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## TAXONOMY OF THE NEOTROPICAL GENUS *AMERICABAETIS*, NEW STATUS (INSECTA: EPHEMEROPTERA: BAETIDAE)

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### ABSTRACT

*Americabaetis* (Insecta: Ephemeroptera: Baetidae), previously considered synonymous with *Acerpenna*, is reinstated and given generic rank. The genus differs from *Acerpenna* in lacking hindwings, gills on abdominal segment 1, and a conical process between the male genital forceps, and in possessing apically rounded gills on abdominal segment 7. The genus has a general Neotropical distribution with a northern limit in east-central Mexico. Five new species of *Americabaetis* are described from South America: *A. alphas*, new species, from Argentina, Bolivia, Brazil, Chile, and Paraguay; *A. labiosus*, new species, from Brazil, Paraguay, and Uruguay; *A. longetron*, new species, from Brazil, Paraguay, and Uruguay; *A. maxifolium*, new species, from Paraguay; and *A. titthion*, new species, from Brazil. *Americabaetis boriquensis*, new combination; *A. intermedius*, new combination; *A. naranjoi*, new combination; *A. pleturus*, new combination; and *A. robacki*, new combination, are reviewed.

**KEYWORDS:** Ephemeroptera, Baetidae, *Americabaetis*, new status, new species, neotropical mayflies.

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### INTRODUCTION

Waltz and McCafferty (1987) described the genus *Acerpenna* (Insecta: Ephemeroptera: Baetidae) based on two species formerly placed in *Baetis* Leach that were clearly distinct from *Baetis*. Kluge (1992) erected *Americabaetis* as a subgenus of *Baetis* for the Cuban species *B. naranjoi* Kluge. Later, Lugo-Ortiz and McCafferty (1994) synonymized *Americabaetis* with *Acerpenna* on the base of certain similarities in the larvae of both, i.e., the absence of the villopore and general morphology of the labium. As a result, the concept of *Acerpenna* was expanded to include spe-

cies having larvae with or without the first pair of gills, with the seventh pair of gills apically rounded or pointed, with a moderate or thumblike distomedial process on labial palp segment 2, and having adults with or without hindwings and with or without a conical process between the male genital forceps.

Our recent comprehensive examination of baetid materials from South America has indicated consistent differences in both the larval and adult stages of Neotropical species which can be associated with *Americabaetis* s.s. and Nearctic species which are associated with *Acerpenna* s.s. We herein redescribe *Americabaetis*, give it generic status, and describe five new South American species. Study materials forming the basis of this study are housed in the Purdue Entomological Research Collection, West Lafayette, Indiana. Because of the extensive materi-

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al examined from South America, all collecting data, except for the type material, are provided in abbreviated form indicating numbers of individuals, stages (L = larva, M = male adult, F = female adult, s = subimago, E = larval exuviae), countries, and departments, provinces, or states of origin. The detailed data are available from the authors upon request.

### *Americabaetis* Kluge, new status

Genus 1 nr *Pseudocloeon* Roback 1966: 134.

*Baetis* (*Americabaetis*) Kluge 1992: 18.

*Acerpenna* Waltz and McCafferty, in part: Lugo-Ortiz and McCafferty 1994: 66.

*Larva*: Frontal keel present (see Lugo-Ortiz & McCafferty 1994: Fig. 6) or absent. Labrum acutely (Figs. 1, 16, 26) or broadly (Figs. 36, 46) rounded distally, with deep median distal cleft. Mandibles (Figs. 3, 4, 18, 19, 28, 29, 37, 38, 47, 48) with incisors basally fused, denticles distinct; row of short, fine, simple setae medially near base of incisors of right mandible; tuft of setae between prosthecae and molae. Maxillary palps (Figs. 5, 20, 30, 39, 49) two segmented, subequal to galealaciniae or longer. Labium (Figs. 6, 21, 31, 40, 50) with paraglossae rectangular, more than 2.0× longer than wide, and glossae 0.7–0.9× as long as paraglossae; distomedial process of palp segment 2 moderately developed (Figs. 21, 50; see also Lugo-Ortiz and McCafferty 1994: Fig. 10) or thumblike (Figs. 6, 31, 40). Femora without villopore, margins subparallel. Hindwingpads absent. Terga (Figs. 10, 22, 32, 42, 53) with variable numbers of scales, scale bases, and short, fine, simple setae. Apically rounded gills present on abdominal segments 2–7, marginal serration well (Figs. 12, 34) or poorly (Figs. 24, 44, 55) developed.

*Adult*: Male turbinate eyes widely separated (Fig. 14). Forewings with paired marginal intercalaries. Hindwings absent. Male genital forceps (Fig. 15; see also Kluge 1992: Fig. 16) with segment 1 robust and cylindrical; segment 2 elongate, basally broad; segment 3 nearly 0.25× length of segment 2; conical process between genital forceps absent.

*Diagnosis*: Larvae of *Americabaetis* are distinguished by the presence of a tuft of setae between the mandibular prosthecae and molae (Figs. 3, 4, 18, 19, 28, 29, 37, 38, 47, 48); a labium (Figs. 6, 21, 31, 40, 50) having rectangular paraglossae, glossae shorter

than paraglossae, and palp segment 2 with a variable distomedial process; absence of hindwingpads; and apically rounded gills on abdominal segments 2–7 only. Male adults are distinguished from those of *Acerpenna* by the absence of hindwings and lack of a conical process between the genital forceps (Fig. 15).

