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A nival *Bryophaenocladius* THIENEMANN, 1934, with reduced wings

(Insecta: Diptera: Chironomidae)

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Abstract

Bryophaenocladius thaleri sp.n. is described from the Dolomite Alps of Italy. Male imagines were found in barren environments above 3100 m altitude. *Bryophaenocladius thaleri* probably mates in leks on a ground substrate, because the males are unable to fly and have lost the setal plume of the antennae. Immature stages are as yet unknown. From knowledge of habitat preferences in other *Bryophaenocladius* species, it is suggested that the larvae of *B. thaleri* are to be found in terrestrial moss patches.

Key words: Diptera, Chironomidae, *Bryophaenocladius*, new species, high altitude, wing reduction, Italy.

Zusammenfassung

Bryophaenocladius thaleri sp.n. wird als neue Art aus den italienischen Dolomiten beschrieben. Männliche Imagines sind in der nivalen Stufe über 3100 m gefunden worden. *Bryophaenocladius thaleri* paart sich wahrscheinlich in "leks" am Boden, da die Männchen flugunfähig sind und den Haarbusch der Antennen verloren haben. Die Jugendstadien sind nicht bekannt. Das Mikrohabitat der Larven von anderen *Bryophaenocladius*-Arten sind terrestrische Moospolster. Und es ist anzunehmen, daß auch die Larven von *B. thaleri* in diesem Habitat zu finden sind.

Introduction

The genus *Bryophaenocladius* THIENEMANN, 1934, includes more than 20 nominal species from the Palaearctic (ASHE & CRANSTON 1990, SCHNELL 1991). Most of the species are known as terrestrial and semiterrestrial in the larval stage (CRANSTON 1987, CRANSTON & al. 1989, WILLASSEN & THUNES 1996). Although HERRMANN & al. (1987) have previously noted that there is a species in Arizona with reduced wings, micropterous members of *Bryophaenocladius* are as yet undescribed. In this paper I describe a species from material provided by Dr. Konrad Thaler (Innsbruck). The specimens were collected in the Italian Dolomites at altitudes above 3100 m.

The specimens were mounted on slides in Euparal according to standard procedure (PINDER 1989). Terminology follows SÆTHER (1980).

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Bryophaenocladius thaleri sp.n.

(Figs. 1 - 5)

Holotype: male, Italy, Dolomites, Pala, Cima Vezzana 3190 m, 26.7. 1987, K. Thaler leg. (in coll. Museum of Zoology, Bergen, Norway). **Paratypes:** 5 males, Italy, Dolomites, Pala, Cima Bureloni 3130 m, 5.7. 1985 (in coll. Naturhistorisches Museum Wien, Austria).

Diagnosis: Male antennae with 6 (occasionally partly fused) flagellomeres. Some flagellomeres with apically bi- to multipartite sensillae. Eyes not hairy. Thorax reduced with small scutellum, lateral sclerites more or less fused. Acrostichal setae strong and decumbent, beginning close to well developed antepronotum. Wings shorter than thorax. All legs with sensilla chaetica on tarsal segments 1 - 4. Inferior volsella with straight mesal margin, caudal part somewhat rectangular and recurved dorsally. Gonostylus with indication of a dorsal hump distally.

Male imago: Head (Fig. 1): Antenna with 6 flagellomeres, each with about 3 - 4 setae. AR 0.4. Flagellomeres 2 - 6 with apically blunt to multipartite sensillae (Fig. 2). Eyes reniform with minute dots of microtrichia between the ommatids. Vertex with 5 - 6 setae to each side, arranged more or less on a line. Postorbitals missing. Frontal protrusions absent. Coronal suture complete. Clypeus short and wide, with 4 mesal setae. Palps short with first segment inconspicuous and fifth segment absent, third segment swollen distally but without distinct sensory pit. Cibarial pump somewhat rectangular with slightly concave dorsal margin and very short cornuae. Tentorium almost evenly tubular, slightly expanded at tentorial pits.

Thorax (Fig. 3): Dorsal side slightly flattened, preepisternum and postnotum narrow and somewhat triangular in lateral view. Anapleural suture faint. Antepronotum well developed, projecting beyond scutum, with 2 lateral setae. Acrostichals 6 - 7, relatively long. Dorcocentrals 12. Prealars 2. Scutellum small with a few weak setae.

