

## Taxonomy

# A new species of *Tricorythodes* Ulmer (Ephemeroptera: Leptohiphidae) from Northern Brazil

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**Abstract** – A new species of *Tricorythodes* Ulmer (Ephemeroptera: Leptohiphidae) is described based on nymphs from the Northern Region of Brazil. *Tricorythodes rondoniensis* sp. n. can be distinguished from other species in the genus by the following characters: wide femora, nearly circular, with the margins covered with very long setae; tarsal claws with 5–6 marginal denticles; terga III–VII with an acute median tubercle; operculate gill ovoid and abdominal colour pattern.

**Key words:** Ephemeroptera / Pannota / *Tricorythodes* / new species / South America

## Introduction

*Tricorythodes* Ulmer (Leptohiphidae) is a Pan American genus with wide distribution in South America. In the last six years, the number of species of *Tricorythodes* recorded from this region has doubled; more of 10 species of this genus were described in this period (Molineri, 2002; Dias and Salles, 2006; Molineri and Zúñiga, 2006; Emerich, 2007). Currently in South America, *Tricorythodes* is constituted by the following species: *T. arequita* (Traver), *T. barbatus* (Allen), *T. bullus* (Allen), *T. capuccinorum* (Emmerich), *T. cristatus* (Allen), *T. curiosus* (Lugo-Ortiz and McCafferty), *T. hiemalis* (Molineri), *T. lichyi* (Traver), *T. mirca* (Molineri), *T. molinerii* (Dias and Salles), *T. nicholsae* (Wang et al.), *T. ocellus* (Allen and Roback), *T. popayanicus* (Dominguez), *T. quizeri* (Molineri), *T. santarita* (Traver), *T. trifasciatus* (Molineri and Zúñiga), *T. uniandinus* (Emmerich), *T. yura* (Molineri), *T. zunigae* (Molineri) (Dias and Salles, 2005; Dominguez et al., 2006; Molineri and Zúñiga, 2006; Emerich, 2007). In this work, we describe a new species of *Tricorythodes* based on nymphs.

According to the classification proposed by Wiersema and McCafferty (2000), based on morphological characters the new species should be included in the genus

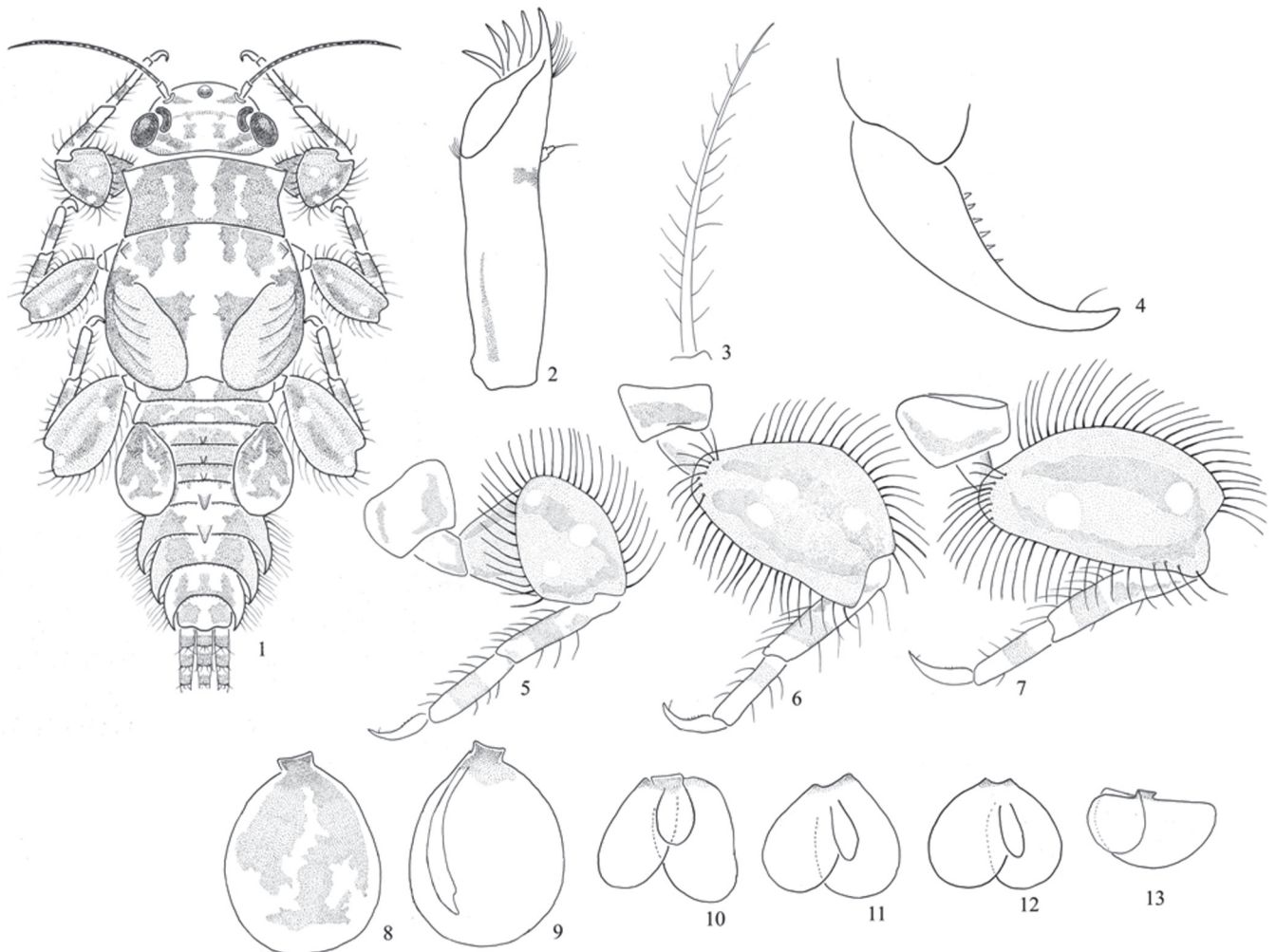
*Asioplax* (Wiersema and McCafferty), one of the genera established by these authors to include some species of *Tricorythodes*. Nevertheless, we prefer the cladistic-based classification proposed by Molineri (2002), which considers *Tricorythodes* (*sensu lato*) as a unity. The material studied of *Tricorythodes rondoniensis* sp. n. originates from the Brazilian states of Rondonia and Roraima, both belong to the north region of Brazil.

