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New species of squat lobsters of the genus *Munida* from Australia

(<http://zoobank.org/urn:lsid:zoobank.org:pub:EA21667A-77A5-411D-9C1A-23ECFF3D505>)

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Abstract

McCallum, A.W., Ahyong, S.T. and Andreakis, N. 2021. New species of squat lobsters of the genus *Munida* from Australia. *Memoirs of Museum Victoria* 80: 113–152.

This study reports on new squat lobsters of the genus *Munida* collected during recent surveys of Australia's continental margins. We report on 33 species of *Munida* including seven new species and 14 new range extensions for Australia. More than 500 specimens were collected, mostly from the western continental margin of Australia, but also including a new species from deep water (>2000 m) off Tasmania. We provide new data on the colour patterns of some species and include molecular data from two mitochondrial markers (16S rRNA and COI) to support the taxonomic status of the new species.

Introduction

Australia has a vast marine realm, the third largest jurisdiction in the world, encompassing tropical and temperate biomes and connected to the highly biodiverse Indo-West Pacific region. Over the last decade, efforts to document the biodiversity of Australia's deep seafloor habitats have grown, as a system of Marine National Parks were established and monitored. Sampling of Australia's deep seafloor has revealed a high proportion of new species and significant range extensions, but most of these records await detailed taxonomic description.

Squat lobsters (Chirostyloidea and Galattheoidea) are among the most diverse groups of decapod crustaceans in deep waters, and there have been intensive efforts to describe and revise species and higher taxa from the group (Macpherson and Baba, 2011). This has been assisted by the availability of taxonomic resources such as synoptic works (e.g. Baba, 2005; Baba et al., 2008) and keys (Taylor and Poore, 2010). In addition, molecular-based approaches are helping to identify overlooked species that show only subtle morphological differences (Poore and Andreakis, 2012).

Munida is one of the largest genera of squat lobsters, currently comprising 297 species (WoRMS, 2021). The most recent major taxonomic study of *Munida* in Australia recorded 19 species (Ahyong and Poore, 2004). Additional records have since been added (e.g. Ahyong, 2007; Baba, 2005; Poore et al., 2008); so, to date, 32 species of *Munida* have been documented from Australia.

Here, we report the specimens of *Munida* collected during several deep-water surveys from 2005 to 2015, including surveys of the continental margin of Western Australia, the Great Australian Bight, Tasmanian seamounts, and the eastern Australian continental margins and abyss. We describe and illustrate new species and record new occurrences of previously described taxa. The synonymies for each species are restricted to papers published after the compilation of Baba et al. (2008). Where available, we include molecular data from two mitochondrial markers (16S and COI) to support the taxonomic status of the species.

Materials and methods

Sampling

Specimens were collected using beam trawls and epibenthic sleds in surveys aboard the FRV *Southern Surveyor* of the south-western continental margin of Australia (SS10/2005) and north-western continental margin (SS05/2007); and surveys aboard the RV *Investigator* of the Great Australian Bight (IN2015_C01_042) and the continental margin and abyss of eastern Australia (IN2017 V03). A small number of specimens were collected from south-west Tasmania (TT 01/2008) using the remotely operated vehicle Jason aboard the RV *Thomas G Thompson*. Specimens collected from well-sampled sites on Tasmanian seamounts (SS01/2008, SS02/2007) were reviewed and represent well-known species previously reported for the area; they are not redescribed herein.

Morphological methods

Specimen measurements in *Material examined* refer to postorbital carapace length (pcl), measured dorsally from the base of the rostrum (situated at the level of the orbit) to the mid-posterior margin of the carapace, and where the rostrum is intact, carapace length (cl) is measured from the rostral apex to the mid-posterior margin of the carapace. The angle of the frontal-margin-from-the-midline is measured as the angle of the intersection between an imaginary line along the frontal margin and the median axis. Thus, a transverse margin corresponds to an angle of 90°. The lengths of articles of the cheliped are measured along the dorsal margin and those of ambulatory legs and maxilliped 3 are measured along the extensor margin and exclude spines. Abbreviations used are Mxp3, maxilliped 3; P1, pereopod 1; P2–4, pereopods 2–4; M, male; F, female; ovig., ovigerous.

Specimens are deposited in the collections of Museums Victoria, Melbourne (NMV), the Western Australian Museum (WAM), the Australian Museum, Sydney (AM), Muséum national d'Histoire naturelle, Paris (MNHN) and the South Australian Museum, Adelaide (SAM). Other abbreviations: WA, Western Australia; acq. refers to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) acquisition number allocated to the specimen on board the vessel at the time of collection.

Molecular analysis

Material collected from south-western Australia (SS10/2005), being mostly preserved in formalin, was not sequenced.

Results

Table 1. Specimens studied for mitochondrial DNA sequences (COI and 16S), including registration codes, survey, station, and GenBank accession numbers

Species	Reg. no.	16S	COI	Survey
<i>Munida agave</i>	NMV J56099	MK847949	MK848000	SS05/2007 161
<i>Munida agave</i>	NMV J56008	MK847961	MK848011	SS05/2007 116
<i>Munida asprosomea</i>	NMV J56393	MK847955	MK848006	SS05/2007 155
<i>Munida asprosomea</i>	NMV J56016	MK847971	MK848022	SS05/2007 68
<i>Munida asprosomea</i>	NMV J57258	MK847950	MK848001	SS05/2007 155
<i>Munida babai</i>	NMV J55042	na	MK848021	SS10/2005 170
<i>Munida distiza</i>	NMV J56487	MK847947	MK847998	SS05/2007 11
<i>Munida leeuwin</i> sp. nov.	NMV J55046	MK847968	MK848018	SS10/2005 170
<i>Munida leeuwin</i> sp. nov.	NMV J56100	MK847954	MK848005	SS05/2007 82
<i>Munida leeuwin</i> sp. nov.	NMV J55046	MK847967	MK848017	SS10/2005 170
<i>Munida gracilis</i>	NMV J55107	MK847963	MK848013	SS10/2005 32
<i>Munida gracilis</i>	NMV J55107	MK847964	MK848014	SS10/2005 32
<i>Munida gracilis</i>	SAM C7658	MK847932	na	BPZ 2010 500
<i>Munida compressa</i>	NMV J55980	MK847946	na	SS05/2007 176
<i>Munida compressa</i>	NMV J55981	MK847944	MK847996	SS05/2007 189
<i>Munida endeavourae</i>	NMV J59312	MK847934	MK847986	TT01/2008 J2-390-015
<i>Munida endeavourae</i>	NMV J59310	MK847933	na	TT01/2008 J2-389-006
<i>Munida gordoae</i>	NMV J56420	MK847957	MK848008	SS05/2007 62
<i>Munida gordoae</i>	NMV J56420	MK847956	MK848007	SS05/2007 62
<i>Munida abrolhos</i> sp. nov.	NMV J55279	MK847962	MK848012	SS05/2007 70
<i>Munida abrolhos</i> sp. nov.	NMV J55262	MK847943	MK847995	SS05/2007 1
<i>Munida leagora</i>	NMV J56018	MK847951	MK848002	SS05/2007 77
<i>Munida leagora</i>	NMV J56004	MK847970	MK848020	SS05/2007 143
<i>Munida leagora</i>	NMV J56004	MK847969	MK848019	SS05/2007 143
<i>Munida leagora</i>	NMV J55999	MK847942	MK847994	SS05/2007 143
<i>Munida pectinata</i>	NMV J55268	MK847939	MK847991	SS05/2007 62
<i>Munida philippinensis</i>	NMV J56003	MK847953	MK848004	SS05/2007 143
<i>Munida philippinensis</i>	NMV J56003	MK847952	MK848003	SS05/2007 143
<i>Munida compacta</i>	NMV J56411	MK847941	MK847993	SS05/2007 57
<i>Munida compacta</i>	NMV J56402	MK847937	MK847989	SS05/2007 15
<i>Munida compacta</i>	NMV J56412	MK847938	MK847990	SS05/2007 56
<i>Munida roshanei</i>	NMV J55991	MK847958	MK848009	SS05/2007 97
<i>Munida roshanei</i>	NMV J56009	MK847960	na	SS05/2007 125
<i>Munida roshanei</i>	NMV J56400	MK847940	MK847992	SS05/2007 116
<i>Munida julumunyu</i> sp. nov.	NMV J55064	MK847966	MK848016	SS10/2005 152
<i>Munida julumunyu</i> sp. nov.	NMV J55979	MK847945	MK847997	SS05/2007 34
<i>Munida heteracantha</i>	NMV J55038	MK847965	MK848015	SS10/2005 146
<i>Munida galalala</i> sp. nov.	WAM C78558	MK847959	MK848010	SS05/2007 156
<i>Munida jurunjurun</i> sp. nov.	WAM C78561	MK847948	MK847999	SS05/2007 63
<i>Munida lutruwita</i> sp. nov.	NMV J67480	MK847935	MK847987	TT01/2008 J2-387-022
<i>Munida lutruwita</i> sp. nov.	NMV J67474	MK847936	MK847988	TT01/2008 J2-387-023

Total DNA was extracted from 50–100 mg of abdominal tissue or pereopod of the target specimen preserved in ethanol following the salt-based extraction procedure described by Aljanabi and Martinez (1997) with minor modifications. The partial mitochondrial cytochrome oxidase subunit I (COI) and 16S rDNA gene (16S fragment 2) were polymerase chain reaction (PCR) amplified following primer combinations, reaction conditions and thermal cycling profiles established previously (Cabezas et al., 2012). Quantity and length of the PCR products were examined by 1% gel electrophoresis against known DNA standards. PCR reactions were sent to Macrogen Inc. (Korea, www.macrogen.com) for purification and direct sequencing in both directions. Electropherograms were assembled in Sequencher v4.9 and sequences were initially aligned in Bioedit v7.0.9 (Hall, 1999) together with 16S and COI sequences from previous works (Cabezas et al., 2009, 2011; Machordom and Macpherson, 2004; Macpherson and Machordom, 2005; Rodríguez-Flores et al., 2019). Final alignments of each of the loci were performed using MAFFT (Kato et al., 2002). Uncorrected divergences (p) were calculated using MEGA 10.04 (Kumar et al., 2018). GenBank accession numbers for the new sequences are given in Table 1. We have not provided the divergence values among all pairs of closely related species because in the genus *Munida* the amount of molecular data is still scarce (excluding the present paper, the sequences of only 72 species are available). Nevertheless, when the molecular data from a new species and its morphological closest relative are available, we have included the divergence values in the *Remarks*.

Systematics

Munididae Ah Yong, Baba, Macpherson and Poore, 2010

Munida abrolhos sp. nov.

<http://zoobank.org/urn:lsid:zoobank.org:act:14DA5265-E0E5-47B5-B4B0-93296A355921>

Figures 1, 2, 3A

Munida sp. MoV 5214. — Poore et al., 2008: 21 (south-western Australia, 201–206 m).

Munida aff. *rubiesi*. — Poore et al., 2008: 20 (part), unnumbered fig. — McEnnulty et al., 2011: app. 1.

Munida sp. MoV 5526. — Poore et al., 2008: 21.

Munida keiensis. — McEnnulty et al., 2011: app. 1.

Type material. Holotype: WAM C78556, ovigerous female (cl 23 mm, pcl 14 mm), Abrolhos, Western Australia, 29° 00.594' S, 113° 42.78' E to 29° 01.512' S, 113°43.32' E, 700–704 m, SS10/2005/85, 2 December 2005.

Paratypes (all Western Australia): NMV J55036, 6 ovigerous females (cl 18.9 mm, pcl 11.2 mm to cl 25.9 mm, pcl 15.7 mm), 6 females (cl 14.0 mm, pcl 8.1 mm to cl 19.0 mm, pcl 12.5 mm), 10 males (cl 15.0 mm, pcl 8.9 mm to cl 22.8 mm, pcl 14.6 mm), collected with holotype; NMV J55262, 1 ovigerous female (cl 27.5 mm, pcl 18.3 mm), 1 female (cl 14.5 mm, pcl 8.4 mm), Barrow L1 transect, 20° 59.412' S, 114° 07.896' E to 20° 59.13' S, 114° 08.394' E, 700 m, SS05/2007/1, 9 June 2007; NMV J55279, 1 specimen, Mermaid L24 transect, 16° 44.286' S, 119° 15.042' E to 16° 43.794' S, 119° 15.48' E, 693–698 m, SS05/2007/70, 17 June 2007; WAM C78557, 1 male (cl 22.6 mm, pcl 13.0 mm), Ningaloo South, 22° 03.57' S, 113° 43.74' E to 22° 04.026' S, 113° 43.26' E, 658–754 m, SS10/2005/149, 10 December 2005.

Description. Carapace. Length and width subequal, widest at midlength. Dorsal surface with main transverse ridges mostly uninterrupted, without secondary transverse striae between main ridges; ridges and striae lined with short, non-iridescent setae. Gastric region with large pair of epigastric spines behind supraocular spines and 2 or 3 pairs of small epigastric spines; without median row of spines behind rostrum. Hepatic region granular; parahepatic spine present. Anterior part of branchial region between cervical groove and postcervical groove with 1 or 2 ridges and sometimes 1 or 2 short striae; postcervical spine present; posterior part of branchial region with 5 transverse ridges (excluding posterodorsal ridge). Cardiac region with 3 main transverse ridges. Intestinal region with 2 lateral striae; posterodorsal ridge distinct, without secondary stria. Frontal margin inclined posteriorly at 110° from midline. Lateral margin slightly convex; anterolateral spines parallel, directed slightly upwards, reaching sinus between rostrum and supraocular spine; hepatic marginal spine anterior to cervical groove, much shorter than anterolateral spine; branchial margin with 4, occasionally 5, spines (additional third spine small). Rostrum spiniform; curving dorsally, 0.6–0.7 × pcl; supraocular spine length 0.3 length × rostrum length. Epistomial ridge straight, ending at antennal gland; mesial protuberance distinct.

Thoracic sternum. Median length of sternal plastron (sternites 4–7) 0.6 × width of sternite 7. Thoracic sternites surface smooth, sternites 4 with few striae. Sternite 3 0.5 × width of sternite 4. Sternite 4 anterior margin subtriangular, narrowly contiguous with sternite 3.

Abdomen. Somite 2 with 8–10 large spines, evenly spaced along anterior ridge; with stria behind anterior ridge. Somites 3–4 with 2 striae behind anterior ridge. Somite 6 posteromedian margin slightly concave. Telson with numerous transverse squamae; greatest width 1.6 × midlength; anterolateral margin concave.

Eye. Maximum corneal diameter 0.35 × distance between anterolateral spines.

Antennule. Basal article (distal spines excluded) not overreaching corneae; distolateral and distomesial spines subequal; 2 lateral spines, proximal smaller, longer lateral spine reaching end of distal spines.

Antenna. Article 1 with distomesial spine reaching distal margin of article 2. Article 2 distomesial spine nearly reaching distal margin of article 4; distolateral spine reaching midlength of article 3. Articles 3 and 4 unarmed.

Maxilliped 3. Ischium 1.8 × length of merus, with small flexor distal spine. Merus flexor margin with large spine and small distal spine; extensor margin without distal spine.

P1. 2.0–2.5 pcl, with plumose setae on inner margins, and some iridescent setae, merus 0.8–0.9 pcl, with row of 6 spines on dorsal margin; distomesial spine reaching midlength of carpus. Carpus 0.4 × length of merus, length 0.9–1.1 × width, with 5 spines along the mesial margin. Propodus 1.0–1.4 × merus length, fingers longer than palm, 0.5–0.6 × total propodus length; pollex with subdistal spine, outer margin unarmed; dactylus outer margin unarmed.

P2–4. Long, slender, with few small scales on lateral surfaces of meri, carpi and propodi; extensor margin with plumose setae and few iridescent setae. P2 and P3 similar in length, P4 shorter (P3 merus 0.9–1.0 × length of P2 merus, P4 merus 0.8 × length of P3 merus). P2 1.9–2.1 × pcl; merus 0.6–0.8 × pcl, length 6 × width, 3–4 × carpus length and 1.6 × propodus length, extensor margin with 9 spines including distal spine, flexor margin with 4 spines and well-developed distal spine; carpus with 2 extensor spines a distal flexor spine; propodus length 5.5–6.5 × height, with 5 movable flexor spines; dactylus 0.8–0.9 × propodus length, gently curved, length 6–7 × width, extensor margin densely lined with stiff short setae on distal half, flexor margin with 8 small moveable spines, space between spines increasing distally, unarmed along distal 1/5. End of P2 carpus overreaching end of P1 merus. P3 with similar spination and article proportions as P2; merus, propodus and dactylus as long as those of P2. P4 length 0.85 × P2 length; merus 0.5–0.6 × pcl; merocarpal articulation reaching hepatic marginal spine of carapace.

Egg diameter. 0.5 mm.

Colour. Carapace and abdominal somites 2–3 pink. Rostrum and supraocular spines white. P1 pale pink with white fingers, P2–4 pale pink on meri and carpi, white on propodi and dactyli.

Genetic data. COI and 16S; see Table 1.

Etymology. After the type locality near the Abrolhos Islands; used as a noun in apposition.

Remarks. *Munida abrolhos* sp. nov. is similar to *M. andamanica* Alcock, 1894, *M. rosula* Macpherson, 1994, and *M. curvirostris* Henderson, 1885, with a dorsally curving spiniform rostrum, P1

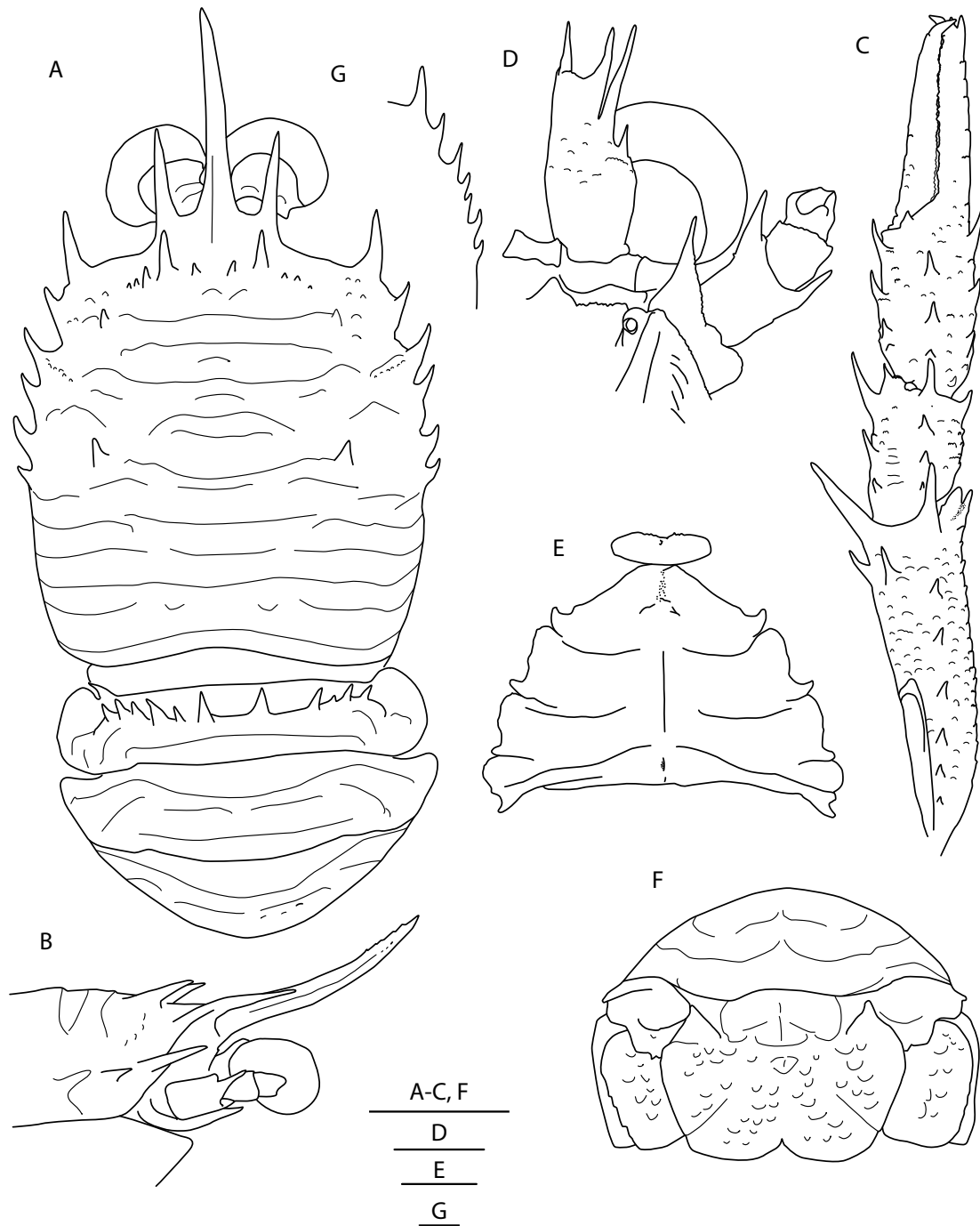


Figure 1. *Munida abrolhos* sp. nov., holotype, ovigerous female cl 23 mm, pcl 14 mm (WAM C78556): A, carapace and abdomen, dorsal view; B, rostrum, lateral view; C, right chela, dorsal view; D, left antenna and antennule, ventral view; E, sternum; F, abdominal somite 6, telson and right uropod. G, ovigerous female cl 22.9 mm, pcl 14.4 mm (NMV J55036), anterolateral margin of carapace. Scale: A–C, F = 5 mm, D, E, G = 2 mm.

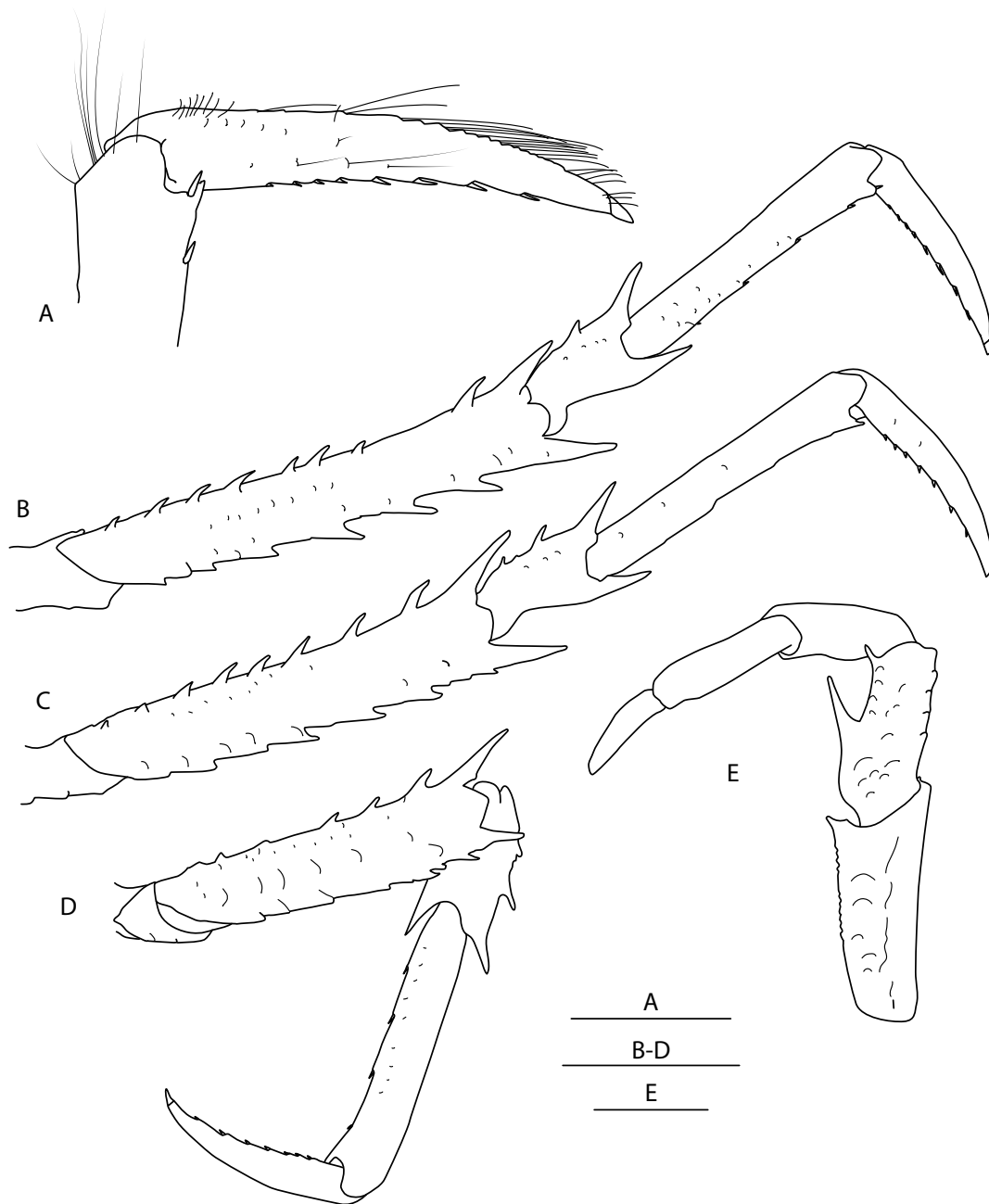


Figure 2. *Munida abrolhos* sp. nov., holotype, ovigerous female cl 23 mm, pcl 14 mm (WAM C78556): A, right P2 dactylus, lateral view; B, right P2, lateral view; C, right P3, lateral view; D, right P4 lateral view; E, left maxilliped 3, lateral view. Scale A, E = 2 mm, B–D = 5 mm

