Zootaxa 2260: 841–860 (2009)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Podoceridae*

NIAMH M. KILGALLEN
National Institute of Water and Atmospheric Research (NIWA), Private Bag 14901, Kilbirnie, Wellington, New Zealand. (n.kilgallen@niwa.co.nz)

* *In*: Lowry, J.K. & Myers, A.A. (Eds) (2009) Benthic Amphipoda (Crustacea: Peracarida) of the Great Barrier Reef, Australia. *Zootaxa*, 2260, 1–930.

Abstract

The genus *Podocerus* from the Great Barrier Reef is examined. Six species are described of which two are new to science. All comprise new records for Australia. A seventh species previously recorded from the reef was not found during this survey.

Key words: Amphipoda, Podoceridae, Great Barrier Reef, Australia, taxonomy, new species, *Podocerus brasiliensis*, *Podocerus casuarinensis*, *Podocerus chelonophilus*, *Podocerus crenulatus*, *Podocerus laevis*, *Podocerus talegus talegus*, *Podocerus uncinatus*

Introduction

The Podoceridae are a family of marine corophiidean amphipods, distinguished by their rectangular head (Myers & Lowry 2003), and dorsoventrally flattened urosome, of which urosomite 1 is at least twice as long as, and not coalesced with urosomite 2. According to Barnard *et al.* (1988), podocerids are typically known to occur in dense hydroid masses and among the fouling masses created by other amphipods. Like other caprelloids, they are efficient climbers of algae and sedentary animals (Myers & Lowry 2003), and position themselves at the highest possible position in order to filter feed, gaining first choice of food particles that sweep past in the current. Although they lack silk glands in their pereopods and thus do not have the ability to build tubes, they often occupy the vacated tubes of other corophiideans (Barnard *et al.* 1988).

Currently, there are eight recognised genera worldwide. Of these, four are known to occur in Australia — *Podocerus* Leach, 1814; *Laetmatophilus* Bruzelius, 1859; *Leipsuropus* Stebbing, 1899; and *Cyrtophium* Dana, 1852. The latter three are temperate water genera and were not recorded in the present study. They have, thus far, only been recorded from the coasts of Victoria and New South Wales as far north as Port Jackson.

The current study recorded six species, all belonging to the genus *Podocerus*. All species constitute new records for Australia, two of which are new to science. A seventh species previously recorded from the reef, *Podocerus laevis* (Haswell, 1885) was not collected during this survey, and is here considered to be unidentifiable.

Materials and methods

The descriptions were generated from a DELTA database (Dallwitz 2005) to the caprelloid world genera and

Accepted by J.K. Lowry: 15 Jun. 2009; published: 8 Oct. 2009

Australian species. All material is lodged in the Australian Museum, Sydney (AM) or the Queensland Museum, Brisbane, Australia (QM). A set of colour plates, a list of standard abbreviations and detailed station data is available in Lowry & Myers (2009). A CD (*Benthic Amphipoda (Crustacea: Peracarida) of the Great Barrier Reef: Interactive Keys*) is available with the book or the keys can be accessed at the crustacea.net website.

Podoceridae Leach, 1814

***Podocerus* Leach, 1814**

***Podocerus brasiliensis* (Dana, 1853)**
(Figs 1, 2)

Platophium brasiliense Dana, 1853: 838, pl. 55, fig. 9.
Platophium synaptochair Walker, 1904: 296, pl. 8, fig. 52.
Podocerus brasiliensis. —Stebbing, 1906: 704. —K.H. Barnard, 1925: 366. —Schellenberg, 1928: 674. —K.H. Barnard, 1935: 305. —Schellenberg, 1938: 94. —J.L. Barnard, 1953: 87. —J.L. Barnard, 1955: 39. —J.L. Barnard, 1959: 39, pl. 13. —Nayar, 1959: 45, pl. 15 figs 21–26. —? J.L. Barnard, 1962: 66, fig. 30. —Nayar, 1965: 164, figs 17d, e. —J.L. Barnard, 1970: 237, figs 156, 157. —J.L. Barnard, 1971: 117, figs 58B – 60B. —Rabindranath, 1972: 302, fig. 2. —Ortiz & Silva, 1990: 180.

Material examined. 1 male, AM P76893 and 1 female, AM P77431 (QLD 1895); 1 female, 3 males, AM P76894 (QLD 1895); 1 male, AM P76895 (QLD 1917); 1 female, 4 males, AM P76896 (QLD 1980); 1 male, AM P76897 (QLD 1983).

Type locality. Rio de Janeiro, Brazil.

Description. Based on male, 5 mm, AM P76893.

Head. *Eyes* large, protruding. *Antenna 1* peduncle article 2 slightly longer than article 3; flagellum with more than 2 articles; accessory flagellum present, 1-articulate. *Mandible* incisor with 5 teeth, molar well developed. *Maxilliped* inner plate smaller than outer plate, quadrilateral; outer plate about twice length of inner plate, inner margin with row of robust setae and few fine setae; palp article 2 scarcely setose on inner margin; article 3 with few distal setae; article 4 blunt.

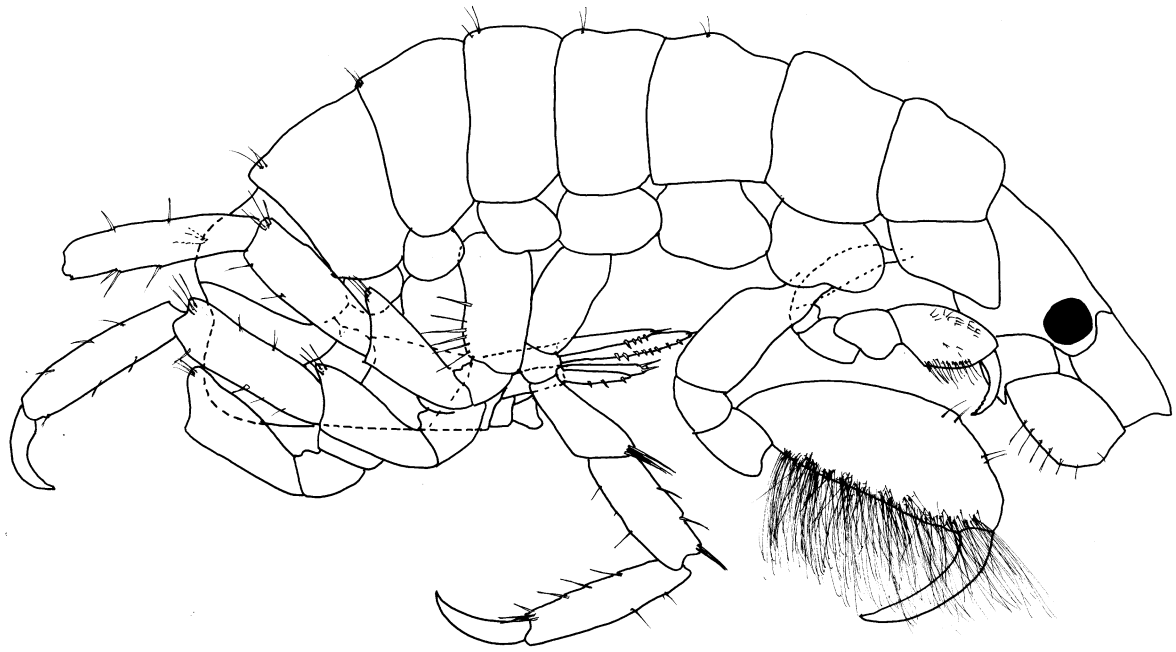

FIGURE 1. *Podocerus brasiliensis* (Dana, 1853), male, 5 mm, AM P76893, Thursday Island, Torres Strait.

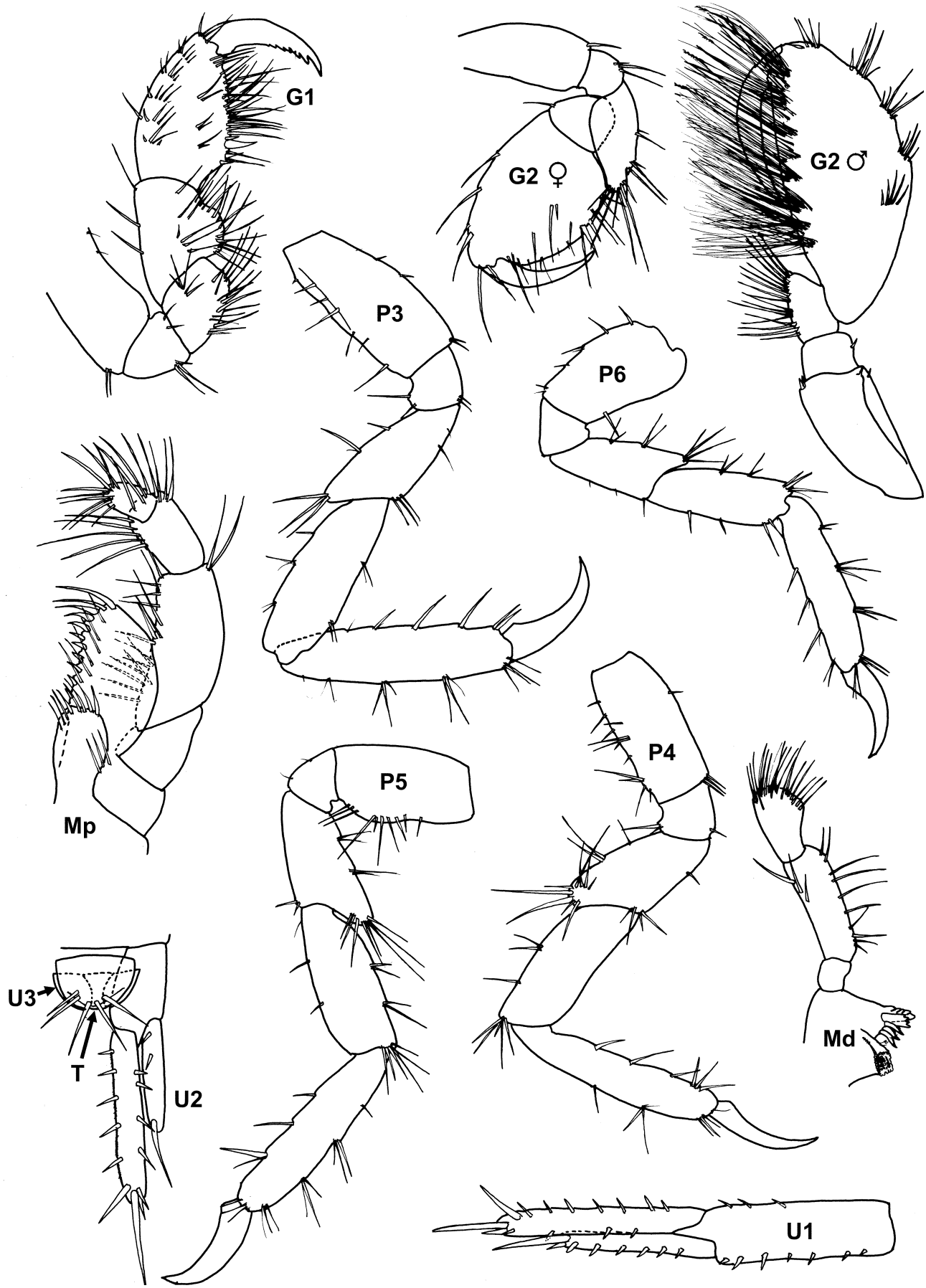

FIGURE 2. *Podocerus brasiliensis* (Dana, 1853), male, 5 mm, AM P76893, female, 3.8 mm, AM P77431, Thursday Island, Torres Strait.

