

A new species of *Leongathus* from the Tasman Sea collected during the 2003 NORFANZ Expedition (Crustacea: Amphipoda: Phoxocephalidae)

JOANNE TAYLOR

Museum Victoria, GPO Box 666, Melbourne, Vic. 3001, Australia (jtaylor@museum.vic.gov.au)

Abstract

Taylor, J. 2006. A new species of *Leongathus* from the Tasman Sea collected during the 2003 NORFANZ Expedition (Crustacea: Amphipoda: Phoxocephalidae). *Memoirs of Museum Victoria* 63(2): 207–213.

Leongathus Barnard & Drummond, 1978 is rediagnosed and a new species *Leongathus alannah* sp. nov. described from the Tasman Sea, collected by the 2003 NORFANZ Expedition. A discussion of the problematic placement of the new species is included in light of the new species exhibiting a combination of characters from Leongathinae and Harpiniinae.

Keywords

Amphipoda, Phoxocephalidae, Harpiniinae, Leongathinae, *Harpinia*, *Proharpinia*, *Leongathus*, NORFANZ, Tasman Sea.

Introduction

A new species of phoxocephalid amphipod was discovered from 700–800 m depth in the Tasman Sea by the 2003 NORFANZ Expedition. The subfamily and generic placement of this species is unclear. It agrees with the diagnosis of the Harpiniinae Barnard and Drummond, 1978, in possessing article 2 of pereopod 5 of narrow form (3 times as long as broad), a state unique to that subfamily. On the other hand, it bears a partly tritritive molar as uniquely seen in the monotypic Leongathinae, *Leongathus nootoo* Barnard and Drummond, 1978. Using Barnard and Karaman's (1991) key to Harpiniinae, the new species keys closest to the genus *Proharpinia* Schellenberg, 1931 based on the presence of eyes, non-ensiform antenna 2, thin article 4 of pereopod 6, ovate propodus of gnathopods and presence of spines on rami of uropod 2. However, the new species differs from species belonging to *Proharpinia* by the presence of setae on the inner plate of maxilla 1, the unreduced flagellum of antenna 2, the presence of setae on epimeron 1–3, the presence of apical nails on rami of uropods and partly tritritive molar. The new species differs from the subfamily diagnosis of Leongathinae only in the presence of the narrow article 2 of pereopod 5, the harpiniin synapomorphy. It shares many characters with the monotypic *Leongathus* including the proximal confinement of the ventral setae of antenna 1 article 2, dissimilar gnathopods (gnathopod 2 enlarged) and the cryptic carpus of gnathopod 2.

This species is an example of an increasing number of new species of Phoxocephalidae that do not comply with described genera (Taylor and Poore, 2001). The problem has been overcome in the past by the publication of new genera that

bear little in the way of new or advanced characters but rather a recombination of known traits. As a result, approximately half of all phoxocephalid genera are monotypic. For example, *Linca* Alonso de Pina, 1993 was erected based on a single specimen from the Argentine continental shelf and although showing some convergence with the Brolginae, its similarity to *Birubius* Barnard and Drummond, 1978 best placed it in the Birubiinae. A preliminary cladistic analysis of the Phoxocephalidae does not support the monophyly of existing subfamilies and highlights the incongruity between the phylogeny and the current generic level classification (Taylor, 2003). Many species have been given generic or subfamily status because of the few unusual traits they exhibit resulting in numerous paraphyletic taxa remaining.

Results of the preliminary cladistic analysis by Taylor, (2003) identified only one strict synapomorphy (pereopod 5 basis of narrow form) defining a clade that includes all genera of the Harpiniinae. Although further phylogenetic work that includes all species of this subfamily may indicate otherwise, results indicate that there is no cladistic support for any of the nine genera of Harpiniinae and only one, *Harpinia* can be diagnosed.

The options for the new species, described here, are: to erect a new genus of uncertain subfamily affinities on the basis of a new combination of characters (ignoring potential synapomorphies with existing genera); place it in Harpiniinae (*Proharpinia* or *Harpinia* Boeck, 1876) on the basis of shared pereopod 5; or, place it in the same genus as *Leongathus nootoo* on the basis of shared partly tritritive molar and the other characters given above. In the absence of convincing evidence one way or the other, the last strategy is followed and *Leongathus* is rediagnosed.

