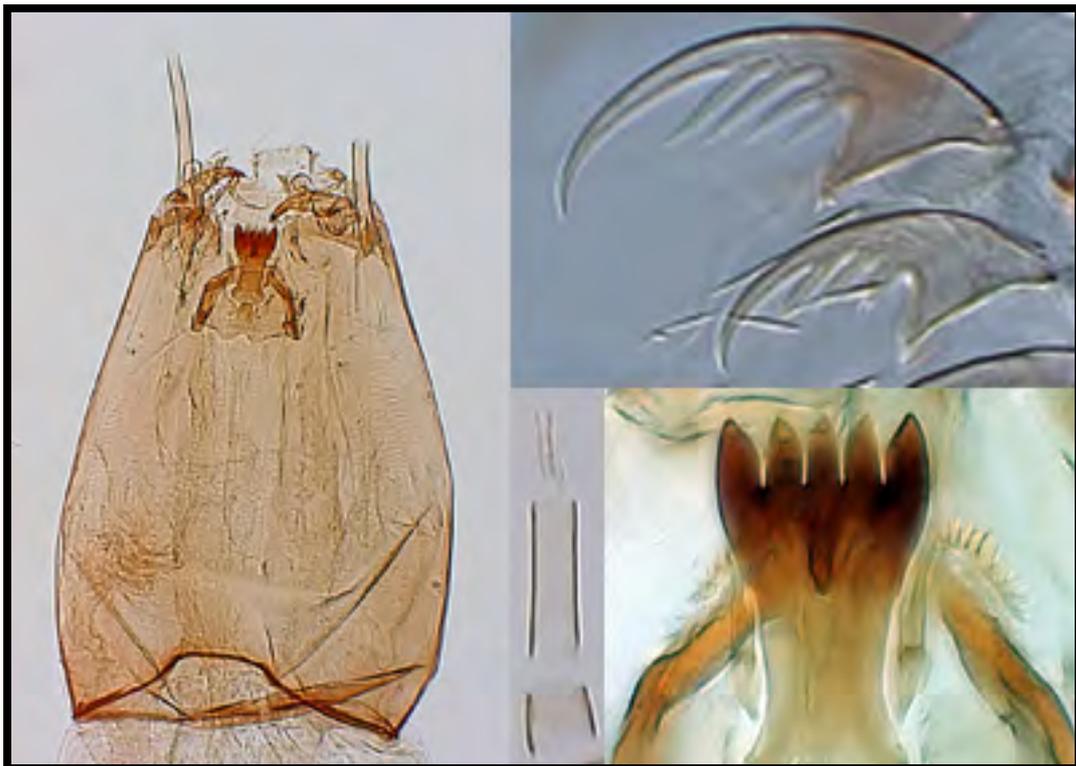


Photographic guide and keys to the larvae of Chironomidae (Diptera) of south-west Western Australia

Part I. Key to subfamilies and Tanypodinae



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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 (e.g. Dean 1999, Timms 2004). 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fauna by Peter Cranston (Cranston 2000)¹, 3) the key to Australian genera by Chris Madden (Madden 2009²) and 4) an unpublished key to south coast chironomid species by Caroline Versteeg and Don Edward.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. We aim to include remaining subfamilies as funds allow.

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, but specimens were also provided by Don Edward (School of Animal Biology, UWA) and Geraldine Janicke (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 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 researchers. We encourage users of this guide to provide us with alternative codes that have been published to populate a translation table (Table 1). Also, we recognise that this is a first and incomplete draft and we welcome feedback from users.

¹ <http://www.entomology.ucdavis.edu/chiropage/index.html>

² <http://www.museumvictoria.com.au/sciencereports>

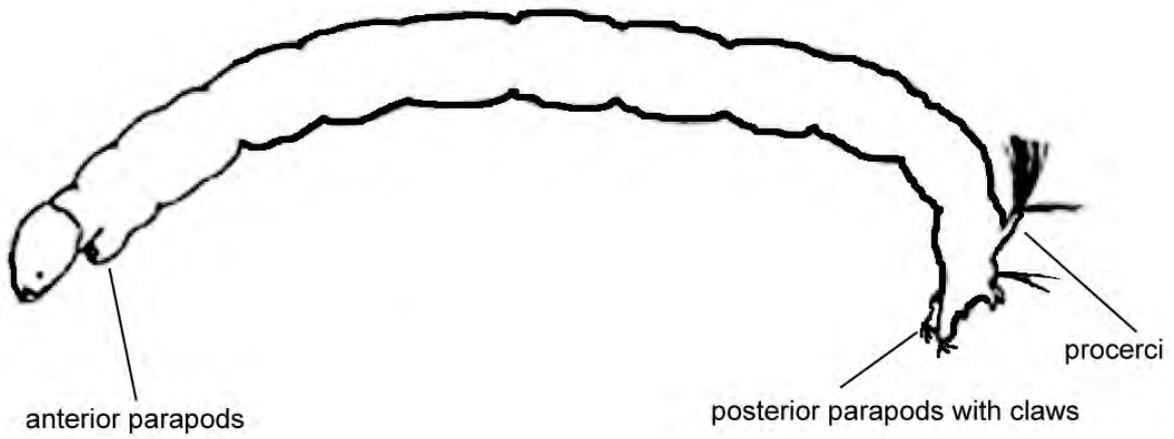
Acknowledgements

The Department of Environment and Conservation's Science Division provided funding for this project in 2009/10. Geraldine Janicke (UWA, Albany) provided whole animal voucher specimens from the Centre for Excellence in Natural Resource Management collection). Peter Cranston provided useful comment on an earlier draft.

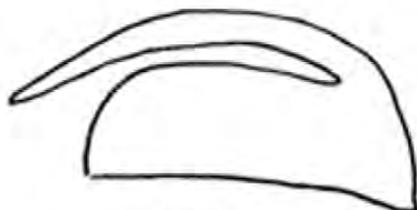
Table 1. List of Tanypod species known from south-western Australia

Species name used in this guide	Origin of name or code used in this guide	Notes
<i>Ablabesmyia notabilis</i> Skuse		
<i>Ablabesmyia</i> V37	UWA	
<i>Alotanypus dalyupensis</i> Freeman		Has also been called <i>Anatopynia dalyupensis</i> and <i>Macropelopia (Alotanypus) dalyupensis</i> = VCD11 (UWA), Tanypodinae genus nr. <i>Apsectrotanypus</i> sp. SW1 (DEC)
<i>Apsectrotanypus</i> (nr <i>maculosus</i>)		= <i>Apsectrotanypus</i> sp.1 (DEC), V9 (UWA)
<i>Australopelopia prionopectera</i> Cranston		= Pentaneurini genus SW1 (DEC), V10 (UWA), <i>Pentaneura</i> (Cranston 2000). <i>Pentaneura</i> sp. 1 (DEC)
<i>Coelopynia pruinosa</i> Freeman		
<i>Larsia albiceps</i> Johannsen		
<i>Paramerina levidensis</i> Skuse		= V1 (UWA), Pentaneurini sp. H (DEC)
Pentaneurini genus C	Cranston (2000)	Pentaneurini sp. C (DEC), Pentaneurini genus C sp. 1 (DEC)
Pentaneurini genus E	Cranston (2000)	
Pentaneurini genus V20	UWA	= <i>Thienemannimyia</i> sp SW1 (DEC)
Pentaneurini sp. A	DEC	= Tanypodinae sp. A (DEC)
Pentaneurini sp. F	DEC	= Pentaneurini sp G (DEC), star chart similar to Pentaneurini 'ST1' of Cranston (2000)
<i>Procladius paludicola</i> Skuse		= VCD1 (UWA)
<i>Procladius</i> sp. P1	DEC	= <i>Procladius paludicola</i> P1 (DEC)
<i>Procladius</i> sp. (normal claws)	DEC	= Tanypodinae sp. C (near <i>Tanypus</i>) (DEC)
<i>Procladius villosimanus</i> Kieffer		

