

## A New Species of *Atopophlebia* (Ephemeroptera: Leptophlebiidae: Atalophlebiinae) from Bolivia and Argentina

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The new species *Atopophlebia flowersi* is described, based on male and female imagines and nymphs. The genus was previously known only from Panama and Ecuador. The new species differs in some morphological features from the present generic description. However, these differences are not considered sufficient to establish a new subgenus.

Keywords: Ephemeroptera, Leptophlebiidae, *Atopophlebia*, South America, Taxonomy.

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### INTRODUCTION

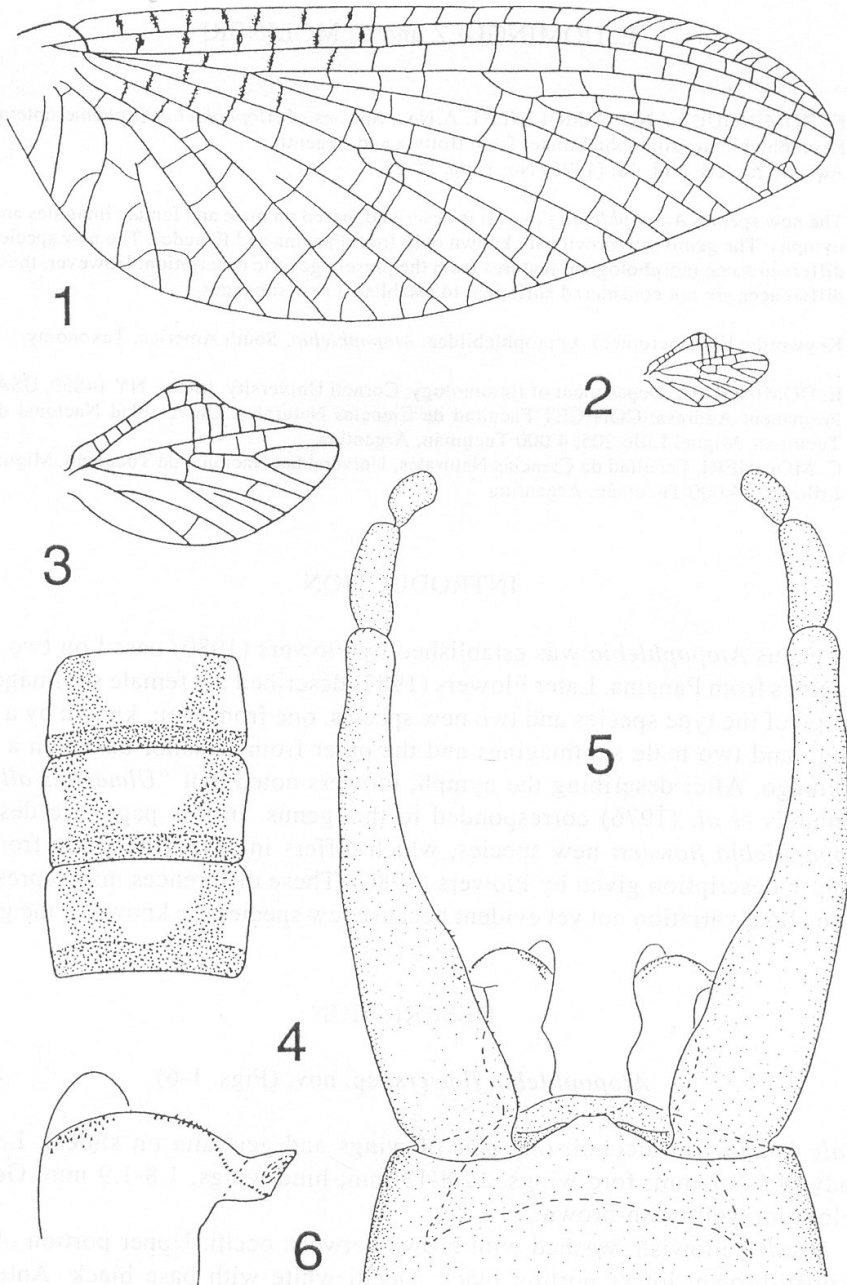
The genus *Atopophlebia* was established by Flowers (1980) based on two male imagines from Panama. Later Flowers (1987) described the female subimago and nymph of the type species and two new species, one from Peru, known by a male imago and two male subimagines and the other from Ecuador based on a male subimago. After describing the nymph, Flowers noted that "*Ulmeritus ally*" in Edmunds *et al.* (1976) corresponded to this genus. In this paper we describe *Atopophlebia flowersi* new species, which differs in several respects from the generic description given by Flowers (1980). These differences may represent a wide clinal variation not yet evident because few species are known in the genus.

### DESCRIPTION

*Atopophlebia flowersi* sp. nov. (Figs. 1-6)

*Male imago:* (in alcohol, one pair of wings and genitalia on slides). Length: body, 8.5-8.7 mm; fore wings, 12.8-13 mm; hind wings, 1.8-1.9 mm. General coloration yellowish-brown.

*Head:* yellowish, washed with brown between ocelli. Upper portion of eyes grayish-brown, lower portion black. Ocelli white with base black. Antennae: scape and pedicel yellowish-brown [flagellum broken off and lost].



Figs. 1-6. *Atopophlebia flowersi*: 1, fore wing; 2, hind wing; 3, hind wing enlarged; 4, abdominal terga - II-IV; 5, genitalia ♂, ventral view; 6 detail of penis lobe.

