

**Leucosiidae of the *Albatross* expedition to the Philippines,  
1907–1910 (Crustacea: Brachyura: Decapoda)**

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A report of the Leucosiidae collected during the *Albatross* Philippines expedition 1907–1910 is given. A total of 36 species in 17 genera are treated, with one genus (*Heterolithadia*) and nine species (*Alox rugosum*, *Arcania elongata*, *Arcania globata*, *Heterolithadia fallax*, *Myra acutidens*, *Leucosia craniolaris*, *L. galantua*, *L. perlata* and *Nucia tuberculosa*) being new records for the Philippines and one species being new. This brings the total number of species known from the Philippines to 64, in 22 genera. A complete list of Philippine Leucosiidae is provided.

KEYWORDS: Leucosiidae, *Albatross* Philippines Expedition, Philippines, new species.

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**Introduction**

During the period 28 November 1907–21 January 1910, the US Fisheries Steamer *Albatross* collected in the waters of Philippines and Indonesia (Chace, 1983:1 for historical background). A large number of brachyuran species, including members of the family Leucosiidae, were obtained from Philippine waters by this expedition. This paper gives an account of these hitherto unreported leucosiids.

Here, diagnoses of 36 species from 17 genera of Leucosiidae collected by the *Albatross* Philippine Expedition are given. Of these, one is described as new and nine species, namely *Alox rugosum* (Stimpson, 1858), *Arcania elongata* Yokoya, 1933, *Arcania globata* Stimpson, 1858, *Heterolithadia fallax* (Henderson, 1893), *Myra acutidens* Ihle, 1918, *Leucosia craniolaris* (Linnaeus, 1758), *L. galantua* Ovaere, 1988, *L. perlata* de Haan, 1841 and *Nucia tuberculosa* A. Milne Edwards, 1874, are listed as new records for Philippine waters.

An updated list of Philippine leucosiids is provided, based on a report by Chen (1989) and on the species presently encountered in the Smithsonian Institution, National Museum of Natural History, Washington DC. The latter collection includes Philippine specimens in the Smithsonian collection not collected by the *Albatross* (marked with ‘+’) which are also treated here for completeness. The species in Chen’s list (1989) not found in the course of this study are marked with an asterisk, ‘\*’. This brings the total number of species known from Philippines waters to 64, in 22 genera. Only references to original descriptions are provided.

Measurements are given in millimetres (mm) and are of the greatest carapace length and breadth respectively. For genera like *Arcania*, which have both lateral and posterior

spines on the carapace, two sets of measurements are given; one denoting dimensions inclusive of spines and the other excluding spines. Where one set of measurements is provided, it is of carapace length and width exclusive of spines. For *Ixa* and *Ixoides*, measurements are given for carapace length (excluding posterior lobes), carapace width excluding lateral projections, and carapace width including lateral projections respectively. In the case of genera like *Myra* and *Myrodes* which do not have lateral spines, measurements are given of length from tip of frontal lobes to base of posterior median spine, widest breadth, and length from tip of frontal lobes to tip of posterior median spine respectively.

Where a large number of specimens from one species have been examined, measurements are given only for a few, usually of the largest and the smallest specimen. The following abbreviations are used in the text APE—Albatross Philippines Expedition, G1 and G2—the 1st and 2nd gonopods of the male respectively, Pt—Point, and Lt.—Lighthouse. The specimens are deposited in the collection of the Division of Crustacea, Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington D.C., U.S.A. (USNM).

#### List of Leucosiidae from the Philippines

(\*—from Chen (1989), † —species in the Smithsonian Institution NOT collected by the *Albatross*)

*Alox ornatum* (Ihle, 1918)\*

*Alox rugosum* (Stimpson, 1858)

*Arcania brevifrons* Chen, 1989\*

*Arcania elongata* Yokoya, 1933

*Arcania globata* Stimpson, 1858

*Arcania novemspinosa* (Adams and White, 1858)

*Arcania quinquespinosa* Alcock and Anderson, 1894

*Arcania septemspinosa* (Fabricius, 1787)

*Arcania undecimspinosa* de Haan, 1841\*

*Cateios frontalis* (Miers, 1884)\*

*Drachiella aglypha aglypha* (Laurie, 1906)\*

*Drachiella morum* (Alcock, 1896)\*

*Ebalia dimorphoides* Sakai, 1963\*

*Ebalia glans* (Alcock, 1896)\*

*Ebalia philippinensis* Chen, 1989\*

*Ebalia scabriuscula* Ortmann, 1892\*

*Ebalia serenei* Chen, 1989\*

*Heterolithadia fallax* (Henderson, 1893)

*Heteronucia laminata* (Doflein, 1904)

*Heteronucia perlata* (Sakai, 1963)\*

*Iphiclus spongiosus* Adams and White, 1848\*

*Ixa edwardsii* Lucas, 1858

*Ixa pulcherrima* (Haswell, 1880)

*Ixoides cornutus* MacGilchrist, 1905

*Leucosia craniolaris* (Linnaeus, 1758)

*Leucosia foresti* Chen, 1989\*

*Leucosia formosensis* Sakai, 1937<sup>+</sup>

*Leucosia galantua* Ovaere, 1988

*Leucosia longibrachia* Shen and Chen, 1978\*

*Leucosia margaritata* A. Milne Edwards, 1874\*

*Leucosia perlata* de Haan, 1841

*Leucosia rhomboidalis* de Haan, 1850

*Leucosia vittata* Stimpson, 1858

*Leucosia whitei* Bell, 1855

*Myra acutidens* Ihle, 1918

*Myra affinis* Bell, 1855

*Myra biconica* Ihle, 1918\*

*Myra elegans* Bell, 1855

*Myra fugax* (Fabricius, 1798)

*Myrodes eudactylus* Bell, 1855

*Nucia speciosa* Dana, 1852\*

*Nucia tuberculosa* A. Milne Edwards, 1874

*Nursilia dentata* Bell, 1855

*Nursilia tonsor* Alcock 1896

*Oreotlos speciosus* Chen, 1989\*

*Parialia major* Sakai, 1961

*Parialia ovata* Chen, 1984

*Pariphiculus agariciferus* Ihle, 1918\*

*Pariphiculus coronatus* (Alcock and Anderson, 1894)

*Pariphiculus mariannae* (Herklots, 1852)

*Philyra pisum* de Haan, 1841<sup>†</sup>

*Philyra platychira* de Haan, 1841

*Philyra verrucosa* Henderson, 1893<sup>‡</sup>

*Praebebalia dondonae* Chen, 1989\*

*Praebebalia semblatae* Chen, 1989\*

*Praebebalia septemspinosa* Sakai, 1983

*Pseudophilyra* sp.

*Randallia* sp.n.

*Randallia eburnea* Alcock, 1896\*

*Randallia lanata* Alcock, 1896

*Randallia pustuloides* Sakai, 1961

*Randallia pustulosa* Wood-Mason and Alcock, 1891

*Randallia speciosa* Chen, 1989\*

*Randallia trituberculata* Sakai, 1961\*

**Systematics**Family **Leucosiidae** Samouelle, 1819Genus **Alox** Tan and N, 1995**Alox rugosum** (Stimpson, 1858)

(Fig. 1A)

*Oreophorus rugosus* Stimpson, 1858: 161.

*Material examined.* **Philippines.** Negros, Guijulugan, shore, coll. USBF, APE, 2.iv.1908, 1 ♂ (6.3 × 7.8). Stn. 5159, coll. USBF, APE, 1 ♀ (10.1 × 14.6).

*Diagnosis.* Carapace broader than long, dorsal surface covered with mushroom-shape granules, groove parallel to border of carapace present, sub hepatic region raised to form large angular projection; front bilobed, lobes pointed, produced and upturned. Chelipeds stout, immovable finger massive. Male abdomen with segments 1, 2, 6, 7 free; G1 with distal portion setose, tip narrow. Female abdomen with groove on either side of median line, terminal segment elongate triangular.

*Remarks.* A revision of *Oreophorus* Rüppell, 1830 [*s. lat.*], was carried out by Tan and Ng (1995). The group was divided into several genera, including *Alox*. *Alox* presently consists of two species, *A. rugosum* (Stimpson, 1858) and *A. somphos* Tan and Ng, 1995. This is a new record for the Philippines.

*Distribution.* Japan (type locality), Philippines (present record).

**Arcania** Leach, 1817**Arcania elongata** Yokoya, 1933

(Figs 2k–o, 1B)

*Arcania elongata* Yokoya, 1933: 133–134.

*Material examined.* **Philippines.** Stn 5309, coll. USBF, APE, 4 September 1908, 1 ♂ (21.7 × 18.5, 24.1 × 22.0). Stn 5210, 17 April 1908, coll. USBF, APE, 1 ♀ (30.8 × 24.2, 32.9 × 30.5). Malavatuan, vic. South Luzon, Stn 5276, 32.9 m, 17 July 1908, 1 young ♂ (badly damaged) (USNM 65346). West Luzon, South Fernando Pt Lt., Stn 5442, 11 May 1909, coll. USBF, APE, 1 ♂ (25.4 × 21.7, 26.7 × 24.8) (USNM 65427), 1 ♀ (30.1 × 27.8, 32.2 × 30.5).

*Diagnosis.* Carapace ovoid, covered with small, sharp granules with curved tips, one spine each on sub hepatic region, anterolateral margin, junction of antero- and posterolateral margins, and posterolateral margin; spine on anterolateral margin represented by tubercle, intestinal region with conical spine, posterior margin with two dorso-ventrally flattened spines; front bidentate, margin with coarse granules. Inner border of merus of 3rd maxillipeds smoother than rest of merus, demarcated from rest of merus by line of hair. Fingers of chelipeds slightly longer than palm; dactylus with fringe of hairs on the anterior edge. Male G1 2.6 × longer than G2, slender, distal end curved, with funnel-shaped tip, base of tip with long setae.

*Remarks.* The spination on the carapace in *A. elongata* varies with size and sex. The frontal teeth in females are generally sharper as they end in a small spine, whereas in the male, the teeth are somewhat more blunt. The spine on the sub hepatic region also varies from a small denticle to a small conical spine. However, in all specimens

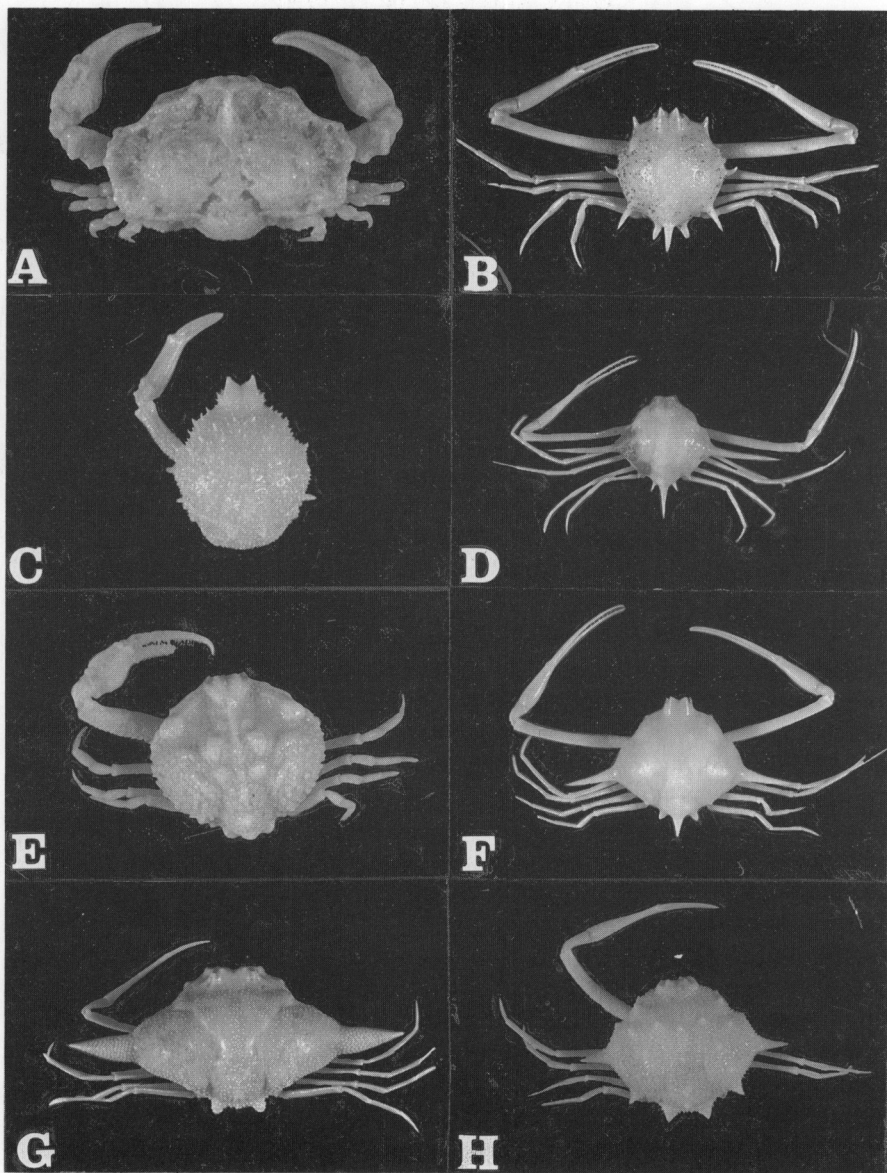


FIG. 1. (A) *Alox rugosum* (Stimpson, 1858), male ( $6.3 \times 7.8$ ); (B) *Arcania elongata* Yokoya, 1933, male ( $21.69 \times 18.46$ ); (C) *Arcania globata* Stimpson, 1858, female ( $10.9 \times 8.8$ ); (D) *Arcania septemspinosa* (Fabricius, 1887), male ( $17.2 \times 16.3$ ,  $24.0 \times 43.8$ ); (E), *Heterolithadia fallax* (Henderson, 1893), male ( $12.0 \times 12.4$ ); (F) *Arcania quinquispinosa* Alcock and Anderson, 1894, male ( $11.1 \times 10.7$ ,  $13.1 \times 20.9$ ); (G) *Ixa edwardsii* Lucas, 1858, female ( $28.9 \times 40.0$ ,  $67.7$ ); (H) *Ixa pulcherrima* (Haswell, 1880), female ( $14.8 \times 15.9$ ,  $22.7$ ).

