

On the subspecies of *Apatania muliebris* McL. (Trichoptera).

By

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Many years ago I found, much to my surprise, this species as a relict in some large springs in Himmerland, northern Jutland. In 1950 I gave a detailed description of specimens from Rold Kilde, assuming that the population in this spring represented the typical form of *A. muliebris*. This assumption was based chiefly on the fact that its annual cycle seemed perfectly suited for Arctic conditions. In the same paper I described two new species, *cimbrica* and *intermedia*, from the spring Lille Blåkilde. (They were described under the generic name *Apatidea*. I now agree with Schmid, 1954a pp. 145—46, that the distinction between the genera *Apatania* Kol. and *Apatidea* McL. cannot be upheld).

As far as female Trichoptera of the same genus go, the difference between *cimbrica* and the population in Rold Kilde is quite great, so it was justified to consider them as separate species. Hence I believed *cimbrica* and *intermedia* to be endemic species, evolved from *muliebris* during the postglacial period, and no doubt *intermedia* also is endemic. As to *cimbrica*, however, Schmid (1954b, p. 38) reported it from Lappland, and later (1961) I found it myself in a large spring, Svinebæk, in the middle of Jutland. Moreover, having examined several specimens, i.a. the type, of Schmid's *helvetica* (1954b, pp. 37—38) I am convinced that this name is a synonym of *cimbrica*; syn. nov.

In his monograph (1954b, pp. 39—40) Schmid pointed out that the population in Rold Kilde is different from that (now unfortunately extinct) in Arundel Park, McLachlan's type locality, and named it *nielsenii*.

I now have had the opportunity to examine specimens from three more relict localities: Arundel Park, South Downs, England; Storlien, Jämtland, Sweden; the island Kolter in the Faroes. They are all different from each other, but together with *intermedia* they form a complete series of links between *cimbrica* and *nielseni*. If specimens from more localities had been examined, a still 'smoother' series probably would have been found. Hence I think that the proper measure will be to consider them, including *cimbrica* and *nielseni*, as subspecies of *A. muliebris*, though of course it is difficult to define subspecies of a species the reproduction of which is exclusively parthenogenetic. *A. m. cimbrica* is the typical and widely distributed form of *muliebris*, but according to the rules of nomenclature the name *A. m. muliebris* must be attributed to the population in Arundel Park. Brief diagnoses of six subspecies are given below.

A. m. cimbrica Niels. (1950, fig. 2; *helvetica* Schmid 1954b, pp. 37—38). The dorsal side of segment X is steeply descendent, almost vertical. It has a pair of low and very indistinct bulgings, but no trace of a longitudinal ridge. The posterior corners of segment X is narrow, rather pointed and clearly visible from above. Length of the anterior wing in Lille Blåkilde 6.7 — 9.4 mm, in Svinebæk 7.8 — 9.7 mm.

A. m. muliebris McL., 1866. My description (fig. 1) is rather much at variance with that by Schmid (1954b, p. 36). In a lateral view the dorsal side of segment X is ca. 45° descendent. It has no bulgings, but a faint indication of a dorsal ridge, which in a posterior direction tapers gradually. The posterior corners of segment X are broadly rounded and clearly visible from above. Length of the anterior wing in two specimens 8.45 and 9.35 mm. Arundel Park, South Downs, England. Unfortunately this locality has been destroyed long ago.

A. m. jemtlandica n. subsp. (fig. 2). The dorsal side of segment X without bulgings but with a longitudinal ridge, which in a posterior direction tapers abruptly into a thin lamella. This lamella is lower than in *nielseni*, and in a lateral view the dorsal side of segment X is ca. 45° descendent in a slightly S-like curve. Its posterior corners are rather narrow, but rounded, and clearly visible from above. Length of the anterior wing in one specimen 8.1 mm. Holotype (Storlien, Jämtland, Sweden, 7.8.1932) in the Zoological Museum, Copenhagen.

