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New and little known Aoridae, Corophiidae, Kamakidae, Photidae and Unciolidae (Crustacea: Amphipoda) from the Indo-Pacific

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In Malaysia, Indonesia and Polynesia, samples of algae and coral rubble were taken in order to collect the Amphipoda (Peracarida: Crustacea) inhabiting them. We report here on eight species: five from Indonesia (among which two are new to science, one Atlantic genus found for the first time in the tropics), one from Malaysia (reported there for the first time) and two were found from Moorea (one new to science, the taxonomic status of the other one not fully resolved).

INTRODUCTION

The shallow seas of the Indo-Pacific region, and maybe especially the Indonesian/Australian region, are reckoned to be the marine area with greatest biodiversity on earth. In spite of this, the fauna of many groups of smaller invertebrates is still very insufficiently known. One of these groups are the Amphipoda (Crustacea); although the amphipod fauna of Indonesian waters is expected to be at least as diverse as that of Australia, many fewer amphipod species have hitherto been reported from this area. This of course is the result of lack of thorough collection activity in this region, and of the fact that there are as yet very few indigenous amphipod specialists. Most of the literature on the amphipods of the mentioned area is the result of short-term expeditions, the most famous of which probably is the Siboga Expedition (Pirlot, 1934). Later Ledoyer (1978, 1979a,b, 1982) has reported on French collection activities, there are papers by Barnard (1965), Olerød (1970) and Ortiz (2003), and the second author has made a number of collecting trips (Myers, 1989, 1995). From the edges of the area under consideration the work of Barnard (1970) in Hawaii, of Lowry & Stoddart (1995) or Myers (1995, 2002) in Papua New Guinea and Thailand, the paper by Myers (1985) about amphipods from Fiji, as well as papers on Vietnamese amphipods by Imbach (1967) and Dang (1965, 1968, 2005) may be mentioned.

The first author had the opportunity to collect amphipods from shallow costal areas in Indonesia (Bali, Lombok) in 1987 and 1993. These data are here combined with the results from collecting activity in Malaysia and Polynesia (by H.G. Müller). The present paper is the second part of a planned series of studies; the caprellidea have already been published (Krapp-Schickel & Guerra-García, 2005). We report here on eight species in five families: five from Indonesia (among which two are new to science, and one new to the Pacific Ocean), one from Malaysia, and two from Moorea, Polynesia (one new to science, the status of the other not yet fully resolved).

MATERIALS AND METHODS

Samples of algae and coral rubble were collected in shallow water by snorkling. The samples were washed in weak formaldehyde and sorted in shallow trays, the amphipods then being picked out and preserved in 70% alcohol. Slides were made using Faure's liquid as a mounting medium, and examined under a compound microscope.

The here studied material is deposited at the collection of the Museo Civico di Storia Naturale, Verona (Italy) (MCVR).

SYSTEMATICS

AORIDAE

Lembos hypacanthus K.H. Barnard, 1916
(Figure 1)

Lembos hypacanthus K.H. Barnard, 1916, 237, pl. 28.—Griffiths, 1976, 34, figure 18.—Myers & Lyons, 1987, 278, figures 1C, 8–9.
Lembos sp. Fox, 1978, 162.

Material examined

One male, Sanur-Bali, mixed algae 1 m, low tide, 26 July 1993, collected by T. Krapp-Schickel & F. Krapp.

Type locality: Sea Point, near Cape Town.

Description (Male)

Head: lateral cephalic lobes apically truncate. Antenna 1, 2 missing.

Mouthparts: maxilla 1 inner plate with one long pectinate apical seta. Maxilliped basis with strong flange on anterior margin of each of the inner and outer plates. Mandible, palp article 3 longer than 2, weakly falcate, posterior margin with setae of several different lengths.

Peraeon: coxa 1 produced anterodistally, subacute. Gnathopod 1 enlarged in males only; basis robust, about twice as long as broad, without a posterodistal spine, posterodistal margin with several long setae, anterodistal

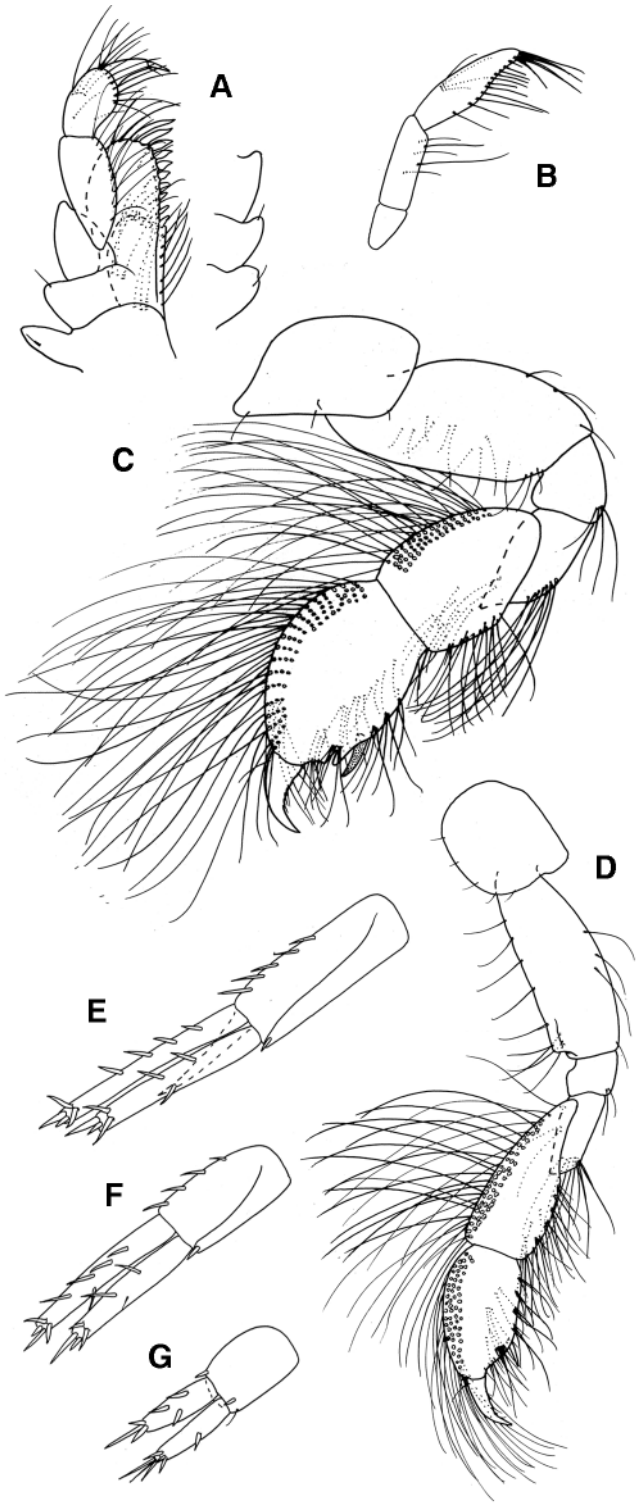

Figure 1. *Lembos hypacanthus* Barnard, 1916 (Bali, Indonesia): (A) maxilliped; (B) mandible palp; (C & D) gnathopod 1, 2 male; and (E–G) uropod 1, 2, 3.

margin convex, with strong flange; ischium anterior margin without flange; merus elongate, fused along its entire length with carpus, posterior distal margin with very long setae, without spine; carpus enlarged, without spine, anterior margin densely clothed in very long setae; propodus wide, subovoid, only slightly longer than carpus, anterior margin densely clothed in very long setae, posterior margin weakly convex, palm deeply incised and defined by very strong inwardly curved robust seta; dactylus short and robust, scarcely overlapping palm. Gnathopod 2 subchelate; basis anterior margin straight, with strong flange, anterodistal margin quadrate; carpus elongate, anterior margin densely clothed in very long setae; propodus 75% length of carpus, anterior margin densely clothed in very long setae, without robust seta defining palm.

Pleon: epimeron 3 posterodistal margin rounded. Uropod 1 peduncle with distoventral inter-ramal spine over one half length of peduncle; inner ramus longer than outer. Uropod 2 peduncle without distoventral interramal spine; inner ramus longer than outer. Uropod 3 biramous; peduncle longer than broad, rami subequal, inner ramus only a little longer than peduncle. Telson with distal fine setae only.

