

## A new genus and new species of Sphaeromatidae (Crustacea: Isopoda) from the Great Barrier Reef, Australia

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### Abstract

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*Pooredoce garyi* gen. nov., sp. nov., is described from Lizard Island, northern Great Barrier Reef, Australia. The genus is related to the group of sphaeromatid genera characterised by having long ‘finger-like’ extensions to the articles of the maxilliped palp, stout robust setae on the inferior margins of pereopods 1–3 and the uropodal endopod round in section, with the exopod about half as long as the endopod; similar genera are *Cymodoce* Leach, 1814 (Indo-Pacific species), *Koremasphaera* Bruce, 2003 and *Oxinasphaera* Bruce, 1997. *Pooredoce* gen. nov. is characterized by the adult male having a dorsally recessed dorsum to the pleotelson, the posterior margin of which has three enclosed foramens, two visible dorsally, the third visible only from the interior of the posterior margin, the two foramens are formed by the pleotelson posterolateral and median margin lobes coming into contact posteriorly; and the posterior margin of the pleon forms an irregular posteriorly directed ridge. *Pooredoce garyi* was collected from the reef crest and is known from the type locality, Lizard Island and at Hicks Reef.

### Keywords

Crustacea, Isopoda, Sphaeromatidae, Great Barrier Reef, coral reef, Queensland, Australia, southwestern Pacific, taxonomy

### Introduction

The Sphaeromatidae of the Great Barrier Reef can be considered as comparatively well known, notably following the work of British authors Keith Harrison and David Holdich (e.g. Harrison and Holdich 1982, 1984; also Bruce 1997; earlier references therein). Poore (2002; 2005) lists 203 species of Sphaeromatidae from Australia, 60 of which are known from Queensland. In comparison eastern Africa (southern Somalia to Mozambique and Madagascar), a similar stretch of tropical continental coast, has 34 recorded species of Sphaeromatidae (Benvenuti and Messina 2000; Kensley 2001; Schotte and Kensley 2005), but the intensity of sampling would probably have been far lower than in Queensland. The Great Barrier Reef, including the adjacent Coral Sea reefs, has 23 species of Sphaeromatidae, recorded principally from Heron Island and Lizard Island, the sites of two major research stations. Despite the high number of species, documentation of this family is far from complete for the Great Barrier Reef and tropical Australia, Poore et al. (2002) commenting that the documented diversity for the family in Australia is still at about 50% of the expected total.

This contribution describes a new genus and new species from the northern Great Barrier Reef, Queensland, named with pleasure for Gary Poore, colleague and friend, in

recognition of his great contribution to knowledge of Australian isopod and decapod crustaceans.

### Methods and abbreviations

Terminology, measurements and descriptions follow Bruce (e.g. 1997, 2003). The generic description was produced using a DELTA (Dallwitz et al. 1997) generic data set that is under development. Setal terminology follows Watling (1989).

#### Abbreviations

RS—robust seta/setae; PMS—plumose marginal seta/e; MTQ—Museum of Tropical Queensland, Queensland Museum, Townsville.

### Taxonomy

#### Family Sphaeromatidae Latreille, 1825

#### *Pooredoce* gen. nov.

*Type species. Pooredoce garyi*, sp. nov., here designated and by monotypy.

*Diagnosis.* Adult male. *Pereonite* 7 narrower than pereonite 6, not extending to lateral body margin. Pleon dorsal surface without process; posterior margin with plate-like extension.

*Pleotelson* dorsally flat, posterior margin with two small submedian foramens, with hardened boss anterior to median notch, with ventral thickened rim; lateral margins forming dorsally directed ridge. *Maxilliped* palp articles 2–4 medial margins extended, forming finger-like lobes. Uropod exopod reduced, mobile, round in section, inserted near midpoint of lateral margin of peduncle-endopod, distally with hard terminal spike; endopod round in section, distally with hard terminal spike.

*Description of male.* Body vaulted, dorsal surfaces granular, densely setose, unable to conglobate; strongly sexually dimorphic. *Head* with rostral point present, dorsally visible, separating antennular bases; without paired incisions in front of eyes, lateral margins not laterally extended to body outline (antennules more or less ventral). *Eyes* lateral, posteriorly lobed. *Pereonite 1* lateral margins not anteriorly produced, not laterally enclosing head, anteriorly without 'keys'; pereonites 2– or 5–7 with posterior margin raised, forming broad and low transverse ridge. *Sternite 1* without cuticular mesial extensions. *Pereonite 7* narrower than pereonite 6, coxal margin free. *Coxae* distally narrow, distally rounded, coxae without ventral 'lock and key' processes or ventral groove, those of pereonite 6 not large, not overlapping those of pereonite 7. *Pleon* consisting of 4 visible segments (as determined by lateral sutures); pleonite 1 entire, posterior margin even, as wide as remainder of pleon, extending to pleon lateral margins; sutures (except first) running to lateral margin, all separate, long; pleonal sternite short relative to width; dorsal surface without process; posterior margin with plate-like extension, without 'keys'. *Pleotelson* flat, anteriorly as wide as pleon; posterior margin with two small submedian foramens; with hardened boss anterior to median notch, with ventral thickened rim; lateral margins forming ridge.