Pereon. *Pereonites* not fused; pereonites 2–6 with gills; pereonites 3–7 each with clump of dorsal setae. *Gnathopod 1* propodus triangular, with 5–6 rows of submarginal setae near anterior margin; palm densely setose, beginning about one-quarter way along posterior margin of propodus, delimited by one large and one small robust seta; dactylus fitting palm, inner margin serrate at distal end. *Gnathopod 2* coxa reduced; basis lacking anterodistal lobe; merus produced posterodistally; carpus indistinct, almost entirely merged with propodus; propodus elongate, longer than basis; palm poorly defined, with brush of long setae arranged in transverse rows; dactylus reaching slightly beyond half palm length. *Pereopods 3* and *4* well developed; basis narrow, cylindrical; dactylus elongate, about half propodus length. *Pereopod 5* basis poorly expanded posteriorly, about subequal in length to merus; carpus distinctly longer than merus; propodus about 1.5 x carpus length; dactylus longer than half propodus length. *Pereopod 6* basis shorter than carpus, slightly longer than merus; propodus shorter than carpus and merus combined; dactylus about half propodus length. *Pereopod 7* basis about subequal in length to carpus, and longer than merus; propodus shorter than carpus and merus combined; dactylus slightly shorter than half propodus length.

Pleon. *Pleonites* not fused; pleonite 1 with clump of dorsal setae. *Uropod 1* peduncle with distoventral spine; biramous with inner ramus subequal in length to peduncle, with moderately dense marginal row of robust setae and fine denticles on inner margins. *Uropod 2* peduncle with distoventral spine; biramous, both inner and outer rami much longer than peduncle. *Uropod 3* uni-articulate. *Telson* apically rounded, posterodorsally produced into subacute knob with 4–8 apical setae.

Female (sexually dimorphic characters). Based on female, 3.8 mm, AM P77431. *Gnathopod 2* merus with rounded distal projection; carpus distinct; propodus large, subovate; palm smooth, slightly convex, not heavily setose; dactylus fitting palm.

Habitat. Associated with turfing brown algae and *Padina* sp., tufts of red algae and *Halimeda* sp., 2–18 m. Often found as a fouling organism on pilings and the hull of ships.

Remarks. This species is considered to have a circum-tropical distribution, having previously been recorded from Brazil to California, Hawaii, India, Sri Lanka and Mozambique. Although there does appear to be some slight morphological variation between different populations, the specimens recorded here correspond well with those described by J.L. Barnard (1970, 1971) from Hawaii, and Rabindranath (1972) from India. The only difference noted is the number of projections on the male gnathopod 2 palm — the Indian specimens have two blunt distal projections and the Hawaiian specimens have just one. The specimens examined from the GBR do not appear to have any projections on the gnathopod 2 palm.

The heavily setose palm and the elongate propodus of the male second gnathopod is a highly distinctive character of this species. Other notable characters include the ventromedial spines on the peduncle of uropods 1 and 2, and the numerous robust apical setae on the telson.

Podocerus brasiliensis is a fouling organism (J.L. Barnard 1971), which may explain its wide distribution. The specimen on which this description is based was collected from brown algae on the hull a ship.

Distribution. *Australia*. Queensland: One Tree Island and Thursday Island, (current study). *Brazil*. Rio de Janeiro (Dana 1853). *India*. Quilon, Kerala; Gulf of Manaar (Rabindranath 1972). *Mozambique*. Maputo Bay (Ortiz & Silva 1990). *Sri Lanka*. Galle Harbour and Galle Bay; Kondatchi Paar; Periya Paar Kerrai; East Cheval Paar (Walker 1904). *USA*. Pearl Harbour, Hawaii (J.L. Barnard 1971).

***Podocerus casuarinensis* sp. nov.**
(Figs 3, 4, Pl. 6B)

Type material. Holotype, female, 3 mm, AM P71219, Casuarina Beach, Lizard Island (14°40.38'S 145°26.69'E), fine sediment in grass beds, sandy bottom with rubble, algae & sparse seagrass, 1 m, S. LeCroy, 2 March 2005 (QLD 1771).

Type locality. Casuarina Beach, Lizard Island, Queensland, Australia (14°40.38'S 145°26.69'E).

Additional material examined. 1 female, AM P76252 (QLD 1625); 1 female, AM P70576 (QLD 1627); 1 female, AM P70651 (QLD 1635).

Etymology. Named for the type locality.

Description. Based on holotype, female, 3 mm, AM P71219.

Head. *Eyes* large, protruding. *Antenna 1* between 0.3–0.5 body length; accessory flagellum present, 1-articulate; primary flagellum about 40% of peduncle length, with 4–5 articles. *Antenna 2* distinctly longer than antenna 1, flagellum with 4–5 articles. *Mandible* incisor with 5 teeth; molar well developed. *Maxilliped* inner plate smaller than outer plate, quadrilateral; outer plate about twice length of inner plate, inner margin with row of robust setae, with a few fine setae; palp article 2 scarcely setose on inner margin; article 3 with few distal setae; article 4 reduced, blunt.

Pereon. *Pereonites* not fused; pereonites 2–6 with gills; pereonites 6–7 posterodorsally produced; pereonite 7 with clump of dorsal setae. *Gnathopod 1* propodus triangular to subtriangular; palm transverse, minutely serrate, beginning less than halfway along posterior margin of propodus; dactylus fitting palm, with 1 accessory tooth. *Gnathopod 2* coxa reduced; basis with rounded anterodistal lobe; merus with short, blunt distal projection; propodus large, subovate, length about 1.5 x width; palm defined by small proximal projection with 2 robust setae, minutely serrate, without distal shelf sinus or midpalmar projection. *Pereopods 3–4* well developed; basis narrow, cylindrical. *Pereopod 5* basis subrectangular, slightly longer than merus; carpus distinctly longer than merus; propodus slightly shorter than carpus and merus combined; dactylus longer than half propodus length. *Pereopod 6* basis and carpus subequal in length, shorter than merus; propodus subequal in length to carpus and merus combined; dactylus longer than half propodus length. *Pereopod 7* similar to pereopod 6; propodus shorter than carpus and merus combined.

Pleon. *Pleonites* not fused; pleonites 1 and 2 posterodorsally produced; pleonite 1 with clump of dorsal setae. *Uropods 1* and *2* well developed; peduncle without distoventral spine; biramous with inner ramus distinctly longer than peduncle, lacking marginal row of robust setae, but with row of fine denticles on inner margins. *Uropod 3* uni-articulate. *Telson* apically rounded, posterodorsally produced into subacute knob with 2 apical setae.

Habitat. In sea grass beds on fine sediment, and on rubble algae and seagrass over sandy substrate, 1–2.5 m.

Male (sexually dimorphic characters). Males not known.

Remarks. The present species differs from the female of *Podocerus crenulatus* Myers, 1985, by the 1-articulate accessory flagellum; the shape of articles 4 and 5 of the second antenna; the more transverse nature of the gnathopod 1 palm; the lack of dorsolateral lobes on pereonite 7 and pleonites 1–2; and the apically rounded telson. *Podocerus crenulatus* females, conversely, have a 2-articulate accessory flagellum, a distomedial inflated article 4 and a curved article 5 of antenna 2, an oblique gnathopod 1 palm, distinct dorsolateral lobes on pereonite 7 and pleonites 1–2, and a subtriangular telson.

Podocerus casuarinensis differs from the female of *P. sandroruffoi* Ortiz & Lalana, 2003, by the serrated gnathopod 1 palm margin; the lack of serrations on the inner margin of the gnathopod 1 dactylus; the more ovate gnathopod 2 propodus; the relative lengths of the uropods 1–2 rami; and the shape of the telson. In *P. sandroruffoi* the gnathopod 1 palm is not serrated, but the inner margin of the dactylus of the same appendage is serrated, the gnathopod 2 propodus of the female is more subtriangular in shape, the inner rami of uropods 1 and 2 are shorter than their respective peduncles, and the telson is subquadrate in shape.

Podocerus inconspicuus (Stebbing, 1888) is also morphological similar, but lacks the dorsal carination of this species, and the gnathopod 1 palm begins more than halfway along the posterior margin of the gnathopod 1 propodus, whereas it begins about one-third of the way along the posterior margin in *P. casuarinensis*.

Distribution. *Australia*. Queensland: Lizard Island (current study).

