

Photographic guide and keys to the larvae of Chironomidae (Diptera) of south-west Western Australia

Part II. Orthoclaadiinae



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Contents

Introduction	2
Acknowledgements	3
List of Orthoclaadiinae known from south-western Australia with informal synonymies	4
Illustrations of terminology used in this guide	6
Key to species of Orthoclaadiinae	7
References	13
Plates of Orthoclaadiinae species	14

Introduction

A significant proportion of Western Australia's freshwater invertebrate fauna is either undescribed or normally sampled as immatures that have not been associated with described adults. Nonetheless, species often can be differentiated and usually allocated to a genus. In aquatic ecology, impact assessment and biodiversity studies such taxa are usually given some sort of code (sp. 1, sp B2, sp. 'Pilbara' etc.). There are some publications by taxonomists that allow consistent use of such codes across research groups as an interim measure, until descriptions and formal names are published. For some other groups, however, there are either no such guides or they incompletely cover much of the Western Australian fauna. This results in a variety of codes being applied to the same taxon by different research groups in Western Australia, hindering comparison and collation of datasets. This is a particular problem for water mites, most dipterans, annelids, rotifers and many of the microcrustacean groups.

This publication is a contribution towards more consistent aquatic invertebrate nomenclature within Western Australia, by making available keys and detailed photographs of the Chironomidae (Diptera) from south-western Australia. This family was selected because there is already a good starting point in 1) the detailed work of Don Edward at the University of Western Australia (UWA), 2) the excellent, but incomplete, guide to the Australian chironomid fauna by Peter Cranston (Cranston 2000), 3) the key to Australian genera by Chris Madden (Madden 2009¹) and 4) an unpublished key to south coast chironomid species by Caroline Versteeg and Don Edward. This guide covers the Chironomidae collected from the south-west, extending north to the Murchison River, inland to include the Avon/Wheatbelt and east to Cape Arid. The guide will grow as the subfamilies are completed, but at present it includes only the Tanypodinae (Leung et al. 2011) and now the Orthoclaadiinae (this key). We aim to include remaining subfamilies as funds and time allow.

Note that there is considerable uncertainty about the identity of many of the orthoclaids, even as to the correct genus for many species, partly due to a lack of association between larvae and adults. Furthermore, some taxa in this key appear to be species complexes and it is very likely that additional species will be found in the region, especially in lentic habitats. This should be seen as a preliminary guide to encourage consistency and promote discussion. We welcome all and any feedback.

We have tried to photograph those characters of each species that distinguish them from related species, or even all other species where there is a particularly distinctive feature. Specimens used are primarily those from various DEC projects and those in the collections of Don Edward (School of Animal Biology, UWA) and Barbara Cook (Centre for Excellence in Natural Resource Management, UWA).

Names at the top of each page are either the species' formal binomial name or codes established by Don Edward, Cranston (2000 or references cited therein) or the wetland fauna lab in DEC's Science Division. Part of the aim of this guide is to have a standard set of codes for undescribed/unassociated species used within WA. However, we recognise that other codes will have been (and may continue to be) used by other

¹ <http://www.museumvictoria.com.au/sciencereports>

researchers. We encourage users of this guide to provide us with alternative codes that have been published to populate a translation table (Table 1).

Acknowledgements

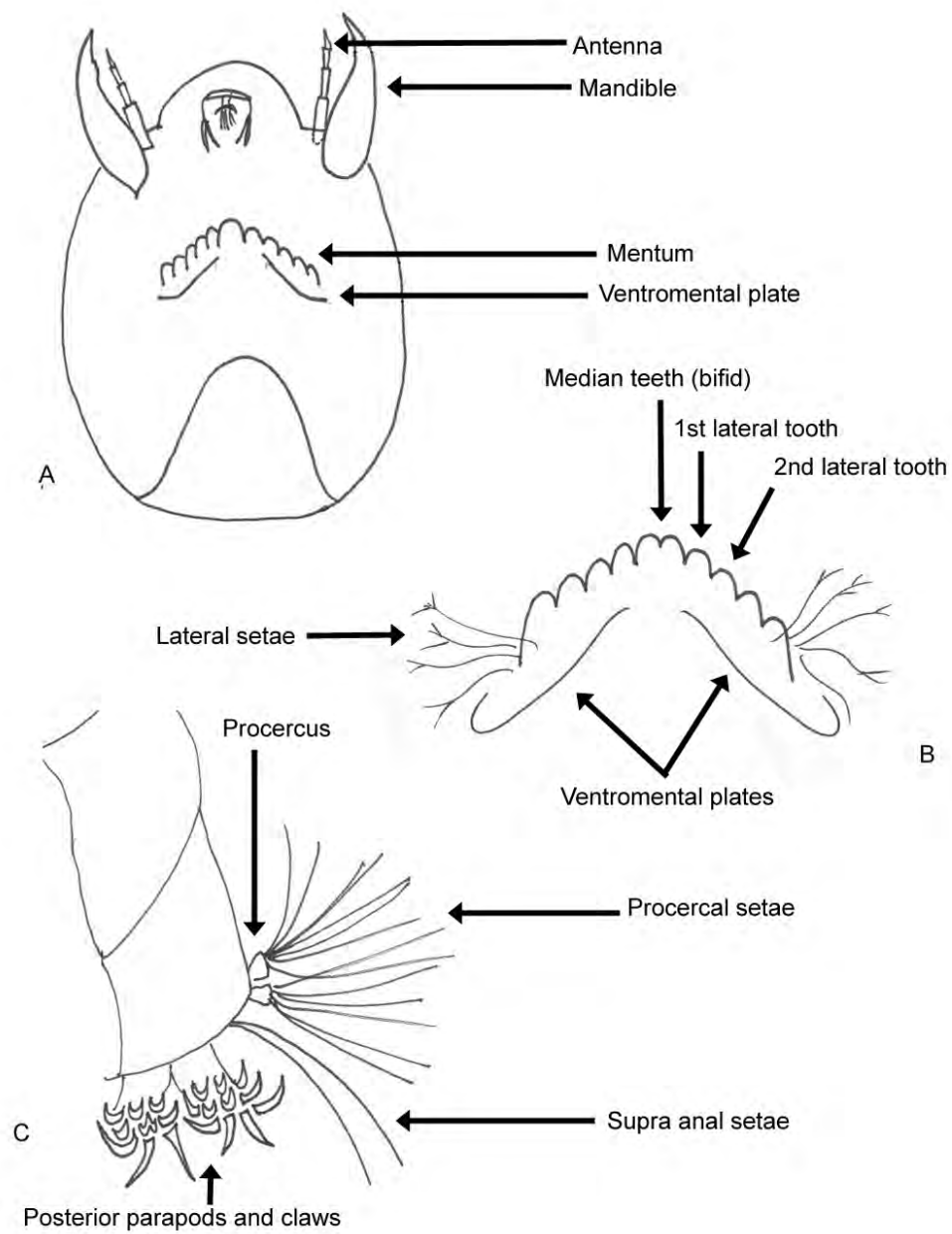
The Department of Environment and Conservation's Science Division provided funding for this project in 2009/10. Geraldine Janicke and Barbara Cook (UWA, Albany) provided whole animal voucher specimens from the Centre for Excellence in Natural Resource Management collection. Phoenix Environmental allowed the senior author to continue working on this project. Thanks to Melita Pennifold for useful comments on an earlier version. Thanks also to Peter Cranston for ongoing advice on matters chironomid.

Table 1. List of species included in key.

(DE = Don Edward codes used at UWA; DEC = Dept. Environment and Conservation; CENRM = Centre for Excellence in Natural Resource Management, UWA).

Species name used in this guide	Origin of name or code used in this guide	Notes
ORTHOCLADIINAE		
<i>Allotrissocladius</i> DEC sp. L	DEC	= Orthoclaadiinae sp. F (DEC)
<i>Austrobrillia longipes</i> Freeman, 1961		= V17 (DE)
<i>Austrobrillia</i> V69	DE	= sp. 2 of CENRM
<i>Botryocladus petrophilus</i> Cranston & Edward, 1999		
<i>Botryocladus bibulmun</i> Cranston & Edward, 1999		= V11 (DE)
<i>Botryocladus freemani</i> Cranston & Edward, 1999		= V77 (DE)
<i>Botryocladus grapeth</i> Cranston & Edward, 1999		
<i>Corynoneura</i> V49	DE	
<i>Cricotopus albitarsus</i>	Cranston, 2000	= V51 (DE)
<i>Cricotopus brevicornis</i>	Cranston, 2000	
<i>Cricotopus parbicinctus</i>	Cranston, 2000	= V2 = <i>Paratrachocladus</i> sp. & <i>Cricotopus annuliventris</i> (DEC) (<i>C. annuliventris</i> not found in WA)
<i>Eukiefferiella insolida</i> (Skuse, 1889)		
nr <i>Gymnometriocnemus</i> V45	DE	= <i>Gymnometriocnemus</i> spp. A & B & Orthoclaadiinae sp. O (DEC)
nr <i>Gymnometriocnemus</i> V44	DE	= Orthoclaadiinae sp. C & R (DEC)
nr <i>Gymnometriocnemus</i> spp. (other)	DE/DEC	Includes VSC11 (DE) plus Orthoclaadiinae spp. A, K & S (DEC) These key out to around 'nr <i>Gymnometriocnemus</i> ' in Cranston 2000
<i>Limnophyes vestitus</i> Skuse, 1889		= V41 (DE) = <i>Comptosmittia</i> sp. A & <i>Limnophyes</i> sp. A (DEC).
<i>Nanocladius</i> sp. 1	Cranston, 2000	= VCD7 (DE)
<i>Nanocladius</i> sp. 2	Cranston, 2000	= V71 (DE)
<i>Nanocladius</i> sp. 3	Cranston, 2000	
Orthoclaadiinae DEC sp. D	DEC	= Orthoclaadiinae sp. N (DEC)
Orthoclaadiinae DEC sp. I	DEC	
Orthoclaadiinae DEC sp. M	DEC	= ? <i>Allotrissocladius</i> sp. M & Orthoclaadiinae sp. B (DEC)
Orthoclaadiinae DEC sp. T	DEC	
Orthoclaadiinae V31	DE	= SO3 sp. A (DEC)

Species name used in this guide	Origin of name or code used in this guide	Notes
Orthocladiinae SO3 DEC sp. B	DEC	
Orthocladiinae SO3 DEC sp. C	DEC	= SO3 'species 2' of Cranston 2000?
Orthocladiinae V35	DE	= SO3 sp. D & Orthocladiinae sp. 3 (DEC)
Orthocladiinae V15	DE	= sp. 5 (DEC)
Orthocladiinae V46	DE	= Orthocladiinae sp. G & P (DEC)
Orthocladiinae V52	DE	= sp. J (DEC)
Orthocladiinae V59	DE	
Orthocladiinae V61	DE	
Orthocladiinae V76	DE	= Orthocladiinae sp. Q (DEC)
Orthocladiinae V43	DE	= woodminer (DEC). Possibly = genus wood miner of Cranston, 2000 but that has procerci whereas this one doesn't
? <i>Parakiefferiella</i> DEC sp. D	DEC	= Orthocladiinae nr sp. G (DEC)
<i>Parakiefferiella</i> sp. S1	Cranston, 2000	= VCD2 (DE) = <i>Parakiefferiella</i> sp. B (DEC)
<i>Parakiefferiella variegatus</i>	Cranston, 2000	= VSC9 (DE) = <i>Parakiefferiella</i> sp. A (DEC) = <i>Eukiefferiella</i> sp. (DEC)
? <i>Parakiefferiella</i> V22	DE	= sp. C (DEC) Unsure this is actually <i>Parakiefferiella</i> as does not have procerci but has large ventromental plates
<i>Paralimnophyes pullulus</i> (Skuse, 1889)		= V42 (DE), <i>Paralimnophyes</i> sp.1 (<i>pullulus</i>) (DEC)
<i>Stictocladus occidentalis</i> Cranston & Saether, 2010		Formerly considered part of <i>Stictocladus uniserialis</i> but WA species now described as <i>S. occidentalis</i> ; = V8 (DE). May include CENRM sp. 1 and 2
<i>Stictocladus</i> DEC sp. U	DEC	
<i>Stictocladus</i> V70 (not included in key)	DE	
<i>Symbiocladius</i> DEC sp. 1	DEC	
<i>Thienemanniella</i> V19	DE	



Orthoclad morphology: A - Head; B - Mentum; C - last abdominal segment

Key to species of Orthocladiinae from south-western Australia

(V = Donald Edward codes used at UWA; DEC = Dept. Environment and Conservation; CENRM = Centre for Excellence in Natural Resource Management, UWA).

Late instar larvae should be used because earlier instars often do not have characters fully developed.

Also note that some species names from Cranston (2000) are informal and placed with quotation marks. These names should not be used without quotation marks in publications.

- 1a** Procercus absent, although procercal setae may indicate the site. Anterior parapods absent or fused but some parapod claws present **2**
- 1b** Procercus present, albeit very small in some species, bearing procercal setae. Anterior parapods may be basally fused but are always distinct **13**

- 2a** Ventromental plates expanded into broad flat plates posteriorly, not sinuate or with a distinct ledge and usually projecting lateral and/or posterior to mentum **3**
- 2b** Ventromental plates not expanded into broad flat plates posteriorly, usually with sinuous or ledge-like sclerotisation **6**

- 3a** Ventromental plates strongly convex on their inner edge and not projecting far beyond lateral edge of mentum **?Parakiefferiella DEC sp. D**
- 3b** Ventromental plates not strongly convex on inner edge, may project well beyond lateral edge of mentum **4**

- 4a** A forwardly directed hook projecting from sides of mentum below the level of the last lateral teeth. Expansion of ventromental plate narrow and paddle-like, projecting posteriorly **Orthocladiinae V46 = DEC sp. G**
- 4b** Without a forwardly directed hook arising from edges of mentum. Expansion of ventro-mental plate broad, projecting posteriorly or postero-laterally **5**

- 5a** Expansion of ventromental plate directed laterally to postero-laterally, sometimes with a crenulate anterior margin. Antennae very small and with a short bulbous blade **Orthocladiinae V76 = DEC sp. Q**
- 5b** Expansion of ventromental plate directed posteriorly and strongly recurved inwards at its extremity. Antennae unknown **?Parakiefferiella V22 = DEC sp. C**

- 6a** Mandibles slender with no inner teeth. Head long and straight. Body swollen. Symbiotic on Ephemeroptera **Symbiocladius DEC sp. 1**
- 6b** Mandibles with inner teeth. Head more stout. Body not swollen. Not symbiotic **7**

- 7a Mentum with even number of teeth 8
- 7b Mentum with an odd number of teeth, central tooth with sinuate margin **Orthocladiinae V52**
- 8a Mentum with a strongly projecting pair of median teeth and 4 pairs of lateral teeth. Chitinous posterior hoop present around anal segment. 4th instars with ventro-lateral projections on mentum **Orthocladiinae V43 = DEC 'woodminer'²**
- 8b Mentum with median teeth not so strongly projecting and with 5 pairs of lateral teeth. Anal segment without chitinous loop. Mentum without ventro-lateral projections 9
- 9a Antennal blade reaching near to, or just beyond, last antennal segment 10
- 9b Antennal blade extending well past last antennal segment 11
- 10a Antennae with 1st segment shorter than 2nd. Anterior parapods very reduced with apical claws shorter and more acutely curved **nr *Gymnometriocnemus* V45 = DEC sp. A and B**
- 10b Antennae with 1st segment longer than 2nd. Anterior parapods with apical claws long and scythe-like **Orthocladiinae V61**
- 11a Lateral 3 teeth of mentum fused, forming an irregular ledge. Posterior parapods virtually absent **nr *Gymnometriocnemus* V44 = DEC sp. 1**
- 11b Lateral teeth distinct, may be adpressed but not forming a ledge. Posterior parapods reduced 12
- 12a Mandible with 4-5 inner teeth. A break in the slope of the mentum so that the outer 2-3 teeth appear about level or the outer-most tooth projects forward of the 4th **?*Allotrissocladius* DEC sp. L**
- 12b Mandible with 3-4 inner teeth. Mentum without a break in the slope of the line of lateral teeth **nr *Gymnometriocnemus* spp. VSC11³**
- 13a Lateral setae on the mentum arising from beneath the ventromental plates ***Botryocladus***
Mentum with a single domed tooth. Ventromental plates large and strongly extending beyond posterior edge of mentum. Lateral setae simple and branched ***Botryocladus freemani* (=V77)⁴**
Mentum with a pair of median teeth. Ventromental plates smaller, but distinctly extending lateral to mentum. Lateral setae long and mostly simple ***Botryocladus bibulmun* (=V11)**

² The ventro-lateral projections seem to only present on 4th instar larvae.

³ This represents more than one unresolved species.

⁴ One specimen in the DEC collection (*Botryocladus* sp. 1) has a domed central tooth (like *B. freeman*) but has small ventro-mental plates.