Remarks

In the relative proportions of the carpus and propodus of the male gnathopod 1, present material appears closer to specimens of *L. hypacanthus* from Florida and North Carolina, than it does with the geographically closer material from South Africa. It differs from both materials in the somewhat shorter propodus of the male gnathopod 2 and in the quadrate anterodistal corner of the male gnathopod 2 basis (in materials from South Africa and south-east North America, the male gnathopod 2 basis terminates anterodistally in a strong recurved spine). In other respects, present material approximates *L. hypacanthus* from previously known localities. It is possible that present material represents a new species, but as it is represented by a single male specimen only, it cannot be known at this time, whether the differences observed are characteristic of the Indonesian population, or are peculiarities of the single specimen.

Lembos hypacanthus is not known to be a fouling species, but its wide, although discrete, distribution is reminiscent of an anthropogenically distributed species.

This is the first record of the genus *Lembos* (otherwise known only from the warm-temperate regions of the Atlantic and the south-west Indian Ocean) from the tropics.

Distribution

Florida, North Carolina, Natal to south-west Africa, Bali.

AORIDAE

Bemlos clypeatus sp. nov.

(Figure 2)

Type material

Holotype: male, 4.5 mm, Sanur-Bali mixed algae 1 m, low tide, 26 July 1993. Deposited at MCSN Cr 446. Collected by T. Krapp-Schickel and F. Krapp.

Paratype: 1 male, Sanur-Bali mixed algae 1 m, low tide, 26 July 1993.

Deposited at MCSN Cr 446 sl. 5845–5847, collected by T. Krapp-Schickel and F. Krapp.

Description (male)

Head: lateral cephalic lobes apically truncate. Antenna 1 unknown. Antenna 2 unknown.

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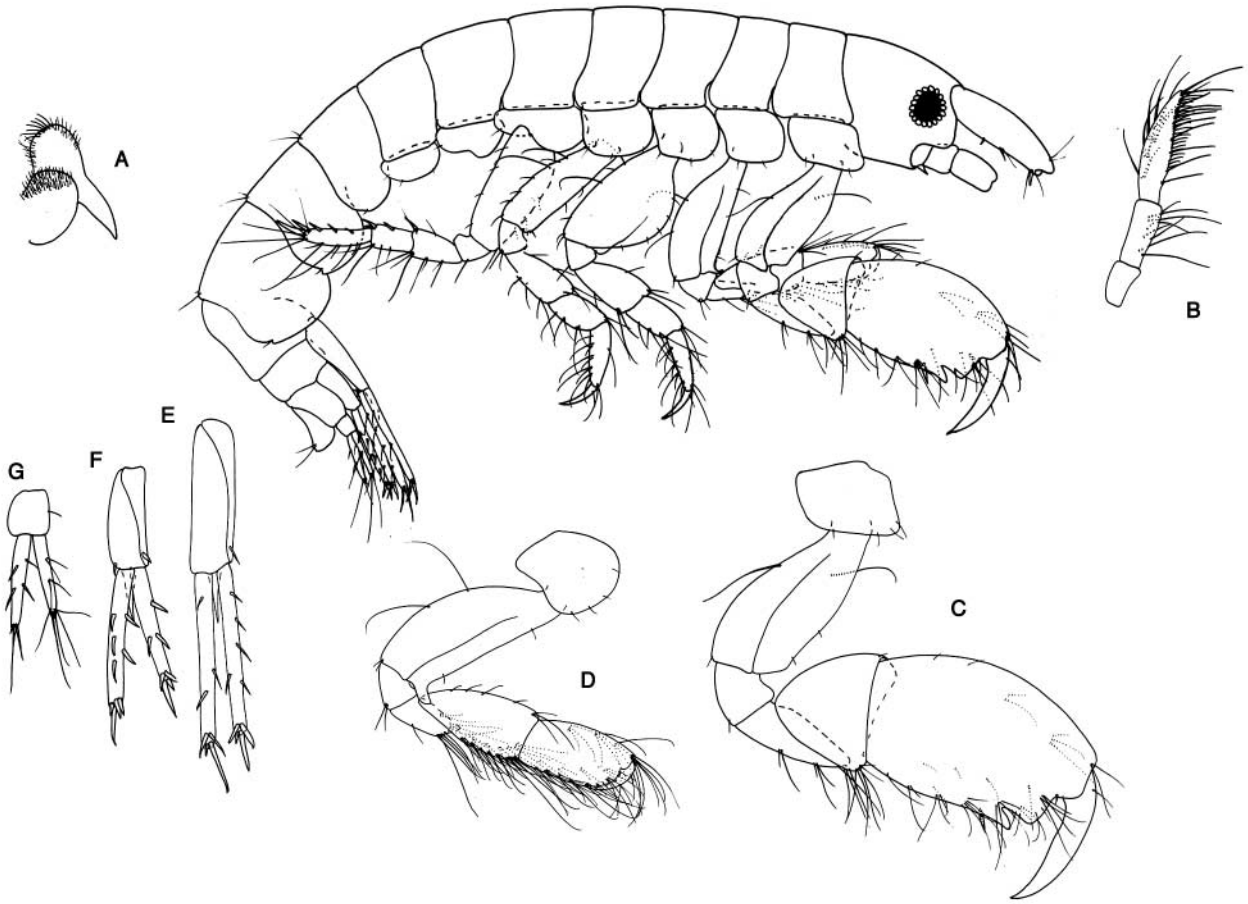

Figure 2. *Bemlos clypeatus* sp. nov. (Bali, Indonesia): habitus male; (A) lower lip; (B) mandible palp; (C) gnathopod 1 male; (D) gnathopod 2 male; and (E–G) uropods 1–3.

Mouthparts: labium with fine setae and stout setae. Maxilla 1 inner plate with one long pectinate apical seta. Maxilliped basis without strong flange on anterior margin. Mandible, palp article 3 longer than 2, posterior margin weakly concave, with setae of two distinct lengths.

Pereon: sternal spines absent. Gnathopod 1 enlarged in males only; coxa produced anterodistally, subacute; basis robust, about twice as long as broad, without a posterodistal spine, posterodistal margin with one long seta, anterodistal margin convex, with strong flange; ischium anterior margin without flange; merus elongate, fused along its entire length with carpus, posterior margin with few setae, without spine; carpus short, cup shaped without spine; propodus more than twice length of carpus, anterior margin weakly setiferous, posterior margin weakly convex, palm delimited from posterior margin by distinct shelf, deep narrow excavation and strong spine, a robust seta inserted at the base of the spine; dactylus strongly overlapping palm, two-thirds length of propodus. Gnathopod 2 subchelate; basis anterodistal margin straight, with strong flange produced into a strong recurved anterodistal tooth, posterodistal margin without robust setae; merus not enlarged; carpus scarcely longer than propodus; propodus with moderately dense long setae, without robust seta defining palm. Peraeopod 3 basis with strong convex flange on anterior margin without brush of long setae on merus. Peraeopod 4 basis slender, parallel-sided. Peraeopods 6–7 unknown.

Pleon: epimeron 3 posterodistal margin with small notch bearing a seta. Uropod 1 rami subequal, peduncle much longer than broad, distoventral interramal spine one-third length of peduncle. Uropod 2 biramous; peduncle with distoventral interramal spine, more than half length of peduncle. Uropod 3 biramous, rami subequal, inner ramus over twice length of peduncle. Telson with distal fine setae only.

Description (female)

Unknown.

Etymology

From the latin *clipeatus* (also with 'y') armed with a shield, referring to the shield-like basis of the male peraeopod 3.

Remarks

This species is similar to *Bemlos saloteae* (Myers), but differs from that species in the expansion of the basis of peraeopod 3 that develops in hyperadult males of *B. clypeatus*; the male gnathopod 1 propodus of *B. clypeatus* is less ovoid, the gnathopod 2 is less elongate, and the sternal processes are less curved and restricted to segments 2–4.

The term 'hyperadult' is used to describe male amphipods that further develop existing characteristics or acquire additional morphological characteristics after reaching sexual maturity.