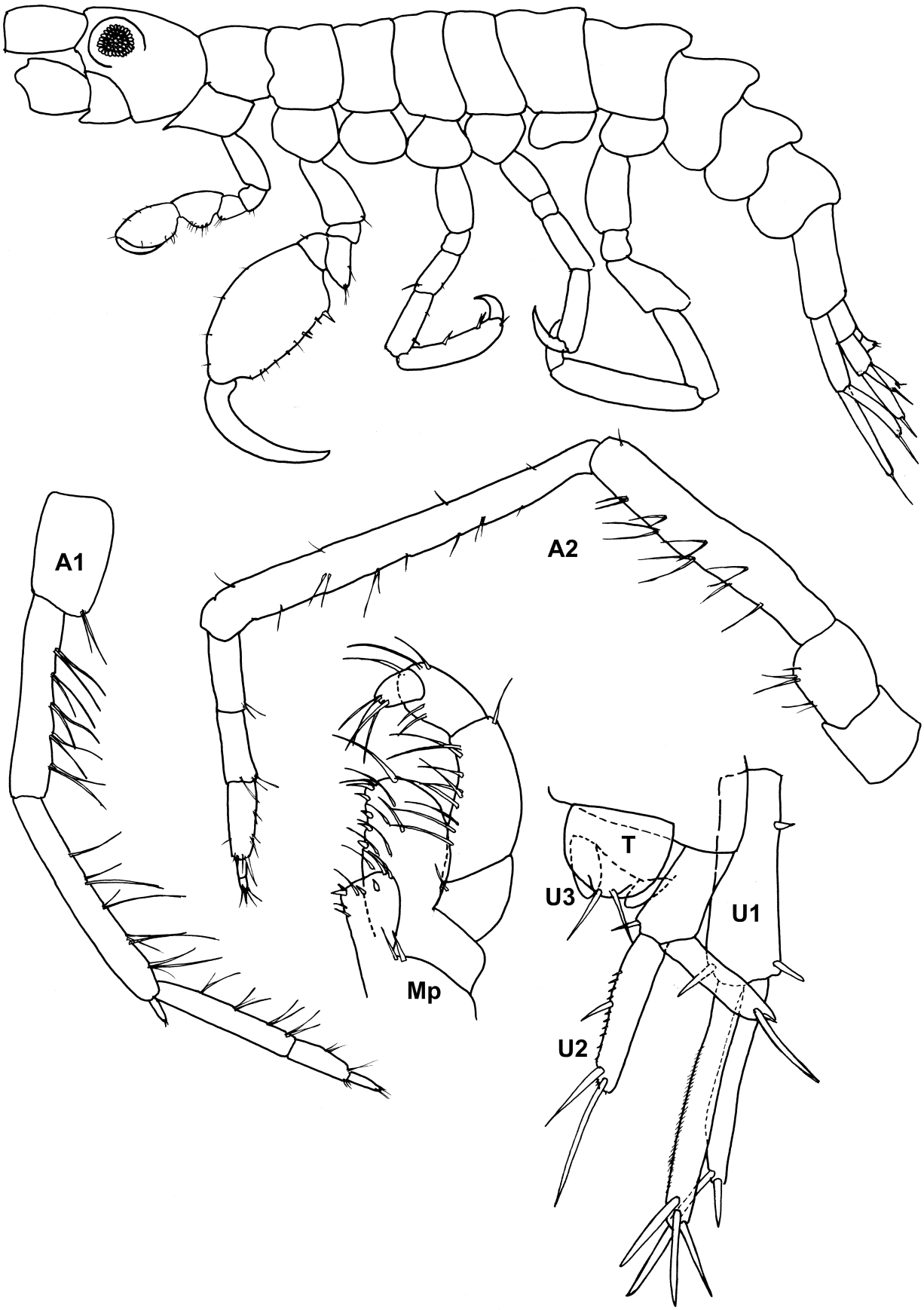

FIGURE 3. *Podocerus casuarinensis* **sp. nov.**, holotype, female, 3 mm, AM P71219, Casuarina Beach, Lizard Island, Great Barrier Reef.

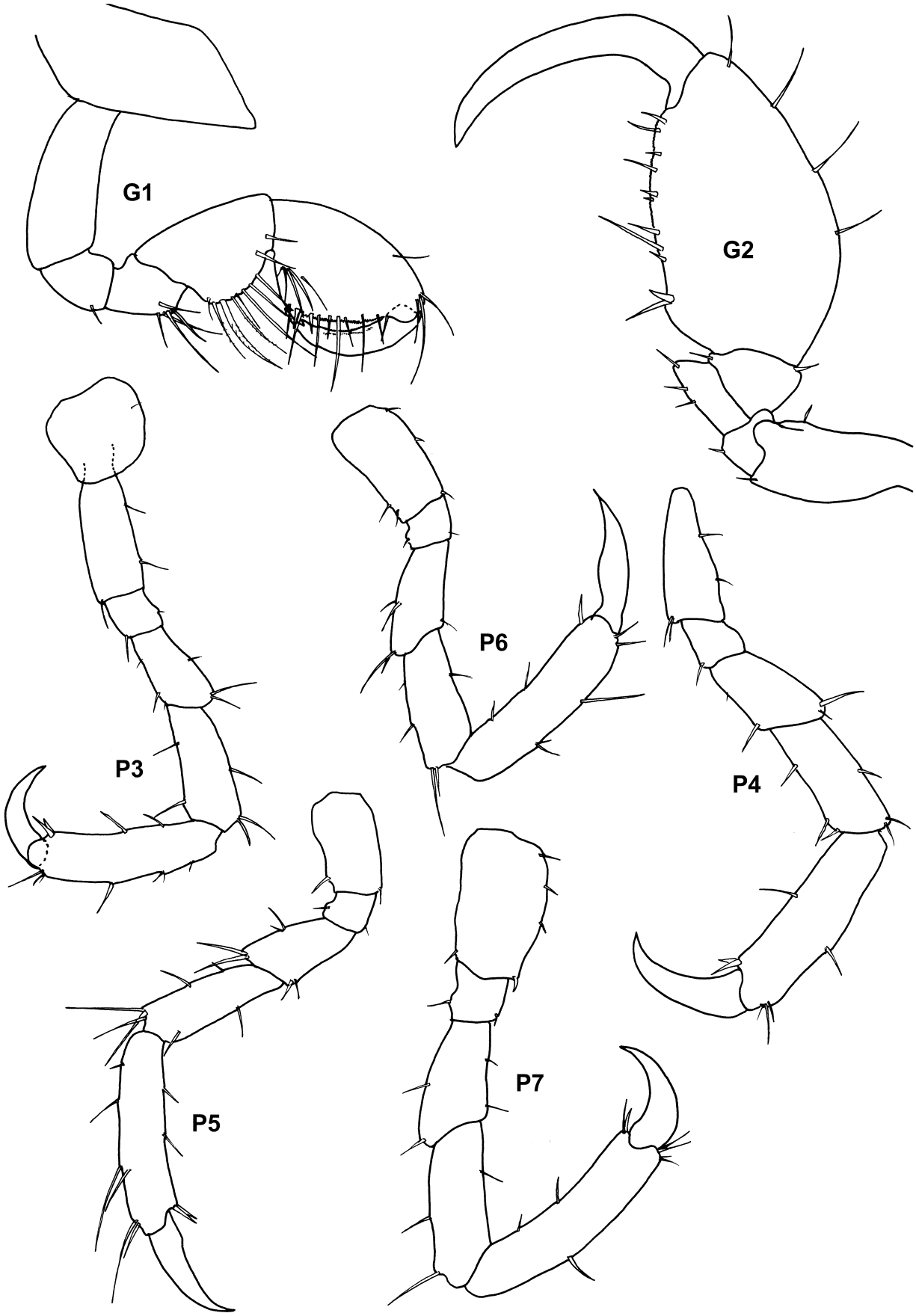

FIGURE 4. *Podocerus casuarinensis* **sp. nov.**, holotype, female, 3 mm, AM P71219, Casuarina Beach, Lizard Island, Great Barrier Reef.

***Podocerus chelonophilus* (Chevreux & de Guerne, 1888)**
(Fig. 5)

Cyrtophium chelonophilum Chevreux & de Guerne, 1888: 625.
Platophium cheloniae Stebbing, 1888: 1190, pl. 30.
Platophium chelonophilum. —Chevreux, 1900: 115, pl. 13, fig. 2; pl. 14, fig. 7.
Podocerus cheloniae. —Stebbing, 1906: 701.
Podocerus chelonophilus. —Stebbing, 1906: 703. —Chevreux, 1911: 272. —Chevreux & Fage, 1925: 375, fig. 383. —Chevreux, 1935: 130. —Mateus & Alfonso, 1974: 36, figs 27, 28. —Thomas & Barnard, 1992: 110, figs 1, 2. —Ruffo, 1993: 675, fig. 462. —Moore, 1995: 253. —Baldinger, 2001: 441, figs 1–6.
? Podocerus umigame Yamato, 1992: 281, figs 1–3. —Ren, 1994: 265, fig. 13.

Material examined. 5 males, 5 females, QM W7398; 5 males, 5 females, QM W7394; 5 males, 5 females, QM W7397 (each taken from a vial of several hundred specimens), Mon Repos near Bundaberg, Queensland, on loggerhead turtle *Caretta caretta* (Linnaeus, 1758), C. Limpus, 1975-1976 (CL 1).

Type locality. Carapace of a loggerhead sea turtle, *Caretta caretta*, which landed on the beach in front of the Aquarium of the Seto Marine Biological Laboratory, Wakayama, Japan (3341'N 13520'E).

Description. Based on male, 7.5 mm, QM W7398.

Head. *Eyes* large, protruding. *Antenna 1* between 0.3–0.5 body length; peduncle article 2 slightly longer than article 3; accessory flagellum present, 1-articulate; primary flagellum 0.3–0.5 peduncle length, with 5 articles. *Antenna 2* distinctly longer than antenna 1; flagellum with 3 articles. *Mandible* right incisor with 5 teeth; lacinia mobilis with 2 teeth; setal row with 3 setae; molar well developed; left incisor with 5 teeth; lacinia mobilis with 4 teeth; setal row with 3 setae. *Maxilla 1* outer plate with 9 setal teeth. *Maxilliped* inner plate smaller than outer plate, quadrilateral; outer plate well developed, 1.5 – 2 x length of inner plate, inner margin with row of robust setae, and few fine setae; palp article 2 setose on inner margin; article 3 with moderately dense distal setae; article 4 reduced, blunt.

Pereon. *Pereonites* not fused, not posterodorsal produced, without dorsal setae; pereonites 2 to 6 with gills. *Gnathopod 1* distinctly smaller than gnathopod 2; propodus triangular to subtriangular, with 5–6 rows of submarginal setae near anterior margin; palm straight beginning about one-third along posterior margin of propodus; dactylus curved, distinctly shorter than palm and with 3 – 4 accessory teeth. *Gnathopod 2* coxa reduced; basis with rounded anterodistal lobe; merus forming short, blunt distal projection; propodus massive, subovate, length about 1.25 x width; palm margin irregular, with distinct proximal projection defining palm, and large midpalmar projection separated from broad, well developed distal projection by deep, wide sinus; distal projection bearing 6 – 8 small, rounded lobes. *Pereopods 3* and *4* basis largely expanded posteriorly into rounded lobe. *Pereopod 5* basis with rounded posterodistal lobe, longer than merus; carpus loner than merus; propodus longer than carpus; dactylus short, about one-third propodus length. *Pereopod 6* basis about subequal in length to merus; carpus longer than merus; propodus longer than carpus; dactylus about one-third propodus length. *Pereopod 7* similar to pereopod 6.

Pleon. *Pleonites* not fused, not posterodorsal produced, without dorsal setae. *Uropod 1* well developed; peduncle lacking distoventral spine; biramous with inner ramus subequal in length to peduncle, inner margin with dense marginal row of robust setae. *Uropod 2* well developed, peduncle lacking distoventral spine; biramous with rami much longer than peduncle, inner ramus inner margin with dense marginal row of robust setae. *Uropod 3* uni-articulate, with 2 small apical robust setae. *Telson* subquadrate, posterodorsally produced into subacute knob with 4–8 apical setae.

Female (sexually dimorphic characters). Based on female, 6 mm, QM W7398. *Gnathopod 1* dactylus fitting palm. *Gnathopod 2* basis without anterodistal projection; propodus large, subovate, with convex palm lacking any projections, defined by 3 robust setae; dactylus with accessory tooth.

Habitat. Epibiontic on the loggerhead turtle (*Caretta caretta* (Linnaeus, 1758)) and the hawksbill turtle (*Eretmochelys imbricata* (Linnaeus, 1766)).

