BIOLOGICAL CONTROL OF SUGARCANE PINK STEM BORERS, SESAMIA SPP. (LEPIDOPTERA: NOCTUIDAE) BY THE PARASITOID WASP PLATYTELENOMUS HYLAS (HYMENOPTERA: SCELIIONIDAE) IN IRAN

By

A. NARREI, K. TAKER-KHANI and A.R. ASKARIANZADEH
Sugar cane Research Center, Ahwaz, Iran
Askar_al2002@yahoo.com

KEYWORDS: Stem Borers, Parasites, Sesamia, Platytelenomus Hylas.

Abstract
THE SUGARCANE stem borers, Sesamia cretica and S. nonagrioides (Lepidoptera: Noctuidae), are the most important pests of sugarcane and cause considerable damage in Khuzestan province (southwestern Iran). The most important Iranian natural enemy of Sesamia spp. is the egg parasitoid wasp Platytelenomus hylas (Hymenoptera: Scelionidae). The wasp is well adapted to the Khuzestan climate, and has been used in a mass-rearing and inoculative release program since 1998. Our monitoring shows the parasitism of stem borer eggs from 1999 to 2003 in Amir Kabir agro-industry was 53.7%, 60.3%, 77.2%, 87.9% and 87.2%, respectively, with a reduction in damage levels from 23.5% bored internodes in 1998 to 11.6% in 2003. Based on these results, we conclude that the parasitoid wasp has established in the area and provides useful control of the pests.

Introduction
Sugarcane pink stem borers Sesamia spp. (Lepidoptera: Noctuidae) cause heavy losses in sugarcane crops and considerable reduction in sugar recovery. Sugarcane has been grown since 1996 in Amir Kabir agro-industry (south of Khuzestan, southwestern Iran), where two species of sugarcane stem borers, S. cretica Lederer and S. nonagrioides (Lefebvre), are widely distributed in all sugarcane growing areas and infest sugarcane during all the stages of crop growth (Daniali, 1985; Rangbar Aghdam, 1999). Highest populations of S. cretica and S. nonagrioides occur during June–October and March–May, respectively (Narrei et al., 2002).

The egg parasitoid wasp Platytelenomus hylas Polazek (Hymenoptera: Scelionidae) is the most important parasite of sugarcane borers in Iran. It was first recorded from Haft Tappeh (north of Khuzestan) in 1973, and was initially assigned to Telenomus sp. Subsequently, specimens of this parasitoid collected on sugarcane in Haft Tappeh were sent to the Natural History Museum, London, and described as P. hylas by Polazek (Rangbar Aghdam, 1999). However, before it was released at Amir Kabir, it had not been recorded from that area (Rangbar Aghdam, 1999).

We first studied P. hylas for biological control of sugarcane stem borers in 1998, and subsequently reared it in the laboratory of the Sugarcane Research Center and made inoculative releases in sugarcane fields. The present study evaluates the biocontrol of sugarcane stem borers by this parasitoid.

Materials and methods
Because P. hylas shows host specialisation, we used their natural hosts for mass rearing. We collected final-instar larvae of Sesamia spp. from sugarcane fields and mass reared them in the laboratory on cut sections of cane. Eggs derived from resultant adults were used as hosts for mass multiplication of P. hylas. Inoculative releases of P. hylas were carried out in sugarcane fields annually from 1998 to Amir Kabir by releasing about 5000 adults of P. hylas per hectare.

We assessed the value of P. hylas as a biological control agent for the control of populations of sugarcane stem borers from 1999 to 2003 by monitoring the levels of stemborer infestation and parasitisation levels in the release area at Amir Kabir. Each year, we collected egg masses of Sesamia spp. at the beginning of each generation (four times each year) and reared individuals separately in glass vials in the laboratory at 25 ± 1°C, 60 ± 10% relative humidity and 14 hours photoperiod. Egg masses were

771
checked daily and the total numbers of parasitised and non-parasitised eggs were recorded. To assess the level of stemborer infestation, 45 plots were selected at random and were sampled in November of each year. We took 100 stalk samples at random from each plot and determined the proportion of damaged internodes.

**Results:**

Figure 1 shows that parasitism of sugarcane stemborer eggs increased rapidly after each inoculative release. In general, the parasitoid population was low in the first generation of the pest in April and gradually increased to the fourth generation of the pest in October. The average egg parasitism increased each year over the 1999–2003 period (Figure 2).

