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Crabs (Crustacea, Decapoda) from the Seas of East and Southeast Asia Collected by the RV *Hakuhō Maru* (KH-72-1 Cruise) 3. Sahul Shelf

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Abstract The crabs collected from the Sahul Shelf, in the Australian part of the Timor Sea by the RV *Hakuhō Maru* (KH-72-1 cruise) are identified and recorded, with some taxonomic comments. They are referred to 40 species of 29 genera in 10 families, including 2 new majoid species, *Naxioides sahulensis* sp. nov. (Epialtidae) and *Prismatopus peterngi* sp. nov. (Majidae). The following 10 species in 7 families, *Cryptodromia amboinensis* De Man, 1888 (Dromiidae), *Mclaydromia colini* Guinot and Tavares, 2003 (Dromiidae), *Ethusa hirsuta* McArdle, 1900 (Ethusidae), *Drachiella morum* (Alcock, 1896) (Aethridae), *Hyastenus kyusyuensis* (Yokoya, 1933) (Epialtidae), *Pseudolambrus bidentatus* (Flipse, 1930) (Parthenopidae), *Charybdis (Charybdis) rosaea* (Hombron and Jacquinot, 1846) (Portunidae), *Latopilumnus tuberculosus* (Garth and Kim, 1984) (Pilumnidae), *Pilumnus rotundus* Borradaile, 1902 (Pilumnidae) and *Viaderiana typica* Ward, 1942 (Pilumnidae), are recorded for the first time from Australia. Most of the species reported are shallow-water inhabitants obtained from station 29 (49–52 m depth), and it is remarkable that majoid and pilumnid crabs are dominant (11 species in the families Inachidae, Epialtidae and Majidae, and 14 species in the family Pilumnidae), with no representative of the family Xanthidae. Otherwise, the generic position of an unusual megalopa of the family Homolidae found in the trawl catch at station 33 (535–547 m depth) is discussed.

Key words: Shallow-water shelf crabs, Brachyura, homolid megalopa, taxonomy, new species, off northern Australia, Indian Ocean.

Introduction

This is the third part of the taxonomic studies on the crabs collected by the RV *Hakuhō Maru* (KH-72-1 cruise) from the seas of East and Southeast Asia. In the first part (Takeda *et al.*, 2021), 17 species of 14 genera in 9 families from the Sulu Sea and the Sibutu Passage, 285–2030 m in bathymetric range, and in the second part (Takeda *et al.*, 2022), 16 species of 14 genera in 10 families, mainly from northern Timor Sea, 295–690 m depth, were recorded. In the first part, in addition to the typical deep-sea species commonly recorded, three new species, *Cymono-*

Table 1. Sampling stations in the Sahul Shelf, from where the crabs were collected by the RV *Hakuhō Maru* (KH-72-1 cruise).

Sta. 29: SW of Bathurst Island, Timor Sea (12°17.3′S, 129°40.9′E–12°17.2′S, 129°41.8′E), 49–52 m depth; 3 m beam trawl; 24 June, 1972
Sta. 30: W of Darwin, Timor Sea (12°24.8′S, 128°00.1′E–12°24.8′S, 128°00.2′E), 115–115 m depth; 3 m beam trawl; 25 June, 1972
Sta. 32: E of Ashmore Reef, Timor Sea (12°17.3′S, 124°33.9′E–12°36.0′S, 124°36.4′E), 74–78 m depth; 3 m beam trawl; 25–26 June, 1972
Sta. 33: S of Ashmore Reef, Timor Sea (12°42.2′S, 123°07.6′E –12°42.0′S, 123°08.5′E), 535–547 m depth; 3 m beam trawl; 26 June, 1972

Table 2. List of the species from the Sahul Shelf recorded in this part, each with bathymetric record in parenthesis next to the station number. Two new species are indicated by boldface, and the species new to Australian waters are marked with an asterisk.

Family Dromiidae De Haan, 1833
Cryptodromia amboinensis De Man, 1888* — Sta. 29 (49–52 m) (Fig. 1A–C)
Mclaydromia colini Guinot and Tavares, 2003* — Sta. 29 (49–52 m) (Fig. 13C)
Family Homolidae De Haan, 1839
Homolid megalopa — Sta. 33 (535–547 m) (Figs. 2–3)
Family Ethusidae Guinot, 1977
Ethusa hirsuta McArdle, 1900* — Sta. 30 (115–115 m)
Family Aethridae Dana, 1851
Drachiella morum (Alcock, 1896)* — Sta. 29 (49–52 m) (Fig. 1F)
Family Leucosiidae Samouelle, 1819
Coleusia magna (Tyndale-Biscoe and George, 1962) — Sta. 29 (49–52 m) (Fig. 4)
Myra australis Haswell, 1880 — Sta. 29 (49–52 m) (Fig. 1E)
Urnalana whitei (Bell, 1855) — Sta. 29 (49–52 m) (Fig. 1D)
Family Inachidae MacLeay, 1838
Achaeus brevirostris (Haswell, 1879) — Sta. 29 (49–52 m) (Fig. 5A, 11A–C)
Achaeus lacertosus Stimpson, 1858 — Sta. 29 (49–52 m) (Fig. 5B)
Achaeus paradicei Griffin, 1970 — Sta. 29 (49–52 m) (Fig. 5 C)
Oncinopus kathae Davie, 2011 — Sta. 29 (49–52 m) (Fig. 5D)
Oncinopus postillonensis Griffin and Tranter, 1986 — Sta. 29 (49–52 m) (Fig. 5E)
Family Epialtidae MacLeay, 1838
Austrolibinia gracilipes (Miers, 1879) — Sta. 29 (49–52 m); Sta. 30 (115–115 m); Sta. 32 (74–78 m) (Fig. 6D–E)
Hyastenus campbelli Griffin and Tranter, 1986 — Sta. 29 (49–52 m); Sta. 30 (115–115 m) (Fig. 6A)
Hyastenus kyusyuensis (Yokoya, 1933)* — Sta. 29 (49–52 m) (Fig. 6F–H)
Naxioides sahulensis sp. nov.— Sta. 32 (49–78 m) (Fig. 7)
Phalangipus australiensis Rathbun, 1918 — Sta. 30 (115–115 m ; Sta. 32 (74–78 m) (Fig. 6B–C)
Family Majidae Samouelle, 1838
Prismatopus albanyensis Ward, 1933 — Sta. 29 (49–52 m); Sta. 30 (115–115 m) (Figs. 8A, 9A–C, 10A–B, 11D–E)
Prismatopus peterngi sp. nov. — Sta. 29 (49–52 m) (Figs. 8B, 9D–F, 10C–D, 11F–G)
Family Parthenopidae MacLeay, 1838
Pseudolambrus bidentatus (Flipse, 1930)* — Sta. 29 (49–52 m) (Fig. 13A–B)
Family Portunidae Rafinesque, 1815
Charybdis (Charybdis) jaubertensis Rathbun, 1924 — Sta. 29 (49–52 m) (Fig. 13F)
Charybdis (Charybdis) rosaea (Hombron and Jacquinot, 1846)* — Sta. 32 (49–78 m) (Fig. 12)
Lupocycloporus gracilimanus (Stimpson, 1858) — Sta. 29 (49–52 m); Sta. 30 (115–115 m) (Fig. 13D)
Portunus sanguinolentus (Herbst, 1783) — Sta. 30 (115–115 m)
Thalamita intermedia Miers, 1886 — Sta. 29 (49–52 m) (Fig. 14A–C)
Thalamita sima H. Milne Edwards, 1834 — Sta. 30 (115–115 m) (Fig. 14D–F)
Family Pilumnidae Samouelle, 1819
Actumnus setifer (De Haan, 1835) — Sta. 29 (49–52 m); Sta. 32 (49–78 m)
Actumnus squamosus (De Haan, 1835) — Sta. 29 (49–52 m)
Bathypilumnus pugilator (A. Milne-Edwards, 1873) — Sta. 29 (49–52 m) (Fig. 15D–E)
Camptoplax coppingeri Miers, 1884 — Sta. 29 (49–52 m) (Fig. 15A–C)
Cryptocoeloma haswelli Rathbun, 1923 — Sta. 29 (49–52 m) (Fig. 16D–E)
Glabropilumnus seminudus (Miers, 1884) — Sta. 29 (49–52 m); Sta. 30 (115–115 m) (Fig. 16A–C)
Gonatonotus pentagonus White, 1847 — Sta. 29 (49–52 m); Sta. 32 (74–78 m) (Fig. 13E)
Latopilumnus tuberculosus (Garth and Kim, 1984)* — Sta. 29 (49–52 m) (Fig. 17)
Pilumnus longicornis Hilgendorf, 1878 — Sta. 29 (49–52 m) (Fig. 18E–F)
Pilumnus minutus (De Haan, 1835) — Sta. 29 (49–52 m); Sta. 32 (74–78 m) (Fig. 18D)
Pilumnus rotundus Borradaile, 1902* — Sta. 29 (49–52 m) (Fig. 18A–B)
Pilumnus semilanatus Miers, 1884 — Sta. 29 (49–52 m) (Fig. 18C)
Serenolumnus kasijani (Serène, 1969) — Sta. 29 (49–52 m) ; Sta. 32 (74–78 m) (Fig. 16F)
Viaderiana typica Ward, 1942* — Sta. 29 (49–52 m)

mus suluensis (family Cymonomidae), *Homolodromia hakuhoae* (family Homolodromiidae) and *Lysirude goekei* (family Lyreididae) were described, with fine photographs, and in the second part, the rare crabs from the depths of the Timor Sea were recorded.

In this third part dealing with the crabs from shallow water of the Sahul Shelf in the Timor Sea (Table 1), 40 species from 29 genera in 10 families are recorded (Table 2). Two new species of spider crabs of the genera *Naxioides* (Epialtidae) and *Prismatopus* (Majidae), are described. It is otherwise noted that, as listed in Table 2, a characteristic but unidentified homolid megalopa having remarkably long, frontal, dorsal and lateral tubercles is recorded, with discussion on its generic identity.

In preparing the third part of this study, the three Japanese authors divided the work to identify the specimens quickly and accurately following their expert knowledge, and S. T. Ahyong joined as one of the authors to check the identifications of the species from Australian waters. The manuscript was edited by the first author, but the other authors equally contributed and are equally responsible to this report.

Sampling Stations and Samples Depository

The cruise track of the RV *Hakuhō Maru* (KH-72-1 cruise) is shown in the first part (Takeda *et al.*, 2021: fig. 1), and the stations (29, 30, 32 and 33) on the Sahul Shelf, from which the crabs reported here were collected, are given in Table 1.

It is remarkable that 34 of 40 species reported here, were from the station 29. All of the KH-72-1 specimens reported here, including the type specimens of two new species are registered and deposited at the Tsukuba Research Departments, National Museum of Nature and Science, Tokyo (NSMT). Specimen measurements are indicated in mm, and abbreviations used are as follows: CB and CL (= carapace breadth and length), PCL (= carapace length excluding pseudorostral spines or tubercles), G1 and G2 (= male first and second pleopods), P2–5 (= first to fourth ambulatory legs).

Taxonomic Accounts

Family Dromiidae De Haan, 1833

Genus ***Cryptodromia*** Stimpson, 1858

[Type species: *Cryptodromia coronata* Stimpson, 1858]

Cryptodromia amboinensis De Man, 1888

(Fig. 1A–C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♀ (CB 3.2 × CL 3.0 mm), NSMT-Cr 30696; 1 ♀ (4.5 × 4.2 mm), NSMT-Cr 30697.

Remarks. The general appearance of the present two females (Fig. 1A–C) seems to be somewhat different from the photograph given by McLay (1993: fig. 18c), but identified as this small rare species, with characteristic ornamentation of the frontoribital margin and arrangement of the anterolateral and subhepatic tubercles of the carapace. They also seem to be different from the schematic figure of *C. demani* Alcock, 1900 given by Buitendijk (1939), which has been synonymized with *C. amboinensis* by McLay (1993), but agree only with the illustration of the frontorbital marginal tuberculation.

Salient aspects of the female specimens at hand are briefly explained as follows: the carapace of the larger female (Fig. 1A) is only slightly wider than long and strongly convex in both directions; it is small, with CB less than 5 mm, but fully mature, with the well-developed pleon fringed with long feathered hairs and covering the whole sternal surface; the pleopods are well developed; the smaller female may be subadult, with the rather narrow pleon and incompletely developed pleopods; both specimens are only slightly smaller than those from New Caledonia, the Philippines and the Persian Gulf reported by McLay (1993), the largest of which is a female from the Persian Gulf with CB 7.1 mm. The paucity of previous records of this species (De Man, 1888; Alcock, 1900, 1901, as *Dromia (Cryptodromia) de Manii*; Laurie, 1906,

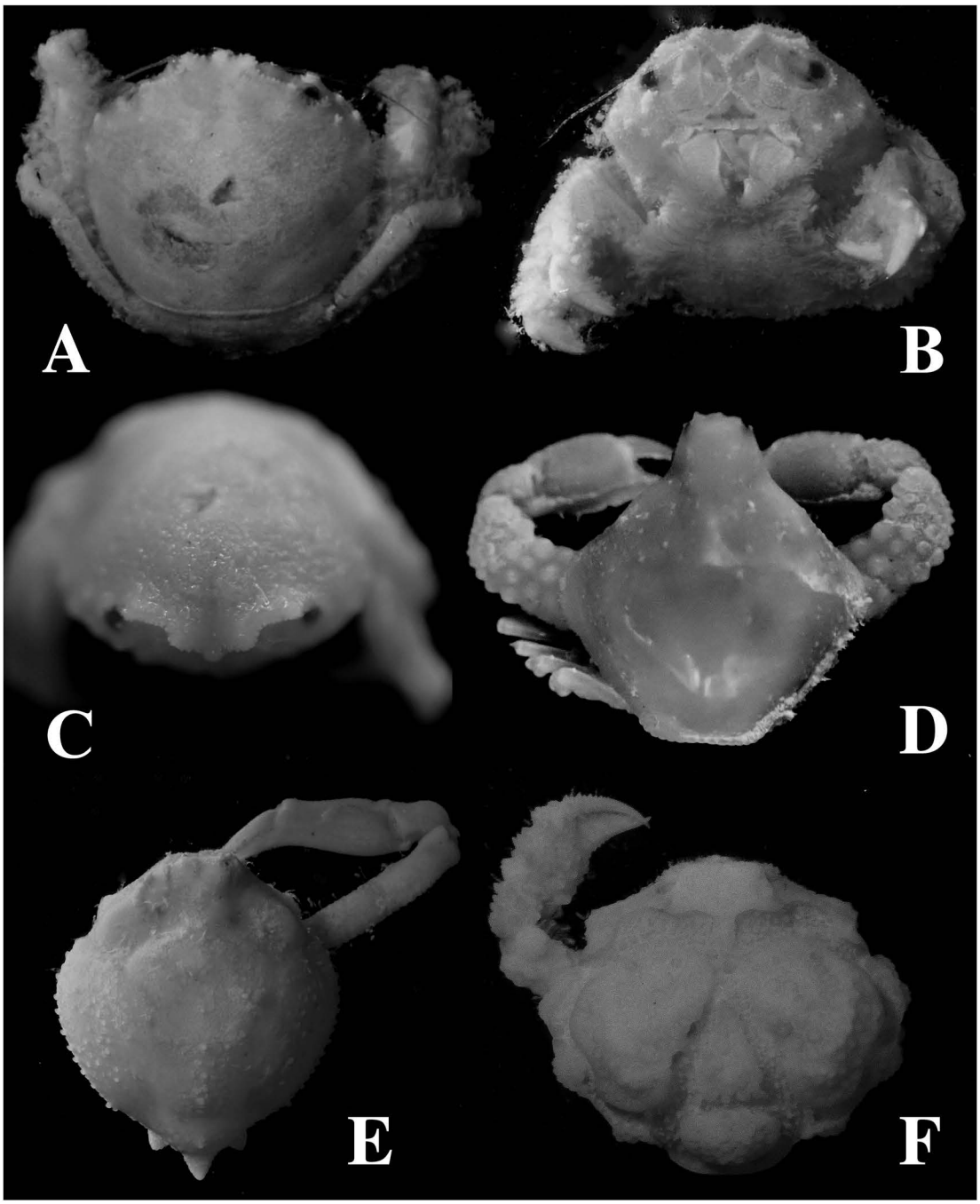

Fig. 1. A–C: *Cryptodromia amboinensis* De Man, ♀ (NSMT-Cr 30697; CB 4.5 × CL 4.2 mm) from sta. 29. Dorsal (A), frontal (B) and frontal upper (C) views. D: *Urnalana whitei* (Bell), ♂ (NSMT-Cr 30704; CB 6.6 × CL 7.2 mm) from sta. 29. E: *Myra australis* Haswell, ♀ (NSMT-Cr 30703; CB 9.7 × CL 11.1 mm including posterior tubercle) from sta. 29. F: *Drachiella morum* (Alcock), ♀ (NSMT-Cr 30701; CB 8.0 × CL 7.0 mm) from sta. 29.

as *C. manii*; Buitendijk, 1939, as *C. de Manii*; McLay, 1993) may be due in part to such the small size as the species, making them easily overlooked.

The frontorbital margin (Fig. 1A–C) of the carapace in the present specimens is thickly festooned with many, small, elongated granules, and similar to the figure of *Cryptodromia de Manii* given by Buitendijk (1939) which is somewhat schematic probably with low number of granules. In the present specimens the median frontal tooth (Fig. 1C) is on a lower level as usual, but rounded at the tip and developed further than the lateral teeth. The anterolateral and subhepatic teeth are also made up with clusters of similar granules. Such marginal ornamentation of the frontorbital border is not seen in the other dromiid species.

The arrangement of tubercles on the subhepatic region and near the orbit was considered by McLay (1993: 204) as the most characteristic for *C. amboinensis*, commenting that "This is best seen in De Man (1888, fig. 4a) which shows a small tubercle near the orbit, above the level of the anterolateral margin, an unusual suborbital tooth with a small tubercle on its base, and two subhepatic tubercles in a straight line towards the first anterolateral tooth." The arrangement of these tubercles is partly referred to the photographs of this paper (Fig. 1A–B).

Both chelipeds are sparsely covered with long plumose setae and armed with a few compound tubercles. The P2 is densely covered with long plumose setae, and much shorter than the other legs with stout merus and carpus. The P4 is long, with whole surface covered with shaggy setae; the dactylus is talon-like, strongly curved inward and weakly upward, opposing a single propodal spine.

Distribution. Sri Lanka, Mergui Archipelago, New Caledonia, Amboina, the Philippines and now from Australia. The records of bathymetric range are from 18 m in Sri Lanka (Laurie, 1906) to 33 m in New Caledonia (McLay, 1993), and now to 52 m depth in Australia.

Genus ***Mclaydromia*** Guinot and Tavares, 2003

[Type species: *Mclaydromia colini* Guinot and Tavares, 2003]

Mclaydromia colini Guinot and Tavares, 2003

(Fig. 13C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 4.5 × CL 5.1 mm), NSMT-Cr 30698.

Remarks. The present male of *Mclaydromia colini* (Fig. 13C) is small, but agrees in general with the photograph of *Dromidiopsis dubia* Lewinsohn, 1984 reported by McLay (1993) from New Caledonia. According to Guinot and Tavares (2003), however, the New Caledonian specimens are specifically different from a female reported from Madagascar, and both species are generically independent from the genus *Dromidiopsis* Borradaile, 1900. The present male is confidently referred to *Mclaydromia* erected to accommodate the two species, with distinguishing characters including the free pleonal somites (fifth and sixth somites fused in *Dromidiopsis*, and the subequal propodi of the P4 and P5 (propodus of P5 much longer in *Dromidiopsis*). The rostrum is small, inclined downwards and not visible from above, giving the front a bidentate appearance as result of the pair of prominent, anteriorly-directed pseudorostral teeth.

Mclaydromia colini differs from *M. dubia* in: 1) the wide, prominent, anteriorly-produced pseudorostral teeth; 2) the cheliped carpus dorsal surface is ornamented with conspicuous tubercles; 3) the carapace suborbital margin is abruptly interrupted, leaving a deep and broad hiatus between the suborbital lobe and antenna; and 4) the anterolateral tooth of the carapace is a small and rounded, but clearly visible. It is conspicuous that the carapace in *M. colini* is distinctly longer than wide, with two blunt anterolateral teeth; the dorsal surface is strongly convex laterally, ill-defined and covered with very short velvety tomentum.

Distribution. New Caledonia and now from Australia, 14–62 m depth.

Family Homolidae De Haan, 1839

Homolid megalopa

(Figs. 2–3)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 33, 1 specimen (CB 4.5 mm excluding lateral spines × CL 5.0 mm excluding frontal spines; length of dorsal spine, 9.0 mm; length of lateral spine, 11.2 mm; length of frontal spine, 7.7 mm; length of protogastric spine, 0.8 mm), NSMT-Cr 30699.

Remarks. The specimen was found in the samples trawled up from station 33, but the exact capture depth is not known. The specimen is different from usual megalopae in having remarkably long frontal, dorsal and lateral carapace spines (Fig. 2). The frontal spines are horizontal and parallel throughout their length, tapering distally; each lateral spine is directed posterolaterally and weakly downwards, and slightly longer than the frontal spines, tapering very weakly towards the tips; the dorsal spine is nearly erect or only weakly inclined posteriorly, and slightly shorter than the lateral spines. The carapace is otherwise armed with a pair of the short protogastric spines weakly directed outwards.