Illustrations of terminology used in the guide



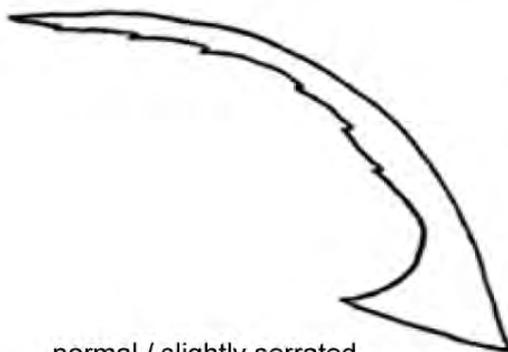
posterior parapod claw types



folded



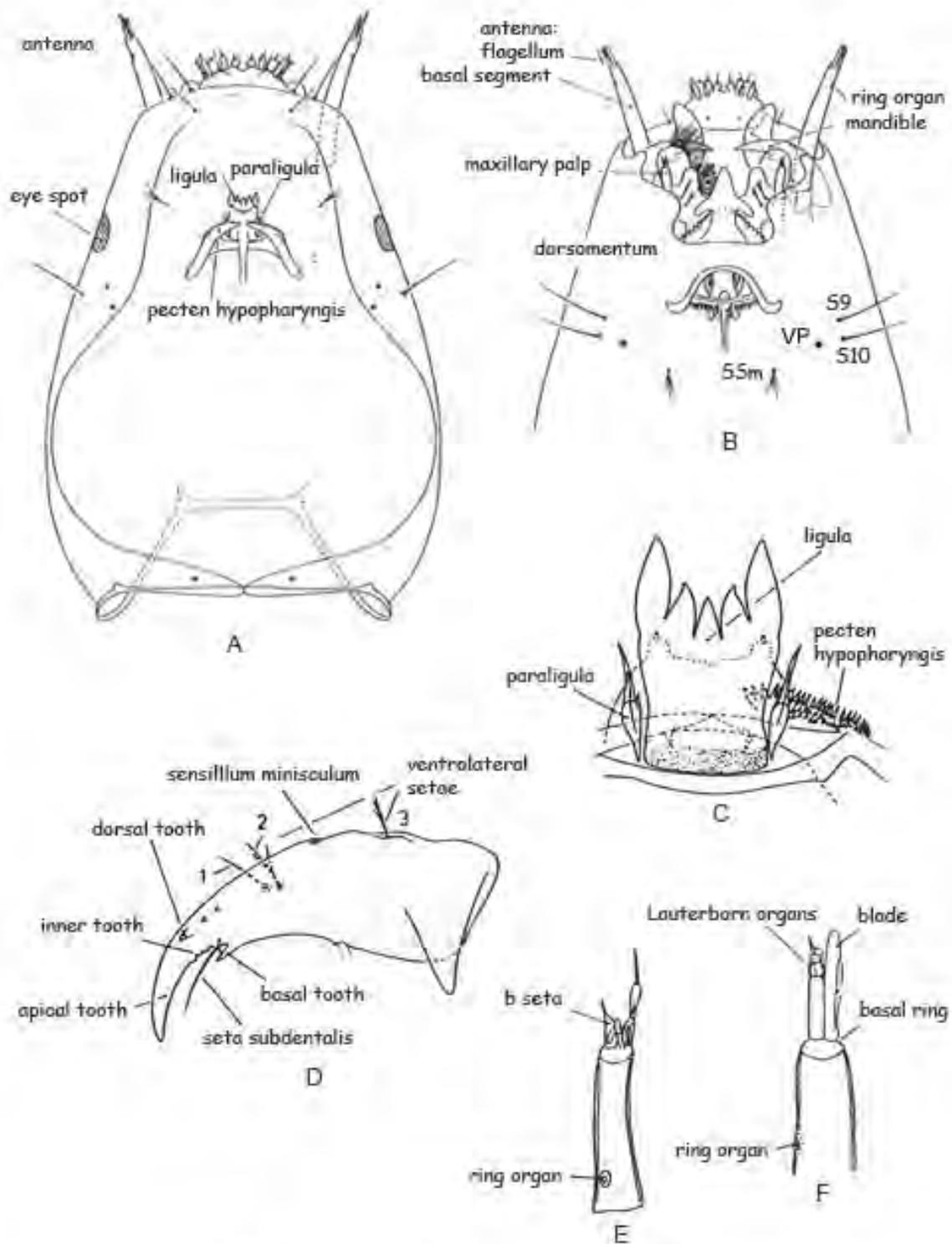
normal / unserrated



normal / slightly serrated



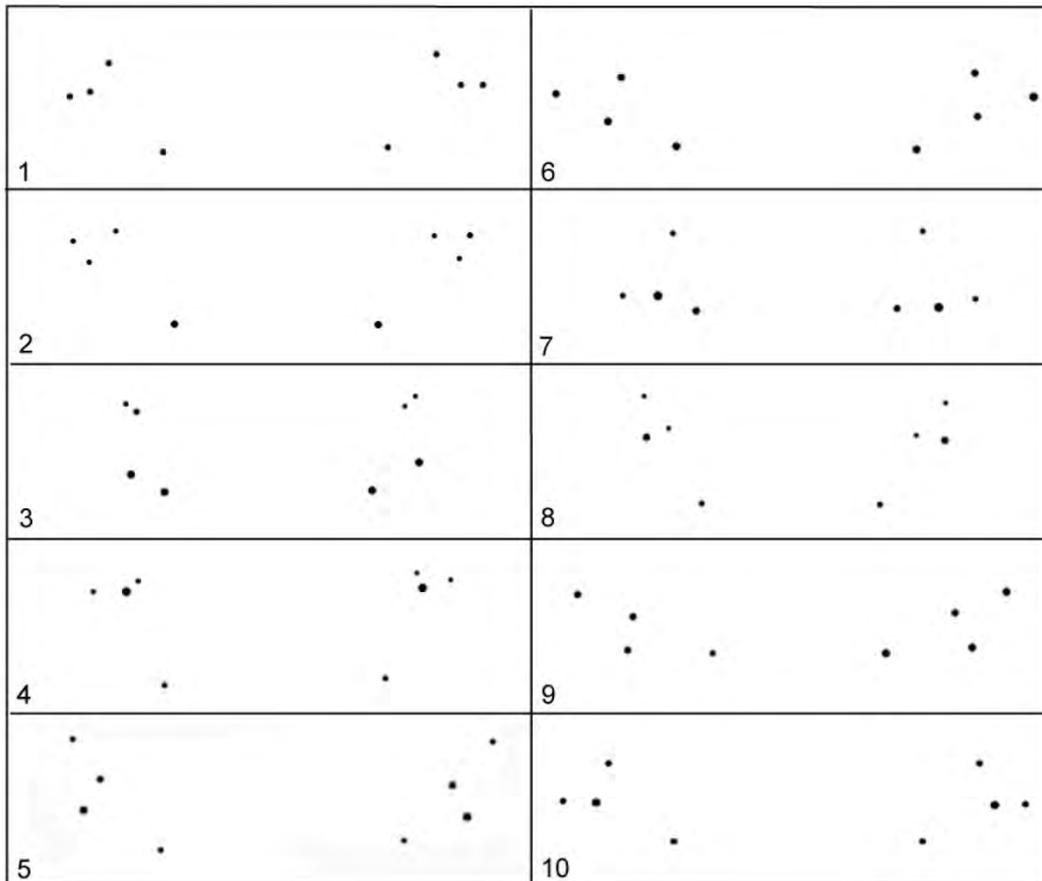
strongly serrated



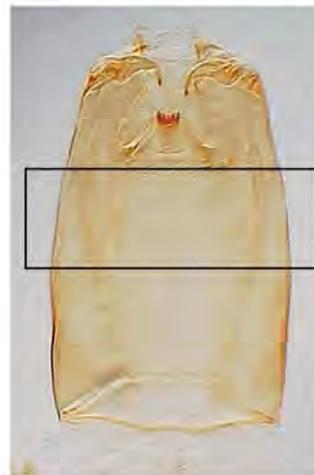
Tanypod morphology: A - Head (dorsal); B - Head (ventral); C - Premento-hypopharyngeal complex; D - Mandible; E - Maxillary palp; F - Antenna.

Pentaneurini (Tanypodinae) “star charts”

The arrangement of three setal insertion points (scars) and a pores, which are visible on the ventral side of the head postero-lateral to the ligula, is referred to as a star-chart and is useful to distinguish species of Pentaneurini. Each star consists of three setal scars (S9, S10 [antero-lateral-most scar], SSm [posterior and inner-most scar] and one pore: Vp (which is a pore and is often slightly larger than the scars and located between the three scars).

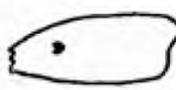


1. *Ablabesmyia notabilis*
2. *Ablabesmyia V37*
3. *Australopelopia prionopectera*
4. *Larsia albiceps*
5. *Paramerina levidensis*
6. Pentaneurini genus C
7. Pentaneurini genus E
8. Pentaneurini genus V20
9. Pentaneurini sp A
10. Pentaneurini sp F



Tanypod head shapes

The general size and shape of the head capsule and size, shape and position of the eye-spot, shown here are for 4th instar larvae and can be variable.

1 HL: 1000-1200 μm		8		HL: 700-740 μm
2 HL: 740-800 μm		9		HL: 800-900 μm
3 HL: 840-920 μm		10		HL: 420-450 μm
4 HL: 660-830 μm		11		HL: 680-780 μm
5 HL: 840-900 μm		12		HL: 690-780 μm
6 HL: 420-540 μm		13		HL: 480-610 μm
7 HL: 500-570 μm		14		paludicola HL: 540-680 μm villosimanus HL: 770-790 μm sp. P1 HL: 630 μm normal claws HL: 520-740 μm

1. *Ablabesmyia notabilis*
2. *Ablabesmyia V37*
3. *Alotanypus dalyupensis*
4. *Apsectrotanypus nr maculosa*
5. *Australopelopia prionopectera*
6. *Coelopynia pruinosa*
7. *Larsia albiceps*

8. *Paramerina levidensis*
9. *Pentaneurini* genus C
10. *Pentaneurini* genus E
11. *Pentaneurini* genus V20
12. *Pentaneurini* sp. A
13. *Pentaneurini* sp. F
14. *Procladius* spp.

