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## THE ISOPODAN GENUS *IAIS* (CRUSTACEA)\*

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### INTRODUCTION

The genus *Iais* contains very small asellote isopods which are found in association with isopods of the family Sphæromidæ. None of the species which we have seen was collected from outside of this association and we believe that reports of *Iais* alone, without a sphæromid, are possibly in error (Chilton, 1892, pp. 266-267). We have had occasion to observe *Iais californica* (Richardson) on *Sphæroma pentodon* Richardson, where they were found on the dorsum, ventral surface, and between the leaf-like pleopods. A few were found on the sides of the burrows occupied by the host.

Initially this project had as its purpose only the redescription of *Iais californica* (Richardson). This, Richardson had placed in the genus *Janiropsis*. Since Vanhöffen (1914, pp. 530-531), Monod (1926, pp. 13-14), and Nordenstam (1933, p. 179) were of the opinion that only one species existed in the world, e.g., *Iais pubescens* (Dana), it became necessary for us to procure specimens of *I. pubescens* with which to compare the Californian species. Specimens of *I. pubescens*, including some samples which had been examined by Bovallius, the author of the genus *Iais*, were sent to us by Dr. Karl Lang of the Swedish State Museum in Stockholm, and we offer our gratitude to him and the Swedish State Museum for the privilege they so generously extended. The work was carried out under the auspices of the Allan Hancock Foundation in the laboratory of Dr. John S. Gärth to whom we extend our thanks for the use of facilities and equipment.

In the paper we redescribe *Iais pubescens* (Dana), consider *I. californica* (Richardson) a valid species, and present the description of a new species from the Philippine Islands and Singapore.

### GENERIC REMARKS

When Bovallius (1887, p. 50) described the genus *Iais* he did not designate a type species. He did mention two species: the first was his own, *I. hargerii*, and this he described in detail; the second, *I. pubescens* (Dana), he assigned to the genus with some doubt because of differences between Dana's description and his

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specimens, and because some omissions made by Dana made him uncertain whether it belonged to his new genus. Bovallius did not see Dana's material collected at Nassau Bay, Tierra del Fuego, from *Sphaeroma*, and which as far as we know has been destroyed. Bovallius' species was collected from the Strait of Magellan, but no mention was made as to whether it was taken from a sphaeromid. From certain of Dana's figures (not his description which is inaccurate in a few important details) and from Bovallius' description it appears that both were dealing with the same species. This supposition was made very early by Stebbing (1900, pp. 548-549) who made exceptional allowances for errors in Dana's figures and descriptions which we did not feel worth accepting until we had examined specimens from the type localities. We have seen specimens from both localities (from sphaeromids) and as far as we can tell only one species is represented. The type of *I. hargeri* is apparently lost for good because the vial which should have contained it had a species of asellote so different from *I. hargeri* (fide Bovallius) that Dr. Lang suggested (in letter) that an exchange had probably occurred at some time and a specimen belonging to a different genus substituted. Certainly, there is no way to clear up the confusion at this late date.

Only two important errors appear in the original description of the genus. First, a small although evident rostrum does exist and second, the dactyls of the pereopoda are not all triungiculate. The dactyls of the first pair are biungiculate, having the inferior claw bifid, exactly as figured by Dana. As in several genera of the Asellota, the dactyls of the other pereopoda are triungiculate.

#### GENUS LAIS BOVALLIUS, 1887

TYPE SPECIES.—LAIS HARGERI BOVALLIUS, 1887=]ÆRA PUBESCENS Dana, 1852.

*Diagnosis*.—(modified after Bovallius.) Eyes present, each consisting of two facets. First antenna with six articles. Second antenna without a scale. Epimeral plates visible in dorsal view on all pereonal somites. Lateral margins of pereonal somites not deeply incised, borders setiferous. Apex of male first pleopod not widely expanded laterally. Third pleopod without plumose setae on endopod. Dactyls of first pereopods with two claws; those of others with three claws. First two articles of maxillipedal palp as wide as endite; apical three articles much narrower than endite. Mandible with a triarticulate palp and with an evident, elongate, apically blunt molar process.