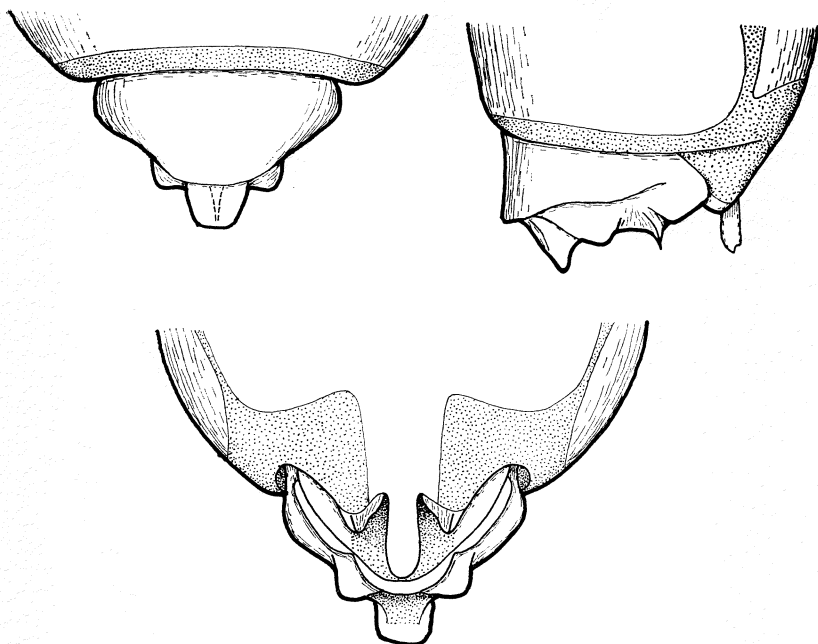


Fig. 1. *A. muliebris muliebris* McL.

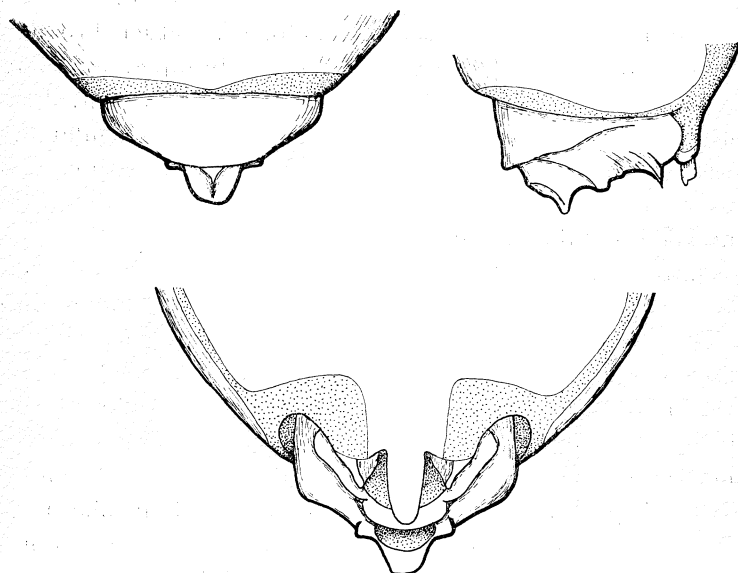


Fig. 2. *A. muliebris jemlandica* n. subsp.

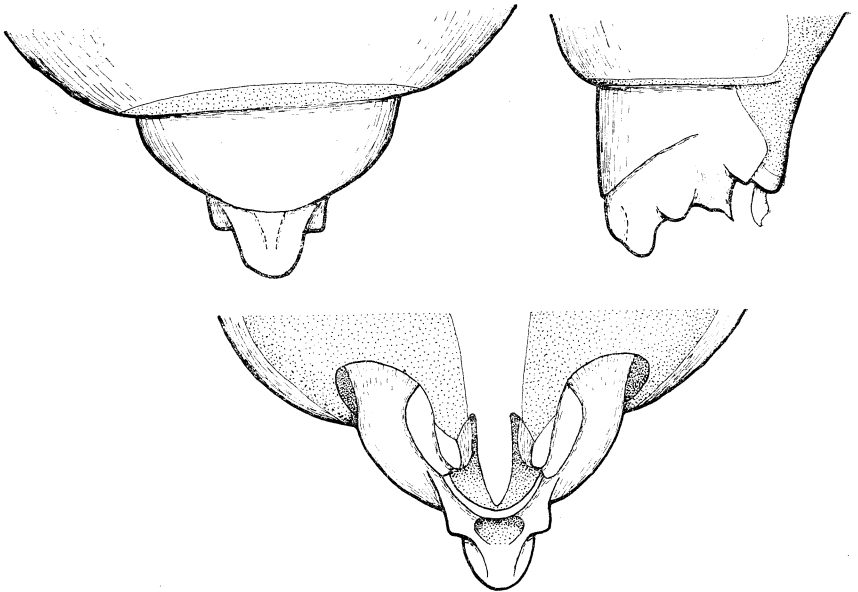


Fig. 3. *A. muliebris kolteriana* n. subsp.

