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NOTES ON SPECIES OF THE GENUS *BRACHYPTERA* NEWPORT (PLECOPTERA) FROM THE NETHERLANDS AND SWITZERLAND[1]

by

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Key words: Plecoptera; Brachyptera; The Netherlands; Switzerland.

A re-examination of the Dutch material of the stonefly genus *Brachyptera* resulted in the establishment of *B. braueri* (Klapálek, 1900) (new to the Netherlands) and *B. risi* (Morton, 1896) as indigenous species, although both are now locally extinct. The occurrence of *B. trifasciata* (Pictet) in this country could not be confirmed. *B. braueri* is also recorded from Switzerland for the first time.

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INTRODUCTION

Our knowledge of the taxonomy and ecology of European stoneflies (Plecoptera) has greatly increased during the last decades. In particular thanks to the compilatory studies of e.g. Hynes (1941), Aubert (1946, 1959) and Illies (1955) European plecopterology has got stimuli for more detailed work. Most emphasis was laid on the fauna of Central Europe, but on the other hand these studies were the firm basis for the study of the stonefly fauna of South and Southeastern Europe. Numerous new taxa from the Balcans, Italy and the Iberian peninsula have been described since. These studies in turn resulted in a more comprehensive and detailed examination of some taxa from Central

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and Northwestern Europe, and new and better identification keys became available for several difficult genera.

The increase of our knowledge of the European Plecoptera seemed to make it worthwhile to re-evaluate the Dutch list after the checklists prepared by Albarda (1889) and Geijskes (1940). A first revision of the material was executed by Mrs. E.E.C.M. Claessens, who prepared a new checklist (Claessens, 1981). I have studied some more material and in this first paper of a series on the stonefly fauna of the Netherlands the genus *Brachyptera* Newport will be treated.

Brachyptera Newport, 1849

According to Zwick (1973) the family Taeniopterygidae may be subdivided in the subfamilies Taeniopteryginae (with only one genus, *Taeniopteryx*) and Brachypterinae (with 13 genera, cf. Ricker & Ross, 1975). The Brachypterinae are characterized by several autapomorphous characters, e.g. the complex and asymmetrical paraprocts of the males and the remarkably large 9th sternite of both males and females. *Taeniopteryx* has symmetrical paraprocts in the male and more usually developed 9th sternites. The segmented and muscled coxal gills of the larvae of the Taeniopteryginae are a remarkable autapomorphy for this group. This character is mentioned by Illies (1955: 127) as 'an among insects unique feature, which seems to be a retrogression in the oldest times of arthropod phylogeny' (my translation). Zwick (1973: 116-117, fig. 36), however, has analysed their morphology very extensively, and they appeared only secondary segmented, as the musculature is unsegmented. According to Ricker & Ross (1975) the presence of these gills must be considered as an apomorphous character.

Several European plecopterists have distinguished a lot of new taxa in the Western Palaearctic genus *Brachyptera* during the last decades (cf. Aubert, 1953, 1956b, 1961; Consiglio, 1957; Raušer, 1962a, 1965; Sowa, 1966, Berthélemy, 1970; Braasch & Joost, 1971). The number of described species in Europe increased from nine in 1950 to twenty in 1978 (cf. Illies, 1966, 1978; Zwick, 1973). A few other species are only known from the Western Palaearctic outside Europe, and new species are still added (e.g. Kazanci, 1984). Two other genera of the Brachypterinae occur in Europe, viz. *Oemopteryx* Klapálek, 1902 and *Rhabdiopteryx* Klapálek, 1902. The first one is Holarctic, the latter Western Palaearctic. Other genera in this subfamily are confined to North America, Japan or Eastern Asia.

The material from The Netherlands only consists of two specimens in the

collection of the Rijksmuseum van Natuurlijke Historie (RMNH), which were both collected in the 19th century and evidently belong to two species. Sampling of more material at these localities is impossible, because most aquatic habitats in The Netherlands, especially the lotic ones, are so heavily polluted that only ten out of 28 species recorded, are still present (Claessens, 1981). Most species only occurring in large rivers, have become extinct already in the 19th or early in the 20th century.

Brachyptera braueri (Klapálek, 1900)
(figs. 1-6, 12)

Taeniopteryx braueri Klapálek, 1900: 7, pl. 2, figs. 33-38.
Brachyptera braueri; Despax, 1951: 35-36, figs. 11A-D; Illies, 1955: 30, figs. 12D, 14C, 14E.
Brachyptera trifasciata; Albarda, 1889: 250 (pro parte); Geijskes, 1940: 9; Claessens, 1981: 74 (nec *B. trifasciata* (Pictet, 1832)).

