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A new species of *Labiobaetis* Novikova & Kluge, 1987 (Ephemeroptera: Baetidae) from Washington, USA

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Abstract

Labiobaetis sonajuventus n.sp. is described from nymphs collected in a tributary of the Okanogan River in north-central Washington, USA. The new species is distinguished from North American congeners by the well-developed keel between the bases of the antennae, the concave lateral margin of labial palp segment 2, the apically expanded submarginal setae on the labrum, and its western Nearctic distribution.

Key words: Ephemeroptera, Baetidae

Introduction

The small minnow mayfly genus *Labiobaetis* Novikova & Kluge, 1987 (Ephemeroptera: Baetidae) is globally widespread (Lugo-Ortiz *et al.* 1999) and includes North American species that had previously been considered to form the *propinquus* Group of *Baetis* of Leech, 1815 (Moriyama & McCafferty 1979a, b). *Labiobaetis* was originally described as a subgenus of *Baetis* by Novikova and Kluge (1987) to include the *propinquus* Group as well as similar species groups from Eurasia. McCafferty and Waltz (1995) later elevated it to the generic rank and described an additional species from western North America. Shortly thereafter, Lugo-Ortiz *et al.* (1999) synonymized *Labiobaetis* with *Pseudocloeon* Klapálek, 1905, thereby transferring all *Labiobaetis* to that genus. Gattolliat (2001) rejected this synonymy as the immature stages are unknown for the Javanese type species of *Pseudocloeon* and because of differences in the male genitalia, but *Pseudocloeon* continued to be recognized in North America until McCafferty *et al.* (2010) reassigned the species to *Labiobaetis*.

Six species are currently recognized in North America, all of which are known in both the nymphal and adult stages (Moriyama & McCafferty 1979a, b; McCafferty & Waltz 1995; Durfee & Kondratieff 1997): *L. apache* McCafferty & Waltz, 1995; *L. dardanus* (McDunnough, 1923); *L. ephippiatus* (Traver, 1935); *L. frondalis* (McDunnough, 1925); *L. longipalpus* (Moriyama & McCafferty, 1979b); and *L. propinquus* (Walsh, 1863). Nymphs can be identified using the keys in McCafferty and Waltz (1995) and adult males can be identified using the key of Moriyama and McCafferty (1979a) together with emendations by Durfee and Kondratieff (1997).

Examination of routine biomonitoring samples from Washington revealed numerous *Labiobaetis* nymphs from Loup Loup Creek, a tributary of the Okanogan River in the north-central portion of the state. These nymphs clearly differed from *L. apache*, the only other species of the genus currently known from Washington (Meyer & McCafferty 2007), as well as from other congeners and is herein described as a new species. The holotype and some paratypes are deposited in the Illinois Natural History Survey, Champaign, IL [INHS] and the remaining paratypes are deposited in the Purdue Entomological Research Collection, West Lafayette, IN [PERC]. Terminology used for describing the mandibles follows Moriyama and McCafferty (1979b).

Labiobaetis sonajuventus n. sp.

Material examined: HOLOTYPE: 1 nymph, USA, Washington, Okanogan County, Loup Loup Creek, 48.47593°

–119.767434°, 3 August, 2012, coll: S. Dunphy [INHS]. PARATYPES: 10 nymphs, same data as holotype (parts of 2 mounted on slides, one in CMC-10, one in Canada Balsam) [INHS]; 10 nymphs same data as holotype [PERC].

Additional material examined. 69 nymphs, same data as holotype [author's personal collection].

