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The genera *Anafroptilum* Kluge, 2011 and *Neocloeon* Traver, 1932, reinstated status, in North America, with remarks about the global composition of *Centroptilum* Eaton, 1869 (Ephemeroptera: Baetidae)

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Abstract

The mayfly genus *Centroptilum* Eaton, 1869, *s.s.*, (Ephemeroptera: Baetidae), as presently understood, is not known to occur in North America. Nearctic species recently classified there belong either to *Anafroptilum* Kluge, 2011 or to *Neocloeon* Traver, 1932, **reinstated genus**. The North American endemic *Neocloeon* differs fundamentally from *Anafroptilum* in that it possesses a patella-tibial suture on the foreleg of larvae and female adults, a characteristic that is shared with certain other baetid genera. *Neocloeon* includes the obligate parthenogen *N. triangulifer*, **new combination**, and a sexual species, *N. alamance*, **reinstated combination**. Nearctic *Anafroptilum* include: *A. album* (McDunnough, 1926), **new combination**, *A. asperatum* (Traver, 1935), **new combination**, *A. bifurcatum* (McDunnough, 1924), *A. conturbatum* (McDunnough, 1929), **new combination**, *A. minor* (McDunnough, 1926), **new combination**, *A. ozarkense* (Wiersema & Burian, 2000), **new combination**, *A. semirufum* (McDunnough, 1926), **new combination**, and *A. victoriae* (McDunnough, 1938), **new combination**. Further study will be required to determine the species composition of *Anafroptilum* and *Centroptilum*, *s.s.*, in the Palearctic and Oriental realms. *Anafroptilum* and *Neocloeon* are part of the *Cloeon* complex of genera, but *Centroptilum*, *s.s.*, is not.

Key words: long-clawed baetids, small minnow mayflies, *Centroptilum luteolum* (Müller, 1776), modified identification key, Anteropatellata

Introduction

The generic limits of the so-called long-clawed Baetidae (Ephemeroptera) are generally poorly known (Kjærstad *et al.* 2012), but recent advances are improving our understanding of this group of small minnow mayflies and helping us to recognize natural groupings. Kluge (2011), for example, recently described *Anafroptilum* Kluge, 2011, a new genus group for some Nearctic and east Palearctic species formerly classified in the genus *Centroptilum* Eaton, 1869. Kluge (2011) noted that *Centroptilum*, *s.s.*, is distinguished from *Anafroptilum* by having male adults with free gonovectes that are not fused with the penial bridge (compare Grandi 1960: Fig. XI-3 and Kluge 2011: Fig. 45), and by having larvae that do not possess the distinct rows of small but prominent spines along the lateral margins of the posterior abdominal segments VIII and IX (sometimes more). It should be noted that *Centroptilum luteolum* (Müller, 1776), the type species of *Centroptilum*, does possess acute processes that are considered to be some form of cuticle texturing or armature, but they are different from the lateral spines of *Anafroptilum*. The possession of these true lateral spines is one larval character used by Hill *et al.* (2010) to define the *Cloeon* complex of genera, which is nearly equivalent to Kluge & Novikova's (1992) concept of *Cloeon* Leach, 1815, *s.l.* Note that the type species of *Centroptilum* does not possess the defining characteristics of the *Cloeon* complex as elaborated here and further below, while *Anafroptilum* does possess these defining characteristics.

Kluge (2011) intuitively considered the presence of the patella-tibial suture (see, e.g., Kluge 2011: Fig. 39) on the forelegs of larvae and female adults to be a synapomorphy for the baetid genera grouped together in

25W, 14-vi-2000, WP McCafferty *et al.* (MP465) [PERC]. One set larval exuviae from lab reared female, USA, Indiana, LaGrange Co., Pigeon Cr. at 1100 E, 10-vi-1974, L Dersch, D Tyler, (LD-3) (slide euparal xi-1984 RDW) [PERC]. One larva, USA, Michigan, Marquette Co., Lower Elm Creek .25 SW of Ives Lake Stone House, 9-11-vii-1985, WP McCafferty, AV Provonsha ["55-01 larva," PERC]; One larva, USA, Michigan, Marquette Co., Pine River at bridge on Compound Rd., Huron Mountain Association, 2-5-vi-1986, WP McCafferty (HM61-03) [PERC]. One male adult, USA, Maine, Somerset Co., Carrabassett River west of N. Anson rt-16, from oaks along road next to river, 13-vii-1986, SK Burian [NAW].

Two larvae from series of unknown number, USA, Vermont, Windhams Co., North Brook at W Edge of Wilmington, 20-vi-1976, WP McCafferty, AV Provonsha, M Minno [PERC].

Centroptilum luteolum. One larva, Ireland, 1973, no additional data [PERC].

C. pirinense. One larva, parts on slide, (det. RD Waltz, iii/1993), Turkey, 2-vii-1992, no additional data [PERC 0,009,483].

Neocloeon alamance. One larva in vial, one set male larval exuviae on slide, USA, Indiana, Putnam Co., Mill Cr., 4 mi S Manhatan, 27-vii-1978, AV Provonsha, D Bloodgood, P419, lab reared [PERC 0,009,435]. One male adult and two female adults, associated larval exuviae, USA, Indiana, Jefferson Co., Soluda Cr at Soluda, 16-vi-1977, AV Provonsha, M Minno, AA Alabi, Acc.2120 [PERC]. One set larval exuviae on slide, one male adult examined closely from long series reared specimens of unknown number, USA, Ohio, Lake Co., Kirtland, 2-ix-1942, JR Traver [PERC 0,009, 477].

N. triangulifer. Five female adults, USA, Pennsylvania, Chester Co., E Fk E Br White Clay Creek at Strout Water Research Center, 0.9 mi SW London Grove, 39/51/32N, 75/47/02W, Lab3, 28-v-1985 [PERC]; five larvae, one set exuviae, same locale, 13-viii-1985 [PERC], one larva on slide, same locale, clone #CT-H-18, reared by D Funk [PERC 0,009,474].

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