

Two new species of the *Rheocricotopus* (R.) *effusus* group

(Diptera, Chironomidae)

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Abstract

Two new species belonging to the *Rheocricotopus* (*Rheocricotopus*) *effusus* group are described; *R. (R.) reduncus* spec. nov. as male imago and pupa; *R. (R.) unidentatus* spec. nov. as male and female imago, pupa and larva. *R. (R.) reduncus* is intermediate between *R. (R.) pauciseta* Sæther and the rest of the *effusus* group. *R. (R.) unidentatus* is intermediate between *R. (R.) effusoides* Sæther and *R. (R.) effusus* (Walker).

Introduction

The genus *Rheocricotopus* Thienemann & Harnish, 1932, recently was revised (SÆTHER 1985). It was divided into two subgenera, *Psilocricotopus* Sæther and *Rheocricotopus* s. str. Of the three species groups in *Rheocricotopus* s. str. only the *effusus* group clearly was shown monophyletic.

Recently Michael Bolton from the Ohio EPA in Columbus, Ohio, sent the senior author some reared specimens collected in a spring stream in Ohio. These specimens showed a puzzling combination of characters. The pupa appeared to belong to *R. (R.) effusoides* SÆTHER, while the adults apparently belonged in *R. (R.) effusus* (Walker). The associated larva, however, had a single median mental tooth and thus resembled *R. (R.) tuberculatus* Caldwell. A closer examination showed that also the pupa and the adult could be separated from the closest related species although perhaps only in insignificant details. The species is described below as *R. (R.) unidentatus* spec. nov.

The junior author during investigations around the Jostedal Glacier, found some males and pupal exuviae of a species of the *effusus* group in the partly glacier fed river Jostedøla. The males appeared quite similar to *R. (R.) pauciseta* Sæther except for the quite distinct superior volsella, while the pupa showed similarities to *R. (R.) tuberculatus* with L-setae on segments V–VIII as 3:3:3:4–5. The species is described below as *R. (R.) reduncus* spec. nov.

Methods and morphology

Morphological nomenclature follows SÆTHER (1980), with the exception that the apical spine of the gonostylus is termed the megaseta. The measurements are given as ranges followed by a mean when four or more measurements are made, followed by the number measured in parentheses (n). In the figures of the male hypopygia the dorsal aspect is shown to the left, the ventral aspect and the apodemes to the right.

The type material is kept at the Museum of Zoology, University of Bergen, Norway (ZMB).

Rheocricotopus (Rheocricotopus) reduncus spec. nov.
(Figs. 1; 2A, C, E)

Type locality: Jostedøla River, Luster, Sogn & Fjordane, Norway.

Type material: Holotype, male, Jostedøla River at inlet to small lake, Luster, Sogn & Fjordane, Norway, 23/7/86, A. Fjellheim and Ø. A. Schnell (ZMB No. 116). Paratypes: 3 males, 1 male pupa, 7 pupal exuviae, as holotype.

Diagnostic characters

The strongly curved, narrow-based, tooth-like projection of the superior volsella combined with the small and indistinct humeral pit will separate the male from other members of the genus. The median spine patches on the tergites grading over in shagreen, presence of pedes spurii B on segment II, combined with L setae of segments V–VIII as 3:3:3:4–5 will separate the pupa from other known pupae of the genus.

Etymology: From Latin, *reduncus*, curved (hooked) backwards, referring to the shape of the superior volsella.

Description

Male imago (n = 4, except when otherwise stated).

Total length 2.69–2.90, 2.80 mm. Wing length 1.58–1.73, 1.94 mm. Total length/wing length 1.41–1.47, 1.45. Wing length/length of profemur 3.01–3.11, 3.06. Coloration dark brown.

Head. AR 0.83–0.90, 0.87. Ultimate flagellomere 402–442, 426 μm long. Temporal setae 5–7, 6; including 0–1, 1 inner vertical; 0–2, 1 outer vertical; and 3–5, 4 postorbitals. Clypeus with 10–20, 16 setae. Cibarial pump, tentorium and stipes as in Fig. 1A. Tentorium 149–155, 151 μm long; 29–31, 29 μm wide. Stipes 149–161, 154 μm long; 53–64, 60 μm (3) wide. Palp segments length (micrometers): 23–29, 27; 59–64, 62; 88–104, 99; 94–105, 100; 155–177, 167. Third palpal segment with 1–3, 2 sensilla clavata.

Thorax (Fig. 1B). Anteprepronotum with 6–9, 8(5) lateral setae. Humeral pit small and indistinct. Dorsocentrals 7–9, 8(5); acrostichals 7–9, 8, all situated in front except for in one specimen with an additional median seta, longest acrostichals 44–47, 46 μm (5) long; prealars 2–3, 3(5). Scutellum with 6–10, 8(5) setae.

