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

Dean Pasko, Rev 04-Oct-2024
(Modified from D.C. Cadien 8-Dec-2014, with permission)

PHOXOCEPHALOIDEA Bate 1857

FAMILY **UROTHOIDAE**

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 grandis (Stimpson 1856)
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 vigitegus (J.L. Barnard 1971)[i]
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[ii] 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)

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* 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.

This key has been modified to accommodate species occurring in the SCB. Should the user find specimens not conforming to the species included herein, s/he is referred to Cadien (2014) and Chapman 2007.

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

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Dean Pasko, Rev 04-Oct-2024
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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* Cmplx[iii]
– 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 distal process; 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 constricted (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) 21
4. Rami of uropod 1 and 2 bearing small subapical "nails" (=spines) dorsally – inspect for these carefully as they are often pressed against tip of ramus.................*Metharpinia* 5
– Rami of uropod 1 and 2 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 distally and dorsally spined; maxilliped inner plate with two stout distal spines…….*Grandifoxus*..........................7
– Posterior margins of epimera 1 and 2 weakly or asetose (Fig. 107A, F); telson distally spined, but lacking dorsal spination; stout spines absent from maxilliped inner plate…. *Rhepoxynius* 8
7. Coxae 1–3 with postero-distal tooth ....*Grandifoxus grandis*
– Coxae 1–3 without postero-distal tooth, evenly rounded............... .... *Grandifoxus longirostris*
8. Urosome with conspicuous anteriorly directed recurving dorsal tooth .... *Rhepoxynius vigitegus*[i]
– Urosome with smooth, without anteriorly directed dorsal tooth...9
9. Basis of pereopod 7 squarish in shape with <u>only</u> two large spikes 10
– Basis of pereopod 7 broadly rounded with three or more large spikes, or with several small to medium sized teeth...11
10. Epistome blunt, rounded ....*Rhepoxynius bicuspidatus*
– Epistome with acutely produced cusp..*Rhepoxynius* sp A
11. Uropod 1 with displaced peduncular spine (Fig. 110G) 12
– Uropod 1 peduncle without displaced spine 14

12. Epistome rounded, without acute cusp (Fig. 108B) .... *Rhepoxynius* sp C
– Epistome acutely produced (Fig. 108I) 13
13. Epistomal cusp long, about 1.5x longer than width of base; rostrum relatively narrow, when viewed from dorsal perspective covering about ½ of the antenna 1 peduncular segments from view .... *Rhepoxynius menziesi*[iv]
– Epistomal cusp short, subequal to or less than width of base (Fig. 108I); rostrum relatively broad, when viewed from dorsal perspective covering about 2/3–3/4 of the antenna 1 peduncular segments from view .... *Rhepoxynius lucubrans*[iv]
14. Epistome rounded, without acute cusp (Fig. 108 Supplement A, B) 15
– Epistome acutely produced (Fig. 108I, Supplement E, M) 18
15. Rostrum very narrow; gnathopods 1 and 2 with article six subequal to or slightly shorter than article 5; uropodal spines elongate .... *Rhepoxynius stenodes*[v]
– Rostrum moderately to very broad; gnathopods 1 and 2 with article six distinctly shorter than article 5; some uropod peduncular spines thick, rhombic 16
16. Pereopod 7 basis with uniformly small serrations/teeth (≥7); rostrum narrowed .... *Rhepoxynius homocuspidatus*[vi]
– Pereopod 7 basis with large or small serrations/teeth (typically <7); rostrum broad 17
17. Pereopod 7 basis with four to five dissimilarly sized teeth/serrations; telson spines long .... *Rhepoxynius heterocuspidatus*
– Pereopod 7 basis with three similarly sized, relatively large teeth/serrations; telson spines short .... *Rhepoxynius tridentatus*
18. Epistomal cusp long, 1.5x longer than width of base (Fig. 108 Supplement M) 19
– Epistomal cusp short, clearly less than width of base (Fig. 108I, Supplement E) 20
19. 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*
20. 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; P7 basis "beveled" – ventral margin angled, smooth, different from more textured facial surface (best visible when viewed on angle) .... *Rhepoxynius fatigans*[vii]
– Rostrum broadened, rounded at apex; gnathopod 1 similar to gnathopod 2, with broad, square-shaped article 6, shorter than article 5 .... *Rhepoxynius daboius*
21. Pigmented eyes present (check carefully, pigment is lost in preservation in some specimens) 22
– Eyes absent 40
22. Antenna 2, article 1 not or only weakly ensiform (Fig. 109A, J, N) 32
– Antenna 2, article 1 strongly ensiform (Fig. 109E) 23

23. Epimeron 3 with postero-ventral tooth (Fig. 107F) .... *Heterophoxus*[viii] 24
– Epimeron 3 without postero-ventral tooth (Fig. 107A) 28
24. Setae present along posterior margin of pereopod 6, article 6 (Fig. 107A) 25
– Setae absent from posterior margin of pereopod 6, article 6 .... *Heterophoxus affinis*
25. Epimeron 3 with large tooth (length ≥1/3 the length of the straight portion of epimeron 3)... 26
– Epimeron 3 with short tooth (length ≤1/4 the length of the straight portion of epimeron 3); pereopod 6, posterior margin of article 5 with singly inserted spines ....*Heterophoxus cf ellisi*[ix]
26. Posterior margin of pereopod 6, article 6 with all setae occurring singly; pereopod 6, posterior margin of article 5 with multiple sets of paired spine(s) and plumose setae ....*Heterophoxus ellisi*[vii]
– Posterior margin of pereopod 6, article 6 with one or more setal groups occurring in doublets or triplets 27
27. Pereopod 6, article 6 with singly and doubly grouped setae; rostrum nearly downturned; pereopod 6, article 5 hind margin with several short spinules ....*Heterophoxus oculatus*
– Pereopod 6, article 6 with at least one triply grouped setae; rostrum nearly straight, little downturned; pereopod 6, article 5 hind margin with several clusters of one to two spines plus a seta...*Heterophoxus conlanae*
28. Posterior margins of epimera 1 & 2 bare, or with at most a few scattered seta ....*Foxiphalus* 29
– 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*
29. Uropod 1 with displaced peduncular spine; ventral margin of pereopod 7 basis without long setae (Fig. 111E) 30
– Uropod 1 without displaced peduncular spine; ventral margin of pereopod 7 basis with numerous long setae (Fig. 111D) ....*Foxiphalus golfensis*
30. 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 31
31. 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*
32. 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, posteriorly expanded, with or without distinct posterior lobe (Fig. 111B); coxa 4 and pereopod 7 not greatly expanded 33

