

# Reassessment of the isopod crustacean *Aega deshaysiana* (Milne Edwards, 1840) (Cymothoida: Aegidae): a world-wide complex of 21 species

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*Aega deshaysiana* (Milne Edwards, 1840) and *A. antillensis* Schioedte & Meinert, 1879, have long been confounded, with all records eventually becoming regarded as belonging to one globally distributed species, namely *A. deshaysiana*. These two species are redescribed and differentiated, with *A. schioedteana* Bovallius, 1885 remaining in synonymy with *A. deshaysiana*. *Aega deshaysiana* occurs only in the eastern North Atlantic and Mediterranean, while *A. antillensis* is known only from the Caribbean and Gulf of Mexico. A further two named species are redescribed: *A. excisa* Richardson, 1910, previously placed in synonymy with *A. deshaysiana*, and *A. magnifica* (Dana, 1852). A neotype is designated for *A. magnifica*. This 'complex' or group of *Aega* species is distinguished from the others by their large eyes, which are usually medially united and occupy most of the head, their large adult size (20–60 mm), a posteriorly acute and defined pleotelson apex, and the uropod rami not extending posteriorly beyond the pleotelson, with exopod held at an oblique angle to the endopod and deeply notched endopod lateral margin. The group is not necessarily monophyletic, as there is a gradation in the depth of the uropod notch from deep to scarcely evident, and in eye size from entirely occupying the head to just separate (though the eyes are always large). **Twelve new species** in the group are described. All species are considered to be micropredators of fishes and elasmobranchs, although prey records are few and unreliable owing to the readiness of these isopods to detach. Species of the group have been recorded from depths varying between 10 m and 600 m and occasionally deeper. Several have extensive distributions ranging from the Southern Ocean to tropical waters. The group is represented in all oceans. © 2004 The Linnean Society of London, *Zoological Journal of the Linnean Society*, 2004, **142**, 135–232.

ADDITIONAL KEYWORDS: Isopoda – new species – revision – taxonomy.

## INTRODUCTION

*Aega deshaysiana* (Milne Edwards, 1840) and *A. antillensis* Schioedte & Meinert, 1879, have had a long and confused history. Both names were applied to species from diverse parts of the world, some authors (e.g. Hale, 1925, 1940, 1952; Kensley & Schotte, 1989; Kensley, 2001) changing their application of the names. Reservations had been expressed that these records were all of one species (e.g. Kensley, 1976; Sivertsen & Holthuis, 1980) but, critically, in 1983, Brusca redescribed *A. deshaysiana* and placed all records for those two names as well as *A. excisa* Richardson, 1910 and *A. schioedteana* Bovallius, 1885, into

synonymy with *A. deshaysiana*. This synonymy was later followed by Kensley & Schotte (1989).

Brusca (1983) discussed in detail the 'subtle variation' to be found in this group, based on the type material of three of the four named species involved and a further five specimens from diverse localities, and concluded that the differences were intraspecific variation. The small amount of material examined by Brusca did not allow the separation of interspecific from intraspecific differences, as well as geographical variation; consequently, he concluded that the specimens belonged to one species.

Fortunately, there are many museum specimens of both the principal species involved, including most of the material examined and identified by previous authors from around the world. Most specimens identified under these two names (e.g. by Nierstrasz, 1918;

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Hale, 1925, 1940; Barnard, 1940; Kensley, 1975, 1976, 1978; Sivertsen & Holthuis, 1980) were available, and have been re-examined and assigned to other, mostly new, species. This material has allowed *A. deshaysiana* and *A. antillensis* to be distinguished, previous records to be re-identified and new species to be described.

Contrary to Brusca's (1983) finding that there was 'no correlation to be seen among the character suites of specimens and their localities' the differences in pereopod morphology observed in a large series of specimens between *A. deshaysiana* and *A. antillensis* are consistent with geographical location. Most species can be easily and consistently separated on a number of characters: eye size, shape of the frontal lamina, setation and shape of the anterior pereopods, shape of the propodal lobe (when present) on pereopods 1–3, setation of pereopods 5–7, uropod shape and setation and pleotelson setation.

#### AEGA DESHAYSIANA AND RELATED SPECIES

Initially, on examining a limited number of specimens, it seemed that there were a number of similar species, with strong Southern Hemisphere representation, all of which were related to the Atlantic species *A. deshaysiana* and *A. antillensis*. They all have large eyes, which in some species occupy almost all of the head, robust pereopods, weakly flattened antennules, an anvil-shaped frontal lamina, pereopods 1–3 often with a small to large lobe on the propodal palm, relatively long robust setae on pereopods 4–7, an elongate pleotelson with a prominently defined apex, the distal margin of which usually has a groove in which the setae are set (see Figs 1G, 29G, 49E), uropods that characteristically have a deeply notched endopod lateral margin (described as falcate by Brusca, 1983) and the transverse plane of the exopod oblique to that of the endopod.

As more species were discriminated, notably those from the large series of excellently preserved material collected by MUSORSTOM off New Caledonia, it became increasingly apparent that none of the above-mentioned characters hold up absolutely. All species have the 'anvil-like' frontal lamina; however, in some the notching of the uropod is scarcely present. The eyes are large and medially united in most species, but are clearly separate in *A. deshaysiana* and *A. birubi* sp. nov. for example. Most species have stout anterior pereopods, the inferior margin of the propodus often with a small distal lobe, occasionally with a large plate-like blade; all have relatively long robust setae on the posterior pereopods (in comparison to species such as *A. monophthalma* Johnston, 1834, *A. semicarinata* Miers, 1875 or *A. magnifica* (Dana, 1853); see descriptions below). In this paper I

group *A. deshaysiana* and related species in order to facilitate their identification, resolve the identity of named species and describe those hitherto undescribed and provide details of what is known of their global distribution.

There are a few additional species that appear similar to those described here, most notably *A. magnifica* (Dana, 1853). Figures of pereopod 1 and of the uropods suggested similarities to the group, despite the relatively small size of the eyes. Examination of material close to the type location showed that it is similar to those *Aega* which have peduncular articles 1 and 2 of the antennule large and anteriorly expanded. *A. magnifica*, in common with species such as *A. monophthalma*, *A. semicarinata*, and *A. urotoma* Barnard, 1914, has the uropodal rami extending posterior to the pleotelson apex, a dense mass of setae along the margins of the pleotelson of the uropods and coplanar uropodal rami. In addition, in all these species the anterior (or inferior, depending on perspective) margin of the antennule peduncle article is strongly defined, with a blade-like edge. Two other species are similar to *A. magnifica*: *A. acuminata* Hansen, 1897, from the Galapagos and off Costa Rica and *A. maxima* Hansen, 1897, from off Cocos Island (Costa Rica) between Panama and the Galapagos. *A. magnifica* is described below.

The phylogenetic significance of these character states and the monophyly of the group are not assessed. Given this caveat, this group is found world-wide and there are numerous species. This paper describes 15 species, 12 of them new, and provides notes for a further six for which material was inadequate for descriptive purposes.

#### DISTRIBUTION

The '*A. deshaysiana* group' occurs world-wide, with the greatest diversity (13 out of 21 species) in the South-West Pacific, a region which extends from the eastern and south-eastern Australian coast to the island arc that runs from the Solomon Islands and New Caledonia to New Zealand. The North Atlantic, an area by now well collected, has two allopatric species, the western *A. antillensis* and the eastern *A. deshaysiana*. Diversity is low in the Indian Ocean and the South Atlantic, though this is likely to be due to limited sampling. Only a single specimen of *A. alazon* is known from the central and northern Indian Ocean and only one specimen of *A. banda* from the eastern Indian Ocean off Western Australia and Indonesia. The only record of this group from the South Atlantic is of a single specimen of *A. alazon* from Tristan da Cunha Island. The North Pacific has two named species (*A. excisa* from the Philippines and Japan and *A. japonica* from Japan) and two unde-

scribed species (one from Hawai'i and one from the tropical East Pacific at Cocos Island).

Several species have extensive local distributions, but only *A. alazon* has an extensive transoceanic distribution, occurring in the Southern, Atlantic, Indian and Pacific Oceans; it is the only species that ranges from temperate to tropical waters.

Most species and specimens were collected from the continental shelf and slope, at depths from as little as 10 m to c. 650 m. Only five specimens reported here were taken at depths greater than 650 m, with one specimen of *A. deshaysiana* recorded from c. 1105 m.

## METHODS

### DESCRIPTIONS

In order to conserve long-term viability, dissection of the holotype was always minimized. As far as material permitted, the description was based on the holotype and a dissected paratype. The individual specimens used to formulate the descriptions are identified as 'dissected' in the Material examined sections and Figure captions.

Counts of robust setae on the pereopod margins (e.g. 'set as 1 and 3' or 'set as 1, 2 and 2') are always proximal to distal, and indicate groups. Counts on the distal margins were made directly from the appendage under the stereomicroscope. These cannot be assessed from the figures as the appendages are opaque and the setae not all visible.

All descriptions were prepared using DELTA (Descriptive Language for Taxonomy: Dallwitz *et al.*, 1997). Species are arranged in alphabetical sequence, named species first then new species, except for *A. magnifica* (Dana, 1853) which is placed last.

For some *integer numeric* character states the description may include a zero (0) rather than the more usual 'without' or 'none'; similarly for some *real numeric* characters it may read '1 times as long as' rather than the simpler 'as long as' (although see Abbreviations, below). Minor details qualifying a coded character state are retained within parentheses.

*Implicit characters* (i.e. taken as existing for all taxa except where otherwise indicated) are: rostral point present; pereopods 5–7 superior margins of ischium–carpus without setae.

### DRAWINGS

All drawings, except for the mouthparts, were made using a Leica MZ12.5 stereomicroscope. Appendages were drawn without being flattened; while perspective has been kept as consistent as possible, allowances must be made for some slight differences between specimens. The articles of the maxilliped palps are

twisted along the axis of the appendage, which means that article 4 is largely seen in lateral view and article 5 is largely concealed by article 4; for most species a separate figure drawn under the dissecting microscope is given for article 5. I made the decision to draw this appendage entire rather than breaking it into component parts. Mouthparts were dissected and mounted in lactic acid and examined and drawn using a Leitz Aksioskop 2 *plus*. All drawings were made using a camera lucida.

*Maps.* In a number of instances the locality names could not be identified or related to an existing or contemporary name, and therefore the record is either omitted or approximated. For *A. deshaysiana* such records are identified by use of an open square.

### DISSECTIONS

Appendages were dissected from the right side of the specimen unless otherwise stated. Dissected appendages are stored in microvials with the specimen. In the interests of long-term viability and to avoid mutilation of the holotype, dissections have principally been taken from a topotypic specimen or a specimen from as near as possible to the type locality.

### MEASUREMENTS

Whole specimens were measured in lateral view using a micrometer eyepiece, along the axis of the join between the coxae and pereonites; total length is given to the nearest millimetre for those specimens over 2 cm. Owing to curvature of specimens on fixation, dorsal views of specimen are often foreshortened. Pereopod measurements were made along the axis of the articles for the basis of pereopods 1–3 and all articles for pereopod 7; for pereopods 1–3 the ischium, merus and carpus were measured along the inferior margin. All proportional measurements have been rounded to one decimal place.

### NAMES AND FISH NOMENCLATURE

Species names were formulated using Brown (1956) or taken from *Aboriginal Words of Australia* and *Aboriginal Place Names* (Anonymous, 1965, 1967). Nomenclature of fishes follows *FishBase* (Froese & Pauly, 2002).

### ABBREVIATIONS

#### *Institutional*

AM	The Australian Museum, Sydney
BMNH	The Natural History Museum, London
FSBC	Marine Invertebrate Collection, Florida Marine Research Institute, St Petersburg, Florida

LACM	Los Angeles County Museum, Los Angeles
MNHN	Muséum National d'Histoire Naturelle, Paris
NIWA	National Institute of Water and Atmospheric Research, Wellington, New Zealand
NMNV	National Museum of New Zealand, Te Papa Tongarewa, Wellington
NMV	Museum Victoria, Melbourne
NTM	Museum and Art Gallery of the Northern Territory, Darwin
QFS	Queensland Fisheries Service (now part of DPI, Brisbane)
QM	Queensland Museum, Brisbane
SAM	South Australian Museum, Adelaide
SafM	South African Museum, Cape Town
SMNH	Swedish Museum of Natural History, Stockholm
TSM	Toyama Science Museum, Japan
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC
ZMA	Zoological Museum, Amsterdam
ZMUC	Zoologisk Museum, University of Copenhagen

#### Anatomical

imm	immature (used for specimens of indeterminate sex)
P1, 2	Pereopods 1, 2 etc
PMS	plumose marginal seta/setae
RS	robust seta/setae

#### Dimensions

Times as long as	× L
Times as long as wide	× LW
Times as wide as long	× WL

#### PREY DATA

A few species of Aegidae have been reliably recorded as showing 'host preferences' (Bruce, 1983, 2002; Ross *et al.*, 2001). In most cases it appears that the attachment is strictly temporary. I regard species of *Aega*, despite the relatively large size of some, as free-living 'micropredators' that probably lack individual host-specific association, as did Brusca (1983). Furthermore, many specimens are trawl-caught, and as these isopods detach readily it is not always possible to be certain that the 'host' record is other than an artefact resulting from proximity in a trawl-net. For these reasons I avoid the word 'host' and use 'prey' to describe the species on which these isopods appear to feed. Nonetheless, these data are useful, as it is likely that the different species do have differing prey preferences, and the sometimes substantial differences seen

in the morphology of the anterior pereopods may well reflect adaptation to attaching to and feeding on different prey species.

#### TAXONOMY

##### GENUS *AEGA* LEACH

#### *Restricted synonymy*

*Æga* Leach, 1815: 369; 1818: 549; Schioedte & Meinert, 1879: 334.

*Aega* – Brusca, 1983: 7; Kussakin, 1979: 231; Kensley & Schotte, 1989: 116.

*Pterelas* Guérin-Méneville, 1836: pl. 20 (not paginated).

*Aegacylla* Dana, 1854: 176 ('aegathoid' or juvenile).

*Aegiochus* Bovallius, 1885: 4.

#### *Remarks*

The genus has most recently been diagnosed by Brusca (1983) and Kensley & Schotte (1989). The present contribution deals with a subset of the species and it is not appropriate to revise the diagnosis. The genus, with 75 species, occurs throughout marine environments from the polar regions to the tropics, with the greatest number of species being recorded from the continental shelf and slope to depths of 1000 m, occasionally greater.

Brusca (1983) established two subgenera, the nominate subgenus and *Ramphion*. These have not been consistently accepted, being used by some (e.g. Wetzer, 1990) but not by others (Bruce, 1988, 1996; Kensley & Chan, 2001). Some of the critical and 'key' characters are not present in all species placed within the respective subgenera. In the context of species related to *A. deshaysiana* (*Aega* (*Aega*) of Brusca) most species lack the expanded antennule peduncle articles 1 and 2, the eyes while large are not always united, the terminal article of the maxilliped palp often lacks 'recurved spines' (= hooked robust setae), several species lack a propodal lobe to the palm of pereopods 1–3 and the exopod of pleopod 1 is consistently distally narrowly rounded rather than quadrate. These inconsistencies do not necessarily negate the validity of the subgenera but rather indicate the need for a refinement of the defining characters and reassessment of the distribution of the species between the two subgenera.

#### *Characters of the Aega deshaysiana group*

Head with large eyes, either narrowly separated or wholly united; anterior of head with a small anteriorly directed acute median rostral point. Antennule peduncular articles 1 and 2 appear somewhat flattened in



dorsal view, but are triangular in cross-section, never strongly expanded (as in, for example, *A. komai* or *A. monophthalma*), with a short flagellum that is always shorter than the peduncle and does not extend beyond the anterior margin of pereonite 1. Antenna peduncle article 2 often with ventral suture or groove; peduncle article 4 often with longitudinal dorsal ridge and groove; articles 4 and 5 often compressed with blade-like posterior edge, but never expanded. Frontal lamina anvil-like. Mandible molar minute or absent. Pereopods robust, anterior pereopods (1–3) always with obvious robust setae; posterior pereopods (4–7) inferior margins of ischium-propodus with relatively long robust setae (in comparison to those of species such as *A. magnifica*, *A. semicarinata* or *A. monophthalma*). Pleopod 1 exopod distally narrow; pleopods 3–5 endopods always with distomedial point; pleopod 2 with appendix masculina shorter than endopod. Uropods always with endopod lateral margin characteristically indented, usually strongly so, occasionally weakly; rami never extending beyond pleotelson apex; uniquely within the genus the exopod is not coplanar to the endopod but at an angle of 145–160°, somewhat similar to that of *Rocinela*.

*Characters useful in identifying species similar to Aega deshaysiana*

**Head:** the size and shape of the eye are reliable indicators, although some slight variation is present. Some species have eyes that almost fill the entire dorsal surface of the head; in others, the eyes are large and just separate. There are, between some species, obvious differences between the anterior clear fields (without ommatidia) and the posterior clear fields. The frontal lamina is critical in making species determinations and is a reliable species-specific character.

**Coxae:** coxal plates are rather uniform within this group. It is, however, necessary to determine: (1) the presence or absence of a posteroventral point on pereonite 1 and coxae 2–4 and (2) the shape of coxae as acutely pointed, rectangular or rounded.

**Antennule and antenna:** generally rather similar. Antennule peduncular article 2 may be with or without a small anterodistal lobe. There is a distinct difference in the relative lengths of the antennule and antennal flagellum between some species.

**Pereopods:** the ornamentation of the palm of the propodus of pereopods 1–3 is consistent within species and is a significant character; the pattern, relative size and number of robust setae on the inferior margin of the merus also differ consistently between species. pereopods 4–7 are less obviously different, though there is a substantial difference between those species

with long acute robust setae (e.g. *A. musorstom* sp. nov. and *A. hamiota* sp. nov.) and those with stout and short robust setae (e.g. *A. deshaysiana* and *A. alazon* sp. nov.). The relative proportions of the articles and the pattern and relative numbers of robust setae is consistent within species.

**Pleopods:** of little discriminatory value.

**Pleotelson:** shape is often similar between species but does vary with regard to length, general shape of the lateral margins (strongly convex to nearly straight). In addition, the number of robust setae should be noted. As the apex of the pleotelson is frequently damaged the number of robust setae is a difficult character of which to make reliable use.

**Uropods:** shape, setation and relative proportions all vary between species. Immediate points to observe include: (1) whether or not the exopod apex falls short of, or extends beyond, the endopod apex; (2) the relative proportions and shape of the exopod (a character that varies widely); (3) relative position of the notch on the endopod lateral margin; (4) numbers of marginal robust setae on both rami, and (5) the relative number of robust setae distal to and proximal to the excision on the lateral margin of the uropodal endopod.

*AEGA ANTILLENSIS* SCHIOEDTE & MEINERT, 1879  
(FIGS 1–4, 61)

*Aega Antillensis* Schioedte & Meinert, 1879: 360, pl. 8, figs 10–13.

*Aega antillensis* – Richardson, 1901: 521; 1905: 170, fig. 149.

*Aega antillensis* – Gerstaecker, 1882: 265; Menzies & Frankenberg, 1966: 5; Menzies & Kruczynski, 1983: 62, fig. 19; Kensley, 2001: 226 (part).

*Aega deshaysiana* – Nierstrasz, 1931: 182 (part).

*Aega (Aega) antillensis* – Brusca, 1983, fig. 1F.

*Aega (Aega) deshaysiana* – Kensley & Schotte, 1989: 117 [not *Aega deshaysiana* (Milne Edwards, 1840)].

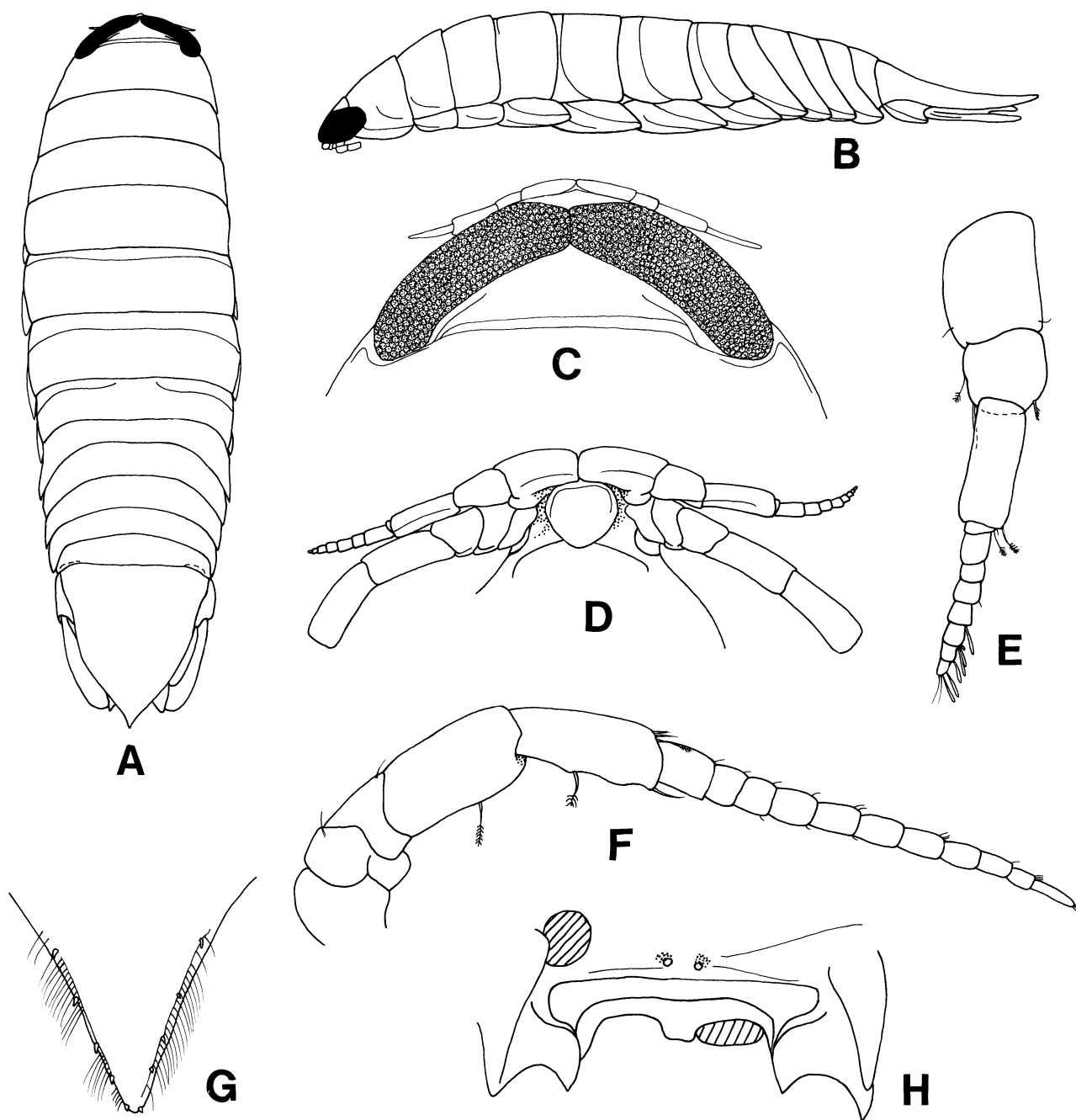
*Aega (Aega) deshaysiana* – Kensley & Schotte, 1989: fig. 51A [not *Aega deshaysiana* (Milne Edwards, 1840)].

Not *Aega antillensis* of all other authors (= various species).

*Material examined*

**Holotype:** ♂ (38 mm), Cuba, Grundlach (ZMB 4046).

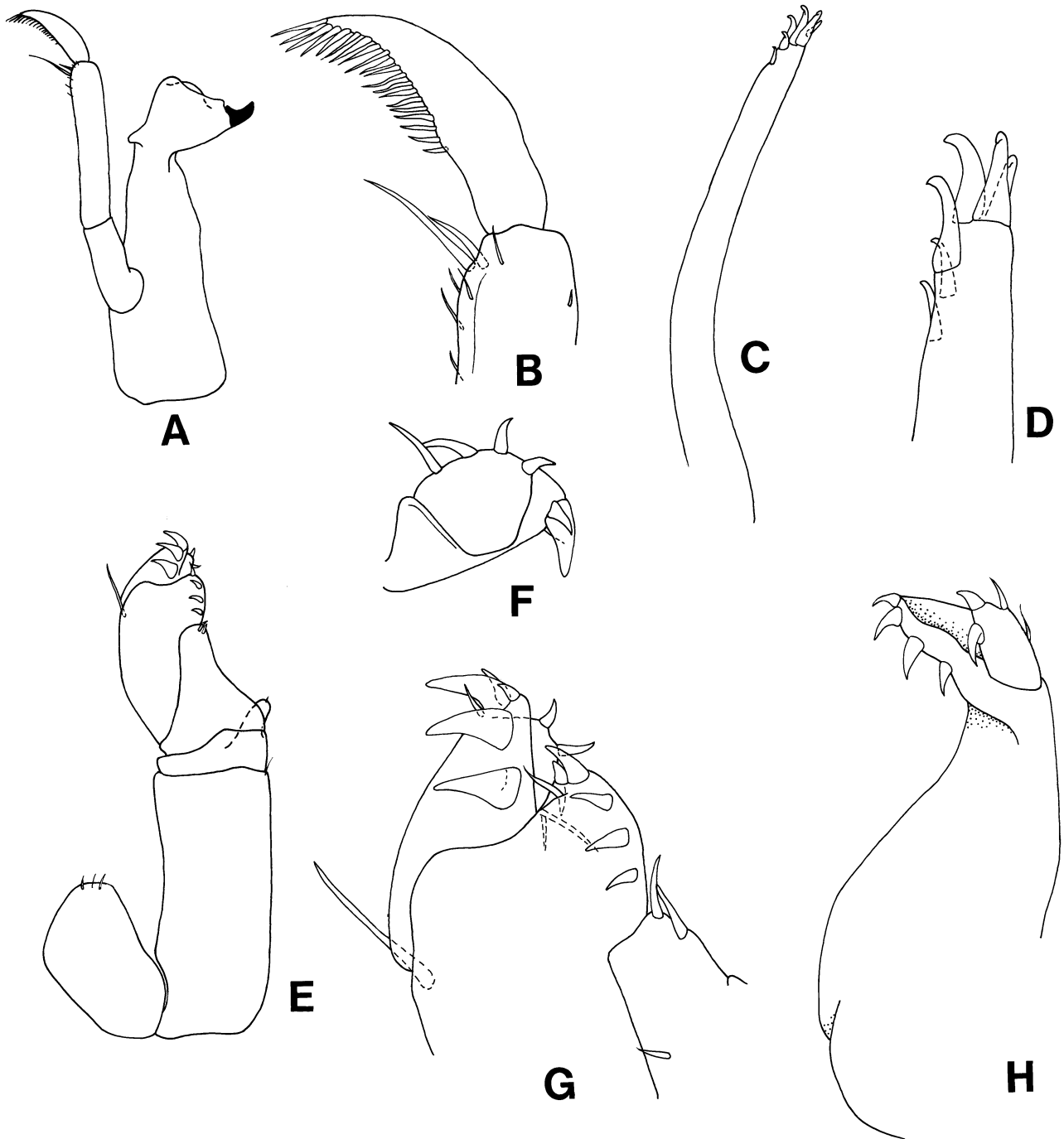
**Non-type:** ♂ (32 mm), Gulf of Mexico, 25°N, 84°W, 14.vii.1965, 128 m, coll. M.L. Jones (USNM 278240). ♀ (non-ovig. 30 mm), Gulf of Mexico, 29°50'N, 86°30'W, 21.iii.1954, 91 m, coll. Oregon (USNM 97891). Manca (13.7 mm), Gulf of Mexico, off Florida,



**Figure 1.** *Aega antillensis* Schioedte & Meinert, 1879. A–D, holotype, ZMB 4046, remainder male 18.5 mm, Gulf of Mexico, FSBC I 18381. A, dorsal view. B, lateral view. C, head. D, frons. E, antennule. F, antenna. G, pleotelson apex, ventral view. H, penial openings.

26°45'42"N, 84°00'08"W, 1.vii.1980, 89.8 m, coll. M.L. Jones (USNM 232928). ♂ (36 mm), off Havana, Cuba, 23°10'51"N, 82°19'03"W, 17.i.1885, 298 m, *Albatross* stn. 2323 (USNM 9494). ♀ (non-ovig. 38 mm), off Havana, Cuba; 23°10'36"N, 82°20'30"W, 1.v.1884, 358 m, *Albatross* stn. 2166 (USNM 7757). ♀ (non-ovig. 34 mm), West Indies, stn. ?283 (USNM 20375). ♀

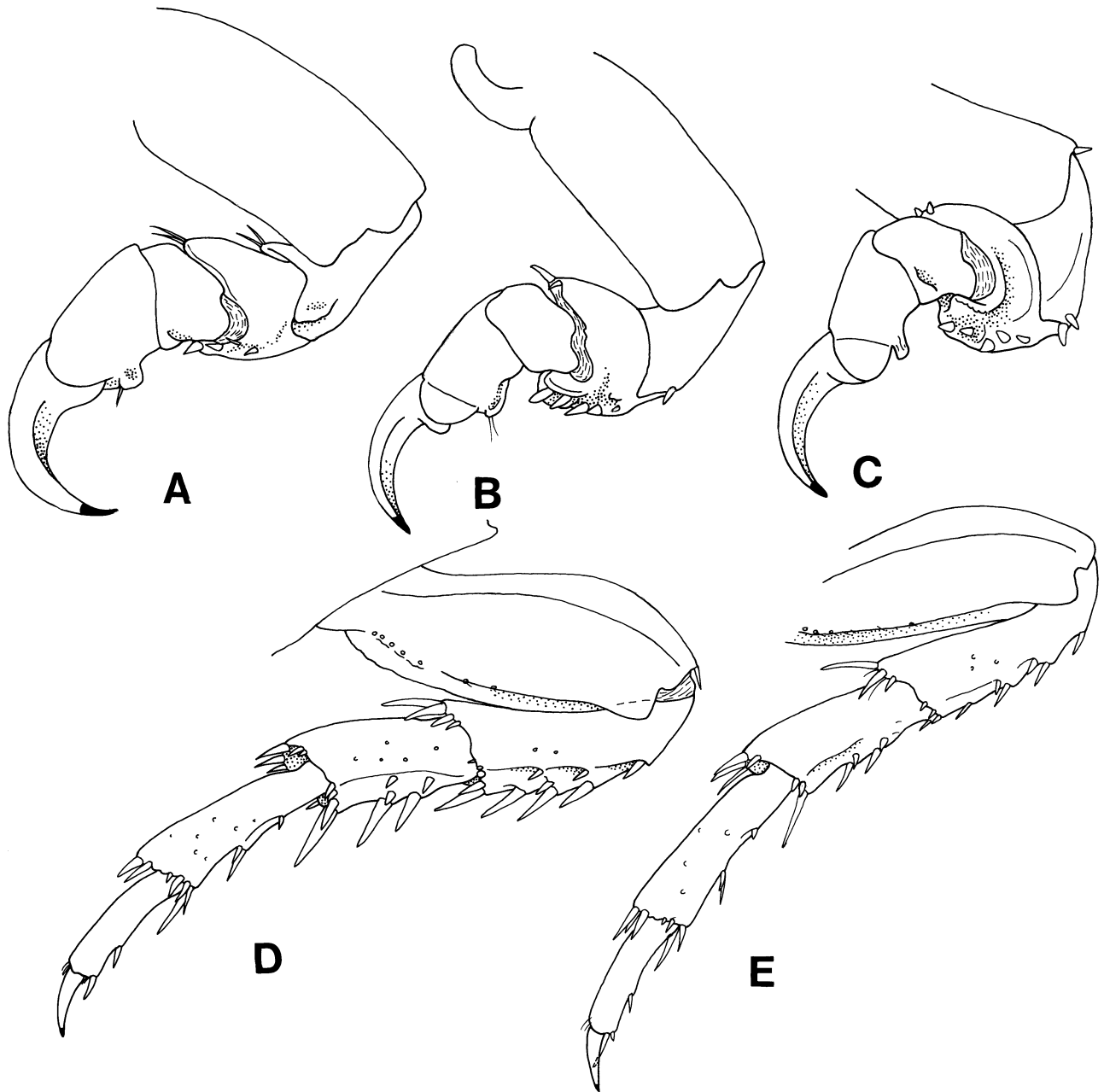
(non-ovig. 38 mm), south of Cozumel, Mexico, 20°19'10"N, 87°03'30"W, 29.i.1885, 422 m, *Albatross* stn. 2359 (USNM 9564, Brusca, 1983). HOURGLASS CRUISE (material examined by Menzies & Kruczynski, 1983). 2 ♀ (non-ovig. 29, 30 mm), off Florida western coast, Gulf of Mexico, 26°24'N, 83°43'W, 8.viii.1967, 70–73 m, crushed shell, dead bryozoans



**Figure 2.** *Aega antillensis* Schioedte & Meinert, 1879. Male 18.5 mm, Gulf of Mexico, FSBC I 18381. A, mandible. B, mandible palp article 3 detail. C, maxillule. D, maxillule apex. E, maxilliped. F, maxilliped palp article 5. G, maxilliped palp articles 2–5. H, maxilla.

and calcareous algae, coll. R. Presley on R.V. *Hernan Cortez* (FSBC I-18383). ♂ (15.0 mm + half specimen), off Florida western coast, Gulf of Mexico, 4 miles west of Egmont Key, 27°35'N, 82°50'W, 5.ii.1967, 6 m, quartz sand and crushed shell, riverine influence, coll. R. Presley on R.V. *Hernan Cortez* (FSBC I-18382). ♂

(18.5 mm), off Florida western coast, Gulf of Mexico, 7 miles west of Egmont Key, 27°37'N, 84°13'W, 3.vii.1966, 6 m, rushed shell, dead bryozoans and calcareous algae, coll. R. Presley on R.V. *Hernan Cortez* (FSBC I-18381). ♀ (non-ovig. 38 mm), off Florida western coast, Gulf of Mexico, 26°30'N, 83°40'W,



**Figure 3.** *Aega antillensis* Schioedte & Meinert, 1879. Holotype, ZMB 4046. A–E, pereopods 1–3, 6 and 7, respectively (pereopod 3 basis omitted).

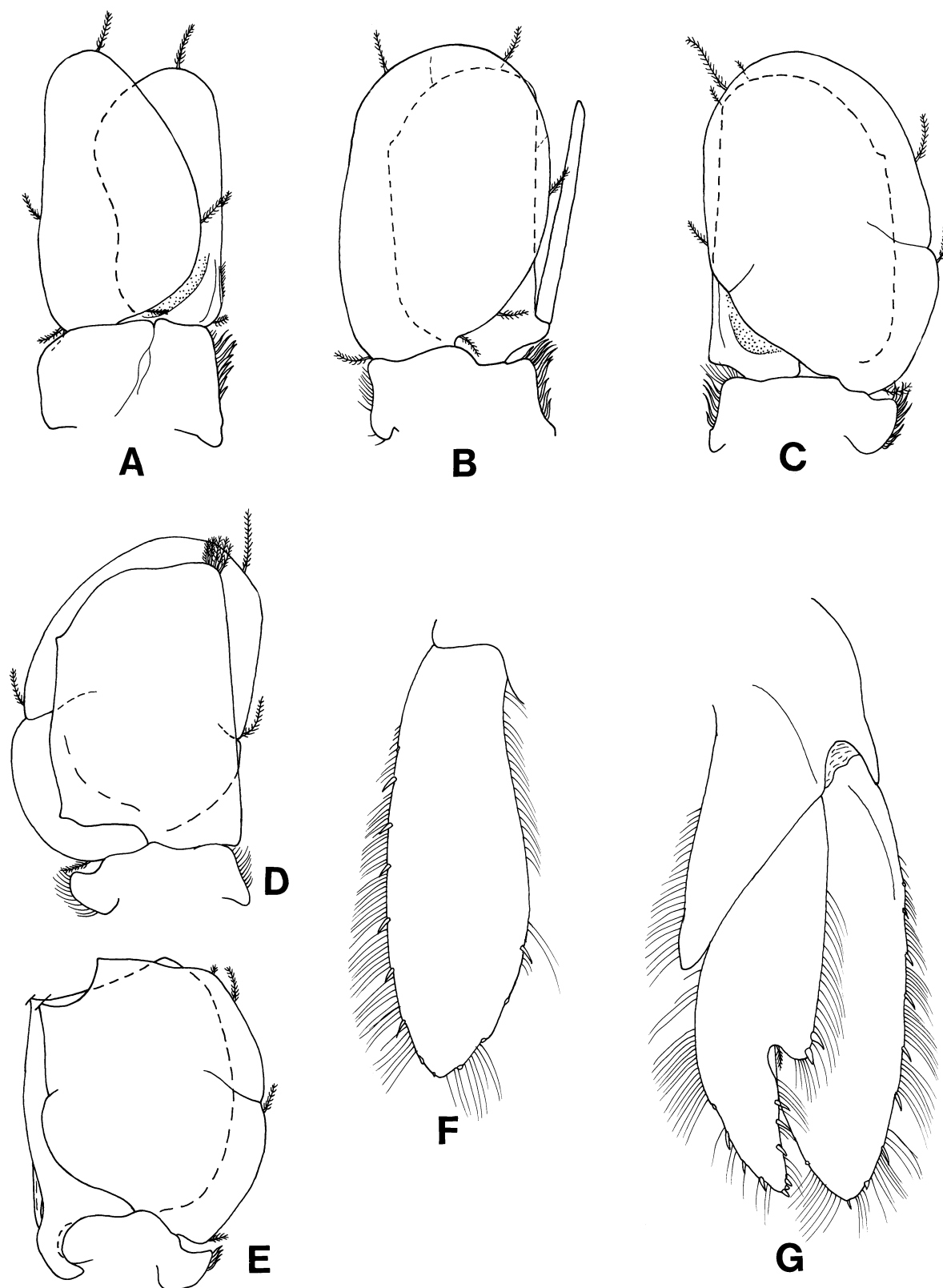
8.v.1967, station depth 69.4–75.2 m, taken from grouper during fishing trip, coll. Lewis H. Bullock on R.V. *White Lightning* (FSBC I-18877).

#### Description

Body 3.5 times as long as greatest width, dorsal surfaces smooth, widest at pereonite 5, lateral margins subparallel. Rostral point projecting anteriorly, not ventrally folded. Eyes large, medially united, anterior

clear field 15% length of head, posterior clear field 53% length of head; each eye made up of ~20 transverse rows of ommatidia, each row with ~7–10 ommatidia; eye colour dark brown. *Pereonite 1* and *coxae 2–3* each with posteroventral angle rounded; *coxae 5–7* with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending to but not beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles free, not overlapped by lateral margins of pleonite 4. *Pleotelson*





**Figure 4.** *Aega antillensis* Schioedte & Meinert, 1879. Male 18.5 mm, Gulf of Mexico, FSBC I 18381. A–E, pleopods 1–5, respectively. F, uropod exopod, ventral view. G, uropod.

1.0 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins sinuate, smooth, posterior margin with elongate medial point, with 10–12 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.7 times as long as combined lengths of articles 1 and 2, article 3 2.7 times as long as wide ( $\times$  LW); flagellum with 7 articles, extending to posterior margin of eye. *Antenna* peduncle article 2 inferior surface without distinct longitudinal suture; article 4  $2\times$  LW, 1.5 times as long as combined lengths of articles 1–3, without deep longitudinal groove, inferior margin with 1 plumose seta, and 0 short simple setae; article 5 not markedly wider or flatter than article 4, 0.9 times as long as ( $\times$  L) article 4,  $2.5\times$  LW, inferior margin with 1 plumose seta, anterodistal angle with cluster of 5 short simple setae; flagellum with 11 articles, extending to posterior of pereonite 1.

*Frontal lamina* flat, as wide as long, lateral margins converging posteriorly, posteriorly rounded, anterior margin rounded, with small median point, posterior margin not abutting clypeus.

*Mandible* molar process present, small distinct flat lobe; palp article 2 with 7 distolateral setae (2 large and 5 small), palp article 3 with 20 setae. *Maxillule* with 6 terminal RS (falcate). *Maxilla* medial lobe with 3 RS (and 1 simple seta); lateral lobe with 4 RS. *Maxilliped* endite with 1 apical seta; palp article 2 with 2 RS; article 3 with 5 recurved RS (and 3 simple setae); article 4 with 3 hooked RS (massive); article 5 articulating with article 4, with 4 RS.

*Pereopod 1* basis 2.2 times as long as greatest width; ischium  $0.5\times$  L basis, inferior margin with 0 RS, superior distal margin with 2 RS (acute); merus inferior margin with 3 RS, set as 2 groups (of 1 and 2), superior distal angle with 2 RS; carpus  $0.8\times$  L merus; inferior margin with 0 RS; propodus 1.3 times as long as proximal width, inferior margin with 0 RS, propodal palm with small distal lobe (rectilinear, with single simple seta), dactylus smoothly curved,  $1.4\times$  L propodus. *P2* ischium inferior margin with 1 RS, superior distal margin with 2 RS; merus inferior margin with 5 RS, set as single row (distal RS overridden by flange), superior distal margin with 2 acute RS; carpus similar in size to that of *P1*, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. *P3* similar to *P2* (but propodal lobe narrower); propodus without large club-shaped distal RS. *P6* similar to *P7* (but longer, inferior margins with longer acute RS). *P7* basis 2.8 times as long as greatest width, inferior margin with 6 palmate setae; ischium  $0.7\times$  L basis, inferior margin with 6 RS (set as 1, 2, 2 and 1), superior distal angle with 5 RS, inferior distal angle with 5 RS; merus  $0.7\times$  L ischium,  $2\times$  LW, inferior margin with 4 RS (set as 2 and 2), superior distal angle with 4 RS, inferior

distal angle with 4 RS; carpus  $0.9\times$  L ischium,  $5\times$  LW, inferior margin with 3 RS (set as 1 and 2), superior distal angle with 4 RS, inferior distal angle with 6 RS; propodus  $0.6\times$  L ischium,  $4.5\times$  LW, inferior margin with 1 RS, superior distal angle with 2 slender plumose setae, inferior distal angle with 3 RS.

*Penes* opening flush with surface of sternite 7; penial openings separated by 6% of sternal width.

*Pleopod 1* exopod  $1.8\times$  LW, distally narrowly rounded with strongly oblique medial margin (not markedly narrow), lateral margin weakly convex, medial margin strongly convex (tapering obliquely to lateral), with PMS from base; endopod  $2\times$  LW, distally subtruncate, lateral margin strongly concave, with PMS from distal half; peduncle 1.6 as wide as long ( $\times$  WL), medial margin with 9 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.8\times$  L endopod, distally narrowly rounded. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediolateral point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 1–2 RS, posterior lobe about  $0.5\times$  L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 4 RS, distal lateral margin with 5 RS, medial margin weakly convex, with 5 RS. *Exopod* extending beyond end of endopod, 3 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 9 RS; medial margin convex, with 5–6 RS.

#### Female

Similar to male with the exception of the sexual characters.

#### Variation

*Robust setae*: pleotelson apex frequently damaged, particularly in old specimens. Of the specimens examined only 5 were sufficiently intact to allow RS to be counted; owing to the uncertainty percentage figures are not given and, as far as could be discerned, the number of pleotelson RS ranges from 4 + 4 to 6 + 6. Uropod ( $n = 13$ ) exopod medial margin 4 (65%), 5 (27%), lateral margin 9 (69%) or 10 (19%); uropod endopod ( $n = 11$ ) medial margin 5 (19%) to 6 (65%), the lateral margin RS are highly variable with the proximal RS 2–5, distal RS 3–6, with 3 + 4 (15%), 4 + 4 (27%) and 4 + 5 and 5 + 5 (each 11.5%), 4 + 5 (10%), and 5 + 4 (5%). There is no discernible difference between males and females, nor does the number of RS increase with the size of the specimen.

P1–3 had highly consistent counts for the RS on the inferior margin of the merus: P1 with 3 (all), P2 and 3 with 5 (all).

#### Size

Males 15.7–36 mm (mean 26 mm), females 29–38 mm (mean 34 mm); manca at 14 mm.

#### Remarks

The characters that best serve to identify *A. antillensis* are the large, medially united eyes, frontal lamina with a minute median point, pleotelson with a strongly produced medial point, pereopod 1 merus inferior margin usually with 3 robust setae, that of pereopod 2 with a single row of 5 robust setae and by the uropodal exopod being slightly longer than the endopod. *Aega antillensis* can be easily separated from other western Atlantic species by the deeply excised uropodal endopod lateral margin.

Differentiation of *A. antillensis* from *A. deshaysiana* is discussed in detail in the remarks for the latter species.

#### Prey

Only recorded prey is 'grouper', a species of Serranidae. The *White Lightning* specimen (FSBC I18877) was not examined by Menzies & Kruczynski (1983) and is the only prey record.

#### Distribution

Caribbean and Gulf of Mexico, including western Florida and Cuba. The species is probably more widespread than the present records indicate. At depths from 70 to 422 m, Menzies & Kruczynski (1983) cast doubt on the accuracy of their 6 m depth record, attributing it to mismatched data.

#### *AEGA DESHAYSIANA* (MILNE EDWARDS, 1840) (FIGS 5–8, 61)

*Rocinela Deshaysiana* Milne Edwards, 1840: 243.

*Aega Deshaysiana* – Lütken, 1859: 75; Heller, 1866: 744.

*Aega Deshayesiana* – Schioedte & Meinert, 1879: 360, pl. 8, figs 7–9; Gourret, 1891: 8, pl. 3, figs 12, 13, pl. 4, figs 1–4.

*Aega Deshayesiana* – Gerstaecker, 1882: 250.

*Aega (Rocinela) Deshayesiana* – Gerstaecker, 1882: 255, 257.

*Aega Schioedteana* Bovallius, 1885: 5, pl. 10, figs 1–10; Stebbing, 1893: 348.

*Aega Deshaysiana* – Norman, 1904: 343, pl. 12, figs 1–4; 1905: 13.

*Aega deshaysiana* – Nierstrasz, 1931: 182 (part).

*Aega (Aega) deshaysiana* – Brusca, 1983: 11, 13 (part), figs 1E, 2E, H, J, K, 3A, D, F–H.

*Aega deshaysiana* – Rokicki, 1984: 72, fig. 2; 1985: 97, 103, 104, 108, fig. 1 (map); Kensley, 2001: 226 (part).

Not *Aega deshaysiana* of all other authors (various species).

#### Type locality

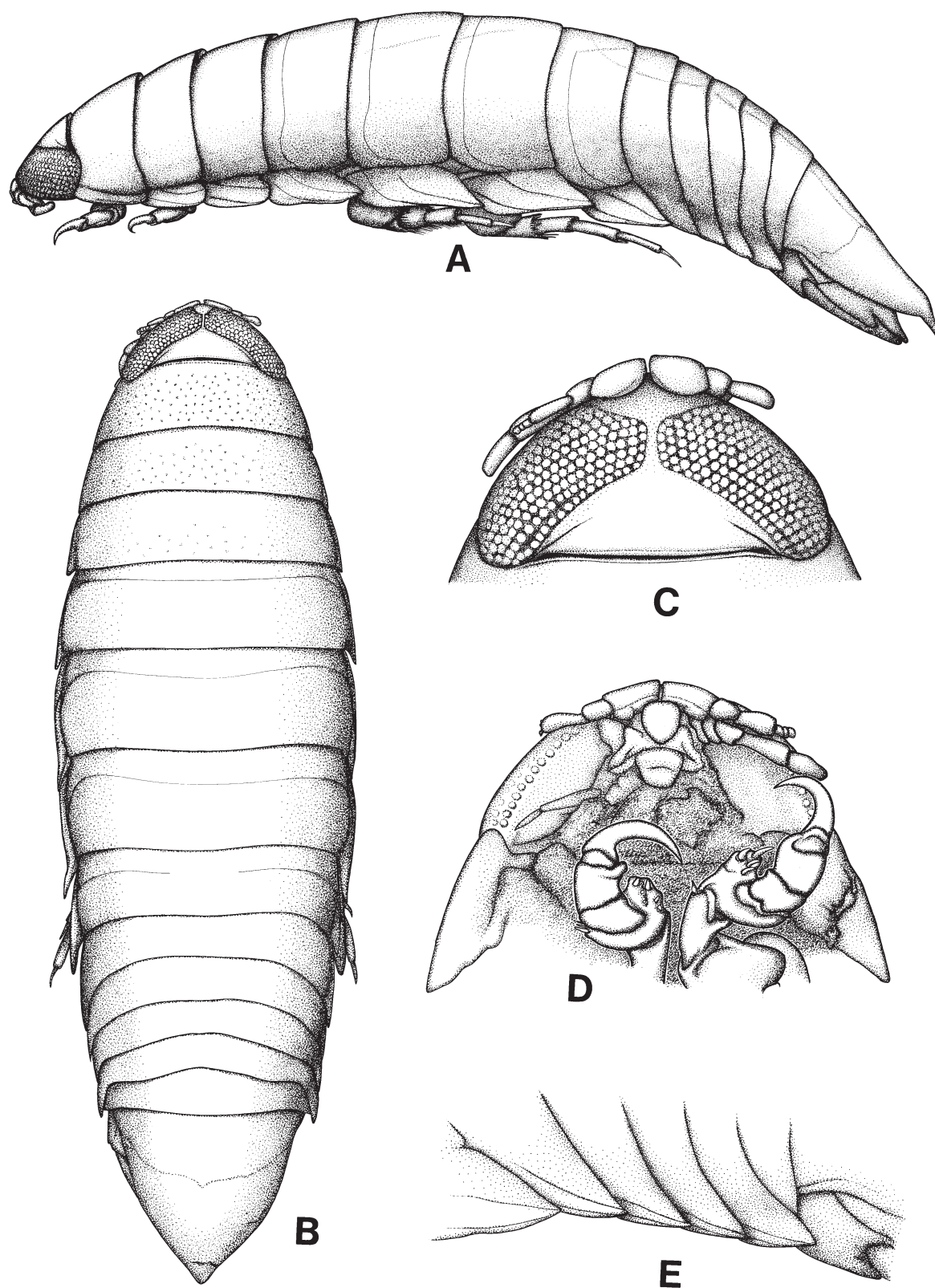
Mediterranean (Milne Edwards, 1840), possibly north-western Africa. Brusca (1983) stated that a label jar read 'Palermé', possibly the Sicilian coastal town of Palermo. Schioedte & Meinert (1879) stated '*ad Panorum captus*.' I have seen no convincing evidence that restricts the type locality to something less precise than the Mediterranean in general.

#### Material examined

*Holotype*: ♂ (23 mm), Mediterranean (MNHN Is.903). *Holotype* of *Aega schioedteana*, ♀ (non-ovig. 17.5 mm), Adriatic, #3736, coll. Wessel (SMNH 5785).

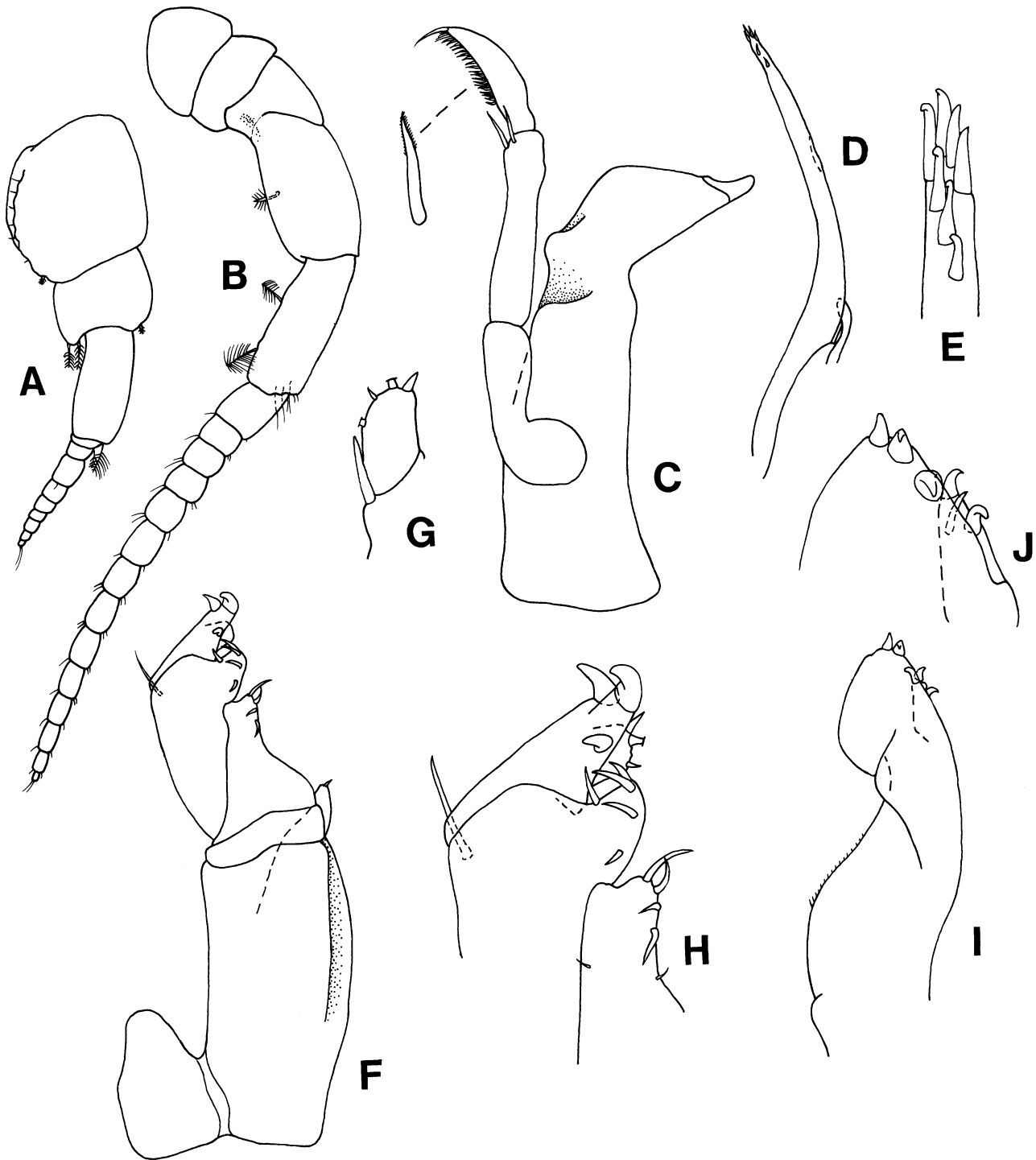
*Non-types*: MEDITERRANEAN. ♂ (25 mm), Formentera, Balearic Islands, Spain, 1871, 40 fv (= c. 73 m), coll. F. Sonderlund (SMNH 6513). ♀ (non-ovig. 20 mm), Cadaqués, Spain (BMNH 1955.2.28.328–29). ♂ (22 mm), Bonifacio, Corsica, 41°22'15"N, 06°47'E, no. 24, 16.vii.1881, 50–60 m, coll. *Travailleur* (MNHN Is.958). Manca (13.0 mm), Skerki Bank, Bay of Tunis, Tunisia, coll. HMS *Porcupine* (BMNH 1882.14). ♂ (23 mm), Bona Bay, Algeria, specimen reported by Norman (1904) (BMNH 1903.5.20.74). 2 ♀ (non-ovig. 32, 34 mm), off Tripoli coast, Libya, 27.v.1986, from pharynx of *Pomatomus saltator* (BMNH 1991.14.2).

