Two new species of moth flies (Diptera, Psychodidae) from the semi-arid region of Brazil

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Abstract

Two new species of Psychodinae, Psychodidae, from the semi-arid region of Brazil are described and illustrated: Arisemus rubeni sp. nov. and Lepidiella olgae sp. nov. Only nine psychodid species were previously known from that region.

Key words: Psychodinae, Arisemus, Lepidiella, Neotropical region

Introduction

More than 500 species of Psychodidae (excluding the Phlebotominae) have been described from the Neotropical region and approximately 150 are known to occur in Brazil. The family is poorly represented in the semi-arid region of Brazil, with only nine described species, all psychodines: Alepia arenivaga Bravo; A. fervida Bravo; A. montana Bravo; Australopericoma dissimilis Bravo; Psychoda alternicula Quate; P. dantilandensis Bravo, Cordeiro & Chagas; P. divaricata Bravo, Cordeiro & Chagas; P. serraorobonensis Bravo, Cordeiro & Chagas; and P. zetoscotia Quate (Bravo 2007, 2008, Bravo et al. 2006, Cordeiro et al. 2011). Brazil’s semi-arid biome covers an area of 969.590 km² in the northeastern part of the country and is characterized by a long dry season (6–11 months) and mean annual rainfall levels of less than 800 mm, usually falling between November and March (Behling et al. 2000, Ministério da Integração Nacional 2005). In the present paper, we describe two new species of Psychodinae, both of them from the semi-arid region of northeastern Brazil.

Material and methods

Specimens were collected with “Luiz de Queiroz” light traps and preserved in 70% ethanol, cleared with hot 10% sodium hydroxide, and mounted in Canada balsam. The terminology of the morphological descriptions follows principally Cumming and Wood (2009). The triangular lobe at the base of the wing is referred to as the jugum, following the recommendation of Duckhouse (1987). All of the specimens described are deposited in the Prof. Johann Becker Entomology Collection at the Zoological Museum of the Universidade Estadual de Feira de Santana, Brazil (MZFS).

Taxonomy

Arisemus rubeni Bravo & Araújo, sp. nov.
(Figs. 1A–I)

Type material. Holotype, male: BRAZIL, Ceará, Chapada do Araripe, Parque Estadual Sítio Fundão (mata ciliar),

**Etymology.** The specific epithet is dedicated to the father of the senior author, Ruben Bravo.

**Diagnosis.** Scape to pedicel ratio 1.5:1.0; first flagellomere approximately 2.0 times longer than the second flagellomere; antepronotum with a pyriform sensory organ located in front of the anterior spiracle; abdominal sternites 3, 4 and 5 without a band of black scales in center of anterior margin; gonoxoxites touching at base; gonostylus bifurcate; aedeagus asymmetrical, narrow and S-shaped apically; right paramere bifurcated apically; cercus without basal spatulate bristles on dorsal surface.

**FIGURE 1.** *Arisemus rubeni* sp. nov. male holotype. (A) head; (B) base of antenna: scape, pedicel and four basal flagellomeres; (C) flagellomeres 11, 12 and 13; (D) palpus; (E) wing; (F) wing jugum; (G) sensory organ of antepronotum; male terminalia (spi = anterior spiracle); (H) dorsal; (I) epandrium, cerci and hypoproct. Escale bars: Figs 1A, 1E, 1F = 0.25 mm, Figs 1B, 1C, 1D, 1G = 0.06 mm, Figs 1H, 1I = 0.12 mm.
Description. Male holotype. Head (Fig. 1A) longer than wide; frons hair patch without median extension, divided in center; eye contiguous; eye bridge with three facet rows; scape to pedicel ratio 1.5:1.0, scape not enlarged, with apical tuft of long, black bristles on the inner margin (Fig. 1B). Flagellum incomplete, 13 flagellomeres observed; first flagellomere much larger than following flagellomeres, approximately 2.0 times longer than the second flagellomere (Fig. 1B); flagellomeres 1–11 nodiform, internodes short; flagellomeres 12–13 reduced, lacking internodes, globular (Fig. 1C); ascoids simple (Fig. 1C), observed only on flagellomeres 9–11. Ratio of palpomeres: 1.0:1.2:1.4:2.3; last palpomere striated (Fig. 1D).

