

# FIRST RECORD OF *CRICOTOPUS AUCKLANDENSIS* SUBLETTE AND WIRTH (DIPTERA: CHIRONOMIDAE) FROM MAINLAND NEW ZEALAND, WITH A DESCRIPTION OF PUPA AND LARVA

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## ABSTRACT

Boothroyd, I.K.G. (1989). First record of *Cricotopus aucklandensis* Sublette and Wirth (Diptera: Chironomidae) from mainland New Zealand, with a description of pupa and larva. *New Zealand Natural Sciences* 16: 51-56.

*Cricotopus aucklandensis* Sublette & Wirth has only been described from the subantarctic Auckland Islands, New Zealand. It is recorded here for the first time from mainland New Zealand, where it is known to occur in streams and rivers of the Waikato region in the North Island. A full description of the pupa and larva is also included for the first time.

KEYWORDS: Chironomidae - Diptera - streams - Orthocladiinae - *Cricotopus*.

## INTRODUCTION

In a study of the Chironomidae of the subantarctic islands, Sublette & Wirth (1980) described several new species that had not previously been recorded from mainland New Zealand. This they attributed to the lack of knowledge of the New Zealand chironomid fauna in general. The taxonomy of some groups in particular are poorly known, and there have been very few descriptions of pupae and larvae. Recent studies (Boothroyd 1987, 1988a) have attempted to correct this, however, and have shown that the New Zealand chironomid fauna is much more diverse than previously realised.

*Cricotopus aucklandensis*, first described from the subantarctic Auckland Islands by Sublette & Wirth (1980), is here recorded for the first time from the New Zealand mainland. This paper presents a description of new adult material, as well as the first description of pupa and larva. *Cricotopus* van der Wulp is one of the larger genera of the subfamily Orthocladiinae, and species of this genus are found in all regions of the world except Antarctica (Coffman *et al.*

1986). Two species are known from New Zealand, *Cricotopus zealandicus* Freeman, and *Cricotopus cingulatus* Hutton, but the immature stages are unknown.

*Cricotopus aucklandensis* is known from several Waikato streams and rivers. Details of life histories and emergence are given by Boothroyd (1987, 1988b), as *Cricotopus* sp. A. *Cricotopus* larvae have also been recorded from South Island, West Coast streams (Cowie 1980). Towns (1979) and Stark (1985) placed larvae from North Island streams in a *Cricotopus*/*Syncricotopus* complex. The distribution of *C. aucklandensis* is therefore likely to extend beyond the margins of the central North Island.

## METHODS AND MORPHOLOGY

Counts and measurements were made from preserved material (in 70% alcohol) collected from the Kaniwhaniwha stream (37°54' S, 175°05' E), Mt Pirongia, and the Ohinemuri River (37°23' S, 175°52' E), near Waihi, in the North Island, New Zealand. Imagines and larvae were prepared by heating for a few minutes in 10% KOH before being dehydrated in a 70-100% alcohol series and mounted in euparal. Morphological nomenclature and ratios follow Saether

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(1980). Measurements are given as the mean, followed by the range in parentheses.

**DESCRIPTION**

*CRICOTOPUS AUCKLANDENSIS*

Type species: *Cricotopus aucklandensis*  
 Sublette & Wirth 1980: 313. Auckland Is.

*Male imago* (n = 3)

Total length 2.45 (2.05-2.77) mm. Wing length 2.04 (1.65-2.31) mm. Total length/wing length 1.20 (1.18-1.24). Colour: head dark brown, thorax dark brown with pale shoulders, abdomen black, legs brown with no markings.

*Antenna.* With 13 flagellomere; Antennal ratio 0.87 (0.84-0.89). Temporal setae: 11-13 including 4-5 verticals, 6-8 orbitals. Palp segment lengths ( $\mu\text{m}$ ): 65; 57.5 (47.5-67.5); 92.5 (75-110); 106.3 (87.5-125); 180 (155-205).

