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Redescription of Paratrissocladius acuminatus (Edwards) comb. n. (= Cardiocladius acuminatus Edwards) from Southern Chile

(Diptera: Chironomidae)

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Abstract

The holotype of *Cardiocladius acuminatus* Edwards, 1931: 274, is redescribed and transferred to the emended genus *Paratrissocladius* Zavřel, 1937. The terminology of the chironomid wing venation is discussed and posterior cubitus – PCu, and second anal vein – An_2 is used instead of vannal fold and Ax-vein respectively.

Introduction

While revising the genera in the *Cardiocladius* group, the holotype of *Cardiocladius acuminatus* Edwards (1931: 274) from Southern Chile was examined. As mentioned by Brundin (1956: 66) the presence of a stout anal point with setae suggests that the species does not belong in *Cardiocladius* Kieffer. Lacking knowledge of other stages than the male makes the generic placement of the species somewhat uncertain. However, the species will in recent keys (Pinder, 1978; Oliver et. al. [MS]) key out to *Paratrissocladius* Zavřel, as defined by Sæther (1976: 253).

Morphology

The morphological terminology follows Sæther (1980) with some additions discussed below. Measurements and ratios follow Schlee (1966) with additions and modifications given by Sæther (1969, 1976).

The presence of a second anal vein (An_2) is a plesiomorphous character in the Diptera (Hennig 1954, 1969). In the chironomids only the first anal vein (An_1) is well developed, while An_2 usually is strongly reduced. However, in several genera it is possible to trace remnants of the vein as often is indicated in the figures. Edwards (1929: 285, text to fig. 1; 317) used the term Ax-vein, and so did also Brundin (1956: 24, fig. 5; 66). An_2 is especially well developed in *Cardiocladius* Kieffer and was used by Edwards as a diagnostic character for the genus. In Brundin's (1956) figure of the wing of *C. capucinus* (Zetterstedt), An_2 is clearly forked with a stem, a short and weak anterior branch and a stronger posterior branch. This condition is present in all species of *Cardiocladius* I have examined, as well as in *Paratrissocladius acuminatus* (Fig. 1C). However, it is not so clearly developed in the latter species. In other genera where An_2 is indicated, including the two other species of *Paratrissocladius*, it always appears unbranched. Edwards stated that when present, the Ax-vein was lying between two anal folds. According to Wotton (1979: 88) and Lindeberg (1983: 168) the anterior fold (a. f. 1 of Edwards) probably is the claval furrow, a flexion line which runs posterior to An_1 in the Diptera. Thus, the anterior branch of An_2 clearly present in *Cardiocladius* may be interpreted as this flexion line, lying very close to the true vein and appearing as a part of it.

Following Lindeberg (1983) and Wotton (1979) the term vannal fold as used by Hansen & Cook (1976) and Sæther (1980) is erroneous, and posterior cubitus (PCu) has to be adopted in its place.

Systematics

Edwards (1931: 274) apparently placed *P. acuminatus* in *Cardiocladius* due to the presence of a cordiform ta_4. This character is at least not a good synapomorphy. Brundin (1966: 363) made a review of the occurrence of a cordiform ta_4 in the Chironomidae, and he regarded the character as a plesiomorphy and a probable adaptation to a life in strong currents. Furthermore, the degree of cordiformity varies inside *Cardiocladius. C. capucinus* (Zetterstedt) has for instance an almost cylindrical ta_4 at least on the front leg, slightly shorter than ta_5 only, while other species in the genus have a more or less distinctly cordiform ta_4. In addition, ta_4 of *P. acuminatus* is slightly different from that in *Cardiocladius* in that it is stronger produced beneath the base of ta_5. These different types of cordiformity are also found inside the Diamesinae (Willassen, pers. com.), and may be interpreted as different trends. However, the tendency to get a cordiform ta_4 can be interpreted as an underlying synapomorphy inside the Orthocladiinae. Sæther (1977: 86), Sæther & Halvorsen (1981: 283) and Sæther (1983 a: 284) indicates that the sistergroup of the *Cardiocladius* group is the *Heterotrissocladius* group, and that the *Parakiefferiella* group is the sistergroup of these two combined. The tendency to get a cordiform ta_4, interpreted as an underlying synapomorphy, would support the hypothesis of these genus groups being a monophyletic unit, possibly including *Psilometriocnemus* Sæther, and with one parallel development only, the *Corynoneura* group.

