

## A New Species and New Synonym in *Camelobaetidius* Demoulin (Ephemeroptera: Baetidae)

LUKE M. JACOBUS AND W. P. MCCAFFERTY  
Department of Entomology, Purdue University,  
West Lafayette, Indiana 47907, USA

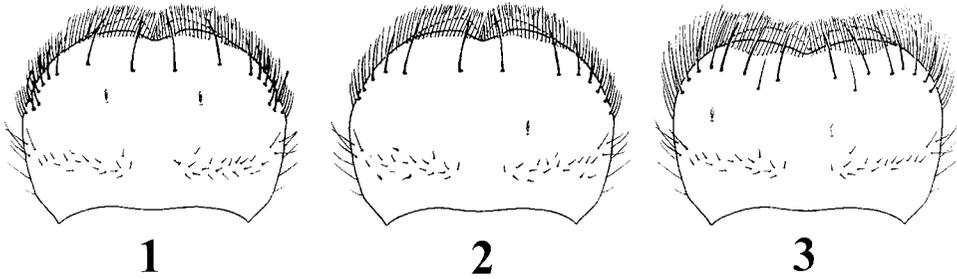
**ABSTRACT:** Based on the examination of type material, we recognize a new synonym for *Camelobaetidius warreni* [= *C. similis*, NEW SYNONYM]. Published records of *C. similis* have been based either on misidentifications of *C. mexicanus* or are referable to a previously undescribed species, *C. maidu* Jacobus and McCafferty, n. sp. *Camelobaetidius maidu* is described based on male and female larvae from the far western United States and Mexico. It is distinguished from congeners by having a combination of osmobranchiae present on the forecoxae and absent on the midcoxae; claws with relatively few denticles; and a labrum with relatively few setae in the dorsal, submarginal anterior line and relatively many sublateral setae. Diagnoses are provided for the larvae of *C. maidu*, *C. mexicanus*, and *C. warreni*.

**KEY WORDS:** *Camelobaetidius*, new species, new synonym, Baetidae, Ephemeroptera

The genus *Camelobaetidius* Demoulin (1966) [= *Dactylobaetis* Traver and Edmunds, 1968 (McCafferty and Waltz, 1990)] is a widespread genus of small minnow mayflies (Ephemeroptera: Baetidae) from the Nearctic and Neotropical regions that has a hypothesized Neotropical origin (see McCafferty, 1998). The larvae, which often inhabit relatively large streams, are distinguished from other Baetidae by their slightly bowed tarsi and distinctive spatulate claws, which have several to many denticles. Lugo-Ortiz and McCafferty (1995) reviewed the nomenclatural history of *Camelobaetidius* and provided a major review of the North and Central American species. Several subsequent contributions to the systematics of the genus have been made by Wiersema (1998), Klubertanz and Jones (1999), Lugo-Ortiz and McCafferty (1999a, b), Dominique *et al.* (2000), McCafferty and Randolph (2000), Randolph and McCafferty (2001), and Nieto (2003). However, species of the genus still require phylogenetic analysis, as first suggested by McCafferty and Klubertanz (1994).

During the course of a study on the distribution of Nearctic small minnow mayflies (McCafferty *et al.*, 2005), we discovered that the type specimens of *C. similis* Lugo-Ortiz and McCafferty are equivalent to a previously described, and more widespread, species. Further investigation revealed that additional specimens that had been identified and reported as *C. similis* are either *C. mexicanus* (Traver and Edmunds) or a new species described herein. In order to clarify this situation, and help alleviate such problems in the future, we include diagnoses for proper identification of each of the three pertinent species, discuss their respective geographic distributions, and note previous reports based on misidentifications.

We note that the diagnostic value and significance of certain morphological characters within *Camelobaetidius* remain unclear at this time. For example, the number of denticles on the claws should be used with caution when identifying material as one of the three species treated here, because the expected range of variation for each of these species overlaps. Also, we observed small spatulate setae on the dorsal surface of the labrum (Figs. 1–3) of each of the species treated here. These setae are different from the “intermediary setae” used for the diagnosis of certain species (see, e.g., Lugo-Ortiz and McCafferty, 1995; McCafferty and



Figs. 1–3. Labra (dorsal view) [Note: Significance of, and variability in, the number and placement of spatulate setae on the dorsal surface is not known.]. Fig. 1. *Camelobaetidius maidu*, n. sp. Fig. 2. *Camelobaetidius mexicanus*. Fig. 3. *Camelobaetidius warreni*.