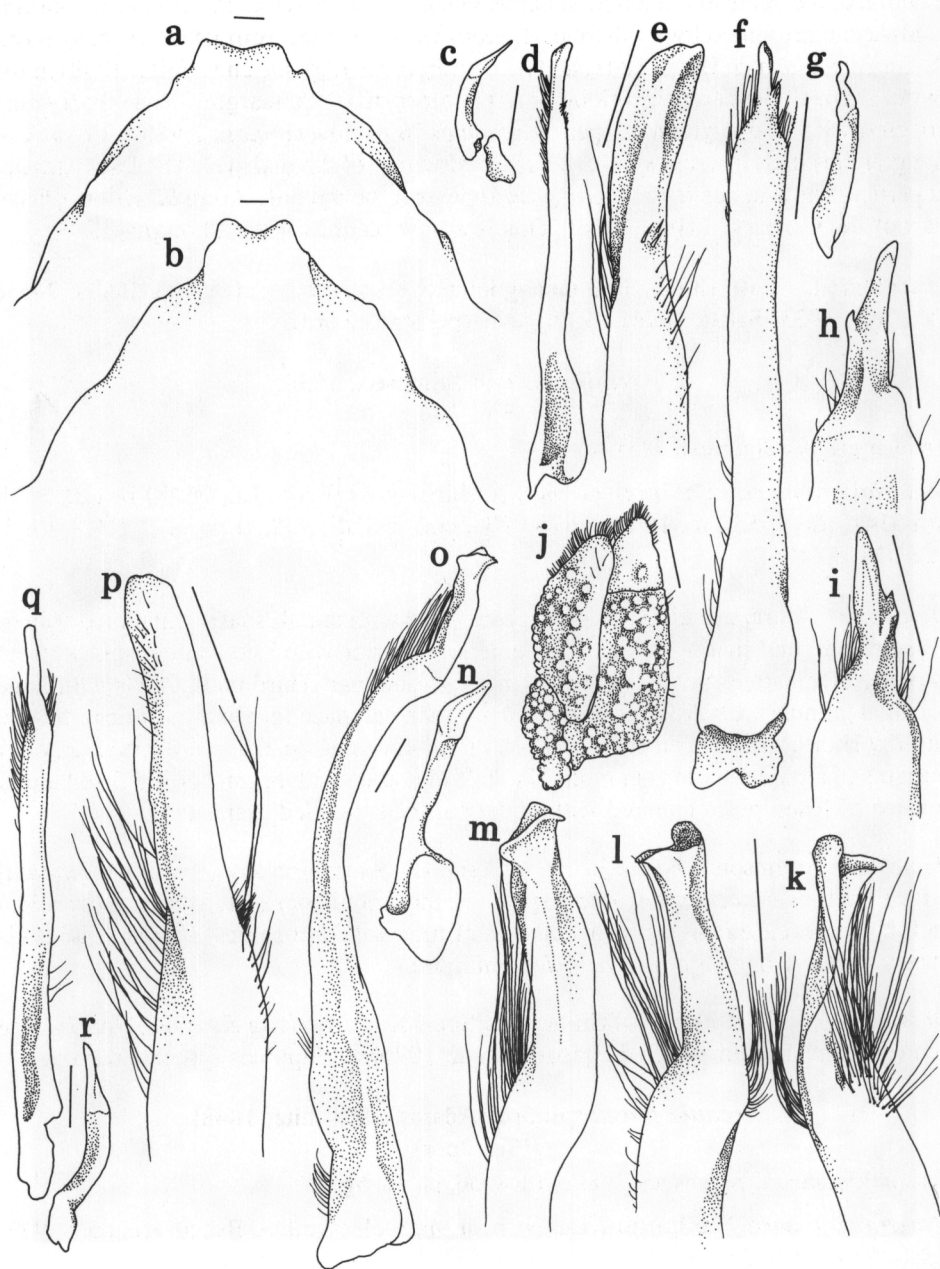


FIG. 2. *Arcania septemspinosa* (Fabricius, 1787), male: (a) front, dorsal view. *Arcania quinquespinosa* Alcock and Anderson, 1894, male: (b) front, dorsal view; (c) right G2; (d) right G1; (e) tip of right G1. *Heterolithadia fallax* (Henderson, 1893), male (11.12 × 11.58): (f), right G1; (g) right G2; (h)–(i) tip of right G1; (j) right 3rd maxilliped, outer surface. *Arcania elongata* Yokoya, 1933, male (25.4 × 21.7), (26.7 × 24.8): (k)–(m) tip of right G1; (n) right G2; (o), right G1. *Arcania novemspinosa* (Adams and White, 1848), male: (p) tip of right G1; (r) right G2. Scales: e, h, i, k–m, p = 0.5 mm; all others = 1.0 mm.

examined, the spine at the junction between the antero- and the posterolateral margins is always represented by a tubercle. *A. elongata* is distinct from its closer congeners, *A. undecispinosa* de Haan, 1841, and *A. novempinosa* (Adams and White, 1848) in the ovoid shape of the carapace (globular in the other two), the margins of the front being covered with coarse granules (pearly granules in *A. novempinosa* and a pavement of flat granules in *A. undecispinosa*) and the structure of the male G1. The last character is particularly diagnostic as *A. elongata* appears to be the only *Arcania* with the distal part of the G1 curved (Fig. 1o–q). This is a new record for the Philippines.

*Distribution.* East China Sea, Guangdong (China) (Dai and Yang, 1991); Japan (Yokoya, 1933; Sakai, 1976); Philippines (present record).

*Arcania globata* Stimpson, 1858

(Fig. 1C)

*Arcania globata* Stimpson, 1858: 160

*Material examined.* **Philippines.** Sulu Archipelago, off Jolo Lt., 06°90'N 120°58'E, Stn 5141, trawl, 53.1 m, 15 February 1908, coll. USBF, APE, 1 ovig. ♀ (10.9 × 8.8) (USNM 134196).

*Diagnosis.* Carapace globular, surface covered with small, sharp granulated spines, 10 spines around margin longer than others, posterior with two conical spines; front strongly bidentate, frontal teeth sharp, margins granular. Third maxillipeds with large rounded granules. Chelipeds slender, longer than carapace (excluding spines), fingers slightly shorter than palm, merus with large granules as on 3rd maxillipeds; anterior margins of ambulatory legs granular. Female abdomen with segments 3–5 fused, outer surface of fused piece covered with widely spaced rounded granules.

*Remarks.* Stimpson (1907: 156), in his original description says, '... it [*A. globata*] differs from *A. erinaceus* in wanting spines on the ambulatory feet; from *A. tuberculata* and *A. laevimana* in having sharp instead of tuberculiform spines'. I concur with his observations. This is a new record for Philippines.

*Distribution.* Off the coast of China, near Soon-Koo and Hong Kong Is., North China Sea (type locality unspecified), Japan (Sakai, 1976), Philippines (present record).

*Arcania novempinosa* (Adams and White, 1848)

(Figs 2p–r)

*Iphis novempinosa* Adams and White, 1848: 56, pl. 13, fig. 1.

*Material examined.* **Philippines.** Luzon, near Mariveles, coll. A. Reese, acc. no. 56023, 1 ♂ (21.3 × 18.6, 25.7 × 23.3).

*Diagnosis.* Carapace globular, surface with widely spaced coarse granules, pterygostomian region with short, upcurved spine, posterior hepatic region with small tubercle, junction between antero- and posterolateral margins with upcurved spine, posterolateral margins and intestinal regions each with long, upcurved spine, posterior margin with one dorsoventrally flattened spine on either side; front strongly bidentate, each tooth surface finely granular. Third maxillipeds finely granular. Chelipeds about 2.6 × longer than carapace (excluding spines), palm slightly swollen at base, fingers slender, longer than palm; ambulatory legs more slender than chelipeds, anterior edge of dacylus

fringed with hairs. Male abdomen with segments 2, 6, 7 free, G1 slender,  $2.7 \times$  longer than G2, apex produced to form elongated process, base of process with long setae.

*Remarks.* According to Alcock (1896: 267), *A. novemspinosa* may be synonymous with *A. undecimspinosa* de Haan, 1841, as the former differs from the latter species only in the following characters: (1) the surface of the carapace, in adults, is almost smooth, without any isolated granules or prickles; (2) the marginal spines are very much larger (except for the spine at the junction of the subhepatic and branchial regions); (3) the regions of the carapace are not well-defined; (4) the front is more prominent; and (5) the adult male chelipeds are  $2.5 \times$  the carapace length, and the merus is finely granular only at the base. I agree with Alcock (1896) on these points, and can find no other differences between the two species. Dai and Yang (1991) figured the G1s of both species and they are very similar in structure. *A. novemspinosa* was described from the Philippines and Amboin, whilst *A. undecimspinosa* was from Japan. A direct comparison of the types will probably show both species to be synonymous, but until then they are retained as separate species.

*Distribution.* China, Philippines, Amboina Is., Australia (Dai and Yang, 1991).

***Arcania quinquespinosa* Alcock and Anderson, 1894**  
(Figs 2b–e, 7F)

*Arcania quinquespinosa* Alcock and Anderson, 1894: 206.

*Material examined.* **China Sea.** Stn 5303, 62.2 m., 9 August 1908, coll. USBF, APE, 1 ovig. ♀ ( $17.6 \times 17.8$ ,  $20.4 \times 31.7$ ) (USNM 65337). China Sea. vic, Hong Kong, Stn 5302, 69.5 m., 9 August 1908, coll. USBF, APE, 1 ovig. ♀ (USNM 65336). Stn 5304, 62.2 m., 9 August 1908, coll. USBF, APE, 1 ♂ (USNM 65338). Stn 5302, 69.5 m., 9 August 1908, coll. USBF, APE, 2 ♀ ♀ (USNM 65336). **Philippines.** Quezon Province, Cabaleta Is., 32.9–58.6 m sand and mud bottom, 21–25 April 1959, coll. F. G. Dayrit and J. E. Norton, 1 ♂ ( $11.1 \times 10.7$ ,  $13.1 \times 20.9$ ,  $11.2 \times 11.6$ ,  $13.4 \times 23.3$ ), 1 ovig. ♀. Buton Strait, Tikola Peninsula, Stn 5642, 67.7 m, 14 December 1909, coll. USBF, APE, 1 ovig. ♀ (USNM 65334). East Mindanao, Nagubat Is., Stn 5235, 80.5 m, 9 May 1908, coll. USBF, APE 1 ♂ (USNM 65335).

*Diagnosis.* Carapace granular towards margins, faint grooves demarcating regions of carapace, hepatic region swollen such that projecting front becomes sharply disjunct from rest of carapace, subhepatic region with small tubercle, junction of antero- and posterolateral margins with long, sharp, backward and upward projecting spine, intestinal region with long, sharp upward curving spine, posterior portion of posterolateral margin with small tubercle, posterior margin with two small spines on either side; front sharply bidentate. Fingers of cheliped  $2 \times$  as long as palm; ambulatory legs slender. anterior and posterior margins of dactyli fringed with hair. G1 slender,  $3 \times$  longer than G2, apex drawn out to form elongated process with setae at base, tip of process slightly expanded.

*Remarks.* The closest congener of *A. quinquespinosa* seems to be *A. septemspinosa* (Fabricius, 1787). Alcock (1896: 266) differentiates them using the following characters: (1) *A. quinquespinosa* is a much smaller species, the carapace of the adult being  $< 12$  mm in length and  $< 14$  mm in breadth; (2) the carapace of



*A. quinquespinosa* has a 'broadly conical' outline due to the bulging branchial regions whereas in *A. septemspinosa*, the carapace is 'bluntly rhomboidal'; (3) the front in *A. quinquespinosa* is sharply bidentate instead of bilobate (as in *A. septemspinosa*); (4) in *A. quinquespinosa*, the carapace spines are relatively smaller, the spine on the posterolateral region being either absent or reduced to a tubercle; (5) grooves demarcating the regions of the carapace are present on the carapace of *A. quinquespinosa*, except for the transverse crease separating the hepatic from the branchial regions, the regions of the carapace are not clearly demarcated in *A. septemspinosa*; (6) the fingers of the chelipeds of *A. quinquespinosa* are nearly  $2 \times$  the length of the palm whilst those in *A. septemspinosa* are a little longer than the palm; and (7) there is a red white-edged ocellus on the cardiac region of live or freshly preserved specimens of *A. quinquespinosa* whilst for *A. septemspinosa*, the carapace is 'streaky and patchy red'. The specimens examined by the author were all creamy white. An additional character is that the hepatic region of *A. quinquespinosa* is swollen in such a way as to cause the front to appear sharply disjunct from the rest of the carapace (Fig. 1a, b).

*Distribution* China (South and East China Sea), Japan, Indonesia, India, Sri Lanka, Laccadive Is, Iran, Persian Gulf, Red Sea, Vietnam, Philippines (Chen, 1989).

*Arcania septemspinosa* (Fabricius, 1787)

(Figs 2a, 1D)

*Cancer septemspinus* Fabricius, 1787:463

*Material examined.* **Philippines** Stn 5209, 14 April 1908, coll. USBF, APE, 2♂♂ ( $17.2 \times 16.3$ ,  $24.6 \times 43.8$ ), ( $17.2 \times 16.7$ ,  $21.0 \times 40.9$ ), 2♀♀ ( $18.4 \times 17.4$ ,  $26.3 \times 46.7$ ) ( $18.9 \times 18.4$ ,  $23.7 \times 39.1$ ). Corregidor Lt., off South Luzon, Stn 5107, 51.2 m, coll. USBF, APE, 9.i.1908, 1♀ (USNM 65347). Mariquitdaquit Is., off East Leyte, Stn 5204, 27.5 m, 11 April 1908, coll. USBF, APE 1♂ (USNM 65349). Taratara Is., off West Samar, Stn 5208, 47.6 m, 14 April 1908, coll. USBF, APE, 1♂ (USNM 65366), St. Fernando Is., West coast of Luzon, Stn 5442, 82.4 m, 11 May 1909, coll. USBF, APE, 1♂ (USNM 65368). **China Sea.** Stn 5302, 69.5 m, coll. USBF, APE, 9 August 1909 1M (USNM 65367).