NORTH-EASTERN ATLANTIC: ♀ (non-ovig. 31 mm), Fayal, Azores, 30–80 fv (= c. 55–146 m), coll. Exped. Joseph (SMNH 4985). Manca (10.5 mm), Bicores, 30.x.1971, stn. 143, 61–74 m, coarse sand, coll. *Jean Charcot* (MNHN Is.762). ♂ (21 mm), Canary Is., 28°49'N, 16°13'W, 28.vi.1883. 120 m, sand and rock, coll. *Talisman* (MNHN Is.959). ♂ (17.0 mm), Madeira (BMNH, 1876.2). ♂ (23 mm), Madeira (BMNH 1858.30). 2 ♀ (non-ovig. 28, 36 mm), Arrerife, Lanzarote Is. (BMNH 1956.5.2.129–30). Specimen (damaged, gender not ascertained, 30 mm), 32°38'–47'N, 18°55'W, 10.viii.1882, 100 m, coral rocks, coll. *Travailleur* (MNHN Is.957). ♀ (non-ovig. 17.5 mm), off coast of Morocco, 23°43'N, 11°22'W, before Mazagan, Africa, Stn 20, about 1105 m, 14.vi.1883, Str. *Talisman* (USNM 40839, Brusca, 1983). ♀ (36 mm), off West



**Figure 5.** *Aega deshaysiana* (Milne Edwards, 1840). Holotype, MNHN Is.903. A, lateral view. B, dorsal view. C, head. D, head, ventral view. E, pleonites. (All figures by Birgitte Rubæk, Zoologisk Museum, Copenhagen.)

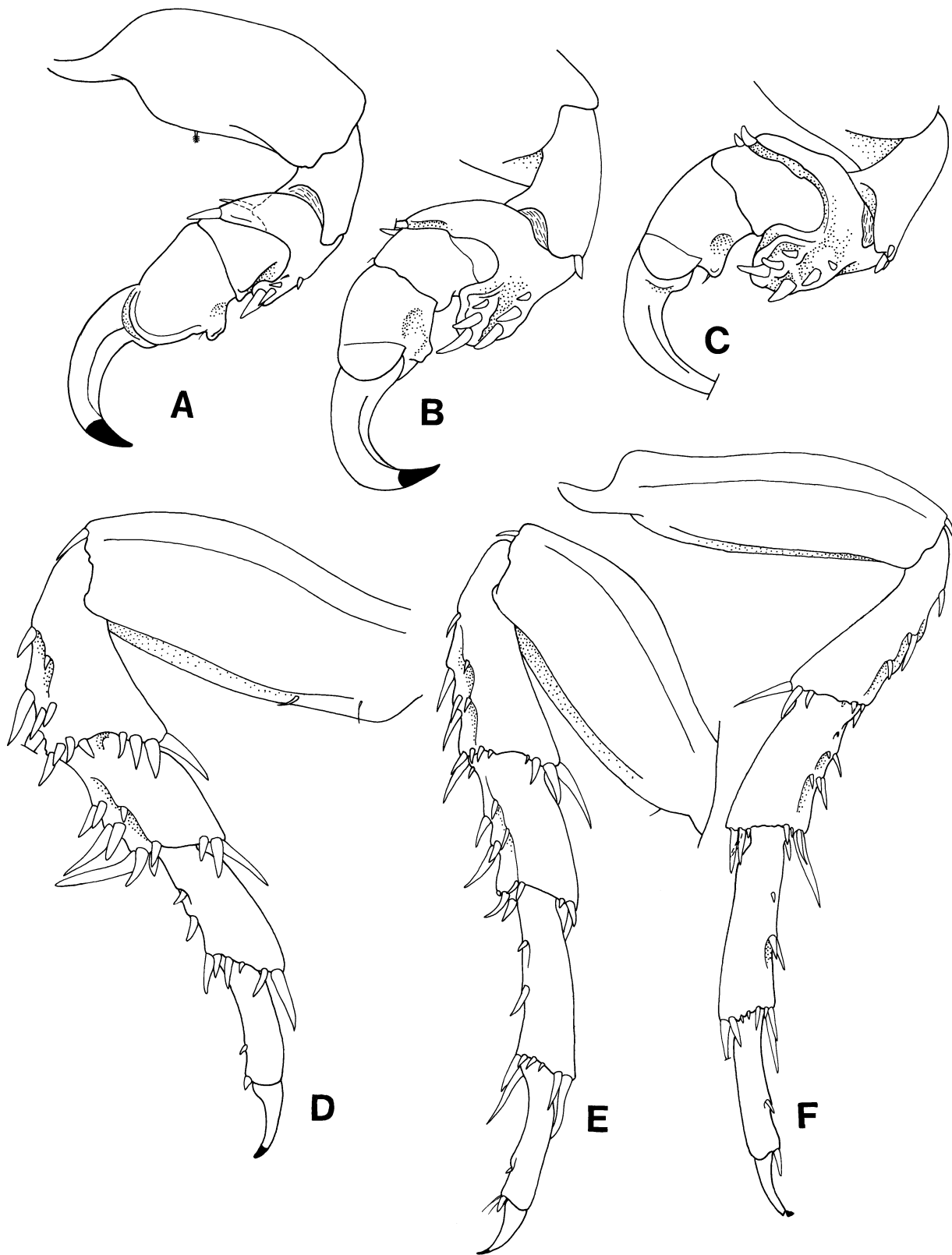




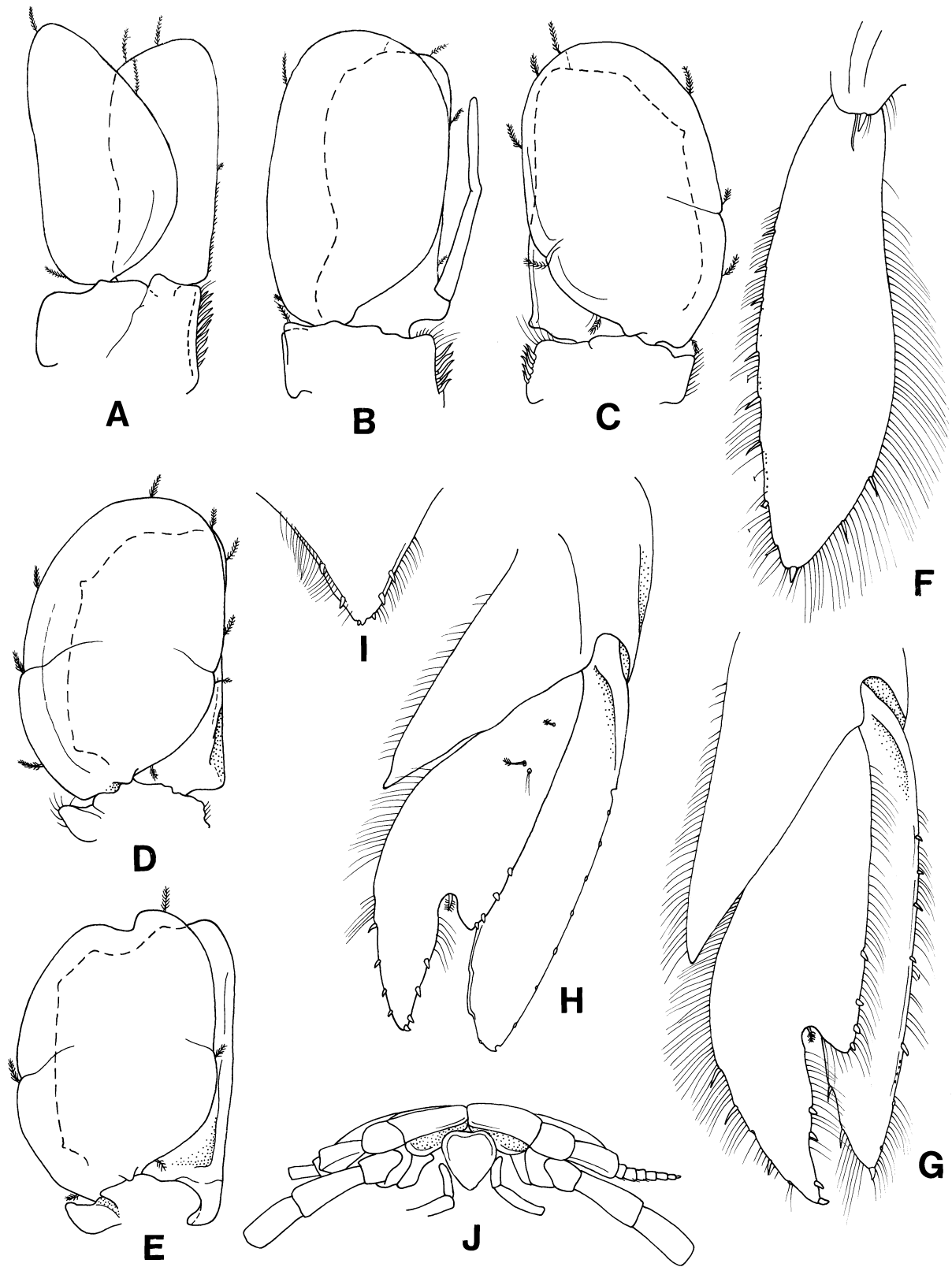
**Figure 6.** *Aega deshaysiana* (Milne Edwards, 1840). Female, 36 mm, Canary Islands, BMNH 1956.5.2.129–30. A, antennule. B, antenna. C, mandible. D, maxillule. E, maxillule apex. F, maxilliped. G, maxilliped palp, article 5. H, maxilliped distal articles. I, maxilla. J, maxilla apex.

Sahara, c. 23°N, 17°W, 5.xi.1978, trawled; 2 ♀ (non-ovig. 35, 19.0 mm), 4 (dried, not sexed, 20, 23, 24, 29 mm), off coast of West Sahara and Mauritania, depth and precise location not recorded (private col-

lection of J. Rokicki, reported by Rokicki, 1985). ♂ (22 mm), SE Leton Bank, 15°40.0'N, 23°05.1'W, 71 m, *Gazelle* Expedition (specimen reported by Studer, 1884; ZMB 5492).



**Figure 7.** *Aega deshaysiana* (Milne Edwards, 1840). Holotype, MNHN Is.903. A–F, pereopods 1–3, 4, 6 and 7, respectively (basis omitted in B and C. Pereopods 2, 3 and 6 drawn *in situ*).



**Figure 8.** *Aega deshaysiana* (Milne Edwards, 1840). A, B and H, holotype. I and J holotype of *Aega schioedtiana*, SMNH 5795, remainder female, 36 mm, Canary Islands, BMNH 1956.5.2.129–30. A–E, pleopods 1–5, respectively. F, uropod exopod, ventral view. G, uropod. H, uropod. I, pleotelson apex, ventral view. J, frons.

*Description*

Body 3.2 times as long as greatest width, dorsal surfaces smooth, widest at pereonite 5, lateral margins weakly ovate. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, not medially united, separated by about 4% width of head; each eye made up of ~21 transverse rows of ommatidia, each row with ~10–12 ommatidia; eye colour dark brown. *Pereonite 1 and coxae* 2–3 each with posteroventral angle rounded; coxae 5–7 with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 1.0–1.1 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins sinuate, smooth, posterior margin with elongate medial point, with 8–10 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.6 times as long as combined lengths of articles 1 and 2, article 3  $2.9 \times$  LW; flagellum with 8 articles, extending to mid-point of eye. *Antenna* peduncle article 2 inferior surface with indistinct groove; article 4  $1.8 \times$  LW, 1.1 times as long as combined lengths of articles 1–3, without deep longitudinal groove, inferior margin with 1 plumose seta, and 2 short simple setae; article 5 not markedly wider or flatter than article 4,  $0.9 \times$  L article 4,  $2.7 \times$  LW, inferior margin with 2 plumose setae, anterodistal angle with cluster of 4 short simple setae; flagellum with 14 articles, extending to middle of pereonite 1.

*Frontal lamina* flat, as wide as long, lateral margins converging posteriorly, posteriorly rounded, anterior margin with median indentation (small), without small median point, posterior margin not abutting clypeus.

*Mandible* molar process absent; palp article 2 with 2 distolateral setae, palp article 3 with 24 setae. *Maxillule* with 7 terminal RS (4 falcate, distalmost 3 simple). *Maxilla* medial lobe with 3 RS; lateral lobe with 4 RS. *Maxilliped* endite with 1 apical seta (acute RS); palp article 2 with 4 RS; article 3 with 4–5 recurved RS; article 4 with 3 hooked RS; article 5 partly fused to article 4, with 3 RS.

*Pereopod 1* basis 1.9 times as long as greatest width; ischium  $0.3 \times$  L basis, inferior margin with 0 RS, superior distal margin with 2 RS; merus inferior margin with 4 RS, set as 2 groups (of 1 and 3), superior distal angle with 2 RS; carpus  $0.9 \times$  L merus, inferior margin with 4 RS (3 small, 1 large); propodus 1.3 times as long as proximal width, inferior margin with 0 RS, propodal palm with small distal lobe (posteriorly convex, distal margin convex, provided with 1 simple seta), dactylus smoothly curved,  $1.6 \times$  L propodus (distally strongly curved). *P2* ischium inferior margin with 0 RS, superior distal margin with 2 RS; merus inferior

margin with 6 RS, set as 2 rows, superior distal margin with 1–2 acute RS; carpus similar in size to that of *P1*, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. *P3* similar to *P2*; propodus without large club-shaped distal RS. *P6* similar to *P7* (but more robust, with more and longer RS). *P7* basis 3.1 times as long as greatest width; ischium  $0.6 \times$  L basis, inferior margin with 4 RS (set as 1, 2 and 1), superior distal angle with 4 RS, inferior distal angle with 4 RS; merus  $0.7 \times$  L ischium,  $1.9 \times$  LW, inferior margin with 5 RS (set as 3 and 3 RS), superior distal angle with 7–9 RS, inferior distal angle with 5–6 RS; carpus  $0.9 \times$  L ischium,  $3.2 \times$  LW, inferior margin with 3 RS (set as 1 and 2), superior distal angle with 4–6 RS, inferior distal angle with 4–6 RS; propodus  $0.7 \times$  L ischium,  $4.3 \times$  LW, inferior margin with 2 RS (single cluster), inferior distal angle with 3 RS.

*Penes* opening flush with surface of sternite 7.

*Pleopod 1* exopod  $1.9 \times$  LW, distally narrowly rounded with strongly oblique medial margin, lateral margin straight, medial margin strongly convex (tapering obliquely to lateral), with PMS from base; endopod  $2.3 \times$  LW, distally subtruncate, lateral margin sinuate, with PMS from distal half, medial margin with PMS from on distal margin only; peduncle  $1.5 \times$  WL, medial margin with 10 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.8 \times$  L endopod, distally bluntly rounded. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediobasal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS (and 6 simple setae), posterior lobe about one-half L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin straight, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 4 RS, distal lateral margin with 4 RS, medial margin weakly convex, with 4–5 RS. *Exopod* not extending to end of endopod, 4.1 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 9 RS; medial margin convex, with 3–5 RS.

*Female*

Similar to the males except for the sexual characters.

*Size*

Males 17–25 mm (mean 22 mm), females 17–36 mm (mean 29 mm), manca at 11 and 13 mm.

*Variation*

*Robust setae*: pleotelson apex frequently damaged, particularly in old specimens. Of the 25 specimens



examined only 7 were sufficiently intact to allow the RS to be counted; owing to the uncertainty, percentage figures are not given and, as far as could be discerned, the number of pleotelson RS ranges from 3 + 3 to 4 + 4, possibly 5 + 5. Uropod ( $n = 13$ ) exopod medial margin 3 (65%), 4 (31%), 5 (once), lateral margin 7 (15%) 8 (19%), 9 (58%) and 10 (once); uropod endopod ( $n = 11$ ) medial margin varied from 4 (41%) or 5 (59%), lateral margin with 3 + 4 (10%), 4 + 4 (61%), 4 + 5 (10%), and 5 + 4 (5%). There is no discernible difference between males and females, nor does the number of RS increase with the size of the specimen.

P1–3 had highly consistent counts for the RS on the inferior margin of the merus: P1 with 3 + 1 (all), P2 had 2 rows of 3 + 3 RS (all) and P3 the same with one instance of 3 + 4.

### Remarks

The characters that best serve to identify *A. deshaysiana* are the large, narrowly separated eyes, the frontal lamina with a median anterior indentation, pleotelson with a strongly produced medial point, pereopod 1 merus inferior margin usually with 4 robust setae (set as 1 + 3), the merus of pereopods 2 and 3 each with a double row of 6 robust setae and by the uropodal exopod not extending to the endopod apex.

The separate identities of *A. deshaysiana* and *A. antillensis*, two large and distinctive aegids, have long been obscured, originally by the lack of detailed descriptions and then by the consequent misidentification of the species from around the world's oceans. Brusca (1983) synonymized these two species along with *A. excisa* Richardson, 1910 and *A. schioediana* Bovallius, 1885. Brusca's (1983) redescription and figures were based on material from the East Pacific (Cocos Island), north-western Pacific (Japan), central North Pacific (Hawaii), Caribbean (holotype of *A. antillensis*) and the East Atlantic (holotypes of *A. deshaysiana* and *A. schioediana*). The pooling of these specimens effectively established the concept of a highly variable species whereas re-examination of that material shows that the eight specimens included by Brusca (1983) under the name *A. deshaysiana* belong to five species: *A. antillensis*, *A. deshaysiana*, *A. excisa*, *A. sp.* (Hawaii), *A. sp.* (Cocos Is.) and *A. japonica* sp. nov.

*Aega deshaysiana* and *A. antillensis* occur in the eastern and western North Atlantic, respectively. The two species are readily and consistently separated by *A. deshaysiana*, having distinctly separate eyes (united in *A. antillensis*), the anterior margin of the frontal lamina indented (with minute point), pereopod 1 merus inferior margin with 3–4 robust setae (vs. 3) and pereopod 2 merus inferior margin with 6 robust setae set in 2 rows (vs. 5 robust setae set in a single

row). The uropods are similar but differ in details of setation and also shape: the uropodal exopod of *A. deshaysiana* is shorter than the exopod (slightly longer in *A. antillensis*), the endopod is distally narrower in *A. deshaysiana* than in *A. antillensis* and the medial margin has 4 (41%) or 5 (59%) robust setae compared to 5–6 (65%) in *A. antillensis*.

Differentiation of the remaining species misidentified as *A. deshaysiana* are discussed under the individual accounts for those species.

### Prey

No reliable records. Rokicki (1985) recorded the species from the basking shark *Cetorhinus maximus* (Gunnerus, 1765) (as Cetorhinidae) and an unidentified shark.

### Distribution

Western Mediterranean at Corsica, Libya and Algeria with two Adriatic records at 'Lesina' in Italy (Heller, 1866) and an unspecified location collected by the 'naturalist-merchant Carl Wessel' (Bovallius, 1885) from the eastern Mediterranean; along the eastern Atlantic seaboard from the Azores, Canary Islands, Madeira and the coast Spain, southwards off North Africa from Morocco, Western Sahara, and to a recorded latitude of 15°N off Senegal. The western extent of the range is not precisely known but Rokicki (1985) shows a record at approximately 38°N, 25°W.

Recorded depth range of 50–146 m, with one record at c. 1105 m.

### *AEGA EXCISA* RICHARDSON, 1910 (FIGS 9–11, 62)

*Aega excisa* Richardson, 1910: fig. 11.

*Aega antillensis* – ?Shiino, 1965: 543, figs 1–3; ?Saito *et al.* 2000: 59 (part).

*Aega deshaysiana* – Nierstrasz, 1931: 182 (part); Kensley, 2001: 226 (part).

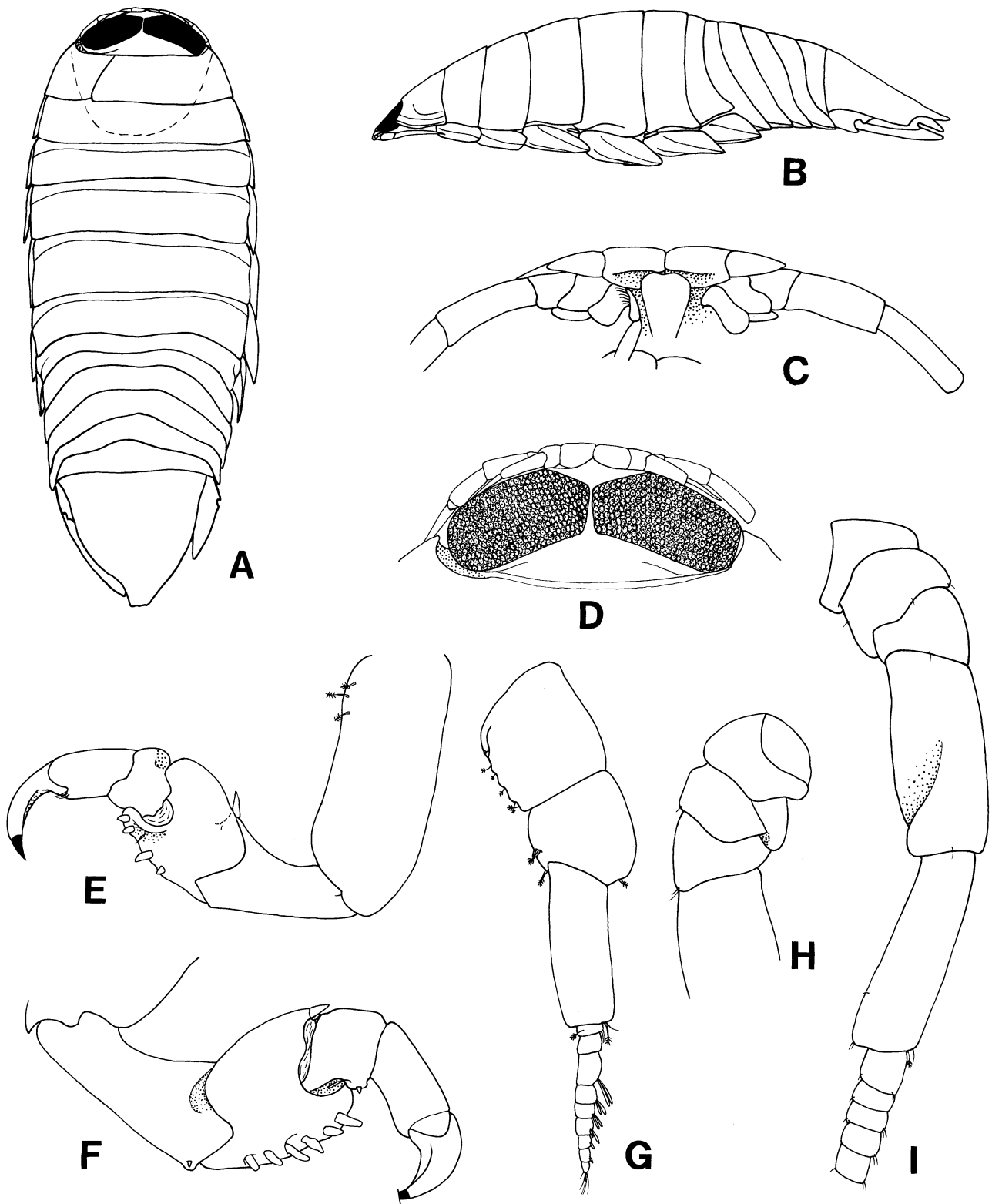
### Material examined

*Holotype*: ♀ (ovig. 34 mm), off Jolo Light, Philippines, 6°02.92'N, 120°53.00'E, 5.iii.1908, *Albatross* stn 5173, 340 m (tube contains label stating 'examined by R.C. Brusca, 1981'; specimen in poor condition, most posterior legs broken anteriorly; previously dissected.) (USNM 40912).

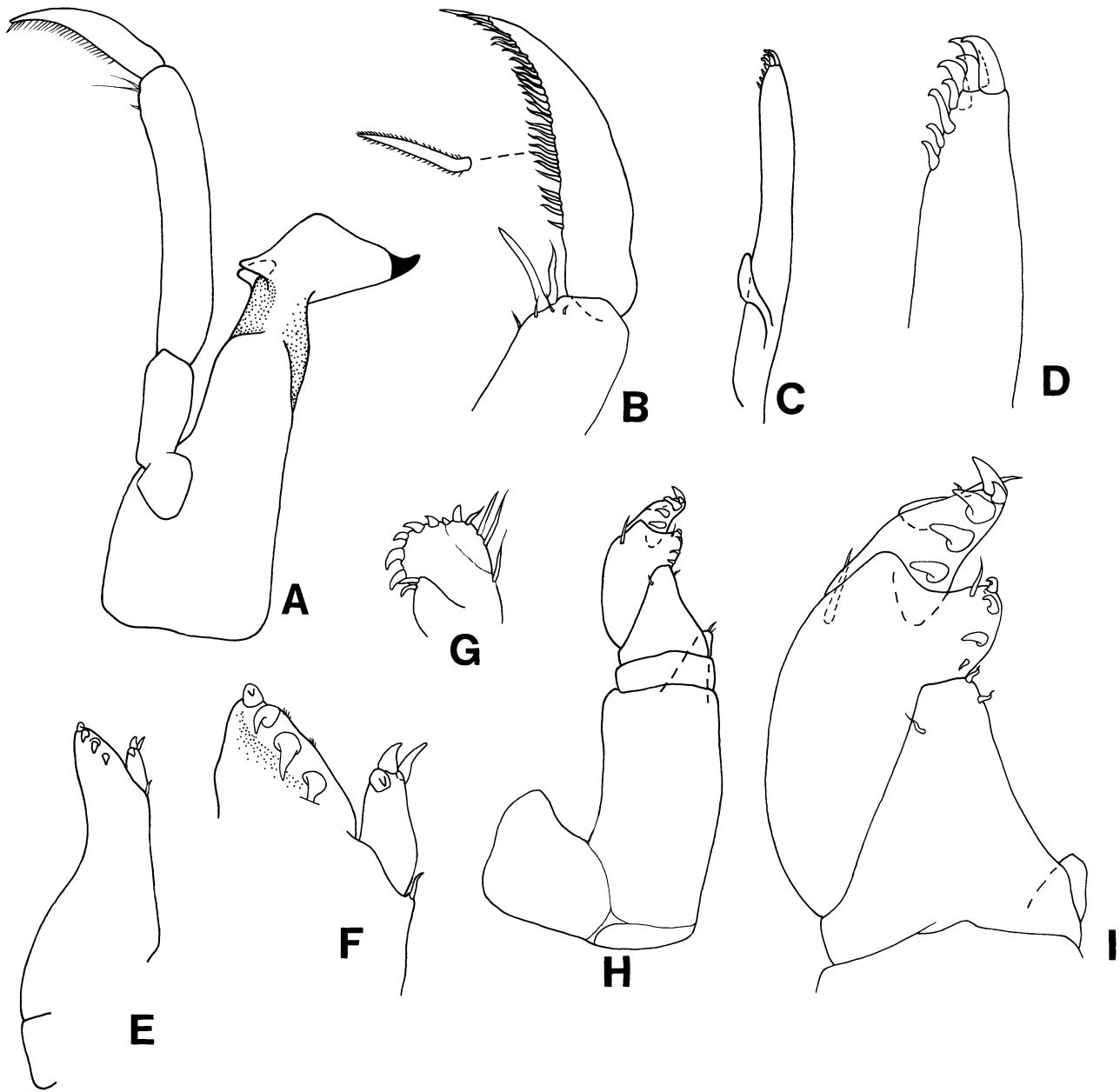
*Non-type*: ♀ (non-ovig. 36 mm), Bono-misaki, Japan, 13.v.1914, trawled 16 m, coll. Dr Th. Mortensen's Pacific Expedition 1914–15 (ZMUC CRU3878).

### Description

*Body* 2.3 times as long as greatest width, dorsal surfaces smooth, widest at pereonite 4, lateral margins



**Figure 9.** *Aega excisa* Richardson, 1910. A–F, holotype, G–I, ♀ (ZMUC CRU3878). A, dorsal view. B, lateral view. C, frons. D, head, dorsal view. E, pereopod 1. F, pereopod 2. G, antennule. H, antenna peduncle articles 1–3, ventral view. I, antenna peduncle.

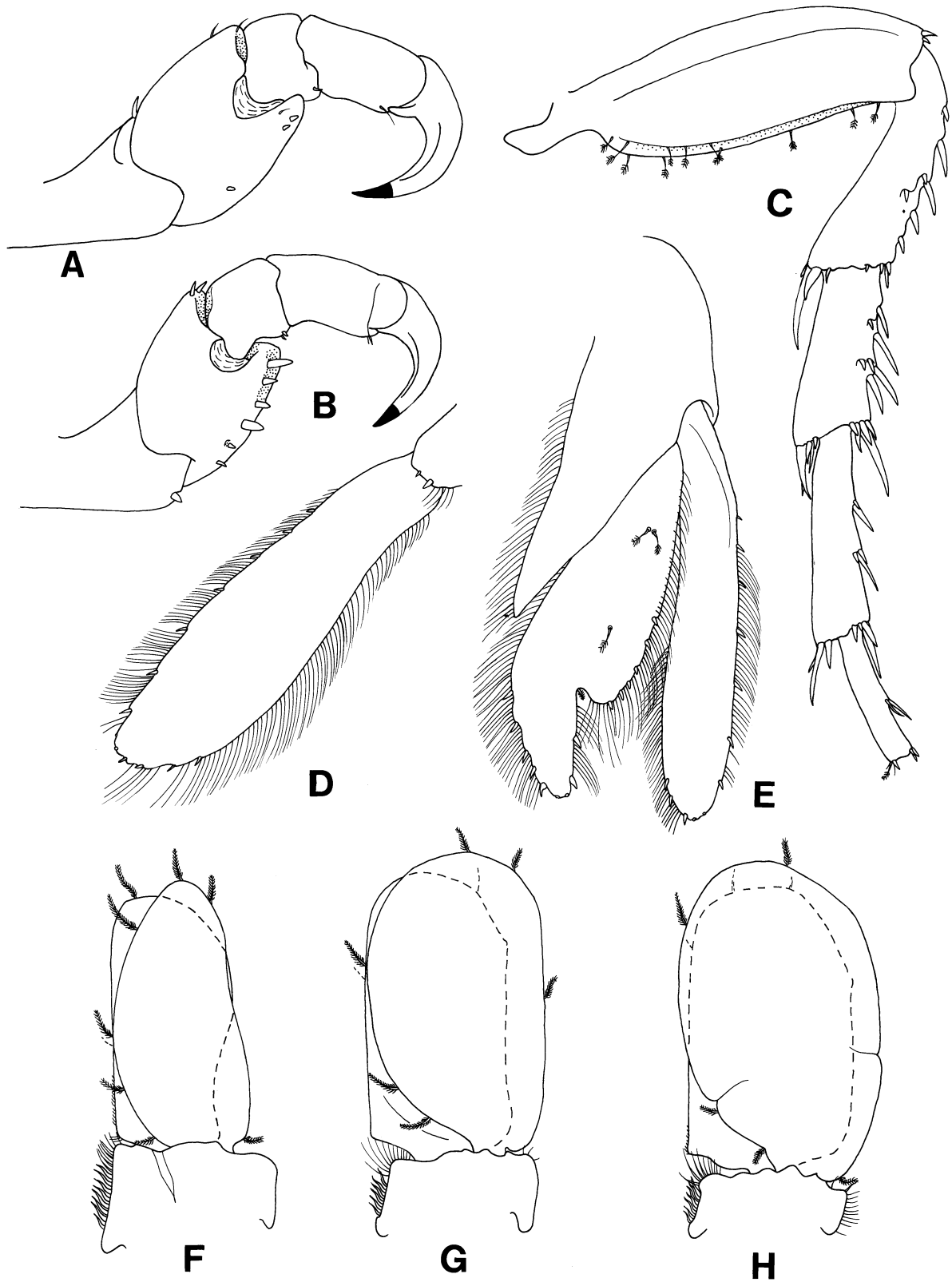


**Figure 10.** *Aega excisa* Richardson, 1910. ♀ (ZMUC CRU3878). A, mandible. B, mandible palp article 3 detail. C, maxillule. D, maxillule apex. E, maxilla. F, maxilla apex, detail. G, maxilliped palp article 5. H, maxilliped. I, maxilliped palp articles 2–5.

subparallel. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, not medially united, separated by about 2% width of head; each eye made up of ~21 transverse rows of ommatidia, each row with ~11 ommatidia; eye colour faded, not known. *Pereonite 1* and *coxae 2–3* each with posteroventral angle rounded; *coxae 5–7* with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolat-

eral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 0.9 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins convex, smooth, posterior margin with elongate medial point, with 10 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.8 times as long as combined lengths of articles 1 and 2, article 3 2.9× LW; flagellum with 8 articles, extending to mid-point of eye. *Antenna* peduncle article 2 inferior



**Figure 11.** *Aega excisa* Richardson, 1910. ♀ (ZMUC CRU3878). A–C, pereopods 1, 2, and 7, respectively. D, uropod exopod, ventral view. E, uropod. F–G, pleopods 1–3, respectively.



surface with distinct longitudinal suture; article 4  $2.3 \times$  LW, 1.4 times as long as combined lengths of articles 1–3, with deep longitudinal groove (distal), inferior margin with 0 plumose setae, and 0 short simple setae; article 5 not markedly wider or flatter than article 4,  $1.1 \times$  L article 4,  $3.1 \times$  LW, inferior margin with 0 plumose setae, anterodistal angle with cluster of 2 short simple setae (1 plumose seta); flagellum with 18 articles, extending to middle of pereonite 1.

*Frontal lamina* flat, longer than greatest width,  $1.6 \times$  LW, lateral margins converging posteriorly, anterior margin rounded (with minute median indentation), without small median point, posterior margin not abutting clypeus.

*Mandible* molar process present, minute; palp article 2 with 2 distolateral setae, palp article 3 with 28 setae. *Maxillule* with 8 terminal RS. *Maxilla* medial lobe with 3 RS (2 hooked, 1 straight); lateral lobe with 4 RS (hooked). *Maxilliped* endite with 2 apical setae (slender); palp article 2 with 2 RS; article 3 with 5 recurved RS (4 recurved and 1 straight); article 4 with 5 hooked RS; article 5 partly fused to article 4, with 6 RS (2 stout recurved, 4 straight).

*Pereopod 1* basis 2.4 times as long as greatest width; ischium  $0.6 \times$  L basis, inferior margin with 0 RS, superior distal margin with 2 RS; merus inferior margin with 4 RS, set as 2 groups (of 2 and 2), superior distal angle with 0 RS; carpus  $0.5 \times$  L merus, inferior margin with 0 RS; propodus 1.9 times as long as proximal width, inferior margin with 0 RS, propodal palm with simple, without blade or process, dactylus smoothly curved,  $1.1 \times$  L propodus. *P2* ischium inferior margin with 1 RS (distal), superior distal margin with 2 RS; merus inferior margin with 6 RS, set as single row, superior distal margin with 2 acute RS; carpus similar in size to that of P1, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. *P3* similar to P2; propodus without large club-shaped distal RS. *P6* similar to P7. *P7* basis 2.9 times as long as greatest width, inferior margin with 11 palmate setae; ischium  $0.6 \times$  L basis, inferior margin with 7 RS (set as 1, 1, 3 and 1), superior distal angle with 4 RS, inferior distal angle with 4 RS; merus  $0.7 \times$  L ischium,  $2 \times$  LW, inferior margin with 7 RS (set loosely as 3 and 4), superior distal angle with 9 RS, inferior distal angle with 5 RS; carpus  $0.9 \times$  L ischium,  $3.5 \times$  LW, inferior margin with 5 RS (set as 2 and 3), superior distal angle with 4 RS, inferior distal angle with 4 RS; propodus  $0.6 \times$  L ischium,  $5 \times$  LW, inferior margin with 2 RS (single cluster), superior distal angle with 3 setae (1 RS, 1 plumose and 1 simple), inferior distal angle with 3 RS.

*Pleopod 1* exopod  $2 \times$  LW, distally narrowly rounded, medial margin weakly oblique, lateral margin weakly convex, medial margin strongly convex, with PMS from base; distally subtruncate, lateral margin sinu-

ate, with PMS from distal half, medial margin with PMS from distal half; peduncle  $1.8 \times$  WL, medial margin with 9 coupling hooks. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediobasal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS (and long PMS), posterior lobe about two-thirds L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex or distally straight, with prominent excision positioned about three-quarters along ramus, proximal lateral margin with 6 RS, distal lateral margin with 3–4 RS, medial margin weakly convex, with 5–6 RS. *Exopod* extending to end of endopod, 3.6 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 9–10 RS; medial margin sinuate, proximally concave, with 4 RS.

#### Male

Not known.

#### Size

Females measure 34 and 36 mm.

#### Variation

The appearance of the uropods is consistent, as is the arrangement of RS on the merus of P1–3. The variation shown between the two specimens is no greater than that between the two sides of the same specimens. However, in the larger specimen from Japan the RS on the merus of P1 are far smaller than in the holotype.

#### Remarks

This species can be readily recognized by the markedly flattened (rather than weakly vaulted) dorsal surface to pereonite 1 and the head. This is difficult to illustrate but is obvious when observing a specimen. Other distinguishing characters are: the frontal lamina is elongate in comparison to other species of the group, pereopods 1–3 are distinctive in the swollen appearance of the merus and carpus and both the propodus and dactylus are relatively short. The uropod rami are slender in comparison to many other species and the uropodal endopod lateral margin has a deep notch, the robust setae on either side being stout; the uropodal exopod extends beyond the apex of the endopod.

The holotype is in a fair condition, with many damaged appendages. One uropod is fully broken, both are rubbed. The pleotelson is, as illustrated by Richardson (1910), malformed and has a broken apex. Pereonite 1 is cracked, and the posterior legs are mostly broken off

at the basis or ischium. Additional descriptive detail has been taken from the Japanese specimen, now also somewhat fragile.

Two species of the of *A. deshaysiana* group are known from Japanese waters: the present species and *A. japonica* sp. nov. There are a number of records of *A. antillensis* from Japan (e.g. Thielemann, 1910; Shino, 1965; Nunomura, 1981), but without access to all reported Japanese specimens, the identity of these records remains in doubt.

*Aega excisa* is readily distinguished from *A. japonica* sp. nov. by the flat dorsal surface of the head and pereonite 1, by the elongate frontal lamina (short, anteriorly rectangular in *A. japonica*) the arrangement of robust setae on the merus of pereopods 1–3 and by its smaller size (*A. japonica* is between 5 and 6 cm).

#### Prey

No records.

#### Distribution

North-western Pacific, Philippines and Japan, at depths of 16 and 340 m.

#### Etymology

The epithet refers, presumably, to the 'excised' uropodal endopod.

#### **AEGA ALAZON SP. NOV.** (FIGS 12–15, 62)

?*Rocinela Deshayesiana* – Studer, 1884: 22.

*Aega antillensis* – Hale, 1925: 176 (part); 1929: 254, fig. 248 (part); Kensley, 1975: 39; 1978, fig. 24A, B, 2001: 226 (part).

*Aega deshaysiana* – Nierstrasz, 1918: 108; 1931: 182 (part).

*Aega 'antillensis'* – Kensley, 1976: 290.

*Aega deshaysiana* – Nierstrasz, 1931: 182 (part); Hale, 1940: 295 (part, Gabo Is.); Sivertsen & Holthuis, 1980: 33; Kensley, 2001: 226 (part).

#### Material examined

*Holotype*: ♀ (57 mm), south of Port Elizabeth, South Africa, 34°24.5'S, 26°12.7'E, 12.x.1992, 545 m, mid-water trawl, coll. RV *Africana* (SAfM A43115).

*Paratypes*: 2 ♀ (51, 58 mm), south of Still Bay, South Africa, 35°27'S, 21°40'E, 28.v.1988, 127 m, bottom trawl, coll. RV *Africana* (SAfM A43114). ♀ (54 mm), south of Still Bay, South Africa, 35°17'S, 21°32'E, 27.v.1988, 116 m, bottom trawl, coll. RV *Africana* (SAfM A43113). ♂ (31 mm), imm (26 mm), off Cape Town, South Africa, 20.vi.1972, SST 84.A, coll. Uni-

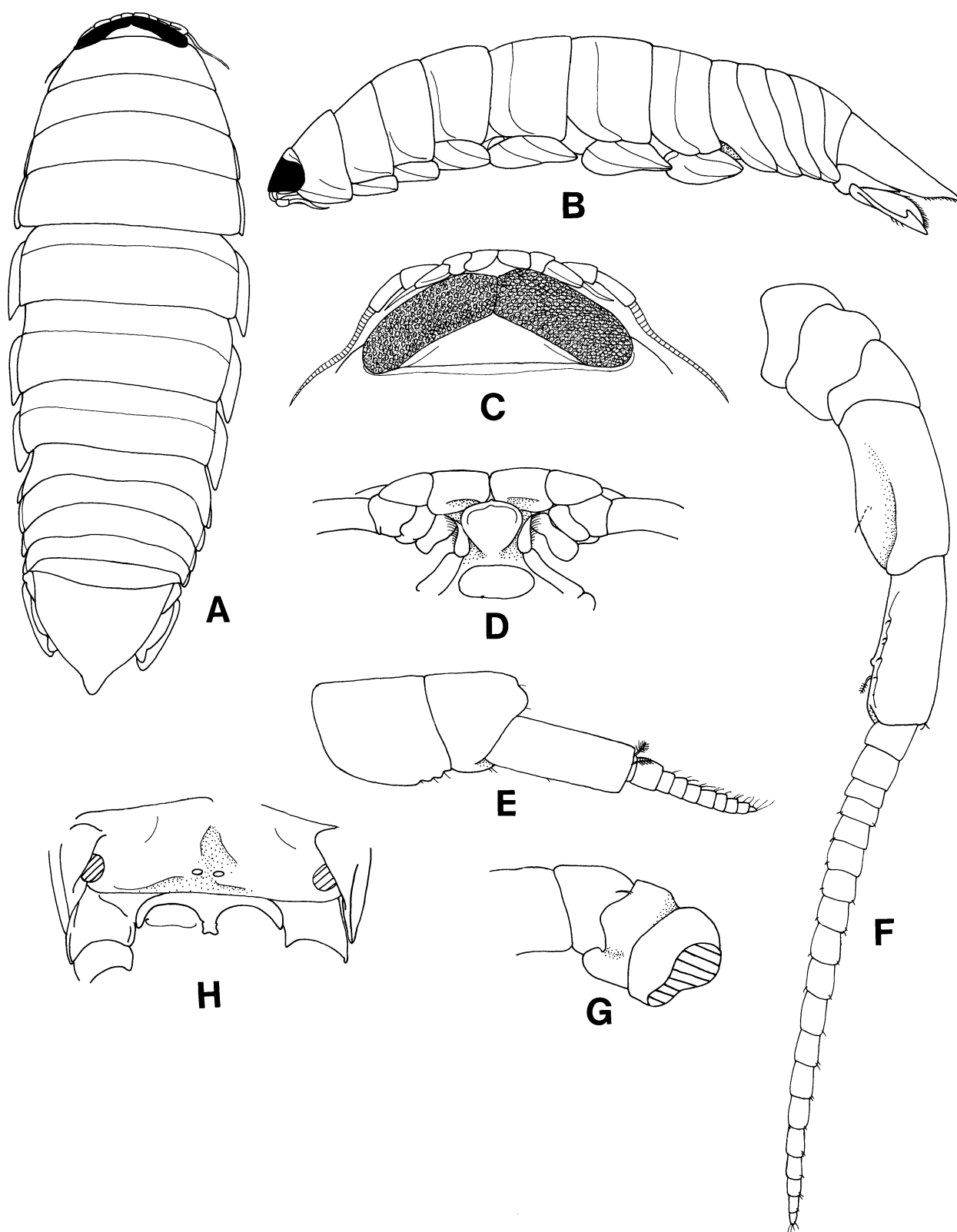
versity of Cape Town Ecological Survey (SAfM A14622) (Kensley, 1975?).

*Non types*. INDIAN OCEAN: ♀ (42 mm), Saint Paul Is, 4.i.1971, on *Thyristes*, coll. R. Vranchev (MNHN Is.2355) (Kensley, 1976); ♀ (33 mm), Saint Paul Is, 4.i.1971, coll. R. Vranchev (MNHN Is.2356) (Kensley, 1976); ♀ (49 mm), near Seychelles (ZMA) (Nierstrasz, 1918); SOUTH ATLANTIC: ♀ (33 mm), Tristan da Cunha Island, 13.i.1938, in a fishing boat (University of Trondheim, Norway) (Sivertsen & Holthuis, 1980). AUSTRALIA: ♀ (33 mm), Tasmania, 40°58.20'S, 143°49.00'E, 26.i.1985, 550 m, coll. CSIRO R.V. *Soela* (NMV J27710). ♀ (33 mm), 37°34'S, 149°55'E, off Gabo Is., Vic, 8.xi.1912, 146 m (AM E4763) (Hale, 1940). ♂ (small, not measured), off Gabo Is., Vic, 366 m (AM E4837) (Hale, 1940). ♀ (non-ovig. 47 mm), Fowlers Bay, South Australia (c. 31°58'S, 132°35'E), on large basking shark (*Cetorhinus maximus*), coll. C.A. Tait (SAM C113) (Hale, 1925). ♀ (41 mm), 22 nm SSW of Cape Martin, South Australia, 37°46.69'S, 139°42.99'E, 15.xii.1987, 290–350 m, trawled, coll. K. Gowlett-Holmes, T. Moran & P. Reilly (SAM TC13990). ♀ (38 mm), 23 nm SSW of Cape Martin, South Australia, 37°50.71'S, 139°50.11'E, 15.xii.1987, 150–170 m, trawled, coll. K.L. Gowlett-Holmes, T. Moran & P. Reilly (SAM TC13991). ♀ (46 mm), south of Beachport, South Australia, 37°45.00'S, 139°41.00'E, 24.x.1981, 370 m, coll. R. Wilson (NMV J27713). NEW ZEALAND: ♀ (26 mm), off south-western South Island, 46°29.1'S, 166°34.0'E, 17.xi.1986, 460 m, on skin of *Genypterus blacodes*, coll. B. Jones, FRD (NMNZ Cr.9264). ♂ (29 mm), off south-western South Island, 47°43.4'S 167°18.7'E, 15.xi.1986, 145 m, pectoral fin of *Rexea solandri*, coll. B. Jones (NMNZ Cr.9266). 2 ♂ (32, 38 mm), ♀ (29 mm), North Otago, South Island, 1962, 45.7 m (as 25 fms), coll. J. Graham (NMNZ Cr.9263). ♀ (56 mm), Oamaru, South Island, 4.i.1969, on dogfish, 73 m (NMNZ Cr.9267). ♀ (56 mm), Pukaki Rise, off skate egg case of *Bathyragea* sp. (no other data), coll. J. Graham (NMNZ Cr.4968). NEW CALEDONIA: ♀ (23 mm), 23°38.35'S, 167°42.68'E, 30.x.1986, stn DW 77, 435 m, coll. MUSORSTOM (MNHN Is.5796).

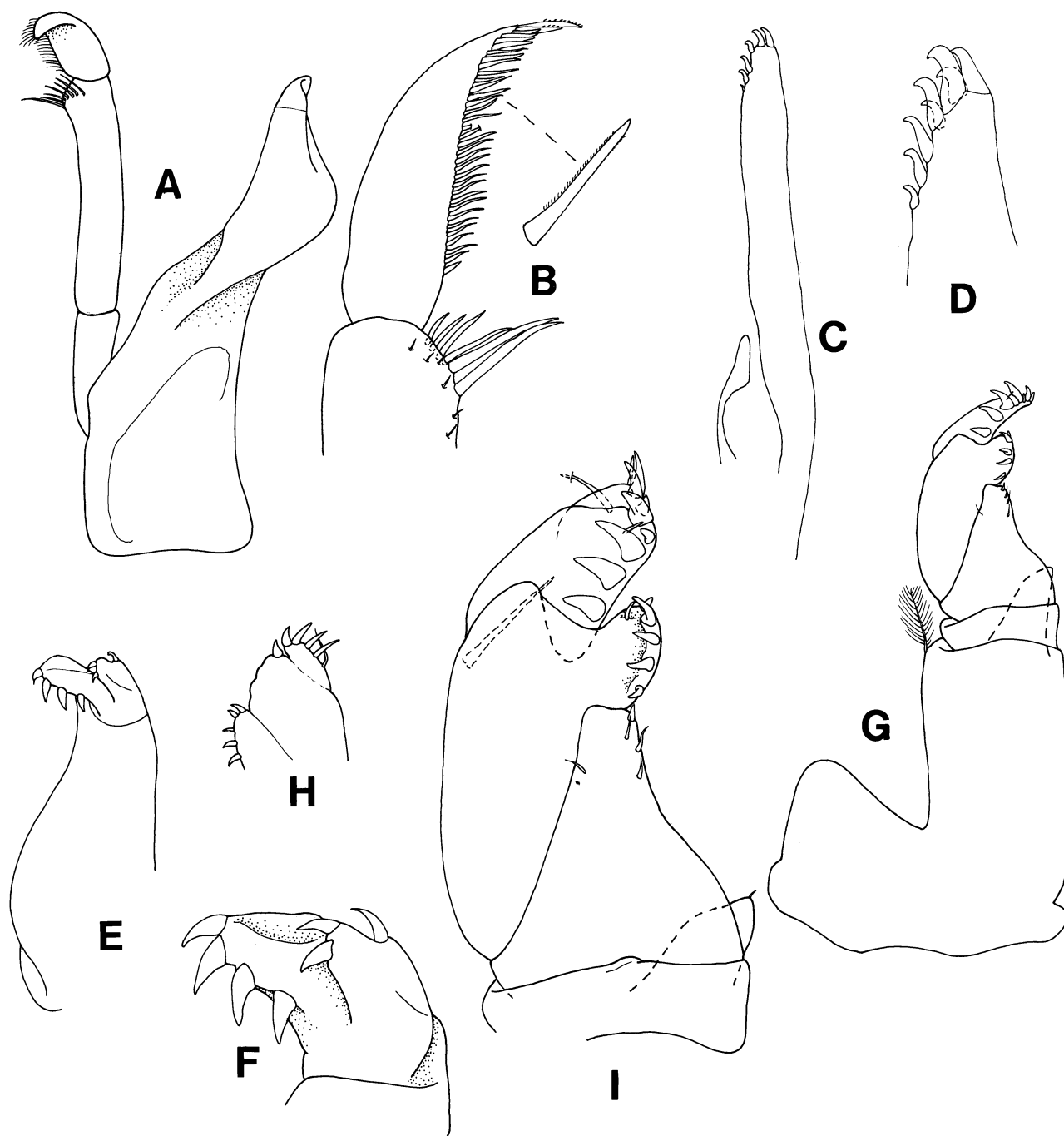
I have not seen the specimen identified as *A. antillensis* (cat. no. SST.84.A, 200 m, Still Bay, c. 35°S, 22°E) by Kensley (1975), presumably held at the Zoology Department, University of Cape Town.

#### Description

Body 2.8 times as long as greatest width, dorsal surfaces smooth, widest at pereonite 5, lateral margins subparallel. Rostral point projecting anteriorly, not ventrally folded. Eyes large, medially united, anterior clear field 21% length of head, posterior clear field 46% length of head; each eye made up of ~22 transverse



**Figure 12.** *Aega alazon* sp. nov. A–D, holotype, E–G, ♀ paratype 51 mm (SafM A43114). A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, antennule. F, antenna. G, antenna peduncle articles 1–3, ventral view. H, sternite 7 showing penial openings, ♂ paratype (SafM A14622).

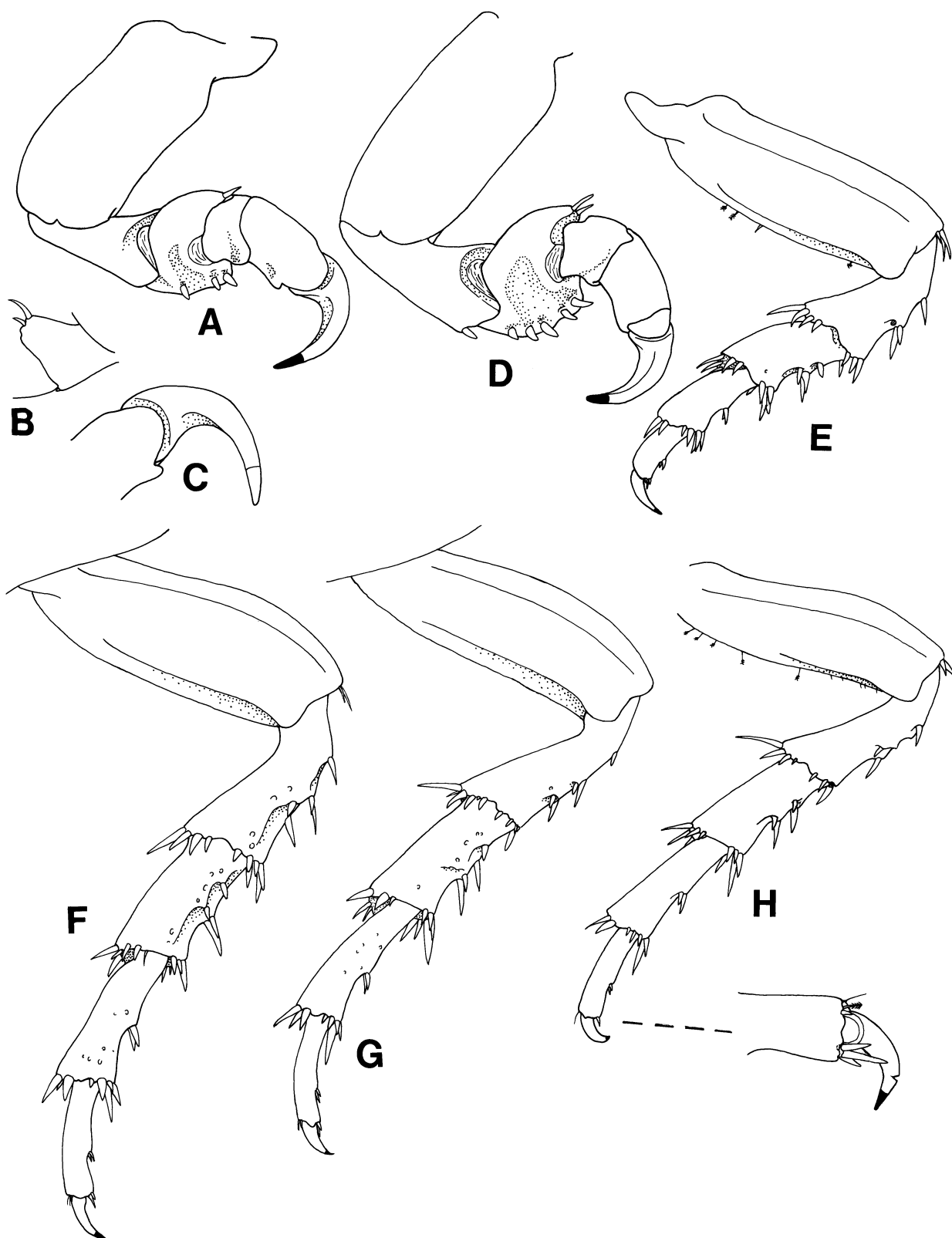


**Figure 13.** *Aega alazon* sp. nov. Paratype ♀, 51 mm (SafM A43114). A, mandible. B, mandible palp article 3 detail. C, maxillule. D, maxillule apex. E, maxilla. F, maxilla apex, detail. G, maxilliped. H, maxilliped palp article 5. I, maxilliped palp articles 2–5.

