BAETOPUS TRISHAE (EPHEMEROPTERA: BAETIDAE): A NEW SPECIES AND NEW GENUS FOR NORTH AMERICA[1]

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ABSTRACT: - The genus *Baetopus* is newly reported from North America based upon a distinctive new species described from two larvae taken from a single mountain locality in North Carolina. The new species is most closely related to *B. montanus*, a species known from Mongolia, but differs from that species, all Palearctic *Baetopus* species, and all other North American baetids by the possession of a single ventrolaterally projecting horn from each side of the larval head capsule and elongate maxillary palps extending well beyond the buccal area of the head. Diagnosis of the genus in North America and species keys to the known world larvae are provided.

The distinctive and relatively rarely collected baetid genus *Baetopus* Keffermüller is herein reported for the first time from North America. The genus was known previously only from Poland, Russia, and Mongolia (Keffermüller 1960, Soldán 1978, Landa and Soldán 1983). Soldán (1978) alluded to a possible *Baetopus* species in the Nearctic based on adult hindwing characters but did not provide further elaboration. Of the three nominal species in the genus, only two species, *B. wartensis* Keffermüller (the type species) and *B. montanus* Soldán, are known as both larvae and adults (Soldán 1978, Landa and Soldán 1983). The remaining species, *B. asiaticus* Soldán (1978) from Mongolia is known only in the adult stage. A new and distinct species is described below from larvae taken from a single mountain locality in North Carolina.

Baetopus Keffermüller

Larval Diagnosis. Larvae of *Baetopus* are recognized by the three tails, elongate claws that are greater than one-half the length of their respective tarsi, simple gills on Abd. I-VII, and most readily by the very long fine setae covering the mouthparts (visible in backlighted/substage lighted specimens) in combination with the distinctive labial palps. The long, dense setae give the mouth region a bearded character both ventrally and dorsally. The labial palps when viewed from the ventral side of the head capsule in a sorting dish, or under higher magnification are clearly two segmented, ellipsoid to bulbous with a distal, constriction or point, and covered with very fine, long setae. In the key to North American baetid genera by Edmunds and Waltz (1996), *Baetopus* will key into couplet 30, including *Apobaetis* Day and *Paracloeodes* Day. While *Apobaetis* (square notched labial palps) and *Paracloeodes* (laterally bulbous labial palps with distal pointed process) also possess elongate claws and two-

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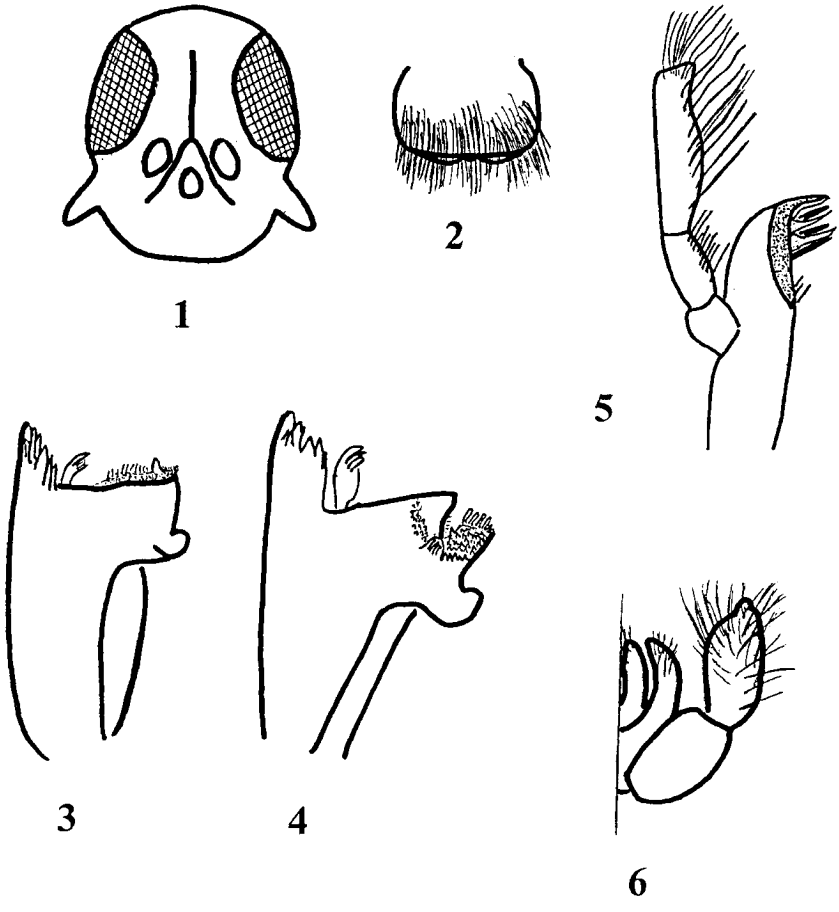
segmented labial palps, the characteristic shape of the labial palps of *Baetopus* among the three genera is diagnostic.