The megalopa at hand was not dissected, but externally agrees well with a megalopa from off Port Hacking, New South Wales, Australia, tentatively attributed to *Dagnaudus petterdi* (Grant,

Fig. 2. A homolid megalopa (NSMT-Cr 30699; CB 4.5 mm excluding lateral spines × CL 5.0 mm excluding frontal spines) from sta. 33, in different views.

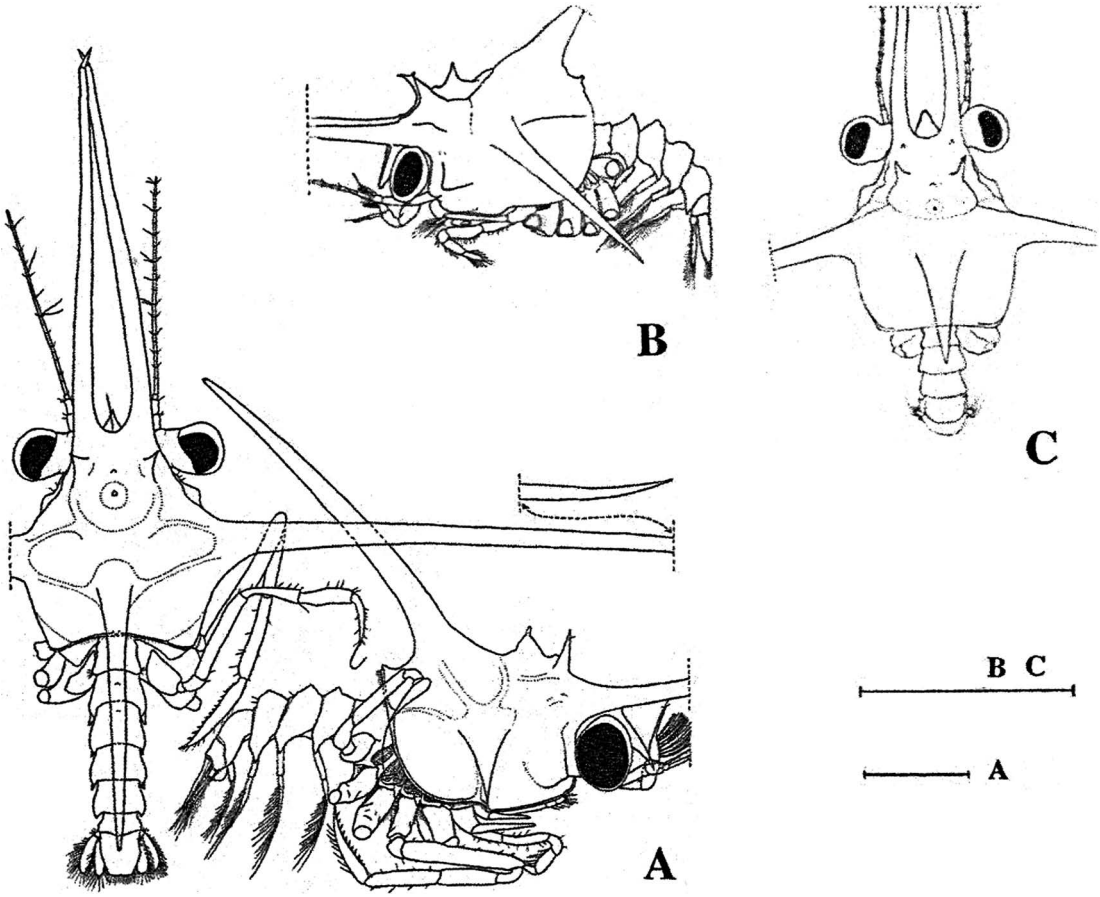

Fig. 3. A: Homolid megalopa of ? *Paromola petterdi* (Grant), from off Port Hacking, N.S.W., Australia [after Williamson (1965, fig. 2A, B)]. B–C: Homolid megalopa from Sagami Bay, Japan [after Rice (1971, fig. 1a, b)]. Scale bars: A = 2 mm; B, C = 5 mm.

1905) by Williamson (1965) (as *Paromola*). The original line drawings of this Australian megalopa were given by Rice (1981: fig. 2a, dorsal view), Wear and Fielder (1985: figs. 41, 42, dorsal and lateral views), Konishi (2017: fig. 119I, dorsal view), and also in this paper (Fig. 3A) for explanation of and comparison with the homolid megalopae.

Sakai (1965) recorded a megalopa of *Homola orientalis* Henderson, 1888 from Sagami Bay, Japan, with an illustration of dorsal view, but without comment on the species identification. The frontal and dorsal carapace spines are long and similar to those of the Australian megalopa, but both of the lateral spines were mentioned and figured as short and obtuse at the tips. Later, however, Rice (1971) examined the same specimen from Sagami Bay, and showed that the lateral spines were shortened as a result of damage over time. As far as the descriptions and figures are concerned, the megalopa from Sagami Bay (Fig. 3B–C) appears to be indistinguishable from the Australian megalopa (Fig. 3A) and also from the Sahul Shelf megalopa (Fig. 2). *Dagnaudus petterdi* is, however, restricted to New Caledonia, New Zealand and off northeastern Australia, and unknown from Japanese waters.

Considering the wide distribution and common occurrence of *Homola orientalis* in the Indo-West Pacific waters including Australia and Japan, the identification of the homolid megalopa from Sagami Bay by Sakai (1965) may be reasonable. Although Williamson (1965) initially thought his Australian megalopa to be *Dagnau-*

dus petterdi (as *Paromola*), Williamson (1967) reidentified the megalopa as *H. orientalis*, and Rice (1971) concluded, after examination of Japanese megalopa, that it belongs to *Paromola*, not to *Homola*. *Paromola* megalopae are unknown to date, so Rice's (1971) conclusion is not always accepted as it is. However, his conclusion that the Australian and Japanese megalopae are not referable to *Homola* is reasonable, because Rice (1964) and Rice and Provenzano (1970) studied the complete developmental stages of *Homola barbata* (Fabricius, 1783), revealing a quite different, but rather usual type of megalopa without long frontal and dorsal carapace spines. As the zoeal and megalopal stages are generally thought to be similar among the congeneric species, Rice's (1964) conclusion can be considered reasonable that the Australian and Japanese megalopae belong to *Paromola*, which is related to, but distinct from *Homola*. Only the *Paromola* zoeae of three species have hitherto been reported: *P. japonica* Parisi, 1915 by Aikawa (1937), *P. cuvieri* (Risso, 1816) by Samuelsen (1976), and *P. macrochira* Sakai, 1961 by Konishi *et al.* (1995), but as mentioned above, no information about the megalopae is available to date.

Recent systematic, taxonomic and biogeographic studies on the family Homolidae by Guinot and Richer de Forges (1981, 1995), Richer de Forges and Ng (2007), Ahyong *et al.* (2009), and Ng and Richer de Forges (2017) recognized 14 genera mostly from Indo-West Pacific waters, the species of which are, in general, rather restricted biogeographically. There is no information about their larvae, especially megalopae, even from planktonic samples, and therefore it is difficult at present to reliably refer the megalopa in question to a genus.

Family Ethusidae Guinot, 1977
Genus ***Ethusa*** Roux, 1830
[Type species: *Cancer mascarone* Herbst, 1785]
Ethusa hirsuta McArdle, 1900

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 30, 1 ♂ (CB 10.2 × CL 9.4 mm), NSMT-Cr 30700.

Remarks. The specimen examined is soft after ecdysis, with the carapace posterior part somewhat distorted, but identified as *Ethusa hirsuta* following the key by Castro (2005), who commented on the characters distinct from the close congeners and clarified synonymies: *E. hirsuta* recorded by Chen (1987) from Madagascar is really referable to *E. machaera* Castro, 2005; *E. makasarica* Chen, 1993 from the Makassar Strait is synonymous with *E. hirsuta*; and *E. makasarica* recorded by Chen (2000) from Vanuatu is in turn *E. abbreviata* Castro, 2005. As a result, correct records of *E. hirsuta* are only those of McArdle (1900: 474), Alcock and McArdle (1902: pl. 59 fig. 12), Alcock and MacGilchrist (1905: pl. 72 fig. 1), MacGilchrist (1905: 257), Ihle (1916: 152), and Castro (2005: 524, fig. 11).

Ethusa hirsuta is characteristic in having the endostome extending beyond the posterior border of the antennular fossae, the straight, rather slender external orbital tooth, and the wide, shallow U-shaped orbital sinus.

Distribution. Gulf of Manaar, off Sri Lanka, Makassar Strait, Timor and Solomon Islands, and now from Australia, at depths of 112–1097 m, as plotted on the map by Castro (2005).

Family Aethridae Dana, 1851
Genus ***Drachiella*** Guinot, 1976
[Type species: *Lithadia sculpta* Haswell, 1879]
Drachiella morum (Alcock, 1896)
(Fig. 1F)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♀ (CB 8.0 × CL 7.0 mm), NSMT-Cr 30701.

Remarks. As discussed by Takeda and Tachikawa (1995), six representatives of the genus *Drachiella* Guinot, in Serène and Soh, 1976, are characterized by differences in the carapace dorsal surface sculptured peculiarly by deep grooves defining distinct areolations. Concerning *Drochiella morum*, Serène (1954: figs. 1–2, pl. 7, as *Actaeomorpha*) noted that the carapace dorsal surface is covered with mushroom-

like tubercles differing from the simple tubercles of various size in congeneric species.

Drachiella morum was originally described by Alcock (1896: 172, pl. 8 fig. 3, as *Actaeomorpha*), and later recorded as *Oreophorus* by Yokoya (1933) and Sakai (1976), as *Actaeomorpha* by Chopra (1934), Sakai (1937, 1965), Serène (1954), Zarenkov (1969), and Takeda and Miyake (1970), and as *Drachiella* by Serène and Soh (1976), Dai and Yang (1991), and Chen and Sun (2002).

The present specimen examined (Fig. 1F) is a young female, but agrees well with the specimens recorded in the literature.

Distribution. Indo-West Pacific from Japan to India, through the East China Sea, Viet Nam, the Andaman Sea off Thailand, and now from Australia; 25–156 m depth. Chen and Sun (2002) recorded numerous specimens from the East and South China Seas.

Family Leucosiidae Samouelle, 1819

Genus ***Coleusia*** Galil, 2006

[Type species: *Cancer urania* Herbst, 1801]

Coleusia magna (Tyndale-Biscoe and George, 1962)

(Fig. 4)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 carapace (CB 28.0 × CL 33.6 mm), NSMT-Cr 30702.

Remarks. Coleusia magna, one of five species in the genus *Coleusia*, is characteristic in having a pair of large, dark brown blotches on the gastric regions. Even in the cast-off carapace examined (Fig. 4A), the black blotches are distinct, and two longitudinal parallel lines along the lateral margins are also hardly traceable, agreeing with the fine photographs of coloration given by Galil (2006). The thoracic sinus (Fig. 4B–C) agrees generally with the description of Galil (2006: 59) as "Thoracic sinus with row of eight

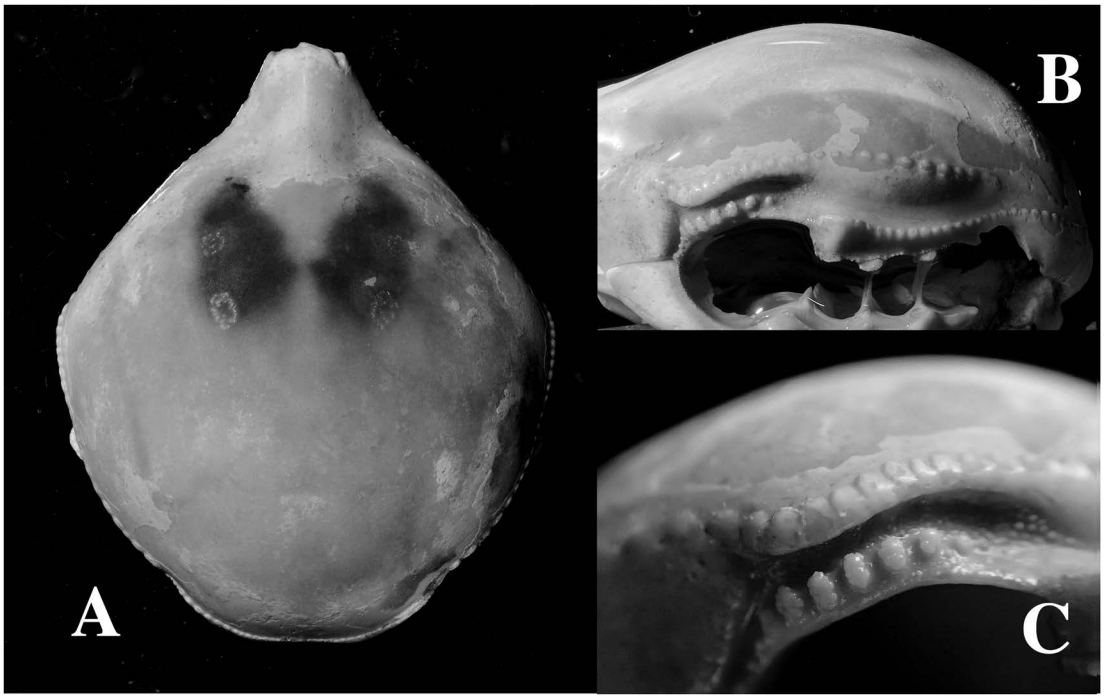

Fig. 4. *Coleusia magna* (Tyndale-Biscoe and George), carapace (NSMT-Cr 30702; CB 28.0 mm × CL 33.6 mm) from sta. 29. Dorsal view (A) to show general shape and dorsal blotches. B–C: Lateral view to show trails of thoracic sinus and granules.

or nine granulate, oval granules above cheliped basis, decreasing in size posteriorly. Sinus anteriorly defined by granulate, straight, overhanging margin of pterygostomian region." The granules in the thoracic sinus in this specimen are fewer than described by Galil (2006), with six main granules surround by several depressed granules.

Distribution. Only from Australian waters (off the Dampier Archipelago, Onslow and Bloome, northwestern Australia; off Bundaberg and Mackay Harbour, Queensland), 55–82 m depth.

Genus ***Myra*** Leach, 1817

[Type species: *Leucosia fugax* Fabricius, 1798]

Myra australis Haswell, 1880

(Fig. 1E)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♀ (CB 9.7 × CL 11.1 mm including posterior tubercle), NSMT-Cr 30703.

Remarks. The present female (Fig. 1E) of *Myra australis* is somewhat young, with all the ambulatory legs detached and the left cheliped missing. The carapace dorsal surface and lateral margins are covered and fringed with granules, differing from the adult type specimens described by Galil (2001) in having the rather short median posterior spine, but agreeing well with the young specimen recorded by Galil and Ng (2007). This species is distinguished from some close congeners such as *Myra fugax* (Fabricius, 1798), *M. celeris* Galil, 2001, and *M. subgranulata* Kossmann, 1877, which were studied in detail by Galil (2001), by the greatly swollen proximal part of the median posterior spine. According to Galil (2001), the G1s of these species are different from each other in the apical process. Otherwise, the figures by the original author (Haswell, 1880a), Tyndale-Biscoe and George (1962), and Campbell and Stephenson (1970) are useful for definitive identification.

Distribution. Australian waters from the Dampier Archipelago, Western Australia through the Torres Strait and its surrounding sea to Moreton Bay, Queensland, 5–57 m depth, and additionally from New Caledonia, Fiji, Vanuatu, Indonesia and the Philippines, 35–240 m depth. The deeper records of more than 300 m by tangle net fisheries operated in the Philippines are not always reliable.

Genus ***Urnalana*** Galil, 2005

[Type species: *Leucosia haematostitca* Adams and White, 1849]

Urnalana whitei (Bell, 1855)

(Fig. 1D)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 6.6 × CL 7.2 mm), NSMT-Cr 30704.

Remarks. The following brief notes on the present young male (Fig. 1D) of *Urnalana whitei* are generally agreeable with the descriptions by Bell (1855a, b) and the detailed comparison with the close congener, *U. cheverti* (Haswell, 1880) made by Arnold and George (1987). The carapace lateral angle is strongly developed and overhanging the thoracic sinus as a thin plate; the carapace posterolateral and posterior margins are developed as a narrow, milled marginal plate; the carapace dorsal surface is wholly smooth, only with some granules on the hepatic and anterolateral regions. Both chelipeds are stout, same in size and shape; the merus is wholly covered with large spherical granules diminishing in size distally; the carpus is covered with smaller granules mainly on the outer surface; the palm is depressed. The specimen is identifiable as *U. whitei* by the following diagnostic features documented by Galil (2005): 1) the frontal margin of the carapace is tridentate; 2) the hepatic region of the carapace has low elevation with two pearly granules; 3) the outer margin of the chelipedal palm is crenulate.

Distribution. Hitherto known from Indonesia and Australia, 14–73 m depth and probably from the Philippines (Tan, 1996).

Family Inachidae MacLeay, 1838

Genus ***Achaeus*** Leach, 1817

[Type species: *Achaeus cranchii* Leach, 1817]

Achaeus brevirostris (Haswell, 1879)

(Figs. 5A, 11A–C)

Material examined. RV *Hakuhō Maru* KH-72-1

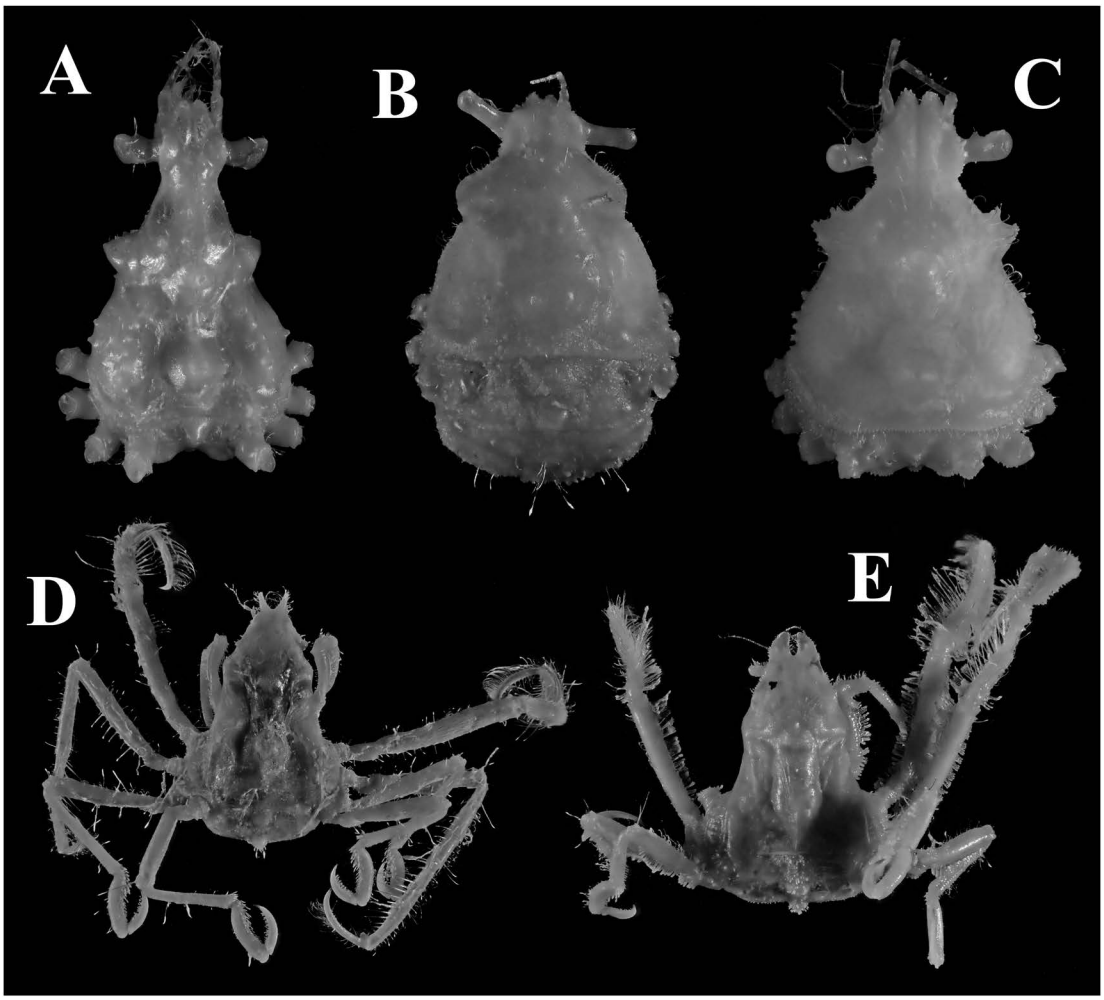

Fig. 5. A : *Achaeus brevirostris* (Haswell), ♂ (NSMT-Cr 30706; CB 5.1 × CL 7.6 mm) from sta. 29. B: *Achaeus lacertosus* Stimpson, ♀ (NSMT-Cr 30707; CB 3.2 × CL 3.8 mm) from sta. 29. C: *Achaeus paradicei* Griffin, ♂ (NSMT-Cr 30709; CB 3.6 × CL 4.7 mm) from sta. 29. D : *Oncinopus kathae* Davie, ovig. ♀ (NSMT-Cr 30711; CB 5.8 × CL 7.9 mm) from sta. 29. E: *O. postillonensis* Griffin and Tranter, ovig. ♀ (NSMT-Cr 30712; CB 5.4 × CL 6.2 mm) from sta. 29.

cruise, sta. 29, 1 ♂ (CB 4.9 × CL 7.2 mm), NSMT-Cr 30705; 1 ♂ (5.1 × 7.6 mm), NSMT-Cr 30706.