- Mentum with a pair of median teeth. A 6th tooth-like projection placed posteriorly in mentum. Ventromental plates small, not extending posteriorly or laterally beyond mentum. Lateral setae branched. Primarily found in granite rock pools ***Botryocladus petrophilus***
- Mentum with a pair of median teeth. Ventromental plates small, not extending posterior or laterally. Lateral setae branched. 2 most outermost teeth subequal. Known only from the Stirling Ranges ***Botrocladius grapeth***
- 13b** Mentum without lateral setae **14**
- 14a** Mentum with ventromental plates long or large, often extending laterally well beyond the outermost mental tooth **15**
- 14b** Mentum with ventromental plates not so developed **16**
- 15a** Ventromental plates extending laterally, but only indistinctly posteriorly, beyond the base the outermost mental tooth. Apical segment of antennae very fine and whip-like. Uneven number of teeth ***Parakiefferiella***
- Ventromental plates slender, with outer edge more or less in line with edge of mentum ***Parakiefferiella* sp. S1 of Cranston (2000) = VCD2 = DEC sp. B**
- Ventromental plates with a large posterior lobe directed outwards well beyond edge of mentum ***Parakiefferiella variegatus* of Cranston (2000) = VSC9 = DEC sp. A**
- 15b** Ventromental plates, long, slender and parallel sided, extending well posteriorly or postero-laterally to outermost tooth of the mentum. Median teeth of mentum either bifid or a single large dome ***Nanocladius***
- Antennae 5 segmented with the 5th segment fine and whip-like. Mentum with a pair of median teeth. Mandibles with 3 inner teeth. Ventromental plates strongly extending postero-laterally beyond the outermost tooth of the mentum ***Nanocladius* sp. 1 of Cranston (2000) = VCD7**
- Antennae 4 segmented. Median tooth of mentum large and domed. Mandibles with 4 inner teeth. Ventromental plates extending strongly posteriorly and weakly laterally beyond the outermost tooth of the mentum ***Nanocladius* sp. 2 of Cranston (2000) = V71**
- Antennae apparently 3 segmented. Mentum with a large domed median tooth. Mandibles with 3 inner teeth. Front of head with broad hair-like processes. Ventromental plates narrow and strongly extending postero-laterally beyond the outermost tooth of the mentum ***Nanocladius* sp. 3 of Cranston (2000)**
- 16a** Antennae longer than half the head length **17**
- 16b** Antennae shorter than half the head length **19**
- 17a** Antennae very long, about 2x length of head ***Corynoneura* V49**
- 17b** Antennae less than 2x length of head length **18**

- 18a** 2nd segment of antennae darker than other segments and less than half the length of the basal segment. Procercus short, about as long as wide. Mandibles with an outer tooth **Thienemanniella V19**
- 18b** 2nd segment of antennae either the same colour as the other segments or hyaline and more than half the length of the basal segment. Procercus much longer than wide. Mandibles without an outer tooth **Stictocladus⁵**
- 2nd segment of antennae about the same length as the basal segment and almost entirely sclerotised . Mentum with 4 lateral teeth. Procerci long and clearly separate .
..... **Stictocladus DEC sp. U**
- 2nd segment of antennae longer than basal segment and with at least basal 2/3^{rds} hyaline. Mentum with 5 lateral teeth. Procerci short and on a common base
..... **Stictocladus occidentalis = V8⁶**
- 19a** Antennae six segmented with a very fine whip-like apical segment (usually difficult to see under low magnification – often need to use 100x lens⁷) **20**
- 19b** Antennae without such a whip-like apical segment **21**
- 20a** Body with numerous distinct and irregularly placed hairs on all segments. Mentum with paired median teeth projecting above rest. Procerci sclerotised **Orthoclaadiinae genus 'SO3'**
- 1st segment of antennae about 4x longer than wide, much longer than 2nd segment. 3rd segment not much longer than wide. Head sclerites SI and SII smooth
..... **SO3 V31 (DEC sp. A)**
- 1st segment of antennae about 5-6 x longer than wide, much longer than 2nd segment. 3rd segment very short, not much longer than wide. Head sclerites SI and SII smooth ..
..... **SO3 DEC sp. B**
- 1st segment of antennae about 4x longer than wide, much longer than 2nd segment. 3rd segment clearly longer than wide. Head sclerites SI and SII rugose **SO3 DEC sp. C**
- 20b** Body without numerous distinct and irregularly placed hairs. Mentum with an uneven number of teeth, with the median tooth depressed between 1st lateral teeth. Procerci not sclerotised **?Lopescladius V35 = DEC SO3 sp. D**
- 21a** Mentum with an uneven number of teeth (i.e. a single or trifid tooth in middle) **22**
- 21b** Mentum with an even number of teeth (i.e. a symmetrical pair in the middle) **25**

⁵ There are additional **Stictocladus** in the south-west, including **Stictocladus V70** that has the procerci entirely fused into an elongate cone.

⁶ This taxon may be more than one species (sp. 1 and sp. 2 of CENRM would fit here).

⁷ If this very fine sixth segment is missed, then 'Orthoclad SO3 sp. A' will key to *Limnophyes vestitus*, which it is otherwise remarkably similar other than the regularly placed paired lateral hairs on the latter.

- 22a** Mentum with 13 teeth in total, central tooth either domed or with a central nipple. Abdominal body segments with postero-lateral setal tufts in addition to body setae (difficult to see under low magnification) ***Cricotopus***
- All lateral teeth about the same size and often adpressed to one another. Mentum with brown colouration largely restricted to teeth giving the mentum a distinct V shape. Mandibles with a smooth outer margin and serrate inner margin
..... ***Cricotopus parbicinctus* = V2**
- 2nd lateral teeth of mentum smaller than adjacent teeth and adpressed to the 1st laterals. Brown colouration on mentum not so restricted to teeth. Mandibles with a crenulate outer margin and smooth inner margin ***Cricotopus albitarsis* = V51**
- All teeth of the mentum about the same size and not adpressed to one another. Mandibles with a smoother outer and inner margin ***Cricotopus brevicornis***
- 22b** Mentum with more or less than 13 teeth in total. Abdominal segments without setal tufts **23**
- 23a** Mentum with 11 teeth in total. Second segment of antennae not much longer than first ... **24**
- 23b** Mentum with 15 teeth in total (with central trifid tooth counted as 3 teeth). Second segment of antenna much longer than first **Orthocladiinae DEC sp. T**
- 24a** Antennae small and inconspicuous with segments 3 and 4 very short. 4 inner teeth on mandibles **Orthocladiinae DEC sp. D**
- 24b** Antennae larger, segment 3 very short but segment 4 longer. 3 inner teeth on mandibles **Orthocladiinae DEC sp. I**
- 25a** Mentum with 8 teeth in total, large indentation in centre ***Austrobrillia***
- Antennal blade annulate and about twice as long as antennal segments 2-4. Procerci tubular and not sclerotised ***Austrobrillia longipes* = V17**
- Antennal blade shorter than antenna. Procerci boot shaped and sclerotised
..... ***Austrobrillia* V69**
- 25b** Mentum with more than 8 teeth in total, median teeth projecting **26**
- 26a** Median pair of teeth of mentum strongly projecting above the rest
..... **Orthocladiinae V15 = DEC sp. 5⁸**
- 26b** Median pair of teeth of mentum not so strongly projecting **27**
- 27a** Antennae 4 segmented. Inner edge of mandibular mola serrated
..... ***Eukiefferiella insolida***
- 27b** Antennae 5 segmented. Inner edge of mandibular mola not serrated **28**

⁸ This very similar to Orthoclad 'woodminer' (see couplet 8) but lacks lateral projections on mentum and has a rudimentary procercus.

- 28a** Head brown. Ventromental plates heavily sclerotised. Distinct fringe of paired lateral hairs on all body segments **29**
- 28b** Head pale. Ventromental plates not so heavily sclerotised. Without a distinct fringe of paired lateral hairs **30**
-
- 29a** Head darker brown. Lateral paired setae long, about the same length as each segment. Mandible with 4 distinct inner teeth. Procerci heavily sclerotised ***Paralimnophyes pullulus* = V42**
- 29b** Head lighter brown. Lateral paired setae less than half the length of each segment. Mandibles with 3 separate inner teeth (although darkened area at apex of mola can appear like a 4th). Procerci not so heavily sclerotised ***Limnophyes vestitus* = V41⁹**
-
- 30a** Head rounded. Mentum narrowing behind outer-most tooth, giving a strongly convex (bulging) edge to outer-most tooth. First antennal segment about 2x longer than wide **Orthoclaadiinae DEC sp. M**
- 30b** Head squarish. Outer most tooth with only slightly curved edge. First antennal segment not much longer than wide. Tooth-like projection posteriorly on mentum. **Orthoclaadiinae V59**

⁹ Colless and Edward (1968) and Madden (2009) describe *Limnophyes vestitus* as having 3 distinct inner teeth on the mandible compared to 4 for *Paralimnophyes pullulus*. However, the dark area at the apex of the mola region on *L. vestitus* can appear like a 4th tooth and in some specimens this dark area is somewhat separated from the rest of the mola. There may also be some variability in the lengths of the lateral hairs, possibly associated with the environment. These species are easily confused.

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Allotrissocladius DEC sp. L

Distinguishing features

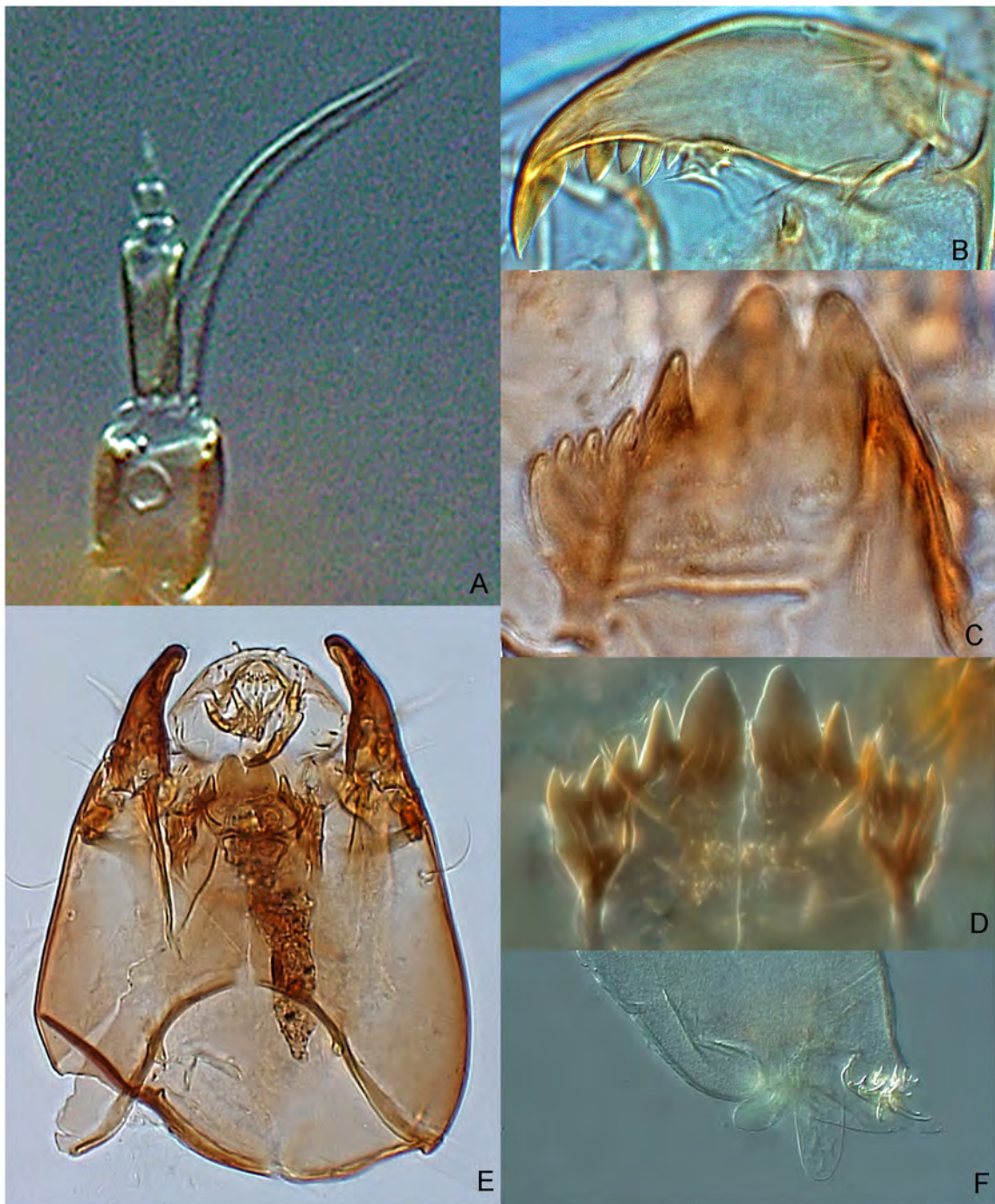
Antennae 5 segmented, with short segments 3 and 4 that can often look like one segment (A)

Mandibles with 4-5 inner teeth, usually uneven in size (B)

Median teeth of mentum bifid (C and D)

Procercus absent (F)

Occurs in granite rock pools



Austrobrillia longipes Freeman, 1961

Distinguishing features

Mentum with 8 teeth in total (A)

Median teeth of mentum separated by a wide “V” shaped notch (A)

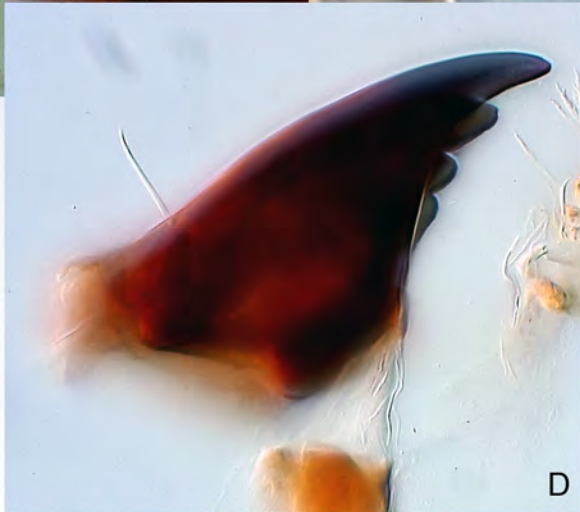
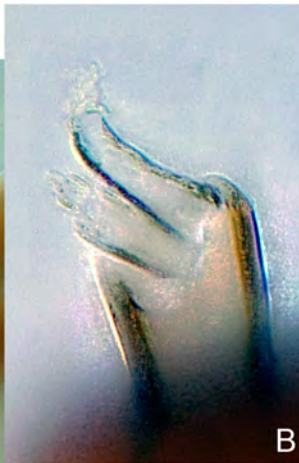
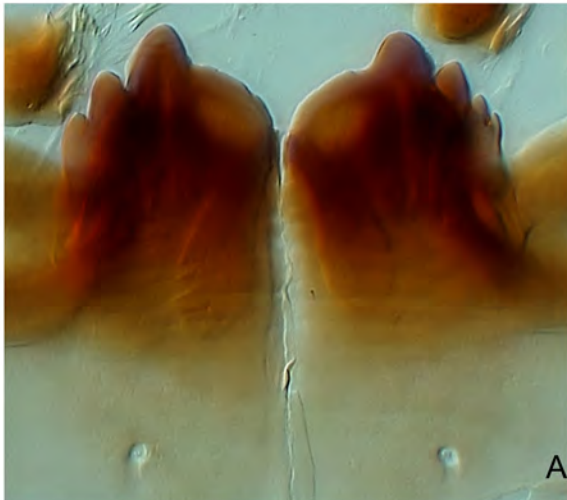
Antennae 4 segmented (B and C)

Antennal blade annulate and about twice as long as antenna segments 2-4 (B)

Mandibles with 3 inner teeth (D)

Procercus present (E)

Occurs in lotic habitats in the higher rainfall south-west



Austrobrillia V69

Distinguishing features

Procercus present, sclerotised and boot-shaped (A)

Median teeth of mentum separated by a wide "V" shaped notch (B)

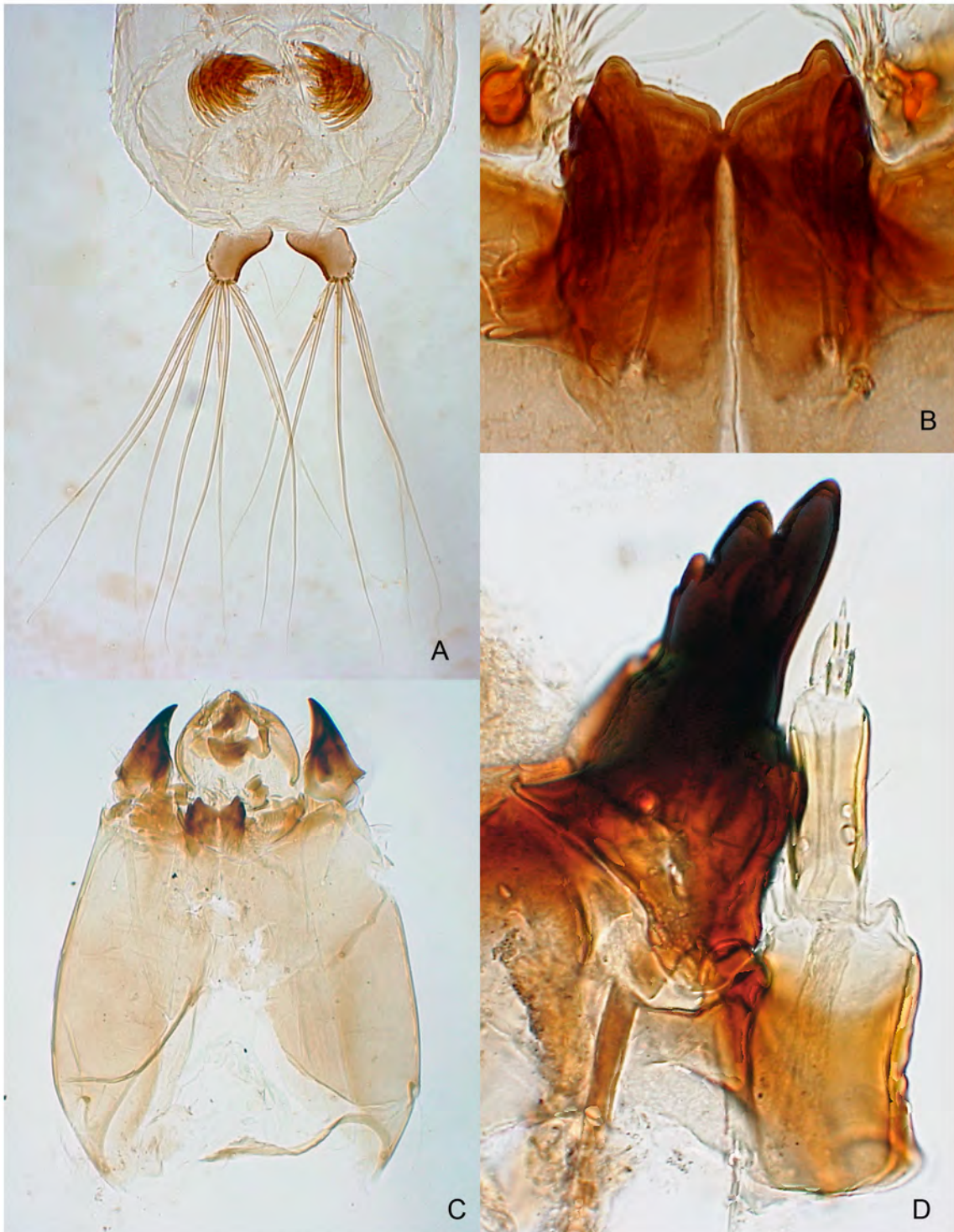
Mentum with 8 teeth in total (B)

Antennae 4 segmented, lauterborn organ mid-way on 2nd segment (D)

2nd and 3rd segments of antennae about the same size (D)

Mandibles with 3 inner teeth (D)

Occurs in freshwater streams.