*Thorax.* (Fig. 1A). Antepronotum laterally with 2-3 setae. Dorsocentrals 9-13; prealars 4. Scutellum with 12-16 setae.

Chiolum with 1 seta;  $R_1$  with 2-3 setae; other veins bare. Squama with 8-12 setae. Costa extended 51 (48-55)  $\mu\text{m}$ .

*Legs.* Spur of front tibia 46.7 (40-50)  $\mu\text{m}$  long; spurs of middle tibia 24.3 (21-28) and 19.3 (15-22)  $\mu\text{m}$ ; spurs of hind tibia 50.3 (42-57) and 26 (23-29)  $\mu\text{m}$  long. Width at apex of front tibia 43.7 (35-54)  $\mu\text{m}$ ; of middle tibia 43.7 (32-55)  $\mu\text{m}$ ; of hind tibia 54 (47-62)  $\mu\text{m}$ . Comb of hind tibia with 12-13 setae, length range 12-30  $\mu\text{m}$ . Lengths ( $\mu\text{m}$ ) and proportions of legs:

	p1	p2	p3
fe	590 (460-750)	637 (540-790)	670 (570-740)
ti	786 (620-900)	690 (530-780)	783 (630-910)
ta1	536 (420-630)	300 (260-340)	440 (350-520)
ta2	316 (230-380)	185 (160-210)	220 (190-260)
ta3	213 (180-240)	150 (130-170)	183 (150-210)
ta4	147 (130-150)	105 (90-120)	117 (100-130)
ta5	103 (90-110)	100 (90-100)	103 (90-110)
LR	0.68 (0.67-0.7)	0.49	0.56 (0.56-0.57)
BV	2.44 (2.23-2.72)	3.07 (2.83-3.30)	3.03 (2.93-3.10)
SV	2.50 (2.42-2.68)	4.08 (4.03-4.12)	3.32 (3.17-3.43)
BR	1.39 (1.19-1.75)	1.24 (1.17-1.31)	1.20 (1.03-1.31)