Key to sub-families of Chironomidae in south-western Australia

- 1a** Antennae retractile into head. One eyespot on each side of head (usually a reverse 'c' shape, but can be more filled in to look like a dot). Hypopharynx with distinctive toothed ligula. Procerci long. Body smooth or at most with a lateral setal fringe **Tanypodinae**
- 1b** Not with above combination of characters 2
- 2a** Two eyespots, usually separate and arranged one above the other, rarely with three eyespots. Ventromental plates distinct and striated **Chironominae**
- 2b** Eyespots not as above. Ventromental plates absent or indistinct 3
- 3a** Procerci usually small (< 2 times longer than wide) or absent 4
- 3b** Procerci longer than wide or bulbous 5
- 4a** Two contiguous eyespots, with one often smaller than the other and usually arranged anterior to posterior. Procerci usually present but small. Generally in inland waters
..... **Orthoclaadiinae**
- 4b** Single small eyespot. Procerci absent. Marine/estuarine/lower reaches of saline rivers
..... **Telmatogetoninae**
- 5a** Antennae with 2nd or 3rd segment annulate. Body smooth. Procerci bulbous, not sclerotised. Mature larvae larger than 1.5 to 2 mm **Podonominae**
- 5b** Antennae not annulate. Body covered in papillae or hooklets which trap silt. Procerci well developed and sclerotised. Larvae very small (1.5 to 2 mm) **Aphroteniinae**

Key to species of Tanypodinae 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.

- 1a** Lateral setal fringe present. Dorsomentum distinct and toothed 2
- 1b** No lateral setal fringe, though isolated hairs or groups of hairs may be present. Dorsomentum indistinct and not toothed **tribe Pentaneurini³ 5**
- 2a** Head capsule wedge shaped in lateral view; head with a deep antero-ventral cavity. Mandibles long and scythe like. Dorsomentum a complete arc of sub-equally sized teeth ***Coelopynia pruinosa***
- 2b** Not as above **3**
- 3a** 1st lateral teeth of ligula curved outwards (or apparently so). Lateral fringe present to abdominal segment seven. Ligula evenly coloured; paraligula bifid **4**
- 3b** 1st lateral teeth not curved outwards; lateral fringe present to abdominal segment 6. Ligula with teeth darker than base; paraligula with at least three teeth ***Procladius***
- Ligula with teeth forming a V-shape. Some “high arched” claws present on the posterior parapods. Paraligula with numerous teeth. Inhabits fresh to slightly saline waters ***Procladius villosimanus***
- Ligula with lateral teeth of more even length and a smaller median tooth. 1 or 2 strongly “folded” claws present on the posterior parapods; paraligula with numerous teeth. Inhabits fresh to highly saline waters ***Procladius paludicola***
- Ligula with teeth forming a V-shape; paraligula bifid or trifid. No modified claws on the posterior parapods..... ***Procladius* DEC sp. ‘normal claws’**
- Ligula with teeth forming a V-shape; paraligula with numerous teeth. No modified claws on the posterior parapods. Common in northern Australia extending south to northern Wheatbelt ***Procladius* DEC sp. P1**
- 4a** 1st lateral teeth strongly curved outwards; antenna with ring organ about 2/3rds of distance from base to tip. Dorsomentum with 7 distinct teeth on each side. Occurs in lentic and slow flowing lotic waters ***Alotanypus dalyupensis***
- 4b** 1st lateral teeth only weakly curved outwards (outer edge of 1st laterals straight, inner edge curved); dorsomentum with 5 distinct teeth on each side. Primarily in flowing water ***Apsectrotanypus nr maculosa*⁴**

³ Species in the tribe Pentaneurni can also be distinguished by the position of four setal scars located on either side of the mid-ventral part of the head. The relative positions of these are known as the star-chart (see table with star-chart patterns)

5a	Base of maxillary palps divided	6
5b	Base of maxillary palps undivided	9
6a	Maxillary palps divided into 2 segments	7
6b	Maxillary palps divided into 5 segments	<i>Ablabesmyia</i> V37 ⁵
7a	Maxillary palps divided at about one third length	8
7b	Maxillary palps divided about half way. Posterior parapods with 2 darker claws	<i>Ablabesmyia notabilis</i>
8a	Posterior parapods with 2 serrated claws (serrations may be variable). Eye C shaped. Ligula with 5 evenly sized teeth. Star chart: S9 linearly aligned with SSm and S10, with VP lying postero laterally	<i>Paramerina levidensis</i> ⁶
8b	Posterior parapod claws all unserrated. Eye shape small and round. Ligula with 5 teeth forming a V-shape. Star chart: VP more or less aligned with S9 and SSm, with S10 lying anterior to VP .	Pentaneurini genus C of Cranston (2000)
9a	Ligula with 4 teeth. Head darker posteriorly. Star chart distinctive, with S10 VP and SSm transversely aligned posterior to S9	Pentaneurini genus E of Cranston (2000)
9b	Ligula with 5 teeth. Head more evenly coloured. Star-chart not as above	10
10a	Posterior parapods with 2 “folded” claws. Pecten hypopharyngis with teeth more than 4 x as long as wide	Pentaneurini DEC sp. A
10b	Posterior parapods with all normal claws. Pecten hypopharyngis with most teeth only 2 to 3 x as long as wide	11
11a	Eye a small round dot. Head more or less parallel sided.	Pentaneurini genus V20
11b	Eye otherwise. Head tapering anteriorly (visible on unmounted specimens laterally and mounted specimens dorso-ventrally)	12
12a	Tips of the 1 st lateral teeth of the ligula slightly curved outwards. S9 and S10 are located close together and distinctly anterior to SSm and VP.....	<i>Australopelopia prionopectera</i>
12b	1 st lateral teeth of ligula straight. VP located closer to S9 and S10	13

⁴ *Apsectrotanypus* sp. 1 (DEC). There may be more than one species of *Apsectrotanypus* found in the south-west, distinguishable only by the thoracic horn in near pupating larvae (CENRM).

⁵ The maxillary palps of earlier instars may have fewer segments.

⁶ Some *Paramerina* (CENRM collection) do not have serrated claws on posterior parapods. It is unsure whether these are a separate species or natural variation within the species.

- 13a** All claws on the posterior parapods weakly serrated with one claw darker and two “folded” claws. S9, S10 and VP located close together and well away from SSm (SSm at least 3 x more distant from VP as distance from VP to S9 or S10) ***Larsia albiceps***
- 13b** Some claws on the posterior parapods weakly serrated. All uniform in colour S9, S10 and VP not located so far away from SSm **Pentaneurini DEC sp. F**

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Ablabesmyia notabilis (Skuse, 1889)

Distinguishing features

Maxillary palps divided into two approximately equal segments (B)

Posterior parapods with two distinctly darker claws (A)

Ligula with 5 teeth, with the first laterals weakly pointed outwards (C)

Paraligula bifid (C)

Pecten hypopharyngis with many long teeth (C)

Star chart (E) - similar to *Larsia albiceps* but S9, S10 and VP are closer to SSm

Occurs in lentic and lotic habitats, primarily freshwater but has been recorded in slightly saline water



Ablabesmyia V37

Distinguishing features

Ligula with 5 teeth forming a V-shape (B)

Paraligula bifid (B)

Pecten hypopharyngis with many spines (B)

