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Vivacricotopus, a new genus of Orthocladiinae from Norway

(Diptera, Chironomidae)

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Abstract

A new genus and species of Orthocladiinae, *Vivacricotopus ablusus*, is described as male imago and pupa. The imago has hairy eyes; well developed pulvilli; coarse punctation of microtrichia on wing membrane; two median acrostichals; long, bare anal point; and a virga; which is a unique combination. The pupa has thoracic horn and anal fringe, and a unique arrangement of simple, branched and broadly filamentous L-seta. The genus apparently occupies a plesiomorphic position within the *Rheocricotopus* group of genera.

Introduction

During the investigations of the area around the Jostedal Glacier in connection with the future building of hydroelectric power stations and dams, some peculiar pupal exuviae were found in the partly glacier fed river Jostedøla. Closer examination showed that also a male belonging to an unknown genus with the same affinities was present in the same sample. The new genus and species is described below.

Methods and Morphology

The mounting procedure used is outlined by SÆTHER (1969: 1). The general terminology follows SÆTHER (1980) with the exception that the vannal fold is called the postcubitus, and the apical spine of the gonostylus the megaseta. The measurements are given as ranges followed by a mean, followed by the number measured in parenthesis (n).

Vivacricotopus gen. nov.

Type species: *Vivacricotopus ablusus* spec. nov. by present designation.

Diagnostic characters

The combination of hairy eyes; large pulvilli; two central acrostichals; relatively coarse punctation on wing membrane; nearly straight Cu_1; long, narrow and bare anal point; and presence of virga will separate the male imago from all other orthoclads. The absence of antepronotals, the low number of dorsocentrals and scutellars, and the absence of a crista dorsalis also are characteristic.

The pupa has a unique pattern of shape of L-setae with L_4 split in 2–6 branches on segments III–VI; L_3 on VI filamentous; 4 filamentous L-setae on VII and 5 filamentous L-setae on VIII, with the two posterior on each segment very broad. Also the caudolateral extension of segments VII and VIII and the very strong anal macrosetae are unique features.

