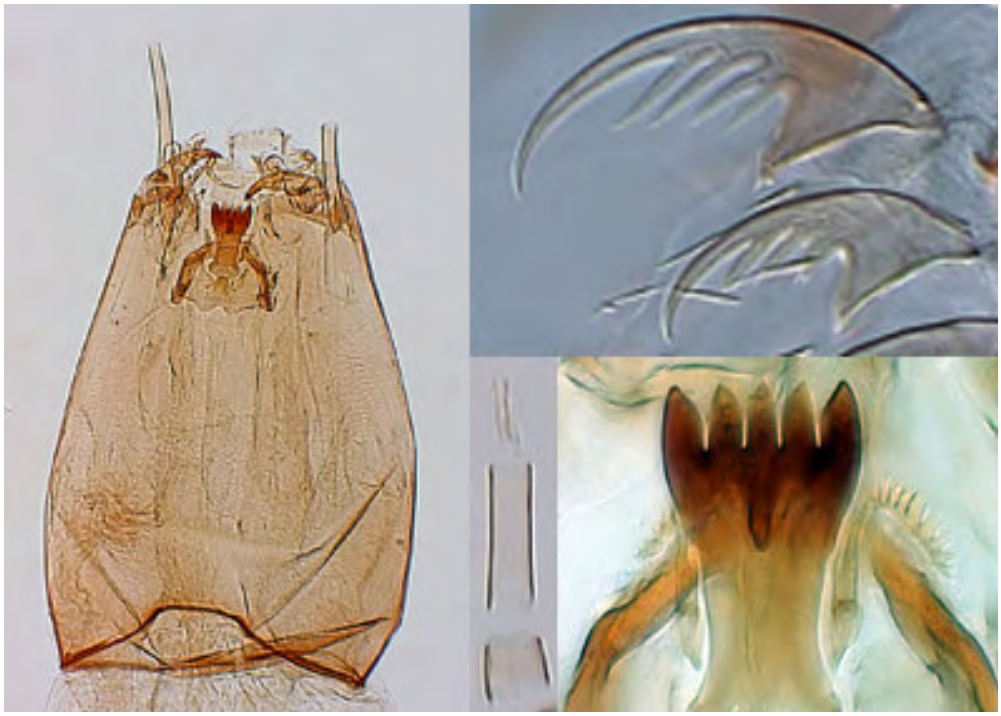
Photographic guide and keys to the larvae of Chironomidae (Diptera) of south-west Western Australia

(Key to subfamilies and Tanypodinae)



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Department of
Environment and Conservation
Our environment, our future

Contents

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fauna by Peter Cranston (Cranston 2000)[1], 3) the key to Australian genera by Chris Madden (Madden 2009[2]) and 4) an unpublished key to south coast chironomid species by Caroline Versteeg and Don Edward.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

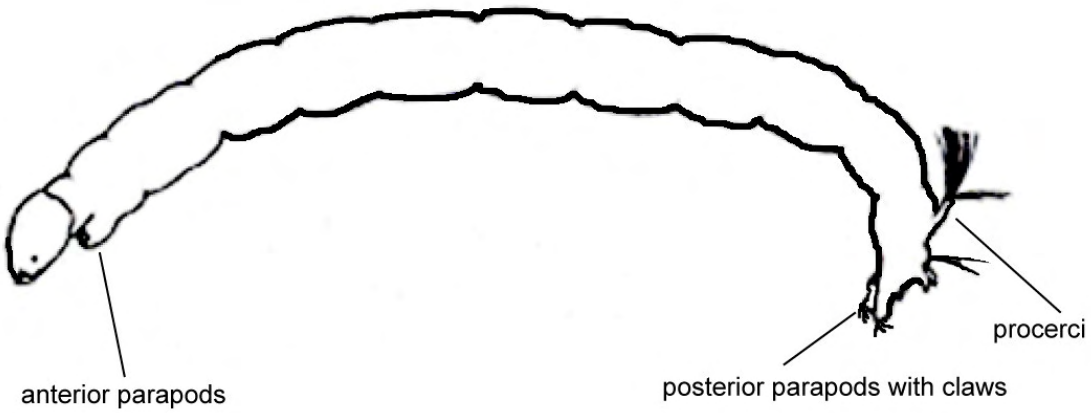
Acknowledgements

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
Ablabesmyia notabilis Skuse		
Ablabesmyia V37	UWA	
Alotanypus dalyupensis Freeman		Has also been called *Anatopynia dalyupensis* and *Macropelopia (Alotanypus) dalyupensis* = VCD11 (UWA), Tanypodinae genus nr. *Apsectrotanypus* sp. SW1 (DEC)
Apsectrotanypus (nr *maculosus)*		= *Apsectrotanypus* sp.1 (DEC), V9 (UWA)
Australopelopia prionoptera Cranston		= Pentaneurini genus SW1 (DEC), V10 (UWA), Pentaneura (Cranston 2000)
Coelopynia pruinosa Freeman		
Larsia albiceps Johannsen		
Paramerina levidensis 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	= *Thienemannimyia* 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)
Procladius paludicola Skuse		= VCD1 (UWA)
Procladius sp. P1	DEC	= *Procladius paludicola* P1 (DEC)
Procladius sp. (normal claws)	DEC	= Tanypodinae sp. C (near Tanypus) (DEC)
Procladius villosimanus Kieffer		

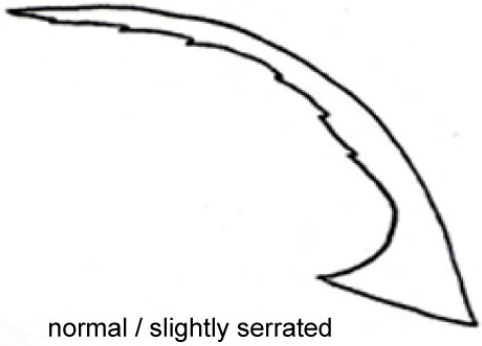
Illustrations of terminology used in the guide



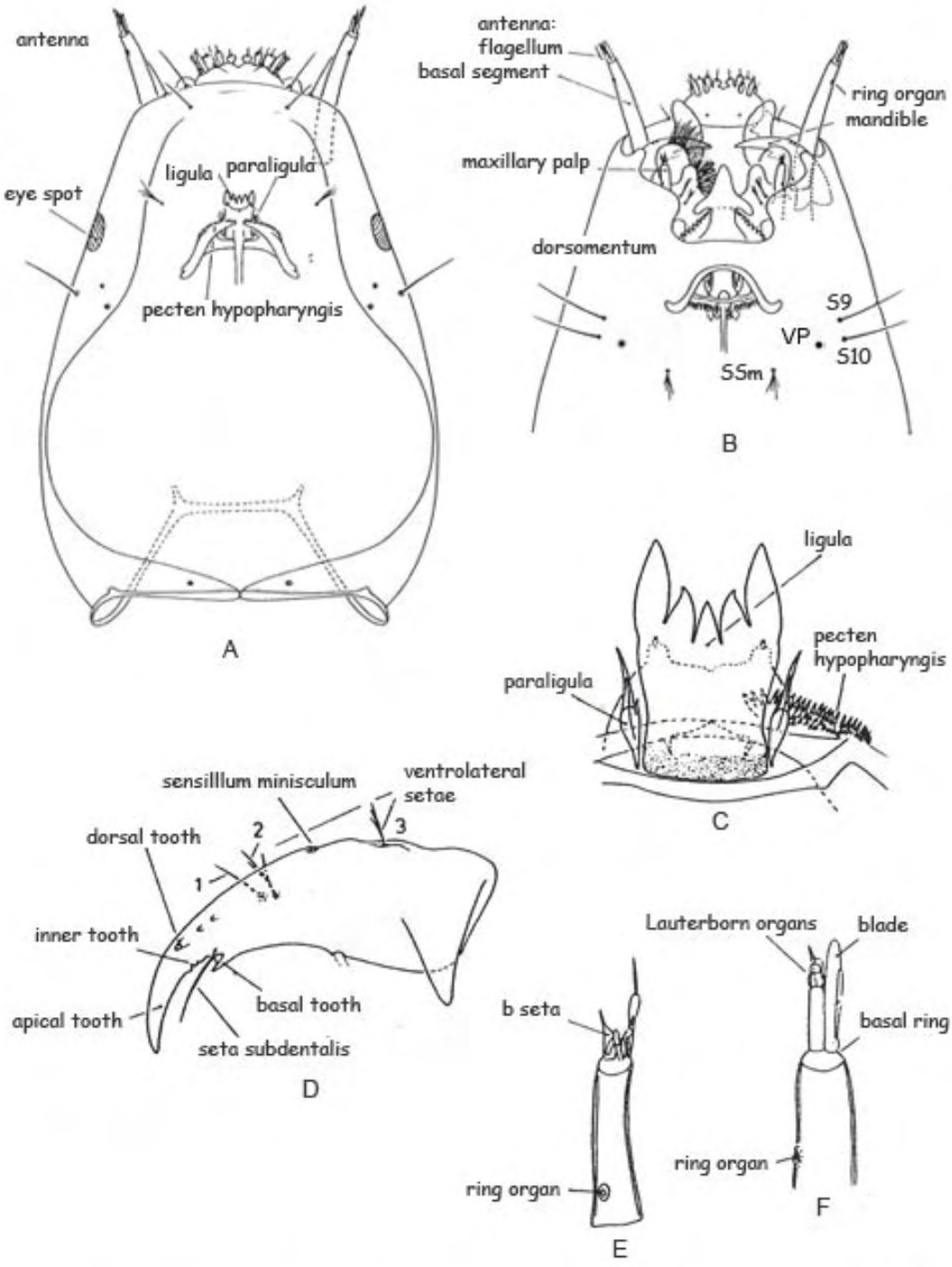
posterior parapod claw types


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.

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 .... **Orthocladiinae**

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 south-western Australian Tanypodinae

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 Pentaneurini[1] 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 trifid. No modified claws on the posterior parapods ..... *Procladius* sp. (normal claws) (DEC)

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* sp. P1 (DEC)

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*

[1] 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)

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*.[2]

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 ..... *Ablabesmyia* V37[3]

7a Maxillary palps divided at about one third length 8

7b Maxillary palps divided about half way. Posterior parapods with 2 darker claws .... *Ablabesmyia notabilis*

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 ..... *Paramerina levidensis*[4]

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

9a Ligula with 4 teeth. Head darker posteriorly. Star chart distinctive, with S10 VP and SSm transversely aligned posterior to S9 ..... Pentaneurini genus E

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 sp. A

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[2] 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).

