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A redefinition of *Acamptocladius* Brundin, 1956 (syn. *Phycoidella* Sæther, 1971, n. syn.) (Diptera: Chironomidae), with the description of *A. reissi* n.sp.

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Cranston, P. S. & Sæther, O. A.: A redefinition of *Acamptocladius* Brundin, 1956 (syn. *Phycoidella* Sæther, 1971, n. syn.) (Diptera: Chironomidae), with the description of *A. reissi* n.sp.

Ent. scand 13: 25-32. Lund, Sweden 15 March 1982. ISSN 0013-8711.

Acamptocladius Brundin, 1956 is shown to be a senior synonym of *Phycoidella* Sæther, 1971, and the generic diagnosis emended. A new combination, *Acamptocladius dentolatens* (Sæther, 1971), is established. The male and female imagines of *A. submontanus* are redescribed and the possible larva described. A new species, *A. reissi*, is described in all stages and both sexes. A key to the three species is given for all stages and both sexes. All larvae have been found in acid and humic pools and lakes. Some presumed first instar larvae found in unionid mussels may belong to *Acamptocladius*.

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The immature stages of an orthoclad collected in Oberbayern by Dr F. Reiss, Zoologisches Staatssammlung, Munich appeared to belong to the genus *Phycoidella* Sæther, 1971. This monotypic genus was described from colonies of blue-green algae in a Canadian lake. The associated adults, however, were tentatively identified as *Acamptocladius submontanus* (Edw.). A closer comparison with the types of *A. submontanus* revealed that the species belonged to a new species which we propose to name *A. reissi* n. sp. in honour of Dr Reiss. The differences mentioned by Sæther (1971:1812) between *Phycoidella* (type-species *P. dentolatens* Sæther) and *Acamptocladius* Brundin (1956:162) did not hold up. Except for the shape of the anal point and the undivided volsella the two European species of *Acamptocladius* conform to the generic diagnosis of *Phycoidella*. Thus *Phycoidella* must be regarded as a junior synonym of *Acamptocladius*.

The general terminology in the following descriptions follows Sæther (1980). The measurements are given as ranges followed by a mean

when three or more specimens are measured; n = number measured.

Acamptocladius Brundin, 1956: 162

Phycoidella Sæther, 1971: 1810, n. syn.

Type species: Acamptocladius submontanus (Edwards, 1932: 46) (as *Spaniotoma* (*Smittia*) *submontanus*) by original designation.

Other included species: Acamptocladius dentolatens (Sæther, 1971: 1814, as *Phycoidella dentolatens*), n. comb., *Acamptocladius reissi* n. sp.

Emended diagnosis: As Sæther, 1971: 1810, 1977: 102 for *Phycoidella*, except:

Imago — Female with 5 flagellomeres. Antennal groove in male reaching flagellomere 3; flagellomeres 2, 3 and 13 with sensilla chaetica. Costa not or barely extended. Sensilla chaetica present on ta₁ of hind leg in male, on mid and hind leg in female. Anal point small, triangular, broad based, rounded apically or with apical point. Gonocoxite with single or double, inferior volsella.

Pupa — Ocular field with 2 postorbitals, no vertical. Antepre-notum with 2 median and only 1 lateral seta. Dorsocentrals 4, anterior two forming one group, posterior two another. Wing sheath smooth. Leg sheath all recurved beneath wing sheath. Segments II-VIII with one dorsal and one ventral pair of 0 setae. Shagreen

