

SCAMIT Meeting

16 April 2018

D. Pasko

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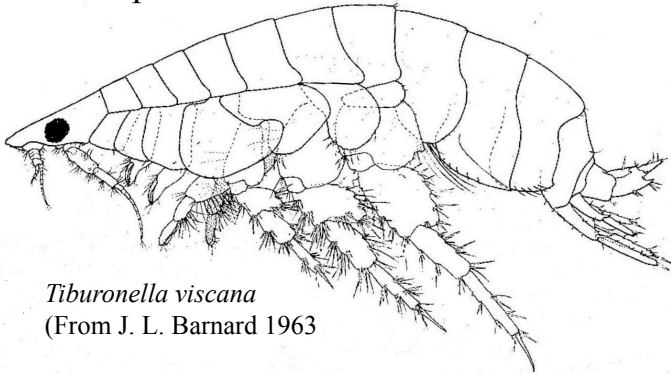
Amphipods: Phoxocephaloidea:
Urothoidae, Phoxocephalidae,
Platyischnopidae



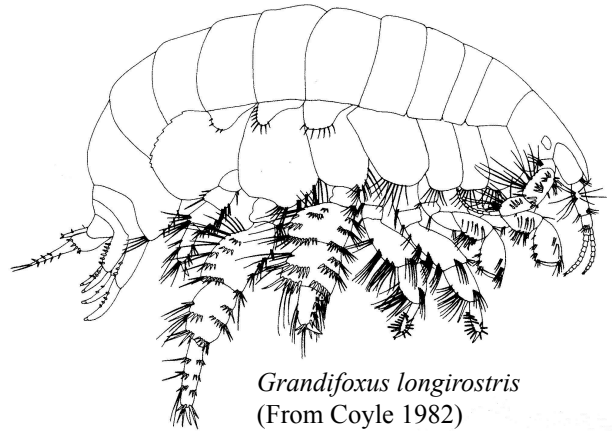
Phoxocephaloidea

(from Bousfield 1979)

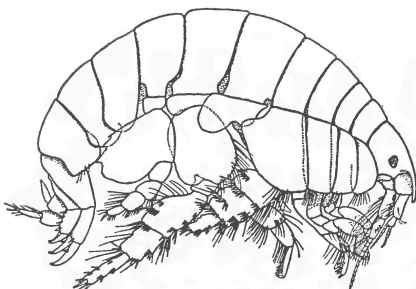
- Plesiomorphic, smooth-bodied, rostrate, fossorial gammarideans
- Usually having strongly dimorphic terminal pelagic male bearing sensory brush setae and calceoli (vibration receptors) on peduncular segments of antenna 1 and 2, and calceoli on flagella of antenna 2
- Accessory flagellum strongly developed, multi-segmented
- Mouthparts modified, usually with weak mandibular molar, normal palp, weakly armed plates of maxillae 1 and 2, and small inner plates of maxilliped
- Lower lip, inner lobes well developed
- Coxal plates deep, 4th large, strongly excavate behind; coxae 5–7 posteriorly lobate
- Gnathopods 1 and 2 subsimilar, subchelate or chelate
- Peraeopods 5–7 each different from the other, often markedly so, dactylose
- Brood plates linear
- Coxal gill usually present on peraeopod 7
- Pleopods normal to powerful
- Uropods lanceolate, rami of 1 and 2 typically subequal
- Uropod 3 foliaceous, outer ramus 2-segmented
- Telson lobes deeply separated (or fused to a notch), apices with minute notch and spine.



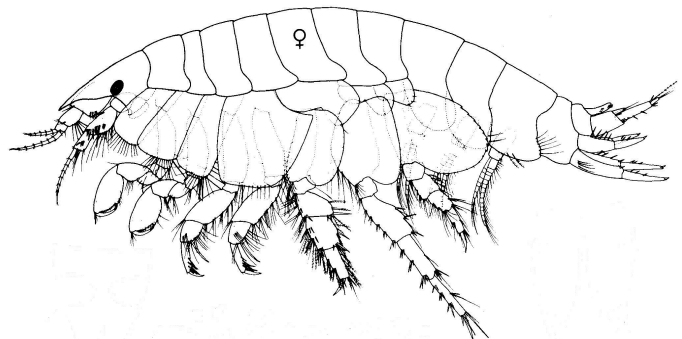
Tiburonella viscana
(From J. L. Barnard 1963)



Grandifoxus longirostris
(From Coyle 1982)



Rhepoxynius pallidus (From
J. L. Barnard 1960)



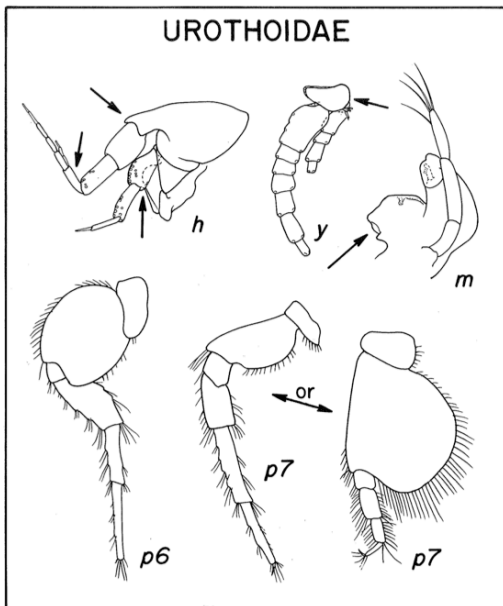
Foxiphalus similis (From Jarrett and Bousfield 1994b)



Phoxocephaloidea

UROTHOIDAE

- Head truncate, rostrum and eyes weak
- Cheek strong (antero-distal head lobe)
- Ant 1, Art 1–3 elongate
- Ant 2, Art 4 not expanded, w/o strong spines
- Mn incisor small; palp rounded apically
- Gnathopods feeble
- P6 & P7 dissimilar
 - P7 basis thin or expanded, if expanded, articles short
- Pleopod peduncles short

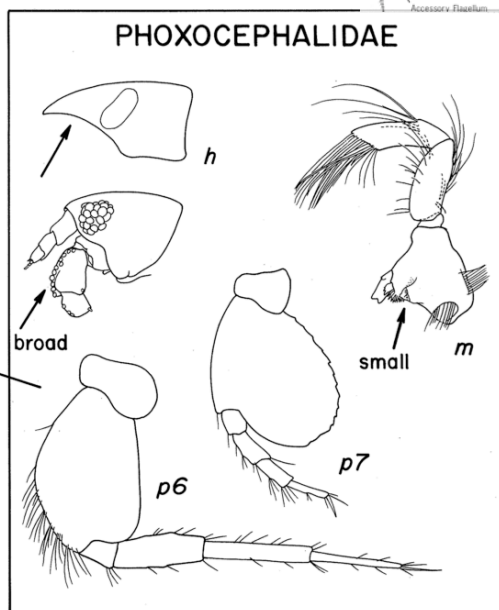
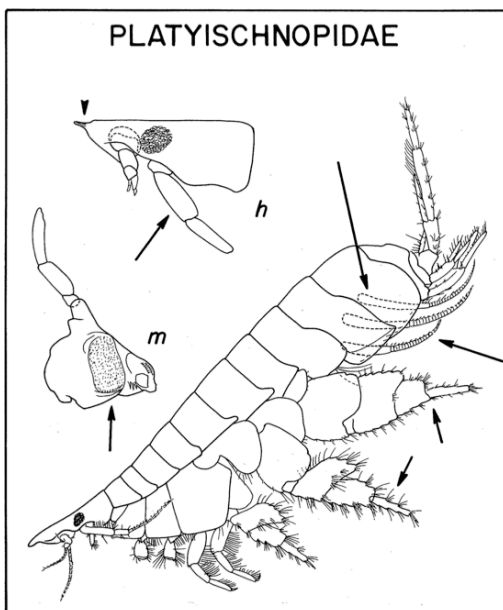
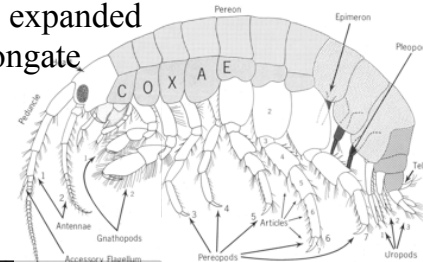


PLATYISCHNOPIDAE

- Head elongate, cylindrical rostrum with ventral retrose process, eyes prominent; cheek poorly developed
- Ant 2, Art 2 elongate
- Molar non-triturative, bearing spinules; palp w/o setae
- Cx 4 dominant & excavate
- P3 & 4 spinose, article 5–6 narrowed
- P6 & P7 subequal, article 4 expanded
- Pleopods peduncles elongate

PHOXOCEPHALIDAE

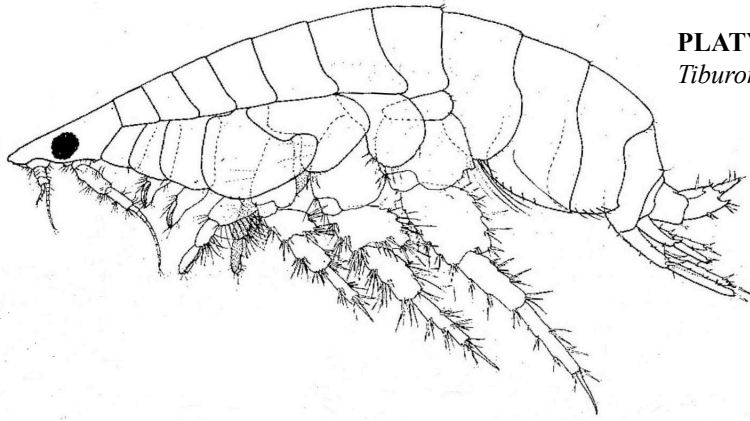
- Accessory flagellum prominent, short
- Head with elongate, hooded rostrum and eyes prominent
- Ant 1, Art normally compact
- Ant 2, Art 4 broad, with robust lateral spines
- Molar small; palp apically truncate
- P3–4 strongly spinose
- P5 short, Art 2 expanded
- P6 & 7 dissimilar, P6 > P7
 - P6 basis linear, P7 expanded
- Pleopod peduncles elongate



Source: Barnard, J.L. and Gordan S. Karaman. 1991



Representative Phoxocephaloidea (taken from Cadien 8-Dec-2014)

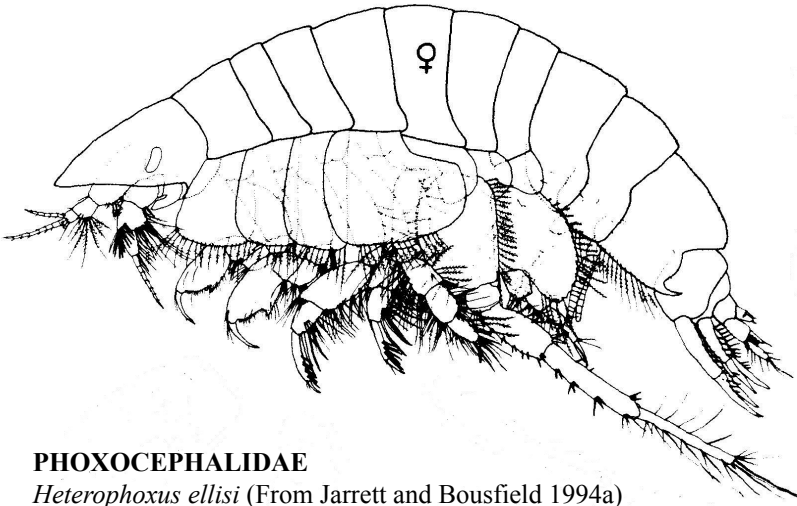
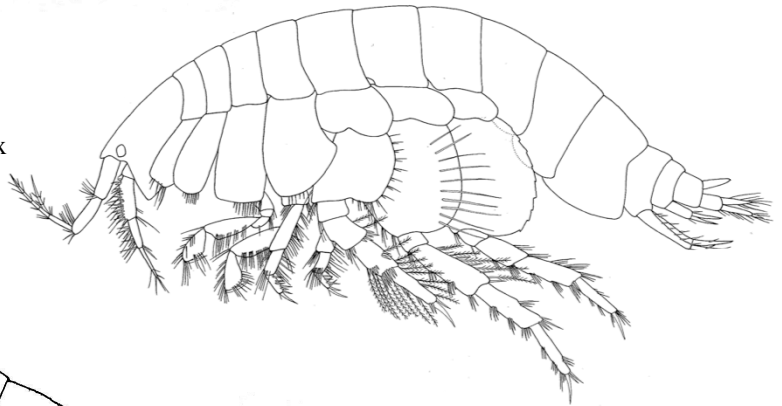


PLATYISCHNOPIDAE

Tiburonella viscana (From J. L. Barnard 1963)

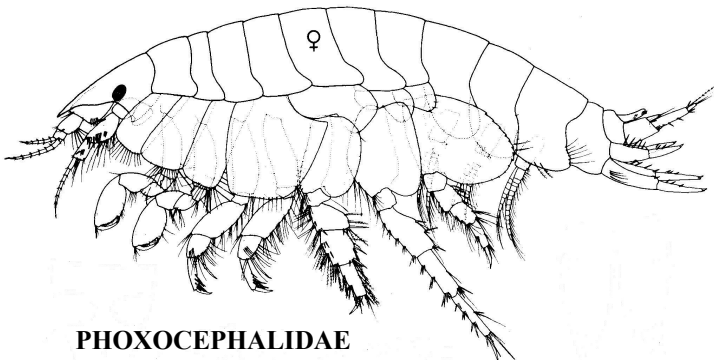
UROTHOIDAE

Urothoe elegans Cmplx



PHOXOCEPHALIDAE

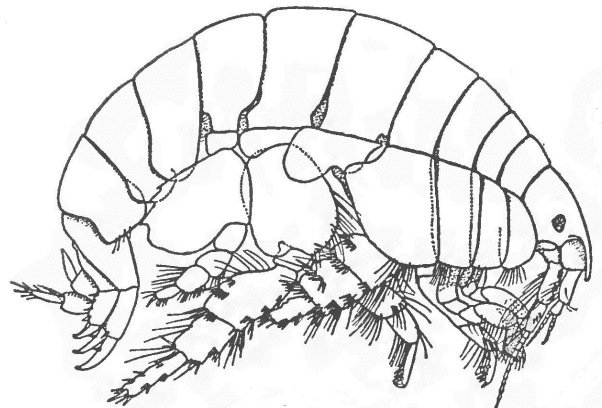
Heterophoxus ellisi (From Jarrett and Bousfield 1994a)



PHOXOCEPHALIDAE

Foxiphalus similis

(From Jarrett and Bousfield 1994b)



PHOXOCEPHALIDAE

Rhexopynius pallidus (From J. L. Barnard 1960)