33. Epimeron 3 without oblique row of robust facial setae and with few to no posterior marginal setae; mandibular molar bearing three or fewer spines 35
– 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* 34
34. Epimeron 3 with large tooth .... *Eyakia robusta*
– Epimeron 3 without tooth .... *Eyakia* sp 2
35. Palp of maxilla 1 uniarticulate (Fig. 108G); 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) 36
– Palp of maxilla 1 biarticulate (Fig. 108D); gnathopod 1, article 5 normal, not noticeably narrowed throughout its length nor greatly extended (Fig. 110A, B, C) 38
36. Gnathopod 1 parachelate (Fig. 110E); gnathopod 2 subchelate, transverse (Fig. 110H) .... *Parametaphoxus* sp 1[x]
– Gnathopods 1 and 2 subchelate, palms oblique (Fig. 110F, G) 37
37. Coxae 1 and 2 with setae occupying two-thirds to entire ventral margin; gnathopods 1 and 2 subequal in size; mandibular molar triturative .... *Cephalophoxoides homilis*
– Coxae 1 and 2 with ventral setae occupying posterior one-quarter to one-third of the ventral margin; propodus of gnathopod 2 larger than that of gnathopod 1; mandibular molar non-triturative, bearing spines, or absent .... *Metaphoxus frequens*
38. 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* 39
– 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[xi]
39. Epimeron 3 lacking ventral setae .... *Eobrolgus spinosus*
– Epimeron 3 with one to two ventral spines or setules .... *Eobrolgus chumashi*
40. Basis of pereopod 5 narrow, not posteriorly expanded and without lobe (Fig. 111C) 42
– Basis of pereopod 5 broadened, posteriorly expanded and with or without distinct posterior lobe (Fig. 111B) 41
41. 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*
42. Antenna 2, article 1 strongly ensiform (Fig. 109E) 43
– Antenna 2, article 1 not or only weakly ensiform (Fig. 109A, J) ... *Harpiniopsis* 44

43. Posterior margin of pereopod 6, article 6 setose; antero-ventral margin of head strongly produced into acute process; antero-distal margin of pereopod 7 basis expanded and flattened, bearing ≥10 large plumose setae .... *Pseudharpinia excavata*
– Posterior margin of pereopod 6, article 6 bare; antero-ventral margin of head strongly not produced; antero-distal margin of pereopod 7 basis not expanded nor flattened ....*Heterophoxus affinis*[xii]
44. Epistome strongly produced (Fig. 109 supplement) .... *Harpiniopsis epistomata*
– Epistome unproduced or with small acute cusp (Fig. 109 supplement) 45
45. Third epimeron with acute tooth at lower posterior corner..46
– Third epimeron prolonged, but blunt, lacking acute tooth at lower posterior corner ....*Harpiniopsis naiadis*
46. Head with acute process at lower corner...48
– Head lacking acute process at lower corner 47
47. Epimeron 3 with prolonged tooth ....*Harpiniopsis emeryi*
– Epimeron 3 with short tooth.. *Harpiniopsis galera*
48 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] *Rhepoxynius vigitegus* has not been reported in the SCB, but is included here for the SFPUC Laboratory,
[ii] *Harpiniopsis similis* 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.
[iii] *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.
[iv] I have reviewed the literature for information in an attempt to distinguish these two species, and have examined a large number of specimens from many surveys and habitats, and have found that the breadth of the rostrum and relative differences of the epistome are the only characters that seem to vary together. Although Barnard and Barnard 1982 discuss lateral "armaments" of urosomite 1 present on *R. lucubrans*, I have found this specific character to vary, and be more consistent with *R menziesi* than *R. lucubrans*. Moreover, in June 2023 I reviewed the holotype of *R lucubrans* (*Paraphoxus lucubrans*, LACM DR 1953-101.1, JL Barnard 1960; Female, Acc #A5486 ExAHF). The specimen had a small epistome, large, broad rostrum, and **no** lateral armaments on urosomite 1.
[v] 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, 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 *R. stenodes*. Representative specimens with the broadened rostrum would key to *R. heterocuspidatus* 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. Dr. D. Diener also recognized the variant form in the 1980s, but he came to a similar conclusion and reported these variant specimens as *R. stenodes*.

[vi] Approximately 1% - 2% of the specimens in southern California possess a tri-cuspid article 2 of pereopod 7. It remains to be seen whether this character state reflects genetic variation or abnormal regeneration of the appendage.

[vii] J. Chapman & N. Rudel (2005) speculated that *R. fatigans* and *R. daboius* would eventually be synonymized: Bibliography of Northeast Pacific Gammaridean Amphipod Taxonomy, distributed at the February 2005 SCAMIT Meeting.

In 1999, D. Pasko found two specimens (one male and one female) of *Rhepoxynius* with uropod 1 possessing a small displaced spine (less than one-fourth the length of the rami); uropod 3 (female) inner ramus subequal to outer ramus; gnathopod 1, articles 5 and 6 narrow, elongate, with article 5 longer than article 6. The specimens were from 168 m off San Diego and were originally designated as *Rhepoxynius* sp SD2 until it was determined that they represented an aberrant deep water form of *R. fatigans,*

[viii] See discussion of *Heterophoxus* in SCAMIT NL Vol. 14, No.8, which included a review of *H. oculatus* from the December 1995 SCAMIT meeting.

[ix] *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 offshore waters. Unfortunately neither conforms 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 do 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.

[x] 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.

[xi] *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).

[xii] *Heterophoxus affinis* is included twice because some specimens without discernable eyes have been encountered in the SCB.

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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.