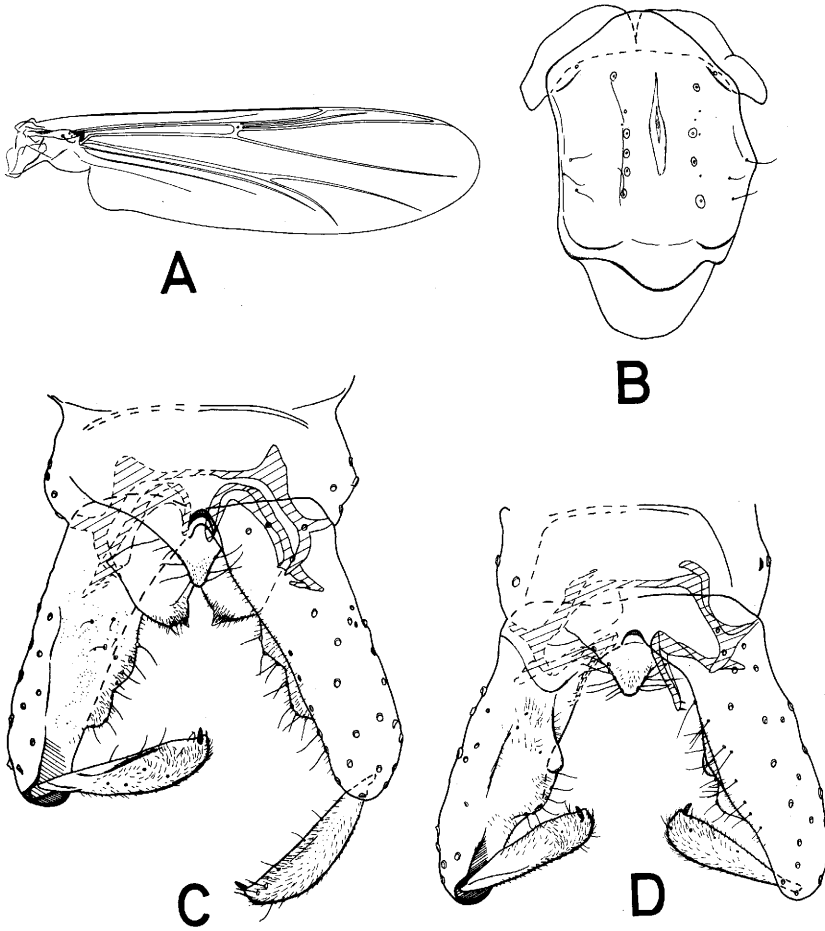


Fig. 1. *Acamptocladus* spp., male imago — A-C. *A. reissi* n. sp. — A. Wing. — B. Thorax. — C. Hypopygium. — D. *A. submontanus* (Edw.), hypopygium.

absent on tergites I and II, may be present on all other tergites. Hooklets on tergite II and well developed pedes spurii B present (not clear in *A. dentolatens* since segments 1-2 damaged). L setae on VIII about 1/3-1/2 as long as width of segment. Genital sac of male extends beyond anal lobe.
 Larva — AR about 1.5-3. Dorsosentum with 12-18 teeth on each lateral plate.

— AR about 0.8-0.9, about 4-6 dorsocentrals (Fig. 1B), phallapodeme subequal in length to transverse sternapodeme, volsella relatively weak (Fig. 1C) *A. reissi* n. sp.

Key to males

1. Anal point with triangular base and narrow parallel-sided apex, volsella single and weak (Sæther 1971, fig. 9C) *A. dentolatens* (Sæth.)
- Anal point triangular with broadly rounded apex, volsella double and more produced 2
2. AR about 1.3, about 11 dorsocentrals, phallapodeme longer than transverse sternapodeme, volsella relatively well developed (Fig. 1D) *A. submontanus* (Edw.)

Key to females

1. Gonocoxite IX with about 10 subequal, relatively short setae (Fig. 2E); cercus not reaching gonapophyses VIII in ventral view. ... *A. reissi* n. sp.
- Gonocoxite IX with 3-4 long setae and 0-2 short setae, cercus reaching gonapophyses VIII 2
2. Clypeus with about 12 setae, cercus reaching dorsomesal lobe (Fig. 2A) *A. submontanus* (Edw.)
- Clypeus with about 6 setae, cercus not reaching dorsomesal lobe (Sæther 1971 fig. 10) *A. dentolatens* (Sæth.)