Following the first release of the parasitoid wasp in 1998, the percent infestation of sugarcane by larvae of *Sesamia* spp. has reduced each year (Figure 2).

**Fig. 1**—Egg parasitism of sugarcane stem borers by *P. hylas* in different generations of *Sesamia* spp. at Amir Kabir during 1999–2003.

**Fig. 2**—Average egg parasitism by *P. hylas* and internode infestation by *Sesamia* spp. at Amir Kabir during 1999–2003.
Conclusions

Assessment of damage to sugarcane caused by sugarcane stem borers (*Sesamia* spp.) confirms the usefulness of *P. hylas* in controlling populations of *Sesamia* spp. Inoculative releases of *P. hylas* have effectively controlled the sugarcane borers, reducing infestation levels from 23.5% in 1999 to 11.6% in 2003. Our survey shows the success of *P. hylas* as a biological-control agent of sugarcane stem borers.

REFERENCES


LA LUTTE BIOLOGIQUE CONTRE LES FOREURS ROSES DE LA CANNE À SUCRE *SESAMIA* SPP. (LEPIDOPTERA:NOCTUIDAE) PAR LA GUÊPE PARASITOIDE *PLATYTELENOMUS HYLAS* (HYMENOPTERA: SCELIONIDAE) EN IRAN

A. NARREI, K. TAHER-KHANI et A.R. ASKARIANZADEH

Sugar cane Research Center, Ahwaz, Iran

Askar_al2002@yahoo.com


Résumé

LES FOREURS de tiges, *Sesamia cretica* et *S nonagrioides* (Lepidoptera: Noctuidae), sont les ravageurs les plus importants de la canne à sucre dans la province de Khuzestan (sud-ouest de l'Iran) où ils causent des dégâts considérables. Le principal ennemi naturel des *Sesamia* spp. est la guêpe *Platytenomus hylas* (Hymenoptera: Scelionidae), un parasitoïde des œufs. Cette guêpe s’est bien adaptée au climat du Khuzestan et a été utilisée depuis 1998 dans un programme d’élevage massal et de lâchers inoculateurs. Une prospection, de 1999 à 2003, dans l’agro-industrie d’Amir Kabir, révèle des taux de parasitisme des œufs des foreurs de 53,7%, de 60,3%, de 77,2%, de 87,9% et de 87,2% respectivement ainsi qu’une baisse du niveau des dégâts 23,5% d’entre nous attaqués en 1998 à 11,6% en 2003. Ces résultats permettent de conclure que la guêpe parasitoïde s’est bien établie dans la région et offre un contrôle efficace de ces ravageurs.

CONTROL BIOLOGICO DE LOS BARRENADORES ROSADOS DEL TALLO, *SESAMIA* SPP. (LEPIDOPTERA NOCTUIDAE) POR LA AVISPA PARASITOIDE *PLATYTELENOMUS HYLAS* (HYMENOPTERA: SCELIONIDAE) EN IRÁN

A. NARREI, K. TAHER-KHANI y A.R. ASKARIANZADEH

Sugar cane Research Center, Ahwaz, Iran

Askar_al2002@yahoo.com


Resumen

LOS BARRENADORES del tallo de la caña de azúcar, *Sesamia cretica* y *S. nonagrioides* (Lepidoptera: Noctuidae) son las plagas más importantes de la caña de azúcar y causan daño considerable en la provincia de Khuzestan (suroccidente de Irán). El enemigo natural iraní más importante de *Sesamia* spp. es la avispa parasitoide de los huevos *Platytenomus hylas* (Hymenoptera:Scelionidae). Se encuentra bien adaptada al clima de Khuzestan, y ha sido empleada en programas de cria masiva y liberaciones inoculativas desde 1998. Los registros muestran que el parasitismo de los huevos del barrenador de los tallos, desde 1999 a 2003, tuvo los siguientes valores de 53.7%, 77.2%, 87.9% y 87.2% respectivamente, en la agroindustria Amir Kabir, y el daño se redujo desde 23.5% de los entrenudos barrenados en 1998, a 11.6% en 2003. Basados en estos resultados, se concluye que la avispa parasitoide se estableció en el área y produce un control satisfactorio de estas plagas.