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First Report and New Species of the Genus *Apobaetis* (Ephemeroptera: Baetidae) from South America

C.R. LUGO-ORTIZ and W.P. McCAFFERTY

C. R. LUGO-ORTIZ and W.P. McCAFFERTY: First Report and New Species of the Genus *Apobaetis* (Ephemeroptera: Baetidae) from South America.

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Apobaetis (Ephemeroptera: Baetidae) is reviewed and newly reported from South America. *Apobaetis signifer*, sp. n., is described from larvae from Brazil and Paraguay. Larvae of the new species are distinguished by short, two-segmented maxillary palps and abdominal coloration. The South American species is apparently plesiotypic relative to known Nearctic congeners, suggesting a Neotropical center of origin for *Apobaetis*.

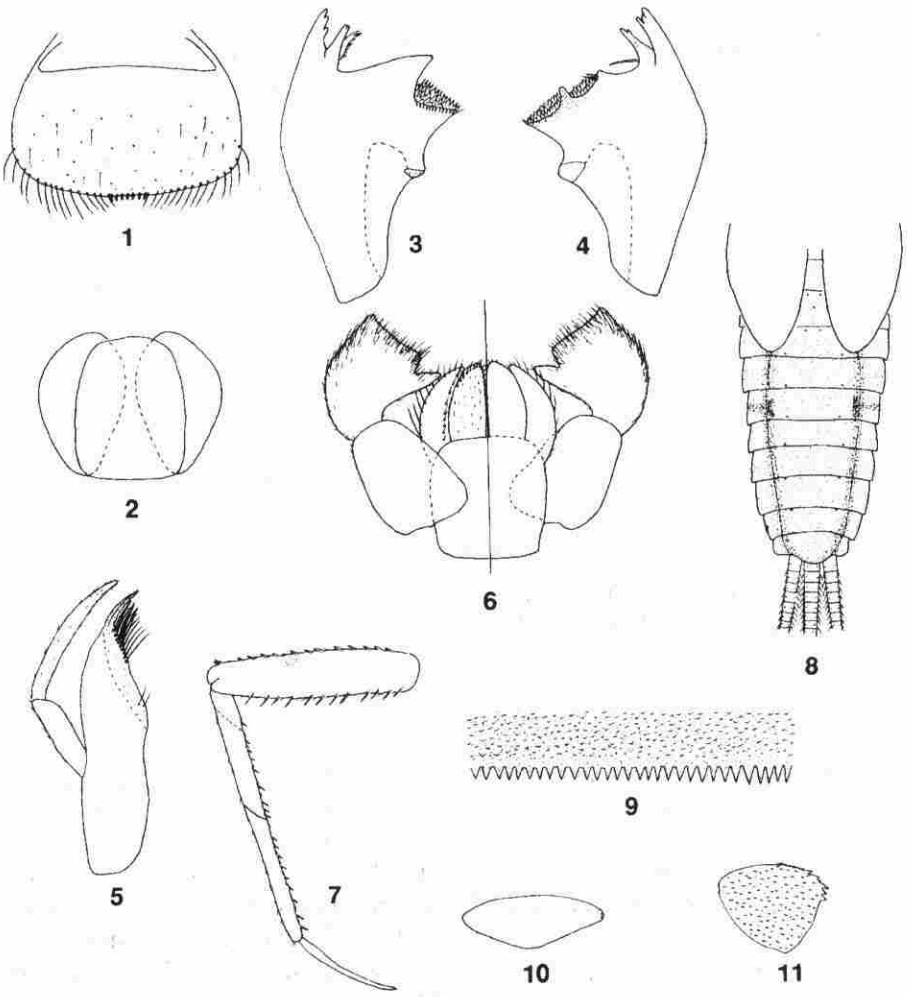
Keywords: Ephemeroptera, Baetidae, *Apobaetis signifer*, South America.

C.R. LUGO-ORTIZ and W.P. McCAFFERTY, Department of Entomology, Purdue University, West Lafayette, Indiana, 47907, USA.

INTRODUCTION

Day (1955) described the genus *Apobaetis* (Ephemeroptera: Baetidae) based on larvae and adults from California. The genus has also been reported from sparse records in Colorado (McCafferty et al., 1993), Georgia (Waltz and McCafferty, 1986), Kansas (Liechti, 1982), and Texas (McCafferty and Davis, 1992; Lugo-Ortiz and McCafferty, 1995). These sketchy range data are probably related to the very small size of the larvae, which makes them difficult to sample when using standard collecting equipment. Known ecology of *Apobaetis* is limited to Day's (1955) comments that larvae are found on sandy substrates in swift currents and are relatively tolerant of poor water quality conditions and high temperatures.

Apobaetis has been thought to be endemic to the Nearctic region. However, it has been an enigmatic genus, both biogeographically and systematically, because it apparently lacked affinities with other Northern Hemisphere genera of Baetidae. Our discovery of *Apobaetis* in Brazil and Paraguay significantly extends the geographic range of the genus to the Neotropics. Moreover, the new Neotropical species we describe herein has plesiomorphic characterization that suggests a Neotropical origin for *Apobaetis*.



Figs. 1–11. *Apobaetis signifer*, sp. n. , larva. 1: Labrum (dorsal). 2: Hypopharynx. 3: Left mandible. 4: Right mandible. 5: Right maxilla. 6: Labium (left-ventral; right-dorsal). 7: Right foreleg. 8: Abdomen (dorsal). 9: Tergum 4. 10: Gill 4. 11. Paraproct.

Genus ***Apobaetis*** Day

Apobaetis Day, 1955: 126.