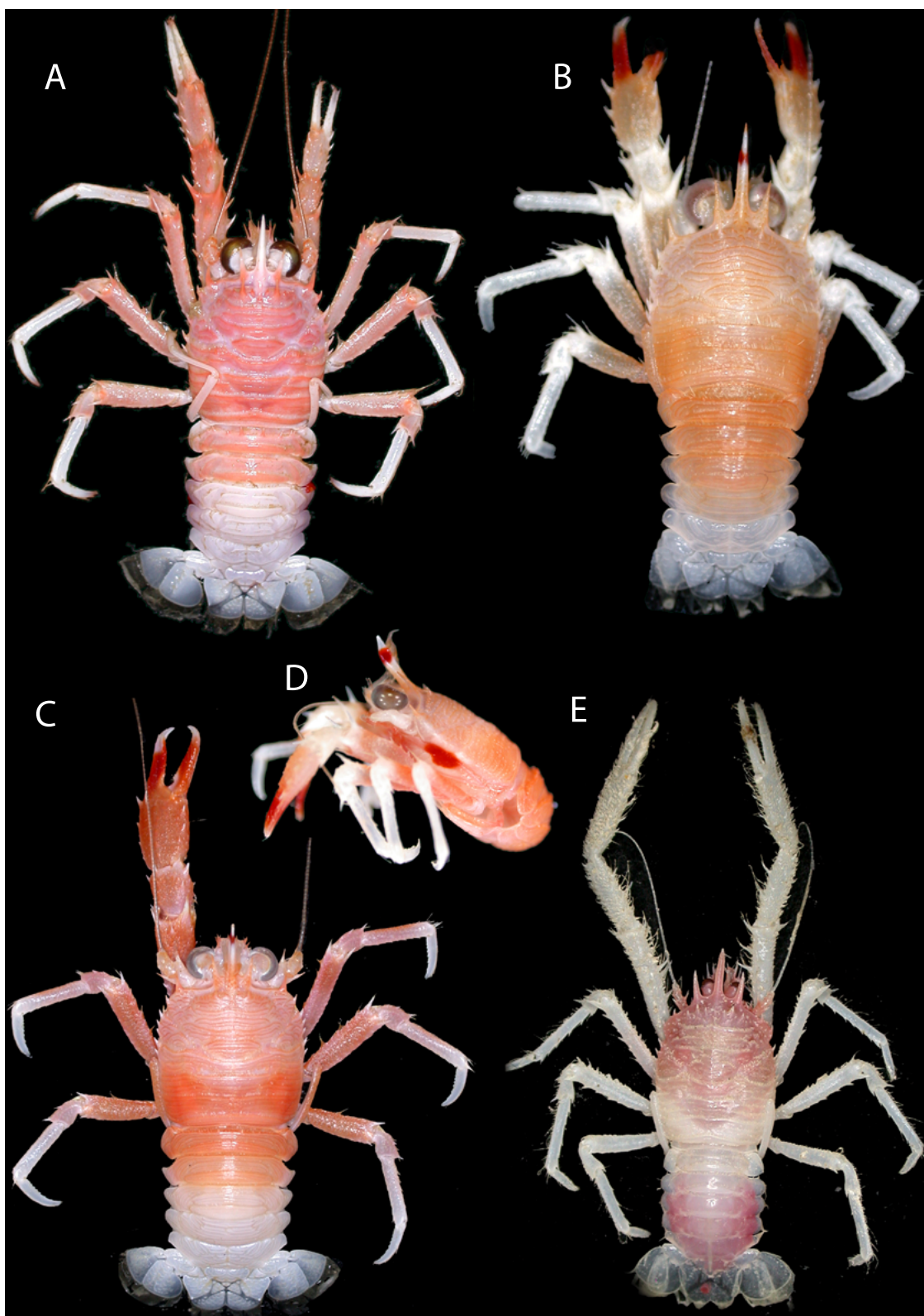


Figure 3. A, *Munida abrolhos* sp. nov., female paratype, cl 27.5 mm, pcl 18.3 mm (NMV J55262); B–D, *Munida julumunyju* sp. nov., undetermined paratype from NMV J55979, juvenile paratype, cl 9.2 mm, pcl 10.8 mm (NMV J55061), juvenile paratype cl 10.9 mm, pcl 6.6 mm (NMV J55062); E, *Munida lutruwita* sp. nov. ovigerous female, cl 14.3 mm, pcl 10.6 mm, (AM P103229). Photos: K. Gowlett-Holmes, CSIRO.

fixed finger with only subterminal spine (without marginal spines on lateral margin), and abdominal somite 2 with a row of 6–8 spines and at most 4 transverse ridges. Most clearly the new species differs from these species as it usually has only 4 branchial spines, although sometimes a smaller third branchial spine is present. In addition, postcervical spines, present in *M. abrolhos* sp. nov., are always absent in the aforementioned species.

Of those species with 4 branchial spines, *M. abrolhos* sp. nov. is most similar to *M. keiensis* Baba, 2005, in having subequal distal spines of the basal antennular article, and the distomesial spine of antennal article 2 overreaching article 3 but not distinctly overreaching article 4. The two species can be distinguished by the shape of the anterior margin of thoracic sternite 4, which is broadly rounded in *M. keiensis* but subtriangular in *M. sp. nov.*

Sequence divergence between *M. abrolhos* sp. nov. and *M. rosula* is 3% for COI and 0.8% for 16S.

Distribution. Presently known only from off Western Australia, 658–754 m.

Munida galalala sp. nov.

<http://zoobank.org/urn:lsid:zoobank.org:act:83168BC4-60EA-4710-A32B-42AFFF985CA>

Figures 4, 5

Type material. Holotype. WAM C78558, male (cl 17.8 mm, pcl 11.5 mm), Western Australia, Leveque L27 transect, 14° 33.432' S, 121° 20.388' E to 14° 2.772' S, 121° 19.644' E, 924–1101 m, SS05/2007/156, 3 July 2007 to 4 July 2007.

Description. Carapace. Length 1.1 × greatest width, widest at midlength. Dorsal surface with main transverse ridges mostly uninterrupted and some short secondary transverse striae between main ridges on anterior half; ridges and striae lined with short, non-iridescent setae. Gastric region slightly elevated, with 2 pairs of epigastric spines, longest pair behind supraocular spines. Hepatic region granular; parahepatic spine absent. Anterior part of branchial region between cervical groove and postcervical groove with few short scale-like ridges and tubercles; postcervical spine absent; posterior part of branchial region with 5 main transverse ridges (excluding posterodorsal ridge) and few short secondary striae laterally between main ridges. Cardiac region with 4 main transverse ridges. Intestinal region with short median stria; posterodorsal ridge distinct, slightly convex medially, without secondary stria. Frontal margin inclined posteriorly at 110° from midline. Lateral margins slightly convex; anterolateral spines parallel, horizontal, reaching sinus between rostrum and supraocular spine; marginal hepatic spine anterior to cervical groove also strong, although distinctly shorter than anterolateral spine; branchial margin with 5 spines. Rostrum spiniform, gentle curving upwards, length 0.7 pcl; supraocular spine 0.45 × length of rostrum. Epistomial ridge curved ending anterior to antennal gland; mesial protuberance distinct.

Thoracic sternum. Surface smooth, without striae. Sternite 3 0.4 width of sternite 4; median length of sternal plastron (sternites 4–7) 0.6 width of sternite 7. Sternite 4 anterior margin subtrapezoid, broadly contiguous with sternite 3.

Abdomen. Somite 2 with 7 prominent spines along anterior transverse ridge. Somites 2–4 each with 1 uninterrupted stria behind anterior ridge, without striae at lateral margins. Somite 6 posteromedian margin almost straight. Telson with numerous transverse squamae; greatest width 1.5 × median length; anterolateral margin concave.

Eye. Maximum corneal diameter 0.15 × distance between anterolateral spines.

Antennule. Basal article (distal spines excluded) overreaching corneae; well-developed distolateral spine much longer than short distomesial spine; 2 lateral spines, proximal smaller, not exceeding distal spines.

Antenna. Article 1 with strong distomesial spine not reaching distal margin of article 2. Article 2 distomesial spine not overreaching distal margin of article 3; distolateral spine reaching distal margin of article 3. Article 3 distomesial spine almost reaching distal margin of article 4. Article 4 unarmed.

Maxilliped 3. Ischium 1.3 × merus length, with small flexor distal spine. Merus with 2 large spines on flexor margin and 1 small spine; extensor margin unarmed.

P1. 3.0 × pcl, covered in plumose setae, without iridescent setae, merus 1.2 × pcl, with row of 6 dorsal spines and 2 rows of spines on mesial margin; distal spines strong, distomesial spine not reaching midlength of carpus. Carpus 0.6 × merus length, length 2.6 × width, with spines along mesial and dorsal margins. Propodus 1.2 × merus length, fingers slightly shorter than palm, 0.5 × total propodus length; pollex with small subdistal spine, margin unarmed; dactylus outer margin unarmed.

P2–4. Moderately long, slender, with numerous scales on lateral surfaces of meri; extensor margin with row of plumose setae. P2 length 2.1 × pcl; merus as long as pcl, length 7 × height, 3.5 × carpus length and 1.4 × propodus length, with well-developed spines on extensor margin, increasing in size distally, flexor margin with row of small spines and well-developed distal spine; carpus with large spine and distal spine on extensor margin, distal spine on flexor margin; propodus length 6.5 × height, with 5 small movable flexor spines; dactylus compressed, slightly curved, 0.6 × propodus length, length 5.5 × width, with 9 movable spines evenly spaced along flexor margin including spine at base of unguis. End of P2 carpus reaching end of P1 merus. P3 missing. P4 length 0.8 × P2 length; merus 0.7 × pcl; merocarpal articulation almost reaching hepatic marginal spine of carapace.

Genetic data. COI and 16S; see Table 1.

Etymology. Named *galalala*, meaning lobster in Dambimangari language, used as a noun in apposition.

Remarks. *Munida galalala* sp. nov. belongs to the group of species having five spines on the lateral branchial margins of the carapace, smooth thoracic sternites, small eyes, and spines on the anterior ridge of abdominal somite 2. The antennal peduncle is most similar to *Munida parvioculata* Baba, 1982, both species having a distinct distomesial spine on antennal peduncle article 3. The new species differs in:

- the generally smooth surface of the carapace with widely spaced transverse striae, compared to rugose with interrupted transverse ridges in *M. parvioculata*

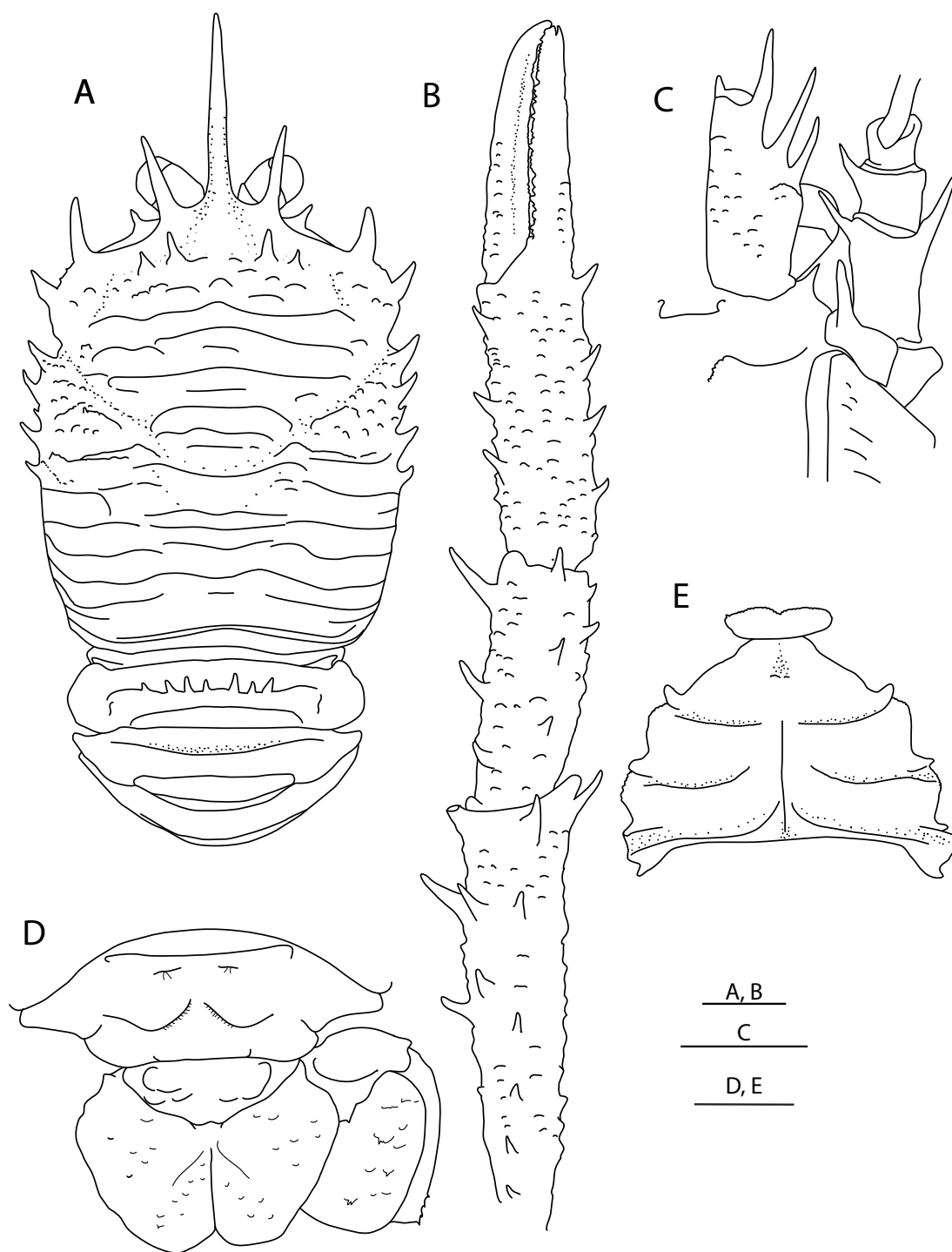


Figure 4. *Munida galalala* sp. nov., holotype, male 17.8 mm (WAM C78558): A, carapace and abdomen, dorsal view; B, right chela, dorsal view; C, left antenna and antennule, ventral view; D, abdominal somite 6, telson and right uropod. E, sternum. Scale: A–E = 2 mm.

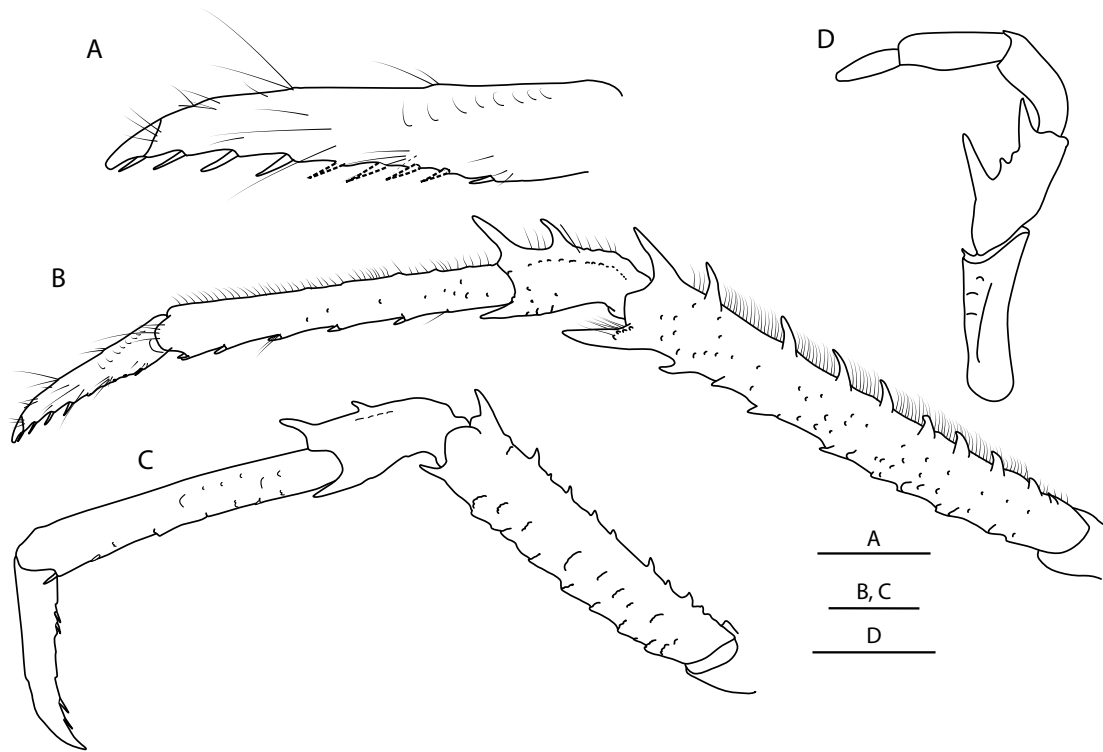


Figure 5. *Munida galalala* sp. nov., holotype, male 17.8 mm (WAM C78558): A, left P2 dactylus, lateral view; B, left P2, lateral view; C, left P4, lateral view; D left maxilliped 3, lateral view. Scale A = 1 mm, B–D = 2 mm

- the unarmed lateral margin of the cheliped pollex (with 2 spines in *M. parvioculata*)

- a row of 7 spines on abdominal somite 2 versus a single pair in *M. parvioculata*.

Munida galalala can be distinguished from all other species in this group (i.e. *M. clevai* Macpherson, 2009, *M. ampli antennulata* Komai, 2011, *M. profunda* Macpherson and de Saint Laurent, 1991, *M. endeavourae* Ahyong and Poore, 2004, *M. pollioculus* Komai and Higashiji, 2016, and *M. typhle* Macpherson, 1994) by the presence of a spine on antennal peduncle article 3.

Distribution. Presently known only from off north-western Australia, 924–1101 m.

Munida julumunyu sp. nov.

<http://zoobank.org/urn:lsid:zoobank.org:act:A4CFAE49-1832-4C56-BDED-A68F843BB9F4>

Figures 3B–D, 6, 7

Munida rubridigitalis. — Poore et al., 2008: 20, unnumbered fig. (upper right) — McEnnulty et al., 2011: app. 1, 2.

Type material. Holotype: WAM C78559, female cl 22.4 mm, pcl 15.8 mm, Western Australia, Onslow L19 transect, 20° 07.962' S, 114° 58.71' E to 20° 07.584' S, 114° 58.416' E, 415–470 m, SS05/2007/15, 11 June 2007.

Paratypes (all Western Australia): NMV J56082, 1 female (cl 24.4 mm, pcl 16.3 mm), collected with holotype; NMV J55979, 1 male (cl 22.0 mm, pcl 15.0 mm), 1 ovigerous female (cl 18.8 mm, pcl 13.3 mm), Dampier L20 transect, 19° 43.776' S, 115° 21.216' E to 19° 43.56' S, 115° 20.598' E, 389–423 m, SS05/2007/34, 12 June 2007; NMV J55061, 1 juvenile (cl 9.2 mm, pcl 10.8 mm), Carnarvon, 24° 33.12' S, 112° 15.12' E to 24° 33.804' S, 112° 15.18' E, 396–404 m, SS10/2005/122, 7 December 2005; NMV J55062, 1 juvenile (cl 10.9 mm, pcl 6.6 mm), Red Bluff, 23° 59.196' S, 112° 32.04' E to 23° 59.724' S, 112° 31.74' E, 411 m, SS10/2005/130, 8 December 2005; WAM C78560, 2 males (cl 22.6 mm, pcl 14.8 mm; cl 27.0 mm, pcl 19.2 mm), 1 female (cl 22.6 mm, pcl 16.0 mm), Point Cloates, 22° 50.808' S, 113° 20.28' E to 22° 51.228' S, 113° 19.98' E, 420–430 m, SS10/2005/137, 9 December 2005; NMV J55060, 1 male (cl 24.2 mm, pcl 16.7 mm), Ningaloo South, 22° 04.374' S, 113° 45.36' E to 22° 04.968' S, 113° 45.36' E, 391–396 m, SS10/2005/148, 10 December 2005; NMV J55064, 1 male (broken rostrum; pcl 10.8 mm), Ningaloo South, 22° 04.314' S, 113° 45.36' E to 22° 04.854' S, 113° 45.36' E, 387–399 m, SS10/2005/151, 10 December 2005; NMV J55059, 1 female (cl 23.2 mm, pcl 15.9 mm), Ningaloo North, 21° 58.212' S, 113° 47.46' E to 21° 58.806' S, 113° 47.1' E, 373–382 m, SS10/2005/165, 12 December 2005; NMV J55058, 2 males (cl 17.0 mm, pcl 11.1 mm; cl 25.8 mm, pcl 18.4 mm), Barrow Island, 21° 00.402' S, 114° 22.86' E to 21° 00.042' S, 114° 22.5' E, 399–408 m, SS10/2005/172, 13 December 2005.

Other material examined. New Caledonia: MNHN-IU-2014-15475, 2 females (cl 14.6 mm, pcl 9.1 mm; cl 18.5, pcl 11.5), 3 males (cl 14.3–16.0 mm, pcl 8.5–10.1 mm), east coast, 21° 14.84' S 165° 55.49' E, 450–

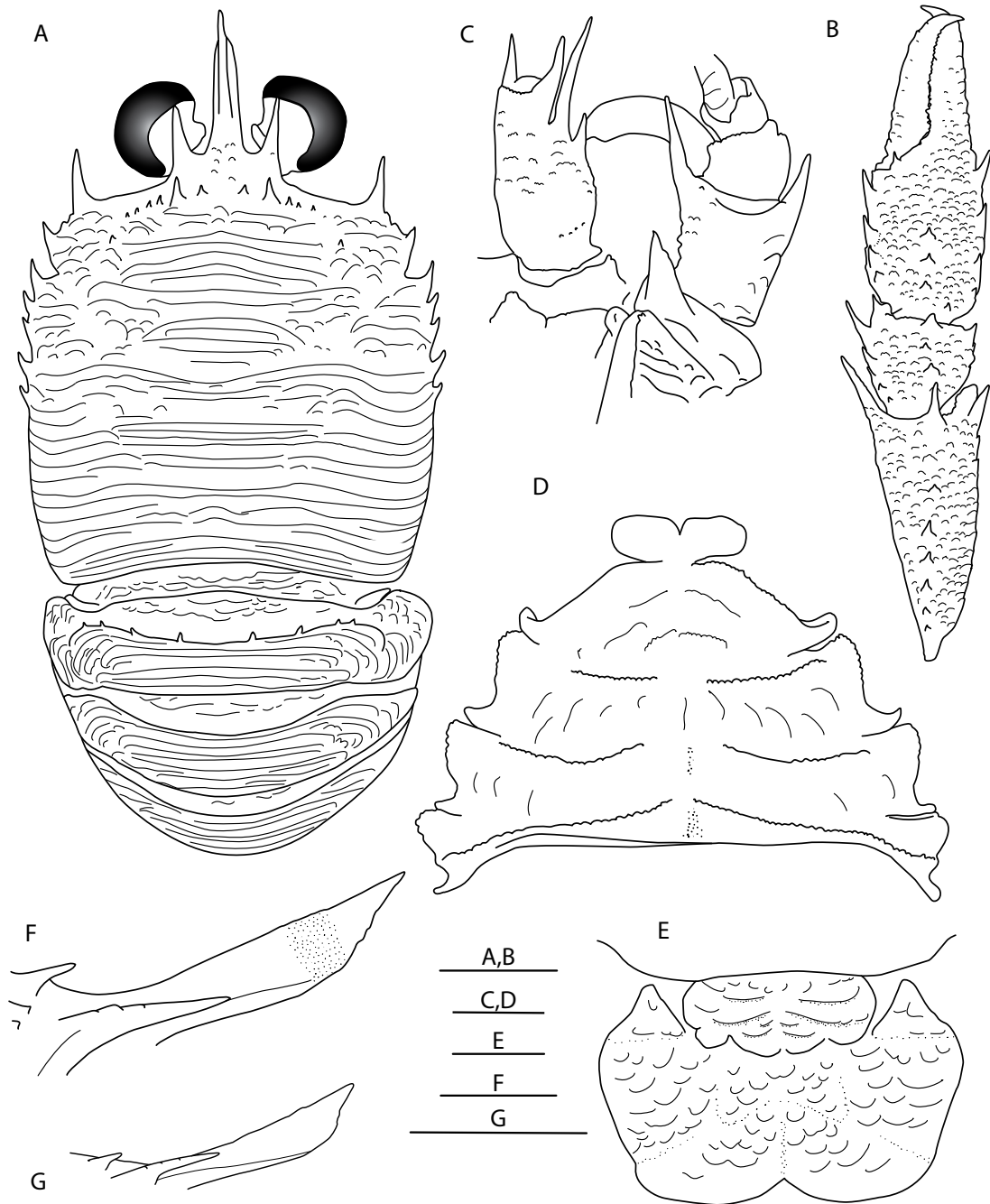


Figure 6. *Munida julumunyju* sp. nov., holotype, ovigerous female cl 22.4 mm, pcl 15.8 mm (WAM C78559): A, carapace and abdomen, dorsal view; B, right chela, dorsal view; C, right antenna and antennule, ventral view; D, sternum; E, telson; F, rostrum, lateral view. *Munida julumunyju*, New Caledonia, male cl. 18.2, pcl 12.2 (MNHN-IU-2014-15475): G, rostrum, lateral view. A–D, G = 5 mm, E–F = 2 mm.