*Composition*.—Nierstrasz (1941, pp. 287-288) appears to be the most recent writer to treat this genus. He records two species, *I. pubescens* (Dana) including the var. *longistylis* Chilton (Chil-

ton, 1912, p. 131), and *I. hargeri* Bovallius as belonging to the genus and remarks, "Beide Formen sind wahrscheinlich identisch, und weil keine anderen Arten von *Lais* bekannt sind, hat dann die einzige Art eine südlichcircumpoläre universelle Verbreitung." This remark, which clearly is in accord with prior opinion concerning the distribution, we feel is partly incorrect. It is conceivable that *I. pubescens* (Dana) is a circumpolar antarctic species but from the evidence we have seen it is improbable that the species is universally distributed. Most of the references to the species *I. pubescens* are notes on occurrence. Usually no additional figures or description are given. This is probably because of the belief that only one species existed and hence nothing further was needed. We prefer to place mere references to the species from localities far removed from the type locality in a list of *species inquirende*. The collection and study of material from the localities referred to might assist in the correct assignment of the disputed synonyms to their proper species.

#### A KEY TO THE SPECIES OF THE GENUS LAIS

1. Inferior (accessory) claw of dactyl of first pereopod bifid.  
..... *pubescens* (Dana)
1. Inferior claw of dactyl of first pereopod simple, not bifid...2.
2. Maxilliped with three coupling hooks..... *californica* (Richardson).
- ..... *singaporensis* new species.
2. Maxilliped with two coupling hooks.....

#### LAIS PUBESCENS (Dana)

Plates 42-43

SYNONYMS.—]ÆRA *pubescens* Dana, 1852, p. 744, atlas, pl. 49, figs. 9a-d.—Beddard, 1886, pp. 19-20, pl. II, figs. 6-10.

*Lais Hargeri* Bovallius, 1886, pp. 50-51.

*Lais pubescens* (Dana).—Bovallius, 1886, pp. 51-52.—Stebbing, 1900, pp. 549-551.—Chilton, 1909, pp. 649-650.—Vanhöffen, 1914, pp. 530-531.—Stephensen, 1927, p. 356.—Monod, 1931a, p. 13.—Nordenstam, 1933, pp. 177-179, fig. 41.—Nierstrasz, 1941, pp. 287-288.

*Diagnosis*.—First antenna about one seventh as long as body and one fifth as long as second antenna. Second antenna more than two thirds as long as body; flagellum with twenty-six ar-

ticles. Maxilliped with two coupling hooks. Peraeonal somite 4 overlaps the borders of somites 3 and 5. Peraeonal setae moderately developed. Inferior claw of dactyl of pereopods one to seven bifid. Lateral subapical processes of sympod of male first pleopods diverging, subacute, each with a laterally located notch; medial processes triangulate, provided with four marginal setae. Pleotelson longer than wide, posterior border evenly rounded.

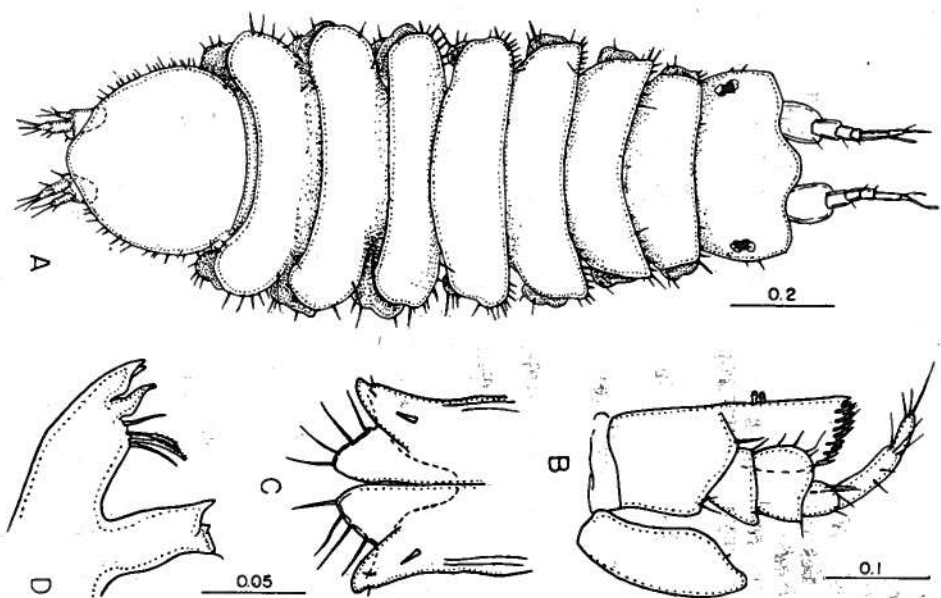


PLATE 42

*Iais pubescens* (Dana). a, toto, adult female. b, maxilliped. c, apex of male first pleopods. d, apical parts of left mandible. Figures with similar magnification (indicated by mm. scale); a, b; c, d.