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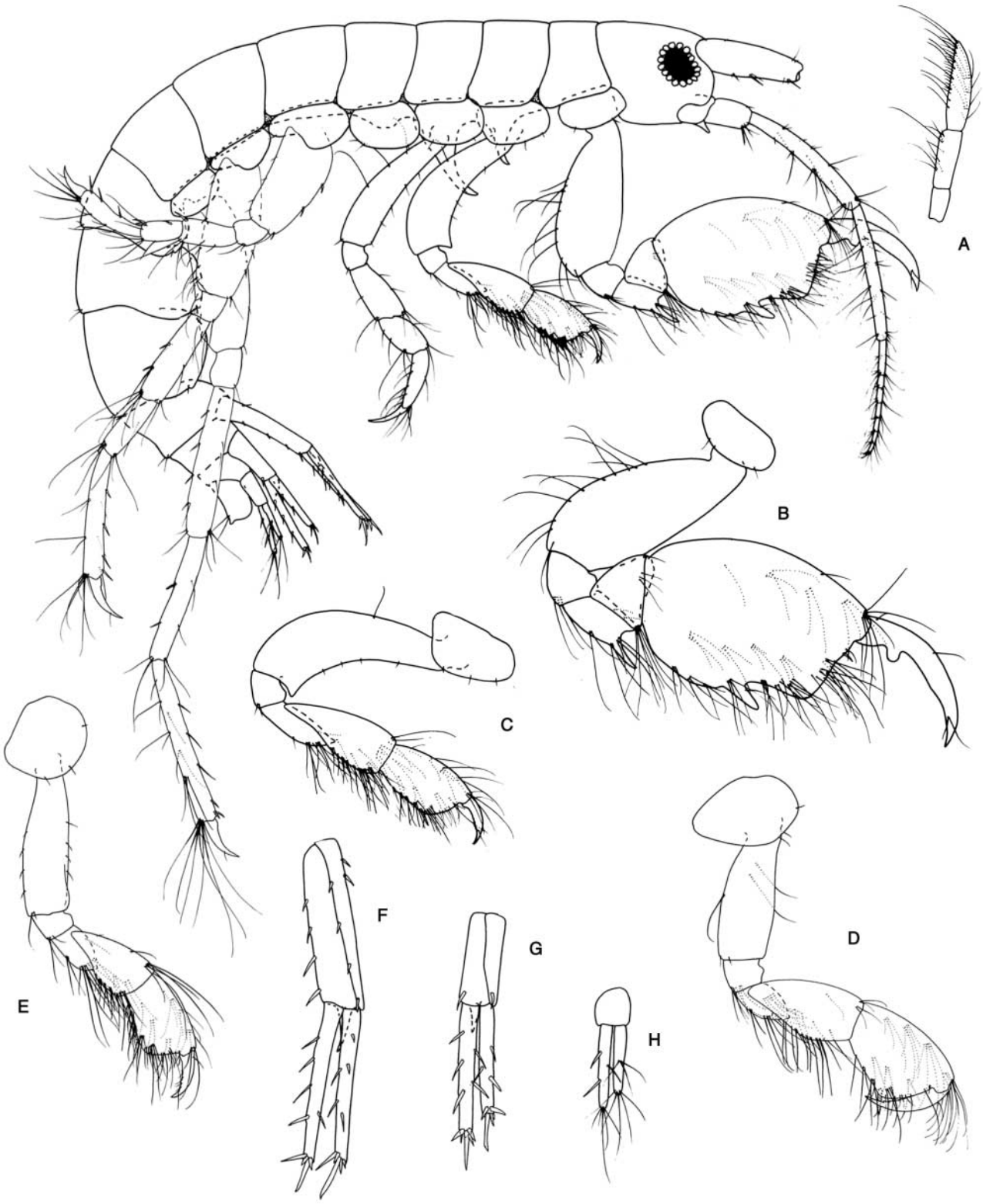

Figure 3. *Bemlos sicus* sp. nov. (Bali, Indonesia): habitus male; (A) mandible palp; (B & C) gnathopod 1, 2 male; (D & E) gnathopod 1, 2 female; and (F–H) uropods 1–3.

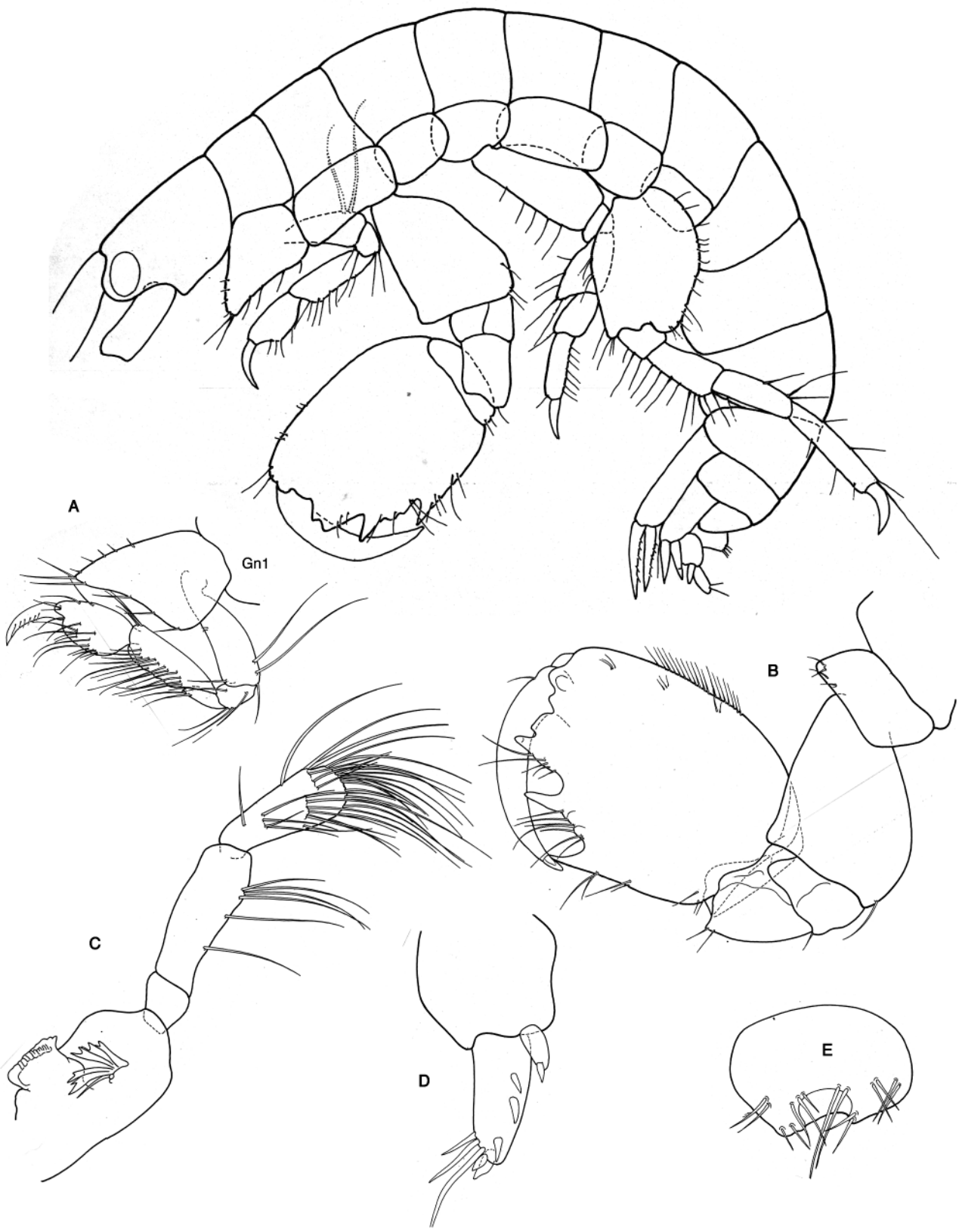

Figure 4. *Cheiriphotis* cf. *durbanensis* K.H. Barnard, 1916 (Bali, Indonesia): male habitus; (A) gnathopod 1 male, female; (B) gnathopod 2 male; (C) mandible; (D) uropod 3; and (E) telson.