Remarks. Davie (2002) listed eight Australian species of the genus *Achaeus*, and two more species remained unidentified in Poore *et al.* (2008). This long-neck species identified as *A. brevirostris* is characteristic in having the smooth carapace surface without prominent spines or tubercles. Although all the chelipeds and ambulatory legs are missing in the male examined (Fig. 5A), the identification as *A. brevirostris* is reasonable, with some characters subject to variation. First, it is noted that the hepatic region of the carapace of the male is strongly developed as a triangular tooth in dorsal view and seems to be proportionally larger than the illustration of Griffin (1970: fig. 1a). There are otherwise some discrepancies in the number of granules on the branchial region, the shape of the male telson, and the curvature and twist of the G1, most of which have been difficult to illustrate and explain accurately. In this study, these differences (Fig. 11A–B) are

considered to represent individual or developmental variations.

Distribution. Indo-West Pacific from Zanzibar in East Africa to the Sulu Archipelago in the Philippines through Australian and Indonesian waters, 11–57 m depth. An unusual depth, 304 m, was recorded from off the Kai Islands by Griffin and Tranter (1986).

Achaeus lacertosus Stimpson, 1858
(Fig. 5B)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ovig. ♀ (CB 3.2 × CL 3.8 mm), NSMT-Cr 30707; 1 ovig. ♀ (3.2 × 4.1 mm), NSMT-Cr 30708.

Remarks. This short-neck species, *Achaeus lacertosus* (Fig. 5B), has two synonyms, namely *A. breviceps* Haswell, 1880 (*fide* Haswell, 1882) and *A. spinifrons* Sakai, 1938 (*fide* Griffin and Yaldwyn, 1966), with figures by Stimpson (1907), Stephensen (1945), Griffin (1970) and Sakai (1938, as *A. spinifrons*; 1976). As briefly diagnosed by Griffin and Tranter (1986), *A. lacertosus* is characteristic in having the rostral anterior margin fringed with spinules, the smooth carapace surface with convex gastric, cardiac and branchial regions, the hepatic outer margin being strongly expanded, with an obtuse tip, and the strongly curved dactylus of the last ambulatory leg.

Distribution. According to Griffin and Tranter (1986), this species is widely distributed in the Indo-West Pacific from Japan to South Africa through intervening localities in the West Pacific, Australian waters and the Indian Ocean including the Persian Gulf. The bathymetric range is from 5 to 90 m, but Griffin and Tranter (1986) recorded two specimens from Singapore collected during low tide.

Achaeus paradicei Griffin, 1970
(Fig. 5C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 3.6 × CL 4.7 mm), NSMT-Cr 30709; 2 ♂♂ (2.9 × 3.7 mm; 3.5 × 4.2 mm), 2 ♀♀ (2.9 × 3.5 mm; 3.5 × 4.0 mm), 4 ovig. ♀♀ (3.0 × 3.8 mm – 4.5 × 5.3 mm), NSMT-Cr 30710.

Remarks. This short-neck species, *Achaeus paradicei* (Fig. 5C), was first mentioned as *Achaeus* sp. in the key to the New Zealand and Australian species of *Achaeus* (Griffin and Yaldwyn, 1965) and later, listed also in the keys by Griffin (1966b, c). However, this species is formally known by the original description (Griffin, 1970) and the subsequent description by Griffin and Tranter (1986), with accounts of interspecific variation.

All the chelipeds and ambulatory legs are missing in three male specimens at hand, but the carapace shape and granulation (Fig. 5C) agree generally with the preceding descriptions, although with some variations. The rostral lobes are blunt and spinulous along the margins, and the median incision is narrower than the original figure. The carapace was mentioned by Griffin and Tranter (1986: 13) as having "two to four spines on the margin of the hepatic region, sometimes the spines are bifid or spinulous," and illustrated as such. In the males at hand the hepatic lobe is well developed and armed with a subsidiary, prominent but slightly smaller tubercle than the main one on the anterior slope. The branchial region is said by Griffin and Tranter (1986) that three to five spines anterior on the submargin are small in females, but much more pronounced and visible dorsally in males. Three tubercles on the branchial margin were figured in the original description and visible in the male at hand.

Distribution. Northwestern Australia, Indonesian waters and the Sulu Archipelago, 32–90 m depth.

Genus ***Oncinopus*** De Haan, 1839
[Type species: *Inachus (Oncinopus) aranea* De Haan, 1839]

Oncinopus kathae Davie, 2011
(Fig. 5D)

Material examined. RV *Hakuhō Maru*

KH-72-1 cruise, sta. 29, 1 ovig. ♀ (CB 5.8 × CL 7.9 mm), NSMT-Cr 30711.

Remarks. The present knowledge of the genus *Oncinopus* was well summarized by Davie (2011), with five species, *O. aranea* (De Haan, 1839), *O. neptunus* Adams and White, 1848, *O angustifrons* Takeda and Miyake, 1969, *O. postillonensis* Griffin and Tranter, 1986, and *O. kathae* Davie, 2011. All the species have been weakly chitinized and rather similar to each other in the general form of the carapace, chelipeds and ambulatory legs, but the G1 is the most important criterion, with the characteristic twisted form in each species (*O. neptunus* by Takeda and Miyake, 1969b: figs. 3, 5a–b; *O. angustifrons* by Takeda and Miyake, 1969b: fig. 5c–d; *O. aranea* by Takeda and Miyake, 1969: fig. 5e–f; *O. postillonensis* by Griffin and Tranter, 1986a: fig. 6b; *O. kathae* by Davie, 2011: fig. 5E).

The present specimen (Fig. 5D) identified as *O. kathae* is an ovigerous female, but definitive identification is possible by the rostrum being deeply excavated and forming an anteriorly-directed, narrow tubercle at each side. Each dactylus of the first two ambulatory legs is provided with long, soft setae along the inner margin in addition to a line of hard setae, which were considered by Davie (2011) as unique of *O. kathae.*

Distribution. Gulf of Carpentaria and northwest shelf of Western Australia, 8–83 m depth.

Oncinopus postillonensis Griffin and Tranter, 1986
(Fig. 5E)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ovig. ♀ (CB 5.4 × CL 6.2 mm), NSMT-Cr 30712.

Remarks. *Oncinopus postillonensis* was originally described by Griffin and Tranter (1986a) based on the specimens from the Flores Sea, Timor, and the Sulu Archipelago. As seen in the photographs of an ovigerous female (Fig. 5E), this species is distinctive in the broad rostral lobe, which is dorsoventrally flattened and divided into two by a median, narrow and deep hiatus. In addition, the G1 shaft with its distal part bent laterally, is unique to *P. postillonensis*.

Distribution. The known geographical range is from the Flores Sea to the Sulu Archipelago, 15–36 m depth (Griffin and Tranter, 1986a), and to Okinawa Island in the Ryukyu Islands, 60–70 m depth (Marumura and Takeda, 2009).

Family Epialtidae MacLeay, 1838

Genus ***Austrolibinia*** Griffin, 1966
[Type species: *Chorilibinia gracilipes* Miers, 1879]

Austrolibinia gracilipes (Miers, 1879)
(Fig. 6D–E)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 12.2 × PCL 13.7 mm), 1 ovig. ♀ (8.3 × 10.7 mm), 1 juv. (4.8 × 6.1 mm), NSMT-Cr 30713. — Sta. 30, 1 ♂ (CB 11.0 × PCL 9.5 mm), NSMT-Cr-30714; 1 ovig. ♀ (7.8 × 7.0 mm), NSMT-Cr 30715. — Sta. 32, 1 ovig. ♀ (CB 13.2 × PCL 13.0 mm), 1 ♀ (12.0 × 11.8 mm), NSMT-Cr 30716.

Remarks. The genus *Austrolibinia* was established by Griffin (1966b) for two Indo-West Pacific species of the genus *Chorilibinia* Lockington, 1877, and now comprised of four species, all from the Indo-West Pacific: *A. andamanica* (Alcock, 1895), *A. capricornensis* Griffin and Tranter, 1986, *A. gracilipes* (Miers, 1879), and *A. pincerna* Wagner, 1992. Of these, the type species, *A. gracilipes*, is characteristic in having a long rostrum diverging only distally (Fig. 6D). The specimens of both sexes in the present collection essentially agree with the original description by Miers (1879) and the illustration of the G1 by Griffin and Tranter (1986: fig. 33c–d). It should be noted, however, that the carapace dorsal spines are not so pronounced in females as in males (Fig. 6E vs. Miers, 1879: pl. 4 fig. 4a).

Distribution. Northwestern and northeastern Australia, Kai Islands, Aru Island, Papua New Guinea; 16–115 m depth (Davie, 2002; present study). Poore *et al.* (2008) also recorded this species, with a photograph of the carapace, from southern Western Australia, 100 m depth.

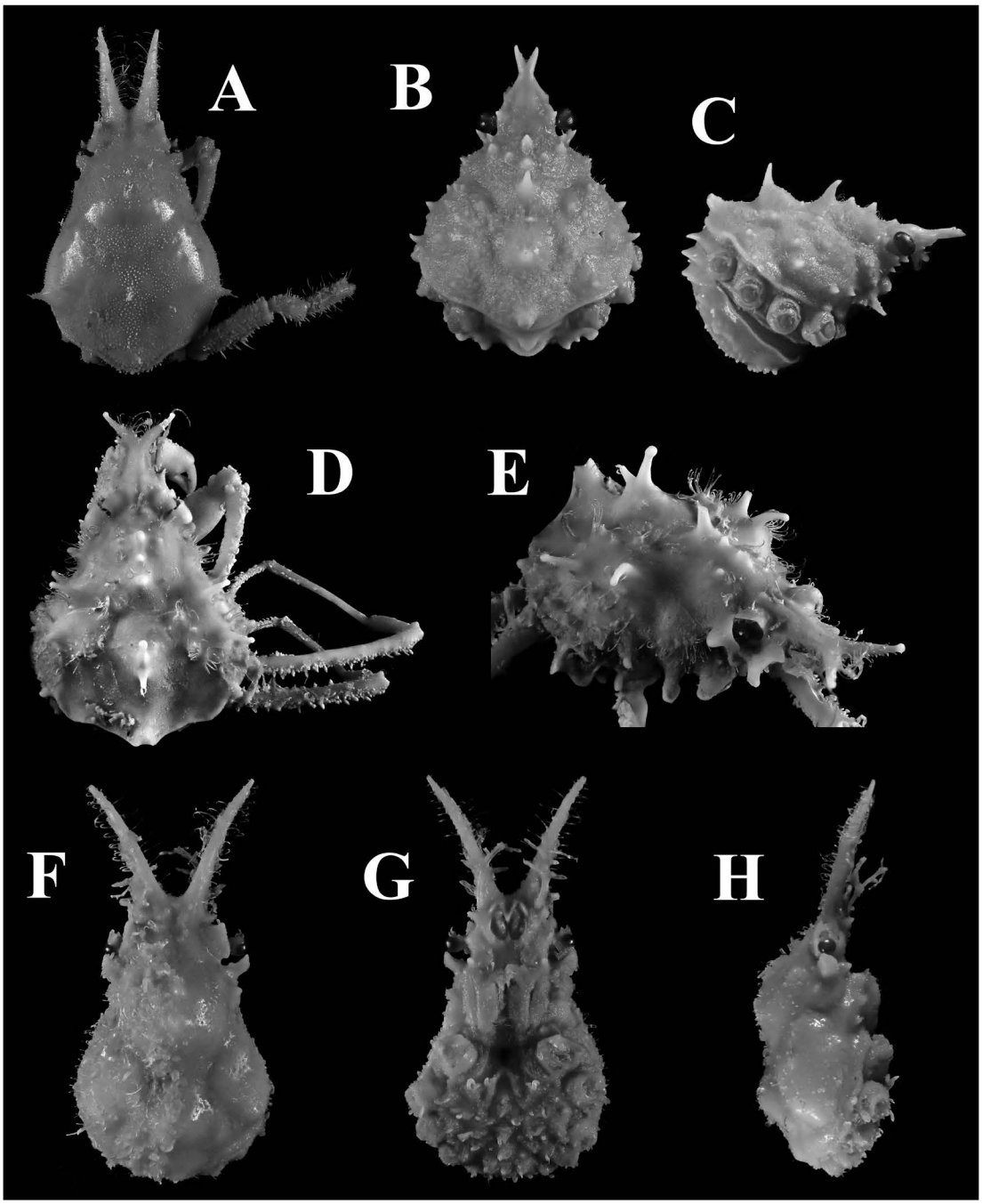

Fig. 6. A: *Hyastenus campbelli* Griffin and Tranter, ♂ (NSMT-Cr 30717; CB 7.7 mm excluding lateral tubercles × PCL 12.4 mm) from sta. 29. Dorsal view. B–C: *Phalangipus australiensis* Rathbun, ovig. ♀ (NSMT-Cr 30724; CB 13.2 mm × PCL 13.0 mm) from sta. 32. Dorsal (B) and lateral (C) views. D–E: *Austrolibinia gracilipes* (Miers), ♂ (NSMT-Cr 30714; CB 11.0 mm excluding lateral spines × PCL 9.5 mm) from sta. 30. Dorsal (D) and anterior dorsal (E) views. F–H: *Hyastenus kyusyuensis* (Yokoya), ♂ (NSMT-Cr 30720; CB 5.3 mm excluding branchial spines × PCL 8.7 mm) from sta. 29. Dorsal (F), ventral (G) and lateral (H) views.

Genus ***Hyastenus*** White, 1847

[Type species: *Hyastenus sebae* White, 1847]

Hyastenus campbelli Griffin and Tranter, 1986

(Fig. 6A)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 7.7 × PCL 12.4 mm), NSMT-Cr 30717; 1 ♀ (4.7 × 7.4 mm), 4 juv. (2.6 × 4.4 mm – 4.3 × 7.2 mm), NSMT-Cr 30718. — Sta. 30, 1 ovig. ♀ (CB 10.4 × PCL 15.8 mm), NSMT-Cr 30719.

Remarks. Ng *et al.* (2008) enumerated 37 species in the genus *Hyastenus*. After that, three species were described from the West Pacific: *H. baru* Windsor and Ahyong, 2013, *H. tabolongi* Lee and Ng, 2019 from north Sulawesi, *H. ducator* Lee and Ng, 2020 from China. In addition, *H. verreauxii* A. Milne-Edwards, 1872 from "Nouvelle-Hollande" (= Australia) was synonymized under *H. elatus* Griffin and Tranter, 1986 from Sydney Harbour, based on the reversal of precedence under the provisions of the International Cord of Zoological Nomenclature invoked by Lee *et al.* (2018). Consequently, the genus *Hyastenus* presently comprises 39 species.

The present specimens identified as *H. campbelli* essentially agree with the original description by Griffin and Tranter (1986), though there is a small tubercle on the hepatic region and no broad low tubercle near posterolateral angle of the pleonites 4 and 5. The 15.8 mm in CL measurement is the smallest record for an ovigerous female of the species.

Hyastenus campbelli is similar to *H. diacanthus* (De Haan, 1837), *H. cracentis* Griffin and Tranter, 1986, and *H. elatus*, but distinguished from them by the absence of tubercle from both the protogastric and mesogastric regions. Other differences were discussed by Griffin and Tranter (1986).

Distribution. Irian Jaya, Aru Island, Sahul Shelf, and northern and western Australia; low intertidal to 115 m depth. This species has been dredged and trawled from sandy to sandy-mud substrates with coral, sponge, rubble and shells (Davie, 2002).

Hyastenus kyusyuensis (Yokoya, 1933)

(Fig. 6F–H)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 5.3 mm excluding branchial spines × PCL 8.7 mm), NSMT-Cr 30720; 1 ♂ (5.1 × 8.2 mm), 2 ♀ ♀ (4.0 × 6.5 mm; 4.5 × 7.6 mm), NSMT-Cr 30721.

Remarks. Hyastenus kyusyuensis had once been recorded frequently from Japan (cf. Sakai, 1976), but the morphological characters were not detailed in the previous studies. Moreover, it is highly possible that the holotype described as *Halimus kyusyuensis* is no longer extant. Komatsu (2011) recorded many specimens from the Ogasawara Islands and some localities along the Pacific coast of Japan from the Sagami Sea to the East China Sea, including a topotypic male from off the Osumi Islands in the south of Kyushu. The present specimens from the Sahul Shelf shown in the dorsal, ventral and lateral views (Fig. 6F–H) share many characters with Komatsu's *H. kyusyuensis*, but slightly differ in the apical structure of the G1 represented by Komatsu (2011: fig. 14C–E). This might be referred to individual or ontogenetic variation as suggested by similar changes in several other *Hyastenus* species (Ohtsuchi *et al.*, 2020).

Distribution. Recorded geographic range is from Sagami Bay to the East China Sea including the Ogasawara Islands, and now from Australia, with bathymetric range, 35–140 m.

Genus ***Naxioides*** A. Milne-Edwards, 1865

[Type species: *Naxioides hirta* A. Milne-Edwards, 1865]

Naxioides sahulensis sp. nov.

(Fig. 7)

http://zoobank.org/urn:lsid:zoobank.org:act:3AF0837C-7F67-43E1-BD21-A537C1ABEA55

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 32, 1 ♀ (holotype), (CB 10.6 mm excluding lateral spines × PCL 13.8 mm excluding intestinal spine), NSMT-Cr 30722.

Comparative material examined. Naxioides

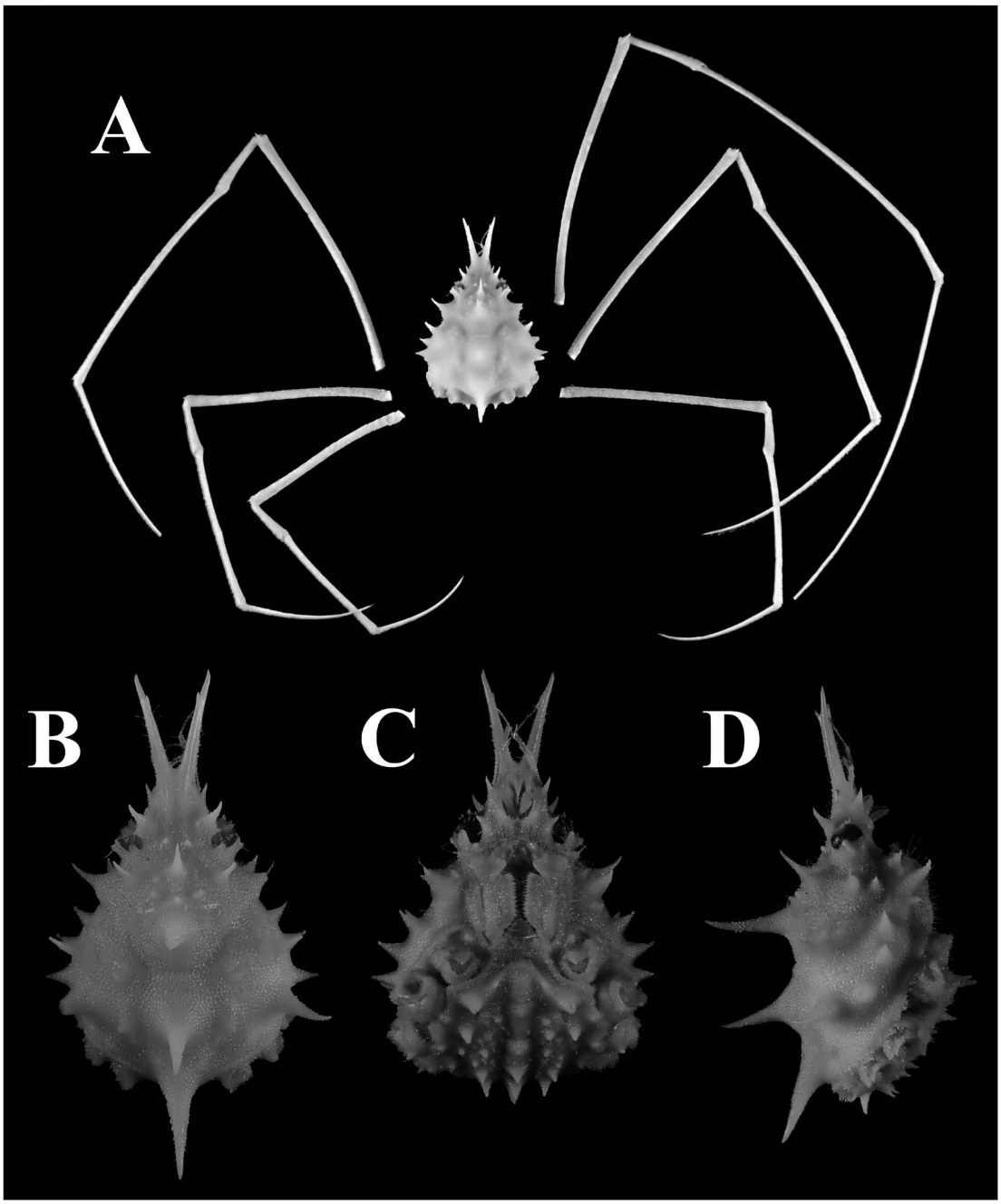

Fig. 7. *Naxioides sahulensis* sp. nov., ♀ (holotype, NSMT-Cr 30722; CB 10.6 mm excluding lateral spines × PCL 13.8 mm excluding intestinal spine) from sta. 32. A: Dorsal habitus. B–D: Cephalothorx in dorsal (B), ventral (C) and lateral (D) views.

tenuirostris (Haswell, 1880). Queensland, Australia: N end Albany Passage, Cape York, dredged, August–September 1928, 3 ♂♂ (8.5 × 11.8 mm–14.7 × 20.5 mm), 3 juv. ♀♀ (9.0 × 13.6 mm–12.0 × 17.7 mm), 1 spent ♀ (12.1 × 18.4 mm), 1 ovig. ♀ (14.1 × 19.6 mm), AM P13491; "Rama"

trawl sta. 1541, 10 November 1964, SE Gulf of Carpentaria, 16°45′40″S, 140°13′35″E, 29 m, 1 ♂ (13.0 × 19.5 mm), 1 juv. ♀ (14.7 × 21.7 mm), AM P18589; FNQ 79-49, 3 miles E of Turtle Head, Island, Cape York, 10°55′S, 142°41′E, 18 m, 15 February 1979, AM P64814, 1 juv. ♀ (5.9 × 8.9 mm); FNQ 79-50, Cape York, 10°39′S, 142°30′E, 20 m, 15 February 1979, carapace only (10.3 × 15.2 mm), AM P64816.