*Antennule* peduncle with basal articles medially not in contact, peduncle 1 and 2 robust, article 3 slender; inferior margin without hard cuticular spines; article 2 approximately 0.5 as long as article 1; with articles 2 and 3 colinear, article 3 longer than article 2; longer than peduncular article 3. *Antenna* peduncle articles less robust than antennule, peduncular articles all of similar thickness.

*Epistome* anteriorly narrow, with median constriction, elongate. *Mandible* incisor wide, multicuspid; lacinia mobilis present, tricuspid; molar process gnathal surface with transverse ridges, rounded. *Maxillule* lateral lobe RS with some or all serrate, mesial lobe with 4 major RS, these setae being heavily serrate. *Maxilla* with setae on middle and lateral lobes serrate. *Maxilliped* palp articles 2–4 medial margins extended, forming finger-like lobes, article 2 not expanded; endite distal margin truncate, without clubbed RS.

*Pereopod 1* ambulatory. *Pereopod 2* similar in proportion to pereopod 3. *Pereopods* with inferior margins of ischium to carpus not bearing dense setulose fringe; ischium superior margin with sinuate acute RS, pereopods 1–3 or 4 ischium superior margin without long stiff slender setae. *Pereopods 1–3*, inferior margins of merus, carpus and propodus palm with widely-spaced conspicuous RS along inferior margins. *Dactylus* of all pereopods with simple secondary unguis.

*Penial processes* entirely separate, basally in contact, short (not extending beyond pleopod peduncles), tapering smoothly from base, apex bluntly rounded.

*Pleopod 1* rami not operculate; exopod lamellar, of similar proportions to exopod, longitudinal axis weakly oblique, mesial margin lamellar, proximomedial heel absent; exopod distally subtruncate, margins not serrate. *Pleopod 2* endopod about as long as exopod; exopod distal margins not deeply serrate; *appendix masculina* inserted basally, margins curving weakly to lateral, 1.25 times as long as endopod, distally bluntly rounded. *Pleopod 3* exopod transverse suture present; endopod of similar proportions to exopod. *Pleopod 4* rami without PMS; exopod transverse suture present, thickened transverse ridges absent, lateral margin not thickened, without short simple marginal setae; endopod thickened transverse ridges present, mesial margin without deep distal notch, without proximomedial lobe. *Pleopod 5* exopod transverse suture present, entire, thickened transverse ridges absent, lateral margin without short simple setae, not thickened, 3 discrete scale patches, scale patches forming protruding lobes. *Pleopod 5* endopod with thickened transverse ridges absent, with proximomedial lobe.

*Uropod* rami not strongly flattened, not forming part of continuous body outline; exopod (of adult male) reduced, mobile, exopod round in section, inserted near midpoint of lateral margin of peduncle-endopod, distally with acute; endopod round in section, distally with hard terminal spike.

*Female.* Body surfaces densely setose. *Pleon* posterior margin not produced. *Pleotelson* dorsally domed, posterior margin obscurely trilobate, median lobe overriding lateral lobes, ventrally with single simple exit channel. *Uropod* rami flat, exopod about half as long as endopod; appendages otherwise similar to male.

No ovigerous females were present in the material but the close relationship of this genus to other genera in the *Cymodoce*-group of genera would strongly suggest that the mouthparts would be metamorphosed.

*Remarks.* *Pooredoce* gen. nov. can be identified by, in males, the cylindrical uropods, with the exopod smaller than the endopod, both rami being terminally acute, and the bi-perforate posterior pleotelson margin, which also has a median boss. Females have conspicuously setose dorsal surfaces, and that character together with the details of the uropods and pleotelson (as figured) serve to identify females in the absence of males.

