



## The family Opisidae (Crustacea: Amphipoda: Lysianassoidea) in Australasian waters

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### Abstract

The lysianassoid amphipod family Opisidae is reported from Australian waters for the first time. Five new species in three genera are described: *Normanion hipposideros* sp. nov., *N. whoi* sp. nov., *Podoprionella bulla* sp. nov., *Podoprionides akantha* sp. nov., *P. moonamoona* sp. nov.

**Key words:** Crustacea, Amphipoda, Opisidae, Australia, taxonomy, new species, *Normanion*, *Podoprionella*, *Podoprionides*

### Introduction

The Opisidae is a small family of four genera and 17 species known mainly from the North Pacific Ocean, North Atlantic Ocean and Mediterranean Sea. Only two species, *Podoprionides incerta* Walker, 1906 from the Antarctic and *Podoprionella dagadugaban* Lowry & Stoddart, 1995, from Papua New Guinea, have been reported previously outside these areas. In this paper we report opisids from Australia for the first time. Three of the four known genera are now recorded from the Australian and Papua New Guinean area.

The genus *Normanion* has previously been recorded from the eastern North Atlantic Ocean and the Mediterranean Sea. New records from south-eastern Australia and southern Papua New Guinea significantly extend the distribution of the genus and place it in the southern hemisphere for the first time. *Podoprionella* was also known only from the eastern North Atlantic Ocean and Mediterranean Sea until it was recorded recently from Papua New Guinea (Lowry & Stoddart 1995). In this paper we record it from Australia for the first time. The third genus, *Podoprionides*, was considered until now as an Antarctic endemic. We also record it from Australia for the first time. The only opisid genus not known from Australian waters is *Opisa*, which is widespread throughout the boreal North Atlantic and North Pacific (Hurley 1963; Lincoln 1979; Bousfield 1987).

It appears that members of the Opisidae are more widespread than previous records would indicate and are probably living throughout the Indo-Pacific area. However, records are relatively rare and the animals may be difficult to collect. During the intensive collecting program on the Great Barrier Reef in 2005 and 2006 (Lowry & Myers 2009) no opisids were collected, yet species are recorded from north and south of the Reef. Neither were any collected in the many baited traps of the SEAS project along the whole east coast of Australia (Lowry & Smith 2003).

Many opisids are regarded as epi-parasites of fish (Vader & Romppainen 1985; Bousfield 1987). The evidence for this is both direct and indirect. *Normanion amblyops* Sars, 1895, *N. quadrimanus* (Bate & Westwood, 1868), *N. sarsi* Diviacco & Vader, 1988, *Opisa eschrichtii* (Krøyer, 1842), *O. odontocheila* Bousfield, 1987 and *O. tridentata* Hurley, 1963, have all been recorded from living and dead fish skins. *Normanion abyssi* Chevreux, 1903 and *Podoprionella dagadugaban* were originally taken in baited traps. In

these cases it is likely that the amphipods were attracted to the smell of the fish in order to attach and not to scavenge, because opisids do not have the mouthpart structure of a scavenger. No other species of *Podoprionella* and no species of *Podoprionides* is a known associate of fish. *Podoprionides moonamoon* has been found repeatedly as an epibiont on ascidians. There could be two different lifestyles occurring in this family.

## Materials and methods

The descriptions were generated from a DELTA database (Dallwitz 2005) to the opisid species of the world. Material is lodged in the Australian Museum, Sydney (AM) and Museum Victoria, Melbourne (MV). Standard abbreviations on the plates are: A, antenna; C, coxa; E, epistome; EP, epimeron; G, gnathopod; H, head; IP, inner plate; l, left; MD, mandible; MP, maxilliped; MX, maxilla; P, pereopod; r, right; T, telson; U, uropod.

## Opisidae Lowry & Stoddart, 1995

The family diagnosis given by Lowry & Stoddart (1995: 139) should be corrected to: Mandible molar present or absent.

### *Normanion* Bonnier, 1893

**Remarks.** The genus has been revised by Kilgallen *et al.* (2006). Their generic diagnosis needs to be modified to: Gnathopod 1 subchelate or weakly chelate. This will accommodate *Normanion whoi*.

With the two new species described below the genus now contains seven species: *Normanion abyss* Chevreux, 1903; *N. amblyops* Sars, 1895; *N. chevreuxi* Diviacco & Vader, 1988; *N. hipposideros* **sp. nov.**; *N. quadrimanus* (Bate & Westwood, 1868); *N. ruffoi* Diviacco & Vader, 1988; *N. whoi* **sp. nov.**

### Key to species of *Normanion*

(modified from Kilgallen *et al.*, 2006)

1. Maxilliped palp 4-articulate, extending beyond tip of inner plate; gnathopod 1 propodus broader than long ..... 2
  - Maxilliped palp 3-articulate, reaching only to tip of inner plate; gnathopod 1 propodus subequal in length and breadth or slightly longer than broad ..... 5
2. Eyes present ..... 3
  - Eyes absent ..... *N. abyss*
3. Maxilliped palp extending beyond outer plate; gnathopod 2 carpus about 2 x length of propodus ..... *N. amblyops*
  - Maxilliped palp not extending beyond outer plate; gnathopod 2 carpus about 1.5 x length of propodus ..... 4
4. Some of maxilla 1 outer plate setal teeth with 2 rows of cusps; gnathopod 1 propodus not produced posterodistally, gnathopod subchelate ..... *N. hipposideros*
  - Maxilla 1 outer plate setal teeth with 1 row of cusps; gnathopod 1 propodus produced posterodistally, gnathopod weakly chelate ..... *N. whoi*
5. Gnathopod 1 propodus palm smooth and striated, not denticulate ..... 6
  - Gnathopod 1 propodus palm distinctly denticulate ..... *N. chevreuxi*
6. Uropod 3 rami subequal; telson entire ..... *N. ruffoi*
  - Uropod 3 rami distinctly unequal; telson slightly emarginate ..... *N. quadrimanus*