Abbreviations are: A, antenna; H, head; MD, mandible; MX, maxilla; MP, maxilliped; GN, gnathopod; P, pereopod; EP, epimera; C, coxa; U, uropod; T, telson; r, right; tl., total length; NMV, Museum Victoria, Melbourne; AM, Australian Museum, Sydney, where material is lodged. All dissections and illustrations follow the methods of Barnard and Drummond, 1978 whereby the left side of the animal is illustrated unless otherwise stated. Descriptions of the new species closely follow that of other species described in Barnard and Drummond (1978). Original illustrations were scanned and inked using Adobe Illustrator following the methods of Coleman, 2003.

Leongathus Barnard and Drummond

Leongathus Barnard and Drummond, 1978: 532. – Barnard and Karaman, 1991: 617.

Type species. Leongathus nootoo Barnard and Drummond, 1978 (by original designation).

Diagnosis. Rostrum unstricted. Eyes present, weak or absent. Antenna 1 peduncular article 2 of medium length, ventral setae confined proximally. Antenna 2 peduncular article 1 not or scarcely ensiform, article 3 with 2 facial setules, facial robust setae on article 4 in 1 main row, all robust setae thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, denticulate, molar partly tritritative, with 7+ large teeth; palpal hump medium, apex of palp article 3 oblique. Maxilla 1 inner plate with 4–5 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail not distinct.

Gnathopods dissimilar, gnathopod 2 strongly enlarged, carpus of gnathopod 1 of ordinary length, free, of gnathopod 2 short, cryptic (posterior margin concealed by the abutment of propodus and merus), palms oblique, gnathopods 1–2 propodus respectively thin and broadened, poorly setiferous anteriorly. Pereopods 3–4 carpus without posteroproximal robust setae, propodus with mostly thin armaments. Pereopod 5 basis of narrow form or broad form (basis equal to or greater than twice width of ischium), but tapering distally, pereopods 5–6 merus-carpus medium to narrow; pereopod 7 unreduced, article 3 not enlarged, dactyl well developed.

Epimera 1–2 with or without long facial brushes of setae, with or without posterior setae, epimeron 3 bearing long setae. Urosomite 3 without dorsal hook. Uropod 1 peduncle without inter-ramal robust setae, without major displaced robust seta (seta that is shifted onto the apical margin disjunctly from the true inner margin), uropods 1–2 rami not continuously setose to apex, without subapical robust setae or nails, uropod 1 inner ramus with 1 row of marginal robust setae. Uropod 2 inner ramus ordinary. Uropod 3 ordinary, outer ramus longer than peduncle, bearing a 2nd article on outer ramus (minute in *L. alannah*), with 2 long apical setae. Telson ordinary.

Remarks. To accommodate the new species the diagnosis of Barnard and Karaman (1991) has been expanded to include the traits eyes present; antenna 2 peduncular article 1 not ensiform; right lacinia mobilis flabellate, denticulate; maxilla 1 inner

plate with 4–5 setae; pereopod 5 basis of narrow form or broad form; pereopods 5–6 merus-carpus medium to narrow; epimera 1–2 with or without long facial brushes of setae, with or without posterior setae.

Leongathus alannah sp. nov

Figures 1–4

Material examined. Holotype: Australia, Tasman Sea, West Norfolk Ridge, Wanganella Bank (32°36.29'S, 167°43.59'E), 707 m, beam trawl, P.B. Berents, 29 May 2003 (stn TAN0308/107), AM P68013 (female, tl. 20 mm).

Paratypes: Type locality, AM P73354 (1 female, tl. 16 mm). Australia, Tasman Sea, North Norfolk Ridge, (28°51.13'S, 167°42.32'E), 812 m, beam trawl, D.J. Bray, 15 May 2003 (stn TAN0308/029) NMV J53346 (2 females, tl. 13–14 mm). Tasman Sea, North Norfolk Ridge, (32°36.18'S, 167°47.26'E), 1029 m, beam trawl, P.B. Berents, 29 May 2003 (stn TAN0308/111), AM P66426 (female, tl. 18 mm).