One of the reasons for transferring the species to *Paratrissocladius* is the shape of the anal point. Sæther (1983 b: 355) made a phylogenetic analysis of the anal points in the *Heterotrissocladius* group, stating that his Type 1 present in all species of *Paratrissocladius* and *Heterotrissocladius,* and in some species of *Parametriocnemus* Goetghebuer and *Paraphaenocladius* Thienemann, was unique. This Type 1 anal point is present in *P. acuminatus* also, and is regarded as an underlying synapomorphy for the *Heterotrissocladius* group.

Sæther (1975: 62) regarded the presence of strong microtrichia only on the wing membrane as a synapomorphy for *Paratrissocladius,* and the presence of both microtrichia and setae as the plesiomorphous character alternative for the rest of the *Heterotrissocladius* group. The situation in the *Cardiocladius* group where the microtrichia are very weak, may be seen as the apomorphous alternative in a three step trend, and exclude *P. acuminatus* from being a member of that group.

The presence of a virga consisting of a group of minute spines also shows affinity with the *Heterotrissocladius* group. This is Type 5 in Sæther (1983 b: 356) and is also found in some *Paraphaenocladius.* Sæther (1976: 253) states that the spines of the penis cavity in *Paratrissocladius* apparently are very small. Only *Tokunagaia* Sæther and *Tvetenia* Kieffer possess virga in the *Cardiocladius* group, the first one has Type 4, the latter one a derivation of Type 4 which possibly is a sixth type of virga in the orthoclads.

The presence of tarsal pseudospurs may indicate a closer relationship with the *Cardiocladius* group. These are absent in the *Heterotrissocladius* group, but present in the *Cardiocladius* group except in the *Eukiefferiella claripennis* and *coerulescens* groups, in *Dratnalia* Sæther & Halvorsen, and in *Tvetenia* where they are both present and absent.

The strong *Parakiefferiella*-like bend of the gonostylus is unique for *P. acuminatus.* However, an indication of a bend is at least present in *P. natalensis* (Freeman). Until additional knowledge of the other stages of *P. acuminatus* is available, the species can best be placed in *Paratrissocladius.*

Diagnosis

The following corrections and emendations have to be included in the diagnosis given by SÆTHER (1976: 253):

Eye scarcely to moderately elongated dorsally. Flagellomere 2 and 3, or 2–6 with sensilla chaetica. Dorsocentrals numerous to normal, with or without humerals. Acrostichals numerous to few. An_2 distinct. ta_4 cylindrical or cordiform. Pseudospurs absent or present. Sensilla chaetica present on mid or hind legs. Anterior margin of transverse sternapodeme convex or straight. Virga present as a small cluster of minute spines. Gonostylus with more or less *Parakiefferiella*-like bend.

Paratrissocladius acuminatus (Edwards) comb. nov.
Fig. 1 A–E

Cardiocladius acuminatus Edwards 1931: 274, male described.

The male is characterized by an AR of 1.40; eyes scarcely elongated dorsally; 6 temporal setae; ta_4 cordiform; pseudospurs present; sensilla chaetica on mid ta_1 only; humerals absent; gonostylus with marked bend.

Male imago (n = 1)

Total length 3.67 mm. Wing length 2.23 mm. Total length/wing length 1.65. Wing length/length of profemur 2.72.

Antenna: (Fig. 1 A) Flagellum with 13 flagellomeres, last flagellomere 534 μm long. AR 1.40.

Head: (Fig. 1 B) Temporal setae 6, including 1 inner vertical, 1 outer vertical, and 4 postorbitals. Clypeus with 8 setae. Tentorium 183 μm long, 28 μm wide at sieve pore. Stipes 151 μm long, 50 μm wide. Palp missing.

Thorax: (Fig. 1 C) Antepronotum with 11 setae. Dorsocentrals 16; acrostichals 5 (some probably lost in preparation); prealars 4. Scutellum with 7 setae.