*Pooredoce* is allied to a group of genera within the Sphaeromatidae characterised by a trilobate pleotelson posterior margin, the maxilliped palp articles 2–5 being greatly elongate ('finger-like'), the inferior margins of the merus–propodus of pereopods 1–3 with conspicuous robust setae, and uropods with a cylindrical in section endopod and a small exopod (50% or less than the length of the endopod) set about mid-length on the fused endopod peduncle. These genera in the broadest sense include the Indo-Pacific species of *Cymodoce* Leach, 1814 (see Harrison and Holdich 1984; Bruce 1997, generic remarks), *Oxinasphaera* Bruce, 1997 and *Koremasphaera* Bruce, 2003. In *Cymodoce* the uropodal exopod is flattened and comparatively larger than the other

genera mentioned; in *Koremasphaera* the trilobate pleotelson is scarcely evident. The *Cilicaea*–*Cilicaeopsis*–*Paracilicaea* group of genera share the maxilliped, pleotelson and pereopod characters but differ conspicuously to the other genera mentioned in having the uropodal exopod cylindrical in section and large, while the endopod is reduced to a small lobe (see figures in, for example, Harrison and Holdich 1984; Benvenuti and Messina 2000).

The pleotelson posterior margin of *Pooredoce* gen. nov. is complex, essentially trilobate, and conforming to the structure of ‘two sub-median notches’ or ‘median notch with median process’. Such a pattern is present in the genera *Cymodoce*, *Cilicaea*, *Cilicaeopsis*, *Paracilicaea* (see Harrison and Holdich, 1984) and *Oxinasphaera* Bruce, 1997 (although *Cilicaeopsis* lacks a lobe within the median sinus). In the new genus the pleotelson lateral ‘lobes’ meet at the midline and the median lobe is posteriorly in contact with the lateral ‘lobes’ leaving the sinuses posteriorly closed off and forming two holes (figs. 1E–G).

This form of pleotelson, with the submedian sinuses posteriorly closed off, is not unique, occurring in the species *Cilicaea caniculata* (Thomson, 1879) (see Hurley and Jansen 1977). A pleotelson morphology approaching that of the new genus can be seen in some *Paracilicaea* Stebbing, 1910 such as *P. stebbingi* Baker, 1926 (see Harrison and Holdich 1984), *P. mirabilis* Benvenuti and Messina, 2000 and also in *Cilicaea calcarifera* Harrison and Holdich, 1984, but in all these species the submedian notches are posteriorly open. These genera are characterized by, among other characters, a uropod exopod that is round in section and the endopod reduced to a stub.

*Pooredoce* has one presumed derived or apomorphic character that is shared only with *Oxinasphaera*, that of the uropods having a cylindrical uropodal endopod and an exopod that is about half the length of the endopod and cylindrical or semi-cylindrical in shape; each ramus is tipped with a hardened ‘spike’. *Koremasphaera* is similar, but the uropodal exopod is large, about as long as the endopod. *Oxinasphaera* is defined by the unique apomorphy of hardened spikes on the antennule peduncle; the present genus lacks these, but does have a unique and defining pleon and pleotelson morphology.

#### *Pooredoce garyi* sp. nov.

Figures 1–4

**Material examined.** Holotype, ♂ (4.1 mm), North Point, Lizard Island, 14.64553°S, 145.45335°E, 12 April 2008, from dead coral heads, 1.0–1.5 m, CReefs stn CGLI 20A, coll. N.L. Bruce, CReefs (MTQ–QM W30539).

Paratypes, ♂ (3.0 mm, immature), ♀ (non-ovig. 3.2, 3.0, 2.9 mm), juveniles (2.7, 2.5, 2.4, 2.4, 2.3 mm), same data as holotype (MTQ–QM W30540).

Additional material. ♂ (3.3 mm), ♀ (non-ovig. 2.9 mm), manca (1.9 mm), Hicks Reef, 14.44803°S, 145.49920°E, 21 February 2009, outer reef, dead coral heads on reef edge, 5.0–7.0 m, CReefs stn LIZ09-16E, coll. N. Bruce & M. Błażewicz-Paszkowycz. (MTQ–QM W31261).

**Description of male.** Body 1.8 times as long as greatest width, lateral margins subparallel, widest at pereonites 3–6; posterior dorsal raised transverse ridges surfaces granular, setose.

Cephalon anterior margin without transverse ridges. Pereonite 1 about 1.2 times as long as pereonite 2; pereonites 2–6 subequal in length, pereonite 7 slightly shorter than 6.

*Antennule* peduncle article 1 1.7 times as long as wide, about 2.1 times as long as article 2; article 3 about half as long as article 1, 2.8 times as long as wide, 1.4 times as long as article 2; flagellum 9-articled, about 2.9 times as long article 3. *Antenna* peduncle article 1 short, articles 2 and 3 subequal in length, article 3 about 0.8 times as long as article 4; articles 4 0.7 as long as article 5; flagellum about 0.8 times as long as peduncle, extending to middle of margin of pereonite 1, with 9 articles.