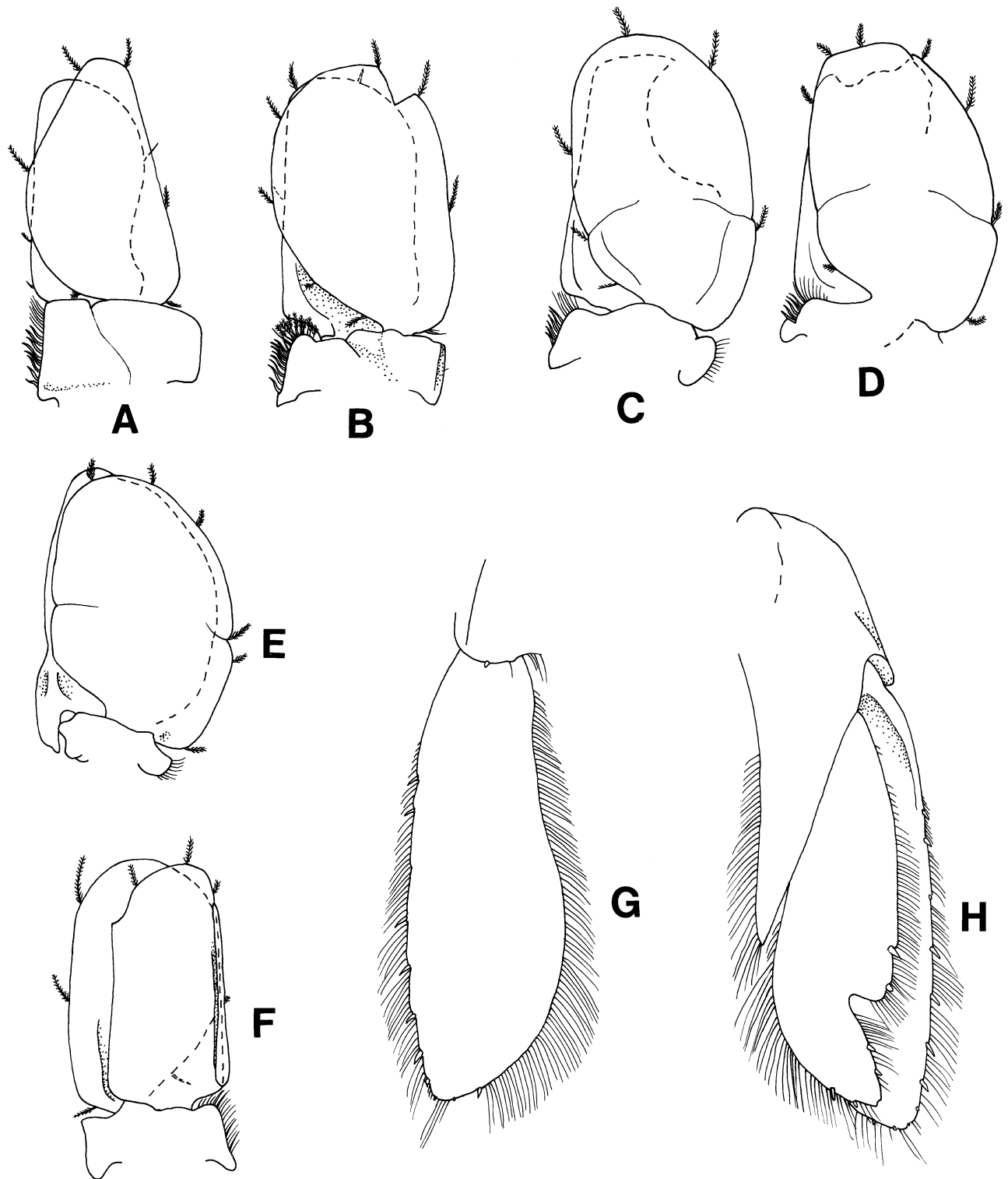
rows of ommatidia, each row with ~9 ommatidia; eye colour dark brown. *Pereonite 1* and *coxae 2–3* each with posteroventral angle right-angled; *coxae 5–7* with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of

pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 1.0–1.2 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins convex, smooth, posterior margin with elongate medial point, with 6–10 RS (?).





**Figure 14.** *Aega alazon* sp. nov. A–G, holotype, H, ♀ paratype 51 mm (SafM A43114). A, D–G, pereopods 1, 2, 4, 6 and 7, respectively. B, pereopod 1, medial surface of ischium. C, pereopod 1 dactylus, in perpendicular view. H, pereopod 7.



**Figure 15.** *Aega alazon* sp. nov. Paratype ♀, 51 mm (SafM A43114). A–E, pleopods 1–5, respectively. F, pleopod 2, ♂ paratype (SafM A14622). G, uropod, uropod exopod, ventral view. H, uropod.

*Antennule* peduncle articles 1 and 2 flattened, article 2 anterodistal lobe not extending beyond mid-point of article 3; articles 3 and 4 0.7 times as long as combined lengths of articles 1 and 2, article 3  $2.7\times$  LW; flagellum with 9 articles, extending to posterior margin of eye. *Antenna* peduncle article 2 inferior surface with indistinct groove; article 4  $1.9\times$  LW, 1.3 times as long as combined lengths of articles 1–3, without deep longitudinal groove, inferior margin with 1 plumose setae, and 0 short simple setae; article 5 not markedly wider or flatter than article 4,  $1.0\times$  L article 4,  $2.6\times$  LW, inferior margin with 1 plumose seta, anterodistal angle with cluster of 2 short simple setae; flagellum with 19 articles, extending to posterior of pereonite 1.

*Frontal lamina* flat, wider than long, lateral margins converging posteriorly, anterior margin rounded, with small median point, posterior margin not abutting clypeus.

*Mandible* molar process absent; palp article 2 with 6 distolateral setae, palp article 3 with 34 setae. *Maxillule* with 8 terminal RS. *Maxilla* medial lobe with 4 RS; lateral lobe with 3 RS. *Maxilliped* endite with 1 apical seta; palp article 2 with 4 RS; article 3 with 5 recurved RS (and 1 simple seta); article 4 with 6 hooked RS; article 5 partly fused to article 4, with 5 RS (2 recurved, 3 straight).

*Pereopod 1* basis 2.1 times as long as greatest width; ischium  $0.5\times$  L basis, inferior margin with 0 RS, superior distal margin with 2 RS (acute); merus inferior margin with 3 RS, set as 2 groups (of 1 and 2), superior distal angle with 2 RS (slender); carpus  $0.9\times$  L merus, inferior margin with 0 RS; propodus 1.8 times as long as proximal width, inferior margin with 0 RS, propodal palm with small distal lobe, dactylus smoothly curved,  $1.2\times$  L propodus. *P2* ischium inferior margin with 1 RS (distal), superior distal margin with 1 RS; merus inferior margin with 5 RS, set as 2 groups (of 3 and 2), superior distal margin with 2 acute RS; carpus similar in size to that of P1, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. *P3* similar to P2 (merus with single row of 7 RS); propodus without large club-shaped distal RS. *P6* similar to P7 (with longer RS on inferior margin). *P7* basis 2.9 times as long as greatest width, inferior margin with 6 palmate setae (or more); ischium  $0.6\times$  L basis, inferior margin with 5 RS (set as 1, 2 and 2), superior distal angle with 7 RS, inferior distal angle with 5 RS; merus  $0.9\times$  L ischium,  $2.6\times$  LW, inferior margin with 4 RS (set as 2 and 2), superior distal angle with 5 RS, inferior distal angle with 7 RS; carpus  $0.8\times$  L ischium,  $2.9\times$  LW, inferior margin with 2 RS (set as single cluster), superior distal angle with 3 RS, inferior distal angle with 6 RS; propodus  $0.7\times$  L ischium,  $5.8\times$  LW, inferior margin with 2 RS (set as single cluster), superior distal angle with 2 slender setae (1 simple, 1 palmate), inferior distal angle with 2 RS.

*Pleopod 1* exopod  $1.8\times$  LW, distally narrowly rounded with strongly oblique medial margin, lateral margin straight (weakly oblique), medial margin strongly convex, with PMS from base; endopod  $2\times$  LW, distally rounded, lateral margin sinuate, with PMS from distal half, medial margin with PMS from distal half; peduncle  $1.8\times$  WL, medial margin with 8 coupling hooks. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediolateral point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS (plus single seta), posterior lobe about one-half L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex, with prominent excision positioned about four-fifths along ramus, proximal lateral margin with 2 RS, distal lateral margin with 4 RS, medial margin strongly convex, with 3 RS. *Exopod* extending beyond end of endopod, 2.8 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 10 RS; medial margin sinuate, proximally concave, with 3 RS.

#### Male

Similar to female. *Penes* opening flush with surface of sternite 7; penial openings separated by 5% of sternal width. Appendix masculina with straight margins,  $0.74\times$  L endopod, distally narrowly rounded.

#### Variation

*Robust setae*: of the specimens examined only 2 had a sufficiently intact pleotelson to allow the RS to be counted, indicating a range from 3 + 3 to 4 + 4, perhaps more. Uropod ( $n = 15$ ) exopod medial margin with 2–4, with 3 (43%) or 4 (47%) most frequent, lateral margin 9 (27%) or 10 (53%); uropod endopod ( $n = 15$ ) medial margin varied from 2 to 6, with 3 (27%), 4 (40%) and 5 (17%) most frequent, the lateral margin RS are variable with the proximal RS at 2–5, distal RS 3–6, with 3 + 4 (15%), 4 + 4 (27%) and 4 + 5 and 5 + 5 (each 11.5%), 4 + 5 (10%) and 5 + 4 (5%). There is no discernible difference between males and females, nor does the number of RS increase with the size of the specimen.

P1 setation of the merus was consistent across its range with 1 + 2 RS (93%), 2 + 2 occurring only twice; P2 merus ranged from 5 to 7 RS, with 5 (28%) and 6 (65%) most common, 7 occurring twice; P3 merus with 6 (82%) or 7 (21%).

In occasional specimens (e.g. from New Zealand, NMNZ Cr.9267) the eyes are very narrowly separated.

*Size*

Males 29–38 mm (mean = 23.5 mm), females 21–58 mm (mean = 37.8 mm); no ovigerous females present in the material examined.

*Remarks*

One of the most widespread and frequently collected of this group of species, and hence the species most frequently misidentified as *A. deshaysiana*, *A. alazon* sp. nov. presents a near consistent appearance throughout its range, though there is variation in the number of robust setae on the merus of the pereopods and on the uropodal endopod. Characters by which the species can be identified include the shape of the weakly lobate antennule peduncle article 2, fully united eyes, the shape of the frontal lamina which has a minute median point, the simple propodus on pereopod 1, the characteristic pattern of robust setae on the merus of pereopod 1 (1 + 2), 2 (2 + 3) and 3 (7 in a single row), the uropodal proportions (exopod longer than endopod, endopod lateral margin with distal part short, anterior part convex) and setation of the uropods which has a relatively distal excision on the endopod and the relatively short pleotelson which has a short median point.

*Aega umpara* sp. nov. and *A. birubi* sp. nov. are sympatric with *A. alazon* over part of their ranges. *Aega umpara* differs in having a more rectangular frontal lamina, in the disparate sizes of the robust setae on pereopod 1 merus (which are of a similar size in *A. alazon*), uropodal exopod lacking PMS on the proximal one-third and the uropodal exopod apex not extending to the uropodal endopod apex (in *A. alazon* the exopod exceeds the endopod). These differences and some others are discussed in more detail under the remarks for *A. umpara*. *Aega birubi* is very similar but smaller and differs most notably in having distinctly carinate palms on pereopods 1–3, a consistently small acute propodal lobe, eyes that are scarcely in contact medially and minor but consistent differences in pereopod setation.

The single female from the Seychelles is provisionally retained under this species as it accords well on most characters. It differs slightly in that the eyes only just meet medially and the frontal lamina is posteriorly slightly wider.

*Aega alazon* is also very similar to the North Atlantic species *A. antillensis*, but can be reliably distinguished from that species in having a simple propodal palm on pereopods 1–3 and in the anterodistal angle of antennule peduncle article 2 forming a distinct small lobe.

*Prey*

Pink cusk-eel, *Genypterus blacodes* (Forster, 1801), Ophidiidae; the snake mackerels *Rexea solandri*

(Cuvier, 1832) and *Thyrustes* sp., Gempylidae; basking shark, *Cetorhinus maximus* (Gunnerus, 1765).

*Distribution*

Southern Ocean from the South Atlantic and South Africa to New Zealand, extending northwards into the tropics of the Indian Ocean and south-western Pacific Ocean off the Seychelles and New Caledonia. Given the widespread records in the Indian Ocean, south-western Pacific and southern South Atlantic, it would seem reasonable to expect this species to be found throughout the Southern Ocean; at depths between 46 and 550 m.

*Etymology*

*Alazon* (Greek), meaning wanderer or rover, alluding to the wide Southern Hemisphere distribution of this species.

***AEGA BANDA* SP. NOV.** (FIGS 16, 17, 63)*Material examined*

*Holotype*: ♂ (30 mm), Kei Islands, eastern Banda Sea, Indonesia, 5°29'S, 132°37'E, 12.v.1922, stn 58, trawl, 290 m, mud, coll. Th. Mortensen, 'Danske Exped. til Kei-Øerne 1922' (ZMUC CRU3736).

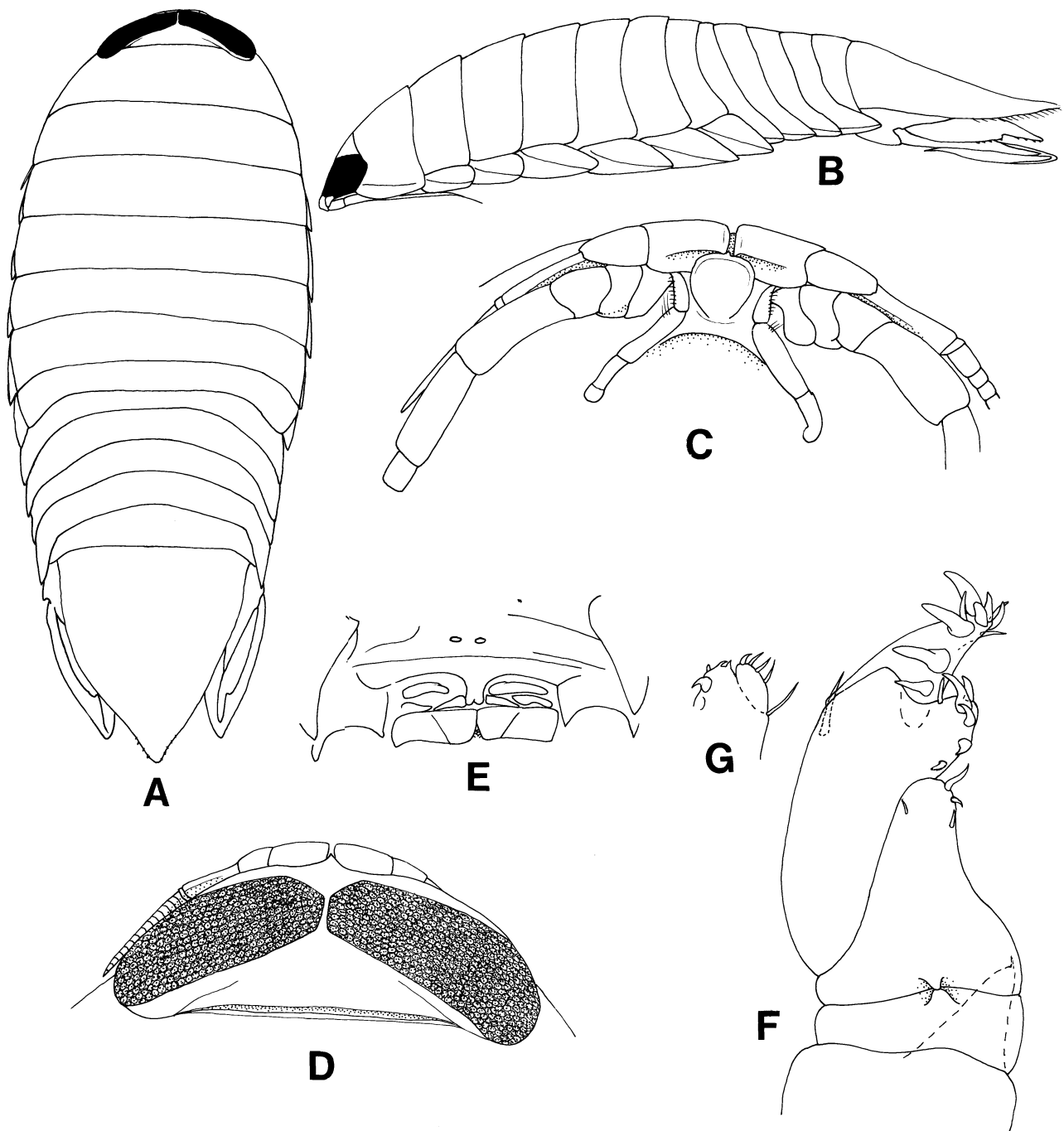
*Non-type*: ♀ (non-ovig. 50 mm), North West Shelf, Western Australia, 17°59.4'S, 118°18.4'E, 28.i.1984, 406–416 m, Sta. T7, coll. A.J. Bruce on FRV *Soela* (NTM Cr000590).

*Description*

Body 2.5 times as long as greatest width, dorsal surfaces smooth, widest at pereonite 5, lateral margins weakly ovate. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, not medially united, separated by about 2% width of head; each eye made up of ~20 transverse rows of ommatidia, each row with ~10 ommatidia; eye colour faded, not known. *Pereonite 1 and coxae 2–3* each with posteroventral angle rounded; coxae 5–7 with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 1.1 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins weakly convex (distally weakly sinuate), smooth, posterior margin with elongate medial point, with 12 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.7 times as long as combined lengths of articles 1 and 2;



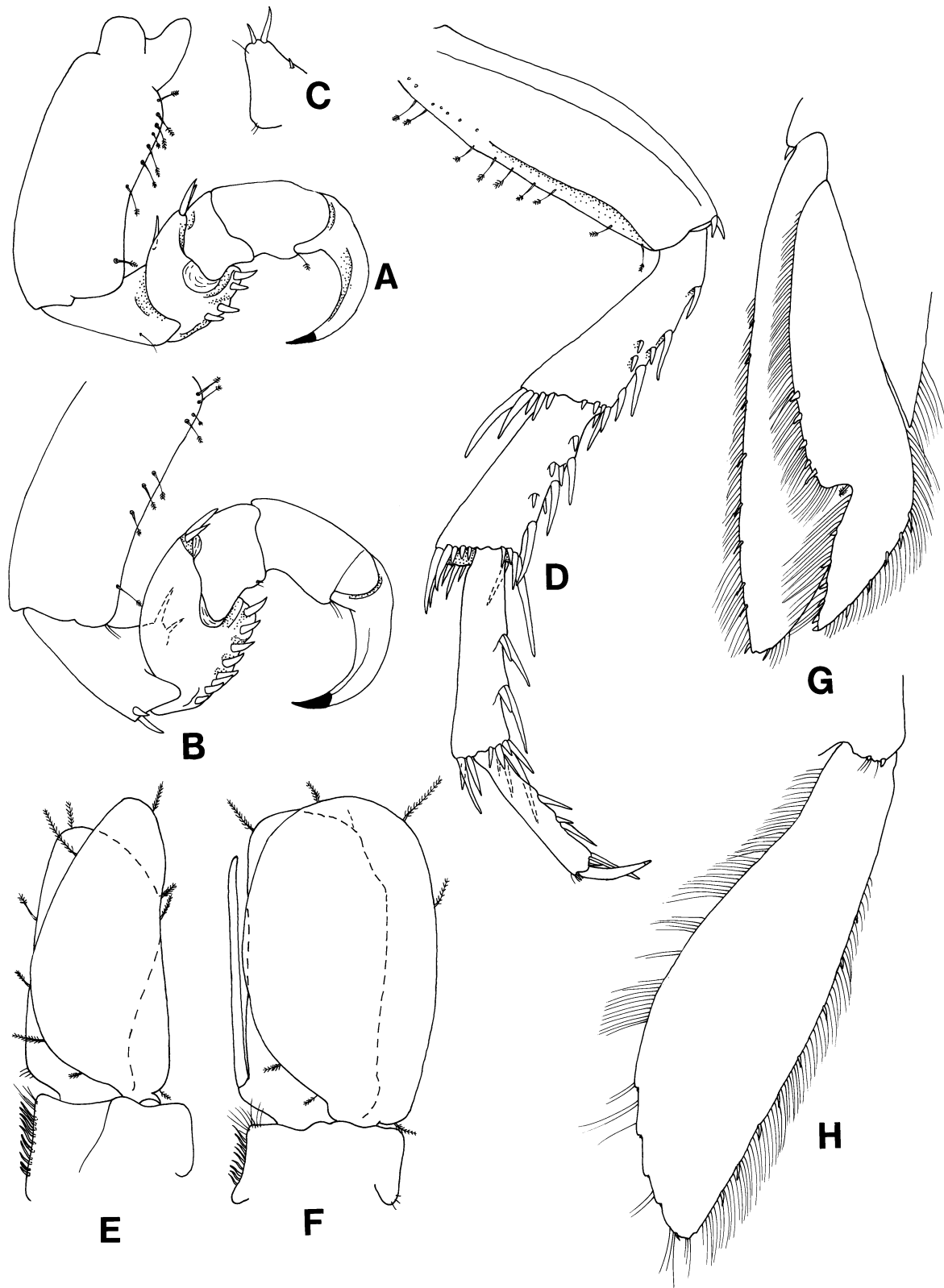


**Figure 16.** *Aega banda* sp. nov. Holotype, ZMUC CRU3736. A, dorsal view. B, lateral view. C, frons. D, head, dorsal view. E, sternite 7 showing penial openings. F, maxilliped palp. G, maxilliped palp, article 5.

flagellum with 10 articles, extending to anterior of pereonite 1. *Antenna* peduncle article 2 inferior surface with indistinct groove; article 4  $2.1 \times$  LW, 1.2 times as long as combined lengths of articles 1–3; article 5 not markedly wider or flatter than article 4,  $0.9 \times$  L article 4,  $2.7 \times$  LW; flagellum with 19 articles, extending to middle of pereonite 3.

*Frontal lamina* flat, longer than greatest width, lateral margins converging posteriorly, posteriorly rounded, anterior margin rounded, with small median point, posterior margin not abutting clypeus.

*Maxilliped* endite with 1 apical seta; palp article 2 with 3 RS (straight); article 3 with 5 recurved RS (and 1 straight); article 4 with 6 hooked RS; article 5



**Figure 17.** *Aega banda* sp. nov. Holotype, ZMUC CRU3736. A, pereopod 1. B, pereopod 2. C, mediodistal angle of ischium. D, pereopod 7. E, pleopod 1. F, pleopod 2. G, uropod (*in situ*). H, uropod endopod, ventral view (*in situ*).

partly fused to article 4, with 4 RS (1 hooked, 3 straight).

*Pereopod 1* basis 2.2 times as long as greatest width; ischium  $0.5 \times$  L basis, inferior margin with 0 RS, superior distal margin with 2 RS; merus inferior margin with 4 RS, set as 2 groups (of 2 and 2), superior distal angle with 2 RS; carpus  $0.6 \times$  L merus, inferior margin with 0 RS; propodus 1.4 times as long as proximal width, inferior margin with 0 RS, propodal palm with small distal lobe, dactylus smoothly curved, 1.4 L propodus. *P2* ischium inferior margin with 2 RS, superior distal margin with 2 RS; merus inferior margin with 8 RS, set as single row, superior distal margin with 2 acute RS; carpus longer than that of *P1*, with infero-distal lobe, inferodistal angle with 1 RS (minute), propodus without large club-shaped distal RS. *P3* similar to *P2*; propodus without large club-shaped distal RS. *P6* similar to *P7*. *P7* basis 3 times as long as greatest width, inferior margin with 16 palmate setae; ischium  $0.6 \times$  L basis, inferior margin with 7 RS (set as 1, 1, 3, 1 and 1), superior distal angle with 6 RS, inferior distal angle with 5 RS; merus  $0.9 \times$  L ischium,  $2.1 \times$  LW, inferior margin with 8 RS (set as 1, 3, 1, 2 and 1), superior distal angle with 10 RS, inferior distal angle with 7 RS; carpus  $1.1 \times$  L ischium,  $3.7 \times$  LW, inferior margin with 4 RS (set as 2 and 2), superior distal angle with 6 RS, inferior distal angle with 7 RS; propodus  $0.8 \times$  L ischium,  $5.9 \times$  LW, inferior margin with 3 RS (set as 1 and 2), superior distal angle with 3 slender setae (plus 1 RS), inferior distal angle with 4 RS.

*Penes* opening flush with surface of sternite 7; penial openings separated by 6% of sternal width.

*Pleopod 1* exopod  $2.3 \times$  LW, distally narrowly rounded with strongly oblique medial margin, lateral margin distally concave, medial margin strongly convex, with PMS from base; endopod  $2.2 \times$  LW, distally subtruncate, lateral margin sinuate (widest subdistally, proximally concave), with PMS from on distal margin only, medial margin with PMS from distal half; peduncle  $1.6 \times$  WL, medial margin with 10 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.7 \times$  L endopod, distally narrowly rounded. Exopods of pleopods 1–5 each, with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediobasal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS, posterior lobe about two-thirds L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex or distally straight, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 5 RS, distal lateral margin with 6 RS, medial margin weakly convex, with 5 RS. *Exopod*

extending beyond end of endopod, 3.4 times as long as greatest width, apically not bifid; lateral margin straight, with 9 RS; medial margin sinuate, proximally concave, with 5 RS.

#### Female

Similar to male, perhaps growing to a substantially larger size.

#### Variation

*Robust setae*: range of the 2 specimens only. Pleotelson indicating a range from  $5 + 5$  to  $6 + 6$ , possibly an additional terminal pair as both apices were crushed. Uropod exopod medial margin with 4 or 5 (once), lateral margin 8 or 9; uropod endopod medial margin varies from 4 to 7, lateral margin with  $5 + 5$  (both rami, Western Australian specimen),  $6 + 5$  and  $7 + 5$ .

*P1* setation of the merus with  $2 + 2$  (all); *P2* merus 7 or 8 (once); *P3* merus with 7 or 8.

#### Size

Male 30 mm, female 50 mm.

#### Remarks

The characters by which *A. banda* sp. nov. is most readily identified are the very narrowly separated eyes, relatively long antennule and antenna, slender uropodal rami, presence of 'long' robust setae on the posterior pereopods and the pattern of setation of the inferior margin of the merus of pereopods 1–3.

*Aega banda* is a species that, with casual examination, appears similar to many other species in the group. However, all other species are readily excluded by clear-cut differences in several characters. The narrow uropodal exopod eliminates *A. hamiota* sp. nov., *A. musorstom* sp. nov., *A. rickbruscai* sp. nov. and *A. trulla* sp. nov.; lack of a propodal blade on pereopods 1–3 eliminates *A. birubi* sp. nov., *A. kixalles* sp. nov., *A. trulla* and again *A. musorstom*; the uropodal exopod extending distinctly beyond the endopod apex eliminates *A. deshaysiana*, *A. kwazulu* sp. nov., *A. excisa*, *A. japonica* sp. nov. and *A. umpara* sp. nov.; and finally the presence of long acute robust setae on the posterior pereopods eliminates the remaining species, *A. antillensis*, *A. alazon* sp. nov. and *A. warna* sp. nov.

The specimen from tropical Western Australia, the only specimen of this group of species recorded from the eastern Indian Ocean, while much larger than the holotype, agrees well with most characters. It is excluded from the type series as the location is a considerable distance from the type locality and there are some minor differences, notably that the antennal flagellum is slightly shorter (not extending to pereonite 3, possibly a sex-related difference) and the pleotelson robust setae are more widely spaced. The arrangement of the robust setae of pereopods 1–3 is consistent with

that expected within a species, and the arrangement and size of the robust setae of the posterior pereopods correspond strongly between the two specimens. The shape and proportions of the uropodal rami similarly correspond well with that of the holotype and the variation in numbers of robust setae on the uropodal margins falls within that shown by species for which there are good data (e.g. *A. antillensis*, *A. deshaysiana*, *A. alazon* sp. nov. and *A. musorstom* sp. nov.).

The description given here is abbreviated, taken only from the holotype, and dissection was minimized to avoid excessive mutilation of the specimen. The antennule, antenna, mouthparts other than the maxilliped, pleopods 3–5 and the uropods were not dissected off and where practical, examined and drawn *in situ*.

#### Prey

Not known.

#### Distribution

Eastern Indian Ocean off the north-west shelf of Western Australia to the Kei Islands, eastern Banda Sea, Indonesia; at depths ranging between 290 and 416 m.

#### Etymology

The epithet is taken from the Banda Sea. The Kei (or Kai) Islands are at the eastern end of this sea, part of the Moluku Archipelago and subregion of Indonesia; noun in apposition.

### **AEGA BIRUBI SP. NOV.** (FIGS 18–21, 63)

*Aega antillensis* – Hale, 1940: 176, fig. 24e (part), 24h.

#### Material examined

**Holotype:** ♂ (26 mm), off Bermagui, NSW, 5.ix.1994, 200 m, SS05/94/148, coll. P.B. Berents on *Southern Surveyor* (AM P43968).

**Paratypes:** ♀ (non-ovig. 26 mm), East of Broken Bay, NSW, 33°39'S, 151°53'E, 14.x.1978, 274 m, coll. FRV *Kapala* (AM P34712). 2♀ (non-ovig. 37, 39 mm), off Botany Bay, NSW, 151°43'E, 34°00'S, 6.xi.1972, 731 m, coll. FRV *Kapala* (AM P19391). ♀ (24 mm), 36°22.6'S, 150°14.9'E, east of Bermagui, NSW, 8.ix.1994, 123–277 m, sledge (AM P43970). ♀ (not measured) off Green Cape to Cape Howe, 37°22–33'S, 150°17–20'E, 18.iii.1977, 329 m, coll. FRV *Kapala* (AM P43974). ♀ (non-ovig. 28 mm), Bass Strait, 27.viii.1994, sled, 120 m (AM P43967). ♂ (29 mm) Tasmania, Australia, 182 m, C. Hedley, old collections, previously dissected (Hale, 1940) (no other data) (AM P9588).

**Non-type:** ♀ (non-ovig. 34 mm), Cook Strait, 14.ii.2000, 165 m, off cheek of barracouta (*Thyristes atun*), coll. Pierce Black (NMNZ Cr.9949).

#### Description

**Body** 2.8 times as long as greatest width, dorsal surfaces sparsely punctate, widest at pereonite 5, lateral margins weakly ovate. Rostral point projecting anteriorly, not ventrally folded. **Eyes** large, not medially united, separated by less than 1% width of head; each eye made up of ~21 transverse rows of ommatidia, each row with ~9 ommatidia; eye colour pale brown. **Pereonite 1 and coxae 2–3** each with posteroventral right-angled; coxae 5–7 with entire oblique carina. **Pleon** with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. **Pleotelson** 1.0 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins convex, smooth, posterior margin with elongate medial point, with 6–8 RS.

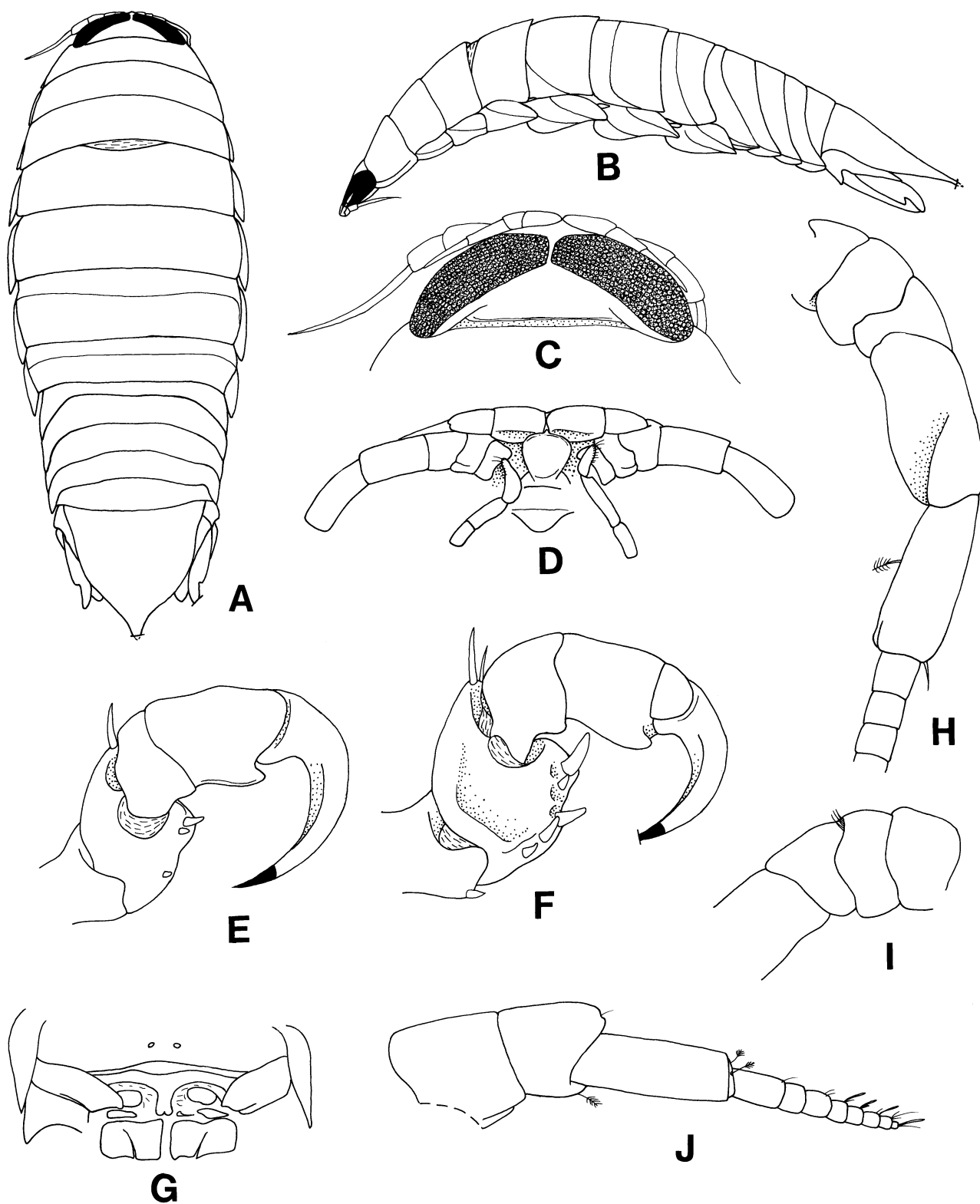
**Antennule** peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.7 times as long as combined lengths of articles 1 and 2, article 3 2.7× LW; flagellum with 8 articles, extending to mid-point of eye. **Antenna** peduncle article 2 inferior surface without distinct longitudinal suture; article 4 2× LW, 1.4 times as long as combined lengths of articles 1–3, with deep longitudinal groove, inferior margin with 1 plumose seta, and 0 short simple setae; article 5 not markedly wider or flatter than article 4, 0.9× L article 4, 2.5× LW, inferior margin with 1 plumose setae, anterodistal angle with cluster of 2 short simple setae; flagellum with 14 articles, extending to middle of pereonite 1.

**Frontal lamina** flat, as wide as long, lateral margins converging posteriorly, anterior margin rounded, with small median point, posterior margin not abutting clypeus.

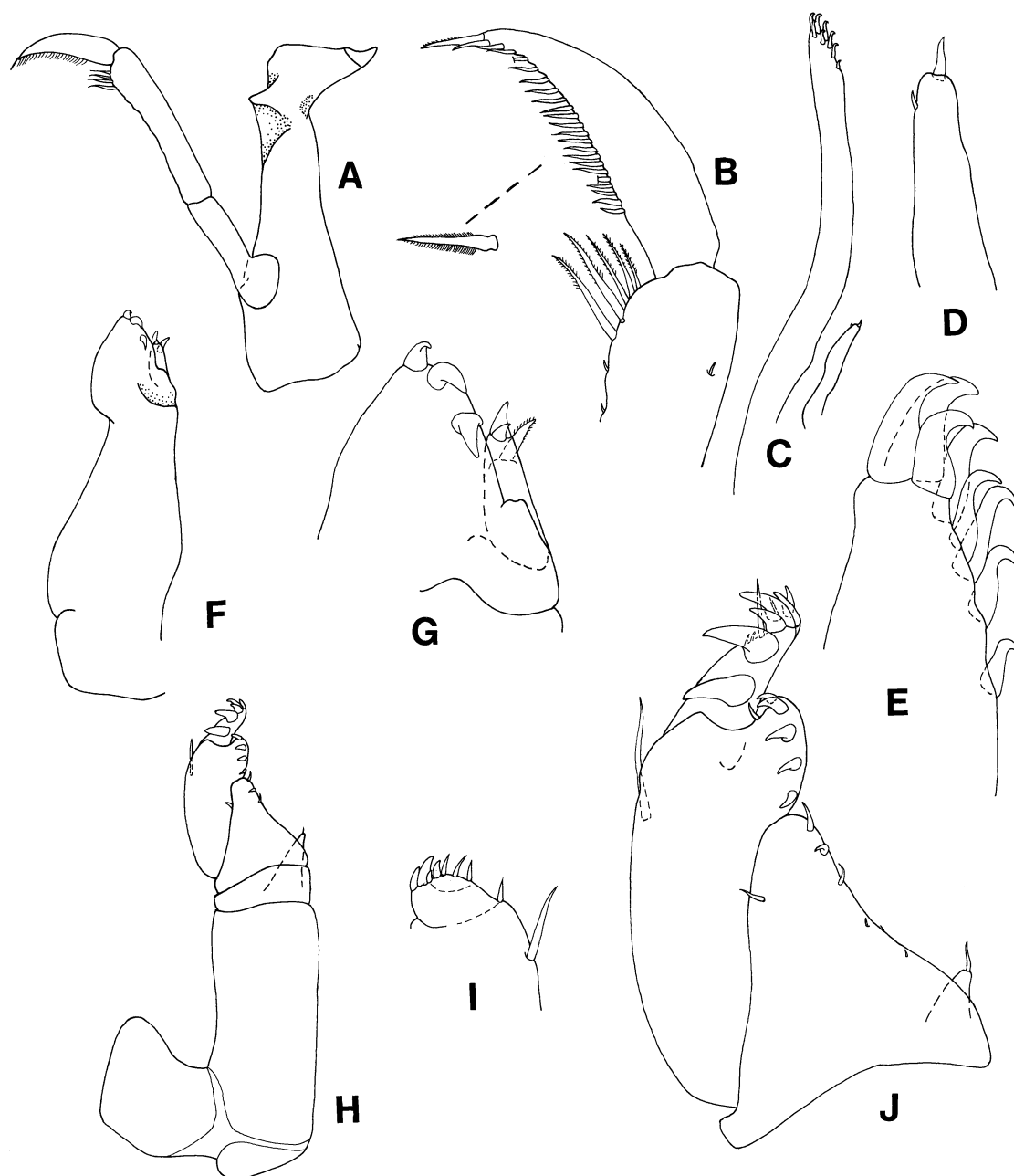
**Mandible** molar process absent; palp article 2 with 5 distolateral setae, palp article 3 with 23 setae. **Maxillule** with 8 terminal RS (falcate). **Maxilla** medial lobe with 3 RS; lateral lobe with 3 RS (hooked). **Maxilliped** endite with 1 apical seta; palp article 2 with 3 RS; article 3 with 6 recurved RS (5 hooked, 1 straight); article 4 with 5 hooked RS; article 5 wholly fused to article 4, with 4 RS (3 straight, 1 hooked).

**Pereopod 1** basis 2.4 times as long as greatest width; ischium 0.6× L basis, inferior margin with 0 RS, superior distal margin with 2 RS (acute); merus inferior margin with 3 RS, set as 2 groups (of 1 and 2), superior distal angle with 2 RS (acute); carpus 0.5× L merus, inferior margin with 0 RS (with small lobe); propodus 1.4 times as long as proximal width, inferior margin





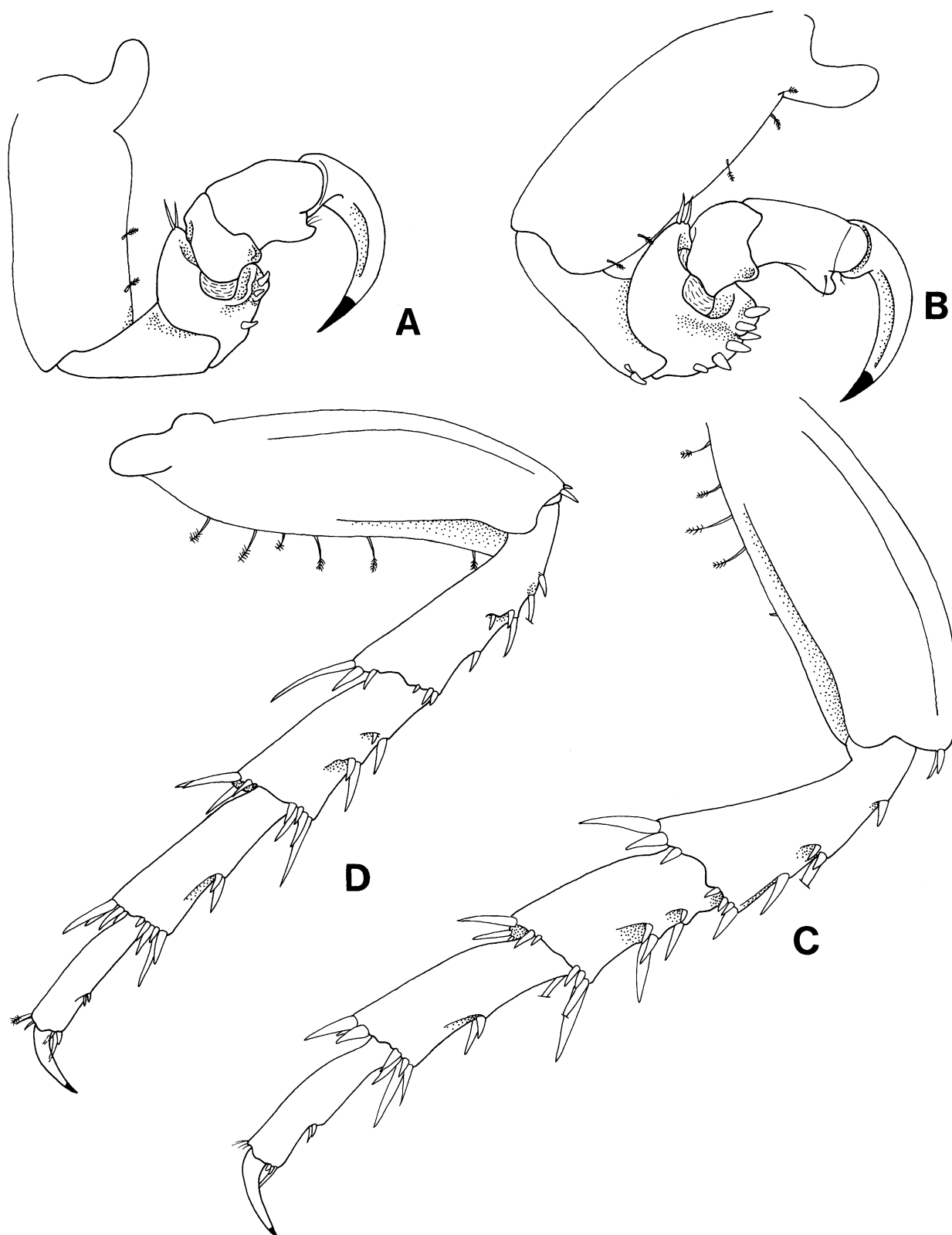
**Figure 18.** *Aega birubi* sp. nov. A–G, holotype. H–J, paratype (AM P43967). A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, pereopod 1 (*in situ*). F, pereopod 2 (*in situ*). G, sternite 7 showing penial openings. H, antenna dorsal view. I, antenna, peduncle articles 1–3, ventral view. J, antennule.



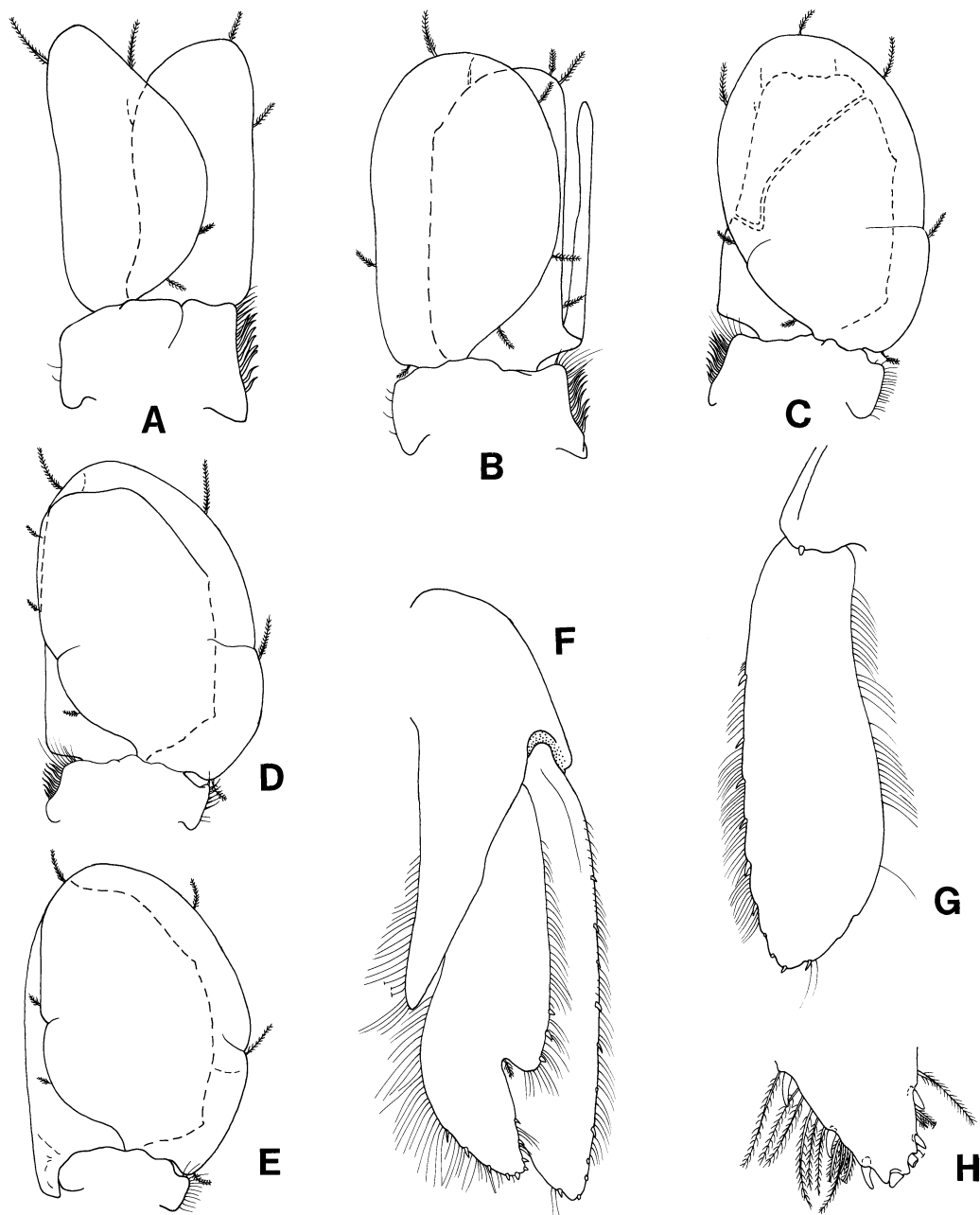
**Figure 19.** *Aega birubi* sp. nov. Paratype (AM P43967). A, mandible. B, mandible palp article 3 detail. C, maxillule. D, maxillule mesial lobe. E, maxillule lateral lobe, apex. F, maxilla. G, maxilla apex, detail. H, maxilliped. I, maxilliped palp article 5. J, maxilliped palp articles 2–5.

with 0 RS, propodal palm with large distal lobe, dactylus smoothly curved,  $1.7 \times$  L propodus. P2 ischium inferior margin with 2 RS (distal), superior distal margin with 2 RS; merus inferior margin with 6 RS (distal 2 on low lobe), set as single row, superior distal margin with 2 acute RS; carpus similar in size to that of P1, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. P3 propodus without large club-shaped distal RS. P6 similar to P7 (larger, more

robust). P7 basis 2.8 times as long as greatest width, inferior margin with 7 palmate setae; ischium  $0.6 \times$  L basis, inferior margin with 6 RS (set as 1, 1, 3 and 1), superior distal angle with 3 RS, inferior distal angle with 3 RS; merus  $0.8 \times$  L ischium,  $1.9 \times$  LW, inferior margin with 4 RS (set as 2 and 2), superior distal angle with 5 RS, inferior distal angle with 5 RS; carpus  $0.8 \times$  L ischium,  $2.6 \times$  LW, inferior margin with 2 RS (single cluster), superior distal angle with 4 RS,



**Figure 20.** *Aega birubi* sp. nov. Paratype (AM P43967). A–D, pereopods 1, 2, 6 and 7, respectively.



**Figure 21.** *Aega birubi* sp. nov. A, B, holotype, remainder paratype (AM P43967). A–E, pleopods 1–5, respectively. F, uropod. G, uropod exopod, ventral view. H, uropod endopod, apex.

inferior distal angle with 6 RS; propodus  $0.7 \times$  L ischium,  $4.5 \times$  LW, inferior margin with 2 RS (single cluster), superior distal angle with 3 slender setae (2 simple, 1 palmate), inferior distal angle with 4 RS.

*Penes* opening flush with surface of sternite 7; penial openings separated by 11% of sternal width.

*Pleopod 1* exopod  $1.9 \times$  LW, distally narrowly rounded with strongly oblique medial margin, lateral

margin straight, medial margin strongly convex, with PMS from base; endopod  $2.2 \times$  LW, distally subtruncate, lateral margin sinuate (widest subdistally, proximally concave), with PMS from distal one-third; medial margin with PMS from distal one-third; peduncle  $1.5 \times$  WL, medial margin with 9 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.9 \times$  L endopod, distally bluntly rounded.

Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediodistal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 1 RS, posterior lobe about  $0.6 \times$  L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex, distally straight, with prominent excision positioned about three-quarters along ramus, proximal lateral margin with 3 RS, distal lateral margin with 4 RS, medial margin weakly convex, with 5 RS. *Exopod* extending beyond end of endopod, 3 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 10 RS; medial margin sinuate, proximally concave, with 4 RS.

#### Female

Similar to male, with exception of the sexual characters.

#### Variation

*Robust setae*: all of the 5 specimens examined had some damage to the pleotelson apex. The number of RS is indicative of a range from 3 + 3 to 4 + 4. The uropod apices of most species have nearly all received some damage, particularly to the endopods. The numbers are probably lower than actuality. Uropod exopod ( $n = 12$ ) medial margin with 2–5, with 4 (42%) or 5 (25%) most frequent, lateral margin 8–10 with 9 (50%) or 10 (42%) most frequent; uropod endopod medial margin ( $n = 10$ ) varied from 2 to 5, with 4 (50%) and 5 (40%) most frequent, the lateral margin ( $n = 10$ ) RS with 2 + 4 (30%), 3 + 4 (60%) and 4 + 4 (once). There is no discernible difference between males and females, nor does the number of RS increase with the size of the specimen.

P1 setation of the merus was consistent across its range with 1 + 2 (all); P2 merus with 3 + 2 (50%) and 4 + 2 (50%); P3 merus with 4 + 2 (91%), 3 + 2 occurring once.

The eyes are consistently just separated with the exception of a single specimen, that of Hale from Tasmania (AM P9588), in which a few ommatidia are just making contact at the mid-point. That specimen otherwise agrees well with this species and this difference is slight.

#### Size

Males 26 and 29 mm, females 26–39 mm (mean = 31.2 mm); no ovigerous females present in the material examined.

#### Remarks

*Aega birubi* sp. nov. belongs to a group of closely similar species that includes *A. alazon* sp. nov., *A. umpara* sp. nov. in the south-west Pacific, *A. kwazulu* sp. nov., in the south-western Indian Ocean and *A. antillensis* in the Caribbean. *Aega birubi* can be distinguished from all these species by the eyes, which are narrowly separated to just making contact (one specimen), a more strongly convex pleotelson posterolateral margin and most notably the palm of pereopods 1–3 being carinate with a distinct curved and acute small distal lobe. In *A. birubi* the setae at the distal angles of the pereopod 7 ischium are more robust than those of *A. alazon*.