Uropod one third as long as pleotelson, endopod as long as peduncle, exopod shorter than endopod. Operculum of female pyriform, with a truncated process on posterior edge.

*Type locality*.—Nassau Bay, Tierra del Fuego (Dana, 1852, p. 744).

*Material examined*.—We have examined the material mentioned by Nordenstam (1933, p. 179) from the Falkland Islands,

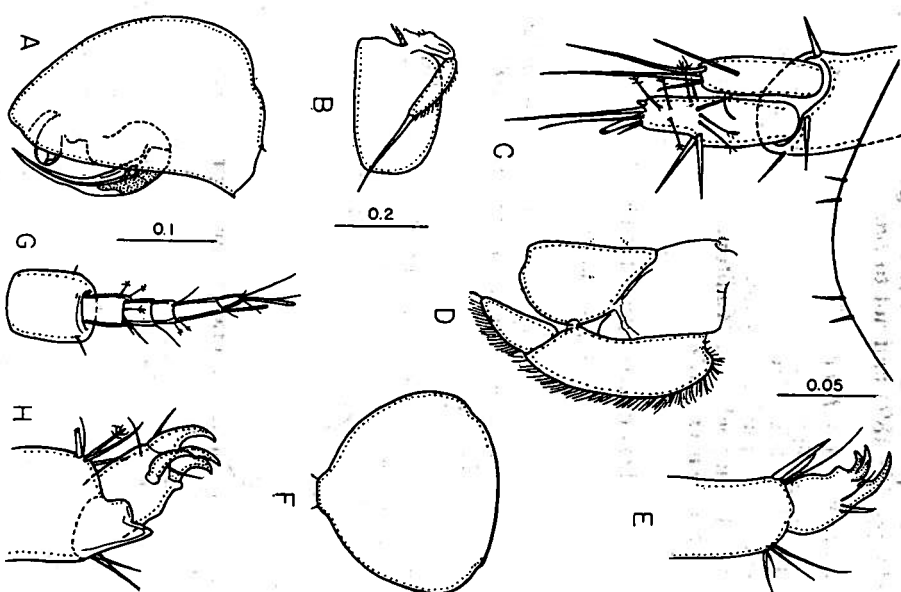


PLATE 43

*Iais pubescens* (Dana). a, male second pleopod. b, male fourth pleopod. c, uropod and apex of telson. d, male third pleopod. e, dactyl of first pereopod, female. f, operculum of female. g, first antenna. h, dactyl of seventh pereopod, female. Figures with similar magnification. a, d, g; b, f; c, e, h.

Magellan Straits, and Tierra del Fuego. This material was collected by the "Eugenie" Expedition, the Swedish Expedition to Tierra del Fuego, and the Swedish Antarctic Expedition.

*Remarks.*—For reasons given earlier we believe *I. hargeri* Bovallius to equal *I. pubescens* (Dana). Stebbing (1900, p. 549) was also of this opinion but it seems he was too liberal in supplying *I. pubescens* with synonyms. We prefer to place some of his synonyms in a *species inquirendae* list. One species, *Jera antarctica* Pfeffer (1887, pp. 134-136, pl. 7), belongs to *Neojera* (Nordenstam, 1933, pp. 187-189) and not to *Iais*.

*Distribution.*—*Iais pubescens* (Dana) appears to be an Antarctic circumpolar species, having been taken at the following locations: Falkland Isls., Tierra del Fuego and vicinity (Nordenstam, 1933), Kerguelen (Beddard, 1886; Vanhöffen, 1914), Auckland and Campbell Isls. (Chilton, 1909; Monod, 1931a), and Tasmania (Stephensen, 1927).