*Diagnosis.* Carapace rhomboidal, surface with irregular patches of granules, hepatic region separated from branchial region by transverse crease, subhepatic region with small tubercle, junction of antero- and posterolateral margins with long, sharp, upward and backward projecting spine, posterolateral margin with small, sharp spine, intestinal region with long, sharp, upward curving spine, posterior margin with a small spine on either side of median line; front bilobed. Chelipeds slender, fingers slightly longer than palm; anterior and posterior margins of dactylus of ambulatory legs fringed with hair.

*Remarks.* This species is allied to *A. quinquespinosa*. The differences between the two species are enumerated under the remarks for *A. quinquespinosa*.

*Distribution.* Malay Peninsula, India, Persian Gulf, China, Red Sea, Cape of Good Hope (Dai and Yang, 1991).

***Heterolithadia*** Alcock, 1896  
***Heterolithadia fallax*** (Henderson, 1893)  
 (Figs 2f–j, 1E)

*Ebalia fallax* Henderson. 1893:402, pl. 38, figs. 4–6.

**Material examined. Philippines.** Gulf of Davao, Linao Pt, Stn 5253, 51.2 m, 18 May 1908, coll. USBF, APE, 2♂♂ (11.1 × 11.5, 12.0 × 12.4) (USNM 65344).

**Diagnosis.** Carapace broader than long, surface covered with flat-topped granules, except in hepatic regions, anterolateral margin thickened, ending posteriorly in large, granular swelling, median ridge present with two granular swellings on gastric regions on either side, cardiac region with one tubercle, intestinal region with two tubercles, posterior margin bilobed; front broadly bilobed. Fingers of chelipeds about 2 × longer than palm, cutting edges finely denticulate and setose. Male abdomen with segments 3–6 fused, penultimate segment with a tooth; G1 moderately stout, 3.8 × longer than G2, with unequally bifurcated tip, base of tip setose.

**Remarks.** Ihle (1918) disagreed with Alcock (1896) that *Heterolithadia* and *Nursilia* are closely related but he gave no reason for this. *Heterolithadia* does resemble *Nursilia* Bell, 1855, in terms of the proportions of the carapace, the bilobed front, the swellings on the anterolateral margins, the gastric, cardiac and intestinal regions, the proportions of the fingers of the chelipeds relative to palm, the finely denticulate cutting edges of the fingers, the presence of a tooth on the penultimate segment of the male abdomen and the bifurcated tip of the male G1. However, according to Alcock (1896:259–260), the movable finger of the cheliped in *Heterolithadia* moves through an arc of >75° whilst that in *Nursilia* moves through an arc of 130°. Also, the chelipeds of *Heterolithadia* are somewhat more slender than those of *Nursilia* and the species of this genus usually have a thin carapace margin.

The genus name was cited in Alcock (1896) as '*Heterolithadia*, Wood-Mason, (name only)'. It appears that Wood-Mason may have suggested the name but the description was written by Alcock. Thus, authorship of *Heterolithadia* should correctly be attributed to Alcock (1896). This is a new genus and species record for the Philippines.

**Distribution.** Gulf of Manaar; Andaman Is.; Orissa Coast, off Sulu (Ihle, 1918), Phillipines (present record).

***Heteronucia*** Alcock, 1896  
***Heteronucia laminata*** (Doflein, 1904)  
 (Figs 3a–e)

*Philyra laminata* Doflein, 1904:46, pl. 15, figs 5, 6.

**Material examined. Philippines.** Stn 5417, 25 March 1909, coll. USBF, APE, 2♂♂ (14.3 × 13.7, 17.4 × 17.1). Stn 5372, 24 February 1909, coll. USBF, APE, 1♂ (16.5 × 15.4). Stn 5411, 23 March 1909, coll. USBF, APE, 1♂ (16.5 × 15.3), 1♀ (17.4 × 16.6). Stn 5412, 23 March 1909, coll. USBF, APE, 1♂ (18.91 × 17.39).

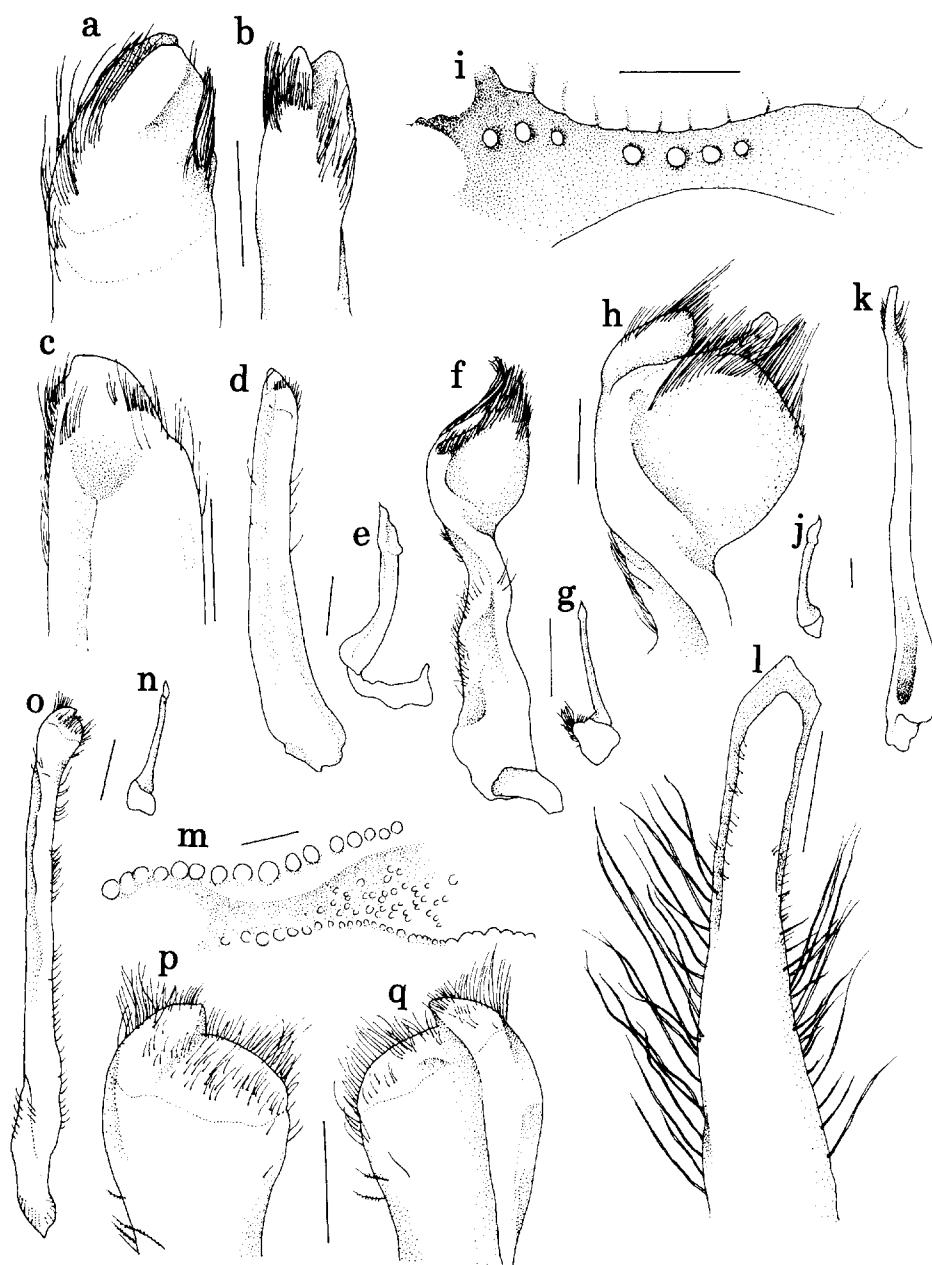


FIG. 3. *Heteronucia laminata* (Doflein, 1904), male (16.5 × 15.3): (a)–(c), tip of right G1; (d) right G1; (e) right G2. *Leucosia cheverti* Haswell, 1880, male: (f) right G1, partially denuded; (g) right G2; (h), tip of right G1, partially denuded; (i), right thoracic sinus. *Ixoides cornutus* MacGilchrist, 1905, male: (j) right G2; (k) right G2; (l) tip of right G1. *Leucosia craniolaris* (Linnaeus, 1758), male: (m) right thoracic sinus; (n) right G2; (o) right G1; (p), (q) tip of right G1. Scales: a–c, h, l, p, q = 0.5 mm; all others = 1.0 mm.

*Diagnosis.* Carapace ovoid, covered entirely by short velvety tomentum, widely spaced, medium sized granules under tomentum, intestinal region tumid and separated from rest carapace by groove, lateral margins entire, not divided into lobes, posterior margin divide into two large, rounded lobes; front bilobed, lobes rounded. Third maxillipeds granular as on dorsal surface of carapace. Sternum granular, suture between sternite 3–4 invisible, sternite 5 in male with two large granules on either side of abdomen. Chelipeds short and stout, palm very swollen, fingers open vertically, slightly longer than palm. Abdominal segments 3–5 fused in male, segments 4–6 in female. G1 2.3 × longer than G2, G1 apex covered with long hairs, with two round lobes.

*Remarks.* Alcock states that for *Heteronucia*, the ‘... basal antennal joint is fused with the orbit and with the front, and the extremely minute antennary flagellum is entirely inside the orbital wall’ (Alcock, 1896:177). This condition is not found in the specimens which the author examined. Instead, the basal antennal joint and the 2nd article are loosely lodged. However, Ihle (1918) believes that the mobility of the basal antennal joint is taxonomically insignificant. This character is rather difficult to examine in most specimens due to the layer of sediment that almost invariably covers them. Chen (1989) transferred the species to *Heteronucia* Alcock, 1896, solely on the basis that the fingers of the chelipeds opened in a vertical instead of horizontal plane. This character is rather subjective and specimens sometimes have fingers opening in a plane intermediate between the horizontal and vertical, depending on how the chelipeds are placed during examination. In my opinion, additional characters should be used to justify the transfer of the species to *Heteronucia*. It is clear that the boundary between *Heteronucia* and *Nucia* needs to be clarified and redefined. I have therefore retained the species in *Heteronucia* until such a revision is done.

*Distribution.* Nias Is., South of Bangkum, Indonesia (type locality); China (South China Sea), Japan, Philippines (Chen, 1989).

*Ixa* Leach, 1815

*Ixa edwardsii* Lucas, 1858

(Fig. 1G)

*Ixa edwardsii* Lucas, 1858: pl. 4, fig. 3.

*Material examined.* **Philippines.** West Luzon, South Fernando Pt Lt., Stn 5442, 82.4 m, 11 May 1909, coll. USBF, APE 1 ♀ (28.9 × 40.0, 67.7) (USNM 65432).

*Diagnosis.* Carapace with two lateral projections gradually tapering to a point, carapace covered with round granules, regions demarcated by shallow grooves, intestinal region raised to form small mound, posterior margin with two round lobes; front broadly bidentate. Endognath of ischium of third maxillipeds covered with closely packed large, pearly granules except for inner edge, proximal 0.75 of exognath covered in similar fashion. Chelipeds long and slender, fingers about half length of palm. Female abdomen coarsely granular, with two grooves running on either side of median line.

*Remarks.* The pattern of pearly granulation on the 3rd maxillipeds in *Ixa edwardsii* is particularly diagnostic as this condition is absent in other *Ixa* species. From the description given, the specimens recorded by Alcock (1896:273) as *Ixa inermis* appear to be conspecific with *I. edwardsii*. Hence, *I. inermis* sensu Alcock, 1896, was

synonymized with the latter species by Chen (1989) and by Dai and Yang (1991). I agree with their action, particularly since Alcock (1896) clearly mentioned the unique pearly granulation on the third maxillipeds.

*Distribution.* India, China, Persian Gulf, Red Sea, Turkey, Zanzibar, Northern Australia (Dai and Yang, 1991), Philippines, Indonesia (Chen, 1989).

*Ixa pulcherrima* (Haswell, 1880)

(Fig. 1H)

*Arcania pulcherrima* Haswell, 1880:58, pl. 6, fig. 4.

*Material examined.* **Philippines.** Gulf of Davao, Linao Pt, Stn 5253, 51.2 m, 18 June 1908, coll. USBF, APE, 1♀ (14.8 × 15.9, 22.7) (USNM 65351).

*Diagnosis.* Carapace broader than long, dorsal surface covered with round granules, margins with pointed granules, large tubercles on hepatic, subhepatic, anterolateral, branchial, cardiac and intestinal regions, junction of posterolateral margin with granular conical spine, posterolateral margin with shorter spine, posterior margin with two flattened spines: front bilobed, lobes triangular. Chelipeds longer than carapace, palm slightly swollen at base, fingers slightly shorter than palm; dactylus of ambulatory legs shorter than propodus. Female abdomen with segments 4–6 fused.

*Remarks.* Miers (1884) synonymized *Arcania septemspinosa* Bell, 1855, with *Ixa pulcherrima* after examining the type specimen of the former species in the British Museum. Serène and Lohavanijaya (1973: 41) agreed with his action, stating 'He (Miers) gave good reasons to maintain the name of Haswell and stipulated that the specimen from Bell (1855) is from Borneo and not of unknown locality, as Bell states ...'. However, Chen (1989: 227) raised doubts about it as the fingers of the chelipeds in her specimen of *I. pulcherrima* are shorter than the palm (nearly as long as palm in Bell, 1855: fig. 7) and the fused piece of the female abdomen is round in Bell's figure whilst that for Chen's specimen (Chen, 1989: pl. 6, fig. 4) and Haswell's specimen (Haswell, 1880: pl. 6, fig. 4) is oval. She concluded that Bell's *Arcania septemspinosa* (1855) is a species distinct from *Ixa pulcherrima*. I have not examined Bell's specimen and thus am unable to comment on the validity of Mier's action (1884). Prior to this, Serène and Lohavanijaya (1973) synonymized *Ixa investigatoris* Chopra, 1933, with *Ixa pulcherrima* and suggested the future possibility of transferring *I. investigatoris* to *Arcania*. Chen (1989) stated that 'The specimens identified by *Ixa pulcherrima* by Serène and Lohavanijaya (1973: 41, pl. 4a) belong to *I. investigatoris* ...', but did not give her reasons for it. Thus, *I. pulcherrima* and *I. investigatoris* should be recognized as distinct until the type specimens of both are examined and compared.