Appendage descriptions have been taken from the Bass Strait female (AM P43967) as all of the specimens closer to the type location had some damage to the uropod apices or anterior pereopods, and the female from Broken Bay (AM P43712) appears to have partially dried out at some point.

#### Prey

The only record is from a line-caught barracouta, *Thyristes atun* (Euphrasen, 1791).

#### Distribution

South-western Pacific: eastern Australian coast from Broken Bay, New South Wales to Tasmania, to the Cook Strait, New Zealand; at depths between 120 and 731 m.

#### Etymology

*Birubi* is an Aboriginal name for the Southern Cross constellation; noun in apposition.

### **AEGA HAMIOTA SP. NOV.** (FIGS 22–25, 63)

#### Material examined

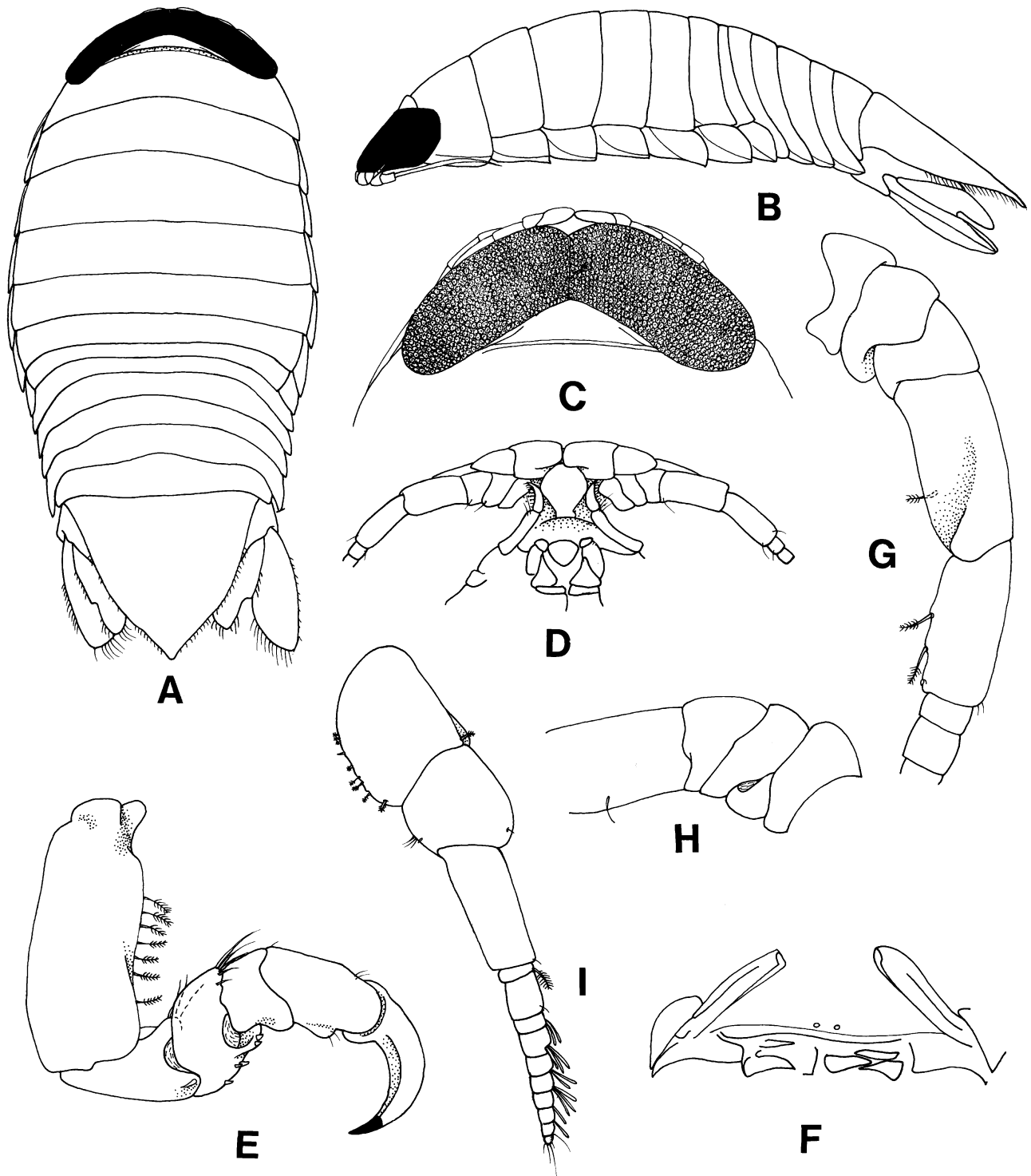
*Holotype*: ♂ (27 mm), northern New Caledonia,  $18^\circ 53.80'S$ ,  $163^\circ 14.10'E$ , 20.ix.1985, stn 0200, MUSORSTOM IV, 535 m (MNHN Is.5787).

*Paratypes*: ♀ (non-ovig. 35 mm, dissected), vicinity of Chesterfield Islands,  $19^\circ 47.90'S$ ,  $158^\circ 44.30'E$ , 19.x.1986, stn 0363, MUSORSTOM V, 700–685 m (MNHN Is.5788). ♀ (non-ovig. 31 mm), Coral Sea, east of Whitsunday Islands, Queensland,  $20^\circ 24.70'S$ ,  $152^\circ 57.55'E$ , 22.xi.1985, 511–508 m, *Soela* stn 0685/27/2 (NTM Cr013498).

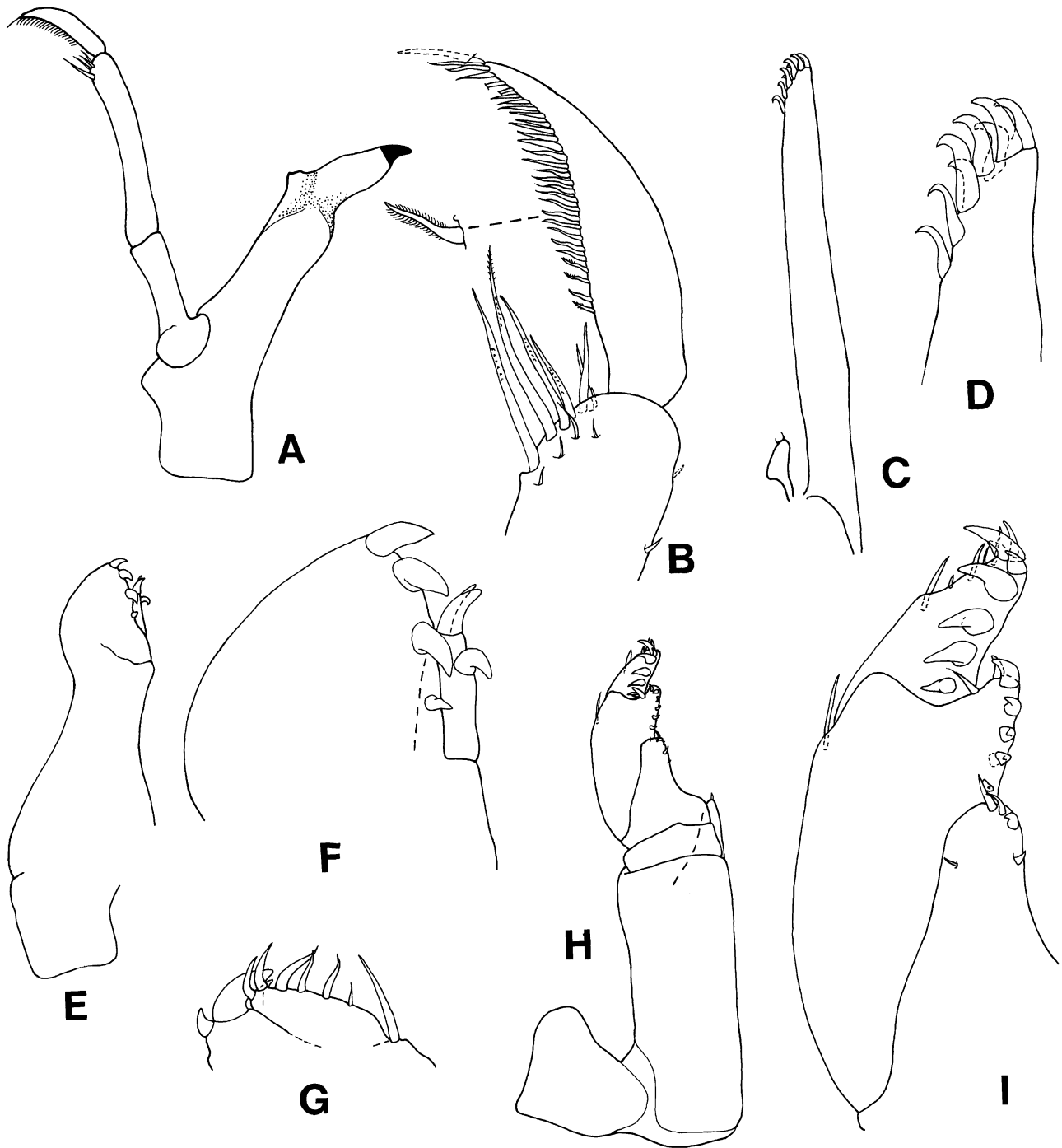
#### Description

*Body* 2.3–2.6 times as long as greatest width, dorsal surfaces punctate, widest at pereonite 5, lateral margins weakly ovate. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, medially united, ante-





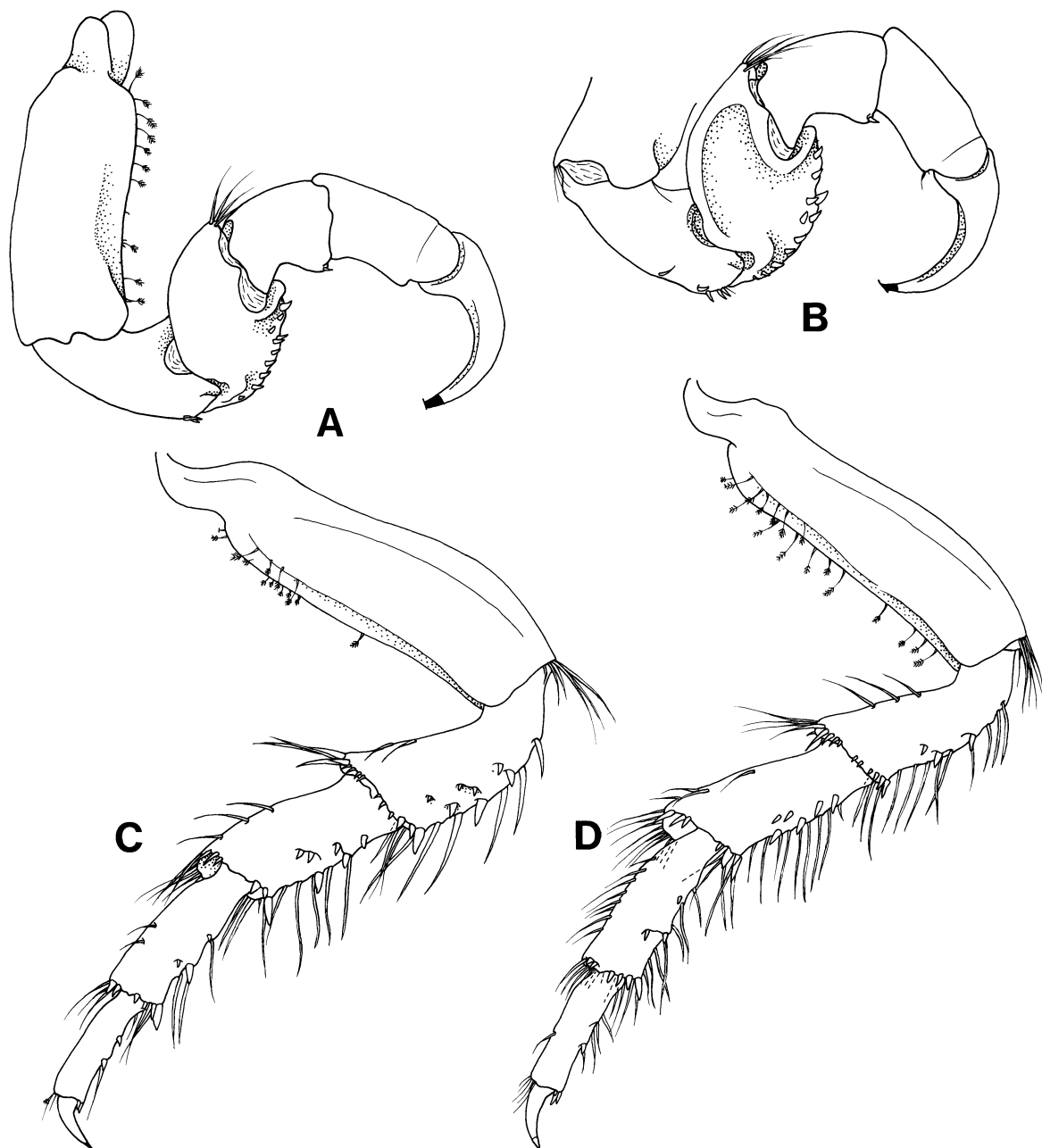
**Figure 22.** *Aega hamiota* sp. nov. A–F, holotype. G–I, ♀ paratype. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, pereopod 1. F, sternite 7 showing penial openings. G, antenna dorsal view. H, antenna, peduncle articles 1–3, ventral view. I, antennule.



**Figure 23.** *Aega hamiota* sp. nov. Female paratype. A, mandible. B, mandible palp article 3 detail. C, maxillule. D, maxillule apex. E, maxilla. F, maxilla apex, detail. G, maxilliped palp article 5. H, maxilliped. I, maxilliped palp articles 2–5.

rior clear field 9% length of head, posterior clear field 34% length of head; each eye made up of ~20 transverse rows of ommatidia, each row with ~10 ommatidia; eye colour dark brown. *Pereonite 1* and *coxae 2–3* each with posteroventral angle right-angled; *coxae 5–7* with entire oblique carina. *Pleon* with pleonite 1

visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 1.1 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins convex, smooth,



**Figure 24.** *Aega hamiota* sp. nov. Female paratype. A–D, pereopods 2, 3, 6 and 7, respectively.

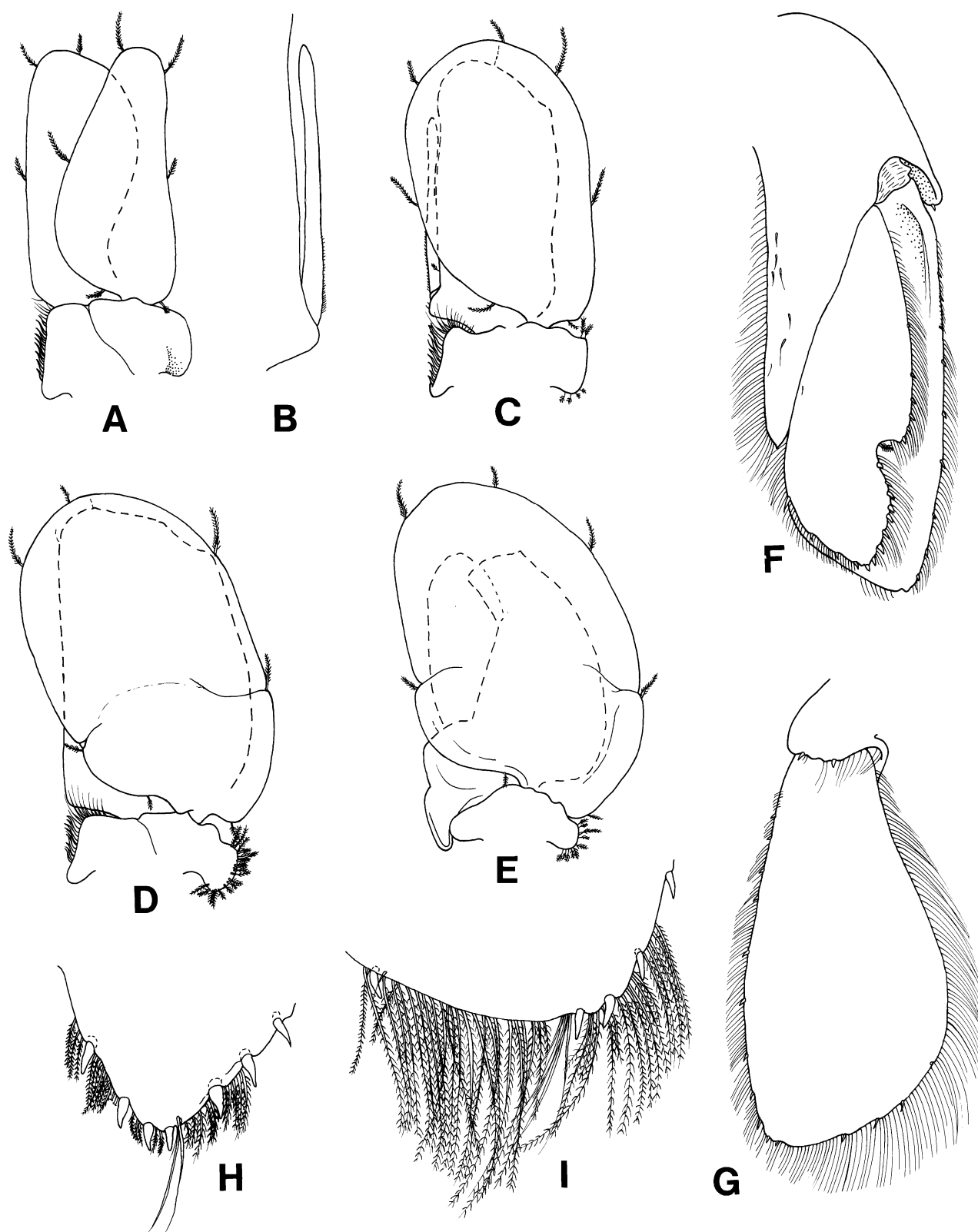
posterior margin with elongate medial point, with 11–16 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.6 times as long as combined lengths of articles 1 and 2, article 3  $2.6\times$  LW; flagellum with 9 articles, extending to mid-point of eye. *Antenna* peduncle article 2 inferior surface with distinct longitudinal suture; article 4  $2.2\times$  LW, 1.3 times as long as combined lengths of articles 1–3, with deep longitudinal groove, inferior margin with 1 plumose seta, and 0 short simple setae;

article 5 not markedly wider or flatter than article 4,  $0.8\times$  L article 4,  $2\times$  LW, inferior margin with 3 plumose setae, anterodistal angle with cluster of 3 short simple setae; flagellum with 20 articles, extending to posterior of pereonite 1.

*Frontal lamina* flat, longer than greatest width, oval, anterior margin rounded, without small median point, posterior margin not abutting clypeus.

*Mandible* molar process absent; palp article 2 with 6 distolateral setae, palp article 3 with 30 setae. *Maxillule* with 8 terminal RS (falcate). *Maxilla* medial



**Figure 25.** *Aega hamiota* sp. nov. A–C, holotype, remainder female paratype. A, C–E, pleopods 1–3 and 5, respectively. B, appendix masculina, dorsal view. F, uropod. G, uropod exopod, ventral view. H, uropod endopod, apex. I, uropod exopod apex.

lobe with 4 RS (3 large, 1 small); lateral lobe with 3 RS (2 recurved, 1 straight). *Maxilliped* endite with 1 apical setae; palp article 2 with 4 RS (3 hooked, 1 straight); article 3 with 6 recurved RS (and 1 straight); article 4 with 7 hooked RS; article 5 wholly fused to article 4, with 6 RS (straight).

*Pereopod 1* basis 2.3 times as long as greatest width; ischium  $0.5 \times L$  basis, inferior margin with 0 RS, superior distal margin with 3 RS (long acute); merus inferior margin with 5 RS, set as 3 groups (of 1, 2 and 2), superior distal angle with 7 RS (long acute); carpus  $0.6 \times L$  merus, inferior margin with 0 RS; propodus 1.9 times as long as proximal width, inferior margin with 0 RS, propodal palm with small distal lobe, dactylus smoothly curved,  $1.3 \times L$  propodus. *P2* ischium inferior margin with 3 RS (at inferodistal angle), superior distal margin with 3 RS (long acute); merus inferior margin with 10 RS, set as single row (with separation of distal 2), superior distal margin with 5 acute RS (long acute); carpus longer than that of *P1*, with inferodistal lobe, inferodistal angle with 1 RS, propodus without large club-shaped distal RS. *P3* similar to *P2*; propodus without large club-shaped distal RS. *P5–7* superior margins of ischium–carpus with long, stiff, acute setae. *P6* similar to *P7* (but more robust, with RS more stout). *P7* basis 3.3 times as long as greatest width, inferior margin with 16 palmate setae; ischium  $0.5 \times L$  basis, inferior margin with 10 RS (7 long and 3 short), superior distal angle with 10 RS (5 stout lateral and 5 long medial), inferior distal angle with 10 RS (6 stout lateral and 4 long medial); merus  $L$  ischium,  $1.9 \times LW$ , inferior margin with 15 RS (9 long and 6 short), superior distal angle with 15 RS (3 stout lateral and 12 long medial), inferior distal angle with 8 RS (3 stout lateral and 5 long medial); carpus  $1 \times L$  ischium,  $3 \times LW$ , inferior margin with 10 RS (7 long and 3 short), superior distal angle with 10 RS (3 stout lateral and 7 long medial), inferior distal angle with 11 RS (4 stout lateral and 7 long medial); propodus  $0.8 \times L$  ischium,  $3.5 \times LW$ , inferior margin with 6 RS (4 long and 2 short), superior distal angle with 6 slender setae (1 plumose), inferior distal angle with 4 RS.

*Penes* low tubercles; penial openings separated by 6% of sternal width.

*Pleopod 1* exopod  $2.1 \times LW$ , distally narrowly rounded with strongly oblique medial margin, lateral margin distally concave, medial margin strongly convex, with PMS from base; distally subtruncate, lateral margin sinuate (widest distally, proximally concave), with PMS from on distal margin only, medial margin with PMS from distal half; peduncle  $1.7 \times WL$ , medial margin with 11 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.7 \times L$  endopod, distally narrowly rounded. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediobasal point (very

weak); pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS (short), posterior lobe about  $0.75 \times L$  endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices broadly rounded. *Endopod* apically not bifid, lateral margin proximally and distally convex, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 6 RS, distal lateral margin with 9 RS, medial margin weakly convex, with 4 RS. *Exopod* extending beyond end of endopod, 1.9 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 11 RS; medial margin convex, with 4 RS.

#### Female

Similar to males; ovigerous females not present in the material examined.

#### Size

Male 27 mm, females 31–35 mm.

#### Variation

*Robust setae*: only 3 specimens, so only ranges are given. There are 11–15 ( $6 + 5 - 7 + 8$ ) RS on the pleotelson, though it is likely that some distal setae are missing, and a maximum of 16–18 seems probable. Uropod exopod medial margin with 3–6, with 5 (half) most frequent, lateral margin with 10 or 11; uropod endopod medial margin with 4 (6 once), lateral margin with  $4 + 8$ ,  $4 + 9$ ,  $5 + 8$  and  $5 + 9$ .

*P1–3*: counts for the RS on the inferior margin of the merus: *P1* with 5 as  $1 + 2 + 2$  with  $1 + 1 + 2 + 2$  once; *P2* with 8 (once), 9 (3 times) and 10 (twice); and *P3* with 6 (once), 9 (once), 10 (twice) and 11 (once).

As occasionally occurs in the genus, there is a substantial difference in the length-to-width ratio between some specimens. Both specimens from New Caledonia are relatively wide-bodied, c.  $2.3 \times LW$ , with the visible portions of pereonites 6 and 7 notably short in comparison to those of the Coral Sea specimen, which is c.  $2.6 \times LW$ . It is possible that these differences are related to maturity.

#### Remarks

The short uropodal endopod, widely rounded uropodal exopod, huge eyes and long acute robust setae on pereopods 5–7 ally *A. hamiota* to *A. musorstom* sp. nov., *A. rickbruscai* sp. nov. and *A. trulla* sp. nov., all from the south-western Pacific. *Aega musorstom* and *A. rickbruscai* can be immediately differentiated by lacking robust setae on the pleotelson and having far more prominent robust setae on the merus of pereopods 1–3. Additionally, *A. musorstom* has a prominent



blade on the propodal palm of pereopods 1–3 while *A. rickbruscai* has a more robust propodus on pereopods 1–3. *Aega trulla*, while having a similar pleotelson setation, has a large propodal blade on pereopods 1–3, as well the uropodal endopod lateral margin having far fewer (6 [5 once] vs. 12–14) robust setae.

*Aega hamiota* sp. nov. can be identified by the large rounded uropod exopod, uropodal endopod apex not extending to the apex of the exopod, lateral margin of the uropodal endopod being densely set with robust setae (12–14 in total), slender propodus of pereopods 1–3, merus with relatively small robust setae and, uniquely within the genus, the posterior pereopods provided with long acute robust setae on superior margins of the ischium, merus and carpus (as well as the more usual inferior margins).

#### Prey

Not known.

#### Distribution

Coral Sea from New Caledonia to Queensland, Australia; one of the few species that occurs on both sides of the Coral Sea; at depths of 508–700 m.

#### Etymology

The epithet is *hamiota* (Greek, angler; from *hamus*, a hook), alluding to 'hooking into fish'; noun in apposition.

#### *AEGA JAPONICA* SP. NOV. (FIGS 26–28, 62)

*Aega antillensis* – Thielemann, 1910: 26, plate, figs 1, 2; Nunomura, 1981: 49 (?part).

*Aega deshaysiana* – Nierstrasz, 1931: 182 (part); Brusca, 1983: 13 (part, Japanese specimen).

#### Material examined

**Holotype:** ♀ (non-ovig. 38 mm), Hokodate Bay, Hokkaido, Japan, 18.ii.1992, 120 m, coll T. Komai (USNM 1014733).

**Paratypes:** ♀ (non-ovig. 54 mm), Wakayama, southern Honshu, Japan, no other data (TSM Cr13017; loaned by Noburu Nunomura). ♀ (non-ovig. 38 mm), Japan, coll. Rev. H. Loomis, previously dissected (R.C. Brusca labels) (USNM 22687).

#### Description

**Body** 3.0 times as long as greatest width, dorsal surfaces smooth (very weakly punctate), widest at pereonite 5, lateral margins subparallel. Rostral point projecting anteriorly, not ventrally folded. **Eyes** large, medially united, anterior clear field 18% length of

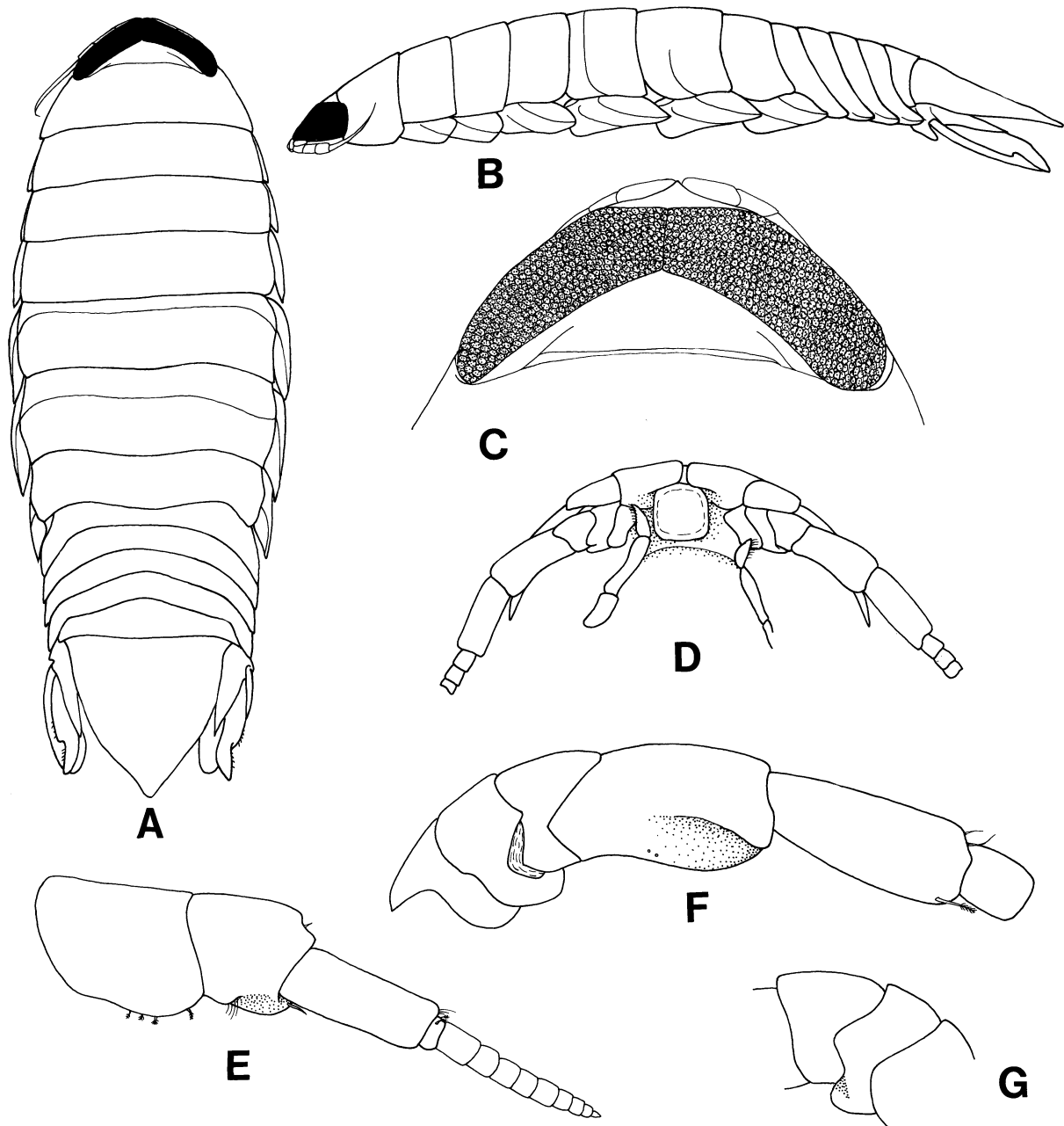
head, posterior clear field 46% length of head; each eye made up of ~23 transverse rows of ommatidia, each row with ~9 ommatidia; eye colour dark brown. **Pereonite 1 and coxae 2–3** each with posteroventral angle rounded; coxae 5–7 with entire oblique carina. **Pleon** with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles free, not overlapped by lateral margins of pleonite 4, or overlapped by lateral margins of pleonite 4. **Pleotelson** 1.1 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins convex, smooth, posterior margin with elongate medial point (indistinct), with 6 RS.

**Antennule** peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.6 times as long as combined lengths of articles 1 and 2, article 3 2.5× LW; flagellum with 9 articles, extending to mid-point of eye. **Antenna** peduncle article 2 inferior surface without distinct longitudinal suture; article 4 1.9× LW, 1.5 times as long as combined lengths of articles 1–3, without deep longitudinal groove (with longitudinal depression), inferior margin with 1 plumose setae (setae missing), and 0 short simple setae; article 5 not markedly wider or flatter than article 4, 0.9× L article 4, 2.3× LW, inferior margin with 2 plumose setae, anterodistal angle with cluster of 3 short simple setae; flagellum with 16 articles, extending to posterior of pereonite 1.

**Frontal lamina** flat, longer than greatest width, rectangular, anterior margin anteriorly truncate, without small median point, posterior margin not abutting clypeus.

**Mandible** molar process absent; palp article 2 with 6 distolateral setae, palp article 3 with 31 setae. **Maxillule** with 7 terminal RS (falcate). **Maxilla** medial lobe with 4 RS (1 hooked, 2 straight, weakly biserrate); lateral lobe with 4 RS (large, hooked). **Maxilliped** endite with 2 apical setae; palp article 2 with 5 RS (1 hooked, 3 slender curved); article 3 with 7 recurved RS (1 minute); article 4 with 6 hooked RS; article 5 partly fused to article 4, with 8 RS (straight).

**Pereopod 1** basis 2.2 times as long as greatest width; ischium 0.5× L basis, inferior margin with 0 RS, superior distal margin with 1 RS; merus inferior margin with 5 RS, set as single row (of 3 and 2), superior distal angle with 2 RS; carpus 0.5× L merus, inferior margin with 0 RS; propodus 1.2 times as long as proximal width, inferior margin with 0 RS, propodal palm with small distal lobe, dactylus smoothly curved (robust), 1.4 L propodus. **P2** ischium inferior margin with 1 RS, superior distal margin with 1 RS; merus inferior margin with 7 RS, set as single row, superior distal margin with 2 acute RS; carpus similar in size to that of P1, inferodistal angle with 1 RS (minute), propodus without large club-shaped distal RS. **P3** similar to P2; pro-

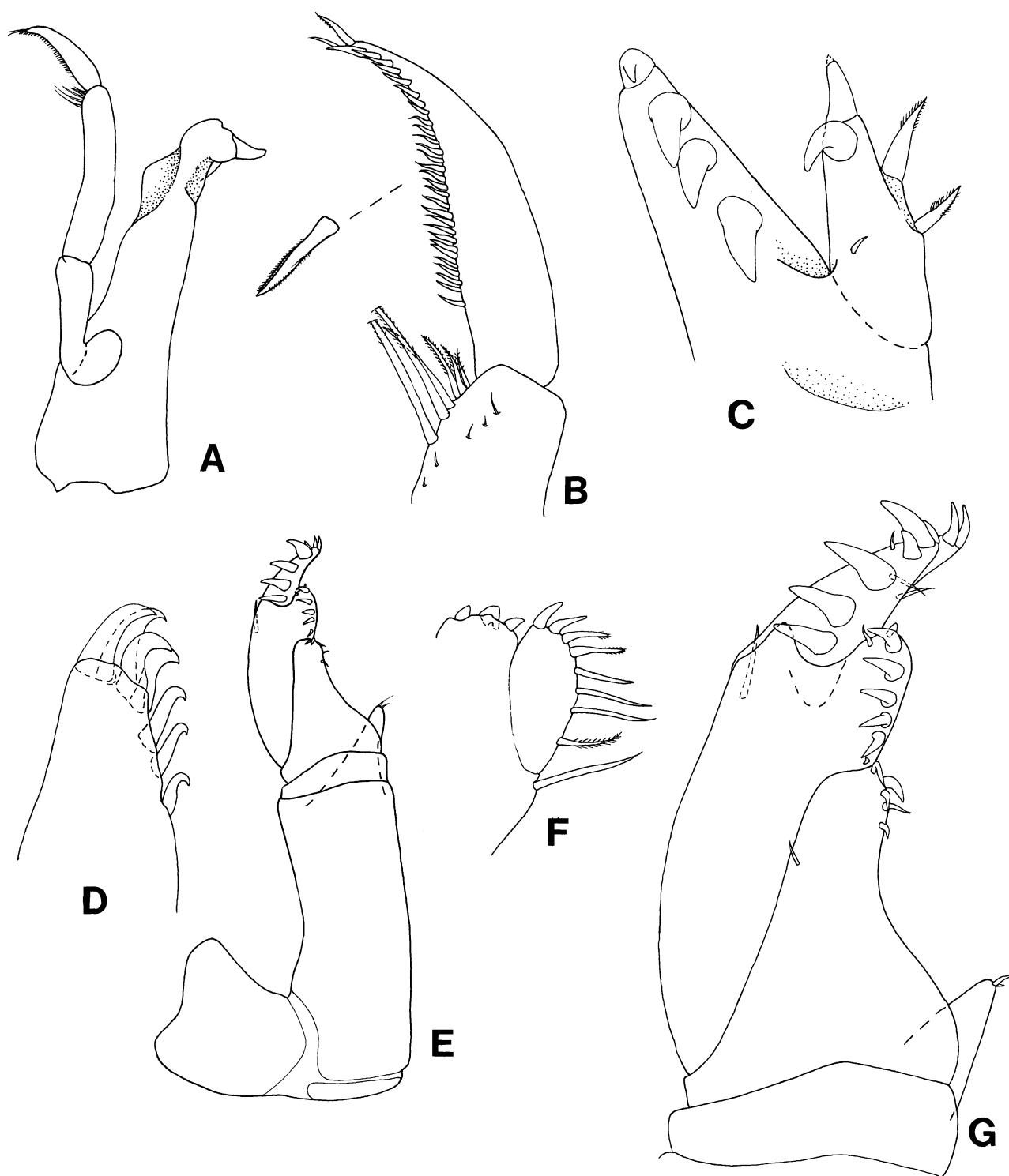


**Figure 26.** *Aega japonica* sp. nov. A–D holotype, remainder paratype, Wakayama. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, antennule. F, antenna peduncle. G, antenna, peduncle articles 1–3, ventral view.

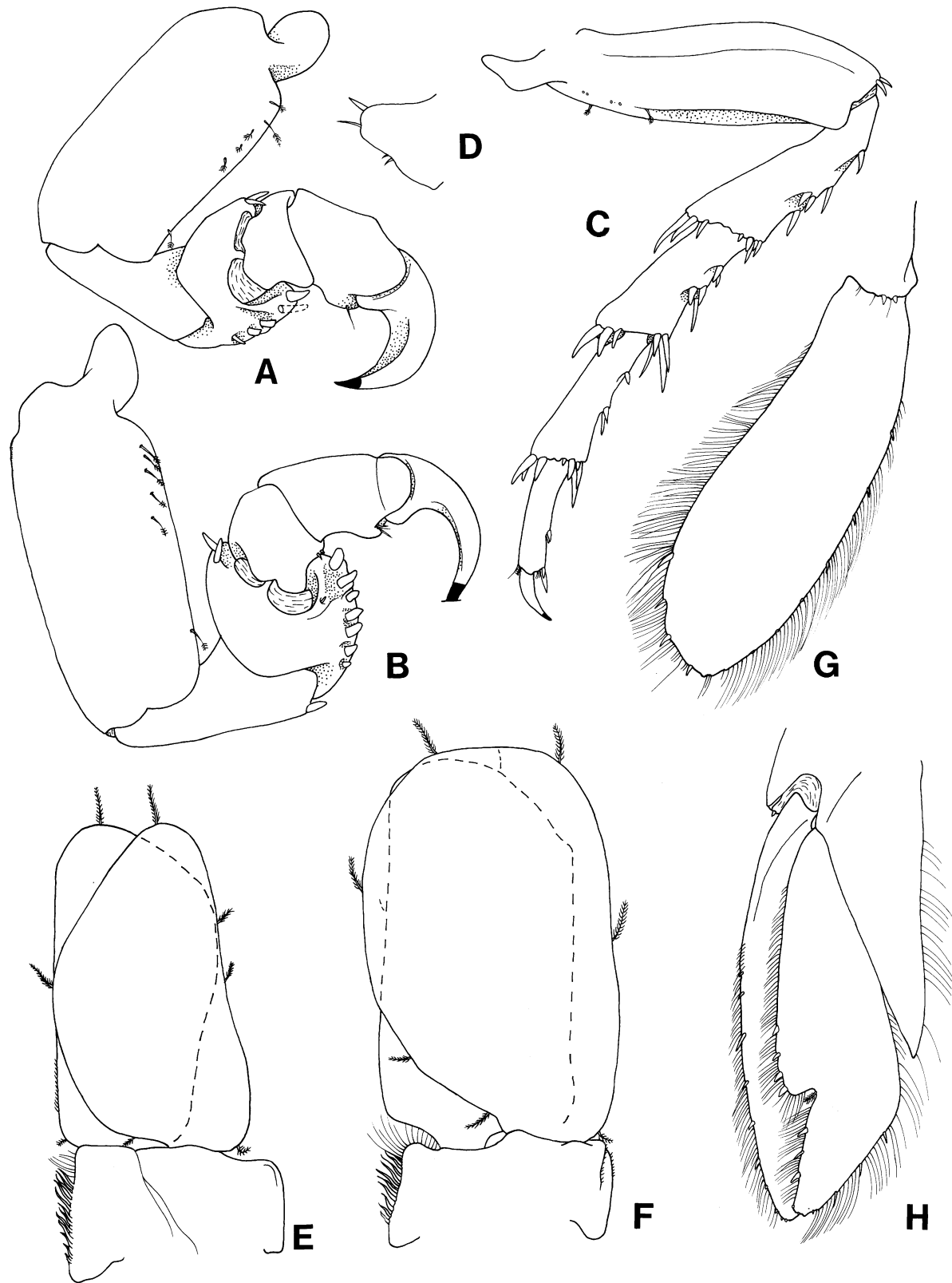
podus without large club-shaped distal RS. *P6* similar to *P7*. *P7* basis 3.3 times as long as greatest width; ischium  $0.5 \times$  L basis, inferior margin with 5 RS (set as 1, 1, 2 and 1), superior distal angle with 3 RS, inferior distal angle with 6 RS; merus  $0.8 \times$  L ischium,  $2.2 \times$  LW, inferior margin with 5 RS (set as 2 and 3), superior distal angle with 6 RS, inferior distal angle with 4 RS; carpus  $0.9 \times$  L ischium,  $2.7 \times$  LW, inferior margin with 3 RS (set as 1 and 2), superior distal angle with 4 RS,

inferior distal angle with 7 RS; propodus  $0.7 \times$  L ischium,  $4.5 \times$  LW, inferior margin with 2 RS (single cluster), superior distal angle with 2 slender setae, inferior distal angle with 4 RS.

*Pleopod 1* exopod  $1.9 \times$  LW, distally narrowly rounded, medial margin weakly oblique, lateral margin weakly convex, medial margin strongly convex, with PMS from base; endopod  $2 \times$  LW, distally subtruncate, lateral margin sinuate (widest subdistally,



**Figure 27.** *Aega japonica* sp. nov. A–D, G, H, holotype. E, F, paratype, Wakayama. A, mandible. B, mandible palp article 3 detail. C, maxilla, detail. D, maxillule apex. E, maxilliped. F, maxilliped palp article 5. G, maxilliped palp articles 2–5.



**Figure 28.** *Aega japonica* sp. nov. A–C, pereopods 1, 3 and 7, respectively. D, pereopod 1, mesial aspect, ischium superior distal angle. E, pleopod 1. F, pleopod 2. G, uropod exopod, ventral view. H, uropod.

proximally concave), with PMS from distal half, medial margin with PMS from distal one-third; peduncle 1.5× WL, medial margin with 10 coupling hooks. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediodistal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS, posterior lobe about 0.6× L endopod. Uropod rami not coplanar, exopod at angle of about 135° to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex, distally straight, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 4 RS, distal lateral margin with 4 RS, medial margin straight, with 5 RS. *Exopod* extending to end of endopod, 3 times as long as greatest width; lateral margin weakly convex, with 10 RS; medial margin sinuate, proximally concave, with 4 RS.

#### Size

Females 38–54 mm, males not known.

#### Variation

*Robust setae*: only 3 specimens, so only ranges are given. Pleotelson with 6–8 (3 + 3–4 + 4) RS, though it is likely that some distal setae are missing. Uropod exopod medial margin with 3–5, with 4 (half) most frequent, lateral margin with 10–12; uropod endopod medial margin with 4 or 5, lateral margin with 3 + 4, 3 + 5, 4 + 4 (half) and 4 + 5.

P1–3: counts for the RS on the inferior margin of the merus: P1 with 5 as 3 + 2, P2 with 7 (all), and P3 with 7 (all).

#### Remarks

The semirectangular shape of the frontal lamina, setation pattern on the inferior margin of pereopods 1–3, together with the weak propodal lobe and ill-defined pleotelson apex are characters by which the species can be identified. The merus of pereopod 1 has five large robust setae. Of those species that have medially united eyes and a small propodal lobe on pereopods 1–3, all have fewer robust setae which are set in distinctly separate clusters (e.g. *A. kwazulu* sp. nov., *A. umpara* sp. nov. and *A. warna* sp. nov.) or have wider uropodal exopod with long setae on the posterior pereopods (e.g. *A. rickbruscai* sp. nov.).

Two species of the *A. deshaysiana* group are recorded from Japan and the North Pacific: this one and *A. excisa*. The identities of the records earlier than Brusca (1983) remain uncertain. Thielemann's (1910)

material is not available (presumed destroyed during World War II), and I have not seen Nunomura's (1981) material, indicated to be one male and five females up to 5 cm in length.

#### Prey

Not known.

#### Distribution

Off Pacific coasts of Japan, from southern Hokkaido to southern Honshu; 120 m is the only depth record.

#### Etymology

The epithet is adapted from Japan, the country of origin for the material described here; noun in apposition.

#### *AEGA KIXALLES* SP. NOV. (FIGS 29–32, 63)

##### Material examined

*Holotype*: ♀ (non-ovig. 48 mm), New Caledonia, 18°52.8'S, 163°21.7'E, 19.ix.1985, Stn 0194, 545 m, coll. MUSORSTOM IV (MNHN Is.5790).

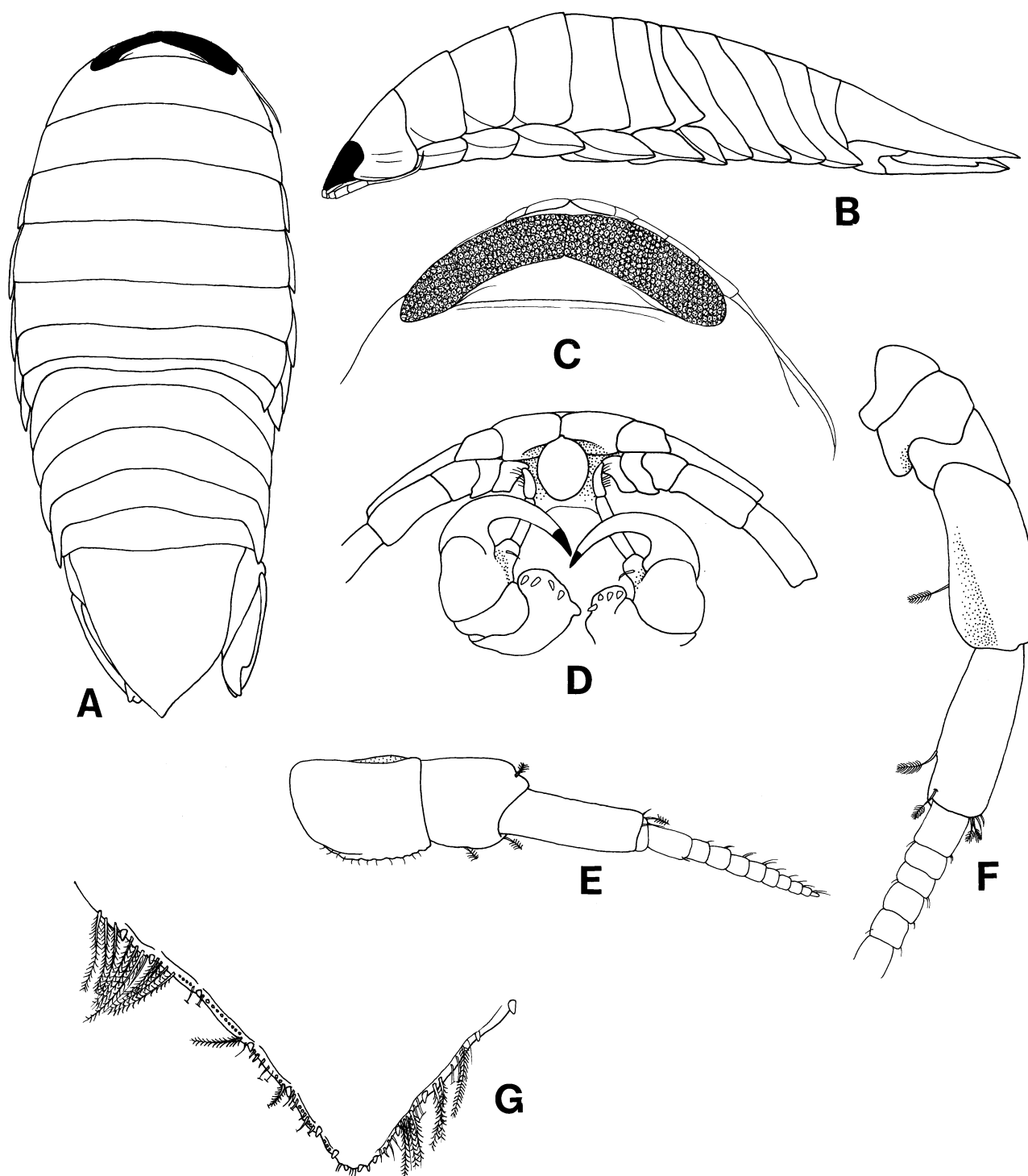
*Paratypes*: ♀ (non-ovig. 38, dissected), same data as holotype (MNHN Is.5791). ♀ (non-ovig. 44 mm), New Caledonia, Loyalty Islands, 21°05.25'S, 167°32.201'E, 21.ii.1989, Stn CP466, 540 m, coll. MUSORSTOM VI (MNHN Is.5789).