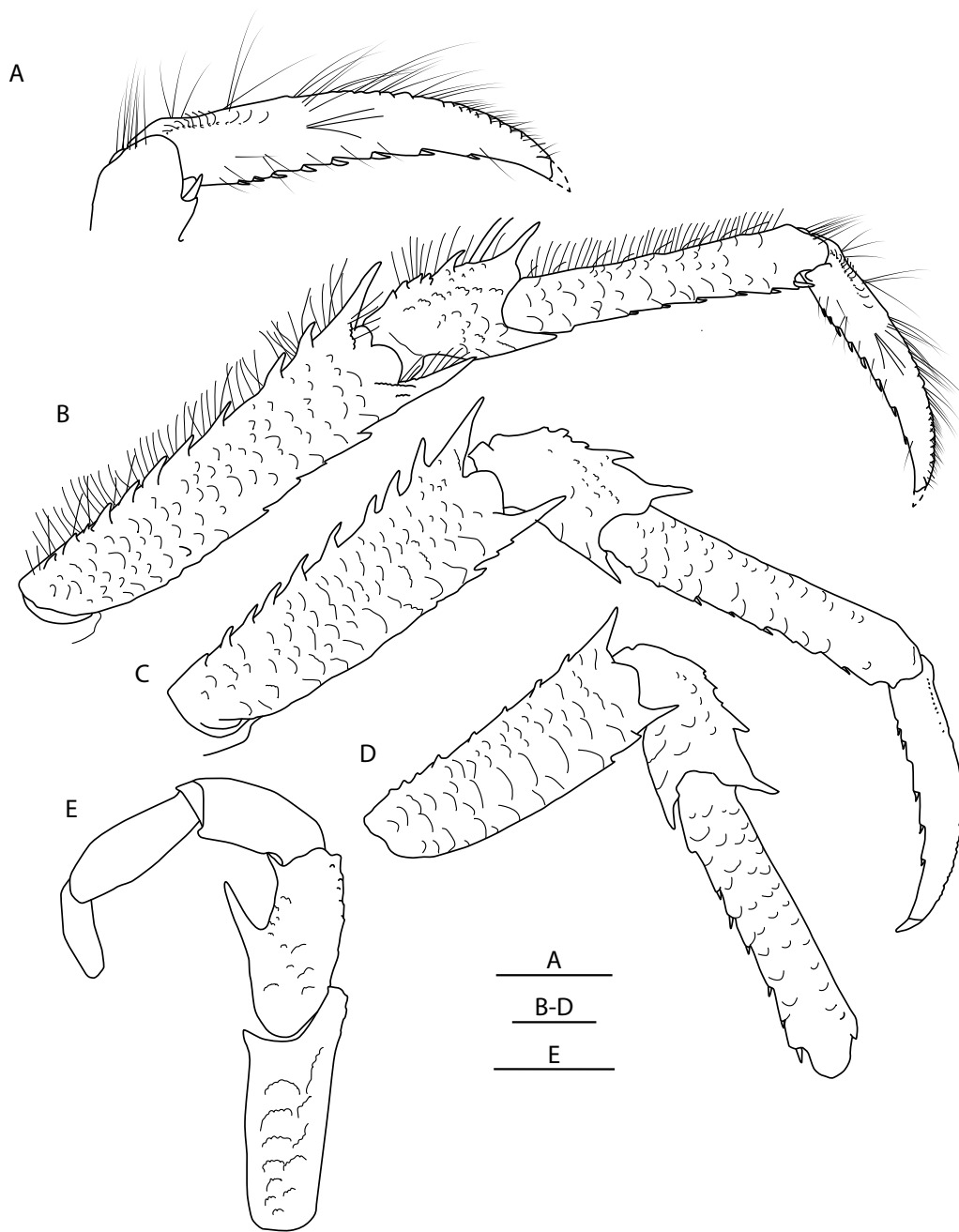


Figure 7. *Munida julumunyju* sp. nov., holotype, ovigerous female cl 22.4 mm, pcl 15.8 mm (WAM C78559). A, right P2 dactylus, lateral view; B, right P2, lateral view; C, right P3, lateral view; D, right P4, lateral view; E, left maxilliped 3, lateral view. Scale A–E = 2 mm.

490 m, HALIPRO 1 CP869, 23, March 1994; MNHN-IU-2014-15474, 1 female (cl 15.8 mm, pcl 10.3 mm), Norfolk Ridge, 22° 10' S 167° 15.2' E, 495–515 m, BIOCAL CP109, 9 September 1985.

Description. Carapace. Length $0.9 \times$ greatest width, widest at midlength. Dorsal surface with main transverse ridges mostly uninterrupted, with secondary transverse striae between main ridges; ridges and striae lined with short, non-iridescent setae. Gastric region with 3–6 pairs of epigastric spines, longest pair behind supraocular spines. Hepatic region with short striae; small parahepatic spine sometimes present. Anterior part of branchial region between cervical groove and postcervical groove with about 6 ridges and some shorter striae; posterior part of branchial region with about 12 transverse ridges (excluding posterodorsal ridge). Cardiac region with 3 or 4 main transverse ridges. Intestinal region with 2 or 3 striae; posterodorsal ridge distinct, with secondary stria. Frontal margin inclined posteriorly at 105° from midline. Lateral margin slightly convex; anterolateral spines parallel, horizontal, just reaching sinus between rostrum and supraocular spine; marginal hepatic spine anterior to cervical groove, much shorter than anterolateral spine; branchial margins with 5 spines. Rostrum laterally compressed; dorsal margin straight, inclined dorsally, ventral margin strongly convex, deepest slightly anterior to midlength, length $0.4\text{--}0.5 \times$ pcl; supraocular spine $0.4 \times$ length of rostrum. Epistomial ridge straight, ending at antennal gland; mesial protuberance distinct.

Thoracic sternum. Median length of sternal plastron (sternites 4–7) $0.5 \times$ width of sternite 7. Sternites 4–5 with striae; sternite 6 with few striae. Sternite 3 0.4 width of sternite 4. Sternite 4 anterior margin subtrapezoid, narrowly contiguous with sternite 3.

Abdomen. Somite 2 with 8 small spines evenly spaced along anterior ridge. Somites 2–4 with about 5, 7 and 12 uninterrupted striae behind anterior ridge, respectively, and squamae at lateral margins. Somite 6 posteromedian margin almost straight. Telson with numerous transverse squamae; greatest width $1.7 \times$ median length; anterolateral margin concave.

Eye. Maximum corneal diameter $0.3 \times$ distance between anterolateral spines.

Antennule. Basal article (distal spines excluded) not overreaching corneae; distolateral and distomesial spines subequal; 2 lateral spines, proximal smaller, longer lateral spine exceeding distal spines.

Antenna. Article 1 with distomesial spine reaching midlength of article 2. Article 2 with distomesial spine reaching distal margin of article 4; distolateral spine almost reaching distal margin of article 3. Article 3 and 4 unarmed.

Maxilliped 3. Ischium $1.8 \times$ merus length, with flexor distal spine. Merus with large spine and small distal spine on flexor margin; extensor margin unarmed.

P1. $1.6\text{--}1.9$ pcl (females), $1.7\text{--}2.1$ pcl (males), covered in plumose setae and iridescent setae in inner margin; merus $0.6\text{--}0.7$ pcl (females), $0.7\text{--}0.8$ pcl (males), with row of 5 small spines on dorsal margin; distomesial spine reaching midlength of carpus. Carpus 0.4 (females), $0.4\text{--}0.5$ (males) \times merus length, length $0.9\text{--}1.1 \times$ width, with 5 spines along the mesial margin. Propodus $1.2\text{--}1.3$ (females), $1.1\text{--}1.6$ (males) \times merus length, dactylus longer than palm, $0.5 \times$ total propodus length; dactylus and pollex outer margin unarmed.

P2–4. Relatively stout, with scales on lateral surface of meri, carpi and propodi; extensor margin with plumose setae and iridescent setae. Meri shorter posteriorly (P3 merus $0.9 \times$ P2 merus length, P4 merus $0.8 \times$ P3 merus length). P2 $1.8\text{--}2.2 \times$ pcl; merus $0.6\text{--}0.8 \times$ pcl, length $4 \times$ width, $2.6\text{--}3.0 \times$ carpus length and $1.3\text{--}1.6 \times$ propodus length, extensor margin with 11–17 spines, flexor margin with acute ridges and well-developed distal spine; carpus with 2 large spines and 2 or 3 smaller spines on extensor margin, distal spine on flexor margin; propodus length $5 \times$ height, with 6–8 movable flexor spines; dactylus $0.7\text{--}0.9 \times$ propodus length, curved, length $5\text{--}6 \times$ width, extensor margin densely lined with stiff long setae on distal half, flexor margin with 8–12 spines, space between spines increasing distally, unarmed along distal $1/5$. End of P2 carpus almost reaching end of P1 merus. P3 with similar spination and article proportions as P2; merus slightly shorter than P2 merus (0.9); propodus and dactylus as long as those of P2. P4 length $0.8 \times$ P2 length; merus $0.5 \times$ pcl; merocarpal articulation reaching hepatic marginal spine of carapace.

Egg diameter. 0.5 mm.

Colour. Carapace and abdominal somites 2–3 orange, remaining abdomen and telson white. Rostrum white with red subdistal spot, supraocular spines orange. Chelipeds and walking legs with transverse white/pale orange and dark orange bands; distal half of palm and proximal half of cheliped fingers orange, distal half of fingers of cheliped white; dactyli of walking legs white.

Genetic data. COI and 16S; see Table 1.

Etymology. Named *julumunyju* with approval of the Kariyarra people. The word *julumunyju* means prawn in Kariyarra language; used as a noun in apposition.

Remarks. *Munida julumunyju* sp. nov. is very similar to *M. rubridigitalis* Baba, 1994, described from Queensland, Australia. Both species have a laterally compressed rostrum with a red mark and red cheliped fingers, the second abdominal somite with 8 or 9 spines along the anterior ridge and subequal distal spines on the basal antennular article. Comparison of *M. julumunyju* with paratypes of *M. rubridigitalis* and additional specimens from eastern Australia found that the two species differ chiefly in the shape of the rostrum. The rostrum of both species is laterally compressed, but shallower and more evenly tapered in *M. rubridigitalis*. In *M. rubridigitalis*, the ventral rostral margin is gently convex with the dorsal and ventral margins parallel for the proximal half or slightly more, after which they gently converge to the apex. In *M. julumunyju* sp. nov., however, the rostrum is deeper, with the dorsal and ventral margins distally diverging, reaching the greatest depth slightly anterior to the midlength and then converging to the apex, making the ventral margin more strongly convex than in *M. rubridigitalis*. In addition, *M. rubridigitalis* usually has a spine on the mesial margin of the antennal article 2 (occasionally present only on one side), which is always absent in *M. julumunyju*. Colour-in-life may also be helpful in distinguishing these species. The new species has a red patch on the pterygostomial flap below the linea anomurica, which is noted as absent in *M. rubridigitalis* by Baba (1994). In *M. julumunyju* sp. nov. the fingers are completely red with a

white tip, whereas *M. rubridigitalis* is described with only the distal half of the fingers red.

We examined six specimens identified as *M. rubridigitalis* from New Caledonia in the collections of the MNHN, and herein we identify these specimens as *M. julumunyju* sp. nov. These specimens agree with *M. julumunyju* sp. nov. in rostral form and lack of a spine on the mesial margin of antennal article 2. Specimens reported and figured from New Caledonia and the Loyalty Islands as *Munida* sp. by Macpherson (1994: fig. 13b, 90) also agree with *M. julumunyju* in rostral form and the colour of the fingers, which are described as red with a white tip. Sequence divergence between *M. julumunyju* sp. nov. and a New Caledonian specimen of "*M. rubridigitalis*" (MNHN-IU-2014-15474) is 4% (COI) and 0.6% (16S). Thus, further study is required to determine if other reported specimens of "*M. rubridigitalis*" from the New Caledonian region are conspecific with, or distinct from, *M. julumunyju* sp. nov. The apparently disjunct distribution of *M. julumunyju* sp. nov. suggests that it can be expected to occur at intermediate localities, possibly off southern Indonesia and Papua New Guinea.

Distribution. Presently known from off Western Australia, 373–450 m. New Caledonia, 450–515 m. Loyalty Islands, 540 m.

Munida jurunjurun sp. nov.

<http://zoobank.org/urn:lsid:zoobank.org:act:CD77DA72-B760-4983-9252-6BC62CC7CE50>

Figures 8, 9

Type material. Holotype: WAM C78561, ovigerous female (cl 14.7 mm, pcl 9 mm), Western Australia, off Imperieuse Reef, 17° 35.982' S, 118° 59.076' E to 17° 38.574' S, 119° 01.26' E, 222–319 m, SS05/2007/63, 16 June 2007.

Description. Carapace. Length 1.1 × greatest width, widest at midlength. Dorsal surface with numerous uninterrupted transverse ridges and secondary transverse striae between main ridges; ridges and striae lined with short, non-iridescent setae. Gastric region with 5 pairs of epigastric spines, longest pair behind supraocular spines. Parahepatic, postcervical and dorsal branchial spine present. Anterior part of branchial region between cervical groove and postcervical groove with 3 main ridges; posterior part of branchial region with 6 main transverse ridges (excluding posterodorsal ridge) and 5 secondary striae laterally between main ridges. Cardiac region with 5 main transverse ridges. Intestinal region with transverse ridge, posterodorsal ridge and secondary stria. Frontal margin inclined posteriorly at 112° from midline. Lateral margins slightly convex; anterolateral spines parallel, horizontal, overreaching sinus between rostrum and supraocular spine; small hepatic marginal spine in front of cervical groove (0.15 × length of anterolateral spine); branchial margin with 4 spines. Rostrum spiniform, horizontal, 0.7 × pcl; supraocular spine 0.5 × length of rostrum. Epistomial ridge straight ending slightly anterior to antennal gland; mesial protuberance distinct.

Thoracic sternum. Sternal surface smooth, sternite 4 with few short striae. Sternite 3 0.4 width of sternite 4; midlength of sternal plastron (sternites 4–7) 0.5 width of sternite 7. Sternite 4 anterior margin broadly rounded.

Abdomen. Somite 2 with 2 pairs of small spines at lateral margins of anterior transverse ridge. Somites 2–4 each with 2 or 3 uninterrupted striae behind anterior ridge and some shorter striae. Somite 6 posteromedian margin almost straight. Telson with numerous transverse squamae; greatest width 2.0 × median length; anterolateral margin almost straight or shallowly concave.

Eye. Maximum corneal diameter 0.36 × distance between anterolateral spines.

Antennule. Basal article (distal spines excluded) overreaching or reaching end of corneae; 2 well-developed distal spines, distomesial slightly longer than distolateral; 2 lateral spines, proximal small, distolateral spine exceeding both distal spines.

Antenna. Article 1 with strong distomesial spine overreaching distal margin of article 4. Article 2 with strong distomesial spine overreaching distal margin of article 4; distolateral spine reaching distal margin of article 4; 2 small lateral spines on mesial margin. Articles 3 and 4 unarmed.

Maxilliped 3. Ischium 1.45 × merus length, with strong flexor distal spine; merus with strong spine on flexor margin and small spine distally, with small spine on distal extensor margin.

P1. length 3.0 × pcl, with iridescent setae on inner margin. Merus 1.25 × pcl, with a row of 5 dorsal spines and row of 5 long, close set spines on mesial margin; distal spines strong, distomesial spine not reaching midlength of carpus. Carpus 0.4 × merus length, length 2.6 × width, with spines along mesial and dorsal margins. Propodus 1.1 × merus length, fingers 0.5 × total propodus length, with 2 small distolateral spines; dactylus with small proximal spine small subdistal spine.

P2–4. Long and slender, with numerous scales on lateral surfaces of meri; margins with row of plumose setae and iridescent setae on ischium and merus. P2 length 2.6 × pcl; merus as long as pcl, length 6 × height, 4.0 × carpus length and 1.2 × propodus length, extensor margin spinose, flexor margin with small spine near distal one-fifth and well-developed distal spine; carpus extensor margin with 3 small spines (broken on right P2 of the holotype) and prominent distal spine, flexor margin with distal spine; propodus length 9.3 × height, with 11 small movable flexor spines; dactylus compressed, slightly curved, length 0.5 × propodus length and 5 × height, with 10 evenly spaced spines along distal 0.8 of flexor margin. End of P2 carpus reaching end of P1 merus. P3 with similar spination and article proportions as P2; merus slightly shorter than P2 merus (0.85); propodus and dactylus as long as those of P2. P4 length 0.9 × P2 length; merus 0.7 × pcl, 0.8 × P3 merus length; propodus 0.85 and dactylus 0.95 × length of those of P3; merocarpal articulation slightly overreaching anterolateral corner of carapace.

Genetic data. COI and 16S; see Table 1.

Etymology. Named *jurunjurun* with the approval of Bardi elders, after Jurun jurun, meaning crayfish in Bardi; used as a noun in apposition.

Remarks. *Munida jurunjurun* sp. nov. is closest to *M. acantha* Macpherson, 1994, from New Caledonia, both species having antennal articles 1 and 2 with long mesial spines overreaching article 4, antennule with distomesial spine longer than

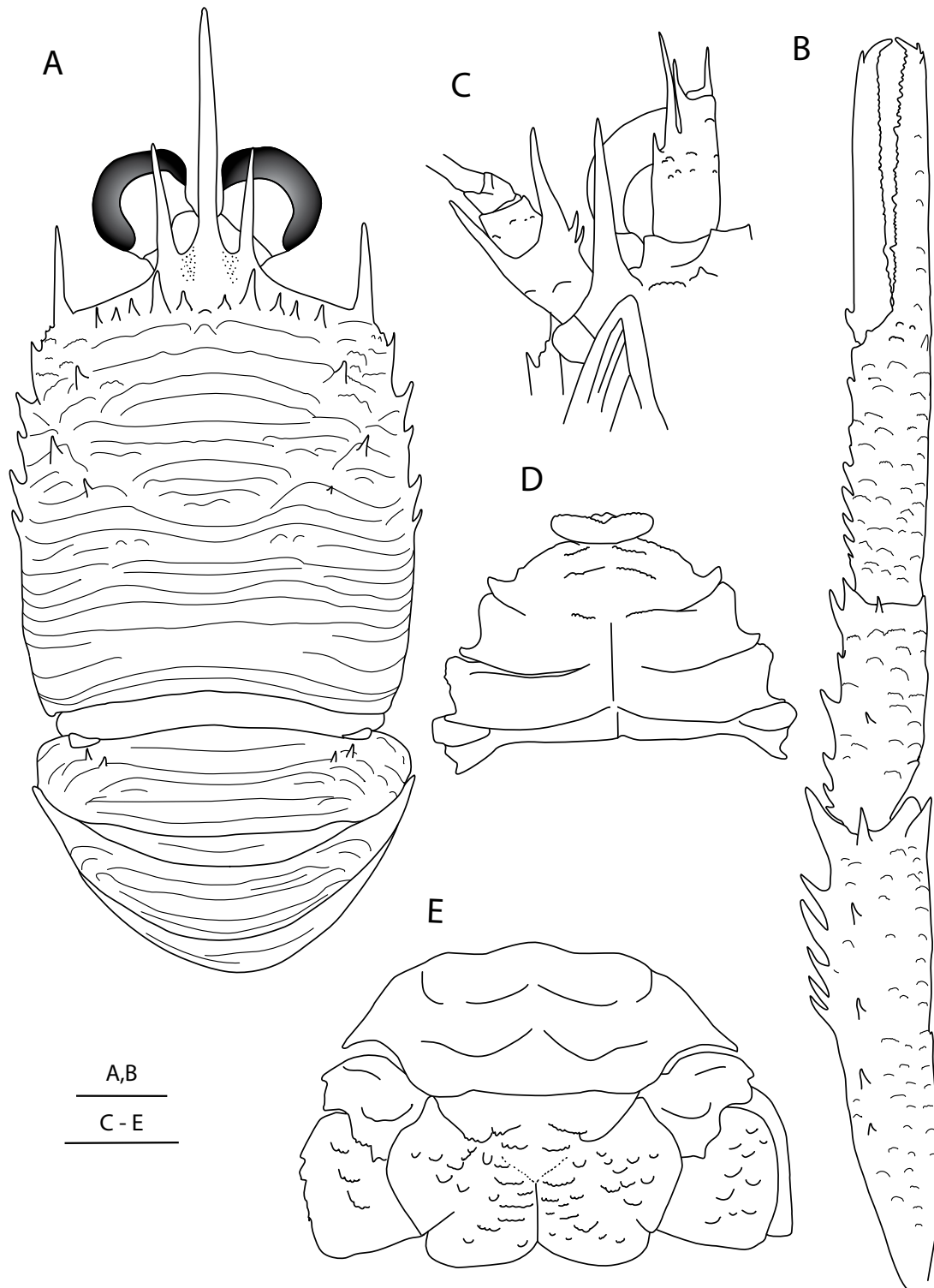


Figure 8. *Munida jurunjurun* sp. nov., holotype, ovigerous female cl 14.7 mm, pcl 9 mm (WAM C78561). A, carapace and abdomen, dorsal view; B, right chela, dorsal view; C, right antenna and antennule, ventral view; D, sternum; E, abdominal somite 6, telson and right uropod. Scale: A–E = 2 mm.

distolateral spine, a smooth thoracic sternum, and abdominal somite 2 with small spines limited to the lateral margins of the anterior ridge. The new species differs from *M. acantha* in having 4 rather than 5 branchial carapace spines. In addition, the new species has a distinct row of spines on the mesial margin of the P1 merus, which are close-set on the distal half of the article, rather than more evenly spaced along the distal 0.6 as in *M. acantha*. Sequence divergence between *M. acantha* and *M. jurunjurun* sp. nov. is 8% for COI and 3.5% for 16S.

Of those species with 4 branchial spines, *M. jurunjurun*

sp. nov. is similar to *M. albiapicula* Baba and Yu, 1987, *M. zebra* Macpherson, 1994, *M. volantis* Macpherson, 2004, and *M. nesiotes* Macpherson, 1999, all of which have a long mesial spine on antennal articles 1 and 2. In these species, however, the spines on the anterior ridge of abdominal somite 2 are evenly spread along the entire margin, rather than placed at the lateral extremities.

Distribution. North-western Australia, off Imperieuse Reef, 222–319 m

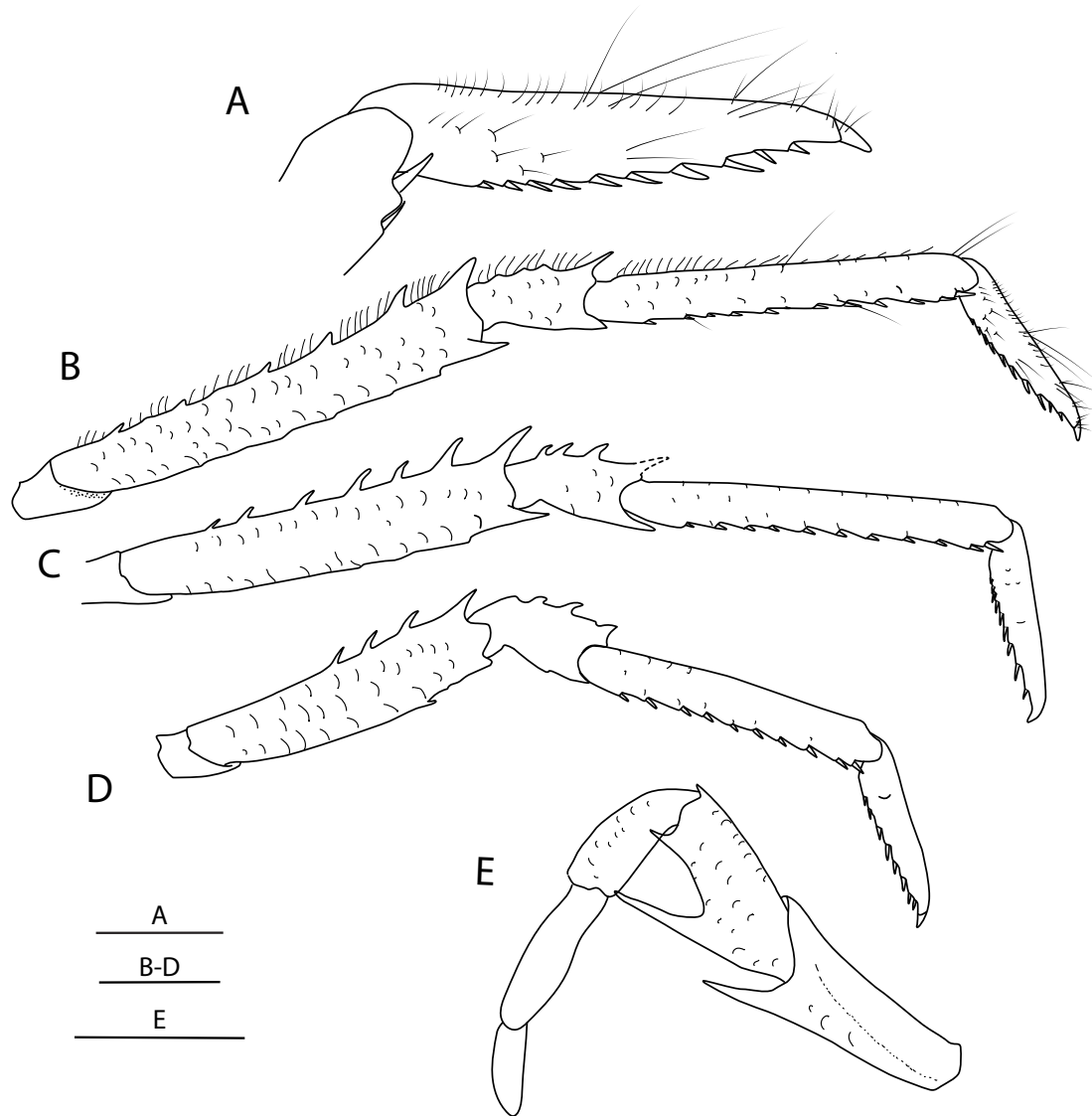


Figure 9. *Munida jurunjurun* sp. nov., holotype, ovigerous female cl 14.7 mm, pcl 9 mm (WAM C78561): A, right P2 dactylus, lateral view; B, right P2, lateral view; C, right P3, lateral view; D, right P4, lateral view; E, left maxilliped 3, lateral view. Scale A = 1 mm, B–E = 2 mm.