Anterpronotum with pyriform sensory organ in front of anterior spiracle (Fig. 1H). Wing (Fig. 1E) with spots of infuscation at the apices of each longitudinal vein; base of R 4 with 29 small macrotrichia (setulae); base of wing vein M 2 without glandular structure; CuA 2 without apical enlargement, not reaching the wing margin; jugum with tuft of long, black bristles (Figs. 1E, F).

Abdominal sternites 3, 4 and 5 without band of black scales at center of anterior margin.

Male terminalia (Figs. 1H, I); hypandrium inconspicuous; gonocoxites touching at base; gonostylus bifurcate, with short median projection; anterior gonocoxal apodemes joined at center forming a narrow plate, triangular shaped; posterior gonocoxal apodemes forming a sclerotized plate below aedeagus, extending nearly to the base of gonocoxites; aedeagus asymmetrical, narrow and sinuous apically; parameres complex, paired, asymmetrical, left pair shorter than right pair; right paramere bifurcated apically; ejaculatory apodeme dorsoventrally compressed, rounded, longer than the gonocoxites; epandrium wider than long, with two foramina; cercus without basal spatulate bristles on dorsal surface, each with one apical tenaculum; hypoproct with apical micropilosity.

Comments. The Neotropical genus *Arisemus*, with 30 recognized species, is known from Central America (Guatemala, Nicaragua, Costa Rica, Panama), northern South America (Venezuela, Colombia, Ecuador, and Peru) and the Caribbean region (Bahamas, Cuba, Puerto Rico, Jamaica, Saint Lucia, Martinique) (Wagner & Joost 1994, Collantes & Martínez-Ortega 1999, Collantes & Baquero 2000, Quate & Brown 2004). *Arisemus rubeni* represents the first record of the genus from Brazil. Species of *Arisemus* can be recognized by the presence of broad anterior gonocoxal apodemes, joined at center and expanded anteriorly, presence of a keel connected to the aedeagus, contiguous eyes, reduction of the terminal three flagellomeres, R 5 ending at the wing tip, and the presence of 1 tenaculum (Quate & Brown 2004).

In a key to the males of *Arisemus* by Quate & Brown (2004) *Arisemus rubeni* comes out at couplet 12 and presents similarities to, as well as differences from, the two species in this couplet: *A. triatrapars* Quate & Brown and *A. aenigmaticus* Quate & Brown.

*Arisemus rubeni* is morphologically similar to *A. triatrapars* by having a frons with the patch of setae alveoli divided at center; gonostylus with short median projection; posterior gonocoxal apodemes forming a sclerotized plate below aedeagus; cercus without basal spatulate bristles on dorsal surface. These two species can be distinguished because *A. rubeni* does not have a band of black scales at the center of the anterior margin of abdominal sternites 3, 4 and 5, which are present in *A. triatrapars*; by the presence of a fig-shaped sensory organ in front of the anterior spiracle of the anterpronotum in the new species, which is absent in *A. triatrapars*; CuA 2 does not reach the wing margin in the new species, while in *A. triatrapars* this wing vein ends at the wing margin; in the new species the apex of the longest paramere is bifurcated, but simple in *A. triatrapars*; the aedeagal apodeme is longer in the new species than in *A. triatrapars*.

The presence of a pyriform sensory organ in the anterpronotum and CuA 2 incomplete are characters observed in both the new species and in *A. aenigmaticus*. These two species can be distinguished by the presence of a conspicuous hypandrium and gonocoxites separated by that structure, the presence of approximately 30 black, spatulate hairs on the dorsal margin near the base of the gonostylus, parameres not bifurcated, and ejaculatory apodeme narrow in *A. aenigmaticus*, while *A. rubeni* has an inconspicuous hypandrium and the gonocoxites are therefore touching basally, absence of spatulate hairs on gonostylus, paramere bifurcated, and ejaculatory apodeme broad.

*Lepidiella olgae* Bravo & Araújo, sp. nov.

(Figs. 2A–I)

Type material. Holotype, male: BRAZIL, Paraíba, Areia, Brejo Paraibano, 06°57’46”S 35°41’31”W, 494 m.a.s.l.