*Distribution.* Chevert Is., Australia (type locality), Borneo, the Indian Ocean and the Philippines (Serène and Lohavanijaya (1973)).

*Ixoides* MacGilchrist, 1905

*Ixoides cornutus* MacGilchrist, 1905

(Figs 3j–1, 4A, B)

*Ixoides cornutus* MacGilchrist, 1905: 255.

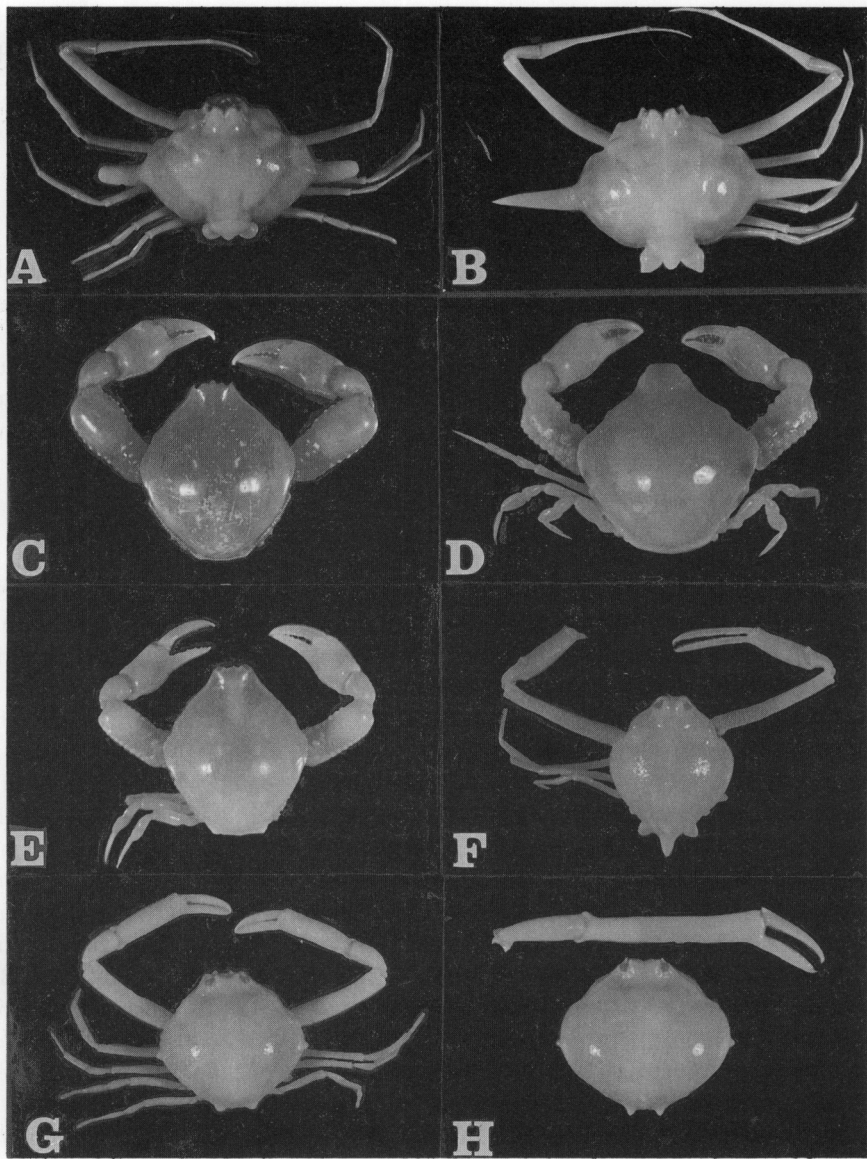


FIG. 4. (A) *Ixoides cornutus* MacGilchrist, 1905, male (28.9 × 29.8, 60.3); (B) *Ixoides cornutus* MacGilchrist, 1905, male (32.0 × 35.4, 55.5); (C) *Leucosia craniolaris* (Linnaeus, 1758), male (17.7 × 14.7); (D) *Leucosia galantua* Ovaere, 1988, female (11.8 × 11.0); (E) *Leucosia vittata* Stimpson, 1858, juvenile (11.2 × 9.2); (F) *Myra acutidens* Ihle, 1918, female (11.7 × 10.0, 12.3); (G) *Randallia pila* sp. n. Paratype female (10.0); (H) *Randallia pila* sp. n., Holotype male (13.1 × 15.1).

*Material examined.* **Philippines.** Stn 5477, 29 July 1909, coll. USBF, APE, 1 ♂ (28.9 × 29.8, 60.3), Stn 5097, coll. USBF, APE, 1 ♂ (32.0 × 35.4, 55.5).

*Diagnosis.* Carapace with 2 lateral projections sometimes tapering to a point, other times, rounding off, dorsal surface smooth, subhepatic region with tubercle, posterior margin with two large lobes constricted at base; front broadly bidentate. Ischium of 3rd maxillipeds with longitudinal grooves on inner border. Chelipeds slender, fingers slightly < 0.5 length of palm; dactyli of ambulatory legs fringed with hairs on anterior and posterior margins. Male G1 slender, about 4 × longer than G2, G1 with tip gradually tapering to distal end, base of tip setose.

*Remarks.* Chen (1989: fig. 21a–c) illustrates the variation in structure of the carapace lateral projection in an immature male and a mature male. The lobes on the posterior margin of the carapace are also variable according to Dai and Yang (1991). However, in the specimens examined, the proportion of the G1 relative to the G2 is the same for both specimens and the structure of the tip of the G1 is also basically similar for the two. As with Chen's specimens (1989), the smaller male here has the lateral projections tapering to a point whilst those in the larger specimen are stubby and rounded at the ends. An account of this kind of variation in this species is given in Serène and Lohavanijaya (1973).

*Distribution.* China (South China Sea and East China Sea), Taiwan, Japan, Vietnam, Persian Gulf. Philippines (Serène and Lohavanijaya, 1973; Chen, 1989).

*Leucosia* Weber, 1795

*Leucosia craniolaris* (Linnaeus, 1758)

(Figs 3m–q, 4C)

*Cancer craniolaris* Linnaeus, 1758: 626.

*Material examined.* **Philippines.** Nasugbu, December 1921, coll. D. Villadolid, 3 ♂ (16.6 × 13.9, 17.7 × 14.7, 17.3 × 14.3).

*Diagnosis.* Carapace hexagonal, thoracic sinus filled with hair, finely granular when denuded, with row of small granules continuous with epimeral edge; front with median triangular tooth. Propodus and dactylus of ambulatory legs compressed, carinate at margins. G1 4 × longer than G2. Colours in spirit: Bluish-grey with two pairs of white spots on dorsal surface of carapace, legs yellowish.

*Remarks.* The differences between *L. craniolaris* and the two species most closely related to it, *L. rhomboidalis* de Haan, 1850, and *L. vittata* Stimpson, 1858, are discussed in the remarks for the latter two species. Bell (1855: 283) adds that it is distinguished by the '... paucity of tubercles on the arm'. This is a new record for Philippines.

*Distribution.* Japan, China, Taiwan, Hong Kong, Gulf of Thailand, Borneo, India, northwest of Australia (Sakai, 1976), Philippines (present record).

*Leucosia galantua* Ovaere, 1988

(Figs 5a, 4D)

*Leucosia galantua* Ovaere, 1988: 95–98, figs. 1–3.

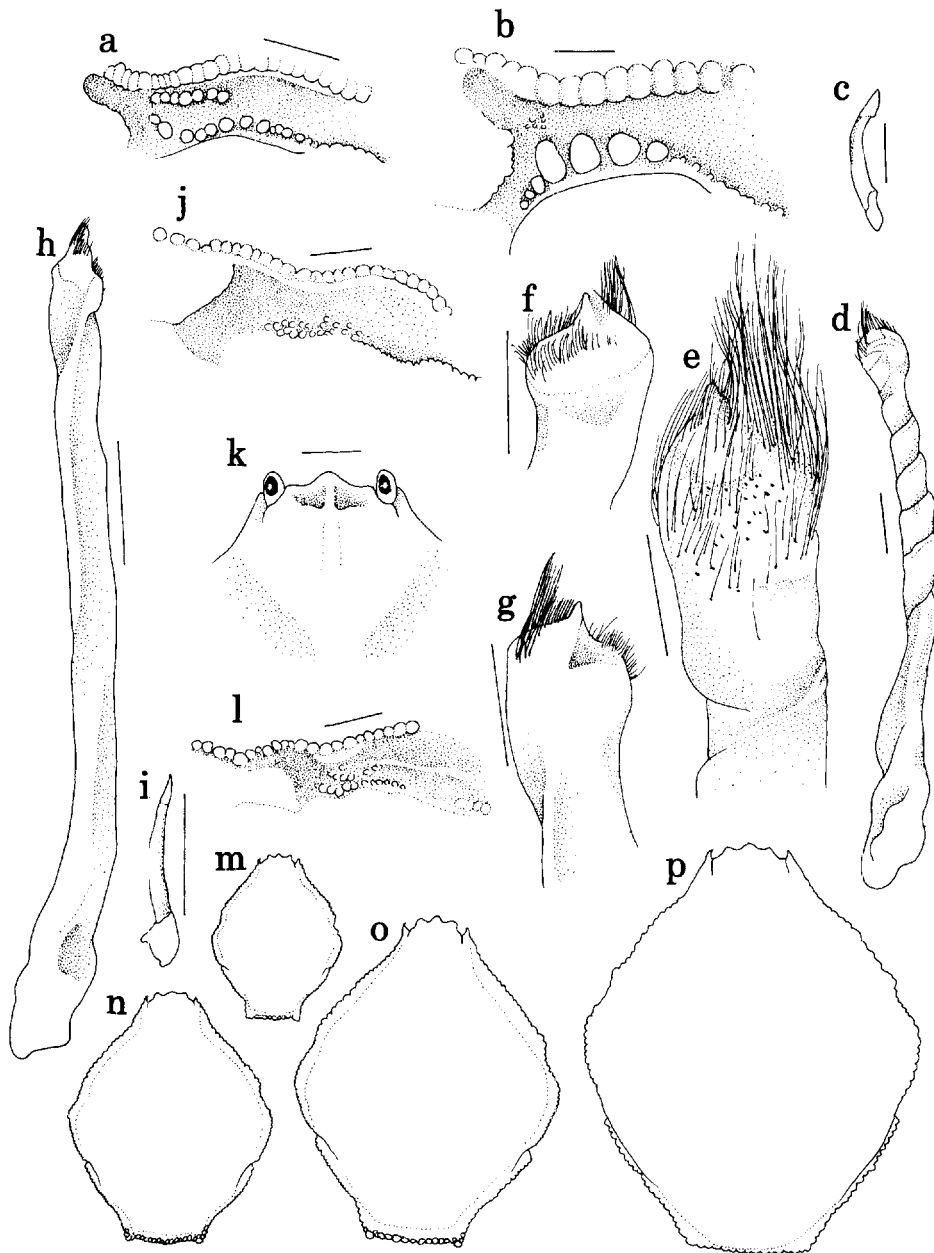


FIG. 5. *Leucosia galantua* Ovaere, 1988, female: (a) right thoracic sinus. *Leucosia perlata* de Haan, 1841, male: (b) right thoracic sinus; (c) right G2; (d) right G1; (e) tip of right G1. *Leucosia rhomboidalis* de Haan, 1850, male: (f), (g) tip of right G1; (h) right G1; (i) right G2; (j) right thoracic sinus; (k) front, dorsal view. *Leucosia vittata* Stimpson, 1858, juveniles: (l) right thoracic sinus; (m)-(p), carapace, dorsal view, showing variation with increasing size. Scales: e-g = 0.5 mm; all others = 1.0 mm.



*Material examined.* **Philippines.** Stn 5159, USBF, APE, 1 ♀ (10.9 × 10.1). Zambales Province, Nasasa Bay, 11–33 m, sandy bottom, coll. 1960, 1 ovig. ♀ (11.8 × 11.0) (acc. no. 23464).

*Diagnosis.* Carapace urn shaped, slightly longer than broad, anterolateral margin with semi-circular notch posteriorly caused by intrusion of dorsal arm of thoracic sinus, epimeral edge visible throughout entire extent, posterior margin slightly rounded, intestinal region weakly raised to form small mound, area below true posterior margin smooth; thoracic sinus filled with hair, with two large granules anteriorly, row of about seven granules on anterior roof of sinus, row of granules just above base of cheliped ending at beginning of epimeral margin; front broadly, weakly bilobed, slightly deflexed. Merus of chelipeds with patch of fur at base, fingers meeting only at tips, slightly shorter than palm. Colours in spirit: greyish brown with central lighter region, two reddish brown spots on each posterior margin just above first pair of walking legs.

*Remarks.* Ovaere (1988: 96) distinguished *L. galantua* from its closest congener *L. angulata* (Rathbun, 1911) by '... the form of tubercles on the anterior margin of the merus of the chelipeds, these tubercles being flat and tooth-like in *L. angulata*, while rounded and pearl-shaped in the new species [*L. galantua*]. The ornamentations of the thoracic sinus are different in both species: one large mushroom-shaped tubercle in *L. angulata* versus 2–3 large rounded tubercles in *L. galantua*'. In the two specimens examined, there are no hairs scattered on the carapace although they were observed by Ovaere (1988) for the holotype. Also, the tooth in the middle of the intestinal region present in the holotype is absent in both specimens. In its place is a slightly raised mound, which is barely discernible. The presence or absence of such a tooth on the intestinal region may be variable in the species and this was mentioned by Ovaere (1988). Ovaere (1988) also stated that the abdomen and underparts of the holotype had small reddish spots. This condition is absent in both the specimens examined.

*Distribution.* Western Australia, Papua New Guinea (Ovaere, 1988); Philippines (present record).

***Leucosia perlata*** de Haan, 1841

(Figs 5b–e)

*Leucosia perlata* de Haan, 1841: 134.

*Material examined.* **Philippines.** Lubana, coll. 1934, 1 ♂ (17.8 × 15.5), 2 ♀ ♀ (19.0 × 16.6, 18.9 × 16.7) (acc. no. 204997).

