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## New species and new record of *Thraulodes* Ulmer, 1920 (Ephemeroptera: Leptophlebiidae: Atalophlebiinae) from Brazil

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### Abstract

A new species of the mayfly genus *Thraulodes* is described based on specimens from the state of Roraima, Brazil. The male imago of *Thraulodes rodrigo* **sp. nov.** is described and the new species can be easily recognized by: forewing with one weakly marked cross veins basal to bullae; femora of forelegs with an apical transversal band brown heavily marked and one submedian macula; styliger plate triangular with a medial rounded projection; and penes short and wide, without lateral pouch. *Thraulodes sternimaculatus* Lima, Mariano & Pinheiro, 2013 is also reported for the first time in Piauí State.

**Key words:** Mayfly, Neotropics, Northern Region, Taxonomy.

### Introduction

The genus *Thraulodes* established by Ulmer (1920) is a widespread genus of Leptophlebiidae, and the majority of its species are only known based on the adult stage. According to Salles & Boldrini (2018), there are currently 20 species known in Brazil, most of them registered from Southeastern and Southern regions. The states of Santa Catarina and Rio de Janeiro have the most species registered in Brazil, and the state of Roraima has only *Thraulodes marreroi* registered (Gama-Neto *et al.* 2018).

The state of Roraima located in the north of Brazil occupies about 2.6% of the country, which is equivalent to 224.299 km<sup>2</sup> (ITERAIMA, 2005). The largest part of this region is covered by protected areas with 62% of it is represented by indigenous areas, military areas and conservation areas. Access to a larger part of this area is hampered by the lack of access roads, so most of the region is unexplored for the knowledge of its biological diversity. One of these areas is the Roraima National Forest (FLONA Roraima), an area of environmental preservation with difficult access and where studies on fauna have never been carried out.

In general, accessible parts of the Roraima State have been well studied with 82 species and 37 genera of mayflies reported (Salles & Boldrini, 2018). However, most of the state remains poorly studied.

The aim of this paper is to describe a new species of *Thraulodes* based on male imago from FLONA Roraima, north Brazil. In addition, *Thraulodes sternimaculatus* Lima, Mariano & Pinheiro, 2013 is reported in Piauí State for the first time.

### Materials and methods

Collections were conducted on Floresta Nacional de Roraima, from 18-22.xii.2017 at Roraima state, Brazil. The subimagos were captured with light traps from 18:00 until 21:00 hrs then kept for about twelve hours in empty microtubules, until they moulted to the imago stage. Male genital structures were examined in alcohol gel and then stored in alcohol. Identifications were based on keys in Domínguez *et al.* (2006), Lima *et al.* (2013), and also by comparisons against original descriptions. Terms used in the description of the adult thorax are from Kluge (1994) and terms for genitalia structure are from Traver & Edmunds (1967) modified by Domínguez *et al.* (2006). The material examined is housed in the Zoological Collection of Universidade Federal de Roraima (UFRR), Boa Vista, RR, Brazil.

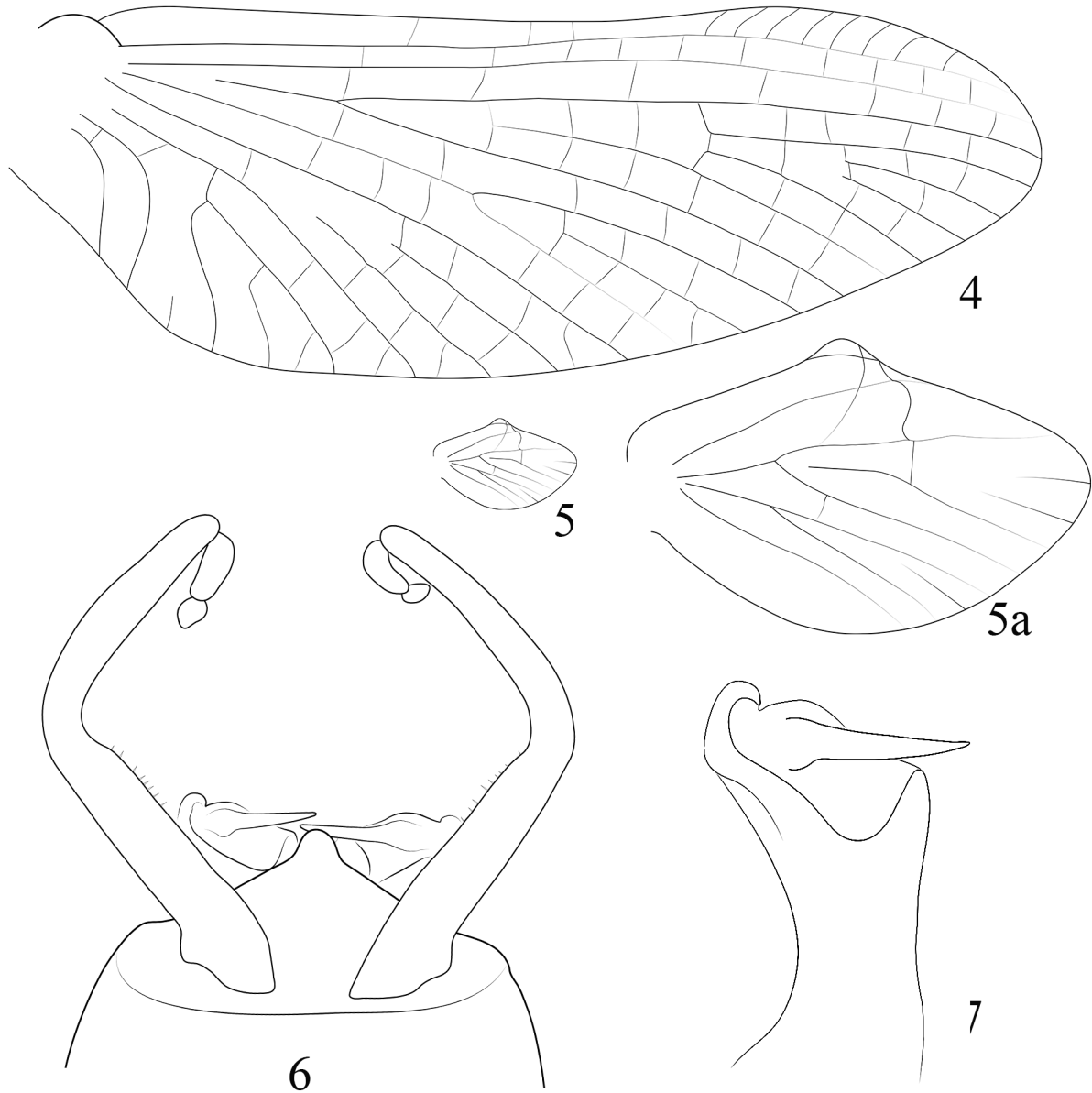
*Thraulodes rodrigo* sp. nov. (Figs. 1–7)