Characters used to distinguish Phoxocephalids

Head

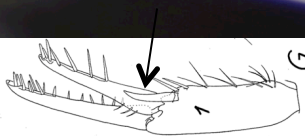
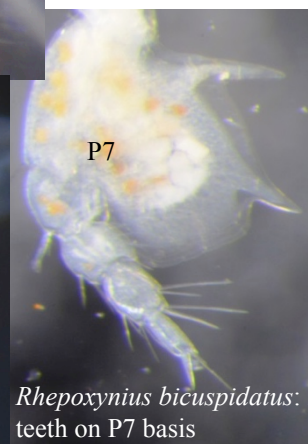
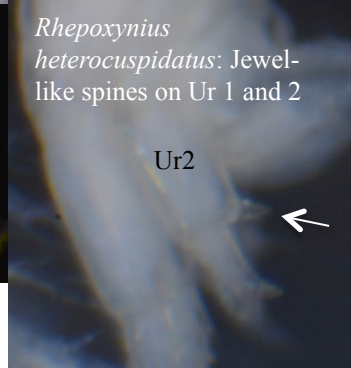
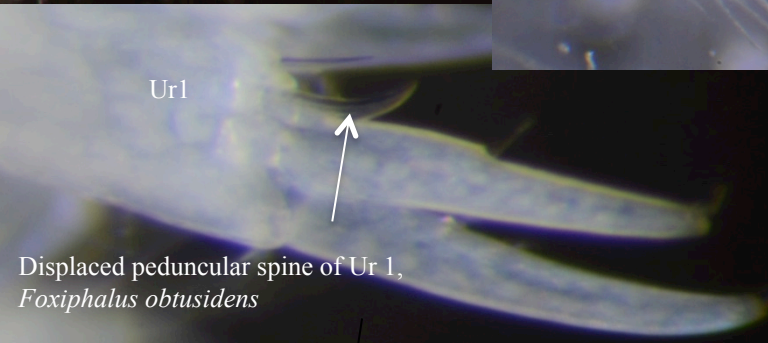
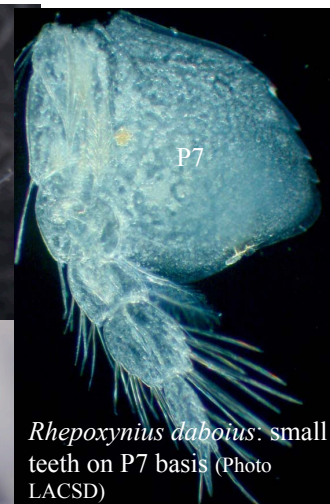
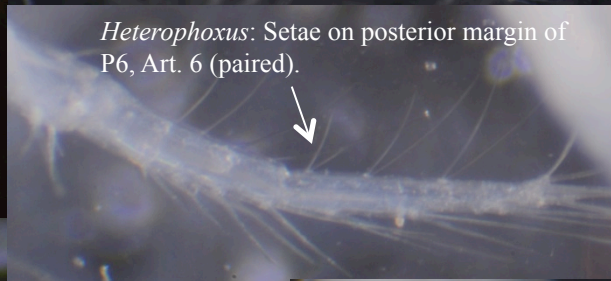
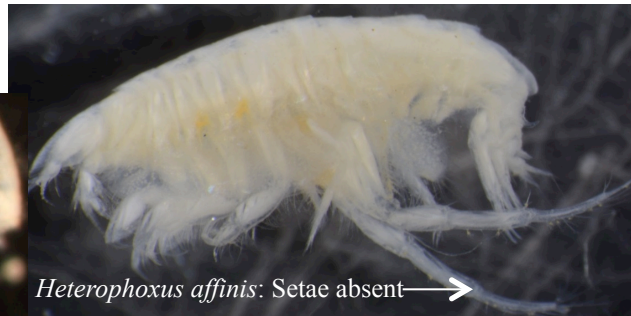
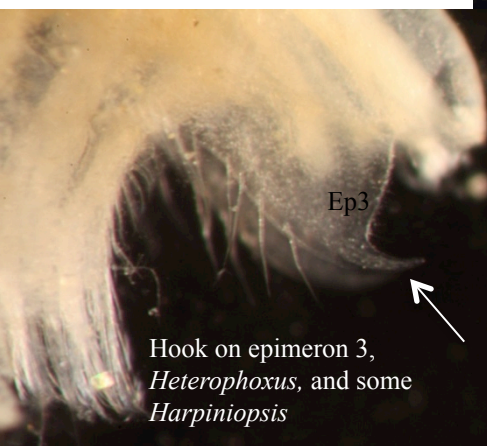
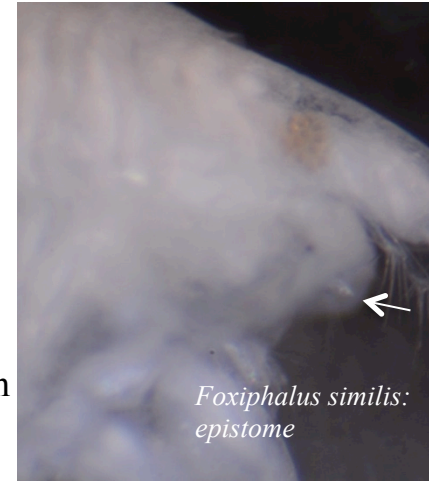
- Rostrum – presence/absence/shape
- Eyes – Presence/Absence
- Epistome – presence/absence/length
- Antennae – spination of peduncular articles

Pereon

- Gnathopod 1 & 2 – eusirid-like attachment vs. normal
- P5 – shape of Art 2 (basis: broadened vs narrow)
- P7, Art 2 – presence/absence/number of serrations or teeth
- P7, Art 6 – setation along posterior margin

Urosome

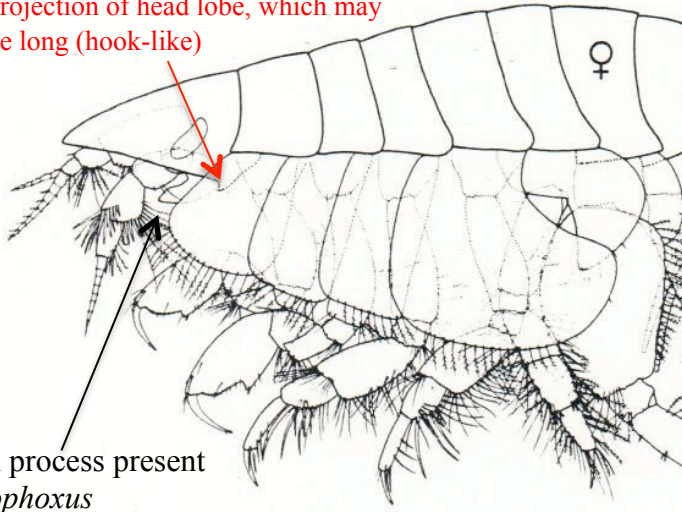
- Epimeron 3 – shape postero-ventral margin (sinuous, straight; pointed, rounded, blunt)
- Urosomites – presence/absence of posterior marginal and facial setae
- Uropod – spination Ur1 to Ur2, size of peduncle, relative length of rami
- Uropod 1 – presence/absence of displaced peduncular spine
- Telson – shape, spination



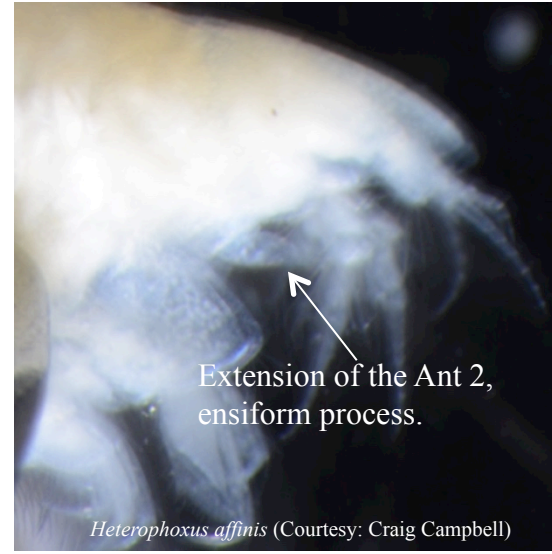
Characters used to distinguish Phoxocephalids

The Antenna 2 ensiform process vs. head lobe

Not this. This is the antero-ventral projection of head lobe, which may be long (hook-like)

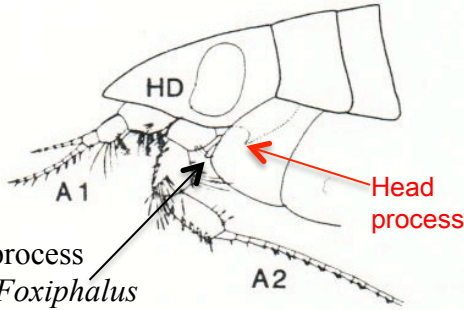


Ensiform process present in *Heterophoxus*

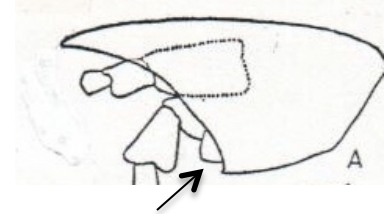


Extension of the Ant 2, ensiform process.

Heterophoxus affinis (Courtesy: Craig Campbell)

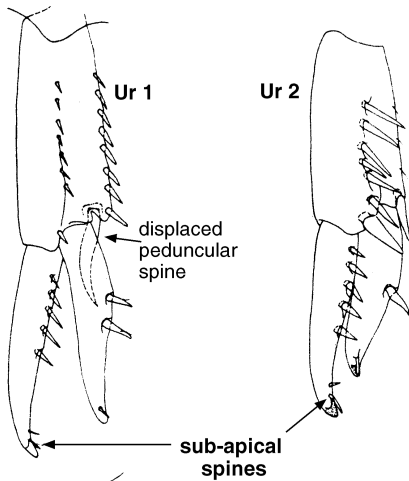


Ensiform process present in *Foxiphalus*

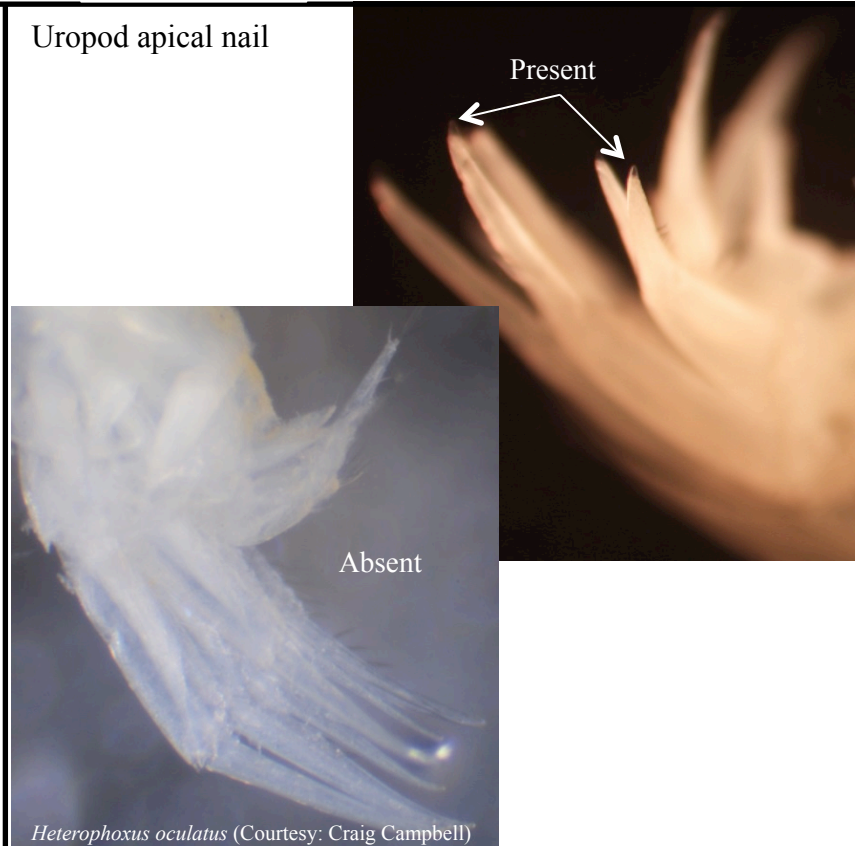


Ensiform process absent in *Harpiniopsis*

Uropod subapical spine of *Metharpinia*
(from JL Barnard 1980)



Uropod apical nail



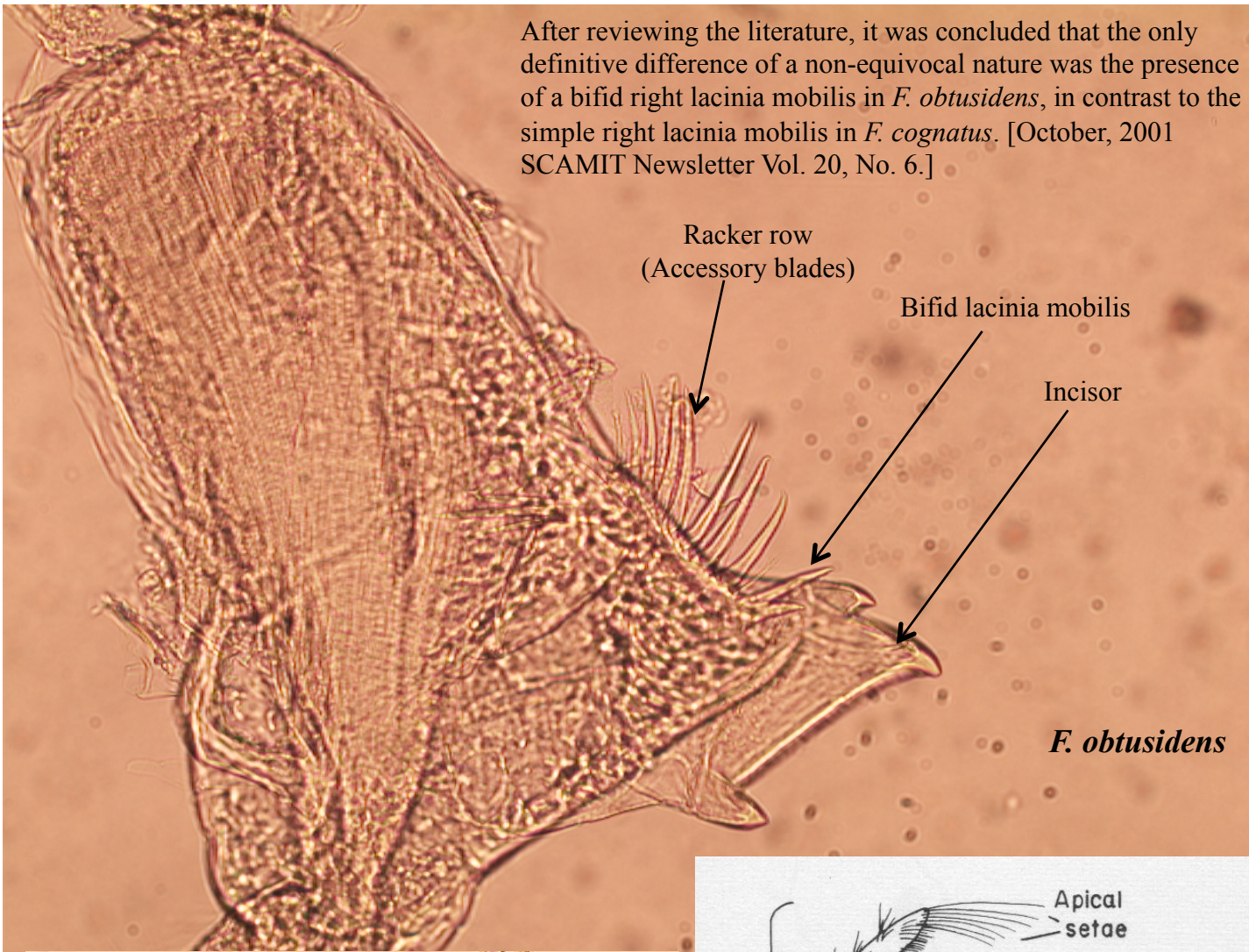
Present

Absent

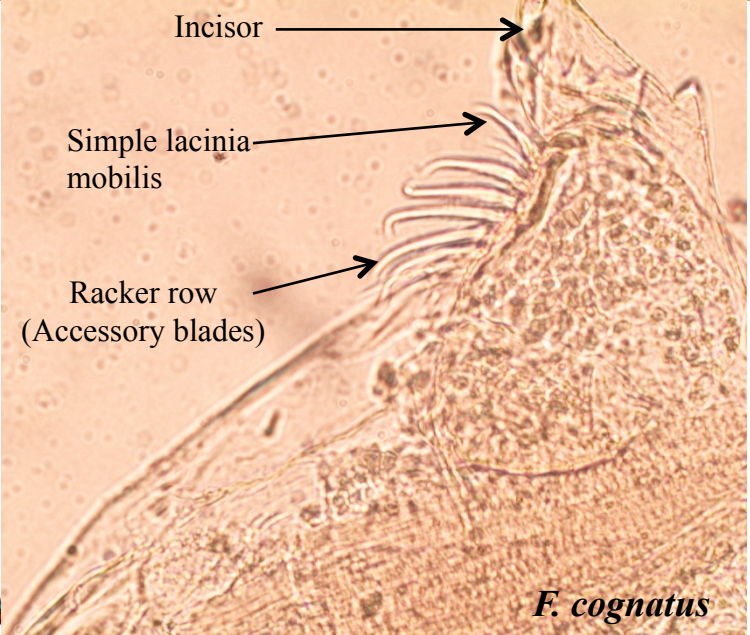
Heterophoxus oculatus (Courtesy: Craig Campbell)