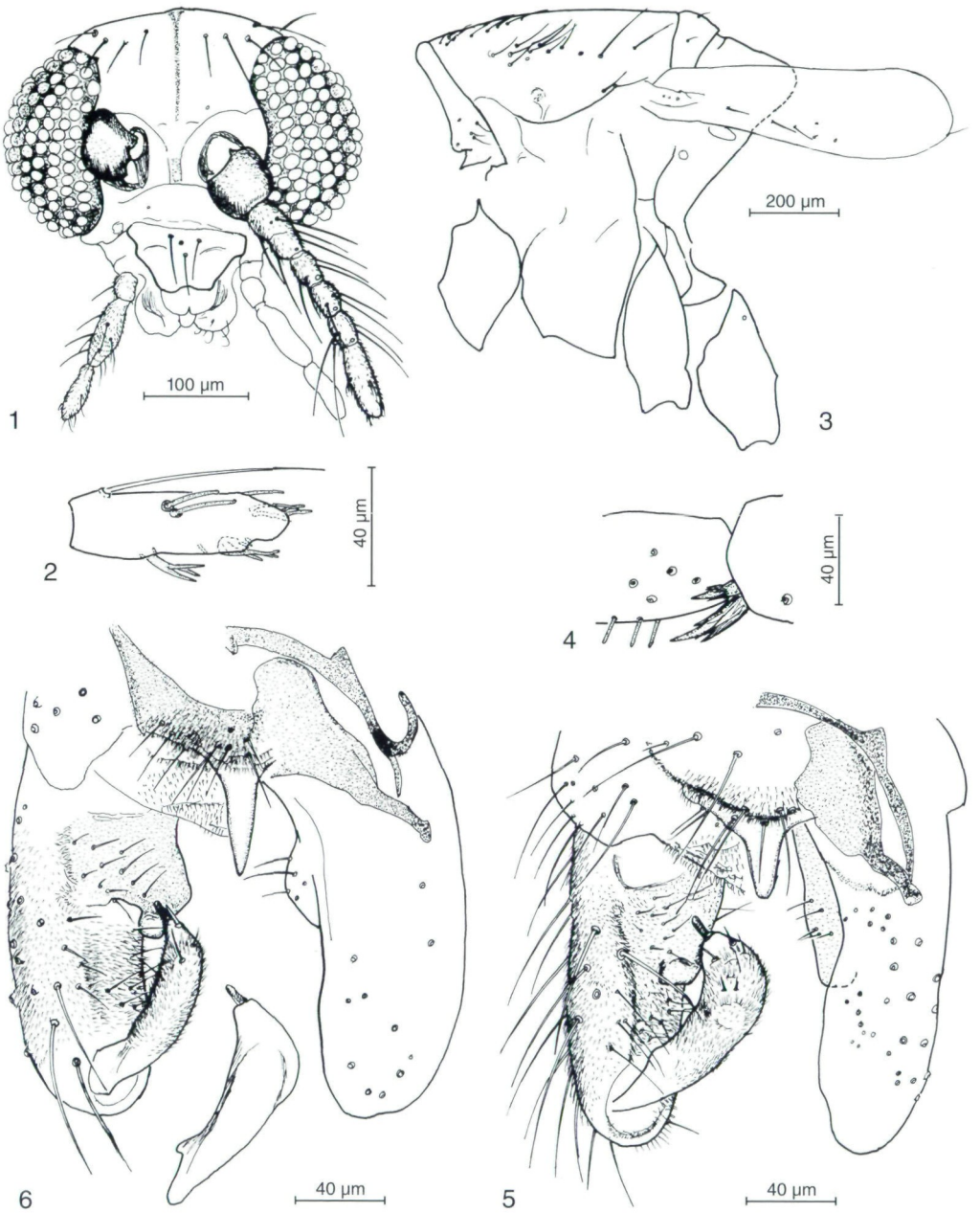
Wings (Fig. 3) reduced, 357 µm long, very narrow near squama but expanding gently towards apex. Wing membrane covered with relatively coarse microtrichia. Veins poorly delineated. Remnants of R-veins with a few relatively long setae. Squama and wing margin without setae except 1 at apex. Halteres reduced to short reniform lobes.

Legs: Spurs on tibiae with decumbent denticles; spur of front tibia 43 µm long, spurs of mid tibia 33 and 24 µm, of hind tibia 41 and 21 µm. Width of tibiae: 45, 41, and 52 µm respectively. Hind tibia with comb of about 10 setae. Ta_{1-4} of all legs without pseudospurs but with sensilla chaetica (Fig. 4) along ventral margin, particularly numerous on ta_{1-2} of hind leg, more scattered on other tarsal segments. Ta_4 cylindrical. Posttarsus with pointed claws, pulvilli not apparent.

Lengths (in µm) and proportions of legs (holotype):

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	714	752	461	244	169	103	94	0.61	3.16	3.18	1.5
p_2	799	827	395	197	132	85	85	0.48	4.05	4.12	1.5
p_3	752	874	508	254	216	103	103	0.58	3.16	3.20	1.7

Genitalia (Fig. 5): Tergite IX with about 10 setae, posterior margin pigmented. Anal point hyaline with granulation of weak microtrichia, relatively broad at base and tapering to a blunt tip at apex. Sternapodeme semicircular and narrow, with or without oral



Figs. 1 - 5. *Bryophaenocladius thaleri* sp.n. (1) head, (2) sensillae of ultimate flagellomere, (3) thorax and wing, (4) spurs and sensillae chaeticae of leg, (5) male genitalia.
Fig. 6. *Bryophaenocladius subnivalis* EDWARDS, male genitalia with variation of gonostylus.

projections. Aedeagal lobe broad, sometimes with hooklike oral projection. Virga week, occasionally visible as a striated area between gonocoxite bases. Inferior volsella with

sparse minute microtrichia and a few scattered setae dorsally, mesal margin more or less straight; posterior part with a small dorsally recurved somewhat rectangular lobe. Gonostylus relatively stout with indication of a dorsal hump distally, inner margin more gently curved, dorsal surface with weak reticulation and dense microtrichia except near apex; megaseta well developed, projecting from apex.

