

NOTE

Taxonomic Status of Historically Confused Species of
Potamanthidae and Heptageniidae (Ephemeroptera)

The mayfly genus *Anthopotamus* McCafferty and Bae (1990. Entomological News 101: 201) was established for Nearctic species of the mayfly family Potamanthidae, which had all previously been placed in the Palearctic genus *Potamanthus* Pictet. *Anthopotamus verticis* (Say), originally described as *Baetis verticis* Say (1839. Journal of the Academy of Natural Sciences of Philadelphia 8: 42), was designated the type species of the genus. However, Say's original description is very incomplete and there are no Say specimens for reference; thus, the concept of *Anthopotamus verticis* was based on the more complete description and remaining original material of *Ephemera flaveola* Walsh (1862. Proceedings of the Academy of Natural Sciences of Philadelphia 1862: 377), which was regarded as a junior synonym of the former (McDunnough, J. 1926. Canadian Entomologist 58: 184-196). The status of this species and any nomenclature correctly or incorrectly associated with it, as well as applicable type specimens require clarification.

Needham (1920. Bulletin of the Bureau of Fisheries 36: 287) recombined Walsh's *flaveola* with *Potamanthus*, and McDunnough (1926) recombined Say's *verticis* with *Potamanthus* and at the same time synonymized the two. All Ephemeroptera workers, with the exception of Ide (1935. Canadian Entomologist 67: 113-125), have recognized that synonymy [see McCafferty (1975. Transactions of the American Entomological Society 101: 447-504)].

As a result of the great Chicago fire of 1871 [see Burks (1953. Illinois Natural History Survey Division Bulletin 26: 1-216)], the only existing original material of Walsh's *flaveola* consists of one male adult and one female adult preserved on pins at the Mu-

seum of Comparative Zoology, Harvard University. We have examined this material. The male specimen (MCZ Type No. 11210) was designated by hand but not published as the lectotype of *Ephemera flaveola* by Nathan Banks. A technicality remaining therefore is to publish this lectotype designation. We therefore designate the above numbered specimen (also labeled "*E. flaveola* Rock Island Walsh 688, BAE-91") as the LECTOTYPE of *Ephemera flaveola* Walsh.

Available data support McDunnough's (1926) synonymy of Walsh's *flaveola* with Say's *verticis* and thus validate the present nomenclatural usage. Assuming Say's description was based on females, then Say's (1839) comparative measurements regarding the body and cerci length, "Length over one-fourth of an inch, of the setae [cerci] over three-tenths," are in approximate agreement with Walsh's (1862) measurements of 9-10.5 mm for the female body and 12 mm for the female cerci. Unfortunately, this cannot be confirmed by the Walsh specimens because cerci are now broken and missing from the remaining original material. Nevertheless, cerci that are only slightly longer than the body are relatively uncommon among Ephemeroptera, considerably strengthening the case for the synonymy. Described color patterns are also in general agreement, and the absolute measurements given by both Say and Walsh fall within the range we have determined for the species. Walsh (1863. Proceedings of the Entomological Society of Philadelphia 2: 204) suggested that Say's *verticis* would eventually prove to belong in the genus *Cloe* [= *Baetisca*, family Baetiscidae] because of the short cerci; however, the cerci of *Baetisca* are slightly to considerably shorter than

the body in both sexes, particularly on those species that are found in Indiana, where Say's material had been collected.

It is important that a neotype be designated for *Baetis verticis* because it is the type of *Anthopotamus*. We therefore do this as follows: NEOTYPE of *Baetis verticis* Say [= *Anthopotamus verticis* (Say)]—Male adult (in alcohol), Indiana, Tippecanoe Co., West Lafayette, VI-25-1974, A. V. Provonsha, at light; deposited in the Purdue Entomological Research Collections (PERC). This species agrees in all available morphological detail with the MCZ lectotype of Walsh's *Ephemera flaveola* and thus solidifies the species synonymy and generic concept. Numerous additional male and female adults and larvae of *A. verticis* associated with the neotype and from the neotype locality are housed in the PERC. Notably, Say's collections came from the Wabash River near New Harmony, Indiana; the neotype also comes from the Wabash River, but farther north, where the species is now common in the river. It is doubtful that the species inhabits the Wabash River near New Harmony at the present, since the river substrate has become considerably silted in that region due to extended local agricultural erosion during the 20th Century.

Unfortunately, all descriptions and treatments of *Baetis verticis* and its synonyms appearing after Say's original description and up to and including Eaton's monograph (1883–88. Transactions of the Linnaean Society of London. Second Series—Zoology 3) [see especially that of Hagen (1861. Smithsonian Miscellaneous Collections 1861: 46)], are based on a misidentification (McDunnough 1926). We have determined that those misidentifications are evidently referable to the North American heptageniid species *Stenonema terminatum* (Walsh), as will be discussed below.

