New species and new records of *Miroculis* Edmunds (Ephemeroptera: Leptophlebiidae) from Southeastern Brazil

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Abstract

In the present work, based mainly on material from environmental protection areas in the State of Espírito Santo, we describe a new species of *Miroculis* (*Miroculis*). The male imago of *M. (M.) caparaoensis*, sp. nov., can be distinguished from other members of the subgenus by the following combination of characteristics: 1) dorsal portion of eyes on a short stalk, dorsal upper portion circular with 12–18 large-sized facets in longest row; 2) forewings with membrane translucid, longitudinal and crossveins brown; 3) abdominal color pattern; 4) posteromedian margin of styliger plate with small concavity; 5) penes length approximately 0.70 length of forceps segment 1. *Miroculis* (*Ommaethus*) *mourei* and *M. (M.) fittkaui* are reported for the first time from the region.

Key words: Taxonomy, Neotropics, mayfly, Caparaó, Atlantic Forest

Introduction

The genus *Miroculis* Edmunds (Ephemeroptera: Leptophlebiidae) is currently composed of 14 described species, ranging from Northeastern Argentina to Trinidad (Domínguez 2007, Peters et al. 2008). In Brazil *Miroculis* is one of the most species rich genera of Leptophlebiidae, with eight species recorded until now (Domínguez et al. 2006). In spite of this, we can consider that the genus has been poorly studied in the country, since most of these records are based on the original description and no other species has been described since the revision of the genus by Savage & Peters (1983).

In the present paper, as part of an effort to study the mayfly fauna of the State of Espírito Santo, we describe a new species of *Miroculis* (*Miroculis*), and extend the distributional range of two species, *Miroculis* (*Ommaethus*) *mourei* Savage & Peters, and *M. (M.) fittkaui* Savage & Peters.

The material examined is housed in the following institutions: Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Brazil; Entomological Collection of the Universidade Federal do Espírito Santo (UFES), Vitória, Brazil; and Collection of the Laboratório de Diversidade de Insetos Aquáticos of the Universidade Federal do Espírito Santo (CEUNES), São Mateus, Brazil.

Results

*Miroculis* (*Miroculis*) *caparaoensis*, sp. nov.

Description. *Nymph.* Unknown.

Male imago (Figs. 1–2).

Maximal length: Body 5.75–7.1 mm; Cerci broken; Forewing 5.9–6.4 mm; Hind wing 1.6–1.8 mm; Prothoracic legs, 5.40–5.75 mm.
Head (Figs. 1, 2, 4). Orangish-brown at base of eyes, darker anteriorly, pale between ocelli. Eyes: Lower portion black; apex of upper portion separated on meson of head by a length 0.4–0.6 width of an upper portion; dorsal portion of eyes on a short stalk; dorsal upper portion circular with 12–18 large-sized facets in longest row, facets orange with dark brown grooves. Ocelli white surrounded with dark brown. Antenna: scape translucid yellow, pedicel brown washed with grey and flagellum brownish.

Thorax (Figs. 1, 2, 4). Pronotum orangish-brown heavily washed with black on lateral margins. Mesonotum and metanotum orangish-brown. Pleura and sterna light-brown with margins dark brown. Wings (Figs. 8–11): Membrane translucid with longitudinal and crossveins brown. Base of Sc and R paler. Crossveins between C, Sc and R dark brown. Bulla prominent on Sc and major branches of RS. Base of forewings with unpigmented patches, apical half hyaline with crossveins surrounded with brown. Hind wings brown with few light-brown areas. Legs: ratio of segments in prothoracic legs, 0.50–0.51: 1.00 (2.15–2.20 mm): 0.01–0.01: 0.29–0.31: 0.23–0.24: 0.17–0.20: 0.07–0.08. Coxae brown, femora, tibiae and tarsi whitish to light brown with subapical blackish bands on femora and tibiae. Fore femora with apical brownish band.

Abdomen (Fig. 5). Terga brown. Tergum I completely washed with black; terga II–VI translucid with three longitudinal blackish marks; one submedian, one sublateral and one lateral. Basal half of terga II–VI washed with black except between submedian marks. All terga with narrow posterior blackish bands. Sterna brown. Sterna I–VI translucid. Sterna II–VIII with dark mark on posterolateral corners. Caudal filaments: light brown with dark brown bands at apex of each segment (broken off apically and missing).