[3] The maxillary palps of earlier instars may have fewer segments.

[4] 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.

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 1st lateral teeth of the ligula slightly curved outwards. S9 and S10 are located close together and distinctly anterior to SSm and VP..... *Australopelopia prionoptera*

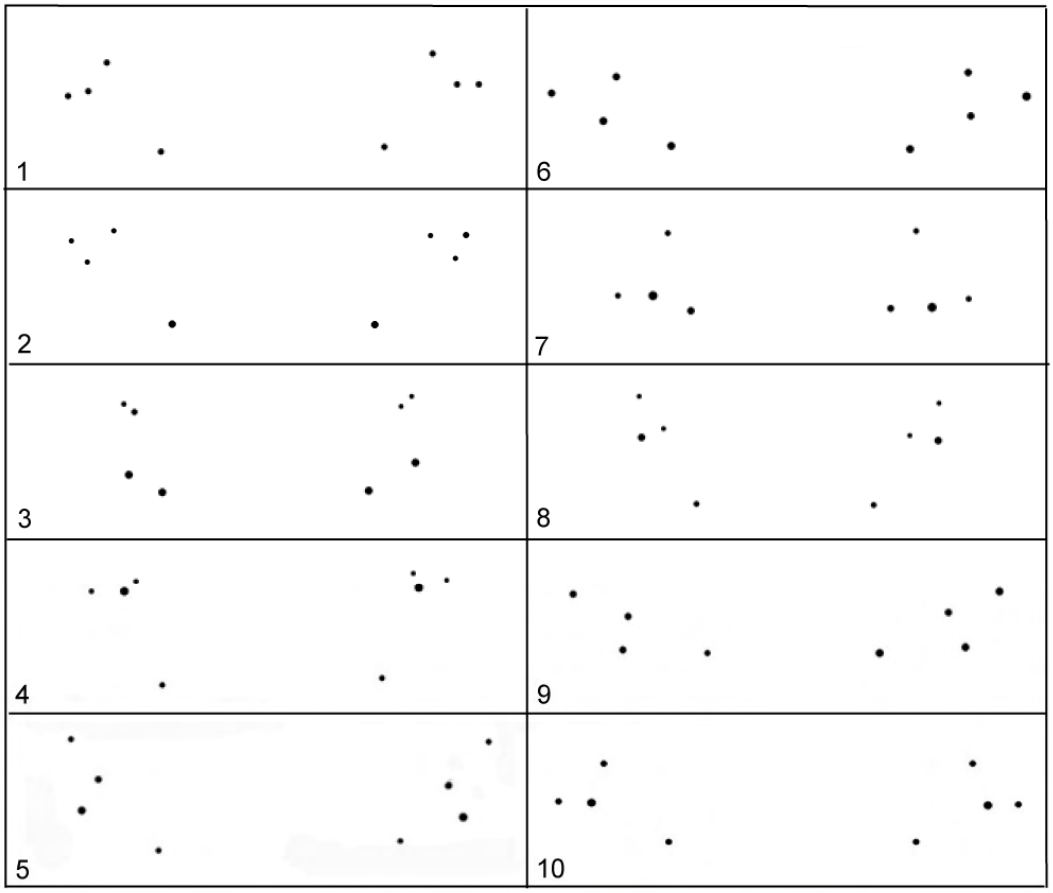
12b 1st lateral teeth of ligula straight. VP located closer to S9 and S10 13

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*

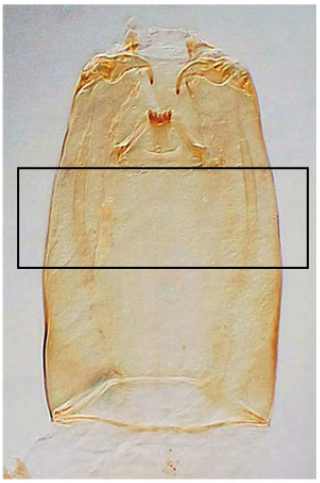
13b Some claws on the posterior parapods weakly serrated. All uniform in colour S9, S10 and VP not located so far away from SSm ..... Pentaneurini sp. F

Pentaneurini (Tanypodinae) “star charts”

Setal scars which are visible on the ventral side of the head, postero-lateral to the ligula on slide mounted specimens are referred to as star charts. There are four scars and they are known as S9, S10 (antero-lateral most setae), SSm (posterior and inner most seta), and VP which is actually a pore and is often the slightly larger and located between the three setal scars.

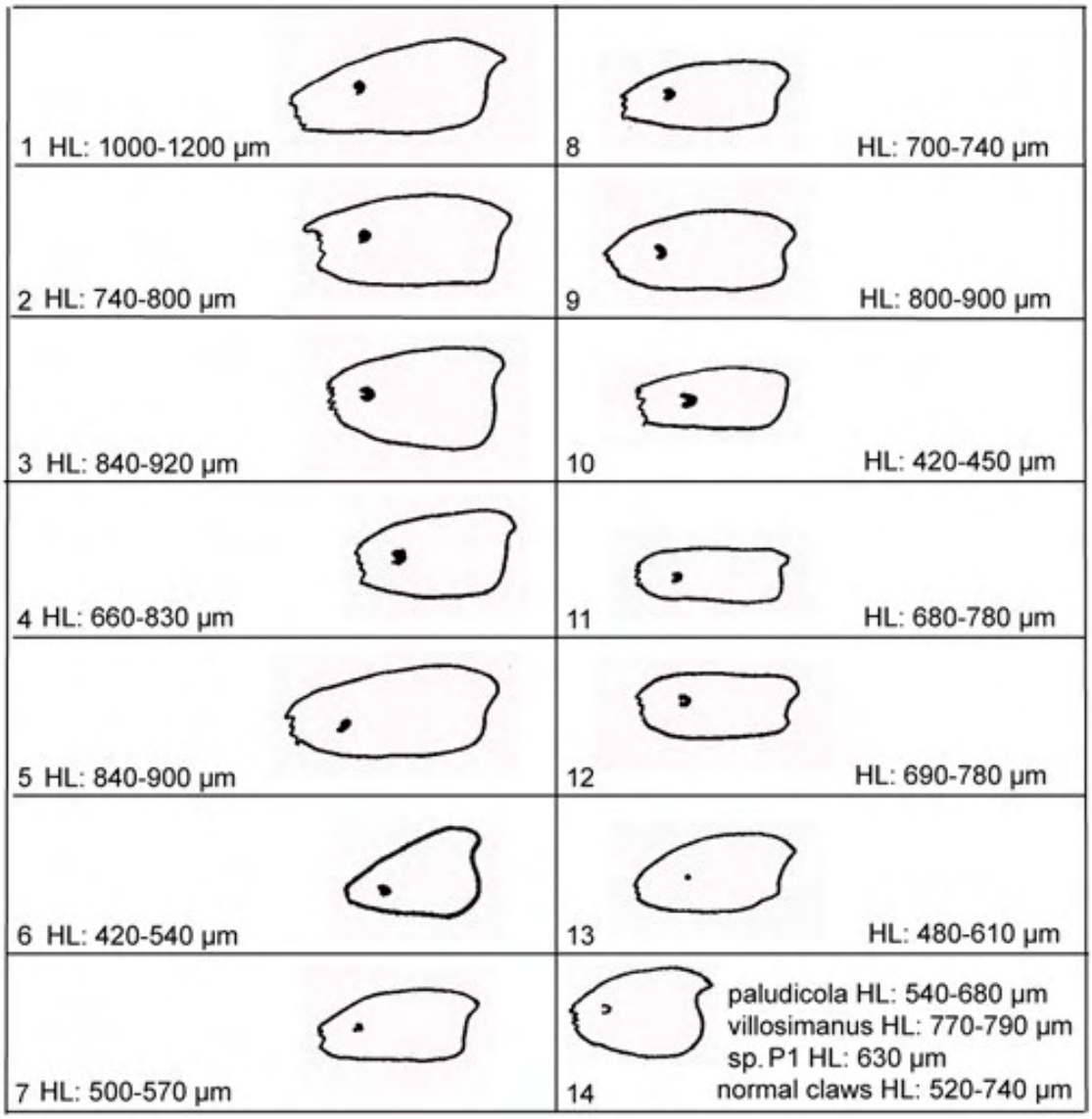


1. Ablabesmyia notabilis
2. Ablabesmyia V37
3. Australopelopia prionoptera
4. Larsia albiceps
5. Paramerina levidensis
6. Pentaneurini genus C
7. Pentaneurini genus E
8. Pentaneurini genus V20
9. Pentaneurini sp A
10. Pentaneurini sp F