Botryocladus bibulmun Cranston & Edward, 1999

Distinguishing features

Mandibles with 3 inner teeth (A)

Median teeth of mentum bifid (B)

Mentum with lateral setae that are simple (E)

Antennae with 5 distinct segments and a 6th fine whip like segment (C)

Antennae with a lauterborn organ atop of the 2nd segment the same size as the 3rd segment (C)

Procercus present (F)

Occurs in south west forest streams



Botryocladus freemani Cranston & Edward, 1999

Distinguishing features

Median tooth of mentum large, domed and protruding anteriorly (A)

Ventromental plates distinct and strongly extending posteriorly (A and C)

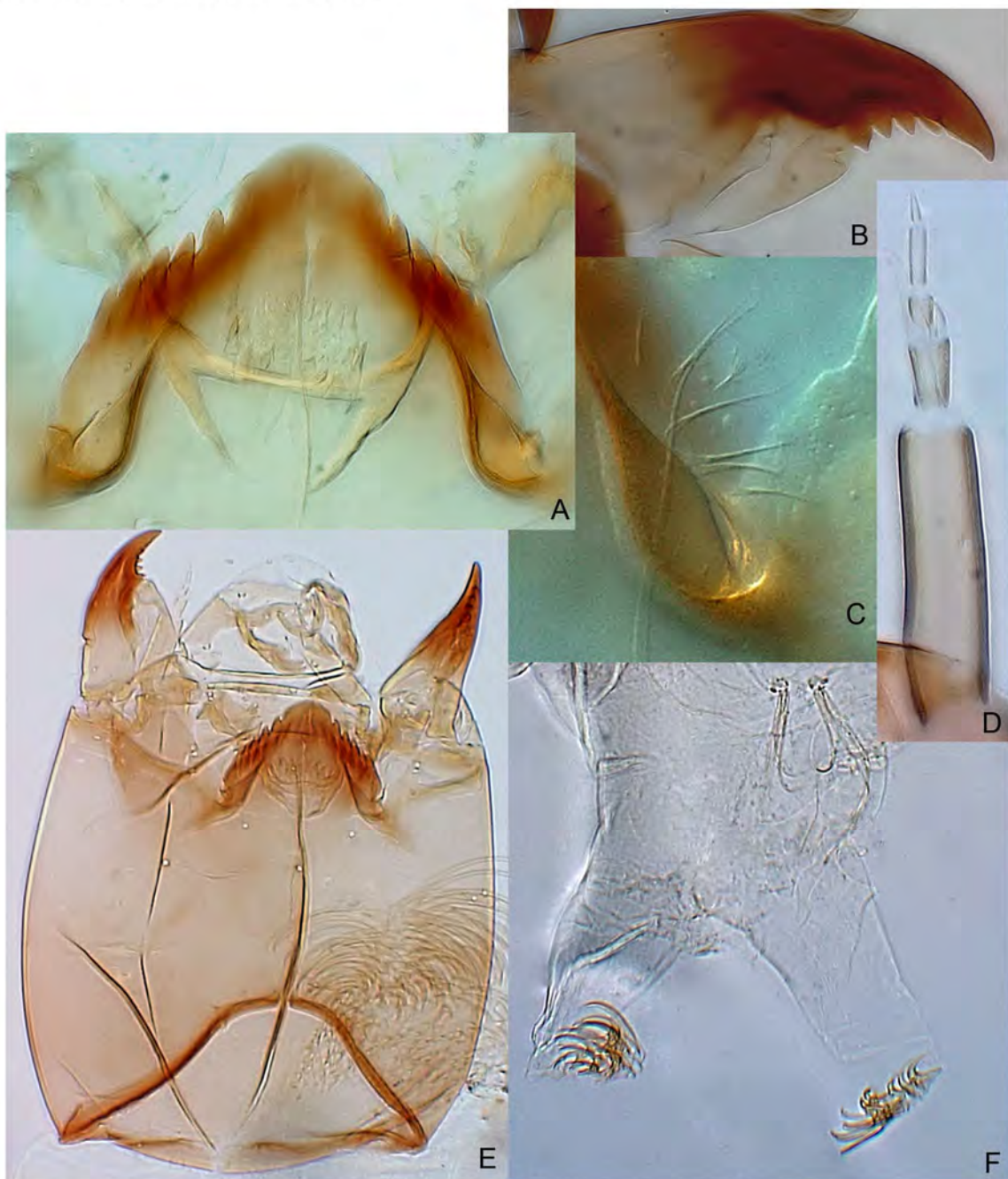
Lateral setae arising from the mentum simple and branched and can sometimes be difficult to see (A and C)

Mandibles with 4 inner teeth (B)

Antennae 5 segmented, the 2nd segment with a lauterborn organ about half the size of the 3rd segment (D)

Procercus present (F)

Occurs in south west forest streams



Botryocladus grapeth Cranston & Edward, 1999

Distinguishing features

Median tooth of mentum bifid (worn in photograph) (A)

Ventromental plates small (A)

Lateral setae arising from the ventromental plates branched (B)

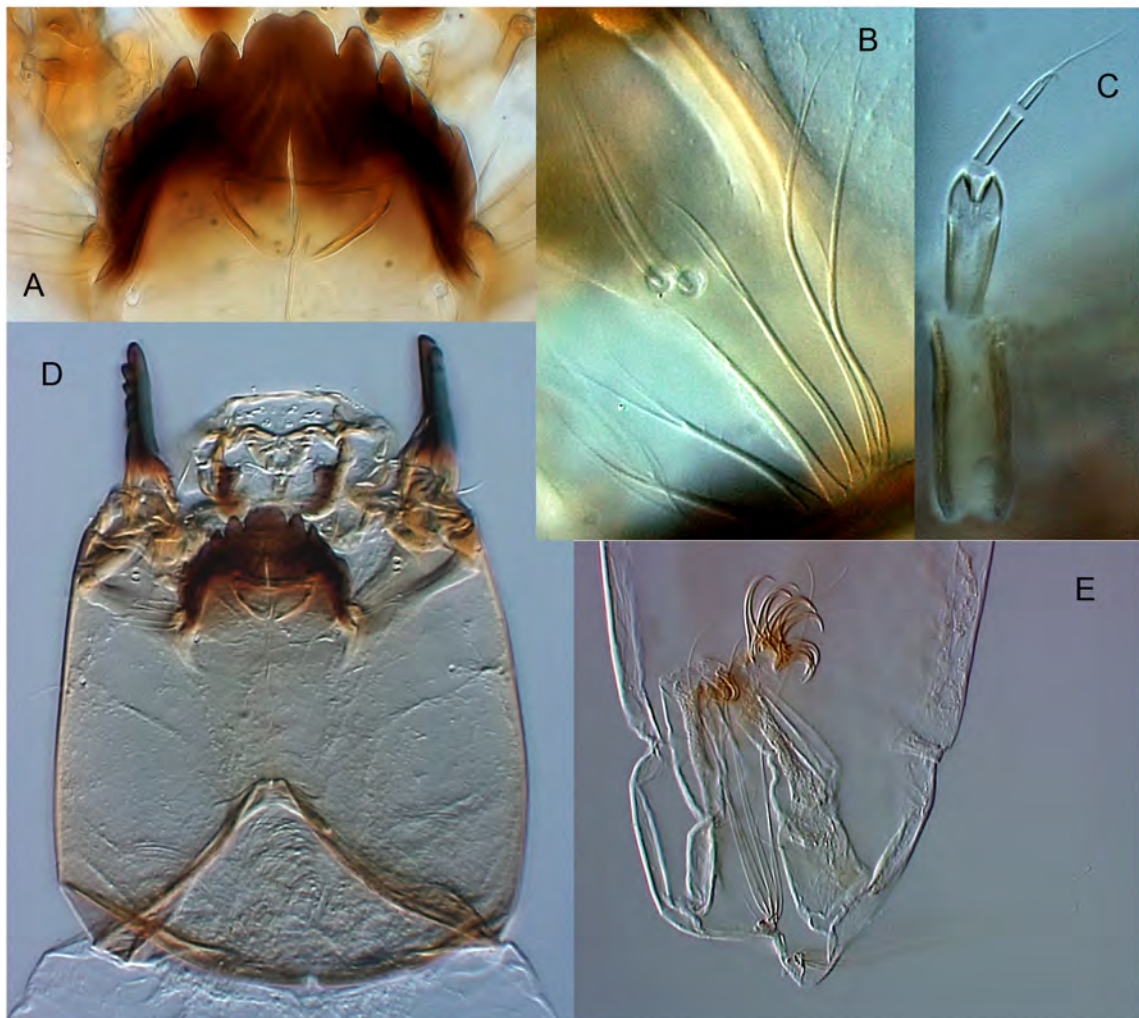
Antennae 6 segmented, the apical segment fine and whip-like (C)

Lauterborn organ the same size as the 3rd segment (C)

Mandibles with 3 inner teeth

Procercus present (E)

Occurs in the Stirling Ranges



Botryocladus petrophilus Cranston & Edward, 1999

Distinguishing features

Antennae 5 segmented with a lauterborn organ slightly smaller than segment 3 (A)

Mentum with lateral setae that are branched (B and C)

Median teeth of mentum bifid (C)

Mentum with a tooth-like projection placed posteriorly in the mentum (C)

Ventromental plates distinct (B and C)

Mandibles with 3, or what looks like 4 inner teeth (D)

Procercus present (F)

Occurs in granite outcrop rock pools and occasionally in forest streams
(usually where there is associated granite pools)



Corynoneura V49

Distinguishing features

Mandibles with 3 inner teeth and 1 outer tooth (A and B)

Median tooth of mentum depressed and much smaller than the rest which are all of similar size (C)

Antennae with 3 distinctive very long segments and a short apical segment (D)

Procercus present (E)

Occurs in fresh to saline wetlands

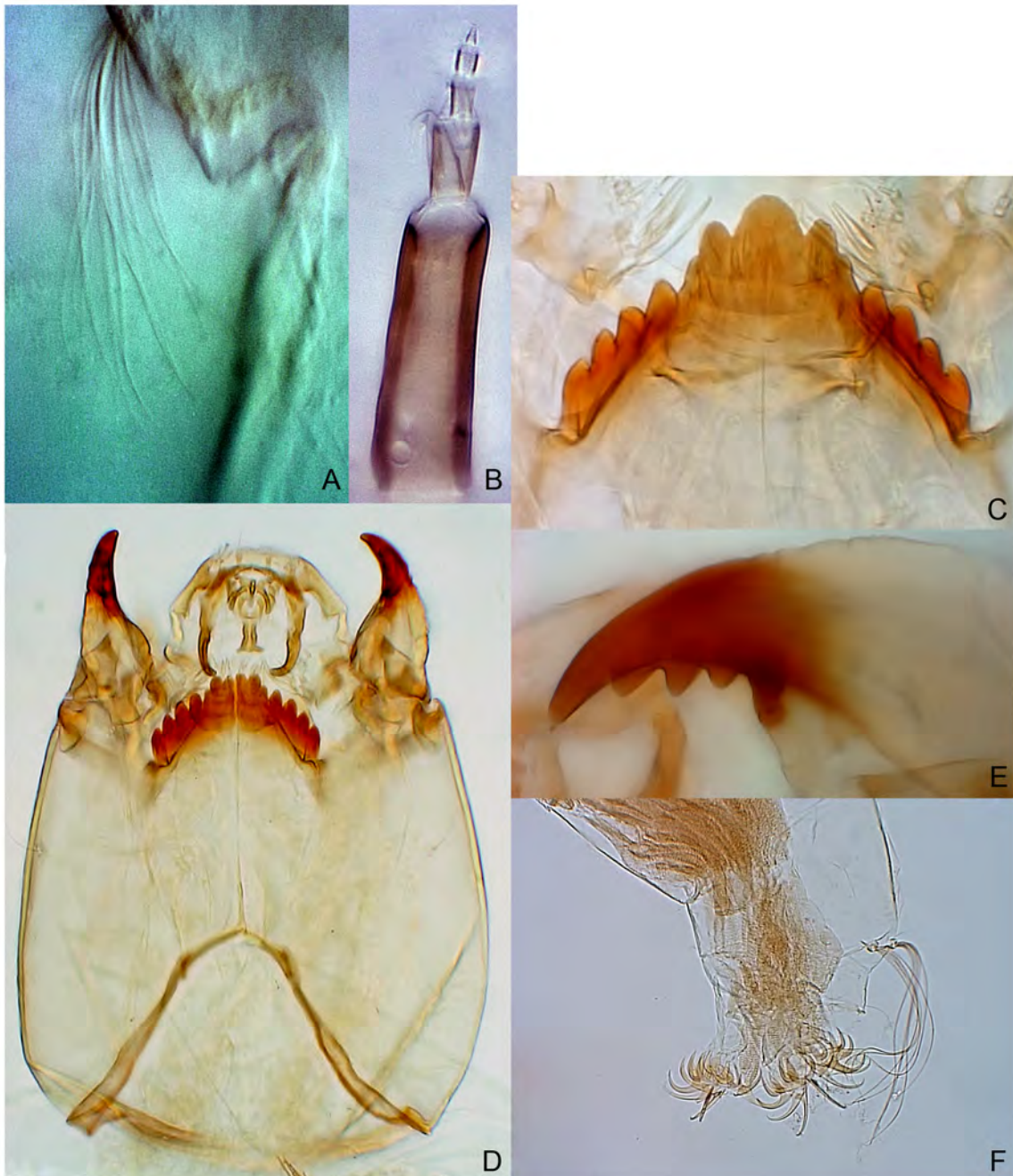


Cricotopus "albitarsis" (sensu Cranston, 2000) (= V51)

Distinguishing features

- Setal tufts present on the postero-lateral parts of each abdominal segment. These are about 0.15 the length of each segment and can be difficult to see if they are clinging to the body (A)
- Antennae 5 segmented with segments 3 and 4 subequal and ring organ at the bottom of the 1st segment (B)
- 2nd lateral teeth of mentum smaller and adpressed to the 1st lateral teeth (C)
- Mandibles with 3 inner teeth and a crenulate outer margin (E)
- Mandibles with mola squared off (D)
- Procercus present (F)

Generally in lentic wetlands, but will utilise slow flowing streams



Cricotopus "brevicornis" (sensu Cranston, 2000)

Distinguishing features

Lateral teeth of mentum teeth all about evenly sized (A)

Mandibles with 3 inner teeth (B)

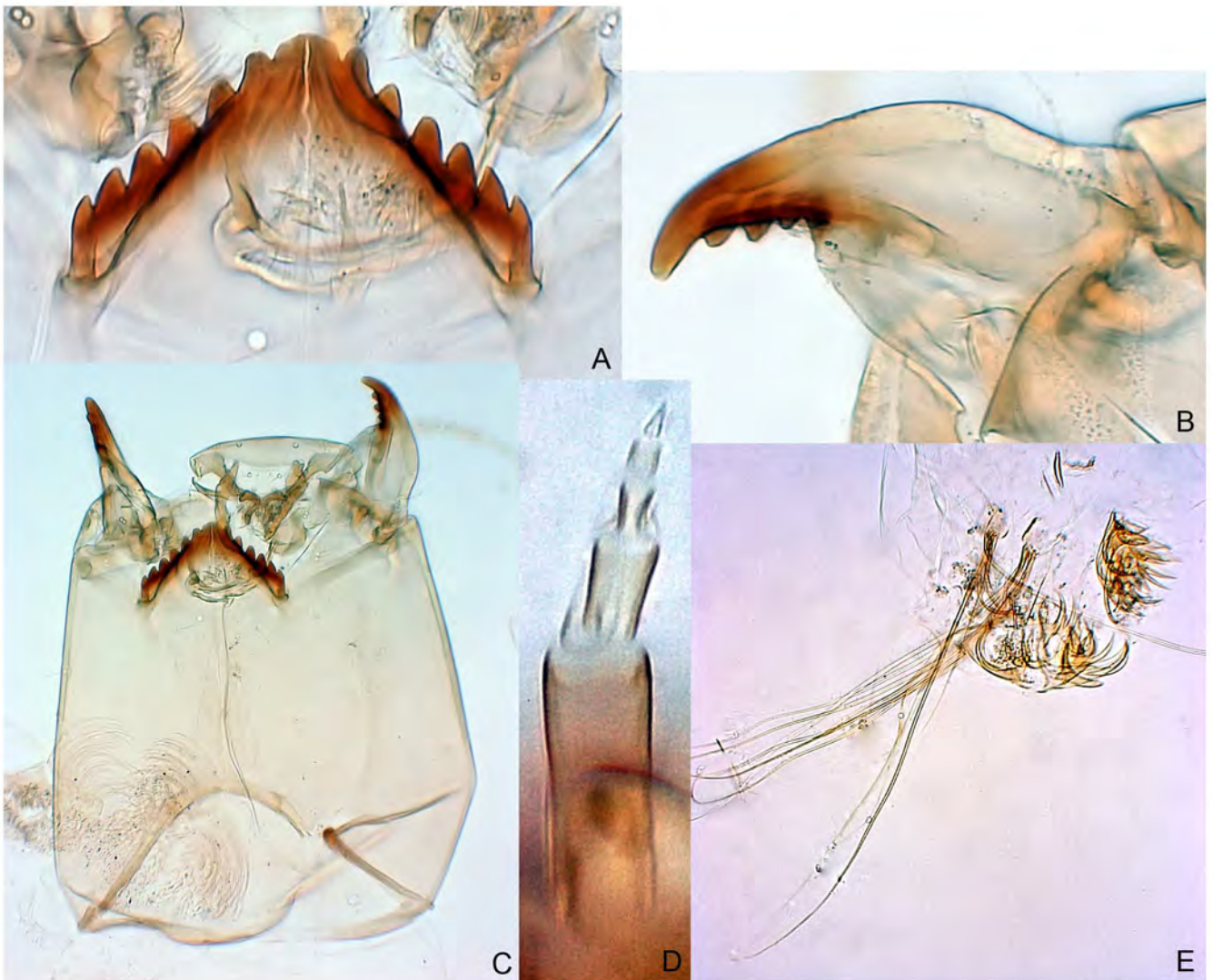
Mandibles with smooth inner and outer margins (B)

Antennae 5 segmented with the 3rd and 4th segments subequal (D)

Procercus present (E)

Setal tuft present on the postero-lateral part of each abdominal segment

Occurs in freshwater wetlands



Cricotopus "parbicinctus" (sensu, Cranston 2000) (= V2)

Distinguishing features

Mentum strongly V-shaped with lateral teeth all similar in size (B)

