DOI: 10.1590/1808-1657000852013

Natural parasitism of *Hexacladia smithii* Ashmead (Hymenoptera: Encyrtidae) on *Euschistus heros* (F.) (Hemiptera: Pentatomidae): new record from Mato Grosso State, Brazil

*Parasitismo natural de **Hexacladia smithii** Ashmead (Hymenoptera: Encyrtidae) sobre **Euschistus heros** (F.) (Hemiptera: Pentatomidae): novo registro no estado do Mato Grosso*

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ABSTRACT: The neotropical stink brown bug, *Euschistus heros* (F.) (Hemiptera: Pentatomidae), is an insect pest to soybean crops in Mato Grosso State, Brazil. In this region, synthetic insecticides are frequently used for insect control. An alternative to the indiscriminate use of insecticides is the biological control with parasitoids. Thus, the objective of this study was to conduct the survey of parasitoids that use *E. heros* adults as hosts. Random samples were conducted during the harvests of 2009/10 and 2010/11 in two farms that produce soybean (conventional system) in Tangará da Serra, Mato Grosso State, Brazil. The total number of collected *E. heros* was: 297 (Field 1) and 293 (Field 2) in 2009/10 and 295 (Field 1) and 376 (Field 2) in 2010/11. Of these, 1.50 (Field 1) and 13.99% (Field 2) were parasitized in 2009/10 and 8.47 (Field 1) and 7.45% (Field 2) in 2010/11. The parasitoids found were *Hexacladia smithii* Ashmead (Hymenoptera: Encyrtidae) in both fields. This is the first record of parasitism in *E. heros* adults in the state of Mato Grosso, Brazil.

KEYWORDS: *Pentatomidae*; endoparasitoid; biological control; soybean.

RESUMO: O percevejo marrom, *Euschistus heros* (Hemiptera: Pentatomidae), é um inseto praga na cultura da soja no estado do Mato Grosso, Brasil. Nesta região, inseticidas sintéticos são frequentemente utilizados ao controle de insetos. Uma alternativa para o uso indiscriminado de inseticidas é o controle biológico com parasitoides. Assim, o objetivo deste estudo foi realizar o levantamento dos parasitoides que utilizam adultos de *E. heros* como hospedeiros. Para isso, amostras aleatórias foram conduzidas durante as safras de 2009/10 e 2010/11, em duas fazendas produtoras de soja (sistema convencional) em Tangará da Serra, Mato Grosso, Brasil. O número total de *E. heros* coletados foi: 297 (Área 1) e 293 (Área 2) em 2009/10 e 295 (Área 1) e 376 (Área 2) em 2010/11. Destes percevejos 1,50 (Área 1) e 13,99% (Área 2) encontravam-se parasitados em 2009/10 e 8,47 (Área 1) e 7,45% (Área 2) em 2010/11. Nas duas áreas, o parasitoide encontrado foi *Hexacladia smithii* Ashmead (Hymenoptera: Encyrtidae). Este é o primeiro registro de parasitismo em adultos de *E. heros* no estado do Mato Grosso, Brasil.

PALAVRAS-CHAVE: *Pentatomidae*; endoparasitoide; controle biológico; soja.

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Received on: 19/09/2013. Accepted on: 10/10/2013

Euschistus heros (F.) (Hemiptera: Pentatomidae) is an insect pest of economic importance to soybean crops in Brazil, especially in Mato Grosso State. This is due to its abundance and the damage it causes to several crops (Panizzi; Slansky, 1985; Corrêa-Ferreira; Azevedo, 2002; Vivan; Degrande, 2011). In this region, insecticides are generally used for arthropod pest control, mainly because of the efficiency of these products. However, they are often applied erroneously, which can contribute with negative impacts on the ecosystem and human health (Belo et al., 2012). Hence, an alternative to use of insecticides is the implementation of other control tactics, such as biological (Kogan, 1998; Parra et al., 2002).

Before initiating the use of biological control against insect pests, it is necessary to know information about species in the region, such as their occurrence and abundances of natural enemies (Henneberry et al., 1991; Parra et al., 2002). Unfortunately, in the state of Mato Grosso, little is known about the natural enemies that control stink bug in adult stage. Thus, the objective of this study was to conduct a survey regarding parasitoids that use *E. heros* adults as hosts.

