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Contributions to the study of the Corsican-Sardinian endemic Caddis Fly *Beraeodina palpalis* MOSELY (Insecta: Trichoptera: Beraeidae)

With 24 Figures

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Abstract. *Beraeodina palpalis* is a strictly endemic Corsican-Sardinian Caddis Fly genus and species. For the first time descriptions are published of its last instar larva, pupa, and cases, insisting on seemingly more original elements. The available information on the ecology and distribution of the species is summarized.

Introduction

The adults of *Beraeodina palpalis,* a strictly endemic Corsican-Sardinian Caddis Fly genus and species, were described by MOSELY (1931, 1932), whereas nothing was published until present on the young instars. Nevertheless, some drawings of larval morphology are included – with notes on the habitat – in a Ph.D. Thesis (GIUDICELLI, 1968). The aim of the present paper is to give descriptions of the last instar larva, of the pupa, and of the cases of this remarkable species, and to summarize what is known on its ecology and distribution. In the descriptions we shall insist on some more original – or *seemingly* more original – elements. For comparisons see especially NIELSEN (1942) (detailed description of the larva of a beraeid species which is not *Beraea pullata* (CURTIS) as stated by the author, but *B. maurus* (CURTIS): see NIELSEN in BERG, 1948), as well as BOTOSANEANU, NOZAKI & KAGAYA (1995), where an attempt is made to summarize similarities and differences between beraeid genera.

The last instar larva (Figs. 1–19)

Head with distinct lateral carinae anteriorly reaching the distal angles of frontoclypeus; posteriorly these carinae are slightly directed dorsad, to become finally indistinct. Extremely numerous longer or shorter secondary setae on frontoclypeus laterally and anteriorly, as well as on the remaining dorsal parts of the head capsule, rendering distinction of the primary setae pratically impossible.

Labrum medio-distally only extremely slightly emarginate (margin thus extremely slightly trilobate); anterior third with salient ornamentation and, proximally to this zone, with a belt of secondary setae.

Mandibles asymmetrical: left one with median hollow much deeper than right one, and with the setal brush with less setae and much more basally inserted; no additional setal brush on the bottom of the

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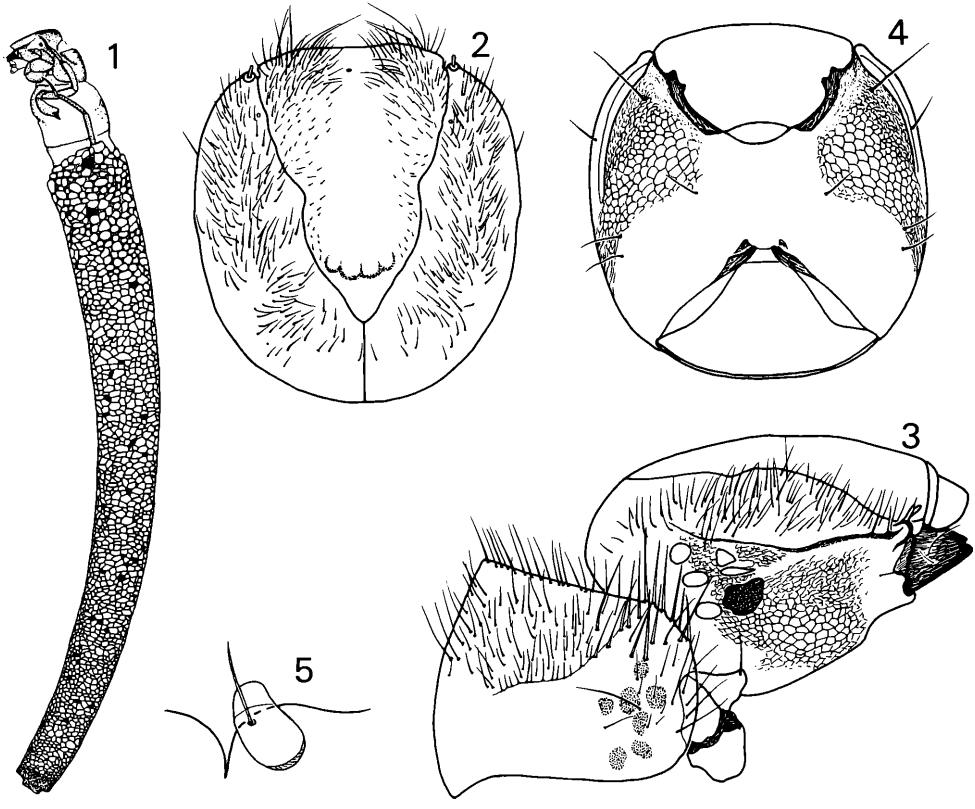