Description. Female. Eyes present. Rostrum unstricted, exceeding apex of peduncular article 1 on antenna 1. Antenna 1 peduncular article 1 about 1.5 times as long as wide, about 2.1 times as wide as peduncular article 2, ventral margin with 4 setae, dorsal apex with 3 setae; peduncular article 2 about 0.5 times as long as peduncular article 1, with 13 ventral and 3 apical setae; primary flagellum with 16 articles, about 0.8 times as long as peduncle; accessory flagellum with 12 articles. Antenna 2 not ensiform, peduncular article 4 with 11 robust setae in 1 apical row, dorsal margin with 2 notches each bearing 1 robust seta and simple setae, ventral margin with 19 long setae, 3 long ventrodistal robust seta; peduncular article 5 about 0.8 times as long as peduncular article 4, with 7 facial robust seta, dorsal margin with 4 setae, ventral margin with 15 long setae; flagellum 1.1 times as long as peduncular articles 4–5 combined, with 16 articles. Mandible, molar partly tritritative, bearing 13 large teeth; right incisor with 3 teeth; left incisor with 3 humps in 2 branches; right lacinia mobilis bifid, distal branch shorter than proximal, flabellate, denticulate, proximal branch simple; left lacinia mobilis with 5 teeth; right raker 10; left rakers 11; molars composed of elongate lamina in form of cone bearing 14 cusps and 2 short plusetae weakly disjunct, molars covered with fine setae; palp article 1 short, article 2 with 10 medium inner apical setae, 6 outer setae and 4 facial setae, article 3 about 1.1 times as long as article 2, apex oblique with 19 robust-slender setae, with 6 basofacial setae. Maxilla 1 inner plate bearing 2 long apical pluseta, 3 apicolateral much shorter seta; palp article 2 with 18 marginal robust setae. Maxilla 2 plates extending equally, outer slightly broader than inner, setation of inner and outer plate as illustrated. Maxilliped inner plates with 2 large thick apical robust setae, 6 apicofacial setae; outer plate large with 12 medial and apical robust setae, 13 apical and lateral setae; palp article 1 lacking apicolateral setae, article 2 with 3 apicolateral setae, medial margin of article 2 strongly setose, article 3 protuberant, with 12 facial setae, 5 lateral setae, nail of article 4 obsolescent, with 2 accessory setules. Coxa 1 slightly expanded distally; main ventral setae of coxae 1–4=21–25–18–43, posteriormost seta of coxae 1–3 shortened; anterior and posterior margins of coxa 4 divergent, posterodorsal corner rounded, posterodorsal margin short,