Random samples were conducted during the harvests of 2009/10 and 2010/11 in two farms that produce soybean in Tangará da Serra, Mato Grosso State, Brazil: Field 1 – 14° 39'S and 57° 24'W; Field 2 – 14° 18'S and 57° 45'W. Field 1 has always used pesticides (organophosphates and pyrethroids) to control pests, while Field 2 adopted an organic system between 2002 and 2009, but currently is using the conventional system. Adults of *E. heros* collected with shake cloth in Fields 1 and 2 were sent to the Laboratory of Entomology at the *Universidade do Estado de Mato Grosso – Campus Tangará da Serra* (UNEMAT/CUTS). All the collected insects were individualized in plastic pots, where they received food and remained at environment temperature until emergence of parasitoids (or not). Hymenopterans were identified by Doctor Valmir Antônio Costa by employing the taxonomic key of Noyes (2010), and the specimens were deposited in the Collection of Entomophagous Insects "Oscar Monte" (IB-CBE), of the Biological Institute in Campinas, state of São Paulo.

The total number of *E. heros* sampled in the 2009/10 season was 297 and 293 in Fields 1 and 2 respectively, and 295 and 376 insects in 2010/11 season in the same areas. The parasitism percentage was 1.5 (Field 1) and 13.9% (Field 2) in 2009/10, and 8.5 (Field 1) and 7.5% (Field 2) in 2010/11. The parasitoid found was *Hexacladia smithii* (Ashmead) (Hymenoptera: Encyrtidae), which is an endoparasitoid of nymphs and adult stink bugs that can contribute to reduction of insect pest.

Hexacladia smithii occurs from Argentina (De Santis, 1979) to Southern USA (Gordh, 1979), although Noyes (2010) considers this last record a result of an erroneous identification. These parasitoids were recorded from the South to the Central region of Brazil, in different cultures, and are associated with the control of *Holymenia histrio* (F.) (Hemiptera: Coreidae) and *Anisoscelis marginella foliacea* (Dallas) (Hemiptera: Coreidae), passion fruit pests (Baldin et al., 2010); *Arvelius albopunctatus* (De Geer) (Heteroptera: Pentatomidae), a tomato pest (Panizzi; Silva, 2010); and *Dichelops furcatus* (F.) (Hemiptera: Pentatomidae) and *E. heros*, soybean pests (Corrêa-Ferreira et al., 1998; Godoy et al., 2010; Panizzi; Silva, 2010).

This species is relatively considered polyphagous, because parasite nymphs and adults of various species of stink bugs are found in diverse crops (Coreidae, Pentatomidae and Scutelleridae). Its hosts are known: *Holymenia clavigera* (Herbst) (Hemiptera: Coreidae) (Costa Lima, 1930), *Holymenia histrio* (F.) (Hemiptera: Coreidae) and *Anisoscelis marginella foliacea* (Dallas) (Hemiptera: Coreidae) (Baldin et al., 2010); *Antiteuchus sp.* (Hemiptera: Pentatomidae) (Noyes, 2010); *Antiteuchus mixtus* (F.) [= *Antiteuchus variolosus* (Westwood)] (Hemiptera: Pentatomidae) (Cuezzo; Fidalgo, 1997); *A. albopunctatus* (Panizzi; Silva, 2010), *Edessa* sp. (Hemiptera: Pentatomidae) (De Santis, 1980; Noyes, 2010); *Edessa meditabunda* (F.) (Hemiptera: Pentatomidae) (Cuezzo; Fidalgo, 1997); *E. heros* (Corrêa-Ferreira et al., 1998; Mourão; Panizzi, 2000) and *D. furcatus* (Panizzi; Silva, 2010); *Pachycoris torridus* (Scopoli) (Hemiptera: Scutelleridae) (Costa Lima, 1930) and *Tetyra pinguis* (Germar) (Hemiptera: Scutelleridae) (De Santis, 1979).

In summary, this research reported the first occurrence of *E. heros* adults parasitism in Mato Grosso State, Brazil. The results showed a low parasitism rate in *E. heros* adults (1.5 to 13.9% in 2009/10 and 8.5 to 7.5% in 2010/11). However, it contributes with knowledge about the diversity of beneficial insects in soybean crops and reinforces the need of further investigations, since these organisms can act on the agroecosystem balance and favor the reduction of insect pest population.

ACKNOWLEDGMENTS

To Franciosi group and *Universidade do Estado de Mato Grosso* for logistical support, to *Fundação de Amparo à Pesquisa do Estado de Mato Grosso* for financing the research.

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