

A new species of *Americabaetis* (Baetidae: Ephemeroptera) from Andean region, Colombia

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Abstract. A new species of *Americabaetis* Kluge, 1992 is described based on nymphs from Colombia. The new species can be recognized by: (1) frontal keel present; (2) lingua broadly pointed apically; (3) glossa $0.7 \times$ length of paraglossa; (4) apex of paraglossa with three rows of pectinate setae; (5) segment II of labial palp with a moderate distomedial projection; (6) posterior margin of abdominal terga with rounded spines. A key for the identification of the South American species of *Americabaetis* is presented.

Keywords. Neotropical; Baetinae; Freshwater; Taxonomy.

INTRODUCTION

Kluge (1992) established *Americabaetis* as a subgenus of *Baetis* Leach for species described from Cuba. Lugo-Ortiz & McCafferty (1994) considered *Americabaetis* as a synonym for *Acerpenna* Waltz & McCafferty based on some similarities in the nymph, the absence of villophores and the general morphology of the labrum. Later, Lugo-Ortiz & McCafferty (1996) elevated it to genus status to differentiate of *Acerpenna*, based on the absence of hind wing pads, gills on the first abdominal segment, and a conical process between the forceps.

In Colombia the genus *Americabaetis* is represented by the species *Americabaetis alphus* Lugo-Ortiz & McCafferty, 1996 distributed in the Andean and piedmont Ibanero region (Caldas and Meta respectively) (Gutiérrez & Llano, 2015; Rojas-Peña *et al.*, 2021). The main objective of this paper is providing the description and illustration of larval stage of a new species of *Americabaetis* from Andean region, Colombia.

MATERIAL AND METHODS

Specimens deposited in the Invertebrate collection of the University of Quindío, Armenia, Colombia (CIUQ) were examined. The drawings were

made with the aid of photographs and Adobe Illustrator ®CS6 and Adobe Photoshop ®CS6 programs as proposed by Coleman (2003, 2006). Pictures were taken using an optical microscope Zeiss Primo star and Leica M-205C stereomicroscope with a Leica MC-170HD coupled camera. Photographs of nymphs were taken using a stereoscopic Zeiss Stemi 2000c with an Axio Cam ERC 5s camera and edited with the Zen 2 lite. Type specimens were deposited in the Invertebrate collection of the University of Quindío (CIUQ), Armenia, Colombia and in the Entomological Collection of the Biology program at Universidad de Caldas, Manizales, Colombia (CEBUC).

RESULTS AND DISCUSSION

Americabaetis boquiensis Salinas, sp. nov.

Diagnosis

Nymphs: (1) frontal keel present (Fig. 1B); (2) lingua broadly pointed apically (Fig. 2B); (3) glossa $0.7 \times$ length of paraglossa (Fig. 3A); (4) apex of paraglossa with rows of pectinate setae (Fig. 3B); (5) segment II of labial palp with a moderate distomedial projection (Fig. 3B); (6) posterior margin of abdominal terga with rounded spines (Fig. 1D).

Description

Body length (mm): Male mature nymph. Body: 3.0-3.2; cerci, terminal filament, and antennae broken. Female mature nymph. Body: 3.3-4.0; cerci, terminal filament, and antennae broken.

Head (Fig. 1B): Coloration brown. Lateral branch of epicanthal suture curved. Frontal keel present. Antenna with scape and pedicel subcylindrical.

Labrum (Fig. 2A): Semicircular, broader than long; length about $0.87 \times$ maximum width. Distal margin with medial emargination and small process; dorsally with few short, fine, simple setae scattered over surface. Dorsolateral arc of setae composed of 2+1+1 long, spine-like setae and 4 long spine-like setae laterally. Ventrally with distal margin with long, branched setae on lateral region and row of short, bifid setae near midline.

Hypopharynx (Fig. 2B): Lingua subequal in length to superlingua, longer than broad; apex of lingua broadly pointed. Medial tuft of apical setae present. Superlingua not expanded; short, fine, simple setae scattered over lateral and distal margin.

Left mandible (Fig. 2C): Incisors fused with 9-10 denticles (Fig. 2D); prostheca robust, apically denticulate. Margin between prostheca and mola straight, with crenulations on distal half, tuft with short and abundant setae. Subtriangular process narrow. Denticles of mola not constricted. Tuft of setae at apex of mola present, reduced to a single seta.

