FURTHER CHARACTERS FOR DISTINGUISHING NYMPHS OF THE *BAETIS VERNUS/TENAX* GROUP FROM *B. BUCERATUS* EATON (EPHEM., BAETIDAE)

BY P.D. ARMITAGE, M.T. FURSE & J.F. WRIGHT

The identification of aquatic insects, using taxonomic keys, is most easily achieved when undamaged specimens are available for examination. In the Freshwater Biological Association's River Communities Project unsorted samples from sites on rivers throughout the country were sent by post and rail to the River Laboratory in Dorset. Transportation resulted in damage to some animals and in particular to Ephemeroptera which often arrived without gills, legs and sometimes abdomens. This caused problems with identification. In our attempts to separate *Baetis buceratus* Eaton nymphs from those of the *B. vernus* Curtis/*tenax* Eaton group *sensu* Macan (1979) we found that body markings were difficult to discern, gills were frequently absent and the paraglossae were not a reliable means of separating the species. However, examination of the left mandible showed a clear distinction between the two species. In the *B. vernus* group 1–3 small auxiliary hyaline spines are present in the molar region and the outermost incisor tooth is about twice the width of the adjacent tooth. In *B. buceratus* these auxiliary spines are absent and the outermost incisor is about the same width as the adjacent tooth. These characters (fig. 1) were tested and compared with gill ratio (length/width of third or fourth gills) and paraglossal ratio (length/width) as a means of distinguishing the two species.

TABLE 1. – A COMPARISON OF THE NUMBER OF AUXILIARY SPINES, RELATIVE WIDTHS OF INCISORS (WIDTH OF OUTERMOST TOOTH/ ADJACENT), GILL RATIO AND PARAGLOSSAL RATIO IN *BAETIS VERNUS/ TENAX* AND *B. BUCERATUS*.

		Baetis vernus/tenax	*Baetis buceratus*
Auxiliary spines (left mandible)	n	26	17
	range	1–3	0
	mean	2.00	0
Incisors (left mandible)	n	14	14
	range	1.60–3.33	0.83–1.25
	mean	2.23	1.00
Gill ratio	n	21	11
	range	1.60–1.93	1.51–1.68
	mean	1.78	1.59
Paraglossal ratio	n	25	17
	range	1.95–2.85	1.95–2.78
	mean	2.22	2.33

Specimens of *Baetis* which keyed out at the *B. vernus* group/*B. buceratus* dichotomy in Macan's (1979) key were separated into the 2 species on the basis of their abdominal markings. Third and fourth gills (where present) and mouth parts were removed and mounted in polyvinyl lactophenol for examination. For this study specimens 3 mm or more in length (front of head–base of cerci) were examined. Twenty-six specimens of *B. vernus* group from 18 sites on 13 rivers (Exe, Axe (Devon), Hampshire Avon, Arun, Rother (Kent), Wey, Mimram, Colne (Essex),

