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The taxonomy of the British species
of Siphonuridæ (Ephem.)

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Westmorland, England).



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The taxonomy of the British species of Siphonuridæ (Ephem.)

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(with 5 figures)

There are four British species in this family, three in the genus *Siphonurus* and one in the genus *Ameletus*.

Cast skins associated with the adults that emerged from them have been used to establish specific identity. This having been done, it has been possible to base the descriptions on both cast skins and whole nymphs. The latter were full-grown.

The mouthparts, except the mandibles, have been drawn after mounting, and may, therefore, have suffered some compression.

Siphonurus lacustris Eaton

Material: Buttermere, CU, 24 cast skins; Brown Cove Tarn, WL, 3 nymphs; R. Brathay, WL, 1 cast skin; Blelham Fishpond, WL, 4 nymphs; Blelham Fishpond Beck, WL, 1 cast skin; Llyn Idwal, CR, 7 nymphs.

Lengths: 12—16 mm.

Structure: Details of structure are illustrated in figs. 1—4; a comparative account of features of taxonomic importance is given under *S. armatus*.

Ecology: In the Lake District it occurs in the high barren stony-bottomed tarns, in the lakes, and in slow rivers with vegetation. I am indebted to Dr. H. B. N. HYNES for a collection of nymphs from Llyn Idwal, at an altitude of 1223 feet in North Wales.

Siphonurus armatus Eaton

Material: R. Winster, WL, 6 cast skins and 5 nymphs; Broxbourne Woods, HT, 10 nymphs.

Lengths: 15—17 mm.

Comparison with S. lacustris: Both species have only the first two pairs of gills double (fig. 3), and are immediately separated from *S. linneanus* by this feature. The differences between them, arranged in order of importance to the taxonomist, are:

1. Along the inner margin of the middle segment of the maxillary palp (fig. 1, top) run two rows of bristles. In *S. lacustris* the bristles of one row are tiny and not seen unless searched for; the segment appears to bear a single row of 4—7 bristles. In *S. armatus* the bristles of both rows are of the same size; usually about 12 bristles altogether are evident. This feature can be observed quite easily on a whole nymph with the high power of a binocular microscope.

2. On the upper surface of the last segment of the labial palp (fig. 1 mid), there are conspicuous large bristles, some in a group towards the apex, the rest extending in a line from the group to the base of the segment. In *S. lacustris* there is a single line of bristles, in *S. armatus* there are one or two extra ones not in the line. This feature is quite obvious on a cleared and mounted specimen or a cast skin, but is not easy to make out on a whole nymph.

3. Fig. 2 shows typical abdominal markings of the two species. The pattern in the centre is variable and unimportant; the obvious difference is that there are dark dots on the sides of the segments of *S. lacustris* but not *S. armatus*. Pattern, however, is notoriously variable in Ephemeroptera nymphs. In the present series about half the specimens of *S. armatus* have dark marks on the sides of segments 8 and 9, though they are usually more elongate than the dots on *S. lacustris* shown in fig. 2. On the other segments the dark area of the centre may encroach toward the sides but there are no detached dots as in *S. lacustris*.

On 22 of the specimens of *S. lacustris* the lateral dark dots are visible on segments 2—9 inclusive; on 5 they can be detected only on segments 7, 8, and 9. On a few specimens the lateral dots on segment 9 are elongate, extending nearly the whole length of the segment as in *S. armatus* and not oval as in fig. 2, but, whenever this condition is found, there are conspicuous dots on the sides of all the other segments.

