

## Australian *Renocila* Miers, 1880 (Isopoda: Cymothoidae), Crustacean Parasites of Marine Fishes

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**ABSTRACT.** The Australian species of the genus *Renocila* are recorded for the first time. Three species are recorded: *R. ovata* Miers, *R. alkoos* n. sp., and *R. plesiopi* n. sp. *Lironeca dubia* Nierstrasz is found to be a synonym of *Renocila ovata*. The genus *Rosca* Schiödte & Meinert is placed in synonymy with *Renocila*. A synoptic list of all Indo-Pacific species of *Renocila* is given, as well as a new generic diagnosis and a key to the Australian species.

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The genus *Renocila* was previously known from Australia by a single record of an unidentified species (Healy & Yaldwyn, 1970). The genus is apparently uncommon in Australian waters there being few specimens in museum collections, while 6 weeks of field work on the Great Barrier Reef (2-4 hours under water each day) failed to obtain any fresh material.

The genus has four species in the Caribbean (Williams & Williams, 1980), and eight species in the Indo-Pacific. Of the Indo-Pacific species two, *R. periophthalma* and *R. recta*, are based on juvenile specimens which lack the species-specific characters of the adult. The status and identity of these two species are therefore uncertain. The number of species is likely to increase, for I have seen specimens of another two *Renocila* species from Australia, but lack sufficient material to describe them, while material recorded by Richardson (1910) as *R. ovata* (USNM 40494, also USNM 231172-4) is an undescribed species. The distribution of *Renocila* around Australia and Indonesia is given in Figure 9.

A key to the Australian genera of externally attaching cymothoid isopods was given by Bruce (1987). Material and methods follow that of Bruce (1987). Abbreviations used are as follows: **AM** - Australian Museum, Sydney, NSW; **BMNH** - British Museum (Natural History), London; **GBR** - Great Barrier Reef, Queensland, Australia; **NMW** - Naturhistorisches Museum, Vienna; **Qld** - Queensland, Australia; **QM** - Queensland Museum,

Brisbane, Qld; **RMNH** - Rijksmuseum van Natuurlijke Historie, Leiden; **USNM** - Smithsonian Institution, Washington, D.C.; **WA** - Western Australia; **WAM** - Western Australian Museum, Perth, WA; **ZMA** - Zoologisch Museum, University of Amsterdam.

### TAXONOMY

#### *Renocila* Miers

*Renocila* Miers, 1880: 464.—Gerstaecker, 1882: 232; Schiödte & Meinert, 1884: 415; Stebbing, 1900: 610; Barnard, 1936: 160; Bowman & Mariscal, 1968: 100; Brusca, 1981: 146.

*Rosca* Schiödte & Meinert, 1881: 85.—Stebbing, 1924: 10.

**Type species.** *Renocila ovata* Miers, 1880, by monotypy.

**Diagnosis of female.** Rostrum wide, anterior part folded under and back, not triangular, not projecting between antennules. Cephalon posterior margin not trisinate. Coxae 2 and 3 as long or longer than respective pereonite; coxae 5-7 shorter than pereonite, posteriorly acute. Posterolateral margins of pereonites 6-7 produced, not narrowed or tapered. Pleonites 1-2 ventrolateral margins not produced, posterolateral margins not acute.

Antennule subequal to or shorter in length than antenna. Mandible palp articles 1, or 1 and 2

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dilated, or wider than article 3; article 3 slender, shorter than 2. Pleopods all lamellar except endopod of pleopod 5, which has 3 weakly developed folds.

**Additional characters.** Body about twice as long as wide, dorsum moderately convex. Eyes posterolateral in position, less than 0.3 width of cephalon. Pereonite 2 shortest, 5 and 6 longest; pereonite 5 widest; coxae visible in dorsal view. Pleotelson always flat.

Antennule dorsoventrally compressed; antenna less robust than antennule; bases widely separate. Maxillule with 4 or 5 terminal spines. Maxilla with 2 small spines each on medial and lateral lobe respectively. Maxilliped article 3 with 3 or 5 terminal spines. Pereopods 1–4 subequal in length, 5–7 slightly longer than 1–4; pereopod 7 not manifestly longer than pereopod 6 (except in *R. ovata*). Brood pouch consisting of alternately overlapping oostegites arising from the base of pereopods 1, 2, 3, 4 and 6; posterior enclosed by laminar fold arising from posterior of sternite 7. Endopods of pleopods 3–5 with prominent proximomedial lobes. Uropod exopod longer than endopod, rami usually concealed beneath pleotelson.

**Male.** Smaller, narrower than female; eyes proportionally larger. Uropods conspicuous, projecting beyond pleotelson. Appendages similar to female except: antennule not as robust; mandible palp more slender, article 1 not dilated; maxilliped article 3 with larger terminal spines; pereopod dactylus nodules and basis carina not developed. Pleopod 2 with appendix masculina; folds on pleopod 5 endopod weakly developed. Penial processes present, on posterior of sternite 7.

**Remarks.** Characters that separate *Renocila* from related genera are: antennule longer and more robust than antenna; rostrum not projecting between antennules; pleonites 1–2 with ventrolateral margins not produced; posterolateral margins of pereonites 6–7 produced; uropods held concealed beneath pleotelson. In addition, *Renocila* are wider than most *Anilocra*, although at least two species of *Anilocra* (*A.*

*amboinensis* and *A. pomacentri*) approach the shape shown by *Renocila*.

Pleopod morphology, included in the genus description, applies only to the species described here, and *Renocila thresherum* Williams & Williams (figured by Brusca, 1981). No other *Renocila* species have had their pleopods described.