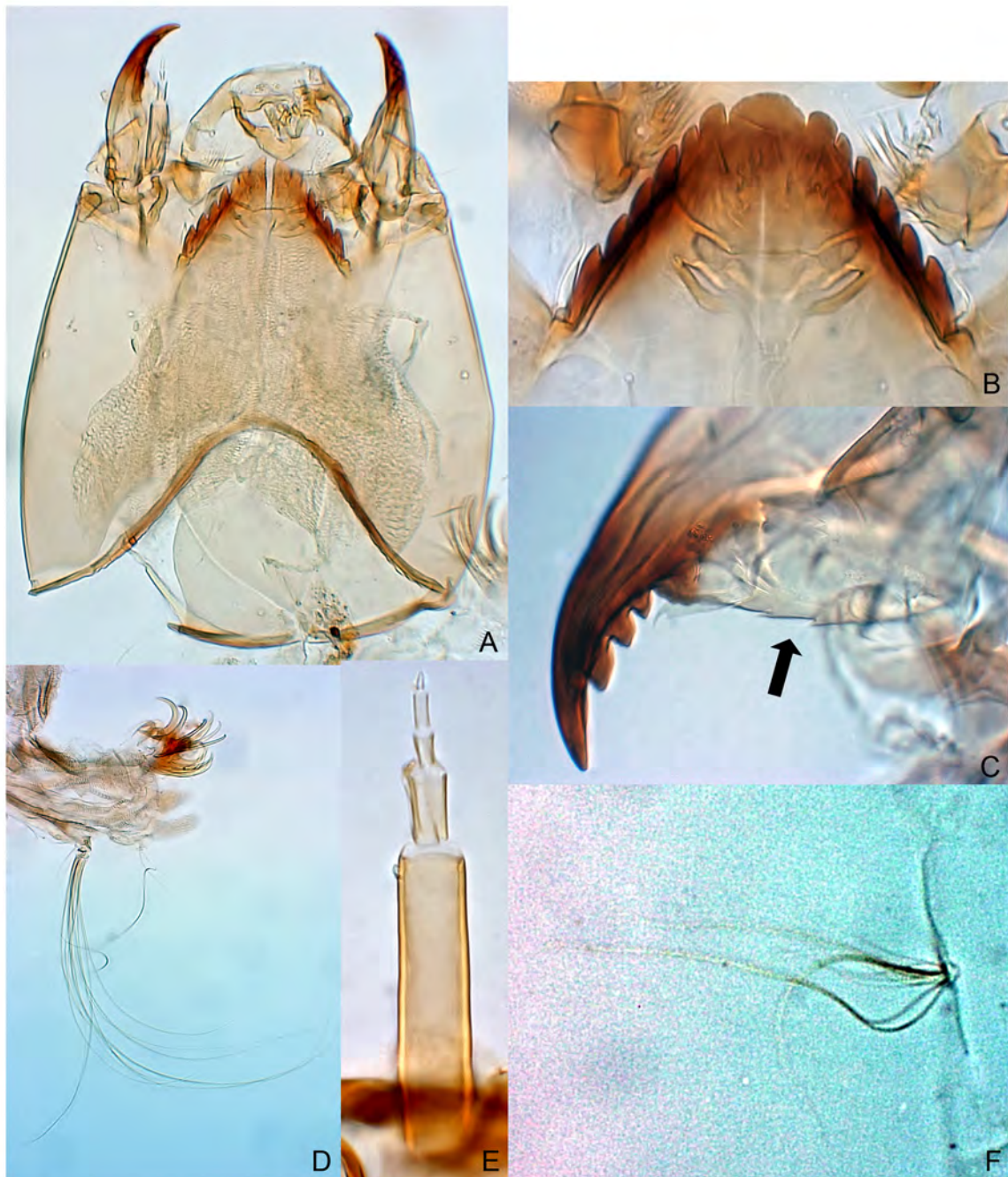
Mandibles with 3 inner teeth with a smooth outer margin and a serrated inner margin (C)

Procercus present (D)

Antennae 5 segmented (E)

Setae tufts present on the postero-lateral part of each abdominal segment. These can be difficult to see (F)

Occurs in freshwater streams and wetlands



Eukiefferiella insolida (Skuse, 1889)

(Drawings from Boothroyd and Cranston 1995)

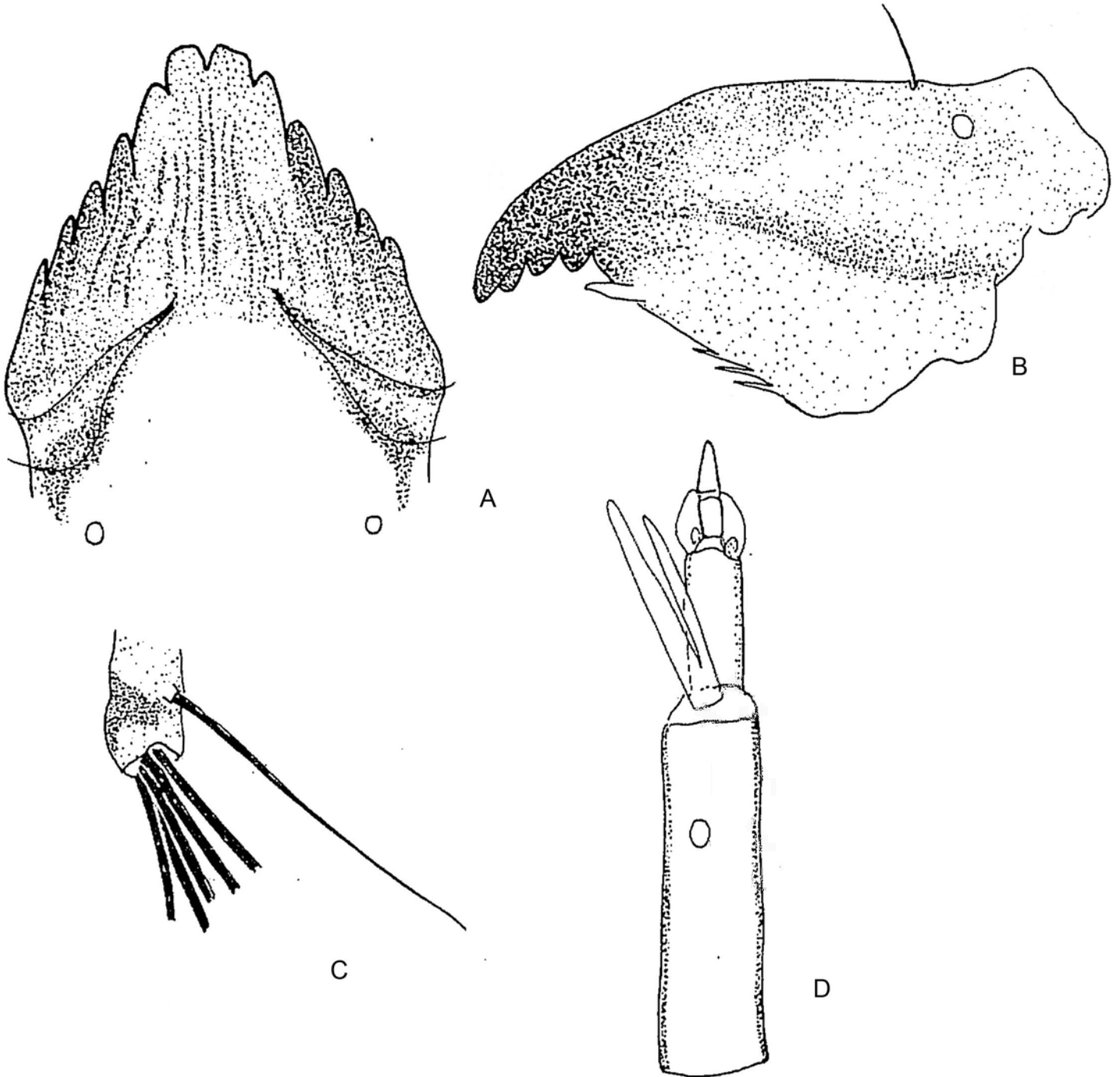
Distinguishing features

Mandibles with 3 inner teeth and serrations on inner edge (A)

Median teeth of mentum bifid (B)

Antennae with 4 segments (D)

Procercus present (C)



nr *Gymnometriocnemus* spp = VSC11

(possibly multiple species with short antennae and a blade that extends well past apical segment (cf. V45)
and with outer teeth on mentum not forming a ledge)

Distinguishing features

Antennae variable with 4 to 5 mostly short segments and a longer antennal blade (A - C)

Median teeth of mentum bifid, outermost lateral teeth may be adpressed but do not form a ledge (cf. V44) (D and E)

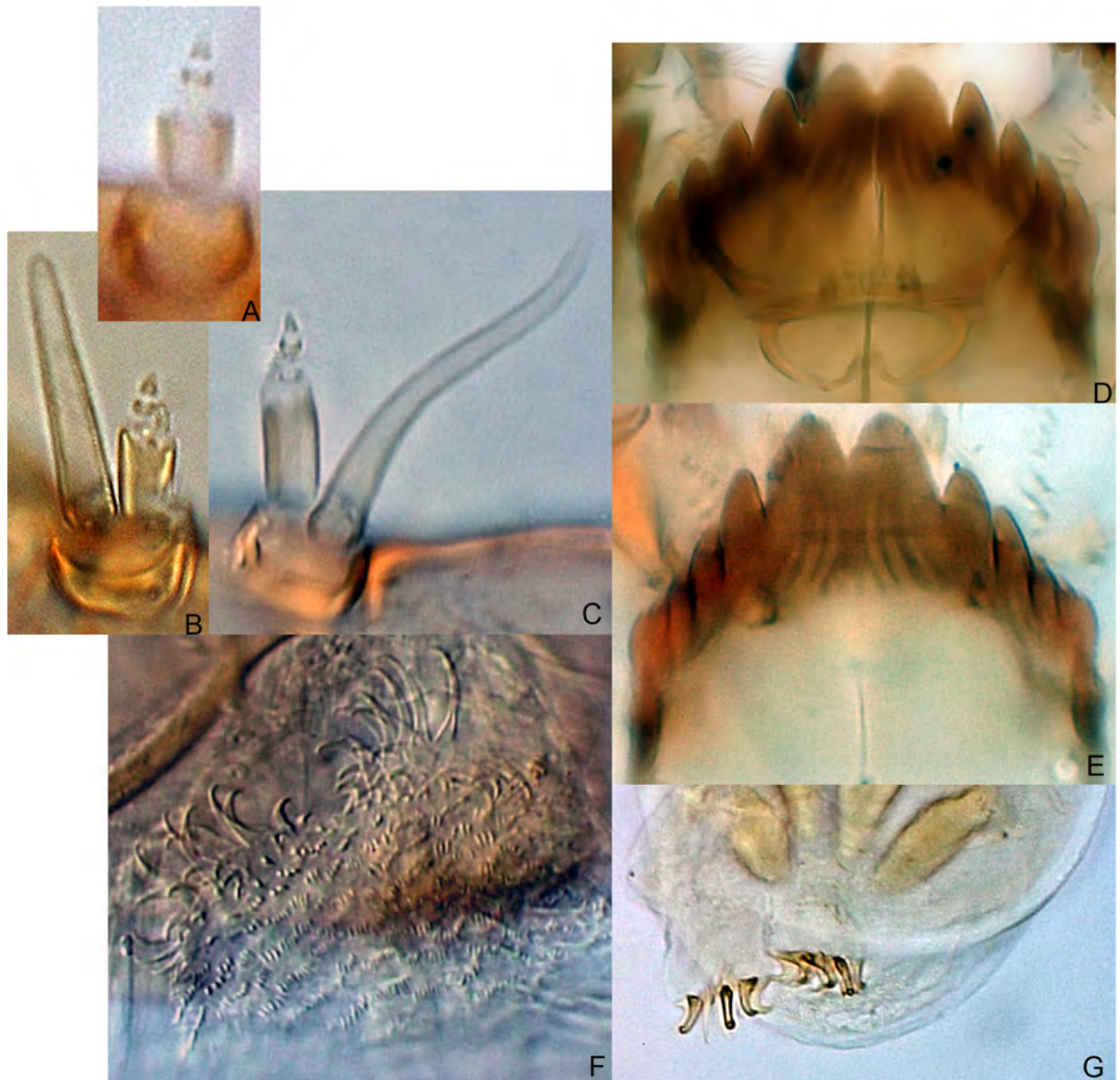
Mandibles with 3 or 4 inner teeth

Anterior parapods are fused and often reduced in size with mostly small hooklets and some small claws (F)

Procercus absent (G)

Posterior parapods present, may be reduced in size (G)

Occur in fresh to saline wetlands



nr *Gymnometriocnemus* V44 (sp. 1 of Cranston 2000)
(= DEC sp. 1)

Distinguishing features

Antennae short and 4 segmented with a long antennal blade (A)

Median teeth of mentum bifid and prominent, outermost teeth fused to form a ledge (B and D)

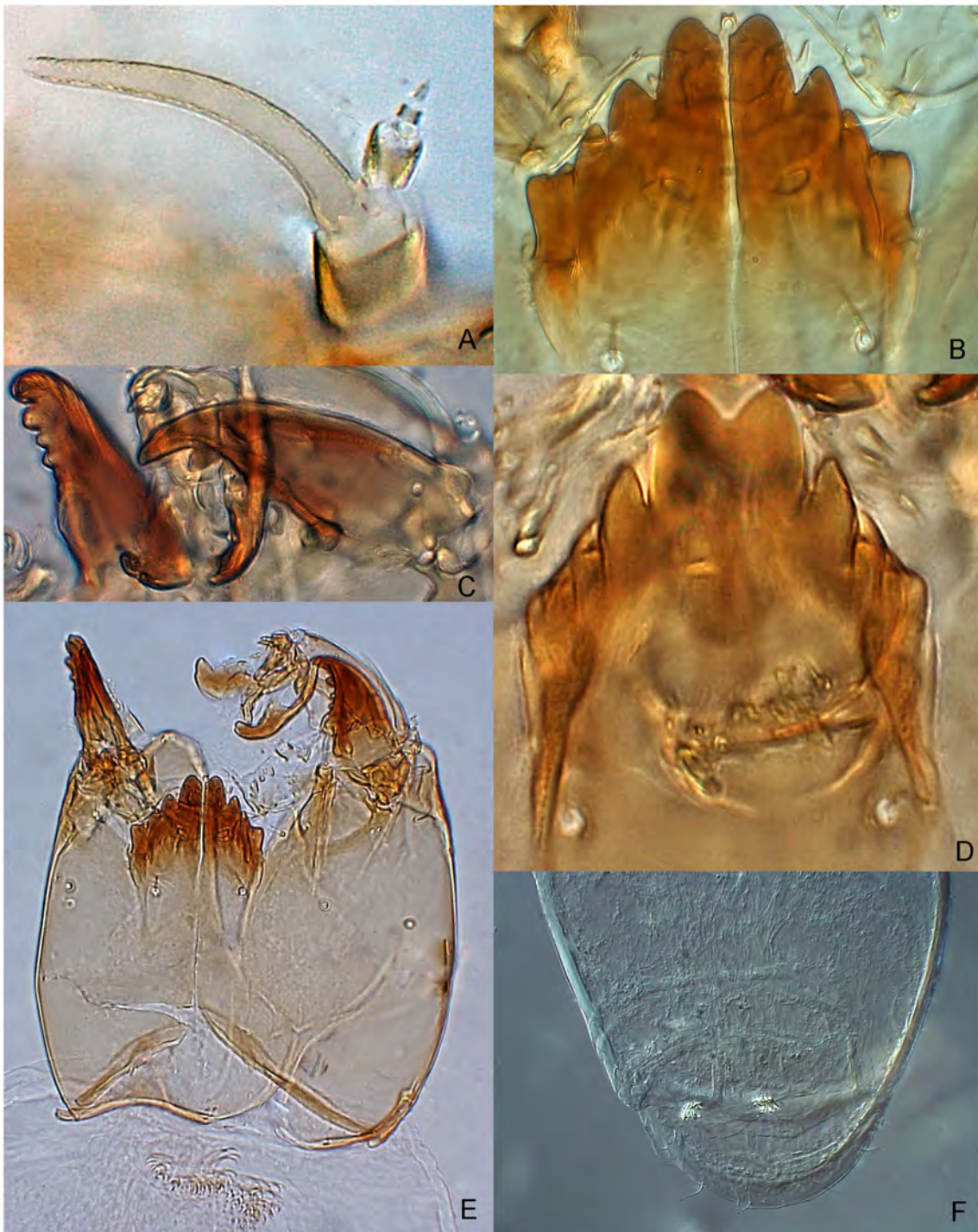
Mentum with another small lateral tooth-like projection located at the base of the 5th lateral tooth (B)

Mandible with 3 inner teeth (C)

Anterior parapods reduced in size and fused (E)

Procercus absent, some small posterior claws present (F)

Occurs in south west forest streams



nr *Gymnometriocnemus* V45 (sp. 2 of Cranston 2000?)
(=DEC sp. 2)

Distinguishing features

Median teeth of mentum bifid (A)

Antennae 5 segmented with a short 1st segment, the tips of segments 2 to 4 hyaline, and the antennal blade reaching to the apical segment (B)

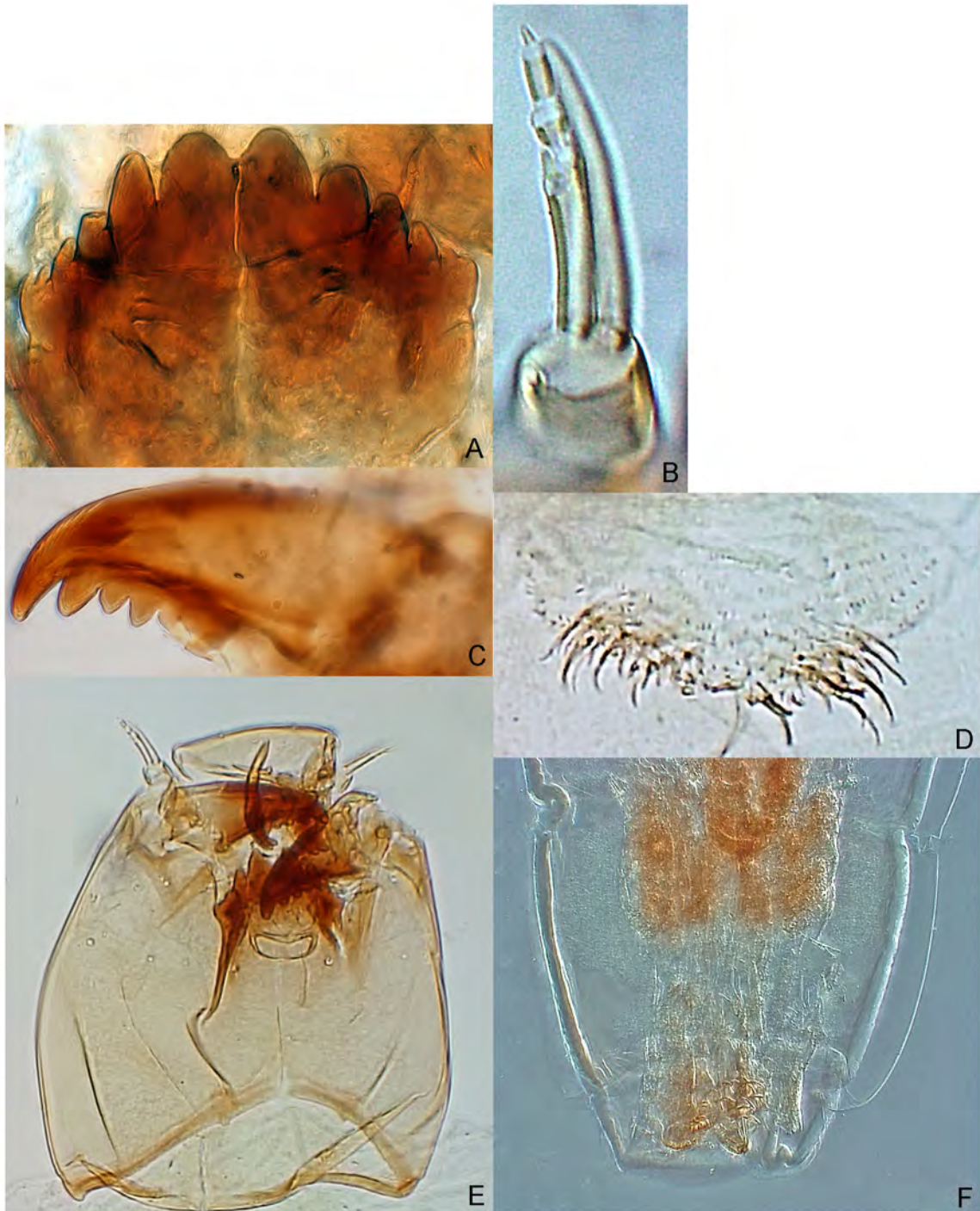
Mandibles with 3-4 inner teeth (4th very small) (C)