*Wing.* (Fig. 1B). V.R. 1.14 (1.11-1.17). Bra-

*Hypopygium.* (Fig. 1C & inset). Anal point

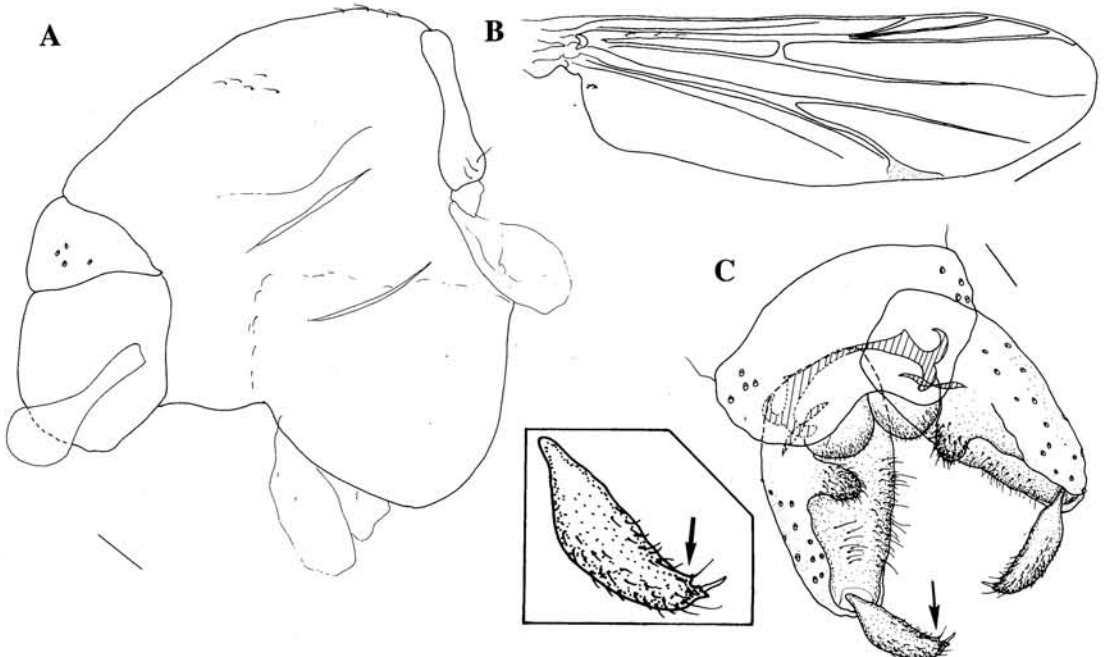


Figure 1. Male imago of *Cricotopus aucklandensis*. A. Thorax, B. Wing, C. Hypopygium. Scale bars: A, B = 0.1 mm; C = 0.05 mm.

absent. Gonocoxite length 219 (202-245)  $\mu\text{m}$ . Gonostylus 86.1 (81-95)  $\mu\text{m}$  long with megaseta 16.3 (15-17.5)  $\mu\text{m}$  in length. Hypopygium ratio 2.55 (2.49-2.58); Hypopygium value 2.84 (2.53-3.08).

#### *Pupa* (n = 7-8)

Total length 3.22 (2.97-3.58) mm. Exuviae pale and transparent.

*Cephalothorax.* (Fig. 2A). Frontal setae absent. Median anteprenotals 129.7 (120-145) and 120.3 (112.5-125)  $\mu\text{m}$  long. Anterior precorneal seta 152.2 (137.5-167.5)  $\mu\text{m}$  long, median 144.4 (132.5-162.5)  $\mu\text{m}$  long, posterior 136.9 (125.0-150)  $\mu\text{m}$  long. Distance between anterior and posterior setae 19.1 (15-25)  $\mu\text{m}$ . Thoracic horn (Fig. 2B) clubbed, 152.2 (142.5-162.5)  $\mu\text{m}$  long, 34.7 (30-37.5)  $\mu\text{m}$  at widest point. Dorsocentral setae robust:  $\text{Dc}_1$  59.7 (50-70)  $\mu\text{m}$  long;  $\text{Dc}_2$  55 (50-60)  $\mu\text{m}$  long;  $\text{Dc}_3$  53.8 (50-60)  $\mu\text{m}$  long;  $\text{Dc}_4$  52.5 (45-60)  $\mu\text{m}$  long. Distance between  $\text{Dc}_1$  and  $\text{Dc}_2$  59.7 (55-60)  $\mu\text{m}$ ; between  $\text{Dc}_2$  and  $\text{Dc}_3$  103.8 (92.5-112.5)  $\mu\text{m}$  long; between  $\text{Dc}_3$  and  $\text{Dc}_4$  22.5 (15-37.5)  $\mu\text{m}$ . Single prealar seta 32.5 (25-50)  $\mu\text{m}$  long. Wing margin 1.05 (0.95-1.2) mm long, 0.33 (0.28-0.38) mm wide.

*Abdomen.* Shagreen as in Fig. 2C. Caudal projection on TII 30.4 (30-32)  $\mu\text{m}$  wide, with 50.7 (48-52), hooklets, length range 17.5-35  $\mu\text{m}$ . Abdominal setation, TI with 4D, 1L setae, TII-VII with 6D and 3L, TVIII with 2D and 4L setae. Sternites III-V with weak lateral caudal spines. Anal lobe (Fig. 2D) 221.8 (200-247.5)  $\mu\text{m}$  long. Outer apical macroseta 143.2 (127.5-160)  $\mu\text{m}$  long; median 137.9 (125-150)  $\mu\text{m}$  long; inner 137.5 (125-150)  $\mu\text{m}$  long.

#### *Larva* (n = 8 except when stated otherwise)

Total length 4.04 (3.3-4.4) mm long; head capsule length 434.5 (418-484)  $\mu\text{m}$ . Body colour after preservation in 70% alcohol, pale yellow. Head capsule pale yellow.