Wing (Fig. 1C). VR 1.10–1.16, 1.13. Wing membrane with punctation visible at 250 \times . Anal lobe reduced. C extension 35–59, 52 μm long. Brachiolum with 1–2, 1 seta; R with 6–8, 7; R₁ with 0–1, 0; R₄₊₅ with 0–1, 1; C extension with 0–3, 1 non-marginal setae. Squama with 2–3, 3 setae.

Legs. Spur of front tibia 43–47 μm (2) long; spurs of middle tibia 18–25, 21 μm (5) and 15 μm (2) long; of hind tibia 44–50, 47 μm and 16–18 μm (2) long. Width at apex of front tibia 38–41, 40 μm ; of middle tibia 41 μm ; of hind tibia 47 μm . Comb of 12–14, 13 setae; shorter seta 21–23, 23 μm (5) long; longest seta 44–56, 49 μm long. Sensilla chaetica 0–1, 0(5) at 0.25 of ta₁ of middle leg; 1–3, 2(5) at 0.20–0.35 of ta₁ of hind leg. Lengths (micrometers) and proportions of legs:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BU	SV	BR
P ₁	609–681 645	735–807 777	490–526 511	311–335 325	221–227 226	137–149 143	84–90 89	0.65–0.67 0.66	2.42–2.52 2.48	2.74–2.83 2.78	2.4–2.7 2.6
P ₂	681–741 711	681–735 711	347–376 360	197–125 208	143–155 148	72–84 80	72–84 81	0.50–0.51 0.50	3.42–3.52 3.48	3.92–4.02 3.95	3.0–3.3 3.2
P ₃	645–729 689	789–878 843	454–478 466	245–263 254	191–209 200	90–108 98	71–84 78	0.53–0.58 0.56	3.11–3.20 3.16	3.16–3.39 3.29	3.4–4.1 3.9

Hypopygium (Fig. 1D). Anal point 38 μm (2) long; with 6–11, 9(5) setae; laterosternite IX with 3–5, 4(5) setae. Phallapodeme 67–76, 72 μm long; transverse sternapodeme 79–98, 88 μm long. Gonocoxite 202–220, 208 μm long; with strongly developed, digitiform, narrowbased, caudomesal projection of superior volsella, superior volsella 59–67, 64 μm (5) long; inferior volsella single, blunt-

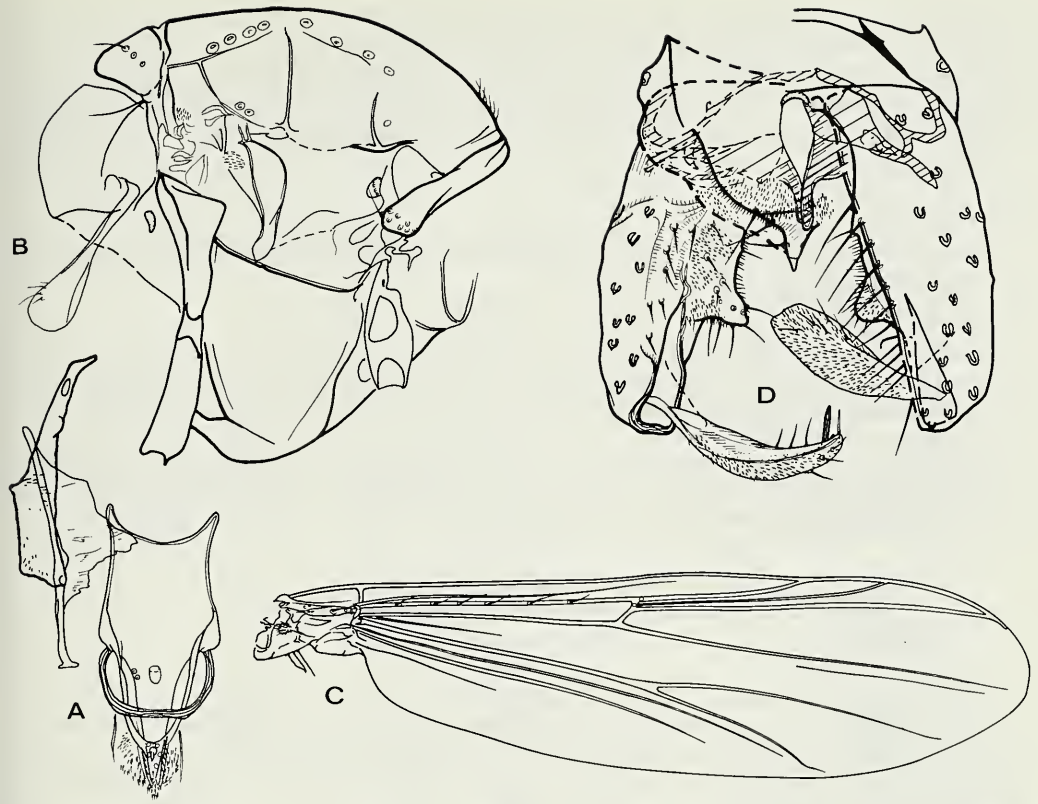


Fig. 1. *Rheocricotopus (Rheocricotopus) reduncus* spec. nov., male imago: A. Cibarial pump, tentorium and stipes; B. Thorax; C. Wing; D. Hypopygium.