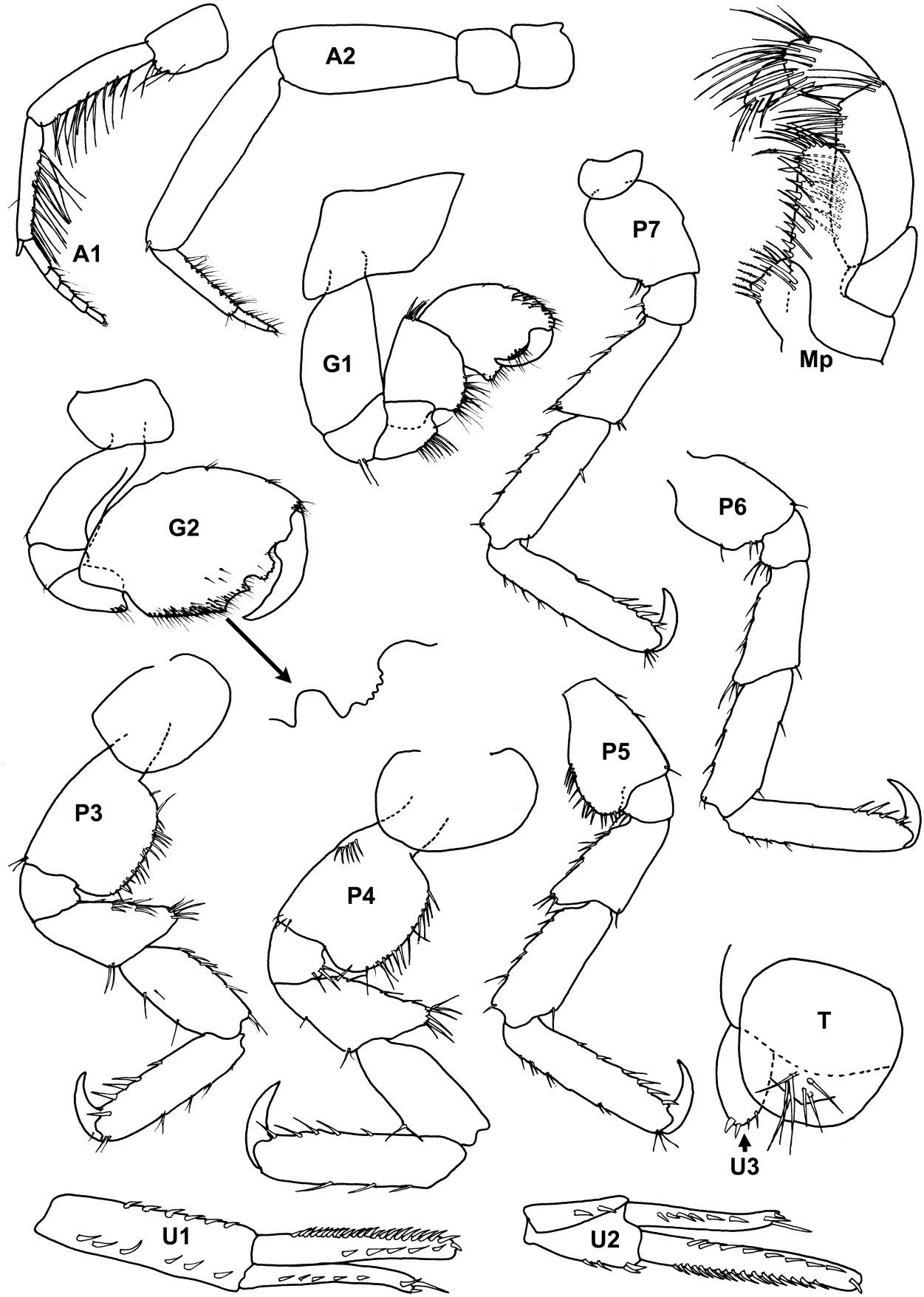

FIGURE 5. *Podocerus chelonophilus* (Chevreux & de Guerne, 1888), male, 7.5 mm, female, 6 mm, QM W7398, Mon Repos Beach, near Bundaberg, Queensland.

Remarks. To date, three *Podocerus* species have been recorded as epibionts of sea turtles — *P. chelonophilus* (Chevreux & de Guerne, 1888), *P. cheloniae* (Stebbing, 1888) and *P. umigame* Yamato, 1992. Confusion exists as to the validity of the latter two. Most authors agree that *P. cheloniae* is likely a junior synonym of *P. chelonophilus* and, though some morphological variation exists between the two, this is accounted for by the fact that Stebbing (1888) based his original description of *P. cheloniae* on an immature specimen.

Podocerus umigame was described from the carapace of a loggerhead turtle (*Caretta caretta*) from Wakayama, Japan. In his remarks, Yamato distinguishes *P. umigame* from *P. chelonophilus* by the differing numbers of setae on the telson, and the morphology of the gnathopod 2 palm. According to him, *P. chelonophilus* has only 2 setae on the telson and a bi-lobed projection near the dactylus hinge on the gnathopod 2 palm. *Podocerus umigame* has 5 long setae on the telson and has a 5-lobed tooth on the gnathopod 2 palm. However, Baldinger (2001) examined a number of specimens from different regions and reported variation in both these characters within both species. For example, he noted a range of 0–9 setae on the telson of *P. chelonophilus*, and 5–7 on *P. umigame.* Likewise, a high degree of variation is reported in the form of the proximal projection on the gnathopod 2 palm. This degree of intra-specific variation led Baldinger (2001) to suggest that these species are not distinct, but rather *P. umigame* is a morphological variant of, and therefore, a junior synonym of *P. chelonophilus*.

Examination of the present specimens, collected from loggerhead turtles, Caretta caretta, on Heron Island and Mon Repos Beach, Queensland, supports this opinion. They also exhibit variation in the number of telsonic setae and the form of the gnathopod 2 palm, which usually displays a small proximal projection, but occasionally this projection takes the form of two small, rounded lobes.

Distribution. *Atlantic Ocean.* Azores (Chevreux, 1900); Madeira (Moore 1995); Florida and South Carolina, USA (Thomas & Barnard 1992). *Mediterranean.* Algeria (Chevreux & de Guerne 1888). *Pacific Ocean*. Heron Island and Mon Repos Beach, Queensland, Australia (current study); Ecuador (Baldinger 2001); ? Wakayama, Japan (Yamato 1992). *? South China Sea:* Hong Kong (Ren 1994).

Podocerus crenulatus Myers, 1985

(Figs 6, 7)

Podocerus crenulatus Myers, 1985: 60, fig. 44.

Material examined. 1 female, AM P76898 and 1 female, AM P76899 (QLD 27); 3 females, AM P77406 (QLD 28); 1 female, AM P77407 (QLD 45); holotype, male, AM P35190; paratypes, 2 males, 2 females, AM P35191.

Type locality. Momi Bay, Viti Levu, Fiji.

Description. Based on female, 2 mm, AM P76898 (QLD 27).

Head. *Antenna 2* well developed, slender, slightly longer than body, without dense concentration of long slender setae along posterior margin, article 5 about 1.5 x longer than article 4; flagellum 4-articulate. *Mandible* palp 3-articulate; molar well developed; right mandible incisor with 5 teeth, lacinia mobilis with 2 teeth, accessory setal row with 2 setae; left incisor with 5 teeth, lacinia mobilis with 4 teeth, accessory setal row with 3 setae. *Maxilliped* outer plate well developed; palp article 2 scarcely setose on inner margin; article 3 with few distal setae; article 4 reduced, blunt.

Pereon. *Pereonites* not fused; pereonites 2–6 with gills; pereonites 3–7 produced posterodorsally, and with few fine dorsal setae. *Gnathopod 1* propodus subtriangular; palm acute, minutely serrate, beginning about one-third along posterior margin of propodus; dactylus with 2 accessory teeth, inner margin minutely serrate. *Gnathopod 2* coxa reduced; basis without anterodistal projection; merus not acutely projecting distally; propodus large, subovate, anterodistal margin convex; palm smooth, convex, and without projections. *Pereopods 3 –7* missing from all specimens collected.

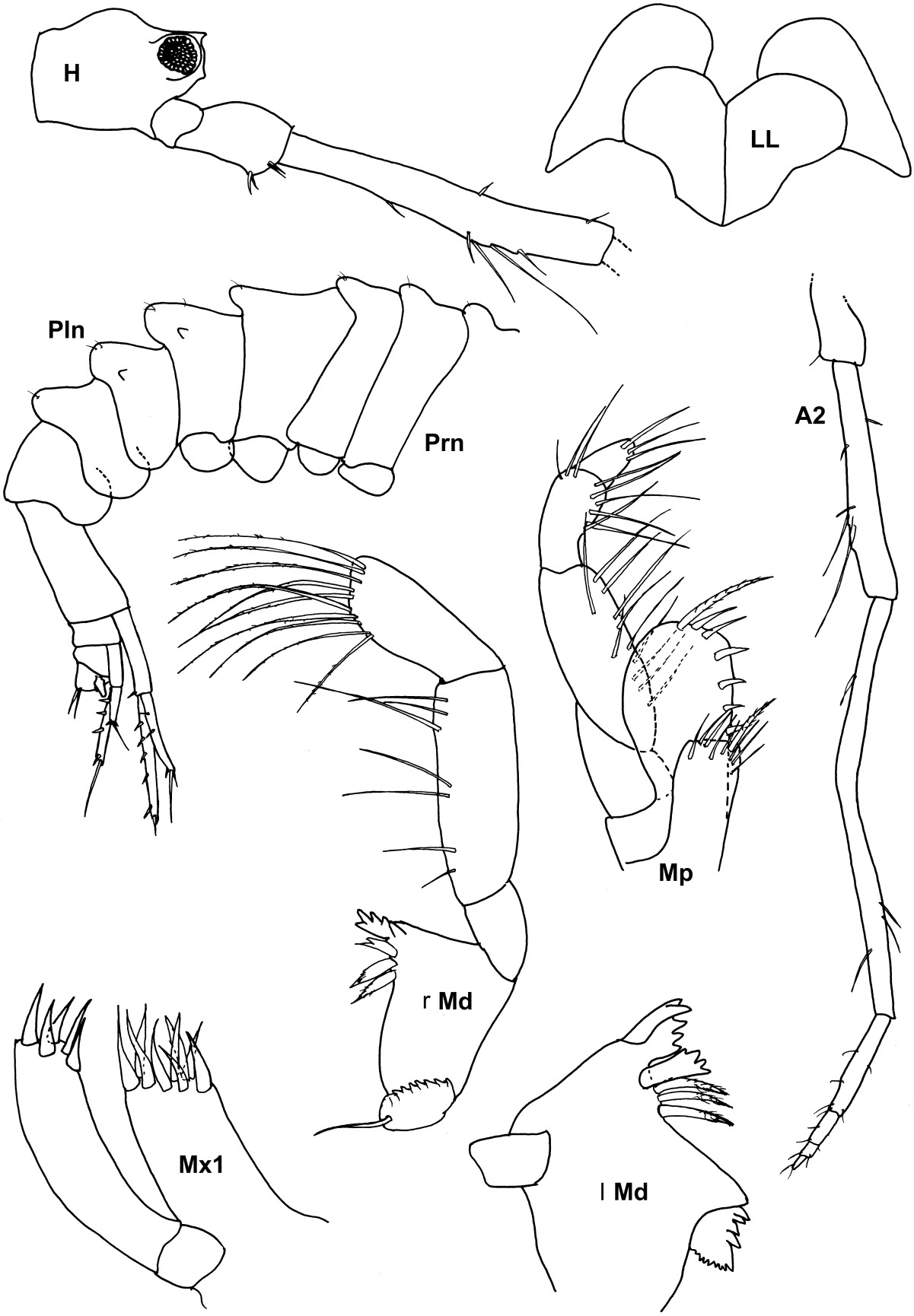

FIGURE 6. *Podocerus crenulatus* Myers, 1985, female, 2 mm, AM P76898, Fringing reef between Bird Islet and South Island, Lizard Island, Great Barrier Reef.