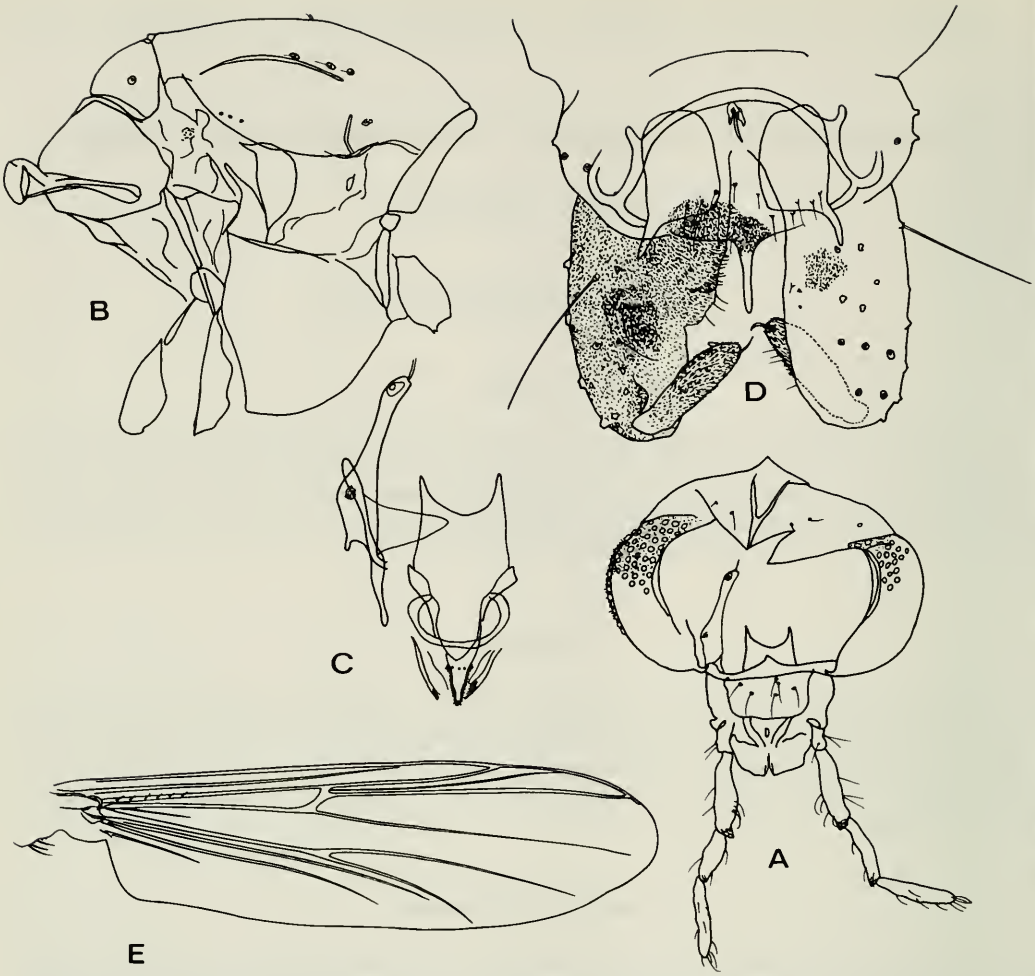

Fig. 1. *Vivacricotopus ablusus* gen. nov., spec. nov., male imago. – A. Head. – B. Thorax. – C. Cibarial pump, tentorium, and stipes. – D. Hypopygium, dorsal aspect to the left, ventral aspect to the right. – E. Wing.

Etymology: From the type locality Viva, near the river Jostedøla, and Cricotopus, a common genus name and ending among Orthocladiinae meaning ringed legs.

Description

Male imago

Medium sized species, wing length about 2 mm. Coloration brown with ringed tibia and pale tarsi.

Eyes hairy with short, wedge-shaped dorsomedial extension.

Antenna with 13 flagellomeres; antennal groove beginning at flagellomere 3; flagellomeres 2, 3, 4 and 13 with thin sensilla chaetica; AR lower than 1.0. Temporals divided into very short inner verticals, longer outer verticals and longest postorbitals.

Clypeus as wide as pedicel. Anterior margin of cibarial pump deeply concave. Five palpal segments, third and fifth subequal in length, third palpal segment with weak apical projection and apparently without apical sensilla clavata, fourth segment with indication of similar apical projection.

Antepronotum well developed; median lobes not medially narrowed, gaping, separated in front of scutal projection; no lateral setae. Two acrostichals in centre of scutum, dorsocentrals and prealars few, supraalars absent. Scutellum with few setae.

Wing membrane with relatively coarse punctation of microtrichia, free of setae. Anal lobe well developed, slightly projecting. Costa slightly extended; R_{2+3} running in the middle between R_1 and R_{4+5}, ending at 1/3 the distance between end of R_1 and R_{4+5}; R_{4+5} ends clearly distal to end of M_{3+4}; FCu lies distally of RM, Cu_1 nearly straight, postcubitus ends far distally of FCu, anal vein ends slightly distally of FCu. R with a few setae, R_1 bare, R_{4+5} with seta(e) at apex. Sensilla campaniformia in normal numbers (about 12 at base, 3 below seta and 13 at apex of brachiolum, 2 on subcosta, 1 on FR, and 1 at base of R_1). Squama with few setae in fringe.