***Munida leeuwin* sp. nov.**

<http://zoobank.org/urn:lsid:zoobank.org:act:6D615718-C84B-416F-891A-4D9FABFB7592>

Figures 10, 11

Munida sp. MoV 5176. — Poore et al., 2008: 20: unnumbered colour fig. (lower right) (south-western Australia, 101–100 m).

Type material. Holotype. WAM C78562, male (cl 8.1 mm, pcl 5.3 mm), Western Australia, Barrow Island, 20° 59.082' S, 114° 54.42' E to 20° 59.67' S, 114° 54.54' E, 100–101 m, SS10/2005/170, 13 December 2005.

Paratypes (all Western Australia). WAM C78563, 1 ovigerous female (cl 7.2 mm, pcl 5 mm), 7 females (cl 6.0 mm, pcl 3.8 mm to cl 8.5 mm, pcl 5.5 mm), 7 males (cl 6.3 mm, pcl 3.8 mm to cl 9.1 mm, pcl 6.2 mm), collected with holotype; NMV J55046, 1 male (cl 8.7 mm, pcl 5.9 mm), 1 ovigerous female (cl 7.9 mm, pcl 5.2 mm), collected with holotype; NMV J55100, 2 ovigerous females (cl 7.7 mm, pcl 5.0 mm; cl 7.8 mm, pcl 5.1 mm), 1 female (cl 7.8 mm, 5.0 mm), collected with holotype; NMV J56100, 1 juvenile (cl 4.4 mm, pcl 3.0 mm), 1 ovigerous female (broken rostrum; pcl 4.8 mm), Imperieuse L23 transect, 18° 27.612' S, 120° 08.682' E to 18° 27.72' S, 120° 08.682' E, 80–81 m, SS05/2007/82, 16 June 2007.

Description. Carapace. Length 1.1 × greatest width, widest at midlength. Dorsal surface with main transverse ridges mostly uninterrupted, without secondary transverse striae between main ridges; ridges and striae lined with short, non-iridescent setae and few long iridescent setae. Gastric region with 5 or 6 pairs of epigastric spines, longest pair behind supraocular spines, with median row of 2 or 3 small spines behind rostrum. Hepatic region with 3 or 4 spines on dorsal surface; parahepatic spines present. Anterior part of branchial region between cervical groove and postcervical groove with 3 ridges and 1 or 2 small spines; 1 postcervical spine; posterior part of branchial region with 4 or 5 main transverse ridges (excluding posterodorsal ridge) and few shorter secondary striae between main ridges. Cardiac region with 3 main transverse ridges. Intestinal region without striae; posterodorsal ridge distinct, without secondary stria. Frontal margin inclined posteriorly at 115° from midline. Lateral margin slightly convex; anterolateral spines parallel, horizontal, not reaching sinus between rostrum and supraocular spine; hepatic marginal spine shorter than anterolateral spine; branchial margin with 5 spines. Rostrum spiniform, slightly sinuous in profile, length 0.5 × pcl; supraocular spine 0.3 × length of rostrum. Epistomial ridge curved, ending anterior to antennal gland; mesial protuberance distinct.

Thoracic sternum. Sternital surface smooth, sternite 4 with few long striae. Sternite 3 0.4 width of sternite 4; midlength of sternal plastron (sternites 4–7) 0.7 width of sternite 7. Sternite 4 anterior margin truncate, entirely contiguous with sternite 3.

Abdomen. Somite 2 without spines. Somites 2–4 each with 2 or 3 uninterrupted striae behind anterior ridge and striae at lateral margins. Somite 6 posteromedian margin almost straight. Telson with numerous transverse squamae; greatest width 2.0 × median length; anterolateral margin concave.

Eye. Maximum corneal diameter 0.35 × distance between anterolateral spines.

Antennule. Basal article (distal spines excluded) not overreaching corneae; distolateral and distomesial spines

subequal; 2 lateral spines, proximal smaller, longer lateral spine exceeding distal spines.

Antenna. Article 1 with distomesial spine reaching midlength of article 2. Article 2 distomesial spine slightly overreaching distal margin of article 3; distolateral spine almost reaching distal margin of article 3. Article 3 unarmed or with small distolateral spine. Article 4 unarmed.

Maxilliped 3. Ischium 1.6 × merus length, with distal flexor spine. Merus with 3 well-developed spines on flexor margin; extensor margin with small distal spine.

P1. length 3.1–4.4 pcl (males), 2.8–3.0 pcl (females), with dense covering of iridescent setae on inner margins of merus (without plumose setae), merus 1.3–1.4 (males), 1.0–1.1 (females) × pcl, with row of 5 subtriangular spines on dorsal and mesial margin; distomesial spine not reaching midlength of carpus. Carpus 0.3–0.4 × merus length, length 1.9 (males), 2.0–2.4 (females) × width, with spines along mesial margin. Propodus 1.6–1.7 (males), 1.4 (females) × merus length; fingers 0.4–0.6 (males), 0.5–0.6 (females) × total propodus length; pollex with row of small spines along outer margin; dactylus with 3 small spines on outer margin.

P2–4. Moderately long and slender, with scales on lateral surfaces of meri; extensor margin with plumose setae and iridescent setae. P2 length 2.1–2.6 × pcl; merus as long as carapace, length 6.4 × height, 3.4 × carpus length and 1.3 × propodus length; extensor margin spinose; flexor margin with acute ridges, 1 or 2 spines and well-developed distal spine; carpus with 4 small extensor spines, distal spine on extensor and flexor margin; propodus length 7 × height, with 10–14 movable flexor spines; dactylus compressed, almost straight, 0.7–0.9 × propodus length, length 6–7 × height, flexor margin with 7–12 spines, unarmed along distal 1/3. End of P2 carpus not reaching end of P1 merus. P3 with similar spination and article proportions as P2; merus slightly shorter than P2 merus (0.8); propodus and dactylus as long as those of P2. P4 length 0.8 × P2 length; merus 0.6–0.7 × pcl, 0.9 × P3 merus length; merocarpal articulation almost reaching marginal hepatic spine of carapace.

Genetic data. COI and 16S; see Table 1.

Etymology. Named after the Leeuwin current which flows off the west coast of Australia; used as a noun in apposition.

Remarks. *Munida leeuwin* sp. nov. is most similar to *M. roshanei* Tirmizi, 1966, *M. janetae* Tirmizi and Javed, 1992, and *M. arabica* Tirmizi and Javed, 1992, described from the western Indian Ocean. These three species are very similar to each other and have been distinguished by the length of the pereopod 1 chela, the ratio of the length of the fingers to the propodus palm, and the shape of sternite 3. In his key, Baba (2005) characterises *M. janetae* as having cheliped fingers that are distinctly longer than the palm, while the fingers are shorter than the palm in *M. roshanei* and *M. arabica*. In *M. leeuwin* sp. nov., the fingers are usually as long as the palm but are occasionally longer or shorter than the palm (0.4–0.6 × propodus length). We tentatively describe this species as new based on a combination of subtle differences from the aforementioned species and significant molecular divergence from material we identify as *M. roshanei*. In *M. leeuwin* sp. nov., the dactyli of P2–4 are slender and

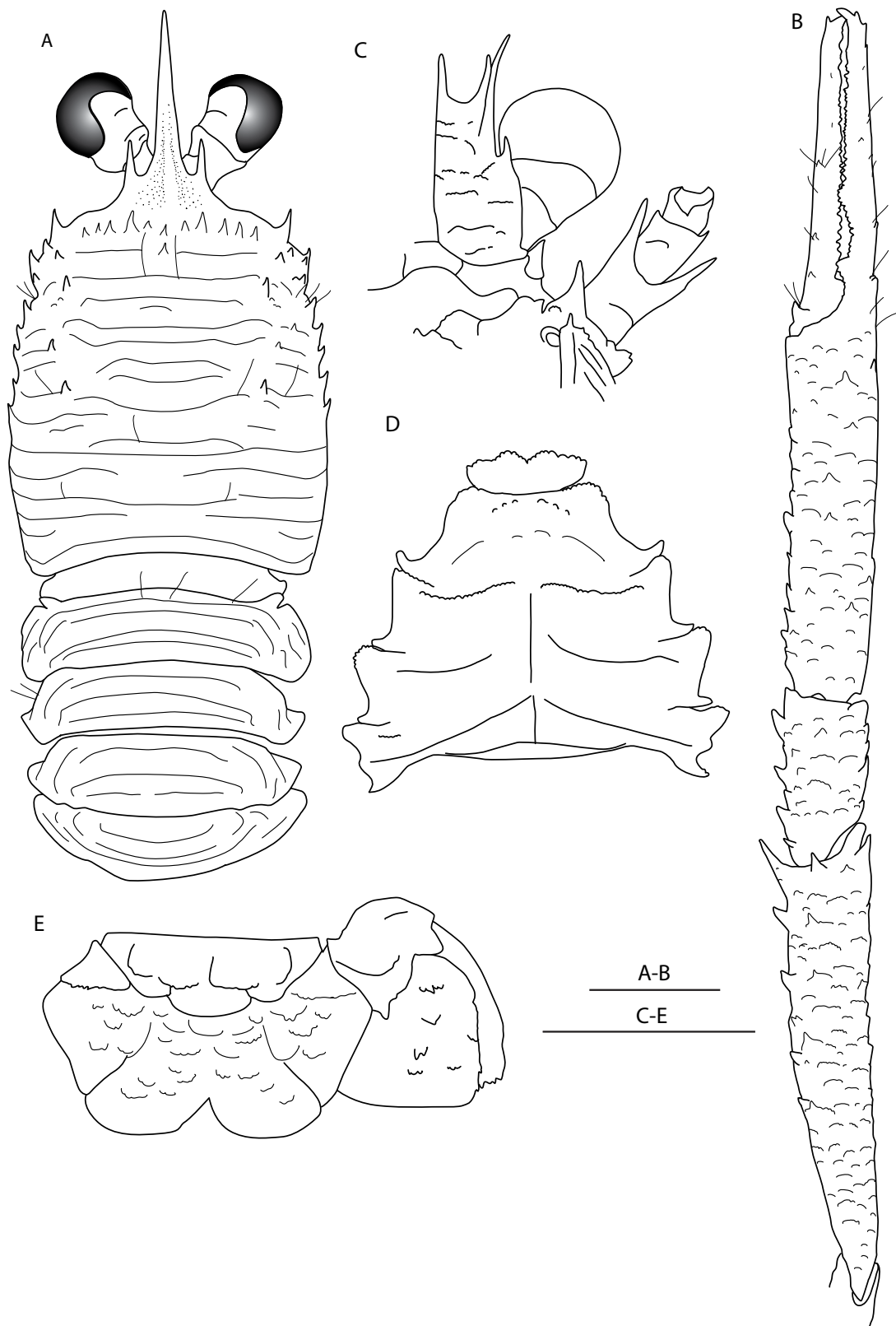


Figure 10. *Munida leeuwin* sp. nov., holotype, male cl 8.1 mm, pcl 5.3 mm (WAM C78562): A, carapace and abdomen, dorsal view; B, right chela, dorsal view; C, left antenna and antennule, ventral view; D, sternum; E, abdominal somite 6, telson and right uropod. Scale: A–E = 2 mm.

unarmed on the distal one-third of the flexor margin, with the ultimate spine closer to the penultimate spine than the unguis. This differs from *M. janetae* in which the dactyli have spines regularly arranged along the entire flexor margin (Tirmizi and Javed, 1992). Illustrations of *M. arabica* show the dactyli to be similar to those of *M. leeuwin* sp. nov., but *M. arabica* can be distinguished by the presence of distal spines on antennal article 4, which are always absent in *M. leeuwin* sp. nov. The type description of *M. roshanei* lacks a description or illustration of the dactyli, as does that of Lewinsohm (1969) for nearby Red Sea specimens. Specimens identified as *M. roshanei* from the Phillipines (Baba, 1988) and Australia (present study), however,

have the dactyli with spines regularly arranged along the entire flexor margin. Although the spination of the P2–4 dactyli of the type material of *M. roshanei* remains to be confirmed, given the brevity of the original description and without access to the type, we fully describe *M. leeuwin* as new to improve the taxonomy of this difficult group.

The genetic sequences of *M. leeuwin* are highly divergent from all other species analysed. Despite their morphological similarities, *M. leeuwin* and our specimens of *M. roshanei* are divergent by 12% in COI.

Distribution. Presently known only from off Western Australia, 658–754 m.

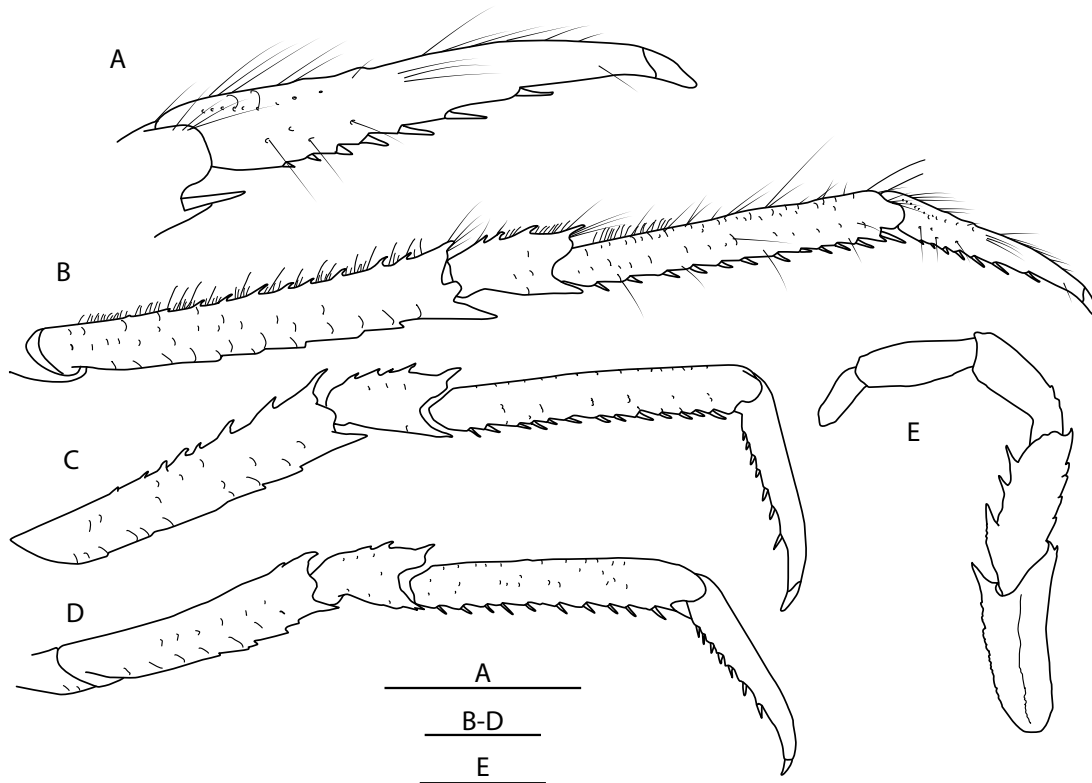


Figure 11. *Munida leeuwin* sp. nov., holotype, male cl 8.1 mm, pcl 5.3 mm (WAM C78562): A, right P2 dactylus, lateral view; B, right P2, lateral view; C, right P3, lateral view; D, right P4, lateral view; E, left maxilliped 3, lateral view. Scale A–E = 1 mm.

***Munida lutruwita* sp. nov.**

<http://zoobank.org/urn:lsid:zoobank.org:act:14904374-57EC-4548-A4D7-ACA713F712C9>

Figures 3E, 12, 13

Munida cf. *manqingae*. — Farrelly and Ahyong, 2019: 13, 55, fig. 99.

Type material. Holotype: NMV J67481, ovigerous female (cl 11.7 mm, pcl 7.8 mm), Tasmania, south of Hobart, Z39 Seamount, 44° 23.346' S, 147° 16.376' E, 2040 m, TT 01/2008/J2-387-003, 25 December 2008.

Paratypes (all Tasmania): NMV J67474, 2 ovigerous females (cl 9.5 mm, pcl 7.1 mm; cl 9.6 mm, pcl 7.4 mm), Z39 Seamount, 44° 23.32' S, 147° 15.349' E, 1599 m, TT 01/2008/J2-387-023, 26 December 2008; NMV J67475, 2 damaged ovigerous females (cl 10.6 mm, pcl 7.3 mm; cl 11.2 mm, pcl 7.9 mm), Z39 Seamount, 44° 22.994' S, 147° 15.09' E, 1893 m, TT 01/2008/J2-387-008, 25 December 2008; NMV J67480, 1 ovigerous female (cl 11.5 mm, pcl 7.9 mm), Z39 Seamount, 44° 23.295' S, 147° 15.348' E, 1616 m, TT 01/2008/J2-387-022, 26 December 2008; NMV J67472, 1 male (abdomen missing; cl 10.9 mm, pcl 6.3 mm), Z39 Seamount, 44° 23.345' S, 147° 16.277' E, 1990–2004 m, TT 01/2008/J2-387-004, 25 December 2008.

Other material examined. AM P103229, 1 ovigerous female (cl 14.3 mm, pcl 10.6 mm), Great Australian Bight, 35° 22.627' S, 132° 19.166' E, 1689–1784 m, from crevice in dead coral, IN2015-C01-042, 6 November 2015.

Description. Carapace. As long as greatest width, widest at midlength. Dorsal surface with main transverse ridges mostly uninterrupted, without secondary transverse striae between main ridges; ridges and striae lined with short, non-iridescent setae. Gastric region with 3 pairs of epigastric spines and 1 or 2 small additional spines, without median row of spines behind rostrum. Hepatic region without spines on dorsal surface. Anterior part of branchial region between cervical groove and postcervical groove with 2 or 3 short tuberculate ridges and often 1 small spine anteriorly; posterior part of branchial region with 5 transverse ridges (excluding posterodorsal ridge). Cardiac region with 2 main transverse ridges. Intestinal region without striae; posterodorsal ridge distinct, without secondary stria. Frontal margin strongly oblique, inclined posteriorly at 115° from midline. Lateral margin slightly convex; anterolateral spine very small, far from reaching sinus between rostrum and supraocular spine; hepatic marginal spine slightly smaller than anterolateral spine; branchial margin with 5 spines. Rostrum spiniform, 0.5 × pcl; supraocular spine 0.25 × length of rostrum, exceeding eyes. Epistomial ridge straight ending at antennal gland; mesial protuberance distinct.

Thoracic sternum. Sternal surface smooth, sternite 4 with only few striae. Sternite 3 0.4 × width of sternite 4. Sternite 4 anterior margin triangular, narrowly contiguous with sternite 3. Midlength of sternal plastron (sternites 4–7) 0.5 × width of sternite 7.

Abdomen. Somites smooth without spines, distinct ridges or striae. Somite 6 posteromedian margin slightly concave. Telson with few striae; greatest width 1.2 × median length; anterolateral margin weakly concave.

Eye. Maximum corneal diameter 0.18 × distance between anterolateral spines.

Antennule. Basal article (distal spines excluded) overreaching corneae; distolateral spine much longer than

distomesial spine; 2 lateral spines, proximal smaller, longer lateral spine not reaching end of distolateral spines.

Antenna. Article 1 distomesial spine almost reaching distal margin of article 2. Article 2 distomesial spine reaching distal margin of article 3; distolateral spine not reaching midlength of article 3. Articles 3 and 4 unarmed.

Maxilliped 3. Ischium 1.9 × merus length, without flexor distal spine. Merus with large median spine and distal spine on flexor margin; extensor margin without distal spine.

P1. Length 2.4–3.2 × pcl, covered in rows of short plumose setae. Merus length 0.9–1.1 × pcl, with row of 2 large spines and 2 small spines on dorsal margin, 1 strong spine on dorsolateral margin, and 4 spines on mesial margin, distomesial spine not reaching midlength of carpus. Carpus 0.5 × merus length, length 3.0 × width, with 6 spines along mesial margin. Propodus 1.3 × merus length, palm with row of 3 or 4 spines on dorsal surface of palm, fingers 0.4–0.5 × total propodus length, without spines on outer margins.

P2–4. Long and slender, with few small scales on lateral sides of meri and carpi; extensor margin with short plumose setae and few longer setae. P2 1.8–2.3 × pcl; merus 0.7–0.8 × pcl, length 8.0 × width, 3.0 × carpus length and 1.5 × propodus length, extensor margin with 5–7 spines, flexor margin with 3 spines and well-developed distal spine; carpus extensor margin with spine at midlength and distal end, flexor margin with distal spine; propodus length about 8 × height, with 5 movable flexor spines on flexor margin; dactylus gently curved distally, 0.6–0.7 × propodus length, length about 7 × height, extensor margin densely lined with stiff short setae on distal half, flexor margin armed along entire length with 12–14 movable spines including spine at base of unguis. End of P2 carpus not reaching end of P1 merus. P3 with similar spination and article proportions as P2; merus 0.9 × P2 merus length, propodus and dactylus as long as those of P2. P4 length 0.7–0.8 × P2 length; merus length 0.3–0.5 × pcl; propodus and dactylus similar in length to those of P3; merocarpal articulation reaching hepatic marginal spine carapace.

Egg diameter. 0.65 mm.

Colour in life. Carapace pink anteriorly fading to white at posterior, abdominal somite 2 white, somites 3–6 pink. P1 and P2–4 white.

Genetic data. COI and 16S; see Table 1.

Etymology. Named *lutruwita*, the original name of Tasmania in *palawa kani*, the language of the Tasmanian Aboriginal people, with the approval of the Tasmanian Aboriginal Centre; used as a noun in apposition.

Remarks. *Munida lutruwita* sp. nov. is very close to *M. manqingae* Liu, Lin and Huang, 2013, described from a single female specimen collected from hydrothermal vent fields at 2218 m in the south-western Indian Ocean. The spination of the antenna and antennule is identical between the two species, but the new species differs from *M. manqingae* in the following:

- the anterior branchial surface of *M. lutruwita* is rugose, with 2 or 3 rows of small tubercles and a small spine anteriorly, but smooth in *M. manqingae*.

- the P2 dactylus has 12–14 movable flexor spines in *M. lutruwita*, but only 10 in *M. manqingae*.

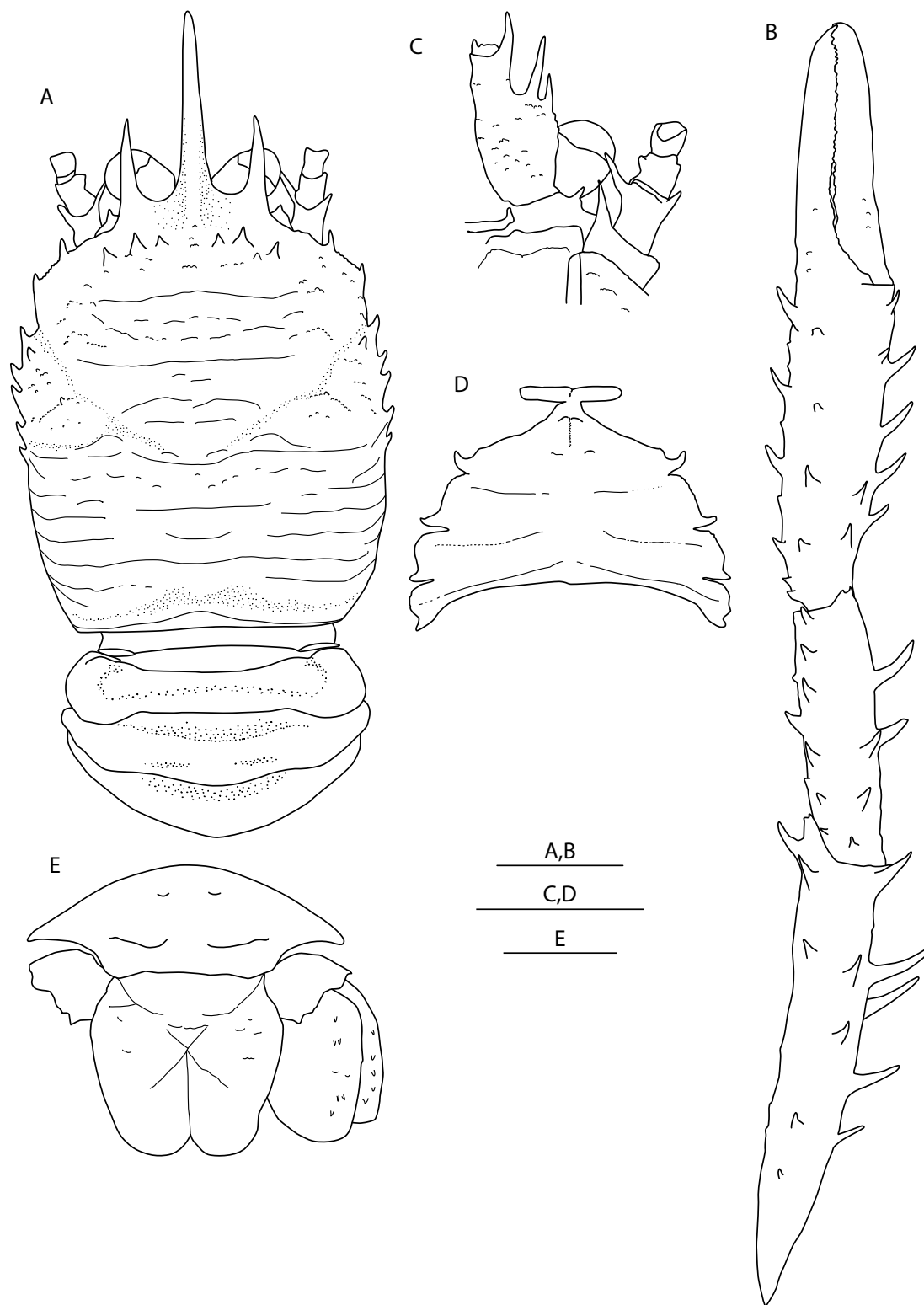


Figure 12. *Munida lutruwita* sp. nov., holotype, ovigerous female, cl 11.7 mm, pcl 7.8 mm (NMV J67481): A, carapace and abdomen, dorsal view; B, right chela, dorsal view; C, right antenna and antennule, ventral view; D, sternum; E, telson. Scale: A–B = 1 mm, C–E = 2 mm.