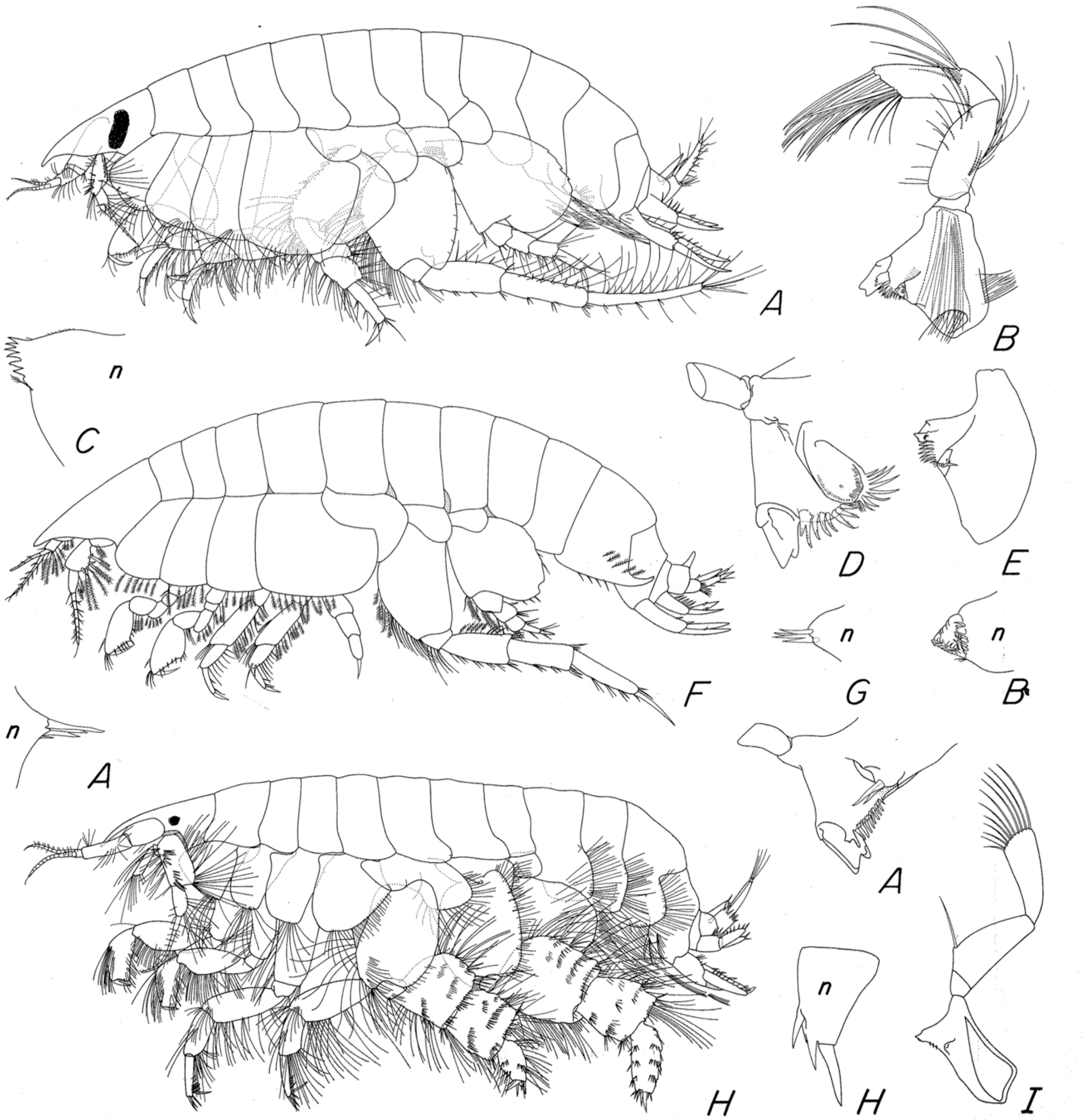


Fig.107. Phoxocephalidae. A, *Brolgus tattersalli*; B, *Urophoxus (= Pontharpinia) pinguis*; C, *Leongathus nootoo*; D, *Kotla batturi*; E, *Yammacoona kunarella*; F, *Harpinia plumosa*; G, *Birubius* species; H, *Tipimegus thalerus*; I, *Leptophoxus falcatus*.

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.

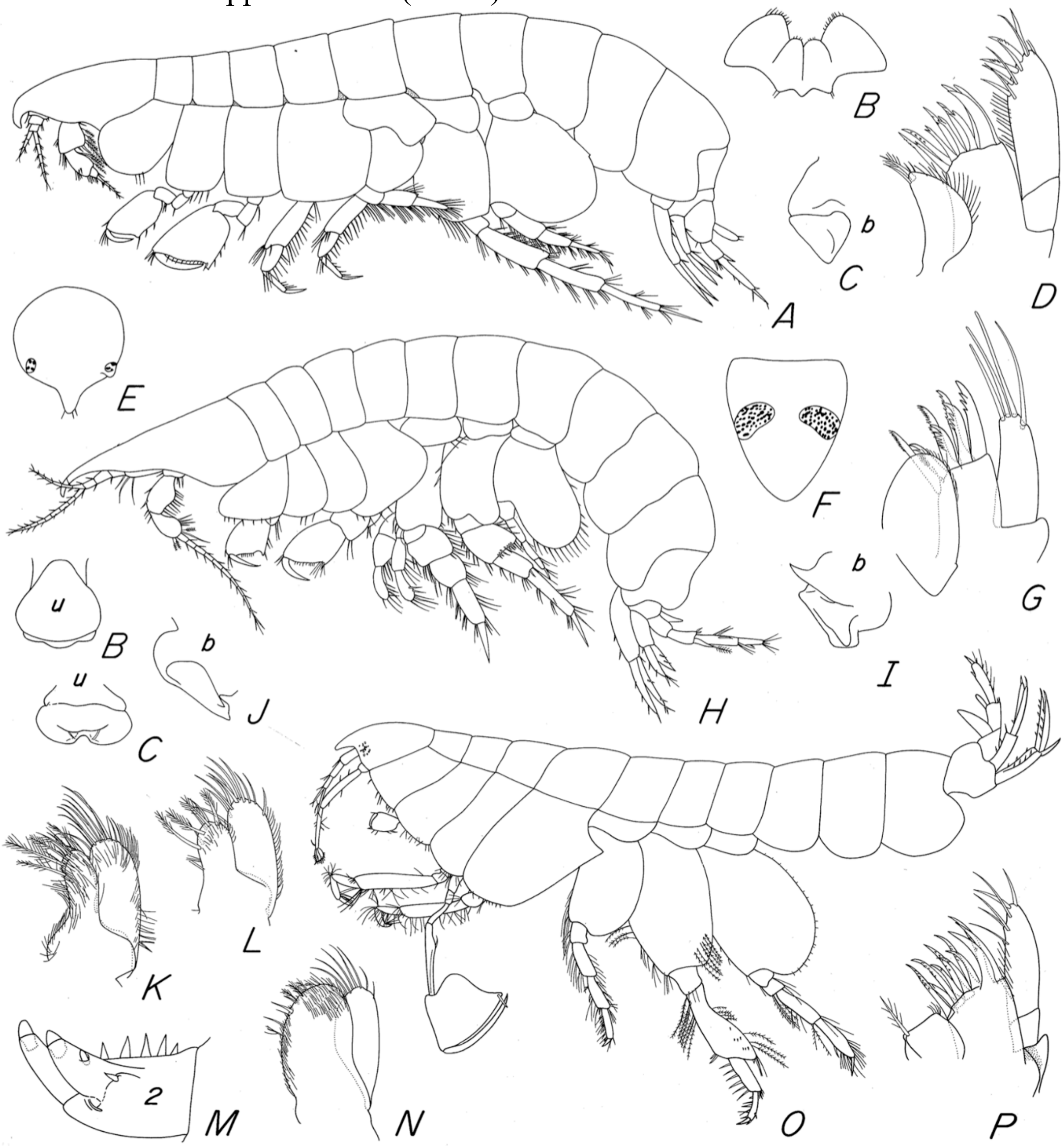


Fig.108. Phoxocephalidae. A, *Leptophoxus falcatus*; B, *Phoxocephalus holbolli*; C, *Tipimegus kalkro*; D, *Birubius mayamayi*; E, *Microphoxus minimus*; F, *Paraphoxus oculatus*; G, *Cephalophoxoides kukathus*; H, *Mandibulophoxus uncirostratus*; I, *Booranus weemus*; J, *Cunmurra itickerus*; K, *Leongathus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

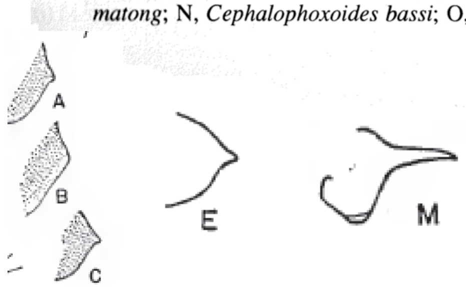


Fig. 108 Supplement. Epistome types: A, B, C − variations of unproduced; E − weakly produced, acute; M − strongly produced, acute

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.