The Caribbean and east Pacific *Renocila* differ in several morphological characters from the Indo-Pacific species, lacking the carinate process on the posterodistal margin of the basis of pereopods 1–3, having mandible palp articles 1–2 not expanded, mandible palp article 3 more setose, lacking any trace of pereopodal nodules (present or absent in Indo-Pacific species), and one species (*R. colini*) with the antennule shorter than the antenna.

Examination of the holotype of *Rosca limbata* Schiödte & Meinert (RMNH 6) revealed it to be an immature *Renocila* specimen. Similarly, the material recorded by Nierstrasz (1931) (ZMA uncatalogued) is also an immature *Renocila*. Only one other species has been placed in *Rosca*: *Rosca rogans* Stebbing, 1924, is an immature intermoult *Nerocila* (see Bruce, 1987). Trilles (1979) recorded two ovigerous females of *Rosca limbata*, but as this material was not available for study no comment can be made on their identity.

Bruce (1987) provided a key to the Australian genera of externally attaching cymothoid isopods.

### Synopsis of Indo-Pacific *Renocila*

*Renocila heterozota* Bowman & Mariscal, 1968. Types at USNM 113431–113433, Mahé, Seychelles, on *Amphiprion akallopisos*.

*Renocila indica* Schiödte & Meinert, 1884. Holotype held at NMW number 5278. Indonesia, hosts unknown, additional figures provided (Fig. 1).

*Renocila limbata* (Schiödte & Meinert, 1881), **new combination**. This species has been little recorded (see Trilles, 1979), and the adult female has not been described. Recorded hosts: *Scorpaena picta* (by

ISOPOD	HOST		DISTRIBUTION
<i>R. heterozota</i>	Pomacentridae	<i>Amphiprion akallopisos</i>	Seychelles
<i>R. indica</i>	not known		Indonesia
<i>R. limbata</i>	Scorpaenidae	<i>Scorpaena picta</i> *	Indonesia
		<i>Sebastopsis polylepis</i> *	Indonesia
<i>R. ovata</i>	Pomacentridae	<i>Eupomacentrus fasciolatus</i>	Carnarvon, WA
<i>R. periophthalma</i>	Periophthalmidae	<i>Periophthalmus</i> sp.*	Lifu, Loyalty Islands
<i>R. plesiopi</i>	Plesiopidae	<i>Plesiops corallicola</i>	Swains, GBR
	Apogonidae	<i>Apogon</i> sp.	Swains, GBR
		<i>Apogon guttatus</i> *	Heron Is, GBR
<i>R. recta</i>	not known		Indonesia
<i>R. alko</i>	not known		GBR