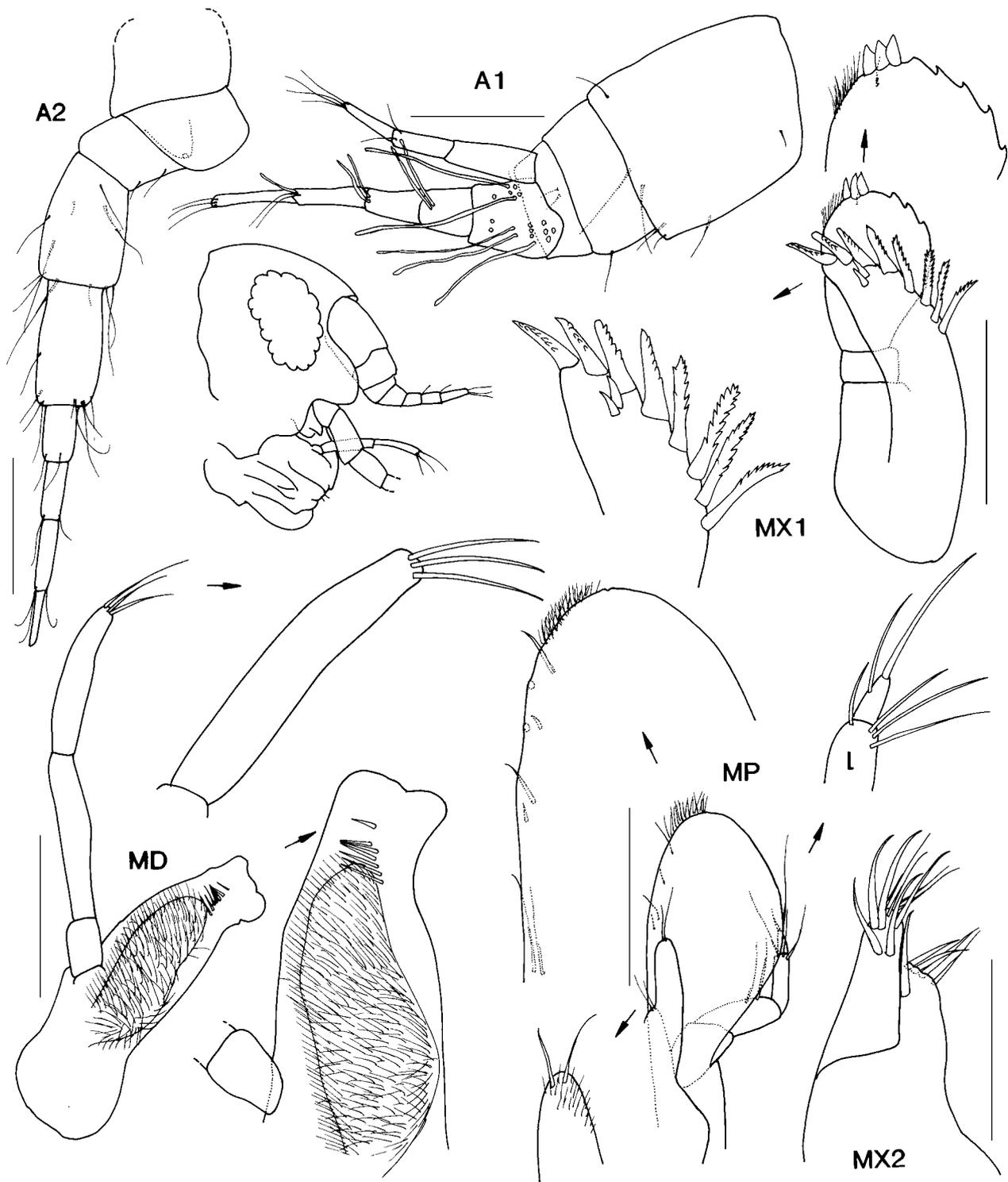
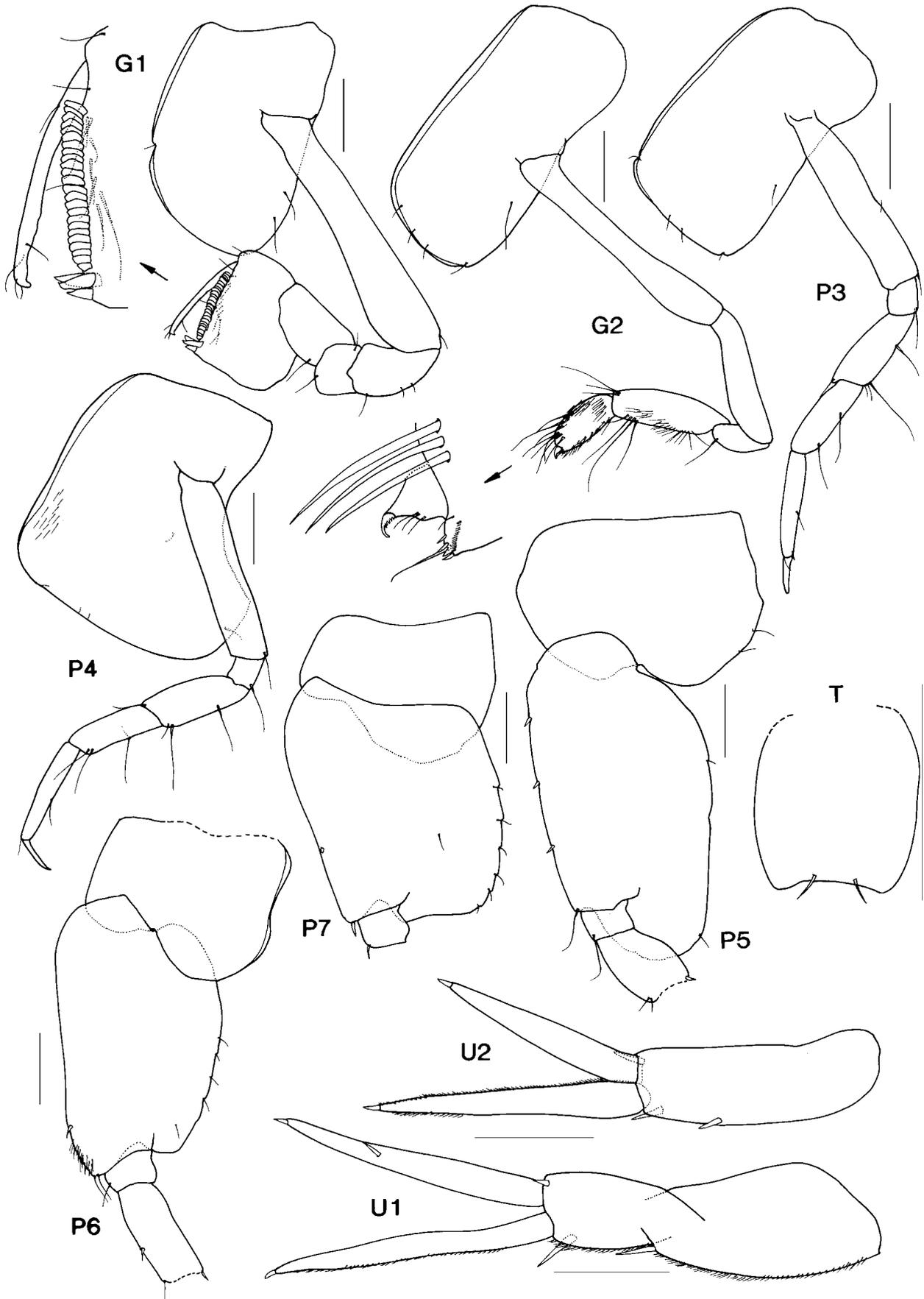


FIGURE 1. *Normanion hipposideros* sp. nov. Holotype female, AM P.69040. Scales represent 0.1 mm.

*Normanion hipposideros* sp. nov.  
(Figs 1, 2)

**Type material.** HOLOTYPE, female, 2.5 mm, AM P.69040, Horseshoe Reef, Horseshoe Reef, Bootless Inlet, Papua New Guinea, 9°30.5'S 147°15.5'E, 12–15 m, coral rubble from reef front slope, 29 October 1980, J.K. Lowry, stn PNG-32.



**FIGURE 2.** *Normanion hipposideros* sp. nov. Holotype female, AM P.69040. Scales represent 0.1 mm.

**Type locality.** Horseshoe Reef, Bootless Inlet, Papua New Guinea, 9°30.5'S 147°15.5'E, 12–15 m depth.

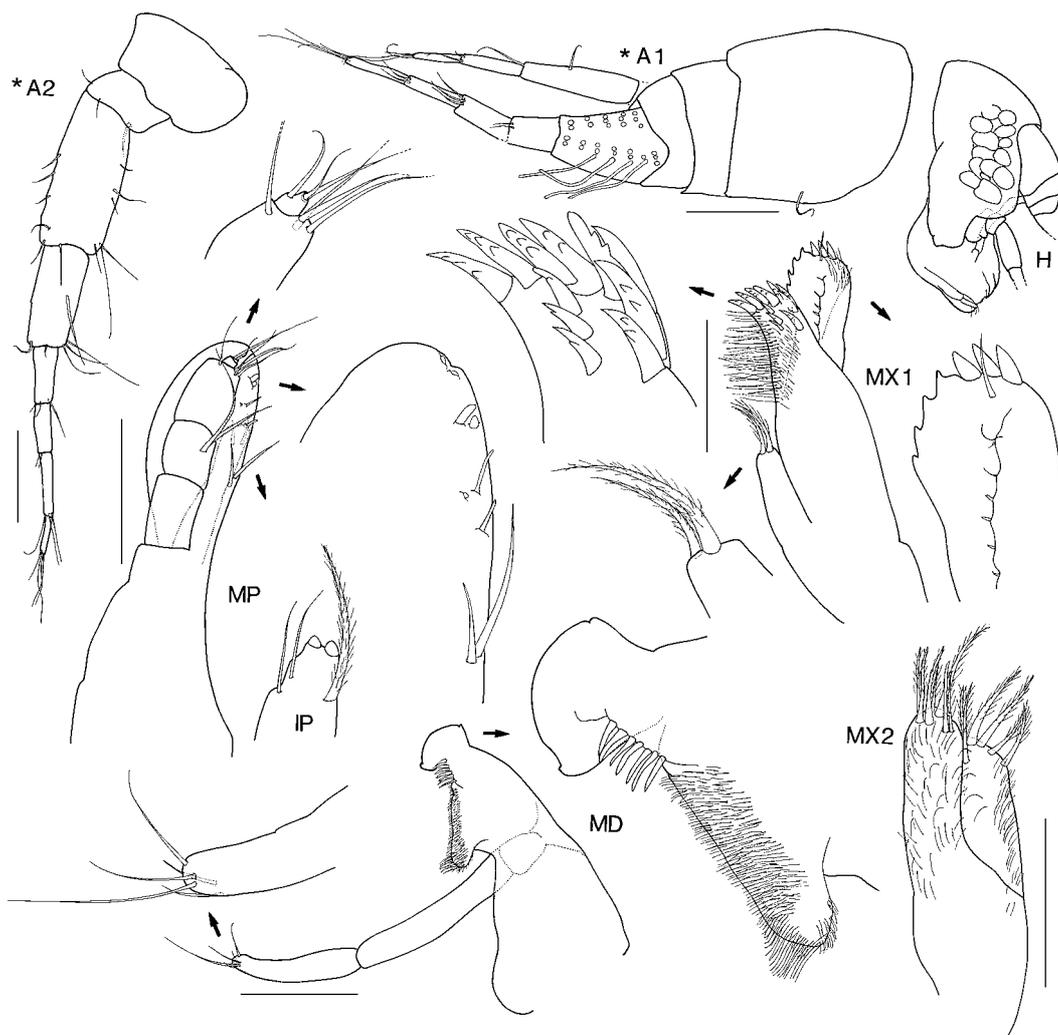
**Etymology.** The species name is the Greek word for a horseshoe, a reference to the type locality.