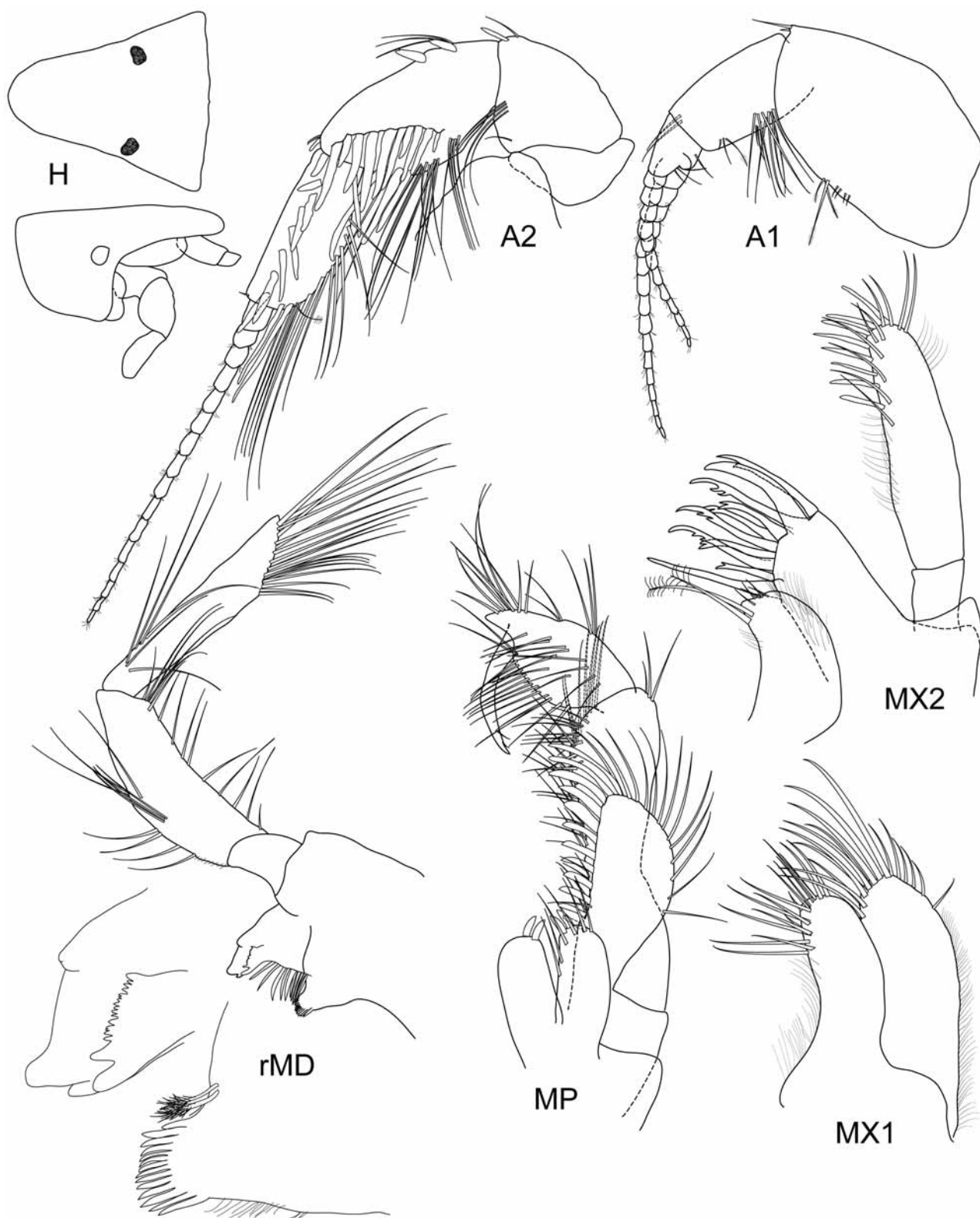


Figure 1. *Leongathus alannah* sp. nov., female, holotype, tl. 20.0 mm.