**Table 1.** Indo-Pacific *Renocila* and their associated hosts (\* = unconfirmed host; GBR = Great Barrier Reef).

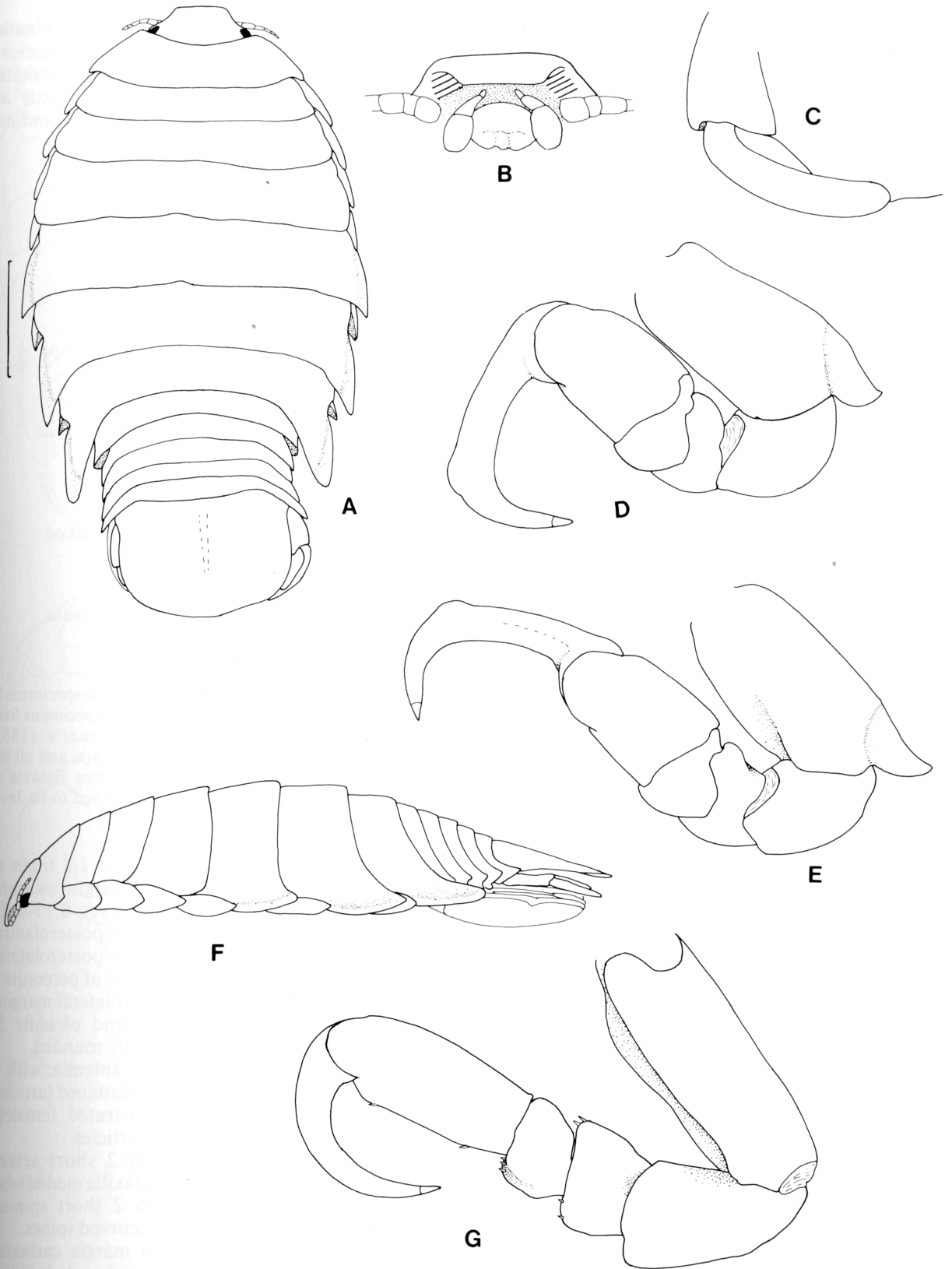


Fig 1. *Renocila indica*, holotype, NMW 5278. A, dorsal view; B, frons; C, right uropod, in situ; D, pereopod 1; E, pereopod 2; F, lateral view; G, pereopod 7. Scale line represents 3.0 mm.

Nierstrasz, 1931) and *Sebastopsis polylepis* (by Trilles, 1979). Localities: Sebu, Savu; Amboina; Timor; all Indonesia.

*Renocila ovata*. Present study.

*Renocila periophthalma* Stebbing, 1900. Holotype, BMNH 1906.4.19.16, Lifu, Loyalty Islands. A damaged male, with head and pereonite 1 missing; identity uncertain. Host given as *Periophthalmus* (F. Periophthalmidae – mud skippers).

*Renocila plesiopi*. Present study.

*Renocila recta* (Nierstrasz, 1915), **new combination**. Holotype RMNH 35, West Java. The species is clearly a *Renocila* (not *Anilocra*), but is an immature specimen and therefore of uncertain identity and status. Host given as *Hexanematichthyes sundiacus* (F. Ariidae).

*Renocila alkoos*. Present study.

### Key to Australian *Renocila*

1. Pleon narrow, about 0.35 width of pereonite 5, posterolateral margins of pereonites 5–7 produced, acute; pereopods 1–2 with long smoothly curving dactylus, without nodules; pereopods 1–2 basis with posterodistal angle not produced. . . . . *R. plesiopi*
- Pleon greater than 0.5 width of pereonite 5, posterolateral margins of pereonites 5–7 not acute; pereopod 1 and 2 dactylus not as above; pereopods 1–2 basis posterodistal angle carinate, produced. . . . . 2
2. Posterolateral margins of only pereonites 6 and 7 produced, rounded; pereopods 1–2 dactylus short, abruptly recurved; pereopods 1–2 basis with posterodistal angle produced and truncate, posterior margin of ischium and merus carinate. . . . . *R. alkoos*
- Posterolateral margins of pereonites 5–7 produced, narrowly rounded; pereopods 1–2 dactylus long, abruptly recurved; pereopods 1–2 basis with posterodistal angle produced, narrowing to blunt point. . . . . *R. ovata*

### *Renocila ovata* Miers

Figs 2–4

*Renocila ovata* Miers, 1880: 464, pl. 25, figs 11–14.—Gerstaecker, 1882: 261; Schiödt & Meinert, 1884: 416; Nierstrasz, 1931: 126.

*Livoneca dubia* Nierstrasz, 1918: 116.

*Livoneca dubia* Nierstrasz, 1931: 138, figs 2–5, pls 10–14.

Not *Renocila ovata*.—Richardson, 1910: 22 (= undescribed species).

**Material examined.** LECTOTYPE, female (ovig 21.5) and PARALECTOTYPE, female (ovig 16.0), Malaysia, coll. P. Bleeker (BMNH 1880: 15).

Non-type. Female (ovig 22.5), Amboina, 1859, coll. Dr Deleschall (NMW 5276, examined by Schiödt & Meinert, 1884). Syntypes of *Livoneca dubia* Nierstrasz, 1931: female (ovig 15.0), Labuan Pandau, Lombok Reef, 27 March 1899, Siboga Expedition Stn 34 (ZMA Is. 100-602); female (ovig 10.5), Seba, Savu, 25 April 1899, Siboga Expedition Stn 58, on *Apogon* sp., coll. M. Weber (ZMA Is. 100-603). Female (ovig 10.0), Seba, Savu, 25 April 1899, on juvenile Pomacentridae sp., Siboga Expedition Stn 58, coll. M. Weber (ZMA Is. 100-604). Types of *Livoneca dubia* Nierstrasz, 1918: female (ovig 15.5), male (9.0), north coast of east Flores, 123°01.3'E, 08°09.7'S, 11 Nov 1908, coll. G.J. Van der Sande (ZMA Is. 105-055).

From Western Australia: female (ovig 21.0), Carnarvon, 24°53'S, 113°40'E, circa 1960, coll. Mr R. Walker (WAM 612-85); female (ovig 16.0), male (7.0), Point Quobba, 24°29'S 113°25'E, Oct 1959, on *Eupomacentrus fasciolatus* (WAM 611-85).