##### Description

*Body* 2.4 times as long as greatest width, dorsal surfaces smooth (finely punctate), widest at pereonite 5, lateral margins weakly ovate. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, medially united, anterior clear field 20% length of head, posterior clear field 43% length of head; each eye made up of ~23 transverse rows of ommatidia, each row with ~9 ommatidia; eye colour dark brown. *Pereonite 1 and coxae* 2–3 each with posteroventral angle rounded; coxae 5–7 with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with postero-lateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 1.1 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins sinuate, smooth, posterior margin with elongate medial point, with 16 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.6 times as long as combined lengths of articles 1 and 2,

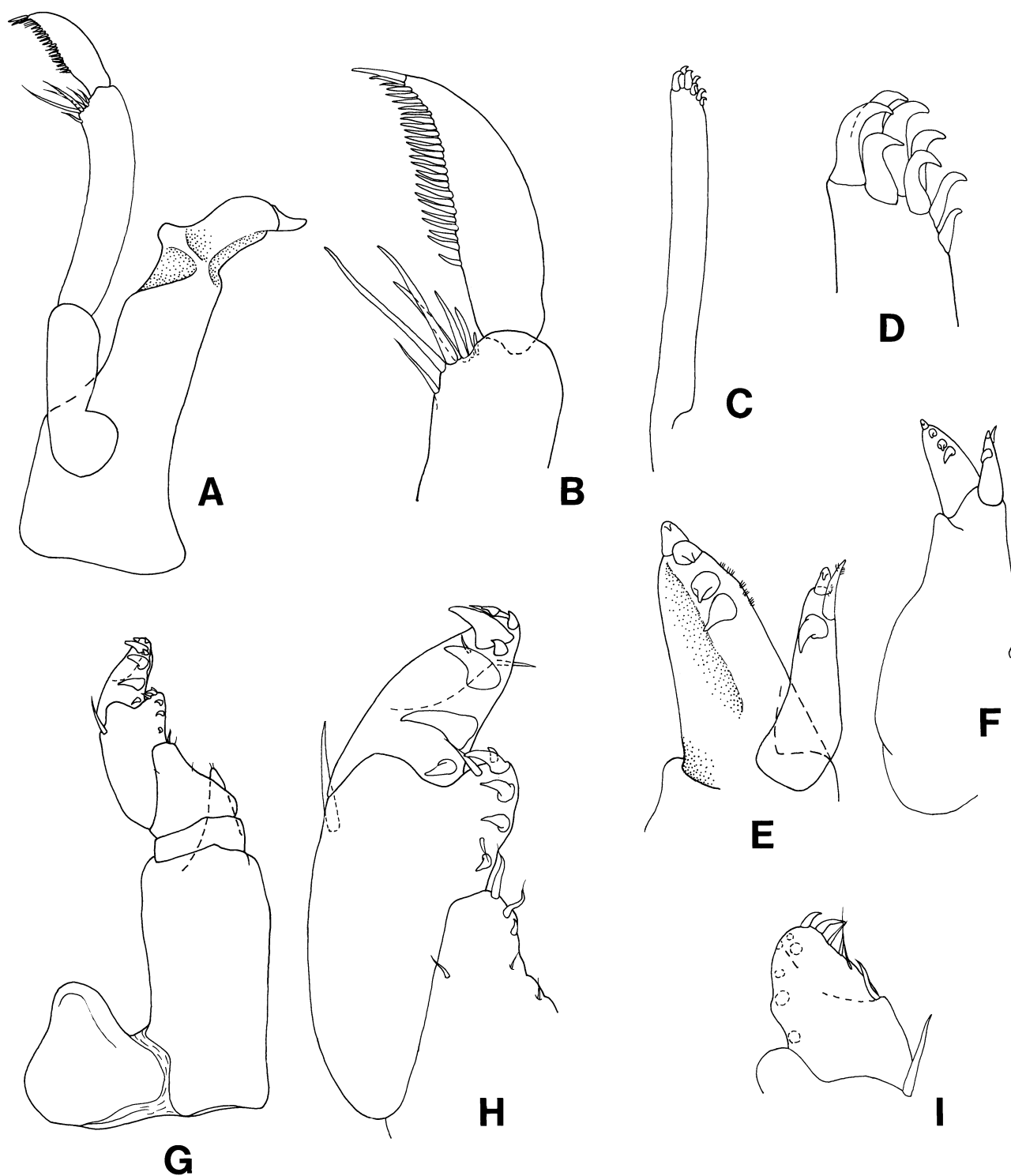




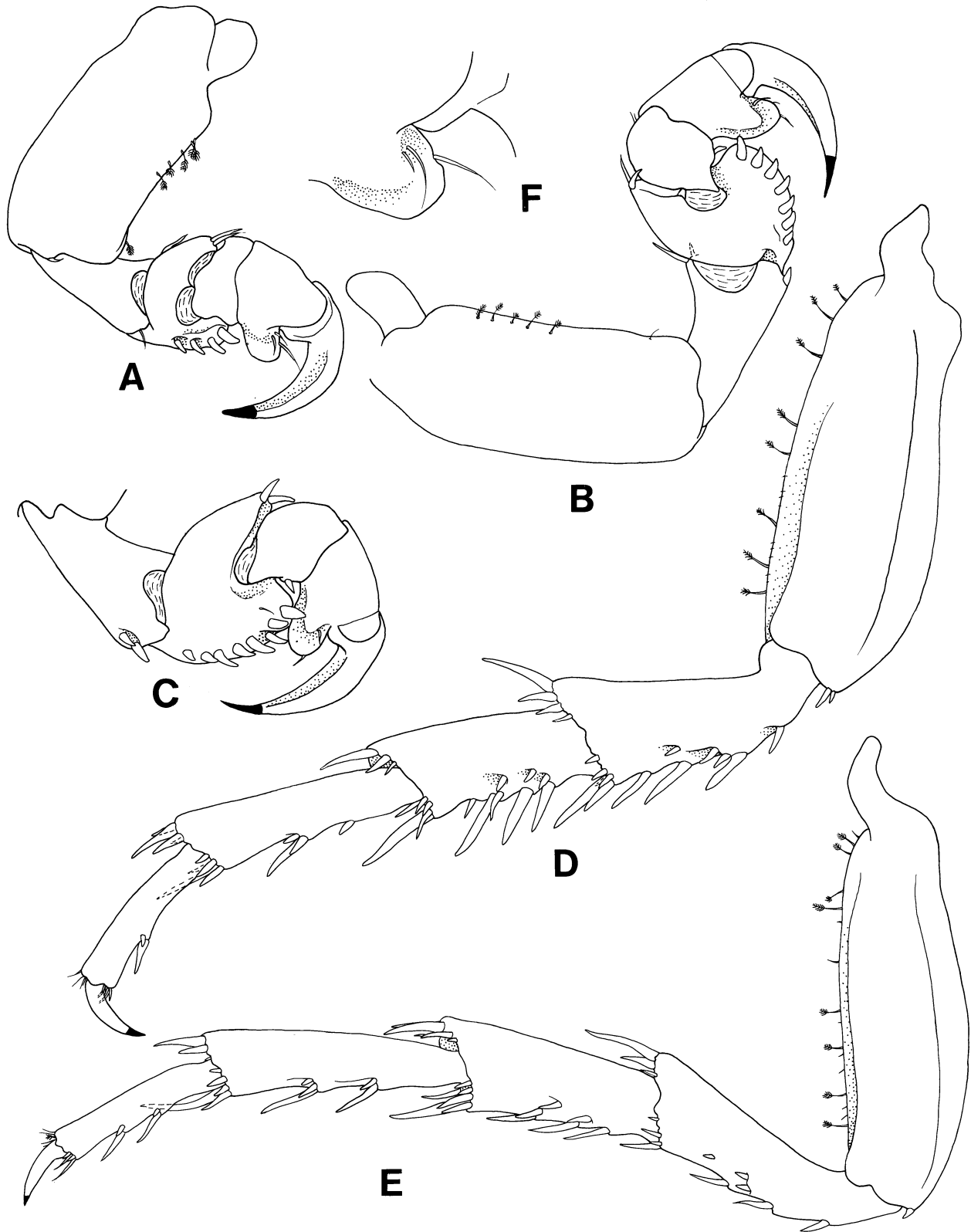
**Figure 29.** *Aega kixalles* sp. nov. A–D, H, holotype, remainder female paratype, 38 mm. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, antennule. F, antenna peduncle. G, pleotelson posterior margin.

article 3  $3.0 \times$  LW; flagellum with 10 articles, extending to posterior margin of eye. *Antenna* peduncle article 2 inferior surface without distinct longitudinal suture; article 4  $2.3 \times$  LW, 1.4 times as long as combined

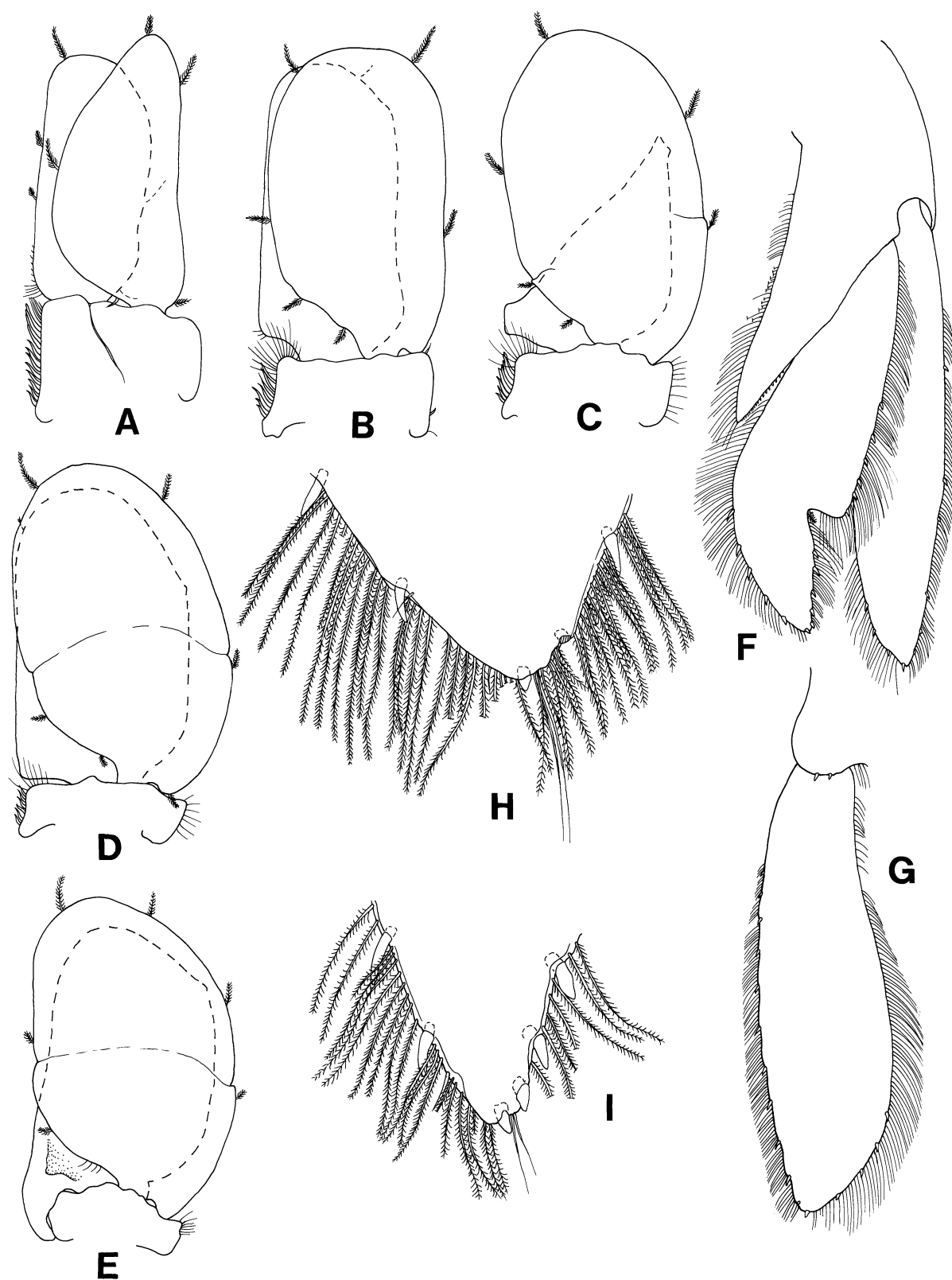
lengths of articles 1–3, without deep longitudinal groove, inferior margin with 1 plumose seta and no short simple setae; article 5 not markedly wider or flatter than article 4,  $0.9 \times$  L article 4,  $2.5 \times$  LW, inferior



**Figure 30.** *Aega kixalles* sp. nov. Female paratype, 38 mm. A, mandible. B, mandible palp article 3 detail. C, maxillule. D, maxillule apex. E, maxilla apex. F, maxilla. G, maxilliped. H, maxilliped palp articles 2–5. I, maxilliped palp article 5.



**Figure 31.** *Aega kixalles* sp. nov. Female paratype, 38 mm. A–E, pereopods 1–3, 6 and 7, respectively. F, pereopod 1, palm detail.



**Figure 32.** *Aega kixalles* sp. nov. Female paratype, 38 mm. A–E, pleopods 1–5, respectively. F, uropod. G, uropod exopod, ventral view. H, uropod endopod, apex. I, uropod exopod apex.

margin with 2 plumose setae, anterodistal angle with cluster of 4 short simple setae; flagellum with 18 articles, extending to middle of pereonite 2.

*Frontal lamina* flat, longer than greatest width, oval, anterior margin rounded, without small median point, posterior margin not abutting clypeus.

*Mandible* molar process absent; palp article 2 with 7 distolateral setae (3 long), palp article 3 with 26 setae. *Maxillule* with 8 terminal RS (large, falcate). *Maxilla* medial lobe with 3 RS (2 hooked, 1 straight); lateral lobe with 4 RS (hooked). *Maxilliped* endite with 2 apical setae (minute); palp article 2 with 3 RS (acute); article 3 with 7 recurved RS (3 large hooked, 2 small hooked and 2 simple); article 4 with 6 hooked RS (3 large and 3 small); article 5 wholly fused to article 4, with 5 RS (2 hooked, 3 straight).

*Pereopod 1* basis 2.3 times as long as greatest width; ischium  $0.4 \times L$  basis, inferior margin with 0 RS, superior distal margin with 1 RS (and 1 slender seta); merus inferior margin with 4 RS, set as single row, superior distal angle with 2 RS; carpus  $0.5 \times L$  merus, inferior margin with 0 RS; propodus 1.2 times as long as proximal width, inferior margin with 0 RS, propodal palm with large distal lobe (distally subtruncate, narrower than propodus inferior margin), dactylus smoothly curved,  $1.7 \times L$  propodus. *P2* ischium inferior margin with 1 RS, superior distal margin with 2 RS; merus inferior margin with 7 RS, set as single row, superior distal margin with 2 acute RS; carpus longer than that of *P1*, with inferodistal lobe, inferodistal angle with 1 RS, propodus without large club-shaped distal RS. *P3* similar to *P2* (but ischium with 2 RS at inferodistal angle, merus inferior margin with 8 RS); propodus without large club-shaped distal RS. *P6* similar to *P7* (but larger, inferior margins with more and larger RS). *P7* basis 3.2 times as long as greatest width, inferior margin with 9 palmate setae; ischium  $0.6 \times L$  basis, inferior margin with 6 RS (set 1, 3 and 2), superior distal angle with 3 RS, inferior distal angle with 5 RS; merus  $0.9 \times L$  ischium,  $2.4 \times LW$ , inferior margin with 6 RS (as 2 loose groups of 3 and 3), superior distal angle with 8 RS, inferior distal angle with 7 RS; carpus as long as ischium,  $3.5 \times LW$ , inferior margin with 5 RS (set as 2 and 3), superior distal angle with 5 RS, inferior distal angle with 6 RS; propodus  $0.8 \times L$  ischium,  $5.4 \times LW$ , inferior margin with 4 RS (set as 2 and 2), superior distal angle with 5 slender setae (4 simple, 1 palmate, plus 1 RS), inferior distal angle with 4 RS.

*Pleopod 1* exopod  $2.1 \times LW$ , distally narrowly rounded with strongly oblique medial margin, lateral margin weakly convex, medial margin strongly convex, with PMS from base; distally subtruncate, lateral margin straight, with PMS from distal half, medial margin with PMS from distal one-third; peduncle  $1.2 \times WL$ , medial margin with 11 coupling hooks. Exopods

of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediodistal point (weak, rather more proximal than in others); pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS, posterior lobe about one-half *L* endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 6 RS, distal lateral margin with 5 RS, medial margin strongly convex, with 6 RS. *Exopod* extending beyond end of endopod, 3.3 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 10 RS; medial margin sinuate, proximally concave, with 6 RS.

#### Male

Not known.

#### Size

Present material 38–44 mm.

#### Variation

*Robust setae*: only 3 specimens, so ranges only are given. All specimens have 16 (8 + 8) on the pleotelson. Uropod exopod medial margin ( $n = 6$ ) with 4 or 5, 6 once, lateral margin 8–11; uropod endopod medial margin with 5–7, with 5 (4 of 6) most frequent, lateral margin with 5 + 4, 6 + 5, 6 + 6, 7 + 5 and 7 + 6.

*P1–3*: counts for the RS on the inferior margin of the merus: *P1* with 4 (all), *P2* with 6–8, with 7 (4 of 6) most frequent, *P3* with 8–11, with 11 occurring once.

#### Remarks

The three specimens present a highly consistent appearance, with the relatively narrow and strongly produced propodal blade on pereopods 1–3 being diagnostic. The ovate frontal lamina, stout robust setae on the posterior pereopods, deeply incised uropodal endopod lateral margin, relatively elongate uropodal exopod and pleotelson posterior margin with 16 robust setae all serve to distinguish the species.

Similar species in the region include *A. alazon* sp. nov. which lacks the propodal blade on the anterior pereopods, has a posteriorly narrowed frontal lamina and fewer robust setae on the lateral margin of the uropodal endopod; *A. musorstom* sp. nov. and *A. rickbruscai* sp. nov. differ in having larger eyes, many long acute robust setae on the posterior pereopods, weakly indented uropodal endopod lateral margin, a much wider uropodal exopod and the pleotelson without robust setae; *A. musorstom* has a far wider propodal blade while *A. rickbruscai* lacks a propodal blade.



*Prey*

Not known.

*Distribution*

Recorded from off New Caledonia; at depths of 540 and 545 m.

*Etymology*

From the Greek *kixalles* (highway robber) alluding to the 'bandit-mask-like' appearance of the eyes.

***AEGA KWAZULU SP. NOV.* (FIGS 33, 34, 62)**

*Aega antillensis* – Barnard, 1925: 389; Kensley, 1978: 57, figs 24A, B; 2001: 226 (part).

*Aega deshaysiana* – Nierstrasz, 1931: 182 (part).

*Holotype*: ♂ (33 mm), Natal coast, South Africa, 'ex South Afr. Mus.' (BMNH, 1937.11.10.16).

*Paratypes*: ♀ (non-ovig. 32 mm), same data as holotype (BMNH, 1937.11.10.17). ♂ (39 mm), off Umvoti River, 1923, c. 237 m, coll. H.W. Bell-Marly on S.S. *Meikle* (SAfM A6597) (Barnard, 1925; this location is approximately 29°22'S, 31°17'E, in the general vicinity of Durban) ♀ (non-ovig. 47.0 mm), no locality, poor condition (SAfM A8080).

*Description*

*Body* 2.6 times as long as greatest width, dorsal surfaces smooth or sparsely punctate, widest at pereonite 5, lateral margins ovate. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, medially united, anterior clear field 11% length of head, posterior clear field 47% length of head; each eye made up of ~21 transverse rows of ommatidia, each row with ~9 ommatidia; eye colour dark brown (some specimens faded). *Pereonite 1 and coxae 2–3* each with posteroventral angle rounded; coxae 5–7 with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 1.2 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins straight, smooth, posterior margin with elongate medial point.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; flagellum with 9 articles, extending to posterior margin of eye. *Antenna* peduncle article 2 inferior surface with distinct longitudinal suture; without deep longitudinal groove; article 5 not markedly wider or flatter than article 4; flagellum with 17 articles, extending to posterior of pereonite 2.

*Frontal lamina* flat, as wide as long, lateral margins parallel, anterior margin rounded (subtruncate), with-

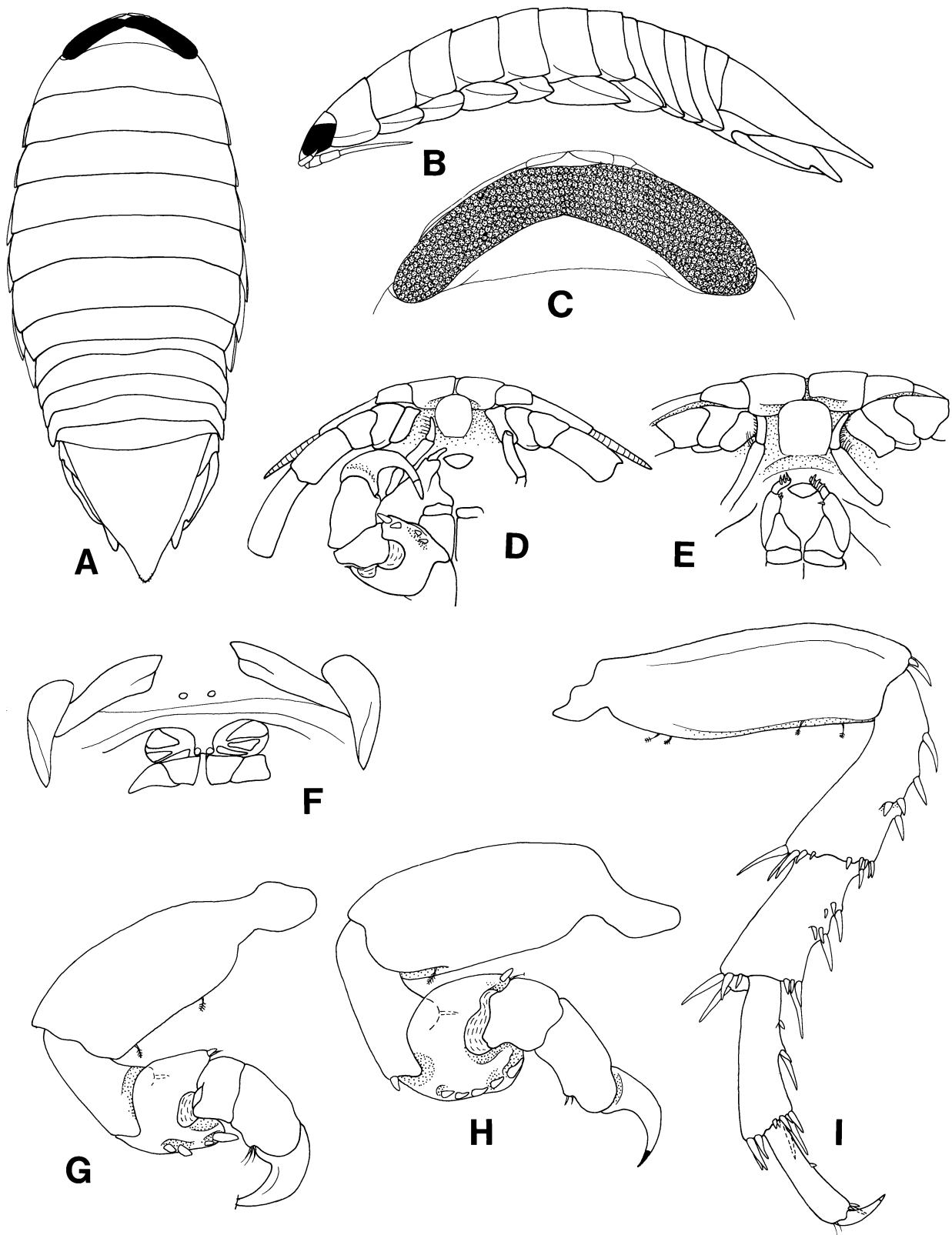
out small median point, posterior margin not abutting clypeus.

*Pereopod 1* basis 2.2 times as long as greatest width; ischium  $0.5 \times L$  basis, inferior margin with 0 RS, superior distal margin with 1 RS; merus inferior margin with 4 RS, set as 2 groups (of 2 and 2), superior distal angle with 1 RS; carpus  $0.5 \times L$  merus, inferior margin with 0 RS; propodus 1.3 times as long as proximal width, inferior margin with 0 RS, propodal palm with simple, without blade or process, dactylus smoothly curved,  $1.3 \times L$  propodus. *P2* ischium inferior margin with 1 RS, superior distal margin with 1 RS; merus inferior margin with 5 RS, set as single row, superior distal margin with 1 acute RS; carpus similar in size to that of P1, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. *P3* similar to P2; propodus without large club-shaped distal RS. *P6* similar to P7. *P7* basis 3 times as long as greatest width; ischium  $0.6 \times L$  basis, inferior margin with 5 RS (set as 1, 1 and 3), superior distal angle with 4 RS, inferior distal angle with 6 RS; merus  $0.7 \times L$  ischium,  $1.6 \times LW$ , inferior margin with 6 RS (set as 3 and 3), superior distal angle with 5 RS, inferior distal angle with 6 RS; carpus  $0.9 \times L$  ischium,  $2.9 \times LW$ , inferior margin with 2 RS (set as 1 and 2), superior distal angle with 3 RS, inferior distal angle with 7 RS; propodus  $0.8 L$  ischium,  $4.7 \times LW$ , inferior margin with 1 RS, superior distal angle with 2 slender setae (simple), inferior distal angle with 3 RS.

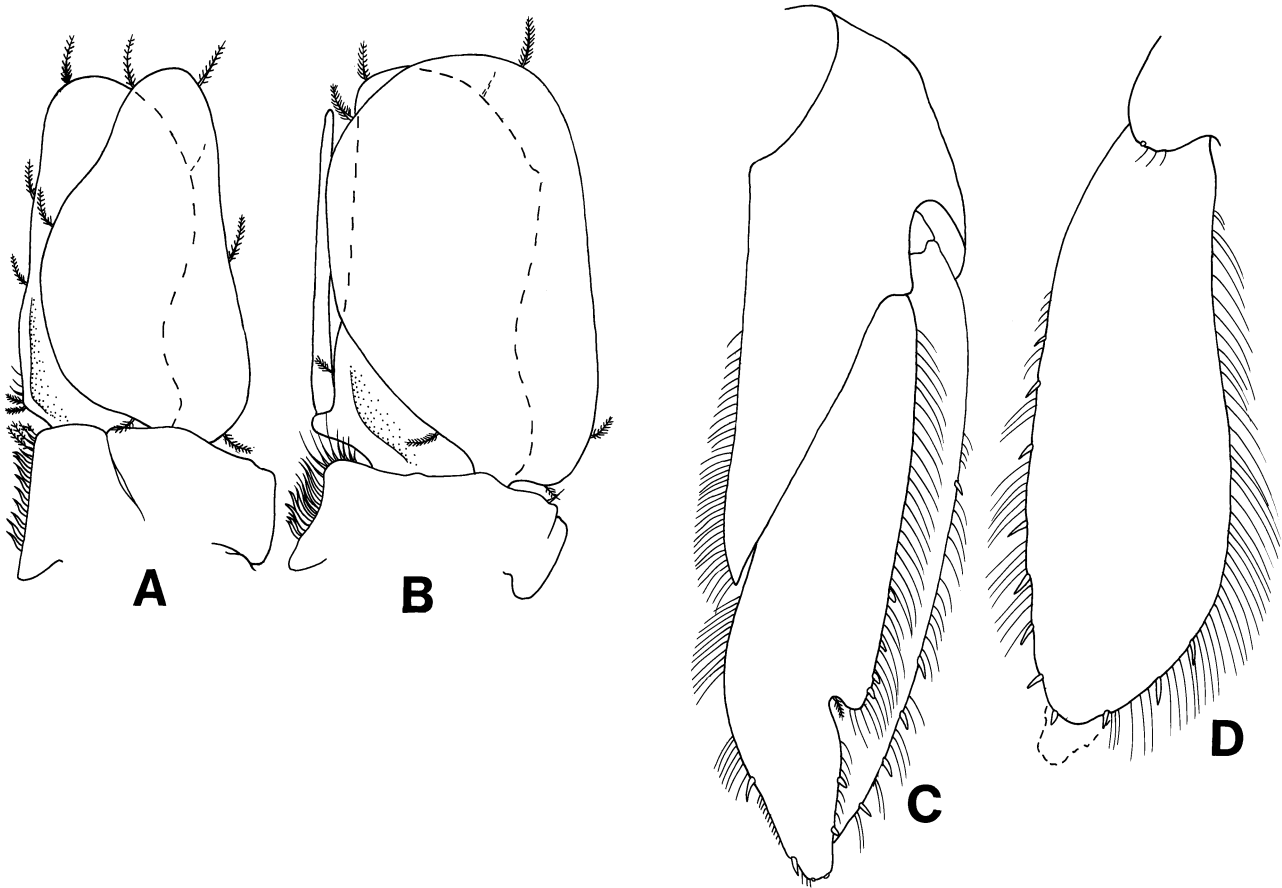
*Penes* opening flush with surface of sternite 7; penial openings separated by 9% of sternal width.

*Pleopod 1* exopod  $1.7 \times LW$ , distally narrowly rounded with strongly oblique medial margin, lateral margin distally concave (weakly), medial margin strongly convex, with PMS from base; distally rounded, lateral margin strongly concave, with PMS from distal one-third, medial margin with PMS from distal half; peduncle  $1.7 \times WL$ , medial margin with 10 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.8 \times L$  endopod, distally bluntly rounded. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediolateral point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 1 RS, posterior lobe about one-half  $L$  endopod. Uropod rami not coplanar, exopod at angle of about 135° to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin straight, with prominent excision positioned about three-quarters along ramus, proximal lateral margin with 3 RS, distal lateral margin with 4 RS, medial margin weakly convex, with 4 RS. *Exopod* not extending to end of endopod, 2.8 times as long as greatest width, apically not bifid; lateral



**Figure 33.** *Aega kwazulu* sp. nov. A–D, F, holotype, remainder female paratype, 32 mm. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, frons, female. F, mouthparts. G–I, pereopods 1, 2 and 7, respectively.



**Figure 34.** *Aega kwazulu* sp. nov. A, B, holotype, C, D, female paratype, 32 mm. A, pleopod 1. B, pleopod 2. C, uropod. D, uropod exopod, ventral view.

margin weakly convex, with 8 RS; medial margin sinuate, proximally concave, with 4 RS.

#### Female

Similar to males; ovigerous females not present in the material examined.

#### Variation

**Robust setae:** pleotelson apices are all somewhat rubbed, the RS that are present indicate that the pleotelson would have more than 3 + 3. Uropod ( $n = 8$ ) exopod medial margin with 3–6 RS, with 5 (50%) most frequent; lateral margin 8 or 9 with 9 (75%) most frequent; uropod endopod ( $n = 7$ ) medial margin with 3–6, with 4 (twice), 5 (3 times) and 6 (twice), the lateral margin RS are variable with 3 + 3 (once), 4 + 3 (twice), 2 + 4 (once), 4 + 4 (twice), 3 + 5 (twice) and 5 + 4 (once).

P1 setation of the merus consistent across its range with 2 + 2 RS (all); P2 with 5 (all); P3 merus with 5 (all except for one which had 9).

#### Size

Males 33–39 mm, nonovigerous females 32 mm; no ovigerous females present in the material examined.

#### Remarks

*Aega kwazulu* sp. nov. may be identified by the medially relatively short but united eyes, anteriorly rounded frontal lamina with a distinctly truncate posterior margin, pleotelson with nearly straight lateral margins, pereopod 1 merus inferior margin usually with 4 robust setae (set as 2 + 2), the merus of pereopods 2 and 3 each with a single row of 5 robust setae and by the uropodal exopod not extending to the endopod apex.

*Aega kwazulu* is very similar to *A. umpara* sp. nov. (from the south-western Pacific), from which it can be distinguished by the pleotelson lateral margins being straighter with the apex more strongly produced, the frontal lamina less distinctly rectangular with the lateral margins converging slightly to the posterior, having 2 + 2 robust setae on the pereopod 1 merus, the

robust setae of the merus of pereopods 3 and 4 in a single row rather than in two clusters, the distal-most seta of the merus of pereopods 1–3 is less elongate and the uropodal endopod is wider and distally more strongly rounded.

With few specimens it is not possible to be confident about the numbers of robust setae on the uropods, but it would appear the uropodal exopod medial margin will have 4 or 5 compared to consistently 4 for *A. umpara* and 9 on the lateral margin.

Because the material is limited in quantity, old and fragile, dissection was kept to a minimum and an abbreviated description is given here, with emphasis on the diagnostic and differentiating characters.

#### Prey

Not known.

#### Distribution

KwaZulu-Natal coast of South Africa, south-western Indian Ocean. The single depth record is at 237 m.

#### Etymology

The epithet is taken from KwaZulu-Natal, the regional name for this area of South Africa; noun in apposition.

### **AEGA MUSORSTOM SP. NOV.** (FIGS 35–39, 64)

#### Material examined

**Holotype:** ♂ (33 mm), off New Caledonia, 18°57.0'S, 163°12.6'E, 19.ix.1985, Stn 0170, 480 m, coll. MUSORSTOM IV (MNHN Is.8503).

**Paratypes:** All material from New Caledonia. 2 ♂ (35 [dissected], 39 mm), 2 ♀ (non-ovig. 32, 31 mm), same data as holotype (MNHN Is.5792). 3 ♂ (29, 35, 37 mm), MUSORSTOM IV, 18°55.8'S, 163°13.87'E, 20.ix.1985, Stn 0201, '*Synagonopi* sp. 1', 490 m, coll. MUSORSTOM IV (MNHN Is.5796). 4 ♂ (26, 27, 31, 35 mm), 18°56.6'S, 163°13.7'E, 18.ix.1985, Stn 0179, 475 m, coll. MUSORSTOM IV (MNHN Is.5802). ♂ (22 mm), 18°58.0'S, 163°59.3'E, 20.ix.1985, Stn 0202, 560 m, coll. MUSORSTOM IV (MNHN Is.5797). ♂ (29 mm), 19°40.85'S, 158°46.10'E, 21.x.1986, stn 0383, MUSORSTOM V, 615–600 m (MNHN Is.5799). ♂ (21 mm), 20°44.95'S, 160°53.67'E, 22.x.1986, Stn 0389, 500 m, coll. MUSORSTOM V (MNHN Is.5801). ♀ (non-ovig. 36 mm), 19°36.43'S, 158°43.41'E, 18.x.1986, Stn 0355 580 m, coll. MUSORSTOM V (MNHN Is.5795). ♂ (26 mm), 2 ♀ (non-ovig. 31, 33 mm), Loyalty Islands, 21°05.13'S, 167°32.11'E, 21.ii.1989, Stn CP467, 575 m, coll. MUSORSTOM VI (MNHN Is.5793). ♂ (29 mm), Loyalty Islands, 21°03.56'S, 167°32.25'E, 21.ii.1989, Stn CP465, 575 m, coll. B. Richer de Forges, MUSORSTOM VI

(MNHN Is.5800). ♂ (25 mm) Chesterfield Islands, 20°50.69'S, 160°55.25'E, 21.vii.1988, Stn DE 15', 580–590 m, coll. CORAIL 2 (MNHN Is.5798). ♂ (31 mm), ♀ (non-ovig. 36 mm), Chesterfield Islands, 20°48.14'S, 160°57.14'E, 21.vii.1988, Stn Cp 17, 580–590 m, coll. B. Richer de Forges, CORAIL 2 (MNHN Is.5794).

#### Description

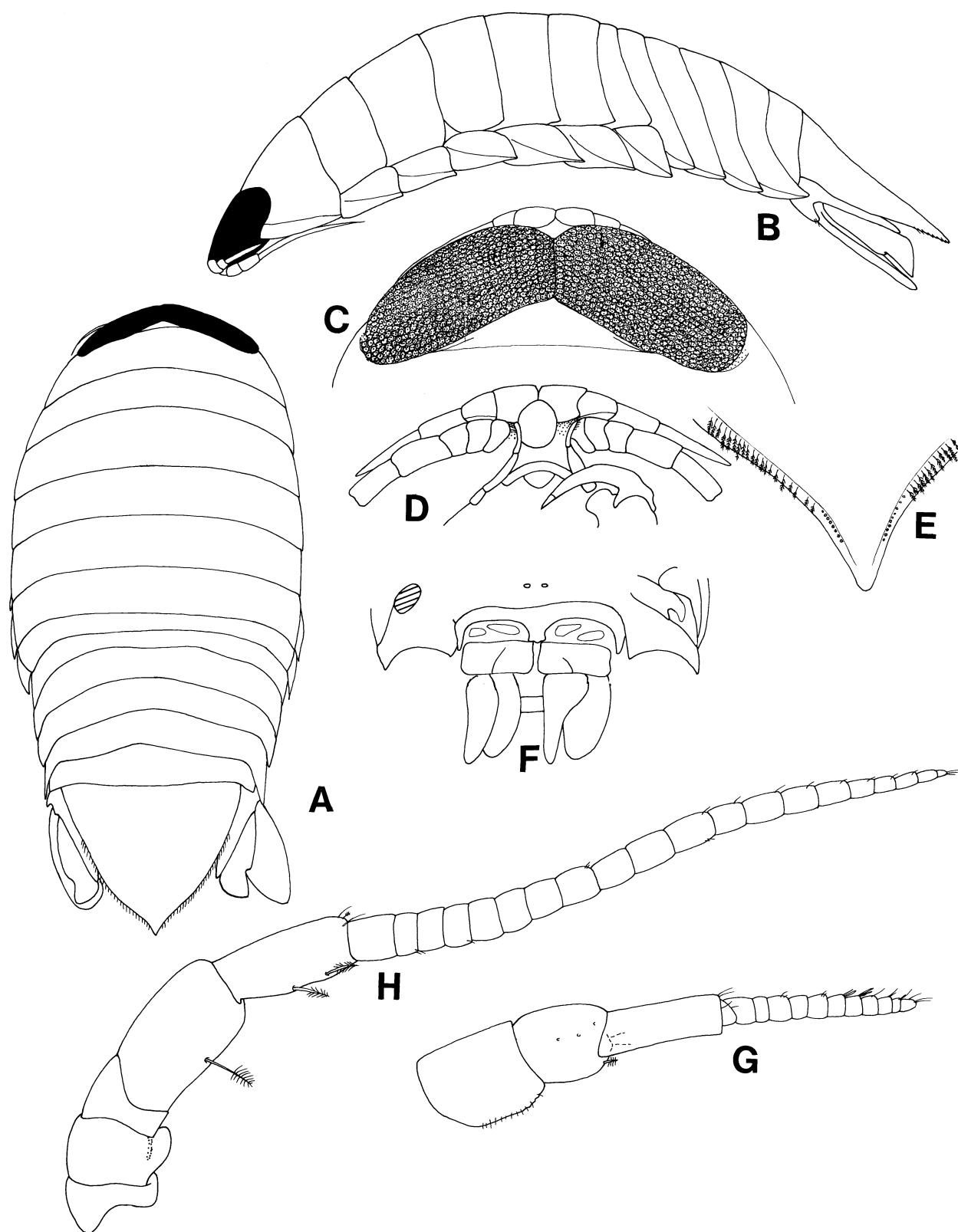
**Body** 2.0–2.4 times as long as greatest width, dorsal surfaces sparsely punctate, widest at pereonite 5, lateral margins ovate. Rostral point projecting anteriorly, not ventrally folded. **Eyes** large, medially united, anterior clear field 11% length of head, posterior clear field 35% length of head; each eye made up of ~26 transverse rows of ommatidia, each row with ~12–14 ommatidia; eye colour pale brown. **Pereonite 1 and coxae 2–3** each with posteroventral angle with small distinct produced point; coxae 5–7 with entire oblique carina. **Pleon** with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. **Pleotelson** 1.0 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins convex, smooth, posterior margin with elongate medial point, with 0 RS.

**Antennule** peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.7 times as long as combined lengths of articles 1 and 2, article 3 2.9× LW; flagellum with 11 articles, extending to posterior margin of eye. **Antenna** peduncle article 2 inferior surface without distinct longitudinal suture; article 4 1.8× LW, 1.4 times as long as combined lengths of articles 1–3, without deep longitudinal groove, inferior margin with 1 plumose seta, and 0 short simple setae; article 5 not markedly wider or flatter than article 4, 0.9× L article 4, 2.1× LW, inferior margin with 2 plumose setae, anterodistal angle with cluster of 2 short simple setae (and 1 plumose seta); flagellum with 20 articles, extending to middle of pereonite 1.

**Frontal lamina** flat, longer than greatest width, oval (rounded-ovate in shape), anterior margin rounded, without small median point, posterior margin not abutting clypeus.

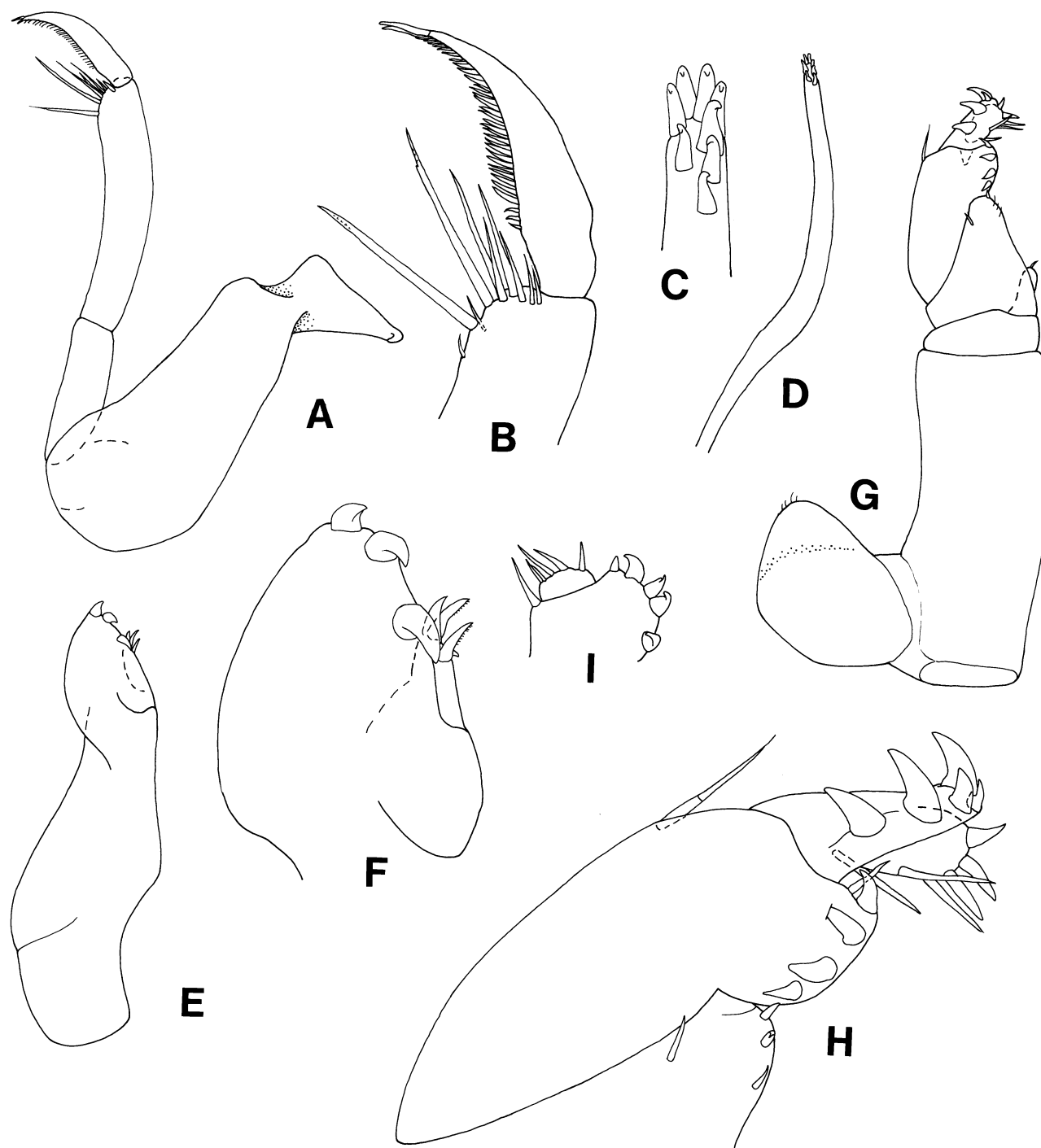
**Mandible** molar process absent; palp article 2 with 8 distolateral setae, palp article 3 with 32 setae. **Maxillule** with 8 terminal RS (falcate). **Maxilla** medial lobe with 3 RS; lateral lobe with 4 RS (2 recurved, 2 straight and finely serrate). **Maxilliped** endite with 1 apical seta; palp article 2 with 3 RS (small hooked); article 3 with 4 recurved RS (hooked and 1 straight); article 4 with 5 hooked RS; article 5 partly fused to article 4, with 6 RS (straight, 3 stout and 3 acute).

**Pereopod 1** basis 2.1 times as long as greatest width; ischium 0.6× L basis, inferior margin with 0 RS (2 sim-



**Figure 35.** *Aega musorstom* sp. nov. A–F, holotype, remainder ♂ paratype 35 mm. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, pleotelson apex, ventral view. F, sternite 7 showing penial openings. G, antennule. H, antenna.

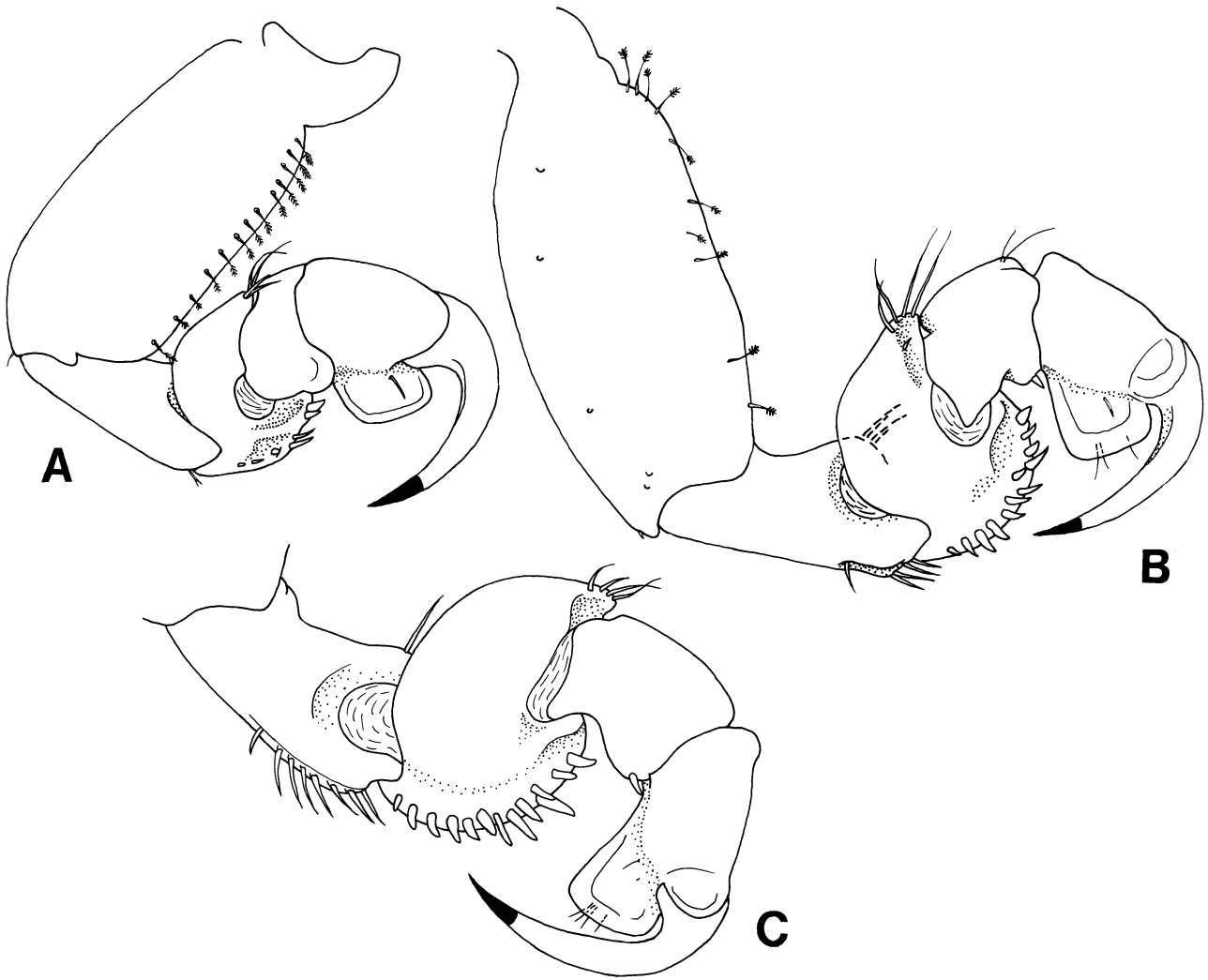




**Figure 36.** *Aega musorstom* sp. nov. Paratype ♂ 35 mm. A, mandible. B, mandible palp article 3 detail. C, maxillule apex. D, maxillule. E, maxilla. F, maxilla apex. G, maxilliped. H, maxilliped palp articles 2–5. I, maxilliped palp article 5.

ple setae), superior distal margin with 0 RS (2 small simple setae); merus inferior margin with 7 RS, set as single row or 2 groups (of 5 and 2), superior distal angle with 5 RS (slender simple setae); carpus  $0.5 \times L$  merus, inferior margin with 0 RS (formed into thickened ridge); propodus 1.3 times as long as proximal

width, inferior margin with 0 RS, propodal palm with distal blade (rectilinear, extending from the entire length of the propodus inferior margin), dactylus smoothly curved,  $1.7 \times L$  propodus. *P2* ischium inferior margin with 5 RS (slender acute), superior distal margin with 2 RS (slender acute); merus inferior margin



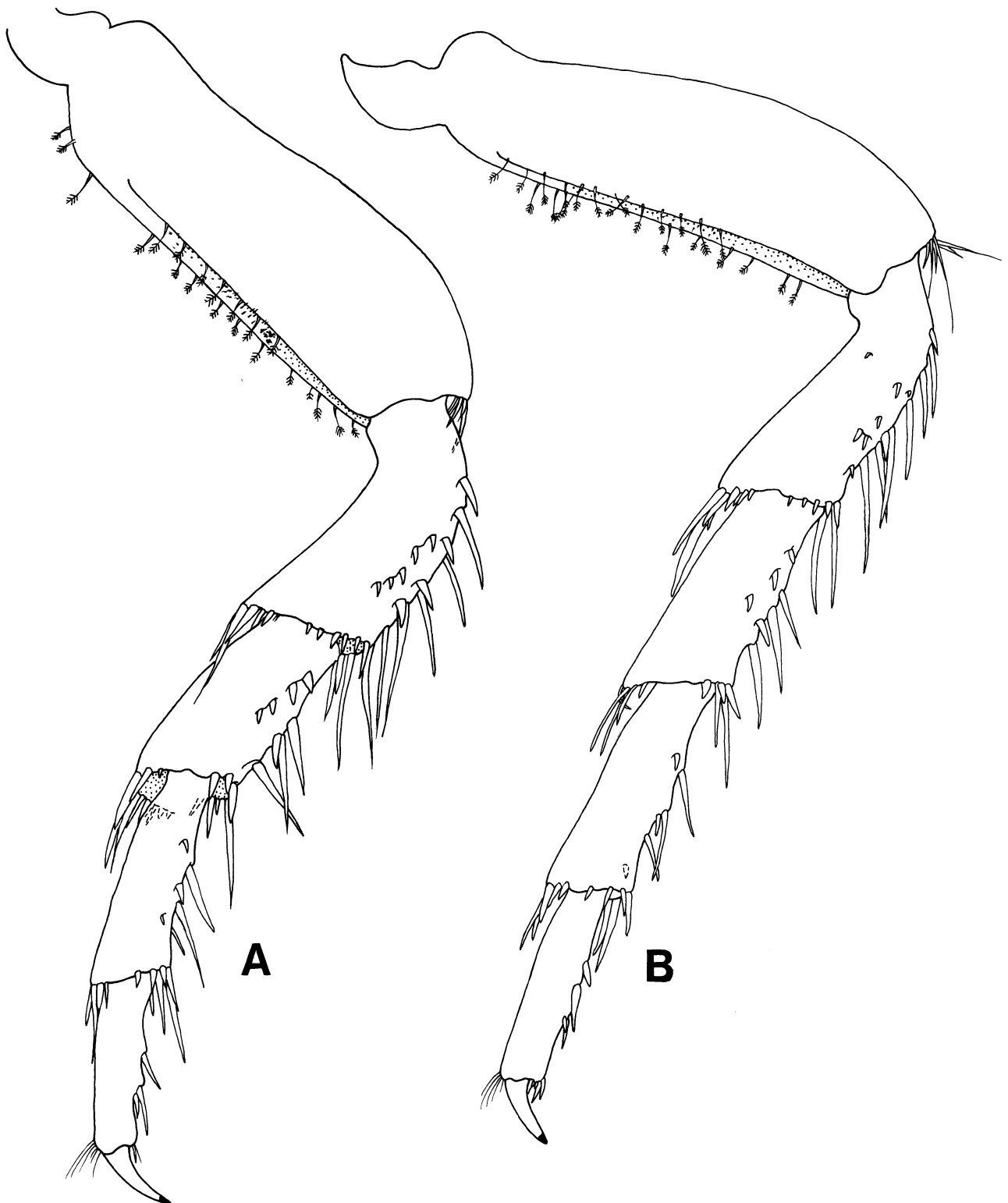
**Figure 37.** *Aega musorstom* sp. nov. A, holotype, remainder ♂ paratype 35 mm. A–C, pereopods 1–3, respectively.

with 12 RS, set as 2 rows (irregular double row), superior distal margin with 5 acute RS (long); carpus similar in size to that of P1, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. P3 similar to P2 (ischium inferior margin with 8 long acute RS, merus inferior margin with 13 stout RS); propodus without large club-shaped distal RS. P6 similar to P7 (but more robust and shorter, with more and longer RS; basis  $2.6 \times$  LW). P7 basis 3.2 times as long as greatest width, inferior margin with 22 palmate setae (medial and lateral margins with 10 and 12, respectively); ischium  $0.5 \times$  L basis, inferior margin with 12 RS (set as row of 7 long and 5 short marginal RS), superior distal angle with 8 RS, inferior distal angle with 7 RS (2 of which are long and acute); merus  $0.9 \times$  L ischium,  $2.2 \times$  LW, inferior margin with 7 RS (3 long acute and 1 short RS and 3 short submarginal RS), superior distal angle with 5 RS, inferior distal angle with 14 RS; carpus  $0.9 \times$  L ischium,  $2.6 \times$  LW, inferior

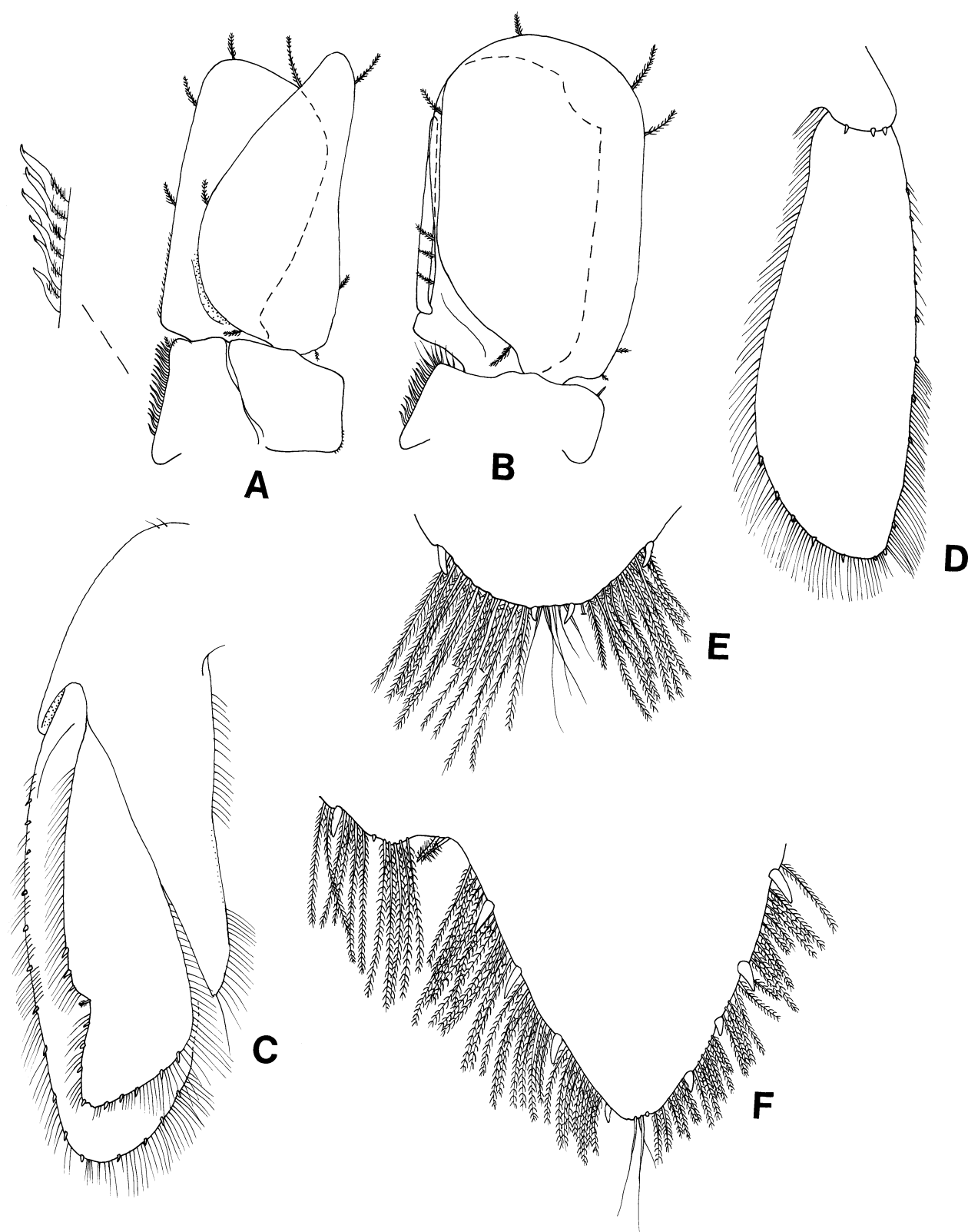
margin with 5 RS (set as a loose cluster of 2 and 3 RS), superior distal angle with 7 RS, inferior distal angle with 12 RS; propodus  $0.8 \times$  L ischium,  $2.5 \times$  LW, inferior margin with 4 RS (set as 1, 1 and 2), superior distal angle with 6 slender setae (simple), inferior distal angle with 4 RS.

*Penes* opening flush with surface of sternite 7; penial openings separated by 4% of sternal width.

*Pleopod 1* exopod  $2.2 \times$  LW, distally narrowly rounded with strongly oblique medial margin, lateral margin distally concave, medial margin strongly convex (distally narrowed), with PMS from base; endopod  $2 \times$  LW, distally subtruncate, lateral margin sinuate (widest distally, proximally concave), with PMS from distal margin only, medial margin with PMS from distal half; peduncle  $1.8 \times$  WL, medial margin with 14 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.6 \times$  L endopod, distally bluntly rounded. Endopods of pleopods 3–5



**Figure 38.** *Aega musorstom* sp. nov. Paratype ♂ 35 mm. A, pereopod 6. B, pereopod 7.



**Figure 39.** *Aega musorstom* sp. nov. A, B, holotype, remainder ♂ paratype 35 mm. A, pleopod 1 and detail of coupling hooks. B, pleopod 2. C, uropod. D, uropod exopod, ventral view. E, uropodal exopod, apex. F, uropod endopod, apex.

each with mediodistal point (small); pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 3 RS, posterior lobe about  $0.6 \times$  L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded or broadly rounded (endopod narrow, exopod broad). *Endopod* apically not bifid, lateral margin proximally convex, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 3 RS, distal lateral margin with 4 RS, medial margin weakly convex, with 6 RS. *Exopod* extending beyond end of endopod, 2.7 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 12 RS; medial margin convex, with 6 RS.