Tanypod head shapes

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

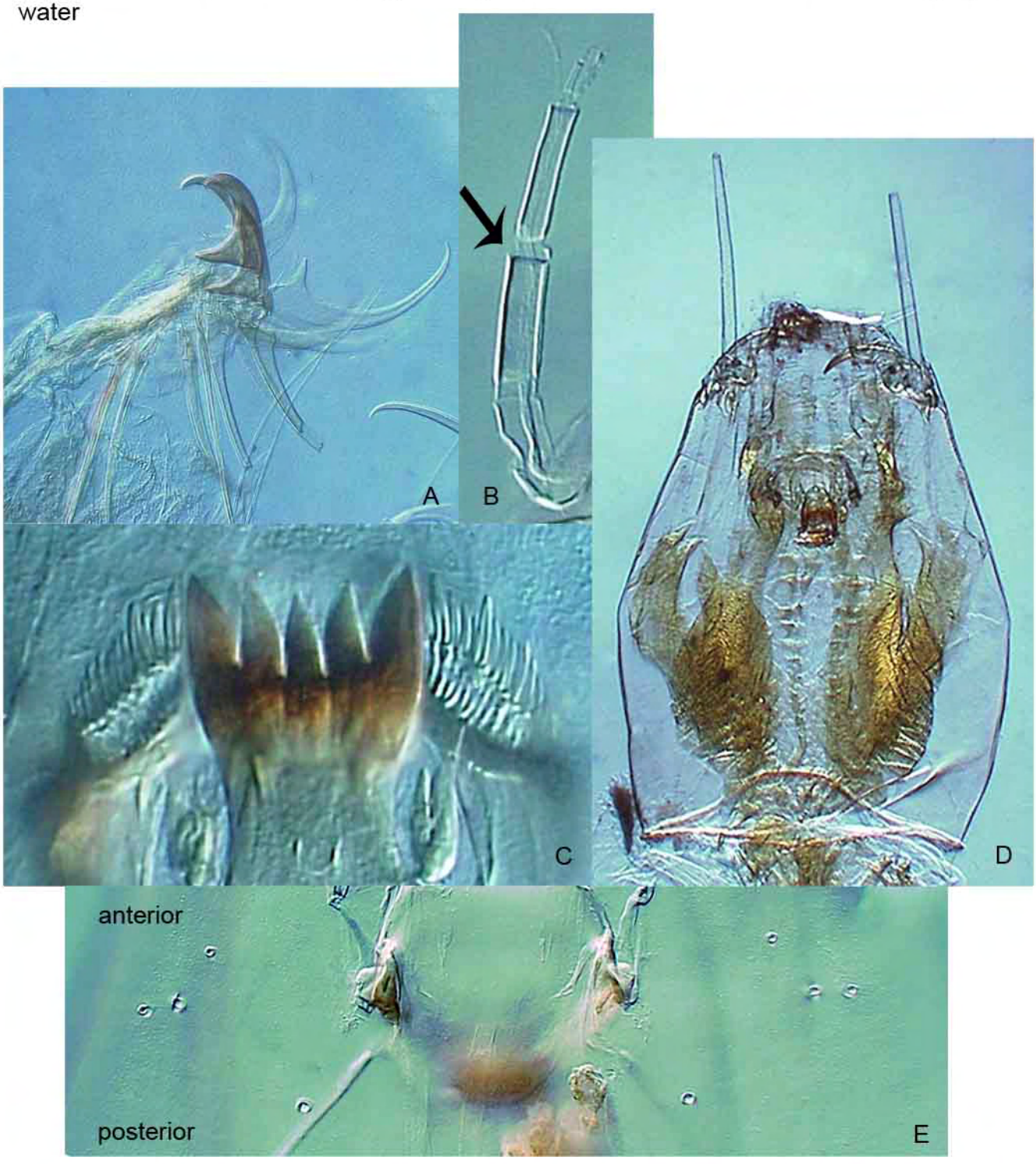


1. Ablabesmyia notabilis
2. Ablabesmyia V37
3. Alotanypus dalyupensis
4. Apsectrotanypus nr maculosa
5. Australopelopia prionoptera
6. Coelopynia pruinosa
7. Larsia albiceps
8. Paramerina levidensis
9. Pentaneurini genus C
10. Pentaneurini genus E
11. Pentaneurini genus V20
12. Pentaneurini sp. A
13. Pentaneurini sp. F
14. Procladius spp.

Ablabesmyia notabilis (Skuse, 1889)

Distinguishing features
Maxillary palps divided into two about 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

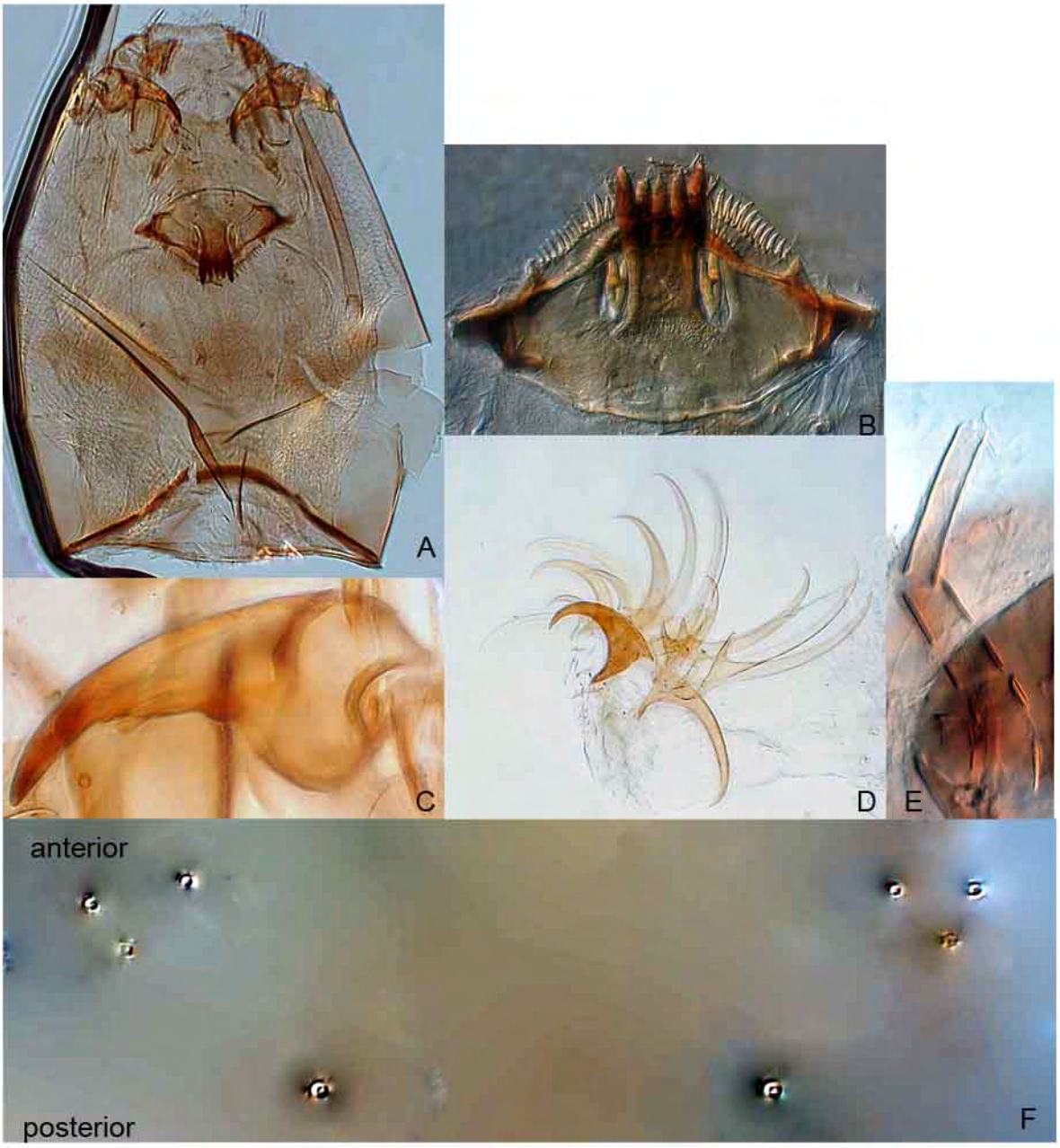
Occurs in lentic and lotic habitats, primarily freshwater but has been recorded in slightly saline water



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

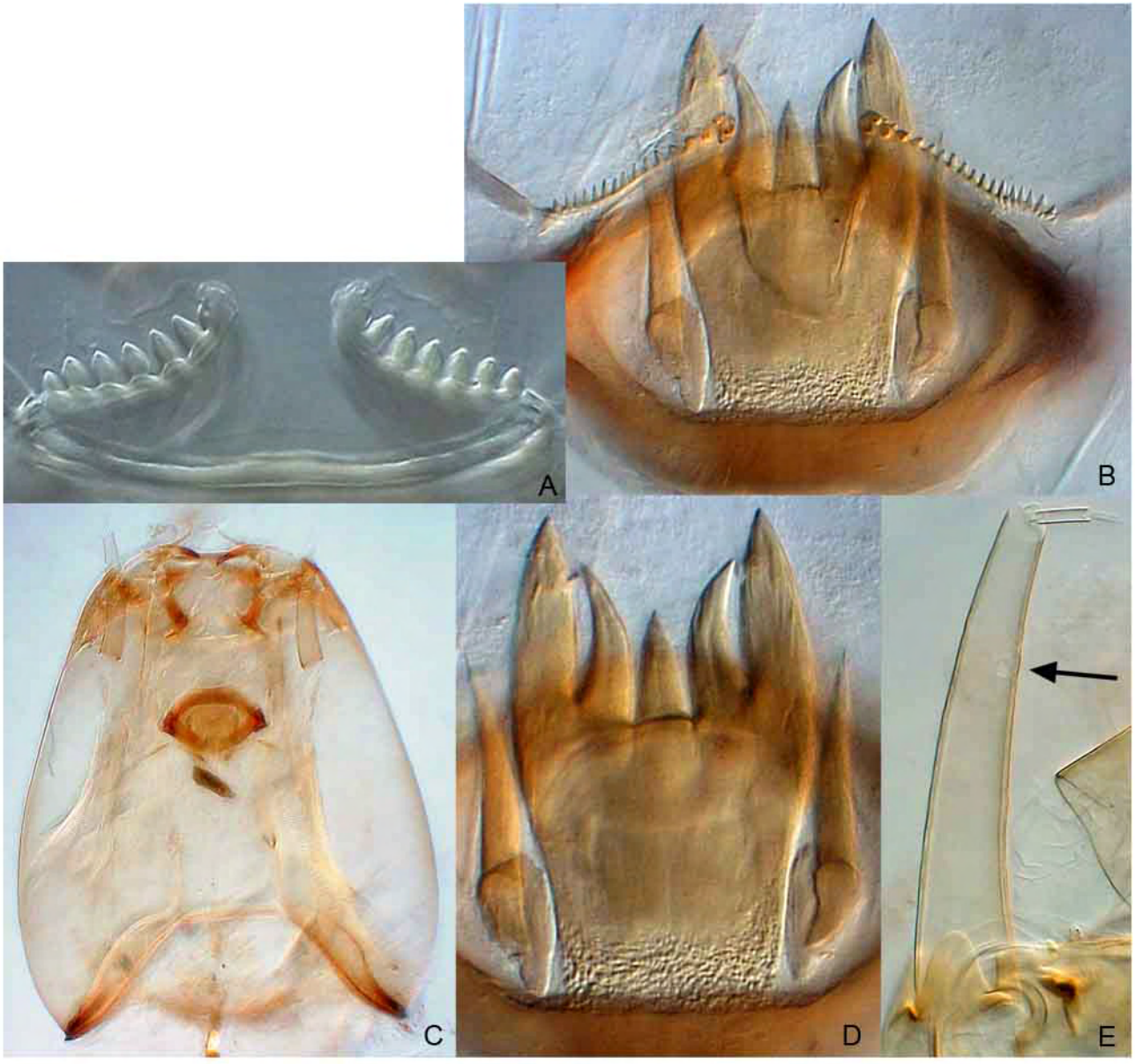
Dorsomentum with 7-8 distinct teeth on each side (A)