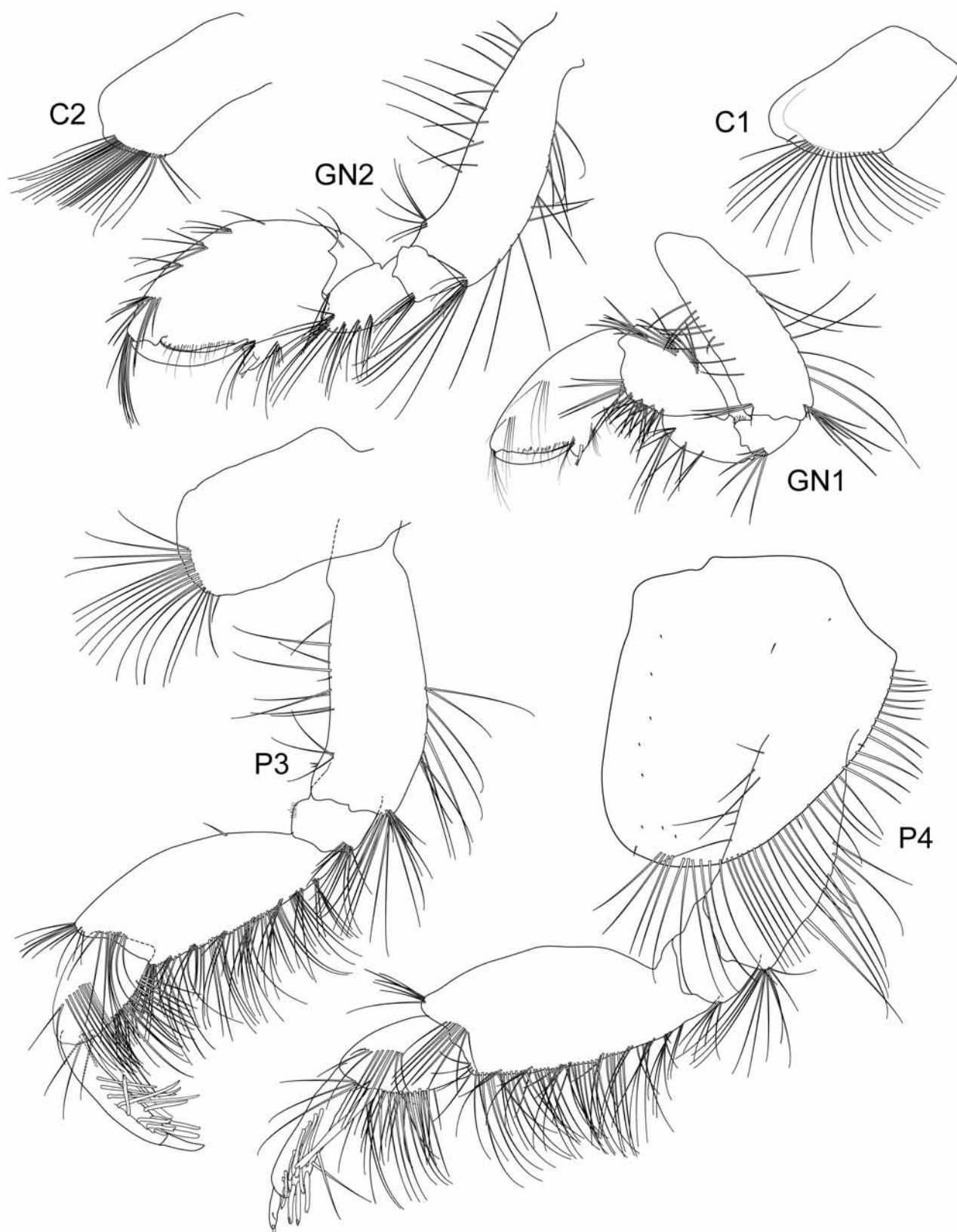


Figure 2. *Leongathus alannah* sp. nov., female, holotype, tl. 20.0 mm.