**Diagnostic description.** *Antenna 1* callynophore present. *Eyes* present. *Mouthpart bundle* subconical. *Mandible* left and right incisor with slightly convex margin, smooth; lacinia mobilis absent; molar present, setose; palp attached proximally, articles 2 and 3 subequal. *Maxilla 1* outer plate with 10 setal teeth in an 8/2 crown arrangement, some of outer row with cusps in 2 rows; palp apical margin serrate, with apical robust setae. *Maxilliped* palp 4-articulate, article 4 vestigial. *Gnathopod 1* subchelate; ischium long; carpus posterior margin not produced, curved; propodus subquadrate, proximal margin produced into strong posteroproximal lobe, palm serrate, posterodistal corner not produced, with 3 robust setae. *Gnathopod 2* minutely chelate; carpus longer than propodus (about 1.5x); palm obtuse. *Pereopod 4* coxa posteroproximal excavation large. *Pereopods 5–7* basis with smooth posterior margin; [dactylus not known]. *Epimeron 3* posterior margin smooth, posteroventral corner broadly rounded. [*Uropod 3* unknown.] *Telson* about as long as broad, entire, distally emarginate, without dorsal robust setae.

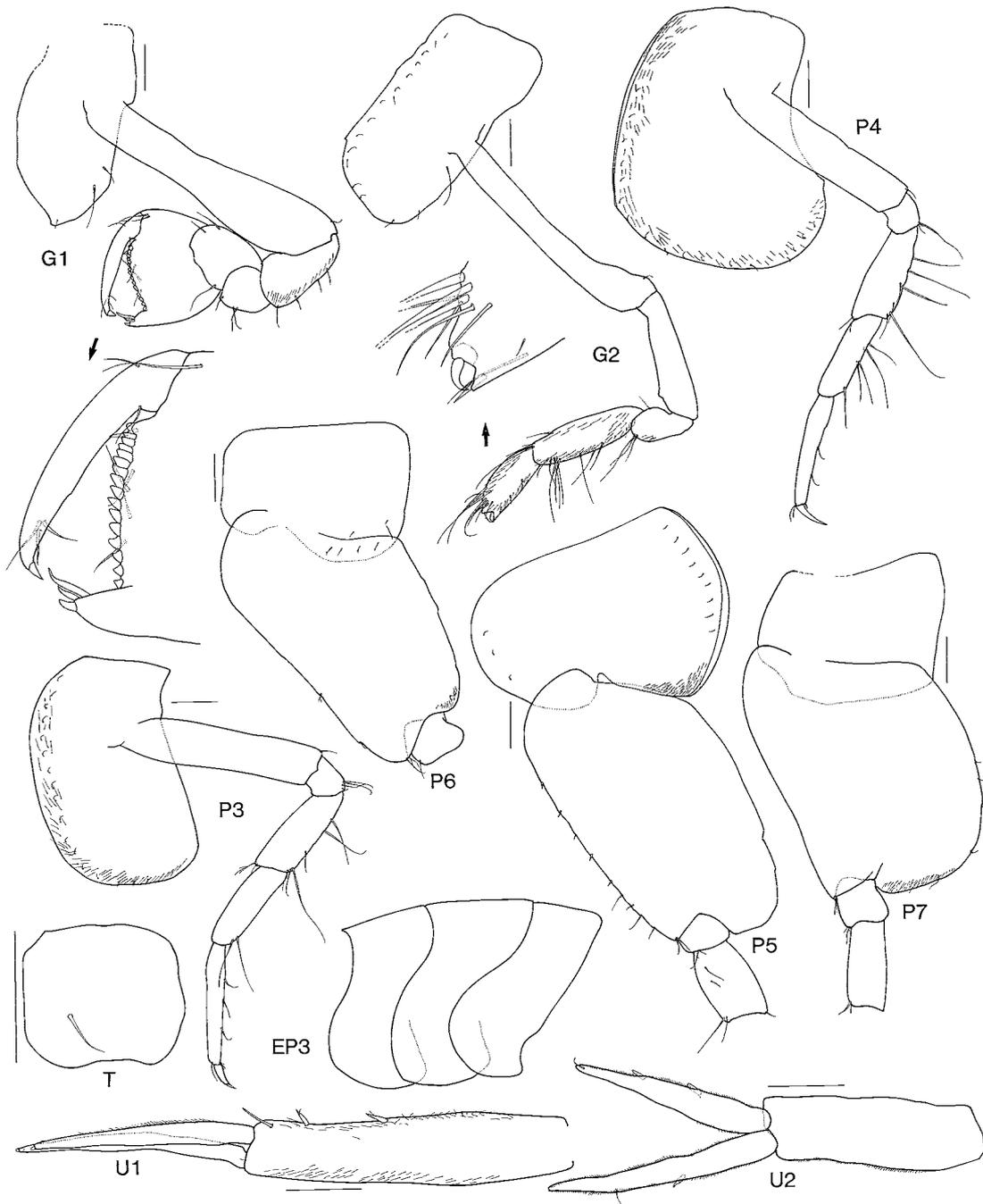
**Male** not known.

**Remarks.** Unfortunately the specimen lacks the distal articles of pereopods 5–7 and uropod 3. *Normanion hipposideros* has the unusual character of having two rows of cusps on some of the outer row of setal teeth on the maxilla 1 outer plate, a character which also occurs in *Podoprionella dagadugaban* Lowry & Stoddart, 1995. Although the status of uropod 3 is not known for *N. hipposideros* the presence of a large setose molar excludes the species from the genus *Podoprionella*. See also remarks under *N. whoi*.

**Distribution.** Southern Papua New Guinea; 12–15 m depth.



**FIGURE 3.** *Normanion whoi* sp. nov. Holotype female, MV J61508. \*A1, A2 paratype female, AM P.81162. Scales represent 0.1 mm.



**FIGURE 4.** *Normanion whoi* sp. nov. Holotype female, MV 61508. Scales represent 0.1 mm.

***Normanion whoi* sp. nov.**

(Figs 3, 4)

**Type material.** HOLOTYPE, female, 3.2 mm, MV J61508, south of Point Hicks, Victoria, Australia, 38°17.70'S 149°11.30'E, 400 m, coarse sand, gravel and mud with many sponges, WHOI epibenthic sled, 24 July 1986, M.F. Gomon *et al.*, RV *Franklin*, stn SLOPE 40. PARATYPES: 1 female, MV J14615 and 2 females, AM P.81162, same data as holotype; 1 female, MV J61509, off Freycinet Peninsula, Tasmania, Australia, 41°58.60'S 148°38.80'E, 500 m, coarse shell, WHOI epibenthic sled, 27 July 1986, M.F. Gomon *et al.*, RV *Franklin*, stn SLOPE 47.

**Type locality.** South of Point Hicks, Victoria, Australia, 38°17.70'S 149°11.30'E, 400 m depth.

**Etymology.** The species is named for the epibenthic sled, WHOI, developed at the Woods Hole Oceanographic Institute, Massachusetts, USA.