Figs. 1–5: *Beraeodina palpalis* Mos., last instar larva (1 – larva and case; 2 – head, dorsal; 3 – head and pronotum, lateral; 4 – head, ventral; 5 – antenna).

hollow of the left (or right) mandible; no zone with peculiar ornamentation on the dorsal face of the mandibles.

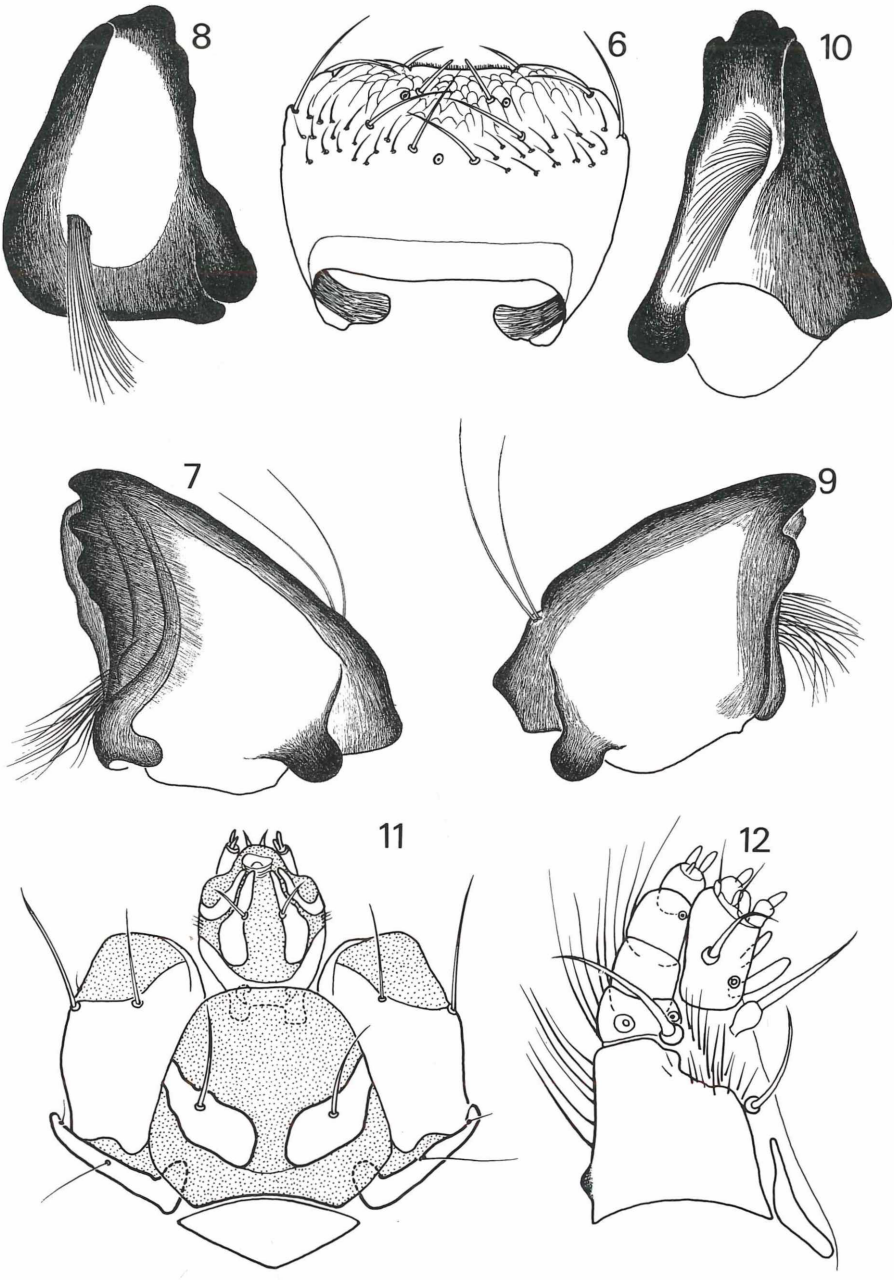
Maxillolabium. In its ventral morphology the following features seem to desserve mention: lateral seta on cardo very small; median seta on stipes normal, not clavate; lateral sclerite of palpifer with a small but distinct bump laterally near the base; the two setae of this sclerite are inserted slightly outside it; medio-apical seta of the palpifer (near the base of the galea) inserted on a strong wart; on the labial lobe there is no medio-ventral sclerite.