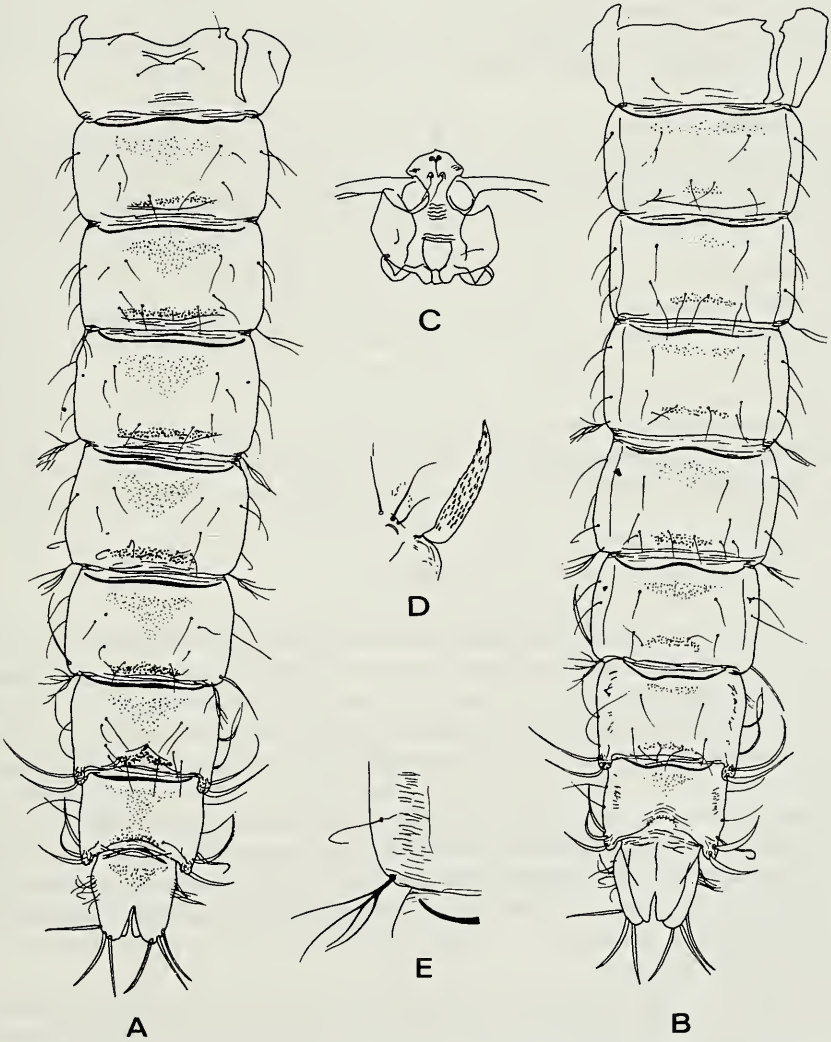

Fig. 2 *Vivacricotopus ablusus* gen. nov., spec. nov., pupa. – A. Tergites. – B. Sternites. – C. Frontal apotome and ocular field. – D. Thoracic horn and precorneal setae. – E. Caudolateral corner of segment V.

Tibial spurs and hind tibial comb normal. Tibia with pale rings. Pseudospurs absent. Sensilla chaetica present in basal 1/2 of tarsomere 1 of hind leg. Pulvilli well developed, about 3/4 as long as claws.

Tergites with setae in 2–3 rows of median setae and 2–3 rows of lateral and posterior setae, or more scattered. Anal point long, free of microtrichia, with several setae at base on tergite IX. Phallapodeme normal, transverse sternapodeme curved with well developed oral projections. Virga consisting of cluster of 2–3 spines. Gonocoxite with low inferior volsella and no superior volsella. Gonostylus evenly wide for most of its length, with well developed megaseta, without crista dorsalis.

Pupa

Median sized pupae about 4 mm long. Frontal seta moderately long, on frontal apotome. Frontal apotome with weak to moderately developed warts, slightly wrinkled. Antennal sheath at most with 2–4 pearls above pedicel. Ocular field with 2 postorbitals. Antepronotum with 2 median and 2 lateral setae, all well developed. Thoracic horn cylindrical, tapering towards apex, covered with not very dense spinules. Two anterior setae subequal in length and about twice as long as posterior seta. Second dorsocentral longer than the others, anterior 3 dorsocentrals grouped or third equidistant from second and fourth. Thorax slightly wrinkled, wing sheath nearly smooth. Sheath of coxae with 1 minute seta each.

Tergite I without shagreen, II–IX with weak anterior and narrow median shagreen grading over into caudal spines on II–VIII. Sternites I and IX without shagreen; II–VIII with weak anterior group shagreen, more extensive on posterior sternites and grading over into weak caudal spines. Tergites II–VIII with about 4 rows of weak caudal spines, weaker on VIII. Tergite II without caudal hooklets. Caudal margin of sternites II–VII with 3–4 rows of similar, but weaker caudal spines, very weak or reduced to a few spinules on II. No spinules on conjunctives. Pedes spurii A and B absent. Segment I with 4 D setae, 1 L seta and 2 V setae. Segments II–VII with 5 D setae, 4 L setae, 4 V setae, and O setae in pattern B (Coffman 1979, 2 dorsal and 1 ventral pair of O setae). Segment VIII with 1 D seta, 5 L setae and 1 V seta. L_4 on segments III–VI split into 2–6 branches, L_3 on segment VI and all L setae on VII and VIII filamentous, L_4 and L_5 very broad on segments VII and VIII. Segments VII and VIII with conspicuous, rounded, darkened caudolateral projections. Apophyses well delineated. Anal lobe with sparse fringe of lamelliform setae and 3 very strong macrosetae about 2/3 as long as the lobe with lateral macroseta slightly weaker then the median ones. Male genital sac not reaching apex of anal lobe.