**Diagnostic description.** *Antenna 1* callynophore present. *Eyes* present. *Mouthpart bundle* subconical. *Mandible* left incisor with strongly convex margin, smooth, right with slightly convex margin, smooth; lacinia mobilis absent; molar present, setose; palp attached midway, article 2 longer than article 3. *Maxilla 1* outer plate with 11 setal teeth in an 8/3 crown arrangement, outer row with cusps in 1 row; palp apical margin serrate, with apical robust setae. *Maxilliped* palp 4-articulate, article 4 vestigial. *Gnathopod 1* weakly chelate; ischium long; carpus posterior margin not produced, curved; propodus subovate, proximal margin produced into strong posteroproximal lobe, palm serrate, posterodistal corner produced into a short acute spine with 3 robust setae. *Gnathopod 2* minutely chelate; carpus longer than propodus (about 1.5x); palm obtuse. *Pereopod 4* coxa posteroproximal excavation large. *Pereopods 5–7* basis with smooth posterior margin; [dactylus not known]. *Epimeron 3* posterior margin smooth, posteroventral corner broadly rounded. [*Uropod 3* unknown.] *Telson* about as long as broad, entire, distally emarginate, without dorsal robust setae.

**Male** not known.

**Remarks.** Unfortunately all specimens lack the distal articles of pereopods 5–7 and uropod 3. *Normanion whoi* is similar to *N. amblyops*, *N. abyssi* and *N. hipposideros* in having a vestigial article 4 on the maxillipedal palp. It differs from *N. amblyops* and *N. abyssi* in its strongly serrate gnathopod 1 palm and from *N. hipposideros* in having 11 setal teeth on maxilla 1 outer plate, each with only one set of cusps, and a weakly chelate gnathopod 1.

It is interesting to note that the female MV J14615 has the right gnathopod 1 extended and rotated between merus and carpus so that the propodus is inverted as in species of *Trischizostoma* which are parasitic on fishes. The left gnathopod 1 is tucked in under the coxae and is not inverted.

**Distribution.** South-eastern Australia; 400–500 m depth.

### ***Podoprionella* Sars, 1895**

The genus now contains four species: *Podoprionella bulla* **sp. nov.**; *P. dagadugaban* Lowry & Stoddart, 1995; *P. fissicaudata* Ledoyer, 1977 and *P. norvegica* Sars, 1895. The new species described here is the second record of the genus in the southern hemisphere.

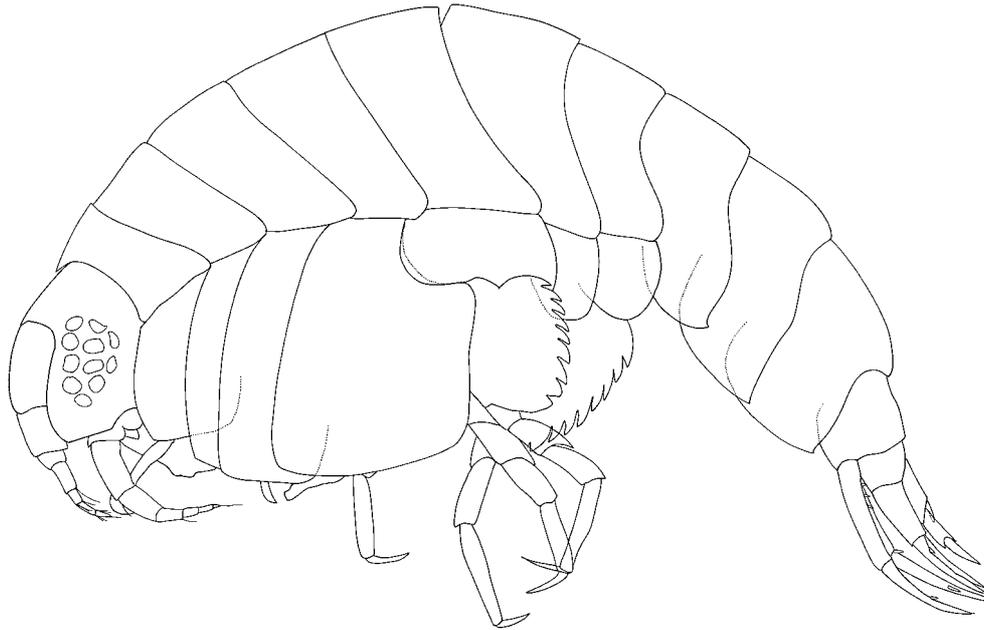
### **Key to species of *Podoprionella***

1. Gnathopod 1 chelate, propodus subrectangular, palm smooth; uropod 3 inner ramus at least half as long as outer ramus ..... 2
- Gnathopod 1 subchelate, palm almost transverse, propodus subquadrate, palm serrate; uropod 3 inner ramus vestigial ..... 3
2. Mandibular palp articles 2 and 3 subequal; telson distally incised ..... *P. fissicaudata*
- Mandibular palp article 2 much longer than article 3; telson entire ..... *P. norvegica*
3. Maxilla 1 outer plate setal teeth of outer row with 2 rows of cusps; gnathopod 1 propodus posterodistal corner produced into an acute spine ..... *P. dagadugaban*
- Maxilla 1 outer plate setal teeth of outer row with 1 row of cusps; gnathopod 1 propodus posterodistal corner produced into a blunt, distally expanded knob-like spine ..... *P. bulla*

### ***Podoprionella bulla* sp. nov.**

(Figs 5–7)

**Type material.** HOLOTYPE, female, 2.2 mm, MV J61510, off Eden, New South Wales, Australia, 37°0.60'S 150°20.70'E, 363 m, coarse shell, epibenthic sled, 21 July 1986, G.C.B. Poore *et al.*, RV *Franklin*, stn SLOPE 22.



**FIGURE 5.** *Podoprionella bulla* sp. nov. Holotype female, MV J61510.

**Type locality.** Off Eden, New South Wales, Australia, 37°0.60'S 150°20.70'E, 363 m depth.

**Etymology.** The species name is from the Latin word for a knob, referring to the irregular spine on the palm of gnathopod 1.

**Diagnostic description.** *Antenna 1* callynophore absent. *Eyes* present. *Mouthpart bundle* subconical. *Mandible* left incisor with straight margin, smooth, right with slightly convex margin, smooth; lacinia mobilis absent; molar absent; palp attached proximally, article 2 longer than article 3. *Maxilla 1* outer plate with 7 setal teeth in a 6/1 crown arrangement, outer row with cusps in 1 row; palp apical margin not serrate, without apical setae. *Maxilliped* palp 3-articulate. *Gnathopod 1* subchelate; ischium short; carpus posterior margin produced into broad triangular lobe; propodus subquadrate, proximal margin transverse, palm serrate, posterodistal corner produced into blunt, distally expanded spine, without robust setae. *Gnathopod 2* minutely chelate; carpus much longer than propodus (about 2x); palm obtuse. *Pereopod 4* coxa posteroproximal excavation small. *Pereopods 5–7* basis with strongly serrate posterior margin; dactylus short, slender. *Epimeron 3* posterior margin smooth, posteroventral corner acute. *Uropod 3* peduncle subequal to outer ramus, with large distoventral spur; inner ramus vestigial; outer ramus 2-articulate; rami without robust setae, without plumose setae. *Telson* about as long as broad, entire, distally tapered, without dorsal robust setae.

**Male** not known.

**Remarks.** *Podoprionella bulla* is very similar to *P. dagadugaban* but differs in having no callynophore on antenna 1, only one set of cusps on the setal teeth of maxilla 1 outer plate, an irregular blunt spine on the posterodistal corner of gnathopod 1 propodus, no serrations on the inner margin of gnathopod 1 dactylus and a much deeper posterior lobe on the coxa of pereopods 5 and 6. Both species differ from the northern hemisphere *P. fissicaudata* and *P. norvegica* in having only two robust setae in the mandible accessory setal row, a transverse serrate palm on gnathopod 1 and a vestigial inner ramus on uropod 3.