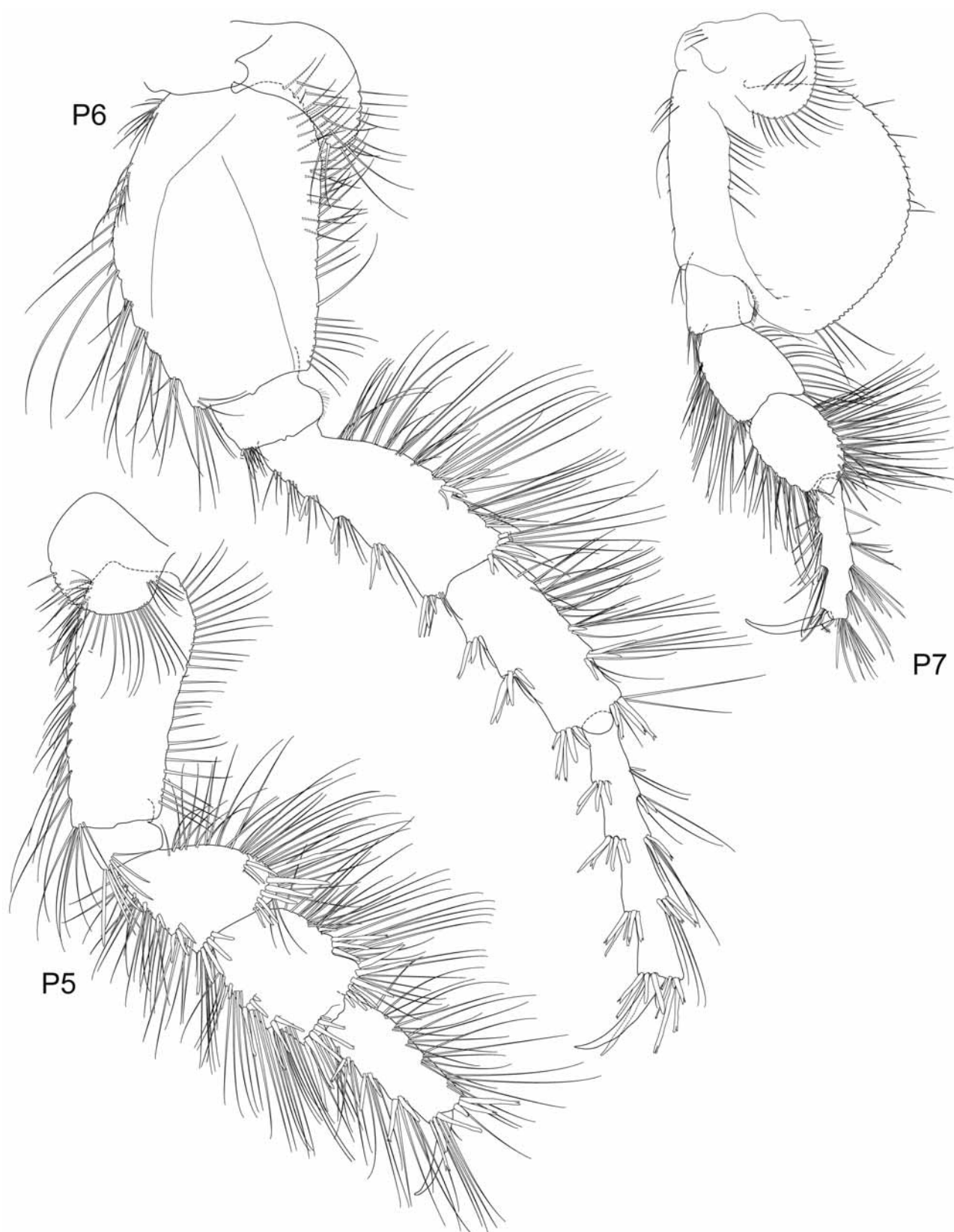


Figure 3. *Leongathus alannah* sp. nov., female, holotype, tl. 20.0 mm.