Anterior parapods reduced in size and fused (D)

Procercus absent (F)

Posterior parapod claws small

Occurs in fresh to saline wetlands



Limnophyes vestitus (Skuse, 1889)

Distinguishing features

Mandible with 3 inner teeth (A)

Median teeth of mentum bifid (B)

Antenna 5 segmented with a small 3rd segment and a lauterborn organ smaller than the 3rd segment (C and D)

Antennal blade reaching past the tip of the apical segment (C)

Procercus present (E)

Body setae short, less than 1/2 the length of each segment (E)

Supra-anal setae about 1/2 to 2/3rds the length of the procercal setae (F)

Occurs in fresh to saline wetlands



Nanocladius sp. 1 (sensu Cranston 2000) (= VCD7)

Distinguishing features

Ventromental plates strongly extending laterally and posteriorly beyond the outermost tooth of the mentum (A and C)

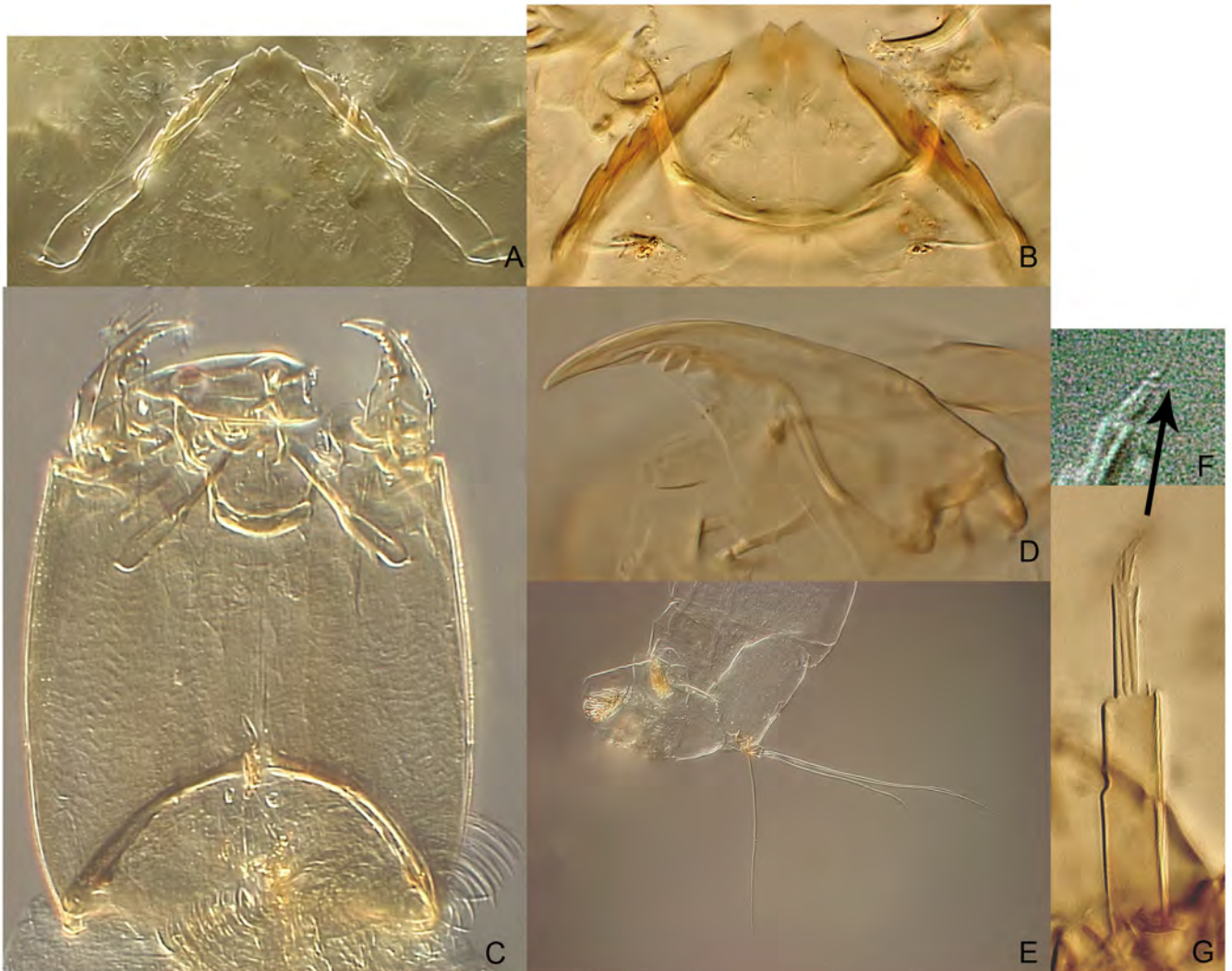
Median teeth of the mentum bifid (A and B)

Mandibles with 3 inner teeth (D)

Antennae with 4 obvious segments (G) and a very fine whip like 5th segment (F)

Procercus present (E)

Occurs in freshwater wetlands



Nanocladius sp. 2 (sensu Cranston 2000) (= V71)

Distinguishing features

Mandibles with 4 inner teeth - 3 small and a larger basal tooth (A)

Median tooth of mentum large and domed, and separated from the next teeth only by a cleft (B)

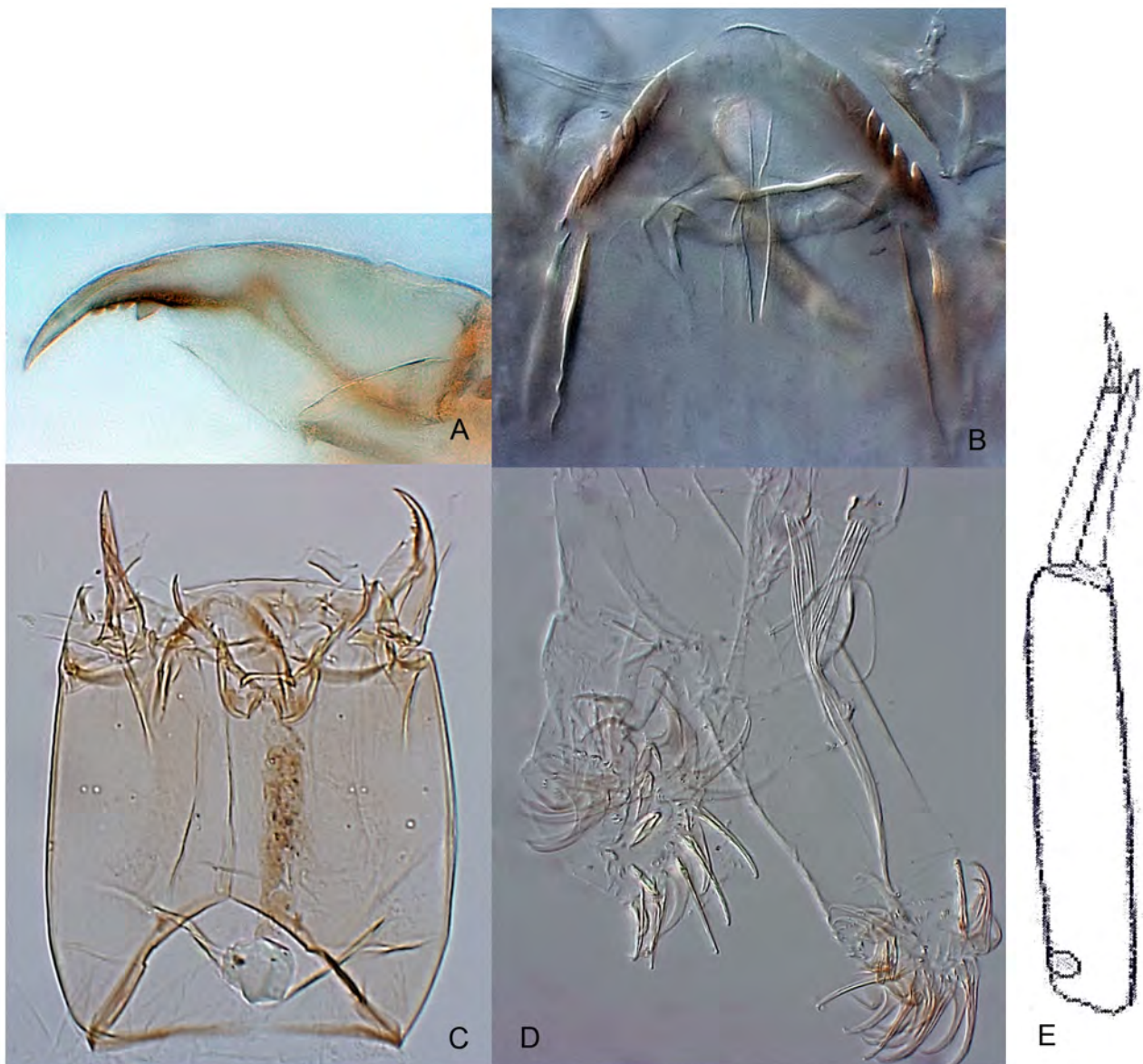
Ventromental plates slender, weakly extending laterally and strongly extending posteriorly beyond the base of the outermost tooth of the mentum (B)

Head squarish (C)

Procercus present (D)

Antennae 4 segmented (E)

Occurs in south west forest streams



Nanocladius sp. 3 (sensu Cranston 2000)

Distinguishing features

Head squarish (A)

Mandibles with 3 inner teeth (B)

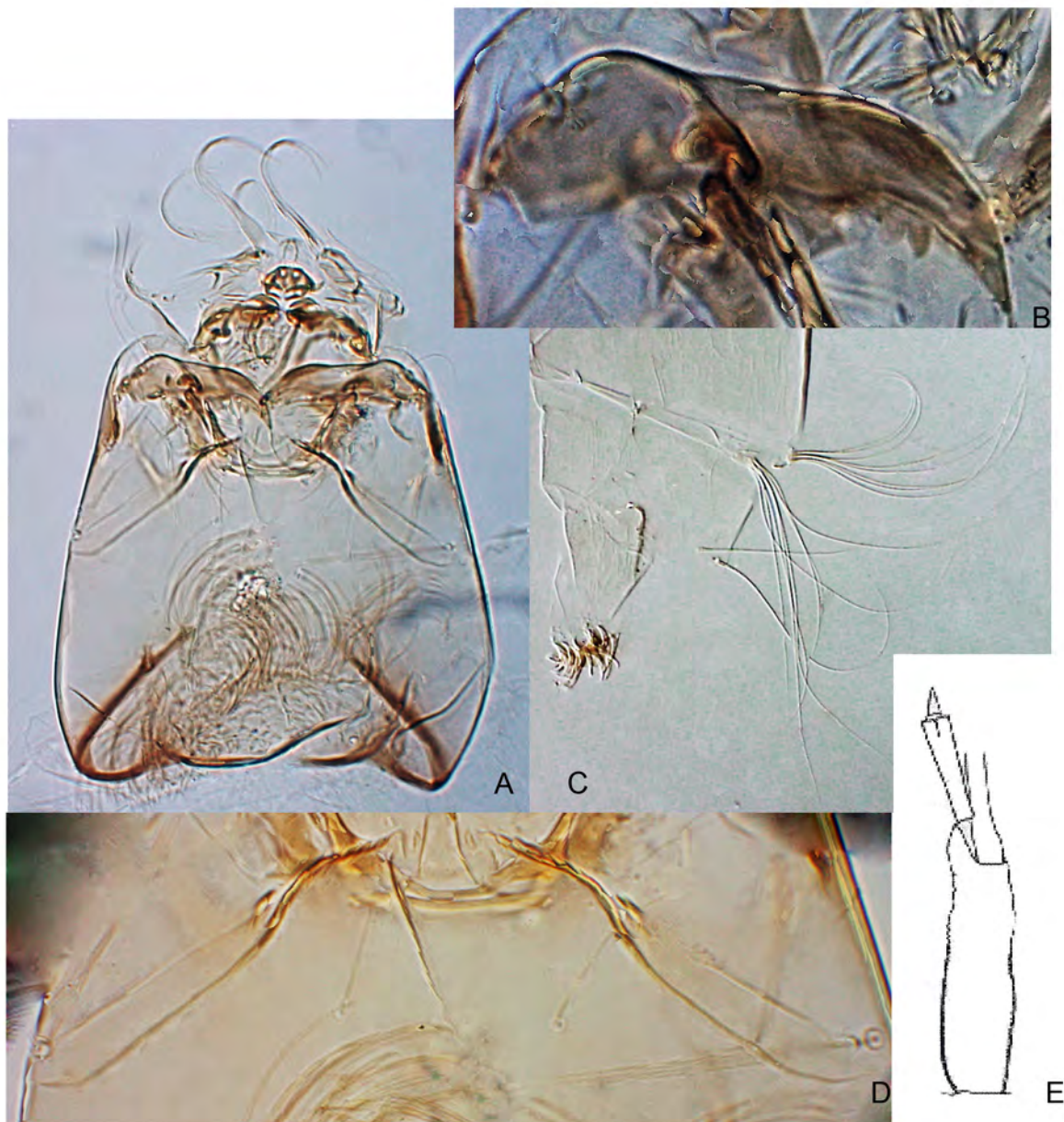
Mentum with numerous pairs of small lateral teeth, appears serrated (B and E)

Procercus present (C)

Ventromental plates very long and slender, strongly extending laterally and posteriorly beyond outermost tooth of the mentum (D)

Antennae 3 segmented (E)

Has been collected in lotic streams in higher rainfall south-west



Orthocladiinae V15
(= DEC sp. 5)

Distinguishing features

- Median teeth of mentum bifid and prominent (A)
- Mentum with 5 pairs of lateral teeth with the outer 3 adpressed (A)
- Antennae 5 segmented with a short 3rd segment (B)
- Antennal blade reaching to about the middle of the 4th segment
- Procercus present (D)
- Mandibles with 3 inner teeth
- Body setae about half length of each segment

Occurs in south west forest streams



Orthoclaadiinae DEC sp. D

Distinguishing features

Antennae small and 5 segmented, with segments 3 and 4 very short (A)

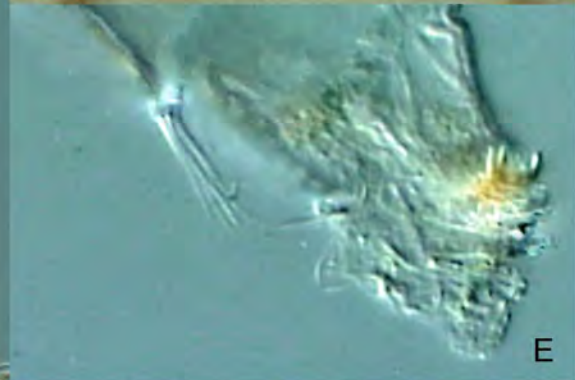
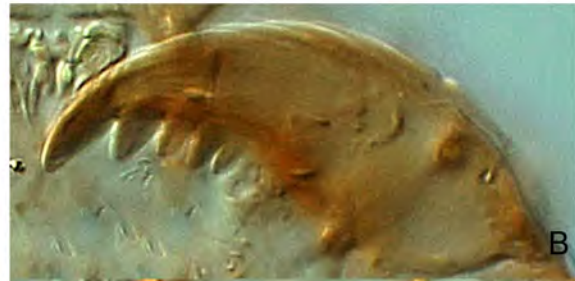
Mandibles with 4 inner teeth (B)

Median teeth of mentum trifid/broad singular (C)

Mentum with 5 pairs of lateral teeth adpressed (C)

Procercus present (E)

Occurs in freshwater wetlands



Orthoclaadiinae DEC sp. I

Distinguishing features

Median teeth of mentum trifid (A)

Mentum with 4 pairs of lateral teeth (A)