*Epistome* anteriorly narrowly rounded, lateral margins with medial constriction; indistinct transverse ridge of nodules present. *Left mandible* incisor with 3 cusps, lacinia mobilis with 3 cusps, spine row of 3 curved, serrate spines; right mandible incisor with 3 cusps, spine row of 5 broad-based distally serrate spines; molar process round, crushing surface strongly ridged; palp article 1 1.2 as long as article 2 subequal, article 2 distolateral margin with 4 biserrate setae; article 3 with 8 biserrate setae, terminal seta being longest. *Maxillule* mesial lobe with 2 long, strongly CP, 2 long fringed and 2 short simple RS; lateral lobe with 10 broad-based, serrate RS and 1 curved, slender RS on gnathal surface, twelfth prominently pectinate seta set between these. *Maxilla* lateral lobe and middle lobe with 6 and 7 curved, pectinate RS respectively, mesial lobe with about 14 serrate and biserrate RS, proximal seta longest. *Maxilliped* endite lateral margin strongly convex, distal margin sub-truncate, with 8 sinuate CP RS, 1 blunt simple RS at sublateral angle, distomesial margin with 2 CP RS and single coupling hook; palp articles 2–5 with about 8, 8, 10 and 12 terminal setae respectively.

*Pereopod 1* without setulose fringe on inferior margins; *basis* about 2.7 times as long as greatest width, approximately 2.3 as long as propodus; *ischium* 0.6 times as long as basis, 1.8 times as long as greatest width, superior margin with 2, sinuate, acute RS; *merus* about 0.5 times as long as ischium, about 1.2 times as long as greatest width, superior distal angle with 2 acute RS, inferior margin with 3 blunt RS distal-most being longest; *carpus* 0.8 times as long as wide, inferior margin with 2 RS, one blunt one acute; *propodus* 1.7 times as long as greatest width, 0.7 as long as ischium, inferior margin with 3 RS, 3 submarginal setae; *dactylus* 0.8 times as long as propodus, inferior margin with few simple scales. *Pereopod 2* *basis* 2.7 times as long as greatest width, inferodistal angle with single long simple seta; *ischium* 0.8 times as long as basis, 2.5 times as long as greatest width, superior margin with 2 acute RS, distal inferior margin with 2 short acute RS; *merus* 0.5 as long as ischium, superior distal angle with 2 RS, inferior margin with 2 blunt RS; *carpus* 0.7 as long as merus, 1.2 times as long as wide, anterodistal angle with 1 RS, inferior margin with 2 blunt RS; *propodus* 0.6 times as long as ischium, 2.3 times as long as wide, superior distal angle with ~4 long simple seta and 1 sensory seta, inferior margin 1 acute RS and 2 submarginal setae; *dactylus* 0.6 as long as propodus, inferior margin distally with scales. *Pereopod 3* similar to pereopod 2. *Pereopods 5–7* similar. *Pereopod 7* *basis* 3.2 times as long as greatest width, inferodistal angle with 1 long simple seta; *ischium* 0.9 times as long as basis, 3.2 times as long as greatest