tipped. Gonostylus 105–111, 109 μm long; crista dorsalis low, very long and relatively well developed, but appearing as absent in some views; megaseta 19–21, 20 μm (3) long. HR 1.82–2.00, 1.90; HV 2.48–2.63, 2.56.

Pupa (n = 8, except when otherwise stated).

Total length 3.38–3.80, 3.57 mm (7). Length of thoracic horn/length of anal macrosetae 1.00–1.17, 1.12 (7). Exuviae relatively dark greyish brown.

Cephalothorax. Frontal seta 44–73, 64 μm (7) long; on frontal apotome (Fig. 2 A). Postorbitals 44–73, 63 μm (7) long. Median anteprenotals 147–190, 172 μm (7) and 88–176, 134 μm long; lateral anteprenotal 50–73, 59 μm long. Thoracic horn (Fig. 2 C) 264–308, 295 μm (7) long; 47–56, 53 μm (4) wide. Anterior precorneal seta 132–176, 154 μm (6) long; median seta 88–147, 129 μm (4) long; posterior seta 44–59, 48 μm 15 long. Anterior dorsocentral (Dc_1) 26–82, 47 μm long; Dc_2 32–103, 75 μm long; Dc_3 26–53, 33 μm long; Dc_4 59–100, 72 μm long. Distance between Dc_1 and Dc_2 23–38, 28 μm ; between Dc_2 and Dc_3 21–41, 31 μm ; between Dc_3 and Dc_4 50–11, 70 μm .

Abdomen (Fig. 2 E). Shagreen absent on tergite I (T I), weak anterior on T II, stronger and extensive on T III–VI, reduced laterally on T VII–VIII, present anterior on T IX. Sternites I (S I) and IX bare, shagreen anterior on S II; S III–IV with anterior and lateral S V–VII with extensive, S VIII with anterior shagreen. Pedes spurii A on S III–VI, sometimes indicated on S VII. Pedes spurii B on segment II, well developed. T II with about 120–170, 49 caudal hooklets. Conjunctives III/IV, IV/V and so

metimes V/VI with anteriorly directed spinules. Number of spines in median patches on T IV–VI as: 10–45, 29; 35–80, 68; 55–80, 70. Maximal length (micrometers) of spines as: 6–12, 9; 12–18, 15; 9–18, 14. L setae on segments I–VIII as: 2, 3, 3, 3, 3, 3, 4–5; all lamelliform on segments VII and VIII. Anal lobe with 16–20, 18 setae in fringe; anal macrosetae 249–270, 263 μm long. Genital sac of male folded and not measurable in males, of female ending 64 μm (1) short of apex of anal lobe.

Larvae unknown

Remarks

The systematic positions of this and the following species are treated in the systematics part at the end of this paper.

Ecology and distribution

The male imagines, pupa and pupal exuviae all were collected in a back eddy where the river Jostedøla enters a small lake at Viva (alt. 850 m a. s. l.) in the uppermost part of the valley Jostedal. The type of 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 approx. 486 sq. km.

Some environmental parameters and a list of some other chironomids found at the locality is given by SCHNELL & SÆTHER (1987). At least three species, *Vivacricotopus ablusus* Schnell & Sæther, a new species of *Limnophyes* and *R. (R.) reduncus* spec. nov. appear to be endemic to the area.

Rheocricotopus (Rheocricotopus) unidentatus spec. nov. (Figs 2 B, D, F; 3; 4)

Type locality; Camp Lazarus, Delaware Co., Ohio, U.S.A.

Type material: Holotype, male with pupal and larval exuviae, spring stream, Camp Lazarus, Delaware Co., Ohio, U. S. A., 18/4/86, M. J. Bolton, in coll. Mus. Zool. Univ. of Bergen (ZMB No. 117).

Paratypes: 2 males reared from larva, 2 females, reared from larvae, 3 larvae, as holotype; 3 larvae as holotype except 1/4/86.

Diagnostic character

The high number of dorsocentrals (18–22 in males, 18–33 in females) and acrostichals (30–36 in males, 43–47 in females) will separate the imagines from *R. (R.) effusus* and *R. (R.) effusoides*, the closest relatives. The pupa has more numerous spinules (65–120) in the spine patches of T V and VI than in *R. (R.) effusus*, and a pale greyish brown coloration of the exuviae separating it from the darker colour of *R. (R.) effusoides*. The single median tooth of the mentum combined with the lack of ventral tubercles on the head capsule will separate the larva from other members of the genus.