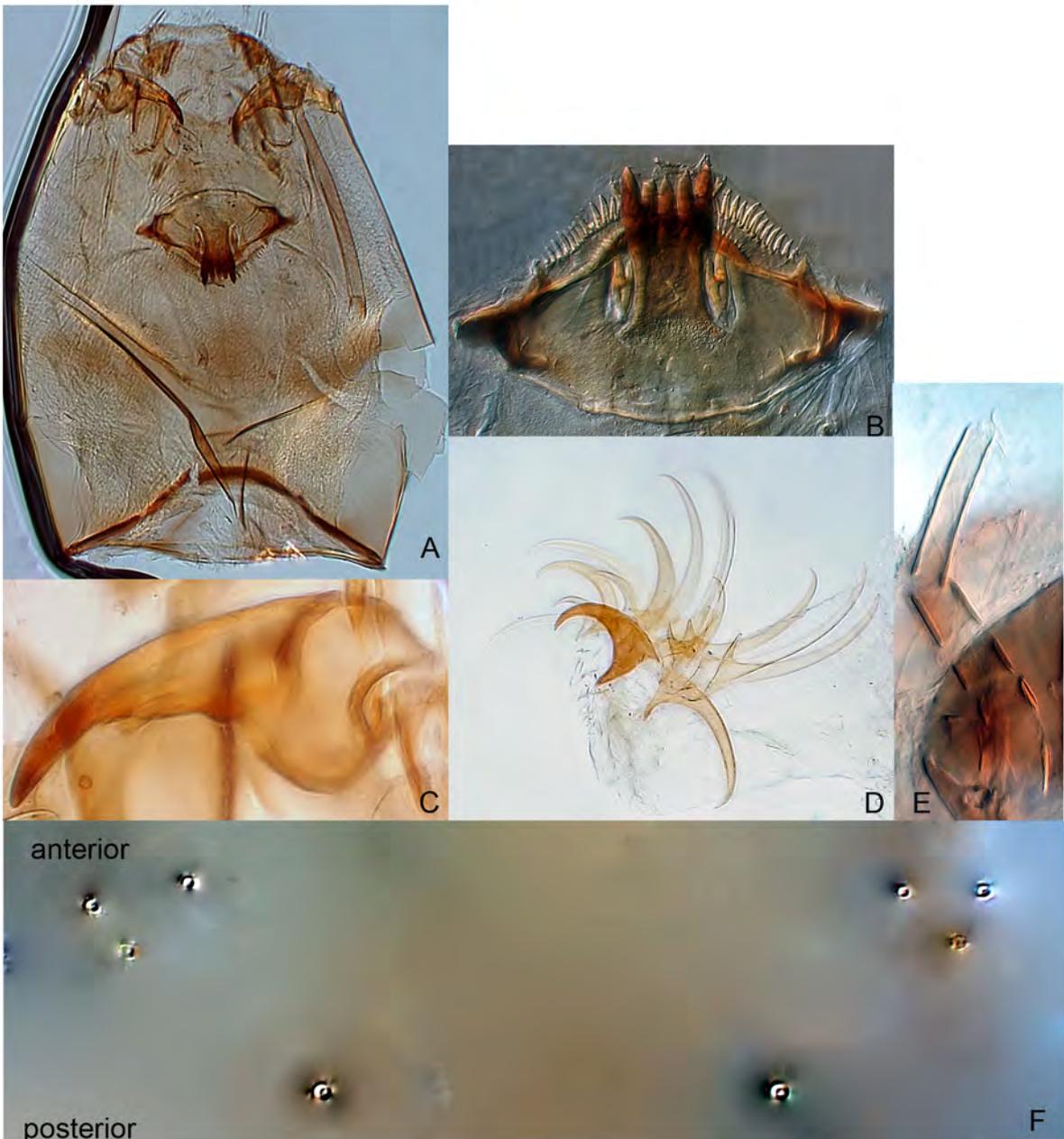
Posterior parapods all unserrated (D)

Posterior parapods with one dark claw (D)

Maxillary palp divided into 5 segments (E)

Star chart: SSm placed inner and well posterior to S9, S10 and VP (F)

Occurs in freshwater streams



Alotanypus dalyupensis (Freeman, 1961)

Distinguishing features

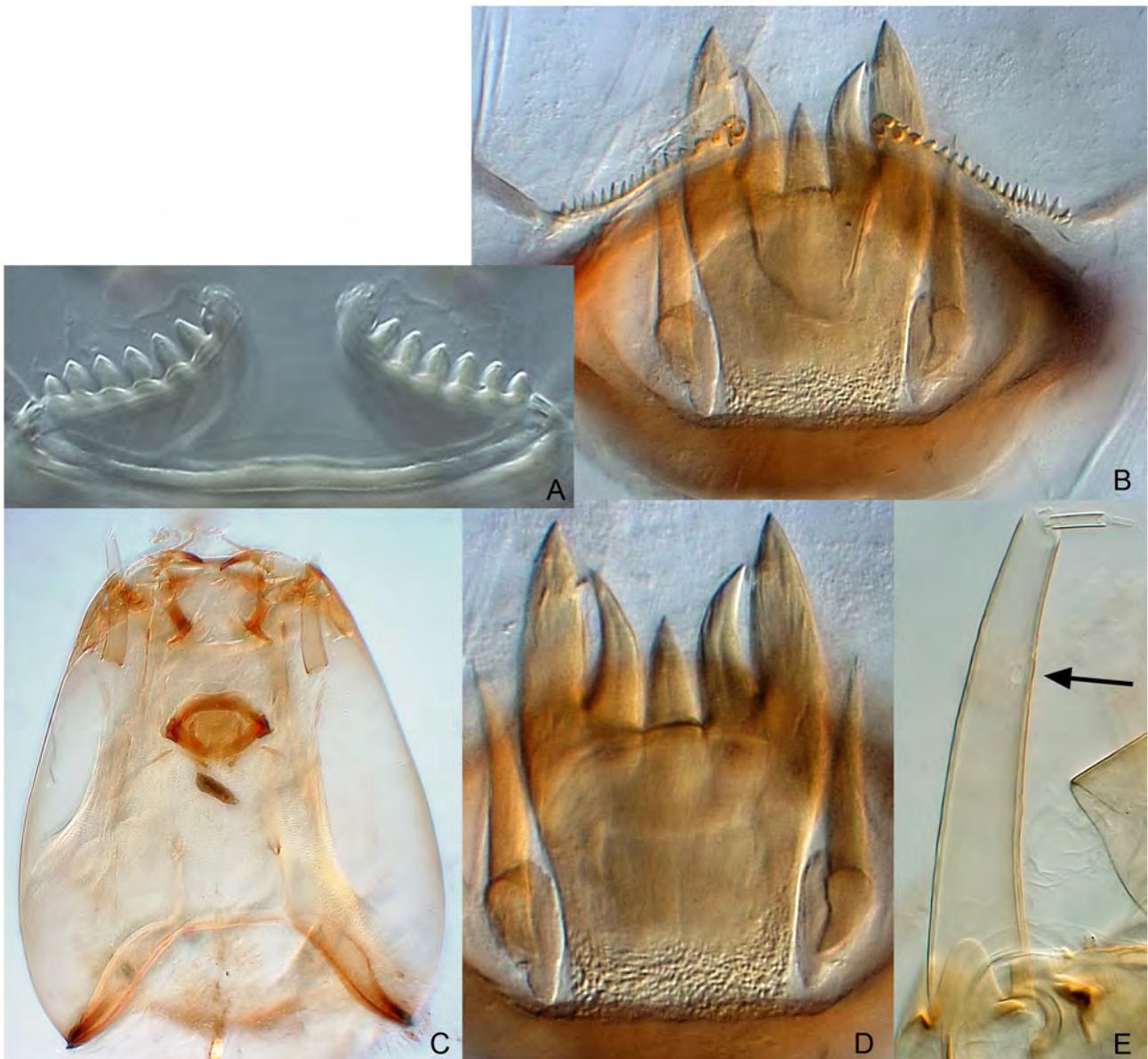
Dorsomentum with 7-8 distinct teeth on each side (A)

Ligula with first lateral teeth distinctly curved outwards and with middle tooth much shorter than the rest (B and D)

Pecten hypopharyngis with about 17 mostly very short spines, except the first pair which are larger and often curled over (B)

Ring organ located about 2/3 of the distance from base of antenna (E)

Occurs throughout the south-west in lentic and slow flowing lotic habitats



Apsectrotanypus nr *maculosa*

Distinguishing features

Dorsosomentum with at least 5 distinct teeth on each side (A)