Description of holotype. Carapace (Fig. 7A–B) pyriform, surface closely tomentose; gastric, cardiac, branchial, intestinal regions well-demarcated, moderately elevated. Gastric region low, bearing 4 long spines, 11 tubercles; anterior end with 2 acute tubercles just behind basis of pseudorostrum; anterior slope medially with slender spine, low spine on both sides; protogastric spines short, directed anterolaterally; mesogastric spine longest, upright, slightly curving anteriorly, with low acute tubercle on both sides, broad U-shaped row of 3 distinct tubercles anteriorly. Cardiac region conical, dorsally elongated into long slender spine, as high as mesogastric spine. Hepatic region inflated, dorso-subproximal surface bearing minute tubercles, lateral surface bearing 2 spines, upper spine longer than lower spine, weakly curved dorsally. Branchial region not markedly inflated, longitudinally with 2 long, slender mesobranchial spines of similar size, small spine anterior to anterior spine, anteromesially with large protuberance mounted with small tubercles; lateral subsurface with 3 short spines of similar size; metabranchial region with small medial spine just anterior to posterolateral carapace margin. Intestinal region elongated posteriorly into large, conical projection, length one-third of PCL. Posterior carapace margin moderately convex, unarmed, not visible in dorsal view.

Pseudorostrum (Fig. 7A–C) distinctly divergent (ca. 30°), straight in lateral view. Pseudorostral spine slender, length 0.3 of PCL, dorsal surface weakly ridged toward frontal region, bearing short, subdistal spine dorsomesially, tips tapered laterally. Supraorbital eave (Fig. 7A–B) strongly expanded laterally; anterior angle produced into long, sharp preorbital spine projecting anterodorsally, almost parallel to anterior gastric spine, gently incurved, with pointed apex; antorbital angle produced into small, acute triangular tooth, directed laterally. Dorsal orbital hiatus rounded. Postocular cup apically bifid; upper postorbital margin generally concave (in dorsal view), proximally with distinct finger-shaped intercalated lobe; lateral wall consisting of 2 triangular lobes divergent anteriorly, upper lobe medially ridged, with tooth; lower postorbital margin sinuous, distally with broad, rounded lobe; distinct tubercle right behind ventral orbital hiatus. Pterygostomian region moderately inflated, armed with 3 strong spines directed ventrally, second spine largest.

Basal antennal article (Fig. 7C) narrow, distolateral angle produced anterolaterally into elongated sharp spine, visible in dorsal view; lateral margin generally straight; strong triangular tooth near mid-length, directed anterolaterally, as long as distolateral spine. Antennal articles slender, penultimate article two-thirds of ultimate article in length; flagellum reaching tip of pseudorostrum.

Thoracic sternites 1, 2 unarmed, sternite 3 with small spine mesially, sternite 4 occupied with largest spine, sternite 5 with second largest spine mesially, small spine laterally, sternites 6 with 2 tubercles, mesial one larger than lateral one, sternite 7 with low tubercle. Sterno-pleonal cavity not sharply defined.

Pleon (Fig. 7C) somites demarcated, but functionally fused in somites 3–6, telson; somites 1–6 each armed with large medial spine; somites 3–6 narrowly ridged medially, somites 1–5 laterally armed with 1–5 spines, somite 5 with hard microscopic setae.

Ambulatory legs (P2–5) (Fig. 7A) slender, much longer than PCL, length decreasing posteriorly. Merus cylindrical, extensor surface terminated with strong spine projecting laterally. Carpus slightly compressed laterally, extensor surface depressed. Propodus cylindrical, 1.2, 1.0, and 0.8 as long as merus in P2, P3, P4–5, respectively. Dactylus slightly curved distally, 1.1, 0.9. 0.8 as long as propodus in P2, P3, P4–5, respec-

tively.

Etymology. Named after the Sahul Shelf.

Remarks. Among nine congeneric species of the genus *Naxioides*, the new species described herein, *N. sahulensis*, is morphologicially closest to *N. tenuirostris* (Haswell, 1880) (type locality: Darnley Island, Torres Strait), with which *Naxia cerastes* Ortmann, 1894 (type locality: Thursday Island, Torres Strait) was synonymized by Griffin and Tranter (1986), known from western to northeastern Australia including the Arafura Sea. Although the holotype female of *N. sahulensis* is not fully mature, with the left P2, right P4 and both chelipeds missing, two species can be distinguished by the following characteristics that are stable in juveniles through adults of both sexes of *N. tenuirostris* determined from the specimens examined here (and the detailed account and figures of Griffin (1966a: figs. 2–9) and Griffrin and Tranter (1986): 1) the preorbital spine projects anterodorsally and is subparallel only to the anteriorly inclined anterior gastric spine (versus projecting vertically or inclined posteriorly and subparallel to the upright gastric and cardiac spines in *N. tenuirostris*); 2) the protogastric and hepatic spines of both sides are directed anterolaterally (usually directed laterally in *N. tenuirostris*); 3) the protogastric spines are similar to the hepatic spines (distinctly longer than the hepatic spines in *N. tenuirostris*); 4) the intestinal spine is long and distinct from the posterior carapace margin (versus proximally fused with additional short projection on the posterior carapace margin in *N. tenuirostris*, although the intestinal spine itself may also be long and slender); and 5) the P2 dactylus is as long as its propodus and much longer than its merus (shorter than both propodus and merus in *N. tenuirostris*). Also, it is remarkable that the pleon is armed with many strong spines in *N. sahuelsns*, compared to the smooth or nodular surface in *N. tenuirostris*.

Distribution. Known only from the Sahul Shelf, the type locality in the Timor Sea, E of Ashmore Reef, 74–78 m depth.

Genus ***Phalangipus*** Latreille, 1828

[Type species: *Cancer longipes* Linnaeus, 1758]

Phalangipus australiensis Rathbun, 1918

(Fig. 6B–C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 30, 3 ♂♂ (CB 10.9 × CL 12.0 mm – 12.5 × 13.6 mm), NSMT-Cr 30723. — Sta. 32, 1 ovig. ♀ (CB 13.2 × CL13.0 mm), NSMT-Cr 30724; 1 ♀ (12.0 × 11.8 mm), NSMT-Cr 30725.

Remarks. The present specimens (Fig. 6B–C) were identified as *P. australiensis* of the nine species of *Phalangipus*, because the G1 is short, stout and straight in distal two-thirds (Griffin, 1973: fig. 8C–D), differing from the curved G1s of the congeners.

Distribution. Aru Islands, Sahul Shelf, northern and eastern Australia from Broome (Western Australia) to Port Stephens (New South Wales) (Rathbun, 1918; Griffin, 1966b; Campbell and Stephenson, 1970; Griffin, 1973; Griffin and Tranter, 1986); 5–120 m depth.

Family Majidae Samouelle, 1838

Genus ***Prismatopus*** Ward, 1933

[Type species: *Prismatopus albanyensis* Ward, 1933]

Prismatopus albanyensis Ward, 1933

(Figs. 8A, 9A–C, 10A–B, 11D · E)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 10.2 mm excluding branchial spines × PCL 14.9 mm), NSMT-Cr 30726. — Sta. 30, 1 ♂ (CL 12.8 × CB 8.4 mm), NSMT-Cr 30727.

Description. Carapace (Figs. 8A, 9A) 1.5 times as long as wide, weakly constricted behind hepatic regions; surface covered sparsely with curled setae. Pseudorostrum divergent anteriorly, with angle of 50–70°; pseudorostral horns gently curved laterally, 0.4 times as long as PCL, almost straight in lateral view. Frontal region with deep, narrow, longitudinal groove running from anterior gastric slope toward pseudorostral divergence between 2 blunt longitudinal ridges. Supraorbital eave not markedly expanded; first

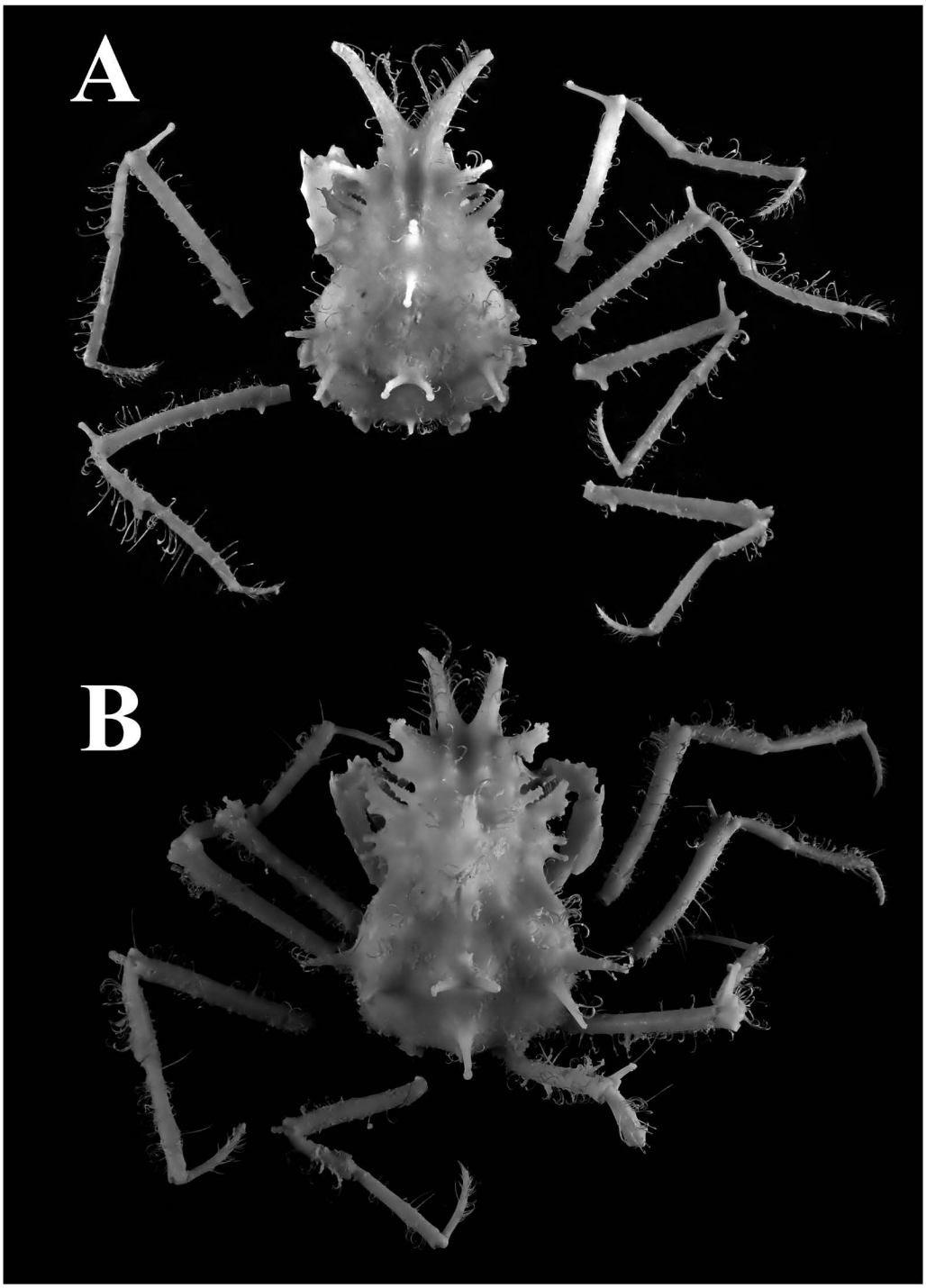

Fig. 8. A: *Prismatopus albanyensis* Ward, ♂ (NSMT-Cr 30726; CB 10.2 mm excluding branchial spines × PCL 14.9 mm) from sta. 29. B: *Prismatopus peterngi* sp. nov., ♂ (holotype, NSMT-Cr 32728; CB 11.9 mm excluding lateral spines × PCL 17.8 mm) from sta. 32.

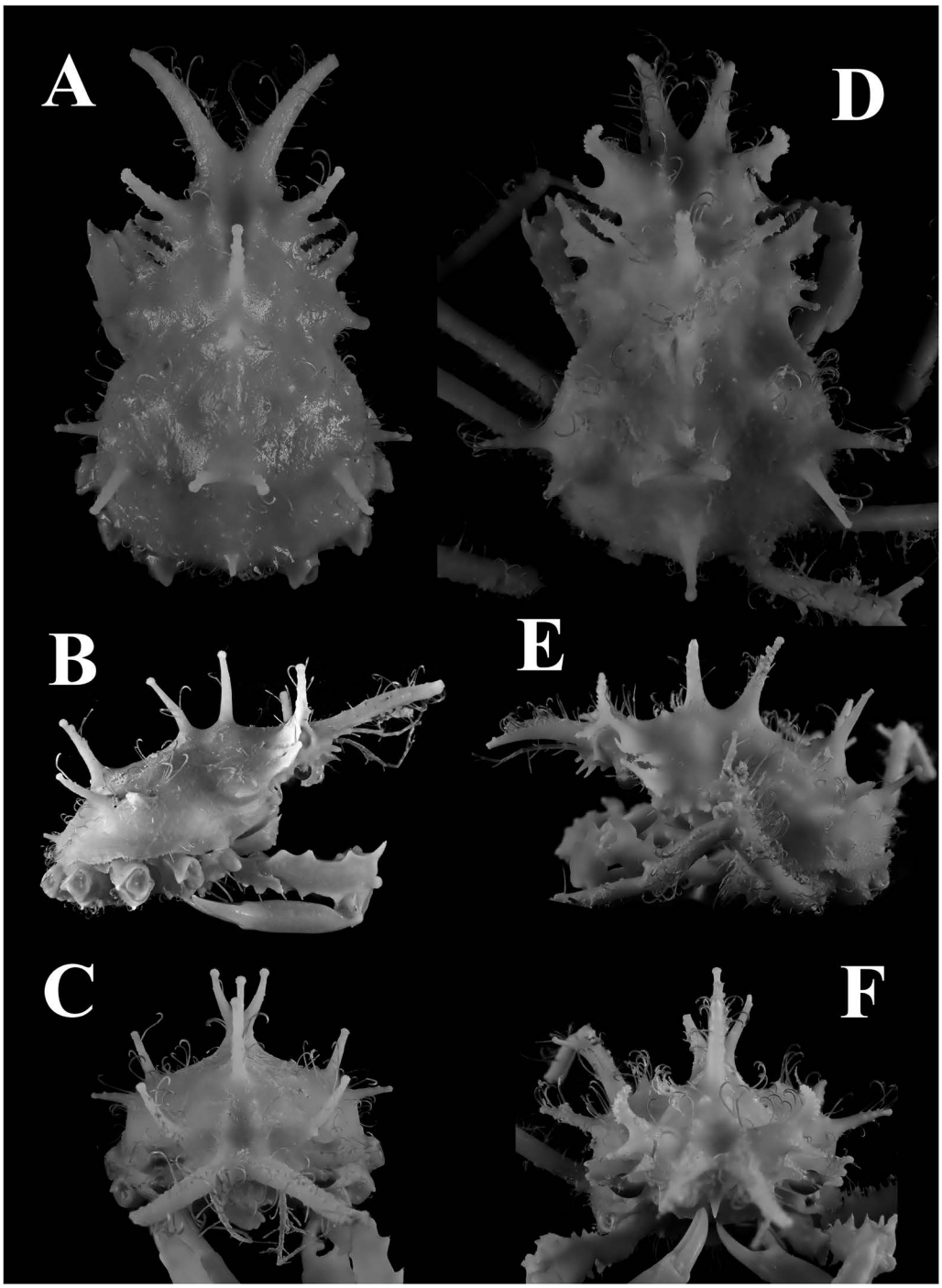

Fig. 9. A–C: *Prismatopus albanyensis* Ward, ♂ (NSMT-Cr 30726; CB 10.2 mm excluding branchial spines × PCL 14.9 mm) from sta. 29. D–F: *Prismatopus peterngi* sp. nov., ♂ (holotype, NSMT-Cr 30728; CB 11.9 mm excluding lateral spines × PCL 17.8 mm) from sta. 32, in dorsal (A, D), lateral (B, E) and frontal views (C, F).

preorbital lobes absent; second preorbital lobes gently curved dorsally, broadly U-shaped in frontal view, knobbed apically, distal end armed with spinules, anterior margin with 1 or 2 acute spinules on midlength, posterior margin subproximally lined with 3 or 4 spinules; antorbital lobe broad, lamellar, gently curled dorsoanteriorly; intercalate lobe subrectangular, digitated on both margins; postocular lobe as long as or slightly longer than hepatic projection, with obtuse tooth on posterior margin. Eyestalk slender, cornea ventrally, shorter than half length of stalk. Gastric region weakly elevated, armed with 2 subequal, knobbed spines arranged longitudinally, posterior slope smooth (Figs. 8A, 9A–B). Hepatic region weakly inflated, anterolaterally sloped, terminated with triangular tooth followed posterolaterally with 1 or 2 additional teeth (Figs. 8A, 9A). Branchial region (Figs. 8A, 9A–C) armed dorsolaterally with 2 long, knobbed spines, anterior dorsolateral margin not defined, subsurface bearing 2 low tubercles, branchial submargin, posterior carapace margin finely spinulate. Cardiac region weakly elevated, mounted with 2 knobbed spines side by side; both spines raised at fused bases, as high as gastric spines (Figs. 8A, 9A–C). Intestinal region smooth, with short spine just above posterior carapace margin (Figs. 8A, 9A–B).

Basal antennal article (Fig. 10A) narrow, lateral margin broadly concave; distolateral angle produced into moderately long, blunt, triangular lobe, directed laterally or slightly posterolaterally, subrectangular in frontal view; proximolateral angle produced into low, round lobe; mesial margin ridged, bearing broad, low, erect, triangular tooth, distomesial angle produced ventrally into rectangular lobe, similar in size, shape to distolateral spine (in frontal view); proximomesial lobe rounded, continuous with anterolateral angle of epistome. Distal 2 peduncular articles free; penultimate article as long as ultimate article. Flagellum exceeding tip of pseudorostral horn.

Antennular peduncular first article medially ridged, with 2 small spines longitudinally, with strong, triangular spine sublaterally. Inter-antennular septum large, subacute, triangular, tip pointing slightly anteriorly.

Pterygostomian region weakly inflated, generally smooth, sharply ridged, bearing sharp, ventrally erected, triangular teeth.

Third maxilliped surface smooth under microscopy. Mesial two-thirds of ischium distinctly depressed, separated from lateral part by sharply crested, longitudinal ridge, anteromesial lobe, weakly produced anteriorly, firmly fitted in sharply rimmed, posteromesial concavity of merus (when closed). Merus dilated distolaterally, distomesial, distolateral margins upturned, depressed, proximolateral lobe depressed. Carpus short, entire, external surface depressed, lateral margin sharply defined, round. Propodus rectangular, extensor margin sharply defined. Dactylus finger-like, as long as propodus.

Chelipeds subequal in length, shape. Ischium not markedly inflated, armed proximally with broad, low triangular teeth, distally with 2 lamellar lobes. Merus trigonal, dorsally armed with 3, broad, ventrally with 3 triangular teeth; medial knob at articulation with carpus compressed into large subspatulate, triangular teeth. Carpus not markedly inflated, outer margin sharply carinate, entire, dorsal surface with sharp rectangular carina, inner margin irregularly dentate, with small subproximal spine, ventral surface unarmed. Propodus not markedly inflated, upper margin sharply crested, lower margin obtusely defined. Fingers narrowly gaping in proximal half, finely toothed on both cutting margins, dactylus marked with broad, low, triangular tooth (adolescent male, PCL 12.8 mm), widely gaping, toothed in distal half, contiguous in distal one-third, subproximal tooth on dactylus simple or bifid, larger than counterpart on immovable finger (full-grown male, PCL 14.9 mm).