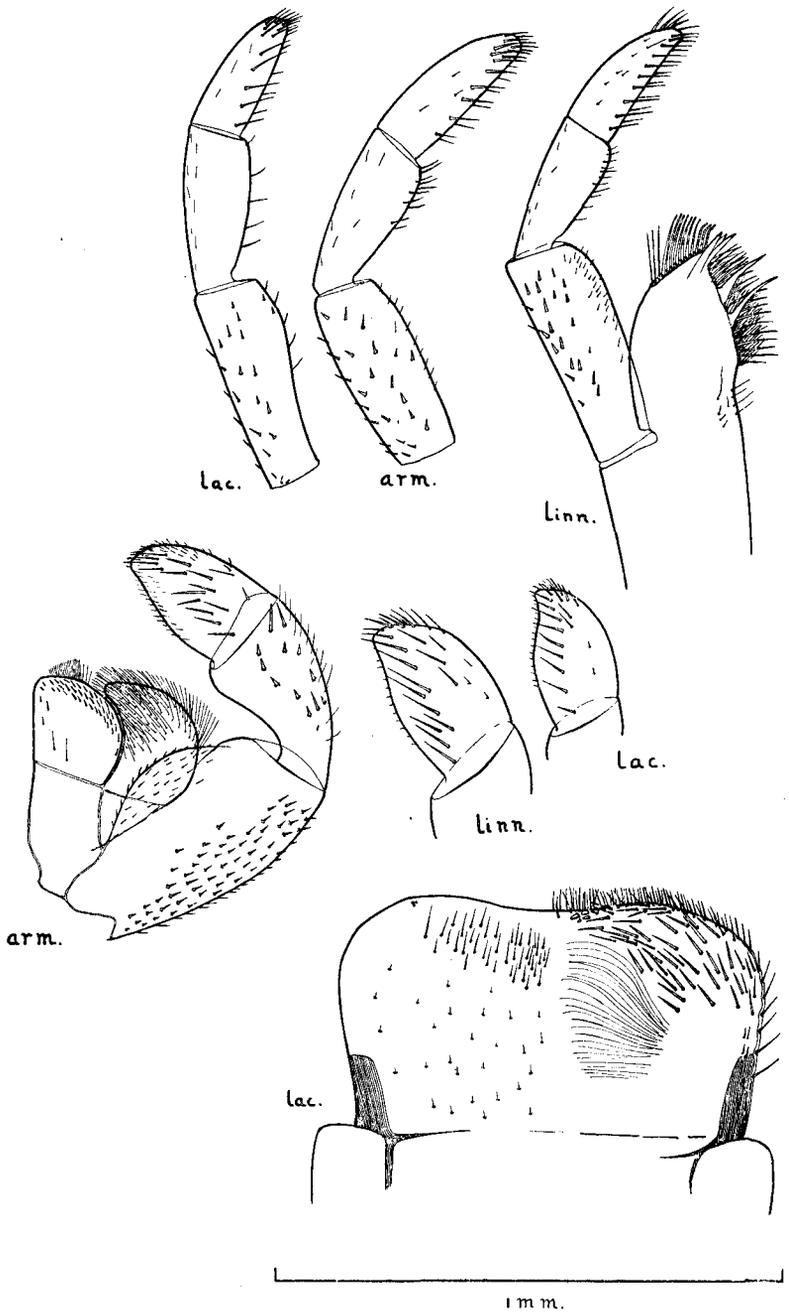


Fig. 1.

maxilla and maxillary palps; labium and labial palps; labrum; lac. = *S. lacustris*, arm. = *S. armatus*, linn. = *S. linneanus*.

4. The lateral spines are larger in *S. armatus* than in *S. lacustris*. Those on the ninth segment reach or nearly reach the tip of the tenth segment in *S. armatus*, but no more or little more than half-way in *S. lacustris* (fig. 2).

5. Fig. 2 shows that the lateral outline of segments 8 and 9 is concave in *S. lacustris* and convex in *S. armatus*. The segments are always concave in *S. lacustris*, sometimes more so than shown in the figure. Unfortunately the sides of segments 8 and 9 are sometimes a little concave in *S. armatus* also, and, therefore, not all specimens can be separated on this feature, though extreme examples are quite distinct.

Ecology: The Westmorland specimens came from a slow weedy river draining partly from limestone; those from Hertfordshire were kindly sent me by Mr. E. S. BROWN. His locality was a fairly fast stream flowing through a meadow surrounded by a wood and connected with a series of sluggish ditches.

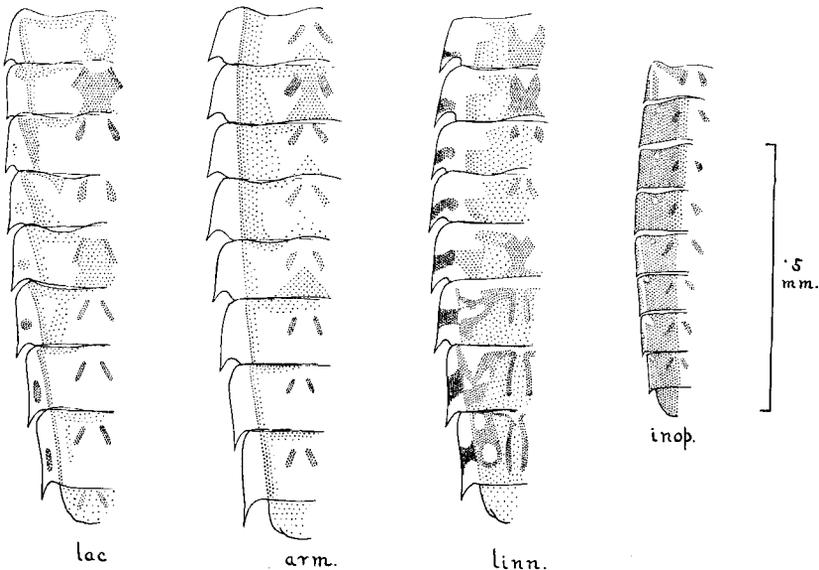


Fig. 2.

