

To Michael Hubbard,
Best wishes!
R.D.

FIELD RECOGNITION OF ADULT *ACENTRELLA* AND *HETEROCLOEON*
(EPHEMEROPTERA: BAETIDAE)

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ABSTRACT

The highly developed anterior process of the mesothorax, is described as a useful field character for identifying adults of *Acentrella* and *Heterocloeon* in the Nearctic. This presumed adult synapomorphy suggests a sister relationship of the two genera.

Larvae of the genera *Acentrella* Bengtsson and *Heterocloeon* McDunnough have been recognized previously as very closely allied on the basis of shared larval synapomorphies (Moriyama and McCafferty 1979a), including the more broadly shared synapomorphy of the femoral villopore (Waltz and McCafferty 1987a,b; McCafferty and Waltz 1990). Larvae of both genera are recognized as living in low sediment, relatively high quality lotic waters.

Identification of adults of these two genera from among other baetids has been largely reliant on species characters of color and hindwing form (see Traver 1935). Both *Acentrella* and *Heterocloeon* tend to possess darkly pigmented abdominal terga (as do *Labiobaetis* Novikova and Kluge (McCafferty and Waltz, in ms.) and some members of the *Baetis rhodani* group). However, normally darkly pigmented abdominal terga of *Acentrella* may appear to be lightly pigmented when preserved in alcohol. Hindwing characters currently provide the most satisfactory means of differentiating *Acentrella* from *Heterocloeon*, and separating both genera from other Nearctic baetids, with the possible exception of some members of *Labiobaetis*. Species of *Acentrella* may or may not possess hindwings. *Acentrella* hindwings always lack a costal process and bear two longitudinal veins. Most *Heterocloeon* possess extremely small hindwings that lack a costal process and veins. The one known exception is *H. frivolum* (McDunnough) which has retained the typical *Acentrella* hindwings and can not be separated from *A. ampla* Traver in the adult stage (Moriyama and McCafferty 1979a). For field sorting purposes, the use of hindwing characters is time consuming and difficult, specimens, if not discarded, may be relegated to a collective identification "Baetidae" or "*Baetis* spp." by non-specialists.

While reviewing adult characters of these and other baetid genera in the course of ongoing systematic revisions of the Baetidae, a striking character state was identified which is unique to *Acentrella* and *Heterocloeon*, i.e., a conical, dorsally directed, anterior process of the mesothorax (Fig. 1). Out-group analyses indicate that the ancestral condition is greatly reduced, low, and non-projecting (e.g., in the baetid genera *Cloeon* Leach and *Callibaetis* Eaton as well as in Siphonuridae and Ameletidae) and that the highly devel-

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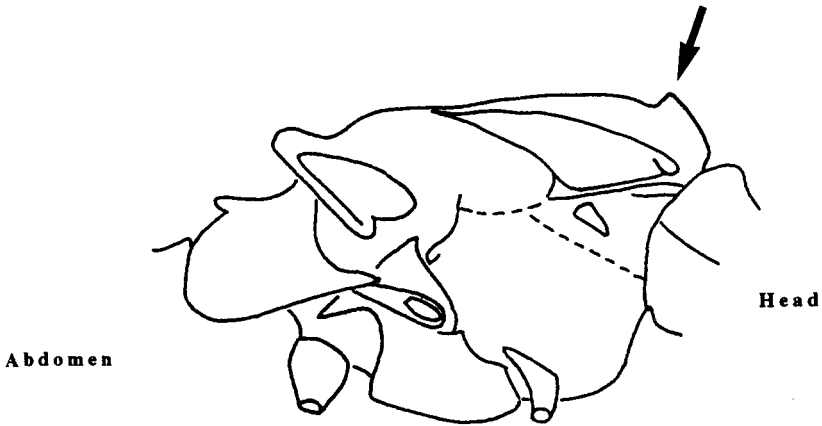


Figure 1. *Acentrella carolina*, female. Mesothorax (Lateral view, right side). (Arrow indicates anterior process).

oped condition of the anterior process of the mesothorax is a synapomorphy uniting *Acentrella* and *Heterocloeon*, not shared by other Nearctic genera or species groups of *Baetis* as defined by Morihara and McCafferty (1979b) and Waltz and McCafferty (1987b). Comparative figures of the anterior process of the mesothorax are available for some baetid genera in Edmunds et al. (1976): *Apobaetis* Day (Fig. 262), *Paracloeodes* Day (Fig. 263), *Baetodes* (Fig. 264), and an unnamed member of the *Baetis fuscatus* group (as *Pseudocloeon* sp.) (Fig. 261).

In all other Nearctic genera of Baetidae the anterior process of the mesothorax is much smaller in size, never projects dorsally, and has never been found to be apically pointed.

The anterior process of the mesothorax (Fig. 1) provides a rapid means of identifying adult members of *Acentrella* and *Heterocloeon* from among other Baetidae. Hindwing characters discussed above will still need to be used to make genus and species determinations. A new key to the Nearctic species of *Acentrella*, for example, has been provided by McCafferty et al. (1993). It is hoped that recognizing this new "field" character will help make determinations of the presence of these taxa more expedient and accurate when sorting mixed samples of adult Nearctic baetids.

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