

## Three new species of *Tricorythopsis* (Ephemeroptera: Leptohephidae) from southeastern Brazil

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### Abstract

Three new species of *Tricorythopsis* Traver (Ephemeroptera: Leptohephidae) are described and illustrated based on nymphs from southeastern Brazil. These new species can be distinguished from other species of the genus by the following characters: *Tricorythopsis araponga* sp. n.: (1) femora with long setae; (2) abdominal segments 5–7 with dorsal tubercles; (3) tarsal claws with 4–6 marginal denticles and 7 + 4 submarginal denticles. *Tricorythopsis baptistai* sp. n.: (1) tarsal claws with 4–5 large marginal denticles and one submarginal denticle on each side; (2) abdominal colour pattern; (3) abdomen without tubercles; (4) coxae without projections. *Tricorythopsis pseudogibbus* sp. n.: (1) abdominal segments 6–8 with small dorsal tubercles; (2) tarsal claws with four large marginal denticles, and 3 + 1 or 2 submarginal denticles; (3) coxae dorsally projected; (4) femora broad and with short setae; (5) pronotum with anterolateral projection.

**Keywords:** *Taxonomy, Leptohephidae, Tricorythopsis, new species, nymphs, Brazil*

### Introduction

*Tricorythopsis* is a genus of South American Leptohephidae (Ephemeroptera: Ephemeroidea), established by Traver (1958) based on male imagines of the type-species, *T. artigas* Traver, from Uruguay. Molineri (1999) described four new species: *T. fictilis* Molineri from Argentina, *T. volsellus* Molineri from Venezuela, *T. sigillatus* Molineri and *T. petersorum* Molineri from Brazil, Rio de Janeiro and Paraná states, respectively. In this paper, the genus was also recorded from Ecuador, based on an unnamed species, and the nymph and the female winged stages were described for the first time. Later, Molineri (2001) revised the genus, two new species were described, *T. chiriguano* Molineri from Bolivia, and *T. yacutinga* Molineri from Argentina, new synonymies and combinations were proposed, and unknown stages of some species were described. Currently, *Tricorythopsis* is constituted from the following species: *T. gibbus* (Allen), *T. minimus* (Allen), *T. undulatus* (Allen), *T. artigas* Traver, *T. sigillatus* Molineri, *T. chiriguano* Molineri and *T. yacutinga* Molineri (Molineri 2001). Despite the fact that most of these species are recorded from Brazil, except *T. chiriguano* and

*T. yacutinga* that are not reported, the knowledge of the genus in this country is restricted to the southern (four species) and southeastern regions (one species) (Salles et al. 2004).

In this paper, three new species of *Tricorythopsis* are described based on nymphs from southeastern Brazil.

## Material and methods

The material is deposited in the following institutions: 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 Museu Regional de Entomologia, Universidade Federal de Viçosa, Minas Gerais, Brazil (UFVB).

## Systematic account

### *Tricorythopsis araponga* sp. n.

*Material.* Holotype: 1 female nymph, Brazil, Minas Gerais state, Araponga, Parque Estadual da Serra do Brigadeiro, Cachoeira Vale das Luas, 17.IV.2004, C. N. Francischetti, L. G. Dias and F. F. Salles leg. (MNRJ). Paratypes: 5 nymphs, same data as holotype (IFML); 10 nymphs, same data as holotype, except, 23—26.X.2004, L.G. Dias, T. Bacca leg. (MNRJ).

Other material studied: 7 nymphs, Brazil, Rio de Janeiro state, Itatiaia, Rio Campo Belo, 17/xi/1999, C. N. Francischetti leg. (MNRJ); 1 nymph, Brazil, São Paulo state, Salesópolis, Estação Biológica Boracéia, stream before Pedreira S 23° 38' 22" W 45° 52' 33", 22.III.2001, C.G. Froehlich, C. M. Polegatto, R. M. L. Silva (USP); 2 nymphs, Brazil, Espírito Santo state, Jerônimo Monteiro, Rio Norte, 24.VIII.2004, L. G. Dias and T. Bacca (UFVB).