#### IAIS CALIFORNICA (Richardson)

Plates 44-45

SYNONYMS.—*JANIOPSIS CALIFORNICA* Richardson, 1904a, pp. 223-224.—1904b, pp. 666-667.—1905, p. 455, figs. 507-508.

*Diagnosis.*—First antenna about one sixth the length of the body and nearly three tenths as long as the second antenna. Second antenna about six tenths the length of the body; flagellum with twenty four articles. Maxilliped with three coupling hooks. Peraeonal somite 4 overlapping the border of somite 3 but overlapped by the border of the fifth somite; peraeonal setae moderately developed. Inferior claw of dactyl of pereopods one to seven simple, not bifid. Lateral subapical processes of sympod of male first pleopod not diverging laterally, lateral margins smooth; medial processes subtriangulate, provided with 5 marginal setae. Pleotelson wider than long, posterior border medially produced into a lobe. Uropod slightly more than one half as long as pleotelson; rami subequal in length, twice as long as peduncle. Operculum of female wide, with a small, rounded, medial process on distal margin.

*Types.*—These have been lost, according to Dr. Fenner A. Chace, Jr., Curator of Marine Invertebrates at the United States National Museum, Washington, D. C.

*Type locality.*—Sausalito, California, collected by Dr. Ritter and party (Richardson, 1905, p. 455).

*Material examined.*—Hamlet, Tomales Bay, Marin County, California, August 18, 1948, coll. R. J. Menzies, in excess of 50 specimens from *Spharoma pentodon* Richardson and the burrows of *Spharoma* in submerged wood.

*Distribution.*—Tomales Bay to Sausalito, San Francisco Bay, Marin County, California.

*Remarks.*—Assuming that our material and hers are conspecific, Richardson's description of the species is incorrect in several details. Some of these are corrected in the above diagnosis but a few additional remarks are needed. The eyes are compound and not simple; the margins of the pleotelson are not smooth, but are covered with numerous setae; all pereopods except the first have triunguiculate dactyls.

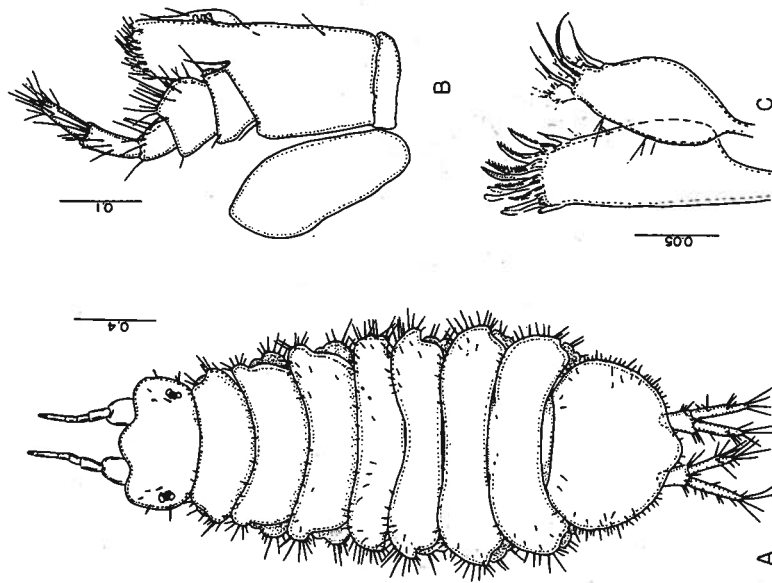


PLATE 44

*Iais californica* (Richardson). a, toto, female. b, maxilliped. c, first maxilla. Magnification as indicated by mm. scale.

This species differs from the others belonging to the genus in having very long uropods and in having three coupling hooks on each maxilliped.

One adult male was 2.7 mm. long and 1.0 mm. in greatest width. Richardson gave no measurements.