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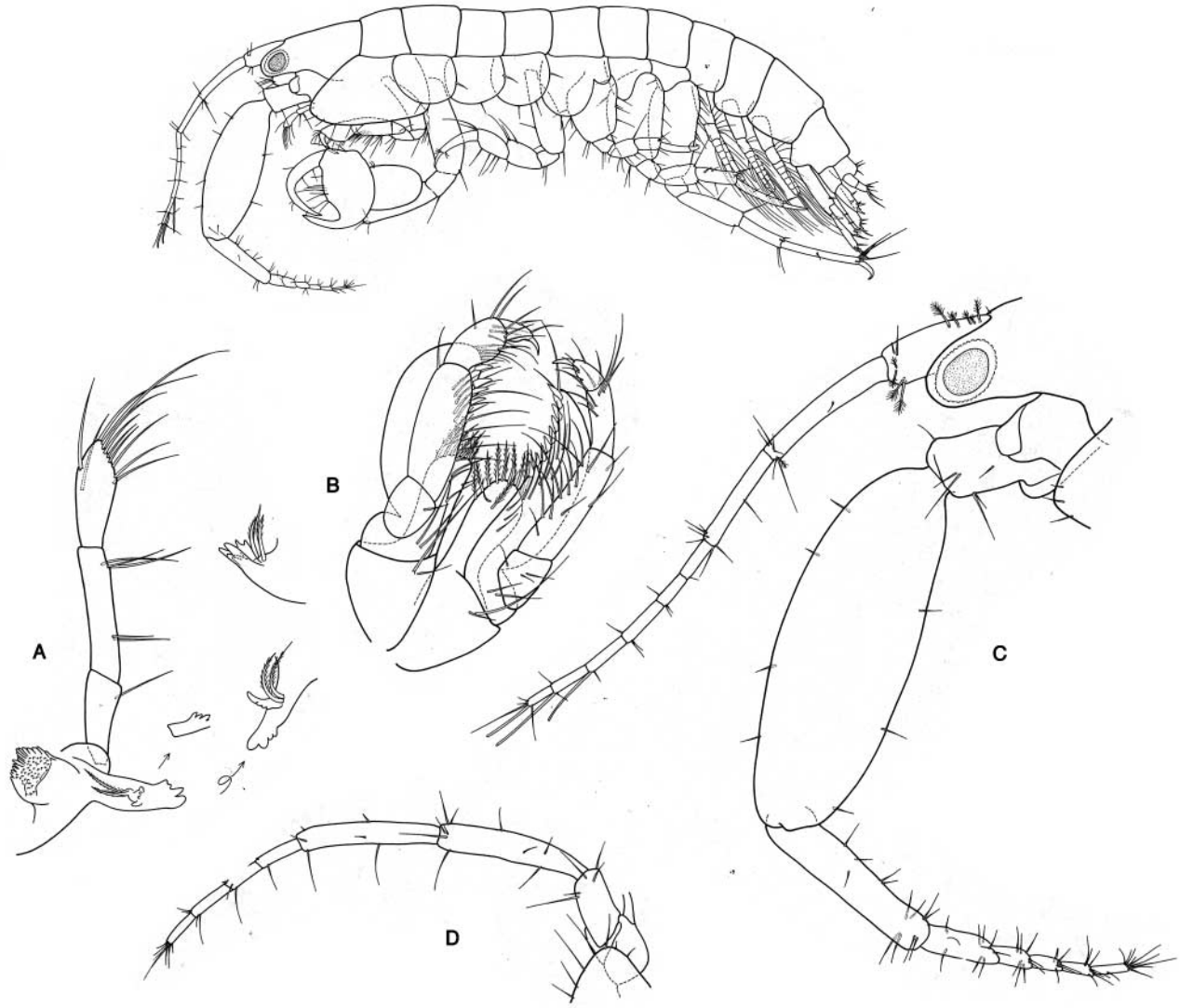

Figure 5. *Kamaka taditadi* Thomas & Barnard, 1991 (Babi Besar, Malaysia): habitus male; (A) mandible; (B) maxilliped; (C) male head and antennae; and (D) antenna 2 female.

Bemlos sicus sp. nov.
(Figure 3)

Type material

Holotype: male, 4.5 mm, Sanur-Bali, S, *Cystoseira* with *Posidonia*, 1–2 m, 23 July 1993. Deposited at MCSN Cr 447. Collected by T. Krapp-Schickel and F. Krapp.

Paratype: 1 male, Sanur-Bali, S, *Cystoseira* with *Posidonia*, 1–2 m, 23 July 1993. Deposited in the collection of the second author. Collected by T. Krapp-Schickel and F. Krapp.

Other material: 1 male, Sanur-Bali, S, *Cystoseira* + *Laurencia*, between *Posidonia*, 1 m, 23 July 1993; 1 male, Bali; 3 males, 8 females Sanur-Bali, *Halimeda* + sponges. 2 m, 19 July 1993; 1 male, Sanur-Bali, mixed algae, 27 July 1993. Deposited in the collection of the second author. Collected by T. Krapp-Schickel and F. Krapp.

Description (male)

Head: lateral cephalic lobes apically truncate. Antenna 1 unknown. Antenna 2 stout, peduncular articles 4 and 5 subequal, flagellum shorter than peduncular article 5.

Mouthparts: labium with fine setae and stout setae. Maxilla 1 inner plate with one long pectinate apical seta. Maxilliped basis without strong flange on anterior margin. Mandible, palp article 3 longer than 2, posterior margin straight, with setae of two distinct lengths.

Pereon: sternal spines present on pereonites 2–4, apically acute on 2–3, rounded on 4. Gnathopod 1 enlarged in males only; coxa not produced anterodistally; basis robust, three times as long as broad, without a posterodistal spine, posterodistal margin with many long setae, anterodistal margin convex, with weak flange; ischium anterior margin without flange; merus not greatly elongated, fused along its entire length with carpus, posterior margin with few setae, with posterodistal acute spine; carpus very short, cup shaped without spine; propodus more than four times length of carpus, anterior margin weakly setiferous, posterior margin convex, palm delimited from posterior margin by shape discontinuity, without robust seta, posterior margin with large spine; dactylus two thirds length of propodus, overlapping palm. Gnathopod 2 subchelate; basis anterodistal margin concave, with strong flange produced into an anterodistal tooth, posterodistal margin without robust setae; merus

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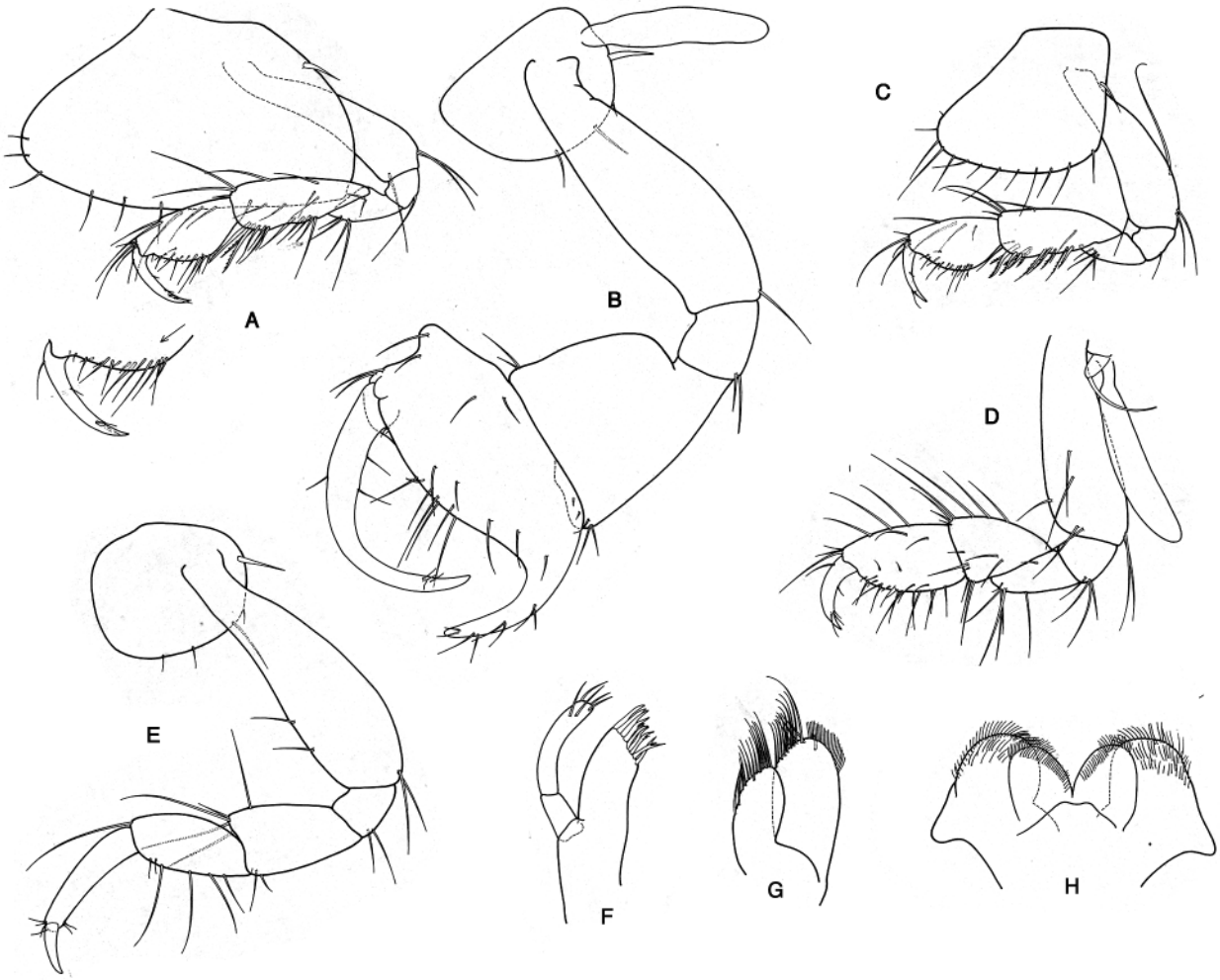