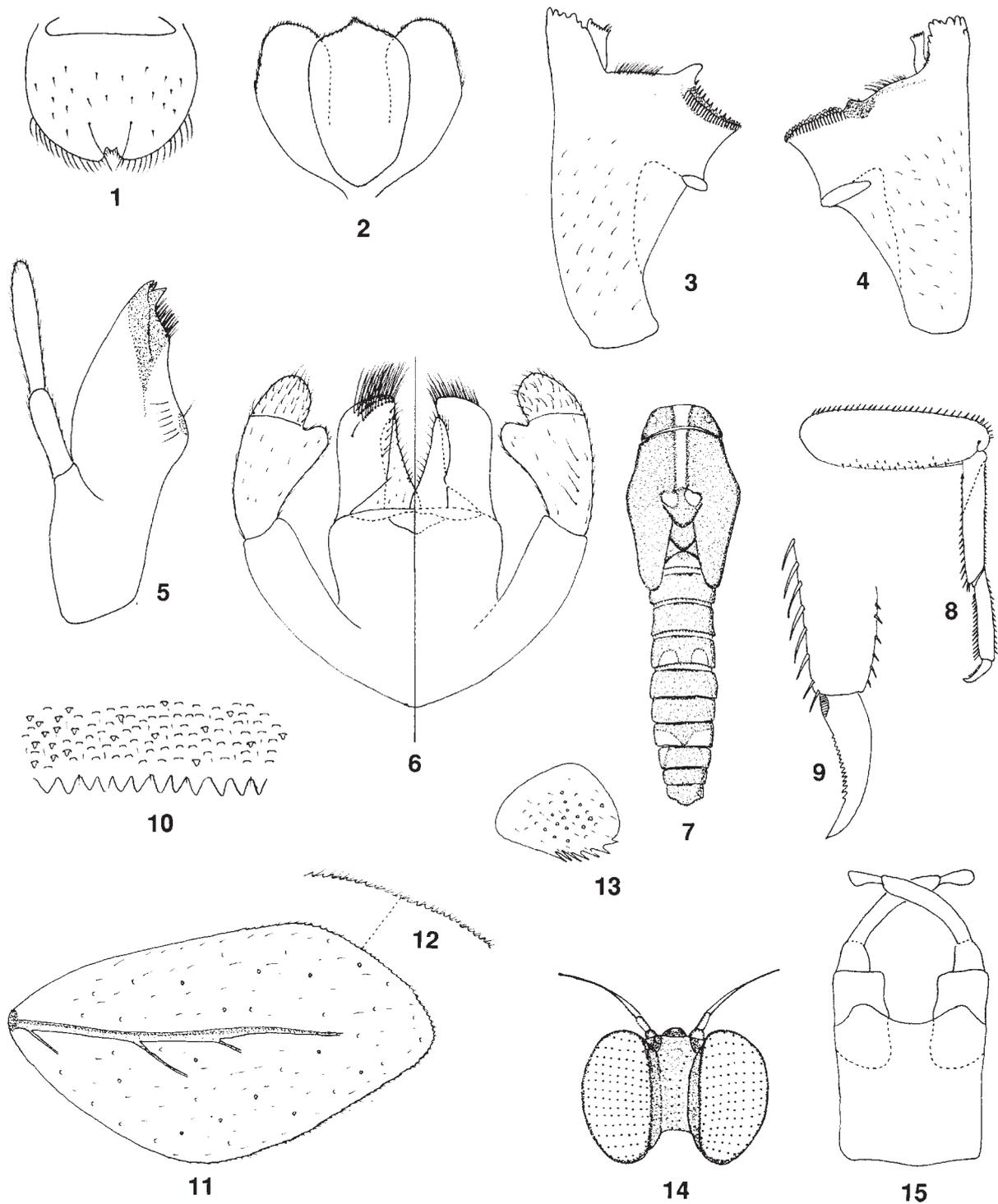
*Type species*: *Baetis naranjoi* Kluge 1992 (original designation).

*Included species*: *Americabaetis alphus* Lugo-Ortiz and McCafferty, new species; *A. boriquirensis* (Lugo-Ortiz and McCafferty), new combination; *A. intermedius* (Lugo-Ortiz and McCafferty), new combination; *A. labiosus* Lugo-Ortiz and McCafferty, new species; *A. longetron* Lugo-Ortiz and McCafferty, new species; *A. maxifolium* Lugo-Ortiz and McCafferty, new species; *A. naranjoi* (Kluge), new combination; *A. pleturus* (Lugo-Ortiz and McCafferty), new combination; *A. robacki* (Lugo-Ortiz and McCafferty), new combination; *A. titthion* Lugo-Ortiz and McCafferty, new species.

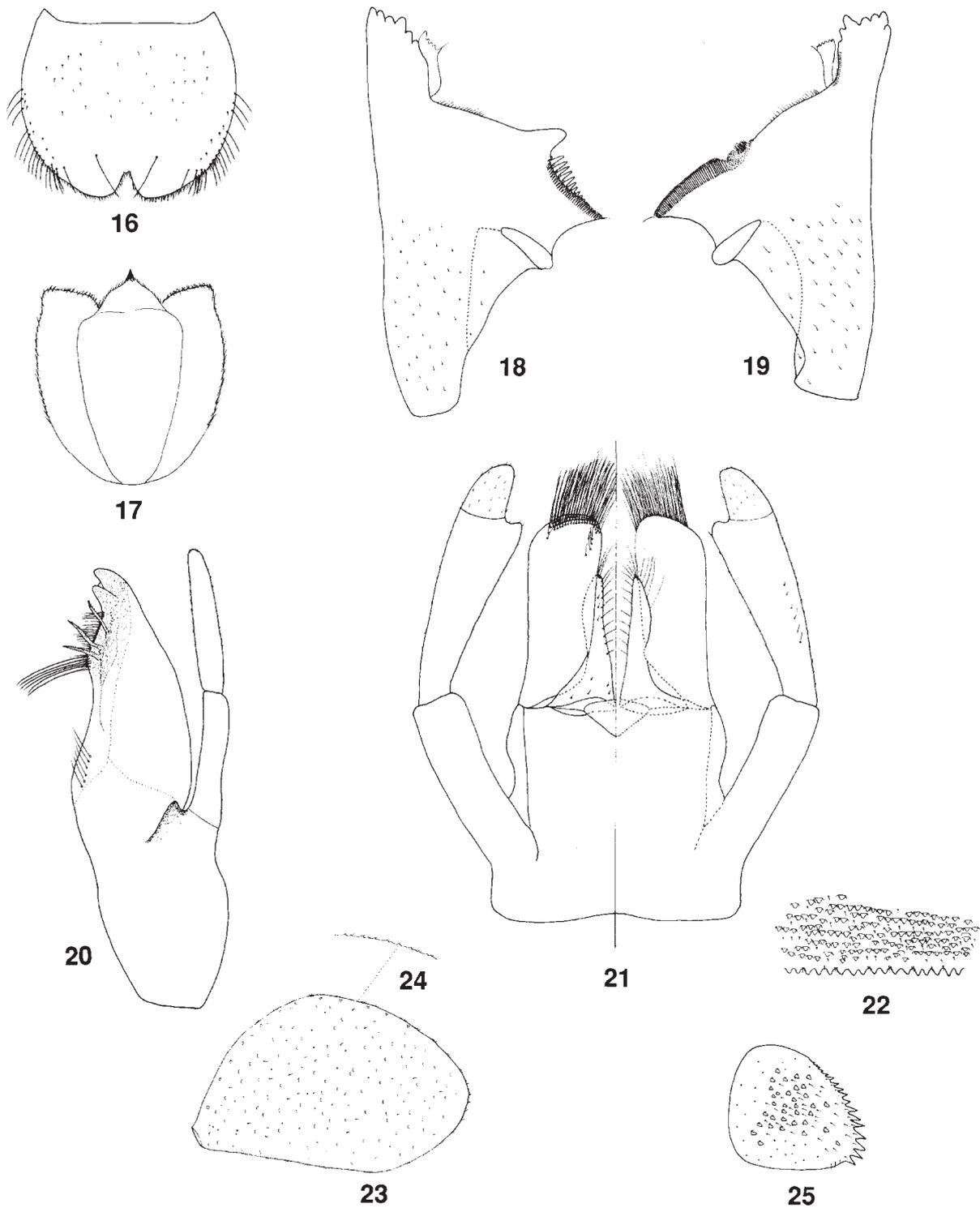
*Distribution*: Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Uruguay. The Colombian and Ecuadorian notations are based on specimens that we have examined but which cannot be described as species at this time because of their relatively poor condition.