Munida lutruwita is also very similar to *Munida magniantennulata* Baba and Türkay, 1992, described from hydrothermal vents in the Lau Basin near Fiji, and the recently described, *M. alba* Liu, Li and Lin, 2020, from the Eastern Pacific Rise. Differences between the three species are as follows:

- the antennal article 1 mesial spine reaches the end of article 2 in *M. lutruwita* and *M. alba*, but does not reach as far as the midpoint of article 2 in *M. magniantennulata*.
- the supraocular spines are parallel or slightly convergent, overreaching the eyes in *M. lutruwita*, while in *M. magniantennulata* and *M. alba*, the supraocular spines are

slightly divergent and do not overreach the eyes.

- the frontal margins of the carapace are oblique in *M. lutruwita* and *M. alba* rather than near-transverse in *M. magniantennulata*.

- *M. lutruwita* and *M. magniantennulata* further differ from *M. alba* in the presence of the distal flexor spine on the maxilliped 3 merus (absent in *M. alba*) and unarmed outer margin of the cheliped pollex (spinose in *M. alba*).

Distribution. Off southern Tasmania and the Great Australian Bight, 1599–2040 m.

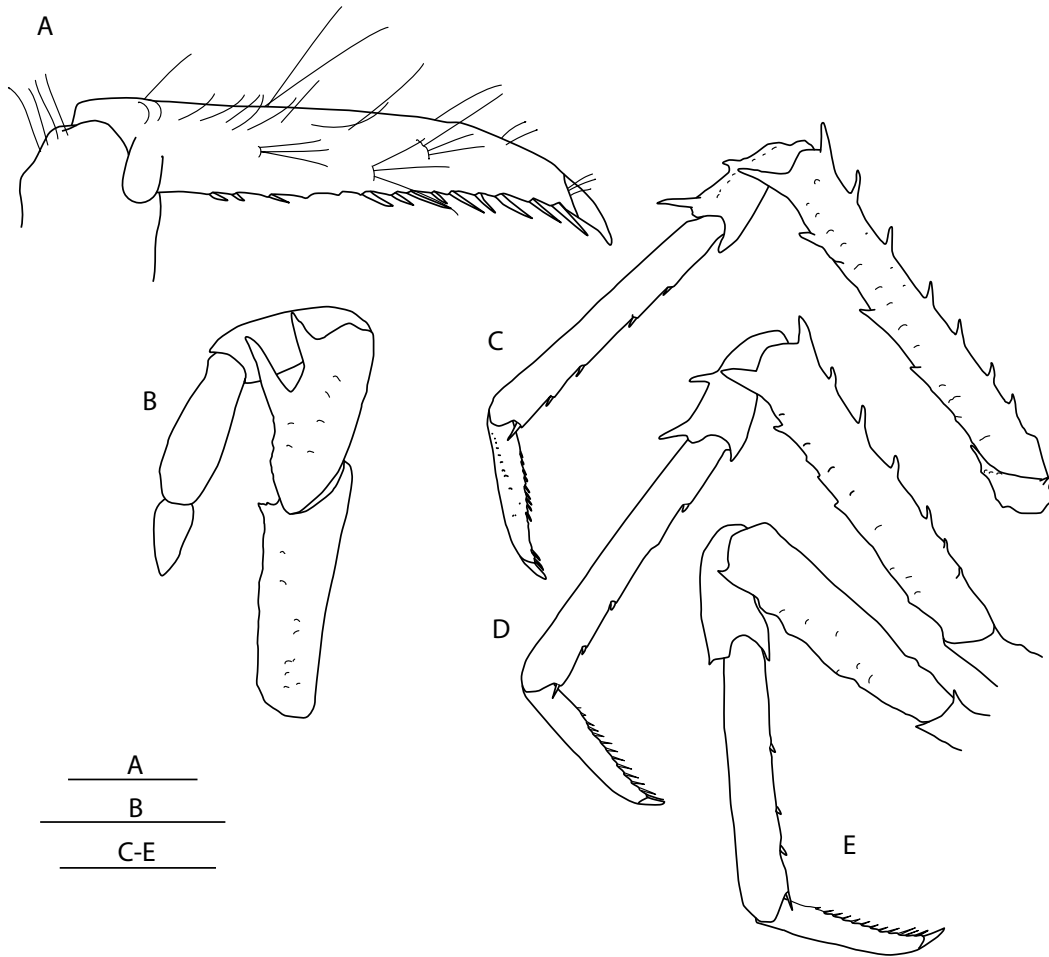


Figure 13. *Munida lutruwita* sp. nov., holotype ovigerous female, cl 11.7 mm, pcl 7.8 mm (NMV J67481): A, right P2 dactylus, lateral view; B, left P2, lateral view; C, left P3, lateral view; D, left P4, lateral view; E, left maxilliped 3, lateral view. Scale = 1 mm.

***Munida maatijadakurnaaku* sp. nov.**

<http://zoobank.org/urn:lsid:zoobank.org:act:354E2119-60D1-498B-9595-32D05B1968BF>

Figures 14, 15

Munida aff. *rubiesi* Macpherson, 1991. — Poore et al., 2008.

Type material. Holotype: WAM C78564, male (rostrum broken; pcl 9.0 mm), Western Australia, south-west of Kalbarri, 27° 56.106' S 113° 4.86' E to 27° 56.646' S 113° 5.28' E, 417–428 m, beam trawl, SS10/2005/98, 4 December 2005.

Description. Carapace. Length 1.2 × greatest width, widest at midlength. Dorsal surface with numerous uninterrupted transverse ridges and secondary transverse striae between main ridges; ridges and striae lined with short, non-iridescent setae and scattered long setae. Gastric region with 4 pairs of epigastric spines, longest pair behind supraocular spines. Hepatic region with short scales; parahepatic spine present. Anterior part of branchial region between cervical groove and postcervical groove with dorsal spine and 5 or 6 main ridges; 1 postcervical spine; posterior part of branchial region with 8 main transverse ridges (excluding posterodorsal ridge) and 5 secondary striae laterally between main ridges. Cardiac region with 5 main transverse ridges. Intestinal region with 2 transverse ridges, posterodorsal ridge distinct, with secondary stria. Frontal margin inclined posteriorly at 106° from midline. Lateral margins slightly convex; anterolateral spine slightly divergent, horizontal, overreaching sinus between rostrum and supraocular spine; hepatic marginal spine distinctly smaller than anterolateral spine; branchial margin with 5 spines. Rostrum broken; supraocular spines 0.4 × pcl, exceeding eyes. Epistomial ridge straight ending slightly anterior to antennal gland; mesial protuberance distinct.

Thoracic sternum. Sternal surface smooth, sternites 4 and 5 with few short striae. Sternite 3 0.4 × width of sternite 4; median length of sternal plastron (sternites 4–7) 0.7 × width of sternite 7. Sternite 4 anterior margin subtriangular, narrowly contiguous with sternite 3.

Abdomen. Somite 2 with 5 pairs of spines on anterior transverse ridge. Somites 2–4 each with 5 or 6 uninterrupted striae behind anterior ridge. Somite 6 posteromedian margins slightly convex, posterolateral margins slightly produced. Telson with numerous transverse squamae; greatest width 1.6 × median length; anterolateral margin slightly concave.

Eye. Maximum corneal diameter 0.4 × distance between anterolateral spines.

Antennule. Basal article (distal spines excluded) overreaching corneae; 2 long, subequal distal spines; 2 lateral spines, proximal smaller, distolateral spine not exceeding distal spines.

Antenna. Article 1 with distomesial spine overreaching distal margin of article 2. Article 2 with strong distomesial spine significantly overreaching distal margin of article 4; distolateral spine reaching distal margin of article 3. Articles 3 and 4 unarmed.

Maxilliped 3. Ischium 1.5 × merus length, with strong flexor distal spine; merus with strong spine on flexor margin and small spine distally, without spine on distal extensor margin.

P1. Length 2.8 × pcl, with long plumose setae and

iridescent setae, setae longest on dorsal surfaces. Merus length 1.1 × pcl, with a row of 8 dorsal spines and row of 4 spines on mesial margin; distal spines strong, distomesial spine not reaching midlength of carpus. Carpus 0.4 × merus length, length 1.9 × width. Propodus 1.1 × merus length, fingers 0.6 × total propodus length; pollex with row of 5 spines on lateral margin; dactylus with row of 3 spines on dorsal margin, 5 spines on lateral margin and 1 small subdistal spine.

P2–4. Long, slender, with numerous scales on lateral sides of meri; extensor margins with row of plumose and iridescent setae. P2 length 2.3 × pcl, merus as long as carapace, length about 7 × height, 4.0 × carpus length and 1.9 × propodus length, row of spines on extensor margin, flexor margin row of spines and well-developed distal spine; carpus with 2 small spines and 2 large spines on extensor margin, distal spine on flexor margin; propodus length 5.3 × height, with 9 small movable flexor spines; dactylus compressed, almost straight, as long as propodus length, length 8.6 × height, with 7 movable spines along the flexor margin, distal one-quarter unarmed. P3 with similar spination and article proportions as P2; merus slightly shorter than P2 merus (0.75); propodus and dactylus slightly shorter than those of P2. P4 length 0.6 × P2 length; merus 0.4 × pcl, length 0.6 × P3 merus length; propodus 0.8 and dactylus 0.9 × as long as those of P3.

Etymology. Named *maatijada* for crawling and *kurnaaku* for crayfish/yabbie in Nhanda language at the Nhanda Language Day (2 July 2019) at Bundiyarra-Irra Wanga Language Centre in Geraldton; used as a noun in apposition.

Remarks. Despite the broken rostrum in the holotype, *Munida maatijadakurnaaku* sp. nov. is clearly distinguished by a number of diagnostic characters. It is most similar to *M. aequalis* Ahyong and Poore, 2004, from eastern Australia, which also has long and subequal distal spines on the basal antennular article, a subtriangular sternite 4, slender P2–4 dactyli and similar antennal spination. The two species can be distinguished by:

- the supraocular spines overreach the eyes in *M. maatijadakurnaaku* but do not reach the end of the eyes in *M. aequalis*
- antennal article 2 has the distomesial spine significantly overreaching article 4 in *M. maatijadakurnaaku*, but only slightly overreaching article 4 in *M. aequalis*
- the P2–4 dactyli are as long as their respective propodi in the new species, with only the distal one-quarter unarmed, rather than slightly shorter than the propodus and unarmed on the distal one-third in *M. aequalis*.

Distribution. Known only from Western Australia, 417–428 m.

***Munida agave* Macpherson and Baba, 1993**

Figures 16A

Munida agave Macpherson and Baba, 1993: 387, figs 1, 2 (type locality: Philippines). — Baba et al., 2008: 84. — Baba et al., 2009: 139, fig. 115.

Material examined. Western Australia: NMV J56008, 1 female (cl 11.6 mm, pcl 10.4 mm), Broome L25 transect, 16° 45.156' S,

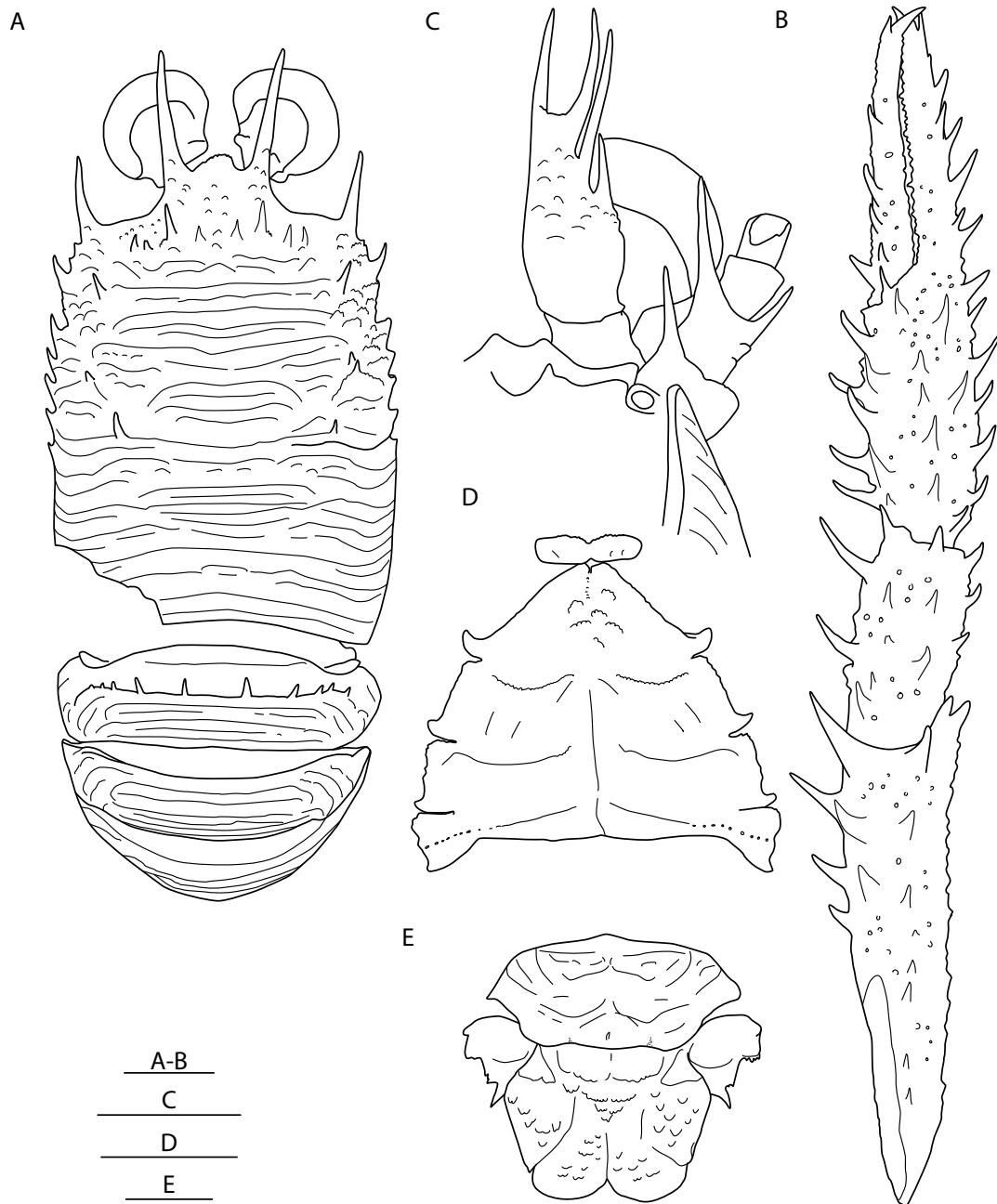


Figure 14. *Munida maatijadakurnaaku* sp. nov., holotype, 1 male with missing rostrum, pcl 9.0 mm (WAM C78564): A, carapace and abdomen, dorsal view; B, right chela, dorsal view; C, right antenna and antennule, ventral view; D, sternum; E, telson. Scale A–E = 2 mm.

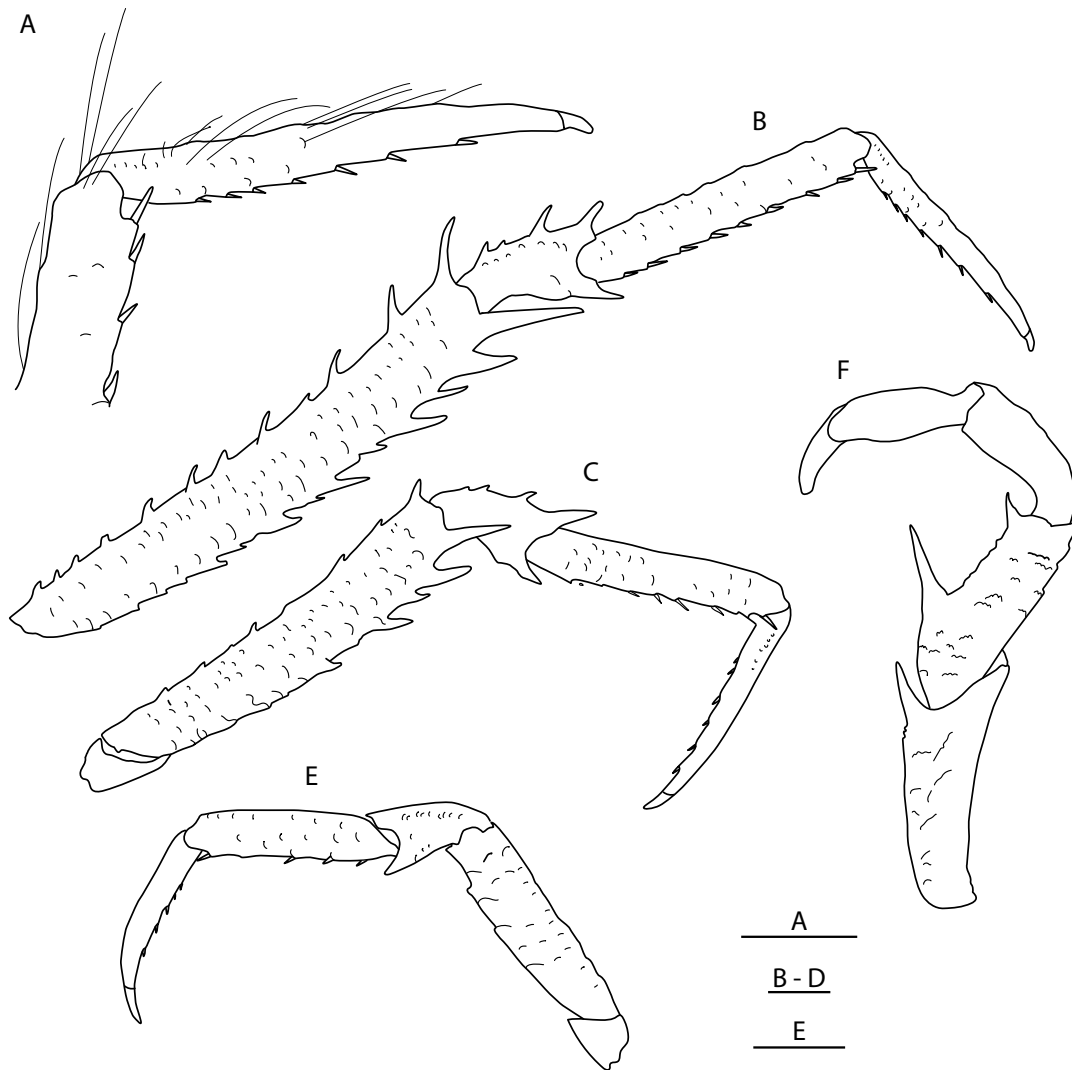


Figure 15. *Munida maatijadakurnaaku* sp. nov., 1 male with missing rostrum, pcl 9.0 mm (WAM C78564): A, right P2 dactylus, lateral view; B, left P2, lateral view; C, left P3, lateral view; D, left P4, lateral view; E, left maxilliped 3, lateral view. Scale: A–E = 1 mm.

121° 02.796' E to 16° 44.592' S, 121° 02.208' E, 100–108 m, SS05/2007/116, 30 June 2007; NMV J56099, Adele L28 transect, 14° 33.732' S, 122° 55.092' E to 14° 33.684' S, 122° 54.906' E, 95–105 m, SS05/2007/161, 4 July 2007.

Colour. Carapace and abdominal somites 2–5 pale orange with orange striae and spines, telson whiteish. Rostrum and supraocular spines orange. P1 and P2–4 pale orange with orange striae.

Genetic data. COI and 16S; see Table 1.

Remarks. This specimen agrees well with the description of the holotype from the Philippines, having arcuate striae on sternites 3–6 and two pairs of spines on the anterior ridge of abdominal somite 2. This is the first record of the species from Australia.

Distribution. Japan, Philippines, Indonesia, Taiwan, 89–549 m. North-western Australia, 55–108 m.

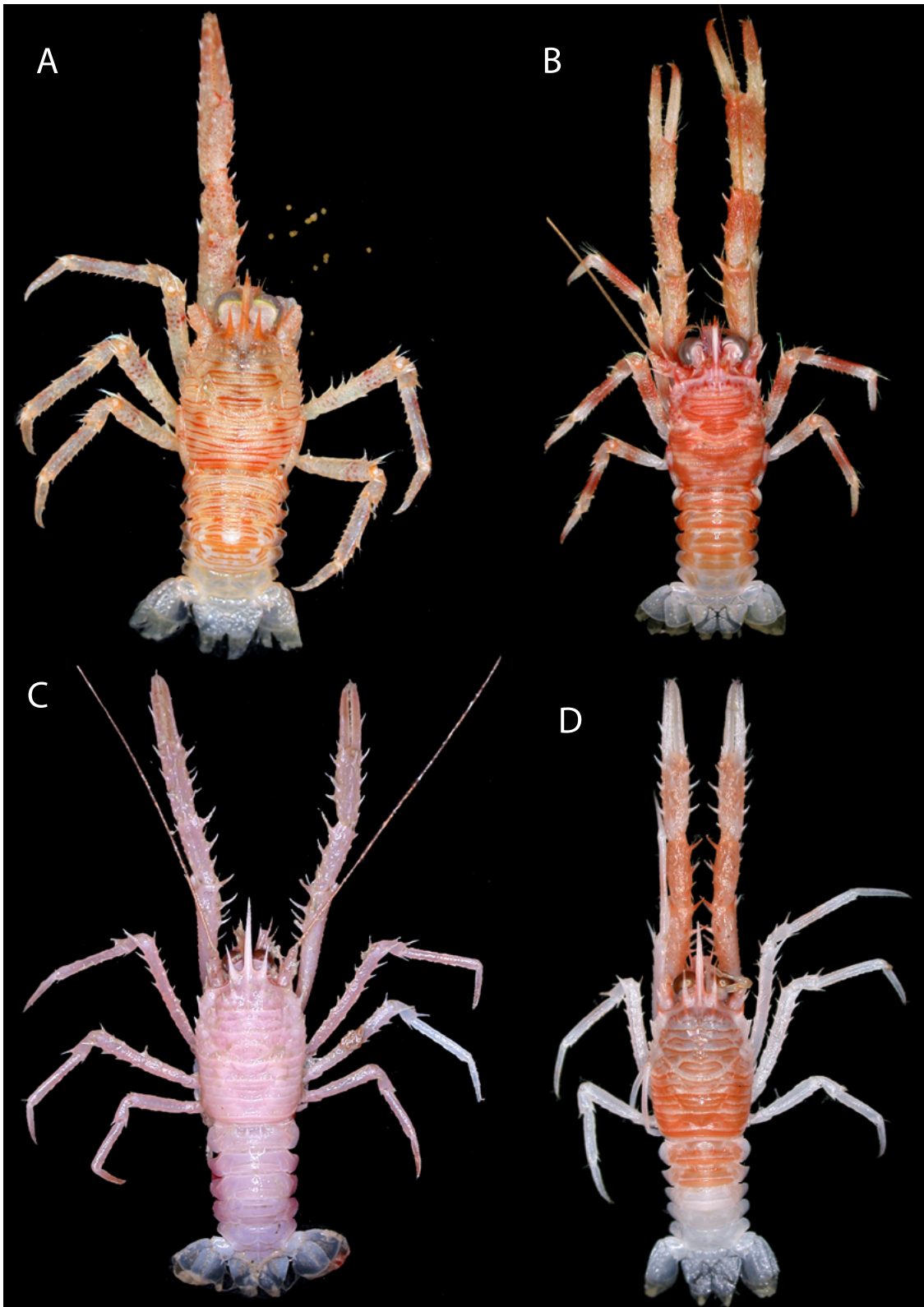


Figure 16. A, *Munida agave* Macpherson and Baba, 1993, female, cl 11.6 mm, pcl 10.4 mm (NMV J56008); B, *Munida armilla* Macpherson, 1994, male, cl 16.1 mm, pcl 10.2 mm (NMV J55081); C–D, *Munida asprosoma* Ahyong and Poore, 2004, male, cl 13.2 mm, pcl 8.0 mm (J55076), ovigerous female, cl 17.4 mm, pcl 10.7 mm (NMV J56016). Photos: K. Gowlett-Holmes.

***Munida armilla* Macpherson, 1994**

Figure 16B

Munida armilla Macpherson, 1994: 446, figs 6, 65 [type locality: New Caledonia]. — Baba et al., 2008: 87. — Macpherson, 2013: 296.
Munida aff. *amathea* — Poore et al., 2008: 20.

Material examined. Western Australia: NMV J55081, 1 male (cl 16.1 mm, pcl 10.2 mm),

Abrolhos, 28° 29.37' S, 113° 25.14' E to 28° 30.06' S, 113° 25.5' E, 416–431 m, SS10/2005/95, 2005.

Colour. Carapace and abdominal somites pink/white with orange/reddish striae and spines. Rostrum white with red tip, supraocular spines red at base and white distally, anterolateral spines red. Walking legs with orange/red bands. Chela with orange bands.

Genetic data. Not available.

Remarks. This single specimen differs slightly from the type material of *M. armilla* Macpherson, 1994. In our specimen the basal article of the antennule has subequal distal spines while in the holotype the distomesial spine is slightly shorter than the distolateral. In our specimen the carapace has interrupted striae while the holotype has numerous scales. This is the first record of the species from Australia.

Distribution. New Caledonia, Matthew and Hunter Islands, Tuscaroa Bank, Tonga, French Polynesia (Tarava seamounts, Tuamotu and Society Archipelagos), 233–710 m. Western Australia, 416–431 m.

***Munida asprosoma* Ah Yong and Poore, 2004**

Figure 16C–D

Munida asprosoma Ah Yong and Poore, 2004: 20, fig. 3 (type locality: east of Broken Bay, New South Wales, Australia). — Baba et al., 2008: 87. — Baba et al., 2009: 146, figs 123–126. — Poore et al., 2011: pl. 16D. — McEnnulty et al., 2011: app. 1.