Etymology: From Latin, *uni-*, one, and *dentatus*, toothed, referring to the single median tooth of the larval mentum.

Description

Male imago ($n = 3$, except when otherwise stated).

Total length 3.08–3.42 mm. Wing length 1.51–1.83 mm. Total length/wing length 1.87–2.04. Wing length/length of profemur 2.59–2.69. Coloration brown.

Head. AR 1.10–1.36. Ultimate flagellomere 394–563 μm long. Temporal setae 4–8, including 0–1 inner verticals, 1–4 outer verticals and 3 postorbitals. Clypeus with 10–14 setae. Cibarial pump, tentorium, and stipes as in Fig. 3 A. Tentorium 146–169 μm long, 38–47 μm wide. Stipes 135–158 μm long, 45–53 μm (2) wide. Palp segments length (micrometers): 38–41, 68–81, 90–116, 101–124, 69–184. Third palpal segment with 2–3 sensilla clevata.

Thorax (Fig. 3 B). Anteprenotum with 4–8 lateral setae. Humeral pit very large, elongate ellipsoid with smaller rounded pit below. Dorsocentrals 18–22; acrostichals 30–36, the longest reaching

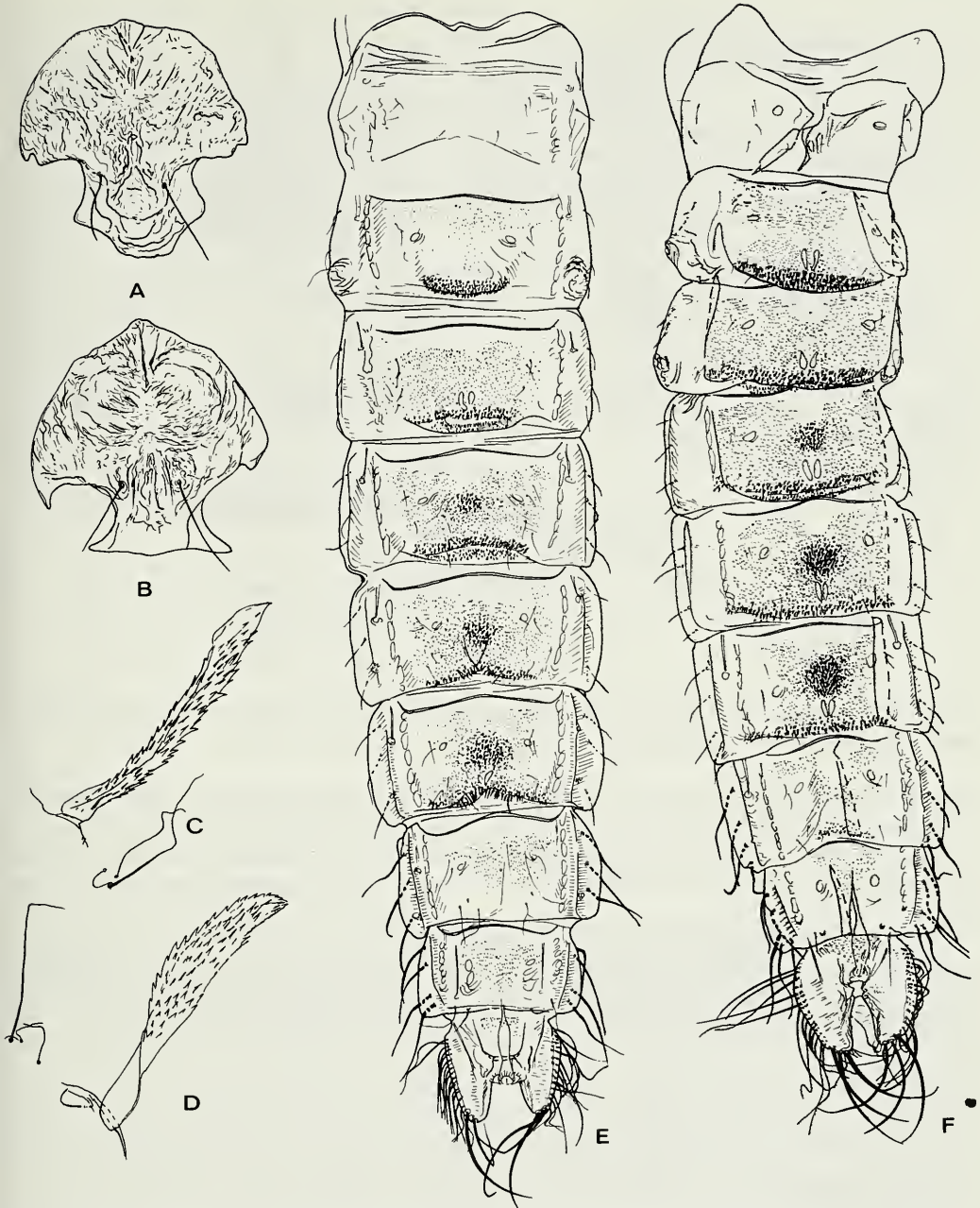


Fig. 2. *Rheocricotopus (Rheocricotopus) spec.*, pupae: A–B. Frontal apodeme; C–D. Thoracic horn; E–F. Tergites. A, C, E. *R. (R.) reduncus* spec. nov.; B, D, F. *R. (R.) unidentatus* spec. nov.

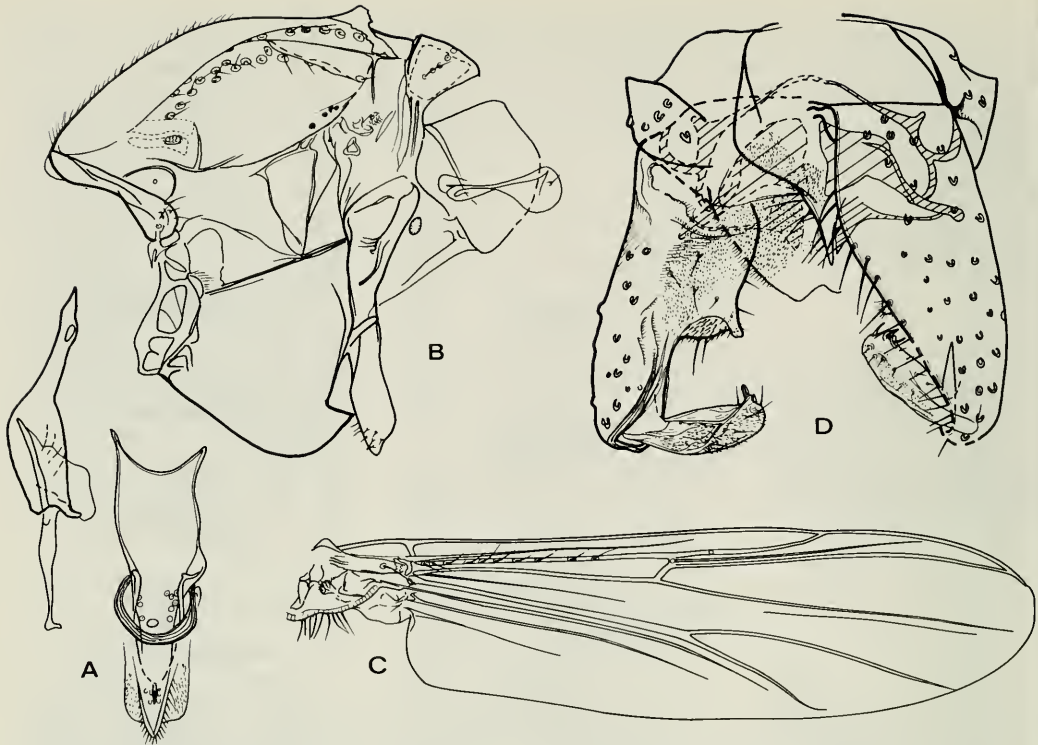


Fig. 3. *Rheocricotopus (Rheocricotopus) unidentatus* spec. nov., male imago: A. Cibarial pump, tentorium and stipes; B. Thorax; C. Wing; D. Hypopygium.

26–38 μm in length (15–26 μm in *R. (R.) effusus* and *R. (R.) effusoides*); prealars 4. Scutellum with 6–9 setae.