Key to known pupae

1. Thoracic horn slightly more than 2× as long as wide (Sæther 1971 fig. 11B), L setae of segment VIII about 0.5× as long as width of segment (Sæther 1971 fig. 11A). ... *A. dentolatens* (Sæth.)
- Thoracic horn more than 3× as long as wide (Fig. 3C), L setae of VIII about 1/3 as long as width of segment (Fig. 3A, B). *A. reissi* n.sp.

Key to larvae

1. AR about 2.9–3.0 (Sæther 1971 fig. 12D)
..... *A. dentolatens* (Sæth.)
- AR about 1.6–2.1 2
2. Anal tubules ovoid, subequal to or longer than posterior parapods (Fig. 4E); antennal segment . 3 distinctly shorter than 2 (Fig. 4B) .. *A. reissi* n.sp.
- Anal tubules tapering to a blunt point, distinctly shorter than posterior parapods; antennal segment 3 subequal in length to 2
..... *A. sp. (? submontanus* (Edw.)

Acamptocladius submontanus (Edw.)

Figs. 1D, 2A–C

Type material: Lectotype ♂ here designated. Scotland: Inverness-shire (now Highland region), Ben Nevis, shore of Lochan Meall an t'Suidhe, 550 m.o.d., F. W. Edwards, B. M. 1931–305. Slide mounted in Berlese, ringed with Euparal. — *Paralectotype* -, here designated. Same date as lectotype. Slide mounted in Euparal. Both types in British Museum (Nat. Hist.).

Diagnosis: The imago is characterized by having a wing length of about 1.8 mm, barely extended costa, a male AR of about 1.3, about 10–11 dorsocentrals, anal

point triangular without apical point, phallapodeme longer than transverse sternapodeme, pronounced double inferior volsella, and female with about 2 long and 2 short setae on gonocoxite IX.

Male imago (n=1)

Total length 3.53 mm. Wing length 1.78 mm. Total length/wing length 1.98. Wing length/length of profemur 3.03.

Head — AR 1.27. Last flagellomere 491 μm long. Temporal setae 5, including 3 outer verticals, and 2 postorbitals. Clypeus with 26 setae. Tentorium 199 μm long, 34 μm wide. Stipes 191 μm long, 68 μm wide. Palp lengths (μm): 41, 68, 105, 94, 165.

Thorax — Anteprenotum with 4 setae. Dorsocentrals 11, prealars 3. Scutellum with 4 setae.

Wing — VR 1.21. Branchiolum with 1 seta, other veins bare. Extended part of costa 38 μm long.

Legs — Spur of front tibia 36 μm long; spurs of middle tibia 19 μm and 11 μm, of hind tibia 56 μm and 15 μm long. Width at apex of front tibia 41 μm, of middle tibia 45 μm, of hind tibia 49 μm. Comb of hind tibia 11 setae 26–41 μm long. Sensilla chaetica 3 at 0.14 to 0.22 of ta₁ of hind leg. Tarsal pseudospurs present at apices and along ta₁–ta₅ of all legs. Lengths (micrometers) and proportions of legs:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
p ₁	586	709	369	217	161	104	76	0.52	2.98	3.51	3.0
p ₂	614	671	326	194	142	95	76	0.49	3.19	3.94	5.4
p ₃	605	747	406	236	194	104	76	0.54	2.88	3.33	4.6

Hypopygium (Fig. 1D) — Ninth tergum with 8 setae on margins of anal point, laterosternite IX with 6 setae. Phallapodeme 81 μm long, with 2–3 apical spines. Transverse sternapodeme 64 μm long. Gonocoxite 223 μm long; with well developed double, inferior volsella. Gonostylus with 14 μm long apical spine. HR 2.19, HV 3.46.

Female imago (n=1)

Total length 2.49 mm.