Right mandible (Fig. 2E): Incisors fused with 9 denticles (Fig. 2F). Prostheca robust, apically denticulate. Margin between prostheca and mola straight; tuft of setae present. Tuft of spine-like setae at base of mola present. Denticles of mola not constricted. Tuft of setae at apex of mola present, reduced to a single seta.

Maxilla (Fig. 2G): Inner dorsal row of setae with three denti-setae: two pectinate denti-seta and one apical denti-seta at the same orientation of canines. Medial protuberance of galea with long, fine, simple setae. Maxillary palp $1.2 \times$ length of galea-lacinia, with long, fine, simple setae scattered over surface. Palp segment II equal in length to segment.

Labium (Fig. 3A): Glossa basally broad, narrowing apically and shorter than paraglossa; $0.7 \times$ length of paraglossa; apex with a robust spine-like setae; ventrally with a row of 6 spine-like setae on inner margin, outer margin with 6 long spine-like setae increasing in length distally. Paraglossa sub-rectangular; apex with 3 rows of apically pectinate setae. Labial palp with segment I $0.54 \times$ length of segments II and III combined; segment I covered with short, simple setae on outer and inner margins; segment II with moderate distomedial protuberance, inner margin with short simple setae, two spine-like setae at

apex; outer margin with few, short, simple setae; dorsally with a row of long fine and simple setae; segment III conical; length $1 \times$ width; covered with spine-like and fine, simple setae.

Thorax (Fig. 1A): Pro, meso and metanotum yellowish-brown with light brown marks.

Foreleg (Fig. 3B): Femur, tibia and tarsi light yellow. Fore-femur. Length about $3 \times$ maximum width; outer margin with a row of long blunt setae (looking spine-like in lateral view). Apex rounded and with blunt setae. Inner margin with a short spine-like setae and micropores. Tibia. Outer margin with a row of scarce, short, fine, simple setae; inner margin with one row of spine-like setae. Tibio-patellar suture present. Tarsus. Outer margin with a row of spine like setae and scarce short simple setae; inner margin with one row of spine-like setae. Tarsal claw with one row of 17 denticles (Fig. 3C).

Abdomen (Fig. 1A): General coloration brown. Terga I to VIII with posterior submedial dark brown mark like-line; segments I to VIII with lateral white longitudinal marks; segments III to VII with sublaterally light brown longitudinal marks. Posterior margin of terga with rounded spines (Fig. 1D). Gills (Figs. 1C, 3D) as long as one and one-half or two abdominal segments combined but never three abdominal segments combined; margin with narrow spines intercalating short, fine, simple setae (Fig. 3E); tracheae extending from main trunk to inner and outer margins. Paraproct (Fig. 3F). With 6-8 marginal spines; postero-lateral extension with minute marginal spines.

Adults: Unknown.

Etymology: The specific epithet is a reference to quebrada Boquia, a creek where this species was collected.

Material examined: Holotype. Male mature nymph (mouthparts, legs, gills and paraproct on a single slide; abdomen in alcohol), Colombia: Quindío: Salento, Quebrada Boquia, tributary of Rio Quindío upper Rio Cauca, $04^{\circ}37'28.5''N$, $75^{\circ}35'56.0''W$, 1,819 m, 05/II/2017; Hernandez G, Gaviria L, cols. Paratypes. Ten mature nymphs (four on slides), same data as holotype (5 CEBUC and 5 CIUQ).

Distribution: Colombia: Quindío, Salento, Quebrada Boquia, tributary of Rio Quindío, upper Cauca River basin.

Discussion: *Americabaetis boquiensis* sp. nov. resembles *A. alphus* Lugo-Ortiz & McCafferty, 1996, *A. longetron* Lugo-Ortiz & McCafferty, 1996, *Americabaetis maxifolium* Lugo-Ortiz & McCafferty, 1996 and *Americabaetis itatiaia* Marulanda-López & Salles, 2023 by presenting frontal keel and by possesses the segment II of labial palp with moderate distomedial protuberance. However, this new species can be distinguished from these species by the presence of rounded spines on posterior margin of terga; *A. alphus*, *A. longetron*, *A. maxifolium* and *A. itatiaia*



Figure 1. *Americabaetis boquiensis* sp. nov., male holotype: (A) Habitus in dorsal view; (B) Head; (C) gGII IV; (D) posterior margin of abdominal terga.