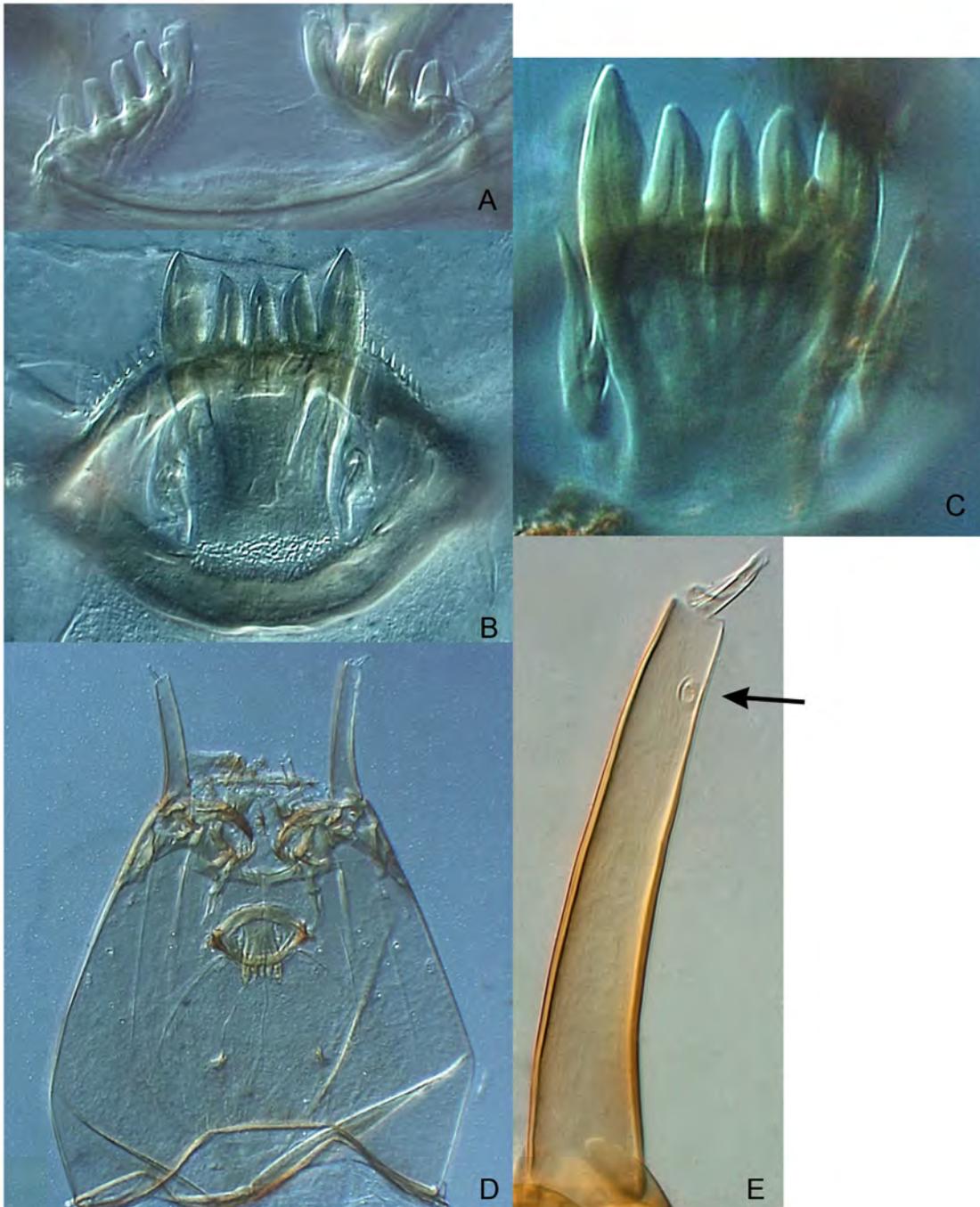
Ligula with first lateral teeth slightly curved outwards and middle three teeth about same size (B and C)

Paraligula bifid (C)

Pecten hypopharyngis with about 10 short spines on each side (B)

Ring organ located near top of the first antennal segment (E)

Occurs in lotic habitats, primarily in the higher rainfall south-west



Australopelopia prionopectera Cranston, 2000

Distinguishing features

Ligula with 5 teeth with the first laterals slightly curved outwards (B)

Paraligula bifid (B)

Pecten epipharyngis with about 19 spines on each side (B)

Maxillary palp undivided

Posterior parapod claws very weakly serrated

Star chart: V9 and V10 distinctively anterior to SSm and VP (C)

Occurs in lotic habitats, primarily in the higher rainfall south-west



Coelopynia pruinosa Freeman, 1961

Distinguishing features

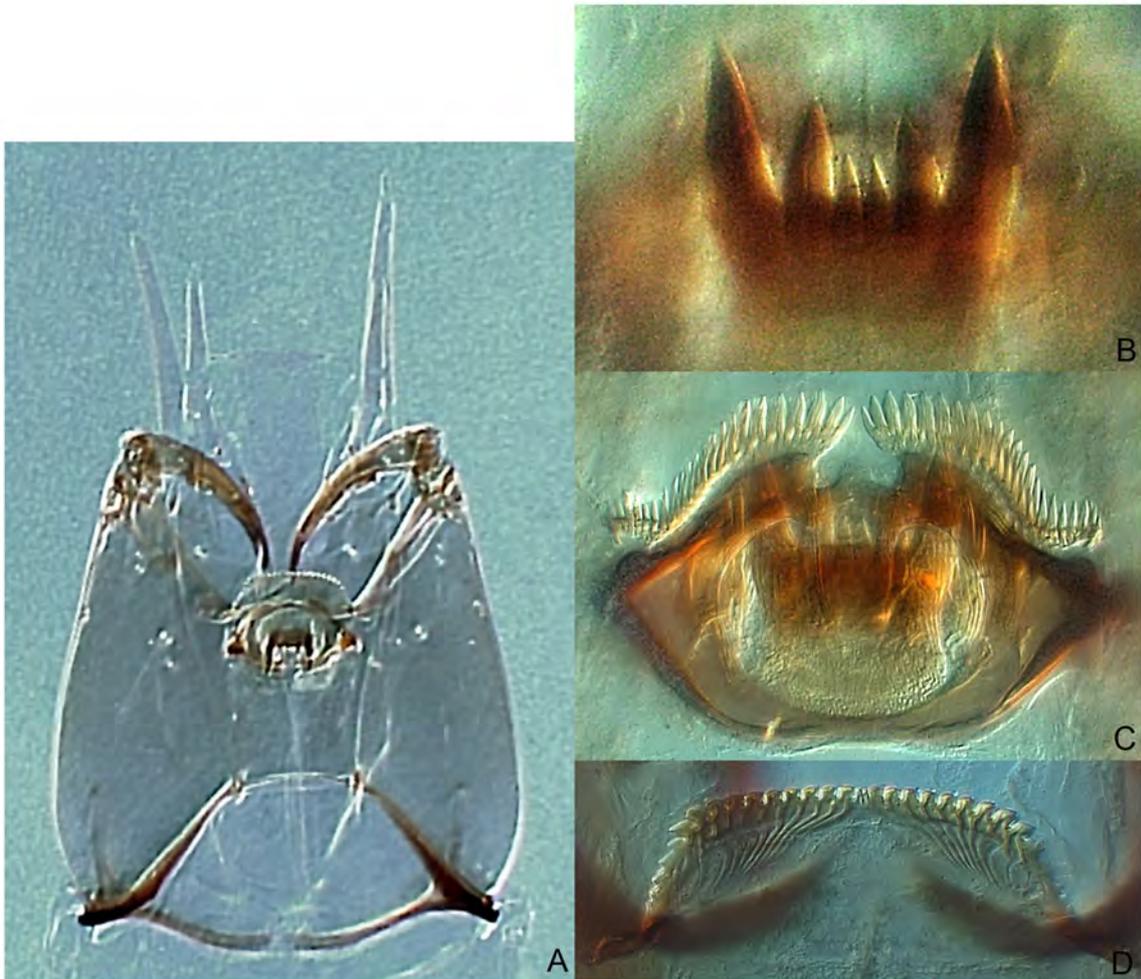
Mandibles very long and slender (A)

Head with large ventral gape (A), head wedge-shaped in lateral view

Ligula with six teeth very distinctively increasing in size from inner to outer (B)

Pecten hypopharyngis with numerous spines increasing in size from lateral to medial (C)

Mentum with numerous equally sized teeth (D)



Larsia albiceps Johannsen, 1931

Distinguishing features

Long head (A)

Claws on posterior parapods weakly serrated (can only be seen under high magnification)

Posterior parapod claws usually with one slightly larger/darker claw and two “folded” claws (B)

Maxillary palps undivided with the ring organ located about halfway (C)

Ligula with 5 teeth, the median tooth slightly smaller than the lateral teeth (D)

Paraligula bifid (D)

Distinctive star chart (E)

Widespread in lentic wetlands and river pools



Paramerina levidensis (Skuse, 1889)

Distinguishing features

Maxillary palps divided, second segment much longer than first

Posterior parapods usually with 2 serrated claws, serrations can be variable (B)