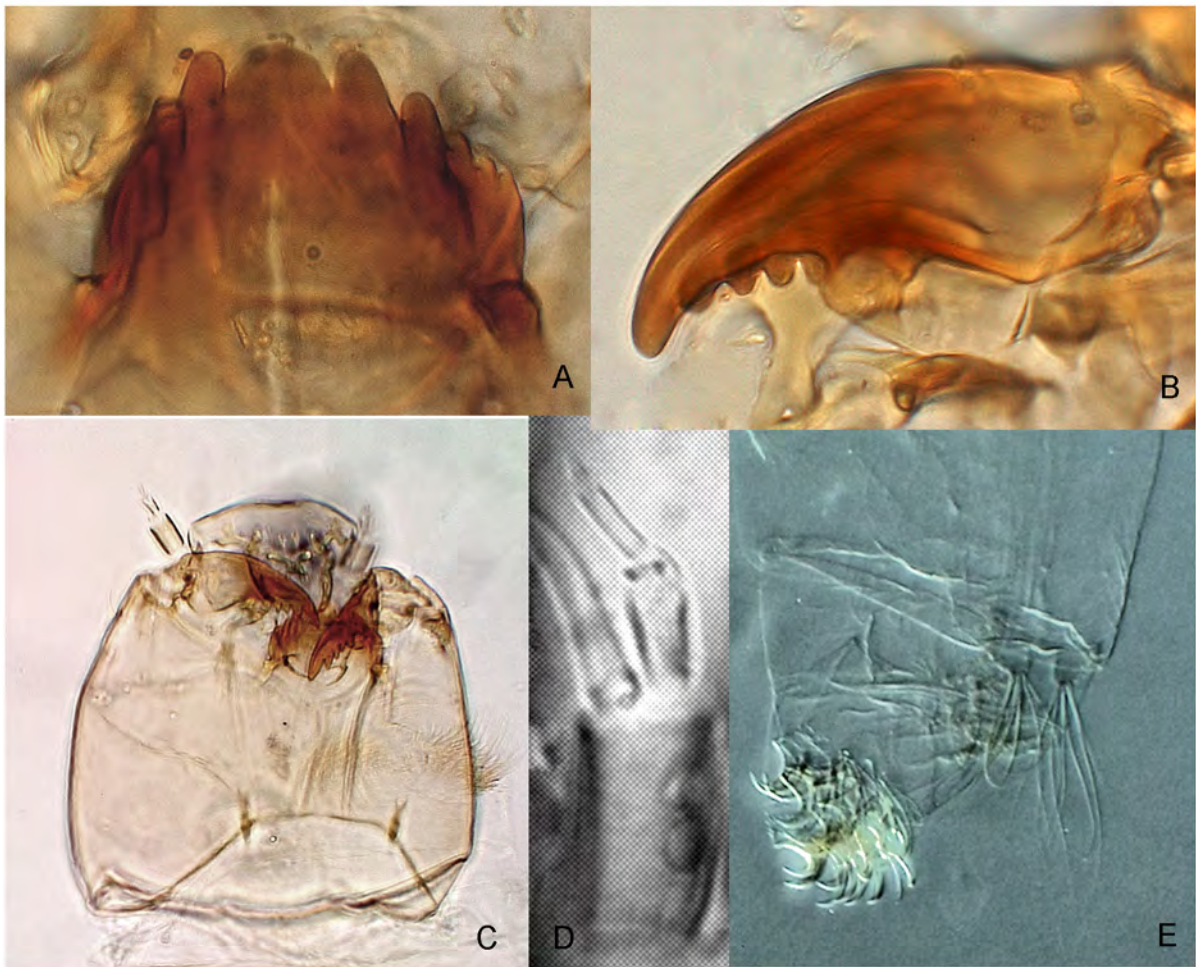
Mandibles with 3 inner teeth, although a lobe midway down may look like another tooth (B)

Antennae 5 segmented with a short 3rd segment and lauterborn organ the same size as the 3rd segment (D)

Antennal blade about the same length as the antenna (D)

Procercus present (E)

Occurs in mostly freshwater wetlands throughout the south west



Orthoclaadiinae DEC sp. M

Distinguishing features

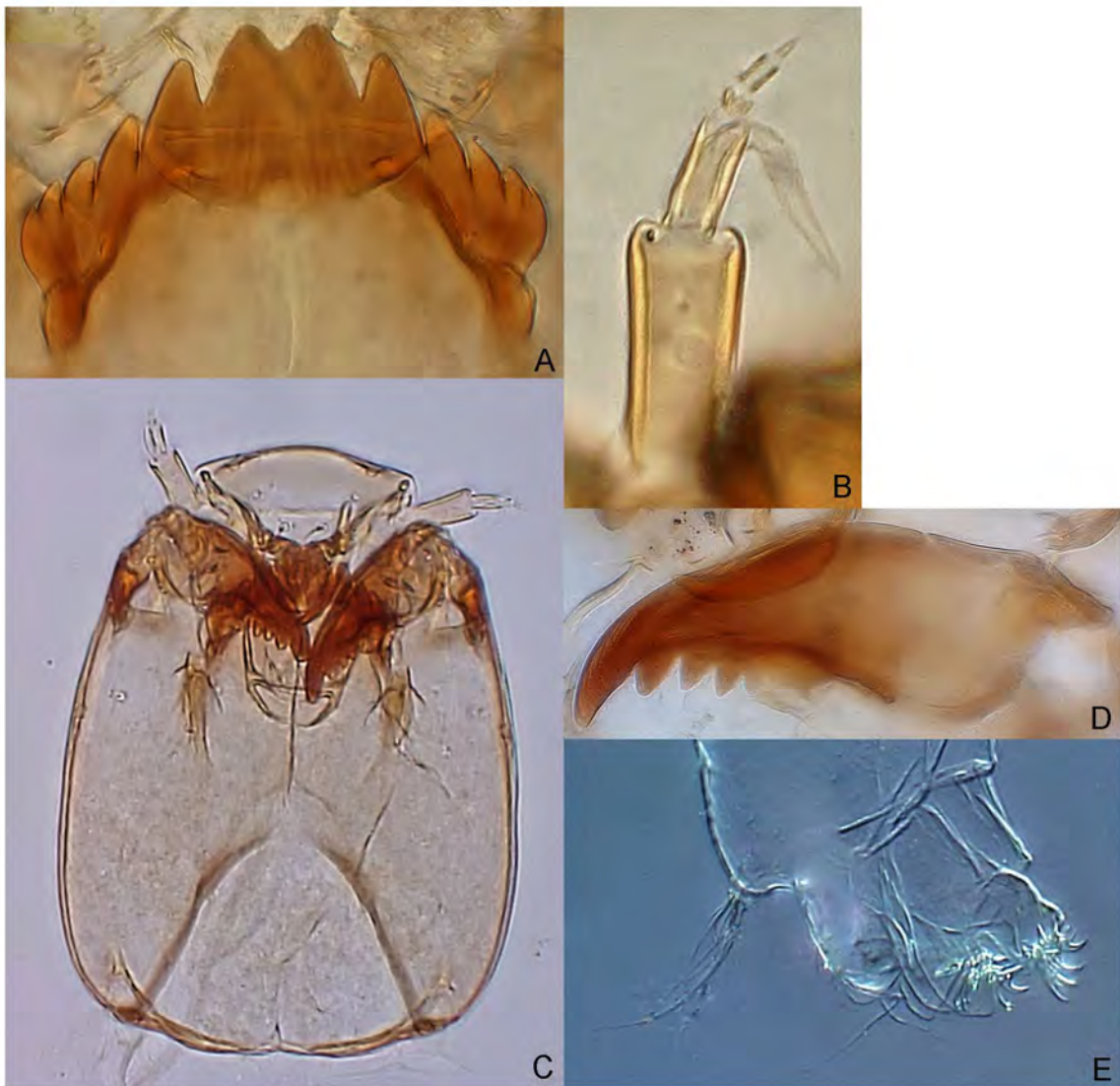
Median teeth of mentum bifid, mentum recurved inwards posteriorly to create bulging edge (A)

Antennae 5 segmented (B)

Mandibles with 4 inner teeth (D)

Procercus present (E)

This species has mostly been found in granite pools and seasonal freshwater wetlands



Orthoclaadiinae 'SO3' (sensu Cranston 2000) DEC sp. B

Distinguishing features

Median teeth on mentum bifid (A)

Antennae with 5 obvious segments and a very fine 6th segment (B and C)

1st segment of antennae long, about 5-6 times long as wide

Mandibles with 4 inner teeth (D)

Procercus present (F)

Body hairs about three quarters length of each segment

Supra anal setae and procercal setae about the same length

Occurs in fresh to saline wetlands



Orthoclaadiinae 'SO3' (sensu Cranston 2000) DEC sp. C

Distinguishing features

Median teeth of mentum bifid (A)

Antennae with 5 obvious segments and a fine 6th segment (B and C)

1st segment of antenna about 4 times long as wide (B)

Head sclerite SI and SII rugose (D)

Mandibles with 4 inner teeth (F)

Procercus present (G)

Body hairs about half length of each segment

Occurs in saline and hypersaline wetlands



Orthocladiinae V35 (nr *Lopescladius*)

Distinguishing features

Median teeth of mentum trifold and broad with a depressed central tooth (A)

Antennae with 5 obvious segments (B), and a fine whip like 6th segment (C - showing distinctive shape of the 5th segment and the fine 6th segment which is often very hard to see)

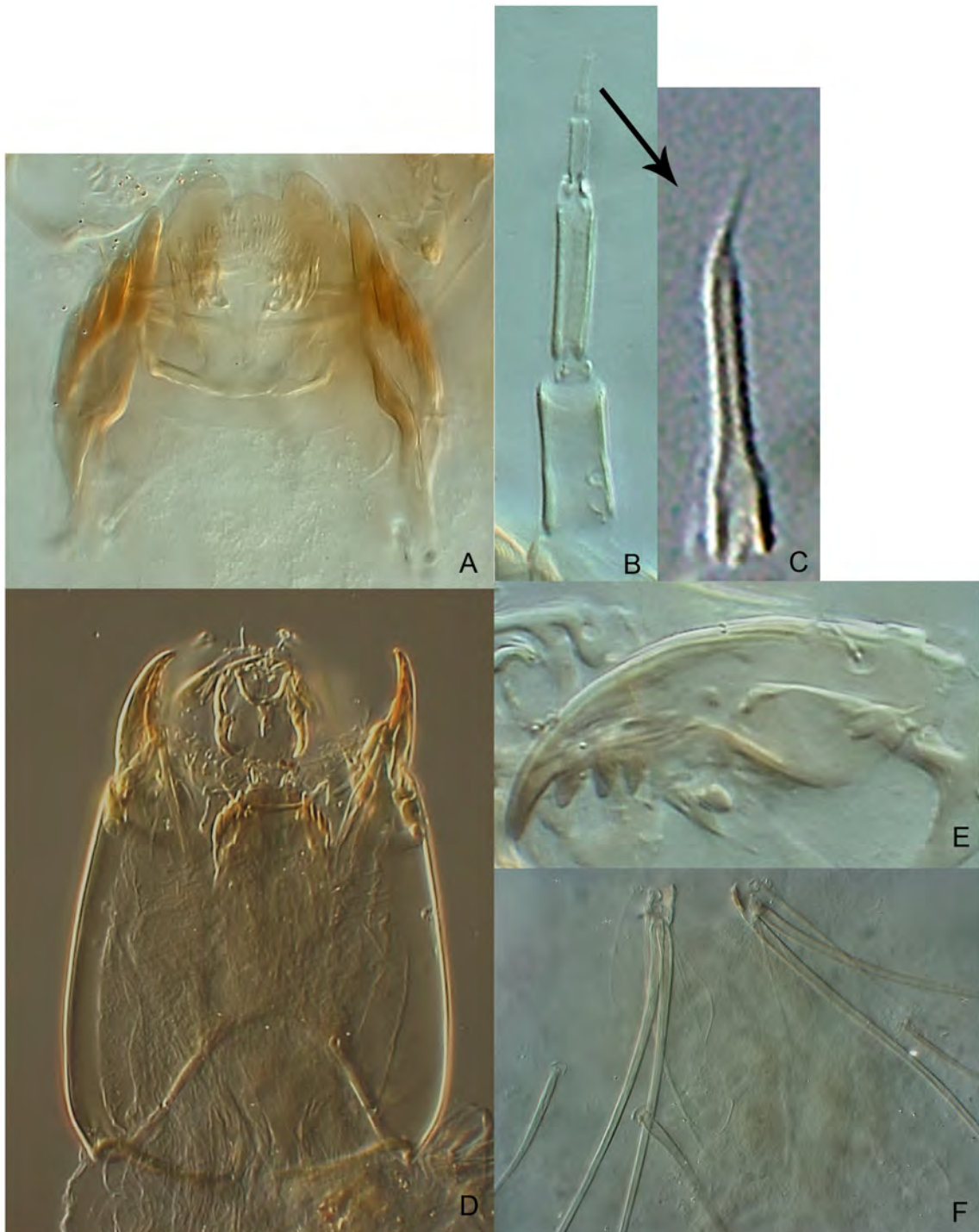
Antennal blade reaching about midway to 3rd segment

Mandibles with 3 inner teeth (E)

Procercus present (F)

Body hairs short and indistinct

Occurs in freshwater lotic habitats



Orthoclaadiinae 'SO3' (sensu Cranston 2000) V31
(= DEC 'SO3' sp. A)

Distinguishing features

Antennae with 5 obvious segments and a very fine 6th segment (A and B)

1st segment of antennae about 3.5-4.5 times long as wide

Mandibles with 4 inner teeth (C)

Mentum with bifid median teeth (D)

Body hairs half to three quarters length of each segment

Procercus present and sclerotised (F)

Supra anal setae present and about as long as procercal setae (F)

Occurs in fresh to hypersaline wetlands



Orthocladiinae V43 “wood miner” (sensu Cranston 2000)

Distinguishing features

Antennae 5 segmented with an annulate antennal blade (A)

Mandibles with 4 inner teeth, the lowest one about half the size of the others (B)

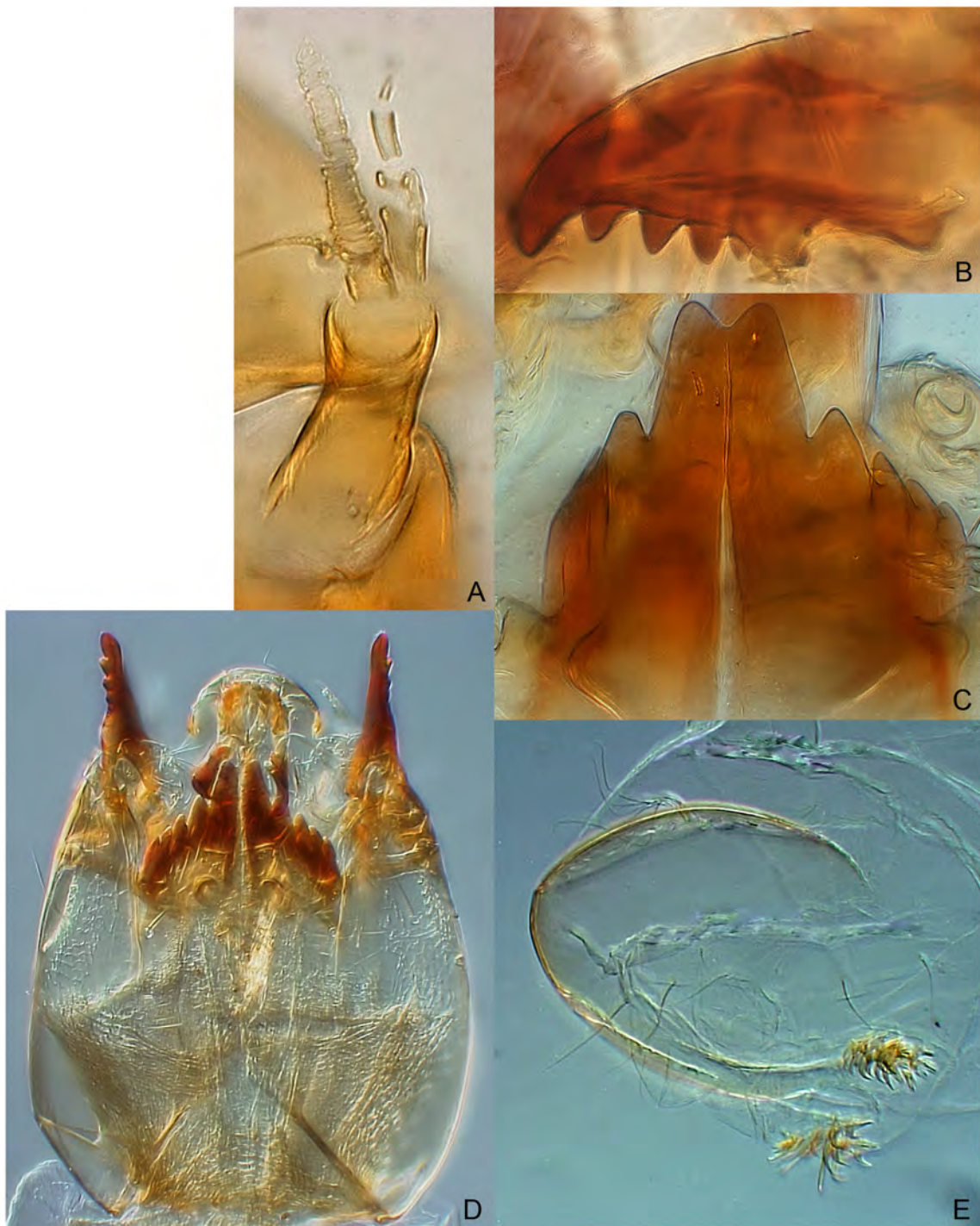
Median teeth of mentum bifid and strongly protruding (C)

Mentum with 4 pairs of lateral teeth (C)

Mentum with paired lobes extending outwards in a horizontal plane (C)

Procercus absent, but procercal setae present (E)

Occurs in freshwater wetlands, inhabits and feeds on decaying wood



Orthocladiinae V46 (= DEC sp. G)

Distinguishing features

Antennae small and very difficult to see, especially the middle segments (A and B)

Mandible with 3 large inner teeth (C)

Median teeth of mentum trifold or broad singular (D and E)