Head — AR 0.78. Flagellomeres lengths (micrometers): 71, 36, 36, 41, 139. Temporal setae 4, including 2 outer verticals, and 2 post-orbitals. Clypeus with 12 setae. Tentorium 150 μm long, 24 μm wide. Stipes 200 μm long, 56 μm

wide. Ocelli 39 μm apart. Coronal suture complete. Palp lengths (micrometers): 39, 45, 75, not measurable, 139.

Thorax — Anteprenotum with 4 setae. Dorsocentrals 10, prealars 2. Scutellum with 4 setae.

Wing — VR 1.23. Branchiolum with 1 seta, R with 9 setae, R₁ with 2 setae, extended part of costa with 1 seta. Costal extension 49 μm long.

Legs — Spur of front tibia 30 μm long, spurs of middle tibia 26 μm and 19 μm, of hind tibia 45 μm and 15 μm long. Width at apex of front tibia 38 μm, of middle tibia 38 μm, of hind tibia 49 μm. Comb of hind tibia of 11 setae 19–41 μm long. Sensilla chaetica 3 at 0.19 to 0.30 of ta₁ of middle leg, 8 at 0.13 to 0.36 of ta₁ of hind leg. Lengths (micrometers) and proportions of legs:

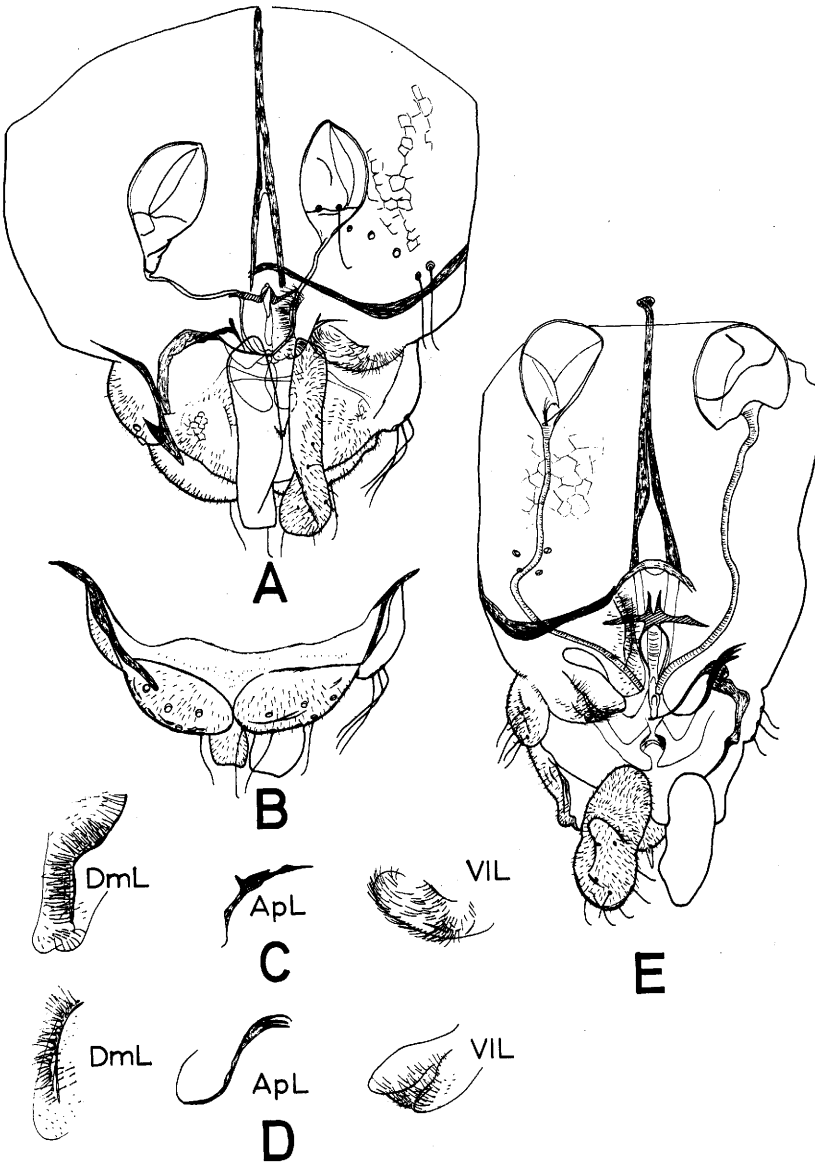


Fig. 2. *Acamptocladius* spp., female genitalia (DmL, dorsomesal lobe; ApL, apodeme lobe; VIL, ventrolateral lobe). — A-C. *A. submontanus* (Edw.). — A. Ventral view. — B. Dorsal view. — C. Lobes of gonapophyses VIII. — D-E. *A. reissi* n.sp. — D. Lobes of gonapophyses VIII. — E. Ventral view.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
P ₁	463	520	265	151	109	66	57	0.51	3.26	3.71	2.4
P ₂	501	539	246	156	104	66	57	0.46	3.32	4.23	2.4
P ₃	482	633	331	189	142	66	57	0.52	3.20	3.37	2.9

Abdomen — Number of setae on tergites II–VIII as: 9, 12, 11, 9, 8, 8, 11. Number of setae on sternites IV–VIII as: 5, 4, 6, 5, 14.

Genitalia (Fig. 2A–C) — Gonocoxite with 4

long and 2 shorter setae. Tergite IX with 14 setae. Cercus 139 μm long. Seminal capsule 94 μm long, including 26 μm long neck; 56 μm wide. Notum 128 long.

Pupa

Not known.