Pleon. P*leonites* not fused; pleonites 1–2 produced posterodorsally, and with few fine dorsal setae. *Uropod 1* peduncle without distoventral spine; rami longer than peduncle, inner ramus longer than outer ramus, with few marginal robust setae. *Uropod 2* peduncle without distoventral spine; outer ramus about subequal in length to peduncle, inner ramus much longer. *Uropod 3* present, uni-articulate. *Telson* apically rounded or subacute, with 2 apical setae.

Habitat. Found on algae and sediment from sea grass.

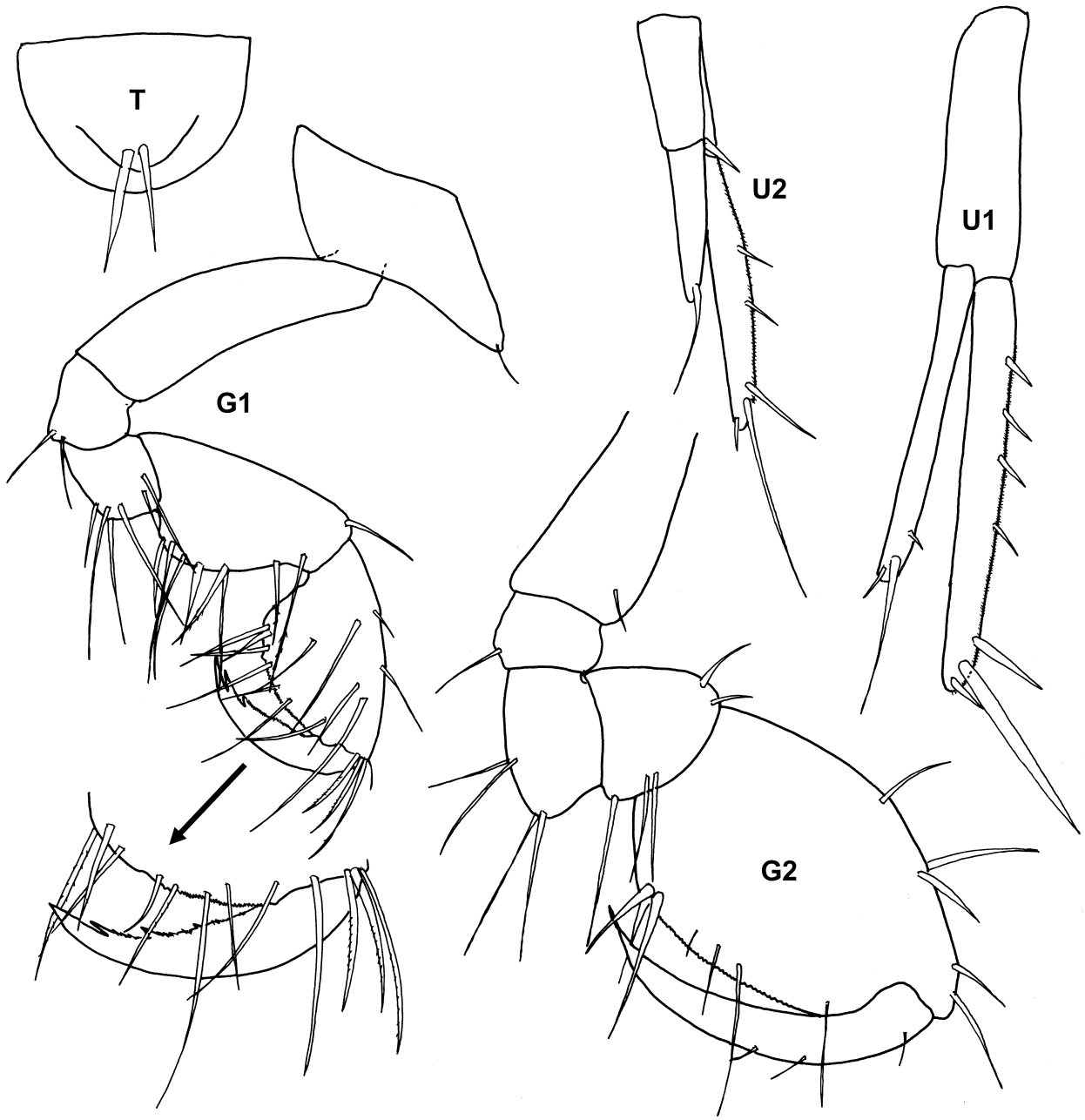

FIGURE 7. *Podocerus crenulatus* Myers, 1985, female 2 mm, AM P76898, Fringing reef between Bird Islet and South Island, Lizard Island, Great Barrier Reef.

Remarks. Myers (1985) gives a comprehensive comparison between *Podocerus crenulatus* and several of its congeners, however, he does not remark on the similarity between it and *P. lobatus* (Haswell, 1885). The lack of detail in Haswell's (1885) original description and illustrations of this latter species makes an accurate comparison difficult; however, it appears that there are definite similarities. The antennae, in particular,

correspond almost exactly to those of *P. crenulatus*. There are, nonetheless, a few noteworthy differences. Firstly, the production of the gnathopod 2 merus is different between the two species, being acute and pointed in *P. lobatus*, but more rounded in *P. crenulatus.* Also, Haswell does not mention any posterodorsal production of the posterior segments of the pereon and the pleon, while he does note a rounded elevation of the anterior four pereonites which are not present on *P. crenulatus.* The type material of *P. lobatus* is lost and it has not been recorded since (the record of Pirlot (1938) is considered erroneous), thus making comparison of specimens impossible. However, given the subtlety of character states in distinguishing members of this genus, and the apparent slight differences between the material examined here and that described by Haswell (1885), it is likely that these are indeed two distinct species.

Distribution. *Australia*. Queensland: Lizard Island (current study). *Fiji*. Viti Levu: Momi Bay (Myers 1985).

Podocerus laevis (Haswell, 1885)

Dexiocerella laevis Haswell, 1885: 111, pl. 18 figs 10–12.
Podocerus laevis. —Stebbing, 1906: 704. —Stebbing, 1910: 651. —Sheard, 1937: 28.
Not *Platophium laeve* Walker, 1904: 295, pl. 7, fig. 51 (=*Podocerus walkeri* Rabindranath, 1972).
Not *Podocerus laevis*. —Sivaprakasam 1969: 381, fig. 4e–f (=*Podocerus walkeri* Rabindranath, 1972).

Material examined. Not collected in the current survey.

Type locality. Long Island (previously Port Molle), Whitsunday Islands, Queensland, Australia.

Remarks. Haswell's (1885) original description and illustrations of this species are extremely sketchy, thus making it hard to discern from other species in the genus. The type material of *P. laevis* is lost (Springthorpe & Lowry 1994) and it has not been collected by any subsequent author since its original description (the records of Stebbing (1906, 1910) and Sheard (1937) given in the synonymy section above are based on that of Haswell, that is, these authors never actually examined any material of *P. laevis*). At this point, it must be considered as an unidentifiable species.

Podocerus talegus talegus J.L. Barnard, 1965
(Figs 8, 9)

Podocerus talegus J.L. Barnard, 1965: 544, fig. 35.
Podocerus cristatus. —Ledoyer, 1972: 266, fig. 72.

Material examined. 1 male, AM P77416 and 1 female AM P77417 (QLD 11); 3 females, 1 male, AM P77418 (QLD 1977); 1 female, AM P77419 (QLD 1961); 2 females AM P77420 (QLD 2006); 2 females, AM P77421 (QLD 1959); 1 female, AM P77422 (QLD 1978); 1 female, AM P77423 (QLD 1975); 3 females, AM P77424 (QLD 2000); 1 female, AM P77425 (QLD 1996); 3 males, 6 females, AM P77426 (QLD 1962). 3 females, 1 male, AM P77427 (QLD 1976); 2 females, 1 male, AM P77428 (QLD 1994); 2 females, AM P77429 (QLD 1992); 1 specimen, AM P77430 (QLD 1995).

Type locality. Ifaluk Atoll, Caroline Islands, Micronesia.

Description. Based on male, 3.5 mm, AM P77416.

Head. *Mandible* right incisor with 5 teeth; lacinia mobilis with 4 teeth; accessory setal row with 2 setae; molar present, well developed; left incisor with 5 teeth. *Maxilliped* inner plate quadrilateral, smaller than outer plate; inner margin of outer plate with row of robust setae; palp article 2 scarcely setose on inner margin; article 3 with few distal setae; article 4 reduced, blunt.

Pereon. *Pereonites* not fused; pereonites 2–6 with gills; pereonite 7 slightly produced posterodorsally, with clumps of dorsal setae. *Gnathopod 1* coxa acutely produced anterodistally; propodus subovate, with 3

rows of submarginal setae near anterior margin; posterior margin continuously rounded with undefined palm; dactylus inner margin deeply serrate with 5 teeth. *Gnathopod 2* coxa reduced; basis with 2 large anterodistal lobes; merus forming acute, short distal projection; propodus massive, subovate, length 1.25 x width; palm not defined, palm margin irregular, with 2 large midpalmar projections and broad, well developed distal shelf with 5–6 small, rounded lobes. *Pereopods 3–4* well developed. *Pereopod 5* missing. *Pereopod 6* basis subovate, slightly longer than merus; merus subequal in length to carpus; propodus shorter than carpus and merus combined; dactylus about half propodus length. *Pereopod 7* similar to pereopod 6.

Pleon. *Pleonites* not fused; pleonites 1–2 slightly produced posterodorsally, with clumps of dorsal setae. *Uropod 1* peduncle with distoventral spine; biramous with inner ramus almost twice as long as outer ramus and slightly longer than peduncle, with marginal row of minute denticles and 4–5 robust setae. *Uropod 2* well developed, peduncle lacking distoventral spine, biramous with inner ramus longer than outer ramus. *Uropod 3* uni-articulate. *Telson* posterodorsally produced into subacute knob with 2 apical setae.