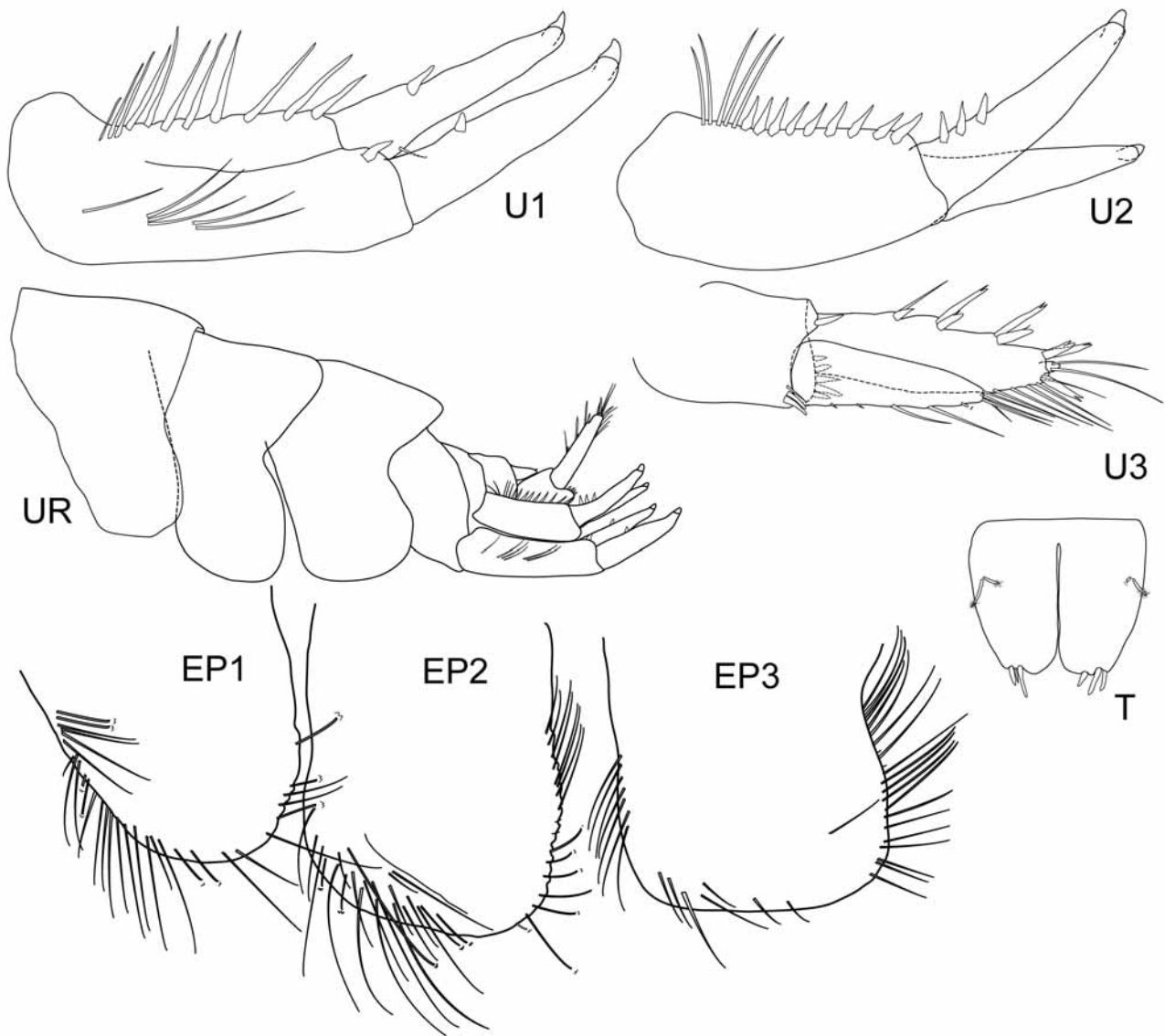


Figure 4. *Leongathus alannah* sp. nov., female, holotype, tl. 20.0 mm.

width-length ratio of coxa 4 almost = 5:6. Long posterior setae on basis of gnathopods 1–2 and pereopods 3–4 = 17–19–21–16, short posteriors = 2–0–3–2, long anteriors = 12–20–12–6, short anteriors = 1–0–2–0.

Gnathopod 1 carpus free, gnathopod 2 enlarged, carpus cryptic. Width ratios of carpus-propodus on gnathopods 1–2 = 9:11 and 8:19, length ratios = 17:23 and 1:5; palmar humps ordinary, palms oblique. Pereopods 3–4 similar, facial setae on merus = 9 and 9, on carpus = 10 and 10; main spine of carpus extending to M. 77 and M. 95, carpus lacking proximoposterior robust setae; robust setae formula of propodus = 8+4 and 9+9; acclivity on inner margin of dactyls of pereopods 3–4 weak,

obsolescent, emergent setule short, midfacial pluseta ordinary. Coxae 5–7 posteroventral setae formula = 23–13–21; merus-carpus of pereopod 5 medium of pereopod 6 narrow, facial robust setae rows sparse, facial ridge formula on basis of pereopods 5–7 = 0–1–1, anterior ridge of pereopod 7 long; width ratios of basis, merus, carpus, propodus of pereopod 5 = 2:2:2:1, of pereopod 6 = 19:10:8:4, of pereopod 7 = 35:12:11:5, length ratios of pereopod 5 = 15:6:6:8, of pereopod 6 = 18:22:19:22, of pereopod 7 = 37:14:14:5; basis of pereopod 7 barely exceeding apex of merus, with row of 9 facial setae along facial ridge, with ventral setae. Pleopods 1–3 with 2 coupling hooks; articles on outer rami = 24–22–24; articles on inner rami = 16–17–17.