Ambulatory legs (P2–5) slightly decreasing in length posteriorly, extensor, flexor surfaces bearing rows of strongly curled setae, long, simple setae. Basis-ischium marked with strong, triangular, subdistal tooth. Merus trigonal, extensor, flexor margins armed with small spines, distolat-

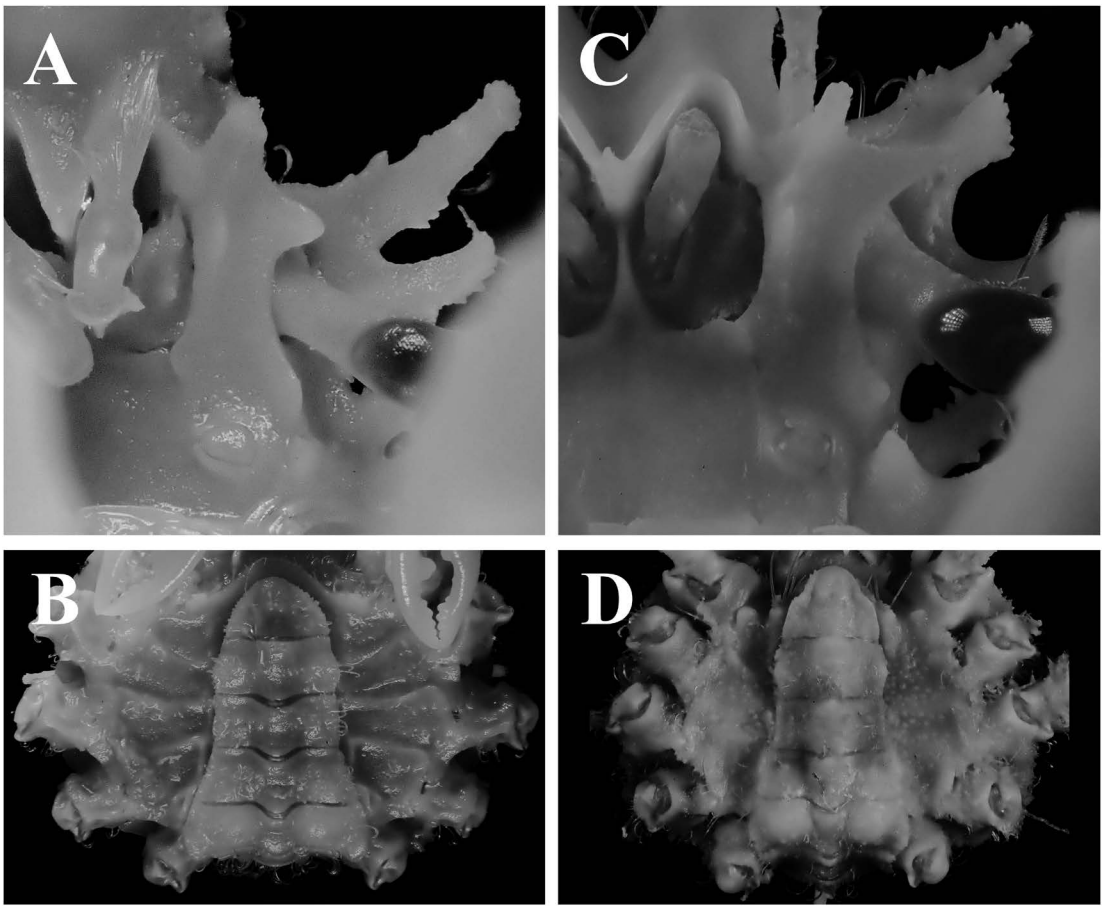

Fig. 10. A–B: *Prismatopus albanyensis* Ward, ♂ (NSMT-Cr 30726; CB 10.2 mm excluding branchial spines × PCL 14.9 mm) from sta. 29. C–D: *Prismatopus peterngi* sp. nov., ♂ (holotype, NSMT-Cr 30728; CB 11.9 mm excluding branchial spines × PCL 17.8 mm) from sta. 32. Basal antennal article (A, C) and pleon (B, D).

eral, median knobs at articulation with carpus prominent, elongated into knobbed spine (disto-lateral spine sometimes lobate, shorter than median spine). Carpus prismatic, elongate, triangular, dorso-extensor margin weakly tuberculate, ventro-extensor margin armed with 4 teeth each bearing long, simple seta. Propodus prismatic, lateral surfaces lined with long, simple setae. Dactylus slender, gently curved in distal half, extensor margin arranged with row of long setae.

Thoracic sternites generally smooth, with distinct sutures on sternites 5–8. Sterno-pleonal cavity sharply rimmed, continuous with erected, triangular tooth on both sides, separating sternites 1–4 from sternite 5.

Pleon (Fig. 10B) with 6 somites and telson; distal 5 somites 1.3 times longer than proximal width, somites 2–6 weakly elevated medially, anterior end produced into small tubercle mounted with few simple setae in somites 3–5. Somite 1 short, narrow, anterolateral lobe rounded, upturned. Somite 2 divergent anteriorly, lateral margin bilobed. Somite 3 subrhomboid, strongly elevated on both lateral parts, lateral margin arcuate. Somite 4 rhomboid, lateral margins convergent. Somite 5 rhomboid, lateral margins slightly convergent. Somite 6 rectangular, lateral margin weakly convex on midlength. Telson (Fig. 10A) subtriangular, lateral margin straight.

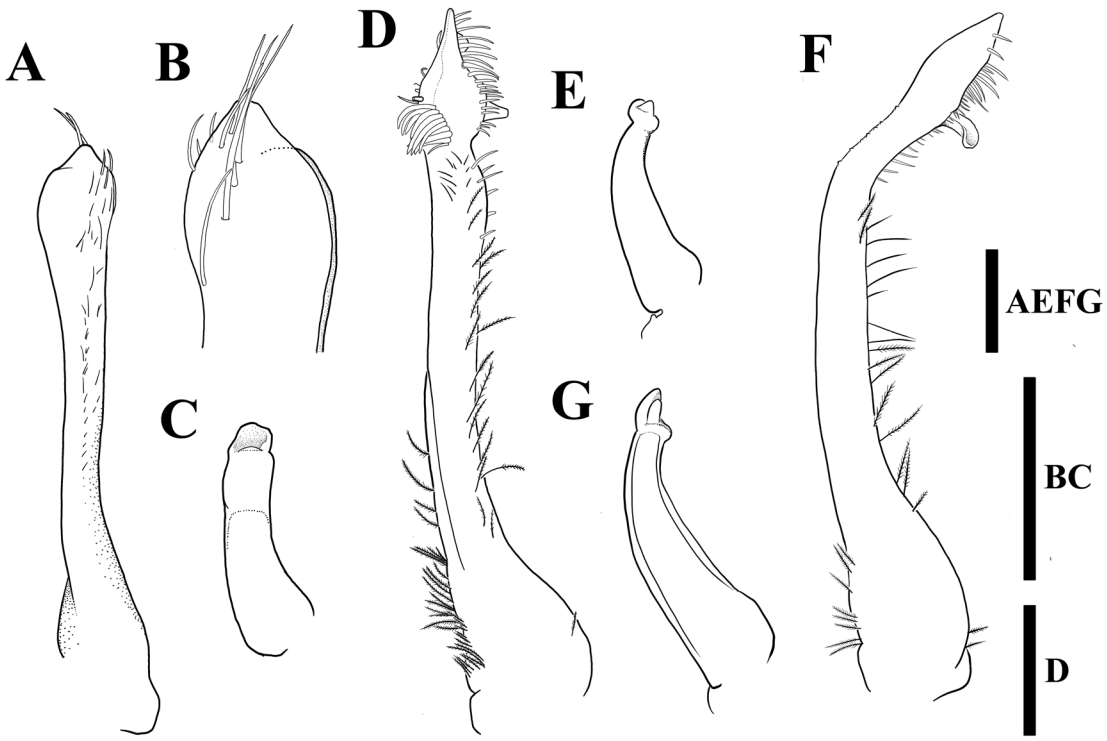

Fig. 11. A–C: *Achaeus brevirostris* (Haswell), ♂ (NSMT-Cr 30705; CB 7.2 mm excluding branchial spines × PCL 4.9 mm) from sta. 29. D–E: *Prismatopus albanyensis* Ward, ♂ (NSMT-Cr 30726; CB 10.2 mm excluding branchial spines × PCL 14.9 mm) from sta. 29. F–G: *P. peterngi* sp. nov., ♂ (holotype, NSMT-Cr 30728; CB 11.9 mm excluding branchial spines × PCL 17.8 mm) from sta. 32. G1 (A, B, D, F) and G2 (C, E, G). Scales = 0.5 mm (B, C, E, G) and 1.0 mm (A, D, F).

G1 shaft (Fig. 11D) almost straight, distal one-fifth teardrop-shaped, proximally with cluster of long spines, tip acuminate, lateral margin lined with stiff setae in distal one-third; subapical flap simple, not markedly twisted. G2 shaft short, slightly curved, with small, conical apical process (Fig. 11E).

Remarks. In the revision of the genus *Acanthophrys* A. Milne-Edwards, 1865, Griffin and Tranter (1986) established a new genus *Thacanophrys*. Later, Ng *et al.* (2001) showed that the genus *Prismatopus* Ward, 1933, has nomenclatural priority over *Thacanophrys*. Of the 12 species in the genus *Prismatopus*, *P. albanyuensis* is characteristic in having a combination of the lamellar preorbital and antorbital spines, and a strong spine on the carapace posterior margin. The present specimens agree with the original description by Ward (1933), and also with *Chlorinoides barunai* Serène, 1969, which was synonymized with this species by Griffin and Tranter (1986).

Distribution. Known from the Albany Passage, northern Queensland, 16–21 m depth (type locality), and otherwise from some localities in the Arafura Sea, 25–57 m depth.

Prismatopus peterngi sp. nov.
(Figs. 8B, 9D–F, 10C–D, 11F–G)

http://zoobank.org/urn:lsid:zoobank.org:act:64F1797A-0F09-4941-8F09-C866A4C9C049

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (holotype), (CB 11.9 mm excluding branchial spines × PCL 17.8 mm), NSMT-Cr 30728.

Description of holotype. Carapace 1.5 times as long as wide, weakly constricted behind hepatic regions (Figs. 8B, 9D); surface sparsely adorned

with curled setae. Pseudorostrum divergent anteriorly, with angle of 30°; pseudorostral horns weakly curved laterally, 0.3 times as long as PCL, weakly convex in lateral view. Frontal region with deep, broad, oval depression between 2 blunt longitudinal ridges. Supraorbital eave not markedly expanded; first preorbital lobes slender, directing downward, proximally with cluster of spinules, posterior margin with small spine somewhat ventrally, distal part spinulate; second preorbital lobes strongly curled dorsally, broadly C-shaped in frontal view, distal part armed with spinules; antorbital lobe narrow, lamellar, strongly curled dorsoanteriorly (broken on right side); intercalate lobe narrow, triangular, digitated on both margins (distal half broken on right side); postocular lobe distinctly longer than hepatic projections, posterior margin medially with 2 subequal round lobes. Eyestalk slender, cornea ventrally, as long as half length. Gastric region (Figs. 8B, 9) weakly elevated, anteriorly with 2 distinct tubercles, longitudinally with 2 subequal knobbed spines, posterior slope obtusely ridged longitudinally toward cardiac region. Hepatic region (Figs. 8B, 9) weakly inflated, not sloped anterolaterally, posterolaterally with 2 distally knobbed, slender projections, ventral surface with row of 4 spines (mesialmost smallest). Branchial region (Figs. 8B, 9) dorsolaterally with 2 long, knobbed spines, anterior dorsolateral margin bluntly defined, lined with granules, subsurface bearing incomplete row of 6 small tubercles, branchial submargin, posterior carapace margin unarmed. Cardiac region (Figs. 8B, 9D–F) faintly elevated, mounted with 2 knobbed spines fused at base, which is higher than anterior gastric spines. Intestinal region (Figs. 8B, 9) smooth, with long knobbed spine medially, short spine just above posterior carapace margin.

Basal antennal article (Fig. 10C) narrow, lateral margin broadly concave; distolateral angle produced laterally into long, sharp, subtrigonal lobe, finger-like in frontal view; proximolateral angle produced into acute, ventrally erected, triangular tooth; distomesial angle produced ventrally into triangular lobe compressed, similar to but narrower than distolateral lobe (in frontal view); mesial margin ridged, bearing erected, triangular tooth, proximomesial lobe overlapped by round anterolateral angle of epistome. Distal 2 peduncular articles free; penultimate article as long as ultimate article; flagellum exceeding tip of pseudorostral horn.

Antennular peduncular first article generally smooth on external surface, medially with small spine. Inter-antennular septum large, acuminate, triangular, tip pointing slightly anteriorly.

Pterygostomian region weakly inflated, generally smooth, bearing 4 papilliform tubercles.

Third maxilliped surface set with microscopic setae. Mesial two-thirds of ischium distinctly depressed, separated from lateral part by blunt, longitudinal ridge, anteromesial lobe rounded, produced anteriorly, firmly fitted in bluntly rimmed, posteromesial concavity of merus (when closed). Merus dilated distolaterally, proximolateral lobe depressed. Carpus short, entire, external surface depressed, lateral margin sharply defined, rounded. Propodus rectangular, extensor margin sharply defined. Dactylus finger-like, slighter shorter than propodus.

Both chelipeds subequal in length, but right merus somewhat deformed by sessile organism. Ischium not markedly inflated, armed proximally with small tubercle, distally with lamellar lobe. Merus trigonal, dorsally armed with 5-dentate carina, ventrally with 3 triangular teeth; medial knob at articulation with carpus compressed into claw-shaped lobe, distomesial knob bearing small triangular tooth subproximally. Carpus not markedly inflated, outer margin compressed into irregularly dentate carina next to large, triangular, subproximal tooth, dorsal surface with 3 lamellar teeth, inner margin sharp, irregularly dentate, with small medial spine, ventral surface bearing small median tubercle. Propodus slender, reflecting morphometrical immaturity, upper margin narrowly ridged in proximal half, bearing 2 or 3 low teeth, lower margin obtusely defined. Fingers narrowly gaping in proximal half, finely toothed on both cutting margins; dactylus

marked with broad, low, rectangular tooth.

Ambulatory legs (P2–5) slightly decreasing in length posteriorly, extensor, flexor surfaces bearing rows of strongly curled setae, long, simple setae. Basis-ischium unarmed. Merus cylindrical, extensor, flexor margins unarmed, distolateral knob at articulation with carpus prominent, elongated into knobbed spine. Carpus subconical, elongate. Propodus cylindrical, extensor surface bearing small proximal spine, flexor surface bearing 2 or 3 low tubercles each bearing simple seta apically. Dactylus slender, gently curved in distal half, extensor margin arranged with row of long setae.

Thoracic sternites 5–8 loosely set by round tubercles, with distinct sutures. Sterno-pleonal cavity sharply rimmed, continuous with both mesial tubercles of sternite 4, but not lateral tubercles.

Pleon (Fig. 10D) with 6 somites and telson; distal 5 somites1.8 times longer than proximal width, distal 6 somites medially elevated, anterior end protuberant in somites 2–6, produced into subacute tubercle in somites 3–5. Somite 1 short, narrow, anterolateral lobe spinulate, slightly upturned. Somite 2 divergent anteriorly, lateral margin straight. Somite 3 subrhomboid, with strong protuberance on both lateral parts, lateral margin arcuate. Somite 4 rhomboid, lateral margins mostly convergent, subparallel only proximally. Somite 5 rectangular, lateral margin almost straight. Somite 6 rectangular, lateral margin weakly convex on midlength. Telson subtriangular, weakly sinuate.

G1 shaft (Fig. 11F) bent laterally, distal 1/6 teardrop-shaped, tip acuminate, lateral margin lined with stiff setae in distal 1/3; subapical flap grooved, twisted toward pleonal side. G2 shaft short, slightly curved, with small, conical apical process (Fig. 11G).

Etymology. This species is dedicated to our friend and colleague, Prof. Peter K. L. Ng of the Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore, whose contribution to crab taxonomy is beyond description.

Remarks. Davie (2002) listed six species of *Prismatopus* from Australia, and Poore *et al.* (2008) recorded *Prismatopus* sp. with a color photograph from Western Australia, 100 m in depth. The new species described herein, *P. peterngi*, is the eighth species of the genus from Australian waters, and thirteenth of the known species of *Prismatopus*.

The present new species represented only by a morphologically immature male is the closest to *P. albanyensis* Ward, 1933, but can be distinguished by the following characters. The orbital eave bears an additional preorbital spine anterior to the preorbital spine; the preorbital spines are relatively long and curved dorsally more strongly than in *P. albanyenesis*. This new species has a long intestinal spine, but *P. albanyensis* does not. Moreover, distal part of the G1 shaft is weakly bent laterally in *P. peterngi*, but almost straight in *P. albanyensis*.

Distribution. Known only from the type locality, SW of Bathurst Island on the Sahul Shelf, 49–52 m depth.

Family Parthenopidae MacLeay, 1838

Genus ***Pseudolambrus*** Paul'son, 1875

[Type species: *Parthenope calappoides* Adams and White, 1849]

Pseudolambrus bidentatus (Flipse, 1930)

(Fig. 13A–B)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 24.5 mm including branchial posterolateral spines × CL 23.9 mm in median line), NSMT-Cr 30729.

Remarks. The male of *Pseudolambrus bidentatus* examined (Fig. 12A–B) agrees completely with the original description and figure, being characterized by a mesogastric tubercle rather directed posteriorly, a sharp keel from a small tubercle at the median part of the branchial region toward the posterolateral outgrowth, the hepatic and branchial margins fringed respectively with three and seven thin lobes, and a thin lobe of remarkable size at the basal part of the outer margin of each palm. As noted by Takeda

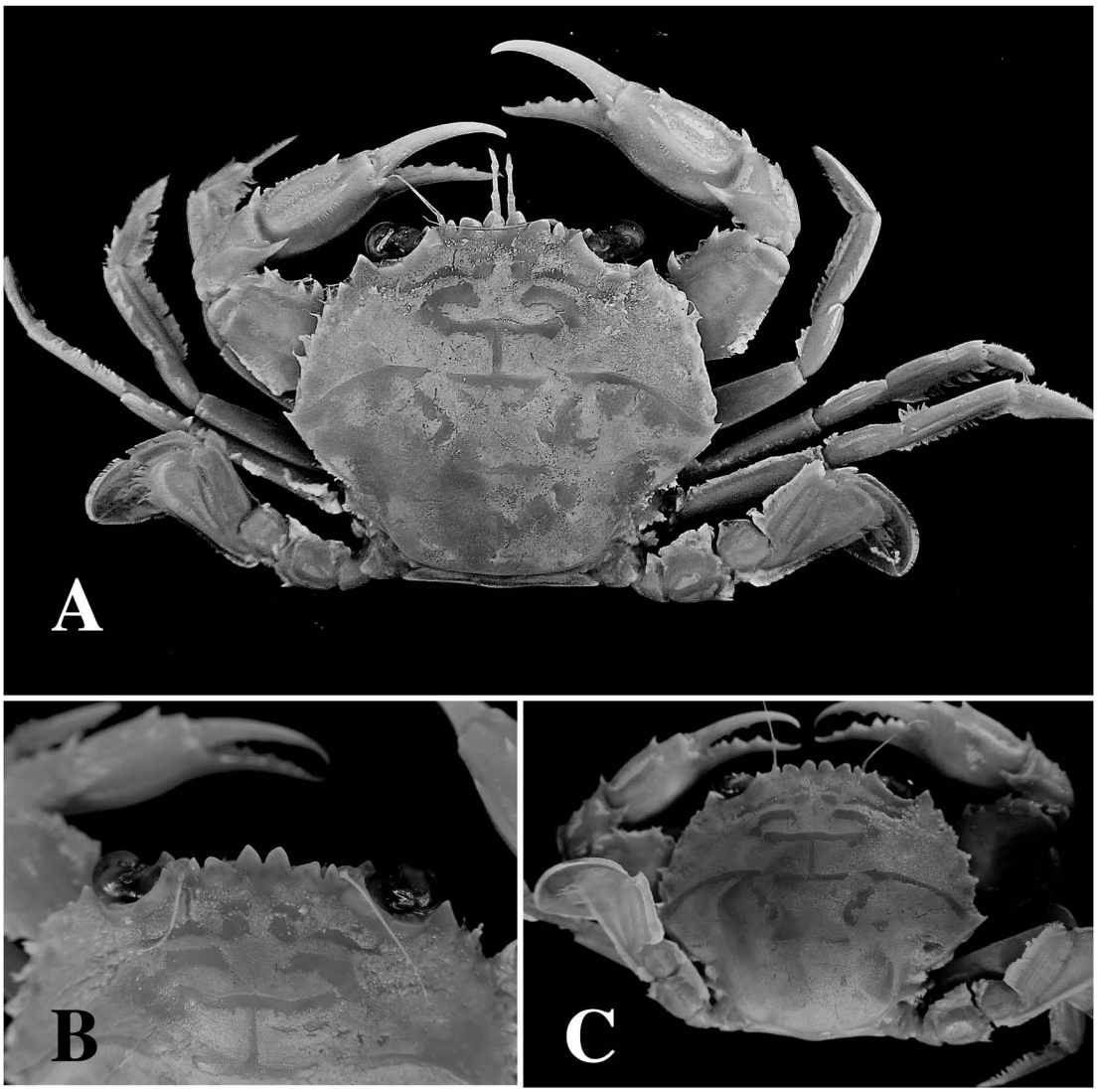

Fig. 12. *Charybdis (Charybdis) rosaea* (Hombron and Jacquinot). A: ♂(NSMT-Cr 30774; CB 32.4 mm including lateral teeth × CL 26.6 mm in median line) from sta. 32. B: ♂(NSMT-Cr 30775; 34.8 × 37.9 mm) from sta. 32. C: ♂(NSMT-Cr 30776; 34.8 × 27.7 mm) from sta. 32.

and Komatsu (2015), this species is in the group of *Pseudolambrus* having the rather depressed and triangular carapace armed with a strong mesogastric tubercle; *P. harpax* (Adams and White, 1848), *P. confragosus* (Calman, 1900), *P. bispinosus* (Rathbun, 1902), *P. lobatus* (Flipse, 1930), *P. bicornis* (Flipse, 1930), and *P. incisus* Takeda and Komatsu, 2015. This species is readily differentiated from them by the characters mentioned above.

