First record of Hexacladia hilaris Burks (Hymenoptera: Encyrtidae) in Brazil and association with Chinavia erythrocnemis (Berg) (Heteroptera: Pentatomidae)

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Abstract. Hexacladia hilaris Burks (Hymenoptera: Encyrtidae) is a parasitoid associated to several stink bug species in Costa Rica, Porto Rico and United States. In April 2018, at the Passo Fundo (28°15′46″ S / 52°24′24″ O), Rio Grande do Sul state, Brazil, specimens of H. hilaris were collected from Chinavia erythrocnemis (Berg) (Heteroptera: Pentatomidae). This is the first record of this parasitoid in South America as well as its association with C. erythrocnemis.

Keywords: Biologic control; Chinavia erythrocnemis; parasitoid; Pentatomidae; Stink bugs.

Parasitoids of the genus Hexacladia Ashmead (Hymenoptera: Encyrtidae) are commonly found parasitizing Pentatomidae (Heteroptera) stink bugs. The most common species is Hexacladia smithii Ashmead, recorded in Brazil parasitizing adults of Edessa meditabunda (F.) (Panizzi & Corrêa-Ferreira 1997), Euschistus heros (F.) (Corrêa-Ferreira et al. 1998), Dichelops melacanthus (Dallas) (Corrêa-Ferreira et al. 2005), Arvelius albopunctatus (De Geer), and Dichelops furcatus (F.) (Panizzi & Silva 2010).

Besides pentatomids, these encyrtids also parasitize adults of Holhymenia clavigera (Herbst), Holhymenia histrio (F.) and Anisoscelis foliaceus (F.) (Coreidae) (Costa Lima 1930; Baldin et al. 2010), and Pachycoris torridus (Scop.) (Scutelleridae) (Costa Lima 1930). Another but less common species is Hexacladia blanchardi De Santis, recorded parasitizing E. meditabunda (F.) (Corrêa-Ferreira et al. 1998), Dichelops melacanthus (Dallas) (Corrêa-Ferreira et al. 2005), Arvelius albopunctatus (De Geer), and Dichelops furcatus (F.) (Panizzi & Silva 2010).

Hexacladia are gregarious endoparasitoids of adult stink bugs, which perform their embryonic and post-embryonic development in the abdominal cavity of their hosts, emerging through orifices made at the dorsal or ventral side (Figure 1A). The host, in that case, continues alive throughout the parasitoid development, an unusual fact among hymenopteran parasitoids (Costa Lima 1930; Rasplis et al. 1990). Costa Lima (1930) reported that individuals of parasitized P. torridus and H. claviger had their internal organs of the abdominal cavity totally damaged, dying a while after the parasitoid’s emergence. Contrasting, Rasplis et al. (1990) reported that only adult gonads of Linus molevolus Rolston were atrophied while the remaining organs were unharmed.

Hexacladia is recognized by the distinct petiole, the antennae inserted very high on head, scutellum dome-shaped, fore wings with characteristic infuscation and setae pattern and males having branched antennae (Noyes 2010).

During March 2018, in Passo Fundo (28°15′46″ S / 52°24′24″ O), Rio Grande do Sul state, Brazil, a total of 22 adults of Chinavia erythrocnemis (Berg) (Heteroptera: Pentatomidae) were collected from plants of Pittosporum undulatum Ventenat (Pittosporaceae). At the laboratory of the “Centro Nacional de Pesquisa de Trigo – Embrapa Trigo”, the insects were kept under controlled conditions (25 ± 1 °C, 60 ± 10 % RH, photoperiod 14 hL:10 hD), in covered plastic boxes, fed twice a week with a natural diet of fresh bean pods (Phaseolus vulgaris L.), ripe soybean seeds [Glycine max (L.) Merrill] and ripe peanut grain (Arachis hypogaea L.).

A male stink bug died due to parasitism and from its body 20 females and four males of H. hilaris Burks emerged, through an orifice made at the ventral side of abdomen (Figure 1B). The identification of the parasitoid was made by one of the authors (VAC) and was based on the identification key of Noyes (2010).

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United States, all associated to phytophagous stink bugs, namely Acrosternum hilaris (Say), Loxa virescens Amyot & Serville, and Nezara viridula (L.) (Heteroptera: Pentatomidae) (NOYES 2019). This is the first record of this parasitoid in South America, as well as its association with C. erythrocnemis.

According to NOYES (2010), adults of H. hilaris are 2.1 - 3.0 mm long, have general coloration dark-brown and hyaline wings with infuscate areas; the males have branched antennae (Figure 2A), while females do not have such character (Figure 3).

Similar to what was observed in the present study, adults of H. hilaris emerged from a female of A. hilaris, at South Carolina (USA), through orifices made at the ventral face of the host's abdomen (JONES et al. 1996).

The following differences between the studied specimens and the H. hilaris description are reported: the proportion of length of the marginal vein/length of the stigmal vein is 0.87 (vs. 1 at the description) and costal cell with 17-22 ventral setae (vs. 11 setae at description). No other differences were observed in the remaining characters, including in the male genitalia (Figure 2B). Thirteen voucher specimens were deposited at the “Coleção de Insetos Entomófagos Oscar Monte”, at Campinas, São Paulo state, Brazil, at the “Unidade Laboratorial de Referência em Controle Biológico do Instituto Biológico”, under the reference numbers from IBCBE 002943 to IBCBE 002955.

Chinavia erythrocnemis has little economic importance in Brazil and was previously observed feeding on white lily, Lilium longiflorum, in Rio Grande do Sul (PALMA et al. 2015), where it has been frequently collected on canola plants, Brassica napus L. var. oleifera (MARSARO JÚNIOR et al. 2017; BIANCHI et al. 2019). This stink bug is also observed feeding on bean, Phaseolus vulgaris L. pods (LUČINI et al. 2020).

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Figure 1. Chinavia erythrocnemis, male. A) Emergence orifice of Hexacladia hilaris at the abdomen; B) emerged individuals of H. hilaris. Author: A. L. Marsaro Júnior.

Figure 2. Hexacladia hilaris, male. A) Antenna (IBCBE 002954). B) Genitalia (IBCBE 002955). Author: V. A. Costa.
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Figure 3. Hexacladia hilaris, female (IBCBE 002943). Author: V. A. Costa.
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