*Head.* Antennae 5-segmented (Fig. 3A), fourth antennal segment longer than third. Lengths ( $\mu\text{m}$ ) 44.6 (41-48); 9.9 (9-11); 3.5 (3-4); 5.1 (5-6); 3.4 (3-4). AR, 2.1 (1.8-2.2). Basal antennal segment 18.5 (14-20)  $\mu\text{m}$  wide; distance

from base to ring organ 10.6 (8-15)  $\mu\text{m}$ . Pre-mandible 78.8 (72-86)  $\mu\text{m}$  ( $n = 6$ ) long. Labrum and epipharyngeal area is in Fig. 3B; SI bifid, all other setae simple. Mandible (Fig. 3C) 145 (135-150)  $\mu\text{m}$  long. Length of apical tooth 22.5 (20-25)  $\mu\text{m}$  long; combined length of inner teeth 26.5 (24-28)  $\mu\text{m}$ . Mola with spines, seta subdentalis notched with hook, and seta interna of 6-7 branches, one 1.5-2 times length of others. Maxilla as in Fig. 3D. Mentum (Fig. 3E) with single median tooth 27.5 (25-30)  $\mu\text{m}$  wide and 6 pairs of lateral teeth. Flattened mentum width 128 (120-135)  $\mu\text{m}$ .

*Abdomen.* ( $n = 4-5$ ). Posterior parapods of abdomen 193.8 (175-200)  $\mu\text{m}$  long, and 119.4 (87.5-150)  $\mu\text{m}$  wide. Procercus 22.4 (20-26)  $\mu\text{m}$  long, bearing 3-5 anal setae, maximum length 536 (490-600)  $\mu\text{m}$ . Two supraanal seta 82.5 (70-90)  $\mu\text{m}$  long.

*Material examined.* Specimens collected from the Ohinemuri River (37°23'S, 175°52'E), Waihi, North Island, New Zealand: 1 adult male reared from larva, 7 October 1987; 2 adult males collected by light trap, 22 September 1987; 3 pupal exuviae and 2 larvae (including one cast larval skin), 7 October 1987. Specimens collected from the Kaniwhaniwha stream (37°54'S, 175°05'E): 4 pupal exuviae and 6 larvae collected during 1984-1985. One adult, 4 pupal exuviae and 4 larvae have been deposited in the New Zealand Arthropod Collection, D.S.I.R., Auckland; the remainder are in the collection of I.K.G. Boothroyd, Hauraki Catchment Board, P.O. Box 246, Te Aroha.

## DISCUSSION

I have examined the holotype and paratypes of *C. aucklandensis*, from the Auckland Islands, and found that whilst the antennal ratio was slightly lower (0.68-0.76), in general the measurements and ratios fell within the ranges described for the mainland specimens. Likewise, the mainland specimens were morphologically identical to the types examined and therefore I see no reason to regard them as separate species. Adult *C. aucklandensis* can be distinguished from *C. zealandicus* and *C. cingulatus* by its uniformly black