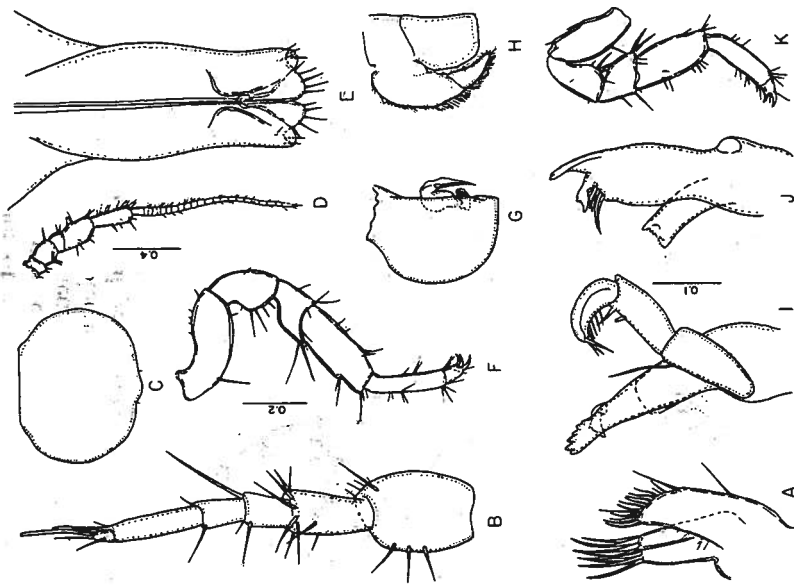


PLATE 45

*Iais californica* (Richardson). a, second maxilla. b, first antenna. c, female operculum. d, second antenna. e, male first pleopods. f, seventh pleopod. g, male second pleopod. h, male third pleopod. i, left mandible. k, first peraeopod. Figures with similar magnification: a, b, e, i, j; c, f, g, h, k; d.

# *Iais* SINGAPORENSIS, new species

Plates 46-50

SYNONYMS.—None.

**Diagnosis.**—First antenna short, about one fifth the length of the body and one third as long as the second antenna. Second antenna slightly less than two thirds as long as body; flagellum with twenty articles. Maxilliped with two coupling hooks. Peraeonal somite 4 overlaps the border of somite 3, but is overlapped on its posterior border by the fifth somite. Inferior claw of dactyls of peraeopods one to seven simple, not bifid. Lateral subapical processes of sympod of male first pleopods not diverging, medial processes with rounded, slightly acute, apices; each with five to eight marginal setae. Pleotelson slightly wider than long, apical process rounded, very noticeable. Uropod one half to one third as long as pleotelson, rami subequal in length, longer than peduncle. Female operculum wide, with a pronounced apical lobe.

**Types.**—Holotype male, length 1.7 mm., width 0.7 mm. Allotype, ovigerous, length 2.3 mm., width 0.85 mm. Thirty paratypes. Six paratypes donated to the Swedish State Museum and six donated to the Allan Hancock Foundation. The other types have been returned to the Raffles Museum, Singapore.

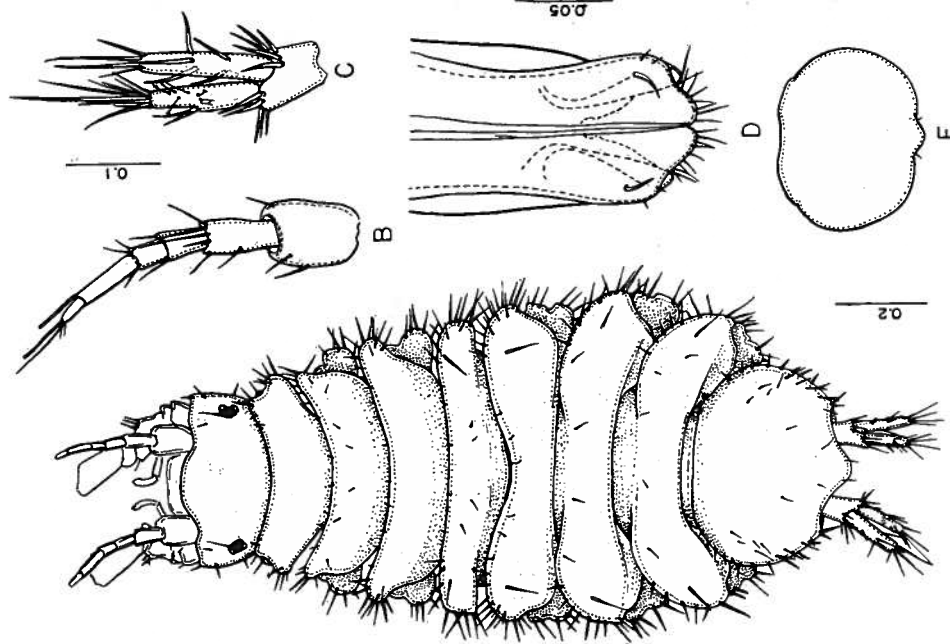
**Type locality.**—Seletar and Ponggel, Singapore Island, May-June, 1950, types, on *Sphaeroma* sp., collected by the Raffles Museum and lent to the writers by Dr. Tweedie, carcinologist.