Various characters states of Phoxocephalids: Bifid lacinia mobilis, *F. obtusidens* vs. *F. cognatus*

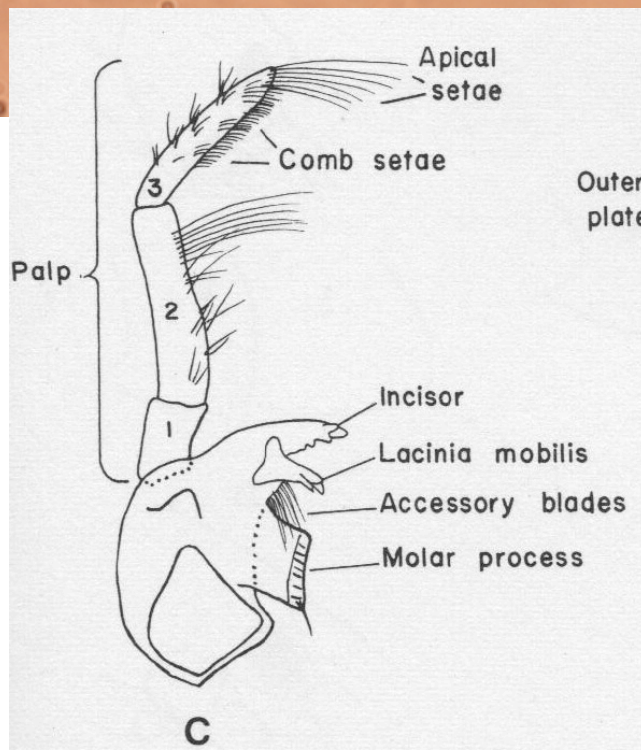
After reviewing the literature, it was concluded that the only definitive difference of a non-equivocal nature was the presence of a bifid right lacinia mobilis in *F. obtusidens*, in contrast to the simple right lacinia mobilis in *F. cognatus*. [October, 2001 SCAMIT Newsletter Vol. 20, No. 6.]



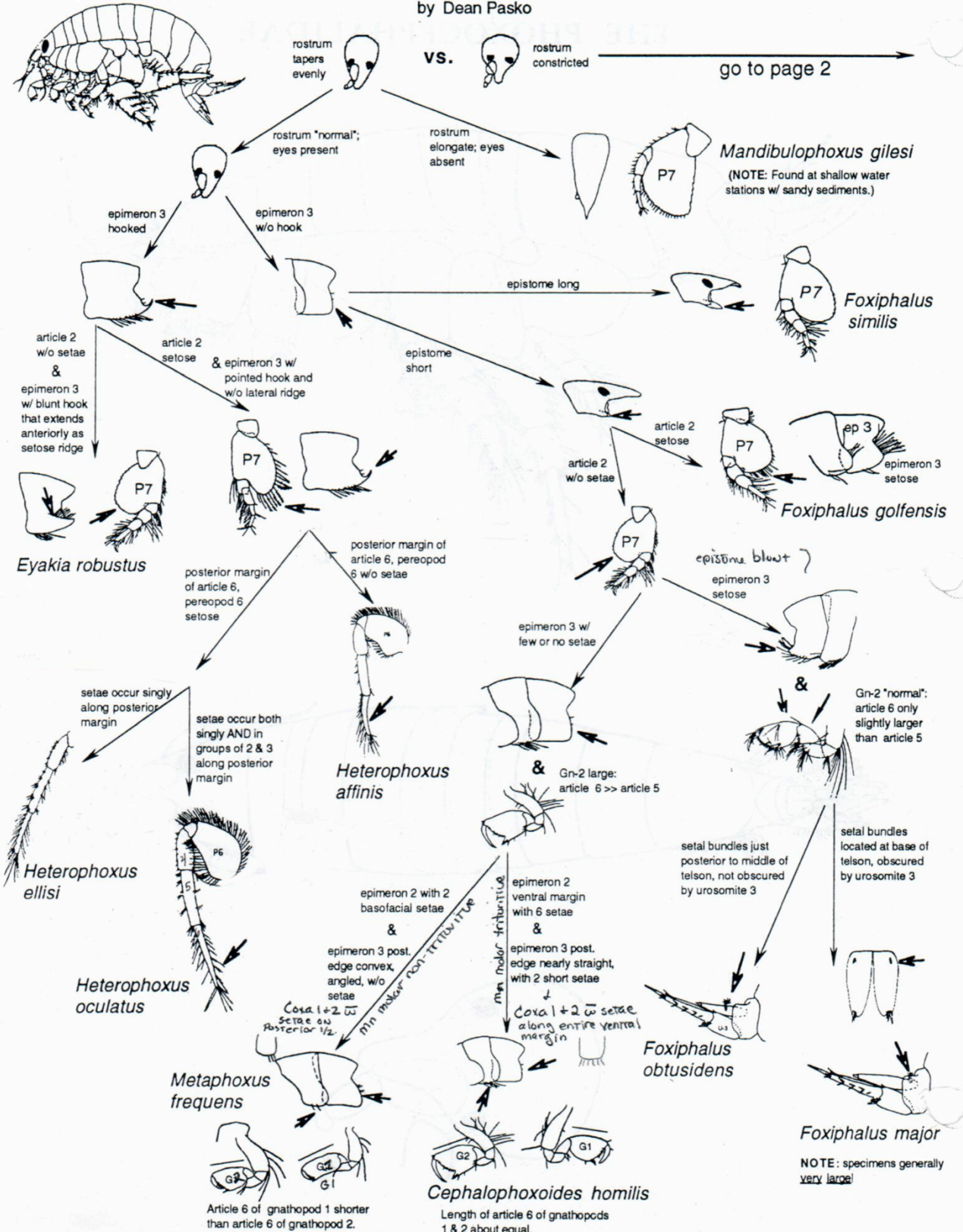
F. obtusidens



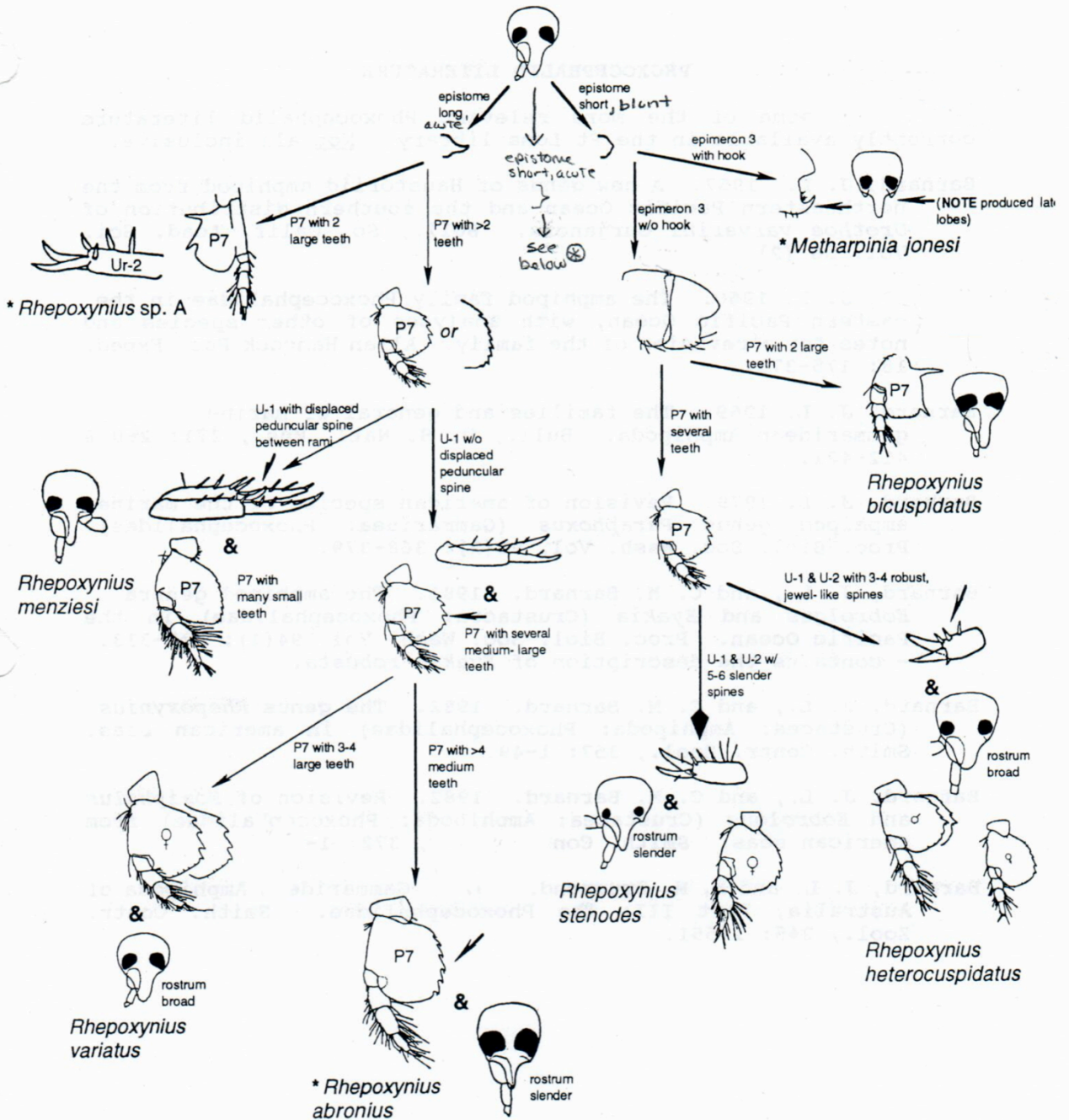
F. cognatus



by Dean Pasko



Use sparingly: contains only 23 of the possible 45 species listed in SCAMIT Ed 11



⊗ } U-1 w displaced spine (straight) → *Rhepoxynius lucidians*
 (R.M.) Lateral facial setae, urasomite 2
 Rostrum broad → *R. menziesi*

U-1 w/o displaced spine → *Rhepoxynius fatigans/daboia*

*NOTE: These species occur at shallow water stations w/ sandy sediments.

Use sparingly: contains only 23 of the possible 45 species listed in SCAMIT Ed 11

Key to the Phoxocephaloidea Reported by SCAMIT Agencies from the Southern California Bight*

Dean Pasko, 12-Apr-2018
(Modified from D.C. Cadien 8-Dec-2014, with permission)

PHOXOCEPHALOIDEA Bate 1857

FAMILY UROTHOIDEAE

Urothoe elegans Cmplx

FAMILY PHOXOCEPHALIDAE

Subfamily Metharpiniinae

Foxiphalus cognatus (J. L. Barnard 1960)
Foxiphalus golfensis J. L. Barnard & C. M. Barnard 1982
Foxiphalus obtusidens (Alderman 1936)
Foxiphalus similis (J. L. Barnard 1960)
Grandifoxus longirostris (Gurjanova 1938)
Majoxiphalus major (J. L. Barnard 1960)
Metharpinia coronadoi J. L. Barnard 1980
Metharpinia jonesi (J. L. Barnard 1963)
Rhepoxynius abronius (J. L. Barnard 1960)
Rhepoxynius bicuspidatus (J. L. Barnard 1960)
Rhepoxynius daboius (J. L. Barnard 1960)
Rhepoxynius fatigans (J. L. Barnard 1960)
Rhepoxynius heterocuspidatus (J. L. Barnard 1960)
Rhepoxynius homocuspidatus J. L. Barnard & C. M. Barnard 1982
Rhepoxynius lucubrans (J. L. Barnard 1960)
Rhepoxynius menziesi J. L. Barnard & C. M. Barnard 1982
Rhepoxynius stenodes (J. L. Barnard 1960)
Rhepoxynius tridentatus (J. L. Barnard 1954)
Rhepoxynius variatus (J. L. Barnard 1960)
Rhepoxynius sp A SCAMIT 1987 §
Rhepoxynius sp C J. L. Barnard & C. M. Barnard 1982

Subfamily Brolginae

Eobrolgus chumashi J. L. Barnard & C. M. Barnard 1982
Eobrolgus spinosus (Holmes 1903)
Eyakia robusta (Holmes 1908)
Eyakia sp 2 Jarrett and Bousfield 1994
Mandibulophoxus gilesi J. L. Barnard 1957
Paraphoxus sp 1 Jarrett & Bousfield 1994

Subfamily Phoxocephalinae

Cephalophoxoides homilis (J. L. Barnard 1960)
Coxophoxus hidalgo J. L. Barnard 1966
Leptophoxus falcatus icelus J. L. Barnard 1966
Metaphoxus frequens J. L. Barnard 1960
Parametaphoxus sp 1 Chapman MS

Subfamily Harpiniinae

Harpiniopsis emeryi J. L. Barnard 1960
Harpiniopsis epistomata J. L. Barnard 1960
Harpiniopsis fulgens J. L. Barnard 1960
Harpiniopsis galera J. L. Barnard 1960
Harpiniopsis naiadis J. L. Barnard 1960
Harpiniopsis profunda J. L. Barnard 1960
*Harpiniopsis similis*ⁱ Stephensen 1925
Heterophoxus affinis (Holmes 1908)
Heterophoxus conlanae Jarrett & Bousfield 1994
Heterophoxus ellisi Jarrett & Bousfield 1994
Heterophoxus cf ellisi Pasko 2014
Heterophoxus oculatus (Holmes 1908)
Pseudharpinia excavata (Chevreux 1887)

FAMILY PLATYISCHNOPIDAE

Tiburonella viscana (J. L. Barnard 1964)

* All references to figures (i.e., Figures 107–111) refer those included in Barnard, J.L. and G.S. Karaman. 1991 The Families and Genera of Marine Gammaridean Amphipoda (except marine gammaroids). Records of the Australian Museum Supplement 13 (Part 2): 419–866.

Please send corrections or suggestions to D. Pasko at deanpasko@yahoo.com.