Female (sexually dimorphic characters). Based on female, 3 mm, AM P77417. *Gnathopod 2* basis with acute distal projection; merus distal projection slight, shorter than in male; propodus subovate, palm defined by 2 robust setae, palm margin convex, smooth, without projections.

Habitat. Among algae, *Halimeda* sp. and *Caulerpa* sp.

Remarks. *Podocerus talegus talegus* is readily distinguished by the ornamentation of the gnathopod 2 palm. It differs from the other subspecies in the group, *Podocerus talegus lawai* J. L. Barnard, 1970, and *P. talegus levuensis* Myers, 1985, by the evenly-rounded posterior margin of the gnathopod 1 propodus. Additionally, it differs from *P. talegus levuensis* by the lack of a palm-defining projection on the posterior margin of the gnathopod 2 propodus.

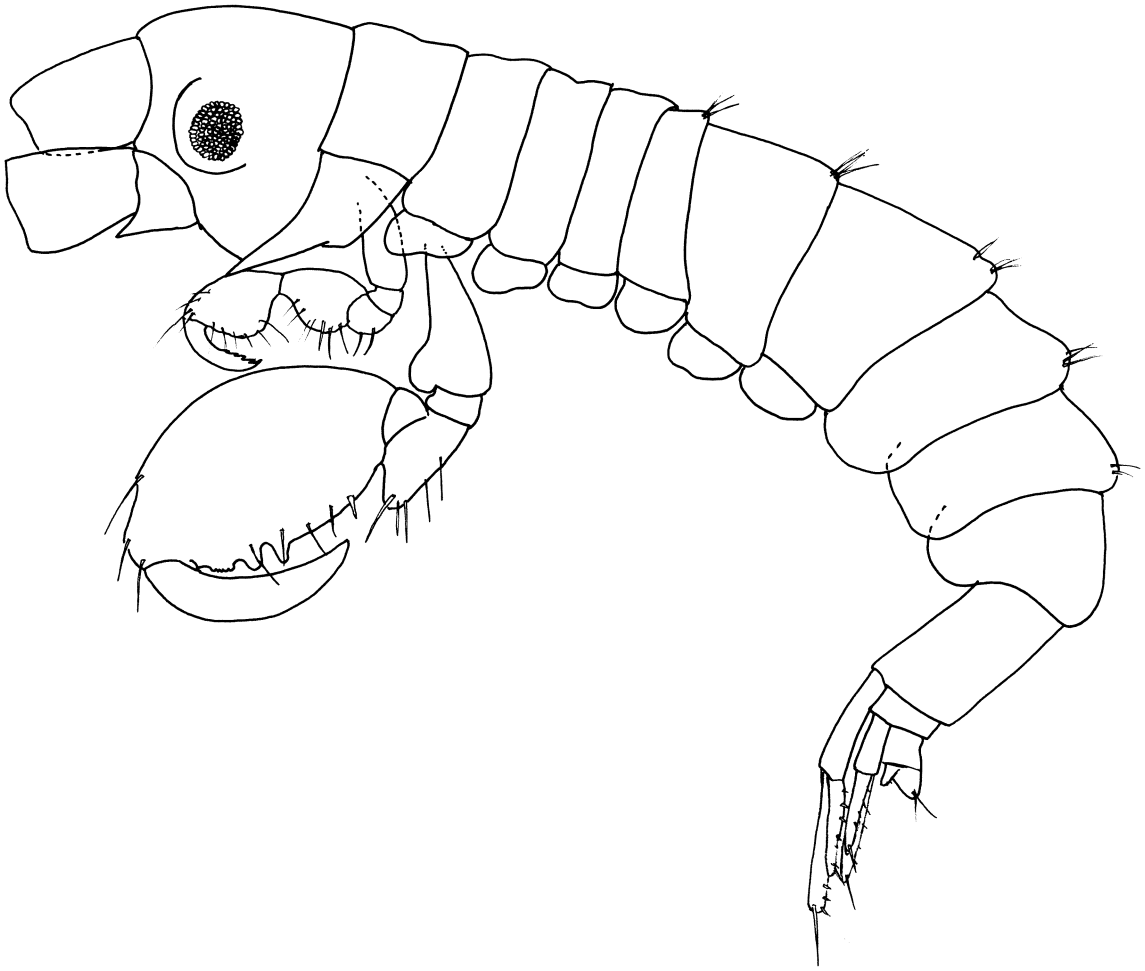

FIGURE 8. *Podocerus talegus talegus* J.L. Barnard, 1965, male 3.5 mm, AM P77416, west end of Blue Lagoon, Lizard Island, Great Barrier Reef.

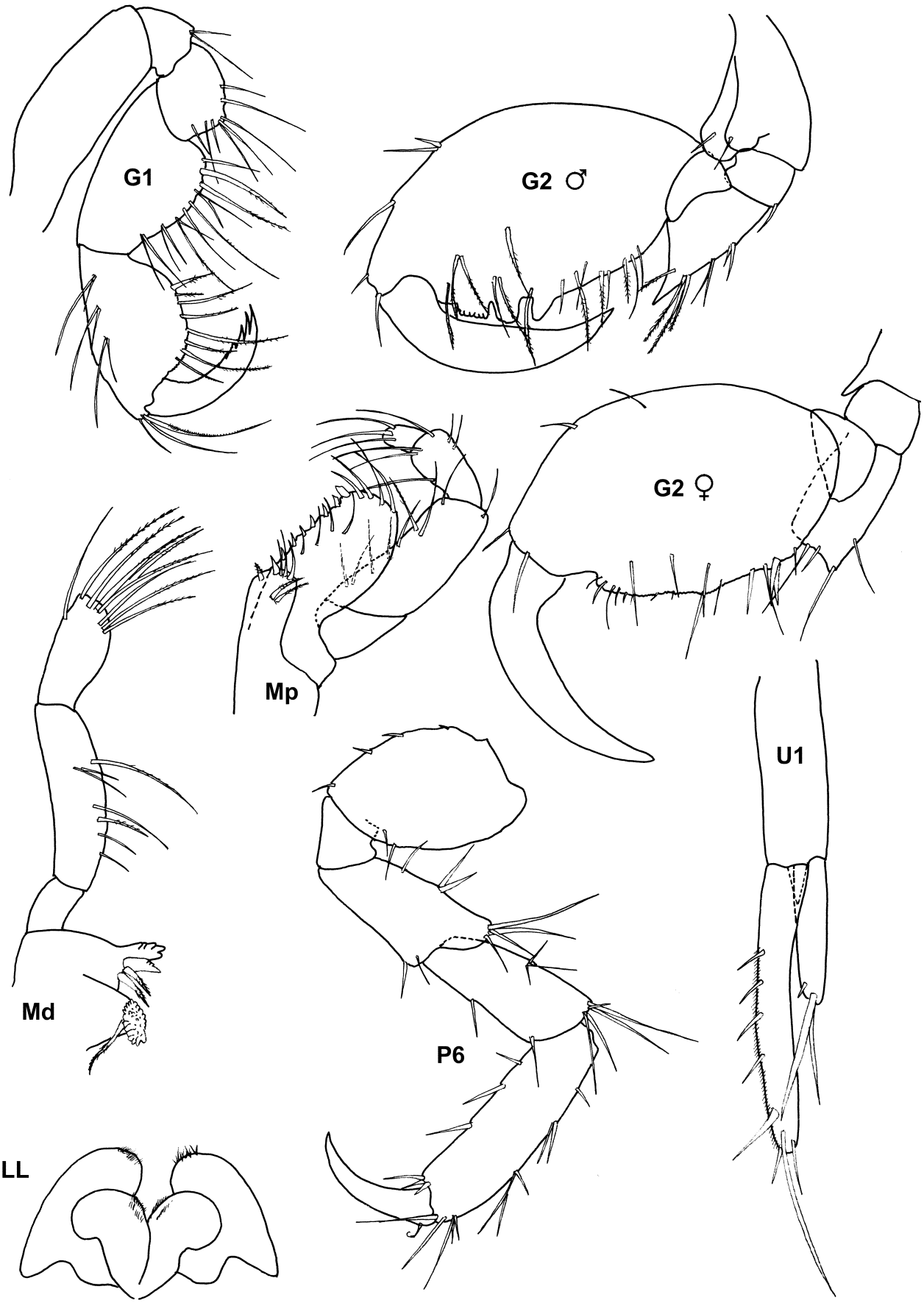

FIGURE 9. *Podocerus talegus talegus* J.L. Barnard, 1965, male 3.5 mm, female 3 mm, AM P77416, west end of Blue Lagoon, Lizard Island, Great Barrier Reef.

Ledoyer (1972) states that his identification of *P. cristatus* (Thomson, 1879) is similar to *P. talegus* but that the palmar projections of the second gnathopod are much more pronounced in his specimens. Upon examination of specimens collected for this study, however, it was noted that the strength of these projections depends on the maturity of the animal and angle of the appendage on the slide during examination. After comparing illustrations of Ledoyer's (1972) specimen with that of J.L. Barnard's (1965), it was concluded that these are, in fact, conspecific, thus, greatly increasing the known distributional range of the subspecies.

Distribution. *Australia*. Queensland: Lizard Island (current study). *Madagascar*. Tuléar (Ledoyer 1972). *Micronesia*. Caroline Islands: Ifaluk Atoll (J.L. Barnard 1965).

***Podocerus uncinatus* sp. nov.**
(Figs 10, 11)

Type material. Holotype, female, 2.5 mm, AM P70848, Cobia Hole, Lizard Island (1439.154'S 14526.851'E), coral rubble, patches of reef and sand, 17.2 m, P.B. Berents, 25 February 2005 (QLD 1669).

Additional material examined. 1 female, AM P70690 (QLD 1640).

Type locality. Cobia Hole, Lizard Island, Queensland, Australia (1439.154'S 14526.851'E).

Etymology. After the Latin '*uncinatus*', meaning 'hooked' and referring to the hook-like dactylus of pereopod 5.

Description. Based on holotype, female, AM P70848. *Gills* on pereonites 2–6. *Pereonites, pleonites* not fused, not produced posterodorsally, and with few dorsal setae.

Head. *Antenna 1* peduncle article 2 slightly longer than article 3; accessory flagellum 1-articulate; primary flagellum short, approximately 40% peduncle length, with 3 articles. *Antenna 2* distinctly longer than antenna 1. *Mandible* right incisor with 5 teeth; lacinia mobilis with 4 teeth; accessory setal row with 3 setae; left incisor with 5 teeth; palp stout, article 2 less than twice as long as broad, article 3 about 1.5 times as long as broad, densely setose distally. *Maxilla 1* outer plate with 9 stout apical setal-teeth. *Maxilliped* inner plate quadrilateral; outer plate about twice length of inner plate, inner margin smooth; palp article 2 setose on inner margin; article 3 with moderately dense distal setae; article 4 blunt.