**Diagnosis.** Imago: 1) forewing with 1 weakly marked cross veins basal to bullae (Fig. 4); 2) costal and subcostal areas of forewing opaque; 3) femora of forelegs with an apical transversal band brown heavily marked and one submedian macula (Fig. 1); 4) tergum I washed with reddish brown; terga II–VI with a medial reddish brown band on posterior margin; terga VII, IX and X reddish brown with lateral areas white (Figs. 1, 3); 5) styliger plate triangular with a medial rounded projection (Fig. 6); 6) penes short and wide, without lateral pouch; penes spines short, with 1.56x the width of penes base, with base robust, tapering to apex (Fig. 7).

Male imago: Length of body: 6.2–6.3 mm; forewings: 7.0 mm; hind wings: 1.3 mm. General color whitish with reddish brown areas.



**FIGURES 1–3.** *Thraulodes rodrigo* sp. nov., male imago: 1) body (lateral view); 2) thorax (dorsal view); 3) abdomen (dorsal view).



**FIGURES 4–7.** *Thraulodes rodrigo* sp. nov., male imago: 4) forewing; 5) hind wing; 5a) hind wing (enlarged); 6) genitalia, ventral view; 7) detail of penes, ventral view.

Head (Fig. 1): Reddish brown. Scapes and pedicels light brown. Ocelli white, surrounded by a dark brown ring at base. Eyes black, turbinate portion reddish.

Thorax (Figs. 1, 2): Pronotum brown, scutellum dark brown; meso- and metanotum light brown. Prosternum whitish; mesosternum white, anterior region brown; metasternum brown with median region darker.

Legs (Fig. 1): All legs with coxae whitish; fore femur with a strongly marked apical reddish brown band, and a submedian reddish brown maculae; mid and hind femur with a strongly marked subapical reddish brown band; tibia and tarsi washed with light brown.

Wings (Figs. 4, 5): Membrane of wings hyaline with reddish brown stain at base. Membrane between C and Sc of forewings opaque. Forewings with one cross vein weakly marked basal to bullae and 10 distal to bullae.

Abdomen (Figs. 1, 3): segments predominantly translucent white; two lateral reddish brown spots on terga II–VI; tergum I washed with reddish brown; terga II–VI with a medial reddish brown band on posterior margin; terga VII, IX and X reddish brown with lateral areas white. Caudal filaments yellowish white, with reddish brown annulations.

Genitalia (Fig. 6): Styliger plate triangular, with a medial rounded projection. Forceps yellowish, with strong constriction on the middle of segment I. Penes short and wide, without lateral pouch; penes spines short, 1.56 x the width of the medial region of the penes, with base robust, tapering to apex (Fig. 7).

**Etymology.** The specific epithet honors Rodrigo Lopes Borges, a student who devoted himself to entomology during his undergraduate studies but passed away due to cancer.

**Distribution.** Roraima State, Brazil.

**Material Examined. Holotype:** Male imago (used to take pictures), Brazil, Roraima, Alto Alegre, Floresta Nacional de Roraima, Rio Preto, light trap, 02°56'18.05"N/ 61°37'27.28"W, 18-22.xii.2017, Boldrini, R., Oliveira, I.B., Barbosa, F.S., Almeida, M.L.S., Picanço, M.M. and Xavier, F.F. leg. Paratype: male imago, same data as holotype (wings, legs and genitalia mounted on slides).

**Comments.** *Thraulodes rodrigo* sp. nov. resembles *T. flinti* Domínguez, 1987 in having a triangular styliger plate and short, broad penes with lateral pouch absent, forewings with cross veins basal to bullae, and fore femur with a strongly marked apical band and with a submedian maculae. Nevertheless, imagos of *T. rodrigo* sp. nov. can be distinguished from *T. flinti* by the shape of forceps, segment I with strong constriction on the middle in *T. rodrigo*, while segment I has a constriction on basal 1/3 of segment I in *T. flinti*. and *T. flinti* has 4 weakly marked cross veins basal to bullae, while the new species has only one.

## New record

### *Thraulodes sternimaculatus* Lima, Mariano & Pinheiro, 2013

**Distribution. Brazil:** Pernambuco. **New record: Piauí State.**

**Material examined.** One male imago CEHJ 391, Brazil, Piauí State, Castelo do Piauí, Rio Poti, near to bridge, S 05°11'16.7", W 41°42'34.4", 177m, 12/III/2016, Lima, L.R.C, coll.

**Comments.** Its presence in this study represents the first record of the genus in Piauí State.

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