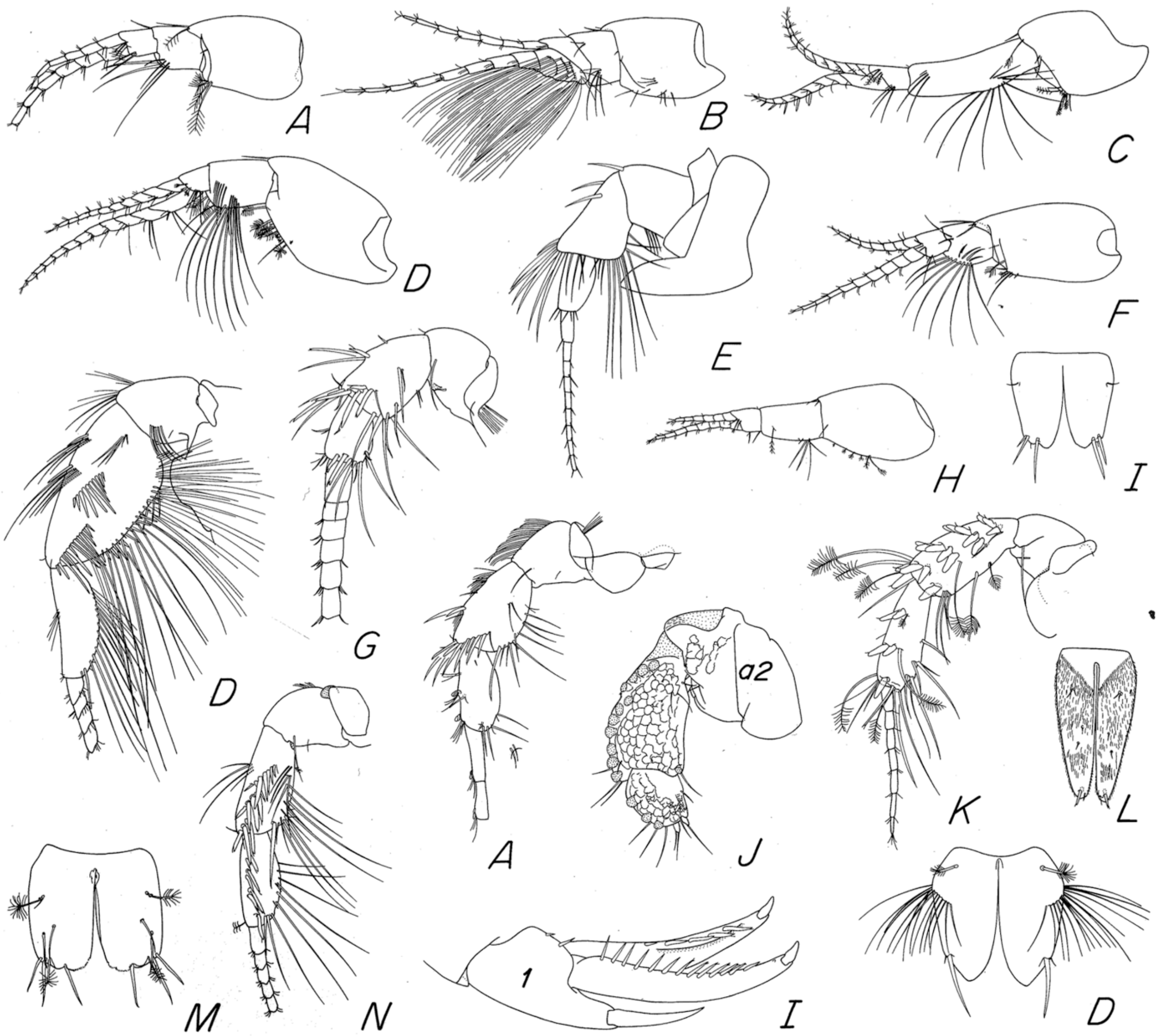


Fig.109. Phoxocephalidae. A, *Brolgus millinus*; B, *Elpeddo kaikai*; C, *Tipimegus thalerus*; D, *Urophoxus (= Pontharpinia) pinguis*; E, *Heterophoxus oculatus*; F, *Brolgus tattersalli*; G, *Wildus thambaroo*; H, *Leongathus nootoo*; I, *Tipimegus kangulun*; J, *Kondoleus tekin*; K, *Kotla batturi*; 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.