Key to the Phoxocephaloidea Reported by SCAMIT Agencies from the Southern California Bight

Dean Pasko, 12-Apr-2018
(Modified from D.C. Cadien 8-Dec-2014, with permission)

-
- 1. Head truncate, rostrum strongly reduced or absent; lower anterior portion of head extended forward as “cheek”; antenna 1 peduncular articles elongate **Urothoidae**.....
..... *Urothoe elegans* Cmplxⁱⁱ
 - Head not-truncate, rostrum present, large, constricted or unconstricted; head not produced forward along lower anterior margin; antenna 1 articles compact 2
 - 2. Rostrum long, cylindrical with ventral, backwardly directed process distally; antennae 2 peduncular articles elongate **Platyischnopidae**..... *Tiburonella viscana*
 - Rostrum hooded (constricted or not), with or without mid sagittal crest; antenna 2 peduncular articles robust with strong lateral spines **Phoxocephalidae**..... 3
 - 3. Rostrum narrowed anterior to eyes (or insertion of antenna 2) (Fig. 108E)..... 4
 - Rostrum evenly tapering, without constriction anterior to eyes (or insertion of antenna 2) (Fig. 108F) 19
 - 4. Uropod 1 and 2 rami bearing small subapical nails dorsally *Metharpinia*..... 5
 - Uropod 1 and 2 rami lacking subapical nails dorsally 6
 - 5. Epimeron 3, postero-ventral corner produced into a hook (Fig. 107F) *Metharpinia jonesi*
 - Epimeron 3, postero-ventral corner unproduced, without hook *Metharpinia coronadoi*
 - 6. Posterior margins of epimera 1 and 2 strongly setose (Fig. 107H); telson both distally and dorsally spined *Grandifoxus longirostris*
 - Posterior margins of epimera 1 and 2 weakly or asetose (Fig. 107A, F); telson distally spined, but lacking dorsal spination..... *Rhepoxynius* 7
 - 7. Uropod 1 with displaced peduncular spine (Fig. 110G)..... 8
 - Uropod 1 peduncle without displaced spine 10
 - 8. Epistome rounded, without acute cusp (Fig. 108B) *Rhepoxynius* sp C
 - Epistome acutely produced (Fig. 108I) 9
 - 9. Epistomal cusp long, longer than width of base *Rhepoxynius menziesi*
 - Epistomal cusp short, clearly less than width of base (Fig. 108I) *Rhepoxynius lucubrans*
 - 10. Basis of pereopod 7 with only two large spikes 11
 - Basis of pereopod 7 with three or more large spikes, or with several small to medium sized teeth..... 12
 - 11. Epistomal cusp blunt, rounded *Rhepoxynius bicuspidatus*
 - Epistomal cusp acutely produced *Rhepoxynius* sp A
 - 12. Epistome rounded, without acute cusp 13
 - Epistome acutely produced 16



13. Rostrum very narrow; gnathopods 1 and 2 with article six subequal to or slightly shorter than article 5; uropodal spines elongate..... *Rhepoxynius stenodes*ⁱⁱⁱ
- Rostrum moderately to very broad; gnathopods 1 and 2 with article six distinctly shorter than article 5; some uropod peduncular spines thick, rhombic 14
14. Pereopod 7 basis with uniformly small serrations/teeth (≥ 7)
..... *Rhepoxynius homocuspидatus*
- Pereopod 7 basis with large or small serrations/teeth (typically < 7)..... 15
15. Pereopod 7 basis with four to five dissimilarly sized teeth/serrations; telson spines long.....
..... *Rhepoxynius heterocuspидatus*
- Pereopod 7 basis with three similarly sized, relatively large teeth/serrations; telson spines short *Rhepoxynius tridentatus*
16. Epistomal cusp long, longer than width of base 17
- Epistomal cusp short, clearly less than width of base 18
17. Rostrum broad; pereopod 7 basis with one or more large teeth (typically three); epimeron 2 without vertically set facial setae..... *Rhepoxynius variatus*
- Rostrum narrow; pereopod 7 basis teeth typically small; epimeron 2 with at least one vertically set facial seta out of sequence from others *Rhepoxynius abronius*
18. Rostrum narrow, apex subacute; gnathopod 1 different in shape from gnathopod 2, with narrow elongate article 6 that is distinctly rectangular and sub-equal to article 5
..... *Rhepoxynius fatigans*
- Rostrum broadened, rounded at apex; gnathopod 1 similar to gnathopod 2, with broad, square-shaped article 6, shorter than article 5 *Rhepoxynius daboius*
19. Eyes present (check carefully, pigment is lost in preservation in some specimens) 20
- Eyes absent 38
20. Antenna 2, article 1 not or only weakly ensiform (Fig. 109A, J, N) 30
- Antenna 2, article 1 strongly ensiform (Fig. 109E) 21
21. Epimeron 3 with postero-ventral tooth (Fig. 107F)..... *Heterophoxus* 22
- Epimeron 3 without postero-ventral tooth (Fig. 107A) 26
22. Setae present along posterior margin of pereopod 6, article 6 (Fig. 107A)..... 23
- Setae absent from posterior margin of pereopod 6, article 6 *Heterophoxus affinis*
23. All setae, exclusive of distal most set, along posterior margin of pereopod 6, article 6 occurring singly 24
- One or more sets setae along posterior margin of pereopod 6, article 6 occurring in pairs . 25
24. Pereopod 6, posterior margin of article 5 with multiple sets of paired spine(s) and plumose setae; epimeron 3 with long, sharp, slightly upturned (hooked) tooth *Heterophoxus ellisi*ⁱⁱⁱ
- Pereopod 6, posterior margin of article 5 with singly inserted spines; epimeron 3 with short, sharp tooth *Heterophoxus cf ellisi*^{iv}



25. Rostrum nearly downturned; pereopod 6, article 5 hind margin with several short spinules; pereopod 6, article 6 with singly and doubly grouped setae..... *Heterophoxus oculus*
- Rostrum nearly straight, little downturned; pereopod 6, article 5 hind margin with several clusters of one to two spines plus a seta; pereopod 6, article 6 with at least one triply grouped setae *Heterophoxus conlanae*
26. Posterior margins of epimera 1 & 2 bare, or with at most a few scattered seta *Foxiphalus* 27
- Posterior margins of epimera 1 & 2 fully and densely setose; telson with one pair of small setules at its base, hidden from view by postero-lateral extensions of urosomite 3 *Majoxiphalus major*
27. Uropod 1 with displaced peduncular spine; ventral margin of pereopod 7 basis without long setae (Fig. 111E)..... 28
- Uropod 1 without displaced peduncular spine; ventral margin of pereopod 7 basis with numerous long setae (Fig. 111D)..... *Foxiphalus golfensis*
28. Epistomal cusp weak (short, blunt or absent); uropod 2, inner ramus naked; each telson lobe with dorsal set of plumose setae inserted basally; right lacinia mobilis bifid *Foxiphalus obtusidens*
- Epistomal cusp sharp, prominent; uropod 2, inner ramus with one or more spines; lobes of telson with different arrangement of dorsal setae and spines; lacinia mobilis simple..... 29
29. Epistomal cusp ensiform (long, broad); right molar with seven spines (six primary spines plus one displaced spine) *Foxiphalus similis*
- Epistomal cusp not ensiform - medium, acute, evenly tapered; right molar with 10 spines (nine primary, short spines plus one strongly displaced spine) *Foxiphalus cognatus*
30. Basis of pereopod 5 narrow, not posteriorly expanded and without lobe (Fig. 111C); coxa 4 and pereopod 7 greatly expanded *Coxophoxus hidalgo*
- Basis of pereopod 5 broadened, with or without distinct posterior lobe (Fig. 111B); coxa 4 and pereopod 7 not greatly expanded 31
31. Epimeron 3 without oblique row of robust facial setae and with few to no posterior marginal setae; mandibular molar bearing three or fewer spines 33
- Epimeron 3 with oblique row of robust facial setae extending from postero-ventral corner anteriorly towards middle of epimeral plate in addition to posterior marginal setae; mandibular molar bearing four or more spines..... *Eyakia*..... 32
32. Epimeron 3 with large tooth *Eyakia robusta*
- Epimeron 3 without tooth *Eyakia* sp 2
33. Gnathopod 1, article 5 eusirid-like (i.e., small, narrowed throughout, cryptic, distally extended at it's attachment to article 6 (Fig. 108A, 110E, F, G)..... 34
- Gnathopod 1, article 5 normal, not noticeably narrowed throughout its length nor greatly extended (Fig. 110A, B, C)..... 36



34. Gnathopod 1 parachelate (Fig. 110E); gnathopod 2 subchelate, transverse (Fig. 110H).....
 *Parametaphoxus* sp 1^v
- Gnathopods 1 and 2 subchelate, palms oblique (Fig. 110F, G)..... 35
35. Mandibular molar triturative; coxae 1 and 2 with setae occupying two-thirds to entire
 ventral margin..... *Cephalophoxoides homilis*
- Mandibular molar non-triturative, bearing spines, or absent; coxae 1 and 2 with ventral
 setae occupying posterior one-quarter to one-third of the ventral margin.....
 *Metaphoxus frequens*
36. Antenna 2, peduncular articles 3 and 4 with two or more rows or clusters of robust facial
 spines (Fig. 109D, N); posterior margin of epimeron 3 with one or more long setae near the
 base of the posterior margin *Eobrolgus*..... 37
- Antenna 2, peduncular articles 3 and 4 single facial spine row; posterior margin of
 epimeron 3 lacking long setae but may bear tiny imbedded setules at intervals.....
 *Paraphoxus* sp 1^{vi}
37. Epimeron 3 lacking ventral setae..... *Eobrolgus spinosus*
- Epimeron 3 with one to two ventral spines or setules *Eobrolgus chumashi*
38. Basis of pereopod 5 narrow, not posteriorly expanded and without lobe (Fig. 111C)..... 40
- Basis of pereopod 5 broadened, with or without distinct posterior lobe (Fig. 111B)..... 39
39. Distal end of rostrum distinctly downturned at about 90° (Fig. 108A); posterior margin of
 pereopod 7 basis with two small, distal serrations, ventral margin asetose, not extending
 beyond article 3..... *Leptophoxus falcatus icelus*
- Distal end of rostrum not downturned at 90° angle (Fig. 108 H); Posterior margin of
 pereopod 7 basis linear with five to seven serrations, ventral margin setose, extending well
 beyond article 3..... *Mandibulophoxus gilesi*
40. Antenna 2, article 1 strongly ensiform (Fig. 109E); pereopod 7 basis expanded and flattened
 antero-distally, bearing ≥10 large plumose setae *Pseudharpinia excavata*
- Antenna 2, article 1 not or only weakly ensiform (Fig. 109A, J); pereopod 7 not as
 described above *Harpiniopsis* 41
41. Epistome strongly produced *Harpiniopsis epistomata*
- Epistome unproduced, rounded 42
42. Third epimeron with acute tooth at lower posterior corner 43
- Third epimeron prolonged, but blunt, lacking acute tooth at lower posterior corner.....
 *Harpiniopsis naiadis*
43. Head with acute process at lower corner 45
- Head lacking acute process at lower corner 44
44. Epimeron 3 with prolonged tooth..... *Harpiniopsis emeryi*
- Epimeron 3 with short tooth *Harpiniopsis galera*



- 45 Pereopod 7 basis with large posterior spikes or teeth, those along postero-distal margin larger than others and separated by excavation *Harpiniopsis profunda*
 – Pereopod 7 basis with small posterior teeth *Harpiniopsis fulgens*

ENDNOTES

ⁱ This species is not treated in this key. Although listed in SCAMIT Ed 11, it has only been reported from the polar seas. This record may be in error.

ⁱⁱ *Urothoe elegans* Bate 1857, a north Atlantic species, and *U. varvarini* Gurjanova 1953 are very similar and may represent the same species. SCAMIT has not been able to adequately resolve the two species and reports them as a species complex.

ⁱⁱⁱ The rostrum of *R. stenodes* appears to be quite variable, from the typical narrowed form described by Barnard (1960) to the less common broad form that has been encountered in Orange County Sanitation District (OCSD) samples, as well as other samples from shallow water, sandy sediments. At one point, OCSD produced an in-house provisional voucher sheet (*Rhepoxynius* sp OC1), but the provisional designation was rejected after careful review and unsuccessful attempts to reliably separate it from other described species. Representative specimens with the broadened rostrum would key to *R. heterocuspoidatus* in most of the commonly referenced keys by SCAMIT member agencies operating in the SCB, but differs distinctly by the absence of broadened, “jewel-like” spines on uropods 1 and 2. The variant form was also recognized by Dr. D. Diener in the 1980s, but he came to a similar conclusion and reported these variant specimens as *R. stenodes*.

^{iv} *Heterophoxus* cf *ellisi* was created to discern two forms of *Heterophoxus* conforming to *Heterophoxus ellisi* Jarrett and Bousfield 1994: the former in bays and the latter in off-shore waters. Unfortunately neither conform to the Jarrett and Bousfield species. The offshore form has a large tooth on epimeron 3 and spines paired with plumose setae on the posterior margin of pereopod 6, article 5; whereas *H. cf ellisi* Pasko 2014 has a small tooth on epimeron 3 and 1–3 unpaired spines on the posterior margin of pereopod 6, article 5. Jarrett and Bousfield describe *H. ellisi* as having “a slender, nearly straight” tooth on epimeron 3, which is also illustrated as being quite large, like our off-shore form, and “pereopod 6, article 5 with two short posterior marginal spines only”, like those present in *H. cf ellisi* Pasko 2014. A variant species, “*Heterophoxus ellisi*, variant” is discussed by Jarrett and Bousfield (1994, page 134). They describe the difference in the pereopod 6 spination and the presence of unique copulatory spines on outer ramus of uropod 2 of the male, but does not include comments about the epimeron 3. Consequently, it appears that no resolution to the problem is possible without seeing material examined by Jarrett and Bousfield.

^v Jarrett and Bousfield (1994b, page 122) argued that *Parametaphoxus fultoni* (Scott 1890), a European Atlantic species, to be different from the southern California species reported by Barnard (1960), Barnard and Karaman (1991), and others working in southern California. The California species, they contend, has different male characteristics of the male copulatory spines and a slightly different structure to pereopod 7, article 5. Jarrett and Bousfield go on to describe *P. quaylei* and distinguish it from *P. fultoni* and the southern California form of *P. fultoni*. In October 2001, SCAMIT examined male specimens of the southern California form and found that the male copulatory spines were indeed different from *P. fultoni*, but not necessarily *P.*



qualei. For this reason, SCAMIT proposed erecting a provisional (see SCAMIT NL Vol 20, No.6), but it was not completed or published. Subsequently, Dr. J. Chapman established *Parametaphoxus* sp 1.

^{vi} *Paraphoxus* sp 1 was erected by Jarrett and Bousfield (1994b), page 99) to distinguish *P. oculatus* Sars, a north Atlantic species, from the southern California specimens treated by J.L. Barnard (1960). *Paraphoxus* sp 1 Jarrett & Bousfield is distinguished from *P. oculatus* by the presence of fewer ventral setae on coxa 1 (6–9 vs. 12–14) and more apical spines on the outer plate of maxilla 1 (11 vs. 9).



Figures 107: from Barnard, J.L. and Gordan S. Karaman. 1991 The Families and Genera of Marine Gammaridean Amphipoda (except marine gammaroids). Records of the Australian Museum Supplement 13 (Part 2): 419–866.

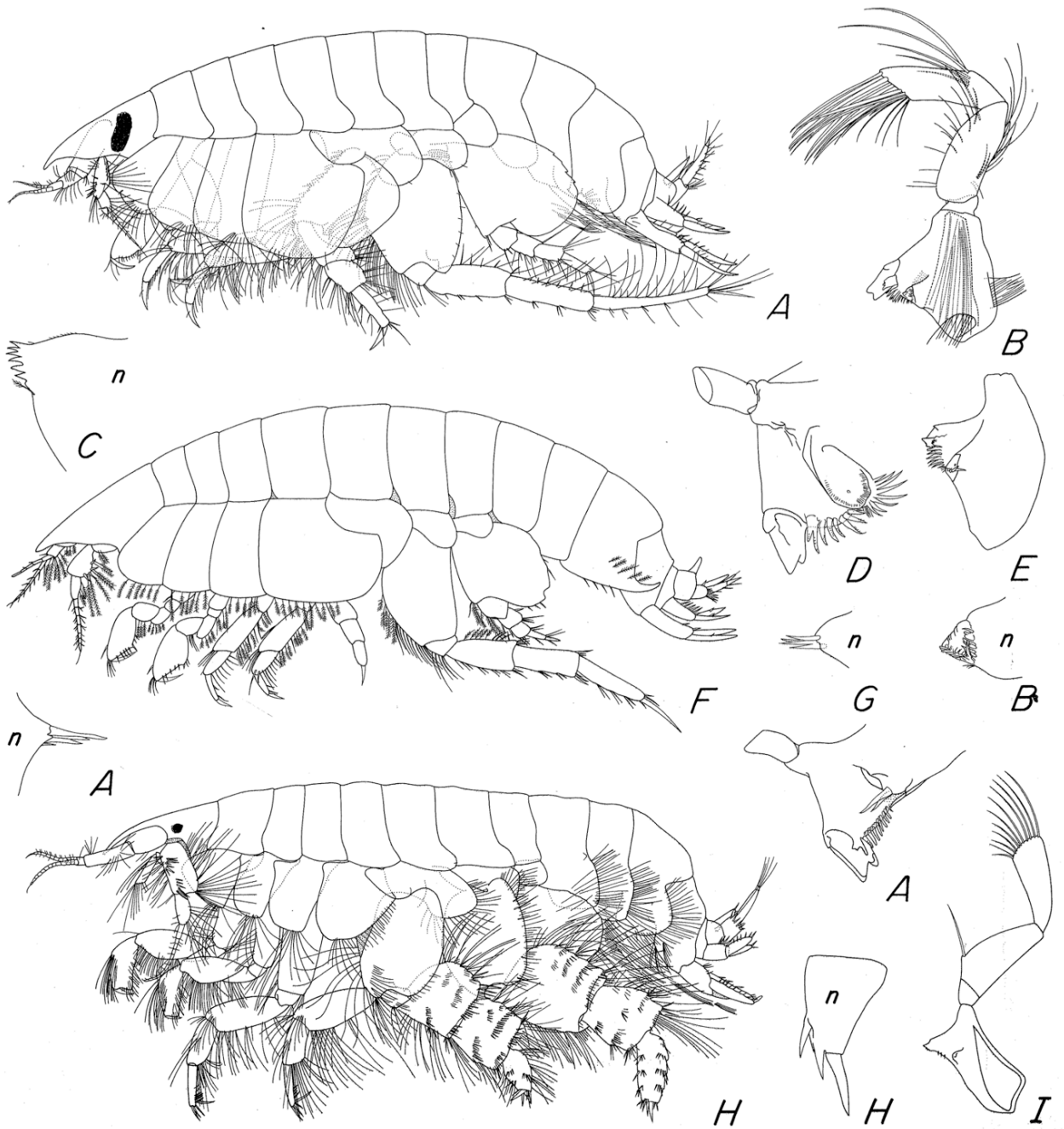


Fig.107. Phoxocephalidae. A, *Brolgus tattersalli*; B, *Urophoxus* (= *Pontharpinia*) *pinguis*; C, *Leongathus nootoo*; D, *Kotla batturi*; E, *Yammacoona kunarella*; F, *Harpinia plumosa*; G, *Birubius* species; H, *Tipimegus thalerus*; I, *Leptophoxus falcatus*.