Larva.

Not known with certainty (see p. 31).

Distribution

Acamptocladius submontanus (Edw.) is known from the type-locality in Scotland and from Sweden (Lappland & Jämtland) (Brundin 1956: 163).

Acamptocladius reissi n.sp.

Figs. 1A-C, 2D-E, 3, 4.

Holotype ♂, West Germany: Oberbayern, Murnauer Moos, Torfstich 9, 6.viii.1979, leg. F. Reiss. Slide mounted. (Zool. Staatssamml., Munich, West Germany). — *Paratypes*. Same data as holotype. 1 ♂, 1 ♀ dissected from pupa, 5 pupal exuviae, 15 larvae (Zool. Staatssamml., Munich); 1 pharate ♂, 5 pupal exuviae, 7 larvae (Mus. Zool., Bergen, Norway); 1 pharate ♂ pupa, 5 pupal exuviae, 4 larvae (British Museum (Nat. Hist.), London, B. M. 1979-458); 6 pupal exuviae, 6 larvae (Can. Nat. Coll., Ottawa).

Diagnosis: The imago is characterized by having a wing length of about 1.0-1.2 mm, costa not extended, a male AR of about 0.8-0.9, about 4-6 dorsocentrals, anal point triangular without apical point, phallopodeme about same length as transverse sternapodeme,

weakly developed double inferior volsella, and female with about 10 subequal setae on gonocoxite IX.

Male imago (n=2 except where stated in parentheses)

Total length 2.05-2.59, 2.28 mm (4) long. Wing length 1.01-1.18 mm. Total length/wing length 1.85-2.02. Wing length/length of profemur 2.84-2.97.

Head — AR 0.82-0.89, 0.86 (3). Last flagellomere 323-345, 331 μm (3) long. Temporal setae 3 (3), including 2 (3) outer verticals, and 1 (3) postorbital. Clypeus with 12-14 setae. Tentorium 116-128 μm long, 19 μm (1) wide. Palp lengths (μm, n=3): 23-26, 24; 30-39, 35; 47-64, 55; 56-64, 60; 81-94, 86.

Thorax (Fig. 1B) — Anteprenotum with 5 (1) setae. Dorsocentrals 4-6, 5 (4); prealars 3. Scutellum with 2 setae.

Wing (Fig. 1A) — VR 1.26 (1). Brachiolium with 1 seta, other veins bare. Costa apparently not extended.