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

Pecten hypopharnyngis 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

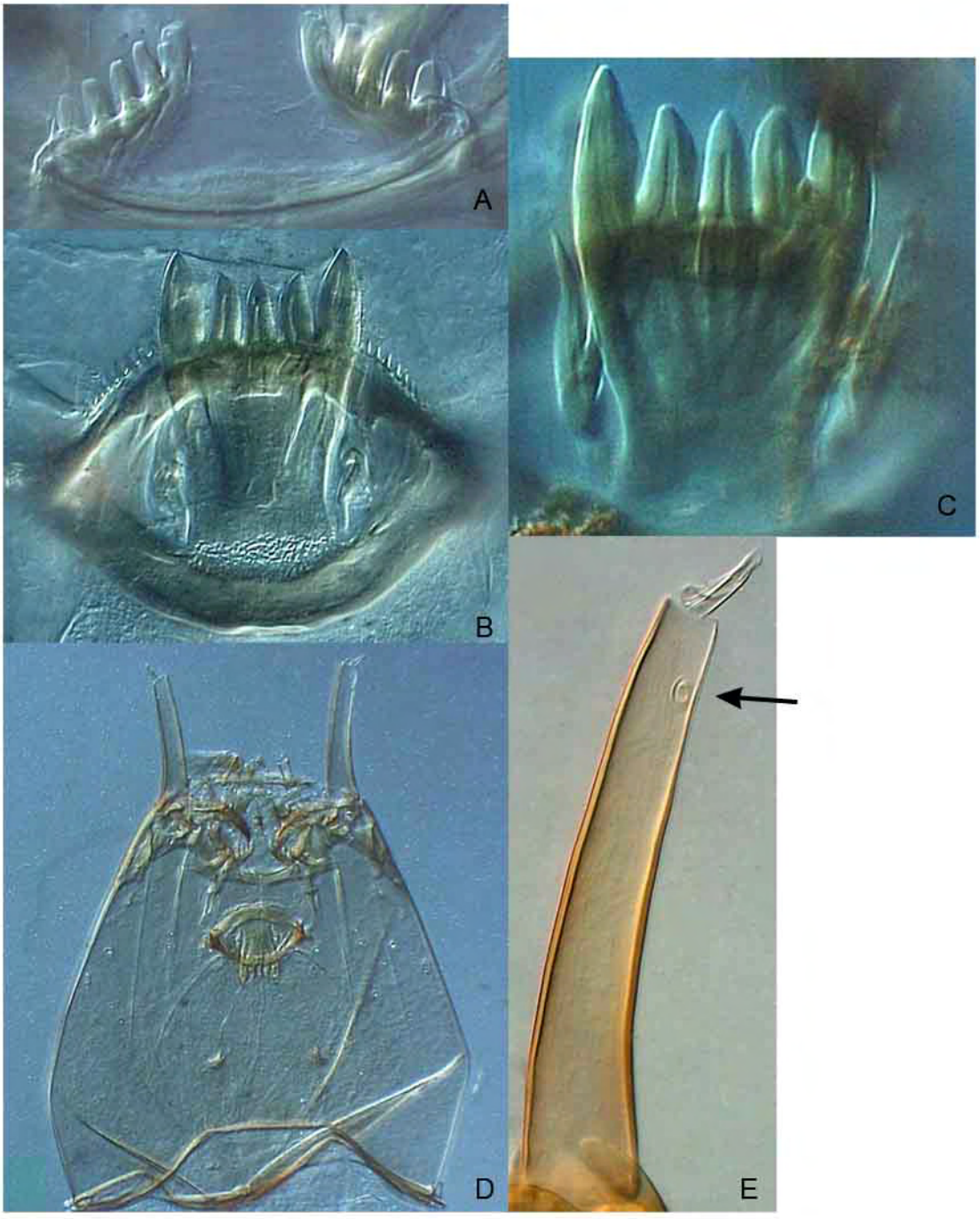


Apsectrotanypus nr *maculosa*

Distinguishing features

Dorsomentum 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)

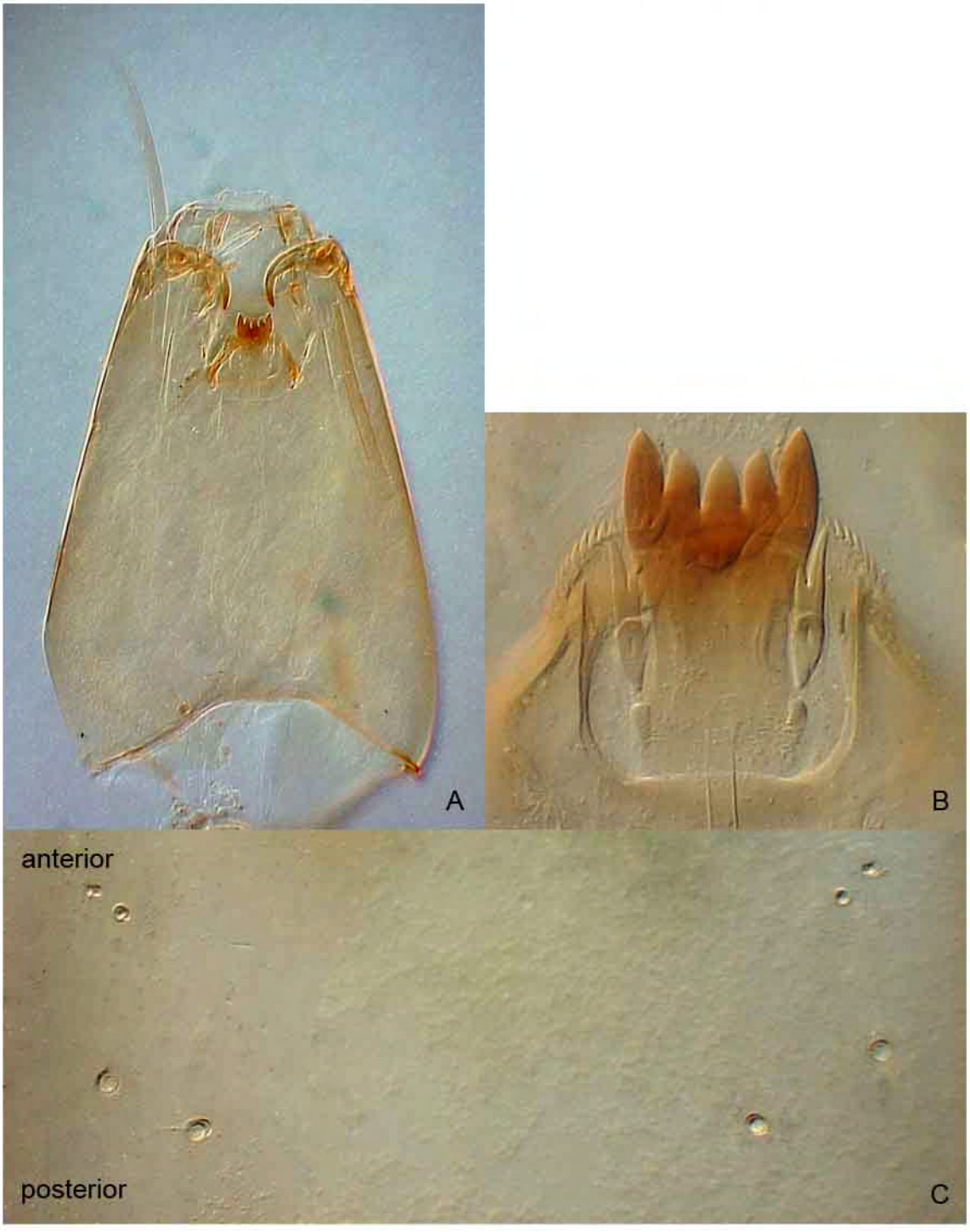
Occurs in lotic habitats, primarily in the higher rainfall south-west



Australopelopia prionoptera 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)

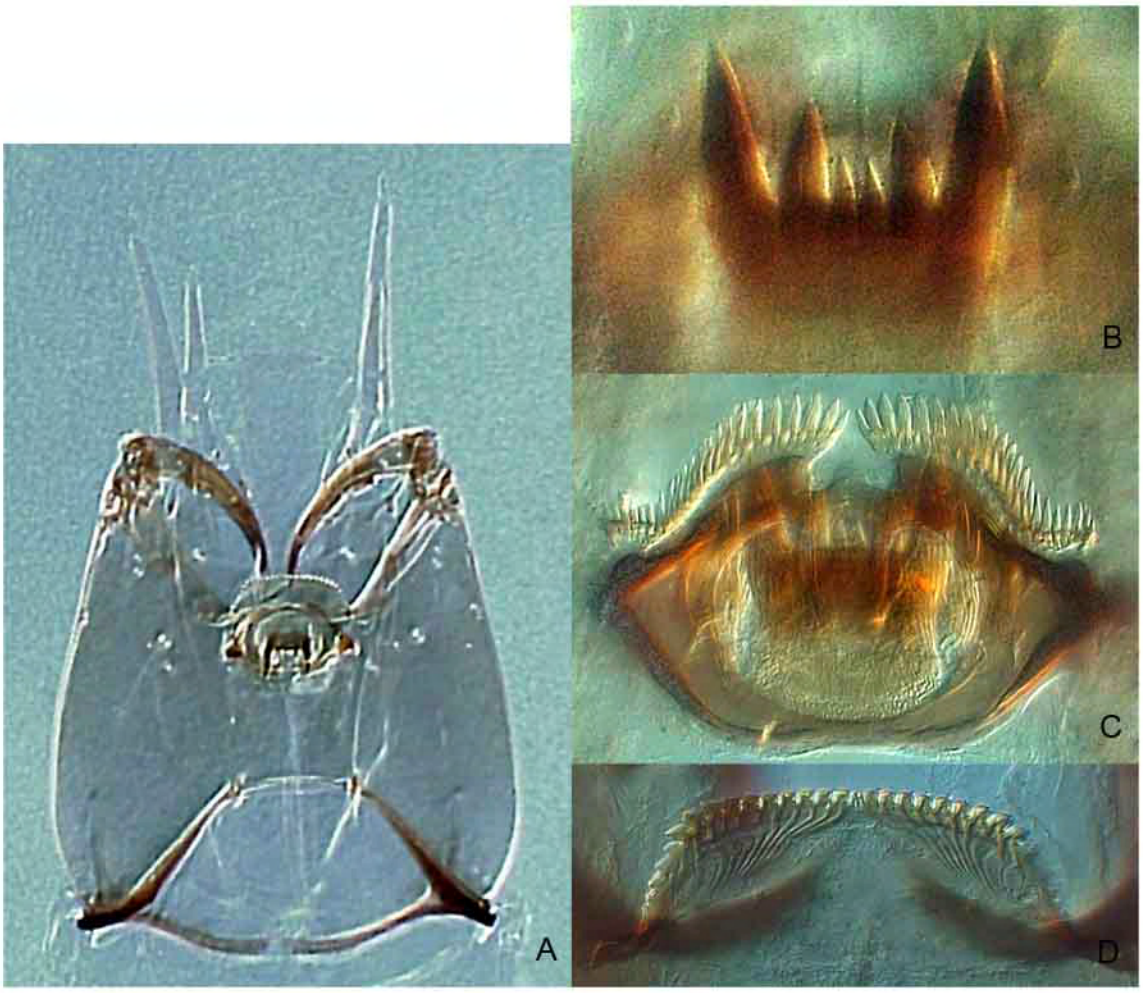
Occurs in lotic habitats, primarily in the higher rainfall south-west