Figures 108: from Barnard, J.L. and Gordan S. Karaman. 1991 The Families and Genera of Marine Gammaridean Amphipoda (except marine gammaroids). Records of the Australian Museum Supplement 13 (Part 2): 419–866.

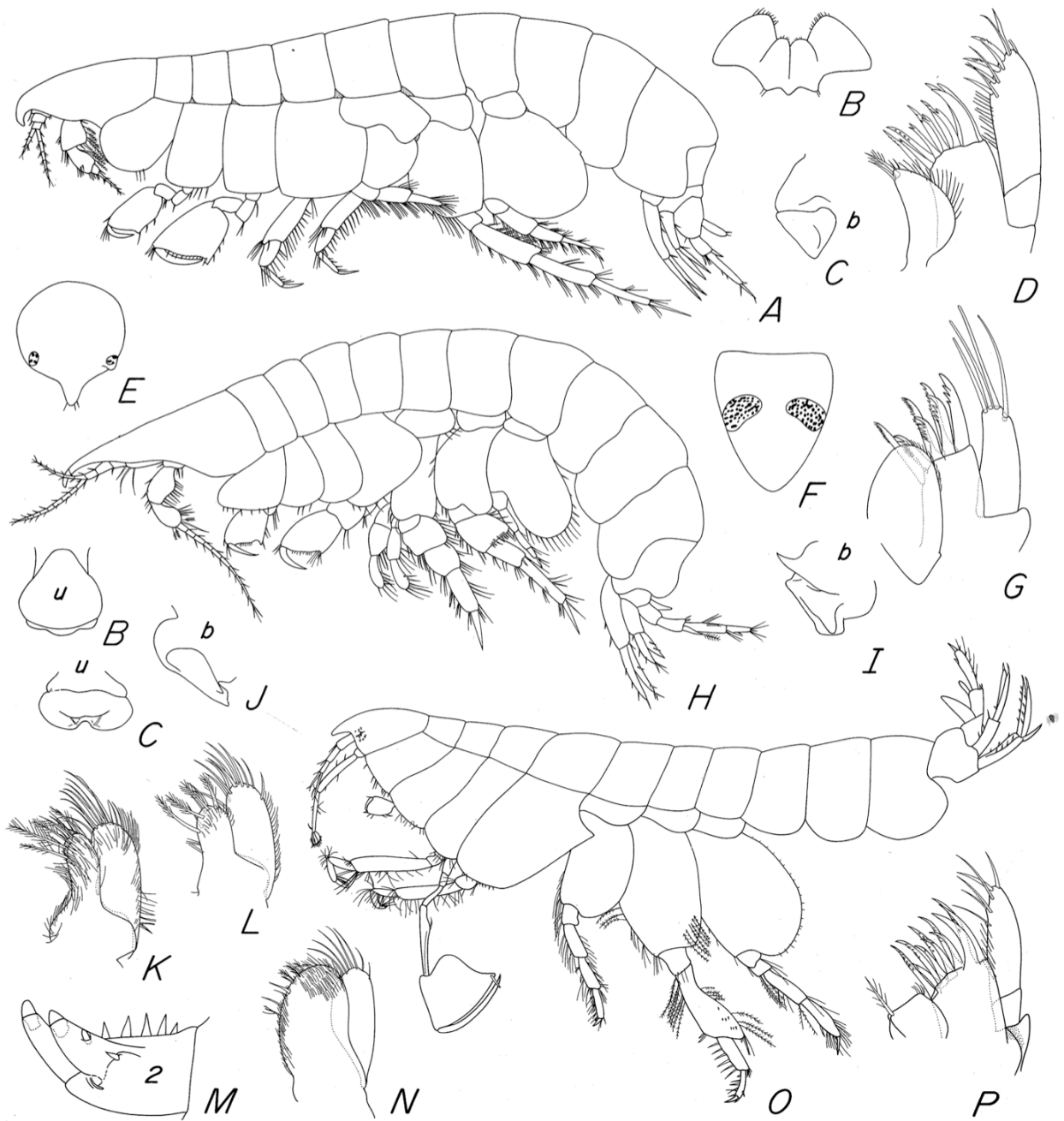


Fig.108. Phoxocephalidae. A, *Leptophoxus falcatus*; B, *Phoxocephalus holbolli*; C, *Tipimegus kalkro*; D, *Birubius mayamayi*; E, *Microphoxus minimus*; F, *Paraphoxus oculatus*; G, *Cephalophoxoides kukathus*; H, *Mandibulophoxus uncistrostratus*; I, *Booranus weemus*; J, *Cunmurra itickerus*; K, *Leongathus nootoo*; L, *Brolgus millinus*; M, *Matong matong*; N, *Cephalophoxoides bassi*; O, *Joubinella traditor*; P, *Brolgus tattersalli*.



Figures 109: from Barnard, J.L. and Gordan S. Karaman. 1991 The Families and Genera of Marine Gammaridean Amphipoda (except marine gammaroids). Records of the Australian Museum Supplement 13 (Part 2): 419–866.

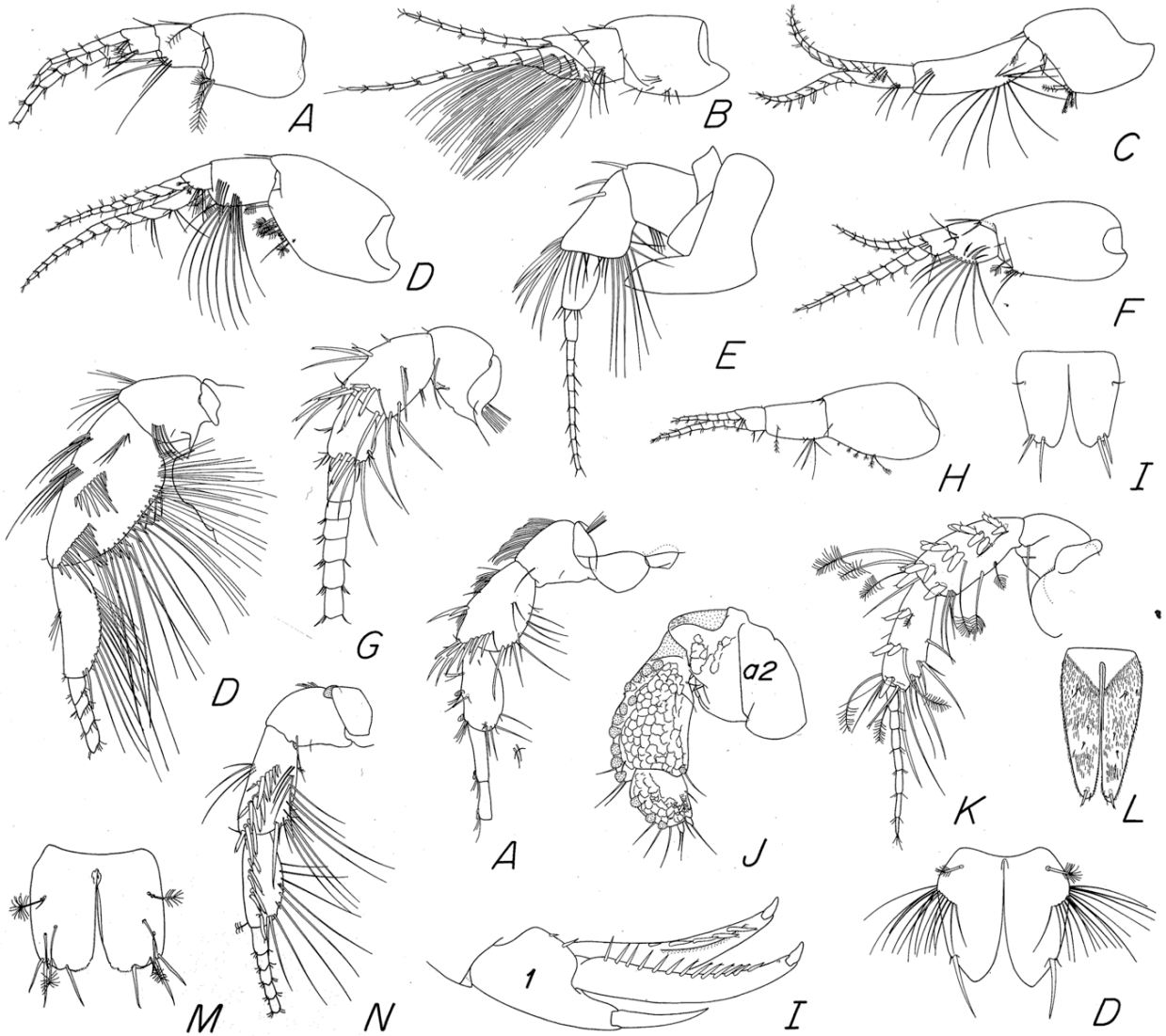


Fig.109. Phoxocephalidae. A, *Brolgus millinus*; B, *Elpeddo kaikai*; C, *Tipimegus thalerus*; D, *Urophoxus (= Pontharpinia) pinguis*; E, *Heterophoxus oculatus*; F, *Brolgus tattersalli*; G, *Wildus thambaroo*; H, *Leongathus nootoo*; I, *Tipimegus kangulun*; J, *Kondoleus tekini*; K, *Kotla batturi*; L, *Metaphoxus yaranellus*; M, *Parharpinia villosa*; N, *Birubius panamunus*.



Figures 110: from Barnard, J.L. and Gordan S. Karaman. 1991 The Families and Genera of Marine Gammaridean Amphipoda (except marine gammaroids). Records of the Australian Museum Supplement 13 (Part 2): 419–866.

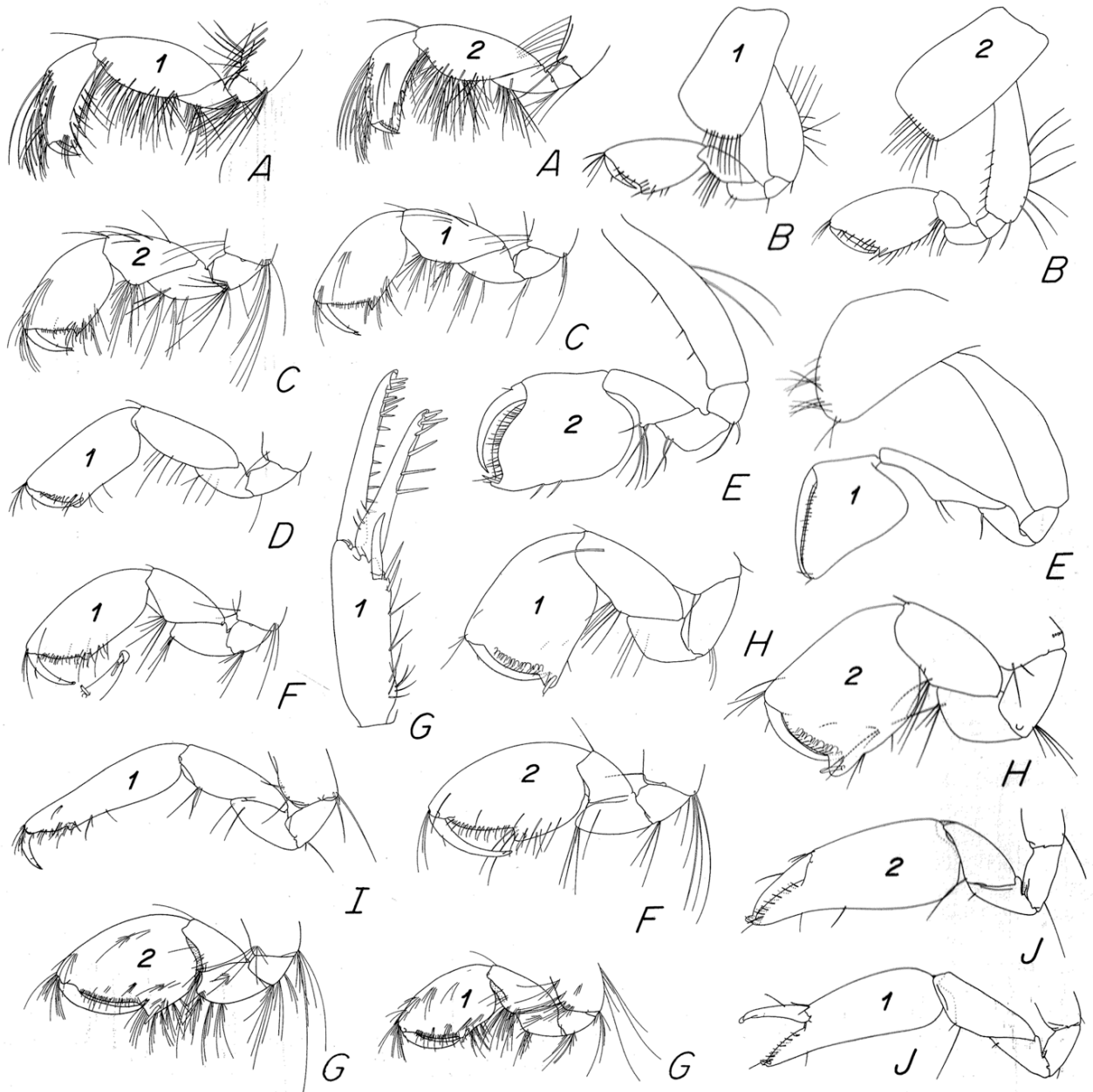


Fig.110. Phoxocephalidae. A, *Tipimegus thalerus*; B, *Phoxocephalus holbolli*; C, *Parharpinia villosa*; D, *Cunmurratitickerus*; E, *Joubinella strelkovi*; F, *Brolgus tattersalli*; G, *Urophoxus* (= *Pontharpinia*) *pinguis*; H, *Matong matong*; I, *Ganba pellati*; J, *Limnoporeia maranowe*.



Figures 111: from Barnard, J.L. and Gordan S. Karaman. 1991 The Families and Genera of Marine Gammaridean Amphipoda (except marine gammaroids). Records of the Australian Museum Supplement 13 (Part 2): 419–866.

