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Two new species of *Thraulodes* Ulmer, 1920 (Ephemeroptera: Leptophlebiidae: Atalophlebiinae) from Southeast Brazil

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Abstract

Two new species of *Thraulodes* Ulmer, 1920 are described from Rio de Janeiro and São Paulo, Southeastern Brazil, based on male and female imagos. *Thraulodes luisae* **sp. nov.** differs from all other species of the genus by the short and wide penes spines, turning up to apex; triangular shape of styliger plate with median projection abrupt and short with rounded apex; abdominal and legs color pattern; and presence of 2–3 weakly marked cross veins basal to bullae. *Thraulodes pinga* **sp. nov.** differs from all other species of the genus by the wide shape of styliger plate with median projection short with wide base and truncated apex; abdominal and legs color pattern; and presence of 1 weakly marked cross vein basal to bullae.

Key words: Mayfly, South America, Atlantic Forest, *Thraulodes luisae* **sp. nov.**, *Thraulodes pinga* **sp. nov.**

Introduction

The genus *Thraulodes* was established by Ulmer (1920) to host the type species *Thraulus laetus* Eaton, 1883 described based on male imagos from Colombia. Currently, *Thraulodes* is probably one of the most abundant and widely distributed leptophlebiid genera in South America and its distribution extends to the Nearctic Region (Traver & Edmunds 1967; Domínguez *et al*. 2006). Presently there are about 55 species of *Thraulodes* (Lima *et al.* 2013) and 17 are recorded from Brazil, most of them known only by the adult stage, a common problem found in many species of the genus (Mariano *et al.* 2011; Gonçalves *et al.* 2013).

According to Savage (1987), *Thraulodes* is one of the leptophlebiid genera composing the Guiana and Brazilian Shield, North Andean, Central American Warm-Adapted Genera. In the same work, Savage (1987) discuss that *Thraulodes* probably shares a common ancestor with members of the *Meridialaris* lineage of the Patagonian Shield Genera. This hypothesis is supported by the phylogenetic analysis on the two-winged genera of South American Leptophlebiidae, using morphological data, made by Domínguez (2009), which found that *Thraulodes* is a sister group of *Meridialaris* Peters & Edmunds, 1972.

Two new species of *Thraulodes* are described herein based on male imagos from Southeastern Brazil. The key to male imagos of *Thraulodes* from Lima *et al*. (2013) is amended to include the two new species.

Material and methods

Specimens were preserved in 80% ethanol and deposited in Coleção Entomológica Professor José Alfredo Pinheiro Dutra (DZRJ), Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Brazil. Specimens were caught

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Etymology. "Pinga" is an informal name for cachaça, a Brazilian alcoholic beverage derived from sugarcane. Paraty, the type-locality of the holotype, is a municipality famous for its cachaça.

Type material. Brazil, Rio de Janeiro State: ***Holotype***: Paraty, Sertão do Taquari, Afluente do Rio Taquari (PA2), 23°02'30,40''S/44°41'45,20''W, 01.I.2013, Souto, P.M., Hoffmann, A. & Silveira, L.F. *leg.* male imago (DZRJ 2368). ***Paratypes***: Same data, 1 male imago, pair of wings on slide (DZRJ 2369); Same data, 1 male imago, genitalia on slide (DZRJ 2370); Same data, 1 female imago (DZRJ 2371); Same data, 1 female subimago (DZRJ 2372); Same locality, 18.VIII.2012, Souto, P.M. & Gonçalves, R.S. *leg.,* 3 male subimagos (DZRJ 2373); Same locality, 12.X.2012, Souto, P.M. & Gonçalves, R.S. *leg*. 2 females subimagos (DZRJ 2374); Same locality, 12.X.2012, Souto, P.M. & Gonçalves, R.S. *leg*. 1 male subimago (DZRJ 2375).

Discussion. *Thraulodes pinga* **sp. nov.** resembles *Thraulodes pelicanus*, specially by the abdominal color pattern, short penes with a lateral pouch and apicolateral rounded with ear-like projection. However, the new species can be distinguished from *T. pelicanus* by the styliger plate format with posterior median projection short with truncate apex and the presence of one cross vein weakly marked basal to bullae. *Thraulodes pelicanus* has a styliger plate with posterior median projection long, almost the size of the penes, and cross veins basal to bullae are absent in forewings. Moreover, *Thraulodes pinga* **sp. nov.** has one band and one maculae on femora, while *T. pelicanus* has only one band.

The two new species described here can be distinguished by the styliger plate and penes format, the number of cross veins basal to bullae on forewings, the general color of the body and the abdominal color pattern. Also, the two new species will key to *Thraulodes ulmeri* Edmunds, 1950 in Lima *et al.* (2013). The new species can be distinguished from *T. ulmeri* by the following characters: femora with one band and maculae, being one band in *T. ulmeri*; coastal membrane basal do bullae with 2–3 cross veins in *T. luisae* **sp. nov.** and 1 cross vein in *T. pinga* **sp. nov.**, being 4 cross veins in *T. ulmeri*; penes with shorter spines in *T. ulmeri*.

The key for male imagos of *Thraulodes* in Lima *et al.* (2013) may be emended by modifying the fourth couplet to separate the new species from *T. ulmeri* and adding two more couplets, as follows:

4(3).	Penes long and slender, without lateral pouch	5
4'.	Penes short to moderate length and width, with lateral pouch	15
15(4').	Femora with one band	*T. ulmeri* Edmunds, 1950
15'.	Femora with one band and maculae	6
16 (15').	Costal membrane basal to bullae of forewings with 1 cross vein (Fig. 10)	*Thraulodes pinga* **sp. nov.**
16'.	Costal membrane basal to bullae of forewings with 2 or 3 cross vein (Fig. 5)	*Thraulodes luisae* **sp. nov.**

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