markings on abdominal tergites; lac. = *S. lacustris*, arm. = *S. armatus*, linn. = *S. linneanus*, inop. = *A. inopinatus*.

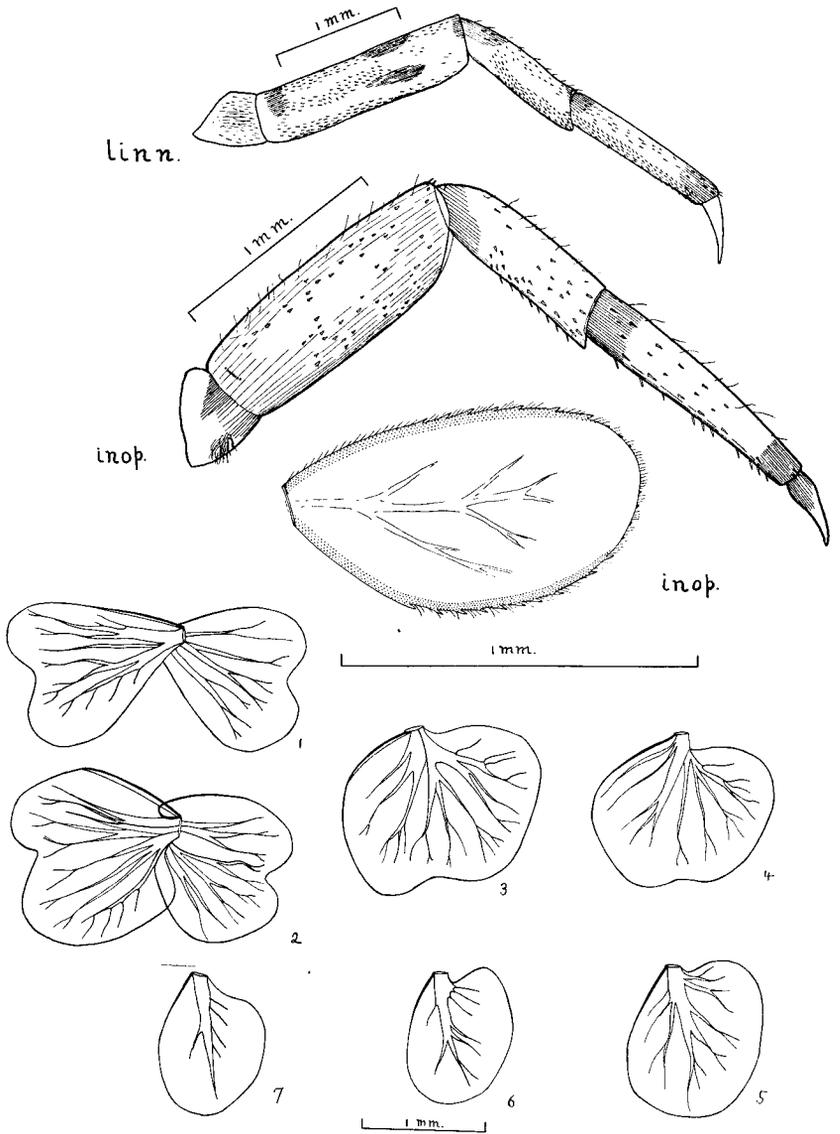


Fig. 3.

legs of *S. linneanus* and *A. inopinatus*; single gill of *A. inopinatus*; set of gills from *S. lacustris*.

Siphonurus linneanus (Eaton)

Material: R. Cree, KB, 15 cast skins and 15 nymphs.

Lengths: 14—18 mm.

Comparison with preceding species: Six pairs of double gills immediately distinguish this species.

The pattern on the abdomen, which is usually strongly contrasted, is also characteristic, the most distinctive feature being the black bands which run from the central pigmented area right to the margin of each segment (fig. 2). The markings on the legs are usually darker than on the other two species (fig. 3).

