

SCIENTIFIC NOTE

Parasitism of *Hypocala andremona* (Stoll) (Lepidoptera: Noctuidae) Eggs on Parsimmon Trees by TrichogrammatidsCELSO L. HOHMANN¹ AND LIDIANA LOVATO²¹Área de Proteção de Plantas, Instituto Agronômico do Paraná - IAPAR, C. postal 481, 86047-902, Londrina, PR
e-mail: celuiz@pr.gov.br²Centro Universitário Filadélfia, UNIFIL, C. postal 196, 86020-430, Londrina, PR*Neotropical Entomology* 32(2):351-353 (2003)Parasitismo de Ovos de *Hypocala andremona* (Stoll) (Lepidoptera: Noctuidae) em Caquizeiro por Tricogramatídeos

RESUMO - O estudo relata levantamento para determinar a ocorrência de parasitismo em ovos da lagarta do caquizeiro, *Hypocala andremona* (Stoll) por tricogramatídeos. Amostragens de ovos de *H. andremona* foram realizados semanalmente em dois ramos/10 plantas durante as safras de 2000/01 e 2001/02 em pomar de Londrina, e 2000/01 em Arapongas, PR. Em laboratório os ovos eram isolados em cápsulas de gelatina e mantidos em condições controladas ($26 \pm 1^\circ\text{C}$, UR $60 \pm 10\%$ e fotofase de 14h) para observação da ocorrência de parasitismo. Três espécies de parasitóides foram encontradas: *Trichogrammatoidea annulata* De Santis, *Trichogramma pretiosum* Riley e *Trichogramma bruni* Nagaraja em Londrina, sendo as duas primeiras espécies as mais abundantes. Em pomares de Arapongas foi coletado apenas *T. pretiosum*. Os níveis de parasitismo em geral foram baixos, porém parasitismo de até 50% foi observado nas amostras. O potencial desses agentes biológicos para o controle da praga é discutido.

PALAVRAS-CHAVE: Lagarta do caquizeiro, *Trichogrammatoidea annulata*, *Trichogramma pretiosum*, *Trichogramma bruni*, controle biológico

ABSTRACT - The study reports a field survey to determine the presence of parasitism on the leaf defoliator *Hypocala andremona* (Stoll) (Lepidoptera: Noctuidae) eggs, on parsimmon trees by Trichogrammatids. *H. andremona* eggs were sampled weekly on two branches/10 trees/orchard during the 2000/01 and 2001/02 crop seasons in Londrina, and during 2000/01 crop season in Arapongas, PR, Brazil. In laboratory the eggs were isolated in gelatin capsules and maintained under controlled conditions ($26 \pm 1^\circ\text{C}$, $60 \pm 10\%$ RH, 14L:10D). Three parasitoid species were identified: *Trichogrammatoidea annulata* De Santis, *Trichogramma pretiosum* Riley and *Trichogramma bruni* Nagaraja. In Arapongas only *T. pretiosum* was collected. Natural control levels in general were low, but parasitization levels up to 50% were found during the samplings. The potential use of these biological agents to control the lepidopteran pest is discussed.

KEY WORDS: Leaf defoliator, *Trichogrammatoidea annulata*, *Trichogramma pretiosum*, *Trichogramma bruni*, biological control

Parsimmon orchards, in spite of being characterized by small acreage, are very important from a social and an economic standpoint. This fruit crop is usually not the only species present in the farm, but rather, it is frequently one component in the system. Avocado is another fruit species that is commonly found in the property. This diversity of species makes this agroecosystem very suitable for the maintenance of natural enemies' population, especially in insecticide-free orchards. Although there are not many pest problems in parsimmon orchards, the parsimmon leaf

defoliator, *Hypocala andremona* (Stoll), occasionally becomes a key pest. Apart from chemical control there is no evidence of alternative methods to reduce insect damage to the fruits.

In this study we seek to determine *H. andremona*'s egg parasitoid fauna, more specifically members of the family Trichogrammatidae. Egg parasitoids of the genus *Trichogramma* are the most studied and successful taxa used in biological control programs. It has been used in more than 30 mil. ha worldwide to control lepidopteran pests in

agriculture and forestry (Hassan 1988, Li 1994). The outcome of this work may provide some insight on the potential role of these biological control agents in maintaining *H. andremona* populations at sub-economic injury levels.

To determine the egg parasitism fauna two branches per plant, in ten plants, were collected weekly in Arapongás, PR, during the 2000/01 crop season, and in orchards located in Londrina, PR, during the 2000/01, and 2001/02 crop seasons. The eggs after being removed from the leaves were placed in gelatin capsules (#000 size) in environmental chambers (26 ± 1°C, 60 ± 10% RH, 14L:10D). They were examined daily to determine the occurrence of parasitism (parasitized eggs become black by the third day at 26°C). Colonies were initiated with the progeny emerging from individual parasitized host. Microscope slides, containing males from each colony, were mounted and sent for identification.