Material examined. Western Australia: NMV J56016, 2 ovigerous females (cl 16.3 mm, pcl 10.2 mm; cl 17.4 mm, pcl 10.7 mm), Mermaid L24 transect, 16° 38.064' S, 119° 09.216' E to 16° 38.766' S, 119° 08.034' E, 983–993 m, SS05/2007/68, 17 June 2007;

NMV J56096, 1 female (cl 13.9 mm, pcl 8.3 mm), 1 juvenile (cl 10.3 mm, pcl 6.0 mm), Mermaid L24 transect, 16° 44.286' S, 119° 15.042' E to 16° 43.794' S, 119° 15.48' E, 693–698 m, SS05/2007/70, 17 June 2007; NMV J56393, 2 females (pcl 6.7–8.1 mm; #B, #A), 1 male (pcl 5.0 mm; #C), Leveque L27 transect, 14° 33.06' S, 121° 15.366' E to 14° 33.588' S, 121° 16.56' E, 1021–1023 m, SS05/2007/155, 3 June 2007; NMV J57258, 1 ovigerous female (cl 20.6 mm, pcl 12.7 mm), SS05/2007/155; NMV J55077, 1 male (cl 20.4 mm, pcl 12.2 mm), Perth Canyon, 31° 57.9' S, 115° 06.3' E to 31° 56.982' S, 115° 07.08' E, 928–1170 m, SS10/2005/73, 30 November 2005; NMV J55078, 4 ovigerous females (cl 18.7 mm, pcl 10.7 mm to cl 22.1 mm, pcl 13.6 mm), 19 females (cl 14.4 mm, pcl 8.6 mm to cl 23.5 mm, pcl 14.5 mm), 11 males (cl 12.4 mm, pcl 7.4 mm to cl 26.5 mm, pcl 15.9 mm), SS10/2005/73; NMV J55076, 3 males (cl 13.2 mm, pcl 8.0 mm to cl 21.5 mm, pcl 12.8 mm), Abrolhos, 29° 00.594' S, 113° 42.78' E to 29° 01.512' S, 113° 43.32' E, 700–704 m, SS10/2005/85, 2 December 2005; NMV J55079, 1 female (cl 16.9 mm, pcl 10.4 mm), 5 males (cl 15.9 mm, pcl 9.6 mm to cl 26.1 mm, pcl 16.1 mm), SS10/2005/85.

Colour. Carapace, abdomen, chela and P2–4 pale pink. Reddish on distal portion of fingers, antenna and posterior margin of carapace. One specimen photographed is different in colour from the other two photographed specimens. This specimen was collected from the Abrolhos station at ~700 m (male, cl 13.2 mm, pcl 8.0 mm, NMV J55076). The carapace is white with orange on the striae and abdominal somites 2–3, P2–4 are white, the chelae are orange with white fingers.

Genetic data. COI; see Table 1.

Remarks. The present specimens of *M. asprosoma* from Western Australia accord well in most respects with those from eastern Australia (Ah Yong and Poore, 2004). Three juveniles (NMV J56393; pcl 5.0–8.1 mm), however, differ from adults in having lesser developed abdominal spination: the median pair of spines on the anterior ridge of abdominal somite 2 is well developed but spines laterad are either incipient or minute, and the anterior ridge of somite 3 is unarmed. Thus, the diagnostic spination of the abdominal somites may not be fully developed in juveniles and care should be taken when identifying small specimens.

The COI sequences of *M. asprosoma* were only 1.3% divergent from *Munida hoda* Macpherson, Rodríguez-Flores and Machordom, 2017, from Mozambique. Intraspecific divergence between the three specimens sequenced here was 0.3–0.6%. These species share a number of morphological characters including: the presence of 5 spines on the branchial lateral margins of the carapace, strongly oblique frontal carapace margins, absence of secondary striae between the widely spaced primary striae, spines along the anterior ridge of the abdominal somite 2, large eyes, and the distomesial spine of the antennular article 1 shorter than the distolateral spine. They can easily be distinguished by the presence of spines on abdominal somite 3 in adults of *M. asprosoma*, and the flexor spination of the P2 dactyli, with 7–9 spines in *M. asprosoma* and only 4 spines in *M. hoda*. One of the specimens photographed had a different colour pattern from the others (NMV J55076, male pcl 8.0 mm; see above) but we could find no other morphological characters to distinguish this specimen from the others. Similarly, Baba et al. (2009) showed a number of distinct colour morphs of *M. asprosoma* from Taiwan, not dissimilar to the variation reported here, and in some cases different from that of the holotype (Poore et al. 2011: pl. 16D).

Distribution. Eastern Australia (New South Wales and Queensland), Vanuatu, Taiwan, 495–1802 m. Western Australia, 700–1170 m.

***Munida babai* Tirmizi and Javed, 1976**

Munida babai Tirmizi and Javed, 1976: 81–85, fig. 1, 2 (type locality: off Natal, South Africa). — Baba et al., 2008: 88. — McEnnulty et al., 2011: app. 1.

Material examined. Western Australia: NMV J55044, 2 males (cl 7.7 mm, pcl 5.1 mm to cl 7.8 mm, pcl 5.3 mm), Ningaloo North, 21° 58.704' S, 113° 49.2' E to 21° 59.052' S, 113° 49.2' E, 170–177 m, SS10/2005/152, 10 December 2005; NMV J55041, 2 males (cl 7.8 mm, pcl 5.3 mm; cl 9.2 mm, pcl 5.9 mm), Ningaloo North, 21° 59.172' S, 113° 49.2' E to 21° 59.79' S, 113° 49.14' E, 165–166 m, SS10/2005/153,

11 December 2005; NMV J55042, 3 females (cl 6.0 mm, pcl 3.8 mm; cl 6.1 mm, pcl 4.0 mm), 4 males (cl 7.7 mm, pcl 5.0 mm; cl 8.1 mm, pcl 5.7 mm), Barrow Island, 20° 59.082' S, 114° 54.42' E to 20° 59.67' S, 114° 54.54' E, 100–101 m, SS10/2005/170, 13 December 2005.

Genetic data. COI; see Table 1.

Remarks. Originally described from off South Africa (off Natal), *M. babai* has subsequently been reported from shelf depths across the Indian Ocean as far east as Hong Kong (Baba, 1988). It can be distinguished by the presence of spines on the anterior margin of abdominal somite 4 and very short supraocular spines. As noted by Baba (1988), the number of spines on the abdominal somites is variable. We found abdominal somite 2 with 5–9 spines, somite 3 with 2–5, and somite 4 with 2–5 spines. The P2 dactylus is 0.75 the length of the propodus in Australian specimens compared to 0.64 for the type (based on Tirmizi and Javed, 1976: fig. 2D), and 0.84 for the Albatross material from Hong Kong and the Phillipines (Baba, 1988). This is the first record of the species from Australia.

Distribution. South Africa, Madagascar, Hong Kong, Malaysia, 70–456 m. Western Australia, 100–177 m.

***Munida benguela* de Saint Laurent and Macpherson, 1988**

Munida benguela de Saint Laurent and Macpherson, 1988: 106, figs 1, 2a, 2c, 3a, 3d, 3f–i (type locality: south of Namibia). — Baba et al., 2008: 89.

Material examined. Western Australia: NMV J56405, 1 male (damaged; cl 11.6 mm, pcl 8.2 mm), SS05/2007/176, Kulumburu L29 transect, 13° 13.482' S 123° 23.742' E to 13° 13.338' S 123° 23.286' E, 392 m, 5 July 2007.

Genetic data. Not available.

Remarks. Although this specimen is damaged, most diagnostic characters are evident. In *M. benguela*, the P2 dactylus has 6–8 spines with the ultimate being distant from the unguis. Similarly, our specimen has 8 spines and is unarmed on the distal one-third. In *M. benguela*, the fixed finger of the chela has at least 4 spines on the lateral margin which agrees with our specimen. However, our specimen lacks any spines on the mesial margin of the moveable finger while *M. benguela* has a subdistal spine and an additional 2–4 spines on the mesial margin.

Distribution. South African coast between S Namibia and Natal, and Madagascar; 352–1000 m. North-west Australia, 392 m.

***Munida compacta* Macpherson, 1997**

Figure 17A–C

Munida compacta Macpherson, 1997: 605–606, fig. 2 (type locality: Kei Islands, Indonesia). — Baba et al., 2008: 90.

Munida andamanica. — Poore et al., 2008: 19. — McEnulty et al., 2011: app. 1, 2.

Material examined. Queensland. AM P89035, 2 ovigerous females (pcl 11.7–13.5 mm), east of Cape York, 10° 29.810' S, 144° 01.380' E, 596 m, RV *Franklin*, FR0688-02, 20 August 1988. Western Australia. AM P72138, 1 ovigerous female (cl 26.5 mm, pcl 19.7 mm), 240 km north-west of Port Hedland, 18° 06' S, 117° 45' E, 500 m, RV *Soela*, S02/82/31,

coll. J. Paxton, 7 April 1982; NMV J56402, 1 male (cl 14 mm, pcl 7.0 mm), Onslow L19 transect, 20° 07.962' S, 114° 58.71' E to 20° 07.584' S, 114° 58.416' E, 415–470 m, SS05/2007/15, 11 June 2007; NMV J56409, 4 females (cl 18.8 mm, pcl 11.6 mm; cl 26.5 mm, pcl 18.0 mm), Dampier L20 transect, 19° 43.548' S, 115° 20.604' E to 19° 43.764' S, 115° 21.144' E, 415–428 m, SS05/2007/28, 12 June 2007; NMV J56414, 1 male (cl 14.5 mm, pcl 7.8 mm), SS05/2007/28; NMV J56408, 1 male (cl 17.9 mm, pcl 11.3 mm), Hedland L22 transect, 18° 34.194' S, 117° 27.864' E to 18° 34.062' S, 117° 28.626' E, 401–405 m, SS05/2007/52, 14 June 2007; NMV J55266, 1 female (cl 13.5 mm, pcl 8.5 mm), Imperieuse L23 transect, 17° 21.492' S, 118° 57.312' E to 17° 20.88' S, 118° 56.802' E, 437–446 m, SS05/2007/56, 15 June 2007; NMV J56412, 2 males (cl 24.7 mm, pcl 16.5 mm; cl 25.0 mm, pcl 16.6 mm), SS05/2007/56; NMV J56411, 3 males (cl 15.7 mm, pcl 9.5 mm to cl 18.0 mm, pcl 11.2 mm), 1 ovigerous female (cl 27.3 mm, pcl 18.1 mm), Imperieuse L23 transect, 17° 31.734' S, 118° 50.61' E to 17° 32.508' S, 118° 50.352' E, 403–407 m, SS05/2007/57, 15 June 2007; NMV J56426, 1 female (cl 14.4 mm, pcl 7.6 mm), SS05/2007/57; NMV J55260, 3 ovigerous females (cl 23.9 mm, pcl 16.0 mm to cl 25.9 mm, pcl 24.0 mm), Imperieuse L23 west transect, 17° 31.044' S, 118° 51.162' E to 17° 31.716' S, 118° 50.742' E, 405–406 m, SS05/2007/64, 16 June 2007; NMV J55265, 1 male (cl 12.4 mm, pcl 7.5 mm), SS05/2007/64; NMV J55990, 1 female (18.9 mm, pcl 13.4 mm), 1 juvenile (cl 9.5 mm, pcl 8.4 mm), SS05/2007/64; NMV J56406, 1 male (cl 11.5, pcl 10.5 mm), SS05/2007/64; NMV J56410, 1 ovigerous female (cl 24.5 mm, pcl 16.7 mm), Leveque L27 transect, 14° 50.814' S, 121° 26.436' E to 14° 50.94' S, 121° 28.164' E, 382–401 m, SS05/2007/102, 26 June 2007; NMV J56080, 8 males (cl 19.9 mm, pcl 14.7 mm to cl 26.7 mm, pcl 16.9 mm), 3 females (cl 21.9 mm, pcl 14.8 mm to cl 25.7 mm, pcl 18.3 mm), Leveque L27 transect, 14° 51.198' S, 121° 25.878' E to 14° 50.724' S, 121° 27.012' E, 396–403 m, SS05/2007/144, 2 July 2007; NMV J56081, 2 females (cl 20.6 mm, pcl 12.6 mm; cl 22.4 mm, pcl 15.1 mm), 1 juvenile (cl 14.9 mm, pcl 9.2 mm), Ashmore L30 transect, 12° 28.884' S, 123° 25.062' E to 12° 29.958' S, 123° 25.002' E, 397–405 m, SS05/2007/189, 6 July 2007; NMV J55994, 4 ovigerous females (cl 22.4 mm, pcl 15.1 mm to cl 23.5 mm, pcl 15.6 mm), 1 female (cl 24.1 mm, pcl 16.3 mm), 3 males (cl 19.6 mm, pcl 12.9 mm to cl 24.4 mm, pcl 16.3 mm), Ashmore L30 transect, 12° 31.77' S, 123° 25.638' E to 12° 30.828' S, 123° 25.362' E, 401–404 m, SS05/2007/192, 6 July 2007; NMV J55051, 1 female (cl 14.4, pcl 9.0 mm), Barrow Island, 21° 00.402' S, 114° 22.86' E to 21° 00.042' S, 114° 22.5' E, 399–408 m, SS10/2005/172, 13 December 2005.

Colour. Carapace and abdominal somites 2–4 pale orange/pink. Rostrum red, supraocular spines white or red and white on distal half. P1 pale orange/pink with white fingers, P2–4 pale orange on meri and carpi, white on propodi, dactyli white with red tips.

Genetic data. COI and 16S; see Table 1.

Remarks. *Munida compacta* is very close to *M. rubridigitalis* Baba, 1994, and *M. julumunyju* sp. nov. from eastern and western Australia, respectively, and *M. rhodonia*, from New Caledonia. These species can be distinguished by:

- the dactylus of P2 is similar in length (0.8–1.0) to the propodus in *M. compacta* and distinctly shorter (0.8) in *M. rhodonia*

- chelipeds with well-developed spines on the dorsal face of the palm in *M. compacta*, which are instead very small in *M. rhodonia*.

While the length of the distomesial spine of the P1 merus was used to differentiate these species (Baba, 1997), we found

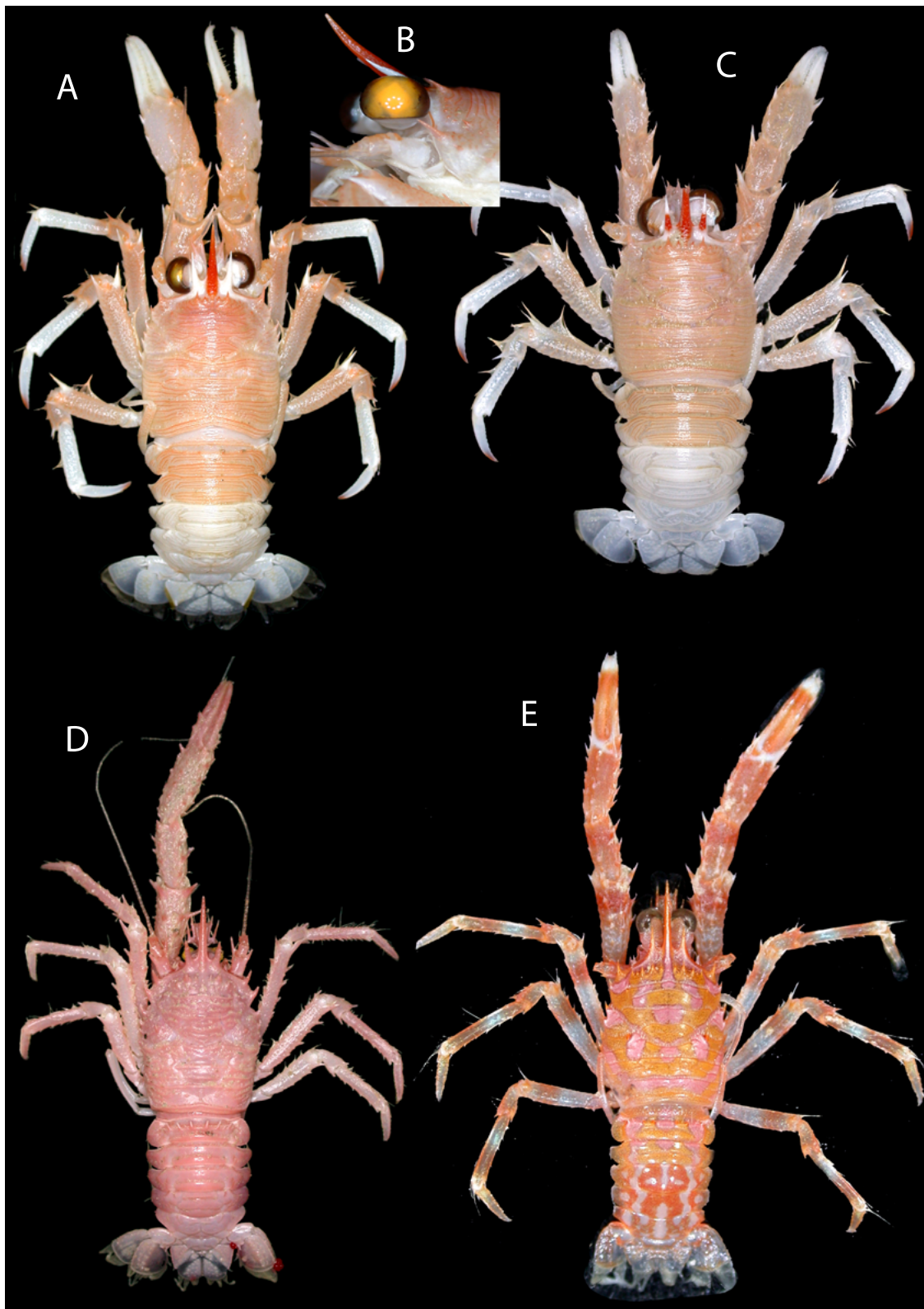


Figure 17. A–C, *Munida compacta* Macpherson, 1997, female, dorsal view and lateral (NMV J56409), female 18.9 mm, pcl 13.4 mm (NMV J55990); D, *Munida endeavourae* Poore and Ahyong, 2004, ovigerous female, cl 21.7 mm, pcl 13.9 mm (NMV J55052); E, *Munida gordoae* Macpherson, 1994 (NMV J56420). Photos: K. Gowlett-Holmes, CSIRO.

that the length of this spine varied in our specimens of *M. compacta* and did not always overreach the midlength of the carpus. Also, the P2 dactylus in *M. compacta* is described as clearly shorter than the propodus, but in our specimens, the P2 dactylus was 0.8–1.0 times the propodus length.

The sequences of *M. compacta* from north-western Australia and *M. rhodonia* from New Caledonia were 1.2% divergent for COI and 0.2% divergent for 16S.

The present specimens represent the first confirmed records of *M. compacta* from Australia.

Distribution. Indonesia, Kei Islands, 246–694 m. Queensland and Western Australia, 397–470 m.

***Munida compressa* Baba, 1988**

Munida compressa Baba, 1988: 91, figs 33, 34 (type locality: Moluccas, Indonesia). — Baba et al., 2008: 91. — Baba et al., 2009: 152, figs 130–134. — Poore et al., 2011: pl. 16H (colour).

Material examined. Western Australia: NMV J55980, 1 male (cl 21.2 mm, pcl 13.0 mm), Kulumburu L29 transect, 13° 13.482' S, 123° 23.742' E to 13° 13.338' S, 123° 23.286' E, 392 m, SS05/2007/176, 5 July 2007; NMV J55981, 4 males (cl 12.0 mm, pcl 8.2 mm; cl 18.6 mm, pcl 12.1 mm), Ashmore L30 transect, 12° 28.884' S, 123° 25.062' E to 12° 29.958' S, 123° 25.002' E, 397–405 m, SS05/2007/189, 6 July 2007.

Genetic data. 16S and COI; see Table 1.

Remarks. This is the first record of the *Munida compressa* from Australia. Sequences from our material and a specimen from the Solomon Islands (Machordom and Macpherson, 2004) were 0.2% divergent for COI and invariant for 16S.

Distribution. Indonesia, Japan, Taiwan, Arafura Sea, 180–668 m. North-west Australia, 392–405 m.

***Munida distiza* Macpherson, 1994**

Munida distiza Macpherson, 1994: 459, figs 14, 68, 69 (type locality: New Caledonia). — Baba et al., 2008: 93. — Macpherson, 2013: 300.

Material examined. NMV J56487, 1 ovigerous female (cl 20.3 mm, pcl 12.6 mm), 1 male (cl 18.7 mm, pcl 12.4 mm), Barrow L1 transect, 21° 00.816' S, 114° 39.15' E to 21° 00.78' S, 114° 38.898' E, 258–271 m, SS05/2007/11, 10 June 2007.

Genetic data. COI and 16S; see Table 1.

Remarks. COI sequences from this material were 4–5% divergent from sequences of *Munida distiza* Macpherson, 1994, from New Caledonia. However, we could not find any distinguishing morphological characters.

Distribution. Philippines, New Caledonia, Loyalty Islands, Matthew and Hunter Islands, French Polynesia, 150–540 m. North-west Australia, 258–271 m.

***Munida endeavourae* Ah Yong and Poore, 2004**

Figure 17D

Munida endeavourae Ah Yong and Poore, 2004: 26, fig. 5 (type locality: south-east of Green Cape, New South Wales, Australia). —

Baba et al., 2008: 94. — Yaldwyn and Webber, 2011: 211. — Farrelly and Ah Yong, 2019: 13, 54. — Yan et al. 2020: 2, tab. 1.

Munida grievae Vereshchaka, 2005: 140, fig. 3A–F (type locality: Bay of Plenty, New Zealand).

Munida sp. MoV 5199. — Poore et al., 2008: 21, unnumbered figure (lower right). — McEnnulty et al., 2011, app. 1, 2.

Material examined. Western Australia: NMV J55052, 1 ovigerous female (cl 21.7 mm, pcl 13.9 mm), Albany, 35° 26.046' S, 118° 21.06' E to 35° 26.19' S, 118° 20.64' E, 912–922 m, SS10/2005/28, 23 November 2005. Tasmania: MV J59312, 1 specimen, Cascade Plateau, 43° 49.706' S, 150° 29.999' E, 1061 m, TT 01/2008/J2-390-015, 4 January 2009; MV J59310, 1 specimen, Hill off St. Helens, 41° 14.349' S, 148° 49.293' E, 1309 m, TT 01/2008/J2-389-006, 1 January 2009.

Colour. Carapace, abdomen, chela and P2–4 pink. Eggs red.

Genetic data. COI and 16S; see Table 1.

Remarks. Poore et al. (2008) and McEnnulty et al. (2011) recorded *M. endeavourae* from south-western Australia as “*Munida* sp. MoV 5199”; the present record is the first confirmation of the species from the area.

Distribution. South-eastern Australia from south-east of Green Cape to Tasmania, 620–1700 m. South-western Australia, 912–922 m

***Munida gordoae* Macpherson, 1994**

Figure. 17E

Munida gordoae Macpherson, 1994: 469, fig. 18 (type locality: Chesterfield Islands). — Baba et al., 2008: 97.

Munida aff. *volantis*. — Poore et al., 2008, 20, unnumbered fig. — McEnnulty et al., 2011: 26, app. 1, 2.

Material examined. Western Australia: NMV J56420, 3 ovigerous females (cl 5.7 mm, pcl 3.5 mm to cl 8.2 mm, pcl 5.3 mm), 8 males (cl 5.1 mm, pcl 2.9 mm to cl 8.1 mm, pcl 6.1 mm), 2 juveniles (cl 4.8 mm, pcl 3.1 mm; cl 5.1 mm, pcl 3.2 mm), Imperieuse L23 east transect, 17° 35.706' S, 118° 58.902' E to 17° 35.346' S, 118° 58.794' E, 140–108 m, SS05/2007/62, 16 June 2007; NMV J55087, 3 males (cl 10.0 mm, pcl 6.3 mm to cl 11.2 mm, pcl 7.2 mm), Two Rocks, 31° 37.452' S, 115° 00.24' E to 31° 37.71' S, 115° 00.18' E, 205–210 m, SS10/2005/11, 19 November 2005; NMV J55085, 1 male (cl 12.0 mm, pcl 6.3 mm), Perth Canyon, 31° 55.26' S, 115° 12.12' E to 31° 55.446' S, 115° 11.76' E, 194–232 m, SS10/2005/69, 29 November 2005; NMV J55088, 1 female (cl 11.0 mm, pcl 6.3 mm), Abrolhos, 28° 59.328' S, 113° 47.04' E to 28° 59.784' S, 113° 47.28' E, 180–183 m, SS10/2005/91, 3 December 2005; NMV J55086, 5 ovigerous females (cl 7.3 mm, pcl 4.8 mm to cl 11.2 mm, pcl 7.4 mm), 1 damaged male, Kalbarri, 27° 55.716' S, 113° 08.28' E to 27° 56.022' S, 113° 08.64' E, 252–253 m, SS10/2005/99, 4 December 2005.

Colour. Carapace and abdominal somite 2–3 pink and orange patterning. Abdominal somite 4–6 with white markings. Rostrum and supraocular spines orange/pink. Chela and P2–4 orange/red with white bands.

Genetic data. COI and 16S.

Remarks. These are the first records of *M. gordoae* from Australia. Sequence divergence between our north-western Australian specimens of *M. gordoae* and those from New Caledonia was only 0.2% for COI and 0.4% for 16S.

Distribution. New Caledonia, Loyalty Islands, Matthew and Hunter Islands, and Chesterfield Islands, Vanuatu, Fiji, 80–500 m. Western Australia, 180–232 m.

***Munida gracilis* Henderson, 1885**

Figure 18

Munida gracilis Henderson, 1885: 412 (type locality: New Zealand, 38° 50' S, 169° 20' E). — Baba et al., 2008: 97. — Yaldwyn and Webber, 2011: 212. — Yan et al. 2020: 2, tab. 1.