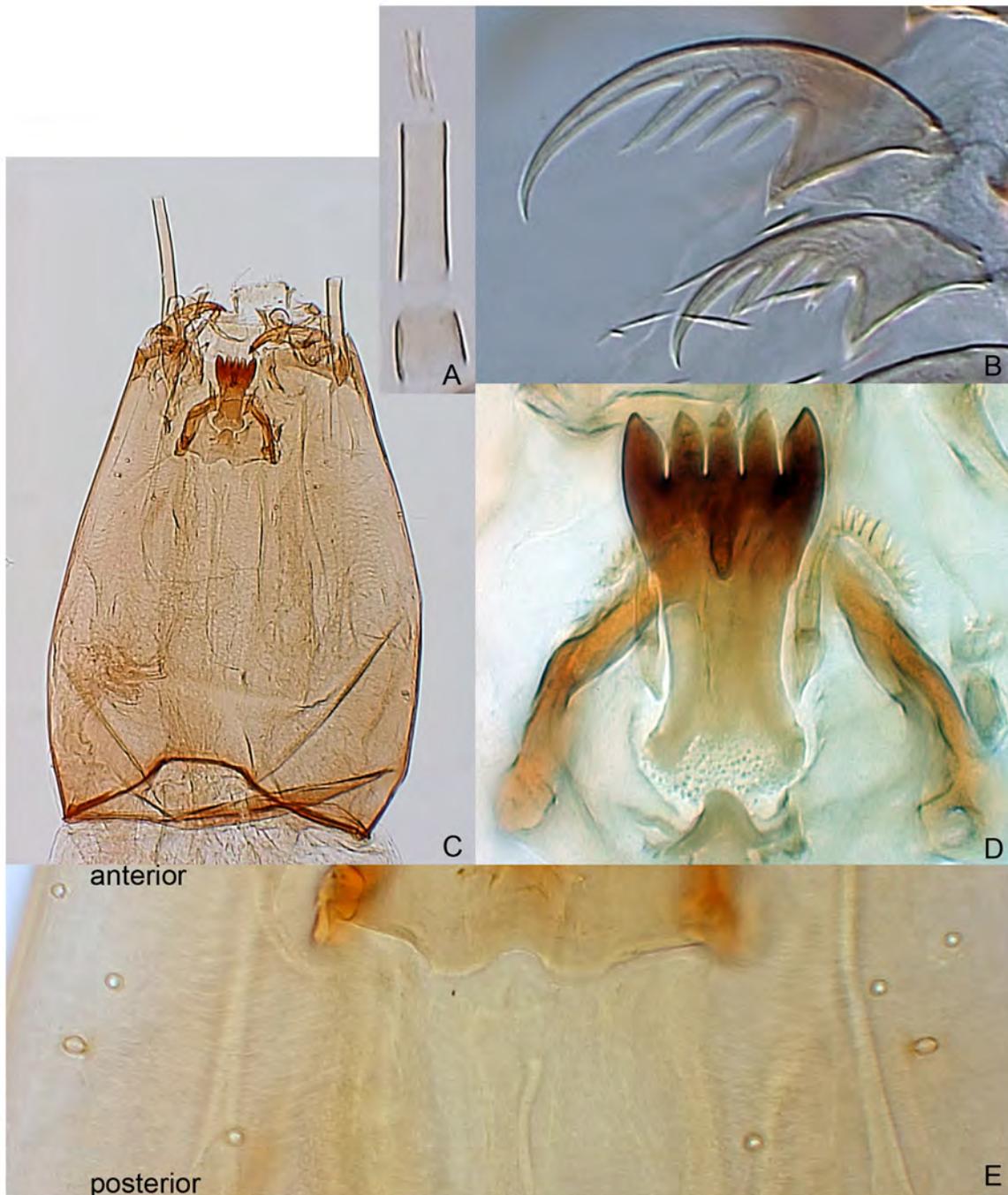
Ligula with 5 evenly sized teeth (D)

Paraligula bifid (D)

Pecten hypopharyngis with many spines (D)

Star chart (E)

Occurs throughout the south-west in lentic and lotic habitats, and in fresh and saline water



Pentaneurini genus C (sensu Cranston 2000)

Distinguishing features

Maxillary palps divided (A)

Head widest medially (B)

Ligula with 5 teeth decreasing in size towards the median tooth (B)

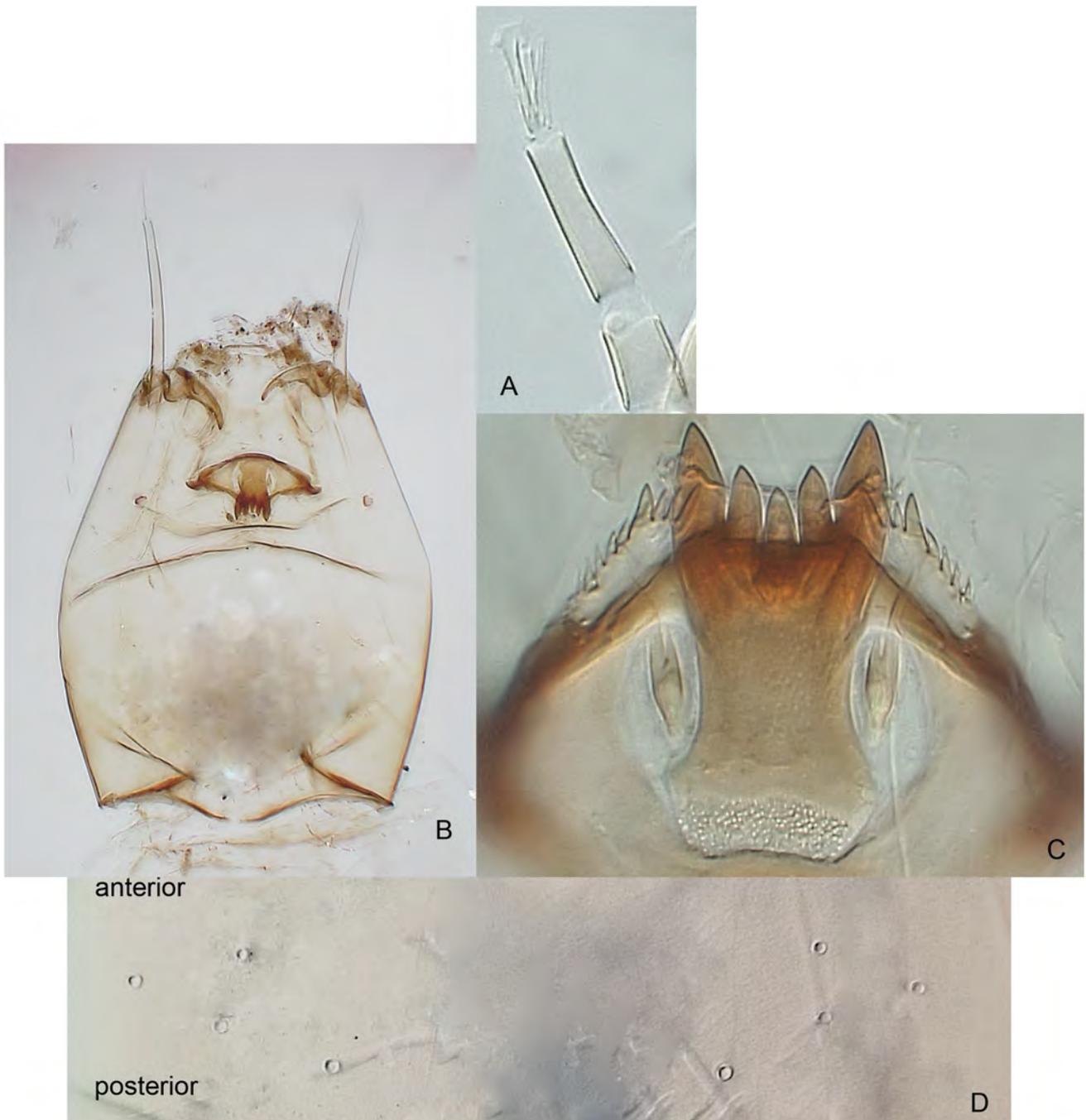
Paraligula bifid (C)

Pecten hypopharyngis with about 10 unevenly sized spines on each side (C)

Star chart (D)

Posterior parapod claws unserrated

Occurs in lentic and lotic habitats



Pentaneurini genus E (sensu Cranston 2000)

Distinguishing features

Black band across the posterior end of the head (B)