*Discussion*: *Acerpenna* and *Americabaetis* show characteristics that clearly distinguish them as separate lineages. Characteristics distinguishing *Acerpenna* from *Americabaetis* are the presence of apically pointed gills on larval abdominal segment 7 (see Morihara and McCafferty 1979: Figs. 31f, 32g) and the presence of a small conical process between the adult male genital forceps (see McCafferty and Morihara 1979: Fig. 2). Characteristics distinguishing *Americabaetis* from *Acerpenna* are the absence of hindwings (and hindwingpads), the absence of gills on larval abdominal segment 1 and the presence of apically rounded gills on larval abdominal segment 7. *Americabaetis* has a widespread Neotropical distribution (see above) with a northern limit in the Mexican states of Nuevo León and Tamaulipas (Lugo-Ortiz and McCafferty 1994, 1996). *Acerpenna* has a widespread Nearctic distribution that extends as far south as central Texas (McCafferty and Davis 1992; Lugo-Ortiz and McCafferty 1995).

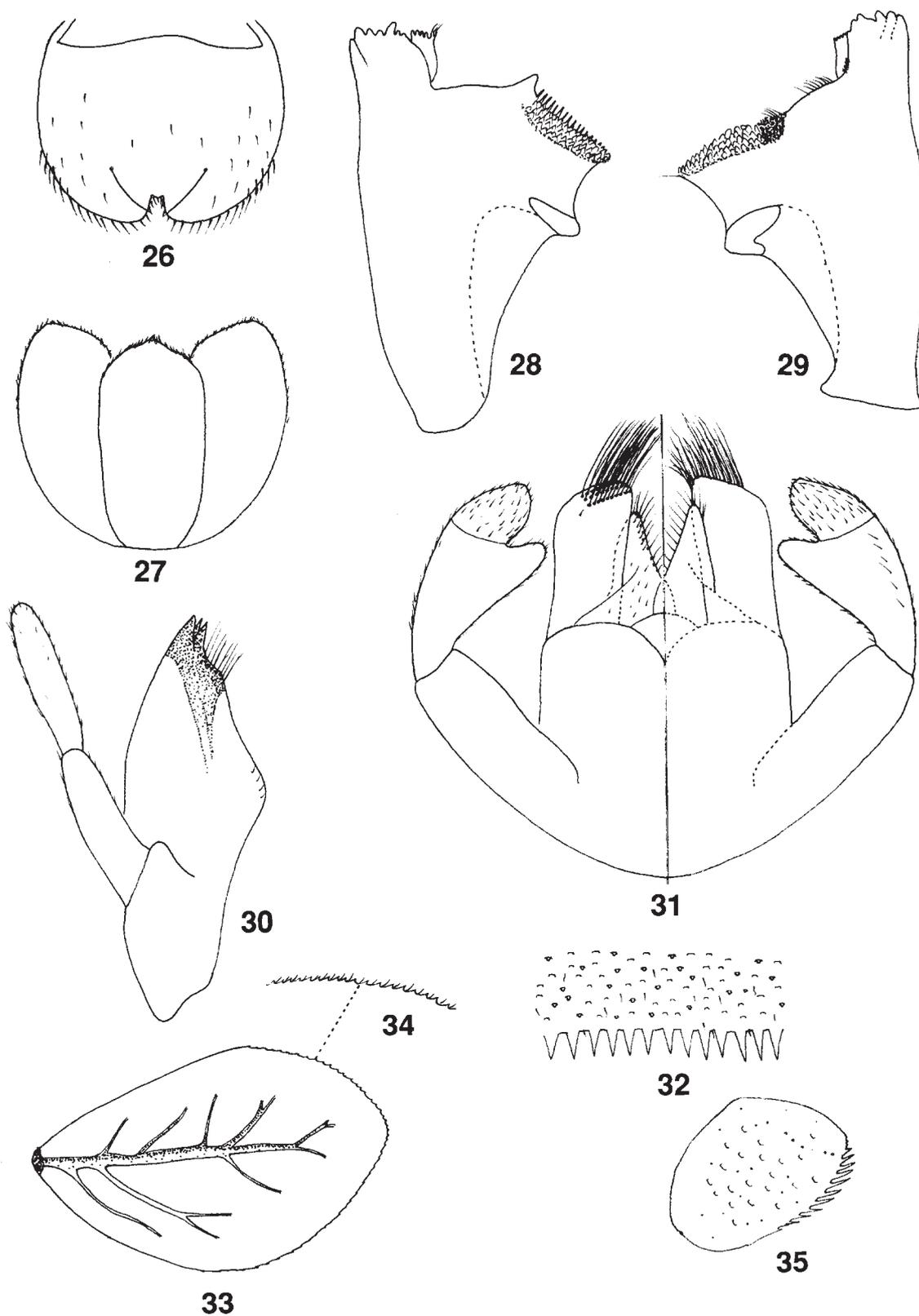
McCafferty and Waltz (1990) indicated that the absence of hindwings is susceptible to convergence