Wing. (Fig. 3C). VR 1.08–1.14. Wing membrane with fine punctuation of microtrichia visible at 150 \times . Anal lobe protruding. C extension 38–49 μm long. R with 6–10 setae. Squama with 3–11 setae.

Legs. Spur of front tibia 49–64 μm long, spurs of middle tibia 21–26 μm and 19–23 μm long, of hind tibia 45–58 μm and 19–23 μm long. Width at apex of front tibia 34–41 μm , of middle tibia 38–49 μm , of hind tibia 41–53 μm . Comb of 11–12 setae, shortest seta 30–34 μm long, longest seta 49–60 μm long. Sensilla chaetica absent. Lengths (micrometers) and proportions of legs:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
P ₁	567-709	662-841	493-595	265-340	180-236	123-151	61-80	0.71	2.60-2.71	2.56-2.60	2.2-2.8
P ₂	576-747	586-747	302-395	1512-208	115-151	57- 80	47-66	0.52-0.53	3.58-3.97	3.72-3.84	2.5-2.7
P ₃	558-709	671-869	397-491	203-274	165-222	80-113	57-71	0.57-0.59	3.04-3.22	3.02-3.21	3.2-4.4

Hypopygium (Fig. 3D). Anal point 41–60 μm long, with 8–12 setae, laterosternite IX with 5–6 setae. Phallapodeme 79–109 μm long, transverse sternapodeme 99–154 μm long. Gonocoxite 218–251 μm long; with well developed tooth-like caudomesal projection on superior volsella, 62–71 μm long; inferior volsella single with pointed apex. Gonostylus 90–101 μm long; crista dorsalis low and long, relatively well developed, but not visible in some views; megaseta 13–15 μm long. HR 2.42–2.50; HV 3.39–3.47.