Figure 6. *Kamaka taditadi* Thomas & Barnard, 1991 (Babi Besar, Malaysia): (A & B) gnathopod 1, 2 male; (C & D) gnathopod 1, 2 female; (E) peraeopod 4; (F & G) maxilla 1, 2; and (H) lower lip.

not enlarged; carpus longer than propodus; propodus with moderately dense long setae, palm with robust seta defining palm. Peraeopod 3 without brush of long setae on merus. Peraeopod 6 basis not produced posterodistally. Peraeopod 7 not significantly greater than 125% length of peraeopod 6.

Pleon: epimeron 3 posterodistal margin with small notch bearing a seta. Uropod 1 rami subequal, peduncle much longer than broad, distoventral interramal spine one quarter length of peduncle. Uropod 2 biramous; peduncle with distoventral interramal spine, a little less than one-third length of peduncle. Uropod 3 biramous, inner ramus shorter than outer, inner ramus twice length of peduncle. Telson with distal fine setae only.

Description (female)

Pereon: sternal spines absent. Gnathopod 1 basis more slender than that of male; carpus slender, subequal in length with propodus; propodus distinctly widening distally, palm defined by rounded corner with robust seta. Gnathopod 2 basis slender; carpus and propodus subequal in length.

Etymology

From the latin *sica* meaning dagger, referring to the long spine on the male gnathopod 1 carpus.

Remarks

This species resembles *Bemlos bidens* Myers from Australia and Papua New Guinea, but in that species, the male gnathopod 1 has a larger carpus, bearing a posterodistal tooth. It also resembles *B. parahastatus* (Myers) from East Africa, but in that species the male gnathopod 1 coxa has an acute anterodistal margin, the basis posterior margin lacks long setae, and the carpus is much larger relative to the propodus.

COROPHIIDAE

Cheiriphotis cf. *durbanensis* K.H. Barnard, 1916

(Figure 4)

Cheiriphotis durbanensis Barnard, K.H., 1916: 247, 1937: 167, figure 14a; Ledoyer, 1979b: 28, figure 10(2); 1982 pp. 191–194, figure 65.
Cheiriphotis megacheles Ledoyer, 1969b: 186, pl. 4.
Cheiriphotis megacheles durbanensis Ledoyer, 1973c: 65, pl. 14A.

Material examined

Sanur-Bali, *Halimeda* + sponges. 2 m, 19 July 1993: 4 males 3.8–4.5 mm; 1 female 5.5 mm, 3 juveniles. Sanur-Bali, *Caulerpa* between *Posidonia*, 18 July 1993, 1 m depth: 1 male juvenile 3.5 mm. Sanur-Bali, *Cystoseira* with *Posidonia*,

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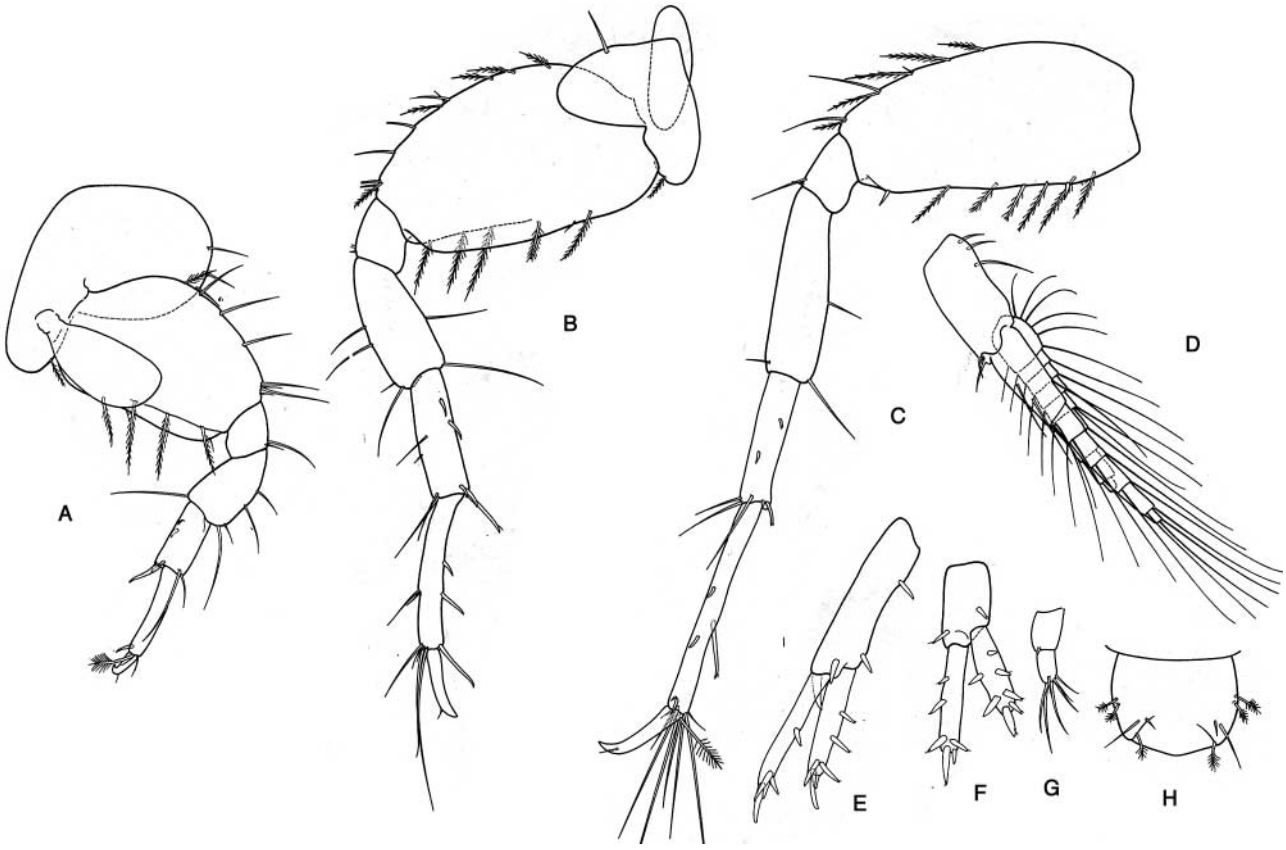

Figure 7. *Kamaka taditadi* Thomas & Barnard, 1991 (Babi Besar, Malaysia): (A–C) peraeopods 5–7; (D) pleopod 2=3; (E–G) uropods 1–3; and (H) telson.