**Type locality.** Miers (1880) stated that the specimens he examined came from an unlocalised jar of specimens from Bleeker's 'Malaysian' collection. Bleeker's (1857) collection was from Indonesia, not Malaysia, and all but two of the 16 species were recorded from Batavia (= Jakarta). The type locality is here considered to be Java, Indonesia.

**Description of female.** Body about 1.8 times as long as wide. Cephalon anterior margin truncate, folded ventrally and posteriorly; eyes 0.13–0.22 width of cephalon. Pereonites 1–4 posterolateral angles weakly produced, 5–7 with posterolateral angles more strongly produced. Coxae of pereonite 2 longer than wide. Pereonite 7 posterolateral margins produced to between pleonite 3 and pleonite 5. Pleonites 1–5 posterior margin evenly rounded.

Antennule distinctly longer than antenna, with 7 articles, articles 1–4 conspicuously flattened (articles 6 and 7 partly coalesced in illustrated female); antenna slender, composed of 6–7 articles.

Mandible palp article 3 with 2 short setae. Maxillule with 4 terminal spines. Maxilla medial lobe fused to lateral, each lobe with 2 short spines. Maxilliped article 3 with 3 short recurved spines.

Pereopod 1 basis posterodistal margin carinate, posterodistal angle acute, weakly produced; dactylus longer than combined length of merus, carpus and propodus, abruptly recurved two thirds along its length with weak nodule at point of

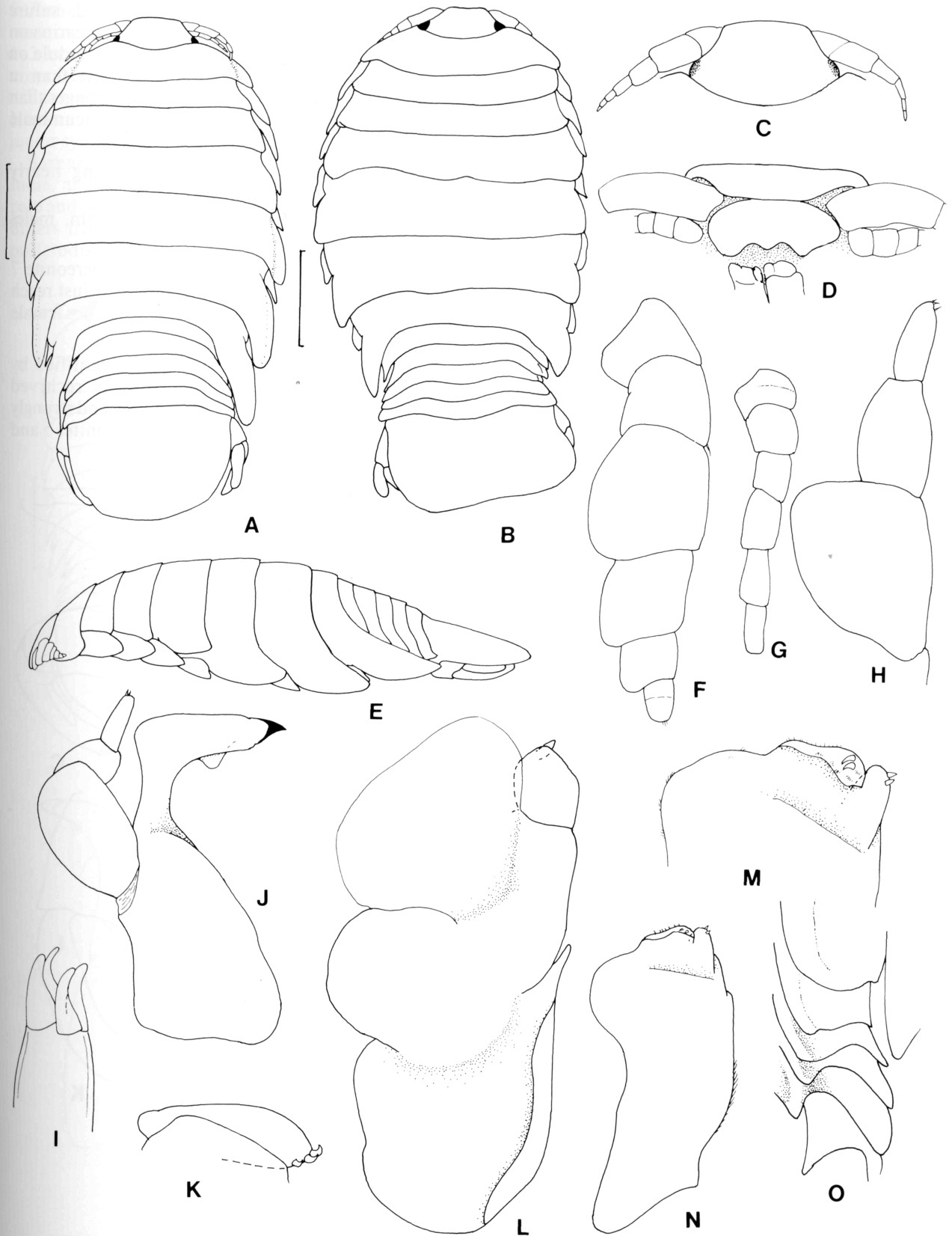


Fig. 2. *Renocila ovata*. A, C–E, lectotype; remainder female, WAM 612-85. A, dorsal view; B, dorsal view; C, cephalon; D, frons; E, lateral view; F, antennule; G, antenna; H, mandible palp; I, maxillule apex; J, mandible; K, maxilliped article 3; L, maxilliped; M, maxilla apex; N, maxilla; O, left pleonites, ventral view. Scale lines represent 4.0 mm.

flexure. Pereopods 2 and 3 similar to 1, basis posterodistal margin more produced on pereopod 2 than on pereopod 1, less produced on pereopod 3, and not produced on pereopod 4. Pereopods 5–7 without carina on basis, without nodule on dactylus; dactylus smoothly curved; pereopod 7 manifestly longer than pereopod 6.