Coelopynia pruinosa Freeman, 1961

Distinguishing features
Mandibles 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 numerous and increasing in size from outer to inner (C)
Dorsomentum with numerous equally sized teeth (D)

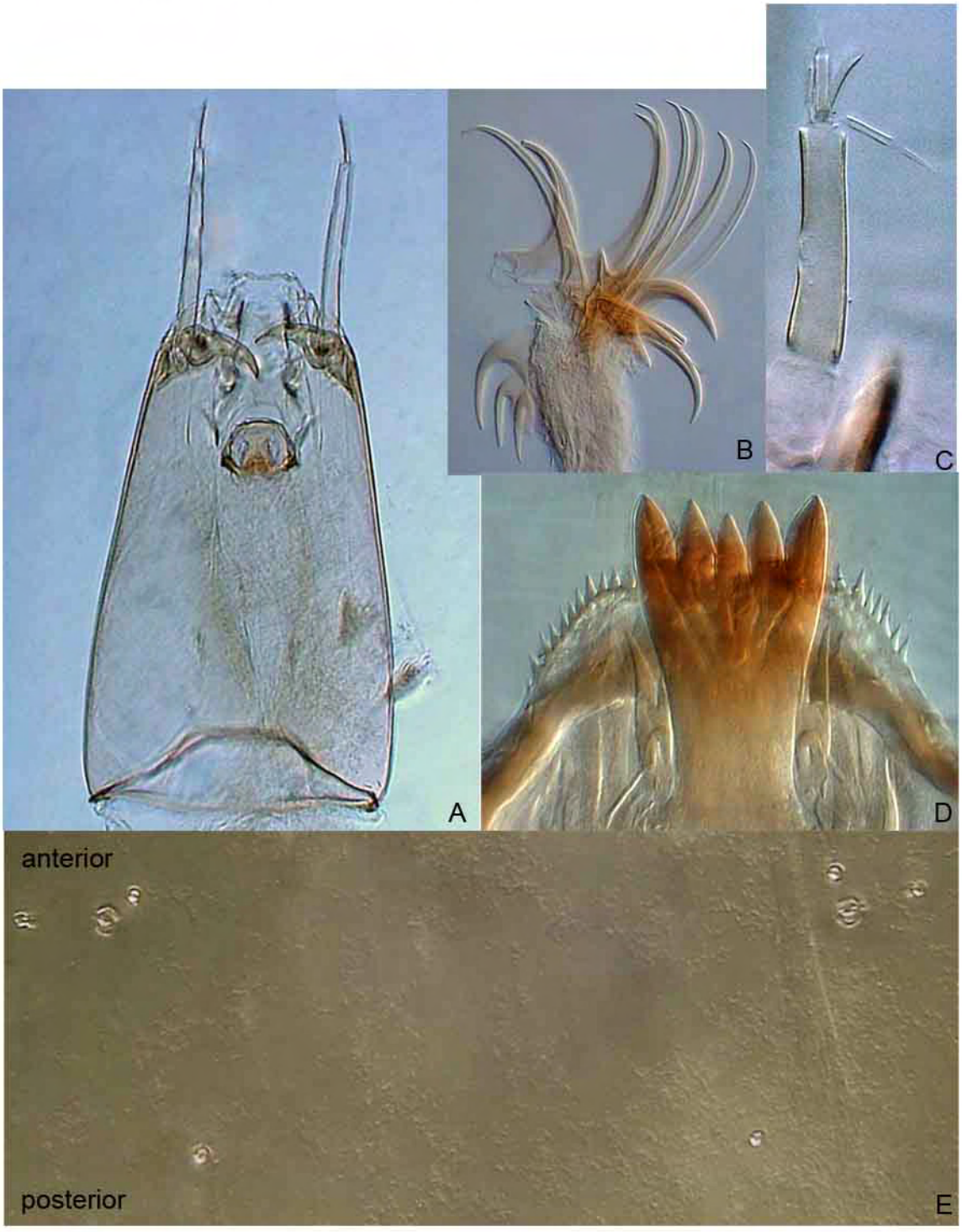
Widespread in lentic freshwater wetlands and river pools



Larsia albiceps Johannsen, 1931

Distinguishing features
Long head (A)
Claws on posterior parapods weakly serrated (B) (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)
Pecten hypopharyngis (D)
Star chart (E)

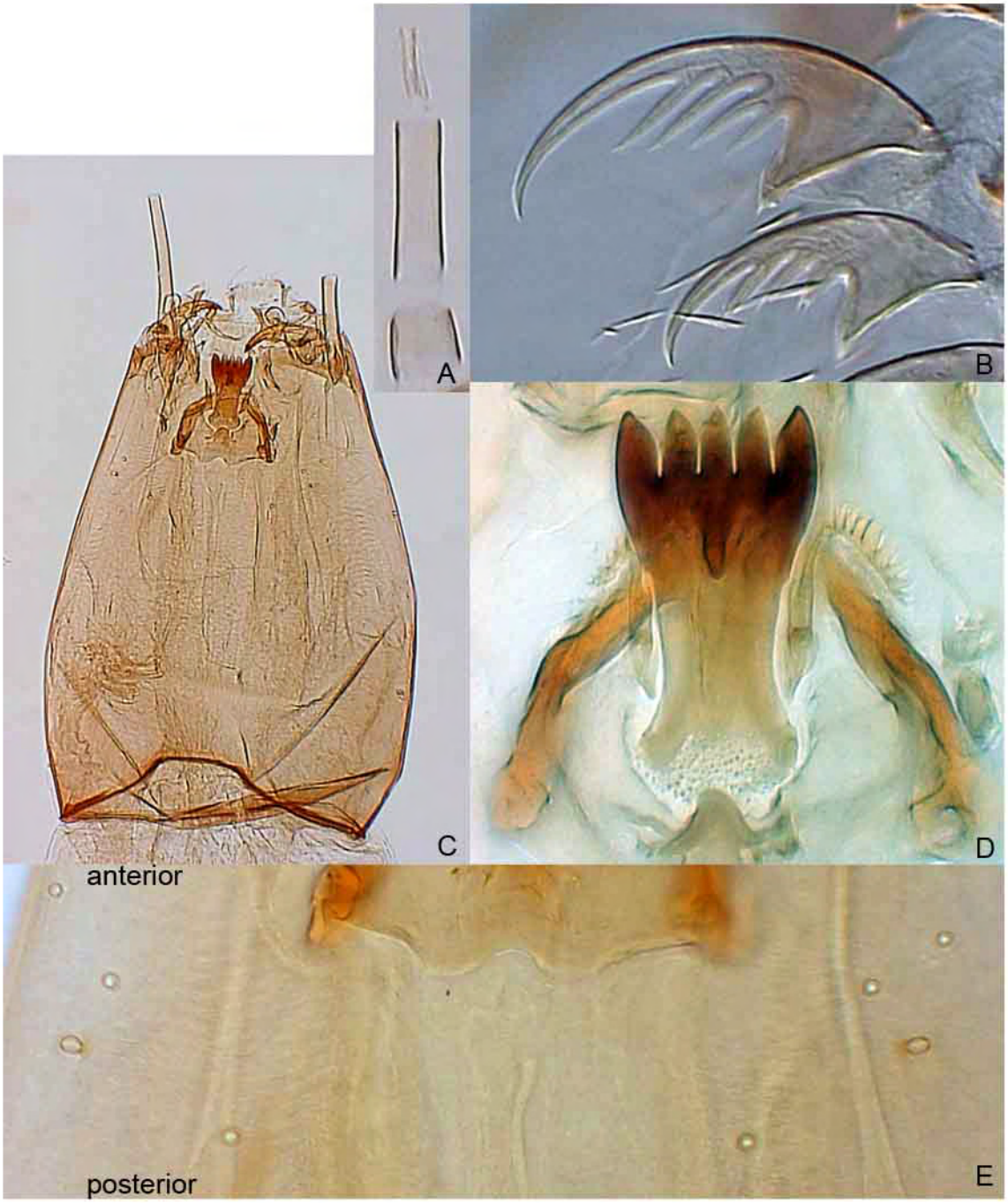
Widespread in lentic wetlands and river pools



Paramerina levidensis (Skuse, 1889)

Distinguishing features
Maxillary palps divided at about one third
Posterior parapods with usually 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)