In Londrina three hymenopteran species of the family Trichogrammatidae were identified: *Trichogrammatoidea annulata* De Santis, *Trichogramma pretiosum* Riley and *Trichogramma bruni* Nagaraja. The first two species were the most frequent. In Arapongás only *T. pretiosum* was observed. *Trichogrammatoidea annulata* was originally collected from eggs of *Alabama argillacea* Hübn. (Lepidoptera: Noctuidae) on cotton (De Santis 1980, Hohmann *et al.* 1989). *Trichogramma pretiosum* is a widespread species in the New World (Pinto *et al.* 1978, Oatman *et al.* 1982, Zucchi & Monteiro 1997) but it has also been reported from Hawaii and Australia (Oatman *et al.* 1982). *Trichogramma bruni* was described from an unidentified notodontid species collected in Minas Gerais, Brazil (Nagaraja 1983). Despite the reports of *T. bruni* occurring also in Bolivia and Venezuela its identification is questionable (Zucchi & Monteiro 1997). None of these three species were referred as parasitoids of *H. andremona* in the literature.

The lack of progeny emergence from some of the eggs sampled prevented us to determine the percentage of eggs parasitized by each parasitoid species in the different localities. In Arapongás, pest infestation was very low during most of the crop season resulting in only one sampling date (Jan 25, 2001). Thirty five percent of the *H. andremona* eggs collected in this orchard were parasitized by *T. pretiosum*.

Parasitism rates during the highest pest population density period (January 2001) varied from ca. 35% to 50% at IAPAR Experimental Field Station in Londrina. However, samplings conducted during the following season in the same area (Nov 2001 - Jan 2002) revealed lower parasitism levels; from zero to 37%, the average being 5%. Similar results were obtained when the study was carried out in a commercial farm in Londrina during the same crop season (2001/02). Parasitism ranged from zero to 38%, but the mean number of eggs parasitized in this case was 14%. Both fields did not receive pesticide applications.

The three Trichogrammatid species collected from *H. andremona* eggs in parsimmon orchards have also been collected from eggs of the avocado fruit borer, *Stenoma catenifer* Wals. (Lepidoptera: Elachistidae), on avocado trees in the vicinity of parsimmon fields (Hohmann & Meneguim 1993).

The co-occurrence of these egg parasitoid species in both

fruit crops, often achieving fair levels of natural control, suggests that they may become potential candidates to be used against these two important pests. An additional factor that may contribute to the successful use of them is that these two fruit crops are inserted in a more stable environment due to the higher diversity of species, characterized by the presence of perennial and annual crops. This variety of plant species may act as hosts for other lepidopteran species whose eggs may also be used by some of these Trichogrammatids. In fact, parasitized eggs have been collected on annual crops and weeds nearby the avocado and parsimmon orchards (C. L. Hohmann, pers. obs.). However, before taking any step forward to start mass rearing and releasing the parasitoids, laboratory and field studies are necessary, mainly with the parsimmon leaf defoliator, to understand their biology and ecology in order to attain a real measure of their potentialities as biological control agents.

Acknowledgments

We thank Ranyse Quirino and Roberto A. Zucchi, ESALQ, Piracicaba, Brazil and John D. Pinto, University of California Riverside, USA for identifying the Trichogrammatids. We also thank Aduino Pedro Costa, and Aparecido de Souza Guedes for collecting the samples, and Aderson Tukushima and Lauro A. Okuyama for graciously allowing us to use their orchards to conduct the surveys. We thank CNPq/PIBIC for the second author's scholarship.

Literature Cited

- De Santis, L. 1980.** Catálogo de los himenópteros brasilenos de la serie parasitica incluyendo Bethyloidea. Editora Universidade Federal do Paraná, Curitiba, 395p.
- Hassan, S.A. (ed.) 1988.** *Trichogramma* News. vol. 4. Federal Research Center for Agriculture and Forestry. Braunschweig, 32p.
- Hohmann, C.L. & A.M. Meneguim. 1993.** Observações preliminares sobre a ocorrência da broca-do-abacate, *Stenoma catenifer* Wals. no Estado do Paraná. An. Soc. Entomol. Brasil 22: 417-419.
- Hohmann, C.L., Silva, S.M.T. & W.J. dos Santos. 1989.** Lista preliminar de Trichogrammatidae encontrados no Paraná. An. Soc. Entomol. Brasil 18: 203-206.
- Li, Li-Ying. 1994.** Worldwide use of *Trichogramma* for biological control on different crops: A survey, p. 37-53. In E. Wajnberg & S.A. Hassan (eds.), Biological control with egg parasitoids. International Organization for Biological Control, U.K, 286p.
- Nagaraja, H. 1983.** Descriptions of new Trichogrammatidae (Hymenoptera) from Brazil. Rev. Brasil. Biol. 43: 37-44.
- Oatman, E.R., J.D. Pinto & G.R. Platner. 1982.** *Trichogramma* (Hymenoptera: Trichogrammatidae) of

Hawaii. Pac. Insect. 24: 1-24.

Pinto, J.D., G.R. Platner & E.R. Oatman. 1978. Clarification of the identity of several common species of North American *Trichogramma* (Hymenoptera: Trichogrammatidae). Ann. Entomol Soc. Am. 71: 169-180.

Zucchi, R.A. & R. C. Monteiro. 1997. O gênero *Trichogramma* na América do Sul, p. 41 - 66. In J.R.P. Parra & R.A. Zucchi (eds.), *Trichogramma* e controle biológico aplicado, FEALQ, Piracicaba, 324p.

Received 01/04/02. Accepted 12/12/02.