Diagnosis. Larvae of *Apobaetis* are distinguished by the combination of small body size, labial palps (Fig. 6) with segment 3 fused to segment 2 and distally truncate and segment 2 with acute distomedial process, tarsal claws between 0.75–0.80× length of respective tarsi (Fig. 7), and presence of abundant minute spines on tergal (Fig. 9) and paraproctal (Fig. 11) surfaces. Male adults are

distinguished by the combination of small body size, forewings with double marginal intercalaries (Day, 1955, Fig. 18), absence of hindwings, and acute conical process distally on the subgenital plate between the genital forceps (Day, 1955, Fig. 13).

Type species. Apobaetis indeprensus Day, 1955: 127 (original designation).

Included species. Apobaetis etowah (Traver); *A. indeprensus* Day; *A. signifer* Lugo-Ortiz and McCafferty, sp. n.

Apobaetis signifer Lugo-Ortiz and McCafferty, sp. n.

Larva. Body length 3.1–3.7 mm. Caudal filaments 1.6–1.7 mm. Head pale yellow-brown, with no distinct markings. Labrum (Fig. 1) with six to eight short, stout setae and without notch on anterior margin; dorsal surface with scattered long, fine, simple setae. Hypopharynx as in Fig. 2. Left mandible (Fig. 3) with incisors deeply cleft, outer set with three denticles, medial set with two poorly defined denticles; prostheca stout, with short, fine, simple setae along medial margin; acute triangular process at base of mola. Right mandible (Fig. 4) with incisors deeply cleft, outer set with three denticles, medial set with two poorly defined denticles; prostheca reduced to long, robust, simple seta; small triangular process at base of mola; enlarged stout denticle in midregion of mola. Maxillae (Fig. 5) with three to four falcate denticles at apex of galealaciniae; palps two segmented, slightly extending beyond galealaciniae, segment 2 ca 1.4× length of segment 1. Labium (Fig. 6) with palp segment 1 ca 1.1× length of segment 2 and 3; segment 2 with abundant long, fine, simple setae and acute process distomedially; glossae robust, with abundant short, fine, simple setae ventrally; paraglossae elongate, becoming pointed distally. Thorax pale yellow-brown, sometimes with faint submedial markings anteriorly on mesonotum; hindwingpads absent. Legs (Fig. 7) elongate and slender; femora with submedial light brown marking on anterior face; tarsal claws 0.75× length of respective tarsi. Abdomen (Fig. 8) with pair of submedial dark specks either anteriorly or posteriorly on terga 1–10; tergum 5 with light brown, elongate marking; terga 1–4 and 6–9 with faint light brown lateral markings; terga (Fig. 9) with abundant minute spines on surface and sharp spination on posterior margins. Gills (Fig. 10) elongate, weakly tracheated. Paraprocts (Fig. 11) with marginal spination increasing in length distally, surface with abundant minute spines. Caudal filaments light cream.

Adult. Unknown.

Type material. Holotype: Larva, PARAGUAY, Departamento Cordillera, Piribebuy, Río Piribebuy, V-3-1985, R. T. Bonace, deposited in the Purdue Entomological Research Collection (PERC). PARATYPES: Two larvae, same data as holotype; larva, PARAGUAY, Departamento Misiones, 4 km S of Yabebyry, X-27-1983, R. T. Bonace (PERC).

Additional material examined. Larva, BRAZIL, Pará State, Rio Cuparí, Caxias, X-26-1941, H. Sioli; two larvae, BRAZIL, Pará State, Villa Nova Cr, Fordlândia, IX-18-1950, H. Sioli; four larvae, BRAZIL, Pará State, swift stream at Mission Cururú, IV-6-1942, H. Sioli; larva, same data as holotype; larva, PARAGUAY, Departamento Central, Compañía Jukyty, III-14-1984, R. T. Bonace; larva, PARAGUAY, Departamento Cordillera, Colonia Piraretá, Arroyo Yhaguy Guazú, VIII-15-

1985, R. T. Bonace; three larvae, PARAGUAY, Departamento Amambay, Parque Nacional Corá, Arroyo Panambay, pool, XI-5-1983, R. T. Bonace [mouthparts, right foreleg, tergum 4, and paraproct of one larva mounted on slide (medium: Euparal)]; larva, PARAGUAY, Departamento Paraguarí, Parque Nacional Ybycuí, Arroyo Corrientes, VII-25-1985, R. T. Bonace. All material deposited in PERC.

Etymology. The specific epithet is a Latin word meaning "bearing marks." It is an allusion to the distinct larval abdominal markings.

Remarks. *Apobaetis signifer* is distinguished from other known larvae of the genus by the relatively short, two-segmented maxillary palps (Fig. 5) and the distinct abdominal color pattern (Fig. 8). The maxillary palps of the Nearctic species *A. indeprensus* are clearly specialized, being elongate and having a basally constricted segment 3 (Day, 1955, Fig. 5). The more generalized maxillary palps of *A. signifer* suggest to us that it is more plesiotypic and that the genus may have originated in South America. This biogeographic pattern of northward diffusion through the Panamanian land bridge in the Pliocene (2–5 mya), with concomitant apotypic transformations, has been previously hypothesized for the baetid genera *Baetodes* Needham and Murphy, *Camelobaetidius* Demoulin, *Cloeodes* Traver, and *Paracloeodes* Day (McCafferty et al., 1992), and supports the view that the South American continent possesses a diverse autochthonous fauna that has recently influenced the Nearctic faunal composition (Rich and Rich, 1983).

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