#### Female

Similar to males.

#### Size

Males 21–39 mm (mean = 30 mm), females 26–36 mm (mean = 33 mm); no ovigerous females present in the material examined.

#### Variation

*Robust setae*: pleotelson without RS. Several uropodal rami were damaged, so the total number counted varies and is given for each margin. Uropod exopod medial margin ( $n = 23$ ) 4 (13%), 5 (22%), 6 (52%) and 7 (13%), lateral margin ( $n = 18$ ) 11 (33%), 12 (50%), 13 (11%); uropod endopod ( $n = 23$ ) medial margin 5 (22%), 6 (22%) or 7 (13%), lateral margin with 2 + 4 (22%), 3 + 4 (17%), 2 + 5 (26%) and 3 + 5 (35%). There is no discernible difference between males and females, nor does the number of RS increase with the size of the specimen. Of 13 specimens counted only 2 had symmetrical RS for the lateral margin of the endopod for both rami.

P1–3 had slightly variable counts for the RS on the inferior margin of the merus: P1 had 6 + 2 (74%), P2 had 11–15, with 11 (35%) and 12 (45%) most frequent, P3 had 13–15, with 13 (39%) and 14 (44%) most frequent.

#### Remarks

The huge united eyes with almost no anterior free space between the eyes and the rostrum separates *A. musorstom* sp. nov. from most others of the genus. *Aega musorstom* can be separated from similar large-

eyed species by the large rectilinear blade on the palm of pereopods 1–3, together with the ovate frontal lamina, long robust setae on the merus of pereopod 1, long acute robust setae on the inferior margin of the ischium of pereopods 2 and 3, long acute robust setae on the ischium-carpus of pereopods 5–7, the uropodal exopod being distinctly larger than the endopod, the uropod endopod with a shallow excision and the pleotelson posterior margin lacking robust setae.

*Aega trulla* sp. nov., also from the tropical southwestern Pacific, has even larger eyes and a similar propodal blade on pereopods 1–3, but is readily separated by the rounded coxae on pereonites 2 and 3 and the presence of robust setae on the pleotelson.

The very similar and fully sympatric (both species were taken together at one station) *A. rickbruscai* is readily separated by the lack of a propodal blade on pereopods 1–3 as well as the propodus of pereopods 2 and 3 being more slender than that of pereopod 1. See remarks for that species.

#### Prey

Only one fish association noted: '*Synagonopi* sp. 1', probably a species of *Synagrops* Günther, 1887 (Acropomatidae).

#### Distribution

All records in the vicinity of western New Caledonia including the Coral Sea region of the Chesterfield Archipelago and the Loyalty Islands; at depths from 475 to 615 m.

#### Etymology

Named in honour of MUSORSTOM, the collecting programme. Its staff have made a major contribution to knowledge of the marine fauna of the region; noun in apposition.

#### **AEGA RICKBRUSCAI** SP. NOV. (FIGS 40–44, 63)

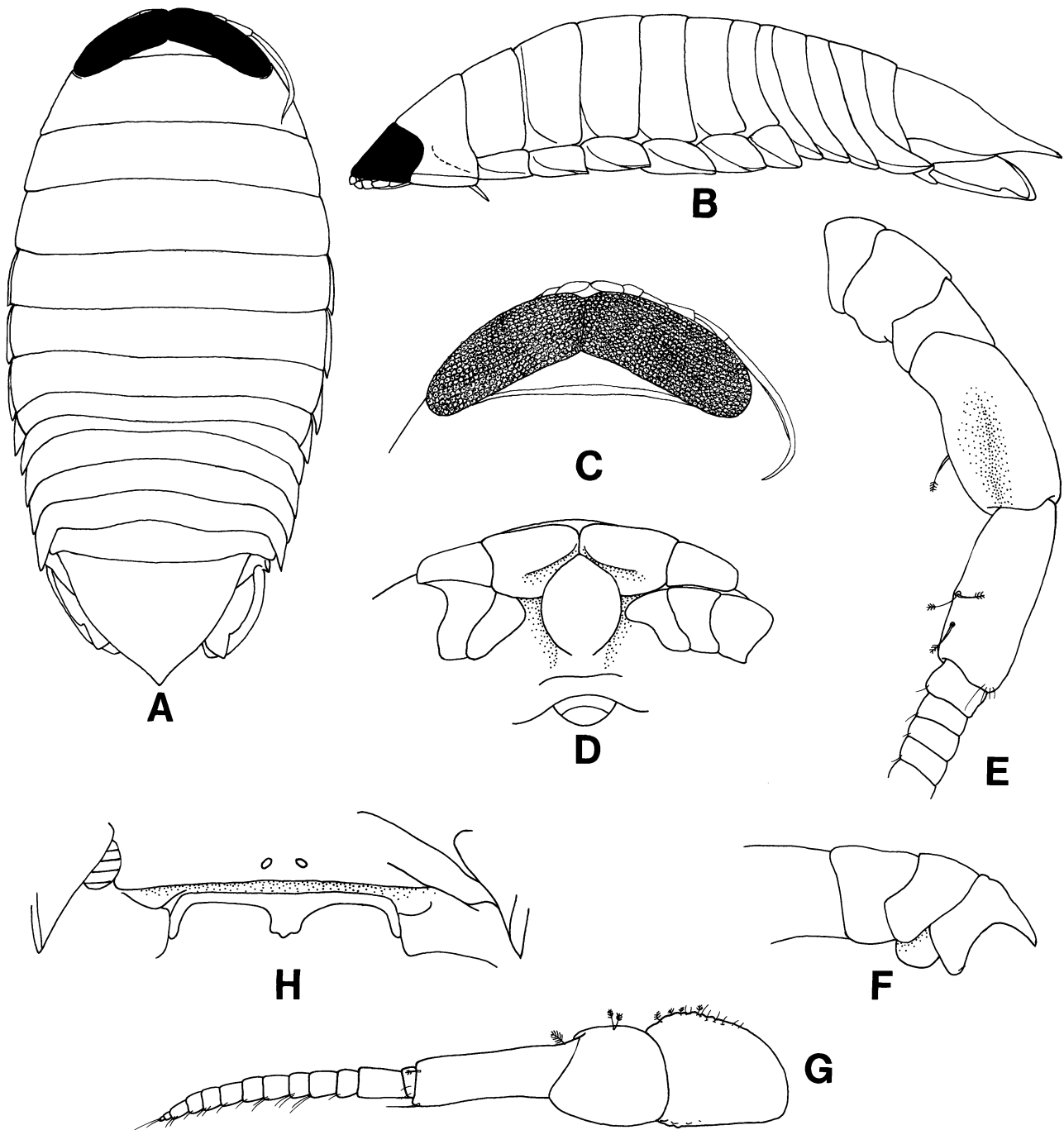
##### Material examined

Type material all from New Caledonia.

*Holotype*: ♂ (44 mm),  $18^\circ 50.0'S$ ,  $163^\circ 14.5'E$ , 20.ix.1985, stn 0199, MUSORSTOM IV, 595 m (MNHN Is.5806).

*Paratypes*: ♂ (50 mm, part dissected),  $18^\circ 53.80'S$ ,  $163^\circ 14.10'E$ , 20.ix.1985, stn 0200, MUSORSTOM IV, 535 m (MNHN Is.5805). ♂ (29 mm),  $19^\circ 45.30'S$ ,  $158^\circ 46.30'E$ , 19.x.1986, stn 0364, MUSORSTOM V, 675 m (MNHN Is.5808). ♀ (ovig. 59 mm, damaged),  $19^\circ 37.70'S$ ,  $158^\circ 43.90'E$ , 21.x.1986, stn 0380, MUSORSTOM V, 555–570 m (MNHN Is.5807). 2 ♂





**Figure 40.** *Aega rickbruscai* sp. nov. A–E, holotype, remainder ♂ paratype 50 mm. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, antenna peduncle. F, antenna peduncle, articles 1–3, ventral view. G, antennule. H, sternite 7 showing penial openings.

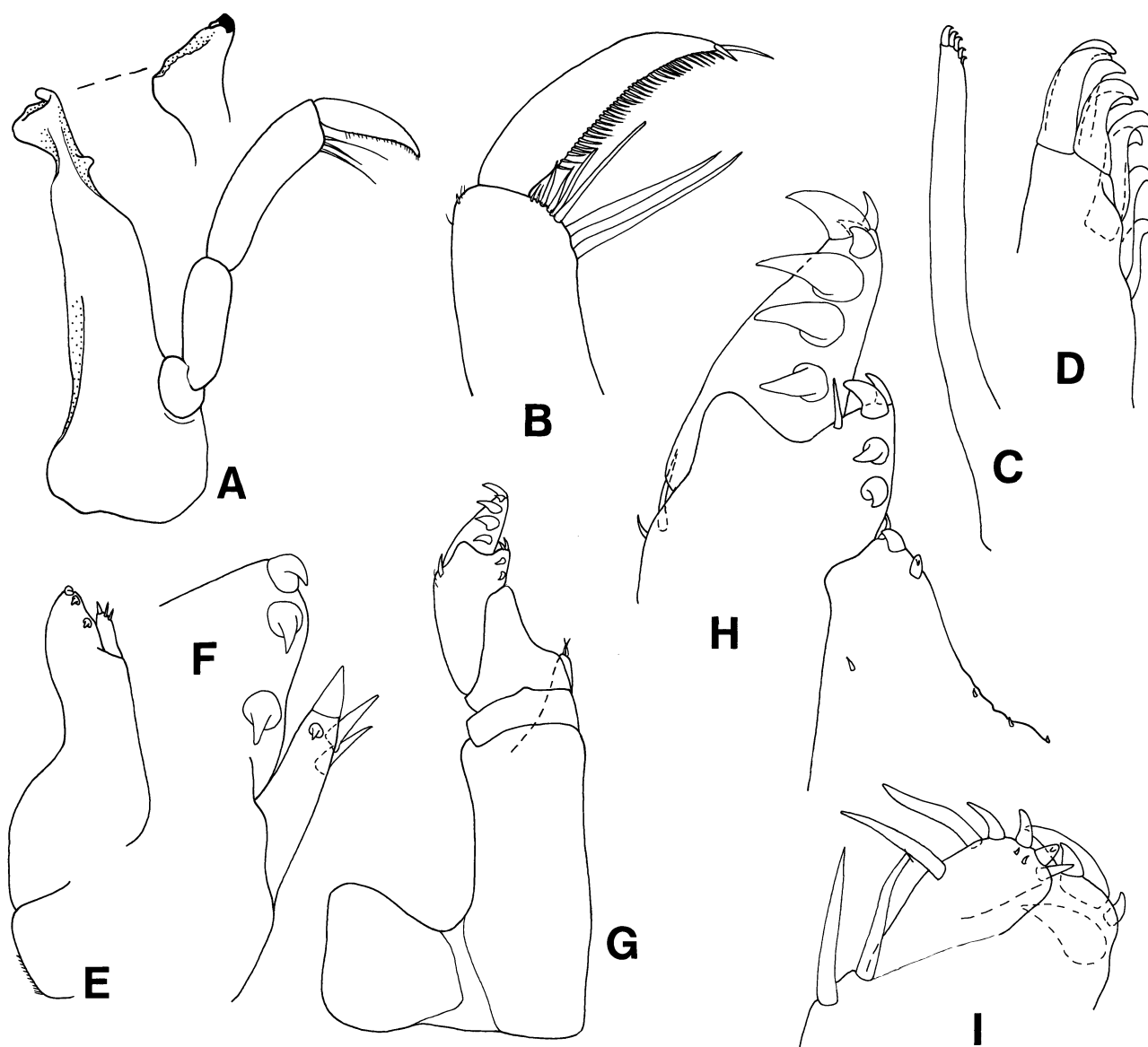
(24, 25 mm), 2 ♀ (non-ovig. 43, 47 mm), 19°40.85'S, 158°46.10'E, 21.x.1986, stn 0383, MUSORSTOM V, 615–600 m (MNHN Is.5804).

*Non-type*: ♂ (44 mm), Cavalli Sea Mount, off northern North Island, New Zealand, 34°07.21'S,

174°05.64'E, 16.iv.2002, 554–549 m, coll. Steve O'Shea on R.V. *Kaharoa* (KAH 0204/27; NIWA 3444).

#### *Description*

*Body* 2.0 times as long as greatest width, dorsal surfaces smooth (finely punctate), widest at pereonite 5,

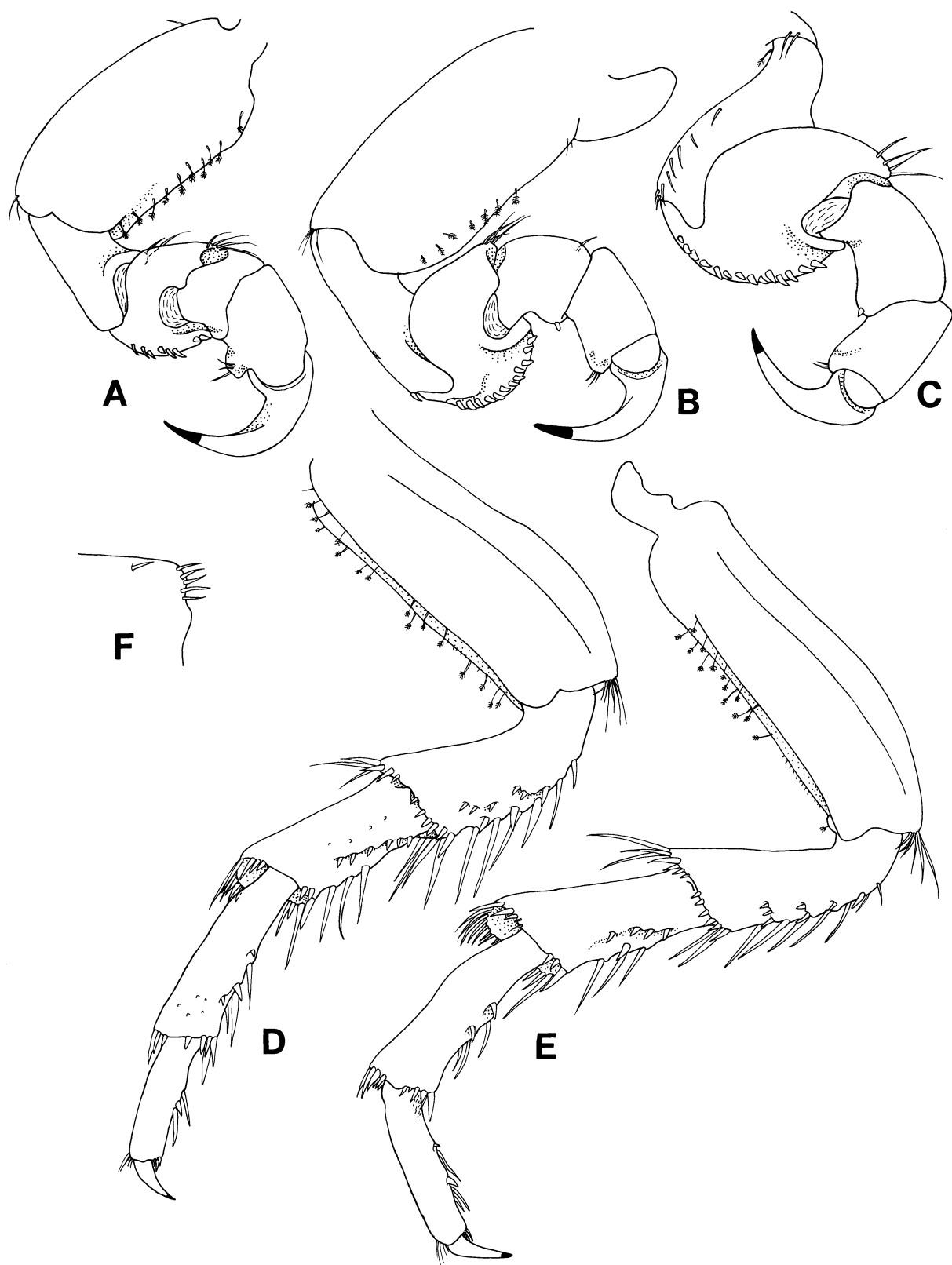


**Figure 41.** *Aega richbruscai* sp. nov. Male paratype. A, mandible. B, mandible palp article 3. C, maxillule. D, maxillule apex. E, maxilla. F, maxilla, apex detail. G, maxilliped. H, maxilliped palp articles 2–4. I, maxilliped palp article 5, dorsal view.

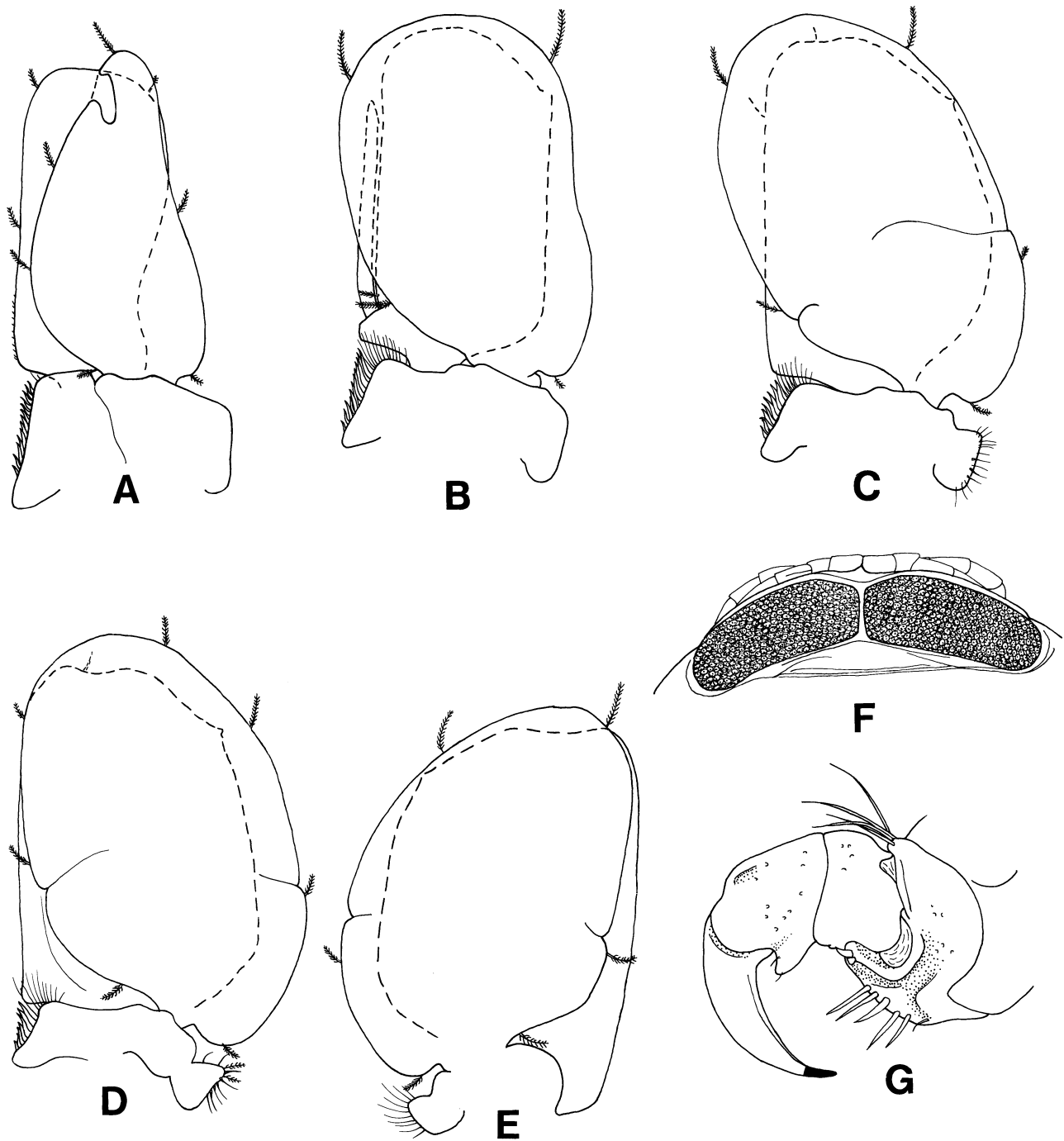
lateral margins ovate. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, medially united, anterior clear field 11% length of head, posterior clear field 34% length of head; each eye made up of ~25 transverse rows of ommatidia, each row with ~12–14 ommatidia; eye colour dark brown. *Pereonite 1 and coxae 2–3* each with posteroventral angle with small distinct produced point; coxae 5–7 with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4. *Pleotelson* 0.9 times as long as

anterior width, dorsal surface without longitudinal carina; lateral margins convex, smooth, posterior margin with elongate medial point, with 0 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.7 times as long as combined lengths of articles 1 and 2, article 3  $3.1 \times$  LW; flagellum with 11 articles, extending to mid-point of eye. *Antenna* peduncle article 2 inferior surface with distinct longitudinal suture; article 4  $2 \times$  LW, 1.4 times as long as combined lengths of articles 1–3, without deep longitudinal groove (with longitudinal depression), inferior margin with 1 plumose seta, and 0 short simple setae; article 5 not markedly wider



**Figure 42.** *Aega rickbruscai* sp. nov. A, E, holotype, remainder ♂ paratype 50 mm. A–E, pereopods 1–3, 6 and 7, respectively. F, pereopod 2, mesial surface, distal angle of ischium.



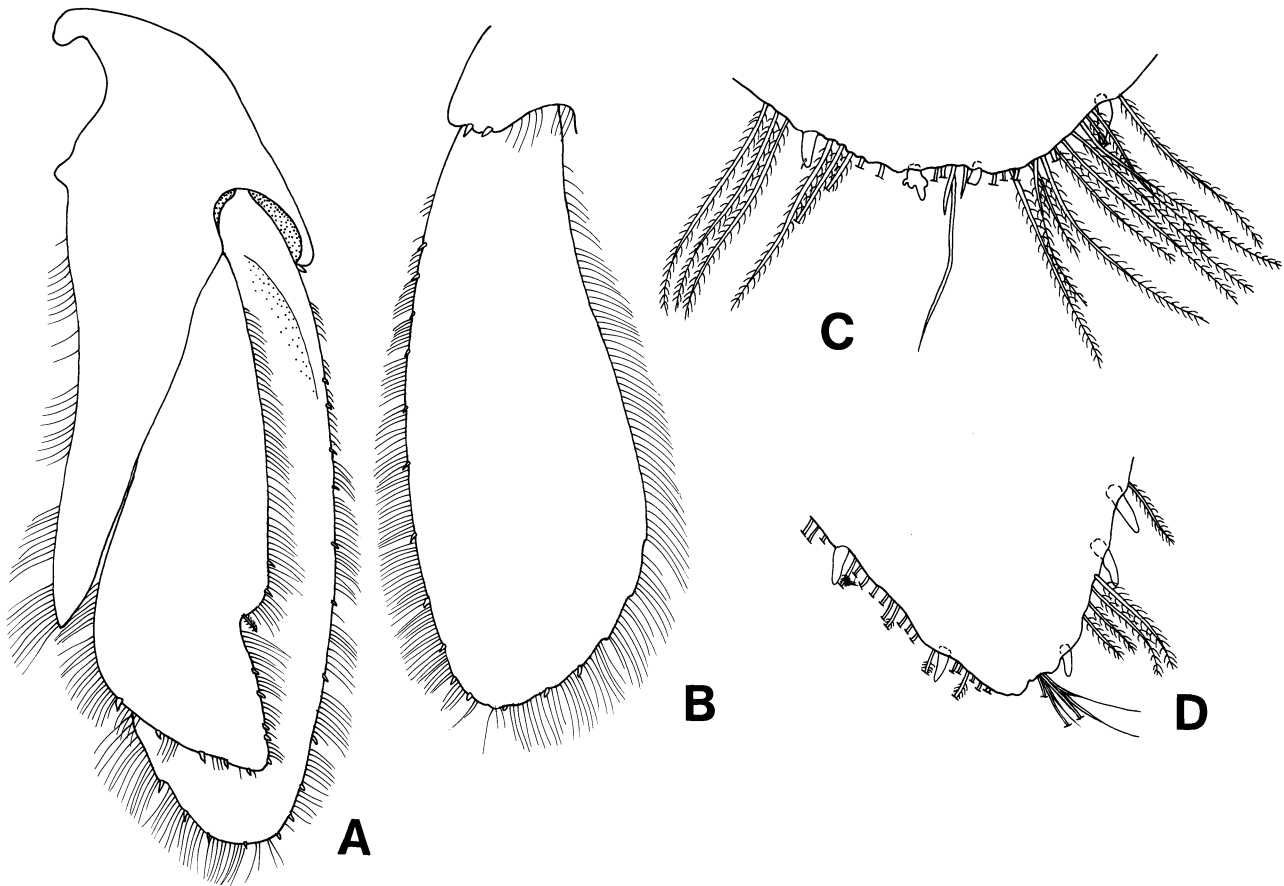
**Figure 43.** *Aega richbruscai* sp. nov. A, B, holotype. C–E, male paratype. F, G, ovigerous female paratype. A–E, pleopods 1–5, respectively. F, dorsal view of head. G, pereopod 1, distal articles.

or flatter than article 4,  $0.9 \times$  L article 4,  $2.3 \times$  LW, inferior margin with 2 plumose setae, anterodistal angle with cluster of 5 short simple setae; flagellum with 22 articles, extending to posterior of pereonite 1.

*Frontal lamina* flat, longer than greatest width, oval (rounded-ovate in shape), anterior margin rounded,

with small median point, posterior margin not abutting clypeus.

*Mandible* molar process absent; palp article 2 with 8 distolateral setae (3 long), palp article 3 with 36 setae. *Maxillule* with 9 terminal RS. *Maxilla* medial lobe with 4 RS (2 hooked, 2 straight); lateral lobe with 3



**Figure 44.** *Aega rickbruscai* sp. nov. Male paratype. A, uropod. B, uropod exopod, ventral view. C, uropod endopod apex. D, uropod exopod apex.

RS. *Maxilliped* endite with 2 apical setae; palp article 2 with 3 RS (small hooked); article 3 with 4 recurved RS (plus 1 straight); article 4 with 6 hooked RS (4 large, 2 small); article 5 partly fused to article 4, with 6 RS (3 hooked, 3 straight).

*Pereopod 1* basis 2 times as long as greatest width; ischium  $0.5 \times$  L basis, inferior margin with 0 RS, superior distal margin with 3 RS (long acute); merus inferior margin with 8 RS, set as 2 groups (of 6 and 2), superior distal angle with 6 RS (long acute); carpus  $0.5 \times$  L merus, inferior margin with 0 RS (with distal flange); propodus 1.3 times as long as proximal width, inferior margin with 0 RS, propodal palm with large distal lobe, dactylus smoothly curved,  $1.6 \times$  L propodus. *P2* ischium inferior margin with 1 RS (inferior distal angle with 4 slender acute RS), superior distal margin with 4 RS; merus inferior margin with 12 RS, set as single row, superior distal margin with 1 acute RS; carpus similar in size to that of *P1*, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. *P3* similar to *P2* (longer, with more acute RS on inferior margin of ischium); propodus without large club-shaped distal RS. *P6* similar to *P7*. *P7* basis 3.2

times as long as greatest width, inferior margin with 14 palmate setae (medial and lateral margins with 5 and 9, respectively); ischium  $0.6 \times$  L basis, inferior margin with 12 RS (set as row of 7 long and 5 short marginal RS), superior distal angle with 7 RS, inferior distal angle with 9 RS (2 long and 8 short); merus  $0.8$  L ischium,  $1.7 \times$  LW, inferior margin with 8 RS (3 long acute and 1 short RS and 4 short submarginal RS), superior distal angle with 8 RS, inferior distal angle with 7 RS (3 short, 4 slender and long); carpus  $0.9 \times$  L ischium,  $2.8 \times$  LW, inferior margin with 5 RS (set as 3 long and 2 short), superior distal angle with 9 RS, inferior distal angle with 10 RS; propodus  $0.8 \times$  L ischium,  $4.3 \times$  LW, inferior margin with 5 RS (3 long and 2 short), superior distal angle with 7 slender setae (simple and palmate, including 1 RS), inferior distal angle with 4 RS.

*Penes* opening flush with surface of sternite 7; penial openings separated by 7% of sternal width.

*Pleopod 1* exopod  $1.8 \times$  LW, distally narrowly rounded with strongly oblique medial margin, lateral margin distally concave, medial margin strongly convex, with PMS from base; endopod  $1.8 \times$  LW, distally



subtruncate, lateral margin strongly concave (widest distally, proximally concave), with PMS from on distal margin only, medial margin with PMS from distal half; peduncle  $1.8 \times$  WL, medial margin with 14 coupling hooks. Pleopod 2 *appendix masculina* with straight margins,  $0.6 \times$  L endopod, distally narrowly rounded. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediolateral point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS, posterior lobe about  $0.75 \times$  L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded or broadly rounded (endopod narrow, exopod broad). *Endopod* apically not bifid, lateral margin proximally convex, with prominent excision positioned about three-quarters along ramus, proximal lateral margin with 2 RS, distal lateral margin with 5 RS, medial margin weakly convex (appearing straight), with 5 RS. *Exopod* extending beyond end of endopod, 2.5 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 11 RS; medial margin convex, with 6 RS.

#### Female

Males and non-ovigerous females appear entirely similar with the exception of the sexual characters. The single ovigerous female differs in having the eyes very narrowly separated, the dorsal surface of the head notably depressed, and the RS on the merus of P1 notably elongate and acute. Five pairs of oostegites are present, on sternites 1–5.

#### Size

Males measured 24–50 mm (mean = 34 mm), non-ovigerous females 43 and 47 mm, and the single ovigerous female 59 mm.

#### Variation

*Robust setae*: pleotelson without RS. Uropod exopod medial margin ( $n = 16$ ) 4 (12%), 5 (44%), 6 (44%), lateral margin 9 (25%), 10 (44%), 11 (31%); uropod endopod ( $n = 16$ ) medial margin 5 (56%), 6 (37.5%) or 7 once, lateral margin with 2 + 5 (25%), 2 + 5 (56%), 2 + 6, 1 + 5 and 3 + 5, all once. There is no discernible difference between males and females, nor does the number of RS increase with the size of the specimen, some of the smaller specimens having more RS than the larger.

P1–3 had slightly variable counts for the RS on the inferior margin of the merus: P1 had 6 + 2 (81%), P2 had 12–14 with 12 (69%) and 13 (25%) most frequent,

P3 had 13–15 with 13 (37.5%) and 14 (50%) and 15 (12.5%).

All material from New Caledonia is pale cream in colour. The recently collected specimen from New Zealand is pale orange-brown, with sparse brown chromatophores; the colour is darkest on the lateral margins of the pleon. The eyes of this specimen are a dark red-brown.

#### Remarks

*Aega rickbruscai* sp. nov. is readily identified by the huge eyes with very little anterior free space, the ovate and anteriorly acute frontal lamina, pereopod 1 merus inferior margin usually with 8 robust setae (set as 6 + 2), pereopods 2 and 3 merus inferior margin with a single row of 12–14 and 13–15 robust setae, respectively, pereopods 5–7 with long robust setae on the inferior margin and the wide uropodal exopod very obviously extend beyond the endopod apex.

*Aega rickbruscai* is distinguished from the very similar and fully sympatric (both species were taken together at one station) *A. musorstom* sp. nov. by the lack of a propodal blade on pereopods 1–3 as well as the propodus of pereopods 2 and 3 being more slender than that of pereopod 1. In addition, *A. rickbruscai* is larger, the anterior margin of the frontal lamina forms an indistinct point, the uropodal exopod is wider and the number of robust setae on the uropodal rami, while overlapping, is fewer. *Aega rickbruscai* has a narrower range of variation in the number of robust setae on pereopods 1–3. Character states that are shared by these two species include the pleotelson lacking robust setae, the ischium of pereopods 2 and 3 being provided with long acute setae, a similar pattern of setation on pereopods 1–3, long acute robust setae on pereopods 4–7, and similar uropod shape and setation.

*Aega rickbruscai* is also similar to *A. hamiota* sp. nov., both having very large eyes, long acute robust setae on pereopods 4–7 and wide uropodal rami, but is readily distinguished by lacking long acute robust setae on the superior margins of the ischium, merus and carpus of pereopods 4–7, a less wide uropodal exopod and by the lack of robust setae on the pleotelson.

#### Prey

Not known.

#### Distribution

Known only from New Caledonia and northern New Zealand; at depths between 535 and 615 m.

#### Etymology

Named for Richard C. Brusca, in recognition of his contributions to knowledge of the Isopoda, and in

acknowledgement of his monographs on the East Pacific Aegidae (Brusca, 1983; Brusca & France, 1992).

***AEGA TRULLA* SP. NOV.** (FIGS 45–48, 64)

?*Aega antillensis* – Hale, 1925: 176 (part).

*Aega deshaysiana* – Hale, 1940: 205 (part).

*Material examined*

*Holotype*: ♀ (non-ovig. 49 mm [mouthparts on SEM stub]), Coral Sea, east of Townsville, Queensland, Australia, 19°00.65'S, 150°39.20'E, 24.xi.1985, stn 35, 752 m, coll. CSIRO FRV *Soela* (NTM Cr013497).

*Paratypes*: ♀ (non-ovig. 39 mm [dissected]), off Marion Reef, north-east of Mackay, Queensland, Australia, c. 650 m, coll. QFS (QM W14371). ♀ (non-ovig. 53 mm), Ontong Java Atoll (c. 8°S, 159°E), Solomon Islands, 22.vi.1918, coll. H. Hogben (AM P9267 [Hale 1940]).

*Description*

*Body* 2.3 times as long as greatest width, dorsal surfaces smooth (finely punctate), widest at pereonite 5, lateral margins weakly ovate. Rostral point projecting anteriorly, not ventrally folded. *Eyes* large, medially united, anterior clear field 8% length of head, posterior clear field 21% length of head; each eye made up of ~32 transverse rows of ommatidia, each row with ~23 ommatidia; eye colour pale brown. *Pereonite 1 and coxae* 2–3 each with posteroventral angle rounded; coxae 5–7 with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles free, not overlapped by lateral margins of pleonite 4. *Pleotelson* 1.1 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins sinuate, smooth, posterior margin with elongate medial point, with 15–17 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.6 times as long as combined lengths of articles 1 and 2, article 3 3.0× LW; flagellum with 10 articles, extending to mid-point of eye. *Antenna* peduncle article 2 inferior surface without distinct longitudinal suture; article 4 2.2× LW, 1.4 times as long as combined lengths of articles 1–3, with deep longitudinal groove, inferior margin with 1 plumose seta, and 0 short simple setae; article 5 not markedly wider or flatter than article 4, 1.2× L article 4, 2.5× LW (inferior margin scalloped), inferior margin with 3 plumose setae, anterodistal angle with cluster of 3 short simple setae; flagellum with 20 articles, extending to posterior of pereonite 1.

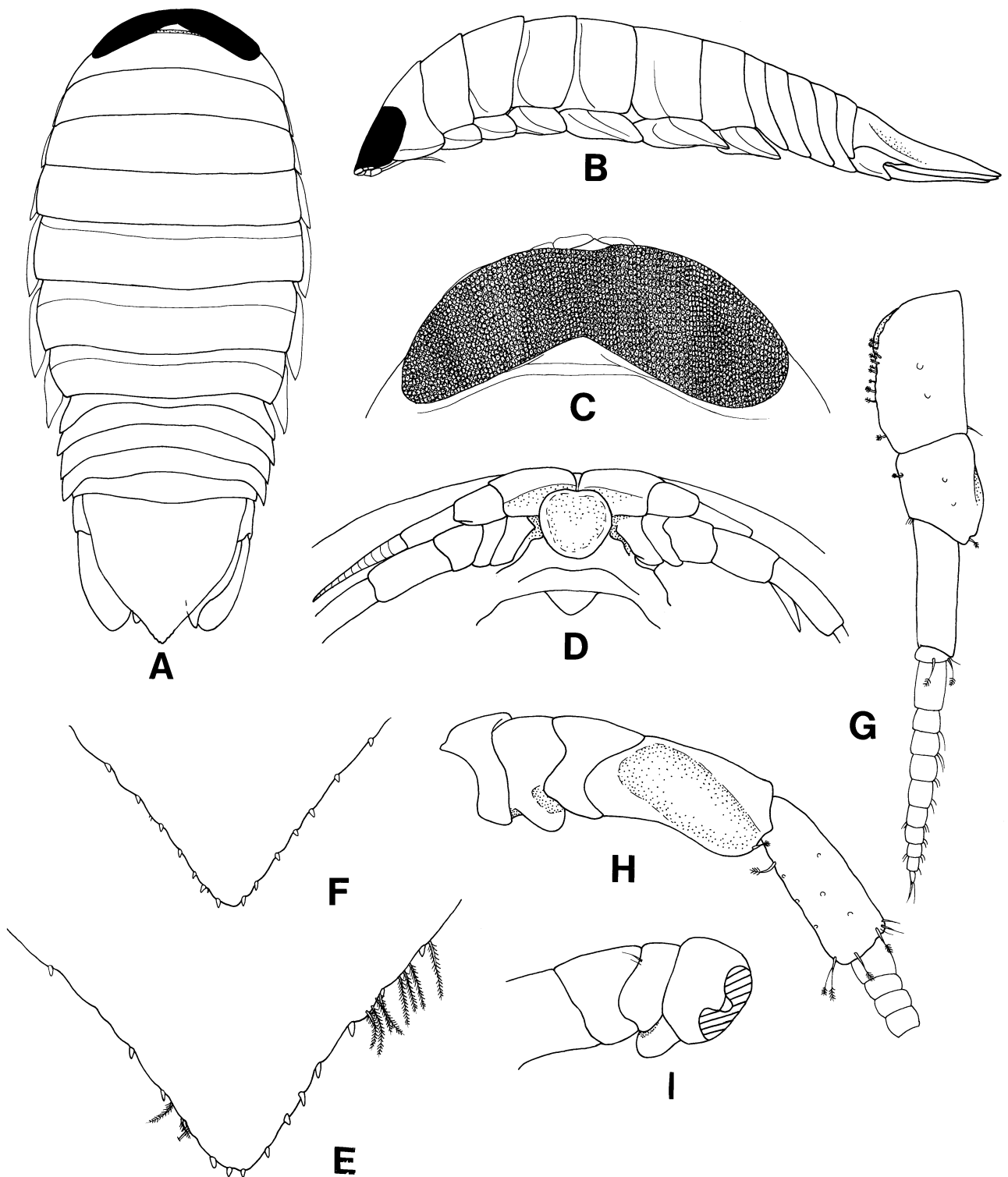
*Frontal lamina* flat, as wide as long, oval, anterior margin with median indentation (minute), without

small median point, posterior margin not abutting clypeus.

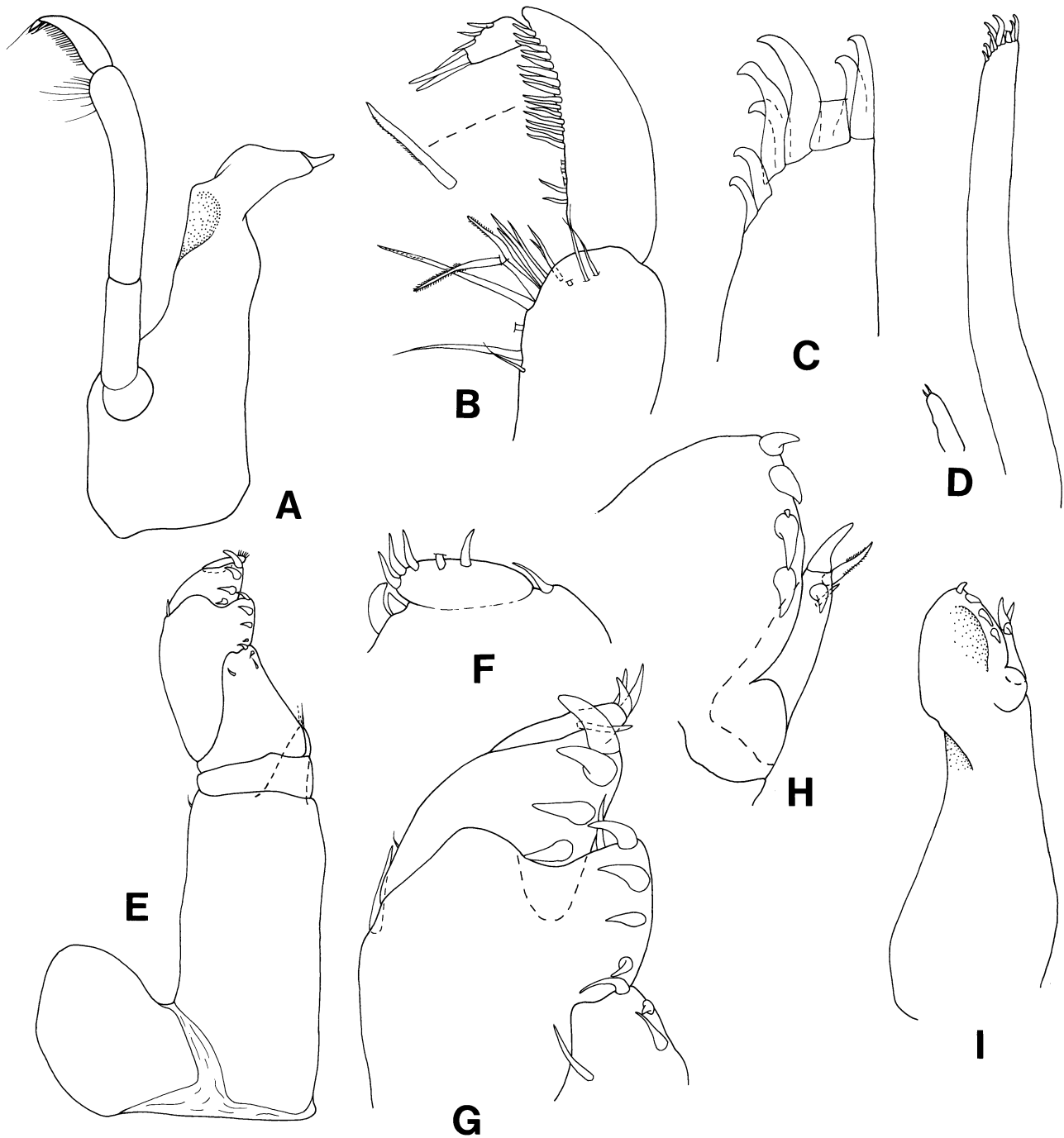
*Mandible* molar process absent; palp article 2 with 11 distolateral setae (and 3 submarginal setae), palp article 3 with 26 setae. *Maxillule* with 8 terminal RS (large, falcate). *Maxilla* medial lobe with 4 RS (2 hooked, 2 straight); lateral lobe with 4 RS (hooked). *Maxilliped* endite with 1 apical seta; palp article 2 with 3 RS (acute); article 3 with 4 recurved RS (weakly recurved; 3 marginal, hooked plus 1 mesial straight); article 4 with 5 hooked RS (4 large and 1 small); article 5 partly fused to article 4, with 5 RS (basally bent then straight).

*Pereopod 1* basis 1.9 times as long as greatest width; ischium 0.6× L basis, inferior margin with 0 RS, superior distal margin with 2 RS; merus inferior margin with 5 RS, set as single (indistinct) row, superior distal angle with 2 RS; carpus 0.7× L merus, inferior margin with 0 RS; propodus 1.2 times as long as proximal width, inferior margin with 0 RS, propodal palm with distal blade (as wide as full length of palm, distally convex), dactylus smoothly curved, 2.0× L propodus. *P2* ischium inferior margin with 2 RS, superior distal margin with 2 RS; merus inferior margin with 7 RS, set as single row, superior distal margin with 2 acute RS; carpus similar in size to that of P1, inferodistal angle with 1 RS, propodus without large club-shaped distal RS. *P3* similar to P2 (but ischium inferior margin with 5 RS; carpus proportionally longer); propodus without large club-shaped distal RS. *P6* similar to P7 (but more robust). *P7* basis 3.4 times as long as greatest width, inferior margin with 8 palmate setae (most missing); ischium 0.5× L basis, inferior margin with 10 RS (set as 1, 2 and 6), superior distal angle with 4 RS, inferior distal angle with 5 RS; merus 0.9× L ischium, 2.3× LW, inferior margin with 8 RS (loosely set as 4 and 4), superior distal angle with 5 RS, inferior distal angle with 5 RS; carpus 0.9× L ischium, 2.8× LW, inferior margin with 5 RS (set as 2 and 3), superior distal angle with 6 RS, inferior distal angle with 6 RS; propodus 0.6× L ischium, 3.6× LW, inferior margin with 4 RS (set as 2 and 2), superior distal angle with 3 slender setae (2 simple, 1 palmate), inferior distal angle with 4 RS.

*Pleopod 1* exopod 2.2× LW, distally narrowly rounded with strongly oblique medial margin, lateral margin distally concave, medial margin strongly convex, with PMS from base; endopod 2.5× LW, distally subtruncate, lateral margin sinuate (widest distally), with PMS from on distal margin only, medial margin with PMS from distal half; peduncle 1.6× WL, medial margin with 12 coupling hooks. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediobasal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.



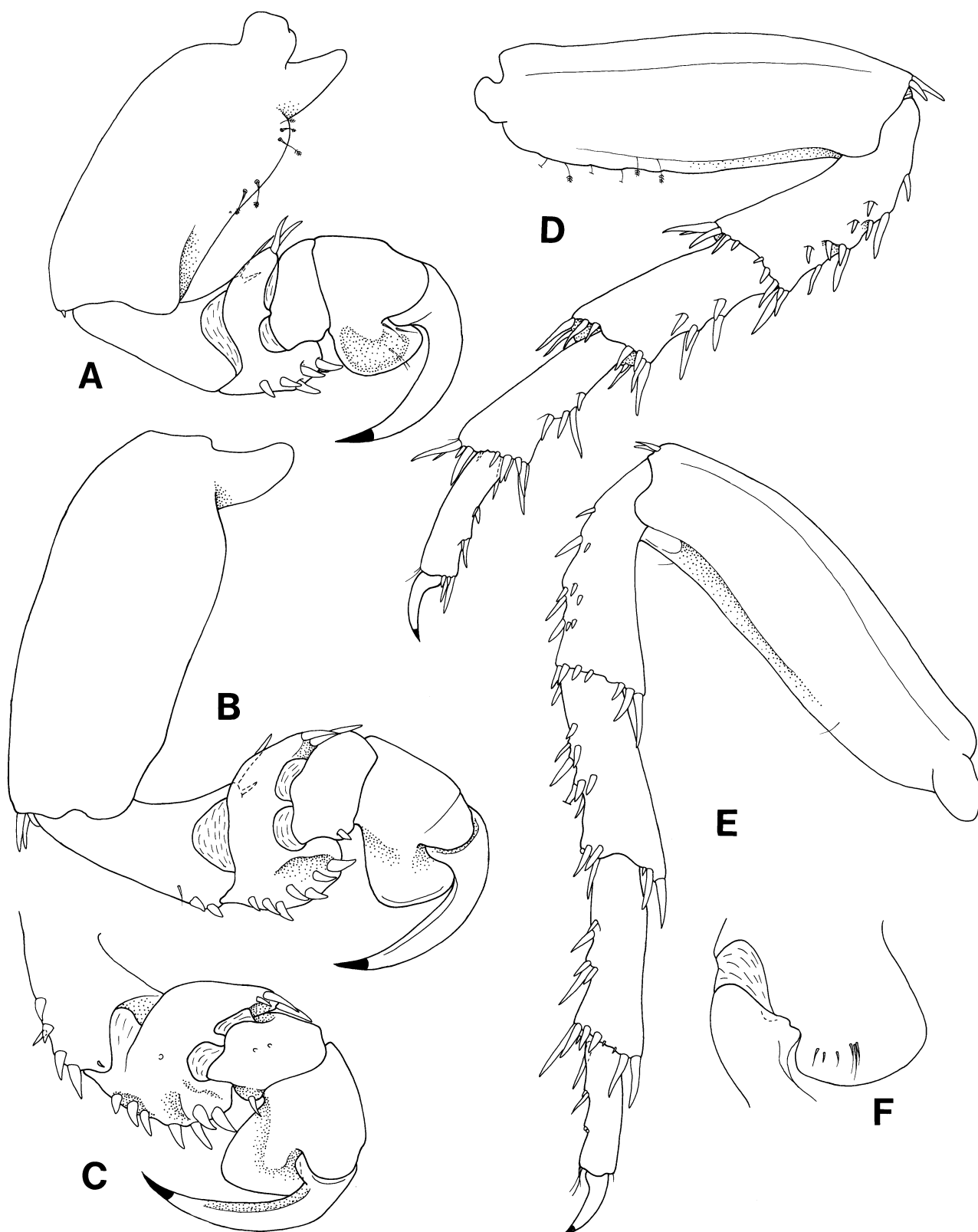
**Figure 45.** *Aega trulla* sp. nov. A–F, holotype, remainder paratype QM W14371. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, pleotelson posterior margin, dorsal view. F, pleotelson posterior margin, dorsal view. G, antennule. H, antenna peduncle. I, antenna peduncle, articles 1–3.



**Figure 46.** *Aega trulla* sp. nov. Paratype QM W14371. A, mandible. B, mandible palp article 3. C, maxillule apex. D, maxillule. E, maxilliped. F, maxilliped palp article 5. G, maxilliped palp articles 2–5. H, maxilla, apex detail. I, maxilla.

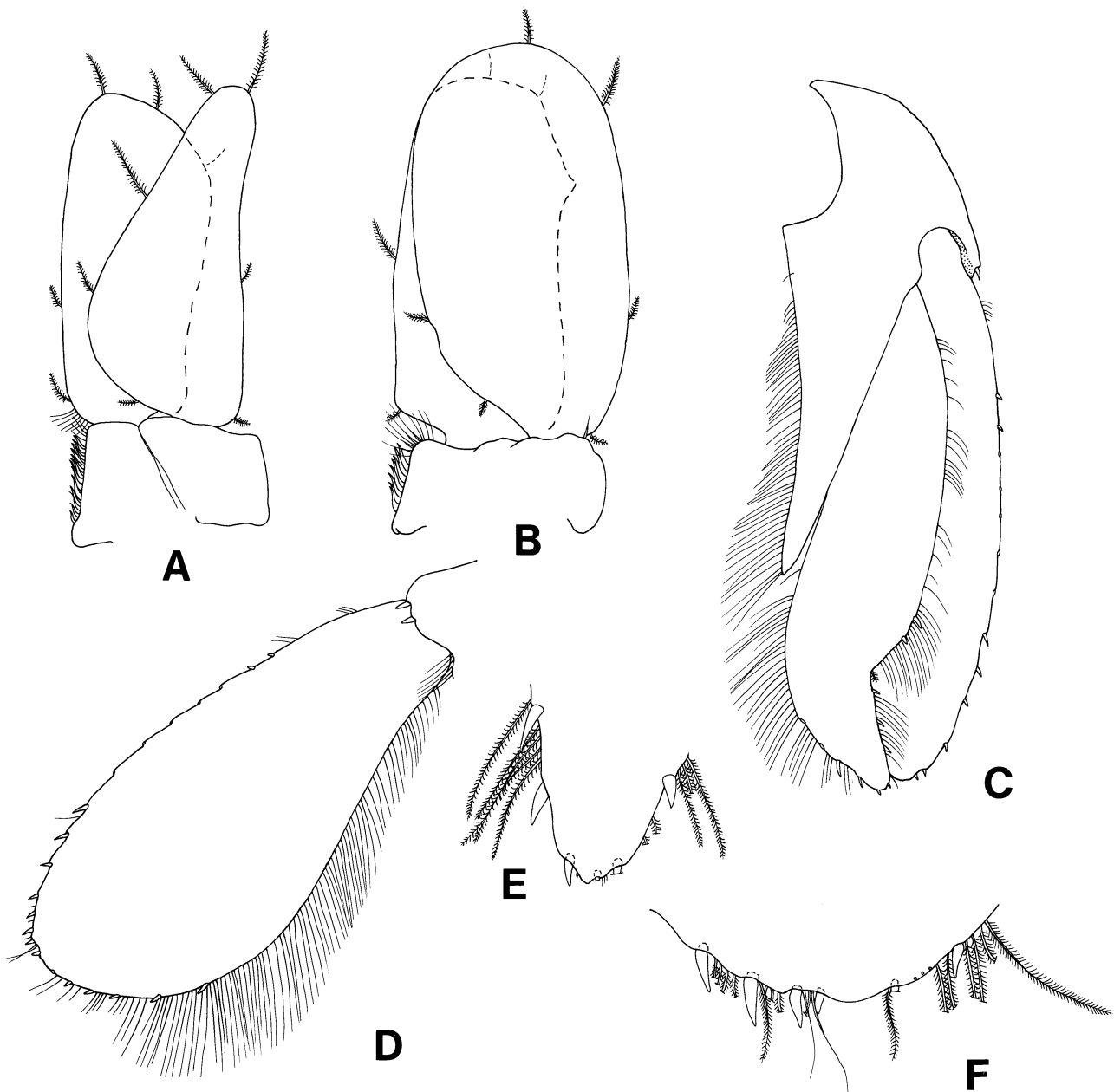
*Uropod* peduncle ventrolateral margin with 2 RS, posterior lobe about  $0.6 \times$  L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded and broadly rounded (endopod narrowly rounded or subtruncate, exopod broadly rounded). *Endopod* apically not bifid, lateral

margin proximally convex, distally straight, with prominent excision positioned about three-quarters along ramus, proximal lateral margin with 2 RS, distal lateral margin with 4 RS, medial margin weakly convex, with 5 RS. *Exopod* extending to end of endopod, 2.2 times as long as greatest width, apically not bifid; lateral margin convex, with 14 RS; medial margin convex, with 6 RS.



**Figure 47.** *Aega trulla* sp. nov. Paratype QM W14371. A–E, pereopods 1–3, 6 and 7, respectively. F, pereopod 2, mesial surface, propodal blade.





**Figure 48.** *Aega trulla* sp. nov. Paratype QM W14371. A, pleopod 1. B, pleopod 2. C, uropod. D, uropod exopod, ventral view. E, uropod endopod apex. F, uropod exopod apex.

*Male*

Not known.

*Size*

Present material 39–53 mm.