Pereon. *Pereonites* not fused; not produced posterodorsally, and with few dorsal setae; pereonites 2–6 with gills. *Gnathopod 1* coxa acutely produced anterodistally; propodus subtriangular, with about 5 rows of submarginal setae near anterior margin; palm convex, beginning about one-third along posterior margin of propodus, minutely serrate near dactyl hinge, without robust seta at corner of palm; dactylus with 2 accessory teeth, fitting palm. *Gnathopod 2* merus with rounded distal projection; propodus large, subovate, length about 1.25 x width; palm margin slightly convex, smooth, without distal shelf, sinus, or midpalmar projection; dactylus short, with distal accessory tooth. *Pereopods 3* and *4* well developed. *Pereopod 5* basis posterior margin with flange; merus shorter than basis; propodus subequal in length to carpus and merus combined; dactylus short and strongly curved, hook-like, about one-third propodus length. *Pereopod 6* basis with flange; merus shorter than basis; propodus shorter than merus and carpus combined; dactylus about half propodus length. *Pereopod 7* basis lacking flange; merus about subequal in length to basis; propodus shorter than carpus and merus combined; dactylus about half propodus length.

Pleon. *Pleonites* not fused, not produced posterodorsally, and with few dorsal setae. *Uropod 1* well developed; peduncle lacking distoventral spine; biramous, with inner ramus distinctly longer than peduncle and lacking marginal row of robust setae, outer ramus shorter than peduncle. *Uropod 2* well developed; peduncle lacking distoventral spine; biramous with inner ramus about twice peduncle length and lacking marginal row of robust setae, outer ramus slightly shorter than peduncle. *Uropod 3* reduced, uni-articulate. *Telson* apically rounded, posterodorsally produced into subacute knob with 2 apical setae.

Male (sexually dimorphic characters). Males not known.

Habitat. Coral rubble and sandy substrates, 8–18 m.

Remarks. The female of *Podocerus uncinatus* is similar to that of *P. walkeri walkeri* Rabindranath, 1972

(= *Platophium laeve* Walker, 1904), but may be distinguished from that species by the lack of dorsal carinations on the body. The gnathopod 1 propodus of *P. uncinatus* is stouter and subtriangular in shape, compared to that of *P. w. walkeri*, which is longer and more triangular. The gnathopod 2 merus of *P. w. walkeri* is also more acutely produced than that of *P. uncinatus.*

Though the Australian species described by Haswell are sketchily illustrated and poorly described, thus making accurate comparisons difficult, *P. uncinatus* appears to differ from *P. laevis* (Haswell, 1885) by the relative length and shape of the first antennae. It differs from *P. lobatus* (Haswell, 1885) in this character also, as well as lacking the dorsal carination of that species.

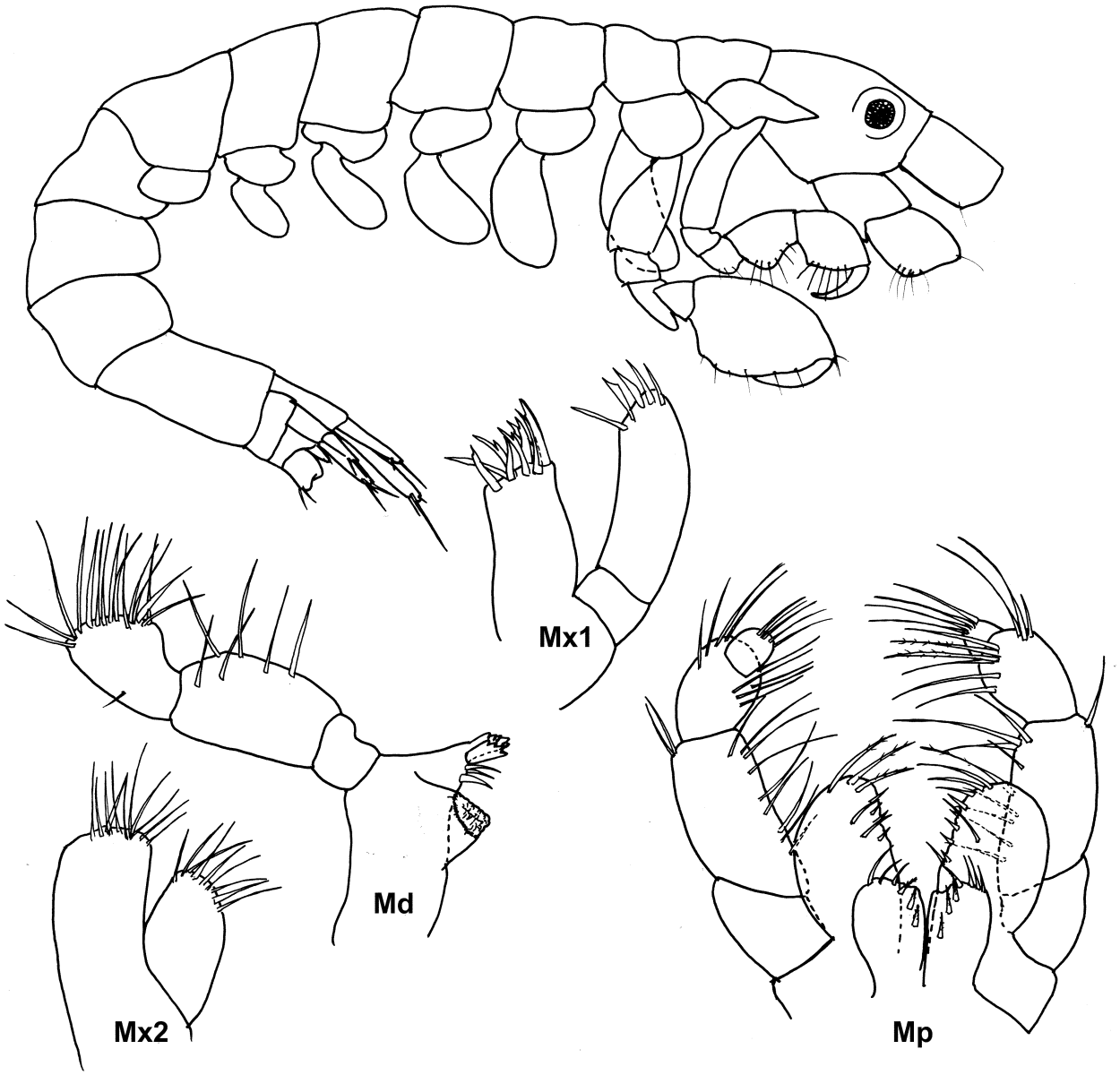

FIGURE 10. *Podocerus uncinatus* **sp. nov.**, holotype, female, 2.5 mm, AM P70848, Cobia Hole, Lizard Island, Great Barrier Reef.

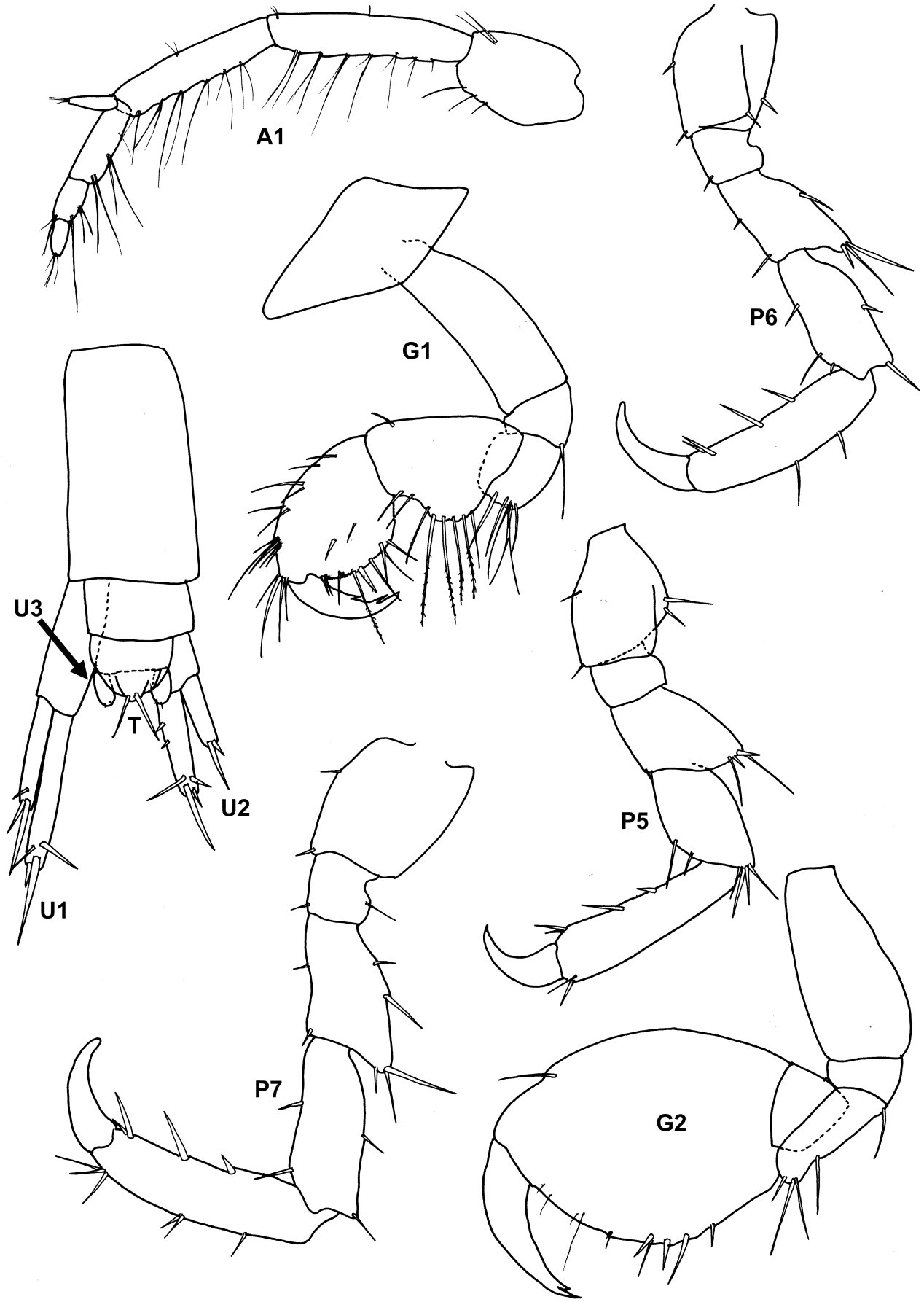

FIGURE 11. *Podocerus uncinatus* **sp. nov.**, holotype, female, 2.5 mm, AM P70848, Cobia Hole, Lizard Island, Great Barrier Reef.