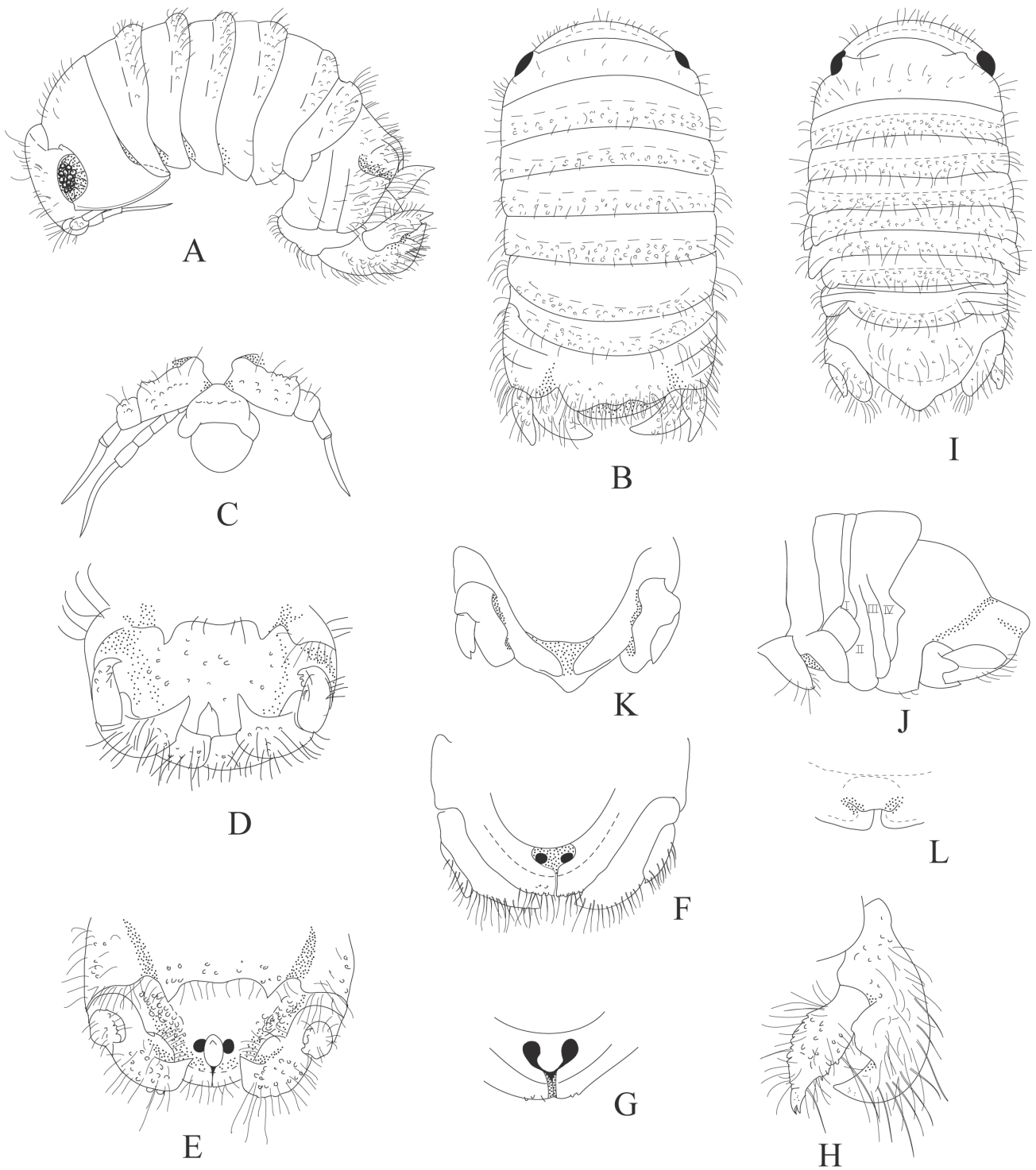


Figure 1. *Pooredoce garyi* sp. nov. A–H holotype, remainder ♀ 3.3 mm paratype. A, lateral view; B, dorsal view; C, epistome; D, pleon and pleotelson, posterior view; E, pleotelson, dorsal view; F, pleotelson, ventral view; G, pleotelson sinuses, ventral view; H, uropod; I, female, dorsal view; J, pleon and pleotelson, lateral view; K, pleotelson, ventral view; L, female pleotelson sinus, posterior view.