Female imago (n = 2, except when otherwise stated).

Total length 3.34–4.20 mm. Wing length 1.81–2.07 mm. Total length/wing length 1.85–2.03. Wing length/length of profemur 2.61–2.65. Coloration yellowish brown with dark brown separate vittae and thoracic markings, scutellum yellowish brown in central area.

Head. Flagellomere lengths (micrometers): 98–105, 56, 53–60, 60–64, 113–116. AR 0.41–0.45. Temporals 7–18, including 1–4 inner verticals, 2–8 outer verticals and 4–6 postorbitals. Tentorium 180 μ m long, 38–41 μ m wide. Stipes 161–180 μ m long, 49–68 μ m wide. Palp segments length (micrometers): 41–49, 79–86, 113–114, 128–133, 218–225. Third palpal segment with 2–3 sensilla clavata at apex. Coronal suture complete.

Thorax. Anteprepronotum with 8–10 lateral setae. Humeral pit as in male. Dorsocentrals 18–33; acrostichals 43–47, longest 38–49 μ m long; prealars 6–7. Scutellum with 19–22 setae.

Wing. VR 1.01–1.16. C extension 79–90 μ m long. Brachiolum with 1–2 setae, R with 22–37, R₁ with 10–17, R₄₊₅ with 26–51, extended part of costa with 5–8 non-marginal setae. Squama with 9–22 setae.

Legs. Spur of front tibia 30–38 μ m long, spurs of middle tibia both 23–26 μ m long, of hind tibia 53–56 μ m and 21–23 μ m long. Width at apex of front tibia 43–53 μ m, of middle tibia 45–56 μ m, of hind tibia 53–73 μ m. Comb of 12–14 setae, 30–60 μ m long. Sensilla chaetica apparently absent. Lengths (micrometers) and proportions of legs:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
P ₁	680-784	765-954	468-586	255-302	170-217	113-142	66-80	0.61	3.15-3.16	2.98-3.09	1.5-2.0
P ₂	718-803	713-851	317-425	161-217	113-161	57-85	57-76	0.44-0.50	3.79-4.51	3.89-4.52	1.5-1.8
P ₃	671-794	784-959	421-539	208-279	161-227	76-109	61-85	0.54-0.56	3.26-3.71	3.25-3.46	1.3 (1)

Abdomen. Number of setae on tergites I–VIII as: 27–48, 34–66, 32–55, 39–55, 40–59, 39–49, 43, 36–47. Number of setae on sternites I–VIII as: 0, 0–3, 2–6, 7–11, 19–21, 23–29, 20–27, 28–46.

Genitalia (Fig. 4A–C). Gonocoxite with 13–17 setae, including 7–8 strong and 5–10 weak setae. Tergite IX strongly divided with 22–26 setae. Cercus 90–128 μ m long. Seminal capsule 101–116 μ m long, including 23–30 μ m long neck; 77–90 μ m wide. Notum 139 μ m long.

Pupa (n = 5, except when otherwise stated)

Total length 3.31–4.83, 3.92 mm. Length of thoracic horn/length of anal macrosetae 0.87–1.22, 1.00. Exuviae pale greyish brown, with darker apophyses and thoracic markings.

Cephalothorax. Frontal seta 90–120 μ m (2) long, on frontal apotome (Fig. 2B). Vertical not measurable; postorbitals 23–49, 35 μ m (4) long. Median anteprepronotals both 120–199, 163 μ m long; lateral anteprepronotals 41–88, 62 μ m long and small peg, 11–19 μ m (3) long. Thoracic horn (Fig. 2D) 259–390, 303 μ m long; 38–53, 44 μ m wide. Anterior precorneal seta 131–233, 186 μ m long; median seta 83–218, 165 μ m long; posterior seta 49–161, 95 μ m long. Anterior dorsocentral (Dc₁) 75–105, 82 μ m long; other dorsocentrals each 41–101, 65 μ m long. Distance between Dc₁ and Dc₂ 64–116, 92 μ m; between Dc₂ and Dc₃ 15–83, 50 μ m; between Dc₃ and Dc₄ 23–53, 37 μ m.

