

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

(Diptera: Chironomidae)

By Godtfred A. Halvorsen

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 – An₂ 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 (An₂) is a plesiomorphous character in the Diptera (HENNIG 1954, 1969). In the chironomids only the first anal vein (An₁) is well developed, while An₂ 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). An₂ 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), An₂ 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 An₂ 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 LINDBERG (1983: 168) the anterior fold (a. f. 1 of Edwards) probably is the claval furrow, a flexion line which runs posterior to An₁ in the Diptera. Thus, the anterior branch of An₂ 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 LINDBERG (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 Orthoclaudiinae. 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 orthoclaids.

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. An₂ distinct. ta₄ 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; ta₄ cordiform; pseudospurs present; sensilla chaetica on mid ta₁ 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 μ m 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 μ m long, 28 μ m wide at sieve pore. Stipes 151 μ m long, 50 μ m 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.

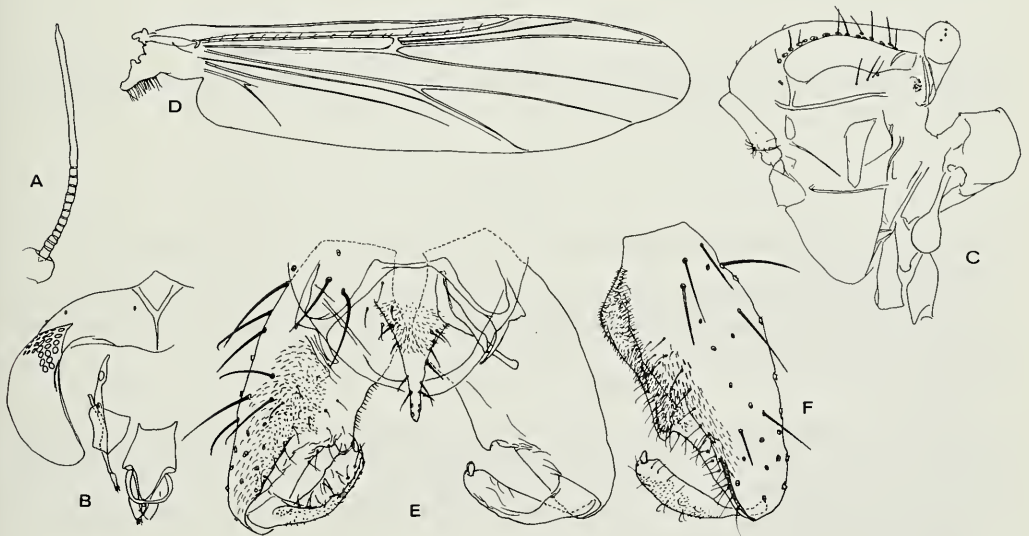


Fig. 1. *Paratrissocladius acuminatus* (Edwards) comb. n.; A – antenna; B – head; C – thorax; D – wing; E – male hypopygium, dorsal view; F – male hypopygium, ventral view.

Wing: (Fig. 1 D) 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.

Acknowledgement

I am much indebted to Dr. P. S. Cranston, British Museum (Nat. Hist.), London, for lending me the holotype, and to Prof. O. A. Sæther, Museum of Zoology, Bergen, for valuable discussions.

Literature

- BRUNDIN, L. 1956: Zur Systematik des Orthoclaudiinae (Dipt., Chironomidae). – Rep. Inst. Freshwat. Res. Drottningholm 37: 5–185
- 1966. Transantarctic relationships and their significance, as evidenced by chironomid midges. With a monograph of the subfamilies Podonominae and Aphroteniinae and the austral Heptagytiae. – K. Svenska Vetensk. Akad. Handl. Ser. 4, 11: 1–472
- EDWARDS, F. W. 1929: British non-biting midges (Diptera, Chironomidae). – Trans. R. ent. Soc. Lond. 77: 279–430
- 1931. Diptera of Patagonia and Southern Chile. – II, 5, Chironomidae: 233–331, British Museum, London
- HANSEN, D. C. & E. F. COOK 1976: The systematics and morphology of the Nearctic species of *Diamesa* Meigen, 1835 (Diptera: Chironomidae). – Mem. Am. ent. Soc. 30: 1–203
- HENNIG, W. 1954: Flügeläder und System der Dipteren unter Berücksichtigung der aus dem Mesozoikum beschriebenen Fossilien. – Beitr. Ent. 4: 246–388.
- 1969. Die Stammesgeschichte der Insekten. – Frankfurt am Main, 436 pp.
- LINDBERG, B. 1983: Terminology of the wing-veins in Chironomidae (Diptera). – Mem. Am. ent. Soc. 34: 165–168

- PINDER, L. C. V. 1978: A key to the adult males of British Chironomidae. – Freshwat. Biol. Assoc. Scient. Publ. 37: 169 pp. + 189 fig.
- SÆTHER, O. A. 1969: Some Nearctic Podonominae, Diamesinae, and Orthocladiinae (Diptera: Chironomidae). – Bull. Fish. Res. Bd Can. 170: 1–154
- 1975: Nearctic and Palaearctic *Heterotrissocladius* (Diptera: Chironomidae). – Bull. Fish. Res. Bd Can. 193: 1–67
- 1976: Revision of *Hydrobaenus*, *Trissocladius*, *Zalutschia*, *Paratrissocladius*, and some related genera (Diptera: Chironomidae). – Bull. Fish. Res. Bd Can. 195: 1–287
- 1980: Glossary of chironomid morphology terminology (Diptera: Chironomidae). – Ent. scand. Suppl. 14: 1–51
- 1983a: Three new species of *Lopescladius* Oliveira, 1967 (syn. “*Cordites*” Brundin, n. syn.), with a phylogeny of the *Parakiefferiella* group. – Mem. Am. ent. Soc. 34: 279–298
- 1983b: The canalized evolutionary potential: Inconsistencies in phylogenetic reasoning. – Syst. Zool. 32: 343–359
- SCHLEE, D. 1966: Präparation und Ermittlung von Meßwerten und Chironomiden (Diptera). – Gewäss. Abwäss. 41/42: 169–193
- WOTTON, R. J. 1979: Function, homology and terminology in insect wings. – Syst. Ent. 4: 81–93
- ZAVŘEL, J. 1937: Eine neue *Trissocladius* Art. – Spisy. vydav. prir. Fak. Masaryk. Univ. 139: 1–12

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Spixiana, Zeitschrift für Zoologie, Supplement](#)

Jahr/Year: 1988

Band/Volume: [014](#)

Autor(en)/Author(s): Halvorsen Godtfred A.

Artikel/Article: [Redescription of Paratrissocladius acuminatus \(Edwards\) comb. nov. \(= Cardiocladus acuminatus Edwards\) from Southern Chile \(Diptera, Chironomidae\) 85-89](#)