Systematics

Especially the pupa but also the male imago of the new genus shows an unusual combination of characters. The hairy eyes, the large pulvilli, the median acrostichals, and the pupal horn, spine pattern and anal lobe fringe apparently place the genus in the *Rheocricotopus* Thienemann & Harnisch group of genere (Brundin 1956: 118; Sæther 1977 fig. 36, 1980b: 131, 1981: 224, 1983a fig. 5, 1985: 63). However, *Rheocricotopus, Paracricotopus* Thienemann & Harnisch, *Mesocricotopus* Brundin, *Nanocladius* Kieffer, *Doncricotopus* Sæther and *Psectrocladius* Kieffer all lacks a virga and the 5 first have a platelike superior volsella not found in *Vivacricotopus*. The male imago also resembles *Sublettiella* Sæther (1983b) in the absence of lateral antepronotals, the low thoracic chaetotaxy, the wing punctation and venation except for the somewhat less curved Cu_1, the hairy eyes, the presence of pulvilli, the virga, and the low inferior volsella. *Vivacricotopus*, however, differ from *Sublettiella* for instance in the absence of pseudospurs, the presence of sensilla chaetica on hind leg, the presence of 2 median acrostichals and the long bare anal point.

The pupa of *Vivacricotopus* will key to *Unniella* Sæther in Coffman et al. (1986). However, it does show few similarities with that genus. Among genera with anal lobe fringe and thoracic horn no other genus is at the same time lacking pedes spurii A and B and caudal hooklets on tergite II. Caudal hooklets are absent only in *Parametriocnemus* Goetghebuer and *Paratrissocladius* Zavřel, pedes spurii A

may be absent in some *Zalutschia* Lipina, while *Paracricotopus, Nanocladius* subgen. *Plecopteracoluthus* Steffan, *Zalutschia,* many *Psectrocladius,* some *Rheocricotopus,* and some *Heterotanytarsus* Spärck lack pedes spurii B. The shape of the L setae with L_4 branched and the posterior L setae on segments VII and VIII very broad is unique. The B pattern of O setae is not very common in the Orthocladiinae, but is the pattern found in *Psectrocladius, Rheocricotopus* and *Unniella.*

Although the genus most likely belong near or in the *Rheocricotopus* group it probably occupies a plesiomorphic position relative to the other genera of the group. It also show similarities with *Sublettiella* and the genera near *Bryophaenocladius* Thienemann and partly with *Unniella.* As most likely for the last genus in which the pupa appear to belong to the *Rheocricotopus* group, the larva to the *Parakiefferiella* group and the male imago to the *Mesosmittia* group, the similarities of *Vivacricotopus* with the *Rheocricotopus* group may be based on plesiomorphies. In that case a placement near *Sublettiella* is the most likely one.

Vivacricotopus ablusus spec. nov.
(Figs 1, 2)

Type locality: Norway, Sogn & Fjordane, Luster, Jostedøla river, Viva.

Type material: Holotype, male, Viva, Jostedøla river, Luster, Sogn & Fjordane, Norway, 23.VII.1986. Leg.: Ø. A. Schnell and A. Fjellheim (ZMBN No. 107). Paratypes, 6 pupal exuviae, same data as holotype. Types in coll. Mus. Zool., Ent. coll. Univ. of Bergen (ZMBN).

Diagnosis: See diagnosis of the new genus.

Etymology: From Latin *ablusus,* meaning different, unlike, referring both to the unique combination of characters and to the very different types of L-setae on the pupae.

Description

Male Imago

Total length 3.10 mm. Wing length 1.93 mm. Total length/wing length 1.61. Wing length/length of profemur 2.91. Coloration brown, halterers pale brown, tarsi and middle 2/3 of tibiae pale.

Head (Figs 1 A + 1 C). AR 0.72. Ultimate flagellomere 364 μm long. Temporal setae 7, including 3 inner verticals, 2 outer verticals, and 2 postorbitals. Clypeus with 7 setae. Cibarial pump, tentorium and stipes as in Fig. 1 C. Tentorium 150 μm long, 32 μm wide. Stipes 139 μm long, 56 μm wide. Palp segments length (micrometers): 30, 53, 120, 88, 116. Third palpal segment with weak apical projection, apparently no sensilla clavata; fourth segment with similar projection.

Thorax (Fig. 1 B). Antepronotum bare. Humeral pit weak, normal. Dorsocentrals 3, acrostichals 2, prealars 3. Scutellum with 2 setae.

Wing (Fig. 1 E). Wing membrane with punctation of microtrichia visible at 150×. C extension 45 μm long. R with 6 setae, R_1 bare, R_{4+5} with 1 apical seta, C extension with 1 non-marginal seta. Squama with 7 setae.