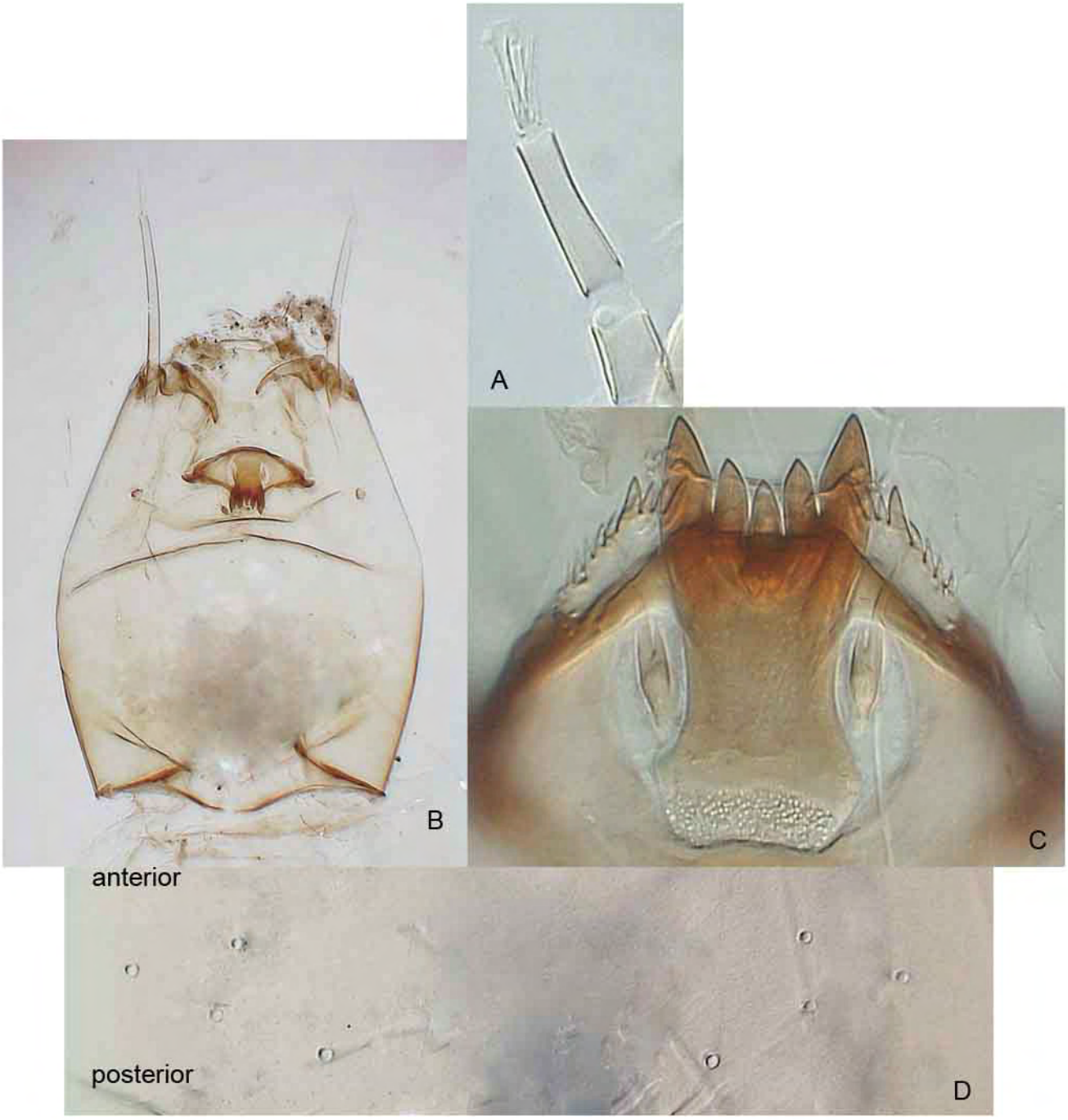
Occurs throughout the south-west in lentic and lotic habitats, and in fresh and saline water



Pentaneurini genus C

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 distinctively sized spines on each side (C)
Star chart (D)
Posterior parapod claws unserrated

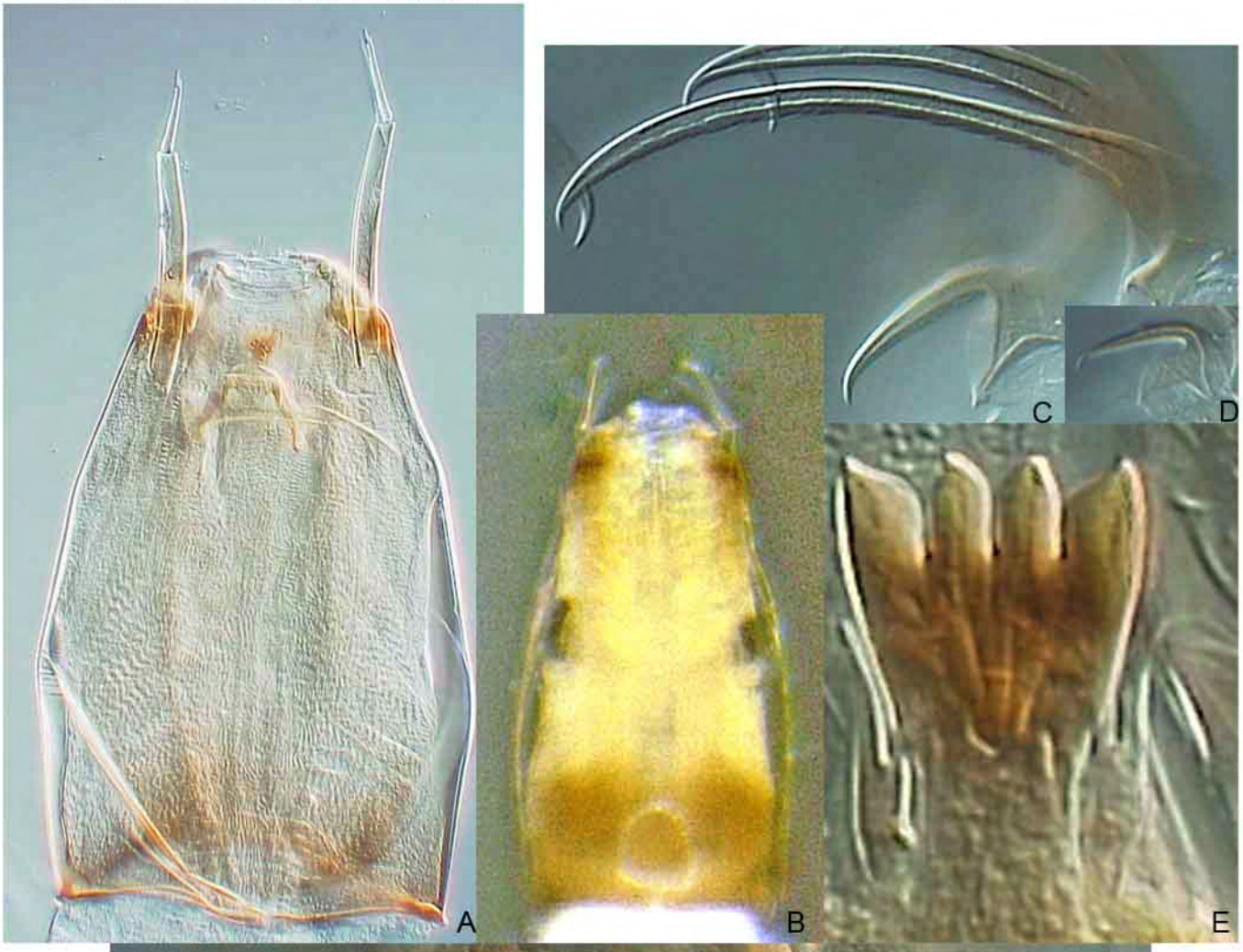
Occurs in lentic and lotic habitats



Pentaneurini genus E

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)

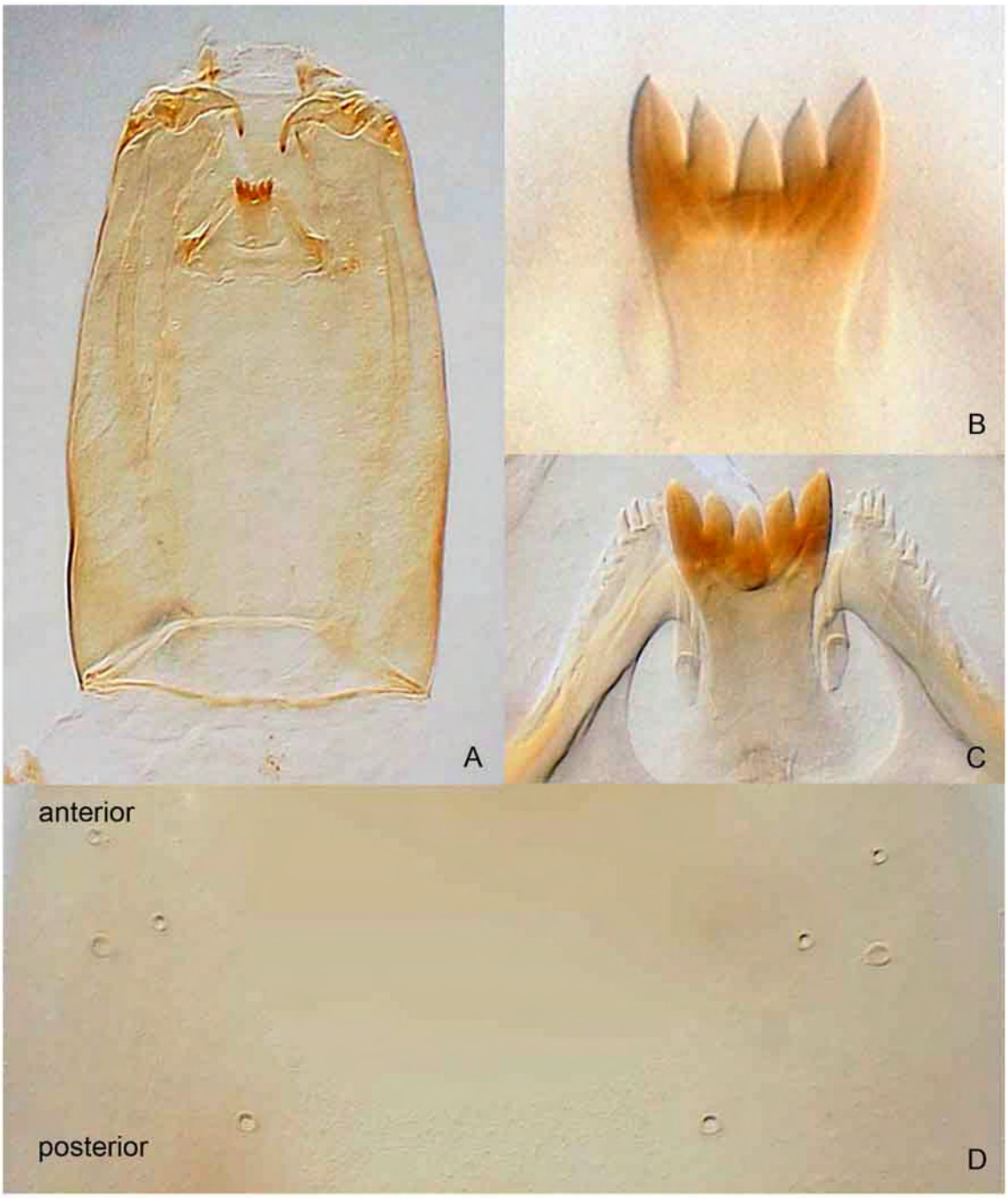
Occurs in lentic and lotic habitats



Pentaneurini genus V20

Distinguishing features
Head not anteriorly tapering, more or less parallel sided (A)
Ligula with 5 teeth with the first lateral slightly curved outwards (B)
Paraligula bifid (C)
Pecten hypopharyingis with 8-10 spines on each side (C)
Base of maxillary palp undivided
Star chart (D)