Munida chydæa Ahyong and Poore, 2004: 24, fig. 4 (type locality: east of Brush Island, New South Wales, Australia). — Poore, 2004: 234, fig. 64b. — Baba, 2005: 260. **Syn. nov.**

Munida disgrega Baba, 2005: 103, figs 40, 41 (east of Victoria, Australia). — Poore et al., 2008: 19. — McEnnulty et al., 2011: app. 1. **Syn. nov.**

Material examined. South Australia: SAM C7658, 1 ovigerous female (cl 32.3 mm, pcl 18.5 mm), 1 damaged specimen (cl 18.5 mm, pcl 10.6 mm), Great Australian Bight, 33° 27.09' S, 130° 41.19' E, 500 m, BPZ 2010/500, 2010.

Western Australia: NMV J55107, 2 females (cl 24.8 mm, pcl 13.7 mm; cl 26.1 mm, pcl 15.5 mm), 3 males (cl 20.6 mm, pcl 11.2 mm to cl 21.9 mm, pcl 12.1 mm), Bald Island, 35° 14.022' S, 118° 39.84' E to 35° 13.674' S, 118° 40.5' E, 710–728 m, SS10/2005/32, 2005; NMV J55106, 6 females (cl 11.4 mm, pcl 6.3 mm to cl 25.4 mm, pcl 14.3 mm), 10 males (cl 12.4 mm, pcl 7.4 mm to cl 24.0 mm, pcl 13.6 mm), Bald Island, 35° 14.022' S, 118° 39.84' E to 35° 13.674' S, 118° 40.5' E, 710–728 m, SS10/2005/32, 23 November 2005; NMV J55083, 3 males (cl 27.9 mm, pcl 19.5 mm to cl 47.8 mm, pcl 34.9 mm), Pt Hillier, 35° 22.902' S, 117° 12.42' E to 35° 22.902' S, 117° 12.42' E, 539 m, SS10/2005/19, 2005; NMV J55080, 1 female (pcl 7.9 mm), Albany, 35° 22.29' S, 118° 19.98' E to 35° 22.644' S, 118° 19.26' E, 685–695 m,

SS10/2005/27, 2005; NMV J55084, 16 females (cl 20.9 mm, pcl 11.9 mm to cl 36.6 mm, pcl 19.6 mm), 19 males (cl 14.3 mm, pcl 9.0 mm to cl 30.2 mm, pcl 17.9 mm), Albany, 35° 22.14' S, 118° 20.1' E to 35° 22.518' S, 118° 19.32' E, 676–680 m, SS10/2005/29, 2005; NMV J55082, 1 female (cl 9.1 mm, pcl 7.0 mm), 2 males (cl 17.4 mm, pcl 7.8 mm; cl 15.1 mm, pcl 9.9 mm), Bald Island, 35° 12.81' S, 118° 39.06' E to 35° 12.24' S, 118° 40.14' E, 408–431 m, SS10/2005/34, 2005.

New Zealand: NIWA 53772, 1 female (cl 23.3 mm, pcl 15.8 mm), 44° 09.47' S, 174° 33.32' W to 44° 09.48' S, 174° 33.56' W, 520–650 m, TAN0905/103, 26 June 2009; NIWA 54087, 1 ovigerous female (cl 21.0 mm, pcl 12.2 mm), Diamondhead Peak B, Andes Seamounts, 44° 08.97' S, 174° 45.41' W to 44° 09.02' S, 174° 45.63' W, 519–609 m, TAN0905/113, 27 June 2009; NIWA 54108, 1 female (cl 24.4 mm, pcl 13.9 mm), Diamondhead Peak B, Andes Seamounts, 44° 08.99' S, 174° 46.09' W to 44° 09.01' S, 174° 46.3' W, 830–900 m, TAN0905/114, 27 June 2009; NIWA 63655, 4 males (pcl 5.4–7.7 mm), Site 3a seamount, Hikurangi Margin, 41° 19.16' S, 176° 11.84' E to 41° 19.28' S, 176° 11.53' E, 495 m, TAN1004/66, 21 April 2010.

Genetic data. COI and 16S; see Table 1.

Remarks. *Munida gracilis* is a common species in New Zealand, usually from depths of 300–600 m with a recorded range of about 100–1200 m (Yan et al., 2020), that is morphologically closest to the Australian *Munida chydæa* Ahyong and Poore, 2004. COI sequences of specimens corresponding to *Munida chydæa* Ahyong and Poore, 2004, from south-western Australia, however, were only 0.9–1.0% divergent from *M. gracilis* from New Zealand and 0.2% divergent for 16S. This low level of sequence divergence led us to further examine the morphological distinctions between *M. gracilis* and *M. chydæa*. Ahyong and Poore (2004) distinguished the two species based on the number of anterior

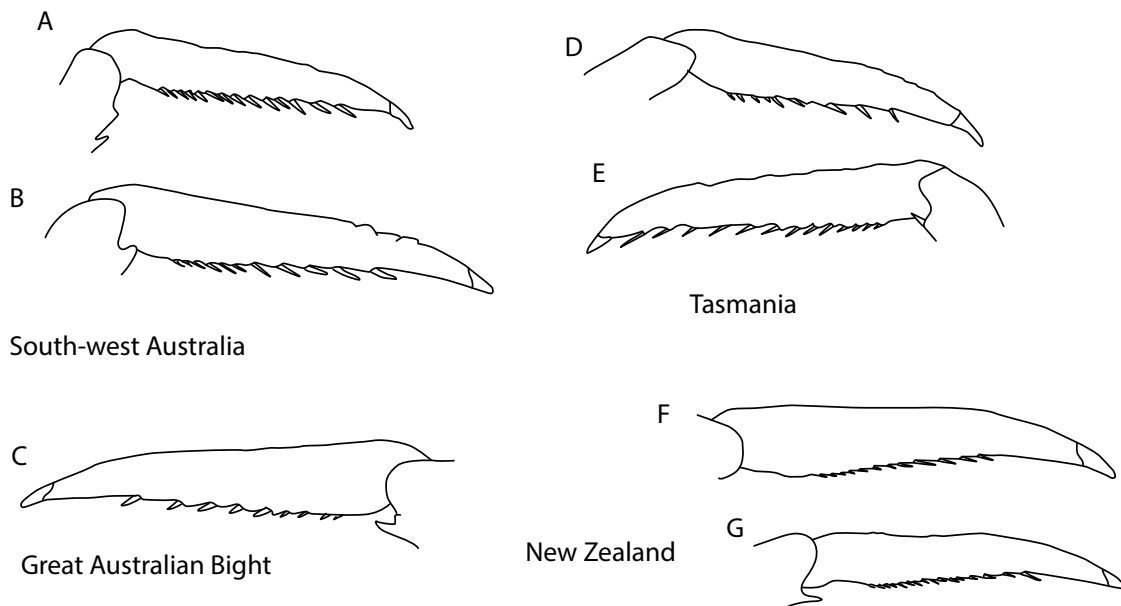


Figure 18. *Munida gracilis* Henderson, 1885. Variation of P2 dactyli. A, female cl 32 mm, 18.3 mm; B, male cl 26.2 mm, pcl 15.5 mm (NMV J55048); C, ovigerous female, cl 32.3 mm, pcl 18.5 mm (SAM C7658); D, male cl 21.2 mm, pcl 11.9 mm (NMV J53574); E, female, cl 30.0 mm (J53574); F, female cl 23.5 mm, pcl 15.8 mm (NIWA 53772); G, ovigerous female, cl 21.0 mm, pcl 12.2 mm (NIWA 54087).

spines on abdominal somite 3 (1 or 2 spines in *M. chydæa*; 4 spines in *M. gracilis*), the length of the unarmed flexor margin of the P2 dactyli (distal one-quarter in *M. chydæa* versus distal one-third in *M. gracilis*), spinules on the outer margin of antennal articles 3 and 4 in *M. chydæa* (absent in *M. gracilis*) and more numerous transverse abdominal striae in *M. chydæa*. Our comparisons between new Australian and New Zealand specimens, however, failed to identify consistent distinguishing features. Although the many specimens examined by Ah Yong and Poore (2004), primarily from eastern Australia, were consistent in the aforementioned features, specimens examined herein from southern Australia (Tasmania, South Australia and Western Australia) and New Zealand exhibit morphological overlap. Thus, the shape and armature of the P2 dactyli in southern Australian specimens is variable, with the flexor margin unarmed on the distal one-fifth to one-third (fig. 21A–E). Similar variation was seen in the eight New Zealand specimens we examined; in most specimens, the distal one-third of the P2 dactylus was unarmed (fig. 21F) but in one ovigerous female (pcl 12.2 mm; NIWA 54087; Fig. 21G), the distal one-quarter was unarmed. Similarly, abdominal somite 3 is variously armed with 2–4 spines, albeit usually 4 in adult New Zealand specimens, and almost always 2 in adult southern Australian specimens. Another character used to distinguish *M. chydæa* was the presence of outer spinules on the third and fourth antennal article, but such spinules were present on all eight of the specimens of *M. gracilis* we examined from New Zealand. Thus, considered as a whole, Australian material is not reliably morphologically separable from New Zealand specimens, and given the minimal divergence between New Zealand and Western Australian sequences, we consider both populations as probably conspecific.

This brings *Munida disgrega* Baba, 2005, to our attention, which was described from 4 small specimens (cl 10.1–13.0 mm) collected from south-eastern Australia and noted as very close to *M. chydæa* and *M. gracilis*. In *M. disgrega*, the flexor margin of the dactylus is unarmed on the distal one-quarter to one-fifth, which is encompassed by the newly observed variation in *M. gracilis* and *M. chydæa*. Other distinguishing features of *M. disgrega*, such as the length of the chela, the lesser striation and broader anterior margin of the thoracic sternum, and proportionately wider eyes appear to be allometric differences given the small size of the type specimens. Consequently, we cannot reliably distinguish *M. disgrega* from *M. gracilis* or *M. chydæa*.

Although we do not have molecular data from eastern Australia (type region of *M. chydæa*), on the basis of the low molecular divergence (between New Zealand and south-western Australian specimens) and morphological variability within southern Australian specimens that encompasses those from New Zealand and eastern Australia, we regard *M. chydæa* and *M. disgrega* as junior synonyms of *M. gracilis*. *Munida gracilis* is closely related to, but clearly distinct from, *M. haswelli*, with 7.6% divergence in COI and 3.3% in 16S.

Distribution. Southern Australia (Sydney to south-western Australia), 146–700 m. New Zealand, 365–610 m.

Munida haswelli Henderson, 1885

Figure 19A

Munida haswelli Henderson, 1885: 411 (type locality: off southern New South Wales, Australia). — Baba et al., 2008: 98. — McEnnulty et al., 2011: app. 1, 2. — Farrelly and Ah Yong, 2019: 13, 54, fig. 96.

Material examined. Western Australia: NMV J60017, 2 males (cl 19.5 mm, pcl 12.3 mm; cl 19.6 mm, pcl 12.5 mm), Ashmore L30 transect, 12° 26.058' S, 123° 36.078' E, 125 m, SS05/2007/186, 6 June 2007; NMV J55102, 1 male (cl 12.1 mm, pcl 7.4 mm), Two Rocks, 31° 37.452' S, 115° 00.24' E to 31° 37.71' S, 115° 00.18' E, 205–210 m, SS10/2005/11, 19 November 2005; NMV J55103, 1 male (cl 19.6 mm, pcl 12.8 mm), SS10/2005/11; NMV J55104, 3 ovigerous females (cl 14.0 mm, pcl 9.0 mm to cl 15.4 mm, pcl 10.2 mm), 2 males (cl 11.4 mm, pcl 7.2 mm; cl 16.4 mm, pcl 10.4 mm), Bald Island, 35° 11.442' S, 118° 38.7' E to 35° 11.25' S, 118° 39' E, 147–157 m, SS10/2005/35, 24 November 2005; NMV J55105, 5 ovigerous females (cl 11.5 mm, pcl 7.5 mm to cl 15.2 mm, pcl 8.9 mm), 5 males (cl 12.3 mm, pcl 7.9 mm to cl 16.4 mm, pcl 11.3 mm), Bald Island, 35° 11.406' S, 118° 38.94' E to 35° 11.514' S, 118° 38.76' E, 161–169 m, SS10/2005/38, 24 November 2005; NMV J55108, 4 ovigerous females (cl 14.4 mm, pcl 9.3 mm to cl 16.0 mm, pcl 10.8 mm), 9 females (cl 11.3 mm, pcl 7.7 mm to cl 16.1 mm, pcl 11.2 mm), 18 males (cl 13.6 mm, pcl 9.1 mm; cl 21.4 mm, pcl 14.5 mm), Albany, 35° 21.276' S, 118° 17.94' E to 35° 21.348' S, 118° 17.76' E, 179 m, SS10/2005/47, 25 November 2005; NMV J55109, 4 females (largest with broken rostrum; pcl 6.2–9.5 mm), 3 males (cl 11.9 mm, pcl 7.6 mm; cl 13.9 mm, pcl 9.0 mm), Point Hillier, 35° 22.41' S, 117° 11.82' E to 35° 22.404' S, 117° 12.24' E, 195–196 m, SS10/2005/57, 27 November 2005; NMV J55099, 3 ovigerous females (cl 11.2 mm, pcl 7.5 mm to cl 11.5 mm, pcl 7.7 mm), 11 males (one with rhizocephalan externa; cl 8.6 mm, pcl 6.1 mm to cl 11.8 mm, pcl 8.7 mm), Ningaloo North, 21° 59.172' S, 113° 49.2' E to 21° 59.79' S, 113° 49.14' E, 165–166 m, SS10/2005/153, 11 December 2005; NMV J55101, 1 ovigerous female (cl 10.4 mm, pcl 7.2 mm), Ningaloo North, 21° 56.628' S, 113° 50.46' E to 21° 57.09' S, 113° 50.28' E, 132–134 m, SS10/2005/163, 12 December 2005.

Colour. Carapace and somites 2–4 pale orange, somites 5–6 and telson white. Rostrum and supraocular spines orange. Chela orange/pink with red bands on distal half of palm. P2–4 whitish pink with red bands on middle of propodus.

Genetic data. COI and 16S; see Table 1.

Remarks. *Munida haswelli* and *Munida gracilis* are closely related, with 7.6% divergence in COI and 3.3% divergence in 16S.

Distribution. Central New South Wales, south to Victoria, Tasmania, South Australia, the Great Australian Bight and Western Australia, 121–329 m.

Munida heteracantha Ortmann, 1892

Munida heteracantha Ortmann, 1892: 255, pl. 11 fig. 12, 12i, 12k (type locality: Sagami Bay, Japan). — Baba et al., 2008: 99. — Poore et al., 2008: 19. — McEnnulty et al., 2011: app. 1. — Castro, 2011: 16
Munida sp. MoV 5214. — Poore et al., 2008: 21.

Material examined. Western Australia: NMV J55037, ovigerous female (cl 9.4 mm, pcl 6.35 mm), 1 ovigerous female (cl 9.8 mm, pcl 7.2 mm), 4 females (cl 8.3 mm, pcl 5.3 mm to cl 9.3 mm, pcl 6.6 mm), 4 males (cl 6.9 mm, pcl 4.4 mm to cl 10.5 mm, pcl 6.7 mm), 3 juveniles (cl 6.1 mm, pcl 4.1 mm to cl 6.6 mm, pcl 4.5 mm), Ningaloo South,

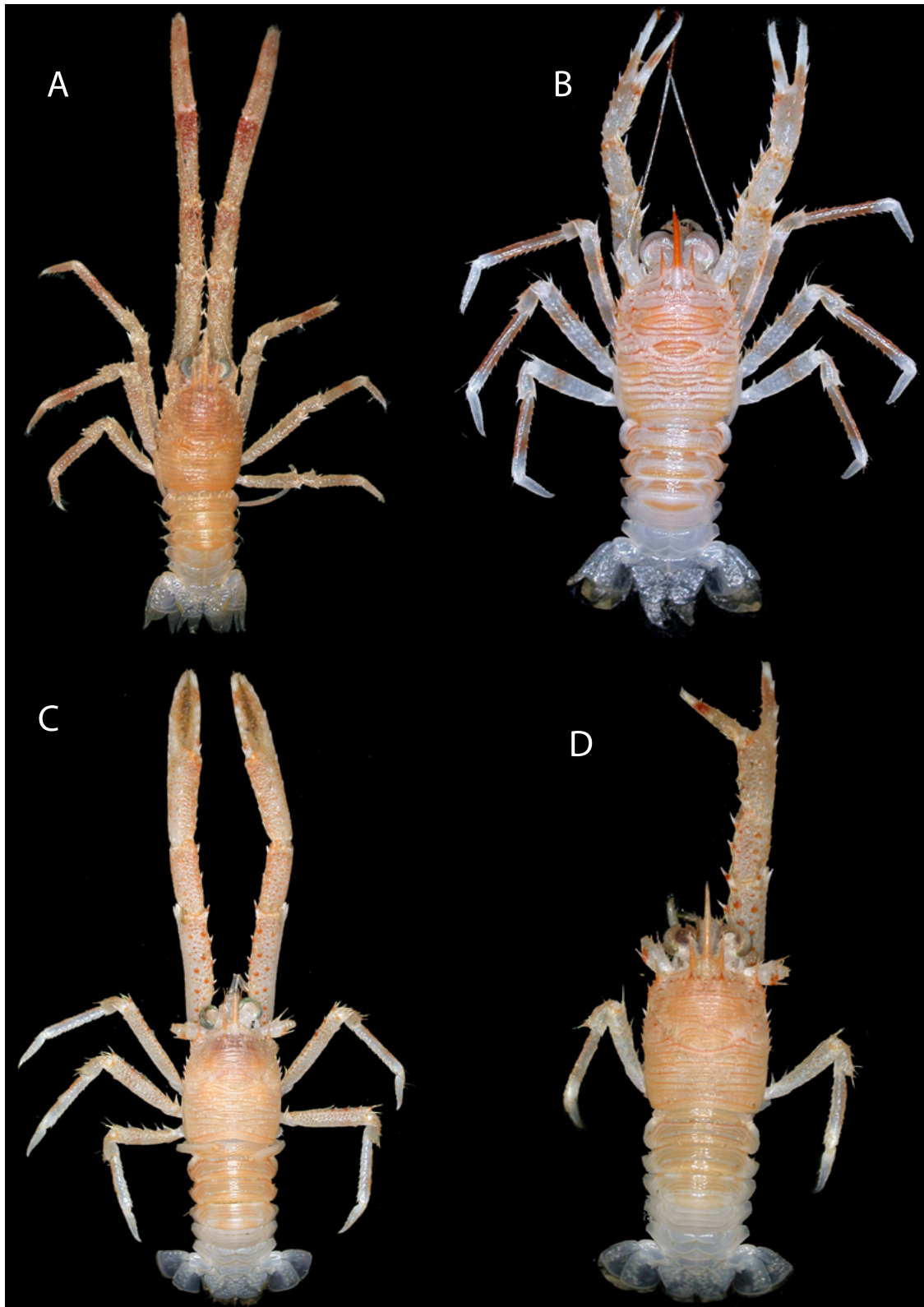


Figure 19. A, *Munida haswelli* Henderson, 1885, male cl 19.55 mm (NMV J55103), pcl 12.81 mm; B–D, *Munida leagora* Macpherson, 1994, 1 juvenile cl 12.2 mm, pcl 7.5 mm (NMV J56018), undetermined specimen (NMV J55999; NMV J56004). Photos: K. Gowlett-Holmes.

22° 04.77' S, 113° 47.76' E to 22° 05.238' S, 113° 47.64' E, 201–206 m, SS10/2005/146, 10 December 2005; NMV J55038, 1 male (cl 10.7, pcl 7.4 mm), 1 female (cl 7.5 mm, pcl 5.0 mm), SS10/2005/146; NMV J55040, 1 male (cl 10.5 mm, pcl 7.0 mm), 1 ovigerous female (cl 9.9 mm, pcl 7.1 mm), 1 female (cl 7.6 mm, pcl 5.2 mm), Ningaloo North, 21° 58.704' S 113° 49.2' E to 21° 59.052' S 113° 49.2' E, 170–177 m, SS10/2005/152, 10 December 2005.

Genetic data. Not available.

Remarks. *Munida heteracantha* Ortmann, 1892 has been recorded widely across the western Pacific, including from Queensland, Australia. Our specimens show some variation from the lectotype from Japan described by Macpherson and Baba (1993). The lectotype has a pair of small parahepatic spines, which are absent in all our material. In most of our specimens the distolateral spine of the basal antennular article is slightly longer than the distomesial spine, while in the lectotype the distal spines are subequal. Macpherson and Baba (1993) noted that some specimens of *M. heteracantha* have 2 small median spines on abdominal somite 3, and half of the specimens here have 1–6 spines. Only three specimens had the P2 attached, and these show the dactyli with 7–8 spines on the flexor margin, compared to only 5 spines in the lectotype.

Munida heteracantha is also similar to *Munida macphersoni* Cabezas, Lin and Chan, 2011, but differs in the length of the supraocular spines, which are very short in *M. heteracantha* (0.34 × rostral length compared to 0.5 in *M. macphersoni*).

Distribution. Japan, Philippines, and Indonesia, off Central Queensland, New Caledonia, Fiji, 100–322 m. South-western Australia, 170–177 m.

***Munida leagora* Macpherson, 1994.**

Figure 19B–D

Munida leagora Macpherson, 1994: 485, figs 26, 76 (type locality: New Caledonia). — Baba et al., 2008: 104.

Material examined. Western Australia: NMV J56004, 1 ovigerous female (cl 13.8 mm, pcl 8.1 mm), 1 male (cl 13.0 mm, pcl 8.0 mm), Leveque L27, 14° 58.362' S, 121° 38.556' E to 14° 57.762' S, 121° 39.264' E, 228–232 m, SS05/2007/143, 2 July 2007; NMV J55999, 5 males (cl 15.7 mm, pcl 9.5 mm to cl 20.2 mm, pcl 12.3 mm), 1 male with bopyrid (cl 14.9 mm, pcl 8.6 mm), 1 ovigerous female (cl 16.5 mm, pcl 10.2 mm), SS05/2007/143; NMV J56018, 1 juvenile (cl 12.2 mm, pcl 7.5 mm), Mermaid L24 east transect, 17° 02.838' S, 119° 39.684' E to 17° 03.708' S, 119° 41.358' E, 424–456 m, SS05/2007/77, 18 June 2007.

Colour. Carapace and abdominal somites 2–4 pale orange, somites 5–6 and telson white. Rostrum and supraocular spines pale orange. P1 and P2–4 meri with orange spots at base of spines and on striae.

Genetic data. COI and 16S; see Table 1.

Remarks. *Munida leagora* was described from New Caledonia, and the present specimens represent the first records of the species from Australia. Our specimens show some minor variation compared to the type description, including the presence of 1 or 2 small spines on the lateral margins of the anterior ridge of abdominal somite 2, and the presence of

parahepatic spines in some specimens. *Munida leagora* is very similar to *Munida alia* Baba, 1994, described from a single specimen in Queensland. We compared our specimens of *M. leagora* to the holotype of *M. alia* and confirmed that these species are distinct. In Baba's (2005) key to *Munida*, these two species are separated by the length of the distomesial spine of antennal article 1, which reaches the end of article 2 in *M. alia* and reaches or overreaches the distal end of article 3 in *M. leagora*. In addition, *M. alia* lacks a pair of postcervical spines, which are always present in our specimens of *M. leagora*.

Divergence in COI sequences between specimens of *M. leagora* from north-western Australia and New Caledonia is <0.5%. The wide transverse yellow and purple bands on the carapace described for New Caledonian specimens are absent in all the specimens examined here.

Distribution. New Caledonia, Loyalty Islands, Chesterfield Islands, Vanuatu, Bayonnaise Bank, Fiji and Tonga, 240–610 m. North-west Australia, 232–456 m.

***Munida magniantennulata* Baba and Türkay, 1992**

Figure 20A

Munida magniantennulata Baba and Türkay, 1992: 205, figs 2, 3 (type locality: Lau Basin). — Baba et al., 2008: 105. — Farrelly and Ah Yong, 2019: 13, 54. fig. 97.

Not *Munida magniantennulata*. — Baba, 1994a: 12 (= *M. typhle* Macpherson, 1994)

Material examined. New South Wales: NMV J73001, 3 ovigerous females (cl 10.6 mm, pcl 7.2 mm to cl 13.4 mm, pcl 12.5 mm), Central Eastern CMR, 30° 05.862' S, 153° 53.922' E to 30° 07.158' S, 153° 52.47' E, 2429–2518 m, IN2017_v03/086, 5 June 2017.

Colour. Carapace, abdomen, cheliped and P2–4 pink. Eggs red.

Genetic data. Not available.

Remarks. The type specimens of *M. magniantennulata* are described as having the P2 dactylus 0.5–0.6 times propodus length, 6.6 times as long as high, and lined with 10 movable spines. Our specimens have a very similar P2 dactylus, which is 0.6–0.7 times the propodus length, 5–6 times as long as high, with 9–10 movable spines on the flexor margin. The chelipeds of all our specimens lack spines on the outer margin of the fingers or on the dorsal face of the palm, which agrees with the type material. All the specimens have two small tubercle-like spines on abdominal somite 2.

These specimens differ from the holotype in the length of the mesial spine on the first antennal article, which reaches the midlength of article 2 in these specimens but is very short in the holotype.

The specimens recorded by Baba (1994) as *M. magniantennulata* from off central Queensland are referred to *Munida typhle* Macpherson 1994 (see *Remarks* for that species).

Distribution. Lau Basin, 1750–2003 m. Eastern Australia, 2429–2518 m.



Figure 20. A, *Munida militaris* Henderson, 1885, ovigerous female cl 15.0 mm, pcl 9.4 mm, (NMV J55033); B, *Munida magniantennulata* Baba and Türkay, 1992, ovigerous female (NMV J73001); C, *Munida pectinata* Machordom and Macpherson, 2005, male (NMV J55268); D. *Munida roshanei* Tirmizi, 1966, male 11.1 mm, pcl 7.2 mm (NMV J55261). Photos: K. Gowlett-Holmes, CSIRO.