The outline of the abdominal segments is like that of *S. lacustris* (fig. 2), but the mouth parts resemble those of *S. armatus* (fig. 1).

Ecology: My only record is from just over the Scottish border in a slow river exactly like one of those in which *S. lacustris* occurs in the Lake District.

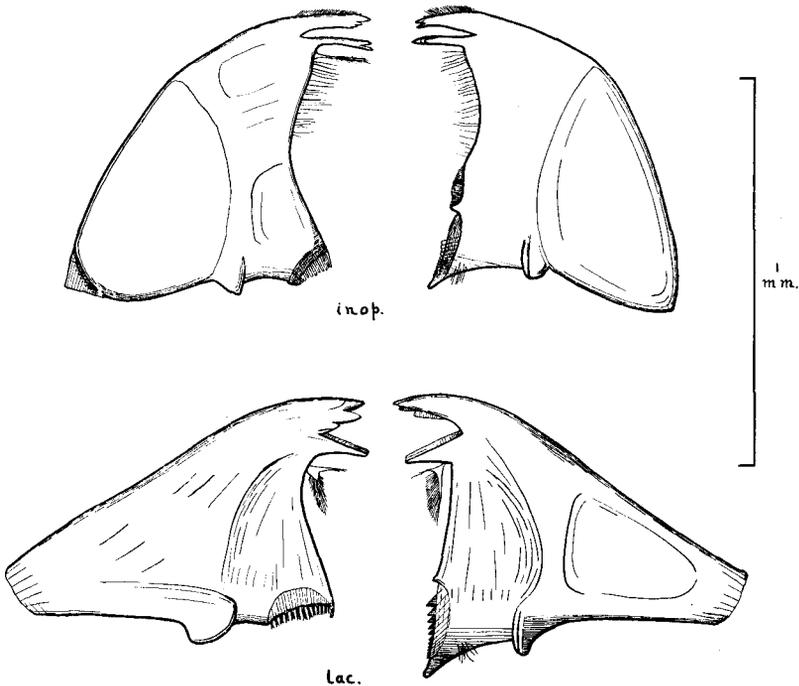


Fig. 4.

mandibles of *A. inopinatus* and *S. lacustris*.

Ameletus inopinatus Eaton

Material: Whelpside Ghyll, WL, 4 cast skins and 2 nymphs.

Dimensions: 9—11 mm.

Distinction from Siphonurus: All the gills are single. There are also many differences in the mouth parts (cf figs. 1, 4, 5), particularly the maxillae, which in *Ameletus* (fig. 5) bear "Planktonharke" (SCHOENEMUND, 1930) reminiscent of those of the Ecdyonuridae. There is little pattern on the abdomen, but the tails have distinct dark bands.

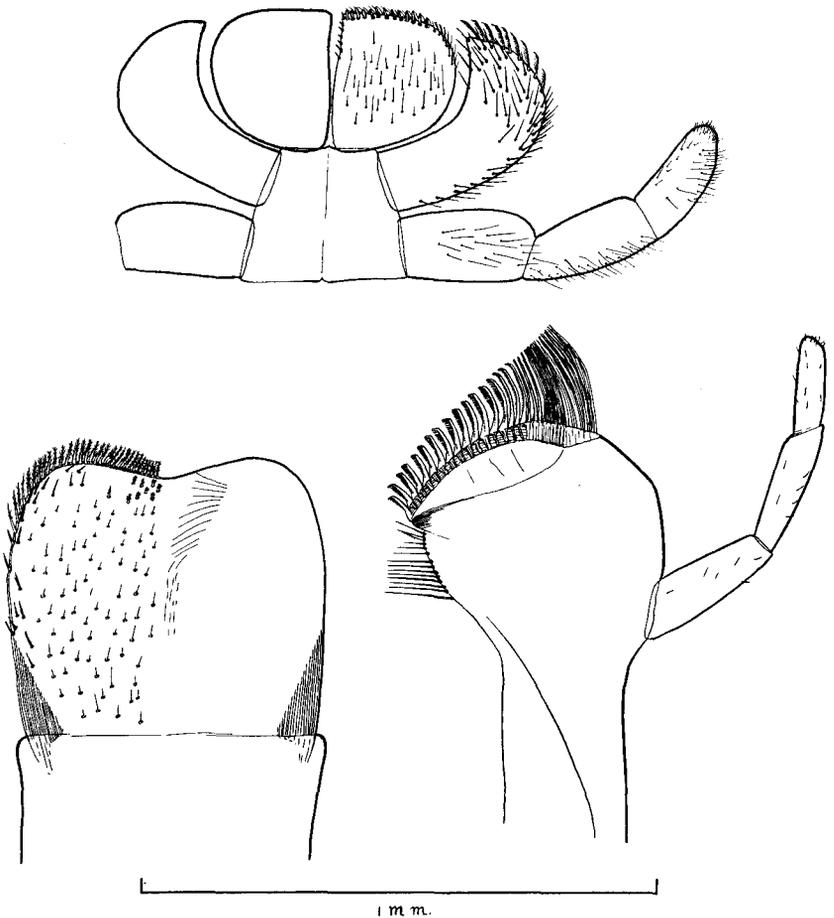


Fig. 5.