Abdomen (Fig. 2F). Shagreen absent on tergite I (T I), weak median on T II, stronger and more extensive on T III–VI, median on T VII–VIII, anterior on T IX. Sternites I (S I) and IX bare; shagreen on S II–III anterior, median and laterally; on S IV–VI postero-laterally, not very strong; on S VII–VIII anterior group shagreen. Pedes spurii A present on S IV–VI with indications also on S VII–VIII in most specimens. Pedes spurii B well developed on segment II and present also on segment III. About 140–260, 150 caudal hooklets on T II. Conjunctives III/IV, IV/V and usually V/VI with rows of anteriorly divided spinules, medially interrupted or (in one specimen) absent on V/VI. Number of spinules in median patches on T IV–VI as: 34–75, 49; 65–118, 79; 68–120, 91. Maximal

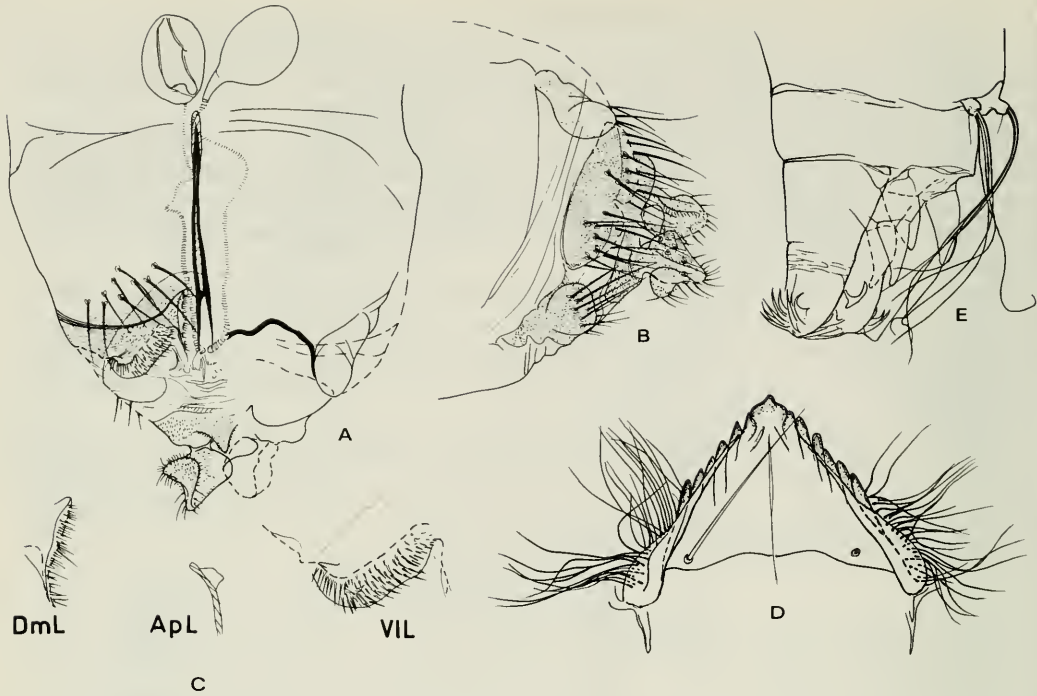


Fig. 4. *Rheocricotopus (Rheocricotopus) unidentatus* spec. nov., female imago and larva: A–C. Female genitalia, ventral (A) and dorsal (B) aspect and lobes of gonapophysis VIII (C) (DmL, dorsomesal lobe; VIL, ventrolateral lobe; ApL, apodeme lobe); D. Larval mentum; E. Posterior end of larva.

lengths (micrometers) of spines as: 11–23, 15; 15–26, 19; 15–26, 20. L setae on segments II–VIII as: 4, 4, 4, 4, 4, 4, 4–5; all lamelliform on segments VII–VIII. Anal lobe with 21–26, 23 setae in fringe; anal macrosetae 281–319, 301 μm long. Genital sac of male not measurable, of female ending 86–124 μm (2) short of apex of anal lobe.

Larva (n = 10–11, except when otherwise stated)

Total length 3.97–7.24, 5.15 mm. Head capsule length 397–473, 438 μm .

Head. Antenna as in *R. (R.) effusoides* Sæther 1985 (fig. 21 A). Lengths of antennal segments (micrometers): 69–87, 78; 16–23, 18; 9–14, 12; 7–9, 8; 7–9, 8. AR 1.55–1.96, 1.70. Basal antennal segment 15–24, 18 μm wide, distance from base to ring organ 8–15, 10 μm ; to basal mark of seta 7–13, 9 μm (8); to distal mark 41–48, 44 μm (7). Lauterborn organs and apical style of second segment each 6–9, 8 μm long. Labrum as in *R. (R.) effusoides* (Sæther 1985 fig. 21 B). Premandible 69–79, 74 μm long. Mandible 116–158, 138 μm long; with 7 branches in seta interna. Mentum (Fig. 4D) with one median tooth with lateral notches; width of median tooth including notches 27–38, 32 μm ; ventromental plates 19–25, 22 μm wide; with 28–40, 33 setae underneath. Postmentum 223–249, 233 μm long.