**Material examined.**—(exclusive of types). Dungun, Trengganu, east coast of Malaya, December, 1950, 3 males, 12 females, on *Sphaeroma* sp., collected by the Department of Forestry, Raffles Museum collection.

Sungei, Patani, Kedah, Malaya, February, 1951, 2 males, 21 females, on *Sphaeroma* sp., collected by the Department of Forestry, Raffles Museum collection.

Dagatdagatan Saltwater Experiment Station, near Manila, Luzon, Philippine Islands, December 12, 1949, 96 specimens, collector Mr. Manuel Tiglao, Philippine Bureau of Fisheries.

**Remarks.**—The specimens from Singapore (Plates 46-47) and those from the Philippine Is. (Plates 48-50), as the figures indicate, are very different in some respects. Specimens from Dungun and Sungei, Malaya, which we received from Dr. Tweedie, possessed characteristics intermediate between the two. This possibly indicates that a "rassenkreis" involving two or possibly more subspecies is represented. Without further material we do not feel it advisable to establish subspecies. We are, however, reasonably certain that only one species is involved. This species resembles *I. californica* (Richardson) in having long uropods and in having a simple inferior claw on the dactyls of the peraeopods. It differs conspicuously from *I. californica* in having only two coupling hooks on each maxilliped.



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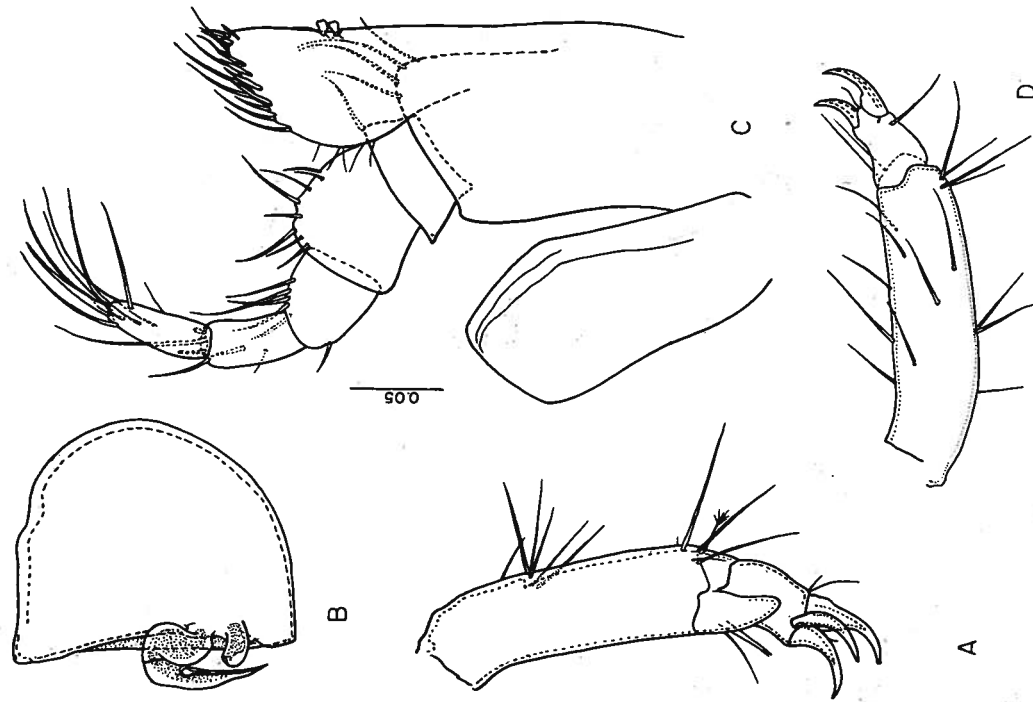
PLATE 46

*Iais singaporensis* Menzies and Barnard, n. sp., paratype. a, toto, female. b, first antenna. c, uropod. d, apex of first male pleopod. e, operculum of female. Figures with similar magnification: a, e; b, c; d. (Singapore).