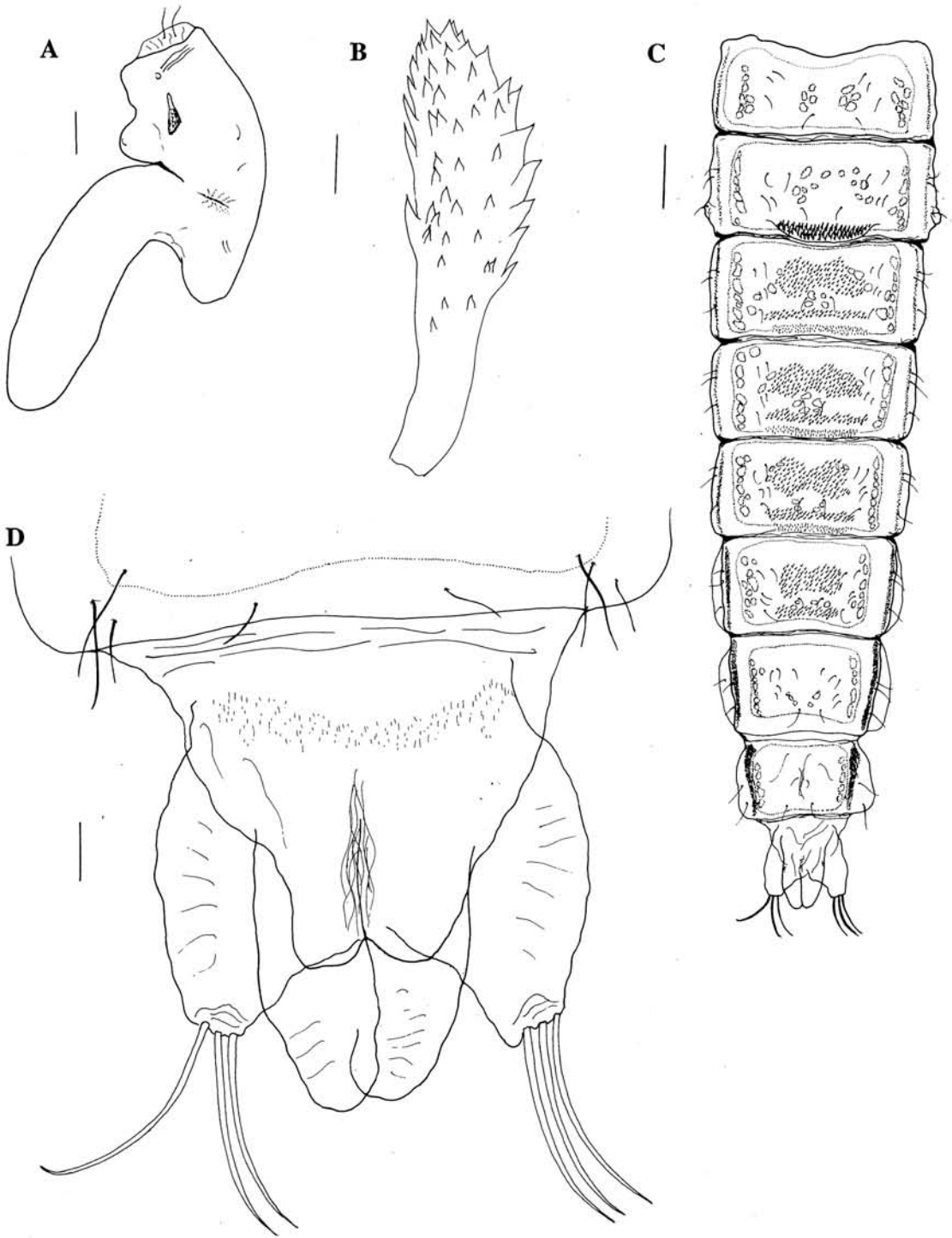


Figure 2. Pupa of *Cricotopus aucklandensis*. A. Thorax, B. Thoracic Horn, C. Abdomen, D. Anal Lobe (♀). Scale bars: A = 0.15 mm; B,C = 0.1 mm; D = 0.05 mm.



Figure 3. Larva of *Cricotopus aucklandensis*. A. Antenna, B. Labrum, C. Mandible, D. Maxilla, E. Mentum. Scale bars: All = 0.01 mm.

abdominal terga (*C. cingulatus* and *C. zealandicus* are characterised by yellow markings on the abdomen).

Sublette & Wirth also distinguished *C. aucklandensis* from the african *C. obscurus* Freeman. I have examined the holotype of *C. obscurus* in the British Museum (Natural History), and *C. aucklandensis* differs in having a lower antennal ratio (approximately 1.0 in *C. obscurus*), a higher leg ratio ( $P_1=0.6$  in *C. obscurus*) and the presence of a distinct flange on the gonostylus (Fig. 1C & inset). The larva and pupa are distinct from other known (but undescribed) *Cricotopus* species. The pupa can be distinguished by the abdominal shagreen pattern and the clubbed thoracic horn. Larvae can be separated by the large median tooth of the mentum being more than twice the width of the first lateral teeth.

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