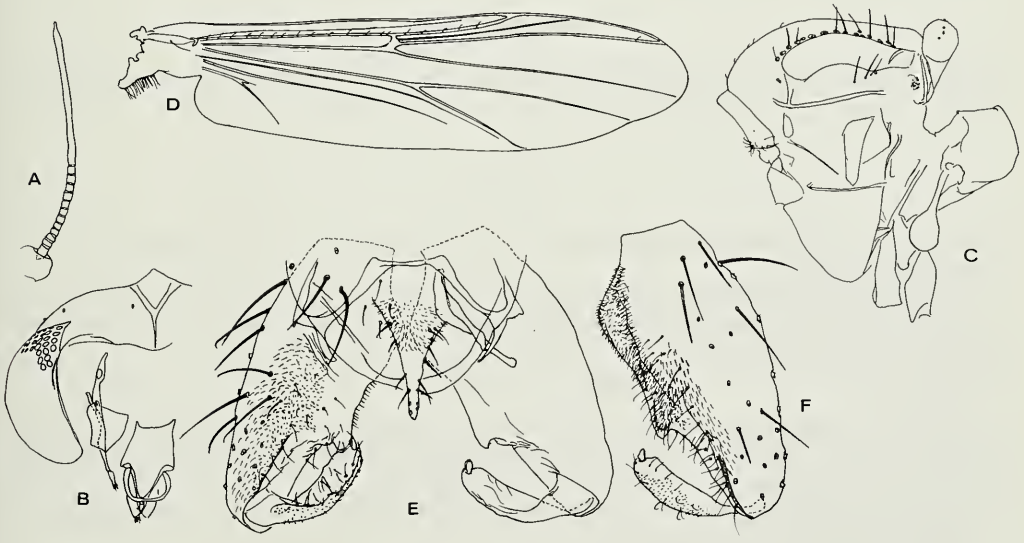

Fig. 1. *Paratrissocladius acuminatus* (Edwards) comb. n.; A – antenna; B – head; C – thorax; D – wing; E – male hypopygium, dorsal view; F – male hypopygium, ventral view.

Wing: (Fig. 1D) Anal lobe well developed. R_{2+3} ending slightly before the middle of the distance between R_1 and R_{4+5}. VR 1.13. Brachiolum with 2 setae; R with 14 setae; R_1 with 5 setae; and R_{4+5} with 1 seta. Squama with 16 setae.

Legs: Spur on front tibia 65 μm long. Spurs on mid tibia 48 μm and 33 μm long; on hind tibia 65 μm and 38 μm long. Width at apex of front tibia 50 μm; of mid tibia 45 μm; and of hind tibia 50 μm. Comb on hind tibia with 10 setae; longest seta 40 μm long; shortest seta 23 μm long. Mid leg with 2 pseudospurs on ta_1 and ta_2, and 1 on ta_3; hind leg with 2 on each. Mid leg with 10 sensilla chaetica apically on ta_1; hind leg without. Leg lengths (micrometers):

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
P_1	819	1051	859	440	252	78	88	0.82	3.18	2.18	2.3
P_2	890	971	516	272	138	55	88	0.53	4.30	3.61	2.2
P_3	950	1183	748	390	163	60	95	0.63	4.07	2.85	---

Abdomen: Setae on tergites numerous, more or less uniformly scattered. Sternites 5–8 with median patches of large setae in addition to lateral lines with weaker setae.

Hypopygium: (Figs. 1 E, F) Ninth tergite with 27 setae, including setae on anal point; laterosternite with 7 setae. Phallapodeme 110 μm long. Transverse sternapodeme 68 μm long. Gonocoxite 282 μm long; gonostylus 124 μm long. HR 2.28. HV 2.96.

Female, Pupa and Larva unknown.

Material examined and distribution: Holotype, male, slide labelled "*Cardiocladius acuminatus* Edw., F. W. Edwards det. 1931, Peulla: 12–13. XII. 1926, Southern Chile: Llanquihue Prov., F. & M. Edwards., B. M. 1927–63". (In the British Museum.) The species is known from the type locality only. This is the first record, of the genus from South America.

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