*Nymph.* Length of male: body, 1.90–1.93 mm; mesonotum, 0.65–0.70 mm; caudal filaments, 2.20–2.25 mm. Length of female: body, 2.30–2.50 mm; mesonotum, 0.70–0.80 mm; caudal filaments, 2.30 mm.

*General colouration* yellow shaded with grey (Figure 1).

*Head* yellowish with posterior region shaded with grey (Figure 1). Mouthparts (Figures 2–8) uniformly yellowish.

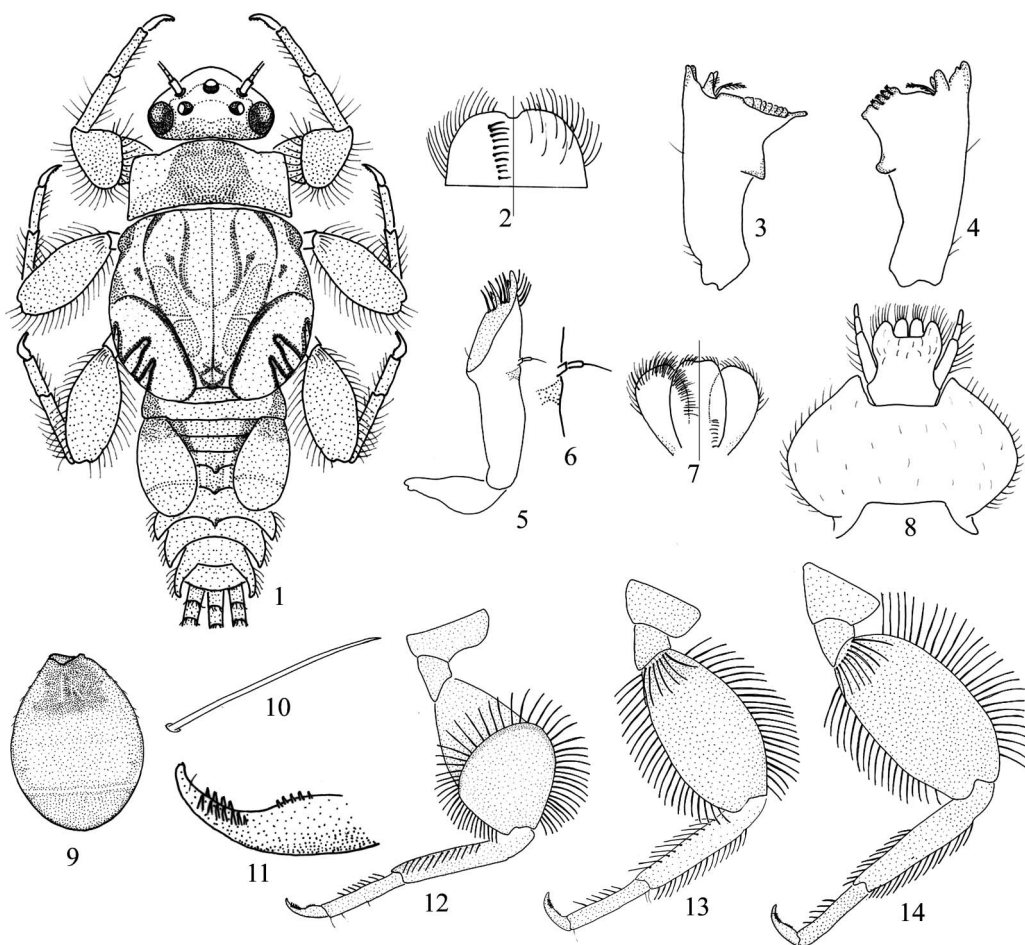
*Thorax.* Pronotum shaded with grey, except anteronotal region, yellowish (Figure 1). Mesonotum and mesoescutellum yellowish shaded with grey, with blackish diffuse marks (Figure 1). Legs yellowish, shaded with grey mainly in dorsal region; femora wide (width/length ratio femora: forelegs 0.5–0.6; mid end hind legs 0.4–0.5) bordered with long setae (Figure 10, Figures 12–14). Tarsal claws with 4–6 marginal denticles, with two rows of submarginals denticles, one side with seven and the other with four denticles (Figure 11). Sterna whitish. Pleura whitish shaded with grey. Metanotum yellow shaded with grey (Figure 1).