**Distribution.** South-eastern Australia; 363 m depth.

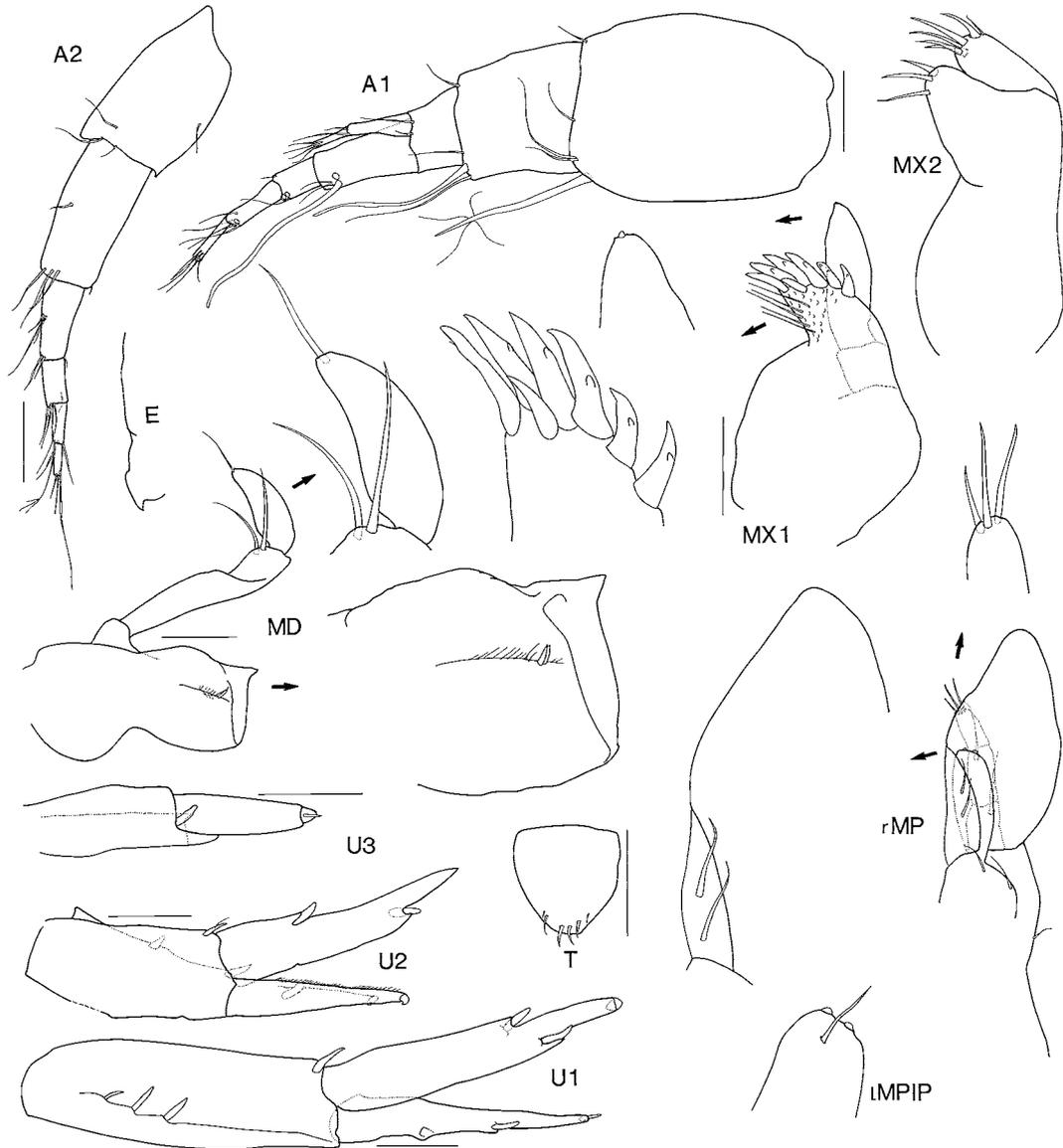


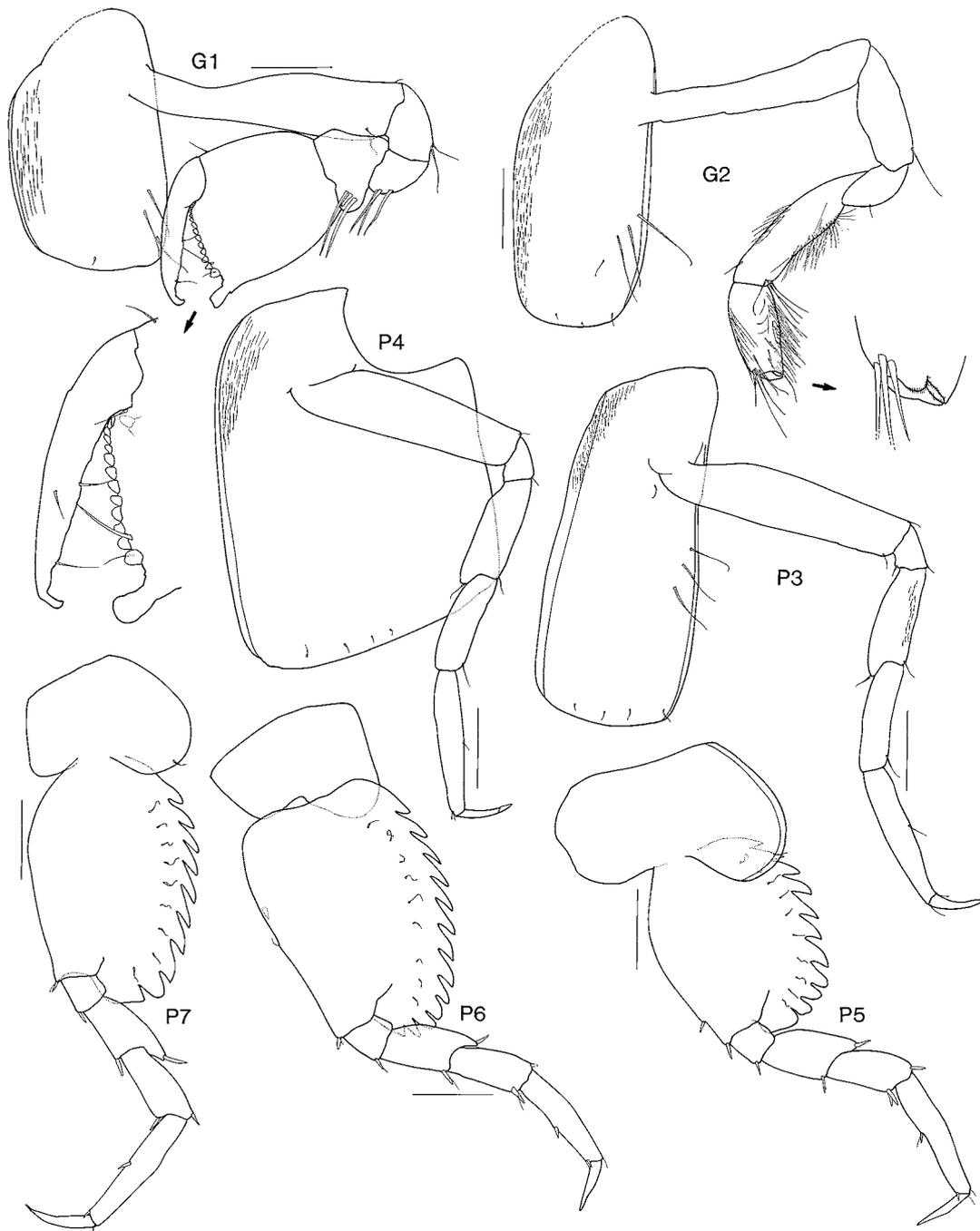
FIGURE 6. *Podoprionella bulla* sp. nov. Holotype female, MV J61510. Scales represent 0.05 mm.

***Podoprionides* Walker, 1906**

After more than 100 years of monotypy the genus now contains three species: *Podoprionides akantha* sp. nov.; *P. incerta* Walker, 1906 and *P. moonamoona* sp. nov.