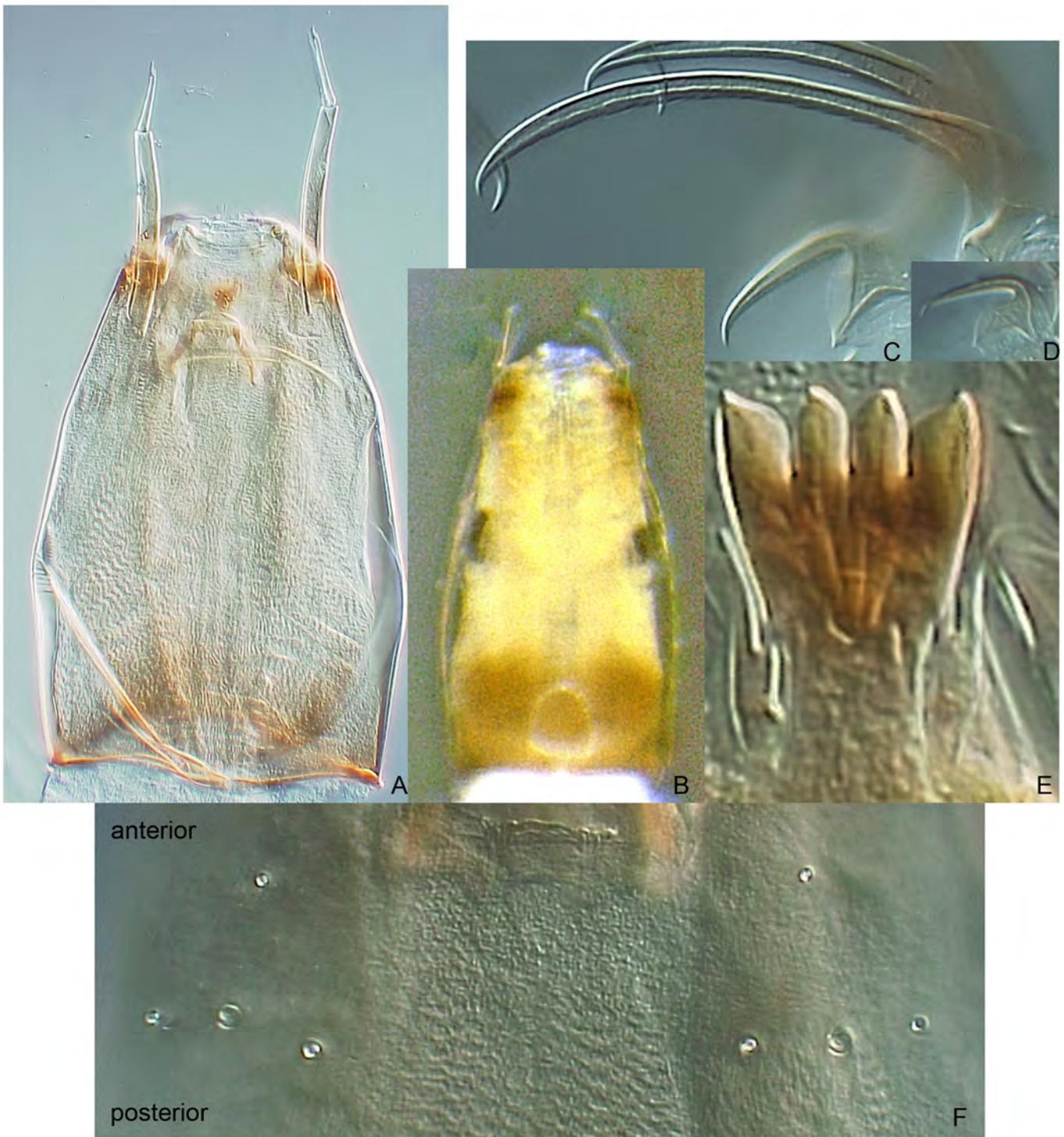
Ligula with 4 evenly sized teeth (E)

Paraligula bifid (E)

Posterior parapods with two “folded claws” like *P. paludicola*, and some finely serrated claws (C and D)

Star chart (F)

Occurs in lentic and lotic habitats



Pentaneurini genus V20

Distinguishing features

Head long and more or less parallel sided (A)

Ligula with 5 teeth with the first lateral slightly curved outwards (B)

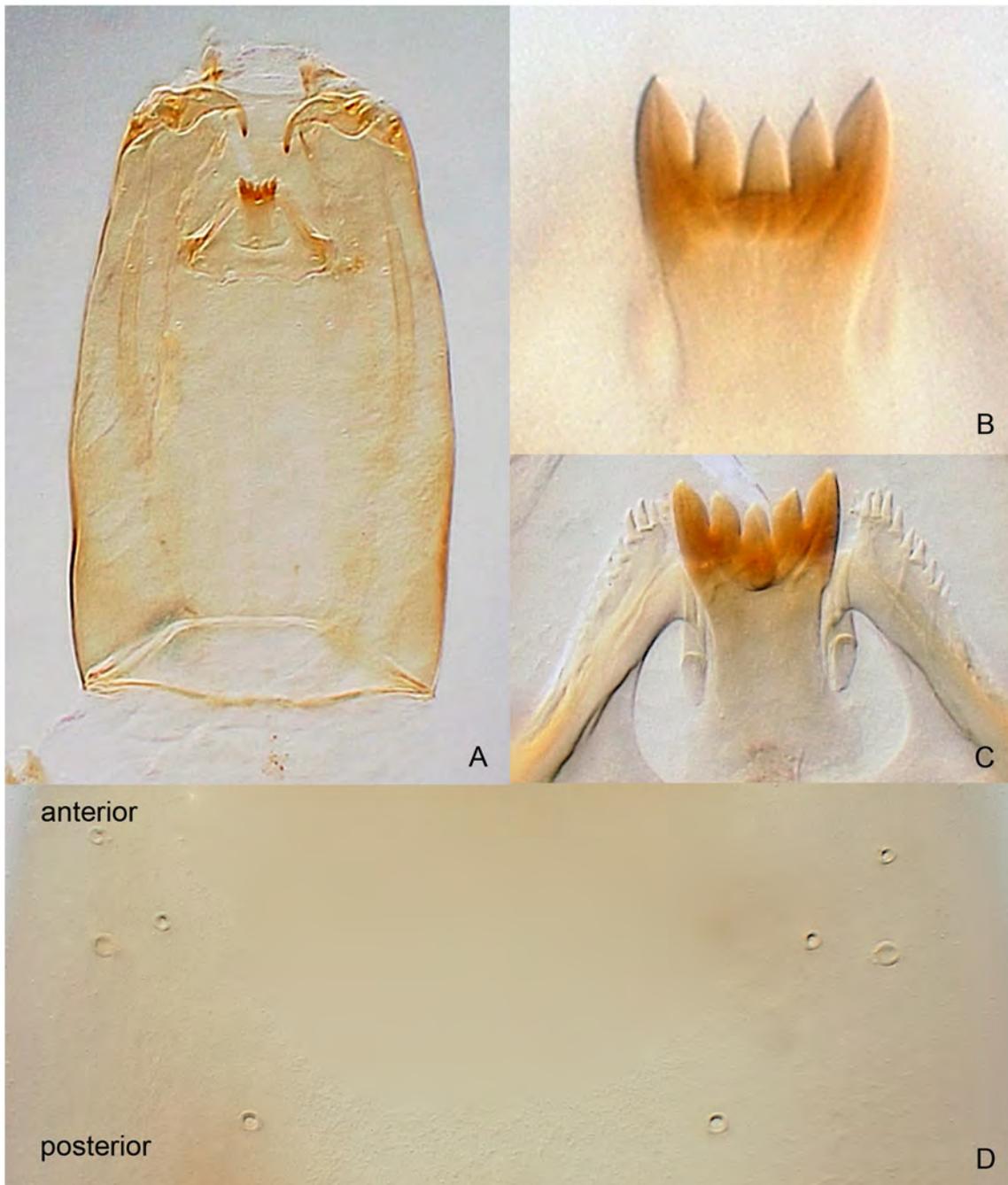
Paraligula bifid (C)

Pecten hypopharyngis with 8-10 spines on each side (C)

Base of maxillary palp undivided

Star chart (D)

Occurs in fast flowing streams



Pentaneurini sp. A (of DEC)

Distinguishing features

Mandible with two triangular teeth (A)

Posterior parapods with two “folded” claws like *Procladius paludicola* (B)

Ligula with 5 teeth decreasing in size towards the median (C)

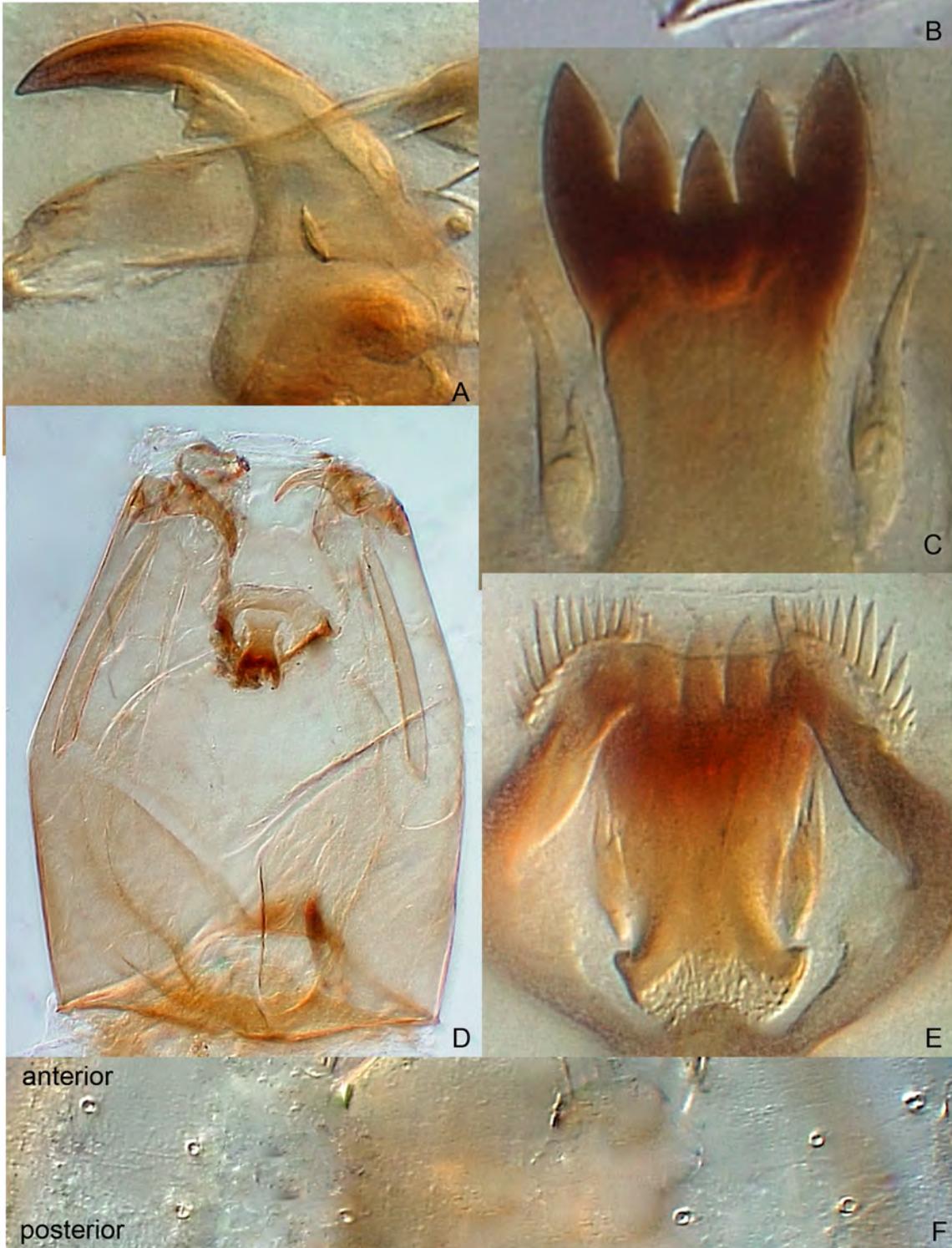
Paraligula bifid (C and E)