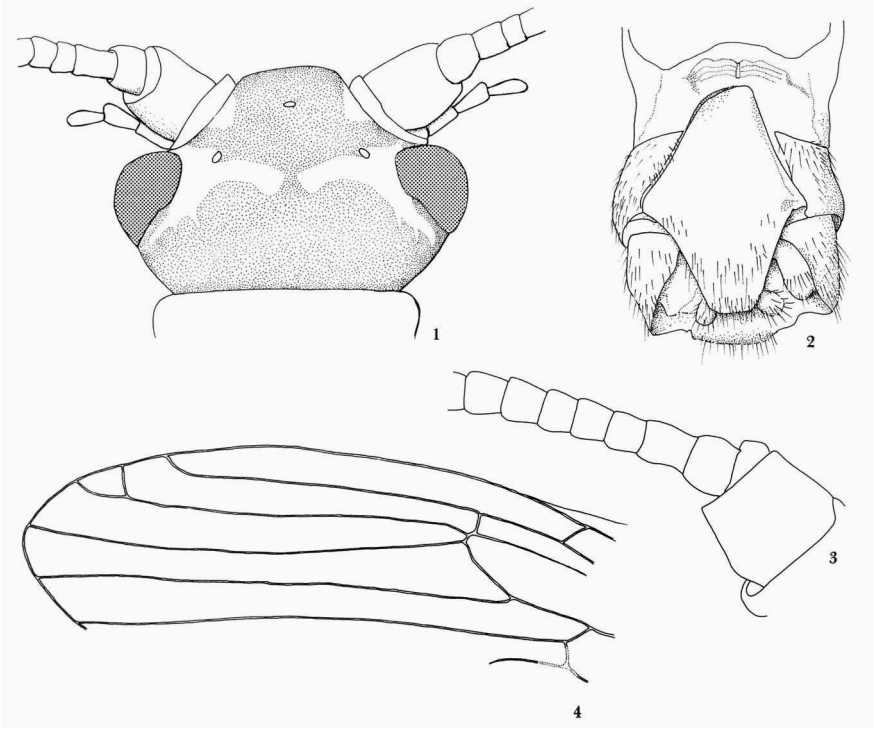

Fig. 1-4. *Brachyptera braueri*, female (Netherlands: Cuijk). — 1, Head in dorsal view, note the light coloured markings between the eyes; 2, Last abdominal segments in ventral view; 3, Right antenna in ventral view; 4, Top of fore wing.

Material. — Nederland (N.B.) (UTM FT 9935) Cuijk, 8 March [19th century], 1♀ (ter Haar) in RMNH ex coll. Albarda (new to The Netherlands); BRD ("Rhijnpreussen") (UTM LB 62) Bonn, [19th century], 1 ♂ (Butkau) in RMNH ex coll. Albarda; Suisse (UTM LT 91) Burgdorf, April [19th century], 1 ♂ 1 ♀ (Meyer-Dür) in RMNH ex coll. Albarda (new to Switzerland).

Diagnosis. — ♂ 7-10 mm, ♀ 9-13 mm. ♂ ♀: Head dark with light-coloured transverse marking between the eyes behind the ocelli and light markings near the antennal base (fig. 1); first antennal segments approximately as long as wide, more or less globular (fig. 3), not with parellel sides as in *B. trifasciata*. Radial sector in fore wing forked two times (so with three veins) (fig. 4). Epiproct ♂ approximately as long as wide, heart-shaped on apical side, and with two sharp points on anal side (figs. 5, 6).

Notes on distribution and ecology. — The occurrence of *B. trifasciata* in The Netherlands, as mentioned by Albarda (1889), Geijskes (1940) and Claessens (1981) seemed rather improbable, because this species seems to be absent in other countries of Northwestern Europe. Aubert (1956a) has removed it from the Belgian list, as all earlier records by De Selys Longchamps and Le Roi could not be confirmed by specimens in collections. *B. trifasciata* seems to be confined to Central Europe, where it was found in or along the rivers Rhine and Rhône (e.g. Aubert, 1959). Adults are usually met in March.

Brachyptera braueri, on the other hand, is distributed over Western and Northern Europe (Illies, 1978), but it was unknown from the Alps (Aubert, 1959). It is widespread in France (Despax, 1951), and was recorded by Aubert (1956a) from the rivers Meuse and Ourthe in Belgium. Adults can be found from late January onwards (Despax, 1951).