## SPECIES INQUIRENDÆ

1. *Jæra novæ-zealandiæ* Chilton, 1883, p. 189 (Lyttelton Harbour, New Zealand).
2. *Iais neo-zealanica* (Chilton), Thomson, 1889, p. 265 (Auckland Harbour, New Zealand).

3. *Iais pubescens* (Dana), Thomson, 1893, p. 59 (New Zealand).
4. *Iais pubescens* (Dana) var. *longistylis* Chilton, 1912, p. 131 (Malborough Sound and Hawkes Bay, New Zealand, also from Sydney Harbour).



A

PLATE 47

*Iais singaporensis* Menzies and Barnard, n. sp., paratype. a, dactyl and propod of seventh pereopod. b, male second pleopod. c, maxilliped. d, dactyl and propod of first pereopod. All figures with similar magnification. (Singapore).

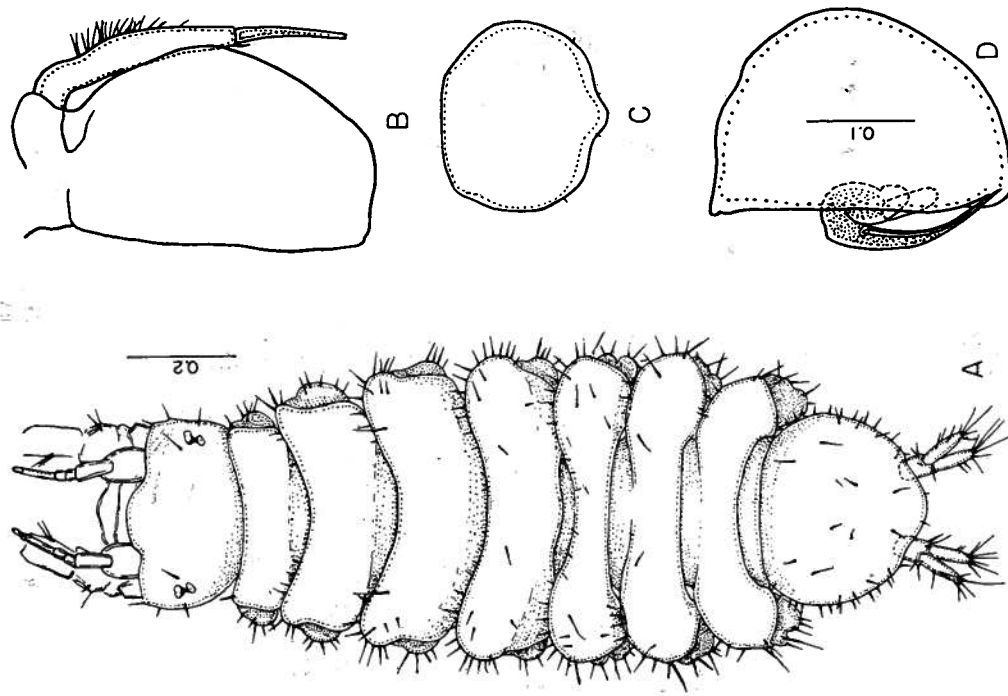


PLATE 48

*Iais singaporensis* Menzies and Barnard, n. sp. a, toto, male. b, fourth pleopod, female. c, female operculum. d, second pleopod of male. Figures with similar magnification: a, c; b, d. (Philippine Isls.).

5. *Iais pubescens* (Dana).

Chilton, 1892, pp. 266-267 (New Zealand); 1925, p. 319 (New Zealand).

Barnard, 1914, pp. 435-436, pl. XXXVII (Table Bay, South Africa); possibly not *Iais*.

Monod, 1931, p. 1 (Douala Bay, Cameroun).

Stebbing, 1904, p. 10 (Negombo, Ceylon); 1917, p. 446 (Durban Bay, South Africa).