**Key to species of *Podoprionides***

- 1. Gnathopod 1 carpus posterior margin produced into a broad triangular lobe; epimeron 3 posteroventral corner quadrate; uropod 3 peduncle subequal to rami ..... *P. moonamoona*
- Gnathopod 1 carpus posterior margin curved, not produced into a lobe; epimeron 3 posteroventral corner rounded; uropod 3 peduncle shorter than rami ..... 2
- 2. Maxilla 1 palp apically serrate, without robust setae; telson deeply cleft (about 80%) ..... *P. incerta*
- Maxilla 1 palp not apically serrate, with small robust setae; telson moderately cleft (about 62%) ..... *P. akantha*



**FIGURE 7.** *Podoprionella bulla* sp. nov. Holotype female, MV J61510. Scales represent 0.1 mm.

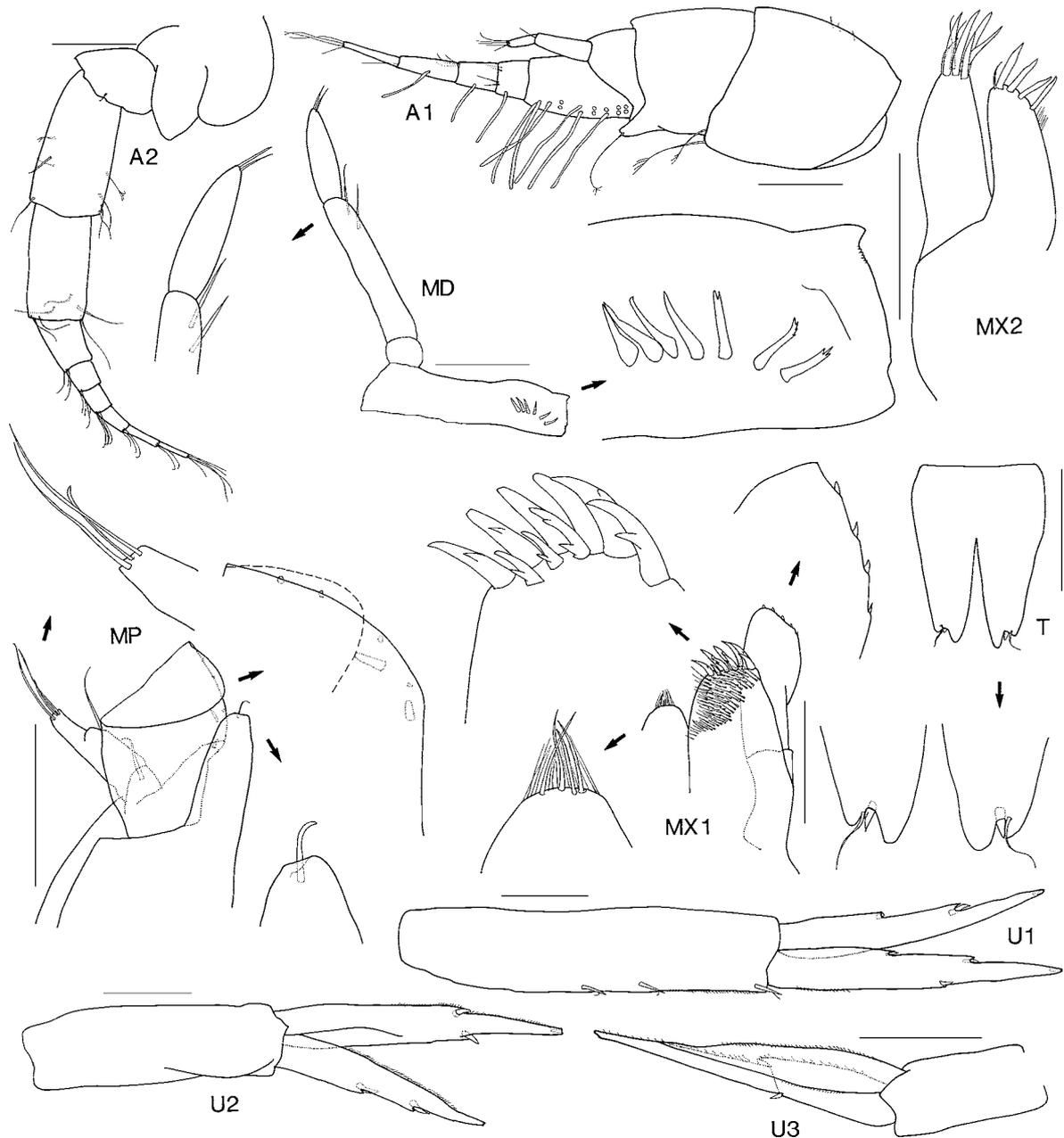
***Podoprionides akantha* sp. nov.**

(Figs 8, 9)

**Type material.** HOLOTYPE, female, 4.2 mm, MV J61511, south of Point Hicks, Victoria, Australia, 38°21.90'S 149°20.00'E, 1000 m, epibenthic sled, 23 July 1986, G.C.B. Poore *et al.*, RV *Franklin*, stn SLOPE 32.

**Type locality.** South of Point Hicks, Victoria, Australia, 38°21.90'S 149°20.00'E, 1000 m depth.

**Etymology.** The species name is a Greek word for a thorn, referring to the small, thorn-like robust setae on the maxilla 1 palp.



**FIGURE 8.** *Podoprionides akantha* sp. nov. Holotype female, MV J61511. Scales represent 0.1 mm.

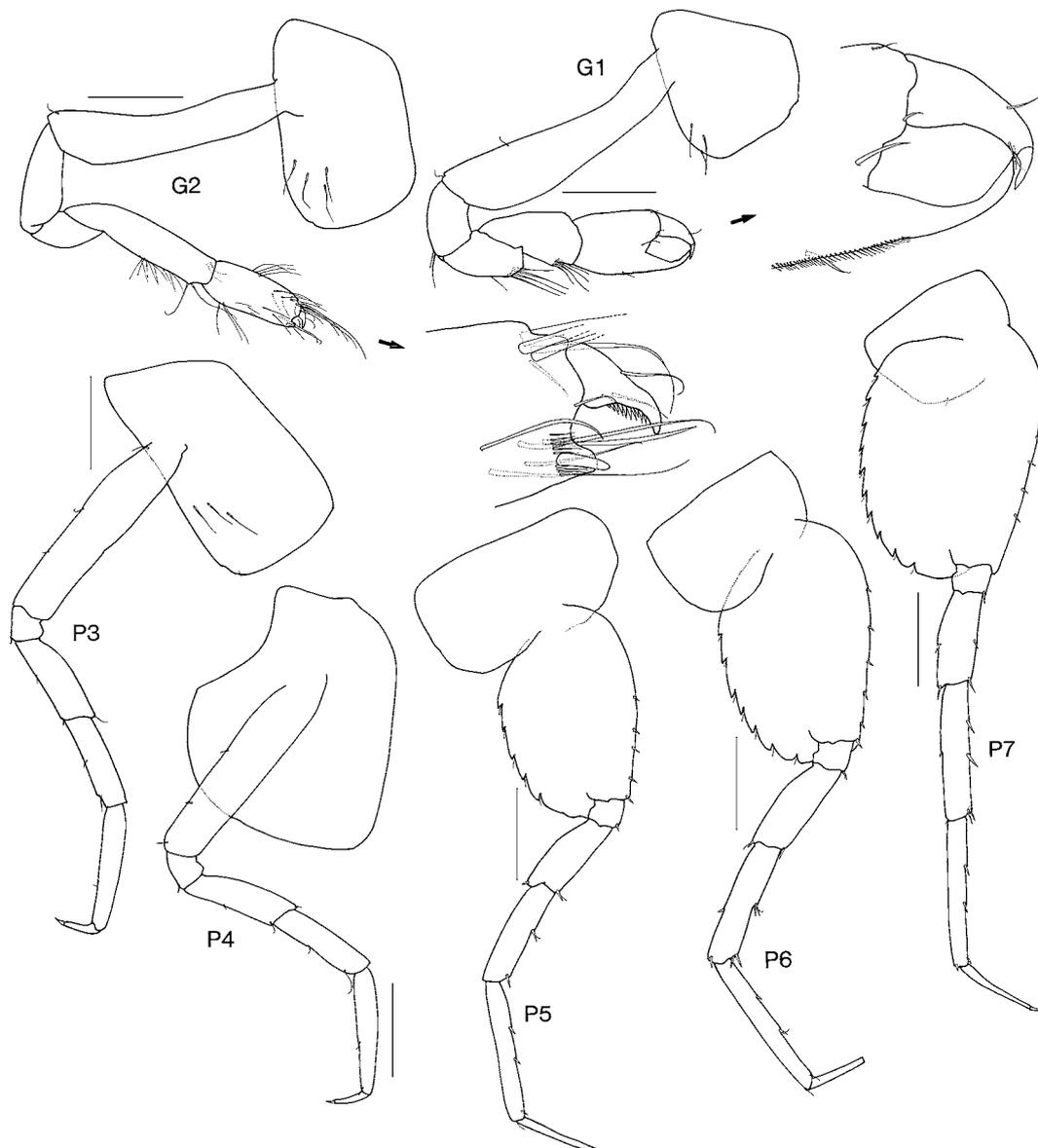
**Diagnostic description.** *Antenna 1* callynophore present. *Eyes* apparently absent. *Mouthpart bundle* subconical. *Mandible* left incisor with straight margin, minutely serrate, right with slightly convex margin, smooth; lacinia mobilis absent; molar absent; palp attached extremely proximally, article 2 longer than article 3. *Maxilla 1* outer plate with 9 setal teeth in a 6/3 crown arrangement, outer row with cusps in 1 row; palp apical margin not serrate, with apical robust setae. *Maxilliped* palp imperfectly 3-articulate. *Gnathopod 1* chelate; ischium short; carpus posterior margin not produced, curved; propodus subrectangular, proximal margin transverse, palm smooth, posterodistal corner produced into long acute spine, without robust setae. *Gnathopod 2* minutely subchelate; carpus much longer than propodus (1.7x); palm transverse. *Pereopod 4* coxa posteroproximal excavation small. *Pereopods 5–7* basis with minutely serrate posterior margin; dactylus long, slender. *Epimeron 3* posterior margin smooth, posteroventral corner broadly rounded. *Uropod 3* peduncle shorter than rami, without distoventral spur; inner ramus shorter than outer ramus; outer ramus 2-