1–2 m, 23 July 1993: 2 juvenile females 3 mm. All collected by T. Krapp-Schickel and F. Krapp.

Description

Length 3.8–5.5 mm.

Head: lateroventral margins recessed in both sexes.

Mouthparts: mandible palp article 2 the longest; article 3 clavate with very long distal setae.

Antennae 1, 2 missing.

Peraeon: coxa 1 the largest, acutely produced anteroventrally. Distally and on lower margin with long setae, anterior margin with short ones. Gnathopod 1 slender, slim carpus clearly longer than propodus (carpus: propodus=3:2), propodus regularly rounded, without defined palm; dactylus elongate and slender. Male gnathopod 2 basis rectangularly widened, stout, carpus short, cup-shaped, propodus rectangularly enlarged, with anterior and posterior margins parallel, anterior margin moderately setose, palm with one acute defining tooth, one acute medially and two blunt humps near the basis of the dactylus; dactylus somewhat overlapping the defining tooth. Female gnathopod 2 much less enlarged, two palmar teeth and defining tooth short, similar to Gilet, 1887 figure 8, but palm not concave. Peraeopods 3–4 merus and basis broadened, distally wider than proximally, with long setae. Peraeopods 5–7 setose, propodus and carpus rather scarcely, merus to basis more densely.

Pleon: uropod 1, 2 elongate, rami shorter than peduncle, regularly spinose; uropod 3 peduncle stout, rounded, about as long as wide, inner ramus 1/4 of length of outer one, with one distal robust seta, outer ramus about as long as peduncle, about twice as long as broad, with two distal short and three long robust setae and two marginal short ones. Telson much broader than long, fleshy, spinose.

Remarks

Cheiriphotis durbanensis Barnard was originally described from South Africa by K.H. Barnard (1916: 247). The same author put this species 1937 (p. 167) in synonymy with *C. megacheles* (Giles, 1885), together with *C. delloyei* Pirlot and *walkeri* Stebbing. Ledoyer cites material from Madagascar first under *C. megacheles* (1969: 186), then under *C. megacheles durbanensis* (1973: 65).

The present material, although being biogeographically very distant from the type locality, most closely resembles *Cheiriphotis durbanensis* Barnard, 1916. Currently, 13 species of this genus are known. Barnard & Karaman, 1991 cite also *C. geniculata* by K.H. Barnard, 1916, but this must be an error: on p. 247, as indicated in the index, we found only the text on Barnard's *C. durbanensis* sp. nov.— *C. quadrichelatus* of Ortiz & Lalana, 1997 and *australiae* Stebbing, 1910 are most distinctive, lacking incisions in the U-shaped palm-excavations of the chelate male gnathopod 2 propodus. All the others may be grouped into those, where the hind margin is much shorter than

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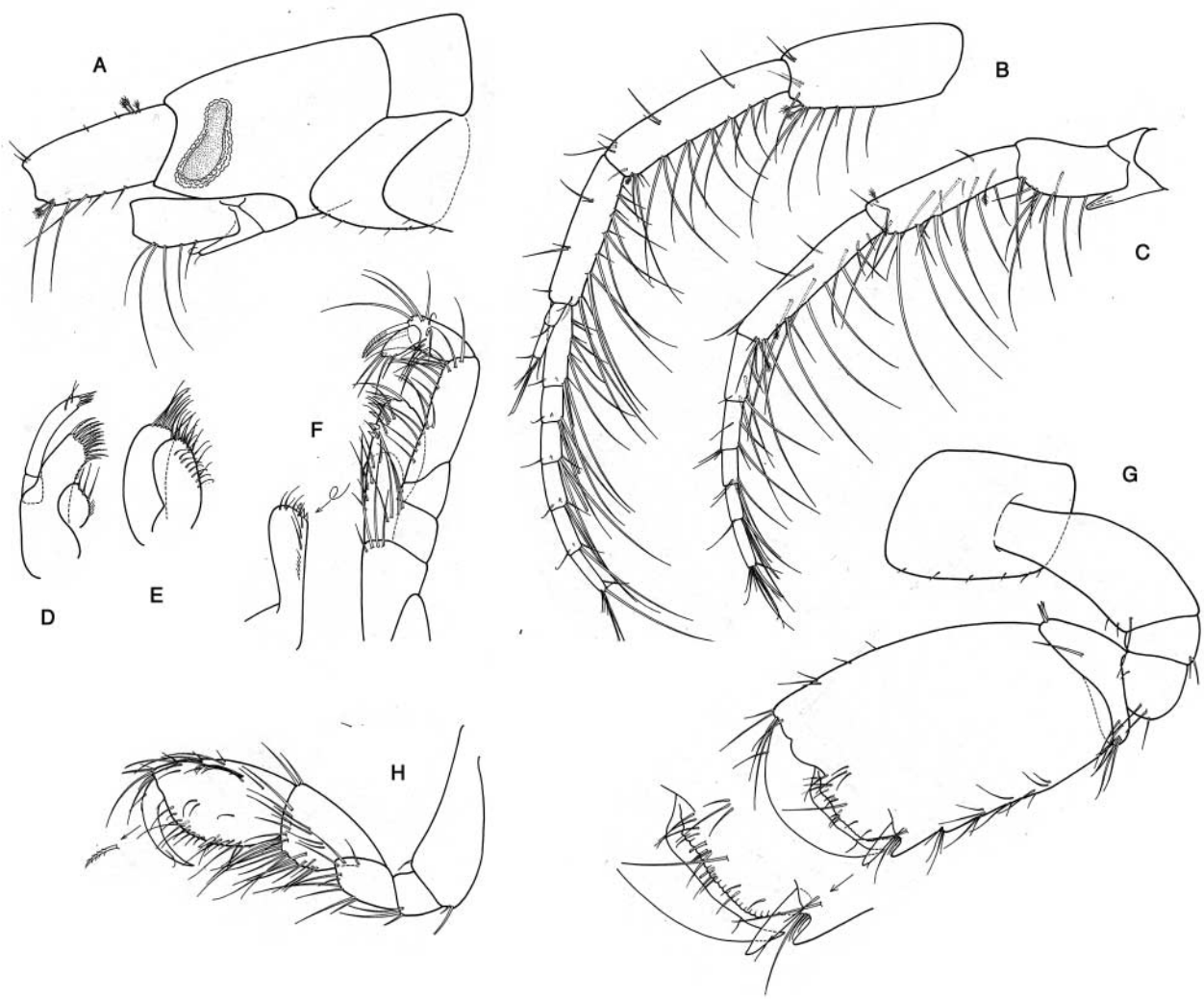

Figure 8. *Gammaropsis* cf. *abbotti* Barnard, 1965 (Society Islands, Polynesia): (A) head; (B & C) antenna 1, 2; (D & E) maxilla 1, 2; (F) maxilliped from both sides; and (G & H) gnathopod 1, 2 male.

the palm, the palm being oblique (*delloyei* Pirlot, 1934, *madagascarensis* Ledoyer, 1979, *minima* Ledoyer, 1982, *monuropus* Walker, 1909) and those, where palm and hind margin are subequal and the palm is at a right angle to the hind margin. Among the latter *C. walkeri* Stebbing, 1918 and *williamsoni* Salman & Jabber, 1990 have very shallow incisions. In *C. pediformis* Myers, 1995 and *rotui* Myers, 1989 the male propodus gnathopod 2 is more slender and rectangular (vs subquadrate here) with two very unequal incisions (vs subequal ones here), in *C. erythraeus* Ruffo, 1969 the defining tooth is bifid followed by one deep incision (vs subequal ones here). The main difference from *megacheles* (Giles, 1885) is the generally much more setose body, the shorter, shallower incisions and the larger body size. The 5 mm long *Cheiriphotis* cf. *megacheles* figured and described by Clark-Imbach, 1967 p. 159 (pl. 29) from the South China Sea is clearly different from the present material both in male and female gnathopod 2, and also certainly does not belong to *megacheles* Giles, 1885.