*Abdomen.* Terga yellowish shaded with grey, with posterior margins whitish and with whitish marks in submedian zones of terga 5 and 6 (Figure 1). Tubercles present in dorsal region of abdominal segments 5–7 (Figure 1). Sterna whitish yellow, with greyish dorsolateral marks. Lateral margins of abdominal segments 2–9 expanded; segments 6–9 with posterolateral spines bordered with setae. Operculate gills completely shaded with grey, darker at base (Figure 9); remaining gills completely shaded with light grey. Caudal filaments yellowish, basal region grey.

*Adults.* Unknown.

*Diagnosis.* (1) Femora wide, bordered with long setae (Figure 10, Figures 12–14); (2) abdominal segments 5–7 with dorsal tubercles (Figure 1); (3) tarsal claws with 4–6 marginal denticles and 7 + 4 submarginal denticles (Figure 11); (4) abdominal colour pattern as in Figure 1.

*Discussion.* *Tricorythopsis araponga* sp. n. is the second species of *Tricorythopsis* in which the nymphal femora are bordered with long setae (the other one is *T. yacutinga*). However, the presence of abdominal tubercles and the tarsal claws with marginal denticles distinguish it from *T. yacutinga*. In addition, nymphs of *T. araponga* sp. n. are not flattened as the nymphs of *T. yacutinga*.



Figures 1–14. *Tricorythopsis araponga* sp. n.: (1) Nymphal habitus (dorsal view). (2) Labrum (left, ventral view; right, dorsal view). (3) Right mandible (dorsal view). (4) Left mandible (dorsal view). (5) Maxilla (dorsal view). (6) Maxilla (detail maxillary palp, dorsal view). (7) Hypopharynx (left, ventral view; right, dorsal view). (8) Labium (ventral view). (9) Operculate gill (dorsal view). (10) Detail setae of femora. (11) Foreclaw (detail). (12) Foreleg. (13) Mid-leg. (14) Hind leg.

*Distribution.* Brazil: Minas Gerais, Rio de Janeiro, São Paulo and Espírito Santo.

*Etymology.* Araponga is the name of the city where the type-material was collected.

***Tricorythopsis baptistai* sp. n.**

*Material.* Holotype: 1 male nymph, Brazil, Minas Gerais state, Paula Cândido, Córrego Airões, S 20° 50.444', W 42° 57.019', 671 m, 27.VIII.2004, C. N. Francischetti and L. G. Dias leg. (MNRJ). Paratypes: 2 nymphs, same data as holotype (MNRJ); 4 nymphs, same data as holotype, except, 14.VII.2004, L.G. Dias leg (IFML).

Other material studied: 3 nymphs, Brazil, Minas Gerais state, boundary between Jaguarauçu and Marliéria, Cava Grande, 15.XI.2002, C. N. Francischetti leg (UFVB).

*Nymphs.* Length of male: body, 1.95–2.20 mm; mesonotum, 0.60–0.75 mm; caudal filaments, 0.90 mm. Length of female: body, 2.10–2.60 mm; mesonotum, 0.70–0.80 mm; caudal filaments, 1.20 mm.

*General colouration* yellowish shaded with grey (Figure 15).

*Head.* Yellowish with greyish marks between ocelli and base of antennae; posterolateral region whitish (Figure 15). Mouthparts uniformly yellowish; maxillae as in Figures 16–17.