Epimeron 1 posteroventral corner rounded, anteroventral margin with 26 medium setae, posterior margin with 12 setae; epimeron 2 posteroventral corner rounded, with 3 rows of 5–7 anteroventral setae, posterior margin with 12 setae; epimeron 3 posteroventral corner rounded, ventral margin with 6 setae, posterior margin with 18 setae. Urosomite 1 naked; urosomite 3 without dorsal hook. Uropods 1–2 rami with distinct apical nails, uropod 1 outer ramus with 3 dorsal robust setae, inner without robust setae, uropod 2 outer and inner rami with 1 dorsomedial robust seta; uropod 1 peduncle with 11 apicolateral robust setae, with 3 sets of 1–3 basofacial slender setae, without apical enlarged robust seta; uropod 2 peduncle with 9 dorsal robust setae and 5 slender setae; apicolateral corners of peduncles on uropods 1–2 without comb. Uropod 3 unreduced, outer ramus longer than peduncle. Uropod 3 peduncle with 5 ventral robust setae, dorsally with 1 lateral robust seta; rami feminine, inner extending to M. 80 on article 1 of outer ramus, apex with 1 seta, medial margin with 4 slender setae, lateral margin naked, article 2 of outer ramus very short, 0.05, bearing 2 long setae, apicomedial margin of article 1 with 4 slender setae, lateral margin with 4 acclivities, robust setal formula = 1–2–2–2, slender setae formula = 1–0–0–0. Telson length-width ratio = 17:19, almost fully cleft, each apex wide, rounded, lateral acclivity broad, shallow, bearing 3 robust setae, midlateral setules diverse.

Adult male. Unknown.

Distribution. Australia, Tasman Sea, Norfolk Ridge; 707–812 m depth.

Etymology. Named for my daughter Alannah Taylor with whom I was pregnant whilst preparing illustrations.

Remarks. The following variations from the holotype were observed in the paratypes. The main ventral setae of coxae 1–4 = (20–21)–(21–25)–(18–22)–(42–46). Uropod 1 outer ramus

with 3–5 dorsal robust setae, inner ramus 0–3 dorsal robust setae. Uropod 2 outer ramus with 1–6 dorsal robust setae, inner ramus with 1 or without dorsal robust setae.

Acknowledgements

Thanks to Gary Poore for reading and suggesting improvements to the manuscript and encouraging me to take time-out from isopods to complete this paper. I am grateful to the Australian Museum for the loan of material. Thanks to Anna McCallum for assistance with illustrations and direction in Adobe Illustrator.

References

- Alonso de Pina, G. M. 1993. *Linca pinata*, a new phoxocephalid genus and species (Crustacea: Amphipoda) from the Argentine continental shelf. *Proceedings of the Biological Society of Washington* 106, 497–507.
- Barnard, J.L., and Drummond, M.M. 1978. Gammaridean Amphipoda of Australia, Part III: The Phoxocephalidae. *Smithsonian Contributions to Zoology* 245: 1–551.
- Barnard, J.L., and Karaman, G.S. 1991. The families and genera of marine gammaridean Amphipoda (except marine gammaroids). Parts 1 and 2. *Records of the Australian Museum, Supplement* 13: 1–866.
- Coleman, C.O. 2003. “Digital Inking”: How to make a perfect line drawing on computers. *Organisms, Diversity and Evolution*. 3, Electronic Supplement. 14: 1–14.
- Taylor, J. 2003. The impact of phylogenetic analysis on the existing classification of the Phoxocephalidae (Amphipoda). Unpublished PhD Thesis, Department of Zoology, The University of Melbourne. 263 pp.
- Taylor, J., and Poore, G. C. B. 2001. Descriptions of new species of *Birubius* (Amphipoda: Phoxocephalidae) from Australia and Papua New Guinea with comments on the *Birubius-Kulgaphoxus-Tickalerus-Yan* complex. *Memoirs of the Museum of Victoria* 58(2): 255–295.