



## A new species of *Miroculis* Edmunds, 1963 (Ephemeroptera, Leptophlebiidae) from northern Brazil

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The species of *Miroculis* Edmunds, 1963 were distributed into four subgenera by Savage & Peters (1983): *M. (Miroculis)*, *M. (Yaruma)*, *M. (Atroari)* and *M. (Ommaethus)*. These four subgenera occur in Brazil, but of the 10 species recorded from the country, five belong to *Miroculis (Miroculis)* (Dominguez *et al.* 2013; Costa & Mariano 2013, Salles *et al.* 2011). This subgenus is characterized by having the dorsal part of the eyes of the males on stalks that are longer than wide, with 5 a 20 facets in the longest row (Peters *et al.*, 2008) and is represented by nine species distributed in Brazil, Colombia, Peru, Suriname, and Venezuela (Dominguez *et al.* 2013; Costa & Mariano 2013). In this paper, *Miroculis* is reported for the first time in the State of Roraima and a new species of *Miroculis (Miroculis)* is described based on male imagoes from Serra Tepequém.

### Material and methods

The specimens were collected in May and June 2012 with a Pennsylvania light trap placed above a second-order stream (03°87'39.6"N/61°44'49.8"W) located on Serra Tepequém, Amajari municipality, State of Roraima, Brazil. The specimens used in the description were dissected and the genitalia were clarified in 10% KOH warmed for 15 minutes, neutralized with 10% acetic acid and observed under an optical microscope using 70% alcohol in a micro concavity slide. The wings were observed under stereoscopic microscope on slides with glycerin. The remainder of the body was preserved in 70% alcohol together with the dissected structures. Wings were illustrated using Adobe Illustrator CS5 and genitalia using Corel Draw CS6. The photographs and measurement were taken with a Leica stereoscopic microscope. The holotype and paratypes are housed in the invertebrate collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, State of Amazonas, Brazil; some paratypes are deposited in the Coleção Zoológica Norte Capixaba, of the Universidade Federal do Espírito Santo (CZNC), São Mateus, State of Espírito Santo, Brazil.

### Results

#### *Miroculis (Miroculis) tepequensis* sp. nov.

(Figs. 1–9)

**Diagnosis:** *Miroculis (M.) tepequensis* sp. nov. can be distinguished from other species in the subgenus by the following combination of characters in the male imago: 1) upper portion of eyes on long stalks with nine facets in the longest row, 2) forewing basal 2/3 with membrane brown pigmented and with a few cells translucent; apical 1/3 with membrane translucent and brown spots around cross veins, 3) Penes tubular with length equal to segment I of forceps, with apex ending in a internally directed hook and with a membranous dorsal median region.

**Maximum length:** body 6.3–6.5 mm (n=10, SD= ± 0.10); forewing 4.9–5.3 mm (n= 10, SD= ± 0.25); hind wing 1.5–1.6 mm (n=10, SD= ± 0.03).

**Head** (Figs. 5–7). Yellowish brown. Antennae: pedicel, scape and flagellum brown translucent. Ocelli: translucent surrounded by black (Fig. 5). Eyes: lower portion black; dorsal portion on long narrow stalk with nine facets in its longest row (Figs. 5–7). Presence of translucent bridge between dorsal portions of the eyes (Fig. 5).

**Thorax** (Figs. 6–9). Pro, meso and metanotum dark brown with median longitudinal suture of mesonotum yellowish (Fig. 6). Pleura and sterna yellowish brown with margins clear (Fig. 8–9). Wings: forewing: longitudinal and cross veins brown; basal 2/3 with membrane brown (Fig. 1); apical 1/3 with membrane translucent and cross veins surrounded by brown pigmentation (Fig. 1). Hind wing: longitudinal and cross veins brown, membrane brown except for some cells translucent, especially in the middle portion of the wing (Fig. 2). Legs: broken off and missing.

*M. fazzariensis*, however, *M. tepequensis* sp. nov. has the apical 1/3 of the forewing translucent with cross veins surrounded by brown pigmentation, while *M. fazzariensis* has only a few translucent cells in the middle and apical portions of the forewing. Furthermore, the apical region of the penes of *M. tepequensis* sp. nov. ends in a hook, while in *M. fazzariensis* this region is long, thin and membranous; and in lateral view, the stalks of the upper region of the eyes of *M. tepequensis* sp. nov. are longer, twice the length of the stalks in *M. fazzariensis*. *Miroculis tepequensis* sp. nov. and *M. fittkai* differ in the color patterns of forewings, which are more pigmented in the new species, and in the shape of the penes which apically excavated in *M. fittkai*. *Miroculis tepequensis* sp. nov. differs from *M. nebulosus* by having the length of the penes similar to that of the first segment of the forceps, whereas in *M. nebulosus* the length of the penes longer, 1.6 times the length of the first segment of the forceps. *Miroculis tepequensis* sp. nov. differs from *M. caparaoensis* mainly by characteristics of the penes, which, in the latter species, is short with a rounded and excavated apex.

With the description of *M. tepequensis* sp. nov. the number of known *Miroculis* species increases from 16 to 17, and the genus is first recorded from the state of Roraima.

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