labium, maxilla, and labrum of *A. inopinatus*

Ecology: In the Lake District it appears to be abundant and widespread in mountain streams, but has not been found below an altitude of 1,000 feet (300 metres). SCHOENEMUND (1930) refers to it as "eine typische Hochgebirgsform".

CU = Cumberland, WL = Westmorland, HT = Hertfordshire (England); KB = Kircudbrightshire (Scotland); CR = Caernarvonshire (Wales).

Key

The families Siphonuridae and Baetidae include all those nymphs that can swim rapidly, and superficial resemblance between the two is close. Detailed examination reveals a number of differences (compare figures in this article with those in Macan 1949 and 1950). Characteristic of all the Siphonuridae are the pointed projections of the hind corners of the abdominal segments (fig. 2). This difference is striking in *Siphonurus* (which is also much bigger than any Baetid when full grown) but less obvious in *Ameletus*, which with its single gills may be taken for a *Baëtis*. A glance at the mouthparts, however, will identify it at once.

1. All gills simple *Ameletus inopinatus*
 Some gills with two lamellae 2
2. First six gills with two lamellae *Siphonurus linneanus*
 First two gills with two lamellae (fig. 3) 3
3. Inner margin of middle segment of maxillary palp with 4 to 7 bristles in a single row (fig. 1); on last segment of labial palp large bristles lie in a regular line between the base and a group of similar bristles towards the apex (fig. 1); an isolated round or oval dark mark on the flat margin of abdominal segments numbers 8 and 9 at least, and usually on 2—9 (fig. 2)..... *S. lacustris*

Inner margin of middle segment of maxillary palp with about 12 bristles in two rows (fig. 1); bristles on last segment of labial palp not in a regular row; flat margins of abdominal segments uniformly pale (fig. 2) except numbers 8 and 9 which may have an elongate dark mark *S. armatus*

Bestimmungstabelle

1. Die hinteren Ecke der Abdominalsegmenten nicht in scharfe Stacheln ausgezogen *Fam. Baetidae*
 Die hinteren Ecke der Abdominalsegmenten in nach hinten gerichtete scharfe platte Stacheln ausgezogen (Abb. 2)
Fam. Siphonuridae
 (Bei *Siphonurus* sind die Stacheln gross und auffallend; bei *Ameletus* aber klein und weniger auffallend. Die *Ameletus*-Larven ähneln auf den ersten Blick diejenigen von *Baëtis*, unterscheiden sich aber von ihnen leicht durch den eigentümlichen Mundteilen (Abb. 4 u. 5).
2. Tracheenkiemen aus 7 einfachen Blättern bestehend
Ameletus inopinatus
 Einige von den Tracheenkiemen doppelt 3
3. Die ersten 6 Paare Tracheenkiemen doppelt
Siphonurus linneanus
 Die ersten 2 Paare Tracheenkiemen doppelt 4
4. Am Innenrand des mittleren Gliedes der Maxillarpalpen 4 bis 7 Borsten in einer einzigen Reihe (Abb. 1); von einer Gruppe von Borsten neben der Spitze des letzten Gliedes der Labialpalpen laufen ähnliche Borsten nach innen in einer geraden einzigen Reihe (Abb. 1); ein runder oder ovaler dunkler Fleck steht auf den flachen Rändern der Abdominalsegmenten Nr. 2 bis 9 (selten nur auf 8 u. 9) (Abb. 2) *S. lacustris*
 Am Innenrand des mittleren Gliedes der Maxillarpalpen ungefähr 12 Borsten in 2 Reihen; Borsten auf dem letzten Glied der Labialpalpen nicht in einer einzigen Reihe (Abb. 1); flache Ränder der Abdominalsegmenten Nr. 2—7 ohne Flecken (Abb. 2), Nr. 8 u. 9 mit oder ohne verlängerten dunklen Fleck *S. armatus*

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