articulate, article 2 long; rami without robust setae, without plumose setae. *Telson* longer than broad, moderately cleft (about 62%), without dorsal robust setae.

**Male** not known.

**Remarks.** *Podoprionides akantha* is very similar to *P. incerta* but differs from it in the presence of apical robust setae on the maxilla 1 palp, the weak serrations on the basis of pereopods 5–7 and the less deeply cleft telson. It differs from *P. moonamoona* as set out under that species.

**Distribution.** South-eastern Australia; 1000 m depth.



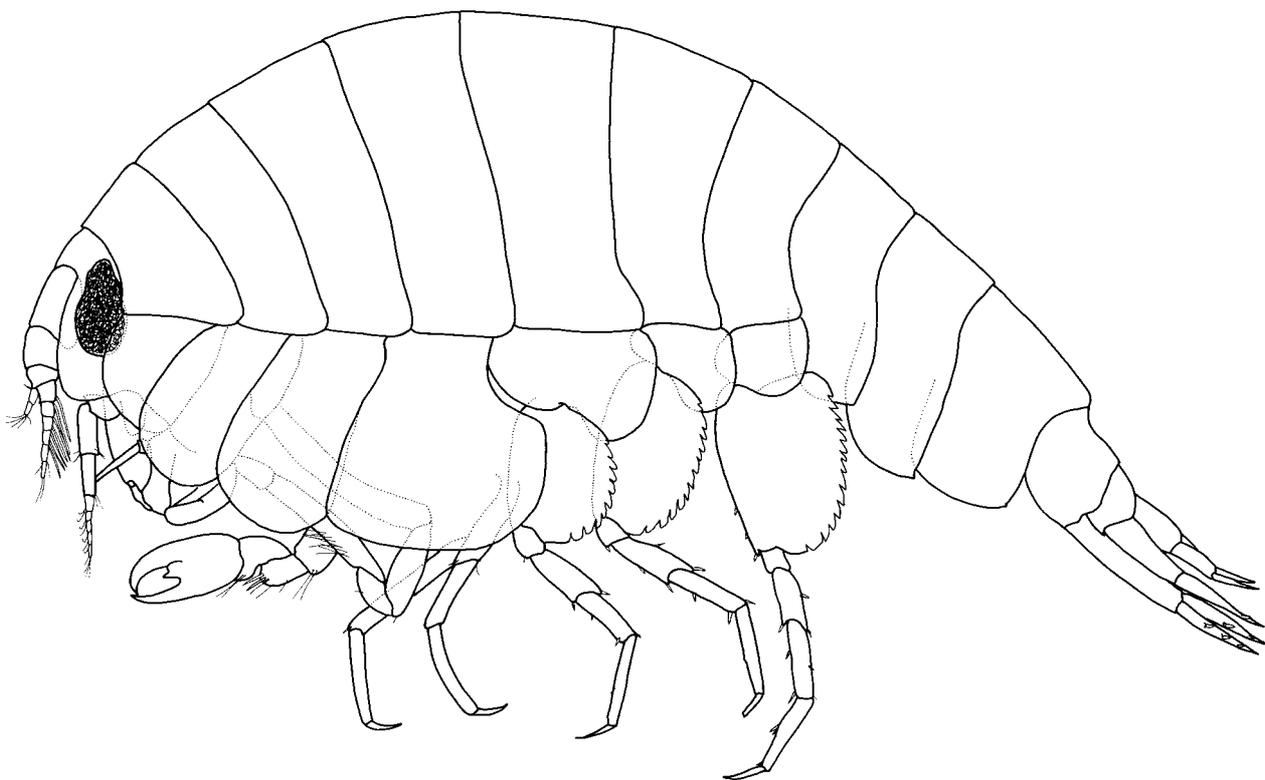
**FIGURE 9.** *Podoprionides akantha* sp. nov. Holotype female, MV J61511. Scales represent 0.2 mm.

***Podoprionides moonamoona* sp. nov.**

(Figs 10–13)

**Type material.** HOLOTYPE, female, 2.8 mm, AM P.69034, near mouth of Moona Moona Creek, Jarvis Bay, New South Wales, Australia, 35°03.5'S 150°41'E, 4.5 m, on test of solitary ascidian *Herdmania momus* in *Ecklonia* bed, 17 October 1981, P.B. Berents, stn NSW-235. PARATYPES: female, AM P.69035 and male,

1.8 mm, AM P.69036 and 44 specimens, AM P.69037, same data as holotype; 2 specimens, AM P.69038, same data, 19 December 1981, stn NSW-236; 2 specimens, AM P.69039, same data, 22 May 1982, stn NSW-241.