## Material and methods

The type material is deposited in the following institutions: Entomological Collection of the Instituto Nacional de Pesquisas da Amazônia, Amazonas, Brazil (INPA); Invertebrate Collection of the Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (MNRJ); Instituto-Fundación Miguel Lillo, San Miguel de Tucumán, Tucumán, Argentina (IFML); and Entomological Collection of the Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (DZRJ).

The length of the body, mesonotum and caudal filaments were measured in mature nymphs. Drawings were made on white paper with the aid of a camera lucida attached to a MZ8 Leica microscope.

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**Figs. 1–13.** *Tricorythodes rondoniensis* sp. nov: 1: Nymphal habitus (dorsal view). 2: Maxilla (dorsal view). 3: Detail setae of femora. 4: Foreclaw (detail). 5: Foreleg. 6: Midleg. 7: Hind leg. 8: Operculate gill (dorsal view). 9: Operculate gill (ventral view). 10–13: Gills III–VI (ventral view).

### *Tricorythodes rondoniensis* sp. n.

#### Nymph

Length of male: body, 1.9–2.5 mm; mesonotum, 0.50–0.70 mm; caudal filaments, 1.0–1.2 mm. Length of female: body, 2.3–2.5 mm; mesonotum, 0.60–0.70 mm; caudal filaments, 1.3–1.5 mm.

#### General aspect

Small body not depressed; wide femora covered with long setae. General coloration yellowish with brown and reddish marks in the dorsal region (Fig. 1), ventrally whitish. Head yellowish with reddish marks on posterior margin, between ocelli and antennae (Fig. 1). Antennae yellowish translucent. Mouthparts yellowish. Maxillary palp 2-segmented with short apical seta (Fig. 2).

Pronotum yellowish almost completely shaded with brown and reddish, except anterolateral margin and

median region, yellowish. Mesonotum yellowish with diffuses brown marks, sometimes with median region completely yellowish. Developing wings blackish, with internal margin reddish. Legs with wide femora, nearly circular and with the margins covered by very long, fine and pectinate setae (Figs. 3, 5–7); dorsal region of femora yellowish with circular small whitish marks distributed irregularly and longitudinal marks brownish (Figs. 5–7); tibiae and tarsi yellowish, with a reddish band on median zone; tarsal claws with 5–6 marginal denticles, submarginal denticle absent, and with subapical seta (Fig. 4).

Abdomen terga I–V yellowish shaded with brown (Fig. 1); lateral margin of terga III–V whitish; terga VI–VIII yellowish brown, with median triangular region whitish, this whitish region increasing in size from terga VI to the VIII (Fig. 1); terga IX yellowish brown with submedian marks whitish and terga X yellowish brown with median marks whitish. Lateral margins of abdominal segments III–IX expanded, posterolateral spines present on segments VII–IX bordered with setae (Fig. 1). Terga III–VII with acute median tubercle, larger

on terga VI–VII (Fig. 1). Operculate gill ovoid (Fig. 8), brown with whitish marks on median and distal region; ventral lamellae of operculate gill long. Gill formula: 2/3/3/3/2 (Figs. 9–13). Gills III–VI with a small blackish mark at base (Figs. 10–13). Caudal filaments brownish or grayish, with posterior region yellowish-translucent, with short setae at joinings.