Randolph, 2000). The number and placement of these spatulate setae probably is variable, but we have not been able to determine the full extent of variation, based on the material we examined. Therefore, this character should not be used yet for diagnostic purposes.

#### Species Accounts

##### *Camelobaetidius maidu* Jacobus and McCafferty, new species

##### Descriptions

**MATURE LARVA.** Body length 4.6–6.1 mm; caudal filaments length 2.5–2.9.

**Head.** Antennae with fine, simple setae on scape, pedicel, and distally on each segment of flagellum. Labrum (Fig. 1) relatively round; dorsal surface with scattered small spatulate setae, four setae in anterior submarginal line, intermediary setae absent, and 5–9 sublateral setae on each side arranged in irregular line, with sublateral setae slightly offset. Right mandible with 3 + 1 + 3 denticles; tuft of setae at base of prostheca; tuft of setae at medial margin of molar region; branched seta at tip of molar region. Left mandible with 5 + 2 denticles; thumblike projection well developed and robust. Maxilla with dentisetae robust; pair of medial setae on inner margin; palp robust, two-segmented, extending to tip of maxilla. Labium with palp segment 1 length approximately 2× width; segment 2 shorter than segment 1 with broadly rounded inner distal projection but no medial point; segment 3 subconical with blunt tip, length subequal to basal width.

**Thorax.** Forecoxal osmobranchiae present; midcoxal osmobranchiae absent. Femora with numerous long, hairlike setae on dorsal margin. Tibiae with 9–13 apicoventral, stout, spinelike setae. Tarsi with several short, stout setae and two long, stout setae on inner margin. Claws with 6–9 denticles and stout, subdistal seta; subdistal seta length subequal to length of longest denticle. Forefemur and foretibia subequal in length.

**Abdomen.** Tergal color patterns highly variable, but generally similar to Fig. 4 of Wiersema (1998); sterna light brown with pale oblique streaks. Terga 2–9 posterolateral corners with single, minute, sclerotized spine; spines on segment 9 longest. Gills with faint tracheation; gills 1 and 7 smaller than others. Median caudal filament length slightly less than that of cerci.

**ADULTS.** Unknown.

##### Larval Diagnosis

*Camelobaetidius maidu* is distinguished from North and Central American congeners by the combination of having: claws with 6–9 denticles, forecoxal osmobranchiae, no

midcoxal osmobranchiae, and a labrum (Fig. 1) with no dorsal intermediary setae and 5–9 sublateral setae on each side.

#### Etymology

The specific epithet, *maidu*, is given to honor a tribe of Native American people from the Feather River drainage of California, USA.

#### Morphological Variability

As noted in the description above, *C. maidu* larvae have several variable characters. These include: body length; the number of sublateral labral setae; the number of apicoventral, stout, spinelike setae on the tibiae; the number of claw denticles; and the dorsal abdominal color pattern. In general, male larvae are slightly smaller than female larvae.

#### Distribution

*Camelobaetidius maidu* is known from California and Mexico.

#### Remarks

The *C. maidu* material listed below had been reported previously as *C. similis* by Randolph and McCafferty (2000) and McCafferty *et al.* (2002).

#### Material Examined

HOLOTYPE: **MEXICO**, SINALOA, Rio Evora Mocerito, near Mocerito on Hwy 21, 17-I-1983, Allen, Murvosh, VanVector, larva (labrum on slide) [Purdue University Entomological Research Collection, West Lafayette, Indiana, USA (PERC)].