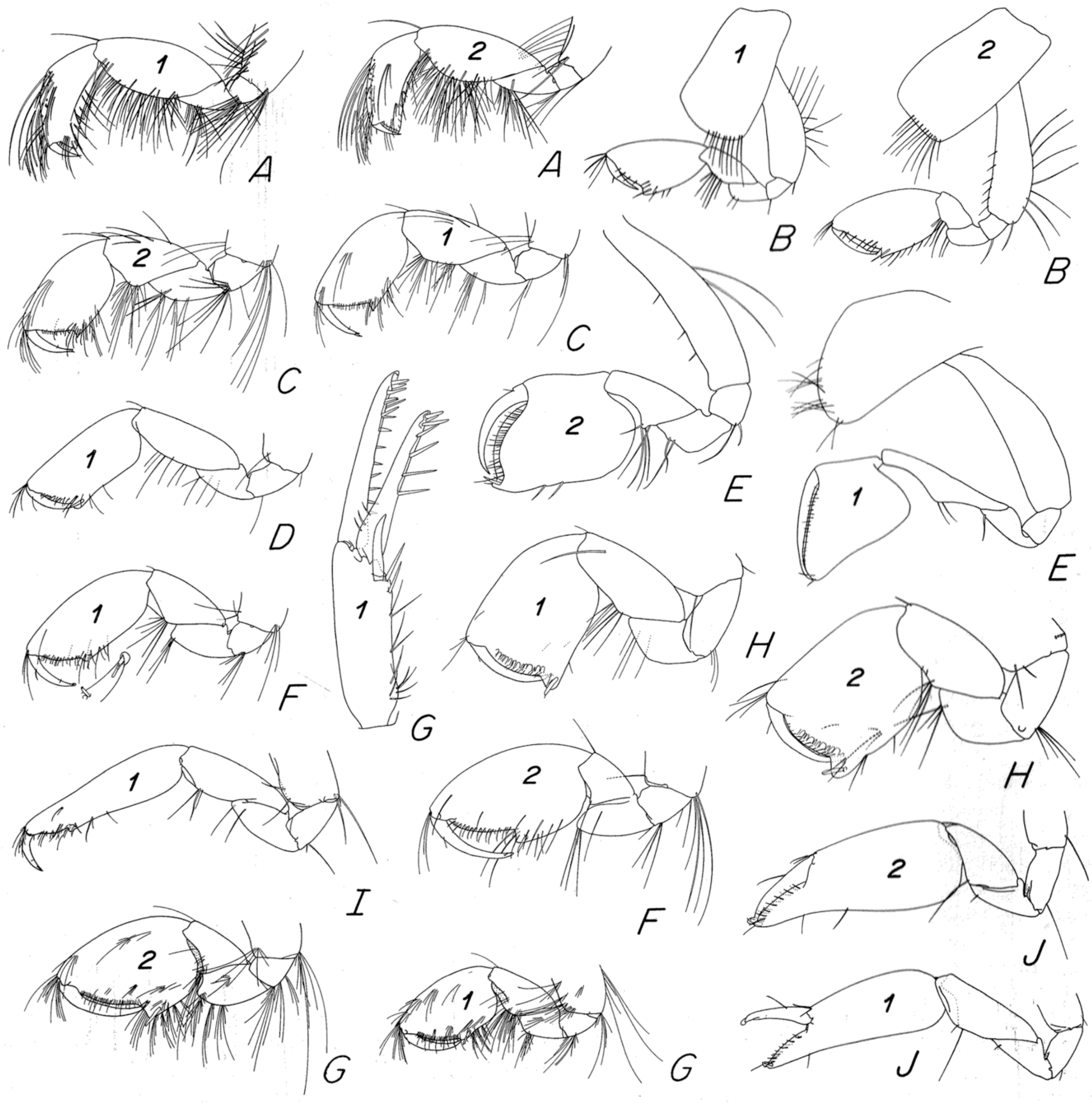


Fig.110. Phoxocephalidae. A, *Tipimegus thalerus*; B, *Phoxocephalus holbolli*; C, *Parharpinia villosa*; D, *Cunmurra itickerus*; E, *Joubinella strelkovi*; F, *Brolgus tattersalli*; G, *Urophoxus (= Pontharpinia) pinguis*; H, *Matong matong*; I, *Ganba pellati*; J, *Limnoporeia maranowe*.

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.

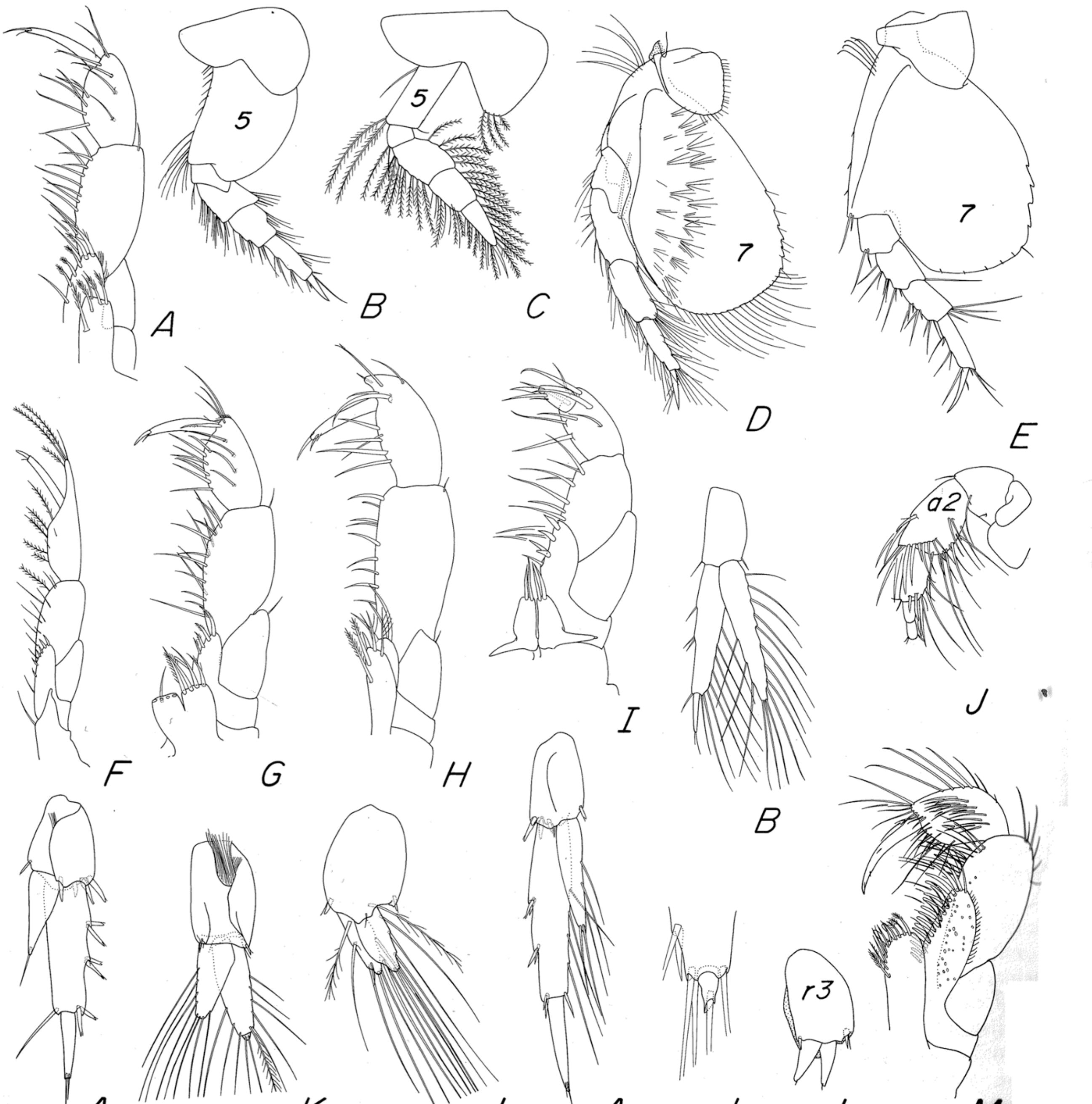
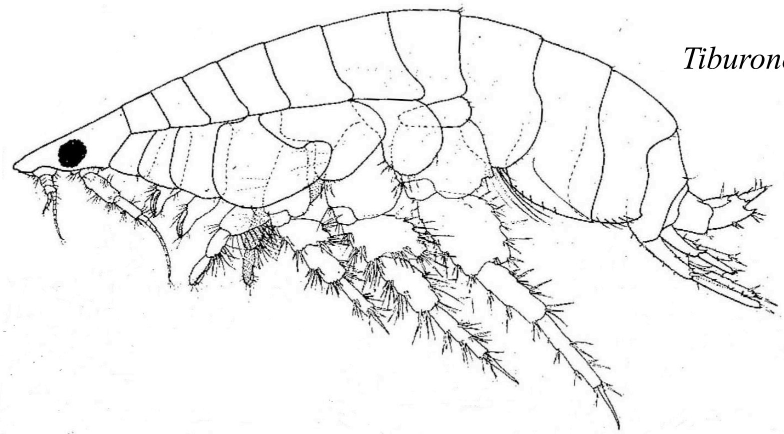
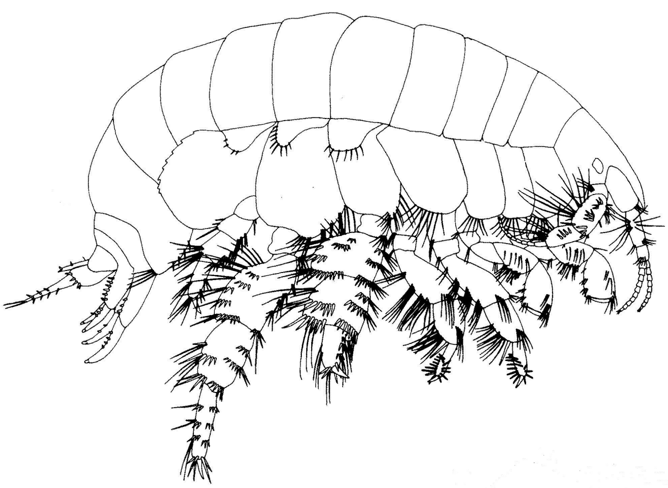