Pseudolambrus bidentatus was originally described as *Lambrus* (*Pseudolambrus*) *confragosus* var. *bidentatus* based on two females, one of which is ovigerous, from the Moluccas, Indonesia; Ng *et al.* (2008) raised the taxon to full species status.

Distribution. Moluccas, Indonesia, and now from northern Australia; 32–52 m depth.

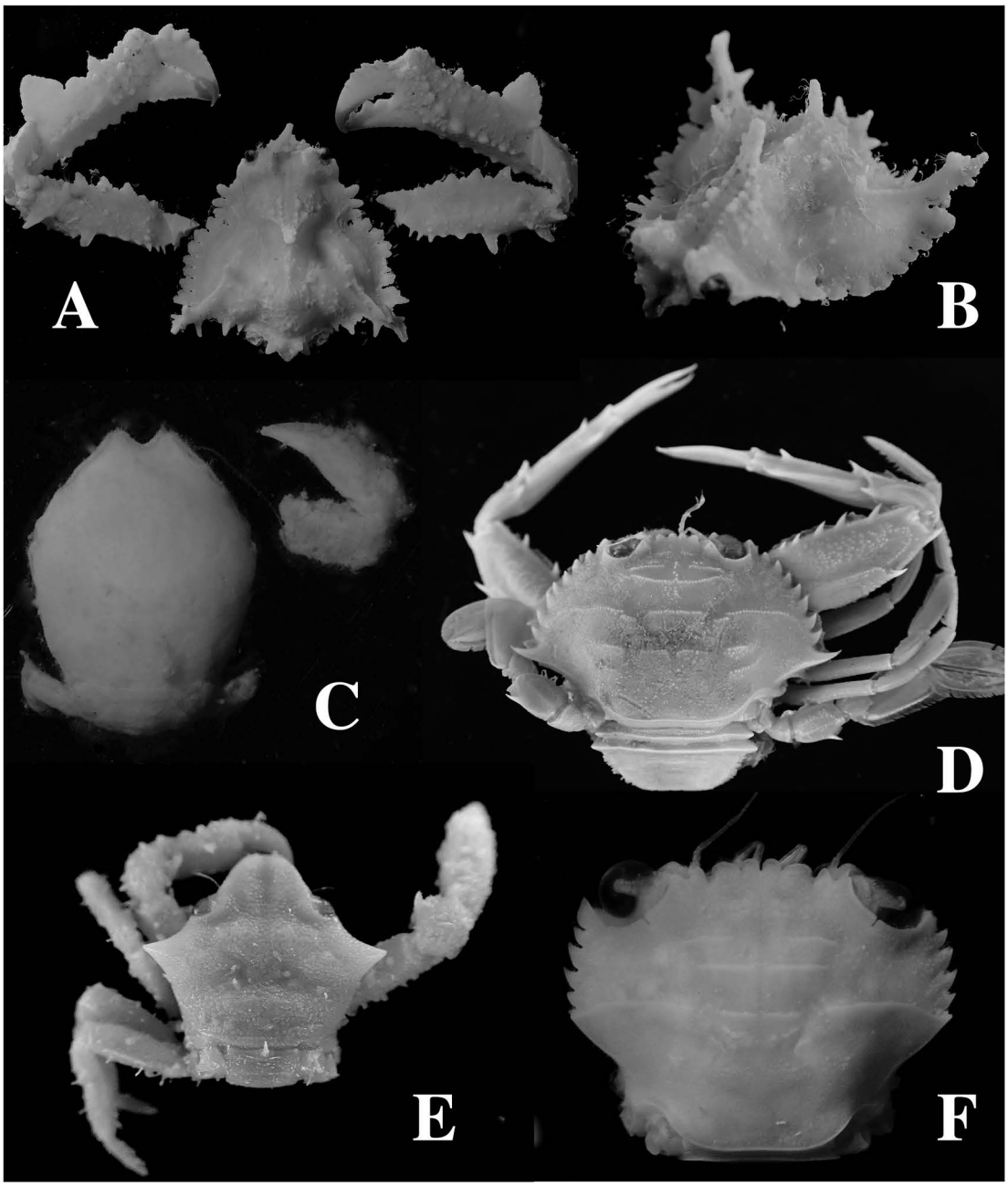

Fig. 13. A–B: *Pseudolambrus bidentatus* (Flipse), ♂ (NSMT-Cr 30729; CB 24.5 mm × CL 23.9 mm) from sta. 29. C: *Mclaydromia colini* Guinot and Tavares, ♂ (NSMT-Cr 30698; CB 4.5 × CL 5.1 mm) from sta. 29. D: *Lupocycloporus gracilimanus* (Stimpson), ovig. ♀ (NSMT-Cr 30733; CB 24.4 excluding lateral tubercles × CL 17.3 mm) from sta. 29. E: *Gonatonotus pentagonus* (White), ♀ (NSMT-Cr 30751; CB 7.6 × CL 7.5 mm) from sta. 29. F: *Charybdis (Charybdis) jaubertensis* Rathbun, ♂ (NSMT-Cr 30731; CB 11.3 × CL 8.9 mm) from sta. 29.

Family Portunidae Rafinesque, 1815
Genus ***Charybdis*** De Haan, 1833
[Type species: *Cancer sexdentatus* Herbst, 1783]
Subgenus ***Charybdis*** De Haan, 1833
Charybdis (Charybdis) jaubertensis
Rathbun, 1924
(Fig. 13F)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 11.3 × CL 8.9 mm), NSMT-Cr 30731.

Remarks. The male specimen examined is without doubt referable to *Charybdis* (*Charybdis*) having the carapace with six anterolateral teeth of nearly equal size and the round junction of the posterior and posterolateral carapace margins, but as in Fig. 13F, the subquadrate carapace is seemingly close to some *Thalamita* species. There are no distinct ridges or granular patches behind the metagastric and epibranchial ridges. The front is prominently six-lobed; the median lobes are separated by a narrow but distinct deep slit, and subtruncated, with weakly rounded distal margin; the submedian lobe is about 1.5 times as wide as the median lobe, as high as, or only slightly shorter than the median lobe, with a subtruncated, or weakly convex distal margin; the distal margin of the submedian lobe is weakly inclined toward the base of the median lobe; the submedian lobe is separated from the median lobe by a notch and from the lateral lobe by a wide slit; the lateral lobe is as wide as the median lobe at the base, triangular, with an obtuse tip; the tip of the lateral lobe exceeds the inner supraorbital lobe, but does not reach as far as the distal margin of the submedian lobe. The orbit is large, and its diameter is as long as half the frontal margin; a narrow slit is distinct on the inner part of the supraorbital margin. The carapace anterolateral margin is only weakly convex and armed with six sharp-tipped teeth that are nearly subequal or the first and third may possibly larger than the others, and the last is slightly smaller than the preceding tooth; in the specimen examined the right first tooth is broken at the tip, but the left tooth is subtruncated along the outer margin, with sharp tip.

The original description of *Charybdis (Charybdis) yaldwyni* by Rees and Stephenson (1966) based on a large series, included comparison with the holotype of *C. jaubertensis* Rathbun, 1924, and the observation that *C. jaubertensis* recorded by Stephenson *et al.* (1957) is referred to *C. yaldwyni.* Many differences between both species are summarized in the table by Rees and Stephenson (1966), but most of them are subtle qualitative distinctions. These distinctions are not always clearly applicable to the specimen at hand, but is closer to *C. jaubertensis* than *C. yaldwyni*, mainly based on the frontal lobes and carapace anterolateral armature.

Distribution. According to Rees and Stephenson (1966), the distribution is in Australian waters from Shark Bay, Western Australia to Moreton Bay, Queensland, with its distribution being nearly sympatric with *C. yaldwyni.* The recorded bathymetric range is from 10 to 31 m.

Charybdis (Charybdis) rosaea (Hombron and Jacquinot, 1846)
(Fig. 12)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 32, 1 ♂ (CB 32.4 mm including lateral spines × CL 26.6 mm in median line), NSMT-Cr 30774, 1 ♂ (34.8 × 27.9 mm), NSMT-Cr 30775; 1 ♂ (34.8 × 27.7 mm), NSMT-Cr 30776; 13 ♂♂ (29.6 × 23.0 mm – 35.0 × 26.6 mm), 8 ♀♀ (29.3 × 22.2 mm – 34.6 × 26.2 mm), 2 young ♀♀ (27.3 × 21.1 mm, 28.7 × 21.8 mm), NSMT-Cr 30730.

Remarks. The present specimens identified as *Charybdis (Charybdis) rosaea* (Hombron and Jacquinot, 1846) agree with the elaborate figures given by Leene (1938: fig. 14; 1940: pl. 5), and with a fine photograph presented by Moosa (1995: fig. 10c). In all the specimens examined, the carapace (Fig. 12A, C) is much narrower than the typical species of *Charybdis*, with the short sixth (last) anterolateral tooth of the carapace; the carapace dorsal surface is wholly covered with fine tomentum; the carapace regions are

indicated by nude, narrow banded and depressed swellings, with the mesogastric swellings of both sides united medially and laterally with each protogastric swelling; the meso- and metagastric swellings are united by a longitudinal swelling along the median line; six frontal teeth are in three pairs, the median two teeth being the most strongly developed and triangular in dorsal view, each with sharp or somewhat obtuse apex, each submedian tooth is subtruncated and oblique along the inner margin and longitudinal along the outer margin, each lateral tooth is about half as wide as the submedian tooth and separated from the submedian tooth by a deep incision.

Leene's (1940) figure and Moosa's (1995) photograph are quite effective in showing all the characters mentioned above as for this very rare species. The carapace dorsal areolation is, however, somewhat similar to some specimens of *C. (C.) callianassa* (Herbst, 1789) mentioned by Stephenson *et al.* (1957). According to them, in *C. (C.) callianassa*, the length/breadth ratio of the carapace varies, owing to increasing length of the last anterolateral tooth with increasing size of specimen; extremes are given by Stephenson *et al.* (1957: fig. 1C–D). Of the two figures, fig. 1D is just that mentioned above, its contour being quite similar to that of Leene's figure in question. In some published figures of *C. callianassa*, the epibranchial teeth of both sides are protruded sharply, making the carapace appearance wider, but in the illustration given by Wee and Ng (1995: fig. 8A), in which the carapace is moderately wide, the meso- and metagastric lines are connected by a median longitudinal line. The large specimens having the narrow carapace identified as *C. callianassa* should be re-examined for the definite identification.

The present specimens were collected by a long-handled scoop net from swarms in the surface layer at night during a full moon. The details of the swarming were not recorded, but similar swarming behavior is rather well known in the Indian Ocean species *Charybdis (Archias) smithii* MacLeay, 1838, taxonomically studied by Ng and Takeda (1999). *Charybdis (A.) smithii* has been ecologically studied by Zamarov *et al.* (1991), Van Couwelaar *et al.* (1997), and Apel and Spiridonov (1998), and also by earlier workers under the name of *C. (Goniohellenus) edwardsi* Leene and Buitendijk, 1949, by Della Croce and Holthuis (1965), and Daniel and Chakrapany (1984). According to Moosa (1995), the specimens identified as *C. (C.) rosaea* from Indonesia have been caught during hauls in 350 to 676–699 m depth, but they were probably caught while the trawl was being brought up to the surface.

Distribution. Known from off New Guinea (type locality), and the Kai Islands and Tanimbar Islands, Indonesia, and now from the Sahul Shelf, Australia.

Genus ***Lupocycloporus*** Alcock, 1899

[Type species: *Achelous whitei* A. Milne-Edwards, 1861 = *Amphitrite gracilimanus* Stimpson, 1858]

Lupocycloporus gracilimanus (Stimpson, 1858)

(Fig. 13D)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 2 ♂♂ (CB 29.5 mm excluding lateral tubercles × CL 20.4 mm; 29.8 × 20.8 mm), NSMT-Cr 30732; 1 ovig. ♀ (24.4 × 17.3 mm), NSMT-Cr 30733; 1 ♀ (27.1 × 18.9 mm), NSMT-Cr 30734. — Sta. 30, 1 ♂ (CB 29.3 mm excluding lateral tubercles × CL 17.8 mm), 1 ovig. ♀ (31.2 × 18.5 mm), NSMT-Cr 30735.

Remarks. Three males and three females, of which two females are ovigerous, agree well with the photographs of *Portunus gracilimanus* given by Stephenson and Campbell (1959: pl. 4 fig. 1, pl. 5 fig. M), Takeda and Miyake (1969a: fig. 1), and Dai and Yang (1981: pl. 27 fig. 6) in the characteristic arrangements of the epi- and protogastric linear, transverse ridges of the carapace, and both cheliped fingers being rather prominently curved outward at the tips. Figures were also given by A. Milne-Edwards (1861) as *Achelous Whitei* A. Milne-Edwards, and by Chopra (1935) and Shen (1937) as *Neptunus (Lupocycloporus) gracilimanus.*

Distribution. Widely distributed in the Indo-West Pacific from the East China Sea southwards to Queensland, Australia and westwards to the east coast of India, 5–55 m depth.

Genus ***Portunus*** Weber, 1795

[Type species: *Cancer pelagicus* Linnaeus, 1758]

Portunus sanguinolentus (Herbst, 1783)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 30, 1 ♀ (CB 101.1 mm including lateral spines × CL 49.3 mm), NSMT-Cr 30736.

Remarks. This species is common as one of the important edible crabs in the West Pacific (Ng, 1998), having three large spots on the carapace, with one on the intestinal region and one on each metabranchial region. A full synonymy was given by Apel and Spiridonov (1998). These peculiar spots were clearly represented by Herbst (1783: pl. 8 fig. 56 as *Cancer sanguinolentus*) and similar colored spots are also present in *P. hawaiiensis* Stephenson, 1968, which was originally described as a subspecies of *P. sanguinolentus* based on the Hawaiian and Fijian specimens, but raised to a full species status by Castro (2011) on the different overall color pattern and minor but constant morphological differences.

Distribution. Widely distributed in the Indo-West Pacific from Japan southwards to Australia and westwards to the Red Sea and South Africa, 3–55 m depth. Barnard (1950) mentioned the occurrence of this species on *Sargassum* algae in the south of Madagascar, and it is likewise noted here that juveniles are commonly found on the floating seaweeds in Japanese waters. Chen (1998) recorded this species from the Nansha Islands at the depth of 382 m.

Genus ***Thalamita*** Latreille, 1829

[Type species: *Cancer admete* Herbst, 1803]

Thalamita intermedia Miers, 1886

(Fig. 14A–C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 12.7 mm including lateral teeth × CL 8.6 mm), 1 ♀ damaged (CL 12.5 mm), NSMT-Cr 30737.

Remarks. The carapace of one of the specimens of *Thalamita intermedia* examined is damaged at the left anterolateral part, but the frontal and right anterolateral portions and the chelipeds agree well with those of another specimen (Fig. 14A–C). This small species is rare, but has been well pictured by the original author (Miers, 1886: 196, pl. 16 fig. 1), and Stephenson and Hudson (1957: 41, fig. 4, pl. 3 fig. 4, pl. 10 fig. G).

Thalamita intermedia is characteristic in having four-lobed front with straight margin; the lateral lobe is separated from the median lobe by a small notch and slightly less than twice as wide as the median lobe; the carapace is narrow, with the anterolateral sharp teeth obliquely directed outward; the carapace fourth anterolateral tooth is the smallest, but distinct; the first male pleopod is straight for its distal half, with the tip truncated. Due to the four-lobed front, *T. annulipes* Stephenson and Hudson, 1957, *T. sexlobata* Miers, 1886, *T. malaccensis* Gordon, 1938 are rather similar to *T. intermedia*. However, they are distinguished from *M. intermedia* by the following key characters: the frontal median lobe is slightly more than half breadth of the lateral lobe, projecting beyond the lateral lobe (*T. annulipes*), the frontal median lobe is rather convex anteriorly and the lateral lobe is concave anteriorly (*T. malaccensis*), the carapace is rather wide, with a prominent last anterolateral tooth, and the fourth anterolateral tooth is rudimentary (*T. sexlobata*).

The other reliable records of *T. intermedia* are those by Ortmann (1894), Rathbun (1924) and Hale (1927) as quoted above, and it is difficult to confirm the identity of two queried records by Alcock (1899) from Sri Lanka and Holthuis (1953) from the Marshall Islands.

Distribution. Australian waters: Torres Strait, Queensland, Western Australia and Great Australian Bight, ca. 5–25 m depth. The record of this species appeared in Sukmaningrum *et al.* (2018, fig. 1J) dealing with crab diversity in the intertidal zone at Gunungkidul, Java Island, Indone-

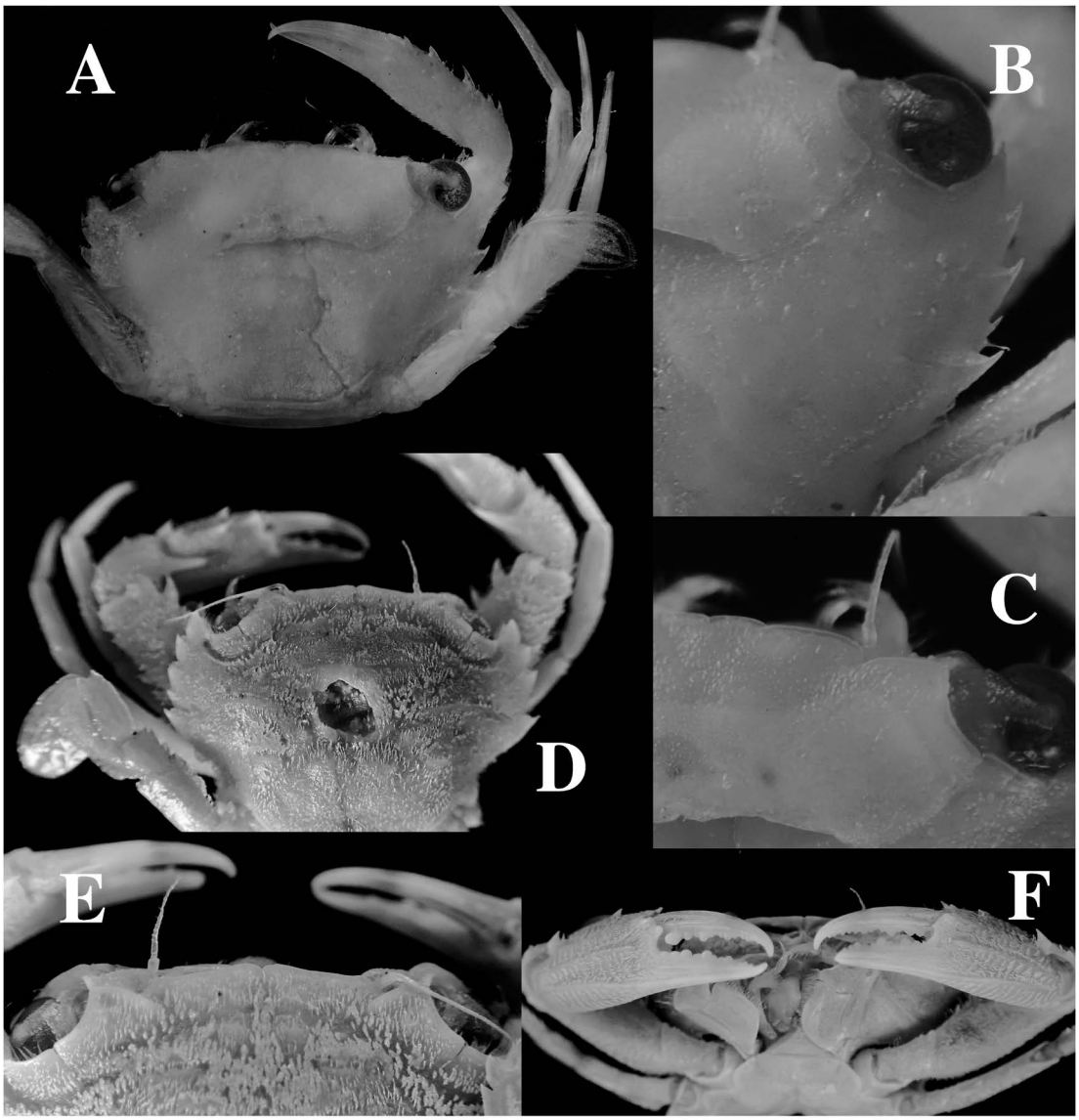

Fig. 14. A–C: *Thalamita intermedia* Miers, ♂ (NSMT-Cr 30737; CB 12.7 × CL 8.6 mm) from sta. 29. Dorsal view (A), right anterolateral teeth (B), and front-orbital margin (C). D–F: *Thalamita sima* H. Milne Edwards, ♂ (NSMT-Cr 30738; CB 20.2 × CL 14.0 mm) from sta. 30. Dorsal view (D), frontal margin (E), and both chelae (F).

sia, is highly probable.