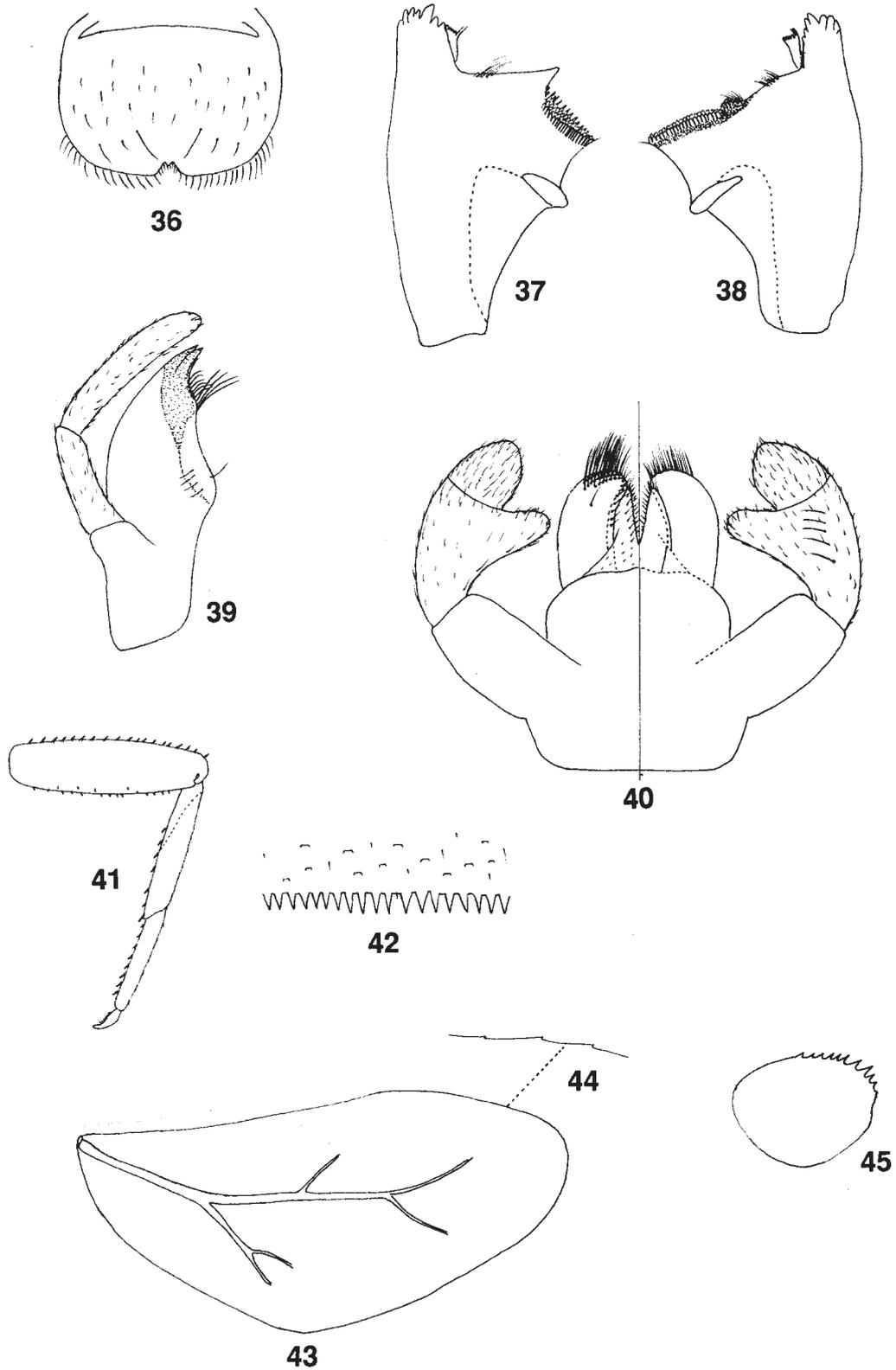
Figs. 1-15. *Americabaetis alphas*, new species, larva and male adult (figures not to scale): 1, labrum (dorsal); 2, hypopharynx; 3, left mandible; 4, right mandible; 5, right maxilla; 6, labium (left-ventral; right-dorsal); 7, male larval thorax and abdomen (dorsal); 8, left foreleg; 9, tarsal claw; 10, tergum 4 (detail); 11, gill 4; 12, gill 4 (detail of margin); 13, paraproct; 14, male turbinate eyes; 15, male genitalia.



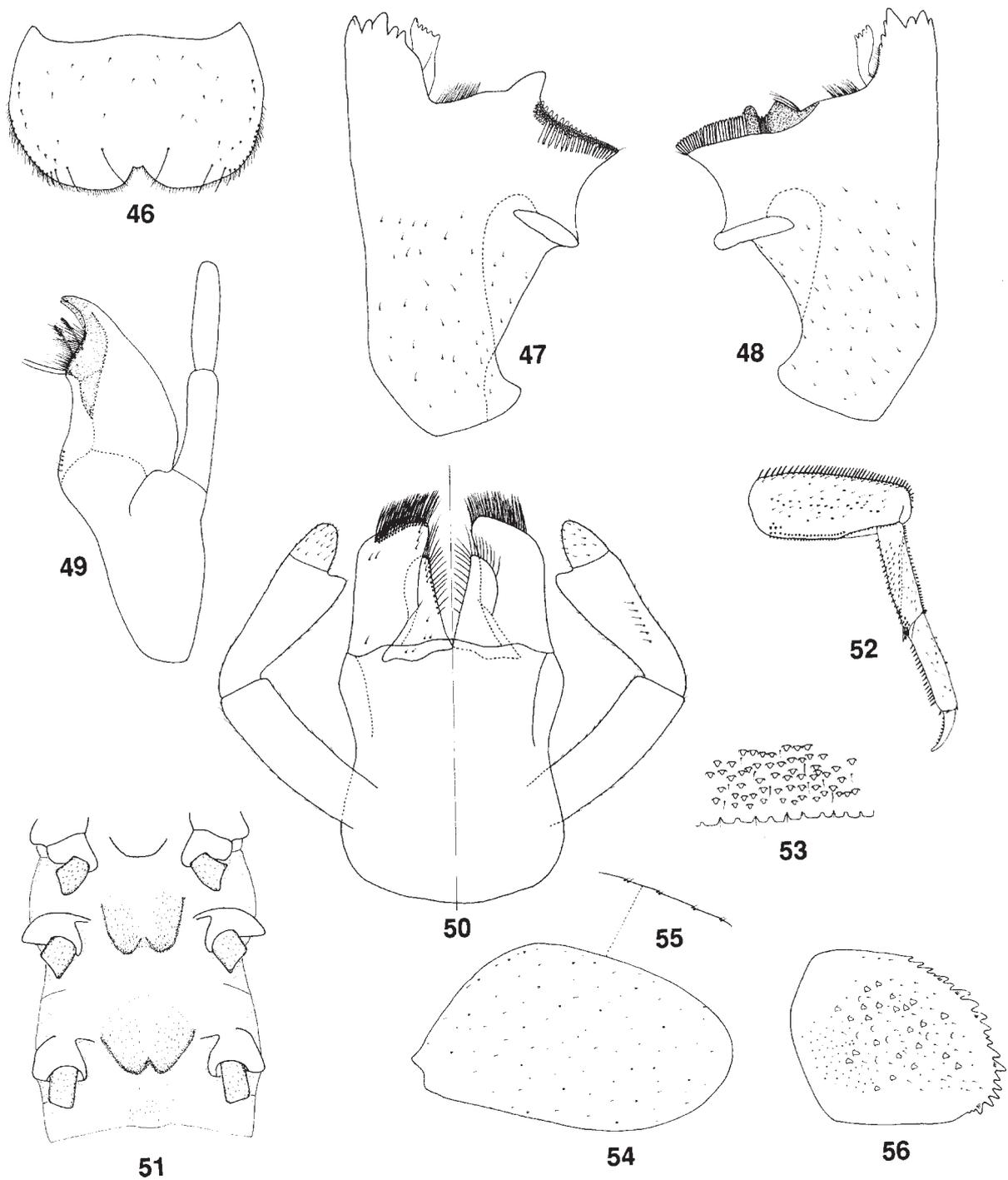
Figs. 16-25. *Americabaetis labiosus*, new species, larva (figures not to scale): 16, labrum (dorsal); 17, hypopharynx; 18, left mandible; 19, right mandible; 20, left maxilla, 21, labium (left-ventral; right-dorsal); 22, tergum 4 (detail); 23, gill 4; 24, gill 4 (detail of margin); 25, paraproct.