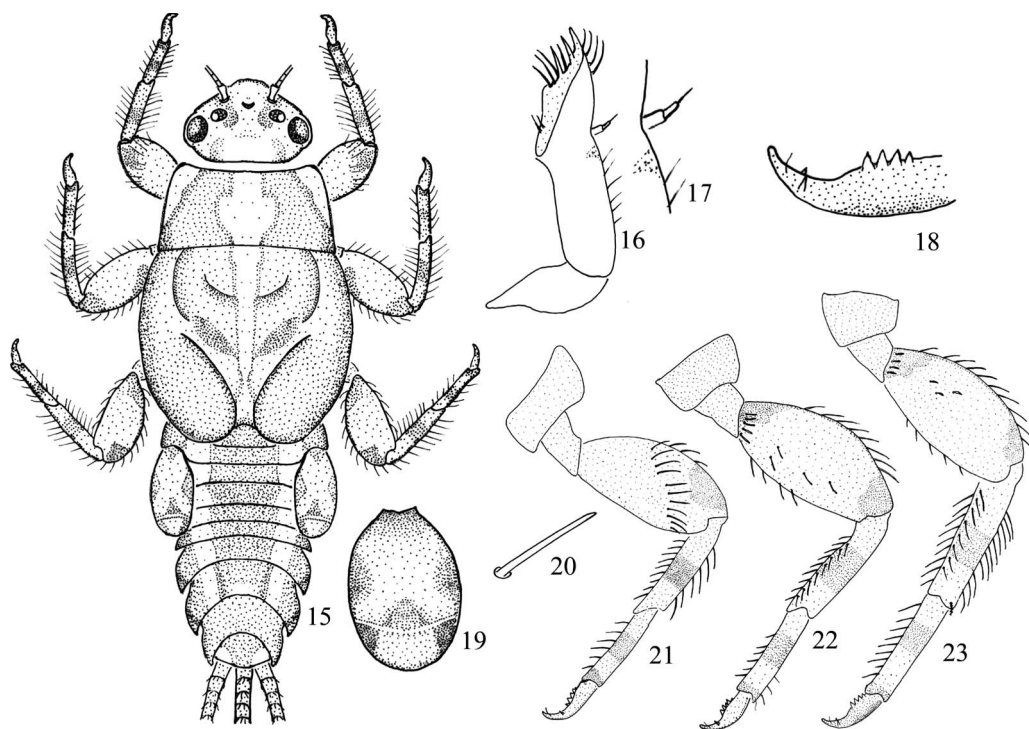
*Thorax.* Yellowish shaded with black, with median line and anteronotal region whitish (Figure 15). Mesonotum yellowish shaded with black, generally with median line whitish and submedian zone with whitish marks extending to lateral margins (Figure 15). Legs yellowish. Femora narrow (width/length ratio femora: fore-, mid-end hind legs 0.3–0.4). Coxae without projections (Figures 21–23). Fore-femora with distal dark greyish mark (Figure 21). Mid-femora and hind-femora with apical and distal dark greyish mark (Figures 22 and 23). Fore-femora with subdistal transversal row of setae; all femora bordered with setae (Figures 20 and 21). Tibiae with transversal light grey band (Figures 21–23). Tarsi with subbasal and distal transversal light grey band (Figures 21–23). Tarsal claws with 4–5 marginal large denticles and one submarginal denticle on each side (Figure 18). Sterna and pleura yellowish shaded with grey.

*Abdomen.* Yellowish shaded with dark grey; terga 1–8 with oblique, sublateral, whitish band on each side of midline; terga 7–8 posteromedially with a small whitish mark (Figure 15) (these marks may be absent in some nymphs). Abdomen without tubercles (Figure 15). Sterna yellowish shaded with grey, darker on lateral margins. Operculate gills yellowish shaded with grey, with six dark grey marks as in Figure 19; remaining gills yellowish, slightly shaded with grey. Caudal filaments yellowish brown, darker at base.