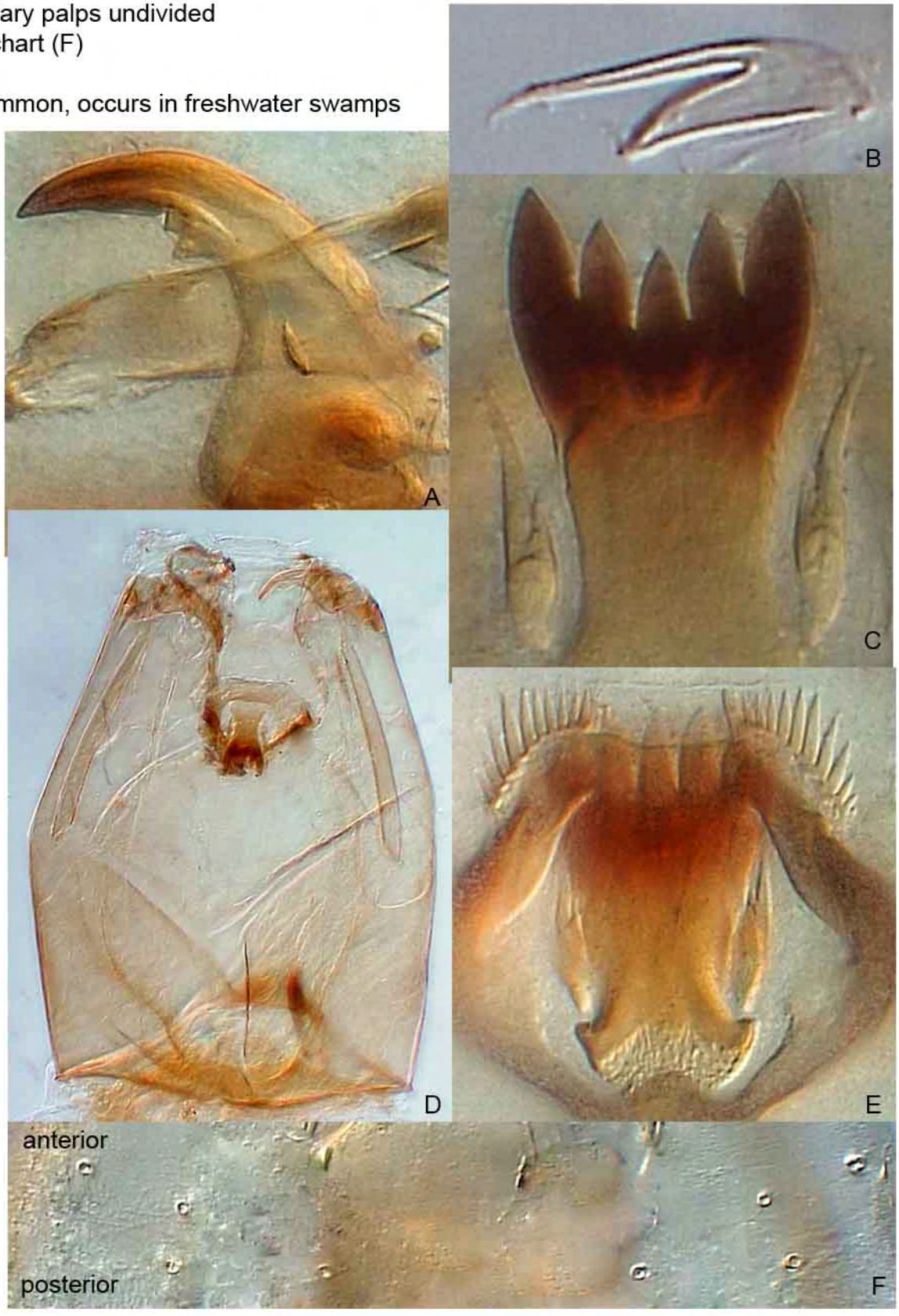
Occurs in fast flowing streams



Pentaneurini sp. A

Distinguishing features
Mandible with two teeth about midway up (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
Star chart (F)