Figs. 26-35. *Americabaetis longetron*, new species, larva (figures not to scale): 26, labrum (dorsal); 27, hypopharynx; 28, left mandible; 29, right mandible; 30, right maxilla; 31, labium (left-ventral; right-dorsal); 32, tergum 4 (detail); 33, gill 4; 34, gill 4 (detail of margin); 35, paraprot.



Figs. 36-45. *Americabaetis maxifolium*, new species, larva (figures not to scale): 36, labrum (dorsal); 37, left mandible; 38, right mandible; 39, right maxilla; 40, labium (left-ventral; right-dorsal); 41, left foreleg; 42, tergum 4 (detail); 43, gill 4; 44, gill 4 (detail of margin); 45, paraproct.



Figs. 46-56. *Americabaetis titthion*, new species, larva (figures not to scale): 46, labrum; 47, left mandible; 48, right mandible; 49, left maxilla; 50, labium (left-ventral; right-dorsal); 51, meso- and metathoracic sternal protuberances; 52, left leg; 53, tergum 4 (detail); 54, gill 4; 55, gill 4 (detail of margin); 56, paraplect.

in many baetid lineages, and thus did not consider it to be a reliable character to delineate baetid genera. The absence of the first pair of gills in the larvae is similarly subject to convergence within baetids because other genera (e.g., *Acentrella* Bengtsson, *Afropitulum* Gillies, *Baetiella* Uéno, *Dipheter* Waltz and McCafferty, *Labiobaetis* Novikova and Kluge, and *Liebebiella* Waltz and McCafferty) lack it. However, the consistent absence of the hindwings, first pair of larval gills, and small conical process between the male genital forceps, along with no geographic overlap of character sets, indicate that *Americabaetis* is a separate genus from *Acerpenna*.

*Americabaetis* and *Acerpenna* may or may not represent sister lineages. We do not know at this time if the rectangular paraglossae and the propensity to have a thumblike distomedial process on the second segment of the labial palps can be considered synapomorphic. McCafferty *et al* (1992) indicated that Panamerican (Neotropical + Nearctic) baetids, as well as other mayfly lineages, show very consistent biogeographic patterns. Those lineages found in South America, all of which are hypothesized to be of Neotropical origin (McCafferty *et al* 1992), show distinctive Nearctic distributional patterns. They are exclusively or primarily restricted to arid western North America and are at least represented in southwestern North America. Although there may be some exception to this, the fact that *Acerpenna* does not fit this pattern (McCafferty and Waltz 1990) suggests that the genus was not derived with *Americabaetis*. In any case, neither *Americabaetis* nor *Acerpenna* belongs to the *Baetis* complex of genera (Waltz and McCafferty 1987; Waltz *et al* 1994) and should not be confused with the genus *Baetis* or any of its cognate genera within the complex.

***Americabaetis alphas* Lugo-Ortiz and McCafferty, new species**

*Type material:* Holotype: L, ARGENTINA, Córdoba, Arroyo Tegua, ca 50 km N of Río Cuarto, 5/9-IV-1967, L. Peña. Paratypes: 16 L, 1M, 1F, 2E, same data as holotype; 6L, same data, except V-1972; 2E, 2F, ARGENTINA, Córdoba, tributary of Río Salsacate, ca 3 km N of Salsacate, 17/18-IV-1967, L. Peña; 2M, ARGENTINA, Córdoba, Copina, ca 25 km WNW of Alta Gracia, 1650 m, 11/14-IV-1967, L. Peña; 1L, BRAZIL, Santa Catarina, Nova Teutonia, 52°23'W,

27°11'S, VII-1971, F. Plaumann; 3L, BRAZIL, Santa Catarina, Rio Areias, 730 m, 50°09'W, 27°28'S, XI-1965, F. Plaumann [mouthparts, forelegs, tergum 4, and paraproct of 1L on slide (medium: Euparal)]; 2L, BRAZIL, Santa Catarina, Capão de Canoas, brook, 20 m, 50°10'W, 29°44'S, IV-1967, F. Plaumann; 5L, BRAZIL, Santa Catarina, Aparados da Serra, Rio Quatis, 1900 m, 50°27'W, 28°42'S, IV-1967, F. Plaumann; 1L, PARAGUAY, Cordillera, Piribebuy, Río Piribebuy, 3-V-1985, R. T. Bonace; 1L, PARAGUAY, Paraguairí, Cerro Acahay, arroyo, 31-V-1985, R. T. Bonace.

*Additional material examined:* 1758L, 29M, 5F, 3Fs, 6E; ARGENTINA (Córdoba, Tucumán), BRAZIL (Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina), BOLIVIA (La Paz), CHILE (Aconagua, Coquimbo), PARAGUAY (Amambay, Cordillera, Guairá, Misiones, Paraguairí).

*Larva:* Body length: 4.2–5.8 mm; caudal filaments length: 2.7–3.0 mm. Head yellow-brown; frontal keel present. Antennae nearly 2.3× length of head capsule. Labrum (Fig. 1) with scattered short, fine, simple setae dorsally, and submedial pair of long, simple setae; distal margin acutely rounded. Hypopharynx as in Figure 2. Left mandible (Fig. 3) with seven denticles; prosthema robust, apically denticulate; tuft of setae between prosthema and mola; triangular process at base of mola somewhat apically blunt; dorsal surface with scattered short, fine, simple setae in basal half. Right mandible (Fig. 4) with 10 denticles; prosthema somewhat slender, apically denticulate; tuft of long, fine, simple setae between prosthema and mola; small tuft of long, fine, simple setae at base of mola; dorsal surface with scattered short, fine, simple setae on basal half. Maxillae (Fig. 5) robust; galealaciniae with three sharp denticles apically and row of long, fine, simple setae; palp segment 1 nearly 0.75× length of segment 2. Labium (Fig. 6) with glossae with scattered short, fine, simple setae ventrally and 8–10 long, simple setae medially; paraglossae nearly 2.2× longer than wide, with three rows of long, simple setae apically; palp segment 1 elongate and slender, subequal to segments 2 and 3 combined; segment 2 with pronounced distomedial process, dorsally with four to five sublateral long, fine, simple setae, and with scattered short, fine, simple setae throughout surface; segment 3 rounded, with scattered short, fine, simple setae throughout surface. Thorax (Fig. 7) yellow-brown to medium brown; pronotum generally with median