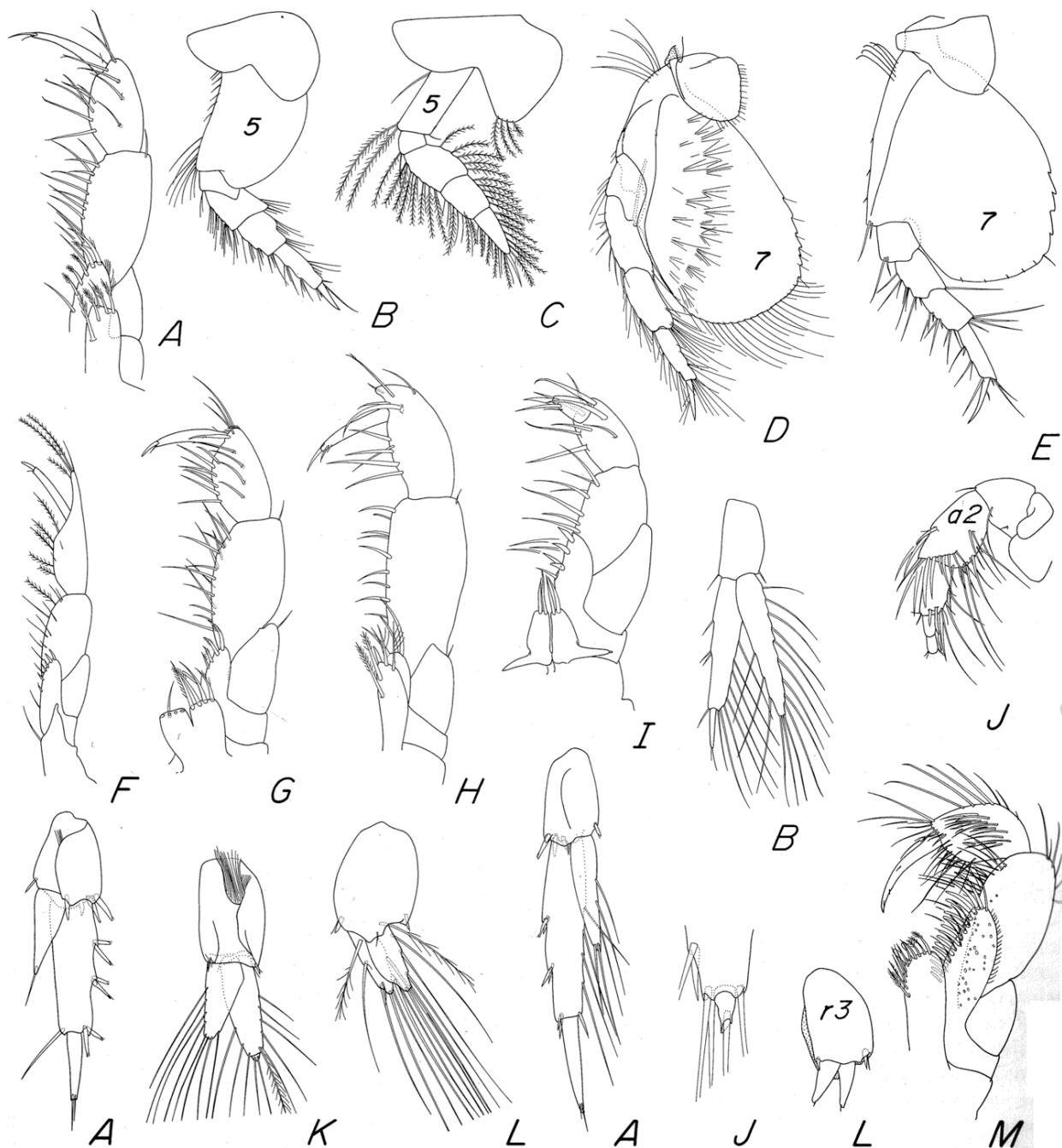
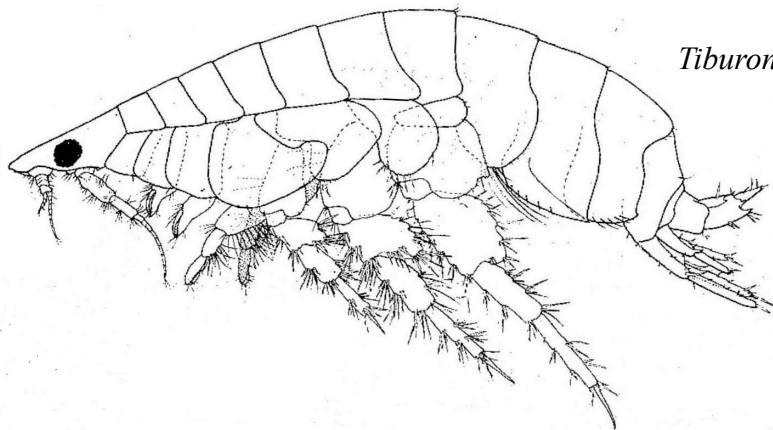


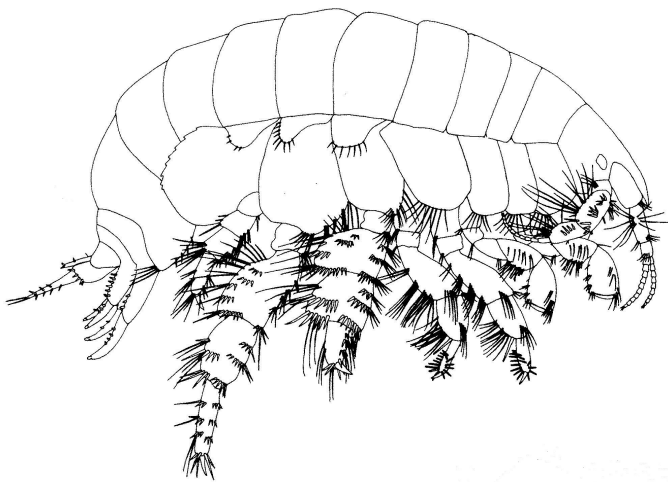
Fig.111. Phoxocephalidae. A, *Elpeddo kaikai*; B, *Phoxocephalus holbolli*; C, *Harpinia plumosa*; D, *Urophoxus* (= *Pontharpinia*) *pinguis*; E, *Brolgus tattersalli*; F, *Leptophoxus falcatus*; G, *Ganba pellati*; H, *Yammacoona kunarella*; I, *Kondoleus tekini*; J, *Brolgus millinus*; K, *Kotla batturi*; L, *Japara papporus*; M, *Tipimegus thalerus*.



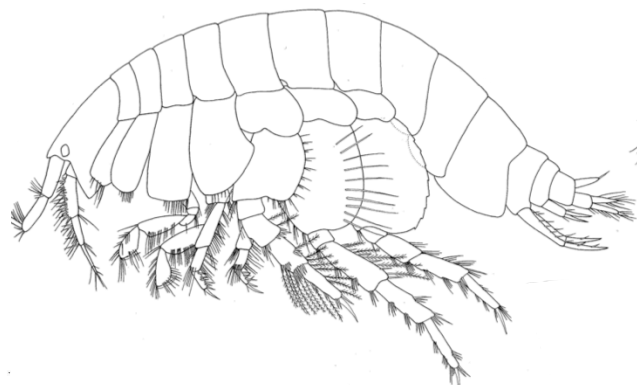
Various figures taken from Cadien 8-Dec-2014



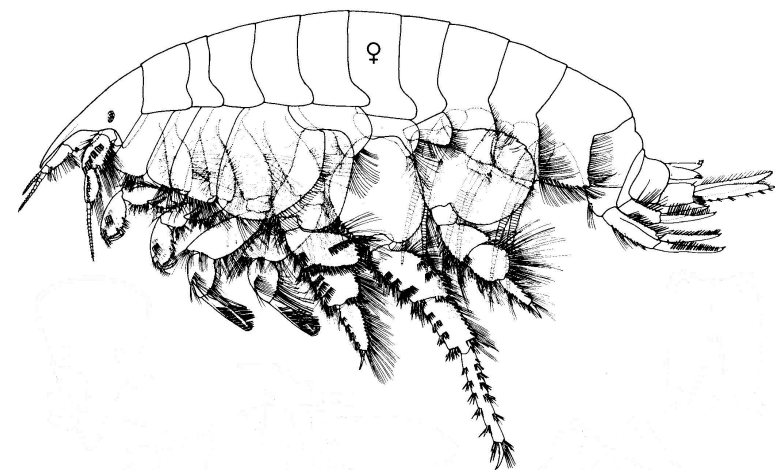
Tiburonella viscana (From J. L. Barnard 1963)



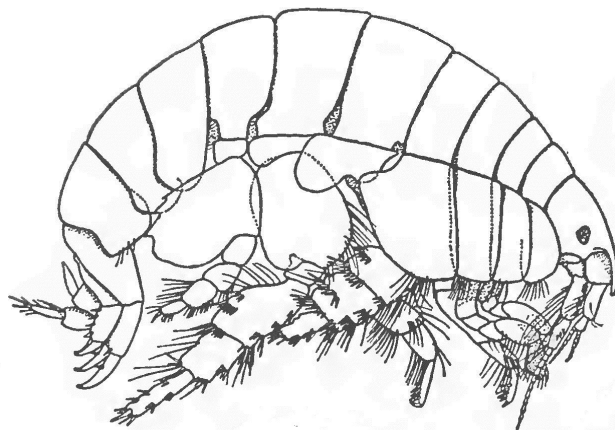
Grandifoxus longirostris (From Coyle 1982)



Urothoe elegans Cmplx



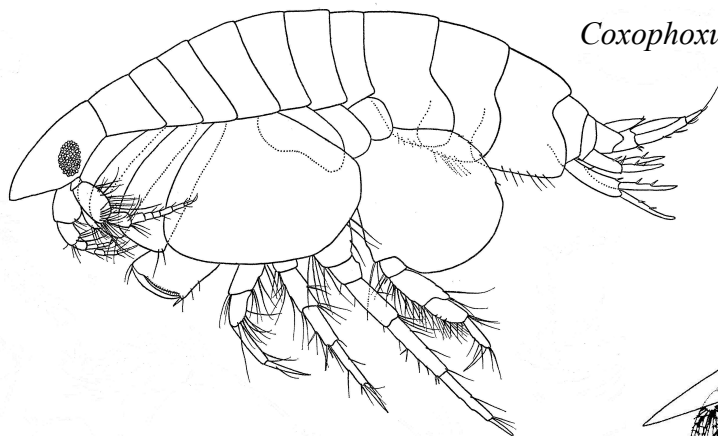
Majoxiphalus maximus (From Jarrett and Bousfield 1994b)



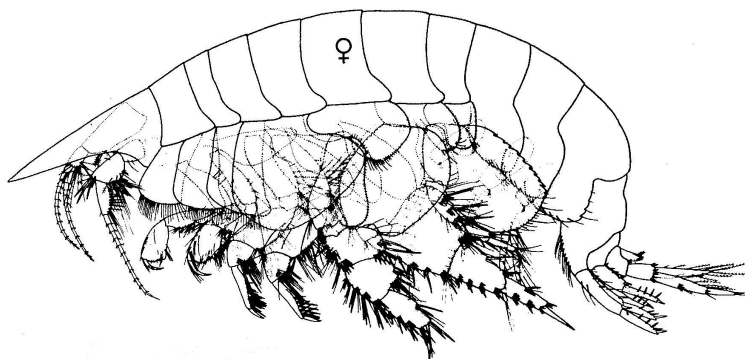
Rhepoxynius pallidus (From J. L. Barnard 1960)



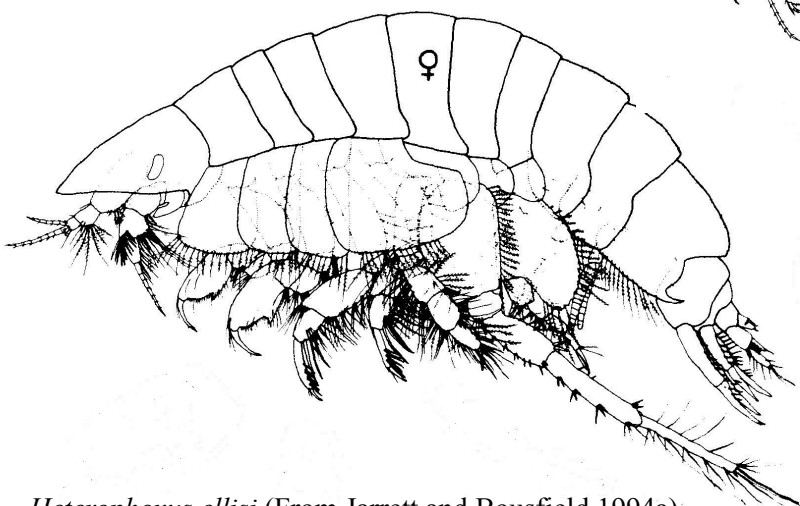
Various figures taken from Cadien 8-Dec-2014



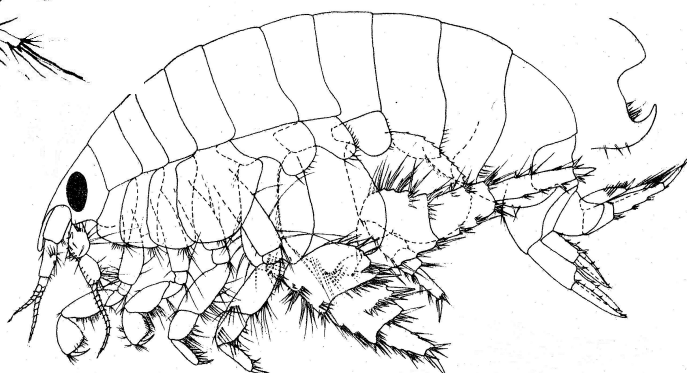
Coxophoxus hidalgo (From J. L. Barnard 1966)



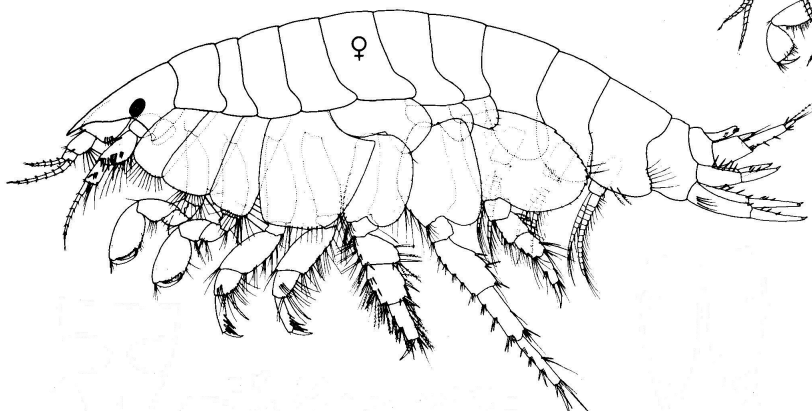
Mandibulophoxus gilesi (From Jarrett and Bousfield 1994a)



Heterophoxus ellisi (From Jarrett and Bousfield 1994a)



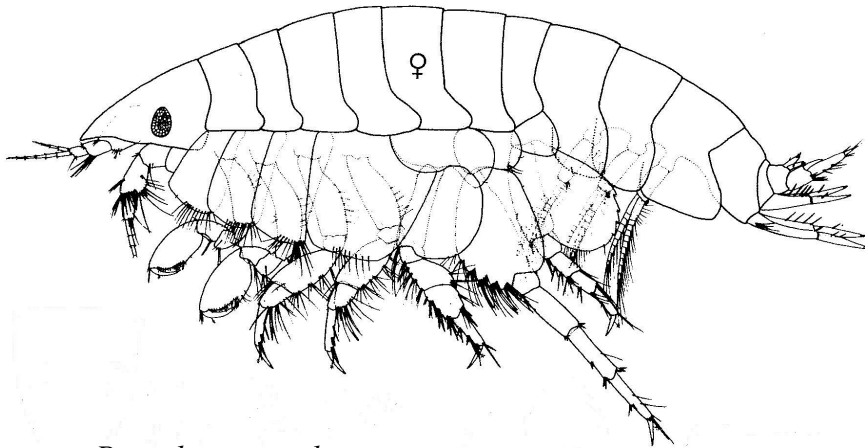
Metharpinia jonesi (From J. L. Barnard 1963)