**FIGURE 10.** *Podoprionides moonamoona* sp. nov. Holotype female, AM P.69034.

**Type locality.** Jervis Bay, New South Wales, Australia, 35°03.5'S 150°41'E, 4.5 m depth.

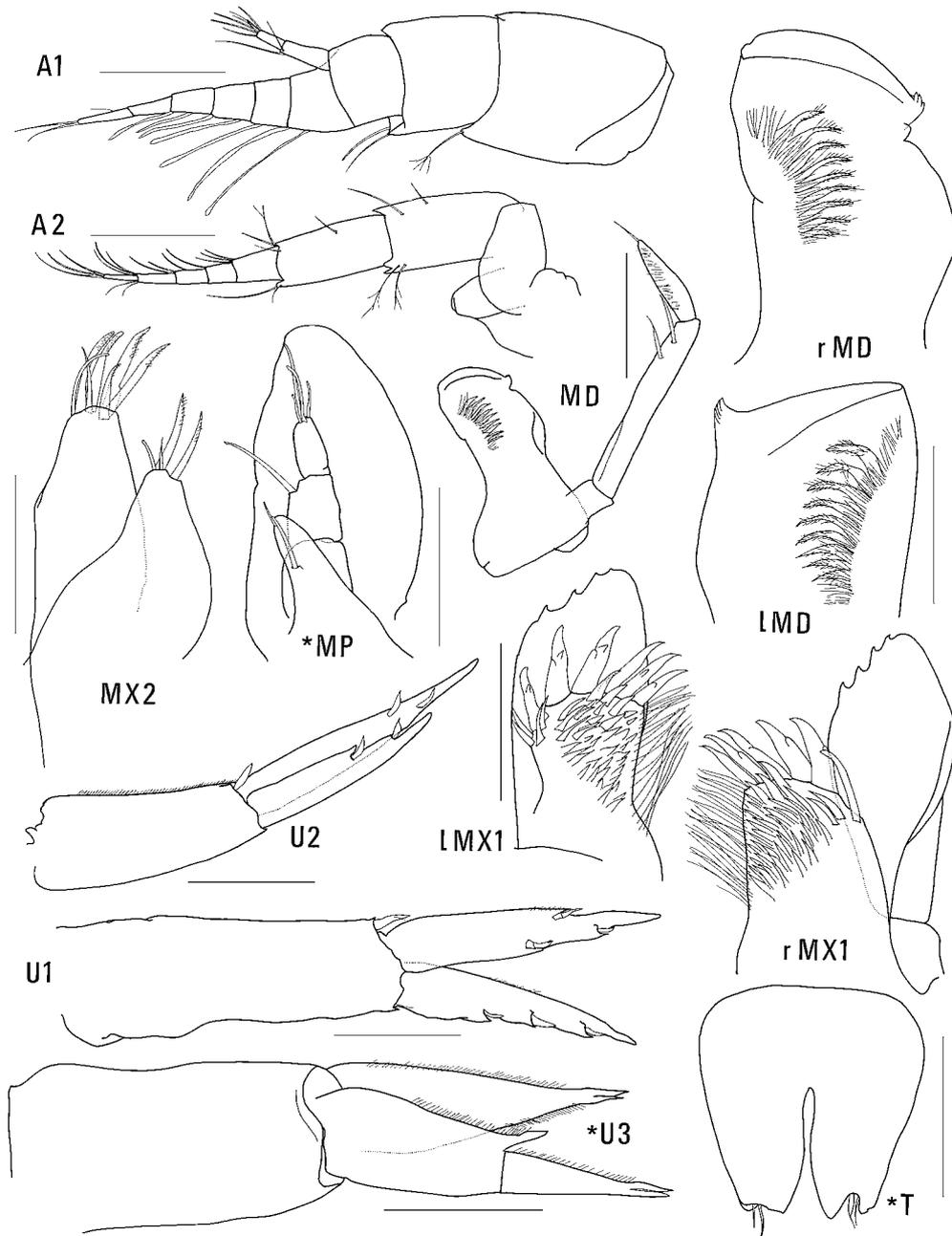
**Etymology.** The species name refers to the type locality.

**Diagnostic description.** *Antenna 1* callynophore absent; calceoli absent in male. *Eyes* present. *Mouthpart bundle* subconical. *Mandible* left incisor with straight margin, minutely serrate, right with strongly convex margin, smooth; lacinia mobilis absent; molar absent; palp attached extremely proximally, article 2 longer than article 3. *Maxilla 1* outer plate with 9 setal teeth in a 6/3 crown arrangement, outer row with cusps in 1 row; palp apical margin serrate, without apical setae. *Maxilliped* palp 3-articulate. *Gnathopod 1* chelate; ischium short; carpus posterior margin produced into broad triangular lobe; propodus subquadrate, proximal margin produced into strong posteroproximal lobe, palm smooth with a small central bump, posterodistal corner produced into long acute spine, without robust setae. *Gnathopod 2* minutely subchelate; carpus much longer than propodus (about 2 x); palm transverse. *Pereopod 4* coxa posteroproximal excavation small. *Pereopods 5–7* basis with strongly serrate posterior margin; dactylus short, slender. *Epimeron 3* posterior margin smooth, posteroventral corner rounded. *Uropod 3* peduncle subequal to inner ramus, without distoventral spur; inner ramus shorter than outer ramus; outer ramus 2-articulate, article 2 long; rami without robust setae, without plumose setae. *Telson* about as long as broad, moderately cleft (about 56%), without dorsal robust setae.

**Male.** Same as female except: *Gnathopod 1* palm with large irregular central protrusion; dactylus with irregular protrusion on inner margin. *Pereopod 7* merus anterodistal corner with single very large, distally complex robust seta.

**Remarks.** *Podoprionides moonamoona* differs from both *P. incerta* and *P. akantha* in the absence of a callynophore, the ornamentation of gnathopod 1 palm, and the peduncle of uropod 3 subequal to the rami, which is based on our examination of the original type of *P. incerta*.

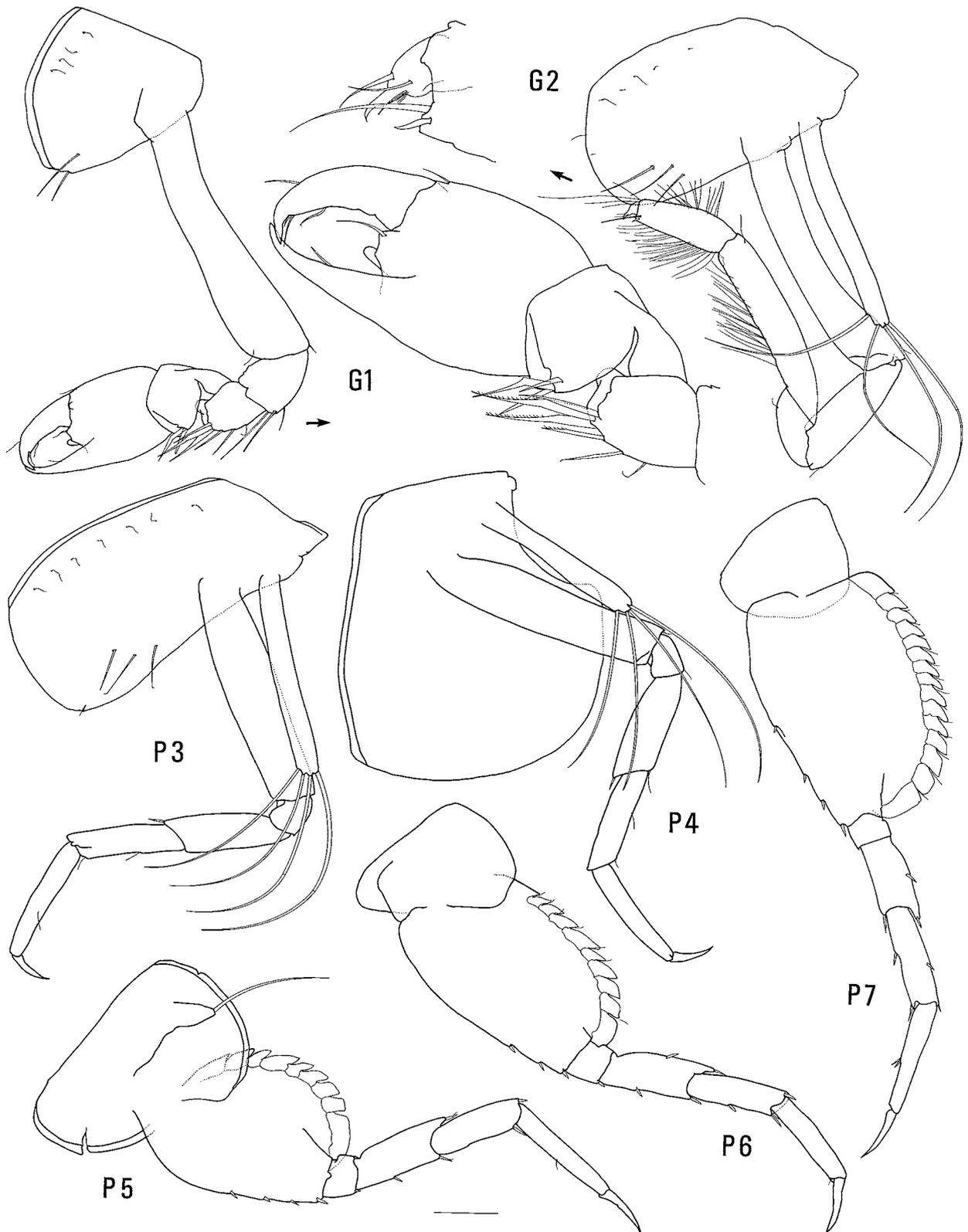
**Distribution.** Eastern Australia; 4.5 m depth



**FIGURE 11.** *Podoprionides moonamoona* sp. nov. Holotype female, AM P.69034; \*MP, U3 and T, paratype female, AM P.69035. Scales for A1, A2, MD, U1, U2 represent 0.1 mm; remainder represent 0.05 mm.

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**FIGURE 12.** *Podoprionides moonamoona* sp. nov. Holotype female, AM P.69034. Scale represents 0.1 mm.



FIGURE 13. *Podoprionides moonamoona* sp. nov. Paratype male, AM P.69036.

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