazandaran. *Trichogramma News*. 8(2): 33.
- Litsinger, J., A. Alviola, C. Cruz, B.Canapi, E. Batay and A. Barrion (2006). Rice white stem borer, *Scirpophaga innotata* (Walker) in southern Mindanao, Philippines. II. Synchrony of planting and natural enemies. *International Journal of Pest management*, 52 (1): 23-37.
- Rani, N.S. (1998). The rice situation in Iran. *International Rice Commission Newsletter* (47), Food and Agricultural Organization of the United Nations.
- Sherif, M. R., A.S. Hendawy. and M. M. El-Habashy (2008). Utilization of *Trichogramma evanescens* for controlling rice stem borer, *Chilo agamemnon* Bles. in rice fields in Egypt. *Egyptian J. of Biol. Pest Control*. 18 (1): 11-16.
- Sherif, M. R. , F. E . Abdallah and A . M . Soliman (1999). Major insects of rice plants in Egypt and their management. *Adv. Agric. Res. In Egypt*, 2 (3) : 188-219.
- Soliman, A. M. and M. A. Ewaise (1997). Evaluation of *Trichogramma evanescens* parasitoid as compared with recommended Furadan insecticide against *Chilo agamemnon* Bles. in rice field. *Egypt. J. of Agric. Res.* , 75(1):105-110.

تأثير إطلاق طفيل التريكو جراما لمكافحة ثاقبة ساق الأرز

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تتسبب ثاقبة ساق الأرز *Chilo agamemnon* في خسائر لمحصول الأرز نتيجة إحداث مظهر القلب الميت ، وكذا مظهر السنابل البيضاء الذي يؤدي إلى وجود سنابل فارغة في النباتات المصابة . ويلجأ المزارعون عادة الى استخدام المكافحة الكيميائية ضد هذه الآفة . اجريت التجربة الحالية لدراسة تأثير إطلاق طفيل التريكو جراما *Trichogramma evanescens* West في حقول الأرز بمنطقة رشيد (محافظة البحيرة) والمنزرعة بالصنف جيزة ١٧٨ على الإصابة بثاقبة ساق الأرز، وذلك خلال موسمي ٢٠٠٩، ٢٠١٠ . تم إطلاق الطفيل مرتين ، بعد ٤٠ ثم بعد ٦٠ يوما من الشتل ، كل منها بمعدل ٣٠.٠٠٠ طفيل / فدان . أدت معاملات الإطلاق إلى تقليل الإصابة بمظهر القلب الميت بمقدار ٤٩.٣٠ - ٦٣.٣٦ ٪ كما قللت مظهر السنابل البيضاء بمقدار ٦٣.١٥-٦٥.١٨ ٪. وهذا يعنى كفاءة استخدام الطفيل لمكافحة ثاقبة الساق في حقول الأرز، مع عدم الحاجة إلى استخدام المبيدات الحشرية .

قام بتحكيم البحث

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