Genitalia (Figs. 12–13). Forceps: segment 3 from 0.80 length of segment 2. Segment 2 from 0.45 length of segment 1; Styliger plate: maximum length approximately 0.65 maximum width; posteromedian margin brown with small concavity. Penes: length approximately 0.70 length of forceps segment 1, apex as in Fig. 13; dark brown.

Female imago (Fig. 3).
Maximal length: Body 4.9–5.8 mm; Cerci broken; Forewing 5.3–6.1 mm; Hind wing 1.0–1.1 mm.


Thorax: pronotum yellowish washed with grey with blackish lateral margins and a submedian blackish mark; meso and metanotum as in male, except for yellowish background. Wings (Figs. 10–11): Forewings hyaline with cross veins surrounded with brown, often forming two bands. Hind wings hyaline with cross veins and apical third washed with brown. Legs: coloration as in male except for absence of apical mark on fore femora.

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Abdomen (Figs. 6–7): Abdominal color pattern as in male except that segments II–VI are not translucid; posterior margin of sternum 7 and anterior margin of sternum 8 forming a relatively long genital extension, nearly one half of sternum 8 (Fig. 7); sternum 9 with apical cleft.

Etymology. After Caparaó National Park, type locality of the new species.

Distribution. BRAZIL: Espírito Santo and Minas Gerais states.

Material examined. HOLOTYPE: Male imago, BRAZIL, Espírito Santo State, Parque Nacional do Caparaó, Pedra Roxa, afluente do Rio Pedra Roxa, 20º 23' 48,1'' S / 41º 44' 08,1'' W, 1063 m, 20/iv/2008, F.F. Salles and M.M. Lima cols (UFES); PARATYPES: nine male imagos, same data as holotype (four at CEUNES, five at INPA); six female imagos, same data as holotype (three at CEUNES, three at INPA).


Discussion. Miroculis (M.) caparaoensis sp. nov. is distinguished by the following combination of characteristics:

In the male: 1) dorsal portion of eyes on a short stalk, dorsal upper portion circular with 12–18 large-sized facets in longest row; 2) forewings with membrane translucid, longitudinal and crossveins brown; 3) abdominal color pattern as in Figs. 5–6; 4) posteromedian margin of styliger plate with small concavity; 5) penes length approximately 0.70 length of forceps segment 1, apex as in Fig. 13.

In the female: 1) Wings hyaline with cross veins surrounded with brown, often forming two bands; 2) abdominal color pattern as in Figs. 5–6; 3) posterior margin of sternum 7 and anterior margin of sternum 8 forming a relatively long genital extension.

Using the key to male imagos proposed by Domínguez et al. (2006), M. (M.) caparaoensis, sp. nov., would key out in couplet 6(5), which includes M. (M.) fittkaui and M. (M.) nebulosus. The new species differs from M. (M.) fittkaui in that the wing marks are broader, the penes are small and not apically hooked, as well as the number of facets in male compound eyes (12–18 in the new species, 5–8 in M. (M.) fittkaui). Regarding M. (M.) nebulosus, the size of the penis (0.70 length of forceps segment 1 in the new species, 1.5 in M. (M.) nebulosus) clearly distinguishes them.
Miroculis (Ommaethus) mourei Savage & Peters 1983

Savage & Peters, 1983: 561 (male, female, nymph); Domínguez et al., 2006: 448.

Comments. This species has been reported exclusively from its type-locality, in the State of Paraná; the new record represents a northward extension of its distribution. The specimens examined fit well with the description given by Savage & Peters (1983), except for the coloration of the male forceps. According to them the distal 1/3 of the first segment, the second and the third segment are washed with black, whereas in the material we have examined this pigmentation is restricted to the distal 1/3 of the first segment.


Miroculis (Miroculis) fittkaui Savage & Peters 1983


Comments. This species has been reported from its type-locality, Pará State, Brazil, besides Surinam and Venezuela (Savage & Peters 1983, Savage 1987); the new record represents a significant southeastern extension of its distribution. The specimens examined fit well with the descriptions given by Savage & Peters (1983) and Savage (1987).

Material examined. Three male imagos, BRAZIL, Espírito Santo State, Reserva Biológica de Sooretama, Rio Quirininho (dentro da reserva), 19° 02’ 72.2” S / 19° 02’ 72.2” W, 69 m, 18/ii/2008, F.F. Salles col. (CEUNES).

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References