Podocerus inconspicuus (Stebbing, 1888) females have a more elongate, triangular-shaped gnathopod 1 propodus, with a transverse palm compared to the more rounded and oblique palm of this species. The present species also lacks a distal lobe on the basis of gnathopod 2. It also differs from *Podocerus t. talegus* J.L. Barnard, 1965, in this latter respect, the *P. t. talegus* female having an acute process at the anterodistal margin of the basis. In addition, the mandibular palp of *P. t. talegus* is much more slender and elongate, the gnathopod 1 dactylus is distinctly serrate, while the gnathopod 2 dactylus lacks the accessory tooth of present in *P. uncinatus*. It is also quite similar to *P. talegus lawai* J.L. Barnard, 1970, and P*. cristatus* (Thomson, 1879) but lacks the dorsal carination of those species, as well as having a more convex gnathopod 1 palm. Finally it differs from *P. talegus levuensis* Myers, 1985, in the form of the gnathopod 1 dactylus, lacking the deep serrations of that species.

Distribution. *Australia*. Queensland: Lizard Island (current study).

References

Baldinger, A.J. (2001) An additional record of *Podocerus chelonophilus* (Chevreux & de Guerne, 1888) (Crustacea: Amphipoda: Podoceridae) from a sea turtle off the coast of Ecuador. *In:* K. Jazdzewski, A. Baldinger, C. O. Coleman, C. De Broyer, M. F. Gable & W. Plaiti (Eds), *Proceedings of the Xth International Colloquium on Amphipoda, Heraklion, Crete, Greece, 16-21 April 2000. Polskie Archiwum Hydrobiologii*, pp. 441–455. –

Barnard, J.L. (1953) On two new amphipod records from Los Angeles Harbor. *Bulletin of the Southern California Academy of Sciences*, 52, 83–87.

Barnard, J.L. (1955) Gammaridean Amphipoda (Crustacea) in the collections of the Bishop Museum. *Bernice P. Bishop Museum Bulletin*, 215, 1–46.

Barnard, J.L. (1959) Estuarine Amphipoda. *Allan Hancock Foundation Publications, Occasional Paper,* 21, 13–69.

Barnard, J.L. (1962) Benthic marine Amphipoda of southern California: families Aoridae, Photidae, Ischyroceridae, Corophiidae, Podoceridae. *Pacific Naturalist, 3*, 1–72.

Barnard, J.L. (1965) Marine Amphipoda of atolls in Micronesia. *Proceedings of the United States National Museum*, 117, 459–551.

Barnard, J.L. (1970) Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands. *Smithsonian Contributions to Zoology*, 34, 1–286.

Barnard, J.L. (1971) Keys to the Hawaiian marine Gammaridea, 0-30 meters. *Smithsonian Contributions to Zoology,* 58, 1–135.

Barnard, J.L., Thomas, J. D. & Sandved, K. B. (1988) Behaviour of gammaridean Amphipoda: *Corophium, Grandidierella, Podocerus,* and *Gibberosus* (American *Megaluropus*) in Florida. *Crustaceana, suppl.* 13, 234–244.

Barnard, K.H. (1925) Contributions to the crustacean fauna of South Africa. No. 8. Further additions to the list of Amphipoda. *Annals of the South African Museum,* 20, 319–380, pl. 334.

Barnard, K.H. (1935) Report on some Amphipoda, Isopoda, and Tanaidacea in the collections of the Indian Museum. *Records of the Indian Museum*, 37, 279–319.

Bruzelius, R.M. (1859) Bidrag till kannedomen om Skandinaviens Amphipoda Gammaridea. *Kungliga Svenska Vetenskapsakademiens Handlingar, Series 2*, 3, 1–104, pls 101–104.

Chevreux, E. (1900) Amphipodes provenant des campagnes de l'Hirondelle (1885-1888). *Résultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert Ier, Prince Souverain de Monaco*, 16, 115–118.

Chevreux, E. (1911) Campagnes de la *Melita*. Les amphipodes d'Algérie et de Tunisie. *Mémoires de la Sociét Zoologique de France,* 23, 145–285, pls 146–120.

Chevreux, E. (1935) Amphipodes provenant des campagnes du Prince Albert Ier de Monaco. *Résultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert Ier Prince Souverain de Monaco*, 90, 1–214, pls 211–216.

Chevreux, E. & de Guerne, J. (1888) Sur un amphipode nouveau (*Cyrtophium chelonophilum*), commensal de *Thalassocaretta* L. *Comptes Rendus de l'Academie des Sciences, Paris*, 88, 4 pp.

Chevreux, E. & Fage, L. (1925) Amphipodes. *Faune de France,* 9, 1–488.

Dallwitz, M.J. (2005) Overview of the DELTA System. http://delta-intkey.com. Last accessed (8/9/2007).

Dana, J.D. (1853) Crustacea. Part II. *United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842 under the command of Charles Wilkes, U.S.N.*, 14, 689–1618.

Haswell, W.A. (1885) Notes on the Australian Amphipoda. *Proceedings of the Linnean Society of New South Wales,* 10, 95–114, pls 110–118.

Leach, W.E. (1814) Crustaceology. *The Edinburgh Encyclopaedia, 7,* 383–434.

Ledoyer, M. (1972) Amphipodes gammariens vivant dans les alvéoles des constrictions organogènes récifales

intertidales de la région de Tuléar (Madagascar). Etude systématique et écologique. *Téthys Supplement*, 3, 165–285.
Linnaeus, C. (1758) Systema Naturae. *In*. Laurentii Salvii, Stockholm.
Lowry, J.K. & Myers, A.A. (2009) Foreword. *In*: Lowry, J.K. & Myers, A.A. (Eds), Benthic Amphipoda of the Great Barrier Reef, Australia. *Zootaxa*, 2260, 17–108.
Mateus, E.d.O. & Afonso, O. (1974) Étude d'une collection d'Amphipoda des Açores avec la description d'une nouvelle espèce. *Publicaçoes do Instituto de Zoologia "Dr Augusto Nobre", Faculdade de Ciências do Porto*, 126, 9–39.
Moore, P.G. (1995) *Podocerus chelonophilus* (Amphipoda: Podoceridae) associated with epidermal lesions of the loggerhead turtle, *Caretta caretta* (Chelonia). *Journal of the Marine Biological Association of the United Kingdom*, 75, 253–255.
Myers, A.A. (1985) Shallow water, coral reef and mangrove Amphipoda (Gammaridea) of Fiji. *Records of the Australian Museum, Supplement*, 5, 1–143.
Myers, A.A. & Lowry, J. K. (2003) A phylogeny and a new classification of the Corophiidea Leach, 1814 (Amphipoda). *Journal of Crustacean Biology*, 23, 443–485.
Nayar, K.N. (1959) The Amphipoda of the Madras coast. *Bulletin of the Madras Government Museum, Natural History Section*, 6, 1–59.
Nayar, K.N. (1965) On the gammaridean Amphipoda of the Gulf of Mannar, with special reference to those of the Pearl and Chank beds. *Proceedings of the Symposium of the Crustacea*, 1, 133–165.
Ortiz, M. & Lalana, R. (2003) On a new species of *Podocerus* (Amphipoda: Gammaridea: Podoceridae) from the Indonesian Archipelago. *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"*, 45, 61–66.
Ortiz, M. & Silva, S. (1990) Contribución al studio de los anfípodos (Crustacea, Peracarida) de la República Popular de Mozambique. *Revista de Investigaciones Marinas*, 11, 179–181.
Pirlot, J.M. (1938) Les amphipodes de l'expédition du Siboga. Deuxième partie. Les amphipodes gammarides III. Les amphipodes littoraux II. Familles des Dexaminidae, Talitridae, Aoridae, Photidae, Ampithoidae, Corophiidae, Jassidae, Cheluridae et Podoceridae. Première partie (addendum). Les amphipodes hypérides. Familles des Lanceolidae, Cystisomatidae et Oxycephalidae. La sexualit chex Cystisoma Guérin Méneville. *Siboga-Expeditie, Monographie*, 33f, 329–388.
Rabindranath, P. (1972) A new species of *Podocerus* Leach (Amphipoda) with a redescription of *Podocerus brasiliensis* (Dana, 1853). *Crustaceana, Supplement*, 3, 299–307.
Ren, X. (1994) Studies on Gammaridea (Crustacea: Amphipoda) from Hong Kong, Daya Bay and adjacent waters. *Studia Marina Scinica*, 35, 249–271.
Ruffo, S. (1993) Family Podoceridae. *Mémoires de l'Institute Océanographique, Monaco*, 13, 669–680.
Schellenberg, A. (1928) Report on the Amphipoda. *Transactions of the Zoological Society of London*, 22, 633–692.
Schellenberg, A. (1938) Litorale Amphipoden des tropischen Pazifiks nach Sammlungen von Prof. Bock (Stockholm), Prof. Dahl (Berlin) und Prof. Pietschmann (Wein). *Kungliga Svenska Vetenskapsakademiens Handlingar Series 3*, 16, 1–105.
Sheard, K. (1937) A catalogue of Australian Gammaridea. *Transactions and Proceedings of the Royal Society of South Australia*, 61, 17–29.
Sivaprakasam, T.E. (1969) Notes on some amphipods from the south east Coast of India. *Journal of the Marine Biological Association of India*, 9, 372–383.
Springthorpe, R.T. & Lowry, J.K. (1994) Catalogue of crustacean type specimens in the Australian Museum: Malacostraca. *Technical Reports of the Australian Museum*, 11, 1–134.
Stebbing, T.R.R. (1888) Report on the Amphipoda collected by H.M.S. Challenger during the years 1873-1876. *Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873-76, Zoology*, 29, 1–1737, pls 1731–1210.
Stebbing, T.R.R. (1899) On the true *Podocerus* and some new genera of amphipods. *Annals and Magazine of Natural History, Series 7*, 3, 237–241.
Stebbing, T.R.R. (1906) Amphipoda. I. Gammaridea. *Das Tierreich, 21*, 1–806.
Stebbing, T.R.R. (1910) Scientific results of the trawling expedition of H.M.C.S. "Thetis". Crustacea. Part V. Amphipoda. *Australian Museum Memoir*, 4, 565–658, pls 547–560.
Thomas, J.D. & Barnard, J.L. (1992) *Podocerus chelonophilus*, a testudinous amphipod newly recorded from the Western Atlantic Ocean. *Bulletin of Marine Science*, 50, 108–116.
Thomson, G.M.(1879) Additions to the amphipodous Crustacea of New Zealand. *Annals and Magazine of Natural History*, 5(4), 329–333, pl. 16.
Walker, A.O. (1904) Report on the Amphipoda collected by Professor Herdman, at Ceylon, in 1902. *Ceylon Pearl Oyster Fisheries - 1904- Supplementary Reports*, 17, 229–300, pls 221–228.
Yamato, S. (1992) A new species of *Podocerus* (Amphipoda, Podoceridae) from the carapace of a loggerhead sea turtle in Japan. *Publications of the Seto Marine Biological Laboratory*, 35, 281–288.