Pleopods all with exopod wider than endopod; proximomedial lobe of endopods 3–5 becoming progressively larger. Uropods short, not extending to posterior margin of pleotelson, endopod about 0.8 length of exopod, both rami broadly rounded, curving medially.

**Male.** Body about 2.9 times longer than wide; posterolateral margins of pereonites not produced; all pleonites visible in lateral view.

Antennule with 8 articles, longer than antenna, but not as flattened as that of female. Antenna with 8 articles. Mandible with molar process prominent; palp basal article narrow, article 3 with 4 setae.

Maxilla medial lobe less distinctly fused, suture partially apparent. Pereopods 1–3 without carina on basis; dactylus smoothly curved, without nodule on anterior margin. Pleopods more elongate than in female. Uropod exopod about 1.7 times longer than endopod; endopod rounded, exopod with acuminate apex.

**Colour.** Dark slaty brown, appearing nearly black.

**Size.** Ovigerous females 10.0–25.0 mm, males 7.0, 9.0 mm.

**Variation.** Posterolateral margins of pereonite 7 may be produced to posterior of pleon, or just reach pleonite 3. Male uropod gradually approaches female form as size increases.

**Remarks.** *Renocila ovata* is easily identified by the large flattened antennule, abruptly recurved dactylus on pereopods 1–4, broad pleon, and strongly produced posterolateral margins on pereonites 5 and

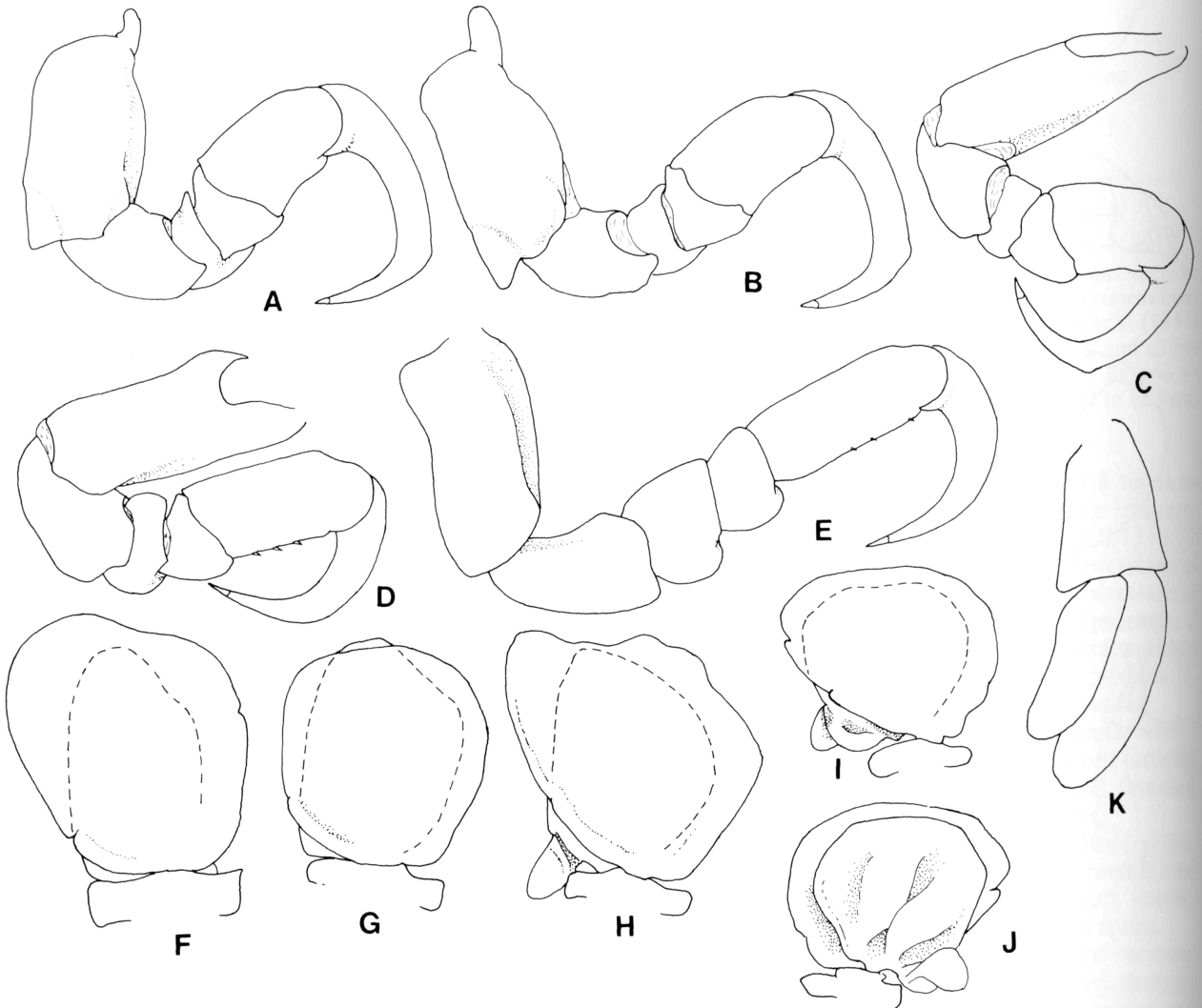


Fig. 3. *Renocila ovata*. All figures female, WAM 612-85. A, pereopod 1; B, pereopod 2; C, pereopod 4; D, pereopod 6; E, pereopod 7; F-I, pleopods 1-3, 5 respectively; J, pleopod 5, posterior view; K, uropod.