A. m. intermedia Niels. (1950, fig. 7). Segment X with a pair of dorsal bulgings, which are much larger than in *cimbrica* and laterally projecting. The segment therefore is rather broad. It has a dorsal longitudinal ridge, which gradually tapers to a vertical, thin, but rather low lamella. In a lateral view the dorsal side of segment X is ca. 45° descendent in a somewhat irregular line. Its posterior corners are broad and rounded, just visible from above. Length of the anterior wing of one specimen (paratype) 8.9 mm. Lille Blåkilde, Himmerland, northern Jutland.

A. m. kolteriana n. subsp. (fig. 3). Segment X has no dorsal bulgings, but a distinct, though low and rounded longitudinal ridge. The posterior end of the ridge, which does not reach the posterior margin of the segment, is rather broad. In a lateral view the anterior part of the dorsal side of segment X is almost horizontal, the posterior part ca. 45° descendent. Its posterior corners are rounded and clearly visible from above. Unlike conditions in the other subspecies the posterior end of the median lobe of the 'vulvar scale' is rather pointed. Length of the anterior wing in one specimen 7.95 mm. Holotype (the island Kolter in the Faroes, 1.8.1926) in the Zoological Museum, Copenhagen.

A. m. nielseni Schmid, 1954 (Anker Nielsen 1950, fig. 1). Segment X is finger-like. It has no dorsal bulgings, but a very distinct longitudinal ridge, which in a posterior direction tapers rather gradually to a thin vertical lamella. In a lateral view most of the dorsal side of segment X is almost horizontal; quite posteriorly it is steeply descendent. The posterior corners of the segment are broadly rounded and not visible from above. Unlike conditions in the other subspecies the posterior corners of segment IX are rather pointed. It is the largest of the subspecies; length of the anterior wing 9.1 — 10.1 mm. Rold Kilde, Himmerland, northern Jutland.

According to the shape of segment X when seen from the side, the series will be: *cimbrica*—*muliebris*—*jemtlandica*—*intermedia*—*kolteriana*—*nielseni*. According to presence and shape of a longitudinal ridge on the dorsal side of segment X, it rather will be: *cimbrica*—*muliebris*—*kolteriana*—*intermedia*—*jemtlandica*—*nielseni*.

Where great and continuous populations of *A. muliebris* exist, as in the Alps and in the Norwegian high mountains, they are represented, or at least dominated, by the subspecies *cimbrica*. In small relict populations, however, local subspecies are apt to arise. It must be borne in mind that these populations are at the verge of extinction, and especially must have been so in the warm Atlantic and Subboreal Periods. Due to the parthogenesis one single surviving female will be able to secure the population at a critical time, and such a female may happen to be a mutant.

The frequency of mutations is shown also by the fact that anomalies in the wing venation are of common occurrence. In both fore wings of the type specimen of *A. m. jemtlandica*, e.g., r_4 and r_5 anostomize near the base. Fork 2 thus has a very long stalk, at the root of which a small trapezoidal cell is seen.

The possibility of course also exists that a mutation may have selective value in altered climatic conditions. Thus, the population of *cimbrica* in Lille Blåkilde cannot be distinguished morphologically from that in Svinebæk, but it has quite another annual cycle. That in Lille Blåkilde, in which the flying season extends over at least most of the year, certainly must have selective value in a stenothermous spring in a temperate climate, in which the winters usually are very mild. (The population in Lille Blåkilde thus may

be said to represent a biological subspecies, but from a systematical point of view a subspecies can be defined only morphologically).

The parthenogenesis also makes it possible that two subspecies may exist in the same locality, which actually is the case in Lille Blåkilde.

A. m. kolteriana has been recorded erroneously as *A. arctica* Boh. (= *zonella* Zett.) by Henriksen (1929, p. 8). In the Norwegian high mountains *A. zonella*, to my experience, is found only in melt-water lakes at or above the snow-line, and there is no eternal snow on the Faroes. (*A. zonella* has a similar distribution as *Ranunculus glacialis*, which probably is dependent on this caddisfly for pollination). It has been recorded, together with *A. muliebris*, from the island Gotland in the Baltic (Gislén & Brinck 1950, p. 21), but perhaps we here are concerned with two subspecies of *A. muliebris*.

For providing material I wish to express my sincere thanks to Professor J. de Beaumont, Lausanne, Dr. D. E. Kimmins, London, and Professor Carl H. Lindroth, Lund.

Summary

A. muliebris McL. is exceedingly variable. In great and continuous populations it is represented by the subspecies *cimbrica*, whereas local subspecies have evolved in small relict populations. Two new subspecies are described.

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