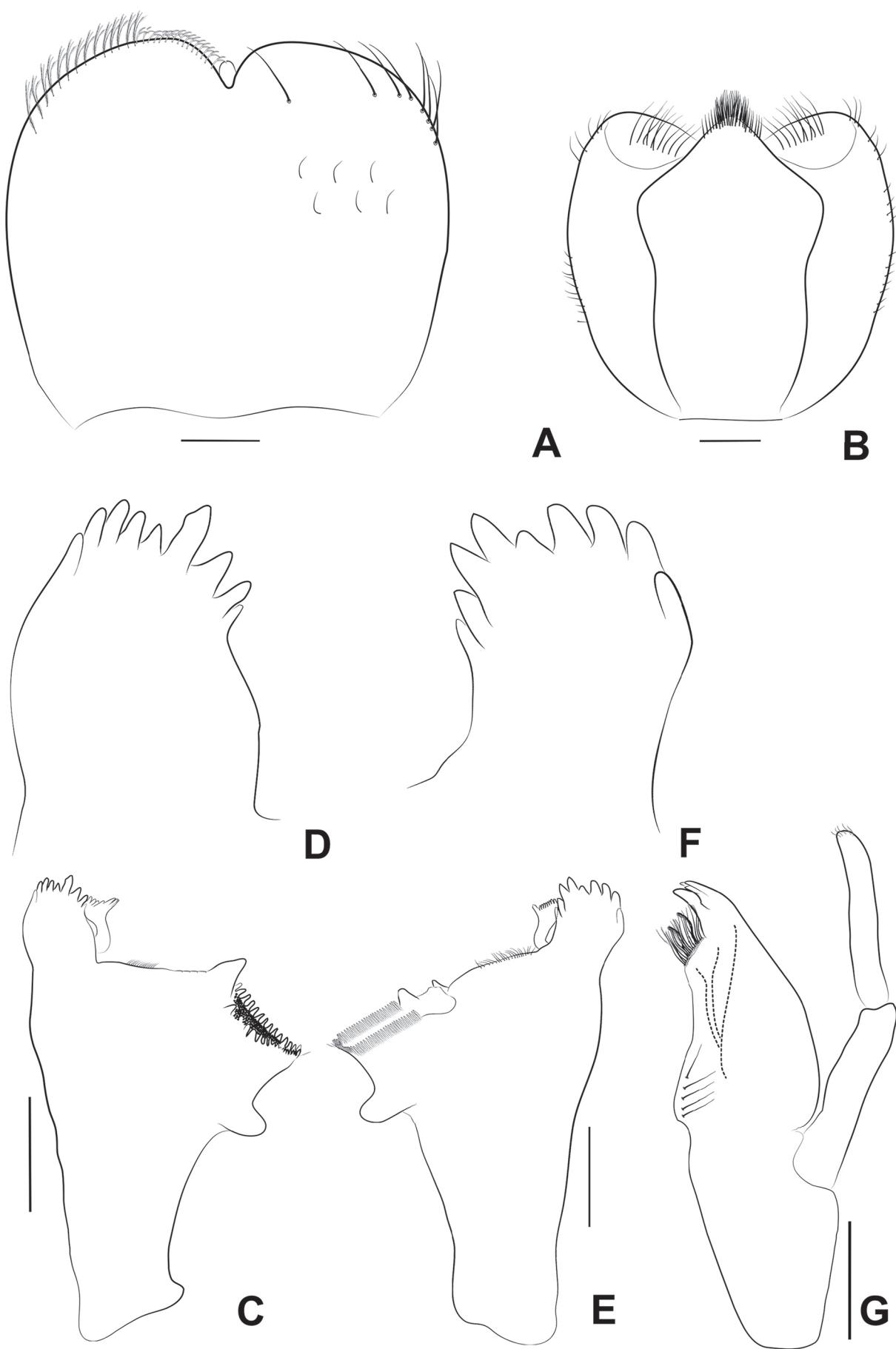


Figure 2. *Americabaetis boquiensis* sp. nov., mouth parts of the male holotype: (A) Labrum (left d.v., right v.v) (scale bar: 0.1 mm); (B) Hypopharynx (scale bar: 0.02 mm); (C) Left mandible (scale bar: 0.1 mm); (D) Incisors of left mandible; (E) Right mandible (scale bar: 0.1 mm); (F) Incisors of right mandible; (G) Maxilla (scale bar: 0.1 mm).