white band and anterolateral white spots; mesonotum generally with median white band and submedian white spots. Legs (Fig. 8) yellow-brown; femora with 25–27 robust simple setae dorsally and scattered short, stout setae ventrally; tibiae with numerous minute, simple setae dorsally and 20–22 simple setae of increasing length ventrally; tarsi with numerous minute simple setae dorsally and 16–18 simple setae of increasing length ventrally; tarsal claws (Fig. 9) with 14–16 denticles, increasing in size apically. Abdomen (Fig. 7) yellow-brown to medium brown; males generally with tergum 1 white and with anteromedian yellow-brown to medium brown triangular mark, tergum 4 with enlarged posterolateral white spots, and tergum 7 with elongate posterolateral marks; females generally yellow-brown to medium brown, with white markings laterally on terga 2–8. Terga (Fig. 10) with abundant scales laterally and scale bases and short, fine, simple setae medially; margins with sharp spines, nearly 2.0× basal width. Gills (Figs. 11, 12) broadest in middle region, with conspicuous tracheation, marginally serrate and with short, fine, simple setae, dorsally and ventrally with abundant short, fine, simple setae and sparse scales and scale bases. Paraprocts (Fig. 13) marginally with six to seven elongate, sharp spines, surface with abundant scales, scale bases, and short, fine, simple setae. Caudal filaments pale yellow-brown, with faint medium brown bands in middle region and apically; terminal filament nearly 0.80× length of cerci.

*Male adult:* Body length: 4.6–5.0 mm; forewing length: 4.7–4.9 mm; caudal filaments length: 11.0–11.5 mm. Head yellow-brown, with no distinct pattern. Turbinate eyes (Fig. 14) yellow, medium brown at bases, ellipsoidal, widely separated. Antennae nearly 0.5× length of head width, pale cream. Thorax yellow-brown, without distinct pattern. Legs pale cream to pale yellow-brown. Abdomen light yellow-brown, with no distinct pattern. Genitalia as in Figure 15.

*Female adult:* Body length: 4.7–5.0 mm; forewing length: 4.7–5.0 mm; caudal filaments length: unknown. Head yellow-brown, with no distinct pattern. Antennae as in male. Thorax yellow-brown. Legs cream to pale yellow-brown. Caudal filaments cream.

*Etymology:* The specific epithet is a noun in apposition formed from the Latinization of the Greek word *alphos* (white spots on the skin). It is in reference to the white spots on the larval thorax and abdomen.

*Discussion:* *Americabaetis alphas* is widespread geographically and altitudinally in South America. This species is distinct within the genus because it is the only one known to have sexually dimorphic larvae. Female larvae are generally larger than male larvae, and their abdominal coloration is less patterned than that of males (Fig. 7). Male adults possess ellipsoidal, widely separated turbinate eyes (Fig. 14) that readily distinguish them from those of *A. naranjoi* (see below).

***Americabaetis boriquirensis* (Lugo-Ortiz and McCafferty), new combination**

?? *Cloeodes* sp. No. 1 Traver 1938: 38, in part.

*Acerpenna boriquirensis* Lugo-Ortiz and McCafferty 1994: 68.

This species was originally described from larvae from Puerto Rico (Lugo-Ortiz and McCafferty 1994). It differs from other species of *Americabaetis* in having unbanded, pale caudal filaments and in a small number of paraproctal marginal spines (Lugo-Ortiz and McCafferty 1994: Fig. 5).

***Americabaetis intermedius* (Lugo-Ortiz and McCafferty), new combination**

*Acerpenna intermedia* Lugo-Ortiz and McCafferty 1994: 69.

This species was originally described from larvae from Costa Rica only (Lugo-Ortiz and McCafferty 1994). Recently, Lugo-Ortiz and McCafferty (1996) reported it from Guatemala. The species is distinctive within *Americabaetis* because the distomedial process of labial palp segment 2 is poorly developed (Lugo-Ortiz and McCafferty 1994: Fig. 10), and the paraprocts possess numerous minute marginal spines (Lugo-Ortiz and McCafferty 1994: Fig. 11).

***Americabaetis labiosus* Lugo-Ortiz and McCafferty, new species**

*Type material:* Holotype: L, BRAZIL, Santa Catarina, Aparados da Serra, Rio Quatis, 1900 m, 50°27'W, 28°42'S, IV-1967, F. Plaumann. Paratypes: 4L, same

data as holotype; 4L, BRAZIL, Santa Catarina, Nova Teutonia, 52°23'W, 27°11'S, VII-1971, F. Plaumann; 3L, same data, except VI-1972.

*Additional material examined:* 437L; BRAZIL (Paraná, Rio Grande do Sul, Santa Catarina), PARAGUAY (Itapúa, Paraguari), URUGUAY (Maldonado).

*Larva:* Body length: 6.7–7.5 mm; caudal filaments length: 4.5–4.8 mm. Head yellow-brown; frontal keel absent. Antennae nearly 2.6x length of head capsule. Labrum (Fig. 16) with scattered short, fine simple setae dorsally, and submedial pair of long, simple setae; distal margin narrowly rounded. Hypopharynx as in Figure 17. Left mandible (Fig. 18) with six denticles; prostheca robust, apically denticulate; tuft of short, fine, simple setae between prostheca and mola; dorsal surface with scattered short, fine, simple setae in basal half. Right mandible (Fig. 19) with seven denticles; prostheca somewhat slender, apically denticulate; tufts of short, fine, simple setae between prostheca and mola; small tuft of short, fine, simple setae at base of mola; dorsal surface with scattered short, fine, simple setae in basal half. Maxillae (Fig. 20) robust; galealacinae with two or three sharp denticles apically and row of long, fine, simple setae with two or three intermixed long, robust, apically pectinate setae; palp segment 2 subequal to segment 1. Labium (Fig. 21) with glossae with scattered short, fine, simple setae ventrally and 8–10 long, simple setae medially; paraglossae nearly 2.5x longer than wide, with three rows of long, simple setae apically; palp segment 1 slender, nearly 0.75x length of segments 2 and 3 combined; segment 2 with moderate distomedial process, dorsally with five to six sublateral long, fine, simple setae, and with scattered short, fine, simple setae over entire surface; segment 3 somewhat conical, with scattered short, fine, simple setae over entire surface. Thorax yellow-brown, with no distinct pattern. Legs (similar to Fig. 52) yellow-brown; femora dorsally with 40–42 long, apically acute, simple setae, decreasing in length apically, ventrally with two to three rows of short, stout, simple setae, anterior and posterior faces with numerous short, stout and short, fine, simple setae; tibiae dorsally with row of short, stout, simple setae, ventrally with numerous short, apically acute, simple setae; tarsi dorsally with two to four short, stout, simple setae and ventrally with 16–18 simple setae increasing in length apically; tarsal claws with 10–12 denticles. Abdomen yellow-brown, with no

distinct pattern, rarely with cream median longitudinal streak. Terga (Fig. 22) with abundant scales and fine, simple setae; margins with apically rounded spines as long as basal width and fine, simple setae. Gills (Figs. 23, 24) broadest in middle region, untracheated, marginally weakly serrate and with short, fine, simple setae, dorsally and ventrally with fine, simple setae and scale bases. Paraprocts (Fig. 25) marginally with 16–18 spines, increasing in length apically; surface with abundant scales and short, fine, simple setae. Caudal filaments yellow-brown; terminal filament 0.75x length of cerci.