*Variation*

*Robust setae*: only 3 specimens, so ranges only are given. There are 15–17 (7 + 8, 8 + 9) on the pleotelson. Uropod exopod medial margin ( $n = 6$ ) with 5 or 7, lateral margin 12–14; uropod endopod medial margin

with 5, 6 once, lateral margin with 2 + 3, 2 + 4, 6 + 6, 1 + 5.

P1–3 counts for the RS on the inferior margin of the merus: P1 with 5, 4 once; P2 with 8, 7 once; and P3 had 8, 9 once.

*Remarks*

The three specimens, despite the difference in their size (39–53 mm) and locations (off the Great Barrier Reef and eastern Solomon Islands) present a uniform and distinctive appearance. The eyes are huge, effec-

tively comprising the entire head in dorsal view, the coxae are bluntly rounded, the frontal lamina has a concave ventral surface, the propodal palm of pereopods 1–3 has a wide blade, the setation of the merus of pereopods 1–3 has a characteristic somewhat radiating loosely double row of RS, the wide and paddle-like uropodal exopod falls short of the endopod apex and is notably wider than most other species (2.2 times as long as greatest width, with most species ranging from 2.5 to 4.1× LW) except *A. hamiota* sp. nov.

There are several species with large eyes, but only *A. musorstom* sp. nov. has wide paddle-like uropods and a wide propodal blade on the anterior pereopods. *A. musorstom*, known only from New Caledonia, is readily distinguished by the ventrally flat, ovate frontal lamina, the merus of pereopods 2 and 3 having a single row of 12–14 robust setae, long slender setae at the superior distal angles of the merus, the uropod exopod extending posterior to the endopod and the pleotelson posterior margin lacking robust setae. *Aega hamiota* sp. nov. has the widest uropodal exopod of all species (1.9× LW) and may immediately be distinguished by the lack of a propodal blade on pereopods 1–3, long acute robust setae on the superior margins of the ischium, merus and carpus of pereopods 4–7 and the pleotelson lacking robust setae.

Hale (1940) described the specimen from Ontong Java as having been ‘recently seen’, strongly suggesting that this is not the same specimen he previously mentioned (Hale, 1925) as coming from ‘South Sea Islands’. The identity (and locality) of that earlier record remains unknown in the absence of the specimen.

Pleopods 3–5 are not illustrated owing to the fragility and age of the nontype specimens. They show few definable species-specific characters and are of little utility in determining species identity or relationships.

#### Prey

Not known.

#### Distribution

From the Coral Sea in the general vicinity of Marion Reef, and from Ontong Java, Solomon Islands; at recorded depths of 650–752 m.

#### Etymology

The epithet is *trulla* (Latin: a spoon or skimmer), alluding to the spoon-like blade on pereopods 1–3.

#### **AEGA UMPARA SP. NOV.** (FIGS 49–52, 64)

*Aega deshaysiana* – Hale, 1940: 295 (part).

#### Material examined

**Holotype:** ♀ (non-ovig. 22 mm), Shag Rock, Moreton Bay, south-eastern Queensland (c. 27°36'S, 153°27'E), vi.1988, on electric ray *Hypnos monopterygium*, 8 m, shot number Crust. 1204, coll. N. Coleman (QM W2672).

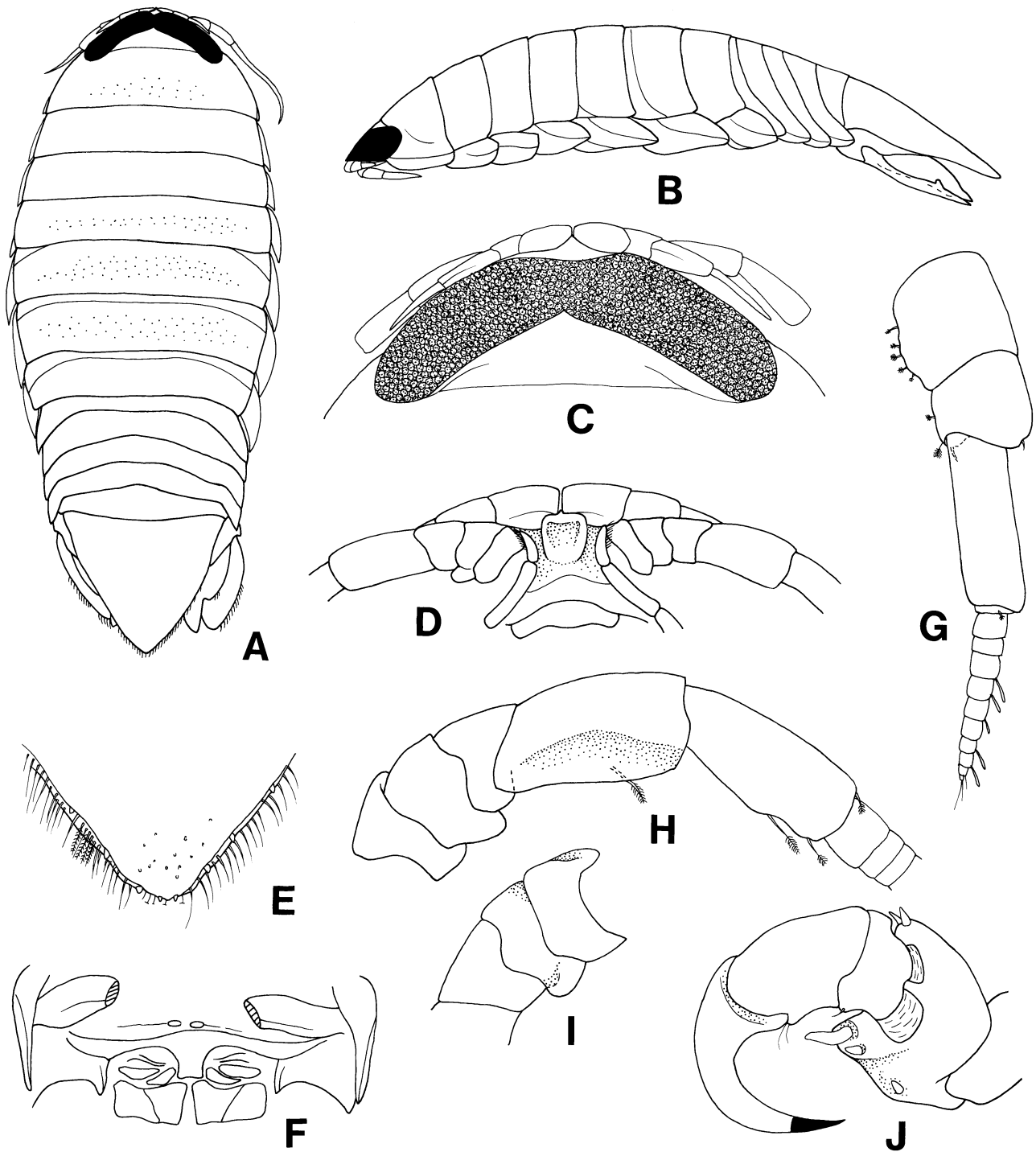
**Paratypes:** ♂ (24 mm), off Byron Bay, NSW, c. 28°37'S, 153°39'E, from cloaca of a tiger shark (Hale, 1940) (AM E4858). ♀ (non-ovig. 45 mm), 29°05'S, 167°57'E, off Norfolk Island, Tasman Sea, hapuka (probably hapuku, *Polyprion oxygenios*) fish behind pectoral fin (AM P11262). ♀ 24 mm (dissected), east of North Solitary Island, NSW, 29°54–57'S, 153°37–36'E, 11.x.1978, 175 m, coll. FRV *Kapala* (AM P37511).

**Non-type:** ♂ (31 mm), Elizabeth Reef, c. 11.xii.1987, from ‘black cod’, coll. L Smith and M. Cordell on ‘F. Bay’ (AM P43986). ♀ (non-ovig. 22 mm), vicinity of Kermadec Islands, 30.2530°S, 178.4033°W, 90 m, *Challenger* Centenary, 1.v.1974, stn K0837, coll. NIWA (NIWA 3479).

#### Description

**Body** 2.4 times as long as greatest width, dorsal surfaces smooth (finely punctate), widest at pereonite 5, lateral margins weakly ovate. Rostral point projecting anteriorly, not ventrally folded. **Eyes** large, medially united, anterior clear field 17% length of head, posterior clear field 48% length of head; each eye made up of ~19 transverse rows of ommatidia, each row with ~9 ommatidia; eye colour dark brown. **Pereonite 1 and coxae 2–3** each with posteroventral angle rounded; coxae 5–7 with entire oblique carina. **Pleon** with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles free, not overlapped by lateral margins of pleonite 4. **Pleotelson** 1.1 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins weakly convex (very), smooth, posterior margin with elongate medial point, with 8 RS.

**Antennule** peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.9 times as long as combined lengths of articles 1 and 2, article 3 3.1× LW; flagellum with 10 articles, extending to posterior margin of eye. **Antenna** peduncle article 2 inferior surface without distinct longitudinal suture; article 4 1.9× LW, 1.2 times as long as combined lengths of articles 1–3, without deep longitudinal groove, inferior margin with 1 plumose seta, and 0 short simple setae; article 5 not markedly wider or flatter than article 4, 0.9× L article 4, 2× LW, inferior margin with 2 plumose setae, anterodistal angle with



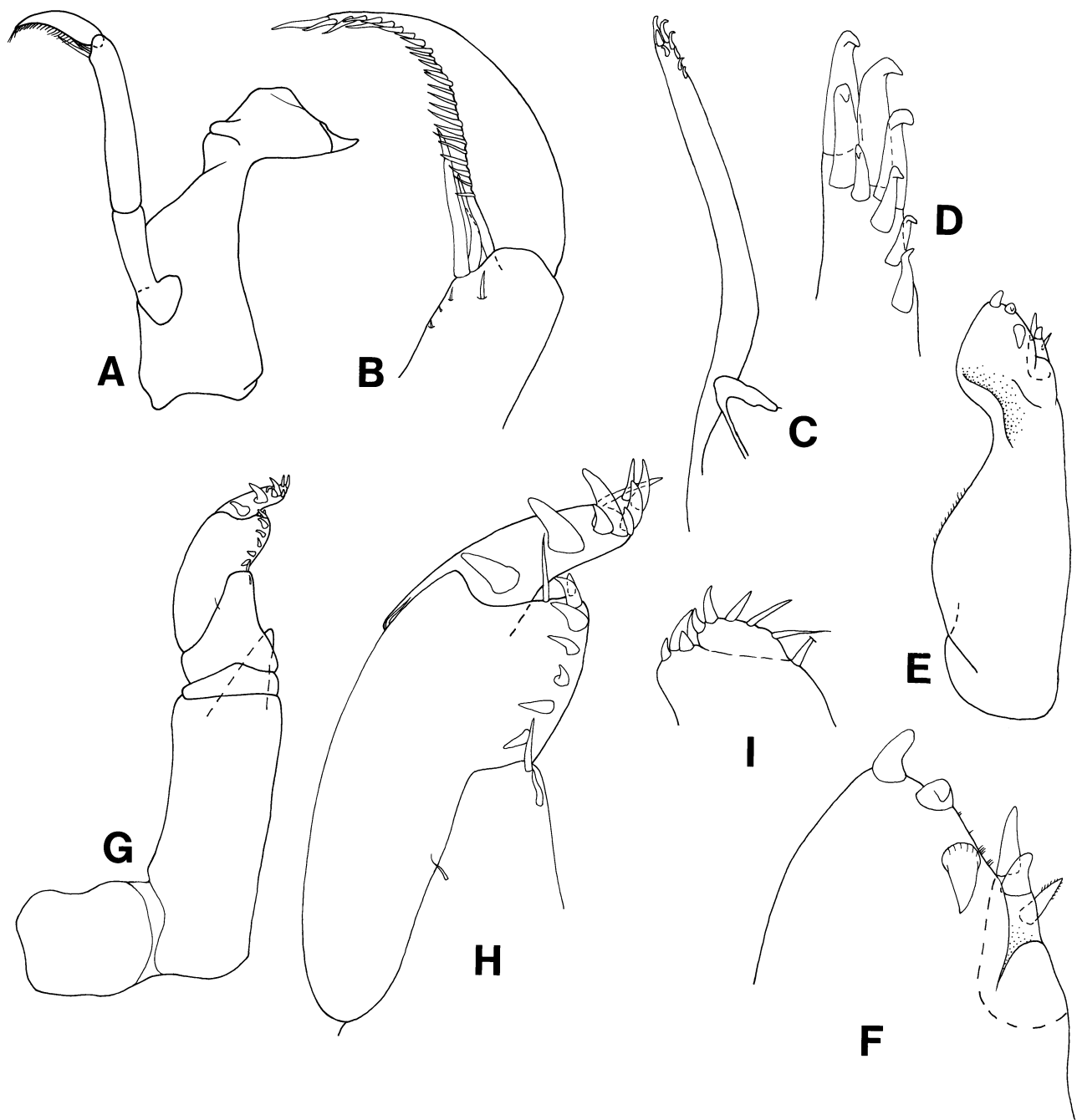
**Figure 49.** *Aega umpara* sp. nov. A–F, J, holotype, remainder paratype AM P37511. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, pleotelson posterior margin, dorsal view. F, sternite 7 showing penial openings. G, antennule. H, antenna peduncle. I, antenna peduncle, articles 1–3. J, pereopod 1, distal articles.

cluster of 1 short simple seta; flagellum with 17 articles, extending to middle of pereonite 2.

*Frontal lamina* flat, longer than greatest width, rectangular, anterior margin anteriorly truncate, with

small median point, posterior margin not abutting clypeus.

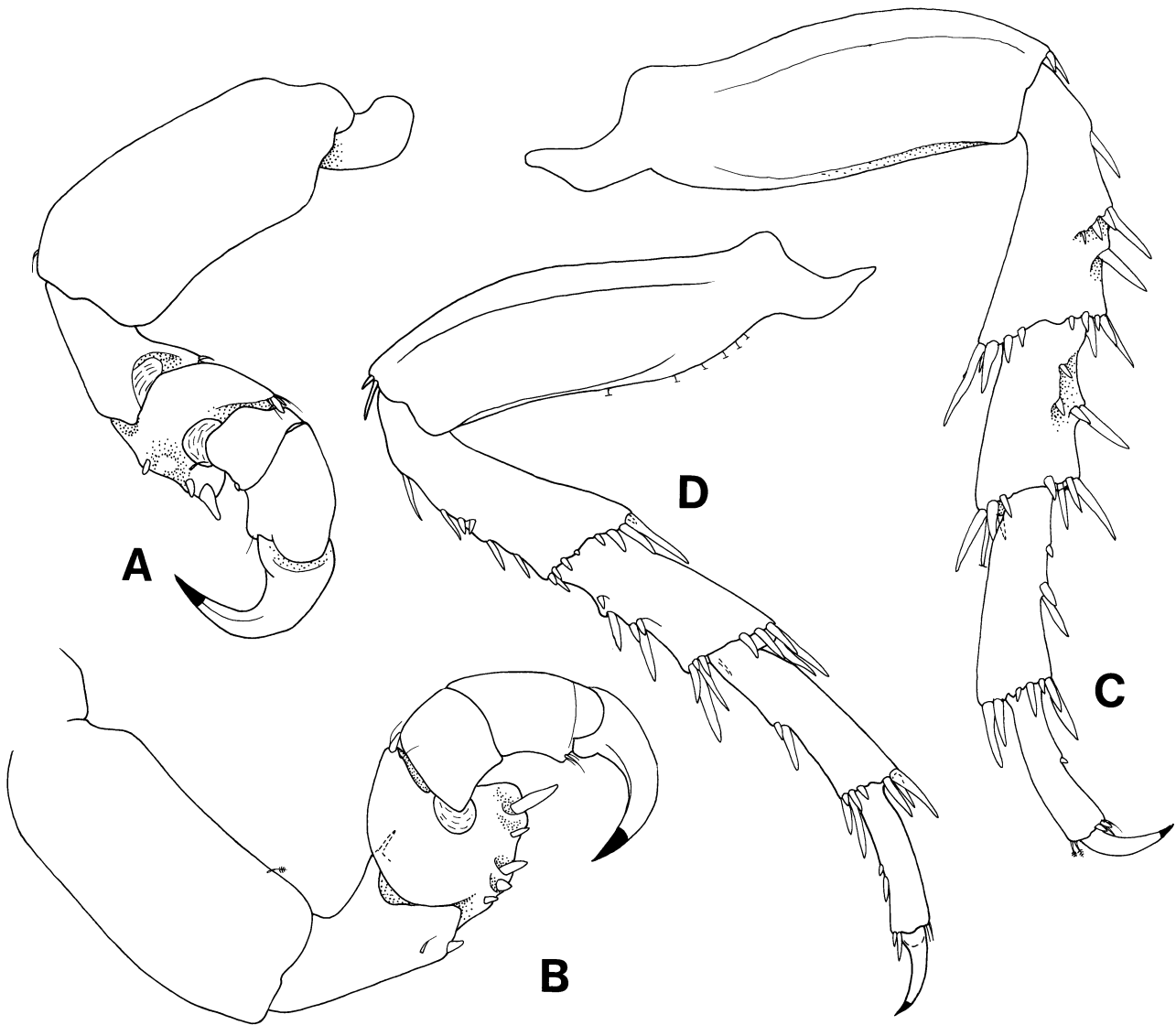
*Mandible* molar process present, minute; palp article 2 with 3 distolateral setae, palp article 3 with 25



**Figure 50.** *Aega umpara* sp. nov. Paratype AM P37511. A, mandible. B, mandible palp article 3. C, maxillule. D, maxillule apex. E, maxilla. F, maxilla, apex. G, maxilliped. H, maxilliped palp articles 2–5. I, maxilliped palp article 5.

setae. *Maxillule* with 8 terminal RS (falcate). *Maxilla* medial lobe with 3 RS; lateral lobe with 3 RS. *Maxilliped* endite with 0 apical setae (may be missing); palp article 2 with 2 RS; article 3 with 7 recurved RS; article 4 with 5 hooked RS (3 large, 2 small, distolateral margin with single straight seta); article 5 partly fused to article 4, with 5 RS (2 weakly recurved, 3 straight).

*Pereopod 1* basis 2 times as long as greatest width; ischium  $0.5 \times$  L basis, inferior margin with 0 RS, superior distal margin with 0 RS (3 simple setae); merus inferior margin with 3 RS, set as 2 groups (of 1 and 2), superior distal angle with 1 RS (and 2 simple setae); carpus  $0.5 \times$  L merus, inferior margin with 0 RS; propodus 1.3 times as long as proximal width, inferior margin with 0 RS, propodal palm with simple, without



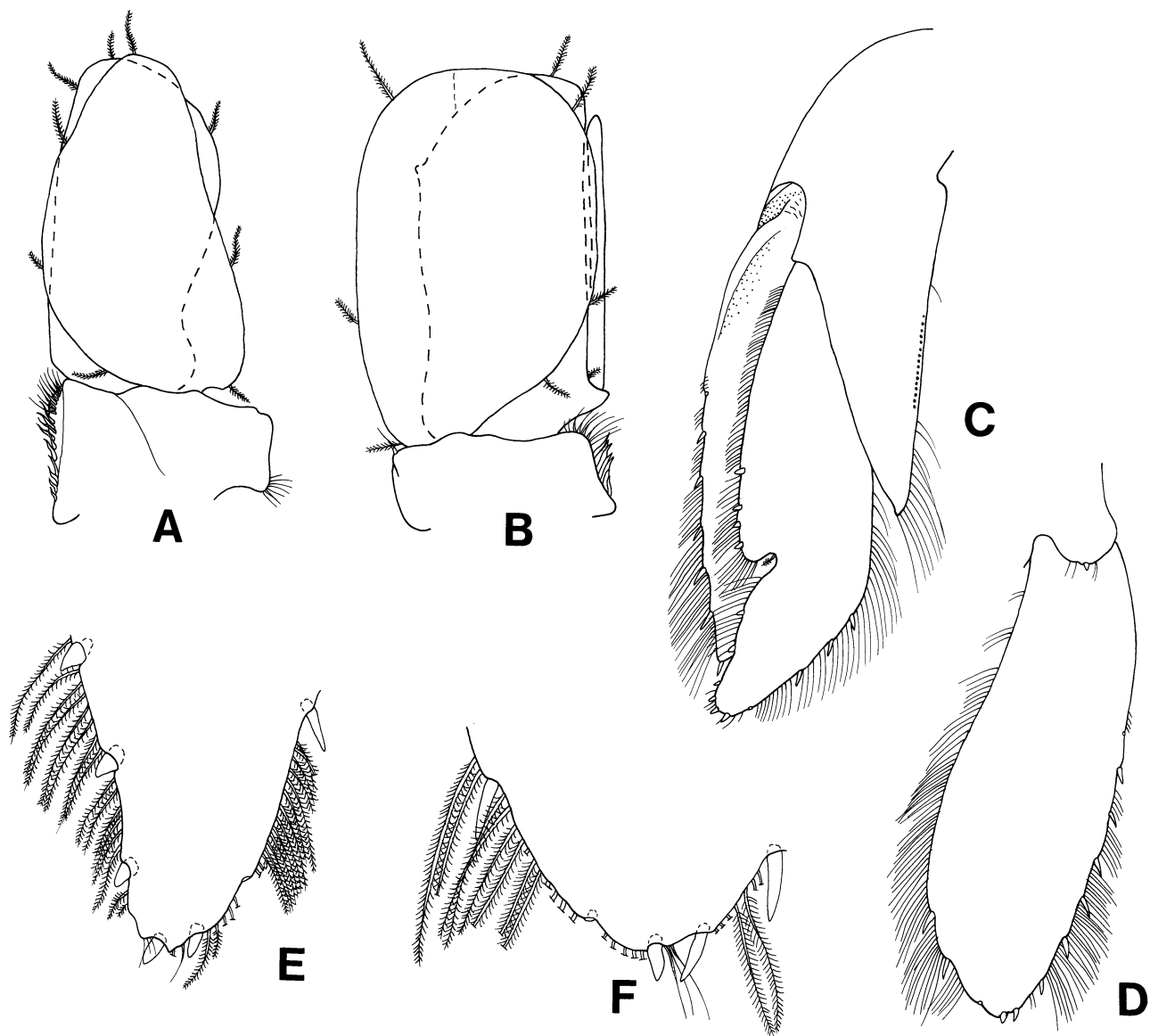
**Figure 51.** *Aega umpara* sp. nov. Paratype AM P37511. A–E, pereopods 1, 2, 6 and 7, respectively.

blade or process, dactylus smoothly curved (but strongly recurved),  $1.5 \times L$  propodus. *P2* ischium inferior margin with 1 RS, superior distal margin with 1 RS; merus inferior margin with 5 RS (set as 3 and 2), set as 2 groups, superior distal margin with 2 acute RS; carpus similar in size to that of *P1*, inferodistal angle with 1 RS (minute), propodus without large club-shaped distal RS. *P3* similar to *P2*; propodus without large club-shaped distal RS. *P6* similar to *P7* (slightly more robust with slightly fewer and more robust RS). *P7* basis 3.5 times as long as greatest width, inferior margin with 6–8 palmate setae (all broken off); ischium  $0.5 \times L$  basis, inferior margin with 6 RS (set as 1, 3, 1 and 1), superior distal angle with 5 RS, inferior distal angle with 6 RS; merus  $0.7 \times L$  ischium,  $1.8 \times LW$ , inferior margin with 5 RS (set as 2 and

3), superior distal angle with 6 RS, inferior distal angle with 6 RS; carpus  $0.9 \times L$  ischium,  $3.3 \times LW$ , inferior margin with 2 RS (single cluster), superior distal angle with 4 RS, inferior distal angle with 7 RS; propodus  $0.7 \times L$  ischium,  $4.2 \times LW$ , inferior margin with 2 RS, superior distal angle with 2 slender setae (palmate), inferior distal angle with 2 RS.

*Pleopod 1* exopod  $1.7 \times LW$ , distally narrowly rounded, medial margin weakly oblique, lateral margin distally concave (weakly), medial margin strongly convex, with PMS from base; distally subtruncate, lateral margin strongly concave, with PMS from distal one-third, medial margin with PMS from distal half; peduncle  $1.9 \times WL$ , medial margin with 10 coupling hooks. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5





**Figure 52.** *Aega umpara* sp. nov. Paratype AM P37511. A, pleopod 1. B, pleopod 2. C, uropod. D, uropod exopod, ventral view. E, uropod endopod apex. F, uropod exopod apex.

each with mediobasal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 1 RS (and 3 short slender setae), posterior lobe about  $0.6 \times$  L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices narrowly rounded. *Endopod* apically not bifid, lateral margin proximally convex (weakly), with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 4 RS, distal lateral margin with 5 RS, medial margin weakly convex, with 5 RS. *Exopod* not extending to end of endopod,  $2.8$  times as long as greatest width; lateral margin weakly con-

vex, with 8 RS; medial margin sinuate, proximally concave, with 4 RS.

#### Male

Similar to female. *Penes* opening flush with surface of sternite 7; penial openings separated by  $3.3\%$  of sternal width. Pleopod 2 *appendix masculina* with straight margins,  $0.8 \times$  L endopod, distally narrowly rounded.

#### Size

Males 24 mm, non-ovigerous females 22–45 mm; no ovigerous females present in the material examined.

### Variation

**Robust setae:** Pleotelson with 4 + 4. Uropod ( $n = 8$ ) exopod medial margin with 4 (all); lateral margin 8–10 with 8 (50%) most frequent; uropod endopod ( $n = 7$ ) medial margin varies from 4 to 6, with 4 (twice), 5 (3 times), 6 (twice), the lateral margin RS with 3 + 4 (twice), 4 + 4 (3 times) and 3 + 5 (twice). There is no discernible difference between males and females, nor does the number of RS increase with the size of the specimen.

P1 setation of the merus was consistent across its range with 1 + 2 RS (all); P2 merus ranged from 5 (all); P3 merus with 5 (6×) or 6 (twice).

### Remarks

*Aega umpara* sp. nov. is most readily identified by the relatively narrow eyes, rectangular shape of the frontal lamina, lack of a distal lobe on the propodal palm, elongate distalmost robust setae on the merus of pereopods 1–3, pattern of robust setae on the uropodal rami and the uropodal exopod not distally exceeding the endopod.

*Aega umpara* is most similar to *A. alazon* sp. nov. with the counts for robust setae on the pereopods, uropods and pleotelson falling within the range of that species. There are several other characters that show clear differences from *A. alazon*, these being the shape of the frontal lamina, relative size of the robust setae on pereopod 1 merus and the setation of the uropodal exopod which in *A. umpara* is without plumose marginal setae on the proximal one-third. An easily observed difference is that in *A. umpara* the uropodal exopod apex does not extend to the apex of the uropodal endopod, in contrast to *A. alazon*, which has the exopod exceeding the endopod apex. The frontal lamina in *A. umpara* has straight lateral margins with a distinctly wide and truncate posterior margin giving a quadrate appearance; in contrast, that of *A. alazon* is posteriorly narrow with convex lateral margins. The merus of pereopod 1 of both species has a similar number and arrangement of robust setae (1 + 2) but the form of these setae is different in those of *A. umpara*, having a small proximal seta and the distal pair consisting of one small and one long robust setae; in *A. alazon* they are all of similar size. The four type specimens have a greater number of robust setae on the uropodal endopod medial margin (4–6) than does *A. alazon*, where the most frequent is 3 or 4 (67%) robust setae with no specimens having more than 5.

The specimen from Elizabeth Reef is excluded from the type series as the eyes seem to be narrowly separated. I have been unable to determine whether this is an artefact of preservation. Otherwise, the specimen is consistent in appearance with the other specimens, showing the characteristic shape of the frontal lamina and pattern of robust setae on the pereopods. The Ker-

mader specimen is excluded from the paratypes as it was received after the description was finalized.

### Prey

*Polyprior oxygenios* (Schneider & Forster, 1801), Polyprioridae; 'black cod' (= *Epinephilus*, Epinephilidae?); *Hypnos monopterygium* (Shaw, 1795), Torpedinidae; and *Galeocerdo cuvier* (Péron & Lesueur, 1882), Carcharhinidae.

### Distribution

South-western Pacific: from eastern Australia at Moreton Bay, Queensland south to the Solitary Islands, and eastwards at Elizabeth Reef, Norfolk Island and the Kermadec Islands. Recorded between 8 and 175 m; the Elizabeth Reef specimen was likely taken from angling depth and *A. umpara* appears to be a genuine shallow-water species.

### Etymology

*Umpara* is an Aboriginal word for stingray, in reference to the prey of the type specimen; noun in apposition.

### *AEGA WARNA* SP. NOV. (FIGS 53–56, 64)

*Aega deshaysiana* – Hale, 1940: 295 (part).

### Material examined

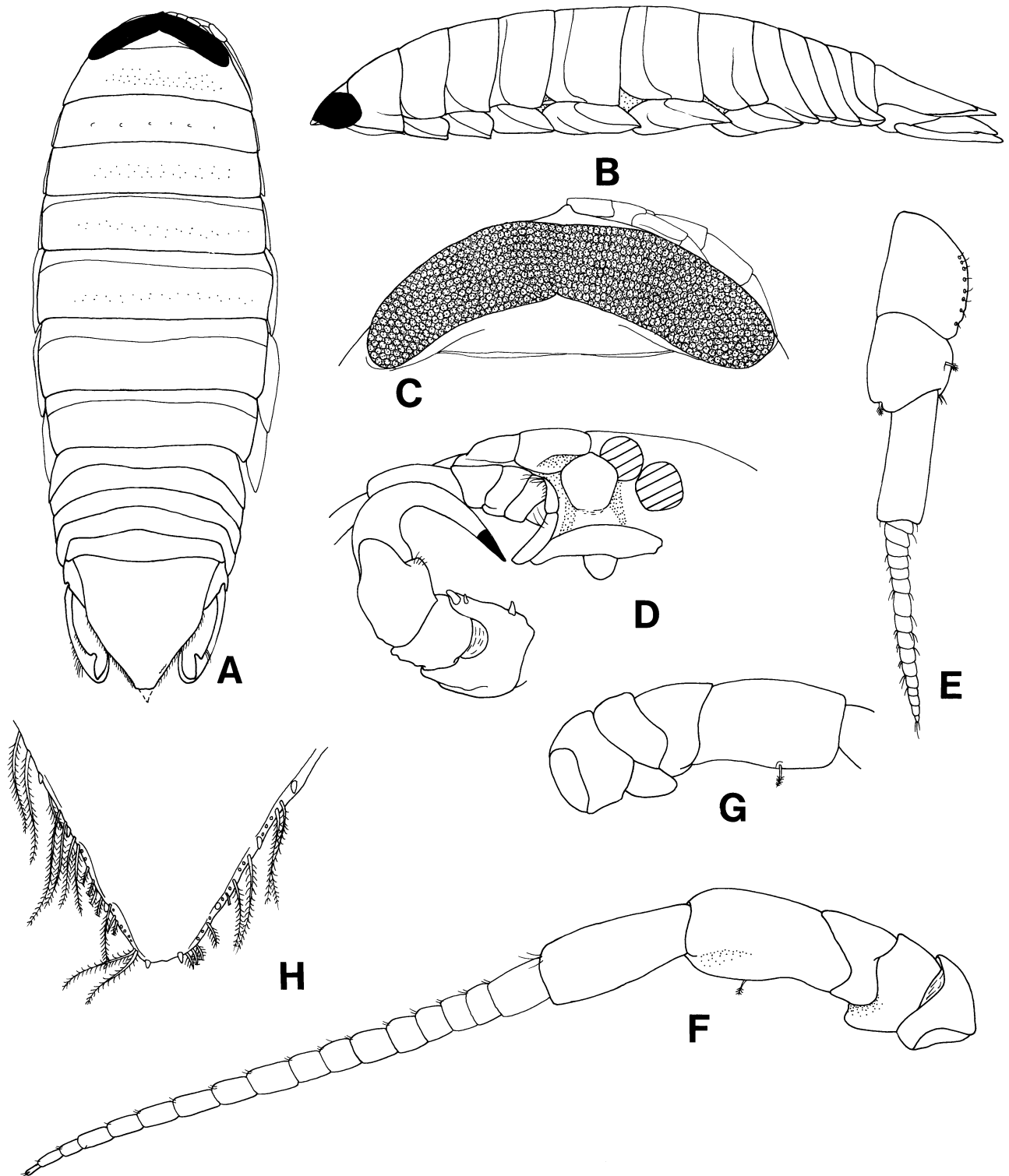
**Holotype:** ♀ (non-ovig. 49 mm), Western Bass Strait, 35 km WNW of West Point, 40°47.4'S, 144°17'E, 2.ii.1991, 99 m, coarse sand, coll. R. Gomon *et al.* (NMV J1335).

**Paratypes:** ♀? (56 mm), Lakes Entrance, Vic., 33 m, ix.1948, coll. W. French (NMV J8887) (apex of pleotelson rubbed away, otherwise intact). ♀ (non-ovig. 50 mm), off Albert Park, Port Phillip Bay, Vic., 3.ix.1964 (uropods missing and some legs broken) (NMV J8886). ♀ (non-ovig. 36 mm [one uropod malformed]), Tasmania, off coast, 1912, no other data (Hale, 1940) (AM E5353). ♀ (non-ovig. 59 mm), off Marsden Point, Kangaroo Is., South Australia (AM E4865) (Hale, 1940).

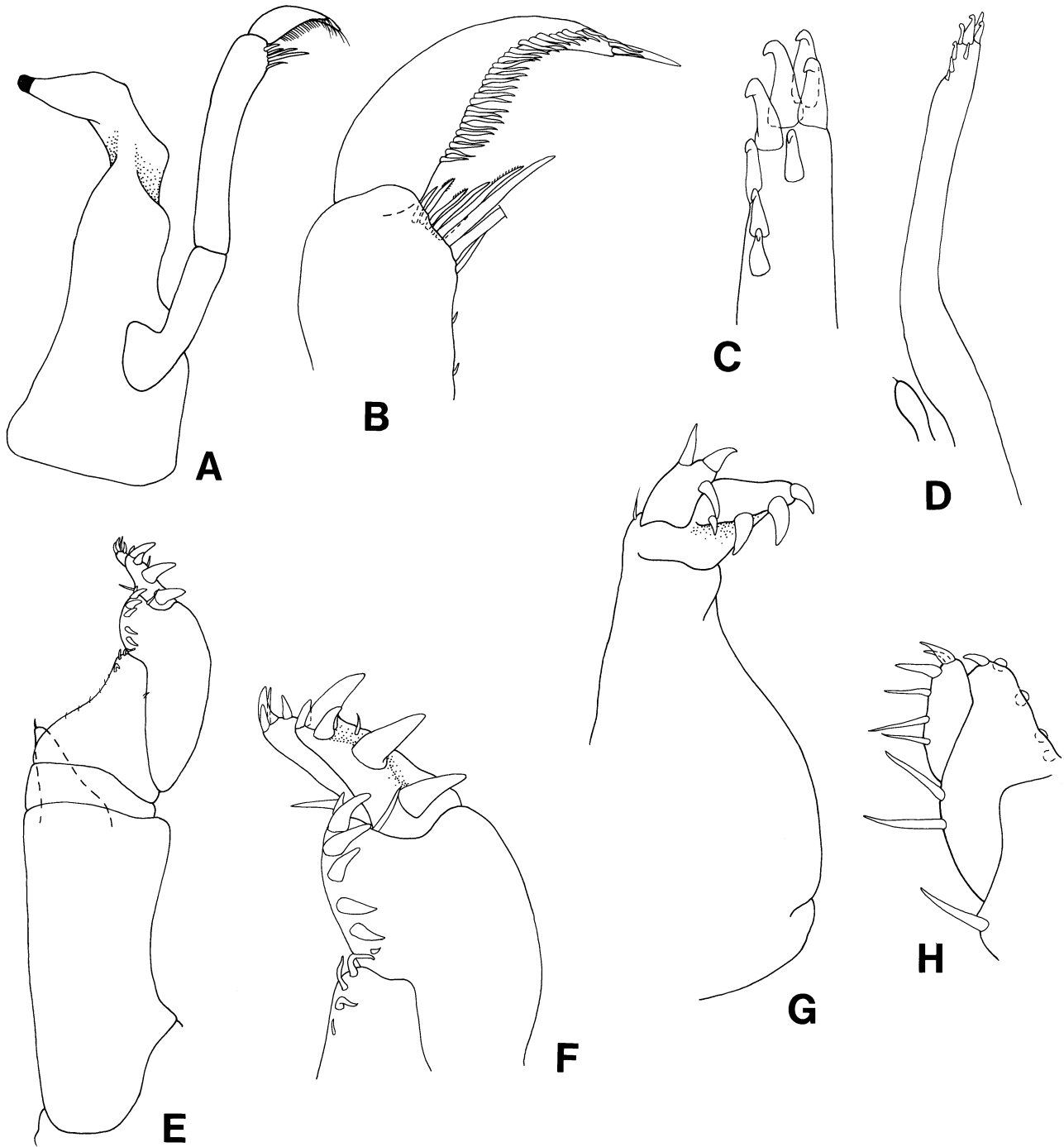
**Non-type:** ♀ (or imm ♂, 25 mm), west of north-west Tasmania, 41°02.50'S, 143°53.10'E, 27.i.1985, 518 m, coll. R. Plant on RV *Soela* (NMV J27711). Manca (21 mm), off Freycinet, Tasmania, 41°57.50'S, 148°37.90'E, 27.vii.1986, 400 m, on coarse shell, coll. M.F. Gomon *et al.* (NMV J18389).

### Description

**Body** 2.7 times as long as greatest width, dorsal surfaces polished in appearance (finely punctate), widest at pereonite 5, lateral margins weakly ovate. Rostral



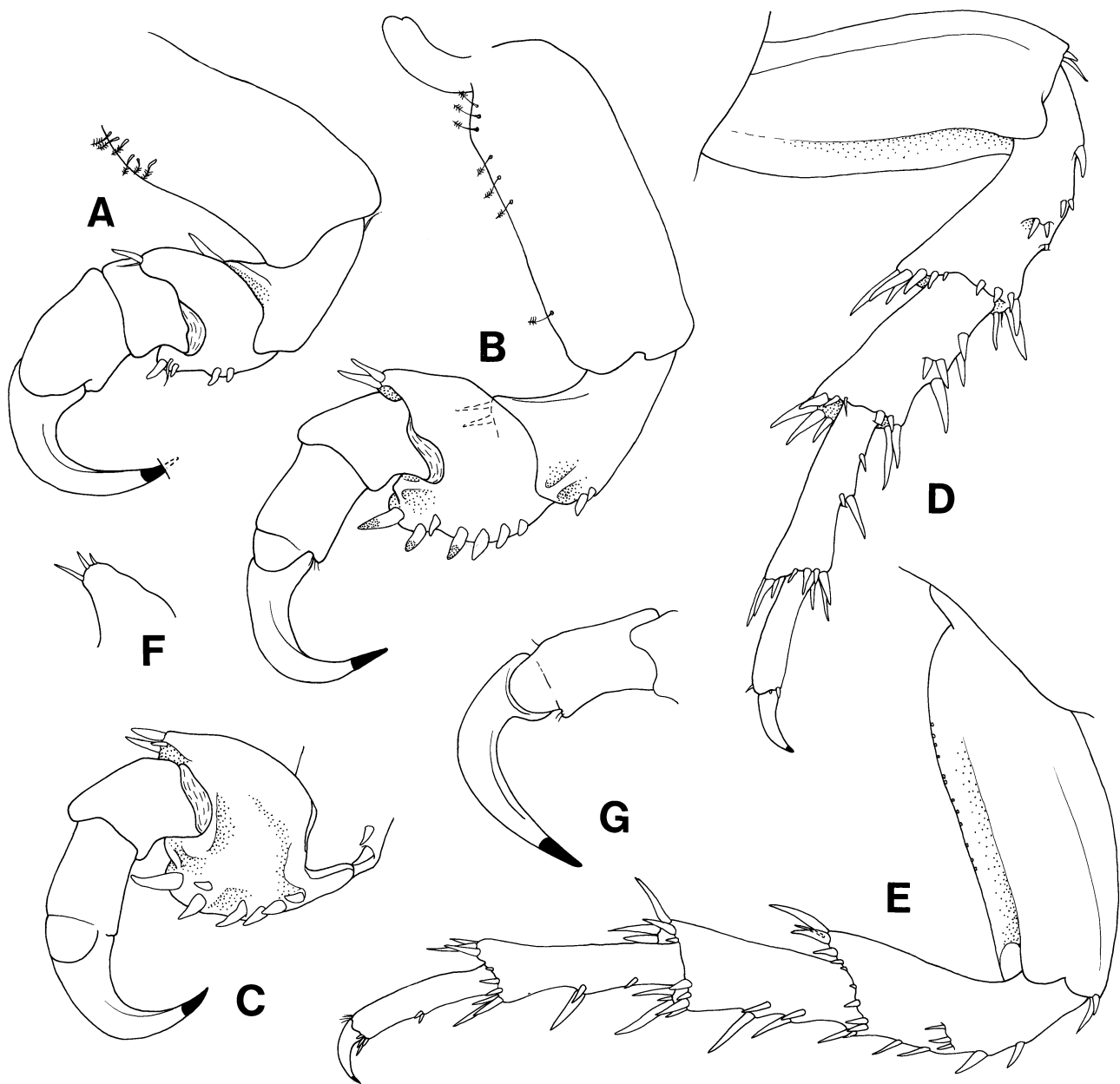
**Figure 53.** *Aega warna* sp. nov. All figs holotype, except H (AM E5353). A, dorsal view. B, lateral view. C, head, dorsal view. D, frons and pereopod 1. E, antennule. F, antenna. G, antenna peduncle, articles 1–3. H, pleotelson posterior margin, dorsal view.



**Figure 54.** *Aega warna* sp. nov. Holotype: A, mandible. B, mandible palp article 3. C, maxillule apex. D, maxillule. E, maxilliped. F, maxilliped palp articles 2–5. G, maxilla. H, maxilliped palp article 5.

point projecting anteriorly, not ventrally folded. *Eyes* large, medially united, anterior clear field 11% length of head, posterior clear field 40% length of head; each eye made up of ~23 transverse rows of ommatidia, each row with ~9 ommatidia; eye colour dark brown. *Pereonite 1* and *coxae 2–3* each with posteroventral

angle right-angled (with minute posteroventral point); *coxae 5–7* with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending clearly beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles overlapped by lateral margins of pleonite 4.



**Figure 55.** *Aega warnae* sp. nov. Holotype: A–E, pereopods 1–3, 6 and 7, respectively. F, pereopod 2, ischium mesial face. G, pereopod 2 propodus and dactylus, perpendicular view.

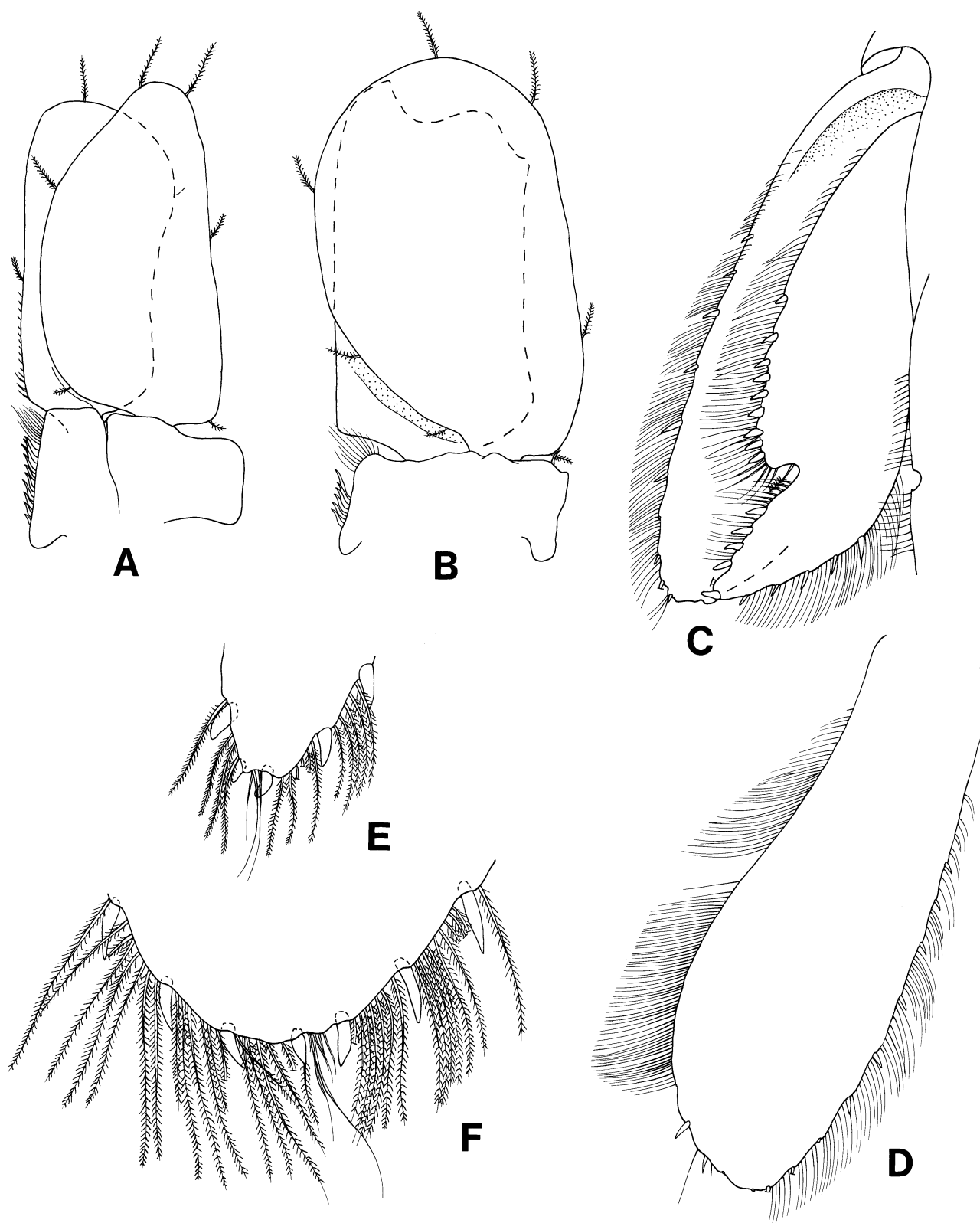
*Pleotelson* 1.0 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins weakly convex, smooth, posterior margin with elongate medial point, with 12–14 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 without anterodistal lobe; articles 3 and 4 0.6 times as long as combined lengths of articles 1 and 2, article 3  $2.6 \times$  LW; flagellum with 15 articles, extending to posterior margin of eye. *Antenna* peduncle article 2 inferior surface with distinct longitudinal suture; article 4  $1.8 \times$  LW, 1.2 times as long as combined lengths of

articles 1–3, without deep longitudinal groove, inferior margin with 1 plumose seta, and 0 short simple setae; article 5 not markedly wider or flatter than article 4,  $0.9 \times$  L article 4,  $2.2 \times$  LW, inferior margin with 1 plumose seta, anterodistal angle with cluster of 3 short simple setae; flagellum with 19 articles, extending to posterior of pereonite 1.

*Frontal lamina* flat, as wide as long, lateral margins converging posteriorly (weakly converging), anterior margin rounded, without small median point, posterior margin not abutting clypeus.





**Figure 56.** *Aega warnae* sp. nov. A–D holotype, E and F, AM E4865. A, pleopod 1. B, pleopod 2. C, uropod. D, uropod exopod, ventral view. E, uropod endopod apex. F, uropod exopod apex.

*Mandible* molar process absent; palp article 2 with 8 distolateral setae, palp article 3 with ~30 setae. *Maxillule* with 8 terminal RS. *Maxilla* medial lobe with 3 RS; lateral lobe with 4 RS. *Maxilliped* endite with 1 apical seta; palp article 2 with 4 RS (curved); article 3 with 7 recurved RS; article 4 with 5 hooked RS (3 large and 2 small; distolateral margin with 2 straight long RS); article 5 articulating with article 4, with 6 RS (3 slender, straight and 3 stout, curved).

*Pereopod 1* basis 2 times as long as greatest width; ischium  $0.5 \times$  L basis, inferior margin with 0 RS, superior distal margin with 3 RS; merus inferior margin with 4 RS, set as 2 groups (2 and 2), superior distal angle with 2 RS; carpus  $0.6 \times$  L merus, inferior margin with 0 RS; propodus 1.5 times as long as proximal width, inferior margin with 0 RS, propodal palm with simple, without blade or process, dactylus smoothly curved,  $1.6 \times$  L propodus. *P2* ischium inferior margin with 2 RS, superior distal margin with 2 RS; merus inferior margin with 7 RS (4 and 3), set as 2 groups, superior distal margin with 2 acute RS; carpus similar in size to that of *P1*, inferodistal angle with 0 RS, propodus without large club-shaped distal RS. *P3* similar to *P2*; propodus without large club-shaped distal RS. *P6* similar to *P7*. *P7* basis 2.2 times as long as greatest width, inferior margin with 7 RS (set as 1, 1, 4 and 1); ischium  $0.6 \times$  L basis, inferior margin with 7 RS (set as 1, 1, 4 and 1), superior distal angle with 7 RS, inferior distal angle with 5 RS; merus  $0.7 \times$  L ischium,  $1.9 \times$  LW, inferior margin with 4 RS (set as 2 and 2), superior distal angle with 5 RS, inferior distal angle with 7 RS; carpus  $0.9 \times$  L ischium,  $3 \times$  LW, inferior margin with 2 RS (set as single cluster), superior distal angle with 3 RS, inferior distal angle with 6 RS; propodus  $0.8 \times$  L ischium,  $5 \times$  LW, inferior margin with 2 RS (set as single cluster), superior distal angle with 3 slender setae (simple and palmate), inferior distal angle with 3 RS.

*Pleopod 1* exopod  $1.9 \times$  LW, distally narrowly rounded with strongly oblique medial margin, lateral margin straight, medial margin strongly convex, with PMS from base; endopod  $2 \times$  LW, distally subtruncate, lateral margin strongly concave, with PMS from on distal margin only, medial margin with PMS from distal half; peduncle  $1.9 \times$  WL, medial margin with 10 coupling hooks. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods 3–5 each with mediobasal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS (and 1 slender seta), posterior lobe about one-half L endopod. Uropod rami not coplanar, exopod at angle of about  $135^\circ$  to endopod, rami not extending beyond pleotelson, marginal setae in single tier, apices broadly rounded (endopod, exopod narrowly truncate). *Endopod* apically not bifid, lateral margin proximally con-

vex, distally straight, with prominent excision positioned about two-thirds along ramus, proximal lateral margin with 9 RS, distal lateral margin with 5 RS, medial margin strongly convex, with 6 RS. *Exopod* extending beyond end of endopod (slightly), 2.9 times as long as greatest width, apically not bifid; lateral margin straight, with 9 RS; medial margin distally concave (proximally weakly sinuate), with 5 RS.

#### Male

Not known.

#### Size

Females 36–59 mm (mean = 50.0 mm); no ovigerous females present in the material examined; manca 21 mm.

#### Variation

*Robust setae*: all specimens had some degree of damage to the uropod and pleotelson apices, therefore only the ranges for RS are given. Pleotelson with 12–14 (6 + 6 and 7 + 7). Uropod exopod medial margin with 5, once with 6, lateral margin 9–12; uropod endopod medial margin varied from 5 to 7, with 6 most frequent (6 of 8), lateral margin RS variable with the proximal RS at 5–9, distal RS 4–7 with 8 proximal most frequent (4 of 8) and 5 distal most frequent (5 of 8).

Pereopod RS are highly consistent with the merus of *P1*, usually asymmetric with 1 + 2 and 2 + 2, *P2* merus with 4 + 3 (100%) and *P3* merus with 4 + 3 (70%) or 5 + 3 (30%).

#### Remarks

This large isopod can be immediately distinguished from other similar species by the 'heavily spined' uropodal rami with the uropodal endopod lateral margin with a total of 11–16 large robust setae, ovate frontal lamina with a thick posterior stem, and by the characteristic pattern of setation of the anterior pereopods. Additionally, the robust setae on the uropod endopod are noticeably stout. The maxilliped and maxillule are furnished with larger robust setae than many other similar species, presumably a reflection of differences in the targeted prey.

Only pleopods 1 and 2 of the holotype have been examined in detail as these were either damaged or brittle in all specimens. Pleopods 3–5 were examined *in situ*, and appear similar to those of other similar species.

Two small specimens are excluded from the type series though they generally agree well with the pattern and range of robust setae of the anterior pereopods and the uropods shown by the adults, as well as having the characteristic frontal lamina shape. There are minor differences in the number of robust setae on

the uropods and the distribution pattern and number of robust setae on the pereopods. The propodi of pereopods 1–3 of the manca (NMV J18389) are more slender than those figured for the adult, and it is also from markedly deeper water than the other specimens, so the identification of this specimen as *A. warna* is regarded as tentative.

#### Prey

No records.

#### Distribution

Tasmania and Bass Strait, westwards to Victoria and South Australia. Most specimens lack precise locality or capture data; at depths of 33 and 99 m, one manca from 400 m and one immature specimen from 518 m.

#### Etymology

*Warna* is an Aboriginal word for the sea; noun in apposition.

### UNASSIGNED SPECIES

The specimens listed here are not described. This is, in the main, due to insufficient or inadequate material. These species are all distinct from the named and new species described here, and in some cases are similar to existing species. Comments are made on what appear to be distinguishing characters, but in all cases this would need to be confirmed and expanded on by examination of further specimens.

1. *Aega* sp. ♀ (non-ovig. 38 mm, previously dissected), 23°27'S, 176°00'E (east of southern New Caledonia), loaned by M. Malyutina, Vladivostok.

*Descriptive notes:* eyes large with a long medial contact. Frontal lamina straight-sided. P2 and 3 propodus with small distal lobe; merus with 7 RS in single row (both P1 missing from specimen). Uropod endopod L exopod, distal part narrow, lateral margin with 3 + 6 and 3 + 7 RS, medial margin with 7 (both); exopod lateral margin with 10 (both), medial margin with 4 (both).

#### Remarks

This species (Fig. 62) is most similar to *A. umpara* sp. nov. from which it differs by having the meral robust setae of pereopods 2 and 3 in a single continuous row and a greater number of robust setae on the medial margin of the uropodal endopod and on the distal part of the lateral margin. The setation of pereopod 2 and pereopod 3 is similar to that of *A. alazon* sp. nov., but the shape of the frontal lamina is different and *A. alazon* has the uropodal exopod clearly extending beyond the endopod apex. This species differs from

*A. japonica* sp. nov. by having larger eyes and a greater number of robust setae on the uropodal endopod.