Antero-lateral angles of the pronotum devoid of salient lobes; on them is inserted a row of spine-like setae with procumbent alveolae. A low but nevertheless laterally distinct carina (not reaching the medio-dorsal ecdysial line) separates the anterior half provided with very numerous secondary setae from the rest of the pronotum.

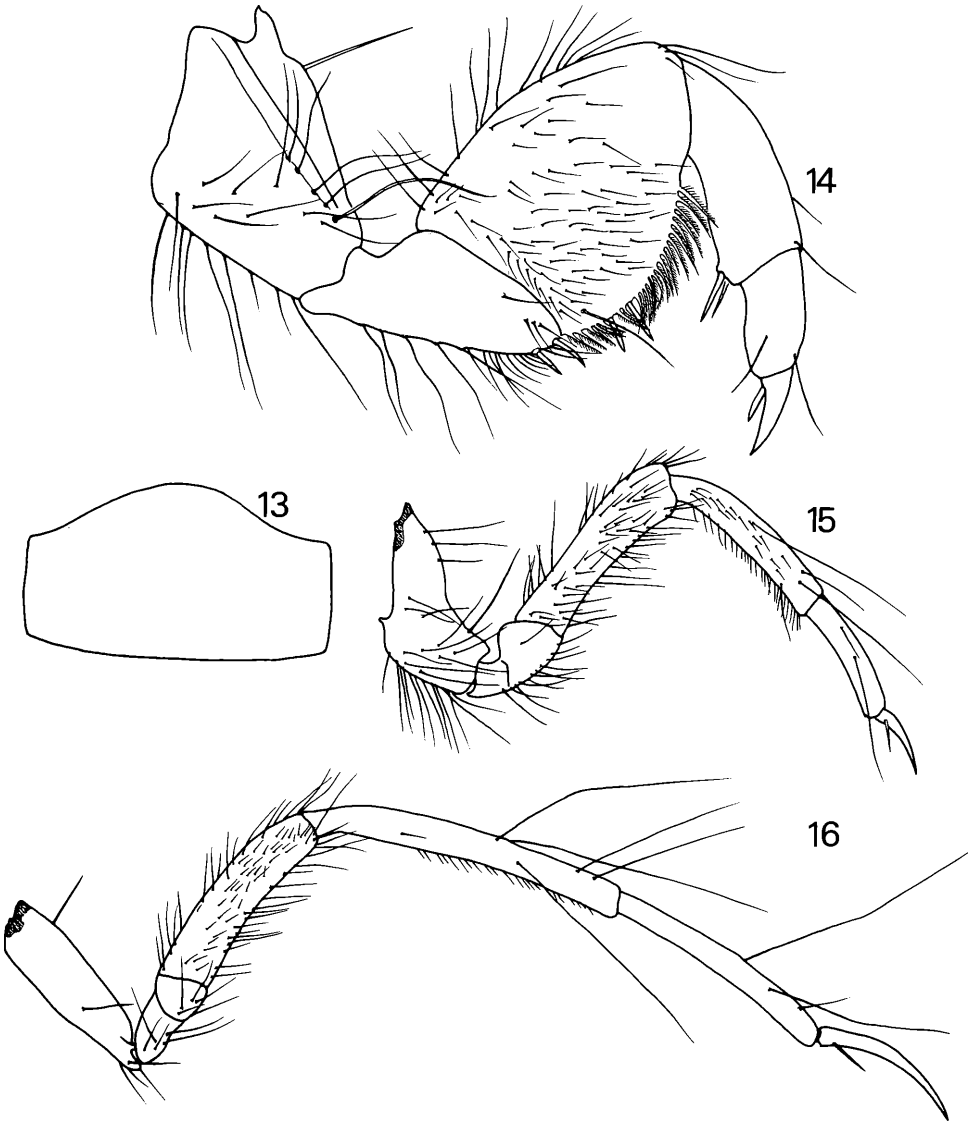
Mesonotum mostly pale (not sclerotized), but with a pair of clearly outlined, small, almost round sclerites.