*Adult:* Unknown.

*Etymology:* The specific epithet is a Latin word meaning “large-lipped.” It is in reference to the distinctly elongate labium of the larvae.

*Discussion:* *Americabaetis labiosus* is most similar to *A. titthion* (see below), but it is distinct from that species and other members of the genus in that the distal margin of the labrum is narrowly rounded (Fig. 16), the labial paraglossae and palps are elongate (Fig. 21), and the gills have weak marginal serration (Fig. 24).

#### ***Americabaetis longetron* Lugo-Ortiz and McCafferty, new species**

*Type material:* Holotype: L, URUGUAY, Maldonado, Arroyo de La Quinta, 9-I-1984. Paratypes: 6L, same data as holotype [mouthparts, forelegs, tergum 4, paraproct of one larva mounted on slide (medium: Euparal)].

*Additional material examined:* 84L; BRAZIL (Minas Gerais, Paraná, Santa Catarina), PARAGUAY (Amambay, Guairá, Itapúa, Paraguari).

*Larva:* Body length: 5.5–6.5 mm; caudal filaments length: 3.6–4.1 mm. Head pale yellow-brown; frontal keel present. Antennae nearly 2.6–2.8x length of head capsule. Labrum (Fig. 26) with scattered short, fine, simple setae dorsally; submedial pair of long, simple setae; distal margin narrowly rounded. Hypopharynx as in Figure 27. Left mandible (Fig. 28) with seven denticles; prostheca robust, apically denticulate; tuft of setae between prostheca and mola absent; dorsal surface with very few scattered short, fine, simple setae in basal half. Right mandible (Fig. 29) with six denticles; prostheca somewhat slender, apically denticulate; small tuft of long, fine, simple setae between prostheca and mola; small tuft of long, fine, simple setae at base of mola; dorsal surface

with very few scattered short, fine, simple setae in basal half. Maxillae (Fig. 30) robust; galealacinae with three sharp denticles apically and row of long, fine, simple setae; palp segment 2 subequal to segment 1. Labium (Fig. 31) with glossae with scattered short, fine, simple setae ventrally and 8–10 long, simple setae medially; paraglossae nearly 2.3× longer than wide, with three rows of long, simple setae apically; palp segment 1 slender, subequal to segments 2 and 3 combined; segment 2 with thumblike distomedial process, dorsally with five to six sublateral long, fine, simple setae, and with scattered short, fine, simple setae throughout surface; segment 3 somewhat conical, with scattered short, fine, simple setae throughout surface. Thorax pale yellow-brown, with no distinct pattern; hindwingpads absent. Legs pale yellow-brown; femora dorsally with 22–25 long, apically acute, simple setae, decreasing in length apically, ventrally with numerous short, stout, simple setae; tibiae dorsally with row of short, stout, simple setae, ventrally with short, fine, simple setae; tarsi dorsally with short, stout, simple setae and ventrally with 16–18 simple setae increasing in length apically; tarsal claws with 12–14 denticles. Abdomen generally pale yellow-brown, with faint median longitudinal line on terga 1–9; some mature individuals purplish brown laterally and with distinct pale yellow-brown median longitudinal line on terga 1–9. Terga (Fig. 32) with abundant small scales, scale bases and fine, simple setae; margins with sharp spines, nearly 2.0× basal width. Gills (Figs. 33, 34) broadest in middle region, well-tracheated, marginally serrate and with short, fine, simple setae, dorsally and ventrally bare. Paraprocts (Fig. 35) marginally with 11–13 slender spines, increasing in length apically, surface with abundant scale bases. Caudal filaments pale yellow-brown, sometimes with faint medium brown band in middle region; terminal filament nearly 0.80× length of cerci.

*Adult:* Unknown.

*Etymology:* The specific epithet is an arbitrary combination of the Latin words *longus* (long) and *etron* (abdomen). It is in reference to the distinctly elongate abdomen of the larva.

*Discussion:* *Americabaetis longetron* is distinguished from other members of the genus by the elongate abdomen and the well-tracheated gills (Fig. 33). We have seen last instar larvae that indicate that adults probably have a purplish abdomen with a pale median dorsal band.

### *Americabaetis maxifolium* Lugo-Ortiz and McCafferty, new species

*Type material:* Holotype: L, PARAGUAY, Presidente Hayes, Estero Patiña, km 164, 19-I-1985, R. T. Bonace. Paratypes: 3L, same data as holotype [mouthparts, forelegs, tergum 4, and paraproct of one larva mounted on slide (medium: Euparal)].

*Additional material examined:* 4L, same data as holotype.

*Larva:* Body length: 3.9–4.1 mm; caudal filaments length: 1.8–2.0 mm. Head pale yellow-brown; frontal keel present. Antennae nearly 2.5× length of head capsule. Labrum (Fig. 36) with scattered short, fine, simple setae dorsally and submedial pair of long, simple setae; distal margin broadly rounded. Hypopharynx as in Figure 27. Left mandible (Fig. 37) with seven denticles; prostheca robust, apically denticulate; tuft of long, fine, simple setae between prostheca and mola; triangular process at base of mola somewhat apically sharp; dorsal surface bare. Right mandible (Fig. 38) with eight denticles; prostheca somewhat slender, apically denticulate; small tuft of long, fine, simple setae between prostheca and mola; small tuft of long, fine, simple setae at base of mola; dorsal surface bare. Maxillae (Fig. 39) robust; galealacinae with three sharp denticles apically and row of long, fine, simple setae; palp segment 1 nearly 0.75× length of segment 2. Labium (Fig. 40) with glossae with scattered short, fine, simple setae ventrally and 8–10 long, simple setae medially; paraglossae nearly 2.1× longer than wide, with three rows of long, simple setae apically; palp segment 1 somewhat robust, subequal to segments 2 and 3 combined; segment 2 with pronounced distomedial process, dorsally with five to six sublateral long, fine, simple setae, and with scattered short, fine simple setae over entire surface; segment 3 rounded, with scattered short, fine, simple setae over entire surface. Thorax pale yellow-brown, with no distinct pattern. Legs (Fig. 41) pale yellow-brown; femora with 18–20 robust simple setae dorsally and scattered short, stout setae ventrally; tibiae with scattered fine, simple setae dorsally and 8–10 simple setae of increasing length ventrally; tarsi with scattered fine, simple setae dorsally and 8–10 simple setae of increasing length ventrally; tarsal claws (similar to Fig. 9) with 14–16 denticles, increasing in size apically. Abdomen pale yellow-brown, with no distinct pattern. Terga (Fig. 42) with sparse scale bases and short, fine, simple

setae; margins with sharp spines, nearly 2.0× basal width. Gills (Figs. 43, 44) broadest in middle region, as long as two and one-half or three abdominal segments combined, with conspicuous tracheation, marginally weakly serrate. Paraprocts (Fig. 45) marginally with 10–11 sharp spines, increasing in length apically, surface bare. Caudal filaments pale yellow-brown, with faint medium brown bands in middle region and apically; terminal filament nearly 0.80× length of cerci.