Discussion

Bryophaenocladius thaleri has a remarkably high number of tarsal sensilla chaetica on all three pairs of legs. Such sensilla are rarely found on the front leg in chironomids (SÄWEDAL 1982) and it is interesting to note that all tarsal segments except the ultimate have such sensillae. According to the generic diagnosis given by CRANSTON & al. (1989) and the emendations added by SCHNELL (1991), *Bryophaenocladius* do not possess sensilla chaetica on the legs. Despite this peculiarity in *B. thaleri* there is little doubt that the species is a *Bryophaenocladius*. The apically split antennal sensillae have been figured for other species of *Bryophaenocladius* (STRENZKE 1942, PINDER & ARMITAGE 1986, CRANSTON 1987, SCHNELL 1991). GOETGHEBUER (1940-50: 64, textfig. 29) used them in the key to females of species that at the time were placed in *Orthocladius (Eudactylocladius)* (see ASHE & CRANSTON 1990). Such sensillae do also occur in males with plumose antennae, although less visible in between the setal plumage. The shape may be a synapomorphy for a monophyletic subgroup of *Bryophaenocladius*.

In chironomids, like in other high altitude insects, wing reduction often correlates with a series of other morphological modifications (SÆTHER & WILLASSEN 1987) and a few species are known to occur in both macropterous and micropterous forms (HANSEN & COOK 1976, WILLASSEN 1985, HERRMAN & al. 1987). An example of antennal dimorphism is also found in the males of the Arctic orthoclad *Oliveridia tricornis* (OLIVER, 1976). However, the two morphs of *O. tricornis* do not differ in wing lengths (OLIVER 1976). Both are apparently fully capable to fly, and both display the same type of mating behaviour (OLIVER 1983).

From knowledge of such cases of dimorphism it is conceivable that *B. thaleri* might be a high altitude morphotype of an already described fully winged species with normal male antennae. The hypopygum of *B. thaleri* has similarities to several other species including *B. flexidens* (BRUNDIN, 1947), *B. ictericus* (MEIGEN, 1830), *B. illimbatus* (EDWARDS, 1929), *B. subvernalis* (EDWARDS, 1929), *B. vernalis* (GOETGHEBUER, 1921), and *B. tirolensis* (GOETGHEBUER, 1938). The relationship between these species and the degree of intraspecific morphological variation is not well understood at present and a critical systematic revision of the genus is needed. Morphology and distributional data would seem to make *B. tirolensis* a likely canditate for a close relationship with *B. thaleri*. However, *B. tirolensis* (GOETGHEBUER 1940-50: fig. 97) is also very similar to *B. subvernalis* (Fig. 6) and there is a possibility that these two species must be regarded as synonyms. The hypopygium of *B. subvernalis* seems to differ from that of *D. thaleri* mainly in the shape of the inferior volsella as the profile of the gonostylus is highly dependent on orientation.

Bryophaenocladius thaleri was found in the nival zone of the relatively steep peaks Cima Burreloni and Cima Vezzana. These elevations are dominated by barren block fields and coarse eroding dolomite rocks (THALER 1988). However, patches of moss

occur and the ground is kept temporarly moist by seepwater from melting snow. Having seen the microhabitat of *Bryophaenocladius faegrii* SCHNELL, 1991, I do not find it unlikely that such high altitude moss patches might provide larval habitats for *B. thaleri*. *Bryophaenocladius tirolensis* occurs under similar ecological conditions and is known as an inhabitant of alpine terrestrial moss (JANETSCHEK 1945: 145)

The specimens were collected with a forceps from the underside of stones resting on finer gravel and sand (K. THALER, pers. comn). Thus, adults of *B. thaleri* probably behave very much like alpine *Diamesa* which often congregate in protected and less wind exposed areas on the ground. Such aggregations may be seen as substitutes of flight swarms in macropterous chironomids and therefore be considered as "leks" (MCLACHLAN & NEEMS 1989). In theory, swarms might function as isolating mating systems versus groundbased leks and might lead to genetical divergence between winged and brachypterous populations. However, at present there is no evidence to support the idea of sympatric proliferation of *B. thaleri*. Thaler (pers. comm.) remarks that he has never seen brachypterous *Bryophaenocladius* on his many collecting trips in the North- and Central-Alps. Based on distributions of nival spiders, he has also suggested that the Dolomites constitute a small-scale area of endemisms for which explanations must be sought in the history of glaciations (THALER 1988).

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