Metanotum devoid of sclerites.

The three legs are characterized by the very numerous secondary setae especially on their femora; on the median edge of the anterior leg femur, a conspicuous row of strong pennate setae.



Figs. 6–12: *Beraeodina palpalis* Mos., last instar larva (6 – labrum, dorsal; 7 – left mandible, ventral; 8 – left mandible, median face; 9 – right mandible, ventral; 10 – right mandible, median face; 11 – maxillo-labium, ventral, without distal parts of maxillae; 12 – distal parts of a maxilla, ventral).

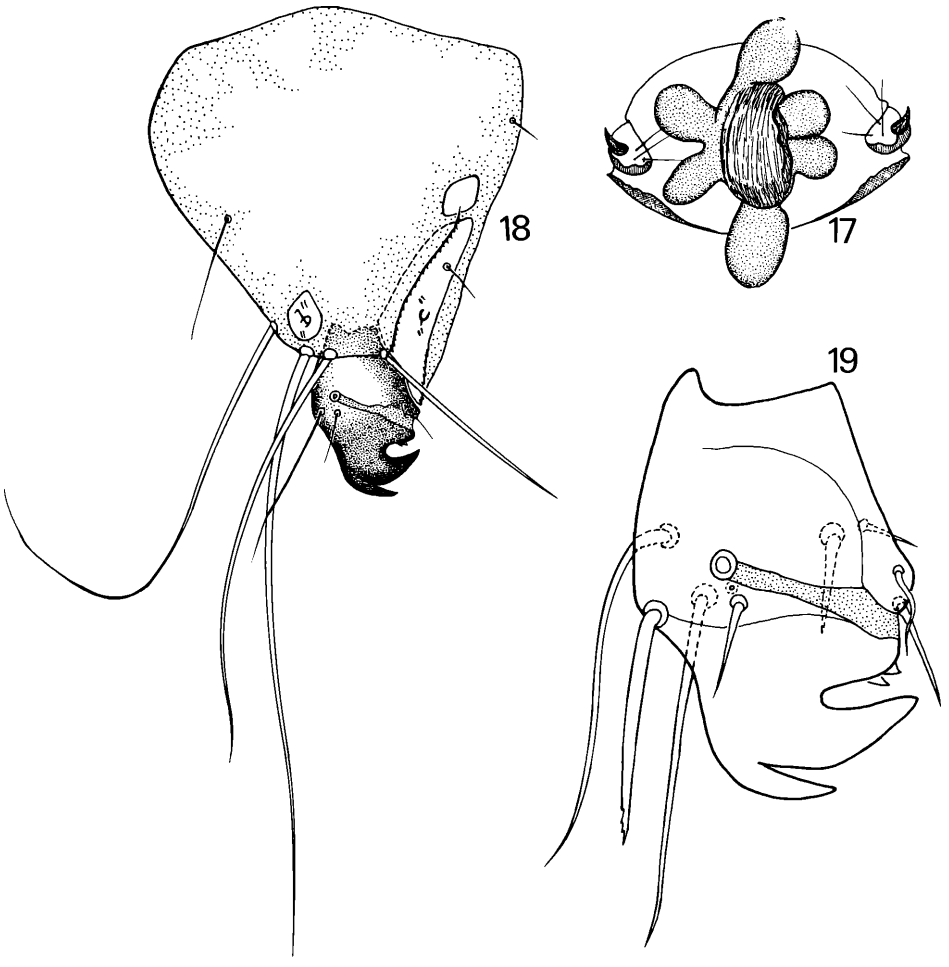


Figs. 13–16: *Beraeodina palpalis* Mos., last instar larva (13 – outline of mesonotum; 14–16 – the legs, each at different scale).

On abdominal segment I the lateral humps are very feebly developed – they may be ever considered as absent –, whereas the dorsal hump is very strongly developed.