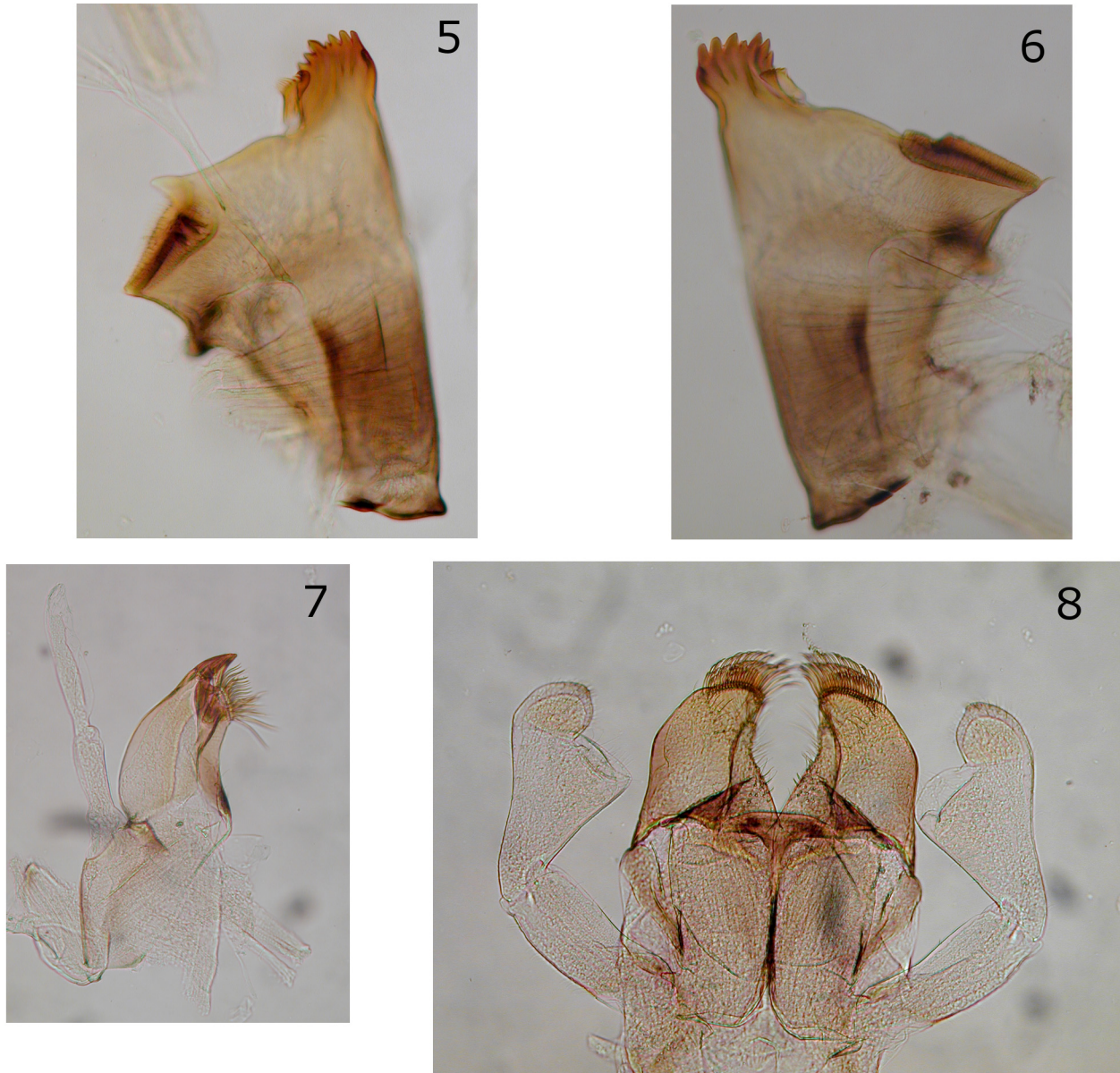


FIGURES 1–4. *Labiobaetis sonajuventus* n. sp. 1, dorsal habitus; 2, lateral habitus; 3, head capsule, anterior; 4, labrum, detail of submarginal setae, with two setae outlined in black.

Diagnosis. Nymphs are readily distinguished from all other North American *Labiobaetis* by the concave outer margin of labial palp segment II, the distinct intra-antennal keel, and the pointed, apically expanded submarginal setae on the labrum. The new species is most similar to nymphs of *L. frondalis* but differs in the more distinctly convex outer margin of the palp and the relatively smaller labial palp segment III (Moriyama & McCafferty 1979b: Fig. 29c). Additionally, *L. frondalis* is not known any further west than eastern South Dakota and southeastern Texas (Moriyama & McCafferty 1979b; Wiersema 1998; Guenther & McCafferty 2008). *Labiobaetis apache* is superficially similar to *L. sonajuventus* n. sp. due to the nearly uniformly brown abdominal terga, but differs by

having hair-like setae on the labrum, the shape of the labial palps, and the absence of a keel between the antennae. The new species is also somewhat smaller than *L. apache*, which can be up to 8mm in length. The original description incorrectly states *L. apache* to be 5–6mm, but some paratypes are 8mm.

Nymph description. Body Length: up to 5 mm; caudal filaments: damaged in all specimens. General color uniformly brown (Figs. 1,2).