*Diagnosis.* Carapace longer than broad, hepatic margin sinuous, thoracic sinus with three small granules anteriorly, four larger, pearly granules posteriorly; front tridentate. Outer edges of movable finger and palm of cheliped cristate; propodus and dactylus of ambulatory legs flattened, with anterior and posterior edges cristate. Male G1 about 4 × longer than G2, distal half coiled, tip with long setae, central chitinous projection present. Colour in spirit: mottled lavender grey anteriorly, two brownish spots posteriorly on either side of median line.

*Remarks.* In the description and figure given by Tyndale-Biscoe and George (1962), the G1 of the male is distally coiled  $7 \times$ . In the specimen examined in this study, there were only five coils. This may be due to individual variation related to age of the specimen. In other aspects, the specimen fits their description. The specimen matches Alcock's description (Alcock, 1896: 222–223) of *L. pallida* well. His record was later synonymized with *L. perlata*. This is a new record for the Philippines.

*Distribution.* 'Moluccensis' (type locality), Andamans, Persian Gulf, New Guinea, Thursday Is., Hong Kong, Indian Archipelago (Ihle, 1918), Philippines (present record).

*Leucosia rhomboidalis* de Haan, 1841

(Figs 5f–k)

*Leucosia rhomboidalis* de Haan, 1841: 134, pl. 33.

*Material examined.* **Philippines** Stn 5426, 3 April 1909, coll. USBF, APE, 1 ♀ (12.8 × 10.9). Stn 5107, 9 January 1909, coll. USBF, APE, 1 ♂ (13.5 × 10.8). Stn 5104, 8 January 1908, coll. USBF, APE, 1 ♂ (13.5 × 10.9).

*Diagnosis.* Carapace rhomboidal, longer than broad, dorsal surface of carapace just behind front with two triangular indentations on either side of median line, antero- and posterolateral margin lined by granules, posterior margin almost straight; front tridentate, median tooth largest, dorsal surface convex and broadly carinate towards median line; thoracic sinus filled with hair, with cluster of small granules just above base of arm. Ischium of third maxillipeds smooth, distal portion of exopod and merus finely granular, anterior border of exopod setose. Chelipeds stout, patch of spongy pubescence at base of arm not completely encircling arm, fingers slightly longer than palm. Abdominal segments 2–3 and 4–6 fused, fused piece of segments 4–6 with median denticle. G1  $5 \times$  longer than G2, weakly twisted along distal third, apex bulbous, setose, ending in small, conical projection. Colours in spirit: carapace greyish-brown on anterior two-thirds, colour gradually fading to ivory posteriorly. Arms of chelipeds similar greyish-brown as carapace, fading to ivory distally. Base of fingers chrome yellow, tips white.

*Remarks.* This species is very similar to *L. craniolaris* (Linnaeus, 1758), as noted by Alcock (1896: 323). *L. rhomboidalis* differs from *L. craniolaris* by the following: (1) the size is much smaller, usually about 14 mm in length, never exceeding 16 mm (specimens of *L. craniolaris* are about 20 mm or more in length); (2) the sides of the front are subparallel, thereby forming an abrupt angle with the anterolateral borders of the carapace (the anterolateral margins and the front converge gradually in *L. craniolaris*); (3) the front ends in three teeth, with the middle one large and prominent and the two lateral ones small and deflexed, giving the impression that the front ends in a sharp point when viewed by the naked eye (in *L. craniolaris*, the front is truncate triangular, ends in five prongs and is broader than long); (4) the anterior boundary of the thoracic sinus is smooth and almost straight (convex in *L. craniolaris*, with the thoracic sinus ending in two notches of equal size); (5) the inner surface of the carpus of the cheliped is bound above and below by a line of granules (in *L. craniolaris*, the surface of the wrist is quite smooth, except for two or three granules along the inner surface) (after Alcock, 1896: 235). The colour in spirit of the specimens is rather variable and cannot be the sole character in distinguishing the species for Alcock (1896)

says, 'carapace and dorsal surface of chelipeds blue-black, the carapace with 2 divergent crescents of dark red spots in its anterior half, following the anterior boundary of the epibranchial regions; tips of arms, hands and fingers sometimes nearly white, bases of fingers sometimes yellow ...' whilst the present specimens are greyish brown anteriorly and ivory posteriorly, without any crescents of red on anterior half.

An interesting character in *L. rhomboidalis* is the presence of two triangular indentations on the dorsal surface of the carapace just behind the front (snout), giving the surface a keeled appearance (Fig. 3k). This has never been mentioned before but is clearly seen in the figure provided by Chen (1989: fig. 30b-c).

*Distribution.* Coromandal Coast, Trincomali, Andaman Is., Hong Kong, Japan, Indian Archipelago (Ihle, 1918), China (South China Sea and East China Sea), Indonesia, Philippines (Chen, 1989).

*Leucosia vittata* Stimpson, 1858

(Figs 5l-p, 6a-d)

*Material examined.* **Philippines.** Manila Bay, outside breakwater, coll. USBF, APE, 12 December 1907, 6 juveniles (4.5 × 3.5, 6.8 × 5.5, 8.8 × 7.0, 8.9 × 7.2, 9.2 × 7.7, 11.2 × 9.2).

*Diagnosis.* Carapace roughly hexagonal, dorsal surface just behind front convex, anterolateral border with emargination just above chelipeds due to intrusion by dorsal arm of thoracic sinus, epimeral edge visible throughout almost its entire extent, posterior margin straight in adults, with two lateral angles in juveniles; thoracic sinus filled with hair, a few small granules present just above base of cheliped; front tridentate, teeth rounded. Fingers of chelipeds slightly longer than palm, anterior edge of movable finger sharp; anterior edge of carpus and propodus of ambulatory legs carinate, dactylus flattened dorso-ventrally. G1 slender, 2.9 × longer than G2, apex setose, with two lobes, one larger than the other. Colours in spirit: largest male (young) has longitudinal white patch on dorsal surface of the carapace just behind front, anterior three-fourths greyish brown, gradually fading to ivory posteriorly, branchial region with two pairs of white spots, anterior posterolateral margin with two short brown stripes going diagonally towards the centre, outer surface of maxillipeds dark brown, base of meri and fingers brown, tips of fingers ivory. Smaller specimens have dorsal surface of carapace either 0.75 greyish brown fading to ivory posteriorly or only with snout greyish brown and rest of body ivory, outer surface of third maxillipeds light brown. A small specimen (6.88 × 5.53) has the brown stripes on posterolateral margin as in largest specimen.

*Remarks.* *Leucosia vittata* closely resembles *L. craniolaris* but is distinguished from the latter species particularly by the presence of an emargination at the posterior anterolateral margin due to encroachment by the dorsal arm of the thoracic sinus. In addition, the cheliped palm is appreciably longer than broad and the fingers are as long as or longer than the palm. According to Alcock (1896), the colour in spirit of the two species is also different. 'The colours in spirit are: carapace blackish blue, or nearly black, with flame-coloured stripes; chelipeds from the distal fourth of the arm to near

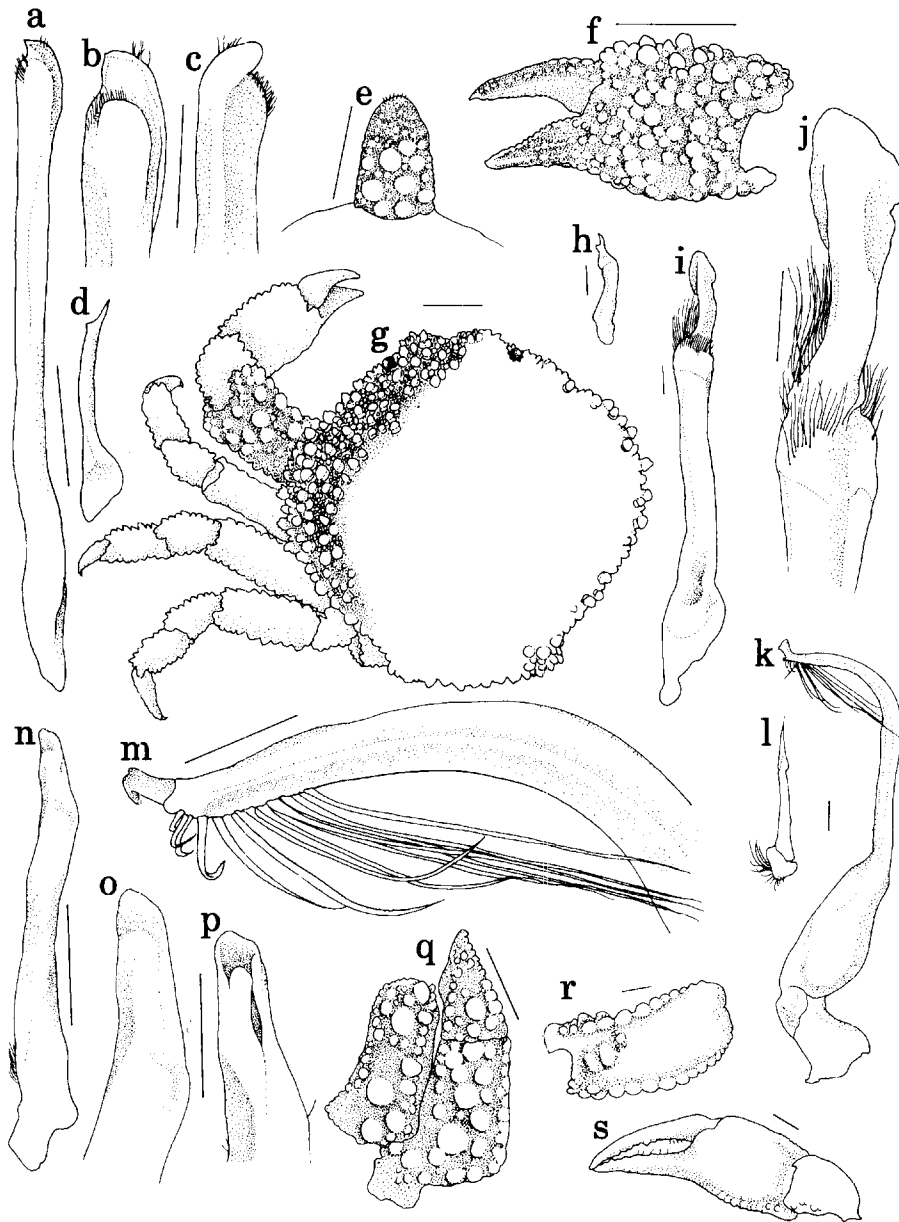


FIG. 6. *Leucosia vittata*, young male: (a) right G1; (b), (c) tip of right G1; (d) right G2. *Nucia tuberculosa* A. Milne Edwards, 1874, female: (e) telson; (f) right cheliped, upper surface; (g) carapace. *Myra fugax* (Fabricius, 1798), male: (h) right G2; (i) right G1; (j) tip of right G1. *Praebebalia septemspinosa* Sakai, 1983. (k) right G1; (l) right G2; (m) tip of right G1. *Myra acutidens* Ihle, 1918, young male: (n) right G1; (o), (p) tip of right G1. *Nucia tuberculosa* A. Milne Edwards, 1874, female: (q) right 3rd maxilliped. *Pseudophilyra* sp, juvenile: (r) right cheliped merus, upper surface; (s) right cheliped, upper surface. Scales: b, c, j, m, o, p = 0.5 mm, all others = 1.0 mm.

the tips of the fingers, smoky flame-coloured on both surfaces, as are also the legs; under surface of body ruddy brown' (Alcock, 1896: 232). The colour of the carapace of the specimens examined in this study was a rather uniform grey, fading to white at the edges. This difference may be attributed to the fact that the specimens which he examined were mostly adults, whilst those examined in this study were all juveniles. This a new record for the Philippines.

*Distribution.* Andaman Sea, Japan, China (Dai and Yang, 1991), Philippines (present record).

*Leucosia whitei* Bell, 1855

*Leucosia whitei* Bell, 1855: 289–290, pl. 31, fig. 2.

*Material examined.* **Philippines.** Stn 5181, coll. USBF, APE, 27 March 1909, 1♂ (12.1 × 10.8).

*Diagnosis.* Carapace urn-shaped, hepatic region with transverse patch of granules, dorsal surface of carapace directly behind front convex, pubescence on posterolateral margin; front sharply tridentate, deflexed; thoracic sinus filled with hair, with row of small granules visible when denuded. Outer surface of 3rd maxillipeds completely smooth. Chelipeds robust, base of arm with patch of spongy fur, fingers short, meeting only at tip. Abdomen of male with basal median depression on penultimate piece. G1 stout, 2.5 × longer than G2, with big, bulbous apex covered with setae, apex made up of two rounded lobes enclosing straight, central chitinous projection.

*Remarks.* Arnold and George (1987) established *L. whitei* as a species distinct from *L. cheverti* Haswell, 1880, on the basis of the carapace and cheliped colour, the tubercle arrangement on the cheliped wrist and palm and on the epibranchial region of the carapace, and structure of the G1 (Ovaere, 1987). Previous authors (e.g. Tyndale-Biscoe and George, 1962; McNeill, 1968; Griffin and Standbury, 1970) had synonymized the two as they considered Haswell's (1880) separation of *L. cheverti* from *L. whitei* as doubtful (Arnold and George, 1987). The present specimen only differs from the description given by Arnold and George (1987), in that the hepatic region granules are coalesced, instead of being distinct, large, and pearly. Also, the specimen was bleached and colour could not be used in this case.

*Distribution* Andamans, Australia, Cape Grenville and Darnley Is. (type locality) (Ihle, 1918), Indonesia, Philippines and Papua New Guinea (Ovaere, 1987).

*Myra* Leach, 1817

*Myra acutidens* Ihle, 1918

(Figs 6n–p, 4F)

*Myra acutidens* Ihle, 1918: 260–261, fig. 139.

*Material examined.* Stn 5158, coll. USBF, APE, 1 young ♂ (7.6 × 6.5, 9.1) 1♀ (11.7 × 9.7, 12.9). Stn 5159, coll. USF, APE, 1 juvenile (8.1 × 7.4, 9.6), 2♀ (11.1 × 9.5, 13.0; 11.7 × 10.0, 12.3).