Laterally on segment VIII, on each side, a long row of ca. 23 chitinous elements having the shape of molars with short roots directed dorsad. It was impossible to detect on the remaining abdominal segments a lateral fringe. No sclerite on dorsum IX. No tracheal gills. The anal papillae are well developed, short, swollen.

The pygopods (or anal prolegs) are characterized by: absence of a strongly salient disto-dorsal lobe offering insertion to the strongest and longest distal seta; sclerite "b" (according to terminology in



Figs. 17–19: *Beraeodina palpalis* MOS., last instar larva (17 – anal papillae; 18 – right pygopod, lateral; 19 – terminal claw of right pygopod, lateral, more strongly magnified).

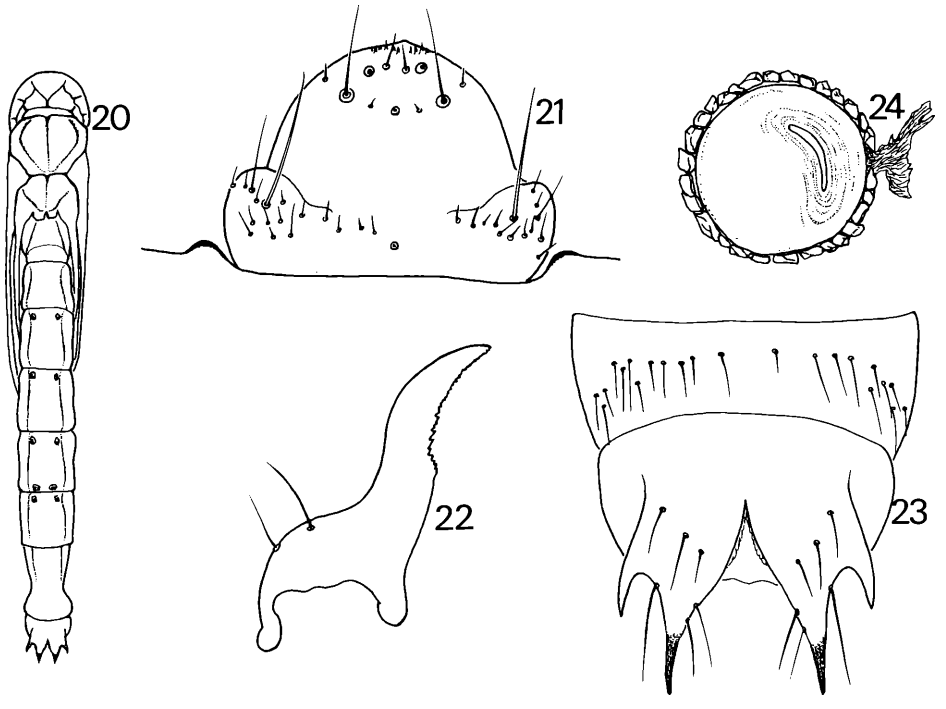
NIELSEN, 1942) apparently reduced to a very small plate near the alveole of this strongest seta; sclerite "c" well developed, near its proximal end with a small additional sclerite. Terminal claw crowned by only one additional hook. Figs. 18–19 correctly represent the situation of the setae and sensory pits on the pygopod and on the terminal claw (there are no secondary setae).