6. *Renocila indica* differs from *R. ovata* in having a more oval body outline, a narrower pleon, pereopods 1-3 basis with crescent posterodistal process, and uropod exopod proportionally much longer.

Examination of the types of *Livoneca dubia* Nierstrasz (1918, 1931) reveal that species to be a junior synonym of *R. ovata*.

Barnard (1936) recorded *Renocila ovata* from India, and gave figures of the maxilliped, mandible and pereopods 1 and 7. The figure of pereopod 1 differs from material examined here in having the posterodistal angle of the basis far more strongly

produced, the posterior margin of the ischium carinate, and a shorter dactylus without nodules. Pereopod 7 differs by having a prominent carina on both the basis and ischium. Barnard's material is not *Renocila ovata*, but is probably *Renocila alko*.

**Hosts.** Known only from *Eupomacentrus fasciolatus* and an unidentified *Apogon* species. Isopods are situated posterior to the pectoral fin, one on each side of the host.

**Distribution.** Carnarvon and Point Quobba, WA; several localities in Indonesia.

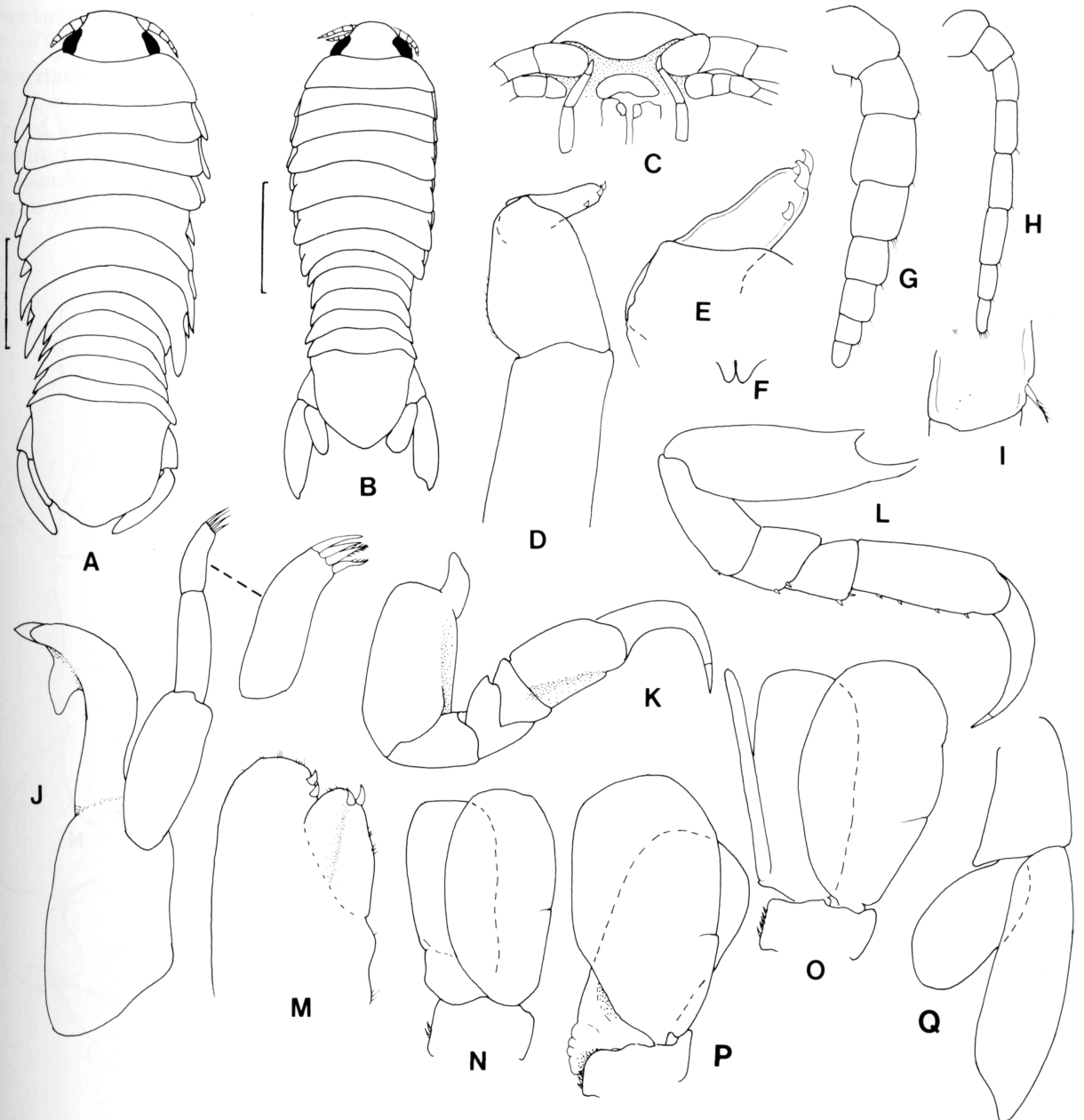
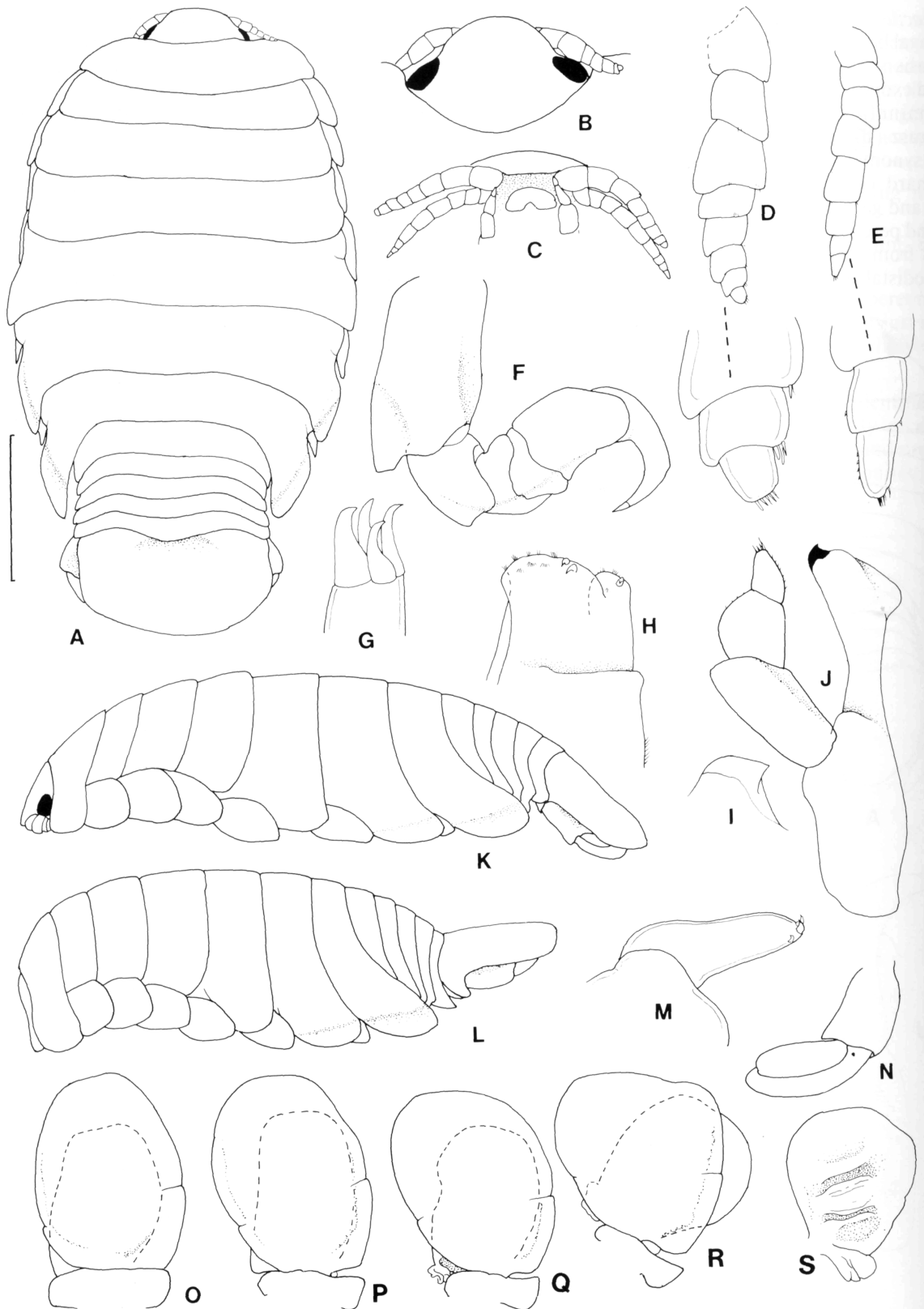