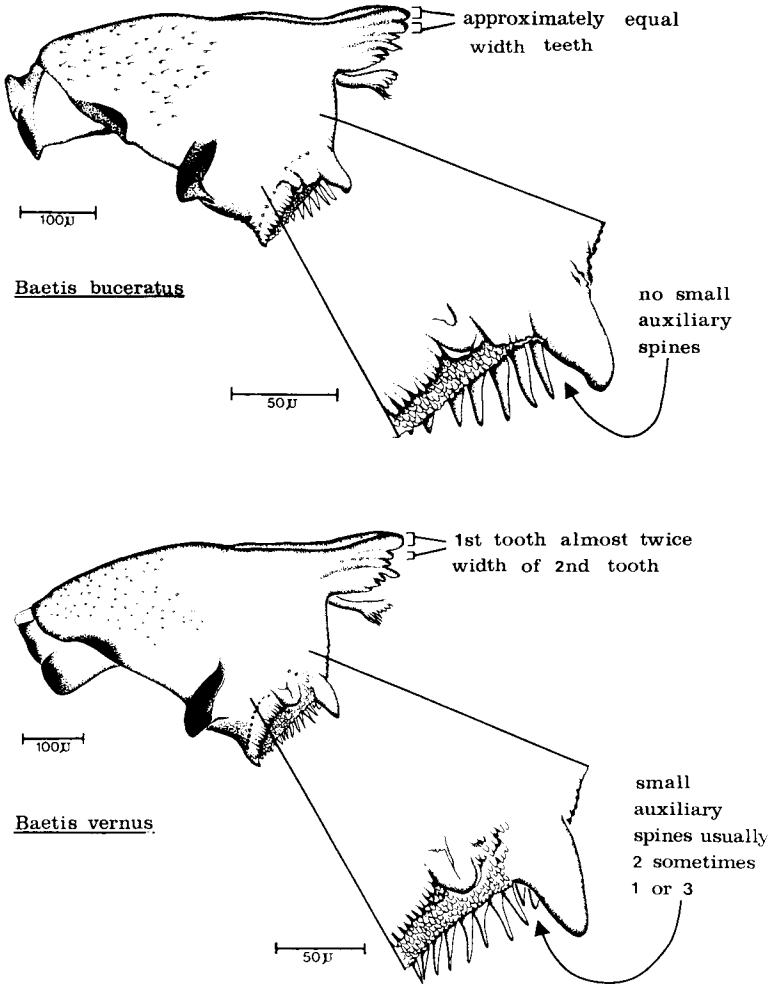

Fig. 1. — Left mandibles of *Baetis buceratus* and *Baetis vernus/tenax*.

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Perry, Weaver, Ure, Derwent (Yorks) and Spey) and 17 specimens of *B. buceratus* from 7 sites on 5 rivers (Axe (Devon), Bristol Avon, Blithe, Perry and Derwent (Yorks)) were investigated. Gill and paraglossal ratios are presented in Table 1. It is clear that there is considerable overlap in these ratios between the two species but none with the mandibular features. The auxiliary teeth also occur in *B. rhodani* (Pictet) but it may be distinguished from *vernus/tenax* by means of the prostheca of the right mandible which is characteristically elongated in the *vernus* group (see Macan 1979).

Additional investigations of the more robust anatomical parts of mayfly nymphs may be helpful in the identification of damaged specimens which are a feature of some samples obtained in routine survey work.

ACKNOWLEDGEMENTS

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REFERENCE

Macan, T.T., 1979. A key to the nymphs of British Ephemeroptera. *Scient. Publs Freshwat. biol. Ass.* **20:** 1–80.

Freshwater Biological Association, River Laboratory, East Stoke, Wareham, Dorset. *March 6th*, 1984.

Predation in an Adult Stonefly (Plecop., Chloroperlidae). — On 23 June, 1984 at Inver near Ballater, Deeside in Scotland we encountered the unusual sight of an adult, male stonefly, *Chloroperla tripunctata* (Scopoli) on top of a live and much larger female sawfly, *Nematus viridescens* Cameron (Tenthredinidae). The stonefly had its mouthparts inserted into the neck of the sawfly in a dorso-lateral position, and was apparently feeding. The prey was turning its head and body round and lifting its legs, presumably in attempts to rid itself of the stonefly. After a few minutes both insects fell about 18" to a lower leaf but the stonefly remained attached. They separated after a few minutes in a collecting tube.

So far as we are aware a predatory habit is known only in larval stoneflies. Adults have been recorded feeding on algae and lichens (Frison, 1935, *Illinois Biol. Mono.* **20**: Hynes, 1941, *Trans. R. Ent. Soc.* **91**: 459–556) or flowers (Proctor & Yeo, 1975, *The pollination of flowers*, London). Hynes (loc. cit.) found water, but no trace of food in adult chloroperlid guts and therefore suggested they do not feed.

However, *C. tripunctata* was attacking a much larger prey and feeding at a specific site suggesting that our observation is not aberrant. Possibly *C. tripunctata* and other chloroperlids occasionally sap small quantities of haemolymph from larger insects. Haemolymph, being a clear fluid under the light microscope, would not have easily shown up in the gut analyses carried out by Hynes (loc. cit.). Further study of feeding behaviour in chloroperlid adults is clearly indicated. — G.E. ROTHERAY, Royal Scottish Museum, Chambers Street, Edinburgh EH1 1JF & A.D. LISTON, 99 Clermiston Road, Edinburgh EH12 6UU: *July 19th*, 1984.