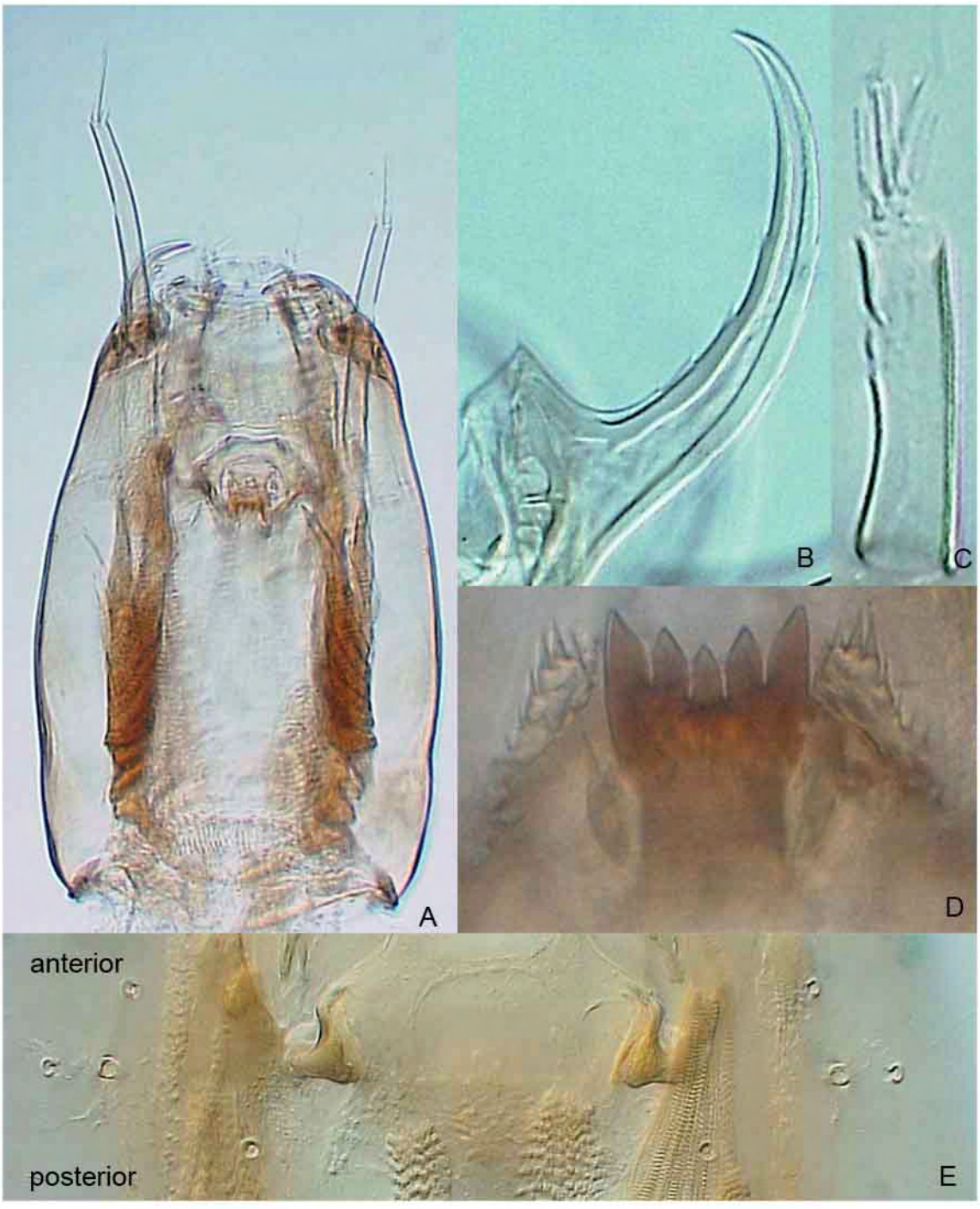
Uncommon, occurs in freshwater swamps



Pentaneurini sp. F

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



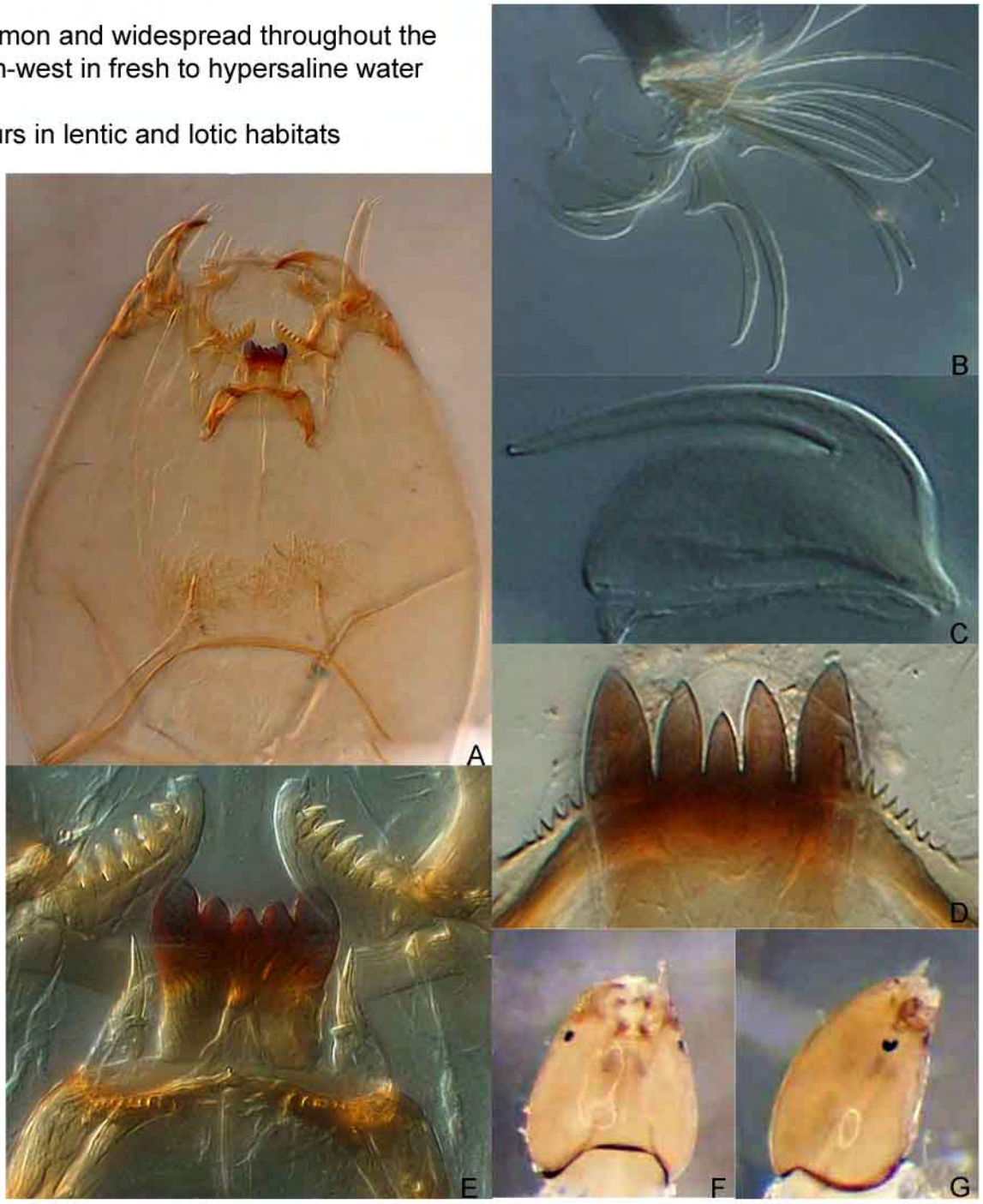
Procladius paludicola Skuse,1889

Distinguishing features

Posterior parapods with usually two “folded” claws (B and C)
Ligula with five teeth decreasing in size towards the median with teeth darker than the base (D and E)
Paraligula with many spines
Dorsomentum with 7-8 distinct teeth on each side (E)
Pecten hypopharyngis with about 9 spines (D)

Common and widespread throughout the south-west in fresh to hypersaline water

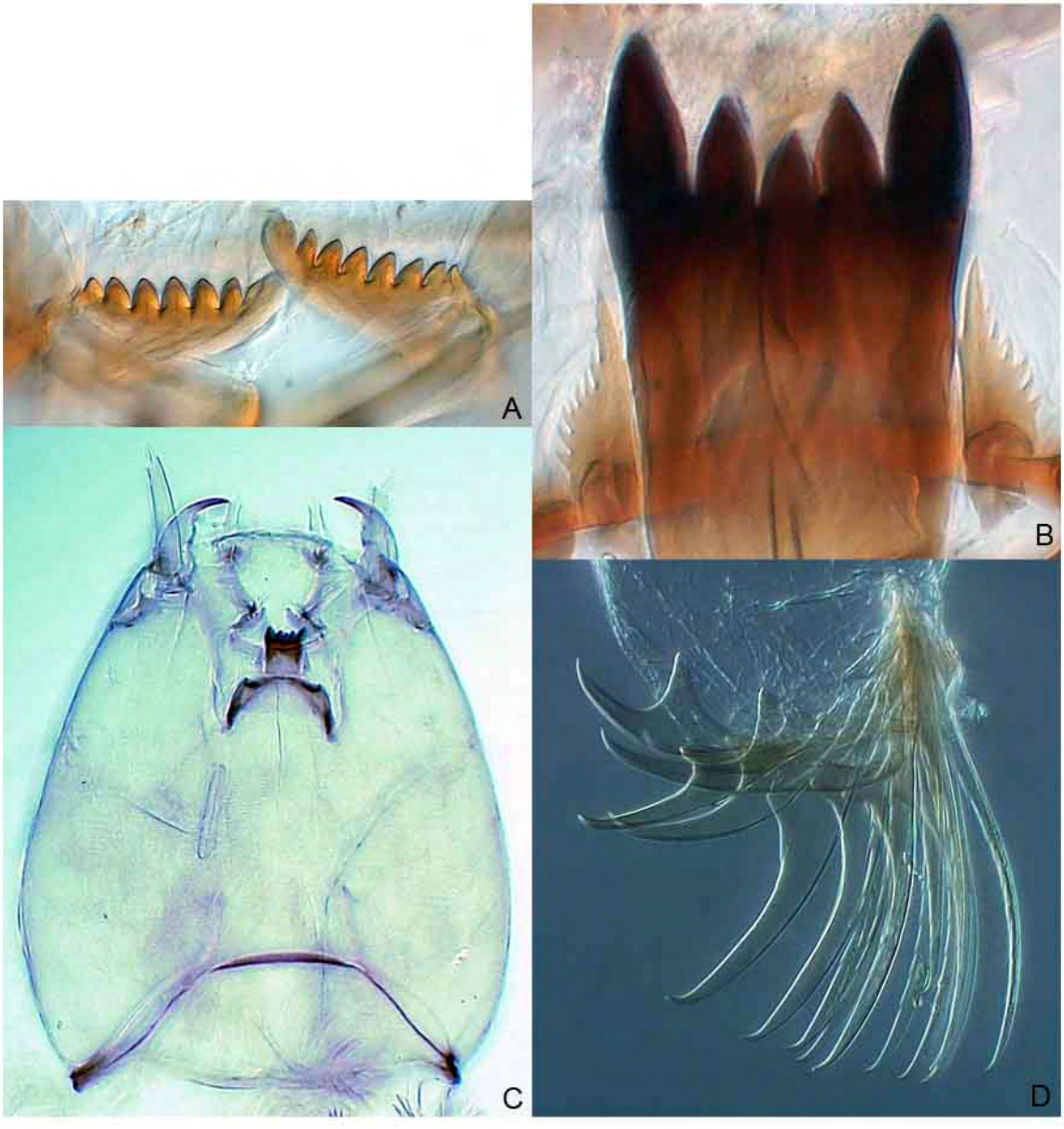
Occurs in lentic and lotic habitats



Procladius sp. P1

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 inners (B)
Ligula teeth darker than base (B)
Paraligula with about 8 spines (B)
Posterior parapod claws all normal (D)

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



Procladius sp. (normal claws)

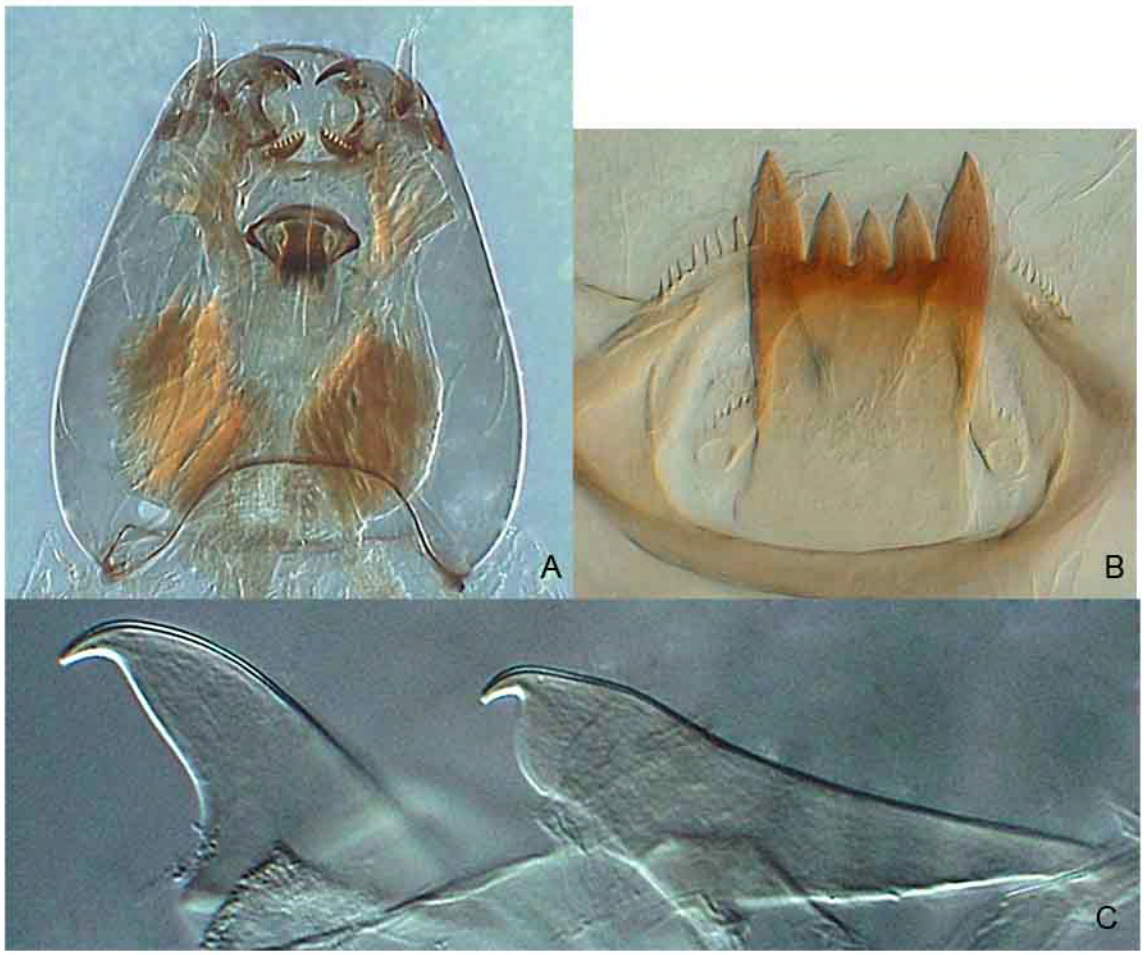
Distinguishing features
Mandible with a large tooth located just over halfway up (A)
Ligula with 5 teeth decreasing evenly in size towards the median tooth (B)
Paraligula trifid (B)
Pecten hypopharyngis is present but is often folded over and hard to see, has about 9 spines (C)
Dorsomentum with 7 distinct 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 with usually two “high arched” claws (C)

Occurs in fresh to mildly saline lentic habitats



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