Maxillary palps undivided

Pecten hypopharyngis with long teeth, longest medially

Star chart (F)

Uncommon, occurs in freshwater swamps



Pentaneurini sp. F (of DEC)

Distinguishing features

Posterior parapods with some weakly serrated claws (B)

Maxillary palps undivided (C)

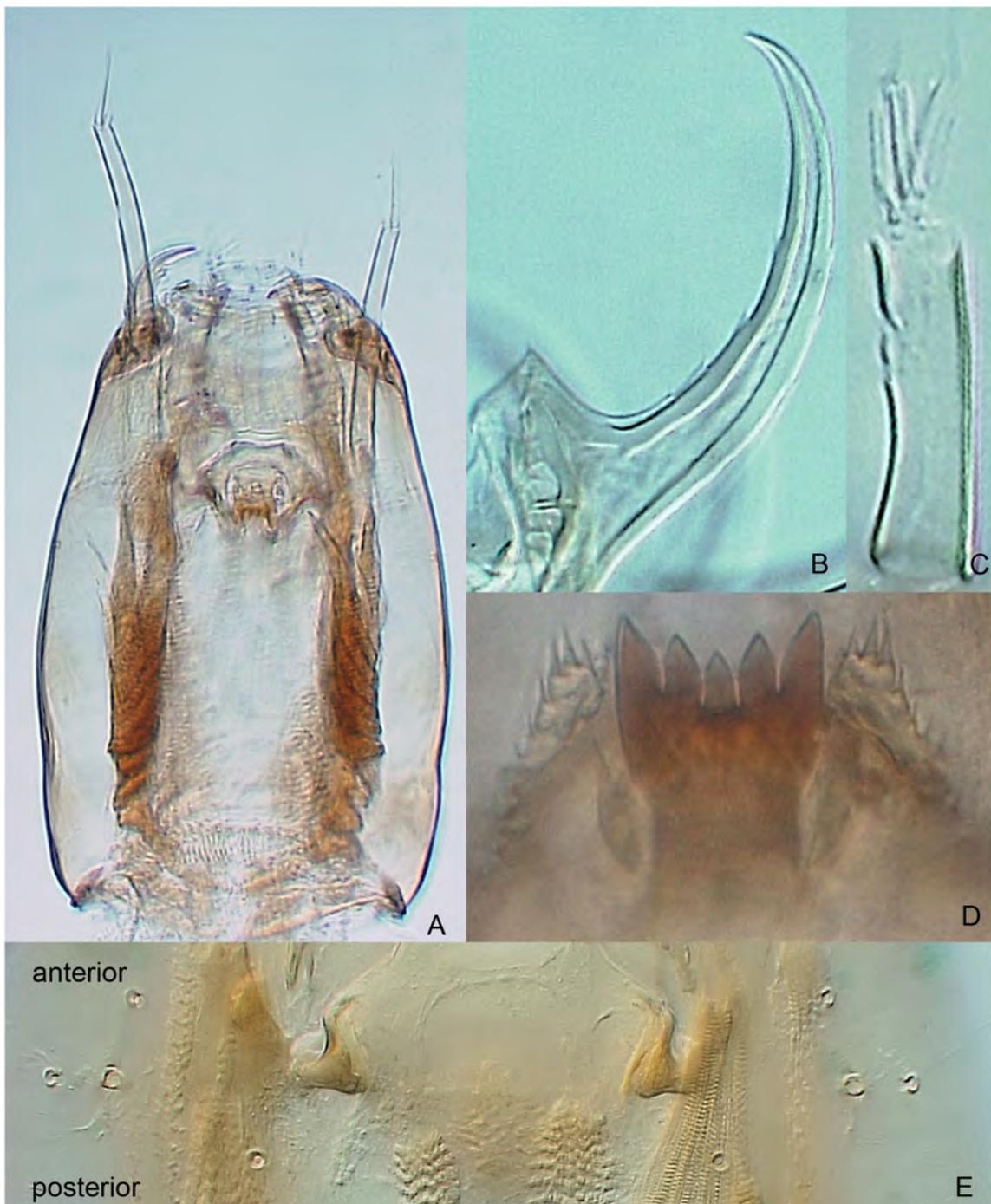
Ligula with 5 teeth, with the median tooth slightly smaller than the laterals (D)

Paraligula bifid (D)

Pecten hypopharyngis (D)

Star chart (E) similar to *Larsia albiceps* but with less of a distance between VP and SSm

Rare, occurs in peaty lentic habitats



Procladius sp. P1 (of DEC)

Distinguishing features

Dorso-mentum with 7-8 distinct teeth on each side (A)

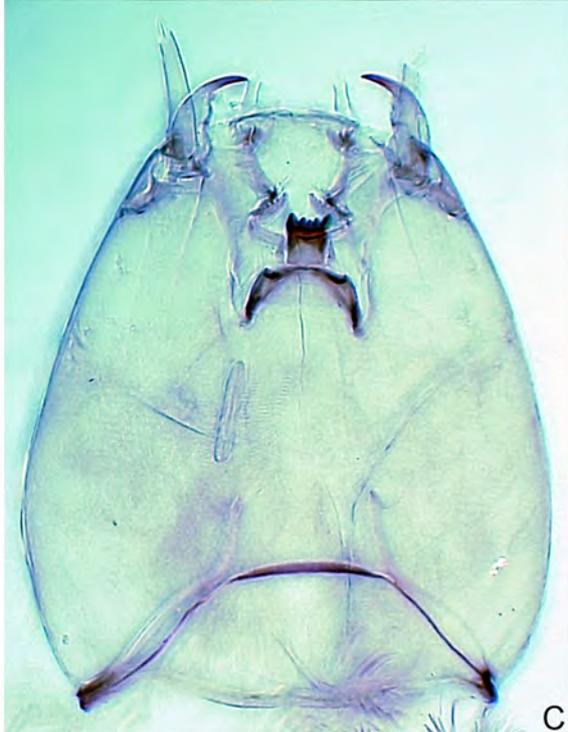
Ligula with 5 teeth forming a V-shape, the outermost pair markedly larger than the inner ones (B)

Ligula teeth darker than base (B)

Paraligula with about 8 spines (B)

Posterior parapod claws all normal (not folded like *P. paludicola* or high arched like *P. villosimanus*) (D)

This species has been collected from organic mound springs in the northern Wheatbelt, but is more commonly found in the Pilbara region.



Procladius DEC sp. 'normal claws'

Distinguishing features

Mandible with a large tooth located just over halfway up (A)

Ligula with 5 teeth decreasing evenly in size towards the median tooth (B)

Paraligula trifold (B) (cf. serrated on species P1)

Pecten hypopharyngis is present but is often folded over and hard to see, has about 9 spines (C)

Dorsomentum with about 7 distinct teeth on each side (D)

Head widest medially (E)

Posterior parapod claws all normal, some are weakly serrated (F)

Uncommon, occurs in temporary freshwater swamps and rock pools



Procladius villosimanus Kieffer, 1917

Distinguishing features

Dorso-mentum with 7-8 distinct teeth on each side (A)

Ligula with 5 teeth with the outermost teeth distinctly larger than the inner three teeth (B)

Ligula teeth darker than base (B)

Pecten hypopharyngis with about 10 spines (B)

Paraligula with many teeth (B)

Posterior parapods usually with two “high arched” claws (C)

Occurs in fresh to mildly saline lentic habitats