Abdomen (Fig. 4E). Procercus 30–38, 34 μm high; 21–28, 24 μm wide; with 5–6 anal setae 450–563, 520 μm long. Supraanal seta 98–131, 112 μm long; 0.90–0.23, 0.21 times as long as anal setae. Anal tubules 98–158, 118 μm long; 38–56, 49 μm wide at base. Posterior parapods 263–319, 290 μm (8) long.

Systematics

SÆTHER (1985) erected a scheme of argumentation delineating the cladogenesis of the genus *Rheocricotopus*. Both species treated here are synapomorphous for trends 17, symplesiomorphous for trends 18, showing that they both belong in the nominal subgenus.

Trends 16 contain six different trends of which all except one for each species are symplesiomorphous for both species. In *R. (R.) unidentatus*, however, there is a single median tooth of the mentum as in *R. (R.) tuberculatus*; and *R. (R.) reduncus* has L setae of the same distribution as in *R. (R.) tuberculatus*. However, none of these two trends are very significant since there is a tendency to reduction to one median mental tooth in for instance *R. (R.) effusoides*, and to reduction of the L setae in the *fuscipes* group. Trend 15 is synapomorphous for *R. (R.) unidentatus*; unknown, but probably also synapomorphous for *R. (R.) reduncus*. Both species are synapomorphous for trend 9, a highly significant trend. It is thus clear that both species belong in the *effusus* group.

R. (R.) reduncus is somewhat intermediate for trends 8, while the species is synapomorphous for the first of trends 7 (with tooth-shaped projection of the superior volsella), symplesiomorphous for the second (with small humeral pit). The phylogenetic placement thus is relatively obvious. It form the sister species of the rest of the *effusus* group minus *R. (R.) pauciseta*, while the latter form the sister species of *R. (R.) reduncus* plus the rest of the group. An alternative placement could be as the sister species of *R. (R.) pauciseta* alone, something further indicated by the similarity of the anal points of the two species.

The placement of *R. (R.) unidentatus* also is relatively simple. Trends 7 and 3 are synapomorphous, 8 and 4 symplesiomorphous, meaning that *R. (R.) unidentatus* belong in a group with *R. (R.) effusus* and *R. (R.) effusoides*. Trends 1 and 2 indicate that *R. (R.) effusus* is the closest species.

R. (R.) reduncus and *R. (R.) unidentatus* is compared with their closest relatives in Table 1.

Table 1. Comparisons of some members of the *Rheocricotopus (R.) effusus* group. Lengths in μm .

	<u>R. pauciseta</u>	<u>R. reduncus</u>	<u>R. effusoides</u>	<u>R. unidentatus</u>	<u>R. effusus</u>
Male:					
AR	0.60 - 0.83	0.83 - 0.90	1.39 - 1.61	1.10 - 1.36	0.99 - 1.33
LR ₁	0.62 - 0.74	0.65 - 0.67	0.64 - 0.67	0.71	0.70 - 0.74
No. dorsocentrals	5 - 7	7 - 9	12 - 16	18 - 22	9 - 16
No. acrostichals	12 - 17	7 - 9	14 - 21	30 - 36	18 - 26
Max. l. acrostichals	25	44 - 47	15 - 26	26 - 38	15 - 26
Humeral pit	small	small	large, ellipsoid	large, ellipsoid	large, ellipsoid
Anal point setae	6 - 8	6 - 11	15 - 20	8 - 12	5 - 13
HR	2.61 - 2.69	1.82 - 2.00	1.92 - 2.07	2.42 - 2.50	-
Female:					
No. acrostichals	-	-	21 - 22	43 - 47	18 - 26
Pupa:					
Coloration	pale yellowish brown	dark greyish brown	dark yellowish brown	pale greyish brown	pale greyish brown
L. frontal seta	84 - 100	44 - 73	56 - 101	90 - 120	38 - 64
W. thoracic horn	48 - 58	47 - 56	49 - 86	38 - 53	34 - 53
Spines patch I IV	ca. 0 - 15	10 - 45	6 - 43	34 - 75	22 - 46
" " I V	ca. 25	35 - 80	36 - 79	65 - 118	28 - 47
" " I VI	ca. 30	55 - 80	35 - 74	68 - 120	26 - 55
No. setae in fringe	11 - 13	16 - 20	18 - 27	21 - 26	11 - 21
Larva:					
Med. mental tooth	double	-	double	single	double
L. basal antennal segm.	62 - 64	-	70 - 86	69 - 87	55 - 69

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