*Diagnosis.* Carapace ovoid, lateral borders not defined by line of small granules, posterior margin with three projections, middle one being pointed and on higher plane, 2 on either side petaloid, dorsal surface of carapace with clumps of granules forming 'constellation'; front indistinctly bilobed; antennules folding obliquely. Ischium of third maxilliped more coarsely granular than merus. Chelipeds more than twice length of carapace, fingers longer than palm. Abdomen in female with segments 4-6 fused.

*Remarks.* This species was originally recognized as a variety of *Myra kessleri* Paul'son, 1875, by Ihle (1918). Ovaere (1986) records *M. acutidens* from Papua New Guinea and provides a redescription (Ovaere, 1986: 121-122, figs. 1-4). He also discusses its validity as a species distinct from *M. kessleri*. The 'constellation' of granules on the dorsal surface of the carapace, even in juveniles or small specimens, appears to be diagnostic, though the character may vary to a certain degree. A discussion of the variation encountered in different sized specimens is given by Ovaere (1986). The distal lobe of the G1 in the young male examined by the first author is not as expanded as that in the adult male figured in Ovaere (1986: fig. 2). It clearly differs from the G1 of *M. kessleri* figured by Tyndale-Biscoe and George (1962: fig. 7.9) in being more slender and having a proportionately longer tip. The specimens from the two different stations differ slightly in that the colour in spirit: one is light brown (Stn 5159) whilst the other is ivory (Stn 5158). Also, the 'constellation' appears to be more obvious and well-developed on the carapace of the specimens from Stn 5159. Otherwise the two lots are identical. A diagnosis of the male abdomen could not be given as it was badly damaged.

*Distribution.* Indonesia, Kei Is., Banda Sea (type locality), Papua New Guinea (Ovaere, 1986), Philippines (present record).

#### *Myra affinis* Bell, 1855

*Myra affinis* Bell, 1855: 296, pl. 32, fig. 2

*Material examined.* **Philippines.** Stn 5146, 16 February 1908, coll. USBF, APE, 1 juvenile (12.0 × 10.7, 12.9).

*Diagnosis.* Carapace ovoidal, surface covered with widely-spaced, coarse granules, margins of carapace delimited by row of sharp granules, hepatic facet demarcated by row of granules dorsally and ventrally. Anterior edges of 3rd maxillipeds without setae. Chelipeds about 1.5 × longer than carapace (excluding posterior median spine).

*Remarks.* This species differs from *M. fugax* by the following (after Alcock, 1896: 205): (1) the carapace surface is covered by coarse granules visible to the naked eye, the longitudinal carina is persistent and granular, the posterior spines are shorter and more blunt; (2) the chelipeds are shorter and stouter, being < 2 × the carapace length (excluding spine); the hand is particularly shorter and stouter, being < 0.5 the length of the carapace and; (3) the penultimate piece of the male abdomen has a strong tooth. Alcock (1896) also mentions that in young specimens, a denticle or enlarged granule is present on either side of the posterolateral margin above the last pair of legs. This was found to be present in the specimen examined.

*Distribution.* Philippines (type locality), Arakan, Mergui, Andamans, Ganjam Coast, India (Alcock, 1896), Red Sea, Japan, Australia, Indian Archipelago (Ihle, 1918).

*Myra elegans* Bell, 1855

*Myra elegans* Bell, 1855: 297, pl. 32, fig. 4.

*Material examined.* **Philippines.** Stn 5358, 7 January 1909, coll. USBF, APE, 1 young ♀ (14.1 × 9.6, 17.1).

*Diagnosis.* Carapace narrowly elongate, rather compressed dorso-ventrally, row of granules on mid-line, hepatic facet demarcated by faint row of granules dorsally and ventrally, setose, margins of carapace delimited by row of granules, posterior region with three spines, median spine longest, slightly curved at tip, lateral spines shorter, on lower level than median spine; front clearly bilobed, with setae on margin, buccal cavern not visible beyond front. Outer surface of 3rd maxillipeds smooth, anterior edges setose. Chelipeds slender, shorter than length of carapace, fingers slightly longer than palm; ambulatory legs slightly more slender than chelipeds, anterior and posterior edges of propodus and dactylus setose. Abdomen in female with segments 1–3 and 7 free.

*Remarks.* This is perhaps the most unusual and elegantly-shaped of the *Myra* species. It is easily distinguished from its congeners by the elongate, flattened carapace.

*Distribution.* 'Oriental seas' (type locality), Philippines, Indonesia, Thailand, Myanmar, India (Chen, 1989).

*Myra fugax* (Fabricius, 1798)

(Figs 6h–j)

*Leucosia fugax* Fabricius, 1798: 351.

*Material examined.* Stn 5181, 27 March 1908, coll. USBF, APE, 1 young ♀ (20.2 × 17.8, 22.8). Stn 5448, 4 June 1909, coll. USBF, APE, 1 juvenile (20.9 × 17.9, 25.0), 1 ♂ (25.5 × 22.2, 31.1).

*Diagnosis.* Carapace ovoidal, longer than broad (excluding spine), with widely spaced fine granules, hepatic facet clearly demarcated by row of granules dorsally and ventrally, margin of carapace delimited by row of granules, posterior anterolateral border with wide notch just above base of chelipeds, posterior region with three spines, median one longest with upwardly curving tip, lateral spines conical, on lower level than median spine; front broadly bilobed, slightly setose. Anterior margins of third maxillipeds setose, outer surface of third maxillipeds with fine granules. Chelipeds about 3 × as long as carapace (exclusive of posterior median spine), stouter than ambulatory legs; dactylus of ambulatory legs longer than propodus, anterior and posterior margins fringed with setae. Abdomen in male with segments 3–6 fused, distal end of fused piece with median denticle; G1 4 × longer than G2, apex with long petaloid structure with tufts of setae at base.

*Remarks.* The proportions of parts of the chelipeds vary a great deal according to age and sex of the specimens. This may be seen from the figure given by Chen (1989: fig. 18a, b). Chen (1989: 223) also provides a table of comparison to differentiate

between young specimens of the two species. With regards to the Atlantic distribution of this species, Manning and Holthuis (1985: 57) list it as an Indo-west Pacific immigrant to the eastern Mediterranean via the Suez Canal.

*Distribution.* China, Taiwan, Japan, New Caledonia, Indonesia, Gulf of Thailand, Singapore, Philippines, Mergui Archipelago, Madagascar, East and South Africa, Red Sea, eastern Mediterranean (Dai and Yang, 1991).

*Myrodes* Bell, 1855

*Myrodes eudactylus* Bell, 1855

*Myrodes eudactylus* Bell, 1855: 299.

*Material examined.* Stn 5133, 6 February 1908, coll. USBF, APE, 1 juvenile (9.2 × 8.3, 9.9).

*Diagnosis.* Carapace ovoidal, covered with sharp granules, median line marked by row of rounded granules, margins lined with sharp granules, subhepatic region with upward-curving spine, intestinal region with central tubercle and posterior triangular lobe, posterior margin with two triangular lobes on either side; front broadly bilobed. Fingers of cheliped about 2 × length of palm, hooked at ends, cutting edges finely denticulate.

*Remarks.* This specimen corresponds well with Bell's figure (Bell, 1855: Pl. 32, fig. 6 a–e), except that the carapace appears narrower in Bell's specimen.

*Distribution.* Philippines (type locality), Andamans, Siam Bay, Arafura Sea, Darnely Is., Torres Strait, New Caledonia, Western Australia (Tyndale-Biscoe and George, 1962).

*Nucia* Dana, 1852

*Nucia tuberculosa* A. Milne Edwards, 1874

(Figs 6e–g, q)

*Nucia tuberculosa* A. Milne Edwards, 1874: 44, pl. 2, fig. 5

*Material examined.* **Philippines.** Sulu Archipelago, Tawi Tawi group, off Jolo Lt., 06°03'45"N 120°57'00"E, Stn 5174, dredge, 36.6 m, 5 March 1908, coll USBF, APE, 1 ♀ (6.1 × 6.6) (USNM 134205).

*Diagnosis.* Carapace almost globular, covered with fairly high, bluntly conical tubercles; front broadly bilobed, slightly produced anteriorly. Merus of 3rd maxillipeds with distal tip sharp. Chelipeds stout, fingers shorter than palm, opening in vertical plane. Female abdomen with terminal segment elongate.

*Remarks.* This species resembles *N. perlata* (Sakai, 1963) in that the entire body is densely covered with tubercles. The general proportions of the carapace are also rather similar. However, *N. tuberculosa* differs from *N. perlata* in having the fingers of the chelipeds shorter than the palm (longer than the palm in *N. perlata*) and the terminal segment of the female abdomen more narrow and elongate. The fingers open in a vertical plane and might warrant the transfer of this species to the genus *Heteronucia*. A. Milne



Edwards (1874) commented that it is a rare species in New Caledonia. This is a new record for the Philippines.

*Distribution.* New Caledonia (type locality), Aden, Pulau Jedan, Gulf of Thailand, Indonesia (Ihle, 1918).

### *Nursilia*

#### *Nursilia dentata* Bell, 1855

*Nursilia dentata* Bell, 1855: 309, pl. 34, fig. 6.

*Material examined.* **Philippines.** Quezon Province, Cabaleta Is., 32.9–58.6 m, sand and mud bottom, 21–25 April 1959, coll. F. G. Dayrit and J. E. Norton, 2 ovig. ♀♀ (7.4 × 7.5, 7.6 × 7.9). Anima Sola Is., between Burias and Luzon, Stn 5218, 36.6 m, 22 April 1908, coll. USBF, APE, 1 ♀ (10.4 × 10.4) (USNM 65383). Sulu Archipelago, Tawi Tawi group, off Tinakata Is., 05°12'00"N 119°54'30"E, Stn 5158, 22 m, dredge, coll. USBF, APE, 21.ii.1908, 1 ♀ (10.4 × 11.0) (USNM 134206).

*Diagnosis.* Carapace edges, cristate dorsal surface with blunt spines and lobes on either side of median line, median line with three spines posteriorly; front bidentate. Longitudinal ridge present on ischium of 3rd maxillipeds. Palm of chelipeds rather swollen at base, fingers very slender, hooked at tips, cutting edges finely denticulate. Base of terminal segment of female abdomen slightly buried in tip of penultimate segment.

*Remarks.* Chen (1989: 203) tabulates the differences amongst the three known species of *Nursilia*: *N. dentata* Bell, 1855, *N. tonsor* Alcock, 1896, and *N. sinica* Chen, 1982. Alcock (1896: 261) also lists the differences between *N. dentata* and *N. tonsor*. Ihle (1918) confirms Stimpson's statement (1858) that this species exhibits sexual dimorphism in the form of the 3rd maxillipeds. The inner margins of the 3rd maxillipeds in males meet and the longitudinal ridge on the ischium is non-setose. In females, however, the strongly developed longitudinal ridge on the ischium is highly setose, setae being directed medially. This is a new record for the Philippines.

*Distribution.* Indian Ocean (type locality), China, Japan, Indonesia, Fiji Is., Australia, Thailand, India, Sri Lanka, Maldives, Seychelles, South Africa, Red Sea (Dai and Yang, 1991).

#### *Nursilia tonsor* Alcock, 1896

*Nursilia tonsor* Alcock, 1896: 261.

*Material examined.* **China Sea.** near Hong Kong, 21°42'N 114°50'E, Stn 5302, agassiz trawl, 69.5 m, 9 August 1909, coll. USBF, APE, 1 ♀ (6.9 × 77.8).

*Diagnosis.* Carapace dorsal surface with pointed spines on either side of median line, median line with three spines posteriorly; front bidentate. Ischium of 3rd maxillipeds with longitudinal ridge. Outer edge of merus of chelipeds with rough, mushroom-shaped tubercles, fingers longer than palm, palm moderately swollen at base, fingers very slender, hooked at tips.

*Remarks.* Sexual dimorphism similar to that in *N. dentata* is found in this species (Ihle, 1918).

*Distribution.* China (South China Sea), Japan, Philippines, Thailand, Indonesia, Sri Lanka, and India (Chen, 1989).

*Parilia* Wood-Mason and Alcock, 1891

*Parilia major* Sakai, 1961

(Figs 7f–k)

*Parilia major* Sakai, 1961: 137, pl. 3, fig. 5.

*Material examined.* **Philippines.** Stn 5183, 30 March 1908, 1 young ♂. Stn 5198, 9 April 1908, coll. USBF, APE, 1 juvenile (24.2 × 26.1, 27.8). Stn 5374, 1♂ (46.1 × 48.8), 2 March 1909, coll. USBF, APE. Stn 5397, 15 March 1909, 2 juveniles. Stn 5402, 16 March 1909, coll. USBF, APE, 3 juveniles. Stn 5403, 16 March 1909, coll. USBF, APE, 8♂♂, 9♀♀. Stn 5406, 17 March 1909, coll. USBF, APE, 1 juvenile. Stn 5407, 17 March 1909, coll. USBF, APE, 1 juvenile (21.8 × 24.0, 24.4). Stn 5410, 18 March 1909, coll. USBF, APE, 1 juvenile (30.3 × 32.8, 33.8). Stn 5412, 23 March 1909, coll. USBF, APE, 2 young ♂♂, 1♀. Stn 5417, 25.iii.1909, coll. USBF, APE, 1 young ♂. Stn 5419, 25 March 1909, coll. USBF, APE, 1 young ♂, 1♂, 2♀♀. Stn 6502, 4 August 1909, coll. USBF, APE, 1 juvenile. Stn 5506, 5 August 1909, coll. USBF, APE, 1♂ (68.4 × 73.1).

*Diagnosis.* Carapace globular, broader than long (length excluding intestinal spine), finely granular with widely spaced granules, regions ill-defined, posterior part of anterolateral margins with three projections, increasing in size posteriorly, posterolateral margin with spine, posterior margin with two spines on either side of median line, posterior intestinal region drawn out to form upward curving spine; front bidentate. Exopod of third maxillipeds rather expanded, broader than ischium. Merus and hand of chelipeds very long, fingers < 0.5 length of hand. Male abdomen consisting of five pieces, fused piece of segments 3–5 with median transverse excavation close to base; G1 3 × longer than G2, with bifurcated tip.

