



Systematics, Morphology and Biogeography

Redescription of the adult male and description of the puparium of *Hirmoneuropsis luctuosa* (Philippi) (Diptera, Nemestrinidae) from central Chile



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ABSTRACT

The male of *Hirmoneuropsis luctuosa* (Philippi, 1865) is redescribed and the puparium is described and illustrated for the first time. *Hirmoneuropsis luctuosa* is compared with other species of the genus. Illustrations of diagnostic characters of the male and pupa are also provided.

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Introduction

The Nemestrinidae or tangle-veined flies are a small group of brachycerous flies with about 300 extant and fossil species in more than 20 genera; the family has a worldwide distribution (Bernardi, 1973), but specimens are sometimes hard to find in some regions. The adult flies are usually moderate to large stout flies with a densely pilose body. Adults frequent visit flowers, feeding upon the nectar. Nemestrinid larvae are internal parasitoids of other insects – such as Orthoptera (Greathead, 1958), Coleoptera (Richter, 1997), and Mantodea (Haenni and Borer, 2007). The species of *Hirmoneuropsis* Bequaert develop in larvae of scarabaeid beetles (Richter, 1997). They have a peculiar wing venation with a compound diagonal crossvein and the apical veins running parallel to the hind margin of the wing and terminating anterior to its apex.

The family was revised worldwide by Bernardi (1973). In the Neotropics the family is represented by four subfamilies, six genera, and 64 species (Papavero and Bernardi, 2009a). In Chile, 4 genera and 39 species are known (Papavero and Bernardi, 2009a) with the genus *Trichophthalma* Westwood the most diversified. The nemestrinids have been studied in Chile by Philippi (1865), Stuardo (1930a, b, 1932, 1934, 1935, 1936), Wagenknecht (1940), and Angulo (1971, 1976).

The genus *Hirmoneuropsis* Bequaert (1932) was described as a subgenus of *Hirmoneura* Meigen belongs to subfamily Hirmoneurinae, tribe Hyrmophlaebini, and comprises 35 species (Bernardi, 1976, 1977; Papavero and Bernardi, 2009a) with most species distributed in Argentina and Chile (Angulo, 1971; Papavero and Bernardi, 2009a; Kosmann et al., 2014).

Knowledge of the immatures of Neotropical species is poor (Papavero and Bernardi, 2009b); immatures only of four species are known – *Neorhynchocephalus sackenii* (Williston) (Prescott, 1960, 1961), *Neorhynchocephalus sulphureus* (Wiedemann) (Crouzel and Salavin, 1943), the pupal skin of *Hirmoneuropsis articulata* (Philippi) (Stuardo, 1936), and the larvae of Falleniinae, which form a respiratory tube (Léonide, 1962; Prescott, 1955, 1961); that tube is lacking in the larva of *Hirmoneura obscura* Meigen (Handlirsch, 1882, 1883).

The objective of the present work is to redescribe the male and to describe for the first time the puparium of *Hirmoneuropsis luctuosa*, then by contributing to our knowledge of the biodiversity of the Diptera of Chile.

Material and methods

Morphological terminology follows Teskey (1969) for pupal exuviae and to Cumming and Wood (2009) for adults. The central zone of Chile has a mediterranean climate with seven months of dry conditions and five months with rains. Broad sclerophyll evergreen trees and shrubs dominate the vegetation. The puparium were found 3–5 cm beneath the soil surface of a *Lithraea* forest,

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on a steep and humid hillside; they were collected with a hand trowel. Specimens were transported to the laboratory and kept in plastic boxes with a wet paper towel to maintain conditions similar to those of the natural habitat until the emergence of adult. Photographs were taken using a Nikon trinocular stereomicroscope SMZ 1500 and digital camera DS-Fi2. Depth of field was enhanced by NikonTD ACT-2U software stacking multiple images. Terminalia were macerated in 10% KOH at approx. 95 °C for 3 h to remove soft tissue, then rinsed in distilled water and dilute glacial acetic acid, and dissected in water.

Results

Hirmoneuropsis luctuosa (Philippi)

(Figs. 1–8)

Hermoneura luctuosa Philippi, 1865: 661

Hirmoneuropsis luctuosa n.comb. Bernardi, 1977

Material examined

Región de Valparaíso, 1 male El Granizo 2.XII.1952, E.Z.R. col.; 1 male El Salto 19.XII.1964 C. Vivar col. Región Metropolitana: Cordillera Province, 1 male Qda. Los Almendros (33°43'50" S/70°29'23" W) elevation 959 m, Reserva Nacional Río Clarillo, 4.XI.1997, P. Estrada col. Material examined deposited in the Instituto de Entomología Collection, Universidad Metropolitana.

Diagnosis

Body color grayish. Scutum dark-brown pollinose with long black hairs. Wing smoky without sectorial vein. Legs brownish-gray pollinose. Abdomen dark gray; first segment with tuft of yellowish,

long and thin hairs on the lateral margin; lateral margin of tergites II–V with long and thin whitish hairs (Fig. 1).

Description

Male. Body length: 10.5–13.5 mm; wing length: 12.5–13.5 mm. Head. Holoptic eyes slightly touching in upper ¼ with short abundant whitish hairs, ommatidia larger in upper 2/3–3/4; occiput grayish pollinose, with short whitish hairs, larger lateral to compound eye; ocellar tubercle raised, polished dark gray, with proclinate dark hairs; frons dark-gray pollinose; face brownish polished gray, with long whitish hairs around oral margin and long black hairs near margin of compound eyes and base of antenna (Fig. 2). Gena with long whitish hairs. Antenna dark-gray pollinose; scape with black hairs on dorsal and ventral surface (Fig. 3); pedicel cylindrical, with long, thin black hairs; first flagellomere ovoid and slightly flattened, 3× longer than pedicel; proboscis short, ½ the length of the eyes; palpus short, brownish-gray pollinose, with short, thin and sparse light-brown hairs. Thorax dorsal view: scutum dark-brown pollinose, with long, thin and sparse black hairs; notopleuron dark-brown pollinose with long black and yellowish hairs; scutellum dark-brown pollinose, with very long black hairs, and thin whitish hairs on base (Fig. 4). Pleura: postpronotal lobe gray pollinose, with dense long, thin whitish hairs; anepisternum gray pollinose, with dense long, thin yellowish hairs, and very few black hairs; katepisternum gray pollinose, with long whitish hairs; anepimeron, meropleurite, mediotergite, laterotergite, metepisternum and metepimeron with long whitish hairs. Wing (Fig. 5): smoky, darker in costal margin; C with delicate black bristles surrounding wing; cell sc and r₁ brownish completely; R₁, R₂₊₃, R₄, R₅, M₁, and M₂ straight and almost parallel to each other; without sectorial vein; CuA₂ and A₁ touching wing margin, cell cup open; alula hyaline; wing 3x longer than wide. Stalk of halter darker brown with delicate yellow bristles near base; knob dark brown on



Figs. 1–4. *Hirmoneuropsis luctuosa* (Philippi, 1865). 1. Adult male; 2. Head of male frontal view; 3. Head of male lateral view; 4. Thorax in dorsal view. Scale bar = 1 mm.

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