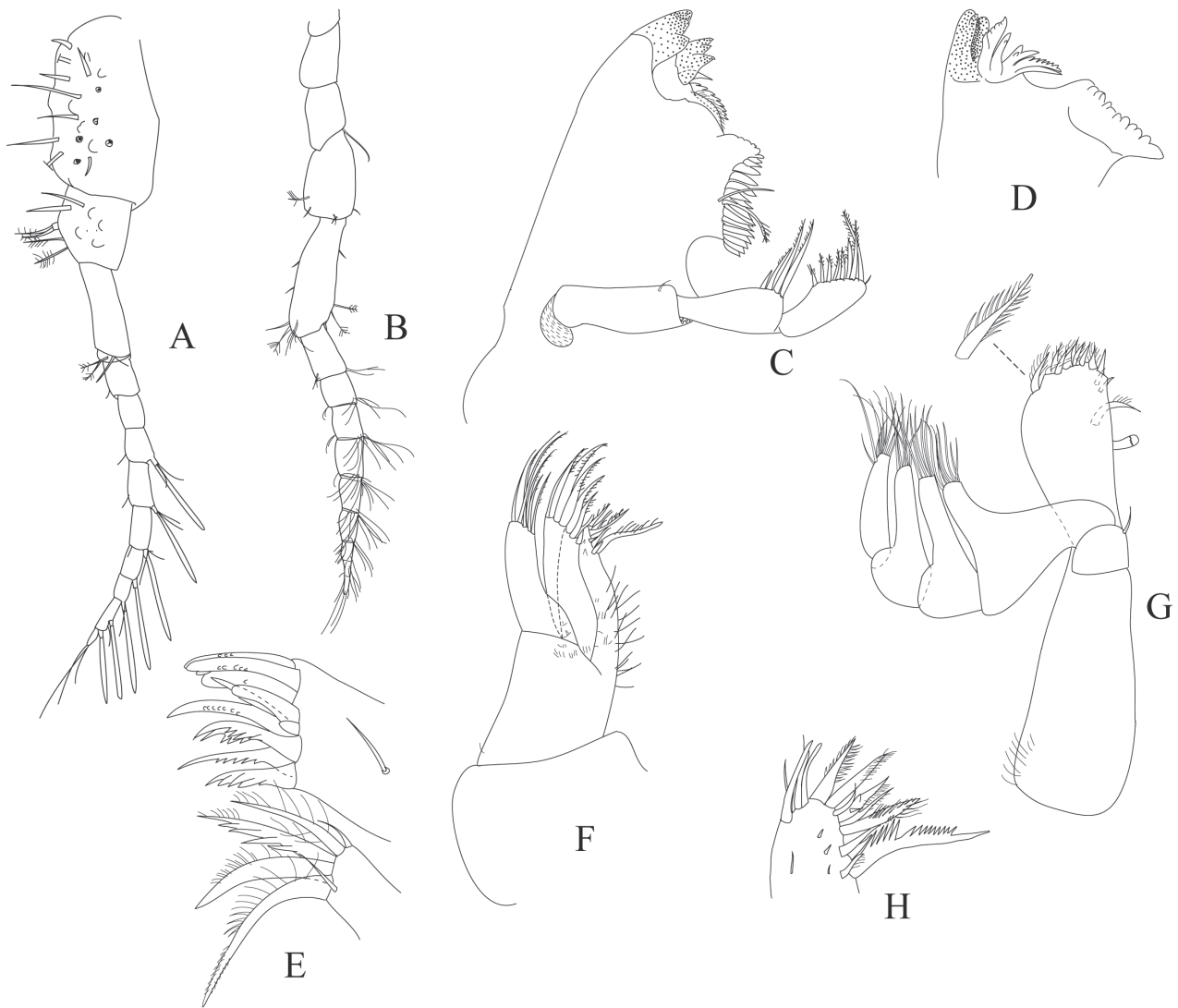


Figure 2. *Poeredoce garyi* sp. nov. A, B holotype, remainder ♂ 3.0 mm paratype. A, antennule; B, antenna; C, left mandible; D, right mandible incisor; E, maxillule; F, maxilla; G, maxilliped; H, maxilla mesial lobe.

width, superior margin with 4 sinuate, acute RS; *merus* 0.4 times as long as ischium, superior distal angle with 2 acute RS, inferior margin with 4 RS (3 acute, proximal RS blunt); *carpus* 0.8 times as long as *merus*, anterodistal margin with 5 acute serrate and biserrate RS, inferior distal angle with 4 RS, inferior margin with 1 RS; *propodus* 0.6 times as long as ischium, 2.9 times as long as wide, inferior margin with 2 RS, superior distal angle with 1 palmate seta and 3 simple setae; *dactylus* 0.5 as long as *propodus*.

*Penes* mutually adjacent, lateral margin distally convex, mesial margin weakly sinuate; approximately 3 times as long as basal width.

*Pleopod 1* exopod and endopod with c. 32 and 20 PMS respectively, exopod proximolateral RS present; endopod and

exopod subequal in length, endopod 1.4 times as long as greatest width, distal margin narrowly rounded. *Pleopod 2* exopod and endopod with c. 32 and 22 PMS respectively; *appendix masculina* 8.7 times as long as basal width, apically narrowly rounded. *Pleopod 3* exopod and endopod with c. 27 and 9 PMS respectively; exopod transverse suture entire. *Pleopod 4* exopod lateral margin proximally with 4 evenly spaced fine simple setae; endopod with single distal seta. *Pleopod 5* endopod distal margin truncate.

*Uropod (in situ)* exopod about 0.5 as long as endopod, 3.1 times as long as greatest width, extending to endopod apex, margins converging to acute, finely bifid apex; endopod about 2.8 as long wide, curving medially, apex acute, curving dorsally; both with fine nodules and heavily setose.