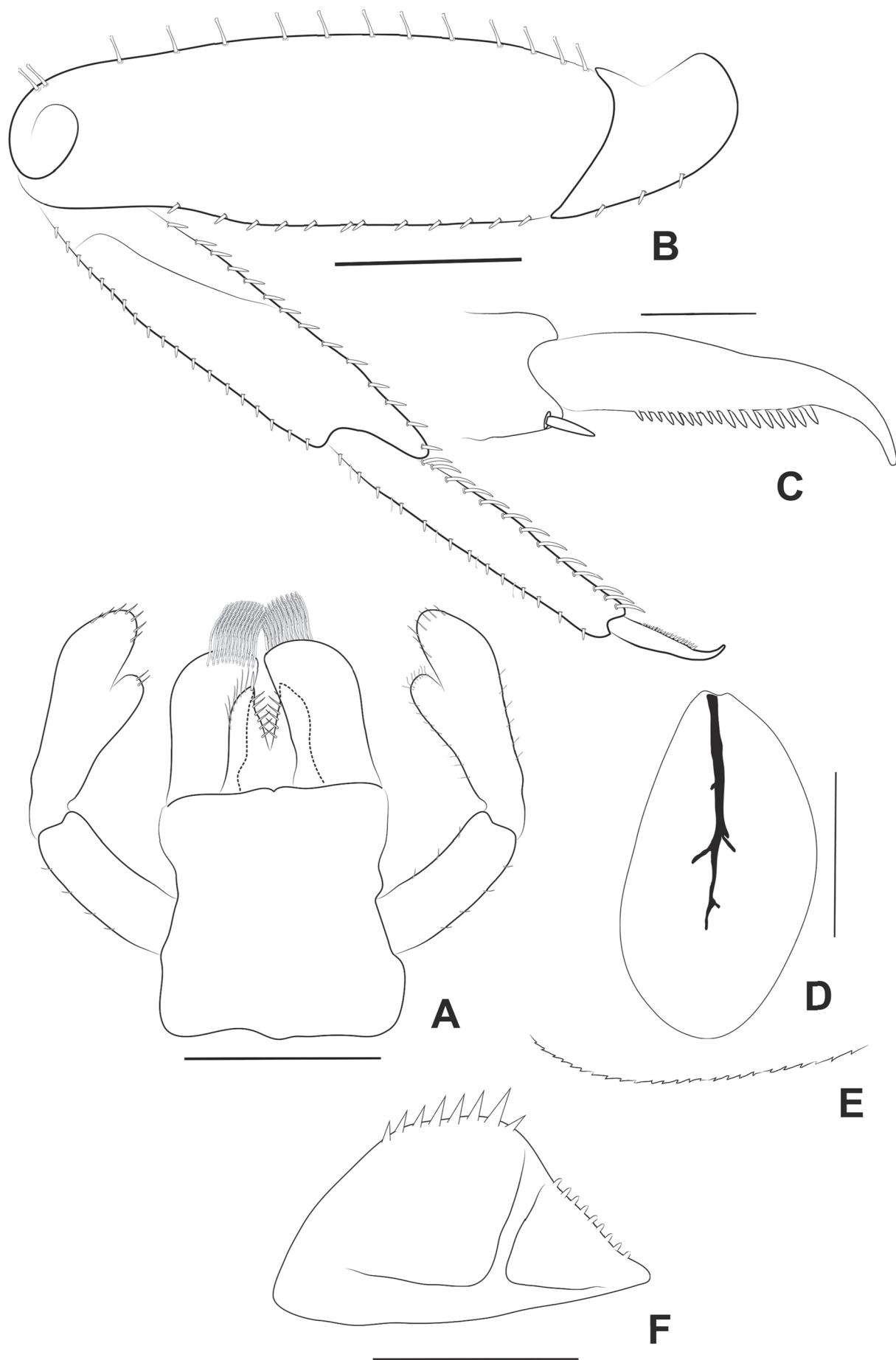


Figure 3. *Americabaetis boquiensis* sp. nov., male holotype: (A) Labium (left d.v., right v.v) (scale bar: 0.1 mm); (B) Foreleg (scale bar: 0.1 mm); (C) Tarsal claw (scale bar: 0.02 mm); (D) Gill IV (scale bar: 0.1 mm); (E) Margin detail of gill IV; (F) Paraproct (scale bar: 0.1 mm).

have pointed spines on posterior margin of terga. Male nymphs of *A. alphus* presented tergum 4 with enlarged posterolateral white spots, and tergum 7 with elongate posterolateral marks (Fig. 7 in Lugo-Ortiz & McCafferty (1996); Fig. 4 in Francischetti et al., 2003; Fig. 23 in Salles et al., 2010; Fig. 1 in Gutiérrez & Llano, 2015), *A. boquiensis* does not have this abdominal color pattern. In the same way nymphs of *A. longetron*, possesses body distinctly elongate, lingua rounded apically, paraprocts with 11-13 spines, gills well tracheated; nymphs of *A. boquiensis* possesses body not elongated, lingua pointed apically, paraprocts with 6-8 spines and gills poorly tracheated. In addition, nymphs of *A. maxifolium* possesses incisors of left mandible fused with 7 denticles and incisors of right mandible fused with 8 denticles, segment II of maxillary palp 0.75× length to segment I, gills as long as two and one-half or three abdominal segments combined and paraproct with 10-11 marginal spines; nymphs of *A. boquiensis* possesses incisors of left mandible fused with 9-10 denticles and incisors of right mandible fused with 9 denticles, segment II of maxillary palp equal in length to segment I, gills as long as two and one-half but never three abdominal segment

combined and paraproct with 6-8 marginal spines. Furthermore, nymphs of *A. itatiaia* present left mandible with incisor fused with 6 denticles, right mandible with incisors fused with 7 denticles and paraproct with 12-14 marginal spines; nymphs of *A. boquiensis* possesses incisors of left mandible fused with 9-10 denticles, incisors of right mandible fused with 9 denticles and paraproct with 6-8 marginal spines.