Fig. 4. *Renocila ovata*. A, male, north-east Flores (ZMA Is. 105.055), syntype of *Livoneca dubia*. Remainder male, WAM 611-85: B, dorsal view; C, frons; D, maxilliped; E, maxilliped article 3; F, penes; G, antennule; H, antenna; I, antenna article 4; J, mandible; K, pereopod 1; L, pereopod 7; M, maxilla apex; N-P, pleopods 1-3 respectively; Q, uropod. Scale lines represent 2.0 mm.



**Fig 5.** *Renocila alkoo* n. sp. A-K, M, holotype; L, N-S, paratype AM P25008. A, dorsal view; B, cephalon; C, frons; D, antennule and detail; E, antenna and detail; F, pereopod 1; G, maxillule apex; H, maxilla apex; I, right mandible apex; J, right mandible; K, lateral view; L, lateral view; M, maxilliped article 3; N, uropod; O-P, pleopods 1, 2, 3 and 5 respectively; Q, pleopod 5 endopod, posterior view. Scale line represents 3.0 mm.



***Renocila alko* n. sp.**

Figs 5, 6

? *Renocila ovata*.—Barnard, 1936: 161, fig. 5 (not *R. ovata* Miers, 1880).

**Material examined.** All Great Barrier Reef, Queensland. HOLOTYPE: female (ovig 13.5), Bushy Is., Redbill Cay, June 1975, from mixed sample of reef flat fish, coll. R.J. McKay (QM W10844). PARATYPES: female (non-ovig 10.5), Gillett Cay, Swains Reefs, 14 Oct 1962, reef flat (AM P37138); female (non-ovig 12.0), One Tree Is., Capricorn Group, 5 Oct 1971, coll. D. Hoese (AM P25008).