Adults. Unknown. Although the adults of *Baetopus* are unknown in North America, it should be noted that the adults of *B. wartensis*, the type species, and the two Mongolian species possess a genital plate between the bases of the male forceps, very similar to *Centroptilum* Eaton. Also the forceps bear a distinct basal tubercle much like *Pseudocentroptiloides* Jacob or some species of *Procloeon* Bengtsson. The hindwings of *Baetopus* species are very similar in shape to *Centroptilum* and *Procloeon* but they bear multiple cross veins.

Baetopus trishae Waltz, NEW SPECIES

Type material. Holotype, female larva, North Carolina: Jackson County, Panthertown Creek at hiking trail off State Road 1301, CC# 7875, 24 June, 1999, D. Lenat, Trish MacPherson, D. Penrose, collectors. Holotype is partially dissected and mounted in Euparal (abs. alc.) under three separate cover slips on one slide including, coverslip 1 - head capsule (labrum and antennae); coverslip 2 - mouthparts dissected and separated, with left foreleg; and coverslip 3 - tenth tergum, paraprocts and caudal filaments mounted ventral side up. Remainder of the holotype body, including legs and with most gills intact, is stored in alcohol. Holotype slide and vial are deposited at the Purdue Entomological Research Collection, West Lafayette, Indiana. Paratype: 1 female larva, same site data as holotype, 25 May, 2001, D. Lenat, T. MacPherson collectors. Paratype is in alcohol in the collection of the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, NC.

Larva. Coloration: head capsule pale with darker shading at vertex. Scape and pedicel of antennae shaded, flagellum pale. Prothorax pale with dorsomedian rectangulate, dark bordered mark with interior shading. Mesothorax dark brown from anterior margin to base of wingpads; wingpads pale. Metathorax and abdominal segment I pale. Legs pale with dorsal margins of femora darkly shaded, coxae of mesothorax and metathorax dark brown, same color as mesothorax, in whole or in part. Abdomen dorsally, lightly shaded. Abdominal segments III-VI with two large pale areas on each segment. Abdomen VII dark, same color as mesothorax. Abdominal segments VIII-X shaded, with segment X slightly darker than VIII-IX. Tails not banded. Head capsule (Fig. 1) hypognathous, expanded anteriorly and flared; a single horn extends ventrolaterally from each side of the head capsule juxtaposed to the capsule margin; head capsule and horns with scabrate cuticular sculpturing. Antennae approximately twice length of head capsule (measured from vertex to tip of labrum). Labrum (Fig. 2) rounded, approaching hemispherical, with very small notch along distal margin, bearing many long fine setae dorsally, and branched, deeply bifurcate setae marginally. Lingua evenly rounded and without median raised area, subequal to superlinguae. Right mandible as in Figure 3. Left mandible as in Figure 4. Maxillae as in Figure 5 with elongate well-separated denticles, and greatly elongated palps. Palp basal segment one-third length of distal segment; jointly palp segments approximately equal to one half length of intact head capsule (i.e., including all mouthparts attached). The distal palp segment elongate and with many long, fine, setae. Labium (Fig. 6): glossae and paraglossae subequal in length and narrowed distally, with distal setae; labial palps two segmented, asymmetric, ellipsoid to bulbous with outer margin evenly, gently, curved to apex and with distal, submedial constriction or blunted point, and covered ventrally with long, fine, setae; dorsally bare except for row of six medial setae. Hindwing pads small. Femora parallel-sided, without villopore, and with scales; dorsally with few short, distally spatulate setae and dorsal sharp spines; ventral spines sharp and more numerous. Tibiae with small dorsal spines, and ventrally, with smaller spines. Claws edentate, approximately 0.7x length of respective tarsus. Gills I-VII simple, ovate, somewhat pointed distally, without margins or clear evidence of tracheation. Terminal filament present and subequal



Figs. 1-6. *Baetopus trishae* n.sp., holotype, 1. female head capsule, frontal view. 2. Labrum. 3. Right Mandible. 4. Left mandible. 5. Maxilla 6. Labium.

to cerci in length, with lateral bristles. Caudal filaments without darkly pigmented banding, with lateral bristles on inner side only. Paraprocts scaled with 13-15 marginal, sharp spines.