Legs — Spur of front tibia 23-24 μm long; spurs of middle tibia 17-23 μm and 11-15 μm, of hind tibia 41 μm and 17-19 μm. Width at apex of front tibia 26 μm, of middle tibia 26-28 μm, of hind tibia 34 μm. Sensilla chaetica 3-4, 4 (3) at 0.11-0.20 to 0.29-0.47 of ta₁ of hind leg. Tarsal pseudospurs present on ta₁-ta₄ of all legs. Lengths (μm) and proportions of legs:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
p ₁	340-416	425-510	227-274	132-161	99-118	61-76	57	0.53-0.54	2.84-2.94	3.30	2.6-2.7
p ₂	318-435	387-463	184-227	113-132	76-99	52-66	52-57	0.48-0.49	3.17-3.24	3.96-4.15	2.4-2.7
p ₃	369-425	435-524	228-236	128-156	109-132	57-76	57	0.54-0.55	2.94-2.97	3.20-3.40	3.8-4.6

Hypopygium (Fig. 1C) — Ninth tergum with 8-9, 9 (4) setae on margins of anal point; laterosternite IX with 5-6, 6 (4) setae. Phallopodeme 66-76, 72 μm (4) long. Transverse sternapodeme 62-76, 67 μm (4) long. Gonocoxite 161-180, 168 μm (4) long; with weak, double inferior volsella. Gonostylus with 12-13, 12 μm (3) long apical spine. HR 2.00-2.27, 2.12 (4); HV 2.63-3.01, 2.87 (4).

Female imago (n=1, mature pupa)

Total length about 1.9 mm.

Head — Lengths of 3 ultimate flagellomeres (μm): 30, 34, 105. Last palpal segment 79 μm long.

Thorax — Anteprenotum with 3 setae. Prealars 2. Scutellum with 2 setae.

Legs — Sensilla chaetica 2 on ta₁ of middle leg, present on ta₁ of hind leg.

Genitalia (Fig. 2A-C) — Gonocoxite with about 10 subequal setae. Cercus 83 μm long. Seminal capsule 60 μm long, including 19 μm long neck; 49 μm wide. Notum 98 μm long.

Other details not observable.

Pupa (n=10)

Length 2.2-3.1, 2.6 mm. Cephalothorax and abdominal segments evenly, but weakly, subfuscous.

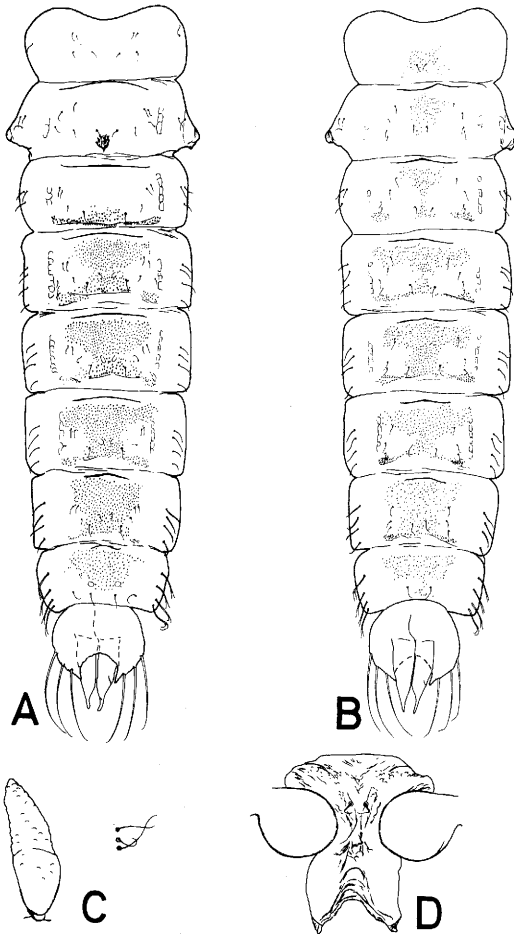


Fig. 3. *Acamptocladus reissi* n.sp., pupa. — A. Tergites. — B. Sternites. — C. Thoracic horn with precorneal setae. — D. Frontal apotome.