FIGURES 5–8. *Labiobaetis sonajuventus* n. sp. 5, left mandible, ventral; 6, right mandible, ventral; 7, maxilla; 8, labium.

Head: Brown, paler around eyes and between bases of antennae. Intra-antennal area with distinct keel (Fig. 3). Antennae brown; scape and pedicel with numerous fine setae and scales, scape with distinct lobe. Labrum nearly square, with 0+8–11 submarginal setae, submarginal setae pointed and widest subapically, submarginal setae evenly spaced, dorsal surface with numerous fine setae (Fig. 4). Right mandible (Fig. 6) planate, area between incisors and mola slightly convex and with numerous minute spines; prosthema robust; incisors fused, with 3(1)+1+3-4 denticles. Left mandible (Fig. 5) angulate, area between incisors and mola sinuate and with numerous minute spines; prosthema robust; incisors fused, with 3(1)+1+3-4 denticles. Maxilla (Fig. 7) with two segmented palp, slightly exceeding length of galea-lacinia, second segment with barely discernible subapical excavation, slightly longer than segment I. Labium (Fig. 8) with palps three segmented; segment II strongly expanded distally on medial margin, outer margin distinctly concave, medial margin nearly straight and lobe with numerous fine

setae and row of three stouter setae near lateral margin; segment III rounded to slightly pointed, base subequal to one-half distal width of segment and with numerous fine setae and pointed robust setae, approximately 0.3 times as long as segment II; paraglossae much wider than glossae, with three rows of marginal setae and subapical oblique row of setae on ventral surface.

Thorax: Pronotum brown with two indistinct pairs of pale spots. Mesonotum uniformly brown. Sterna pale brown. Hind wing pads present. Femora with single, sparse row of medium pointed setae on dorsal margin, subapically with 2–3 setae, apically with several medium pointed robust setae and fine setae; anterior surface with numerous sharply pointed robust setae, most numerous ventally and basally; ventral margin with numerous short robust setae, villipore absent or poorly developed on all legs. Tibiae with two rows of medium robust setae on inner margin, scattered row of short robust setae on outer margin and scattered short robust and fine setae on other surfaces. Tarsi with single row of medium robust setae on inner margin, scattered row of short robust setae on outer margin and scattered short robust and fine setae on other surfaces. Tarsal claw with row of ~17 evenly sized denticles.

Abdomen: Abdominal terga brown with indistinct pair of submedian pale dots and anterior longitudinal streaks, slightly paler laterally, with scales, scale bases, and fine setae; posterior marginal spine length subequal to width; posterior margins with sharply pointed spines, lateral margins without fringe of robust setae. Sternum pale brown to brown, posterior margins of sterna VII–IX with triangular spines. Gills missing on all specimens, gill sockets present on segments I–VII. Paraprocts with numerous long sharply pointed marginal spines and scales and fine setae on surface. Caudal filaments three, broken on all specimens.

Adults: unknown.

Etymology. The specific epithet is an allusion to the recently disbanded music group, Sonic Youth and is derived from the Latin nouns *sonus* (=sound) and *juventas* (=youth).

Discussion

With the description of *L. sonajuventus* **n. sp.**, there are now seven species of *Labiobaetis* known from North America. Even though adults of the new species are not known, the nymphs are sufficiently distinct from congeners to allow the establishment of a new species. The new species is most similar to, and is the presumed sister species of, *L. frondalis* based on the shape and arrangement of the submarginal setae on the labrum, the inconspicuous maxillary excavation, and the well developed intra-antennal keel. This hypothesized relationship cannot be confirmed without a comprehensive review of the *Labiobaetis* of the Holarctic and the discovery of the adults of the new species, however.

The new species will key to *L. frondalis* in the most recent key to species of *Labiobaetis* nymphs (McCafferty & Waltz, 1995). The first part of the second couplet of that key can be modified and a new couplet added to include *L. sonajuventus* **n. sp.** as follows:

2. Labrum with submarginal setae spatulate (Fig. 9), often fringed apically 6
6. Distribution midwestern and eastern; outer margin of labial palp segment II straight to slightly concave; labial palp segment III approximately ½ length of segment II *L. frondalis*
- 6.7. Distribution northwestern; outer margin of labial palp distinctly concave; labial palp segment III approximately 1/3 length of segment II *L. sonajuventus* **n. sp.**

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