The pupa (Figs. 20–23)

Mandibles strongly sinuous, i.e. with base strongly developed laterad and distinctly separated from distal (cutting) part.

Anteclypeus clearly wider than labrum; median part of the limit between the labrum and the anteclypeus, obsolete; for chaetotaxy and sensory pits: Fig. 21.

Tarsi of 2nd pair of legs with well developed fringes of swimming setae; swimming setae also on tarsi of anterior legs, but much less well developed.



Figs. 20–24: *Beraeodina palpalis* Mos., pupa (20 – habitus; 21 – anteclypeus and labrum; 22 – left mandible; 23 – segment IX and anal appendages, dorsal; 24 – anterior end of pupal case).

Sclerites anteriorly on abdominal dorsa III–VI, and posteriorly on dorsum V; they are generally very small and with two hooklets, the exception being the posterior plates on dorsum V which are larger and maybe with an interesting sexual dimorphism: we have seen two hooklets in a female pupa, and three in a male one (a similar observation was made by MORTON, 1890, for *Beraea maurus*).

On abdominal dorsum IX, proximally, a continuous row of short setae. There is no sexual dimorphism in the anal appendages which are slender, sharply pointed (not bifid), flanked by much shorter but nevertheless well developed, slender and sharply pointed projections.

Cases (Figs. 1, 24)

With a maximum length of ca. 8 mm, the cases are very slender, regularly and slightly curved, not very hard, surface completely and regularly covered by fine sand grains. Posterior end closed by silk membrane with central opening surrounded by a slightly protruding silk ring. Operculum closing the anterior end of the pupal case: Fig. 24.

The originality of the young instars

Taking into account the numerous gaps in our knowledge of the young instars of the various Beraeidae, rendering comparison a difficult task, the following could be said at this point about apparently more or less interesting characters of *Beraeodina palpalis* – genus and species well characterized by their imaginal morphology.

Last instar larva: very abundant secondary setae on several parts of the body, frontoclypeus, epicranium, labrum, pronotum, legs; mandibles with only one setal brush; pronotum without salient antero-lateral angles; mesonotum with pair of small, distinct sclerites; anterior leg femur with conspicuous row of pennate setae on its median edge; strongly developed dorsal hump on 1st abdominal segment; anal prolegs without salient disto-dorsal lobe, with only a very small sclerite "b", sclerite "c" proximally with additional small sclerite (structure of "c" like, for instance, in *Ernodes articularis* PICT.: WIBERG-LARSEN, 1979, fig. 4C).

Pupa: mandibles with base strongly developped laterally, and distinctly separated from the falciform distal part whose inner edge is serrate; incompletely developed limit between anteclypeus and labrum; anal appendages rather short, slender, pointed (not bifid), flanked in both sexes by pointed processes.

Cases particularly long and slender.

Habitat and distribution

This species is widely distributed in Corsica, where it was found in all sampled hydrographic bassins. It is far much rarer in Sardinia, where it was recorded by MORETTI & CIANFICCONI (1980), being caught only in 4 (from 195) sampling localities - all in the extreme South of the island, between 120 and 650 m a.s.l.

In Corsica, *Beraeodina palpalis* was caught between 50 and 1 000 m a.s.l., especially in water courses of the Rhithral. GIUDICELLI (1968) has studied its distribution in a hydrographic bassin of central Corsica, Tavignano, where the species was caught in 12 (from 38) sampling stations, being more abundant between 400 and 700 m a.s.l.; its ecological requirements are best met in eurythermic tributaries of the lower course of the Tavignano where densities up to 300 larvae and pupae/m^2 can be found. In contrast, population density in the Potamal is low (less than 5 larvae and pupae/m^2).

The larvae are found in slowly flowing water; they are exclusively found on stones, either laterally on smaller stones or on vertical sides of immersed boulders. Prior to pupation the larva fastenes its case to the substrate, the pupae often being found in groups of several tens. The preimaginal development lasts from April to July, the pupae appearing by end of June. The species is on the wing from end of June to end of August (in Sardinia adults were sampled end of May and in June).

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