*Adults.* Unknown.

*Diagnosis.* (1) Tarsal claws with 4–5 marginal large denticles and one submarginal denticle on each side (Figure 18); (2) abdominal colour pattern as in Figure 15; (3) abdomen without tubercles (Figure 15); (4) coxae without projections (Figures 21–23).

*Discussion.* Based on the length of the setae on the femora, *T. baptistai* sp. n. appears more related to *T. minimus*, *T. artigas* and *T. chiriguano*, but it can be distinguished from them by the size of the marginal denticles on the tarsal claws and the abdominal colour pattern.



Figures 15–23. *Tricorythopsis baptistai* sp. n.: (15) Nymphal habitus (dorsal view). (16) Maxilla (dorsal view). (17) Maxilla (detail of maxillary palp, dorsal view). (18) Foreclaw (detail). (19) Operculate gill (dorsal view). (20) Detail setae of femora. (21) Foreleg. (22) Mid-leg. (23) Hind leg.

*Distribution.* Brazil: Minas Gerais.

*Etymology.* We are honored in naming this species after Dr. Darcílio F. Baptista, supervisor of the first author while she was an undergraduate student, for his contribution to the knowledge of aquatic insects in Brazil.

***Tricorythopsis pseudogibbus* sp. n.**

*Material.* Holotype: 1 male nymph, Brazil, Rio de Janeiro state, Itatiaia, Rio Campo Belo, 29.XII.1999, C. N. Francischetti leg. (MNRJ). Paratypes: 2 nymphs, same data as holotype, except 27.VII.2000 (MNRJ); 2 nymphs, same data as holotype, except 21.VI.2000 (IFML).

Other material studied: 3 nymphs, Brazil, Minas Gerais state, Araponga, Parque Estadual da Serra do Brigadeiro, Cachoeira Vale das Luas, 17.IV.2004, C. N. Francischetti, L. G. Dias and F. F. Salles leg. (UFVB); 2 nymphs, same data, except L. G. Dias and T. Bacca. 23—26.X.2004 (UFVB).

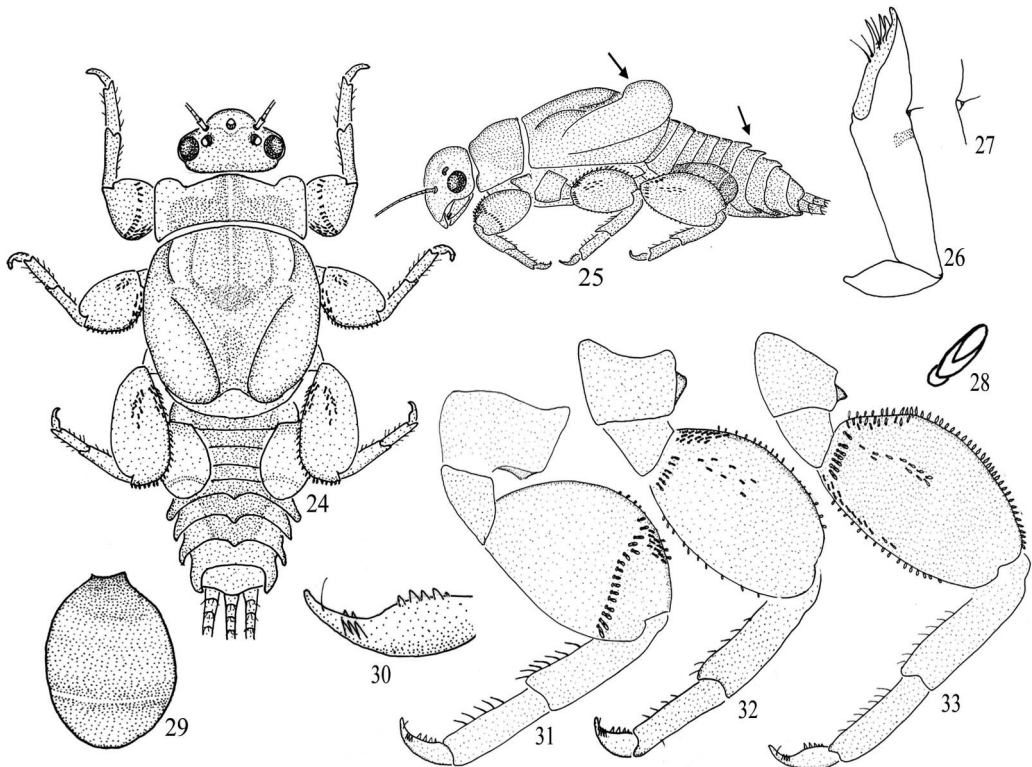
*Nymphs.* Length of male: body, 1.90–2.10 mm; mesonotum, 0.50–0.80 mm; caudal filaments, 0.60–0.70 mm. Length of female: body, 2.50 mm; mesonotum, 0.90 mm; caudal filaments, 0.80 mm.