Eaton (1885), recognizing that what he believed to be Say's *verticis* was not a true *Baetis* (Baetidae), recombined it with the heptageniid genus *Ecdyurus* Eaton [= *Ec-*

dyonurus Eaton]. In addition, Eaton (1885) regarded *Heptagenia flaveola* (Pictet) as a junior synonym of *Ecdyurus verticis* (based on his misidentification of the latter). Pictet's *flaveola* had originally been described as *Baetis flaveola* Pictet (1843–45. Histoire Naturelle des Insectes Néuroptères. Famille des Éphémérides 1843–45: 186) and it was recombined with *Heptagenia* Walsh by Eaton (1871. Transactions of the Entomological Society of London 19: 1–164). (The names *Baetis flaveola* Pictet and *Ephemera flaveola* Walsh, treated above, refer to different species and should not be confused.)

Georg Ulmer examined two specimens housed at the Vienna Museum that were presumably the material on which Pictet based his description of *Baetis flaveola*. (There evidently had been a female and male before Pictet since he gave measurements for a female, but figured a male.) Ulmer (1921. Archiv für Naturgeschichte 87: 242–244) concluded that one of these specimens was *Heptagenia interpunctatum* (Say) [= *Stenacron interpunctatum* (Say)] and one was *Heptagenia pulchellum* (Walsh) [= *Stenonema pulchellum* (Walsh)]; the former name has chronological priority over Pictet's name, but the latter does not. Regardless of rules of priority, however, this synonymy has gone unrecognized [it was overlooked in the revision of *Stenonema* by Bednarik and McCafferty (1979. Canadian Bulletin of Fisheries and Aquatic Sciences 201: 1–73)] and appears invalid on scientific bases. We have also studied these specimens from the Kollar collection at the Vienna Museum, and, since they are subimagos and are poorly preserved, it is impossible to identify them to species with any confidence. The female cannot even be identified to genus; the male (bearing the label "*Baetis flaveola*" in Herman Hagen's handwriting), however, is definitely a *Stenonema*. Other than this, however, these probable cotypes are of little value in establishing a species concept.

We have also examined materials from

the McLachlan collection at the British Museum of Natural History (BM) which Eaton (1871, 1885) had evidently used for his descriptions of *Heptagenia flaveola* and *Ecdyurus verticis*, respectively. This material is identifiable as *Stenonema terminatum* (Walsh) [originally described as *Palingenia terminata* Walsh (1862: 376)]. Interestingly, Hagen, in Walsh (1863: 177), had suggested that males from Washington, D.C., that were treated by him (Hagen, 1861) under the name *Baetis verticis* were in actuality Walsh's *Palingenia terminata*.

From all the above, we conclude that Pictet's *Baetis flaveola* belongs to the genus *Stenonema* and therefore it can be regarded as *Stenonema flaveolum* (Pictet) NEW COMBINATION, but because of its incomplete description and subimaginal type specimens there is no way to establish whether it represents a distinct species or is equivalent to another named species. We therefore designate *Stenonema flaveolum* a NOMEN DUBIUM, for eventual suppression, and regard the suggested synonymy of Ulmer (1921) as invalid.

Finally, we have also studied three pinned adults in the BM, identified by Francis Walker as "*Baetis flaveola* (type) Walker," but we agree with Herman Spieth's subsequent identification of them as *Stenonema luteum* (Clemens), *Stenonema rubromaculatum* (Clemens) [= *Stenonema modestum*

(Banks)], and *Heptagenia hebe* McDunnough [= *Leucrocuta hebe* (McDunnough)]. The "type" labels were evidently Walker's way of indicating a tentative identification. This is corroborated by the fact that in his treatment of the Neuropterous insects in the BM (Walker, 1853. Catalogue of the Neuropterous Insects in the Collection of the British Museum 3: 533-585) he listed these specimens as "? *Baetis flaveola*."

In summary, Hagen's (1861) and Eaton's (1871 and 1885) treatments of *Baetis flaveola* Pictet, *Heptagenia flaveola* (Pictet), *Baetis verticis* Say, and *Ecdyurus verticis* (Say) are referable to *Stenonema terminatum* (Walsh) (Heptageniidae). Furthermore, while the applicability of Pictet's *flaveola* remains unknown and it is therefore regarded a nomen dubium, Say's *verticis* is now known as *Anthopotamus verticis* (Say) (Potamanthidae), and because it is the type of the genus *Anthopotamus*, it is reestablished herein by the designation of a neotype. Walsh's *flaveola* (nec Pictet) is confirmed as a junior synonym of *Anthopotamus verticis*.

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