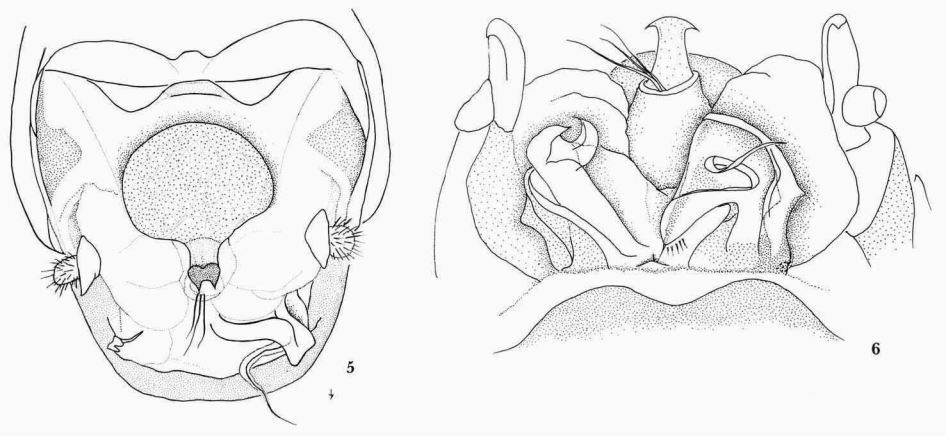

Fig. 5-6. *Brachyptera braueri*, male (Switzerland: Burgdorf). Genital apparatus. — 5, Dorsal view; 6, Posterior view.

The only Dutch specimen of *B. trifasciata* sensu Geijskes (1940), which is a female in poor condition and now preserved in alcohol, was re-examined by me and it proved to belong to *B. braueri* (Klapálek). Especially the light-coloured markings on the dorsal side of the head between the eyes (fig. 1) are characteristic of *B. braueri*. The Rs in the fore wing of this specimen is forked two times, which is always the case in *B. braueri* (Illies, 1955: 30), but only seldom in *B. trifasciata* (Despax, 1951: 34). The form of the sub-genital valve (fig. 2) can hardly be used for the diagnosis.

A preliminary inventory of the collection of the Rijksmuseum van Natuurlijke Historie revealed a male specimen from Bonn, but it was a great surprise to find also a male and female from Switzerland in the Albarda collection. Both specimens were collected by Meyer-Dür in Burgdorf, a village at the outermost northwestern border of the Alps, along the river Emme. According to Horn & Kahle (1935-1937) the Plecoptera collection of this scientist is now in the Dresden Museum (I may add that the Rijksmuseum van Natuurlijke Historie has quite a lot of specimens collected by Meyer-Dür in the Albarda collection). I have not checked the specimens of *Brachyptera* that may be in Dresden, but the presence of more material seems to be rather plausible. The discovery of this new species to the Swiss fauna is quite remarkable, because its fauna is relatively well known by the work of Aubert (1946, 1959).

Dr. J. Aubert (Musée Zoologique, Lausanne) has informed me (letter of 15 October 1984) that he has investigated the fauna of the Grande Emme near Burgdorf himself many times between 1947 and 1949 and again between 1980 and 1983. He has collected only *Brachyptera risi* and *B. seticornis* (Klapálek), but never *B. braueri* here. In this letter he also confirmed both my identification as well as the fact that this species had never been recorded from Switzerland before.

Brachyptera risi (Morton, 1896)
(figs. 7-12)

Taeniopteryx risi Morton, 1896: 56, pl. 2, figs. 1-3.

Brachyptera risi; Geijskes, 1940: 9; Illies, 1955: 27-28, figs. 12A, 14A, 14D; Berthélemy, 1970: fig. 10-11; Claessens, 1981: 74.

Brachyptera trifasciata; Albarda, 1889: 250 (pro parte) (nec *B. trifasciata* (Pictet)).

Material. — Nederland (Gld.) (UTM GT 06) Arnhem, 18 May [19th century], 1 ♂ (Van Meedenbach de Rooy) in RMNH; Norge (Hedm.) (UTM NP 49) Rondane, Folldal: Langglupdalen, along fast running brook, 29 June 1976, 1 ♂ (J. van Tol) in RMNH; Sverige (Jämtlandlän) (UTM VJ 49) Linsell, 10 km N of: along brook with brown water, 6°C, mosses, 2 July 1978, 2 ♀ (J. van Tol) in RMNH.

Diagnosis. — ♂ 8-11 mm, ♀ 8-14 mm. ♂ ♀ Head and pronotum dark, area between eyes and ocelli and hind margin of pronotum somewhat lighter; segments of antenna longer than wide, particularly obvious in segments 5-10. Radial sector in fore wing forked only once. ♂ Basal segment of cerci globular, apex of epiproct oblong heart-shaped, sub-genital valve very large and far extending (fig. 7, 9-10). ♀ sub-genital valve rather narrow with dark margin in apical half (cf. Illies, 1955: fig. 14A).

