Vivacricotopus, a new genus of Orthocladiinae from Norway

(Diptera, Chironomidae)

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Abstract

A new genus and species of Orthocladiinae, *Vivacricotopus aculus*, is described as male imago and pupa. The imago has hairy eyes; well developed pulvilli; coarse punctuation of microtrichia on wing membrane; two median acrostitals; 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-setae. 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 Jostedol. 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 aculus* spec. nov. by present designation.

Diagnostic characters

The combination of hairy eyes; large pulvilli; two central acrostitals; relatively coarse punctuation on wing membrane; nearly straight Cu1; 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 L4 split in 2–6 branches on segments III–VI; L3 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 abiusus* 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 subequa 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 $\frac{1}{3}$ 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 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 brachiolium, 2 on subcosta, 1 on FR, and 1 at base of $R_1$). Squama with few setae in fringe.

Fig. 2  *Vivacicatopus ablussus* 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 dorsocentrales 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. L₄ on segments III–VI split into 2–6 branches, L₃ on segment VI and all L setae on VII and VIII filamentous, L₄ and L₅ 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 than 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 genera (BRUNDIN 1956: 118; SÄTHER 1977 fig. 36, 1980b: 131, 1981: 224, 1983a fig. 5, 1985: 63). However, Rheocricotopus, Pararhacicorpus Thienemann & Harnisch, Mesocricotopus Brundin, Nanocladius Kieffer, Donrhcricotopus 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 punctuation and venation except for the somewhat less curved Cu₁, 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 Goetzhebuer and Paratrissocladius Zavrel, pedes spurii A
may be absent in some Zalutschia Lipina, while Paracricotopus, Nanocladius subgen. Plecopteracolothus Steffan, Zalutschia, many Psectrocladius, some Rheocricotopus, and some Heterotanytarsus Späreck lack pedes spurii B. The shape of the L setae with L₁ 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 Sublettia and the genera near Bryophygacladius Thiemann 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 Para-kiefferiella 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 Sublettia is the most likely one.

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

Type locality: Norway, Sogn & Fjordane, Luster, Jostedola river, Viva.  
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 1/3 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. Dorsocephalics 3, acrostichals 2, prealars 3. Scutellum with 2 setae.  
Wing (Fig. 1 E). Wing membrane with punctuation of microtrichia visible at 150×. C extension 45 μm long. R with 6 setae, R₁ bare, R₄+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 ta₁ of hind leg. Lengths (micrometers) and proportions of legs:

|     | re | ti | ta₁ | ta₂ | ta₃ | ta₄ | ta₅ | LR  | BV  | SV  | BR  |
|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| P₁  | 662| 775| 454 | 326 | 217 | 132 | 85  | 0.59| 2.48| 3.17| 2.6 |
| P₂  | 695| 709| 312 | 189 | 142 | 99  | 80  | 0.44| 3.37| 4.52| 2.6 |
| P₃  | 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 (DC2) 68–105, 82 μm long; other dorsocentrales 45–64, 55 μm long. Distance between DC1 and DC2 15–23, 17 μm; between DC2 and DC3 15–38, 24 μm; between DC3 and DC4 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. 2 A, B). Shagreenation, caudal spines and chaetotaxy as in generic diagnosis. Maximal length (micrometers) of caudal spines on TI–VIII as: 6–9, 7; 8–11, 10; 11–15, 13; 15–17, 16; 17–23, 21; 13–21, 19; 4–8, 6. L4 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 Jostedola 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 indrothi Goetghbeuer, Pseudodiamesa cf. nivosa (Goetghbeuer), Eukiefferiella minor (Edwards), several new species of Limnophyes Sæther 1988, Mesocricotopus thienemanni (Goetghbeuer), Orthocladius (Eudactylocladus) grampianus (Edwards), Orthocladius (Euorthocladius) frigidus (Zetterstedt), Orthocladius (Euorthocladius) riviola Kieffer, Orthocladius (Euorthocladius) thienemanni Kieffer, Psectrocladius (Allopsectrocladius) sp., Rheocricotopus (Rheocricotopus) effimus (Walker), Rheocricotopus (Rheocricotopus) reduncae Sæther & Schnell 1988, Micropsectra recravata (Goetghbeuer).

The new species is known only from the type locality.

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Literature


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