*Adult*: Unknown.

*Etymology*: The specific epithet is a noun in apposition formed by the combination of the Latin words *maxi* (large) and *folium* (leaf). It is in reference to the enlarged abdominal gills.

*Discussion*: This Paraguayan species is readily distinguished by the relatively very large abdominal gills (Fig. 43). Other characteristics that may help in separating *A. maxifolium* from other members of the genus are the weak armature of the abdominal terga (Fig. 42) and weak serration of the abdominal gills (Fig. 44).

***Americabaetis naranjoi* (Kluge), new combination**

*Baetis* (*Americabaetis*) *naranjoi* Kluge 1992: 19.

*Acerpenna naranjoi* (Kluge): Lugo-Ortiz and McCafferty 1994: 71.

Kluge (1992) originally described *A. naranjoi* from Cuba. We have not been able to secure specimens of this species for examination, but it appears to differ from *A. boriquensis* in that it possesses caudal filaments with two narrow brown bands on the cerci and a narrow brown medial band on the terminal filament. Male adults differ from those of *A. alphas* in their smaller and rounder turbinate eyes (Kluge 1992: Fig. 18).

***Americabaetis pleturus* (Lugo-Ortiz and McCafferty), new combination**

*Acerpenna pletura* Lugo-Ortiz and McCafferty 1994: 71.

*Americabaetis pleturus* has a widespread distribution in Mexico and Central America (Lugo-Ortiz and McCafferty 1994, 1996). The species is distinct

in that it possesses a broad brown medial band on the caudal filaments and the paraprocts have medium-size marginal spines (Lugo-Ortiz and McCafferty 1994: Fig. 14).

***Americabaetis robacki* (Lugo-Ortiz and McCafferty), new combination**

Genus 1 nr *Pseudocloeon* Sp. 5 Roback 1966: 135.

*Acerpenna robacki* Lugo-Ortiz and McCafferty 1994: 73.

Lugo-Ortiz and McCafferty (1994) described this species from a single larva from Peru. Part of the description was based on Roback's (1966) original description. We have re-examined the type material of *A. robacki*, and have determined that the species possesses six pairs of gills, rather than seven pairs mentioned by Lugo-Ortiz and McCafferty (1994). The elongate and sharp paraproctal spination (Lugo-Ortiz and McCafferty 1994: Fig. 15) distinguishes this species from other members of *Americabaetis*.

***Americabaetis titthion* Lugo-Ortiz and McCafferty, new species**

*Type material*: Holotype: L, BRAZIL, Santa Catarina, Rio Irany, 600 m, 51°47'W, 26°55'S, IV-1962, F. Plaumann. Paratypes: 7L, same data as holotype; 3L, BRAZIL, Paraná, 1200 m, 51°29'W, 25°26'S, Guarapuava, Rio Chalquim, III-1963, F. Plaumann.

*Additional material examined*: 156L; BRAZIL (Paraná, Rio Grande do Sul, Santa Catarina).

*Larva*: Body length: 6.7–7.5 mm; caudal filaments length: 3.5–4.0 mm. Head yellow-brown, with no distinct pattern; frontal keel absent. Antennae nearly 2.3× length of head capsule. Labrum (Fig. 46) with scattered short, fine, simple setae and submedial pair of long, simple setae; distal margin broadly rounded. Hypopharynx similar to Figure 17. Left mandible (Fig. 47) with six denticles; prostheca robust, apically denticulate; tuft of long, fine, simple setae between prostheca and mola; dorsal surface with scattered short, fine, simple setae in basal half. Right mandible (Fig. 48) with seven denticles; prostheca somewhat slender, apically denticulate; tuft of long, fine, simple setae between prostheca and mola; small tuft of long, fine, simple setae at base of mola; dor-

sal surface with scattered short, fine, simple setae in basal half. Maxillae (Fig. 49) robust; galealacinae with two or three sharp denticles apically and row of long, fine simple setae with two or three intermixed long, robust, apically pectinate setae; palp segment 2 subequal to segment 1. Labium (Fig. 50) with glossae with scattered short, fine, simple setae ventrally and 8–10 long, simple setae medially; paraglossae nearly 2.2× longer than wide, with three rows of long, simple setae apically; palp segment 1 elongate and slender, subequal to segments 2 and 3 combined; segment 2 with moderate distomedial process, dorsally with five to six sublateral long, fine, simple setae, and with scattered short, fine, simple setae over entire surface; segment 3 somewhat conical, with scattered short, fine, simple setae over entire surface. Thorax yellow-brown, with no distinct pattern; meso- and metasterna each with medial pair of soft, setose protuberances (Fig. 51). Legs (Fig. 52) yellow-brown; femora dorsally with 40–42 long, apically acute, simple setae, decreasing in length apically, ventrally with two to three rows of short, stout, simple setae, anterior and posterior faces with numerous short, stout and short, fine, simple setae; tibiae dorsally with row of short, stout, simple setae, ventrally with numerous short, apically acute, simple setae; tarsi dorsally with two to four short, stout, simple setae and ventrally with 16–18 simple setae increasing in length apically; tarsal claws with 10–12 denticles. Abdomen yellow-brown; segment 4 sometimes paler than other segments. Terga (Fig. 53) with abundant scales and fine, simple setae; margins with blunt spines and fine, simple setae. Sternum 1 usually with setose, transverse, medial hump. Gills (Figs. 54, 55) broadest in middle region, untracheated, marginally with regularly-spaced pairs of short, simple setae, dorsally and ventrally with fine, simple setae and scales. Paraprocts (Fig. 56) marginally with 16–18 somewhat irregular spines; surface with abundant scales and short, fine, simple setae. Caudal filaments yellow-brown, sometimes with faint, broad, medium brown band in middle region; terminal filament 0.75× length of cerci.

*Adult:* Unknown.

*Etymology:* The specific epithet is a Greek word meaning “small teats.” It is an allusion to the paired protuberances on the thoracic sterna.

*Discussion:* *Americabaetis titthion* is most similar to *A. labiosus* (see above). It differs from that species and other members of the genus by the pres-

ence of two pairs of setose protuberances on the meso- and metasterna (Fig. 51). Other characteristics that are helpful in distinguishing *A. titthion* include its relatively large size, the blunt marginal spination of the abdominal terga (Fig. 53), and the marginal setation of the abdominal gills (Fig. 55).

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