Cephalothorax — Thoracic horn (Fig. 3C) 105–143, 120 μm long; 31–42, 36 μm wide, subfuscous, with scattered weak spines. Anterior precorneal seta 31–63 μm long, median 18–47 μm long, posterior 13–16 μm long. Frontal apotome (Fig. 3D) with 18–34, 28 μm long frontal setae on small tubercles.

Abdomen (Fig. 3A, B) — Shagreen and chaetotaxy as in figure. Anal lobe 169–241, 210 μm long; anal macrosetae 178–294, 213 μm long. Pedes spurii A present on sternites IV–VII, strong pedes spurii B present on segment II.

Length of longest L seta on segment VIII, 132–159, 142 μm .

Fourth instar larva (n=10)

Body length 2.8–3.4, 3.0 mm; head capsule length 265–344, 295 μm . Body colour (after alcohol preservation) green with intersegmental areas showing purple or blue pigmentation; head capsule pale brown. Eye spot single.

Head — Antenna (Fig. 4B) 5 segmented, the basal 2 segments brown, the apical 3 weakly sclerotized and difficult to differentiate; lengths (in μm): 80–95, 90; 14–21, 17.5; 8–13, 10.1; 6–9, 8.0; 5–6, 5.8. AR 1.68–1.90, 1.78. Antennal blade 35–53, 44 μm long. Ring organ 53–66, 61 μm from base of antenna. Labrum as in Fig. 4D. Premandible with 3 apical, 1 inner and 1 outer teeth; 29–34, 33 μm long. Mandible (Fig. 4C) 75–92, 84 μm long. Seta subdentalis 13–18, 16 μm long. Maxilla as in Fig. 4F. Mentum (Fig. 4A) 106–114, 111 μm wide between posterior margins of dorsomentum. Ventromentum overlapping dorsomentum and bearing 3 small median teeth. Dorsomentum with 13–18 small teeth on each lateral plate.

Abdomen (Fig. 4E) — Anterior parapods with simple, pale brown claws. Procercus darkened; 53–64, 58 μm high, 21–48, 36 μm wide, 6 or 7 anal setae of length 275–399, 343 μm , and 2 weak lateral setae. Supraanal setae strong, 164–249, 208 long. Anal tubules ovoid, 199–239, 219 μm long; subequal to, or longer than posterior parapods. Posterior parapods 132–222, 181 μm long; bearing simple, brown claws.

Distribution

Acamptocladus reissi is known only from the type locality in southern Germany.

Acamptocladus sp. indet. (? *submontanus* (Edw.))

Fourth instar larva (n=4) (not figured)

Body length 2.4–3.6, 2.9 mm, head capsule length 315–346, 335 μm . Body colour (slide mounted, uncleared) green without purple pigment, head capsule pale brown, eye spot single.

Head — Basal antennal 2 segments brown, apical 3 weakly sclerotized and difficult to differentiate, lengths (in μm) 80–100, 93; 14–21,