## Material

### Holotype

One nymph, Brazil, Rondônia state, Porto Velho, Rio Mamãe Quinó, BR 364, 27 August 2006, Cruz, P.V. (INPA).

### Paratype

One nymph, same data as holotype (IFML). Two nymphs, Roraima state, Boa Vista, Rio Cauamé, 3rd February 2007, Jesine Falcão col. (INPA). One nymph, Roraima state, Boa Vista, Rio Marupú, 10 November 2006, Jesine Falcão col. (DZRJ). One nymph, Roraima state, Amajari, Igarapé do Pedral, Serra do Tepequém, 16 November 2006, Jesine Falcão col. (MNRJ).

### Diagnosis

(1) Maxillary palp 2-segmented, with apical seta (Fig. 2); (2) wide femora, nearly circular and with the margins covered with very long setae (Figs. 5–7); (3) tarsal claws with 5–6 marginal denticles and without submarginal denticles (Fig. 4); (4) terga III–VII with a single acute median tubercle (Fig. 1); (5) lateral margins of abdominal segments III–IX expanded, posterolateral spines present on segments VII–IX (Fig. 1); (6) abdominal colour pattern (Fig. 1); (7) operculate gill ovoid, with a long ventral lamellae (Fig. 9).

### Etymology

The epithet of the new species is a reference to Rondônia, the state where the holotype was found.

### Discussion

The nymphs of the new species possess operculate gill ovoid and body relatively small as the species included in *Asioplax* genus by Wiersema and McCafferty (2000, 2005) and Baumgardner *et al.* (2006), they are: *Asioplax corpulenta* (Kilgore and Allen), *A. dolani* (Allen),

*A. edmundsi* (Allen), *A. nicholsae* (Wang *et al.*), *A. sacculobranchis* (Kluge and Naranjo), *A. sierramaestrae* (Kluge and Naranjo), *A. curiosus* (Lugo-Ortiz and McCafferty), *A. numinuh* (Wiersema *et al.*), *A. santarita* (Traver), *A. texana* (Traver), *A. zunigae* (Molineri) and *A. isabelia* (Baumgardner *et al.*). In addition, *T. rondoniense* sp. n. shows close affinities with *T. santarita* (Traver) and *T. nicholsae* (Wang *et al.*), due to that all these species possess femora with long setae, maxillary palp reduced and the presence of median tubercles on abdominal terga. However, the differences among these three species are the number of denticles on tarsal claws, localization of the abdominal tubercles on the terga and abdominal colour pattern.

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## References

- Baumgardner D.E., Meyer M.D. and McCafferty W.P., 2006. A new species of *Asioplax* (Ephemeroptera: Leptohiphidae) from Costa Rica and Nicaragua. *Pan-Pacific Entomol.*, 82, 346–350.
- Dias L.G. and Salles F.F., 2006. A new species of *Tricorythodes* (Ephemeroptera: Leptohiphidae) from Minas Gerais, Southeastern Brazil. *Neotrop. Entomol.*, 31, 56–58.
- Domínguez E., Molineri C., Pescador M., Hubbard M.D. and Nieto C., 2006. Aquatic Biodiversity in Latin America, Pensoft, Sofia-Moscow, Ephemeroptera of South America, 646 p.
- Emmerich D.E., 2007. Two new species of *Tricorythodes* Ulmer (Ephemeroptera: Leptohiphidae) from Colombia. *Zootaxa*, 1561, 63–68.
- Molineri C., 2002. Cladistic analysis of the South American species of *Tricorythodes* (Ephemeroptera: Leptohiphidae) with the descriptions of new species and stages. *Aquat. Insect.*, 24, 273–308.
- Molineri C. and Zuñiga M.C., 2006. New species of Leptohiphidae (Insecta: Ephemeroptera) from Colombia with evidence of reproductive time segregation. *Stud. Neotrop. Fauna Environ.*, 41, 139–151.
- Wiersema N.A. and McCafferty W.P., 2000. Generic Revision of the North and Central American Leptohiphidae (Ephemeroptera: Pannota). *Trans. Amer. Entomol. Soc.*, 126, 337–371.
- Wiersema N.A. and McCafferty W.P., 2005. Contribution to the taxonomy of *Asioplax* (Ephemeroptera: Leptohiphidae: Tricorythodinae) in the New World. *Entomol. News*, 116, 147–158.