CONCLUSION

Americabaetis boquiensis sp. nov. is known only from a single locality, as its description was based on material deposited in the insect collection of the University of Quindío. The limited description of species within this genus in Colombia may also be attributed to the insufficient sampling efforts conducted by specialists in the country. Additionally, the discovery of this new species improves the knowledge of this genus in Colombia and South America and supports larger scientific endeavors focused on protect freshwater environments and the delicate balance of aquatic ecosystems.

Key to the nymphs of *Americabaetis* species from South America adapted from Dominguez et al., 2006

1. Frontal keel absent 2
- 1'. Frontal keel present 5
2. Posterior margin of terga with blunt or rounded spines; distomedial projection of segment II of labial palp poorly developed 3
- 2'. Posterior margin of terga with pointed spines; distomedial projection of segment II of labial palp well developed, thumblike *A. robacci*
3. Meso and metasterna with paired setose projections *A. titthion*
- 3'. Meso and metasterna without paired setose projections 4
4. Mouthparts, including labrum, mandibles and maxillae distinctly elongate; paraprocts with 8-9 spines *A. meistognathus*
- 4'. Only labium elongate; paraprocts with 16-18 spines *A. labiosus*
5. Posterior margin of terga with rounded spines *A. boquiensis* sp. nov.
- 5'. Posterior margin of terga with pointed spines 6
6. Gills large, as long as two and one-half or three abdominal segments combined *A. maxifolium*
- 6'. Gills not as above 7
7. Body distinctly elongate; paraprocts with 11-13 spines; gills well tracheated *A. longetron*
8. Body not elongate 9
9. Paraprocts with 6-7 spines; gills poorly tracheated *A. alphus*
- 9'. Paraprocts with 12-14 spines; gills well tracheated *A. itatiaia*

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