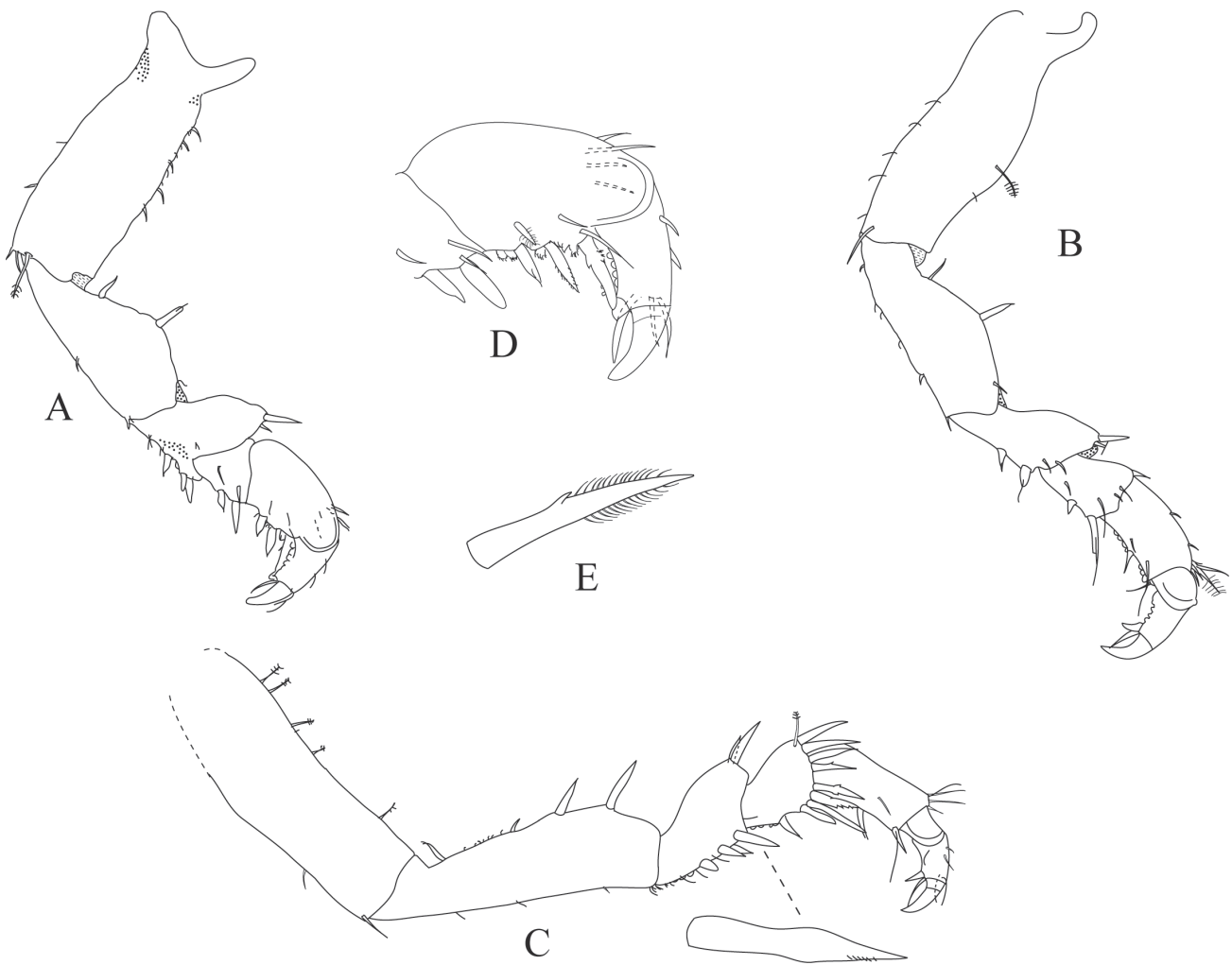


Figure 3. *Pooredoce garyi* sp. nov. Holotype. A–C, pereopods 1, 2 and 7 respectively; D, propodus and dactylus, pereopod 1; E, RS from inferodistal margin of carpus, pereopod 7.

*Female.* No ovigerous females present. Uropod endopod 2.8 as long as wide, posteriorly truncate; exopod 0.6 as long as endopod, 2.6 as long as wide, apically bifid, lateral side of apical division largest. Non-ovigerous females otherwise characterized by the generic characters.

*Size.* Adult males 3.3–4.1 mm; adult females 2.9–3.2 mm; juveniles 2.3–2.7 mm.