***Munida militaris* Henderson, 1885**

Figure 20B

Munida militaris Henderson, 1885: 410 (type locality: off Matakau, Fiji Islands). — Baba, 2008: 108 (synonymies, type data). — Baba et al., 2009: 173, figs 153–155 (in part) (Taiwan, 190–1183 m). — Poore et al., 2011: pl. 17E (colour).

Not *Munida militaris* Baba et al., 2009: 173 (in part) (Taiwan) (= *M. lanciaria* Cabezas et al., 2011).

Munida aff. *Rubiesi* — Poore et al., 2008, 20 (part), unnumbered fig. *Munida* MoV 5183. — McEnulty et al., 2011: app. 1, 2.

Material examined. Western Australia: NMV J55033, 1 ovigerous female (cl 15.0 mm, pcl 9.4 mm), 31° 36.528' S 114° 58.86' E to 31° 37.038' S 114° 58.26' E, 329–370 m, SS10/2005/06, 19 November 2005; NMV J55035, 1 ovigerous female (cl 15.0 mm, pcl 10.2 mm), near Abrolhos islands, 28° 29.37' S 113° 25.14' E to 28° 30.06' S 113° 25.5' E, 416–431 m, SS10/2005/95, 4 December 2005.

Genetic data. Not available.

Colour. Carapace and somites 2–4 orange and white, somites 5–6 and telson white. Rostrum and supraocular spines orange on base and tips and white in the middle. Chela white and orange, and orange/red bands on distal half of fingers. P2–4 transparent white/orange with orange/red across the middle of propodus and tips of dactyli.

Remarks. The specimens here agree with the lectotype description of *M. militaris* by Baba and Macpherson (1991). *Munida militaris* closely resembles *M. benguela* de Saint Laurent and Macpherson, 1988, but can be distinguished by the following features:

- moveable finger of the cheliped bears a single basomesial spine
- P2–4 dactyli with about 10 ventral spines, the unimate at the base of the unguis.

Our specimens differ slightly from the illustrated lectotype material from Fiji and Ambon. The lectotype has the distomesial spine of antenna article 2 described as occasionally overreaching the end of the peduncle, while in both our specimens, the distomesial spine distinctly overreaches the distal end of the peduncle.

Distribution. Taiwan, Indonesia, Queensland, New Caledonia, Vanuatu, Wallis and Futuna, Fiji, Tonga, 190–1183 m. South-western Australia, 329–431 m.

***Munida pectinata* Machordom and Macpherson, 2005**

Figure 20C

Munida pectinata Machordom and Macpherson, 2005: 828, fig. 3 (type locality: New Caledonia). — Baba, 2008: 112. — Komai, 2011: 359, fig. 10, 11D (colour) (Japan 96–221 m). — Komai, 2012: 38 (Izu islands, 174–192 m).

Material examined. Western Australia: NMV J55268, 4 males (2 damaged; cl 10.8 mm, pcl 6.5 mm; cl 18.4 mm, pcl 10.7 mm), 17° 35.706' S, 118° 58.902' E to 17° 35.346' S, 118° 58.794' E, 108–140 m, SS05/2007 stn 62, 16 June 2007.

Colour. Carapace and somites 2–4 pale orange with dark orange markings, somites 5–6 and telson pale orange. Rostrum

and supraocular spines orange. Chela merus pink with red bands, remaining chela mottled orange. P2–4 white with orange/red bands.

Genetic data. COI and 16S; see Table 1.

Remarks. These Australian specimens of *M. pectinata* agree well with illustrations of type material from New Caledonia, extending the range to eastern Indian Ocean. The north-western Australian sequences of COI (639 bp) and 16S were identical to two sequences from New Caledonia. This is the first record of *M. pectinata* from Australia.

Distribution. New Caledonia, Japan and north-western Australia, 96–240 m.

***Munida pherusa* Macpherson and Baba, 1993**

Munida pherusa Macpherson and Baba, 1993: 408, fig. 15 (type, locality: Philippines). — Baba et al., 2008: 112. — Baba et al., 2009: 178, figs 158–159. — Kim et al., 2016: 9, fig. 9 (Korea, 112–117 m).

Material examined. Western Australia: NMV J55097, 1 specimen, Ningaloo South, 22° 04.002' S, 113° 48.66' E to 22° 04.248' S, 113° 48.9' E, 101–106 m, SS10/2005/144, 10 December 2005; NMV J13307, 9 ovigerous females (cl 7.7 mm, pcl 4.5 mm to cl 11.4 mm, pcl 7.3 mm), 2 females (cl 8.3 mm, pcl 4.9 mm; cl 9.1 mm, pcl 7.3 mm), 7 males (cl 7.3 mm, pcl 4.9 mm to cl 12.7 mm, pcl 7.7 mm), North-west Shelf, between Port Hedland and Dampier, 18° 50' S, 117° 39' E to 18° 50' S, 117° 39' E, 178 m, NWA stn 29, 6 June 1983.

Remarks. In addition to one specimen of *M. pherusa* collected in 2005 in north-western Australia, another 17 specimens are reported here from a survey of the North-West Shelf in 1983. The specimens show that the length of the disto-mesial spine on antennal article 2 is slightly variable in length, sometimes just reaching the end of the peduncle and in some specimens, including the holotype, it slightly overreaches the peduncle. In the illustrated holotype, the cheliped finger is distinctly shorter than the palm, while in all of our specimens, the cheliped finger and palm are subequal in length.

These are the first records of *M. pherusa* from Australia.

Distribution. Japan, Philippines, Indonesia, Korea, 73–167 m. North-western Australia, 101–178 m.

***Munida philippinensis* Macpherson and Baba, 1993**

Munida philippinensis Macpherson and Baba, 1993: 410, fig. 16 (type locality: Philippines). — Baba et al., 2008: 112.

Material examined. Western Australia: NMV J56003, 4 females (cl 7.9 mm, pcl 4.8 mm to cl 10.1 mm, pcl 9.0 mm), 12 males (cl 7.5 mm, pcl 4.8 mm to cl 11.2 mm, pcl 7.4 mm), Leveque L27, 14° 58.362' S, 121° 38.556' E to 14° 57.762' S, 121° 39.264' E, 228–232 m, SS05/2007/143, 2 July 2007.

Genetic data. COI and 16S; see Table 1.

Remarks. This is the first record of the species from Australia.

Distribution. Philippines, Indonesia, 146–297 m. North-west Australia, 228–222 m.

***Munida pilorhyncha* Miyake and Baba, 1966**

Figure 21

Munida pilorhyncha Miyake and Baba, 1966: 81, figs 1, 2 (type locality: Tosa Bay, Japan). — Baba et al., 2008: 112 (synonymies, type data). — Baba et al., 2009: 180, figs 160–162 (Taiwan).

Munida sp. MoV 5200. — Poore et al., 2008: 20, unnumbered fig. (lower right). — McEnulty et al., 2011: app. 1, 2.

Material examined. Western Australia: NMV J55145, 1 female (cl 21.5 mm, pcl 16.8 mm), Bunbury, 33° 00.504' S, 114° 34.26' E to 33° 00.12' S, 114° 34.5' E, 414–421 m, SS10/2005/13, 20 November 2005.

Colour. Carapace and somites 2–4 pale orange. Rostrum orange. Supraocular spines white. Cheliped with orange/red spots at base of spines and orange/red at distal ends of chela fingers.

Genetic data. Not available.

Remarks. Poore et al. (2008) and McEnulty et al. (2011) reported the present specimens as “*Munida* sp. MoV 5200”; this is the first confirmed record of *Munida pilorhyncha* from Australia.

Distribution. Japan, South China Sea, Philippines, Taiwan, Kei Islands, Indonesia, 200–366 m. South-western Australia, 414–421 m.

***Munida roshanei* Tirmizi, 1966**

Figure 20D

Munida roshanei Tirmizi, 1966: 192, fig. 13 (type locality: Gulf of Oman). — Baba, 2008: 116.

Material examined. Western Australia: NMV J55261, 1 male (cl 11.1 mm, pcl 7.2 mm), Barrow L1 transect, 21° 02.148' S, 114° 53.28' E to 21° 01.992' S, 114° 53.142' E, 90–100 m, SS05/2007/8, 10 June 2007; NMV J55991, 16 ovigerous females (cl 8.4 mm, pcl 5.0 mm to cl 10.9 mm, pcl 7.0 mm), 7 females (cl 8.5 mm, pcl 5.3 mm to cl 10.9 mm, pcl 6.7 mm), 22 males (cl 8.4 mm, pcl 4.9 mm to cl 11.2 mm, pcl 6.4 mm), Mermaid L24 transect, 17° 46.104' S, 120° 43.152' E to 17° 45.948' S, 120° 42.942' E, 97–109 m, SS05/2007/97, 20 June 2007; NMV J56400, 2 males (cl 8.9 mm, pcl 5.9 mm; cl 13.5 mm, pcl 8.0 mm), 2 ovigerous females (cl 9.9 mm, pcl 5.6 mm; cl 11.8 mm, pcl 6.8 mm), 3 females (1 damaged; cl 9.5 mm, pcl 5.6 mm to cl 10.0 mm, pcl 5.7 mm), 1 male (cl 8.9 mm, 5.9 mm), Broome L25 transect, 16° 45.156' S, 121° 02.796' E to 16° 44.592' S, 121° 02.208' E, 100–108 m, SS05/2007/116, 30 June 2007; NMV J56009, 2 ovigerous females (cl 10.9 mm, pcl 7.2 mm; cl 11 mm, pcl 7.8 mm), 1 male (cl 7.8 mm, pcl 4.7 mm), Lacedpede L26 transect, 15° 48.672' S, 121° 03.738' E to 15° 48.426' S, 121° 03.654' E, 90–107 m, SS05/2007/125, 1 July 2007; NMV J56098, 4 males (cl 8.4 mm, pcl 5.1 mm to cl 11.7 mm, pcl 7.0 mm), 1 female (cl 10.6 mm, pcl 6.7 mm), Adele L28 transect, 14° 33.732' S, 122° 55.092' E to 14° 33.684' S, 122° 54.906' E, 95–105 m, SS05/2007/161, 4 July 2007; NMV J56395, 1 ovigerous female (cl 14.1 mm, pcl 8.6 mm), 1 female (cl 9.1 mm, pcl 5.2 mm), 3 males (cl 11.3 mm, pcl 6.9 mm to cl 11.8 mm, pcl 7.8 mm), Ashmore L30 transect, 12° 26.7' S, 123° 36.048' E to 12° 26.964' S, 123° 36.588' E, 95 m, SS05/2007/188, 6 July 2007; NMV J56007, 1 ovigerous female (cl 11.3 mm, pcl 7.2 mm), 1 female (cl 10.0 mm, pcl 6.3 mm), Ashmore L30 transect, 12° 25.944' S, 123° 35.784' E to 12° 26.064' S, 123° 35.868' E, 111 m, SS05/2007/196, 6 July 2007; NMV J55096, 1 male (missing chelipeds and rostrum; pcl 7.3 mm), Kalbarri, 27° 48.48' S, 113° 17.82' E to 27° 48.756' S, 113° 17.94' E, 112–123 m, SS10/2005/96, 4 December 2005; NMV

J55047, 1 ovigerous female (missing chelipeds; cl 11.6, pcl 7.1 mm), 1 male (cl 12.8 mm, pcl 8.0 mm), 1 juvenile (cl 9.0 mm, pcl 5.4 mm), Barrow Island, 21° 01.896' S, 114° 53.52' E to 21° 02.064' S, 114° 53.28' E, 93 m, SS10/2005/169, 13 December 2005; NMV J55045, 1 female (cl 7.0 mm, pcl 5.0 mm), 6 males (cl 8.0 mm, pcl 4.3 mm to cl 12.7 mm, pcl 5.5 mm), Barrow Island, 20° 59.082' S, 114° 54.42' E to 20° 59.67' S, 114° 54.54' E, 100–101 m, SS10/2005/170, 13 December 2005; NMV J55048, 1 male (cl 10.2 mm, pcl 5.8 mm), SS10/2005/170.

Genetic data. COI and 16S; see Table 1.

Remarks. *Munida roshanei* is reported for the first time from Australia. Our specimens have much longer supraocular spines (0.36 times rostrum length) than figured for the type (0.2 times rostrum length) (Tirmizi, 1966: fig. 13). Longer supraocular spines are also present on the specimen from the Red Sea illustrated by Lewinsohn (1969). Our specimens all lack a row of median gastric spines behind the rostrum, whereas the type has a row of 3 median gastric spines behind the rostrum, and in other specimens 1 or 2 spines are reported (Baba, 1988; Tirmizi and Javed, 1993). There is clear sexual dimorphism in this species with males having large, gaping cheliped fingers. All of our specimens have cheliped fingers subequal to the palm in length.

Distribution. Indian Ocean (Gulf of Oman and Gulf of Aden, Red Sea, Andaman Sea and Mozambique Channel), and Phillipines, 16–528 m. Western Australia, 93–123 m.

***Munida rubridigitalis* Baba, 1994**

Figure 22

Munida rubridigitalis Baba, 1994a: 13, fig. 6 (type locality: off Central Queensland). — Ahyong and Poore, 2004: 41. — Poore, 2004: 234 (compilation). — Baba, 2005: 273. — Baba et al., 2008: 117.

Not *Munida rubridigitalis* — Poore et al., 2008: 20 (south-western Australia, 396–411 m) (= *Munida julumunyu* sp. nov.).

? *Munida rubridigitalis*. — Macpherson, 1997: 610.

Munida sp. — Macpherson, 1994: 558, figs 13b, 90 (= *Munida julumunyu* sp. nov.).

? *Munida rubrodigitalis* [sic]. — Macpherson, 1999: 423, fig. 4e.

Type material. Paratypes: QM W19726, 2 males (pcl 10.0–12.7 mm), 3 ovigerous females (pcl 10.9–12.1 mm), 1 female (9.5 mm), Queensland, Coral Sea, 17° 51.13' S 147° 8' E, 497–503 m, Cidar Station 47-2, 16 May 1986.

Other material examined. Queensland: AM P42278, 1 male (pcl 14.7 mm, cl 20.5 mm), 1 ovigerous female (pcl 16.6 mm, cl 23.0 mm), north-east of Tweed Heads, 27° 55–57' S, 154° 03' E, 549 m, trawl, K78-23-09, 6 November 1978.

New South Wales: AM P88982, 1 male (pcl 12.6 mm, cl 17.8 mm), 4 ovigerous females (pcl 12.4 mm, 17.3 mm to pcl 14.7 mm, cl 20.6 mm), north-east of Tweed Heads, 28° 01.8' S, 153° 58.8' E, 549 m, trawl, K78-09-05, 2 June 1978; AM P31504, 2 ovigerous females (pcl 13.1 mm, 18.9 mm; pcl 15.7 mm, cl 22.6 mm), south-east of Cape Byron, 28° 41–44' S, 153° 51' E, 156 m, K78-17-21, 5 April 1978; AM P31423, 1 female (pcl 16.0 mm, cl 22.5 mm), north-east of Sugarloaf Point, 32° 15' S, 153° 02' E, 457 m, trawl, K78-03-04, 5 April 1978; AM P31502, 1 male (pcl 13.4 mm, cl 19.5 mm), 1 female (pcl 13.1 mm, cl 18.4 mm), north-east of North Solitary Island, 29° 53–50' S, 153° 42–43' E, 457 m, trawl, K78-06-07, 24 April 1978; AM P66658, 2 females (pcl 10.4 mm, cl 14.9 mm; pcl 12.2 mm, cl 18.0 mm), north-east of Long Reef, 33° 42' S, 151° 42' E, K85-21-06, 439–466 m, K85-21-06, 19 December 1985.

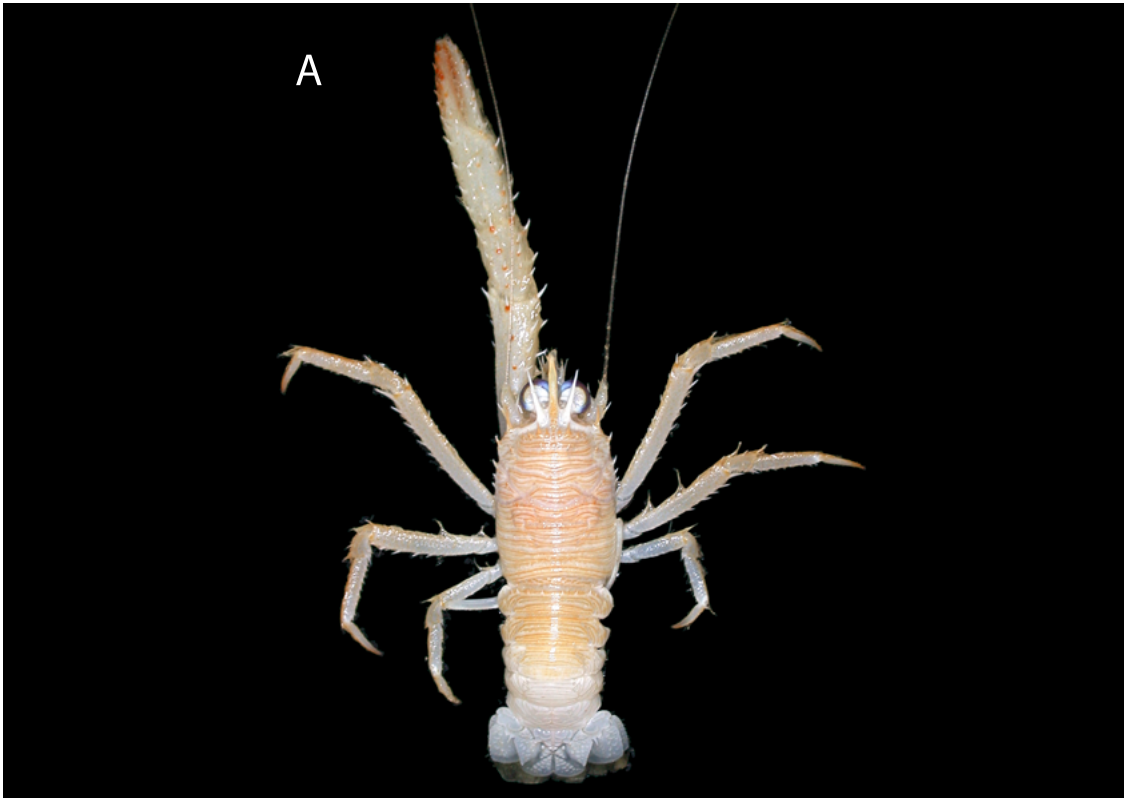


Figure 21. *Munida pilorhyncha* Miyake and Baba, 1966, female, cl 21.5 mm pcl 16.8 mm, (NMV J551451).

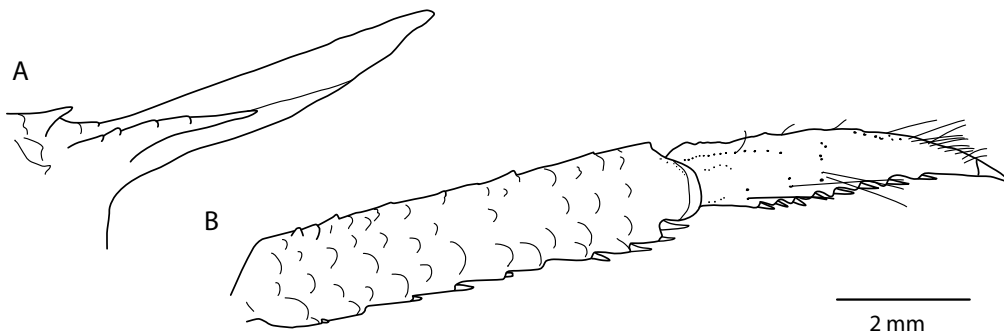


Figure 22. *Munida rubridigitalis* Baba, 1994. Baba, 1994, paratype, male cl 16.2 mm, pcl 10.2 mm (QM W19727): A, rostrum; B, right P2 dactylus and propodus. Scale: A–B = 2 mm

Genetic data. Not available

Remarks. *Munida rubridigitalis*, described from Queensland, has been also reported from New South Wales, north-western Australia, New Caledonia, Vanuatu, Indonesia (Kei islands) (Macpherson, 1994, 1997, 1999; Ahyong and Poore, 2004; Baba et al., 2008; Poore et al., 2008). The north-western Australian records of *M. rubridigitalis* are herein shown to be referable to a separate species, *M. julumunyju* sp. nov., which differs chiefly in having a deeper, more strongly curved rostrum (see account of that species). We compared paratypes and other Australian

material of *M. rubridigitalis* to six MNHN specimens identified as *M. rubridigitalis* from New Caledonia (see material listed under *M. julumunyju*). These New Caledonian specimens are herein referred to *M. julumunyju* sp. nov., as are specimens reported from New Caledonia and the Loyalty Islands as *Munida* sp. by Macpherson (1994). Thus, other records of *M. rubridigitalis* from New Caledonia, Kei Islands and Vanuatu could also be referable to *M. julumunyju* sp. nov. (see *Remarks* for that species). At present, *M. rubridigitalis* sensu stricto is known only from eastern Australia.

Distribution. Eastern Australia, from Queensland and New South Wales, 156–549 m.

***Munida sacksi* Macpherson, 1993**

Munida sacksi Macpherson, 1993: 438 (part), fig. 6 (type locality: Philippines). — Baba et al., 2008: 119.

Munida sp. MoV 5217. — Poore et al., 2008: 21. — McEnulty et al., 2011: app. 1.

Material examined. Western Australia: NMV J55039, 1 male (cl 11.6 mm, pcl 8.2 mm), Ningaloo South, 22° 04.314' S, 113° 45.36' E to 22° 04.854' S, 113° 45.36' E, 387–399 m, SS10/2005/151, 10 December 2005.

Genetic data. Not available.

Remarks. *Munida sacksi* was described from the Philippines, based on a single female, missing the chelipeds. The present specimen, reported by Poore et al. (2008) as “*Munida* sp. MoV 5217”, represents the first record of the species from Australia.

Distribution. Philippines, 300–330 m. Western Australia, 387–399 m.

***Munida shaula* Macpherson and de Saint Laurent, 2002**

Munida shaula Macpherson and de Saint Laurent, 2002: 474, figs 3A–C, E–H [type locality: Réunion Island]. — Baba et al., 2008: 117.

Munida sp. MoV 5215. — Poore et al., 2008: 21. — McEnulty et al., 2011: app. 1.

Material examined. Western Australia: NMV J55111, 1 ovigerous female (cl 15.3 mm, pcl 9.9 mm), Ningaloo North, 21° 58.212' S, 113° 47.58' E to 21° 58.752' S, 113° 47.46' E, 324–356 m, SS10/2005/157, 11 December 2005.

Genetic data. Not available.

Remarks. This specimen, reported as “*Munida* sp. MoV 5215” by Poore et al. (2008), agrees well with *Munida shaula*, previously recorded from the western Indian Ocean (Réunion Island, Madagascar and Zanzibar). This is the first confirmed record of *M. shaula* from Australia.

Distribution. Zanzibar, Madagascar, La Réunion and Mozambique, 263–510 m. Western Australia, 324–356 m.

***Munida typhle* Macpherson, 1994**

Munida magniantennulata. — Baba, 1994: 12.

Munida typhle Macpherson, 1994: 549, fig. 60 (type locality: New Caledonia). — Baba et al., 2008: 126. — Baba et al., 2009: 200, figs 181–182. — Poore et al., 2011: pl. 18H (colour). — Macpherson, 2013: 306. — Macpherson et al., 2017: 54.

Munida cf. *magniantennulata*. — Farrelly and Ahyong, 2019: 13, 55, fig. 98.

Material examined. Queensland: QM W19722, 1 female (cl 12 mm, pcl 7.5 mm), Coral Sea, 17° 45.04' S, 147° 48.014' E, 1223–1228 m, CIDARIS I stn 20–4, 10 May 1986; QM W19721, 1 female (cl 7.5 mm, pcl 5.0 mm), Coral Sea, 16° 50.133' S, 147° 10.1' E, 1607–1609 m, CIDARIS I stn 35–3, 14 May 1986; NMV J72915, 1 ovigerous female cl 21.9 mm, pcl 13.8 mm, Coral Sea CMR, 23° 37.872' S, 154° 39.582' E to 23° 39.54' S, 154° 38.628' E, 1761–1770 m, IN2017_v03 stn 128, 13 June 2017.

Genetic data. Not available

Remarks. The present specimens referred to *M. typhle* were recorded by Baba (1994) from central Queensland as *M. magniantennulata*. These two species are very similar overall, but the cheliped of *M. typhle* has spines present on the dorsal face of the palm and 2 lateral spines on the proximal half of the fixed finger, which are absent in *M. magniantennulata*. In addition, the P2–4 dactyli are longer in *M. typhle* (0.8 times the propodus compared to 0.5–0.6 in *M. magniantennulata*); and abdominal somite 2 has 4 spines on the anterior ridge while *M. magniantennulata* has 2 spines. In the Queensland specimens examined here, the P2 dactylus has 7–8 spines along the flexor margin compared to the holotype of *M. typhle*, with 9 spines. The QM registration numbers published by Baba (1994) were listed incorrectly and have been corrected here. The ovigerous female (NMV J72915; Ahyong and Farrelly, 2019: fig. 98) collected during the recent Investigator voyage is much larger than most specimens collected previously. This large female differs from other specimens in lacking spines on the cheliped dactylus, and the spines on abdominal somite 2 are proportionally longer (similar in length to the branchial margin spines) and limited to the median part of the anterior ridge.

Distribution. Somalia coast, Seychelles, southern Madagascar, Taiwan, New Caledonia, Vanuatu, French Polynesia, 500–1940 m. Queensland, 1607–1761 m.

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