Thalamita sima H. Milne Edwards, 1834
(Fig. 14D–F)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 30, 1 ♂ (CB 20.2 mm including lateral teeth × CL 14.0 mm), NSMT-Cr 30738.

Remarks. *Thalamita sima* is best characterized by the two-lobed front (this report: fig. 14E; Shen, 1934: fig. 17; Sakai, 1939: pl. 51 fig. 3; Barnard, 1950: fig. 33b; Stephenson and Hudson, 1957: pl. 5 fig. 2; Sakai, 1965: pl. 64 fig. 1; Sakai, 1976: pl. 130 fig. 3; Wee and Ng, 1995: fig. 59A), the pilose carapace surface (this report:

fig. 14D, F) and the squamiform sculpture of the palm lower surface (this report: fig. 14E; Montgomery, 1931: pl. 29 fig. 2; Shen, 1934: fig. 18a). Of the five anterolateral teeth of the carapace, the fourth is slightly smaller than the others as seen in Fig. 14D of this report. The basal antennal article is armed with a low, smooth, curved crest finely granulated along the margin. Stephensen (1945: fig. 27E), Stephenson and Hudson (1957: fig. 3C), Crosnier (1962: fig. 181), Dai and Yang (1981: fig. 138-1), Wee and Ng (1995: fig. 59D–F) and Apel and Spiridonov (1998: fig. 94) gave fine figures of the G1 with the flared tip, which is close to those of such species as *Th. sexlobata* Miers, 1886 and *Th. picta* Stimpson, 1858, in having the four-lobed front.

Distribution. Widely distributed in the Indo-West Pacific, from Hawaii and Japan to southwards to New Caledonia and Australia, and westwards to South Africa and the Red Sea. In Japan, this species is not uncommon on rocky shores down to 15 m depth, but otherwise there are some records from deeper waters down to 50 m. The bathymetric range is extended down to 115 m in this report.

Family Pilumnidae Samouelle, 1819

Genus ***Actumnus*** Dana, 1851

[Type species: *Actumnus tomentosus* Dana, 1851]

Actumnus setifer (De Haan, 1835)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 5.2 × CL 4.3 mm), NSMT-Cr 30740. — Sta. 32, 1 ♂ (CB 5.0 × CL 4.1 mm), NSMT-Cr 30741.

Remarks. The carapace of *Actumnus setifer* (De Haan, 1835) is wholly covered only with short tomentum, leaving linear interregional furrows. Both chelipeds are different in size, being covered with dense small granules, short thick tomentum and scant longish silky setae. The ambulatory legs are stout and covered with dense tomentum and longish setae similar to that of the chelipeds, with a dense fringe of setae along the anterior margin of the last leg. Takeda and Komatsu (2017: fig. 6C–D) included photographs of a female of *A. setifer* for comparison with the new species, *A. tsurukaii*.

This species has been recorded from many localities across the Indo-West Pacific under the names of *A. setifer* (De Haan, 1835) or *A. tomentosus* Dana, 1852, and sometimes simultaneously in the same paper, as seen in the papers by A. Milne-Edwards (1865), Alcock (1898), Grant and McCulloch (1906), Klunzinger (1913) and Rathbun (1924). As recorded by Laurie (1906) for this species (under two varieties, *setifer* and *tomentosus*), *A. setifer* is considerably variable in the convexity, areolation, setation and anterolateral armature of the carapace.

Distribution. Whole Indo-West Pacific, with bathymetric records from 10 to 200 m. Davie (2002) recorded this species as near circum–Australian, "on coral and rocky reefs, from low intertidal to 200 m depth."

Actumnus squamosus (De Haan, 1835)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ovig. ♀ (CB 7.4 × CL 5.7 mm), NSMT-Cr 30742.

Remarks. In the ovigerous female of *Actumnus squamosus* (De Haan, 1835) at hand, the carapace is thickly covered with short soft tomentum, and therefore the dorsal areolation is not visible. The three anterolateral carapace teeth are prominent, but only moderately protruded from the general outline of the carapace. The characteristic armature covering the surface of both cheliped palms is distinctive, agreeing with the photograph given by Takeda and Komatsu (2017: fig. 6A). The ovigerous female examined, with CB 7.4 mm, is smaller than the smallest ovigerous female (CB 8.1 mm) from Kyushu, Japan, recorded by Takeda and Miyake (1969c).

Distribution. From Japan to India through the coasts of the West Pacific, including Australia, with bathymetric range from 10 to 324 m. Previous Australian records are from Queensland, so the current record extends the known Australian range to the northwest.

Genus ***Bathypilumnus*** Ng and Tan, 1984

[Type species: *Pilumnus sinensis* Gordon, 1930]

Bathypilumnus pugilator

(A. Milne-Edwards, 1873)

(Fig. 15D–E)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 7.9 mm including lateral teeth × CL 5.9 mm), NSMT-Cr 30743; 1 ♀ (15.6 × 11.0 mm), 1 juv. (4.0 × 3.3 mm), NSMT-Cr 30744.

Remarks. Ng and Tan (1984) established *Bathypilumnus*, a new genus for two *Pilumnus* species, *P. sinensis* Gordon, 1930 and *P. nigrispinifer* Griffin, 1970. Later, Davie (1989) reassigned *Actumnus pugilator* A. Milne-Edwards, 1873, to *Bathypilumnus* in discussion on the establishment of a new genus *Takedana*. In these three congeneric species, the general form of the carapace, chelipeds and ambulatory legs are generally close to those of *Pilumnus*, but the carapace dorsal surface is strongly convex and vaulted longitudinally and transversely, both chelipeds are heavy, with strong heterochely, the male pleon is narrow, and the G1 is simple and long, differing from the so-called *Pilumnus*-type with the recurved tip.

In one pair of the specimens of *B. pugilator* examined, both chelipeds and most of the ambulatory legs are missing in female and male, respectively. The strongly vaulted carapace is covered only with short setae, not granulated, and has the shallow interregional furrows. The front is divided into two convex lobes fringed with minute granules, with a small, but sharp lateral lobule close to the supraorbital angle; the dorso-frontal view shows that each frontal lobe is deeply separated by a wide V-shaped notch and is strongly convex anteriorly along the inner half and shallowly concave just inside of the lateral lobe. The external orbital angle is armed with a small obtuse granule and followed by some smaller granules on the carapace margin to the first anterolateral tooth. The three anterolateral teeth behind the external orbital angle are conical and stout in dorsal view, being subequal and projecting regularly from the first to the third.

Both chelipeds are heavy and prominently armed on the carpus and palm (Fig. 15D–E). On the larger chela, the outer surfaces of the carpus and palm are armed with several longitudinal lines of mushroom-like tubercles; in each line, several mushrooms are connected through the truncated umbrella; the outer lower surface is covered with conical, tuberculate granules of good size. On the smaller chela, the mushroom tubercles are replaced by rows of the tall and subtruncated tubercles on the upper surface and armed with rows of conical tubercles on the whole outer surface. The pleon is narrow, with a remarkably narrow and slender telson.

There seem to be no recent records of this species, but the present specimens agree well with the original description and figures.

Distribution. Originally reported from Lifou Island in New Caledonia. Davie (2002) recorded this species from Queensland coast, on sand and shell substrates, from the shallow subtidal to about 20 m depth. Poore *et al.* (2008) recorded this species from Western Australia, 100 m depth. The present specimens were collected at a depth of 49–52 m and represents the first record from the Northern Territory, Australia.

Genus ***Camptoplax*** Miers, 1884

[Type species: *Camptoplax coppingeri* Miers, 1884]

Camptoplax coppingeri Miers, 1884

(Fig. 15A–C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 5.7 × CL 4.5 mm), NSMT-Cr 30745.

Remarks. Davie (1993) reported a male of *Camptoplax coppingeri* dredged from the lagoon at the Chesterfield Reefs, Coral Sea, as the first record of the species since the original description based on two males from the Prince of Wales Channel, Torres Strait (Miers, 1884). As a result, Davie (1993) showed that *C. coppingeri* properly belonged in the family Pilumnidae rather than being a goneplacid. This species is

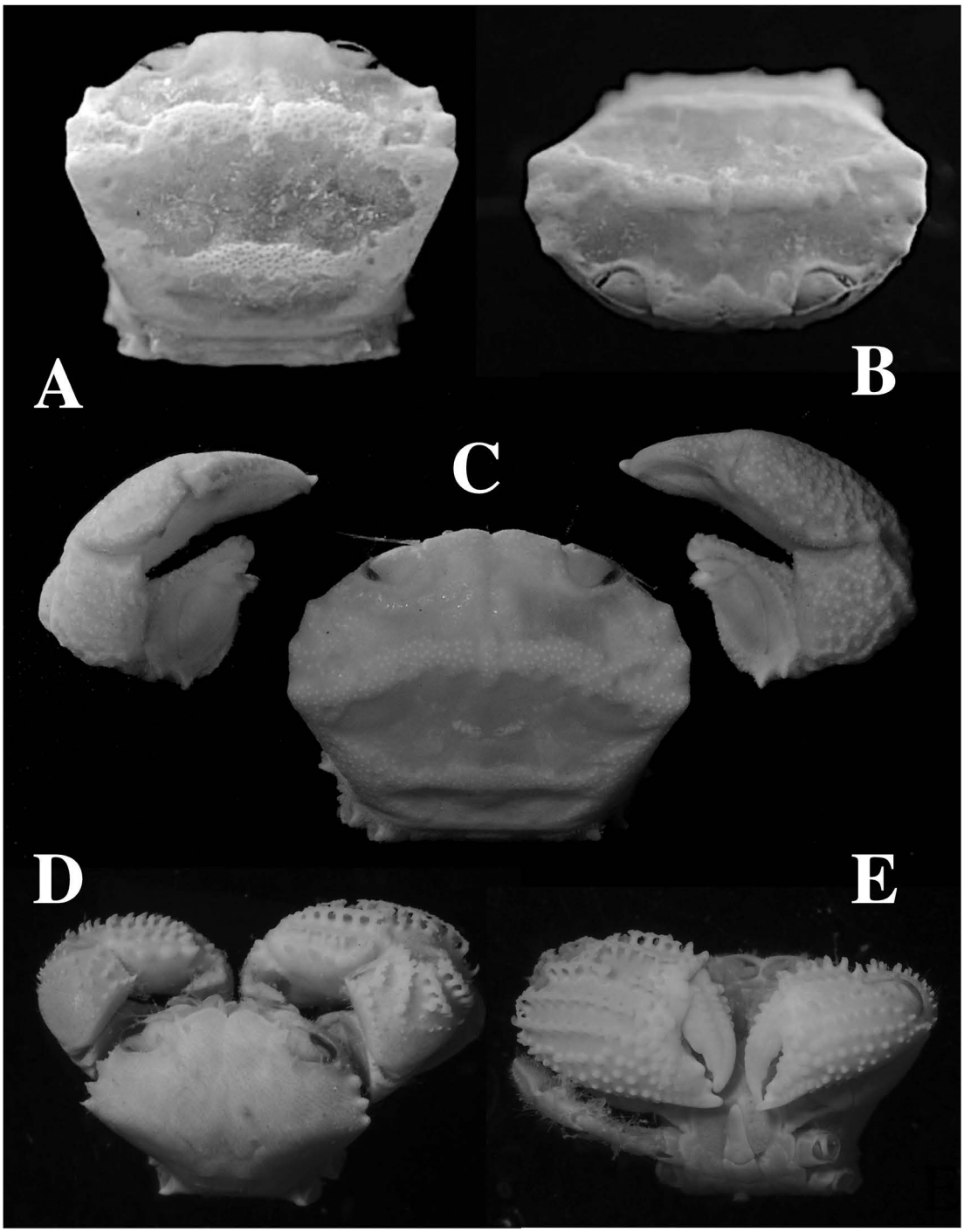

Fig. 15. A–C: *Camptoplax coppingeri* Miers, ♂ (NSMT-Cr 30745; CB 5.7 × CL 4.5 mm) from sta. 29. D–E: *Bathypilumnus pugilator* (A. Milne-Edwards), ♂ (NSMT-Cr 30743; CB 7.9 × CL 5.9 mm) from sta. 29.

characteristic especially in the sculpture of the carapace dorsal surface (Fig. 15A–C); a broad transverse depression occupies about one-third of the median dorsal surface, bound anteriorly by an irregular blunt transverse ridge, which is clearly demarcated from the thickened, frontorbital margin; the posterior part of the main depression is marked by a rather raised, low blunt ridge, followed by a transverse depression along the carapace posterior margin. The front is one-third as wide as the carapace, divided into two weakly convex lobes by a small median notch; frontal dorsal surface is thickened, with median part produced posteriorly as an obtusely triangular thickening. The carapace anterolateral margin is about half the length of the posterolateral margin and armed with three teeth, of which the third is only weakly angulated and directed laterally, and the first and second are sharper and obtuse at the tips, directed obliquely forward, and the second is hardly larger than the others. The right cheliped is only slightly larger than the left in the male examined; the carpus and palm are finely reticulated for their whole outer surfaces; the upper margin of the palm is thinly crested, with fringe of short hairs. The male pleon is seven-segmented, and the G1 is typically pilumnid-type, as illustrated by Davie (1993).

Distribution. Previous records are from the Prince of Wales Channel in the Torres Strait, 12–16 m depth, and the Chesterfield Reefs in the Coral Sea, 52 m depth. The present specimen represents the first record for the Northern Territory, Australia.

Genus ***Cryptocoeloma*** Miers, 1884

[Type species: *Cryptocoeloma haswelli* Rathbun, 1923]

Cryptocoeloma haswelli Rathbun, 1923

(Fig. 16D–E)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 8.9 × CL 7.0 mm), NSMT-Cr 30746; 1 ♂ (7.0 × 5.0 mm), NSMT-Cr 30747.

Remarks. The confused taxonomic history of this characteristic species was fully clarified by Ng (1989) who determined its systematic position to be in the family Pilumnidae, despite its unusual appearance. As depicted by Haswell (1882: pl. 1 fig. 4, as *Pilumnus fimbriatus*), Fulton and Grant (1906: pl. 4 fig. 5, as *Cryptocoeloma fimbriatus*), Ng (1989: figs. 1–3) and in the present paper (Fig. 16D–E), the frontorbital and anterolateral margins of the carapace are fringed with long, thick shaggy setae; in dorsal view (Fig. 16D), the details of the frontal and anterolateral margins are completely obscured by the setal fringe; in ventral view (Fig. 16E), the strongly flexed frontal margin is evidently divided into two lobes, and the carapace anterolateral margin is divided into three low lobes by two small interruptions.

Distribution. Queensland to Western Australia; Java. According to Ng (1989), *C. haswelli* appears to be a tropical littoral coral reef species. Otherwise, the habitat and depth records in the literature are as follows: coral reef (Haswell, 1882); 7–9 m at Thursday Island (Miers, 1884); 3 m at Denham, the administrative town for the Shire of Shark Bay (Balss, 1933); under rocks and corals at Linman Island (Ng, 1989). The specimen examined was obtained from a depth of 49 to 52 m.

Genus ***Glabropilumnus*** Balss, 1932

[Type species: *Xantho dispar* Dana, 1852]

Glabropilumnus seminudus (Miers, 1884)

(Fig. 16A–C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 2 ♂♂ (CB 10.4 × CL 7.4 mm; 22.6 × 16.2 mm), NSMT-Cr 30748; 1 ♀ (17.8 × 12.1 mm), NSMT-Cr 30749. — Sta. 30, 1 ♂ (CB 11.2 × CL 7.9 mm), NSMT-Cr 30750.

Remarks. Glabropilumnus seminudus is characterized by the smooth carapace with a band of a close velvety pubescence along the carapace frontal and anterolateral margins (Fig. 16A–B), and the reticulated appearance of four longitudinal lines of granules on the palm outer surface (Fig. 16C). The setation of the carapace dorsal surface may be somewhat variable, with rather

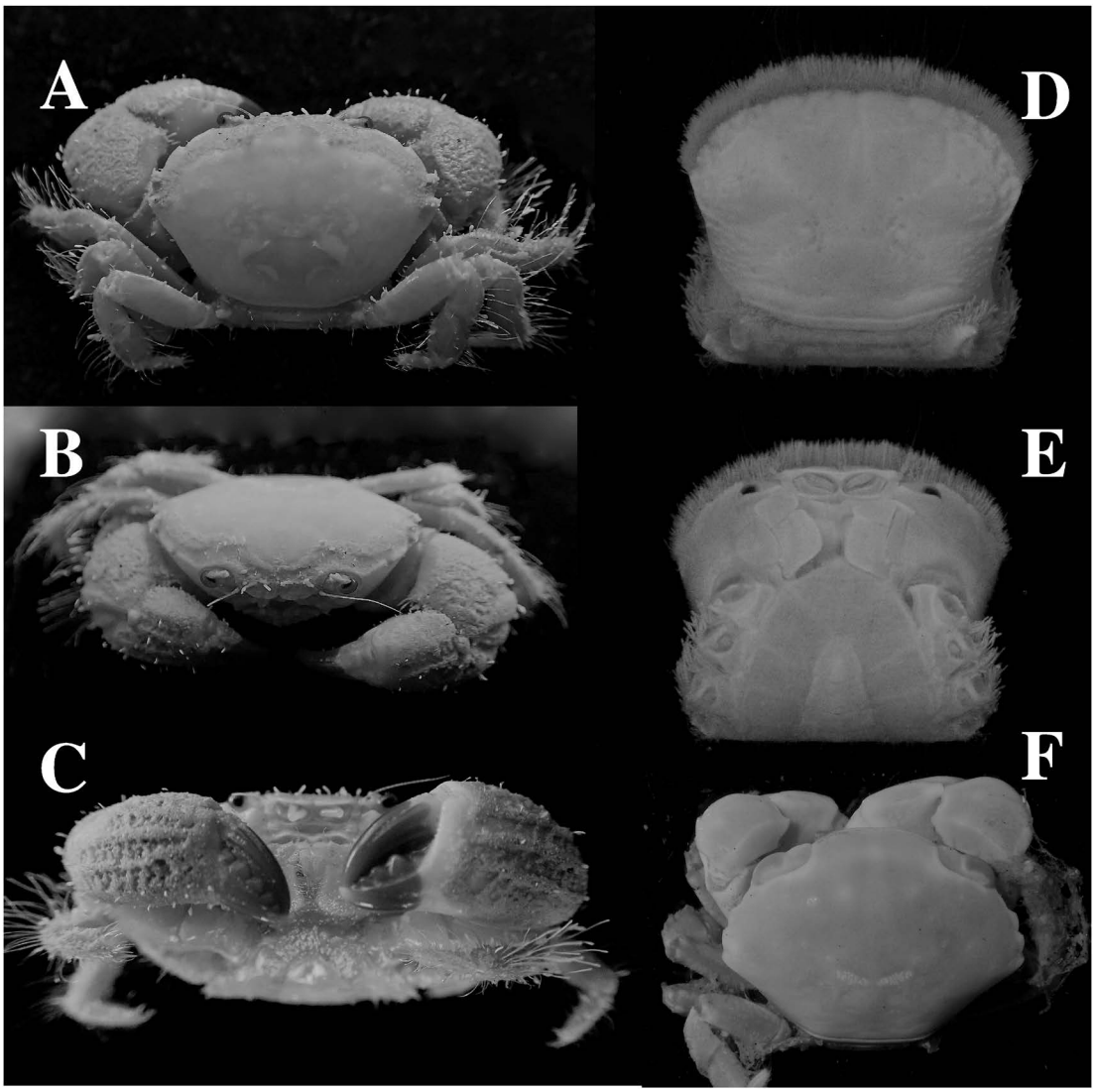

Fig. 16. A–C: *Glabropilumnus seminudus* (Miers), ♀ (NSMT-Cr 30749; CB 17.8 × CL 12.1 mm) from sta. 29. D–E: *Cryptocoeloma haswelli* Rathbun, ♂ (NSMT-Cr 30747; CB 7.0 × CL 5.0 mm) from sta. 29. F: *Serenolumnus kasijani* (Serène), ovig. ♀ (NSMT-Cr.30763; CB 6.4 × CL 4.7 mm) from sta. 32.

shorter and sparse setae in the present specimens different from the longish dense setae in the Arafura Sea specimens reported by Takeda and Miyake (1969c: pl. 1 fig. B). Good figures are otherwise given by the original author (Miers, 1884: pl. 22 fig. B, as *Pilumnus*), Rathbun (1923: pl. 24 figs. 1, 2, as *Pilumnus*), and Galil and Takeda (1988: figs. 3D, 5).

Distribution. Queensland, Australia; Torres Strait; Arafura Sea; Hong Kong; Makassar, Celebes. Edmondson (1952, 1962) recorded a specimen from biofouling on the hull of a barge in Pearl Harbor, Oahu Island, which had service in Guam for two years. The recorded bathymetric range is from 7 to 30 m depth. Davie (2002) listed this species as one of four Australian species of *Glabropilumnus*.

Genus ***Gonatonotus*** White, 1847

[Type species: *Gonatonotus pentagonus* White, 1847]

Gonatonotus pentagonus White, 1847

(Fig. 13E)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 2 ♂♂ (CB 8.4 × CL 7.3 mm; 10.5 × 8.4 mm, soft, deformed), 1 ♀ (7.6 × 7.5 mm), NSMT-Cr 30751. — Sta. 32, 1 ♂ (CB 5.1 × CL 4.6 mm), NSMT-Cr 30752.