2. *Aega* sp. ♂ (16.5 mm), Coral Sea, north-east of Cooktown, Queensland, 12°20.4'S, 153°34.8'E, 21.xi.1985, 462–459 m, *Soela* 0685/22/3 (NTM Cr013499).

*Descriptive notes:* eyes large, narrowly but clearly separated. Frontal lamina similar to that of *A. alazon* sp. nov. and *A. hamiota* sp. nov. P1–3 propodus without any trace of lobe; P1 merus inferior margin with 1 + 1 RS (both), P2 and 3 merus with 3 + 2 RS except one P2 with 3 + 3, all in 2 groups. Uropodal endopod L exopod, distal part narrow, lateral margin 2 + 3 (both), medial margin with 5 (both); exopod medial margin with 4 (both). Pleotelson with at least 3 + 3 RS.

#### Remarks

This species (Fig. 62) is somewhat similar to *A. birubi* sp. nov. from south-eastern Australia, from which it differs by pereopods 1–3 lacking any trace of a propodal lobe, the distinctive setation of the merus of pereopods 1–3 and the uropodal exopod not notably extending beyond the endopod apex. Although this small specimen has distinctive pereopodal setation, confirmation that this is consistent would be needed before it could be described and differentiated from other similar species.

3. *Aega* sp. ♀ (non-ovig. 40 mm), East of Mackay, 19°32.85'S, 152°34.8'E, 23.xi.1985, 477–470 m, coll. CSIRO FRV *Soela* (NTM Cr01349).

*Descriptive notes:* eyes large, just separated. Frontal lamina similar to that of *A. musorstom*, but round. All coxae with distinct posteroventral point. P1–3 propodus with prominent blade; P1 merus inferior margin with 7 long acute RS (both), P2 with 14 and 13, P3 merus with 14 and 16. Posterior pereopods with long acute RS (as in *A. musorstom*). Uropod exopod wide, extending beyond endopod apex, medial margin with 6 (both) widely spaced RS; endopod notch shallow, lateral margin 2 + 5 (both), medial margin with 4 and 6. Pleotelson without RS.

#### Remarks

This species is similar to two South-West Pacific species: *A. musorstom* sp. nov. from New Caledonia and *A. trulla* sp. nov. from eastern Australia and the Solomon Islands, both of which have a prominent blade to the propodus of pereopods 1–3. The latter is immediately distinguished by having the anterior coxae rounded, larger eyes, relatively short robust setae on the posterior pereopods and robust setae on the pleotelson. *Aega musorstom* is very similar with regard of the morphology and setation of the pereopods.

pods, uropods and pleotelson and also the coxae, but differs from the Australian species in having a longer frontal lamina, larger eyes that are fully united, narrower uropod endopod and fewer robust setae on pereopod 2 and pereopod 3. Given that these two species are so similar, further material of the Australian species is needed to confirm that these differences are consistent before it can be named.

4. *Aega* sp. ♂ (25 mm), Taupo Sea Mount, 33°10.5'S, 156°07.7'E, 7.x.1982, 154–164 m, stn U212, coll. AM on R.V. *Tangaroa* (AM P43987).

*Descriptive notes:* eyes large, entirely united. Frontal lamina nearly circular in outline. P1 merus inferior margin with 2 + 3 (both), P2 and P3 merus with 7 RS except one P2 with 6; RS as single row except for distal doubled pair. Uropod exopod extending to endopod apex. Pleotelson apex damaged, with 15 visible RS, and a probable number of 18 RS.

#### Remarks

This species is somewhat similar to *A. alazon* sp. nov. from which it differs by having a nearly circular frontal lamina, pereopods 1–3 having a different arrangement of robust setae on the merus, the uropodal exopod not notably extending beyond the endopod apex and, most conspicuously, a far larger number of robust setae on the pleotelson, the apex of which appears slightly deflected to the dorsal.

5. *Aega* sp. ♀ (non-ovig. 19.5 mm, previously dissected), Pailolo Channel between Molokai and Maui Islands, N.E. approach, Hawaii, 254–308 m coll. *Albatross* Hawaii (USNM 28974) (Richardson, 1904 and part *A. deshaysiana* of Brusca, 1983).

*Descriptive notes:* eyes large, entirely united. Frontal lamina anteriorly indented, posteriorly narrow. P1–3 propodus with small distal lobe; merus inferior margin with 6 RS as single row (both), P2 and P3 merus with 7 RS as single row. Uropod exopod not extending to endopod apex. Uropod exopod medial margin with 4 RS (both); endopod medial margin with 4 and 5 RS, lateral margin with 2 + 3 and 2 + 4 RS. Pleotelson apex damaged, with 5 + 6 visible RS, and a probable number of 12 or 14 RS.

#### Remarks

This species is most similar to the eastern Atlantic species *A. deshaysiana*, most notably in the having the frontal lamina anteriorly indented, uropod exopod not extending to the apex of the uropodal endopod and the posterior part of the uropodal endopod relatively narrow. It differs in having the eyes united, more numerous robust setae on the merus of pereopods 1–3, those setae being set in a single row. *Aega antillensis* is also similar, but that species has the uropodal exopod extending beyond the apex of the endopod, and while

the meral robust setae of pereopods 1–3 are set as a single row, they are fewer in number.

6. *Aega* sp. ♂ (20 mm), Chatham Bay, Cocos Island, Pacific Costa Rica (c. 5°33'N, 86°34'5 W), 14.i.1938, coarse white sand, *Velero IV* stn 780–38 (LACM CR1938-296-1) (part *A. deshaysiana* of Brusca, 1983; also Espinosa-Pérez & Hendrickx, 2001).

*Descriptive notes:* eyes large, clearly separated. Frontal lamina anteriorly wide, wider than long, posteriorly narrow. P1–3 propodus with small distal lobe; merus inferior margin with 3 as 1 + 2 (both), P2 and P3 merus with 5 RS as single row; all RS are relatively large (as in *A. birubi* sp. nov. or *A. umpara* sp. nov.). Uropod exopod slender, just extending beyond endopod apex. Uropod exopod medial margin with 3 RS (both); endopod medial margin with 5 RS (both), lateral margin with 3 + 4 and 4 + 3 RS. Pleotelson apex damaged, with 4 + 5 visible RS, and a probable number of 10 RS.

#### Remarks

This species is similar to the Atlantic species *A. antillensis* and *A. deshaysiana*, but is readily distinguished by the obviously separate eyes and by the unusual frontal lamina which is anteriorly far wider than in any other species. These character states also distinguish this species from the undescribed species recorded from Hawai'i. The setation of the merus of pereopods 1–3 is similar to that of *A. birubi* sp. nov. and *A. umpara* sp. nov. in both arrangement and stoutness.

#### ÆGA MAGNIFICA (DANA, 1853) (FIGS 57–60)

*Pterelas magnificus* Dana, 1853: 769; 1853 (Atlas), pl. 51, fig. 4a–g.

*Æga magnifica* – Schioedte & Meinert, 1879: 363, pl. 8, figs 14–19.

*Aega magnifica* – Bovallius, 1885: 8, pl. 2, figs 11–17; Dollfus, 1891: F56, pl. 8, fig. 1, 1b; Giambiagi, 1925: 233; Menzies, 1962: 117, fig. 38D–I.

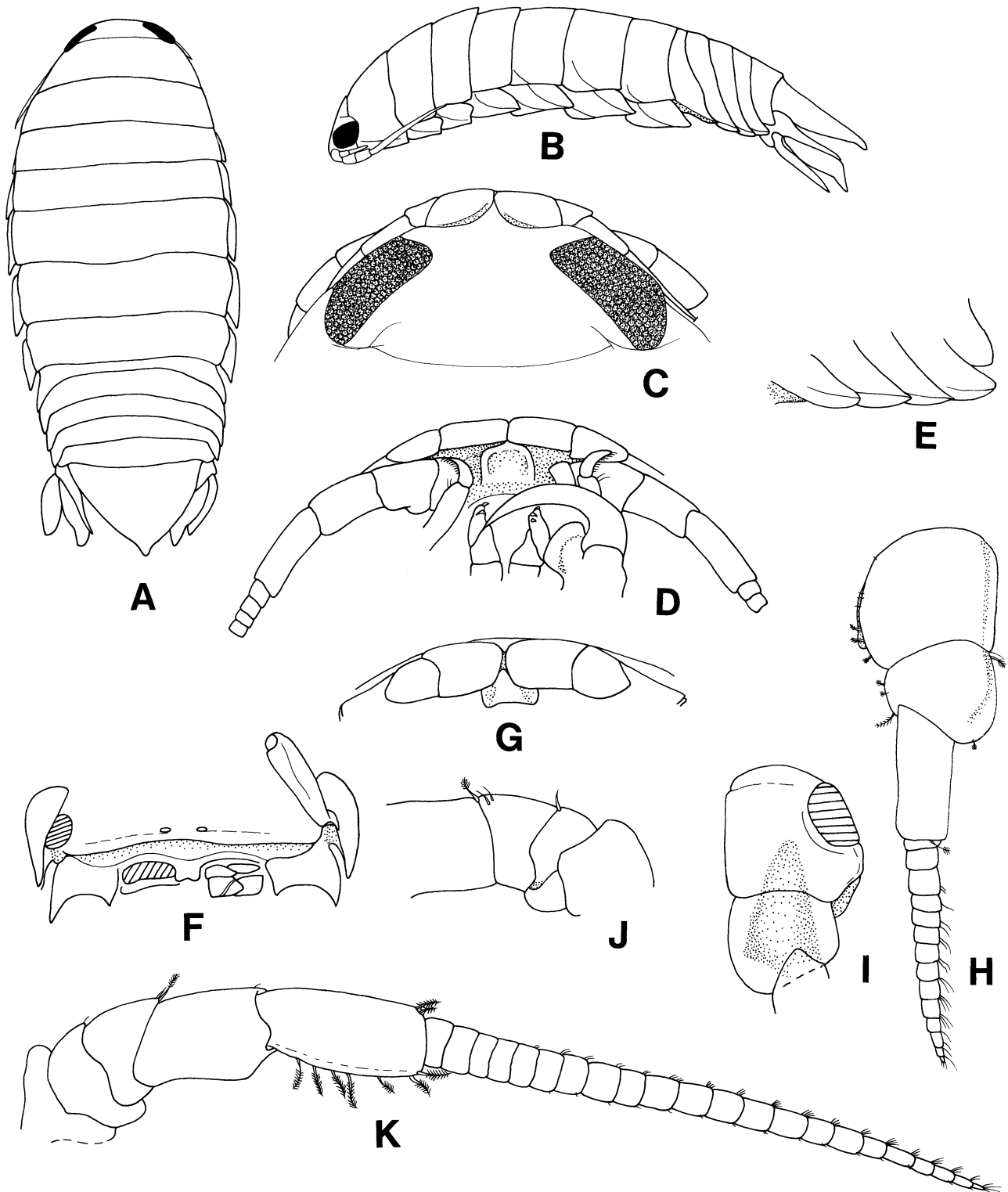
*Aega (Aega) magnifica* – Brusca, 1983: 9, 11.

#### Material examined

*Neotype* (here designated): ♂ (18.5 mm), Bahia Inutil (c. 53°37'S, 69°36'W), Patagonian Archipelago, 23.i.1896, stn 626, 36–55 m, shell debris, collected by Nordenskjöld's Expedition till Eldslandet och Patagonien, 1895–96 (SMNH 5907).

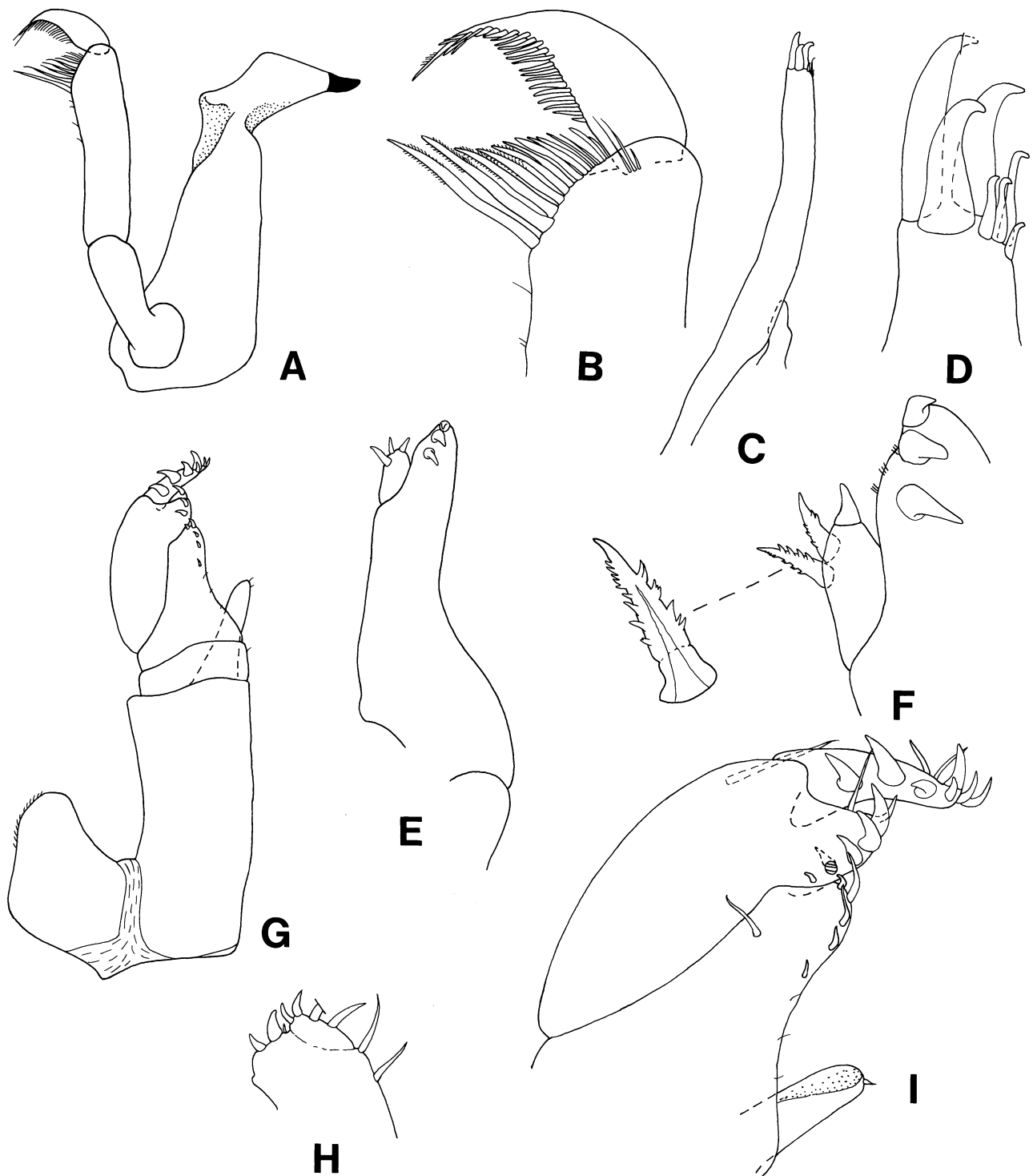
*Non-type material:* LUND UNIVERSITY CHILE EXPEDITION 1948–49 (Menzies, 1962): 2 ♀ (non-ovig. 29, 30 mm), Golfo de Ancud, Estero Huito, central part, 41°43.83'S, 73°10.25'W, 5.xii.1948, stn M20, very fine sand mixed with mud, 15 m (SMNH 46250); ♀



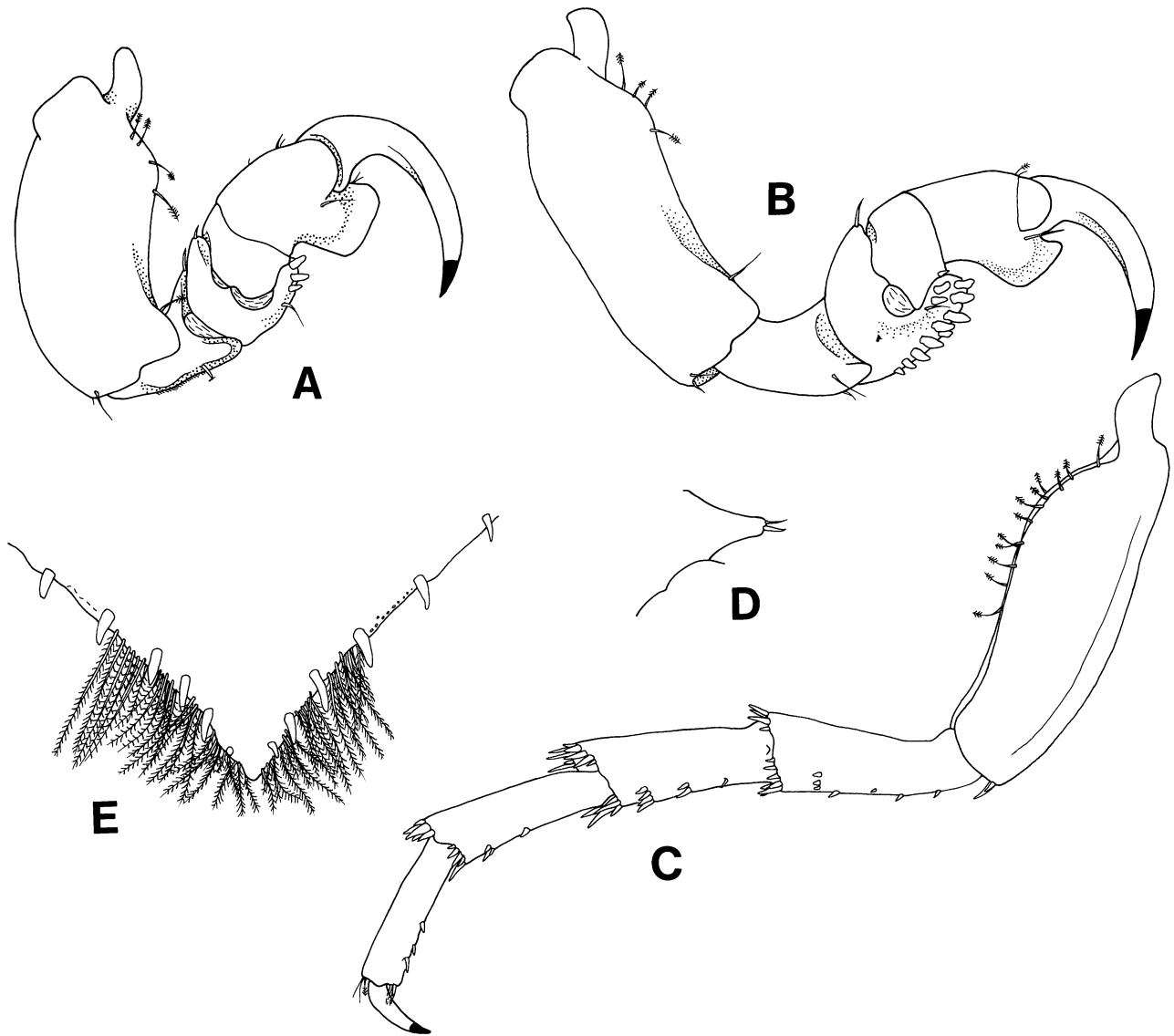


**Figure 57.** *Aega magnifica* (Dana, 1853). Neotype. A, dorsal view. B, lateral view. C, head, dorsal view. D, frons. E, pleonite, lateral view. F, sternite 7 showing penial openings. G, frontal margin of head in anterior view. H, antennule. I, antennule peduncle, articles 1 and 2, ventral view. J, antenna peduncle, articles 1–3, ventral view. K, antenna.





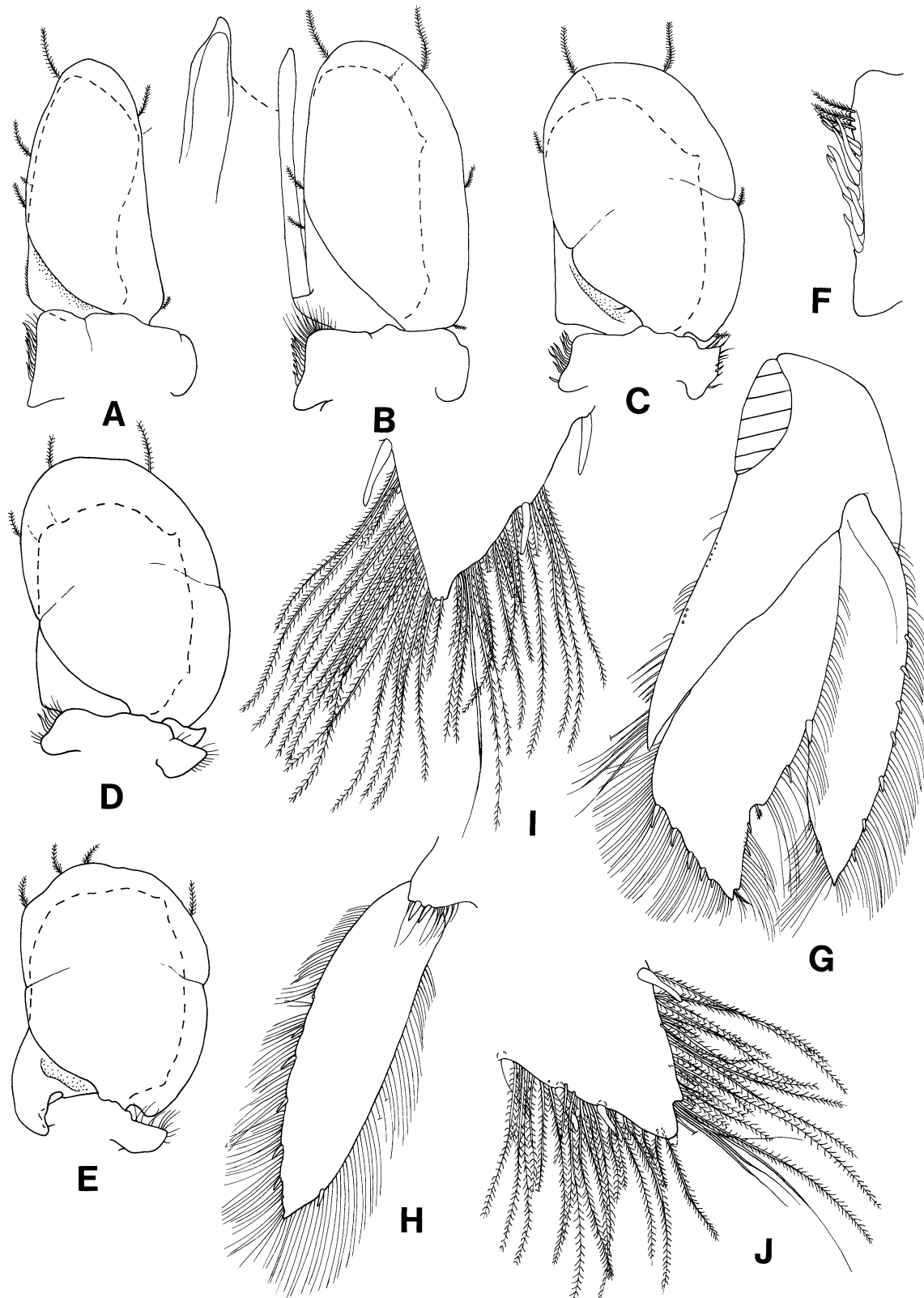
**Figure 58.** *Aega magnifica* (Dana, 1853). Female, SMNZ46250. A, mandible. B, mandible palp article 3. C maxillule. D, maxillule apex. E, maxilla. F, maxilla, apex detail. G, maxilliped. H, maxilliped palp article 5, dorsal view. I, maxilliped palp articles 2–4.



**Figure 59.** *Aega magnifica* (Dana, 1853). Neotype. A–C, pereopods 1, 2 and 7, respectively. D, pereopod 1, ischium superior distal angle. E, posterior margin of pleotelson.

(ovig. 28 mm, with 2 mancas), Golfo de Ancud, Canal Calbuco, between Punta Meimen and Punta, 41°48.83'S, 73°09.67'W, 15.xii.1948, stn M21, small stones, 25 m (SMNH 46249); ♀ (non-ovig. ~19 mm, previously dissected, in 2 pieces, one P1 missing), Golfo de Ancud, between Isla Quenu and Isla Chidguapi, 41°49.67'S, 73°10.00'W, 3.v.1949, stn M27, coarse sand with shells, 45 m (SMNH 46248); ♀ (non-ovig. 23 mm), Golfo de Ancud, south of Isla Quellin, from rocks, vii.1949 (SMNH 46251). (All coordinates converted to decimal degrees to 2 places.) *EUGENIE* EXPEDITION: 3 ♀ (non-ovig. 18, 20, 21 mm), Magellan Strait, Atlantic, coll. *Eugenie* Expedition 1851–1853 (no other data but 'det. H.J. Hansen') (SMNH 46239); ♀ (non-ovig. 25 mm), Magellan Strait, Atlan-

tic, without station number ('utan nummer'), coll. *Eugenie* Expedition 1851–1853 (SMNH 46240) (Bovallius, 1885, reported one specimen from this expedition). *NORDENSKJÖLD'S EXPEDITION* till Eldslandet och Patagonien, 1895–96: 2 ♀ (non-ovig. 23 mm, ovig. 22 mm, both somewhat anteriorly posteriorly crushed), Punta Arenas, Patagonian Archipelago, 5.xii.1895, stn 341, shell debris (SMNH 46247). 3 specimens (19, ~20, ~17 mm, all damaged), Bahia Inutil, Patagonian Archipelago, 23.i.1896, stn 63718, 27 m, shell debris (SMNH 46243). Manca (9.5 mm), Voilier Cove, Patagonia, 54°53'S, 69°38'W, 2.ii.1896, 18 m, sand and mud (SMNH 46244). ♂ (10.5 mm), Katanashuaia, Patagonia, channel between Oste and ??, 28 May? 1896 (stn 189), 18–22 m, stones and shell debris



**Figure 60.** *Aega magnifica* (Dana, 1853). A, B and F, neotype, remainder female, SMNZ46250. A–E, pleopods 1–5, respectively. F, pleopod 1 peduncle, mesial margin, dorsal view. G, uropod. H, uropod exopod, ventral view. I, uropod exopod apex. J, uropod endopod apex.

(SMNH 46245). SVENSKA SUDOLAR EXPEDITION 1901–03: ♀ (non-ovig. 21 mm, partly dissected, appendages missing), Patagonian Archipelago, the east inlet of the Beagle Channel, 55°10'S, 66°15'W, 15.ix.1902, 100 m, broken shells (SMNH 46241). SWE-DISCHE EXPEDITION NACH DEN MAGEL-LANSLÄNDERN 1907–09: ♂ (19.0 mm), Otway Water, Pto Toro, Argentina, 15.iv.1908, 20–30 m stones and shell debris (SMNH 46246). MISSION SCIENTIFIQUE DU CAP HORN. 1882–1883 (reported by Dollfus, 1891): ♂ (22 mm), ♀ (non-ovig. 28 mm), Baie Orange, Mis. Cap Horn 59–96 (MNHN Is.2446). ♀? (21 mm), Baie Orange, Mis. Cap Horn (MNHN Is.2447). ♂ (~16 mm), ♀ (ovig. ~23 mm), poor condition, dried out at some time in the past, no collection details (MNHN Is.2448).

*Other material:* ♀ (non-ovig. 17.5 mm), Straits of Magellan, 'Ichthye' Kr. [part of Schioedte & Meinert's (1879) material] (ZMUC old collection, unreg.). ♀ (ovig. 24 mm), manca (9.8 mm) off Gulf of San Mation, Patagonia, Argentina, Argentina, Rio Negro, U.S. Fish Commission Steamer *Albatross* stn 2768, 79 m (USNM 22667). ♀ (non-ovig. 33 mm), off coast off Patagonia, Argentina, U.S. Fish Commission Steamer *Albatross* stn 2770, 106 m (USNM 22668). ♀ (non-ovig. not measured), Patagonian Shelf, 46°19.0'–17.5'S, 65°0.0'–4.5'W, 3.xi.1931, 107–99 m, *Discovery* stn WS776 (BMNH 2003.12); also 3 (2 and manca) *Discovery* stn WS776 (BMNH, 2003.13–15). ♀ (non-ovig. not measured), Patagonian Shelf, 47°50.3'S, 63°57.0'W, 20.iii.1931, 101–114 m, *Discovery* stn WS797 (BMNH 2003.16). 1, Patagonian Shelf, 51°44.5'–46.0'S, 66°38.0'–42.0'W, 13.i.1931, 111–118 m, *Discovery* stn 814 (BMNH 2003.10).

#### Type locality

That of neotype, namely Bahia Inutil, Fuegia, Chile, c. 53°37'S, 69°36'W. Dana's type locality was given only as 'Nassau Bay, Fuegia' (Cape Horn, Chile). This location is approximately 54°S, 68°W (part of Isla de Navarino).

#### Description

*Body* 2.5 times as long as greatest width, dorsal surfaces smooth, widest at pereonite 6, lateral margins subparallel. Rostral point projecting anteriorly, not ventrally folded. *Eyes* small, combined widths less than 50% width of head, separated by about 38% width of head; each eye made up of ~13 transverse rows of ommatidia, each row with ~8 ommatidia; eye colour black. *Pereonite 1 and coxae* 2–3 each with posteroventral angle rounded, or with small distinct produced point; coxae 5–7 with entire oblique carina. *Pleon* with pleonite 1 visible in dorsal view; pleonite 4 with posterolateral margins extending to but not

beyond posterior margin of pleonite 5; pleonite 5 with posterolateral angles free, not overlapped by lateral margins of pleonite 4. *Pleotelson* 0.8 times as long as anterior width, dorsal surface without longitudinal carina; lateral margins sinuate (weakly), smooth, posterior margin converging to caudomedial point, with 14 RS.

*Antennule* peduncle articles 1 and 2 flattened, article 2 anterodistal lobe not extending beyond mid-point of article 3 (with blade-like anterior margins); articles 3 and 4 0.7 times as long as combined lengths of articles 1 and 2, article 3 2.2× LW; flagellum with 13 articles, extending to anterior of pereonite 1. *Antenna* peduncle article 2 inferior surface with distinct longitudinal suture; article 4 1.5× LW, 1.0 times as long as combined lengths of articles 1–3, without deep longitudinal groove, inferior margin with 0 plumose and 0 short simple setae; article 5 not markedly wider or flatter than article 4, 1.1× L article 4, 2.1× LW, inferior margin with 7 plumose setae, anterodistal angle with cluster of 2 short simple setae (plumose); flagellum with 22 articles, extending to middle of pereonite 3.

*Frontal lamina* flat, wider than long, lateral margins parallel, anterior margin rounded, with small median point, posterior margin not abutting clypeus.

*Mandible* molar process absent; palp article 2 with 13 distolateral setae (biserrate, plus 3 simple submarginal), palp article 3 with 27 setae. *Maxillule* with 7 terminal RS (3 large, 4 small and slender). *Maxilla* medial lobe with 3 RS (2 biserrate); lateral lobe with 3 RS. *Maxilliped* endite with 2 apical seta; palp article 2 with 5 RS (straight); article 3 with 7 recurved RS (5 hooked, 1 long and 1 short straight); article 4 with 5 hooked RS (4 large, 1 small); article 5 partly fused to article 4, with 4 RS (2 straight, 2 curved).

*Pereopod 1* basis 2.1 times as long as greatest width (widest basally); ischium 0.4× L basis, inferior margin with 0 RS (with 1 subdistal seta), superior distal margin with 2 RS; merus inferior margin with 3 RS, set as distal group (plus 1 slender seta), superior distal angle with 1 RS (small); carpus 0.6× L merus, inferior margin with 0 RS; propodus 1.3 times as long as proximal width, inferior margin with 0 RS, propodal palm with distal blade, dactylus smoothly curved, 2.1 L propodus. *P2* ischium inferior margin with 0 RS (with subdistal slender seta), superior distal margin with 2 RS; merus inferior margin with 11 RS, set as in 2 groups (row of 9 with distal pair set dorsal to row), superior distal margin with 1 acute RS; carpus similar in size to that of P1, inferodistal angle with 1 RS (small), propodus without large club-shaped distal RS. *P3* similar to P2; propodus without large club-shaped distal RS. *P6* similar to P7. *P7* basis 2.9 times as long as greatest width, inferior margin with 12 palmate setae; ischium 0.6× L basis, inferior margin with 7 small RS (set as 1, 1, 1, 1 and 3), superior distal

angle with 4 RS, inferior distal angle with 7 RS; merus  $0.9 \times L$  ischium,  $2.5 \times LW$ , inferior margin with 7 RS (set as 1, 2 and 4), superior distal angle with 13 RS, inferior distal angle with 7 RS; carpus  $1.0 \times L$  ischium,  $3.1 \times LW$ , inferior margin with 4 RS (set as 1 and 3), superior distal angle with 7 RS, inferior distal angle with 7 RS; propodus  $0.8 \times L$  ischium,  $4 \times LW$ , inferior margin with 3 RS (set as 1, 2 and 1), superior distal angle with 3 slender setae (2 simple, 1 palmar), inferior distal angle with 4 RS.

*Penes* opening flush with surface of sternite 7; penial openings separated by 10% of sternal width.

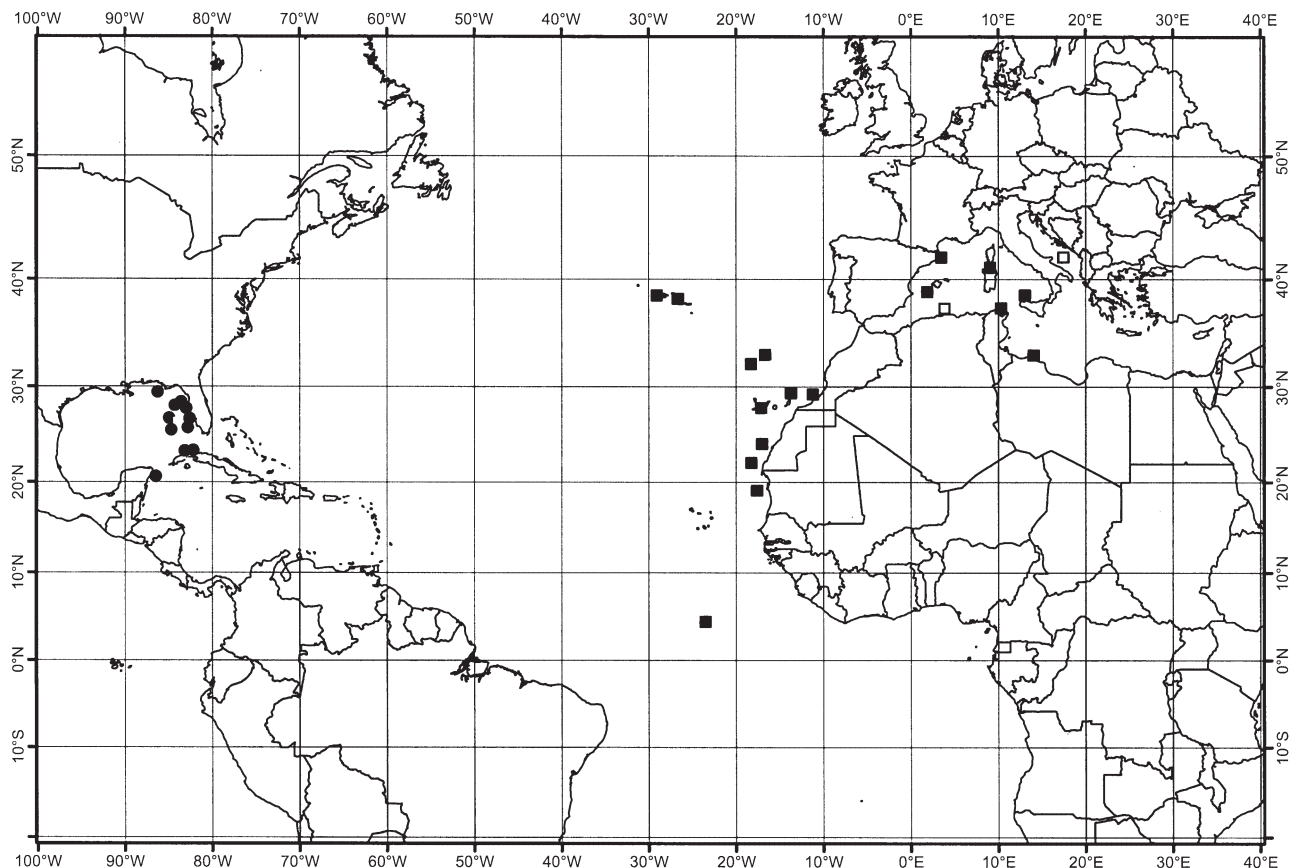
*Pleopod 1* exopod  $2.1 \times LW$ , distally narrowly rounded, medial margin weakly oblique, lateral margin straight, medial margin strongly convex, with PMS from distal half; endopod  $2.1 \times LW$ , distally subtruncate, lateral margin strongly concave, with PMS from distal margin only, medial margin with PMS from distal half; peduncle  $1.7 \times WL$ , medial margin with 10 coupling hooks. *Pleopod 2 appendix masculina* with straight margins,  $0.9 \times L$  endopod, distally narrowly rounded. Exopods of pleopods 1–5 each with distolateral margin not deeply serrate; endopods of pleopods

3–5 each with mediodistal point; pleopods 2–5 peduncle distolateral margin without prominent acute RS.

*Uropod* peduncle ventrolateral margin with 2 RS, posterior lobe about  $0.75 \times L$  endopod. Uropod rami with endopod and exopod coplanar (weakly oblique), rami extending to pleotelson apex, marginal setae dense, in several tiers (weakly so), apices acute. *Endopod* apically subbifid, medial process prominent, lateral margin proximally convex or distally straight, without prominent excision, proximal lateral margin with 2 RS, distal lateral margin with 2 RS, medial margin straight, with 6 RS. *Exopod* not extending to end of endopod, 3.6 times as long as greatest width, apically not bifid; lateral margin weakly convex, with 10 RS; medial margin straight, distally convex, with 2 RS.

#### Variation

*Robust setae*: many specimens have some degree of damage to the pleotelson apex, therefore only the ranges for RS are indicative. Pleotelson ( $n = 10$ ) 12–14 RS with 12 (50%) most frequent, 13 (30%) and 7 + 7 (20%). Uropod exopod medial margin ( $n = 15$ ) with 2 (80%) or 3 (30%) RS, lateral margin ( $n = 14$ ) with from



**Figure 61.** North Atlantic distributions of: *Aega antillensis* (●) and *A. deshaysiana* (■). Open squares are records specified to region only, namely Algeria and Adriatic.



9 to 12, with 10 (42.8%) and 11 (50%) most frequent; uropod endopod ( $n = 21$ ) medial margin varied from 5 to 7, with 5 (80.9%) most frequent 6 (14.3%) and 7 once, lateral margin usually with 2 + 2 (71.4%) also 1 + 1 (once), 2 + 3 (twice) and 3 + 2 (3 times).

Pereopod RS are highly consistent with the merus of P1 ( $n = 25$ ) with a distal row of 3 (100%); P2 merus ( $n = 26$ ) with 7 + 2 (69.2%), 8 + 2 (26.9%) and 9 + 2 (once); and P3 merus ( $n = 27$ ) with 9 + 2 (77.8%) most frequent, with 8 + 2, 9 + 3, 10 + 2 and 10 + 3 all occurring at least once.

*Colour pattern* is rarely recorded for aegids in large part due to the lack of patterning. Most of the specimens examined here have, despite their age, a persistent pattern of dark brown patches on the lateral margin of pereonites (most noticeable on pereonites 5, 6 and 7) and on the anterolateral corners of the pleotelson; there is some colour on the coxae but this is weaker than that shown on the pereonites and pleotelson.

#### Size

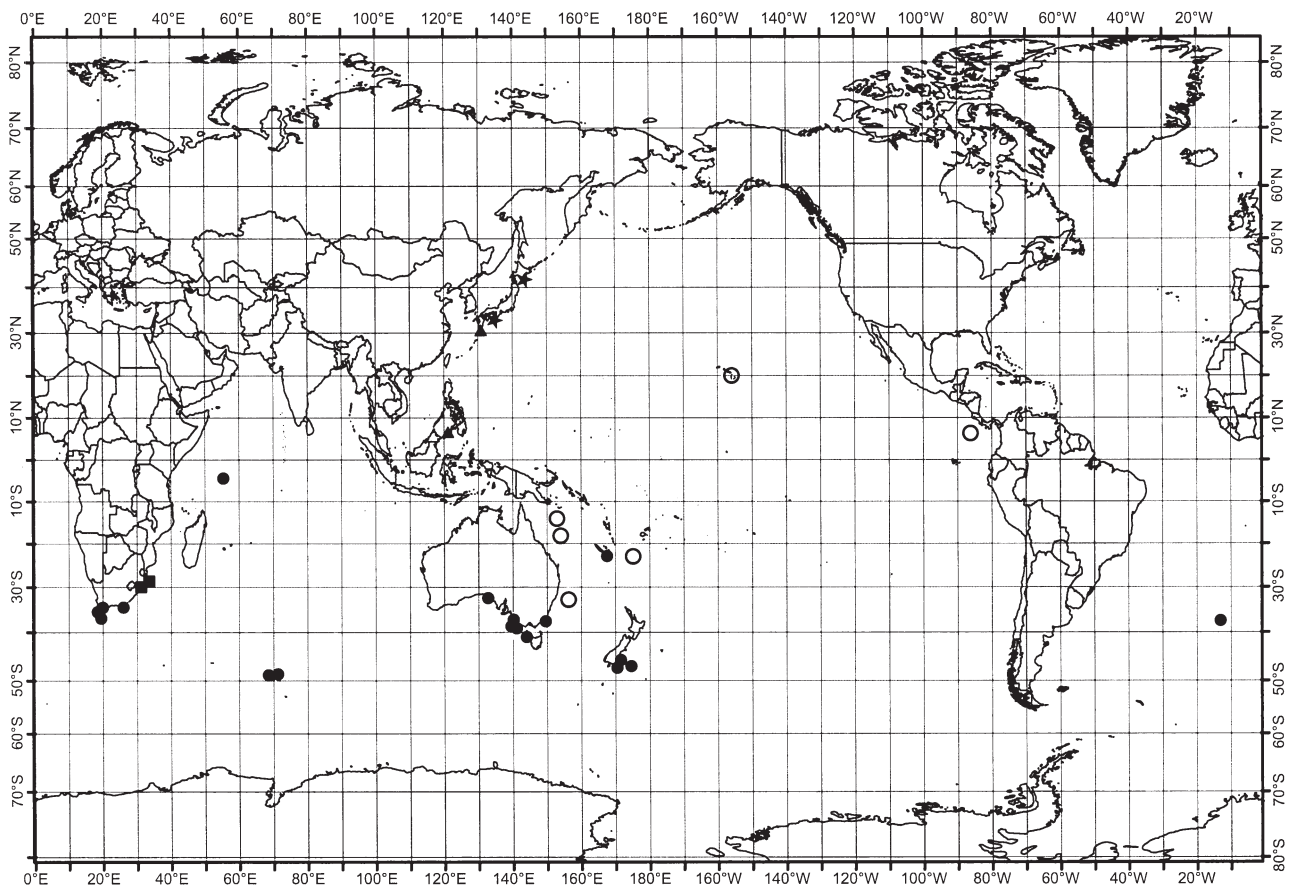
Males ( $n = 5$ ) 10.5–22 mm, mean 17.2 mm; non-ovigerous females ( $n = 11$ ) 18–29 mm, mean 22.8 mm;

ovigerous females ( $n = 3$ ) 22–28 mm, mean 24.3 mm (3 damaged specimens omitted from calculations).

#### Remarks

This species is excluded from the *A. deshaysiana* group by having relatively small eyes, uropods that extend to just beyond the posterior margin of the pleotelson, margins of the uropodal rami provided with a dense multitiered row of plumose marginal setae, and coplanar uropodal rami. In addition, the anterior margins of the antennule peduncle articles 1 and 2 are anteriorly expanded with a blade-like edge.

Species recognition is easily made on the basis of the relatively small eyes in conjunction with pereopods 1–3 having a large propodal blade and the shape of the coxae of pereonites 2 and 3 which have a somewhat lobate posterodorsal margin; the setation of the anterior pereopods is characteristic and distinctive in that on the inferior margin of pereopod 1 merus there is a distal cluster of 3 robust setae, there being no robust setae proximal to these, and on the inferior margin of the merus of pereopods 2 and 4 there is a ventral row of robust setae with a distal pair of setae



**Figure 62.** Distributions of: *Aega alazon* sp. nov. (●), *A. excisa* (▲), *A. japonica* sp. nov. (★), *A. kwazulu* sp. nov. (■) and six undescribed species of the *A. deshaysiana* group (○).

set more dorsally. Confirmation of identity can be made using the shape and setation of the pleotelson and uropods.

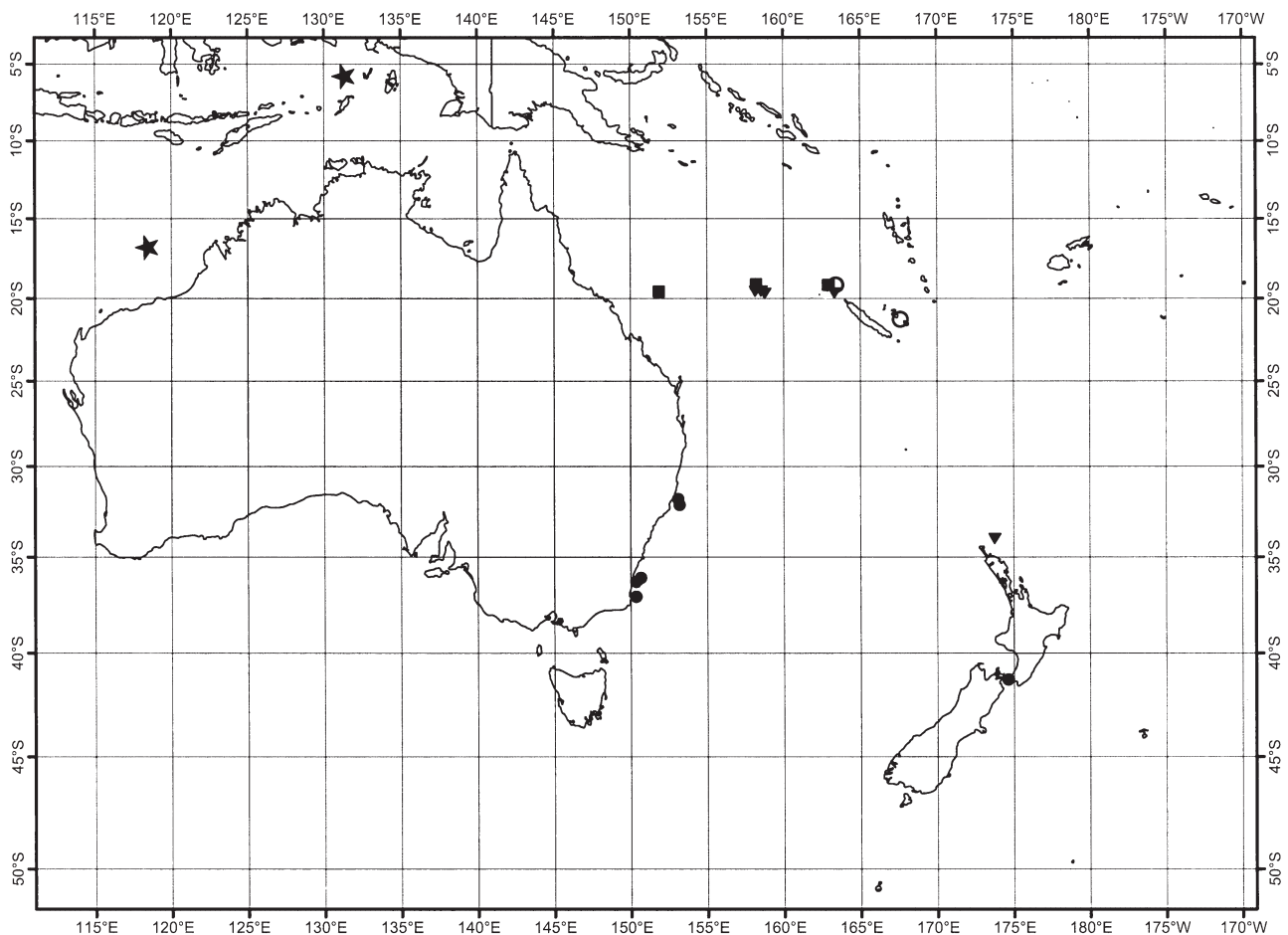
*Aega falklandica* Kussakin, 1967, is perhaps the most similar species to *A. magnifica*, and there is the potential that these two species have distributions that overlap. *Aega falklandica* is readily separated from *A. magnifica*, as are all other species of *Aega* known from the South Atlantic, by the lack of a prominent propodal blade on the propodus of pereopods 1–3. The status of *A. falklandica* in relation to *A. punctulata* Miers, 1881 ('from the Straits of Magellan') and *A. edwardsi* Dollfus, 1891 (Orange Bay, Cape Horn) is entirely uncertain given that all three of these species are in need of redescription and clearly lack a blade or lobe on the propodal palm of pereopods 1–3. *Aega punctulata* is described by Miers (1881) as having the posterior segments covered in setae.

It is well known that Dana's South Pacific crustacean type material 'was lost on the fatal bar' when the sloop *Peacock* sank at the mouth of the Colombia River in 1841 (information from a hand-written

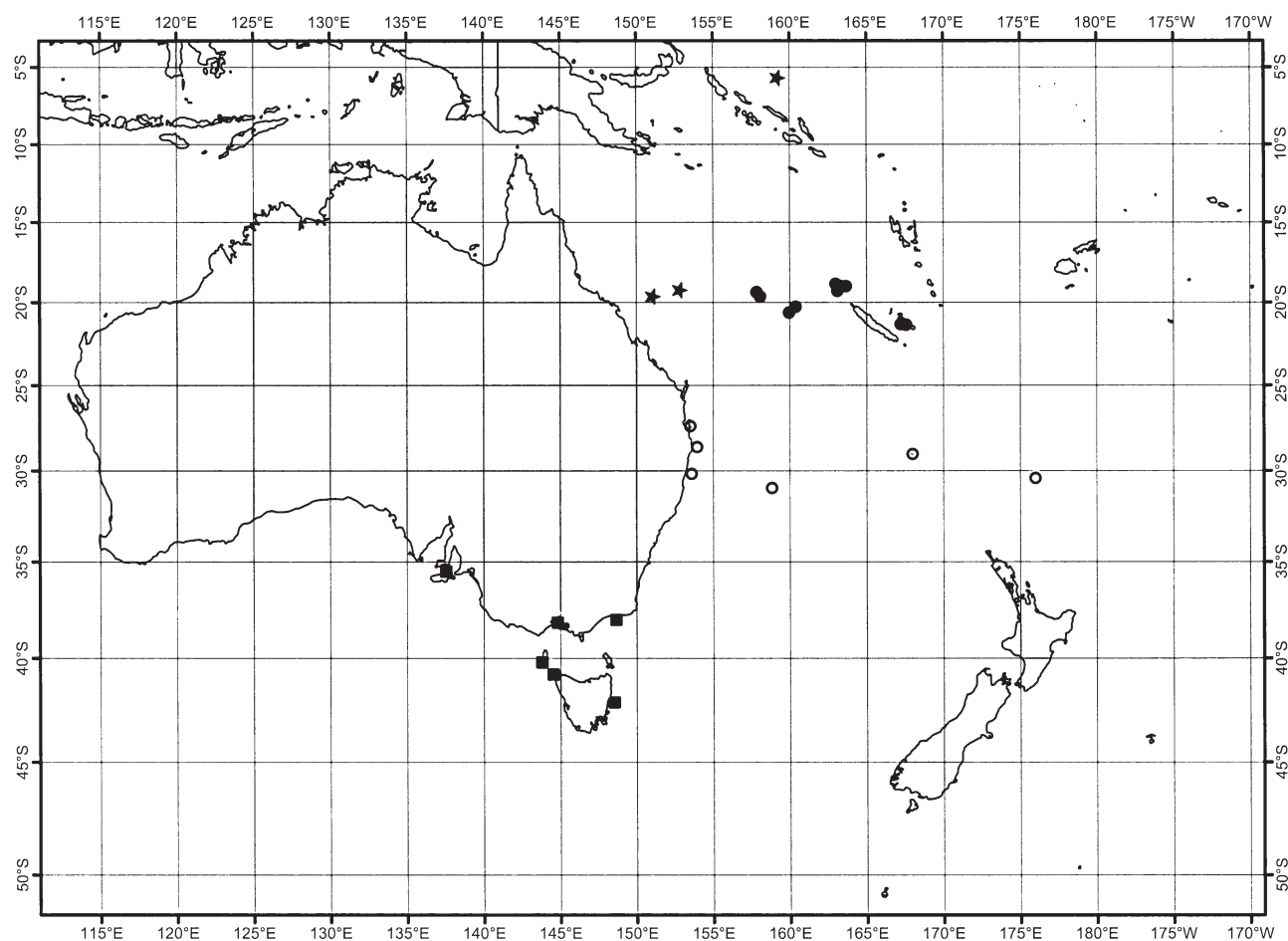
account from Dana's note books, dated 1857, of the fate of his material). Most of this material was from the tropical and equatorial Pacific, and while Dana's notes do not mention that the Fuegian material was lost there has never been any evidence to suggest that any isopod types survived the disaster. The subsequent records of *A. magnifica* are consistent, and the species differs from all others by virtue of the spoon-shaped blade on the propodus of pereopod 1 together with the relatively small eyes. Given that there are other species that are similar *A. magnifica*, that this name has priority over most others, that it is now apparent that there are groups of morphologically very similar species within the genus *Aega*, and that although many species have restricted ranges, others (such as *A. monophthalma* [see Bruce, 2001] and *A. alazon* sp. nov., to name two) have extensive, possibly global, distributions, I have designated a neotype for *A. magnifica* (Dana, 1853).

#### Prey

No records.



**Figure 63.** Distributions of: *Aega banda* sp. nov. (★), *A. birubi* sp. nov. (●), *A. hamiota* sp. nov. (■), *A. kixalles* sp. nov. (○) and *A. rickbruscai* sp. nov. (▼).



**Figure 64.** Distributions of: *Aega musorstom* sp. nov. (●), *A. trulla* sp. nov. (★), *A. umpara* sp. nov. (○) and *A. warna* sp. nov. (■).

#### Distribution

Southern South America in the Atlantic region of the Straits of Magellan, Tierra del Fuego, to 41°S in the Chilean Pacific; recorded depths between 10 and 118 m.

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