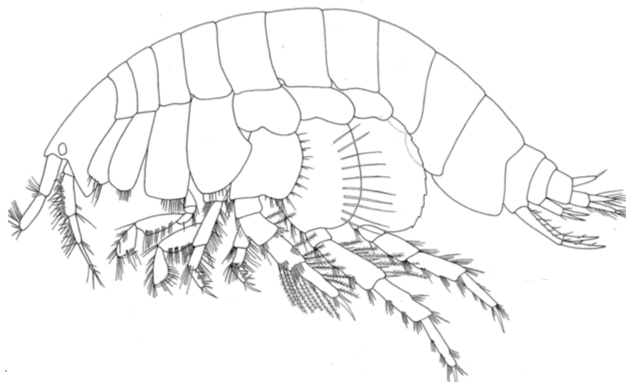
Fig.111. Phoxocephalidae. A, *Elpeddo kaikai*; B, *Phoxocephalus holbolli*; C, *Harpinia plumosa*; D, *Urophoxus (= Pontharpinia) pinguis*; E, *Brolgus tattersalli*; F, *Leptophoxus falcatus*; G, *Ganba pellati*; H, *Yammacoona kunarella*; I, *Kondoleus tekin*; J, *Brolgus millinus*; K, *Kotla batturi*;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

Various figures taken from Cadien 8-Dec-2014



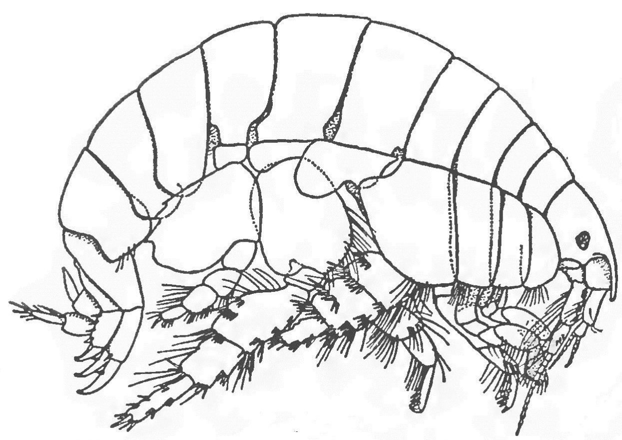
Tiburonella viscana (From J. L. Barnard 1963



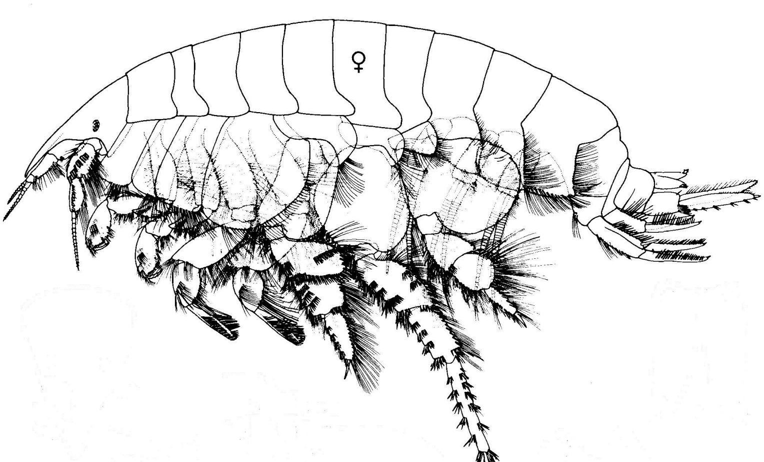


Urothoe elegans Cmplx

Grandifoxus longirostris (From Coyle 1982)

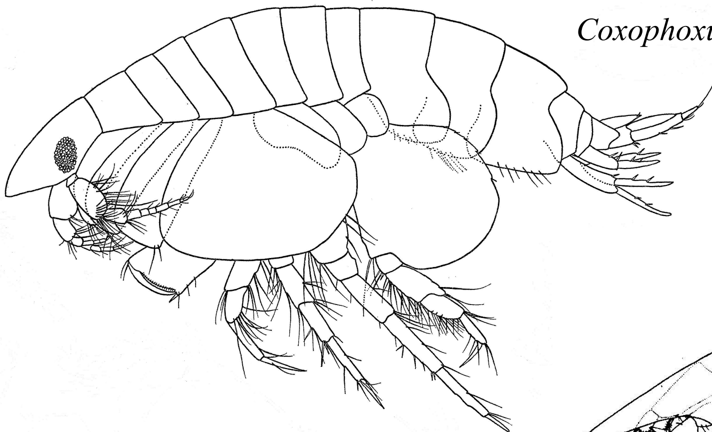


Rhepoxynius pallidus (From J. L. Barnard 1960)

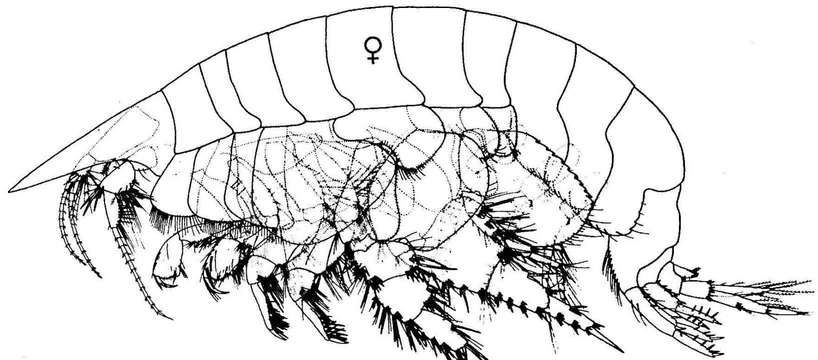


Majoxiphalus maximus (From Jarrett and Bousfield 1994b)