*Thorax*: pronotum yellowish-gray, with anterior margin washed with blackish-brown; meso- and metanotum yellowish-brown, except central portion lighter; pleura and sterna light brown, margin of sclerites darker. Wings (Figs. 1-3): Membrane of fore wings hyaline, costal and subcostal areas slightly tinged with brown, wing base brown. Veins C, Sc and R1 brownish, remaining longitudinal and cross veins blackish. Cross vein in costal and subcostal areas clouded with black and black spot at base of vein Sc and R1. Membrane of hind wings hyaline, with black spot at base of Sc and MA. Veins Sc and base of MA, and cross veins in costal and subcostal areas blackish, remaining veins yellowish, lighter posteriorly. Legs: leg I: coxae, trochanters and femora yellowish-brown, apex of femora tinged with black, tibiae I blackish brown, except basal 1/7 and apex yellowish; tarsi blackish-brown, lighter apically. Tarsal claws grayish-brown. Legs II and III yellowish-brown, with a median narrow band on femora; tibiae, tarsi and claws as in leg I.

*Abdomen* (Fig. 4): terga yellowish-brown with posterior margins of segments I-IX black and divergent lines from posterior to anterior margins (Fig. 4) blackish; sterna yellowish.

*Genitalia* (Figs. 5-6): subgenital plate and forceps blackish; penes light brown, washed with black on basal half, appendages as in figs. 5-6. [Caudal filaments broken off and lost].

*Female imago* (in alcohol, one pair of wings on slide). Length: body, 10.8-11.0 mm; fore wings, 13.7-14.0 mm; hind wings, 2.0-2.2 mm. Similar to male imago except as follows: head grayish white washed with black between ocelli and on posterior margins, eyes black. Black markings on abdomen more diffuse. Caudal filaments grayish-black with segment union blackish.

*Male subimago* (in alcohol). Length: body, 10.5-10.8 mm; fore wings, 11.6-12.8 mm; hind wings, 1.5-2.0 mm. Similar to male imago, except as follows: upper portion of eyes yellowish-brown; flagellum of antennae light brown. Membrane of fore and hind wings translucent yellow. Caudal filaments light brown with segment unions blackish.

*Female subimago* (in alcohol). Length: body, 9.3-10.8 mm; fore wings, 12.0-13.8 mm; hind wings, 1.2-2.0 mm. Similar to female imago, except fore and hind wings translucent yellow.

*Female mature nymph* (in alcohol, head and mouthparts and legs on slide). Body length, 10.5-11.0 mm. General coloration yellowish-brown.

*Head* brownish washed with black between base of eyes and base of antennae and on inner margin of eyes and between lateral ocelli. Ocelli white with inner margins black. Eyes black. Antennae brownish, with small black markings on scape and pedicel. Mouthparts: light brown, apical 1/3 of maxillae and inner portion of galea-lacinia lighter, central area of mandibles, external margin of maxillae and base of mentum of labium tinged with black.

*Thorax*: light brown, washed with black on pronotum and dark orange lines close to wing articulation; sterna yellowish. Legs: light orange brown, coloration of adult leg visible through cuticle. Claws brown.

*Abdomen* orange brown, with black markings on terga resembling the adult pattern and a pair of black spots on posterior margins of segments I - VIII. Gills grayish, with tracheae black. [Caudal filaments broken off and lost].

*Male mature nymph*: unknown.

*Material*: Holotype, male imago, BOLIVIA, Cochabamba, Rio Vinto, 2,350 m, 20/X/83, E. Domínguez col.; Allotype, female imago, same data as holotype. Paratypes: 2 female subimagines, same data as holotype; 1 male subimago, Cochabamba, Rio Pasare, 85 Km camino a Villa Tunari; 20/X/83, E. Domínguez col.; 1 male subimago and 1 nymph, ARGENTINA, Salta, Orán, Ruta Nac. 57, Km 33, Rio Pescado, Estancia Jakulika, 20/XI/78, A.A.P. Fidalgo, S. Halloy col. The association of the nymph and imago is by the color markings on the abdomen of specimens from the same locality. Holotype and paratypes deposited in the collections of Instituto-Fundación Miguel Lillo, Tucumán, Argentina.

*Etymology*: We dedicate this species to Dr. R.W. Flowers, Florida A & M University, who is the author of the genus.

*Variations*: The blackish marks on the abdominal terga are narrower on the male paratype than those on the holotype. Also the male paratype has a pair of streaks on all sterna (one short and close to the anterior margin and the other close to the lateral margins) which are absent in the holotype.

*Biology*: Specimens of this species have been collected from rocky streams in the mountain rain forests of the western side of the Andes (Yungas) of Argentina and Bolivia. The adults have been attracted by light as subimagines. The microhabitat of the nymphs is still unknown. The location of the single nymph of this species was not recorded. No nuptial flight was observed. Other mayflies collected in the same rivers were *Tricorythodes popayanicus* Domínguez, *Farrodes yungaensis* Domínguez, *Thraulodes consortis* Domínguez and *Thraulodes cochunaensis* Domínguez.

## DISCUSSION

*A. flowersi* can be distinguished from the other species of the genus, as follows. In the imago: 1) fork of vein MA of fore wings (Fig. 1) slightly asymmetrical; 2) vein ICul of fore wings attached at base to CuA and CuP by a cross vein; 3) costal projection of hind wings (Figs. 2-3) located near 1/2 of distance from base to margin; and 4) vein MP of hind wings forked. Another noticeable characteristic is the presence of a row of small spines on each penis lobe. Variation occurs in the hind wing shape among the species of this genus, because in *Atopophlebia obrienorum*, the hind wing is intermediate in shape between *A. fortunensis* and *A. flowersi*. The nymph can be separated from *A. fortunensis*, the only other nymph known for the genus, by the abdominal color pattern, with black markings

on terga resembling the adult pattern (Fig. 4). No significant morphological differences were found between the nymphs of *A. flowersi* and *A. fortunensis*.

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