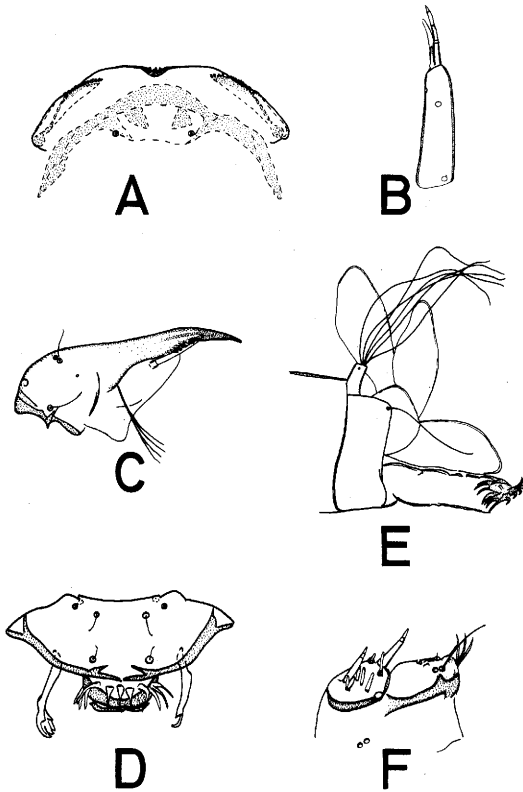


Fig. 4. *Acamptocladius reissi* n.sp., larva. — A. Mentum. — B. Antenna. — C. Mandible. — D. Labrum. — E. Posterior end. — F. Maxilla.

17.0; 15–21, 17.7; 8–14, 10.5; 5–6, 5.2. AR 1.60–2.10, 186. Antennal blade 42–53, 48 μ m long. Ring organ 53–72, 61 μ m from base of antenna. Labrum as in *A. reissi*. Premandible 29–32, 31 μ m long. Mandible 87–95, 92 μ m long. Seta subdentalis 16–22, 19 long. Maxilla as in *A. reissi*. Mentum 116–132, 123 μ m wide at posterior margins of dorsomentum. Dorsomentum with 12–14 small teeth on each lateral plate.

Abdomen — Anterior parapods with simple pale brown claws. Procercus darkened; 53–58, 57 μ m high; 26–42, 35 μ m wide; bearing 6 or 7 anal setae of maximum length 380–410, 394 μ m, and 2 weak lateral setae. Strong supraanal setae; 226–254, 245 μ m long. Anal tubules tapering to a blunt point 98–122, 105 μ m long, shorter than posterior parapods. Posterior parapods 164–216, 182 μ m long, bearing simple brown claws. Body setae simple and short.

Material examined

England: Dorset, nr Furzebrook, pools at N.G.R. 30/926 836 and 30/935 833 (Blue Pool) iii/iv. 1979, leg. L. Barnes (4 larvae). (British Museum (Natural History))

Comments

These unreared larvae differ from those of *A. reissi* in the short, tapering anal tubules, the greater mandibular length and the greater combined lengths of antennal segments 3–5. Although the identity is uncertain these may be the larvae of *A. submontanus*.

Ecology of Acamptocladius spp.

Adults of *A. submontanus* have been collected from the shores of upland moorland lakes and from Sphagnum at the margin of a polyhumic lake (Edwards 1932; Brundin 1956). Larvae of *A. dentolatus* were collected from colonies of the blue-green alga *Aphanocapsa* sp. in a Canadian lake (Sæther 1971). *A. reissi* has been reared from larvae found in a peat pool and larval gut contents showed many peat particles. Undetermined *Acamptocladius* larvae have been taken from four Dorset pools. All sites are ball clay pools on a sandy bed, with acidity of pH 4.0–6.3 associated with high SO₄ levels. The water is clear with no phenolic colouration. *Acamptocladius* larvae form up to 17% of the Chironomidae in vegetation (including *Sphagnum cuspidatum*) samples (Barnes pers. comm. 1980).

Presumably first instar larvae of a species presumed to belong to a genus near *Acamptocladius* (as *Phycoidella*) or a redefined *Acamptocladius* have been found between the demibranchs of Unionidae from New Brunswick, Canada (Gordon, Swan & Paterson 1978) and Louisiana, USA (Roback 1979). Although occurring in high numbers later instars have been impossible to find and the larvae must be leaving the bivalve to pass further instars elsewhere.

Acknowledgements: The authors wish to thank Dr. F. Reiss, Zoologische Staatssammlung, Munich, for permission to describe *A. reissi* and permission to retain some material in their collection. We are also grateful to Ms. Laurie Barnes, University of Exeter for permission to

include descriptions of specimens collected by her and for information on the locality ahead of completion of her PhD thesis. We wish to thank Mrs. Unni Sæther for the illustrations and for typing the manuscript.

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Manuscript received January 1981.