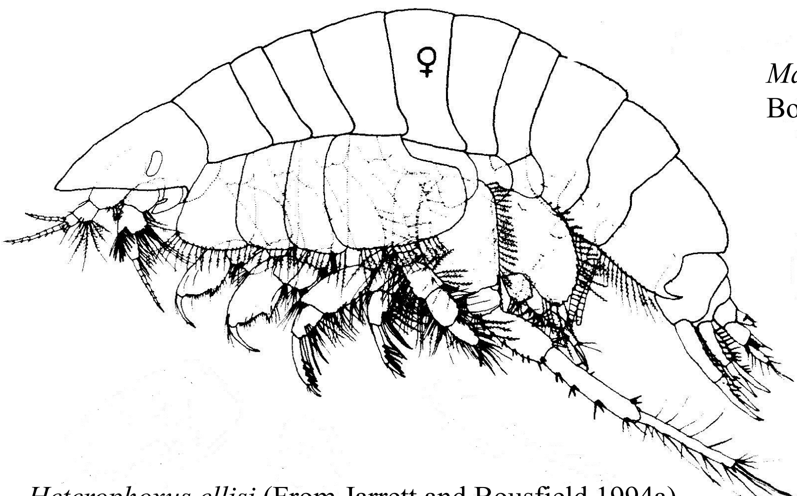
Various figures taken from Cadien 8-Dec-2014



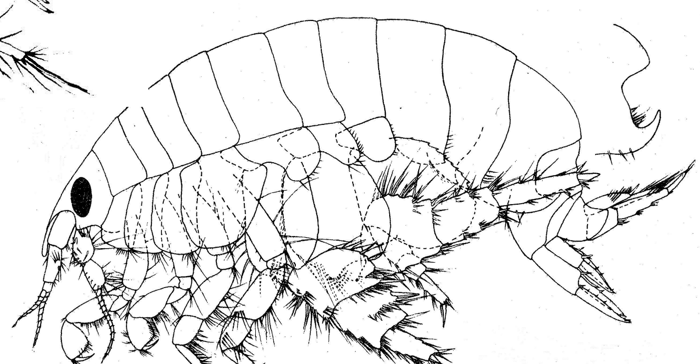
Coxophoxus hidalgo (From J. L. Barnard 1966)



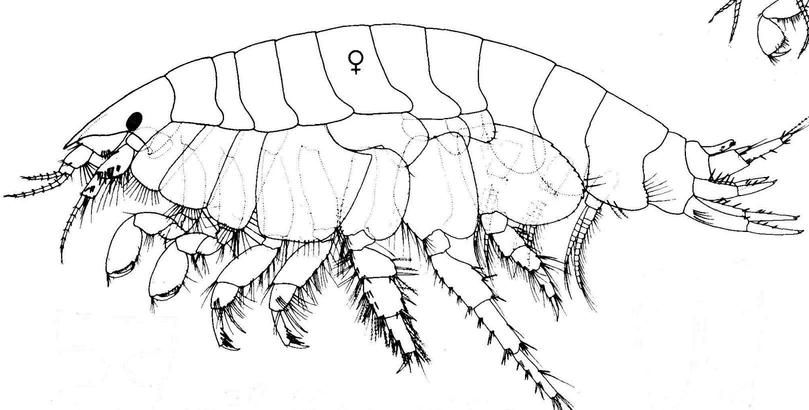
Mandibulophoxus gilesi (From Jarrett and Bousfield 1994a)



Heterophoxus ellisi (From Jarrett and Bousfield 1994a)

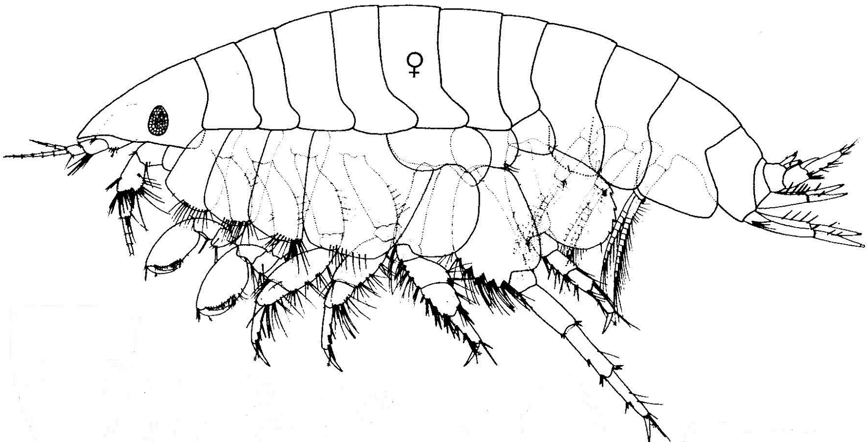


Metharpinia jonesi (From J. L. Barnard 1963)

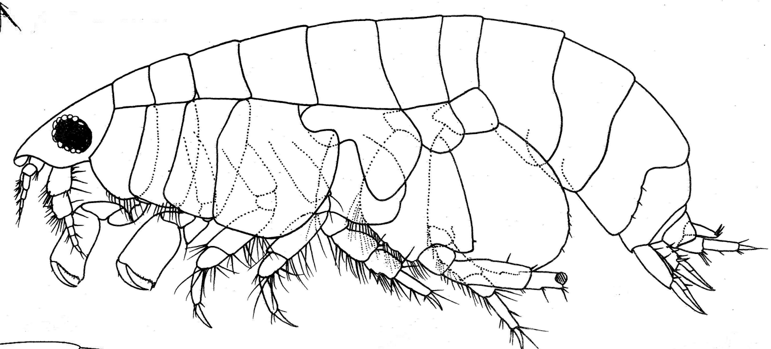


Foxiphalus similis (From Jarrett and Bousfield 1994b)

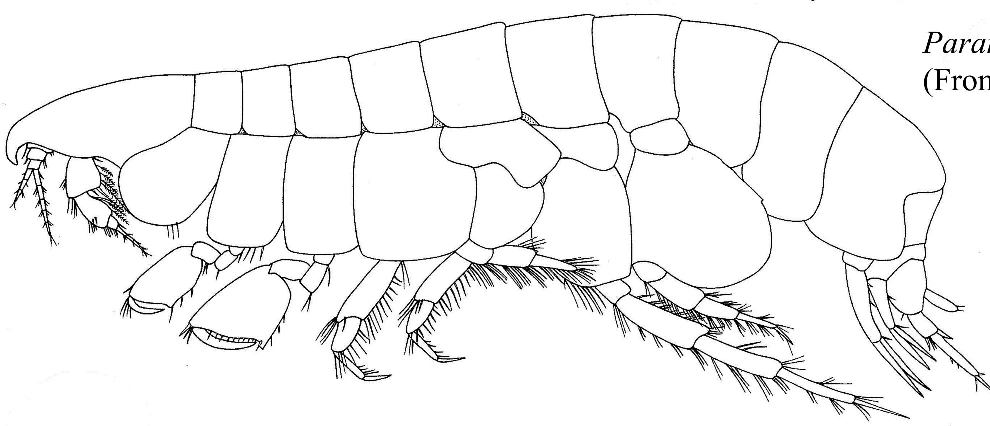
Various figures taken from Cadien 8-Dec-2014