Etymology: *trishae*, feminine, genitive, named for one of the collectors of this species, Trish Finn MacPherson, North Carolina.

DISCUSSION

The new species may be quickly sorted from all North American baetids by the very elongate, and setate palps of the maxillae and by the distinct ven-

trolaterally projecting horn on each side of the head capsule, as may be found in some ephemerellids. The maxillary palps are greater than one half the length of the head capsule and are easily seen even at lower magnifications in a sorting dish. The distinct pair of horns on the head capsule (Fig. 1) that project noticeably ventrolaterally when viewed from the front are unique among North American Baetidae.

Compared to the type species of the genus, *B. wartensis*, the larva of the new species, *B. trishae*, possesses several autapomorphies including elongation of the maxillary palps, the development of distinct side horns on the head capsule, a more robust and rounded form of the labrum, and asymmetric labial palps. The new species appears to be more closely allied to *B. montanus* based on the similarity of characters, but may be easily differentiated using the key provided below.

Key to the known world larvae of *Baetopus* Keffermüller[3]

1. Larva with single, prominent ventrolateral horn on each side of head capsule (Fig. 1); labrum (Fig. 2) dorsally covered with long, fine setae; labrum rounded (sub-semicircular) and with very small median notch ..... *B. trishae* Waltz (North America)

1' Larva without ventrolateral horns on each side of head capsule; labrum with long fine setae or with short stout setae; labrum not sub-semicircular 2

2. Labrum dorsally with short, stout setae; distal segment of maxillary palps elongate, irregularly cylindrical; gills more or less pointed ..... *B. montanus* Soldán (Mongolia)

2'. Labrum dorsally with long, fine setae; distal segment of maxillary palps bulbous; gills rounded ..... *B. wartensis* Keffermüller (Poland, Russia)

Information regarding the type locality is gratefully provided by Dave Lenat and Trish Finn MacPherson. Panthertown Creek, at the collection site, has dark, tannin stained waters, and a white sand substrate, very similar to a coastal plain stream. The Whiteside granitic bedrock has very little buffering capacity. The type locality is located in the Panthertown Valley, an atypical Blue Ridge Mountains area distinguished by a broad flat valley floor that allows formation of large bogs and serves as the headwaters for three separate streams. At the time of collection, the measured site pH was 6.3 and alkalinity 4mg/l $CaCO_3$. Panthertown Valley is part of the Nantahala National Forest. "The impression is of a coastal plain stream that has been dropped into the mountains." (Lenat, personal communication).

Baetopus wartensis, B. montanus, and *B. trishae,* as larvae, possess disruptive coloration patterns similar to patterns also seen in *Barbaetis* Waltz and McCafferty, in some species of *Plauditus* Lugo-Ortiz and McCafferty, and in some Baetiscidae. Most of the species included in the above dwell in pebble or cobble substrates. The type species of *Baetopus, B. wartensis,* is known primarily from larger, lowland rivers. *Baetopus trishae* and *B. montanus* are associated with smaller, rapidly flowing mountain streams. The remaining spe-

[3] Key characters based on published descriptions, and holotype of *B. trishae*.

cies from Mongolia, *B. asiaticus*, is postulated to be associated with lakes (Soldán 1978:212).

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(4) Biological Control:
http://ag.udel.edu/other_websites/biir/anoplophora/pdf/MidwBiolCtrlN.pdf (Smith, Michael T. 1999. The potential for biological control of Asian Longhomed Beetle in the U.S. Midwest Biological Control News 6: 1-7.) and
http://ag.udel.edu/other_websites/biir/anoplophora/pdf/Bioctrl.pdf (Smith, Michael T. 2000. Biocontrol and IPM for the Asian Longhorned Beetle. The IPM Practitioner, 22:1-5).

In notes of entomological interest: Howard Boyd reported two observations: Feb 24, Mourning Cloak Butterfly, *Nymphalis antiopa,* newly emerged from hibernation, in full sunlight, on windowsill. Feb 26, first burrows of plasterer bees appearing, probably *Colletes thoracicus.* Joe Patt reported seeing a tiger beetle on February 23, and Dale Schweitzer noted the late occurrence of *Shistocerca americana* on January 30, at Dividing Creek, NJ.

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