We had the chance to compare the material from Bali with one specimen from Madagascar sampled by Ledoyer. The carpus of the male gnathopod 1 in the present material is longer and slimmer (about as wide as propodus in *durbanensis* of Madagascar), coxa 1 has short setae also on anterior margin (vs lacking), the mandible palp article 3 is distally clavate, widened (vs equal in breadth), telson medially with many long setae (vs few short ones). But these morphological differences are not sufficient for separating the Madagascan from the Indonesian material.

Distribution

South Africa, Madagascar, ?Indonesia.

KAMAKIDAE

Kamaka taditadi Thomas & Barnard, 1991 (Figures 5–7)

Kamaka taditadi Thomas & Barnard, 1991, 311–18, 3 figures.

Material examined

One specimen Lombok, Senggigi, algae 0.2 m depth, 23 September 1987, collected by T. Krapp-Schickel and F. Krapp.

One specimen Babi Besar, Malaysia, 1–2 m depth, algae with sponges, 2–9 April 1991, collected by H.G. Müller.

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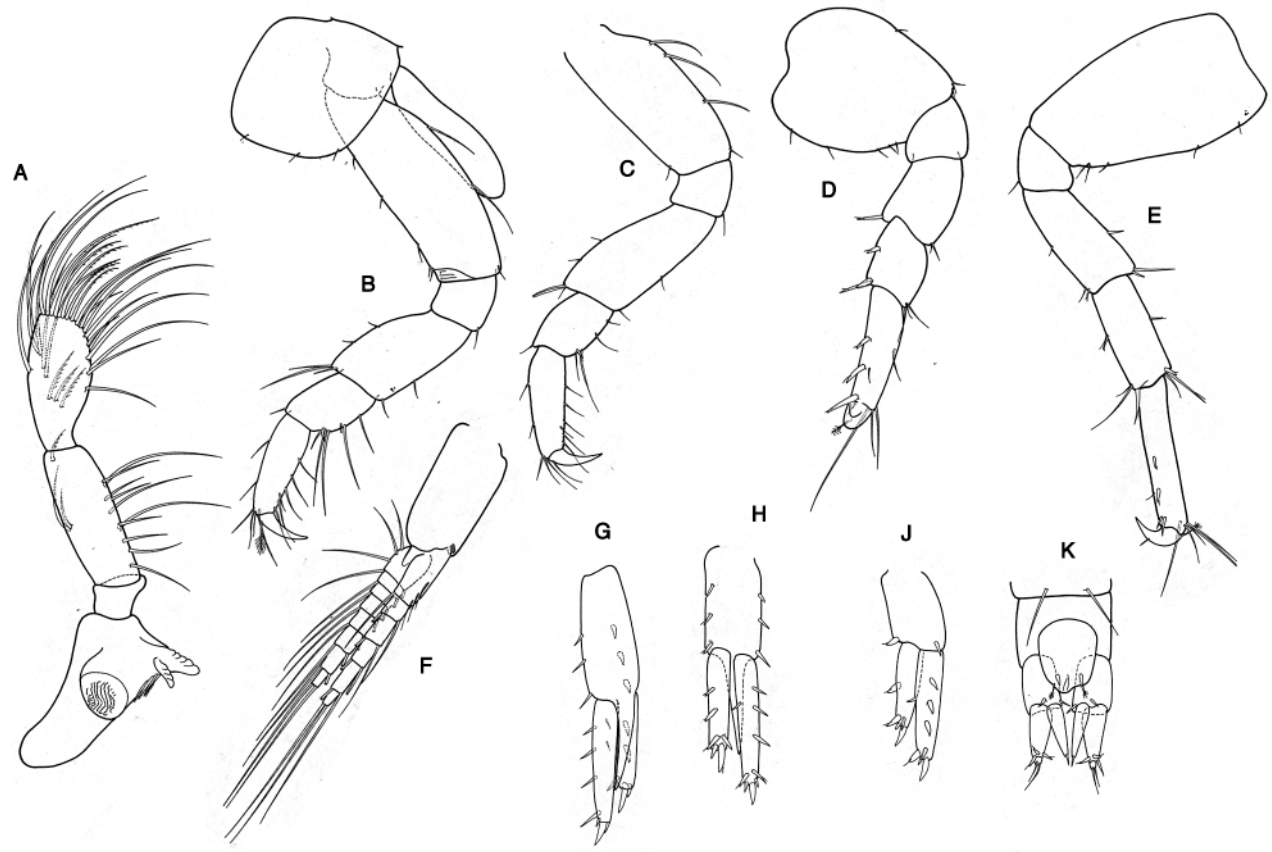

Figure 9. *Gammaropsis* cf. *abbotti* Barnard, 1965 (Society Islands, Polynesia): (A) mandible; (B & C) peraeopods 3, 4; (D & E) peraeopods 5, 7; (F) pleopod 2=3; (G & H) uropod 1 from both sides; (J) uropod 2; and (K) uropod 3 and telson.

Remarks

Present material agrees perfectly with the description of this species by Thomas & Barnard (1991a) from Madang in Papua New Guinea. The species has since been recorded from the Andaman Sea (unpublished); now also Indonesia and Malaysia.

PHOTIDAE

Gammaropsis cf. *abbotti* (Barnard, 1965)

(Figures 8 & 9)

Megamphopus abbotti Barnard, 1965, 537, figure 32.
Gammaropsis abbotti Ledoyer, 1972, 237, pl. 50; 1982, 31, figure 12.

Material examined

Four males, 1 female. Moorea, Society Islands; Temae, north of airport; dead corals near beach in channel with strong current, ~2 m depth, 31 March 1988. All collected by H.G. Müller.

Remarks

This species was originally described from Micronesia by Barnard (1965). It has since been recorded from Madagascar (Ledoyer, 1972, 1979a, 1982), Mauritius (Ledoyer, 1978), the Moluccas (Ledoyer, 1979b) and Papua New Guinea (Myers, 1995). Unfortunately, the original description is rather incomplete and lacking in important detail, making it difficult to make comparisons without recourse to the type material.

The present material differs from the description of *G. abbotti* in having a three-articulate, as opposed to a two-articulate accessory flagellum. This may seem insignificant, but the two-articulate accessory flagellum composed of one long and one terminal rudimentary article is very stable in corophiid amphipods and is an important alternative state to the multi-articulate state. In addition, present material has a strongly crenated palm in the male gnathopod 2, which is not figured for *G. abbotti*. In other respects, it conforms with the description of *G. abbotti* and for the moment, until a complete revision of this poorly studied genus can be carried out, present material is assigned to that species.

Gammaropsis pistoris sp. nov.

(Figures 10 & 11)

Type material

Holotype: male 2.8 mm. Moorea, Society Islands: coral slope of Tiagura, fringing reef, dead corals, 1–2 m, 26 March 1988, collected by H.G. Müller. Stored in alcohol at MCSN Cr 445 slides 5836–5837, with paratype male and female MVRCr 445 slide 5838–5839.

Paratypes: 5 males, 3 females in alcohol: Moorea, Society Islands, crest of fringing reef near Afaregitu, dead corals 0–0.05 m, 29 March 1988; collected by H.G. Müller.

Type locality: Moorea, Society Islands.