**Type locality.** Bushy Island (Redbill Cay), Great Barrier Reef, 20°57'S, 150°05'E.

**Description of female.** Body about 1.8 times as long as wide. Cephalon anterior margin smoothly rounded, eyes about 0.26 width of cephalon. Coxae of pereonites 1–2 as wide as long, those of pereonites 4–7 rapidly decreasing in length. Posterolateral margins of pereonites 6–7 weakly produced, laterally

bent. Pleon about 0.35 width of pleon, lateral margin subparallel; pleonite 1 longest. Pleotelson lateral margins subparallel, posterior subtruncate.

Antennule extending to pereonite 1, with 8 articles. Antenna slightly shorter than antennule, with 8 articles.

Mandible palp article 3 with 4 terminal setae. Maxillule with 4 terminal spines. Maxilla with 1 or 2 small spines on medial lobe, 2 on lateral lobe. Maxilliped article 3 with 3 recurved spines.

Pereopod 1 basis posterodistal angle carinate, produced, truncate; posterior margins of ischium and merus carinate, carpus indistinctly so; dactylus short, extending to carpus, abruptly curved, anterior margin with very weak nodule. Pereopods 2 and 3 similar to 1 but basis posterodistal angle not as produced, posterior margins of ischium and merus not as obviously carinate. Pereopods 6 and 7 similar in length, both with basis anterolateral margin carinate; pereopod 7 with 3 small spines on propodus palm, 2 on carpus, 1 on ischium.

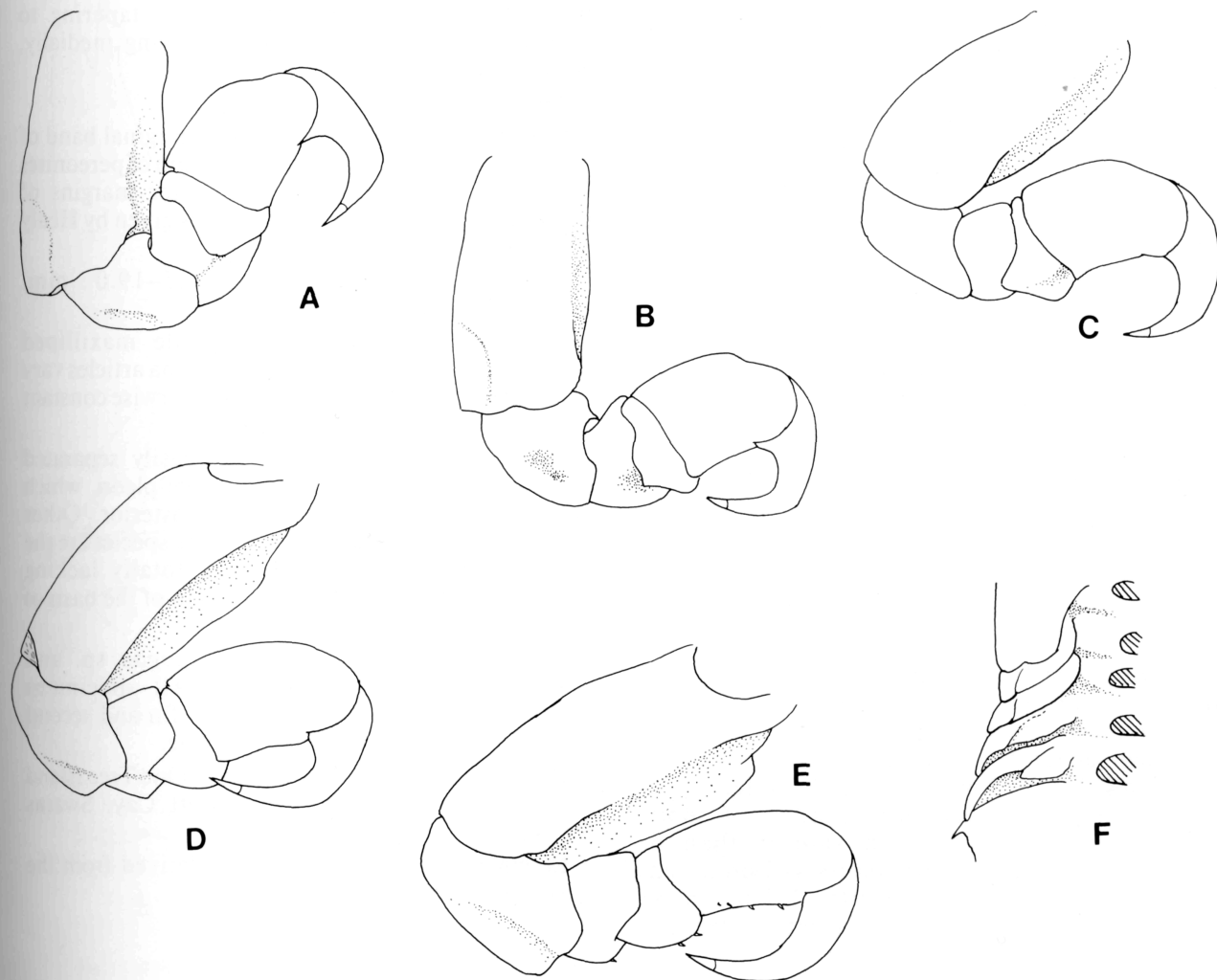


Fig. 6. *Renocila alko* n. sp. All figures female, AM P25008. A–E, pereopods 1, 2, 4, 6 and 2 respectively; F, left pleonites, ventral view.