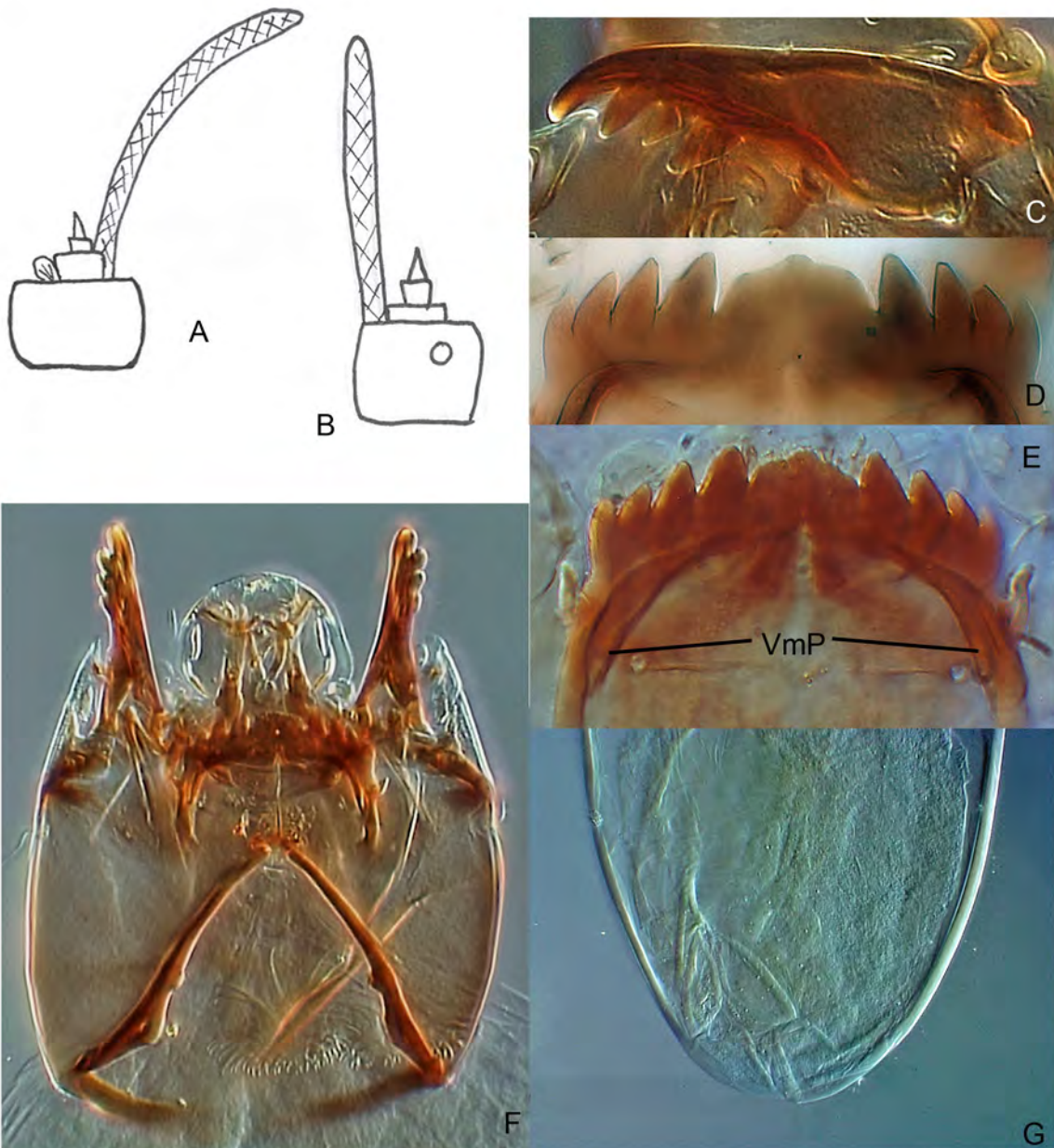
Mentum with 4 pairs of lateral teeth (D and E)

Ventromental plate (VmP) paddle-shaped (E)

A tooth-like projection placed posteriorly on mentum (E)

Procercus absent (G)

Occurs in a wide range of freshwater to hypersaline wetlands throughout the south west



Orthoclaadiinae V52 (= DEC sp. J)

Distinguishing features

Median tooth of mentum trifid (A)

Mentum with 5 pairs of lateral teeth (A)

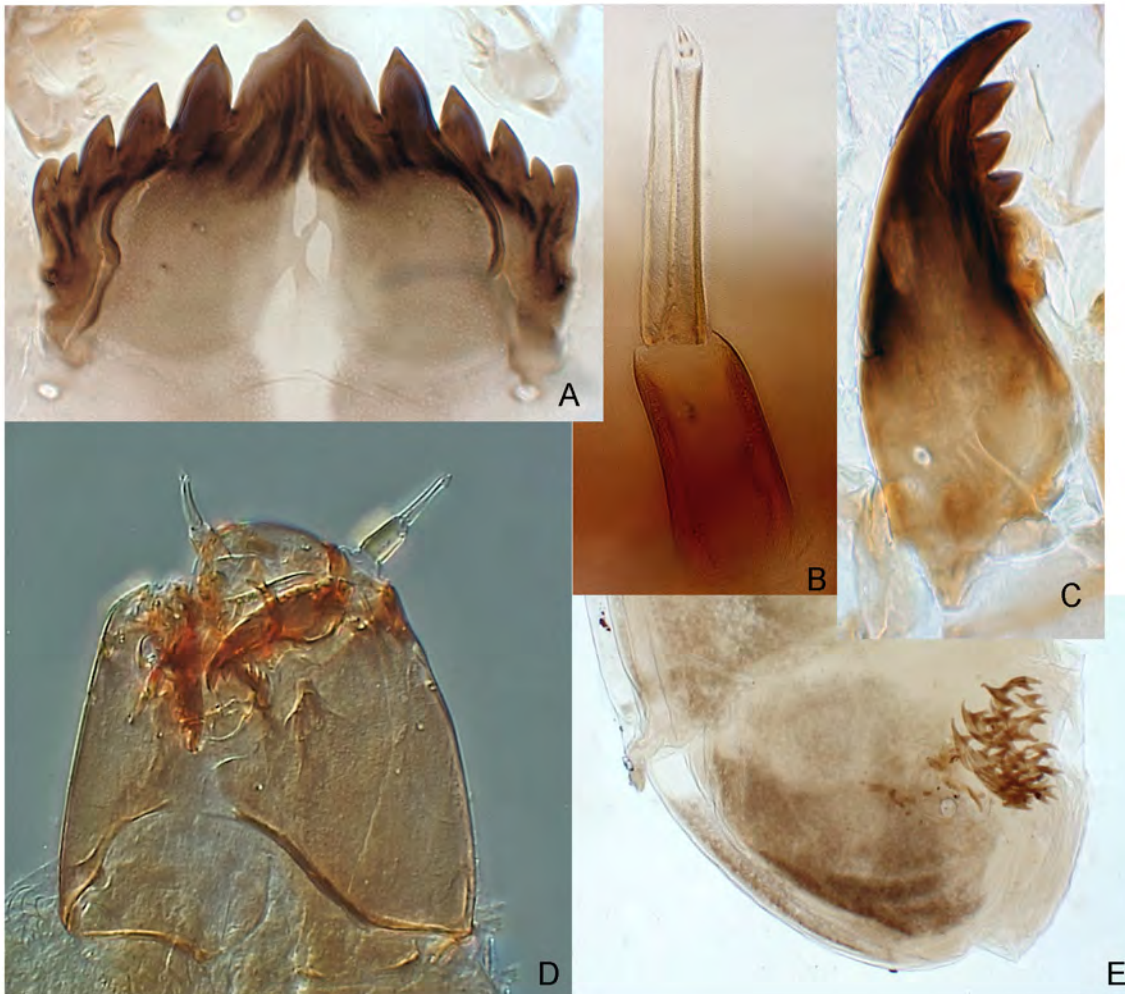
Antenna 5 segmented with a long 2nd segment and very short, often difficult to distinguish 3 apical segments (B)

Antennal blade almost extending to the last segment of the antenna (B)

Mandibles with 3 inner teeth (C)

Procercus absent (E)

Occurs in fresh to saline wetlands



Orthoclaadiinae V59

Distinguishing features

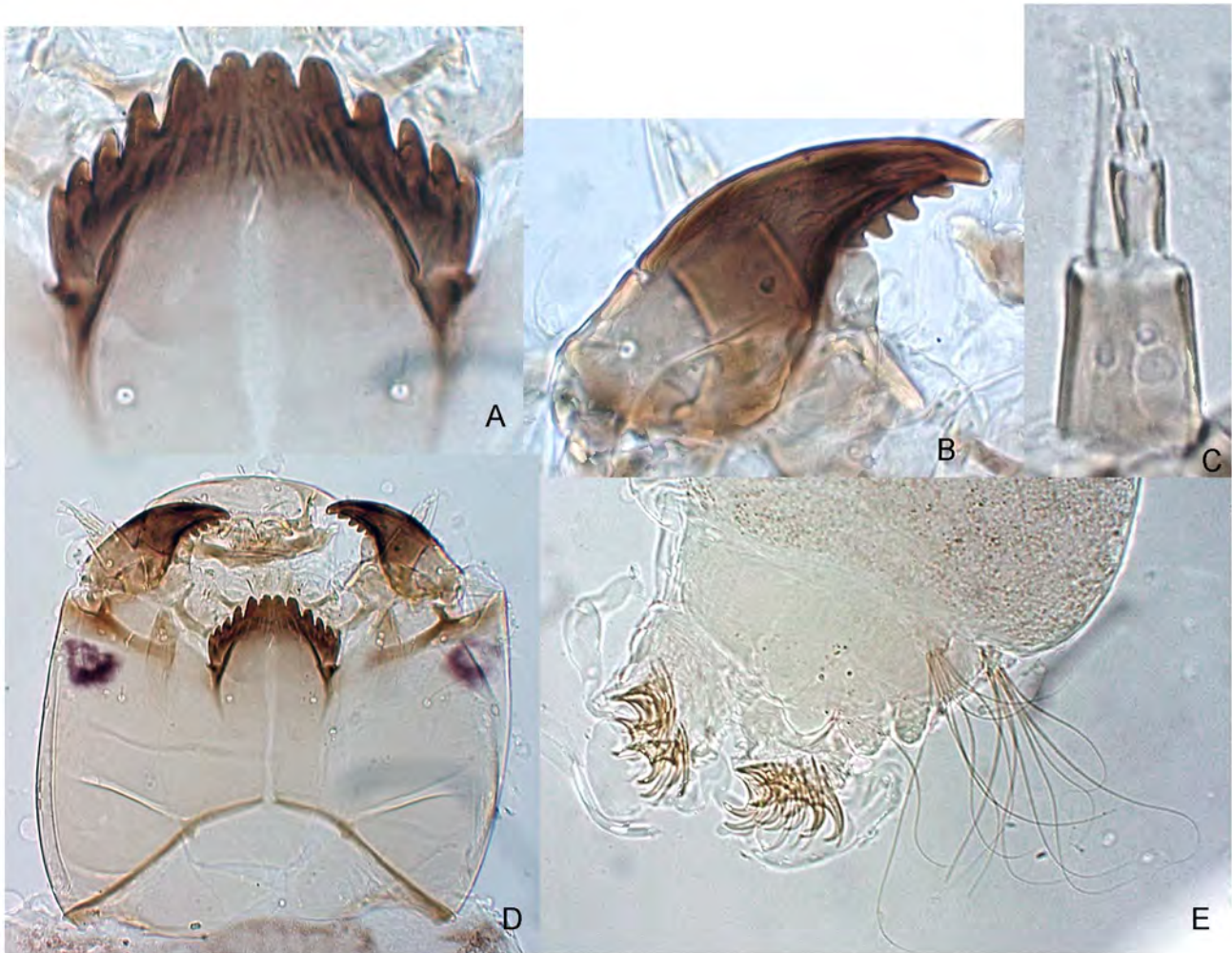
Median teeth of mentum bifid (A)

Mandibles with 4 inner teeth (B)

Antenna 5 segmented, with squarish 1st segment and lauterborn organ atop second segment (C)

Antennal blade about same length as antenna (C)

Procercus present (E)



Orthoclaadiinae V61

Distinguishing features

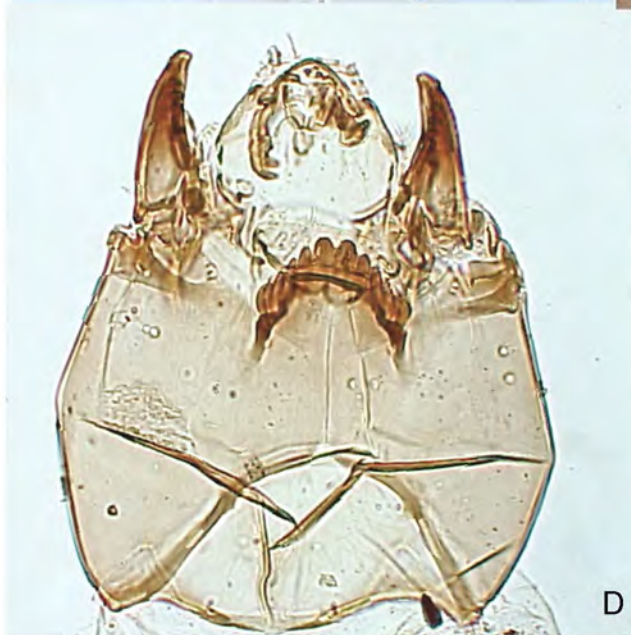
Median teeth of mentum bifid (A)

Antennae 4 segmented, with 2nd and 3rd segments approximately the same length, and lauterborn organ located atop second segment (B)

Antennal blade about the same length as the antenna

Mandibles with 4 inner teeth (C)

Procercus absent (E)



Orthoclaadiinae V76 (= DEC sp. Q)

Distinquishing features

Mandibles with 3 inner teeth (A)

Median teeth of mentum trifid (B)

Mentum with 4 lateral teeth on each side (B)

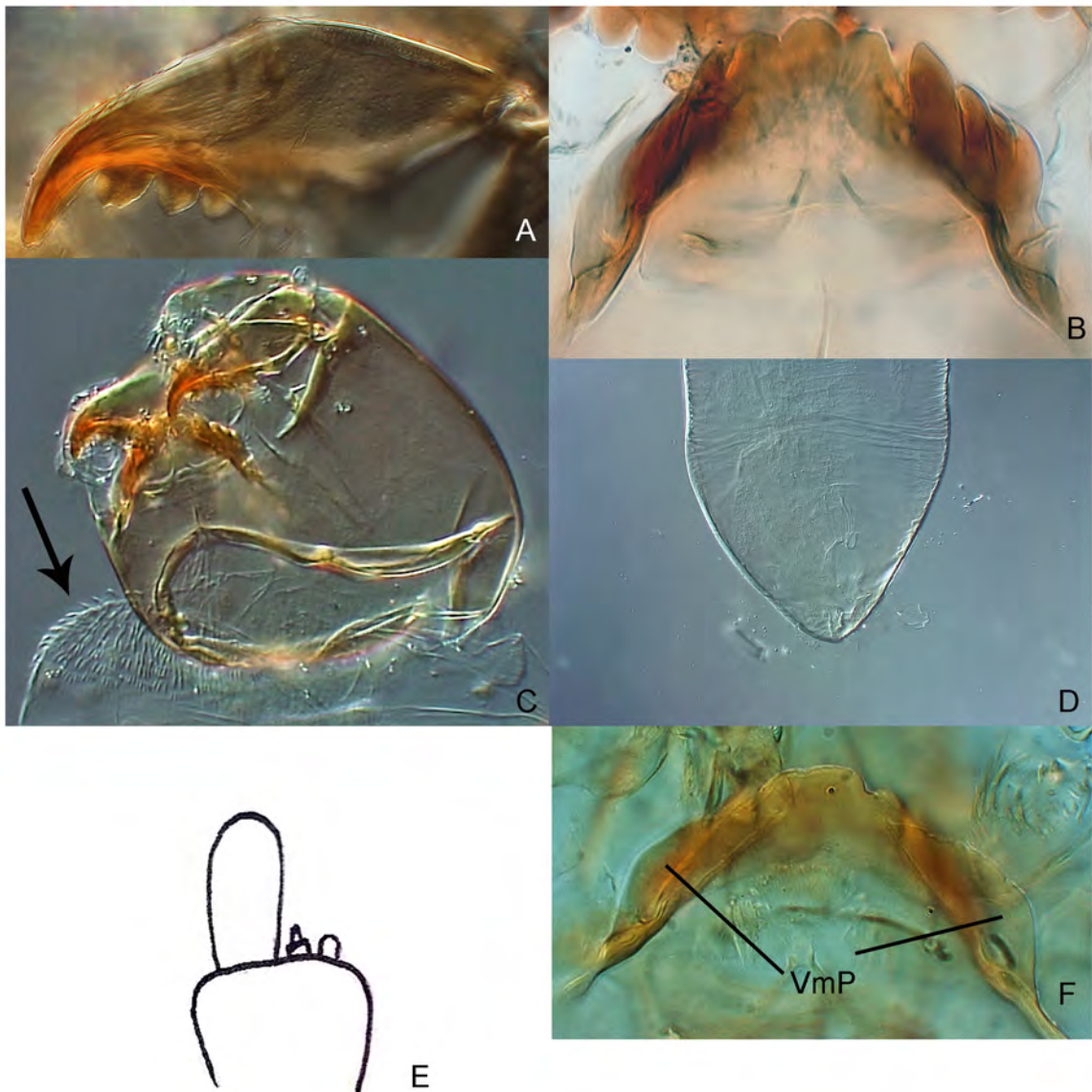
Ventromental plates expanded with flat base and rounded outer edge (F)

Anterior parapods strongly reduced (C)

Procercus absent (D)

Antennae very small and difficult to see. 3 segmented, blade bulbous (E)

Occurs in freshwater



?Parakiefferiella DEC sp. D

Distinguishing features

Median tooth of mentum broad (A)

Mentum with 4 pairs of lateral teeth (A)

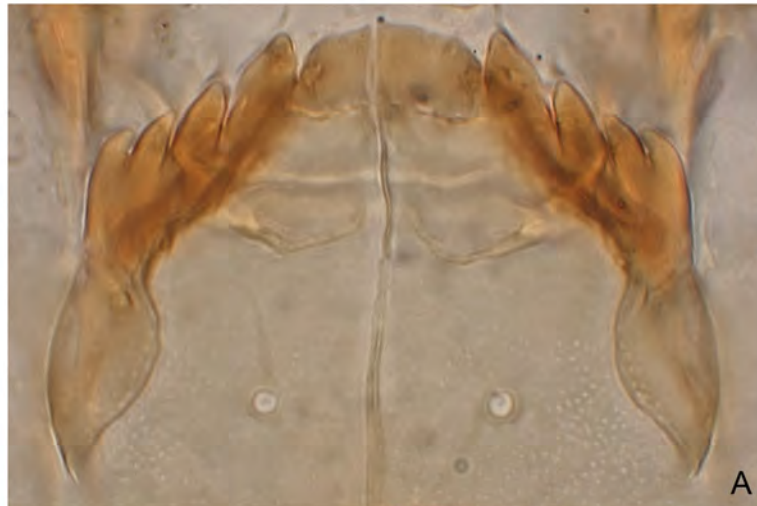
Ventromental plates large and weakly extending laterally beyond the outermost tooth of the mentum, curved inner margin (A)

Mandibles with 3 inner teeth

Procercus absent but fine procercal setae present (C)

Posterior parapods small (C)

Occurs in springs in the northern Wheatbelt



Parakiefferiella sp. S1 (sensu Cranston, 2000) (= VCD2 = DEC sp. B)