**Etymology.** The specific epithet is dedicated to the mother of the senior author, Olga Quijano.

**Diagnosis.** Head without corniculi; eyes separated by 2.0 facet diameters; scape approximately the same length as pedicel, without internal protuberances; hypandrium dorsally narrow with apical microtrichia; aedeagus symmetrical, bifid, V-shaped; internal parameres knife-like, ending in pointed apex, not bifurcated; cercus with 14 tenacula.

**FIGURE 2.** Lepidiella olgae sp. nov. male holotype. (A) head; (B) base of antenna: scape, pedicel and three basal flagellomeres; (C) flagellomeres 12, 13 and 14; (D) palpus; (E) wing; female: (F) ventral; male terminalia: (G) ventral: epandrium, cerci and hypoproct; (H) dorsal; (I) cercus. Escale bars: Figs 2A, 2E = 0.25 mm, Figs 2B, 2C, 2D, 2F = 0.06 mm, Figs 2G, 2H, 2I = 0.12 mm.
**Description.** Male holotype. Head (Fig. 2A) without corniculum. Vertex dorsally expanded. Eyes separated by 2.0 facet diameters; eye bridge with four facet rows; interocular suture inverted Y-shaped; frons with hair patch not divided at center, extending dorsally and reaching the interocular suture. Scape approximately the same length as pedicel, without internal protuberances (Fig. 2B). Flagellum with 14 flagellomeres; first flagellomere fusiform (Fig. 1B); flagellomeres 2–13 fusiform with short internodes (Figs. 1B, C); flagellomere 14 with apiculus (Fig. 1C); pair of digitate ascoids on each flagellomere (Fig. 1B) except for the last three. Ratio of palpomeres: 1.0:2.2:2.2:3.0; last palpomere striated (Fig. 1D).

Wing (Fig. 1E) 2.8 times longer than broad; costal cell darker than rest of wing membrane; radial fork distal to medial fork; Rₔ ending at wing tip.

Male terminalia (Figs. 2G, H, I): hypandrium stripe-like with apical microtrichia; gonocoxite 0.4 times as long as gonostyle; gonostylus with 2/3 apical bare and 1/3 basal inflated, with basal patch of setal alveoli; aedeagus symmetrical, bifid, V-shaped; two pairs of parameres, external pair shorter than internal; internal parameres knife-like, ending in pointed apex, not bifurcated; ejaculatory apodeme dorsoventrally flattened; gonocoxal bridge not expanded anteriorly; epandrium 1.5 times wider than long, with two foramina; cercus with 14 tenacula; hypoproct with apical micropilosity.

Comments. The Neotropical genus *Lepidiella* currently comprises 13 species and is known from Costa Rica, Nicaragua, Panama, Colombia, Peru, Bolivia, Brazil (the states of São Paulo and Espírito Santo) and from Saint Lucia in the Caribbean (Ibáñez-Bernal 2010, Bravo & Santos 2011). *Lepidiella* is characterized by having the vertex dorsally expanded, Rₔ ending at the wing tip, gonocoxal apodemes not expanded anteriorly, and males with multiple tenacula (Bravo & Santos 2011).

Three morphological species groups can be recognized in *Lepidiella*: 1) species with scape and pedicel having approximately the same lengths and head without corniculi, characteristics observed in many other Psychodinae; 2) species with scape equal to or more than 1.5 times the length of pedicel, without internal protuberances and head with corniculi; 3) species with scape equal to or more than 1.5 times the length of pedicel, head with corniculi.

The new species *Lepidiella olgae* is included in the first group (species with scape and pedicel approximately the same length, head without corniculi), characteristics shared by only two other species, both from Brazil: *Lepidiella spinosa* Bravo and *Lepidiella flabellata* Bravo & Santos.

*Lepidiella olgae* can be differentiated from *L. flabellata* by the number tenacula, 14 in the new species and 17 in the latter, and by the shapes of the internal parameres, bifurcated in *L. flabellata* and blade-shaped in the new species.

The male terminalia of *L. olgae* and *L. spinosa* can be distinguished by the shape of ejaculatory apodeme (paddle-shaped in the new species and narrower in *L. flabellata*), and by the relative sizes of the parameres (with the external paramere in *L. flabellata* terminating near the apex of the internal paramere and ending in a pointed apex, and a shorter external paramere in the new species, ending at the center of the internal paramere, with apex plumose). Another difference between these two species are the colors of their costal cells, darker in the new species and normal in *L. flabellata*.

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