*General colouration* brown (Figures 24, 25).

*Head.* Brown, with margins dark brown (Figures 24 and 25). Mouthparts light brown; maxillary palp reduced as in Figures 26 and 27.

*Thorax.* General colouration brown. Pronotum with anterolateral projections; colouration dark brown, lateral and anterolateral regions light brown (Figures 24 and 25). Mesonotum dark brown, shaded with grey between wing pads (Figure 24). Forewing pads elevated just before apex (Figure 25). Pleura and sterna shaded with grey. Legs brown. Coxae of all legs dorsally projected (Figures 31–33). Femora with dark brown margins, wide (width/length ratio femora: fore-, mid-end hind legs 0.5–0.6) and with short setae (Figures 28, 31–33). Tarsal claws light brown, with four large marginal denticles (eventually, a small denticle may also be present), four or five submarginal denticles, three in one side and one or two on the other side, and with apical seta (Figure 30).

*Abdomen.* Brown shaded with grey, posterior margin of all terga and lateral margins of terga 2 and 7–8 light brown (Figures 24 and 25). Small median tubercles present on terga 6–8 (Figures 24 and 25). Lateral margins of segments 3–9 laterally expanded; segments 5–9 with posterolateral projections. Sterna slightly shaded with grey. Gills brown, with base shaded with grey (Figure 29). Caudal filaments brown.



Figures 24–33. *Tricorythopsis pseudogibbus* sp. n.: (24) Nymphal habitus (dorsal view). (25) Same (lateral view, arrows indicating forewing pads slightly elevated and tubercles present on terga 6–8). (26) Maxilla (dorsal view). (27) Maxilla (detail of maxillary palp, dorsal view). (28) Detail setae of femora. (29) Operculate gill (dorsal view). (30) Foreclaw (detail). (31) Foreleg. (32) Mid-leg. (33) Hind leg.

*Adults.* Unknown.

*Diagnosis.* (1) Forewing pads elevated just before apex (Figure 25); (2) small tubercles present on terga 6–8 (Figures 24 and 25); (3) tarsal claws with four large marginal denticles, and 2 rows of 3 + 1 or two submarginal denticles (Figure 30); (4) coxae dorsally projected (Figures 31–33); (5) femora broad and with short setae (Figures 28, 31–33); (6) pronotum with anterolateral projections (Figure 24); (7) abdominal colour pattern as in Figures 24 and 25.

*Discussion.* Despite the similarity between the nymphs of *T. pseudogibbus* sp. n. and *T. gibbus*, the pronotum with anterolateral projections, the broader femora, and the abdominal tubercles smaller and restricted to segments 6–8, separates this new species from *T. gibbus*.

*Distribution.* Brazil: Minas Gerais, Rio de Janeiro.

*Etymology.* The species is named after *pseudo* (Greek, to mock) and *gibbus* (Latin, hump), an allusion to *T. gibbus*, a very similar species.

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