Distinguishing features

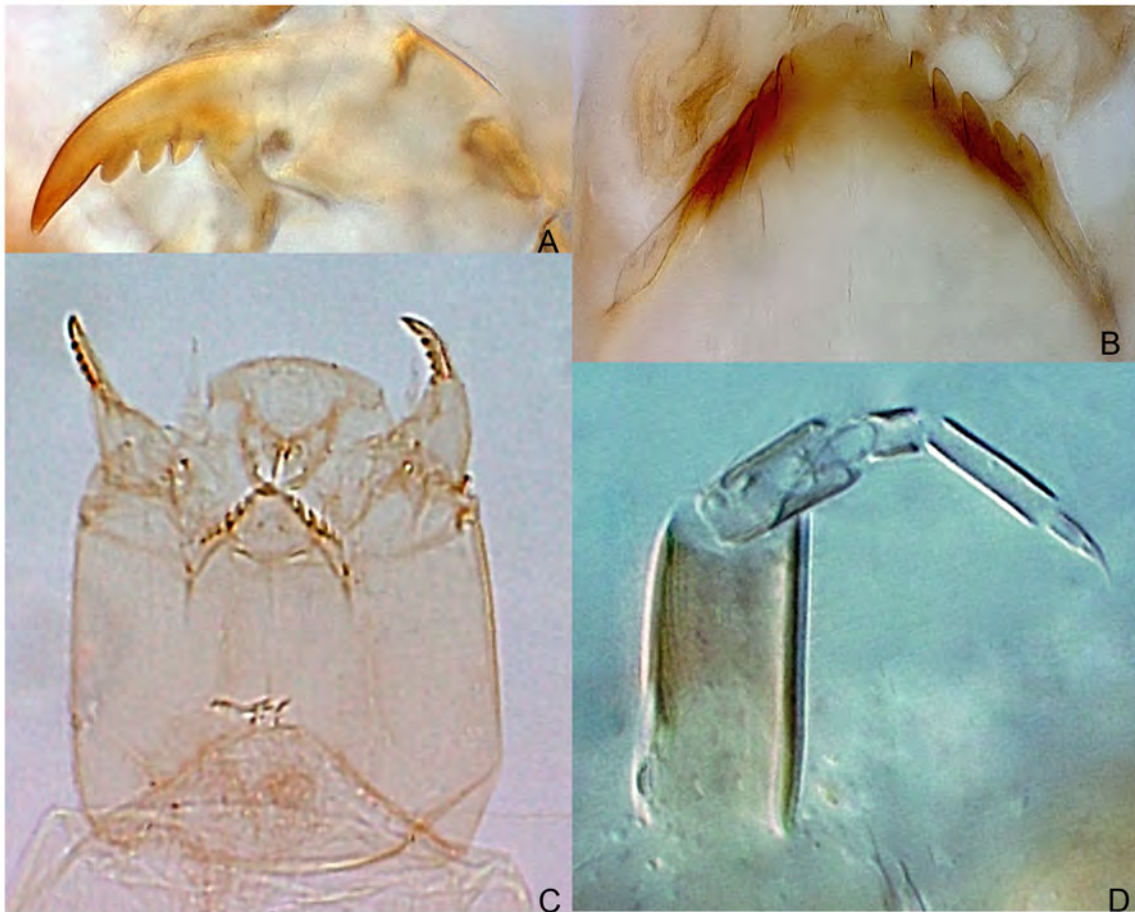
Mandibles with 3 inner teeth (A)

Ventromental plate slender and extending laterally beyond the outmost tooth of the mentum (B)

Antenna 6 segmented with a very fine whip-like apical segment (D)

Procercus present

Occurs in freshwater streams and swamps



?Parakiefferiella V22 (= DEC sp. C)

Distinguishing features

Median tooth of mentum broad (A)

Mentum with 4 pairs of lateral teeth (A)

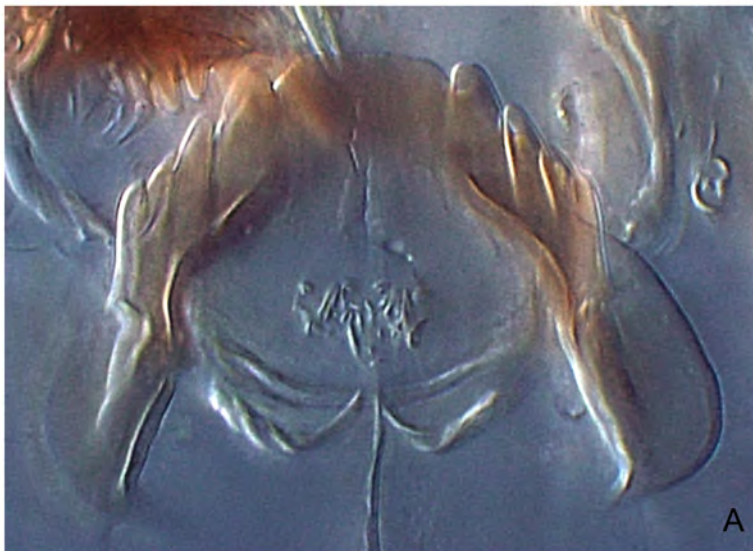
Ventromental plates extending laterally beyond the outermost tooth of the mentum (A and C)

Ventromental plates hooked inwards posteriorly (A and C)

Mandibles with 3 teeth

Procercus absent (B)

Occurs in south-west forest streams



Parakiefferiella "variegatus" (sensu Cranston, 2000) (= VSC9 = DEC sp. A)

Distinguishing features

Ventromental plate strongly extending laterally beyond the outermost tooth of the mentum (A and B)

Median teeth of mentum trifid (B)

Mandibles with 3 inner teeth (C)

Antenna 5 segmented with a small 3rd segment and a fine last segment (E)

Procercus present (F)

Occurs mostly in fresh wetlands but has also been collected in some saline wetlands



Paralimnophyes pullulus (Skuse, 1889) (=V42)

Distinguishing features

Median teeth of mentum bifid (A)

Mandibles with 4 inner teeth (B)

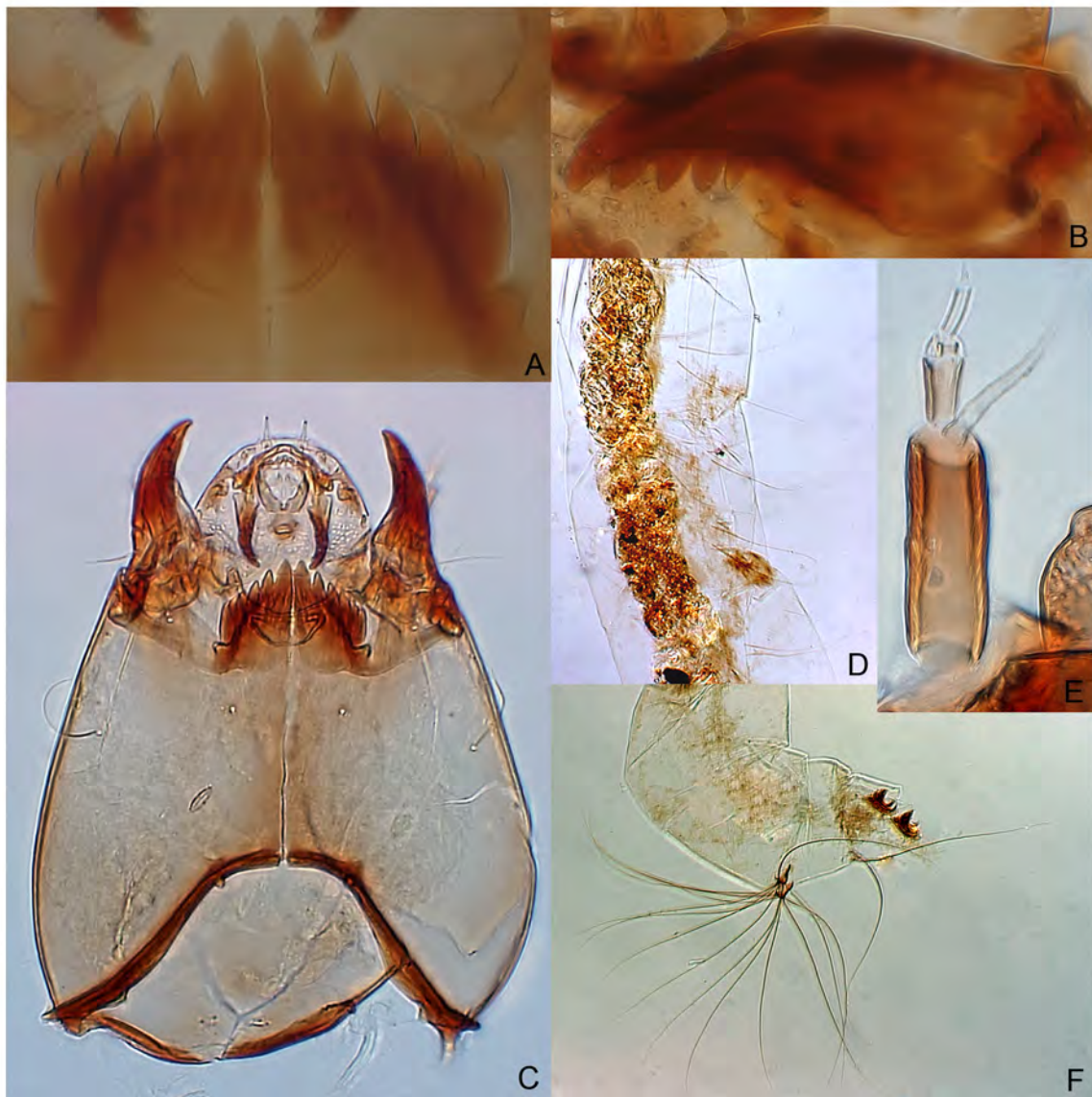
Body setae long, about the same length of each segment (D) (These distinguish this species from *Limnophyes*)

Antennae 5 segmented. Lauterborn organ at the top of the 2nd segment and about same size as the 3rd segment (E)

Procercus present and sclerotised (F)

Supra-anal hairs long, about the same length as the procercal hairs (F)

Occurs in fresh to saline wetlands and streams

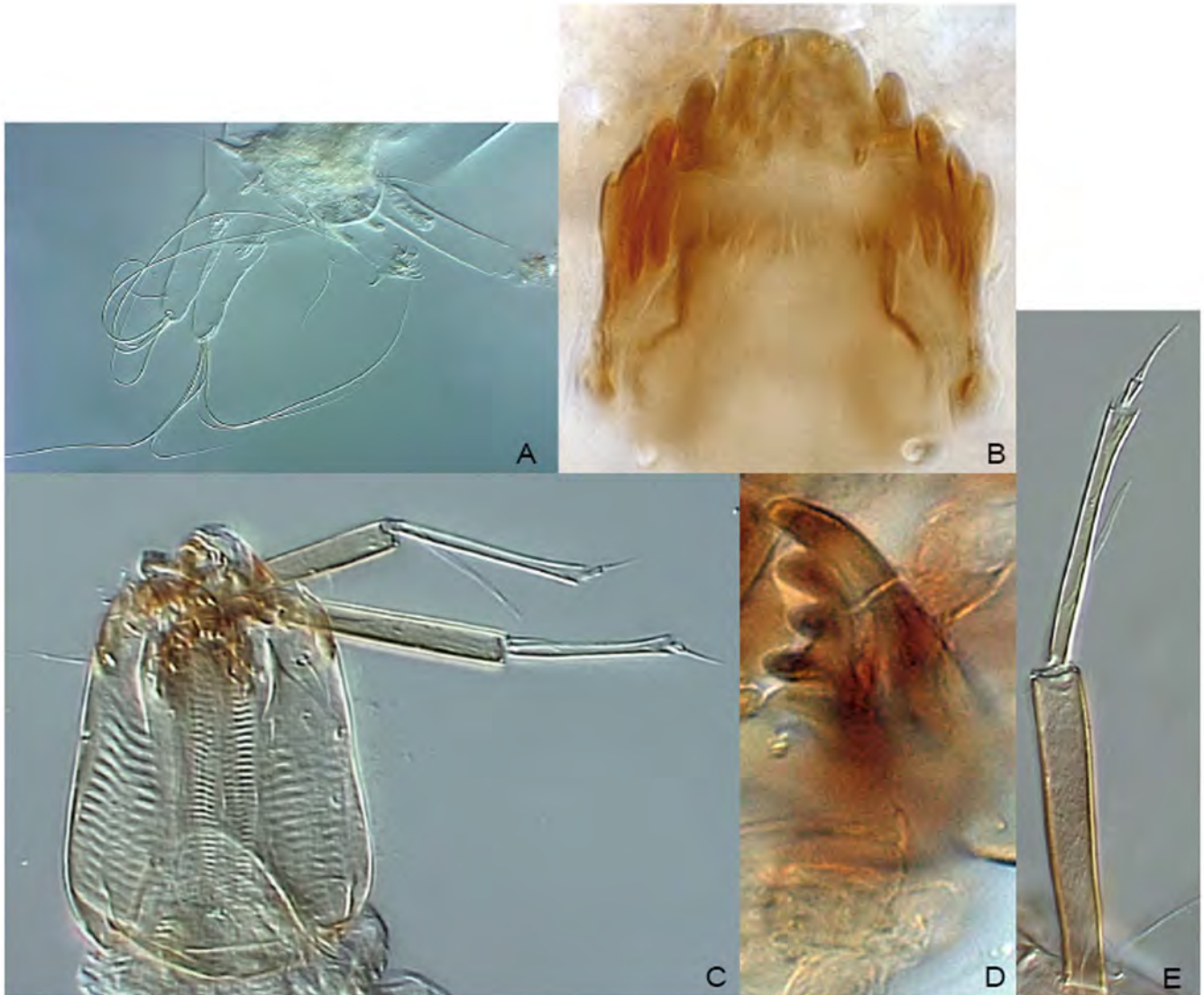


Stictocladius DEC sp. U

Distinguishing features

- Procercus present - elongate (A)
- Posterior parapods long and slender (A)
- Mentum with a large domed median tooth (B)
- Antennae longer than head (C)
- antennae 4 segmented with a whip-like apical segment (C and E)
- Mandibles with 3 inner teeth (D)

Occurs in south west forest streams



Stictocladius occidentalis Cranston & Saether, 2010 (= V8)

Distinguishing features

Antennae with 5 segments. The 2nd segment is very long and has a hyaline basal 2/3rds and a sclerotised 1/3rd top. The apical segment is fine and whip-like (A and B)

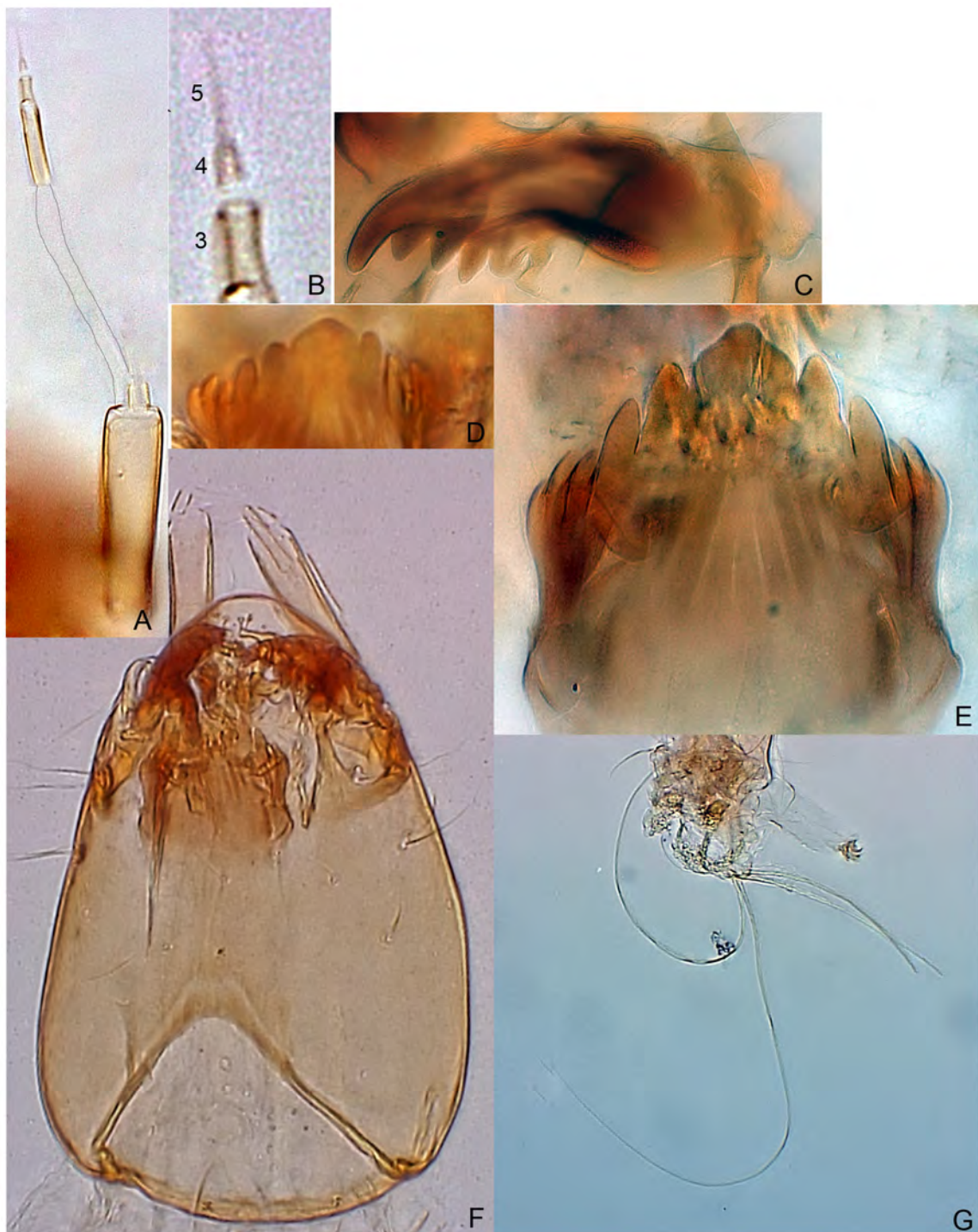
Antennal blade has a sclerotised base (A)

Mandibles with 3 inner teeth, or what looks like 4 inner teeth (C)

The 3rd outer most lateral tooth of mentum about the same height as the 4th outer most lateral tooth (D and E)

Procercus present (G)

Occurs in south west forest streams



Symbiocladius DEC sp. 1

Distinguishing features

Mandibles slender with no inner or outer teeth (A)

Head long and straight (B)

Posterior segment enlarged with no procercus but setae are present (C)

Neither antennae nor mentum were visible on this specimen. *Symbiocladius aurifodae* is the only known species in this genus but that has only been recorded in Victoria.

The mentum of *S. aurifodae* has a single broad median tooth and fine needle-like lateral teeth and the antennae is short with 4 segments. It is parasitic on Ephemeroptera.

Occurs in south west forest streams



Thienemanniella V19

Distinguishing features

Mandibles with 3 inner teeth and 1 outer tooth (A)

Median teeth of mentum trifold (B)

Mentum with 5 pairs of lateral teeth, the 3 outermost adpressed (B)

Antennae with 5 segments, the 2nd segment much darker than the others (C and D)

Procercus present (E)

Occurs in freshwater streams and rivers