Notes on distribution and ecology. — The only specimen from The Netherlands preserved and mentioned above, is again in poor condition. For

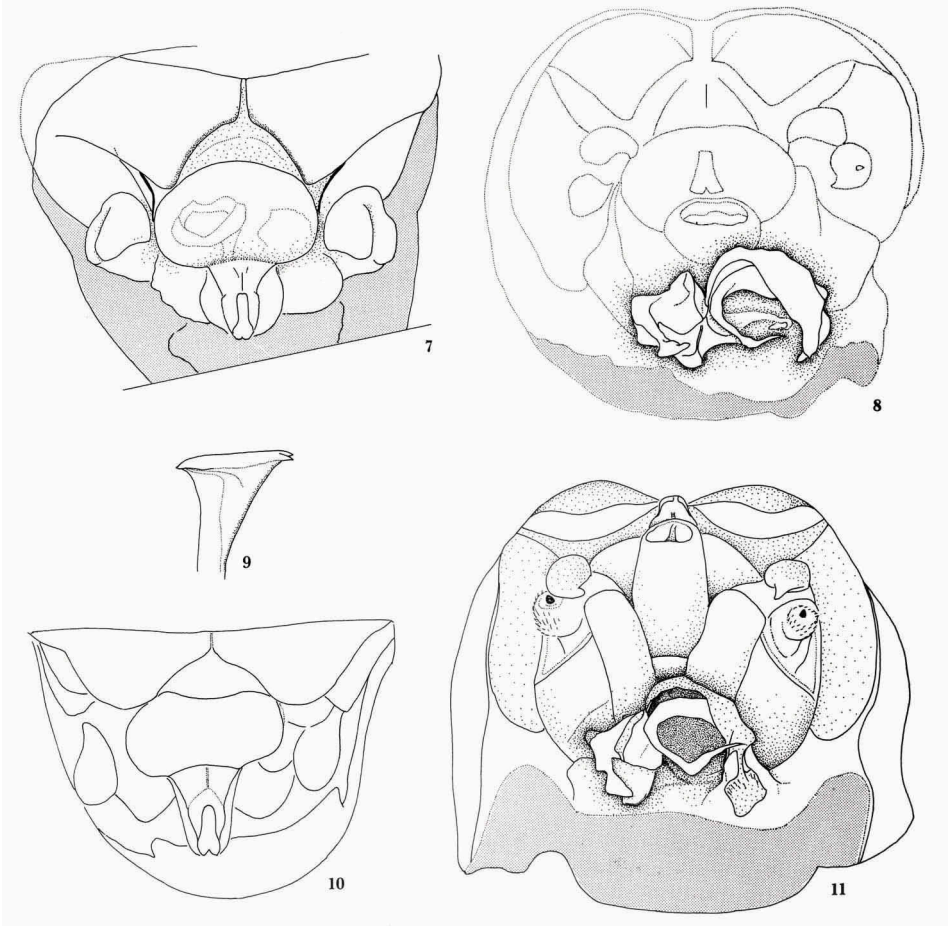

Fig. 7-11. ***Brachyptera risi***, genital apparatus. — 7, Dorsal view, specimen from the Netherlands, Arnhem; 8, Posterior view, paraprocts in shadowed area, the Netherlands, Arnhem; 9, Epiproct in left laterial view, the Netherlands, Arnhem; 10, Dorsal view, specimen from Norway, Folldal; 11, Posterior view, Norway, Folldal.

two reasons I had some doubt that this specimen should belong to *B. risi*. Firstly the date was mentioned by Geijskes (1940) as 18 February, although Albarda (1889) only indicated March and April for *B. trifasciata*, in which *B. risi* was included. Half February would be the earliest record of this species for Central Europe. Adults are found from April to June to Denmark (Madsen, 1976: 284), Germany (Illies, 1955: 28) and Switzerland (Aubert, 1946: 120). In Northern Italy, however, the emergence period seems to be more early. Ravizza (1976) recorded imagines along the river Erro in the province of Liguria and Piemonte, from March to June, and Ravizza & Ravizza-Dematteis (1979) along the Nure stream in the Po valley from late February until the end of May. Other species of this genus, e.g. *B. monilicornis* (Pictet), emerge from January onwards, so that a misidentification did not seem impossible.