*Remarks.* The genus *Parilia* Wood-Mason and Alcock, 1891, at present consists of four species: *P. alcocki* Wood-Mason and Alcock, 1891, *P. major* Sakai, 1961, *P. tuberculata* Sakai, 1961, and *P. ovata* Chen, 1984. According to Sakai (1976), *P. major* is very similar to *P. alcocki*, but differs in having the narrower exopod on the 3rd maxilliped, the hepatic regions not inflated and the epistome not projecting much beyond the front. A male specimen of *P. alcocki* obtained as a gift from the Indian Museum in the Smithsonian collection was used for comparison and I have found that Sakai's (1976) points are valid. The G1's of the three species, *P. alcocki*, *P. major* and *P. ovata* are very similar, each being bifid at the apex, with the edges of each branch being serrated. *P. major* is one of the largest leucosiid species, with the largest male examined here measuring 68.1 mm in length and 73.1 mm in width.

*Distribution.* Japan (Sakai, 1961; 1976); Phillipines (Chen, 1989).

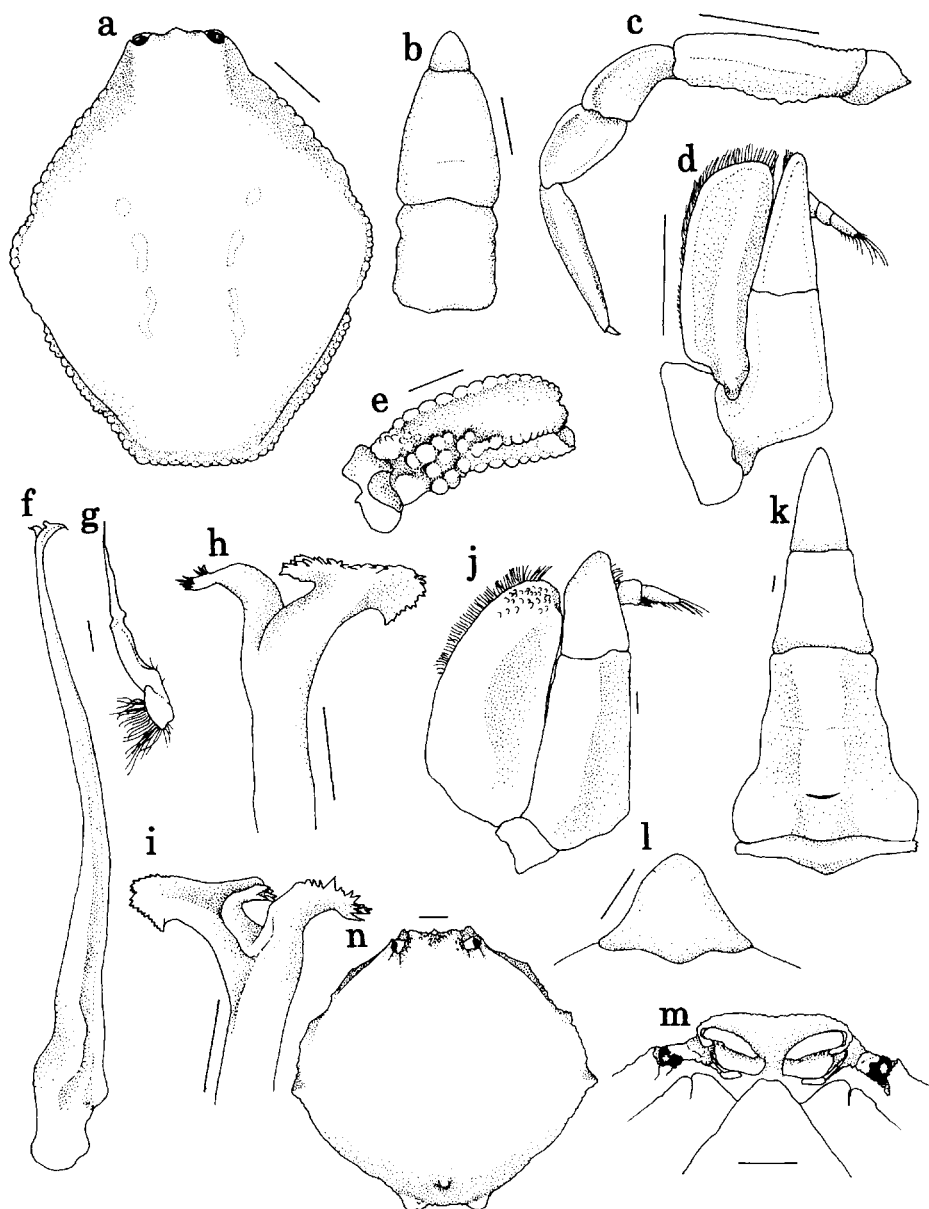


FIG. 7. *Pseudophilyra* sp., juvenile. (a) carapace; (b) abdomen; (c) left last ambulatory leg; (d) right third maxilliped; (e) underside of right cheliped merus. *Parilia major* Sakai, 1961, male: (f) right G1; (g) right G2; (h) (i) tip of right G1; (j) right 3rd maxilliped; (k) abdomen, excluding segment 1. *Randalliapila* sp. nov. Paratype female: (l) telson; (m) frontal view; (n) carapace dorsal view. Scales: h, i = 0.5 mm, all others = 1.0 mm.

*Parilia ovata* Chen, 1984

*Parilia ovata* Chen, 1984: 482–486, figs. 1–6.

**Material examined. Philippines.** Stn 5188, 1 April 1908, coll. USBF, APE, 1 juvenile (10.3 × 9.2, 11.8).

**Diagnosis.** Carapace ovoid, anterolateral margins with three broad teeth, the middle one being the weakest, posterior intestinal region with upward curving spine, posterior margin with a tooth on either side of median line, shorter than and on lower plane than intestinal spine; front with two truncate lobes, subhepatic region slightly convex. Exopod of merus of 3rd maxilliped expanded only slightly, particularly at base; chelipeds long, fingers about as long as hand.

**Remarks.** The carapace of this juvenile specimen is longer than broad and definitely not as broad as that seen in *Parilia alcocki* Wood-Mason and Alcock, 1891. The specimen differs from the one figured by Chen (1984) in that the lateral margin has three broad, indistinct teeth instead of one, and the three teeth on the posterior region of the carapace are of equal length instead of the median one being the longest. Little is known about the variation exhibited by specimens of different ages of *Parilia* although variation in the number of lateral teeth in *Parilia major* Sakai, 1961 has been reported by Chen (1989). However, the diagram given in Chen (1989: fig. 30d) resembles the present specimen more closely in terms of the posterior dentition. Her specimen is 14.0 × 12.2 mm and is a juvenile.

**Distribution.** China (South China Sea), Philippines (Chen, 1989).

*Pariphiculus* Alcock, 1896*Pariphiculus coronatus* (Alcock and Anderson, 1894)

*Randallia coronatus* Alcock and Anderson, 1894: 177.

**Material examined. Philippines.** Capitancillo Is. Lt., between Cebu and Leyte, Stn 5403, 333.1 m, coll. USBF, APE, 16 March 1909, 1 ♂ (USNM 65342); East Negros, Pescador Is., Stn 5188, 547.2 m, 1 April 1908, coll. USBF, APE, 1 juvenile (USNM 65343); Lais Pt Lt., between Cebu and Bohol, Stn 5417, 302 m, 25 March 1909, coll. USBF, APE, 1 ♂ (USNM 65385); Lais Pt Lt., between Cebu and Bohol, Stn 5411, 265.4 m 23 March 1909, coll. USBF, APE, 1 ♀ (USNM 65386); Marindique Is., Tayabas Lt., Stn 5369, 194 m, coll. USBF, APE, 24.ii.1909, 1 juvenile (USNM 65422), 2 ♂ ♂ (USNM 65423); Capitancillo Is. Lt., between Cebu and Leyte, Stn 5408, 291 m, 18 March 1909, coll. USBF, APE, 1 ♀; Capitancillo Lt., between Cebu and Leyte, Stn 5403, 333.1 m, 16 February 1909, coll. USBF, APE, 3 ♂ ♂ (USNM 65424); Marinduque Is., Tayabas Lt., Stn 5371, 151.9 m, 24.ii.1909, coll. USBF, APE, 1 ♂, 1 ♀ (USNM 65425); Apo I., between Negros and Siquijor, Stn 5537, 464.4 m, 19.viii.1909, USBF APE, 1 ♀ (USNM 65426). **China Sea.** Stn 5402, 16.iii.1909, coll. USBF, APE, 2 ♀ ♀.

**Diagnosis.** Carapace broader than long, covered with coarse granules and dense tomentum, with large tubercles on subhepatic, cardiac, intestinal and branchial regions, antero-, posterolateral, and posterior margins, cardiac and intestinal regions demarcated by shallow grooves; front bidentate. Fingers of chelipeds longer than palm, palm slightly swollen at base. Female abdomen with all seven segments free. Male abdomen made up of five pieces; G1 with sinuous distal portion.

*Remarks.* This species is easily separated from its closest congener *Pariphiculus mariannae* (Herklots, 1852) by the broader than long carapace (longer than broad in *P. mariannae*), the tubercle on the cardiac region and one on either side of the branchial region (these regions are unarmed in *P. mariannae*), the less swollen base of the cheliped palm, the more elongate and narrow terminal segment of the male abdomen, the almost hairless fingers of the chelipeds (in *P. mariannae*, the denticulations on the fingers are obscured by a thick growth of short colourless hairs), and the rather straight structure of the distal portion of the male G1 (the distal portion of the male G1 in *P. mariannae* is bent at an angle). Serène and Lohavanijaya (1973) provides a key to distinguish the species of *Pariphilculus*.

*Distribution.* Bay of Bengal (type locality), China (South China Sea and East China Sea), Japan, Indonesia, Red Sea (Serène and Lohavanijaya, 1973; Chen, 1989).

***Pariphiculus mariannae*** (Herklots, 1852)

*Illa mariannae* Herklots, 1852: 36–37, fig. 2

*Material examined.* **China Sea.** Stn 5303, 62.2 m, 9 August 1908, coll. USBF, APE, 1 juvenile (USNM 65339); **Philippines.** Marindique Is., Tayabas Lt., Stn 5376, 164.7 m, 2 March 1909, coll. USBF, APE, 1 juvenile (USNM 65340); East Luzon, South Miguel Pt, Stn 5448, 86 m, 4.vi.1909, coll. USBF, APE, 1 juvenile (USNM 65341); Badian Is., off West Samar, Stn 5206, 58.6 m, 14. April 1908, coll. USBF, APE, 1 juvenile (USNM 65387); West Luzon, South Fernando Pt Lt., Stn 5442, 82.4 m, coll. USBF, APE, 11 May 1909, 1 young ♀ (USNM 65433).

*Diagnosis.* Carapace longer than broad, covered with coarse granules and dense tomentum, lateral margins, subhepatic and intestinal regions with large tubercles, cardiac region and either side with large tubercles; front acutely bidentate. Fingers of chelipeds longer than palm, cutting edges finely denticulate, with fine hairs, palm rather swollen at base. Female abdomen with seven segments free.

*Remarks.* Nobili (1906) synonymized *P. rostratus* Alcock, 1896, with *P. mariannae*. Serène and Lohavanijaya (1973) noted that abdominal segmentation varied amongst individuals examined by previous authors (Ihle, 1918 (R + T); Doflein, 1904 (1 + 2 + R + 6 + T)) and suggested that it may be 'individual variation related to the age of the specimens ...' (Serène and Lohavanijaya, 1973: 38). The specimens I examined are all juveniles which have the abdominal segmentation pattern 1 + 2 + R + 6 + T. It is possible that fusion of additional abdominal segments occurs in older specimens. This can only be ascertained when a large series of specimens of different ages are examined. The differences between *P. mariannae* and *P. coronatus* are enumerated under the remarks for *P. coronatus*.

*Distribution.* China (South China Sea), Indonesia, Myanmar, India, Philippines (Serène and Lohavanijaya, 1973; Chen, 1989).

***Philyra*** Leach, 1817

***Philyra platychira*** de Haan, 1841

*Philyra platychira* de Haan, 1841: 132, pl. 33, fig. 6.

*Material examined.* **Philippines.** Lubig Bay, Port Binanga; near Mariveles, Luzon, 8 January 1908, 1 ♀ (USNM 65350), coll. Albert M. Reese.

*Diagnosis.* Carapace depressed, regions ill-defined, surface with scattered granules, margins beaded, hepatic facets lined with granules; front obscurely bilobed, anterior edge of the epistome projecting beyond edge of front, edge of epistome deeply cleft below eye. Chelipeds in adult male about  $2.5 \times$  length of carapace, palm flattened, fingers thin, curved, cutting edges sharp and entire, cutting edge of immobile finger thickly fringed with short hairs. Abdomen of male with telson free, groove between segments 5 and 6 distinct; G1 stout, apex rounded, with setae.

*Remarks.* This species is easily recognizable by the flattened palm and fingers and the thick fringe of setae on the immovable finger of the chelipeds.

*Distribution.* China, Taiwan, Japan, Australia, Philippines, Mergui Archipelago, Andamans, Persian Gulf, and South Africa (Dai and Yang, 1991).

*Praebebalia* Rathbun, 1911

*Praebebalia septemspinosa* Sakai, 1983

(Figs 6k–m)

*Praebebalia septemspinosa* Sakai, 1983: 625, figs 2d–h.

*Material examined.* **Philippines.** Visayan Is., Capitancillo Is., Northeast of Is. Lt.,  $11^{\circ}10'10''\text{N } 124^{\circ}17'15''\text{E}$ , Stn 5403, trawl, 333–1 m, 16 March 1909, coll. USBF, APE, HOLOTYPE ♂ ( $13.3 \times 14.8$ ) (USNM 195061), ALLOTYPE ♀ ( $9.0 \times 10.9$ ) (USNM 195062), PARATYPE ♂ ( $12.5 \times 14.0$ ) (USNM 195063).

*Diagnosis.* Carapace covered with coarse granules, particularly anteriorly, regions well-demarcated by grooves, intestinal region with large pointed tubercle, anterolateral margin with notch in the centre, junction of antero- and posterolateral margins with spine, posterolateral margin with spine, posterior margin with spine on either side of median line; front bidentate. Outer surface of third maxillipeds coarsely granular. Chelipeds very long, palm about  $2.5 \times$  longer than fingers, fingers as thick as ambulatory legs. Male abdomen segments 3–5 fused, G1  $3 \times$  longer than G2; curved distally, distal portion with long hairs, tip unequally bifid.