*Remarks.* Males can be identified by the generic characters, principally the unique pleotelson morphology in conjunction with the uropods. The females are rather similar to females of several other genera, notably *Cilicæa* and *Paracilicæa*, and are best identified by the very setose dorsal surfaces, the pleotelson posterior margin median notch appearing somewhat truncate and dorsal part being produced and overriding the

lateral notches. Females of *Oxinasphaera* lack a distinct pleotelson notch.

*Distribution.* Northern Great Barrier Reef; on exposed reef edges from mid-shelf at Lizard Island and the outer reef front at Hicks Reef, intertidal to at least 7 m.

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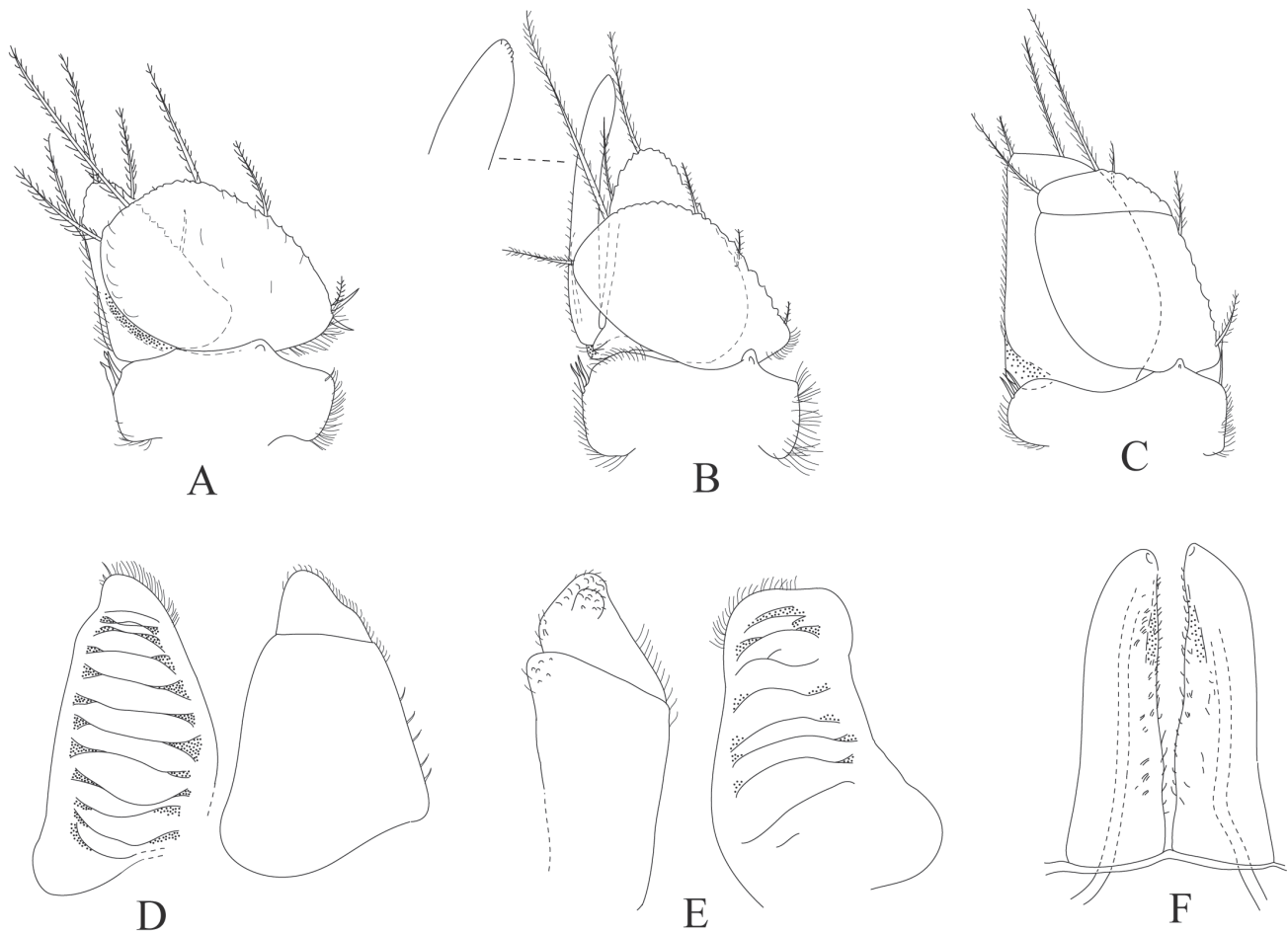


Figure 4. *Pooredoce garyi* sp. nov. Holotype except E, ♂ 3.0 mm paratype. A–E, pleopods 1–5 respectively; F, penes.

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