Secondly, specimens collected by Van Meedenbach de Rooy in Arnhem

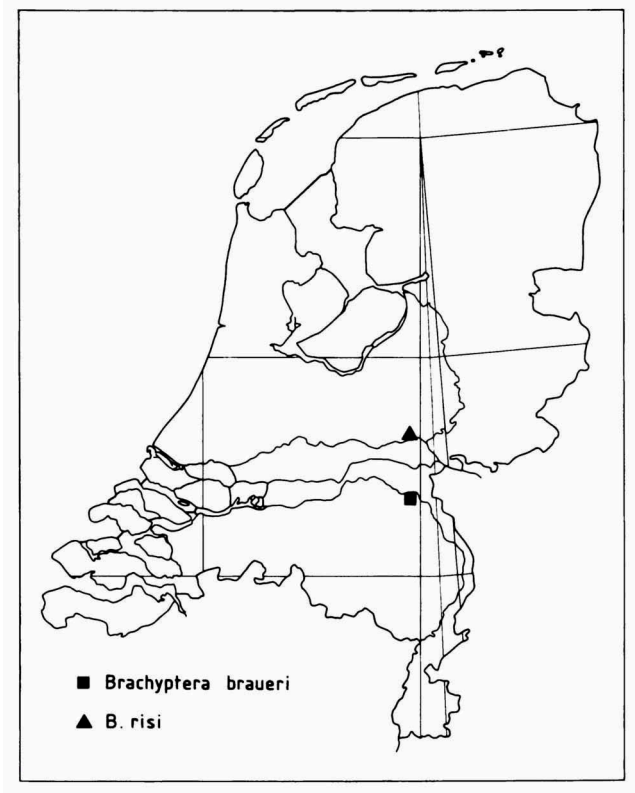

Fig. 12. Distribution of *Brachyptera* species in the Netherlands.

were usually collected along the river Rhine. Larger rivers are a quite atypical habitat for *B. risi*, as appears from e.g. Illies (1955: 28), and also from the more detailed description of the habitat by Madsen (1968, 1976), as well as from my own observations. It is usually found in the upper courses of mountain brooks, but, on the other hand, it is rather abundant in larger streams in Northern Italy (e.g. Ravizza, 1976). The only two species known from the river Meuse in Belgium are *B. braueri* and *B. monilicornis*, although *B. risi* is the commonest species of this genus in this country (Aubert, 1956a). It is the dominant species among the Plecoptera in brooklets in Norway (Lillehammer, 1974). Larvae, which are univoltine, are living between stones and mosses, particularly at the side exposed to current. They are absent from streams with sandy or silty substrates, as well as in those with leaf packets (Lillehammer, 1975; Hoffman, 1960).

Nevertheless, after re-examination of the only specimen from the Netherlands, I am confident that it belongs to *B. risi*, although there are some small differences in the genital apparatus between it and the male from Norway. In the Dutch specimen the hind margin of the posterior lobe of tergite 10 is more or less pointed (fig. 7), whereas this structure is more or less rounded in the Norwegian one (fig. 10). Also the figure in Despax (1951: 38), although of rather poor quality, suggests a more or less rounded hind margin. The structure of the paraprocts as studied from posterior is somewhat different in both specimens too (figs. 8, 11). On the other hand the Dutch specimen agrees very well with that figured by Berthélemy (1970, fig. 10) from the Pyrenees, except for the head of the flagellum of the right paraproct, which seems to be smaller in the specimen from Arnhem.

The early collecting date could also be explained. In my opinion the data on the hand-written label must be read as v.18 (i.e. 18 May), and not ii.18 (i.e. 18 February), as was indicated by Geijskes (1940).

DISCUSSION

Plecoptera are widely used for biogeographical analyses, for which they have proved to be very useful, because a lot of species show a low dispersal power (e.g. Illies, 1965). The genus *Brachyptera* may be important to reconstruct the biogeography of the western Palaearctic, since rather impressive speciation seems to have occurred during or since the Pleistocene glaciations. The number of taxa in the Balcans, on the Iberian peninsula, and presumably also in Asia Minor, is quite high, whereas only a limited number of species occurs in Central and Northwestern Europe. The distribution of the

NW European species is insufficiently known, due to incorrect records in early literature. This is illustrated by the present findings. The maps in e.g. Raušer (1962b) should thus be used with care, because they are (also) based on such older records.

Regarding the distribution of ***B. braueri***, ***B. risi*** and ***B. trifasciata*** it may be mentioned here that the last one is much more confined to Central Europe than was supposed up to now. The fact that males of ***B. trifasciata*** are always short-winged, will certainly have influenced the chance of reaching new territories after the last glaciations.

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