Legs. Spur of front tibia 49 μm long, spurs of middle tibia 24 μm and 23 μm long, of hind tibia 49 μm and 19 μm long. Width at apex of front tibia 38 μm, of middle tibia 36 μm, of hind tibia 41 μm. Comb of hind tibia with 12 setae, 19–49 μm long. Sensilla chaetica 8 at 0.19–0.49 on ta_1 of hind leg. Lengths (micrometers) and proportions of legs:

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
P_1	662	775	454	326	217	132	85	0.59	2.48	3.17	2.6
P_2	695	709	312	189	142	99	80	0.44	3.37	4.52	2.6
P_3	709	832	416	241	189	104	76	0.50	3.21	3.70	3.7

Hypopygium (Fig. 1D). Anal point 41 μm long, with 14 setae at base on tergite IX; laterosternite IX with 5 setae. Phallapodeme 79 μm long, transverse sternapodeme 109 μm long. Virga 24 μm long. Gonocoxite 193 μm long, inferior volsella weak. Gonostylus 77 μm long, megaseta 19 μm long. HR 2.51, HV 4.03.

Pupa (n = 6, except when otherwise stated).

Total length 3.70–4.03, 3.88 mm. Exuviae pale brownish grey.

Cephalothorax. Frontal setae on frontal apotome (Fig. 2C), 75–116, 99 μm long. Postorbitals 75–116, 95 μm and 56–94, 70 μm long. Median antepronotals both 75–113, 96 μm long. Thoracic horn (Fig. 2D) 188–221, 209 μm long; 36–43, 40 μm wide; 1.06–1.19, 1.14 times as long as anal macrosetae. Anterior precorneal seta 79–131, 94 μm long; 4–17, 10 μm in front of median seta. Median precorneal seta 105–135, 126 μm long; 4–15, 8 μm in front of posterior seta. Posterior precorneal seta 45–86, 61 μm long; 38–45, 41 μm in front of horn. Second dorsocentral (Dc_2) 68–105, 82 μm long; other dorsocentrals 45–64, 55 μm long. Distance between Dc_1 and Dc_2 15–23, 17 μm; between Dc_2 and Dc_3 15–38, 24 μm; between Dc_3 and Dc_4 39–68, 50 μm. Setae on coxal sheaths 2–11, 6 μm long on front leg; 11–26, 20 μm long in middle leg; 23–30, 26 μm long on hind leg.

Abdomen (Fig. 2A, B). Shagreenation, caudal spines and chaetotaxy as in generic diagnosis. Maximal length (micrometers) of caudal spines on TII–VIII as: 6–9, 7; 8–11, 10; 11–15, 13; 15–17, 16; 17–23, 21; 13–21, 19; 4–8, 6. L_4 on segment III split into 2 branches; on IV and V in 3–4, 4 branches (Fig. 2E); on VI in 3–6, 4 branches. Anal lobe 263–278, 268 μm long; with 8–12, 10 setae in fringe; macrosetae 176–193, 183 μm long. Genital sac of male ending 11–23, 17 μm (5) short of apex of anal lobe; of female ending 98 μm (1) short of anal lobe.

Ecology and Distribution.

The pupal exuviae and the drowned male imago were collected in an eddy where the river Jostedøla runs into a small lake at Viva (alt. 890 m a. s. l., UTM ref. 32V MP 474184) in the uppermost part of the valley Jostedal. The type locality is situated above the timber line only a few kilometers east of the Jostedal Glacier, which is the largest glacier on mainland Europe, covering an area of approximately 486 sq. km.

The water temperature varies between near 0°C during the period of ice cover; from middle of the november to end of may; to 11.7°C the day the specimens were sampled, the highest measured at Viva in the years −85 and −86. The pH varies between 5.0 to 6.0, the conductivity (μS/cm) between 5.7 to 9.5 during −85 and −86. (A. Fjellheim pers. comm.). The river is heavily loaded with silt from the nearby glacier.

Some other chironomids found at the type locality were: *Diamesa lindrothi* Goetghebuer, *Pseudodiamesa* cf. *nivosa* (Goetghebuer), *Eukiefferiella minor* (Edwards), several new species of *Limnophyes* SÆTHER 1988, *Mesocricotopus thienemanni* (Goetghebuer), *Orthocladius (Eudactylocladius) grampianus* (Edwards), *Orthocladius (Euorthocladius) frigidus* (Zetterstedt), *Orthocladius (Euorthocladius) rivicola* Kieffer, *Orthocladius (Euorthocladius) thienemanni* Kieffer, *Psectrocladius (Allopsectrocladius)* sp., *Rheocricotopus (Rheocricotopus) effusus* (Walker), *Rheocricotopus (Rheocricotopus) reduncus* Sæther & Schnell 1988, *Micropsectra recurvata* (Goetghebuer).

The new species is known only from the type locality.

Acknowledgements

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