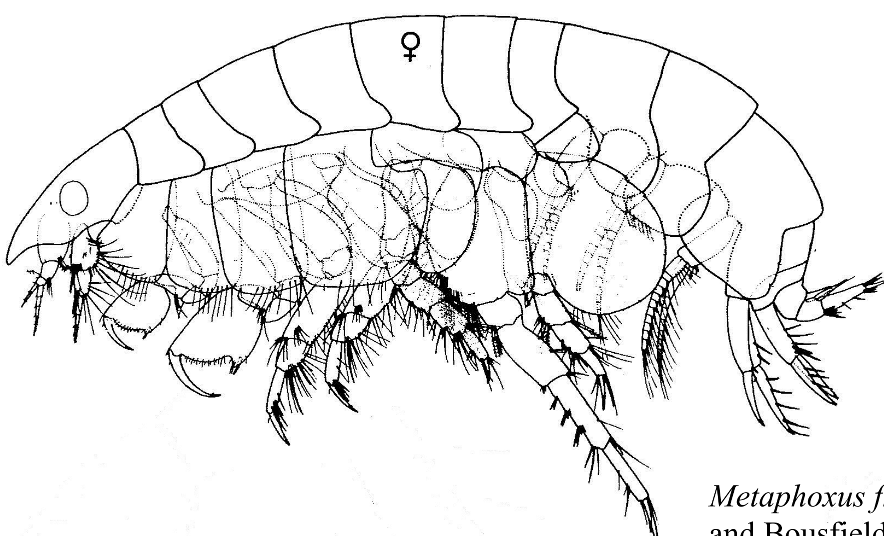
Paraphoxus similis
(From Jarrett and Bousfield 1994a)



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

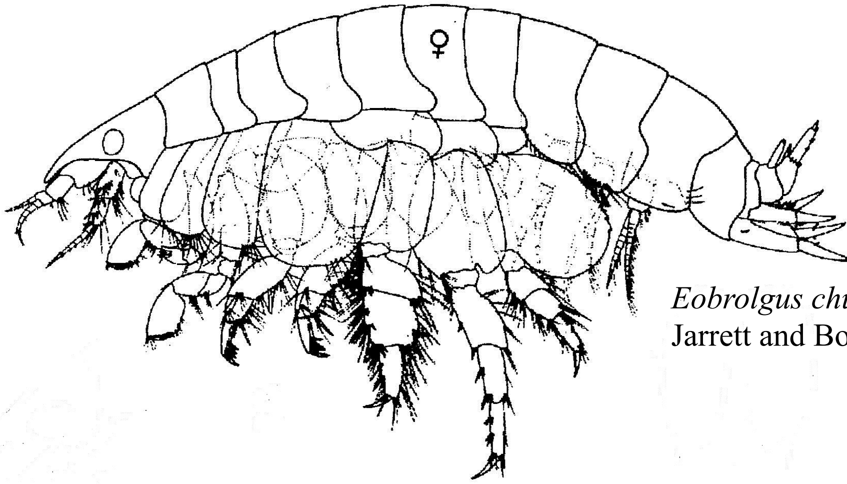


Leptophoxus falcatus (From J. L. Barnard and Karaman 1991)

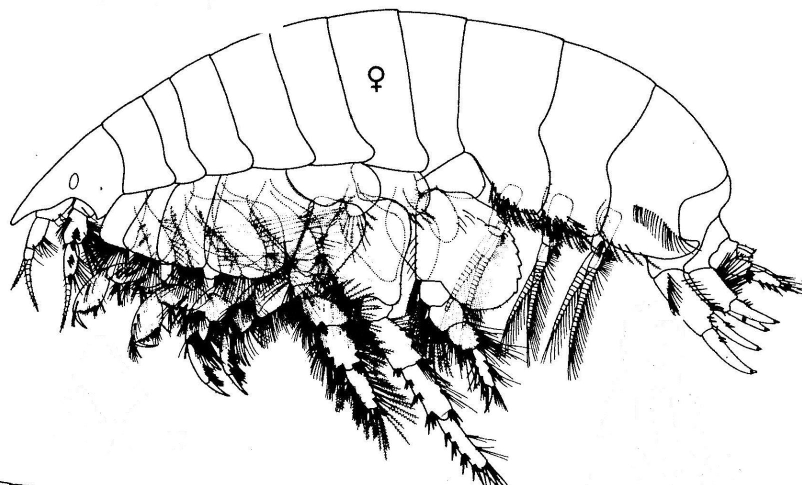


Metaphoxus frequens (From Jarrett and Bousfield 1994a)

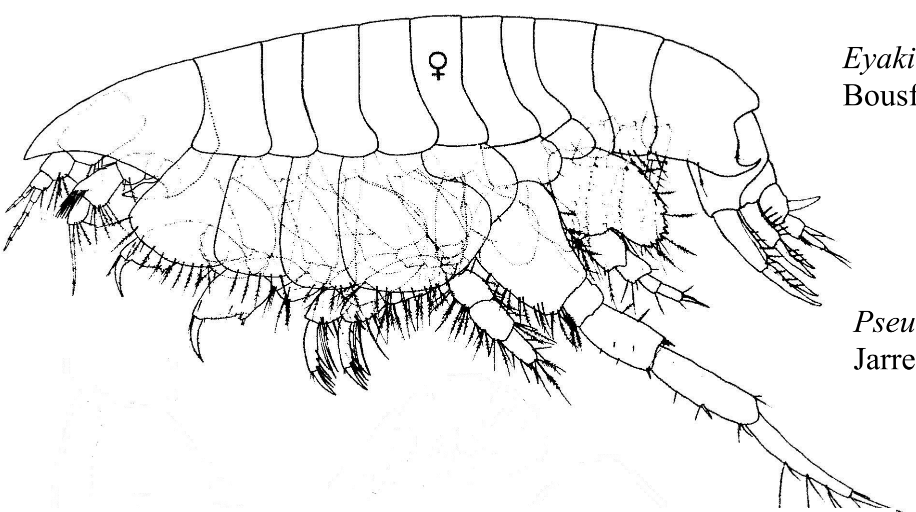
<u>Various figures taken from Cadien 8-Dec-2014</u>



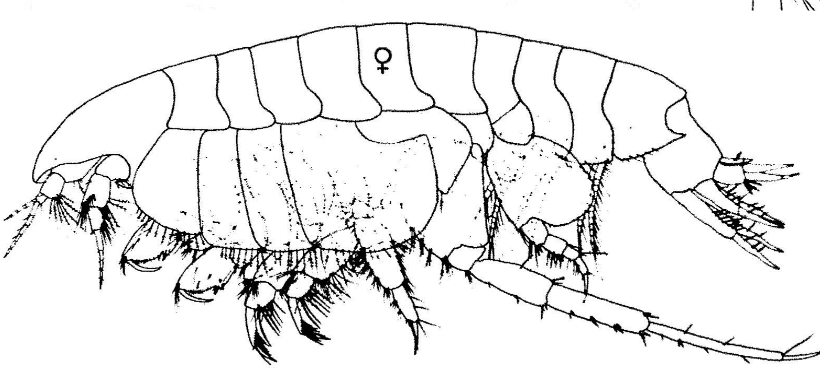
Eobrolgus chumashi (From Jarrett and Bousfield 1994a)



Eyakia robusta (From Jarrett and Bousfield 1994a)



Pseudharpinia inexpectata (From Jarrett and Bousfield 1994a)



Harpiniopsis fulgens (From Jarrett and Bousfield 1994a