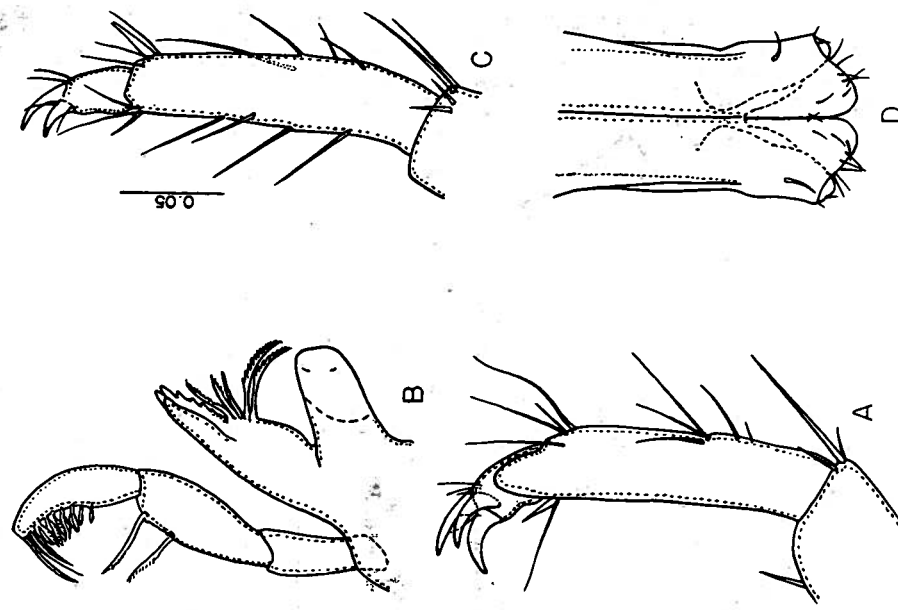


PLATE 49

*Iais singaporensis* Menzies and Barnard, n. sp. a, seventh pereopod. b, right mandible. c, first pereopod. d, male first pleopods. All figures with similar magnification. (Philippine Isls.).

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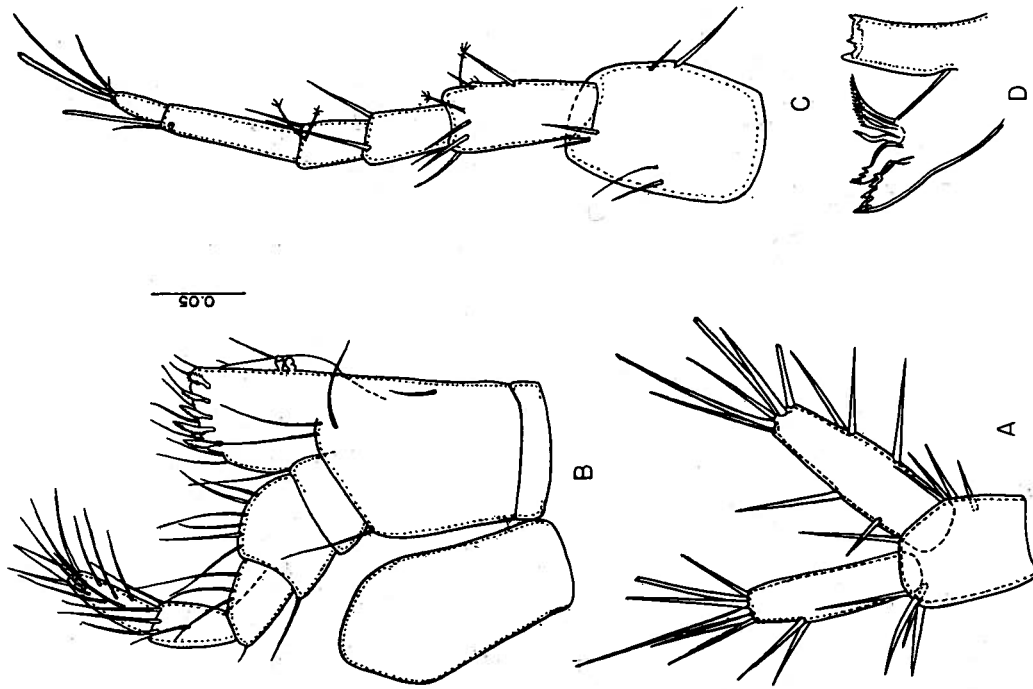


PLATE 50

*Isais singaporensis* Menzies and Barnard, n. sp. a, uropod. b, maxilliped. c, first antenna. d, left mandible. All figures with similar magnification. (Philippine Isls.).



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