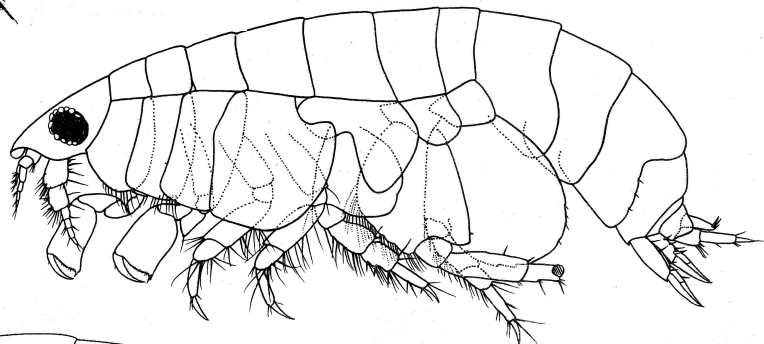
Foxiphalus similis (From Jarrett and Bousfield 1994b)



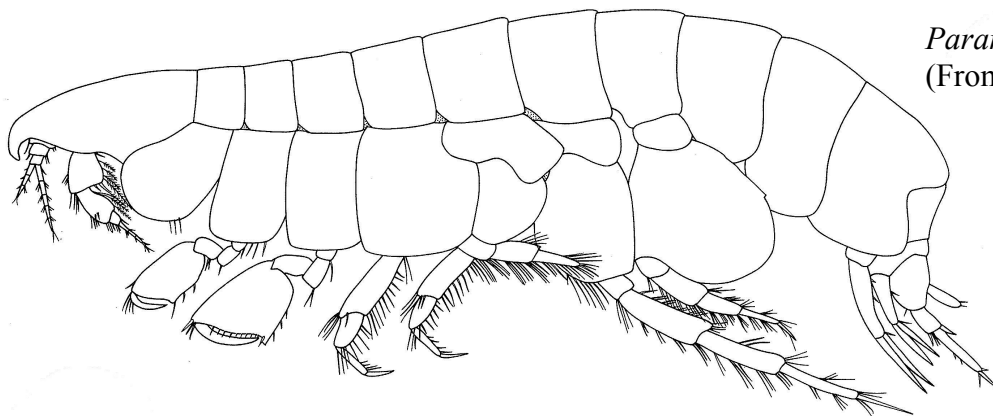
Various figures taken from Cadien 8-Dec-2014



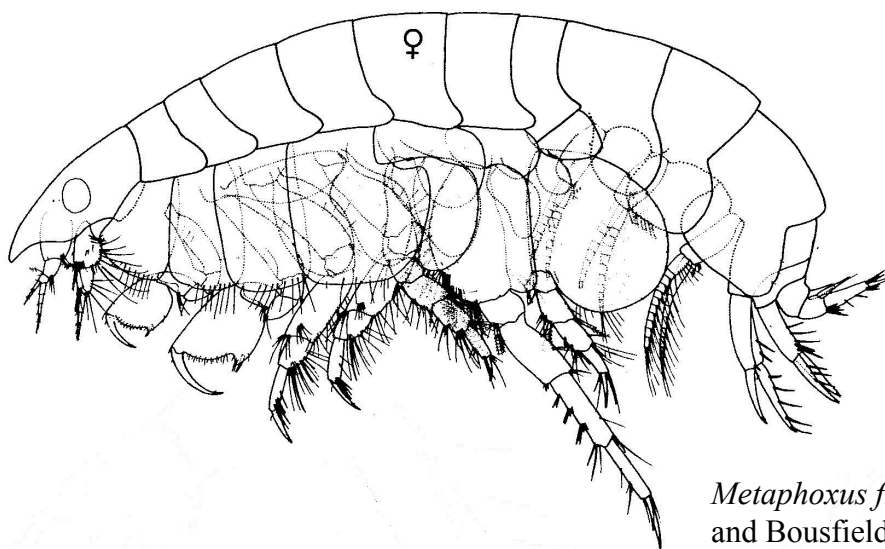
Paraphoxus similis
(From Jarrett and Bousfield 1994a)



Parametaphoxus sp 1
(From J. L. Barnard 1964)



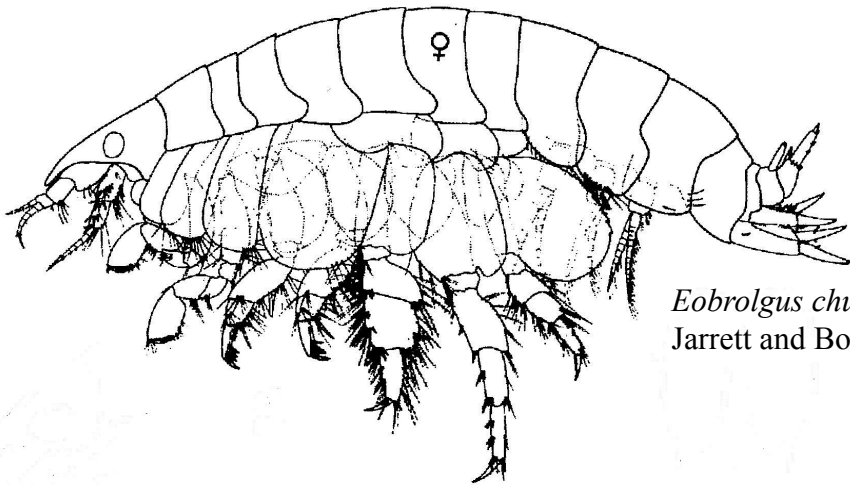
Leptophoxus falcatus (From J. L. Barnard and Karaman 1991)



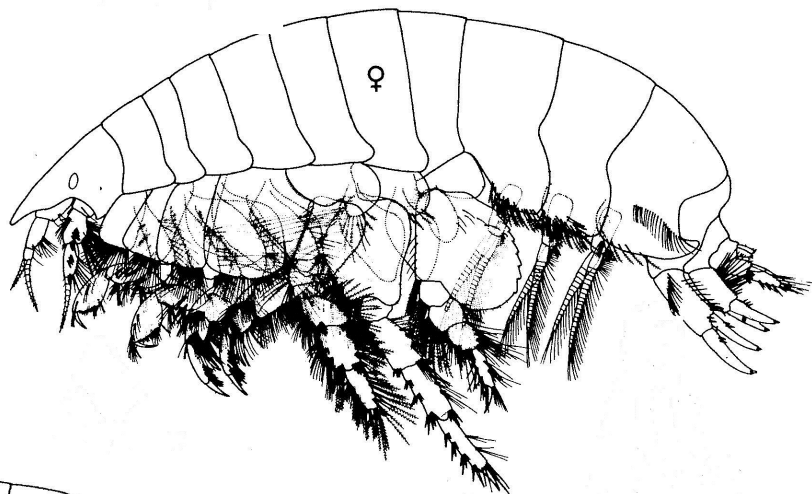
Metaphoxus frequens (From Jarrett
and Bousfield 1994a)



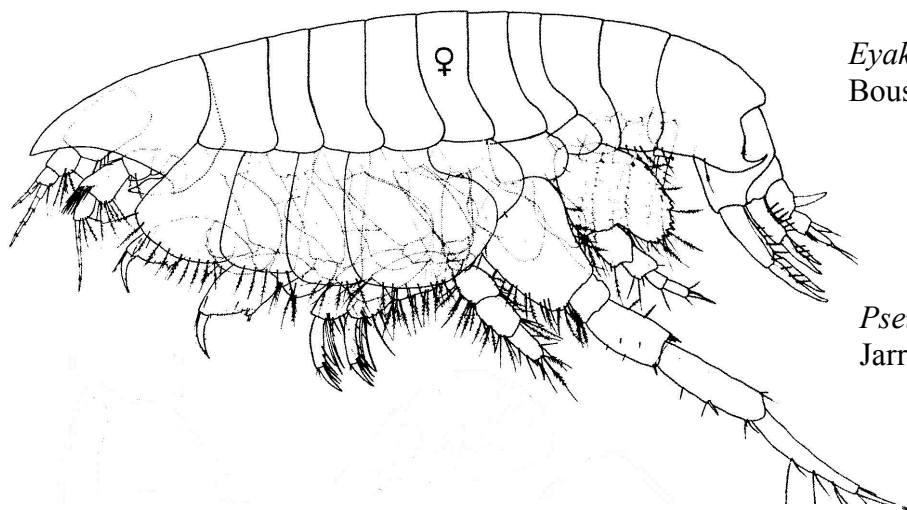
Various figures taken from Cadien 8-Dec-2014



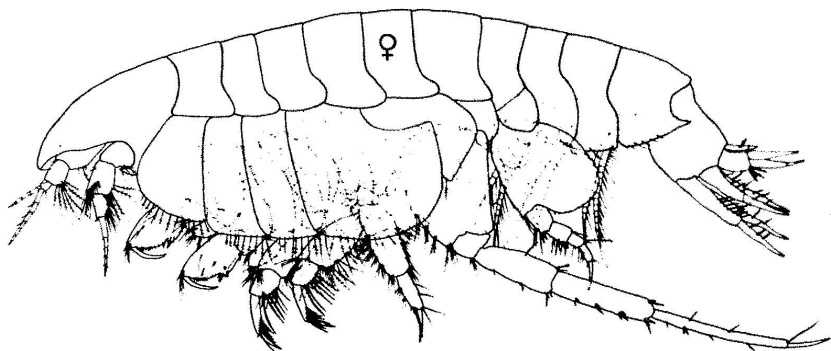
Eobrolgus chumashi (From Jarrett and Bousfield 1994a)



Eyakia robusta (From Jarrett and Bousfield 1994a)



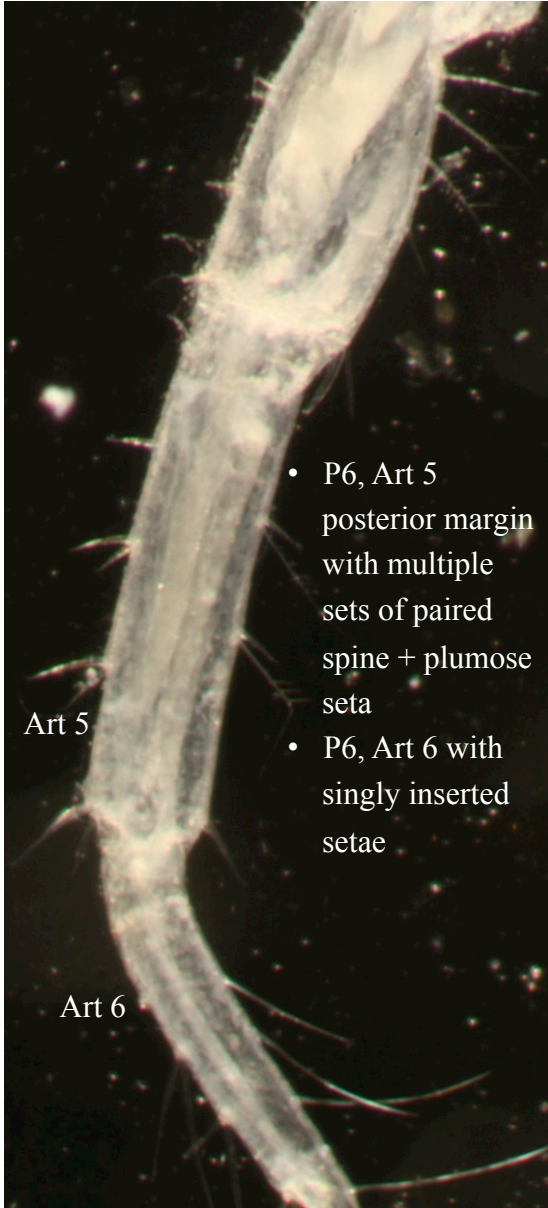
Pseudharpinia inexpectata (From Jarrett and Bousfield 1994a)



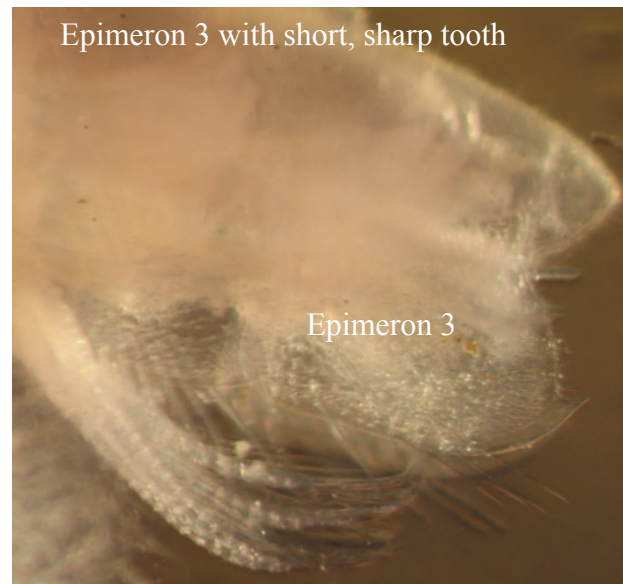
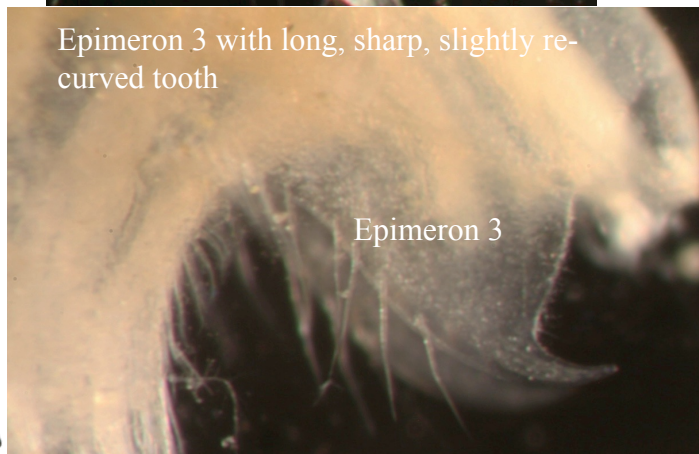
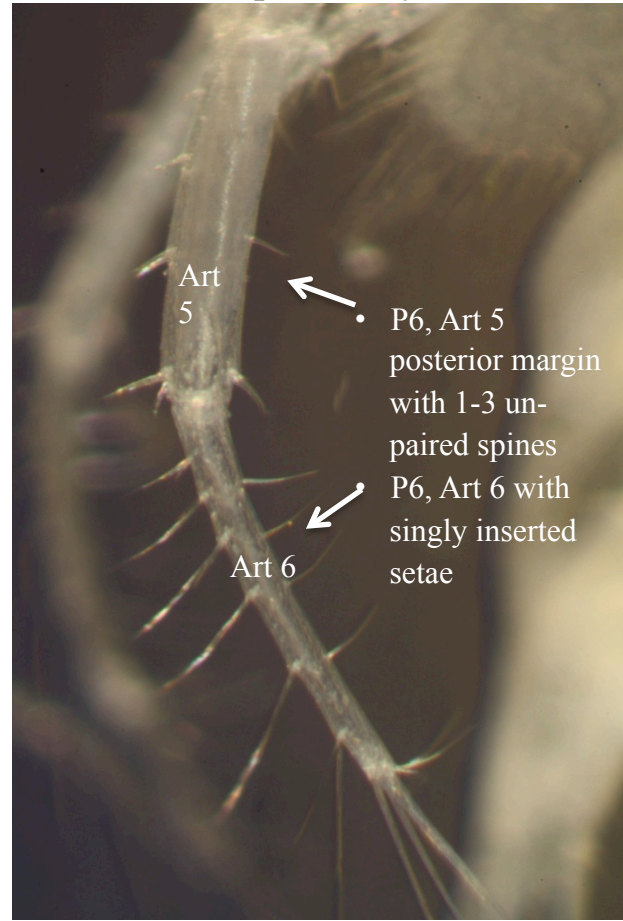
Harpiniopsis fulgens (From Jarrett and Bousfield 1994a)