PARATYPES: **MEXICO**, OAXACA, Rio Atoyac at Ayonquezco, elev. 4600', 40°F, 22-X-1968, RK Allen, one larva (mouthparts on slide) [PERC]; **SINALOA**, Rio Evora Mocerito, near Mocerito on Hwy 21, 17-I-1983, Allen, Murvosh, VanVector, five larvae (head and mouthparts in microvial) [PERC]; **USA**, CALIFORNIA, Plumas County, North Fork Feather River, XI-2001, two larvae (mouthparts in microvial) [PERC].

#### *Camelobaetidius mexicanus* (Traver and Edmunds, 1968)

##### Larval Diagnosis

Larvae of *C. mexicanus* are distinguished from North and Middle American congeners (see Lugo-Ortiz and McCafferty, 1995; McCafferty and Randolph, 2000) by the combination of having: claws with five or six denticles, fore- and midcoxal osmobranchiae absent, and a labrum (Fig. 2) with no intermediary setae and 2–4 sublateral setae.

##### Distribution

*Camelobaetidius mexicanus* has a disjunct distribution. Populations are known from throughout Guatemala, Mexico, and Texas, with additional populations known from Idaho and Oregon [see most recent geographic review by McCafferty *et al.* (2004)].

##### Remarks

The record of *C. similis* from Tamaulipas, Mexico, given by Wiersema and Baumgardner (2000), is based on a misidentification of *C. mexicanus* (D. Baumgardner, pers. comm.).

### Material Examined

**MEXICO**, TAMAULIPAS, Branch of Rio Chihue at Hwy 101, ca. 12 mi S of Jaumave, between kilomarkers 91 & 92, 17-V-1995, DE Baumgardner, BC Henry, one larva [Texas A&M University, College Station, Texas, USA (TAMU)]; Rio Guayalejo, 22-XII-1939, L Berner, one larva (holotype, mouthparts and legs on slide) [PERC].

*Camelobaetidius warreni* (Traver and Edmunds, 1968)  
[=*C. similis* Lugo-Ortiz and McCafferty, 1995, new synonym]

### Larval Diagnosis

Larvae of *C. warreni* are distinguished from North and Central American congeners (see McCafferty and Randolph, 2000) by the combination of having: claws with 7–9 denticles, forecoxal osmobranchiae, no midcoxal osmobranchiae, and a labrum (Fig. 3) with intermediary setae and 2–4 sublateral setae.

### Distribution

*Camelobaetidius warreni* is known from western and intermountain USA states, Saskatchewan, Nebraska, and parts of Mexico and Central America [see most recent geographic review by McCafferty *et al.* (2004)].

### Remarks

Labral chaetotaxy had been used by Lugo-Ortiz and McCafferty (1995) and McCafferty and Randolph (2000) to differentiate between *C. similis* and *C. warreni*. Examination of *C. similis* type material revealed that the setation of the labrum matches exactly that of *C. warreni*. We examined the slide-mounted (in Euparal) labrum of *C. similis* with a compound light microscope and found that intermediary setae are present, in contrast to the original description and subsequent diagnosis (Lugo-Ortiz and McCafferty, 1995; McCafferty and Randolph, 2000). The labrum is mounted on the slide such that the intermediary setae are in a different plane-of-focus than the setae in the dorsal submarginal anterior line, and these intermediary setae are easily overlooked. If the intermediary setae are broken off, as may be common, the intermediary setal bases remain visible with careful observation using compound microscopy.

### Material Examined

**MEXICO**, GUERRERO, km 15, carretera Bejucos, near Ciudad Altamirano, 22-XI-1984, Brailovsky *et al.*, two larvae (*C. similis* paratopotype; mouthparts, forelegs, antenna, and paraprocts mounted on three different slides) [PERC]; **USA**, CALIFORNIA, Stanislaus Co., Tuolumne R., 11-VI-1955, WD Daytnife, five male adults, four female adults, three larvae, associated exuviae (*C. warreni* paratypes) [PERC]; Tuolumne R., 3 mi E of Shiloh [Bridge], 24–31-VII-1954, WC Day, one larva (legs, mouthparts, and head on slide) [PERC]; **COLORADO**, Conejos Co., Conejos R. at La Sauses, 27-VII-1992, Colorado Dept. of Health team, four larvae (labrum in microvial) [PERC].

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