Remarks. *Gonatonotus pentagonus* was fully described and figured by Chia and Ng (2000), differing from two congeners, *Gonatonotus granulosus* (MacGilchrist, 1905) and *G. nasutus* Chia and Ng, 2000, in the frontal margin hardly reaching beyond the orbits. One of the specimens, a male from sta. 29, is soft-shelled and somewhat deformed, but another male (Fig. 13E) is in good condition and agrees well with the description, line drawings and photographs of many specimens, including the holotype, given by Chia and Ng (2000: figs. 16–19).

Distribution. Chia and Ng (2000) recorded many specimens from Indonesia, Singapore, Thailand and Australia, 9–54 m in depth.

Genus ***Latopilumnus*** Türkay and Schumacher, 1985

[Type species: *Latopilumnus tubicolus* Türkay and Schumacher, 1985]

Latopilumnus tuberculosus (Garth and Kim, 1984)

(Fig. 17)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 4.8 × CL 3.3 mm), NSMT-Cr 30780; 1 ♀ (4.8 × 3.2 mm), NSMT-Cr 30781; 3 ♂♂ (4.0 × 3.0 mm – 5.5 × 4.3 mm), 3 ♀♀ (4.2 × 3.5 mm – 5.9 × 4.0 mm); 3 ovig. ♀♀ (3.4 × 3.0 mm – 4.4 × 3.6 mm), NSMT-Cr 30753.

Remarks. Only one male is in good condition (Fig. 16A–C), and a female (Fig. 17D) retains the left cheliped and two left ambulatory legs, but otherwise, nine carapaces (3 ♂♂, 3 ♀♀, 3 ovig. ♀♀), the detached three chelipeds and some ambulatory legs remained in a vial. The setosity of the carapace dorsal surface is quite similar to the good male specimen, but in most of the specimens the anterolateral teeth are not so distinctly triangular in dorsal view, but tipped with a more or less recurved sharp tubercle. The remaining chelipeds are close to the female cheliped of *Latopilumnus tuberculosus* shown by Takeda and Komatsu (2020: fig. 4), having many obtuse or subtruncated granules on the carpus. The palm of the larger chela of the good male specimen is bare except for the basal marginal part, being different from the female cheliped palm.

Distribution. Originally described on a male from the vicinity of Jolo Island in the Philippines, 45 m in depth, and later from the Okinawa-jima and Ishigaki-jima in the Ryukyu Islands, and now from northern Australia, 45–150 m depth.

Genus ***Pilumnus*** Samouelle, 1819

[Type species: *Cancer hirtellus* Linnaeus, 1761]

Pilumnus longicornis Hilgendorf, 1879

(Fig. 18E–F)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♂ (CB 11.2 mm including lateral teeth × CL 8.6 mm), NSMT-Cr 30754.

Remarks. The specimen of *Pilumnus longicornis* at hand is slightly smaller than the size usually seen, but is typical in the setation and armature of the carapace and ambulatory legs (Fig. 18E). This species is most characteristic in having three strong spines on the median to submedian parts of the anterior margin of each merus of the first three ambulatory legs, with a spine at the distal end. Otherwise, *P. longicornis* is characterized by the following: 1) the carapace is covered with sparse, short setae, with a line of long setae along the frontal margin and some tufts of similar setae on the protogastric and mesobranchial regions; 2) the carapace dorsal surface is shallowly separated into regions which are regularly covered with minute

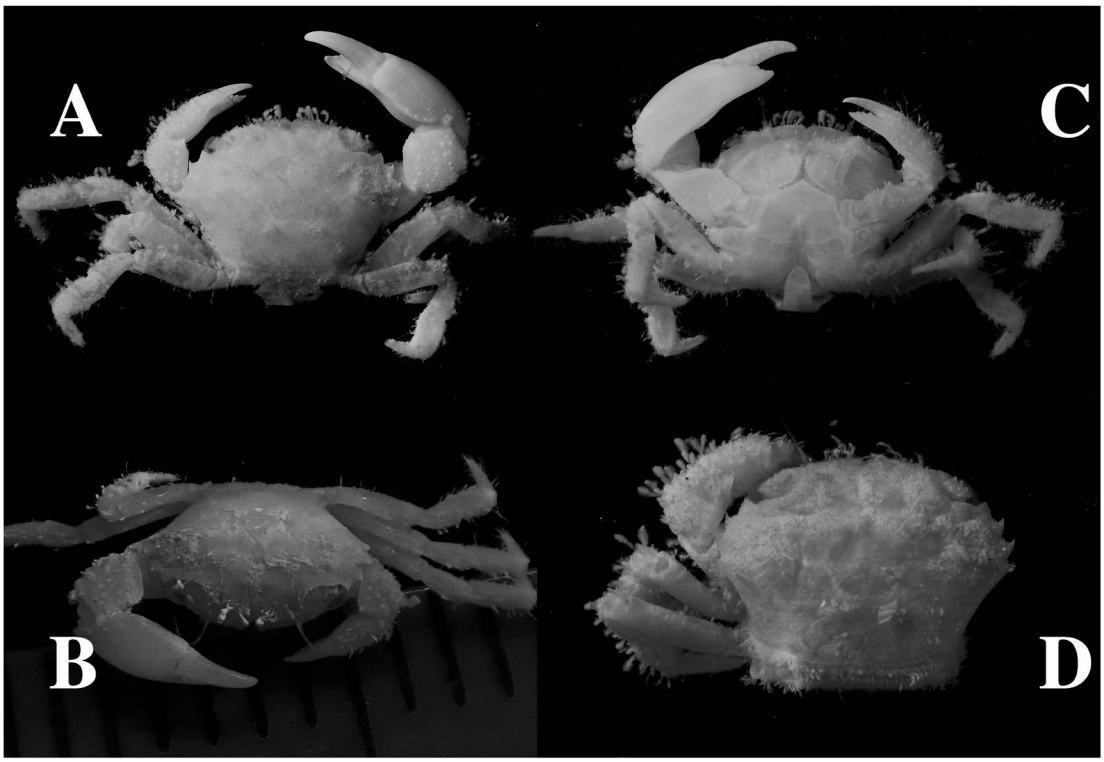

Fig. 17. *Latopilumnus tuberculosus* (Garth and Kim) from sta. 29. A–C: ♂ (NSMT-Cr 30780; CB 4.8× CL 3.3 mm). D: ♀ (NSMT-Cr 30781; CB 4.8 × CL 3.2 mm).

granules of equal size; 3) the frontal lobes are rather rounded and produced forwards; 4) the three anterolateral teeth of the carapace are each tipped with a sharp spine on the thick base, curving strongly obliquely forward; 5) both chelipeds are different in size, the merus outer margin being armed with a strong spine-tipped tubercle behind the subterminal depression followed by two much smaller tubercles; the carpus surface is wholly and equally covered with conical granules; the larger palm is smooth and polished except for the upper basal part covered with conical granules similar to those on the carpus upper surface.

Balss (1933) synonymized *Pilumnus andersoni* De Man, 1887 and *P. tantulus* Rathbun, 1923 with this species, without comment. Takeda and Miyake (1968) simply followed this conclusion, but Ng *et al.* (2008) listed *P. tantulus* as valid. The original figures of *P. tantulus* show the quite similar formation of the carapace and chelipeds with this species, but the ambulatory armature is described as "Ambulatory legs hairy, the merus roughened above by fine, unequal spinules."

Distribution. Widely distributed throughout the whole Indo-West Pacific, from East Africa through the Indian Ocean to the western and central Pacific, with bathymetric records from 5 to 100 m.

Pilumnus minutus (De Haan, 1835)
(Fig. 18D)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 3 ♀♀ (CB 7.0 mm excluding lateral spines × CL 5.1 mm – 11.7 × 7.6 mm), NSMT-Cr 30755. — Sta. 32, 1 ♂ (CB 8.9 mm excluding lateral spines × CL 6.1 mm), NSMT-Cr 30756; 1 ♂ (8.2 × 6.6 mm), 1 ♀ (7.7 × 6.2 mm), NSMT-Cr 30757; 1 ♀ (7.8 × 6.2 mm) with a *Sacculina*, 1 ♀ (6.5 × 4.8 mm)

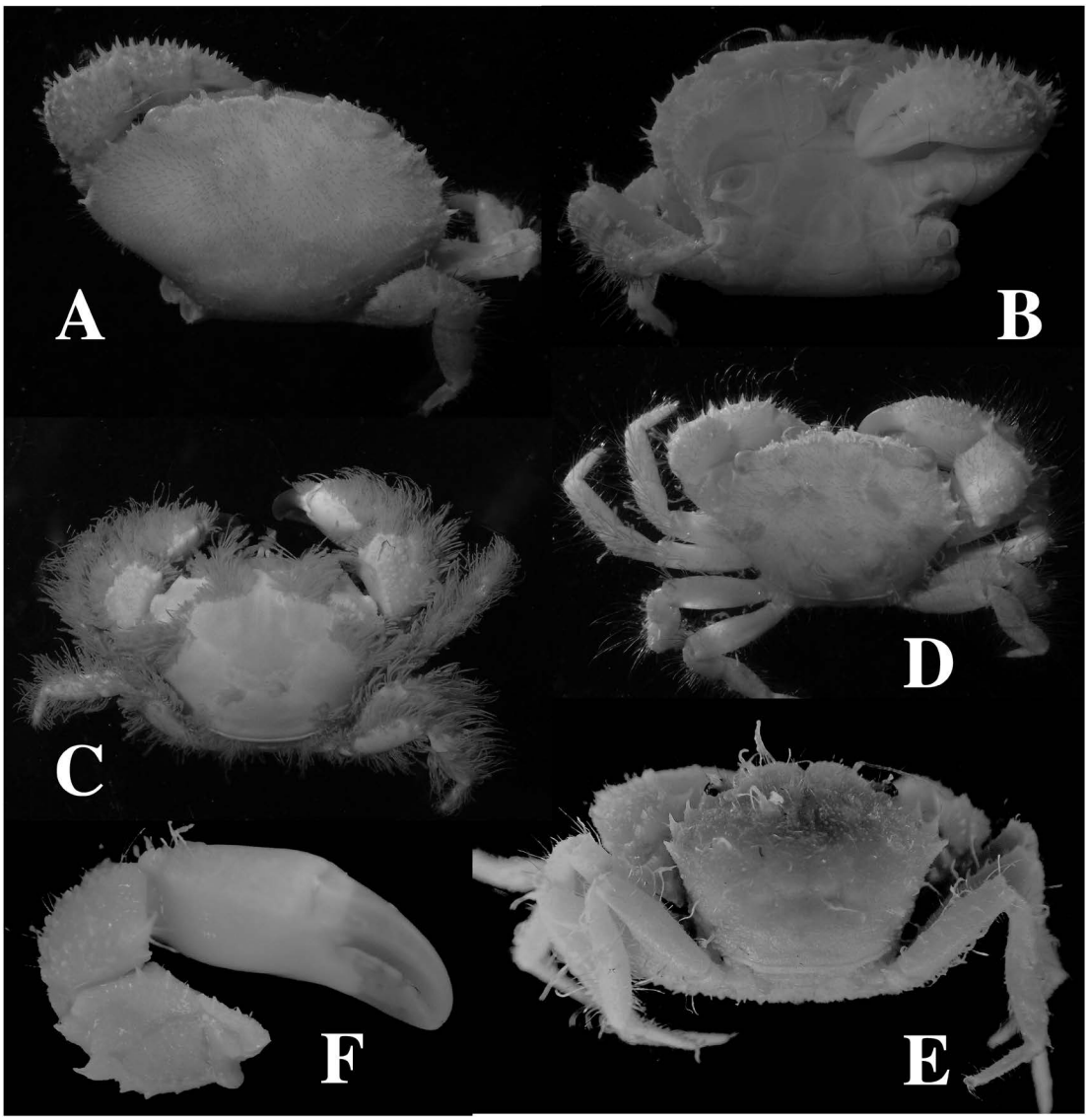

Fig. 18. A–B: *Pilumnus rotundus* Borradaile, ♀ (NSMT-Cr 30760; CB 10.6 × CL 7.5 mm) from sta. 29. C: *Pilumnus semilanatus* Miers, ♀ (NSMT-Cr 30761; CB 14.7 × CL 11.1 mm) from sta. 29. D: *Pilumnus minutus* (De Haan), ♂ (NSMT-Cr 30755; CB 8.9 × CL 6.1 mm) from sta. 29. E–F: *Pilumnus longicornis* Hilgendorf, ♂ (NSMT-Cr 30754; CB 11.2 × CL 8.6 mm) from sta. 29.

with 3 *Sacculina*, NSMT-Cr 30758.

Remarks. Pilumnus hirsutus Stimpson, 1858, has been considered to be synonymous with *P. minutus* (De Haan, 1835) first by Parisi (1916), and then followed by Sakai (1939, 1965, 1976) and Takeda and Miyake (1968). The original description of *P. hirsutus* was translated from Latin to English, with an illustration and some additional information (Stimpson, 1907), and as rightly mentioned, the original description of *P. minutus* is short, and the figure is too small and poor for subsequent definite identification. However, Stimpson's description and figure of *P. hirsutus* (1858, 1907) based on the specimens from the northern China Sea (= East China Sea), Ousima (= Amami-Oshima Island), and the

Bonin Islands (= Ogasawara Islands) also lacks the sufficient detail for the accurate identification. According to Takeda and Miyake (1968), *P. minutus* is the most abundant species of *Pilumnus* in Japanese shallow waters, and therefore, it is reasonably considered that *P. minutus* and *P. hirsutus* reported from Japanese waters represent the same species, and some differences in carapace dorsal granulation and setation, and the ambulatory armature with spines, spinules or sharp granules between both species are not specific and may be referred to individual variation.

There are many records of *P. hirsutus* from the wide area in the Indo-West Pacific before the 1960s. Dai and Yang (1991: fig. 178, pl. 49-5) recorded *P. minutus*, without mention of *P. hirsutus*, and the photograph is not always clear, but the G1 is close to the figures given by Takeda and Miyake (1968: fig. 9d, as *P. minutus*) and Chopra and Das (1937: fig. 11, as *P. hirsutus*) in having the brush-like setae near the distal part, which is not seen in the other species of *Pilumnus*.

Distribution. Widely distributed in the Indo-West Pacific from Japan to Australia and to South Africa, down to about 200 m depth, but usually 30 to 50 m depth (cf. Takeda and Miyake, 1968).

Pilumnus rotundus Borradaile, 1902
(Fig. 18A–B)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♀ (CB 10.6 × CL 7.5 mm), NSMT-Cr 30760.

Remarks. The female examined (Fig. 18A–B) is characteristic in the short setae covering the carapace and the simple carapace anterolateral spines as described below, agreeing with the original figure that is somewhat diagrammatic, but enough to identify the species as *P. rotundus*.

This species is briefly diagnosed as follows. The carapace is covered uniformly with short, subequal setae, but not obscuring dorsal surface, without long setae and granules; the surface areolation is indistinct; the external orbital angle is armed with two spinules of equal length arranged along the carapace anterolateral margin; the anterolateral margin is armed with three, equidistant spines of equal length; each spine is perpendicular to the carapace surface, without bulged base. The outer surfaces of the cheliped carpus and palm are covered with setae similar to those on the carapace dorsal surface and armed with prominent spines similar to the three carapace anterolateral spines; the movable finger of the cheliped is also armed with slightly shorter, but similar spines on its basal half. The ambulatory legs are stout and fringed with long soft setae, with a spinule at the median part of each merus anterior margin and at the distal part of each merus and carpus anterior margin, respectively.

The type specimen of *P. rotundus* from Kolumdulu Atoll, Maldives, is 12 mm in breadth and 8 mm length, without record of sex. However, Deb (1987) mentioned that the original description was based on a very young specimen and quite inadequate. The female specimens newly recorded from Pearl Banks, Sri Lanka, and Port Blair, Andaman Islands, are CW 22.5 mm and CL 15 mm, and CW 12 mm and CL 7 mm, respectively. Unfortunately, it is difficult to be sure of its identification and for the subsequent identification due to the inadequate description and low quality of the photograph provided by Deb (1987: pl. 12 fig. 3).

Distribution. Maldives, Sri Lanka, Andaman Islands, and now from northern Australia, 49–63 m depth.

Pilumnus semilanatus Miers, 1884
(Fig. 18C)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ♀ (CB 14.7 × CL 11.1 mm), 5 juv., NSMT-Cr 30761.

Remarks. *Pilumnus similanatus* is quite characteristic among many species of the genus *Pilumnus* in having scattered tufts and rows of long shaggy setae symmetrically arranged on the carapace dorsal surface (Fig. 18C). The carapace is substantially bare, as well as the upper surfaces of the cheliped carpus and palm. The main

characters of the carapace, chelipeds and ambulatory legs were discussed by Takeda and Miyake (1968: figs. 1a–c, pl. 1 fig. B) based on Arafura Sea specimens, including habitus and G1 figures. Otherwise, line drawings have been provided by the original author (Miers, 1884: pl. 22 fig. B) and McCulloch (1913: fig. 43), and photographs by Rathbun (1923: pl. 24 figs. 1–2).

Distribution. Endemic to Australia, from Moreton Bay, Queensland to Shark Bay, Western Australia, 15–52 m depth.

Genus ***Serenolumnus*** Galil and Takeda, 1988

[Type species: *Glabropilumnus kasijani* Serène, 1969]

Serenolumnus kasijani (Serène, 1969)

(Fig. 16F)

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 ovig. ♀ (CB 4.2 × CL 3.1 mm), NSMT-Cr 30762. — Sta. 32, 2 ♂♂ (CB 4.8 × CL 3.5 mm; 6.6 × 5.2 mm), 5 ovig. ♀♀ (4.2 × 3.1 mm – 6.4 × 4.7 mm), NSMT-Cr 30763.

Remarks. The specimens examined fully agree with the description and figure of *Glabropilumnus kasijani* Serène, 1969, which was designated as the unique representative of *Serenolumnus* by Galil and Takeda (1988). The carapace (Fig. 16F) is strongly convex dorsally, and smooth and glabrous without granules and setae except for sparse, short setae along the frontal and anterolateral margins. The carapace anterolateral margin is strongly arched and cut into four lobes; the first lobe is straight and confluent with the external orbital angle; the second and third lobes are low and triangularly toothed each with the tip directed obliquely forward along the general contour of the carapace margin as a whole; the last is similar to, but smaller than the preceding lobe. The thick eyestalk and elongate cornea are not fully accommodated in the oblong orbit. Both chelipeds are almost smooth, without distinct granules and hairs, and heavy in both sexes; the outer upper surface of the palm is engraved with a longitudinal furrow along the whole length and the distal half of the outer lower surface with a longitudinal furrow extending the distal part of the immovable finger. The G1 is distinctly of the pilumnid-type as finely illustrated by the original author.

Distribution. East of Sumatra, Indonesia, 12–15 m depth; Sulu Archipelago; South China Sea; Singapore. Otherwise, Garth and Kim (1983) recorded this species from the north of Cebu and the Sulu Archipelago in the Philippines, 43–54 m deep. The bathymetric range is extended down to 78 m in the present study.

Genus ***Viaderiana*** Ward, 1942

[Type species: *Viaderiana typica* Ward, 1942]

Viaderiana typica Ward, 1942

Material examined. RV *Hakuhō Maru* KH-72-1 cruise, sta. 29, 1 juv. (CB 4.1 including lateral spines × CL 4.0 mm), NSMT-Cr 30764.

Remarks. In the genus *Viaderiana*, the carapace dorsal surface is typically covered with long, rather sparse, silky setae, and shallowly divided into regions; the carapace anterolateral margin is armed with two spiniform tubercles and a third vestigial tooth or granule behind the external orbital angle. The specimen at hand is unfortunately lacking all the chelipeds and ambulatory legs, while the generic affiliation is without doubt in *Viaderiana*.

The carapace is narrow and distinctly quadrate with the almost longitudinal posterolateral margins, and the posterior of the two anterolateral spines is slightly larger than the first. The latter character is of specific value in *Viaderiana*, but it is also affected by maturity, and the present specimen is a juvenile. As for the narrowly quadrate carapace, this specimen is close to *V. typica* Ward, 1942 and *V. quadrispinosa* (Zehntner, 1894). The latter species is well known by its characteristic chocolate brown color pattern, although in the specimen examined, the color is completely faded, without trace of color pattern. In adult *V. typica*, the carapace has the coarsely areolated dorsal surface and stronger anterolateral teeth. Recently, Maenosono (2020) reported on four species of *Viaderiana* from the Ryukyu

Islands, namely, *V. incerta* (Takeda and Miyake, 1969), *V. typica* Ward, 1942, *V. quadrispinosa* (Zehntner, 1894) and *V. longipes* (A. Milne-Edwards, 1873), and discussed the identification challenges in detail, with fine photographs. Following the details elucidated by Maenosono (2020), the young specimen at hand, having no chelipeds and ambulatory legs, is reasonably, but tentatively identified as *V. typica* among the congeners from the Ryukyu Islands as well as the other, about 14, Indo-West Pacific congeners.

Distribution. West Pacific (Ryukyu Islands, Palau Islands, Indonesia, Viet Nam and Thailand), Indian Ocean (Mauritius), and now northern Australia, as referred to Ward (1942), Serène (1971, 1980), Takeda (1972), and Maenosono (2020). Maenosono (2020) recorded two males collected from crevices of a dead coral block at Urasoe, Okinawa-jima in the central Ryukyu Islands.

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