Heterophoxus ellisi vs. *cf ellisi*

Heterophoxus ellisi



Heterophoxus cf ellisi



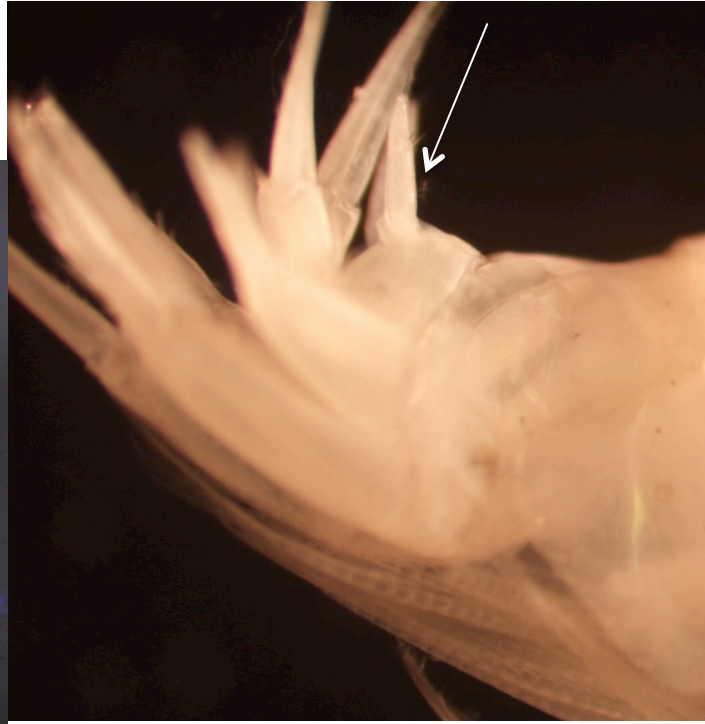
More common in embayments

Primarily in off-shore waters

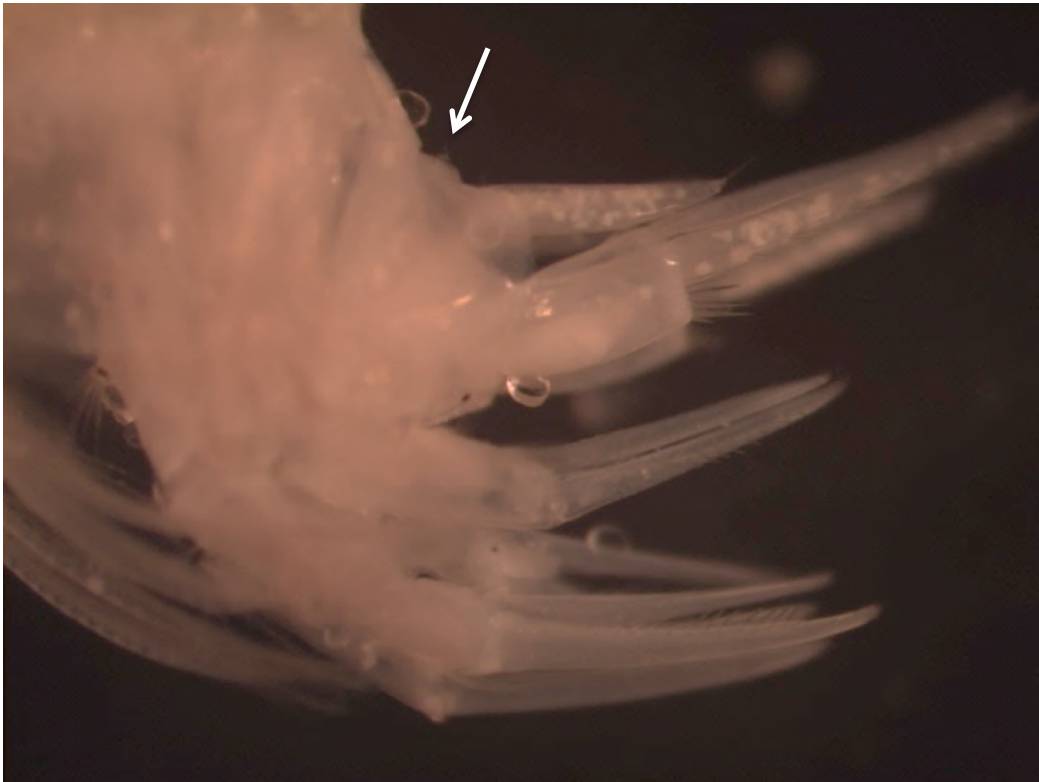


Foxiphalus obtusidens vs. *Majoxiphalus major*: Placement of telson setal group

Basal plumose setae on telson of
Foxiphalus obtusidens



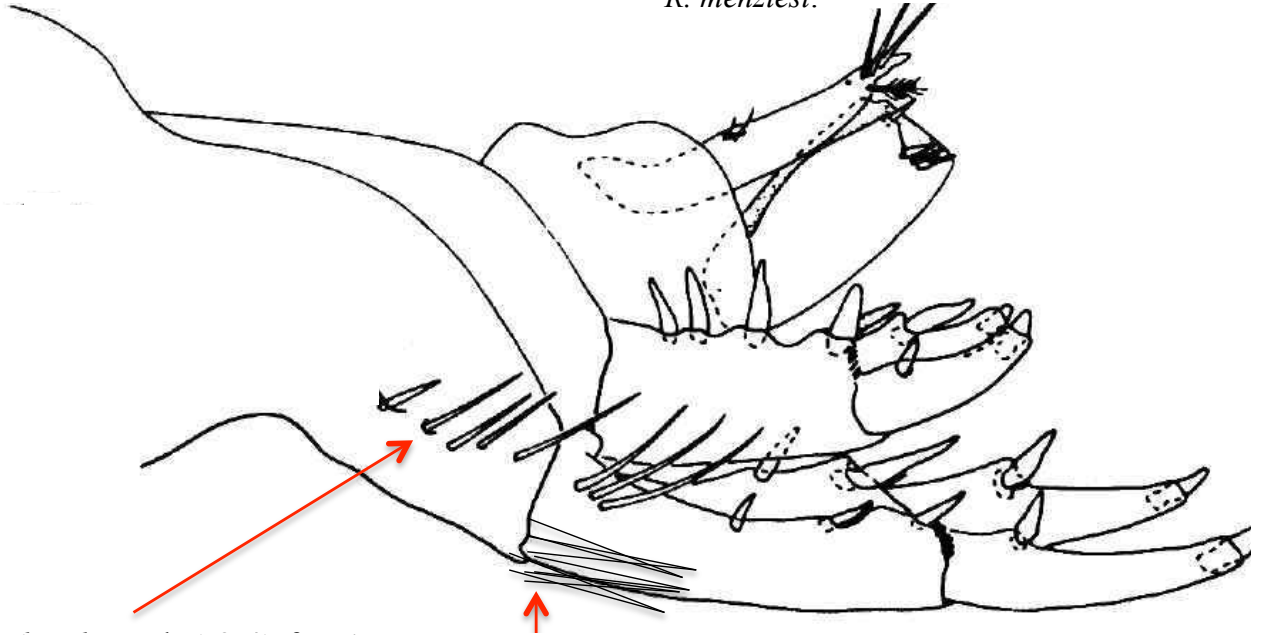
Basal plumose setae at very base of telson of *Majoxiphalus major* hidden by urosomal ridge



Rhepoxynius lucubrans vs. *R. menziesi*

Representation of lateral armaments present on ventro-lateral portion of *Rhepoxynius lucubrans*, according to “Relationship” section (Page 20) of Barnard and Barnard (1982).

NOTE: The pictured uropod spines or telson spines are **NOT** representative of *R. lucubrans* or *R. menziesi*.



Rhepoxynius lucubrans has 3–4 of these lateral armaments (spines) while *R. menziesi* has none. They are best viewed by removing the pleopods and then looking down onto the urosome. Initially, remove the urosome entirely to clearly view these structures.

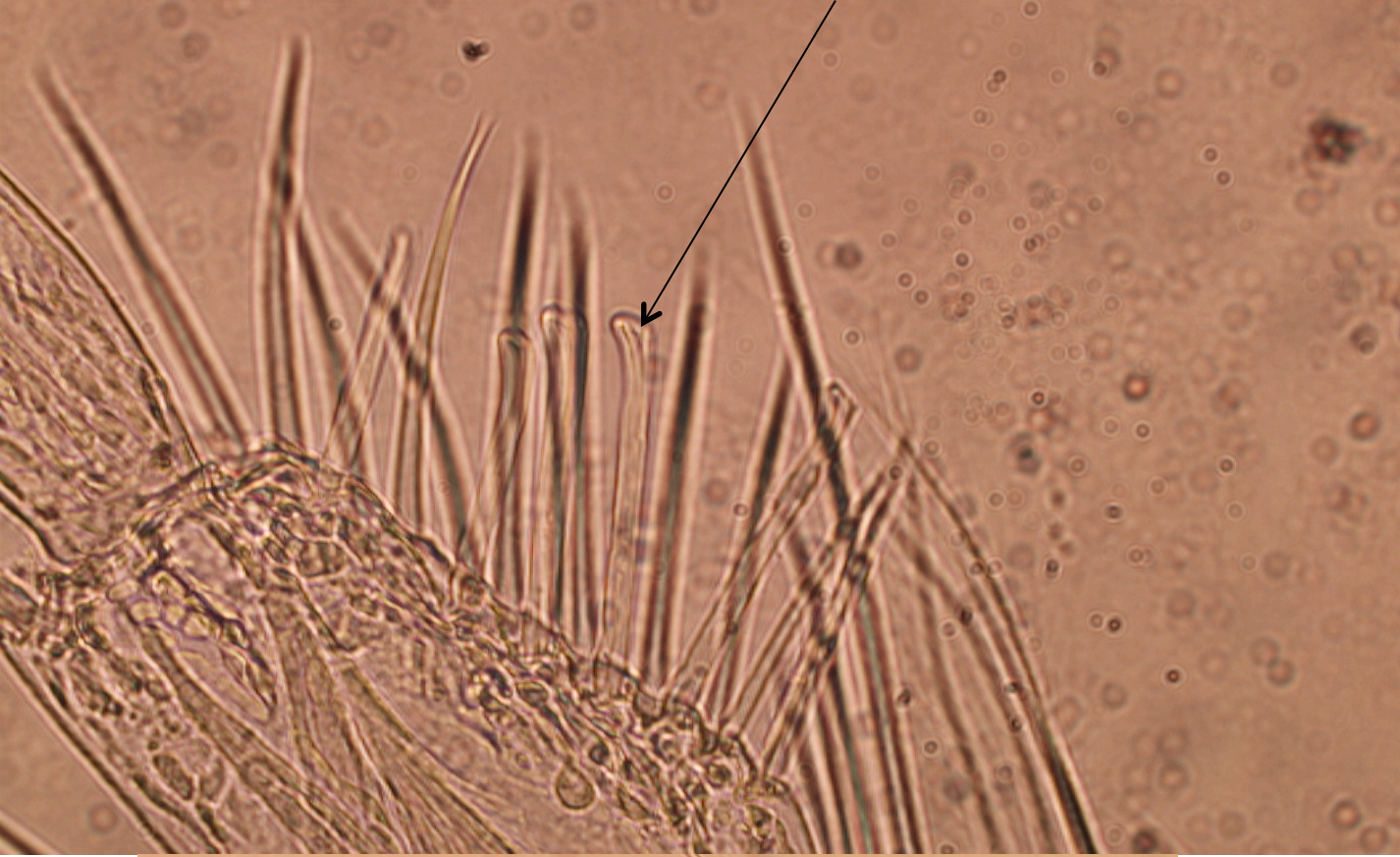
Both *Rhepoxynius lucubrans* and *R. menziesi* have these ventral armaments at the junction of urosomite 1 and uropod 1 peduncle; though those of *R. menziesi* seem to be more dense and splay outward more than in *R. lucubrans*.

Modified from Fig. 3 of Barnard and Barnard (1982) showing urosomites and uropods of *Rhepoxynius* sp C which also possess ventro-lateral armaments on urosomite 1.
(modified by D. Pasko, 7-Jan-2016)



Parametaphoxus sp

Male copulatory spines, pereopod 7, article 5



SCAMIT Taxonomic Toolbox

Subclass Eumalacostraca

▶ Superorder Eucarida

▶ **Superorder Peracarida**

▶ **Order Amphipoda**

▶ -OTHER USEFUL TOOLS

▶ **Suborder Gammaridea**

▶ Infraorder Caprellida

▶ Infraorder Corophiida

▶ Infraorder Dexaminida


▶ Infraorder Eusirida

▶ **Infraorder Gammarida**

▶ **Superfamily Phoxocephaloidea**


▶ **Family Phoxocephalidae**

▶ -OTHER USEFUL TOOLS

 **Key to the genera of Phoxocephalidae*

▶ **Subfamily Harpiniinae**

▶ **Heterophoxus ellisi**


 *Heterophoxus ellisi.pdf*

▶ **Subfamily Metharpiniinae**


▶ -OTHER USEFUL TOOLS

 *Rhepoxynius comps.pdf*

▶ **Foxiphalus obtusidens**

 *Foxiphalus obtusidens.pdf*

▶ **Foxiphalus similis**

 *Foxiphalus similis.pdf*

▶ **Rhepoxynius bicuspidatus**

 *Rhepoxynius bicuspidatus.pdf*

▶ **Rhepoxynius daboius**

 *Rhepoxynius daboius.pdf*


▶ **Rhepoxynius fatigans**

 *Rhepoxynius fatigans.pdf*

▶ **Rhepoxynius heterocuspis**

 *Rhepoxynius heterocuspis.pdf*


▶ **Rhepoxynius menziesi**

 *Rhepoxynius menziesi.pdf*

▶ **Rhepoxynius sp A**

 *Rhepoxynius sp A.pdf*

▶ **Rhepoxynius stenodes**

 *Rhepoxynius stenodes.pdf*


▶ **Family Platyschnopidae**


▶ **Tiburonella viscana**

 **Tiburonella viscana.pdf*

▶ **Family Urothoidae**

▶ **Urothoe elegans Cmplx**

 **Urothoe elegans.pdf*

 **Urothoe varvariini.pdf*

ostraca

Subclass Eumalacostraca

Superorder Eucarida

Superorder Peracarida

Order Amphipoda

▶ -OTHER USEFUL TOOLS

▶ **NEP Amphipod Reviews**

 *Amphipoda of the NEP Ampeliscoidea.pdf*

 *Amphipoda of the NEP Aoroidea.pdf*

 *Amphipoda of the NEP Bogidielloidea.pdf*

 *Amphipoda of the NEP Calliopioidea.pdf*

 *Amphipoda of the NEP Caprelloidea.pdf*

 *Amphipoda of the NEP Cheluroidea.pdf*

 *Amphipoda of the NEP Chevalioidea.pdf*

 *Amphipoda of the NEP Corophioidea.pdf*

 *Amphipoda of the NEP Crangonyctoidea.pdf*

 *Amphipoda of the NEP Dexaminidea.pdf*

 *Amphipoda of the NEP Eusiroidea.pdf*

 *Amphipoda of the NEP Gammaroidea.pdf*

 *Amphipoda of the NEP Hadzioidea.pdf*

 *Amphipoda of the NEP Ingolfiellids.pdf*

 *Amphipoda of the NEP Iphimedioidea.pdf*

 *Amphipoda of the NEP Leucothoidea.pdf*

 *Amphipoda of the NEP Liljeborgida.pdf*

 *Amphipoda of the NEP Lysianassoidea updated.pdf*

 *Amphipoda of the NEP Melphidippoidea.pdf*

 *Amphipoda of the NEP Neomegamphopoidea.pdf*

 *Amphipoda of the NEP Oedicerotoidea.pdf*

 *Amphipoda of the NEP Pardaliscoidea.pdf*

 *Amphipoda of the NEP Photoidea.pdf*

 *Amphipoda of the NEP Phoxocephaloidea.pdf*



The end!
[Thankfully]