*Remarks.* This species is an unusual *Praebebalia* in that the carapace is very spiny and granular. Most other *Praebebalia* species have smooth carapaces, including the type species, *P. extensiva* Rathbun, 1911.

*Distribution.* Philippines (type locality)

*Pseudophilyra* Miers, 1879

*Pseudophilyra* sp.

(Figs 6r, s, 7a–e)

*Material examined.* **Philippines.** Manila Harbour at Malate, 9 December 1907, coll. USBF, APE, 1 juvenile ( $7.6 \times 6.4$ ).

*Diagnosis.* Carapace rhomboidal, with margins beaded, anterolateral margin slightly sinuous, posterior margin straight; front tridentate, teeth broad and blunt. Merus of 3rd maxillipeds triangular and elongate, exopod slightly dilated at distal end, edges setose. Merus of chelipeds with patch of spongy pubescence at base, fingers as long as palm; anterior edge of carpus, anterior and posterior edge of propodus and dactylus carinate.

*Remarks.* The absence of a thoracic sinus is the main feature that distinguishes *Pseudophilyra* from *Leucosia*. In many other aspects such as the carapace, form of the chelipeds and form of the 3rd maxillipeds, these two genera are very similar. This present species resembles *Leucosia vittata* in terms of the carapace shape, the straight and beaded posterior margin, the chelipeds and the tridentate front. However, as no traces of a thoracic sinus could be found, the species is tentatively placed in *Pseudophilyra*.

***Randallia* Stimpson, 1857**

*Randallia* Stimpson, 1857a: 471, pl. 20, fig. 3; 1857b: 85.

***Randallia pila* sp. n.**

(Figs 7l–n, 8a–f, 4G, H)

*Material examined.* **Philippines.** Stn 5454, coll. USBF, APE, 7 June 1909, HOLOTYPE ♂ (13.1 × 15.1); Stn 5453, coll. USBF, APE, 7 June 1909, PARATYPE ♀ (10.0 × 10.9).

*Description.* Holotype male. Carapace globular, broader than long, surface finely granular, regions ill-defined, more coarsely granular posteriorly; shallow concavity present between hepatic and anterolateral margins, junction between antero- and posterolateral margins with rounded tubercle, posterior intestinal region with round tubercle, posterior margin with two rounded tubercles on either of median line; front almost straight, with shallow median groove, edge of anterior pterygostomian region extends slightly beyond front. Orbits excavated such that eyes entirely visible from dorsal view, with two shallow fissures. Basal antennule segment plate-like, covering half of antennular fossa.

Ischium of 3rd maxillipeds sparsely covered with coarse granules, edges of merus granular, palp 3-segmented. Chelipeds stouter than ambulatory legs, surface finely granular, palm 2.5 × longer than fingers, fingers stout, cutting edges with denticles. Ambulatory legs finely granular, posterior edge of dactyli with pointed granules, anterior and posterior edges setose.

Male G1 slender, bifid, one branch being reduced to almost a lobe, other branch long, slender, hooked at tip, glabrous, much longer than other branch.

Female paratype. Anterolateral margin with two irregular teeth anterior to tubercle at junction of antero- and posterolateral margins. Telson broadly triangular, basal edge rather sinuous. Non-sexual aspects similar to male.

*Remarks.* *Randallia pila* sp. n. is characterized by its relatively smaller size, the G1 structure, the relatively smooth surface of the carapace, the straight, non-bilobed front and only two tubercles on the posterior margin of the carapace. Characters in *R. pila* sp. n. such as the overall globular shape, the imperfect orbits which barely conceal the eyes, the pattern of tubercles on the carapace, the basic structure of the G1 (long and slender and bent at an angle at the tip) and the terminal segment of the female abdomen (broadly triangular with sinuous margins (Fig. 51) appear to affiliate it with *R. eburnea*

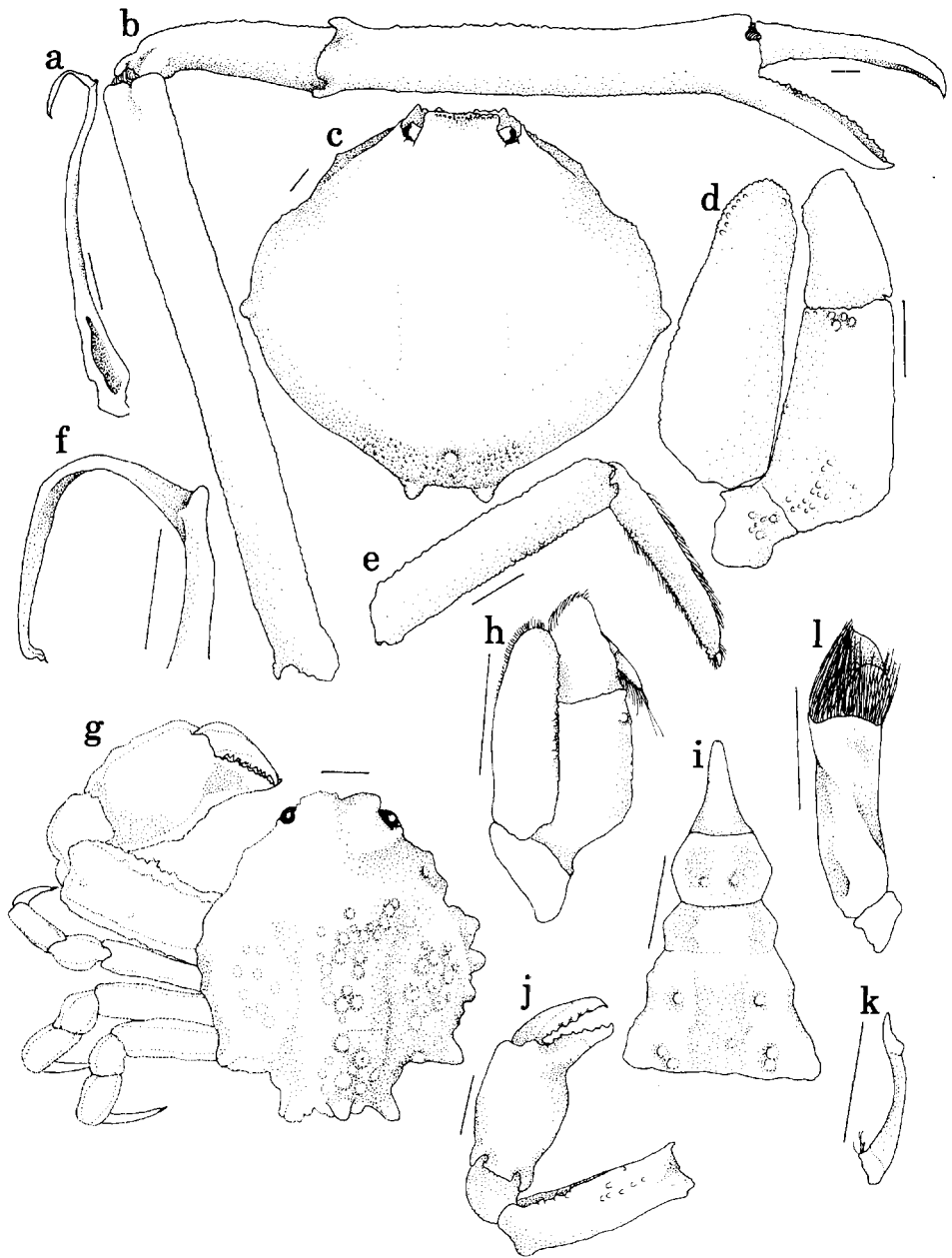


FIG. 8. *Randallia pila* sp. n., Holotype male: (a) right G1; (b) left cheliped upper surface; (c) carapace, dorsal view; (d) right 3rd maxilliped; (e) right ambulatory leg, showing propodus and dactylus; (f) tip of right G1. *Randallia lanata* Alcock, 1896, male: (g) carapace, dorsal view, right side denuded; (h) right 3rd maxilliped, outer surface, denuded; (i) abdomen, excluding segments 1 and 2; (j) left cheliped, denuded; (k) right G2; (l) right G1. Scales: f = 0.5 mm, all others = 1.0 mm.



Alcock, 1896, and *R. trituberculata* Sakai, 1961. It may seem possible to place this species in the genus *Parilia*, due to its highly convex carapace, elongate limbs and form of the G1 (bifid tip). However, it lacks the wide afferent channels of the branchial channels and the expanded ischial exognath so characteristic of *Parilia*. I have thus decided to place this new species in *Randallia*. At present, the genus *Randallia* appears to be heterogeneous and in need of a revision, considering the known variation in G1 structure, abdominal segmentation and carapace features amongst the species of *Randallia* (e.g. *R. lanata* versus *R. trituberculata*). The male abdomen and G2 were missing from the Holotype and could not be figured.

#### *Etymology*

The Latin 'pila' means 'ball', referring to the swollen, rounded appearance of the animal's carapace. The name is used as a noun in apposition.

*Distribution.* Philippines (present record).

#### *Randallia lanata* Alcock, 1896

(Figs 8g–l)

*Randallia lanata* Alcock, 1896: 193.

*Material examined.* **Philippines.** off South Luzon Is., 14°45'48"N 120°12'20"E, Stn 5104, 60.4 m, trawl, 8 January 1908, coll. USBF, APE, 1 ♂ (7.1 × 5.9) (USNM 128569).

*Diagnosis.* Carapace entirely covered by thick, velvety tomentum, posterior three quarters with large, flat, round granules under tomentum, subhepatic region, intestinal region, antero- and posterolateral margins with large, triangular tubercles of different sizes, posterior margin with small tubercle and large, blunt spine on either side of median line, small granule just below spine; front broadly bilobed. Third maxillipeds rather smooth, with margins slightly granular. Chelipeds robust, surface of merus rather granular, fingers shorter than palm, cutting edges blade-like, with small denticles. Male abdomen consisting of five pieces; G1 very short and stout, 1.8 × longer than G2, tip made up of few flattened lobes covered with long setae.

*Remarks.* *Randallia lanata* is very different from other species of *Randallia* in aspects of the abdomen (Ihle, 1918), the G1 structure and the relative length of the chelipeds to the carapace (chelipeds not much longer than carapace) and its position in the genus should be re-examined. It is possible that a new genus should be created for it. According to Ihle (1918), 'the third and fourth segments are completely fused, whereas a distinct groove is seen between the fourth and fifth segments'. This was true for the specimen examined by the author. This is contrary to Alcock's description (Alcock, 1896: 193) which said '... all seven abdominal terga are plainly and independently recognizable though not all independently movable ...'. *Randallia villosa* Chen, 1989, is very similar to *R. lanata* and the differences between the two species which Chen (1989) stated, i.e., the hexagonal carapace (round, globular in *R. lanata*), the presence of two rounded granules on the posterior border (not mentioned for *R. lanata*), and the convex front (almost straight in *R. lanata*), are rather subjective. The two species may be synonymized when the type of *R. villosa* is examined.

*Distribution.* Andaman Sea (type locality), Indonesia (Ihle, 1918), Philippines (Chen, 1989).

***Randallia pustuloides* Sakai, 1961**

*Randallia pustuloides* Sakai, 1961: 135, pl. 3, fig. 4.

*Material examined.* **Philippines.** Stn 5538, coll USBF, APE, 19 August 1909, 1 ♀ (39.5 × 44.0).

*Diagnosis.* Carapace covered with large flattened tubercles, regions well-defined, antero- and posterolateral margins with pointed tubercles, intestinal region with large tubercle, posterior region with round, pearly granules, posterior margin with two sharp granules; front bilobed. Chelipeds stout, merus with patch of round, pearly granules at distal, ventral surface, fingers slightly shorter than palm, anterior margin of movable finger carinate; ambulatory legs with sharp, pearly granules on posterior edges, edges fringed with setae. Female abdomen with segments 4–6 fused.

*Remarks.* This species bears some resemblance to *R. pustulosa*. The difference between these two species are mentioned under the remarks for *R. pustulosa*.

*Distribution.* Japan (type locality); Philippines (Chen, 1989).

***Randallia pustulosa* Wood-Mason and Alcock, 1891**

*Randallia pustulosa* Wood-Mason and Alcock, 1891: 266.

*Material examined.* **Philippines.** Stn 5203, 10 April 1908, coll. USBF, APE, 1 juvenile (17.2 × 19.6, 20.1).

*Diagnosis.* Carapace globular, regions well-demarcated, covered with coarse granules, margins with large, pointed tubercles, intestinal region with long, backward and upward curving spine, posterior margin with two pointed tubercles on either side of median line just below intestinal spine; front broadly bilobed. Fingers of chelipeds slightly shorter than palm; ambulatory legs finely granular, dactyli fringed with hairs.

*Remarks.* Alcock (1896: 197) remarked that the young *R. pustulosa* bears a strong resemblance to the adult *R. pustulilabris* Alcock, 1896, in terms of the spherical carapace, the spiny edges of the carapace, and the granular surface. Chen (1989) on the other hand, believes that *R. pustulosa* is related to *R. pustuloides* Sakai, 1961. However, in *R. pustuloides* ‘... the dorsal surface of the carapace is studded with tubercles. A large tubercle and some small tubercles are present on the intestinal region. The chelipeds are stouter. The terminal segment of the male abdomen has a conical tooth. The last ambulatory legs (except the dactylus) are irregularly studded with high tubercles’ (Chen, 1989: 219).

*R. pustulosa* has sometimes been incorrectly attributed to Wood-Mason, 1891. However, I have found that the article in which the original description of *R. pustulosa* was published was under the authorship of both Wood-Mason and Alcock (1891). Although Wood-Mason’s name was cited together with the species name (presumably by Alcock), no mention was made that the species’ authorship should be solely given

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to Wood-Mason. Therefore, the correct citation should be *R. pustulosa* Wood-Mason and Alcock, 1891.

*Distribution.* Japan, Phillipines, Andaman Sea, Laccadive Sea, Travancore Coast, Great Nicobar Is., East Coast of Africa (Sakai, 1976).

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