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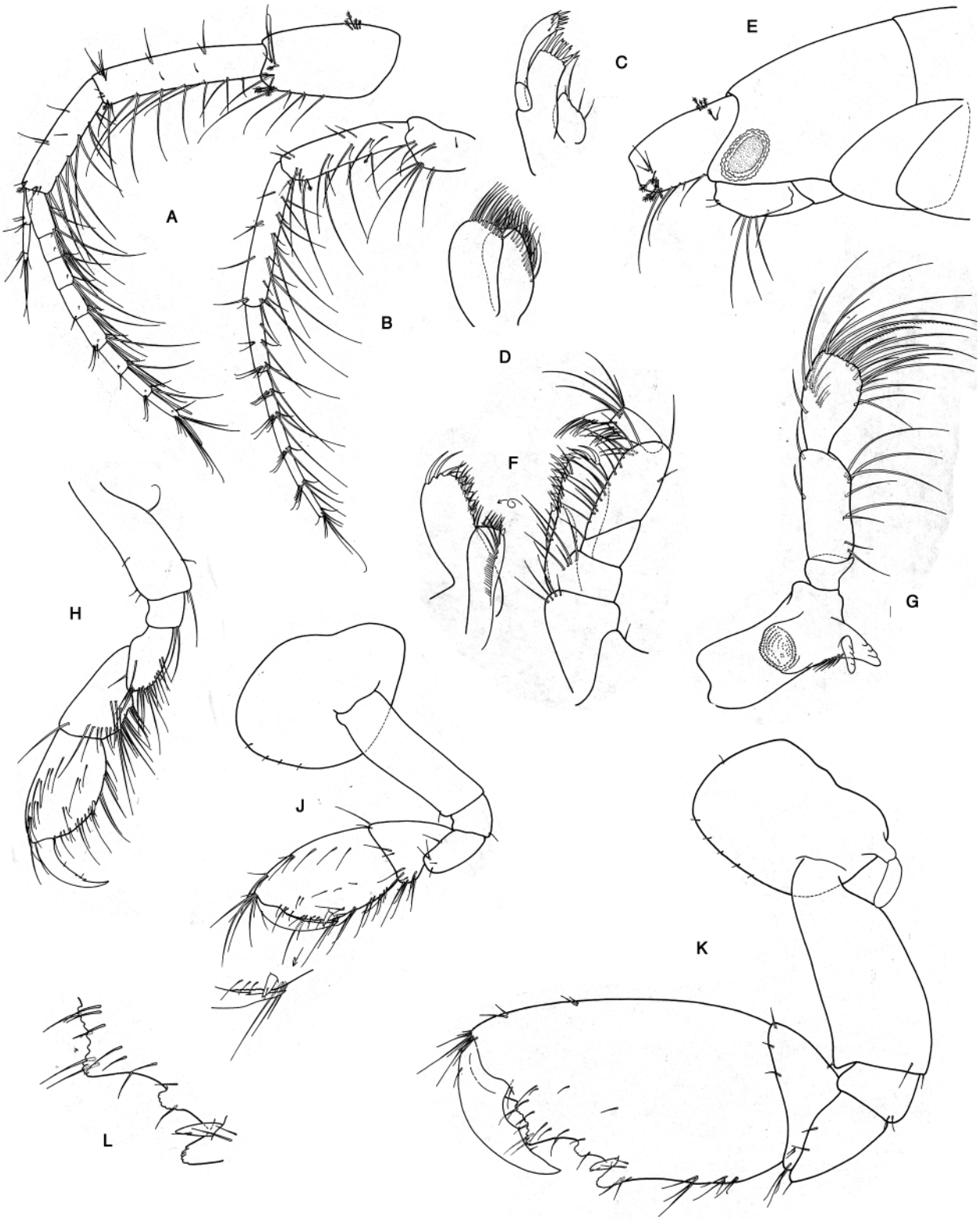

Figure 10. *Gammaropsis pistoris* sp. nov. (Society Islands, Polynesia): (A & B) antenna 1, 2; (C & D) maxilla 1, 2; (E) head; (F) maxilliped from both sides; (G) mandible; (H) gnathopod 1 male, female; (J) gnathopod 2 female; (K) gnathopod 2 male; and (L) gnathopod 2 male palm enlarged.

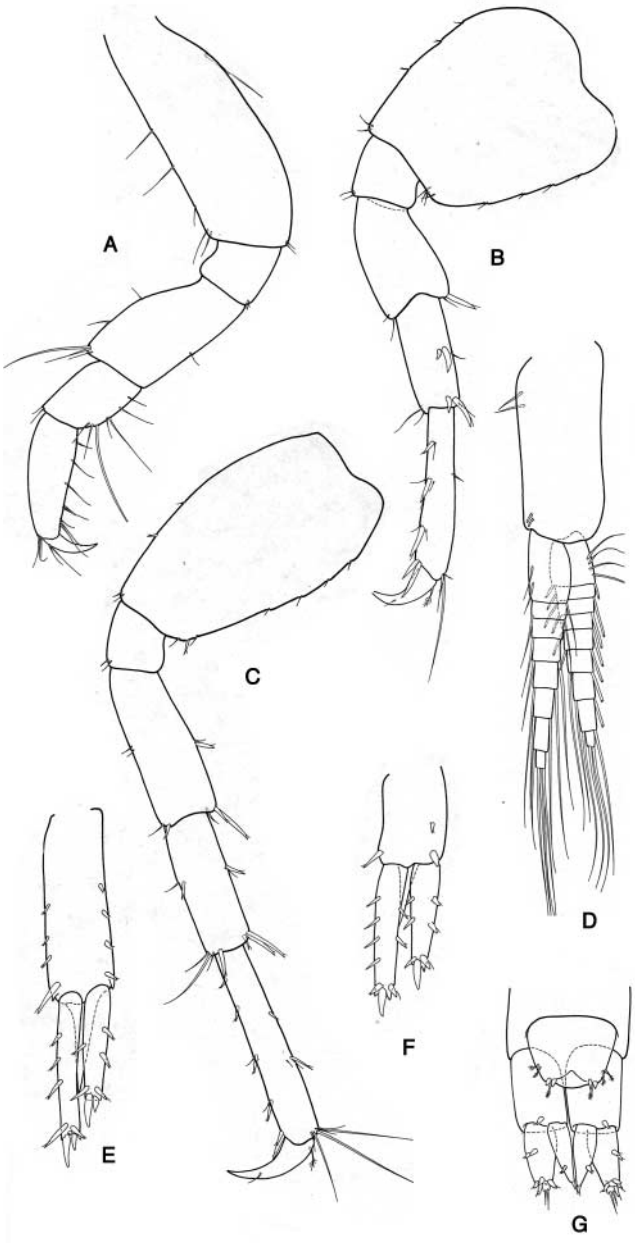

Figure 11. *Gammaropsis pistoris* sp. nov. (Society Islands, Polynesia): (A, B & C) peraeopods 3,5,7; (D) pleopod 2=3; (E) uropod 1; (F) uropod 2; and (G) uropod 3+telson.

Description

Length: 2.8–3.2 mm.

Head: lateral cephalic lobes with about 60° corner. Antenna 1 peduncle article 1 ratio length:width 1.7 to 2, distally narrowing; article 2 > article 3, articles 1 and 3 subequal; flagellum with eight articles, accessory flagellum with three articles. Antenna 2 peduncle article 4 < article 5. Both antennae with long and dense setae.

Mouthparts: maxilla 1 inner plate with one long subapical seta and two marginal shorter ones. Maxilla 2 inner plate with mediofacial row of setae. Maxilliped outer plate reaching nearly end of article two (=carpus) of palp. Palp article 3 and 4 (=dactylus and propodus) slender, with long setae. Mandible, palp article 3 clavate, slightly shorter than article 2, with long and dense setae distally, marginally and also on a diagonal medial row.

Peraeon: gnathopod 1 weakly subchelate, with regularly rounded hind margin; carpus a little shorter than propodus, basis slender. Gnathopod 2 male enlarged, subchelate; basis much wider than ischium, anterodistally with rectangular corner; merus about twice as long as wide, posterodistally ending with blunt triangle; carpus cup-shaped, much shorter than wide (width more than twice the length); propodus rectangular, ratio length: width about 1.75; palm oblique, with a rectangular ledge medially and a small hump mediodistally; palmar corner thumb-shaped, one strong robust seta situated directly next to it. Dactylus strongly curved, short, robust, on inner side medially with blunt protuberance. Gnathopod 2 female subequal to gnathopod 1, but propodus wider and carpus shorter.

Peraeopods 3–5 similar in length, in peraeopod 5 basis nearly as wide as long, in peraeopod 7 ratio length to width about 1.7; dactyli shorter than half propodi, curved, robust.

Pleon: uropods biramous, in U1 peduncle only little longer than longer ramus, which is about 1.25 length of shorter ramus; in U2 peduncle is subequal to shorter ramus, longer ramus about 1.3 length of shorter. Uropod 3 short, robust, peduncle ratio length to width about 1.6, rami shorter, outer one with dense group of robust setae, inner only apically one robust seta.

Telson: trapezium-shaped, three-dimensional; on distal corners two short robust setae and one plumose slender one in between, two plumose setae marginally.

Etymology

Dedicated to Hans Georg Müller (Giessen), collector of this new species, whose surname means miller in English, in Latin=pistor. He is one of the most skilful and careful collectors of tiny marine creatures, and his love for plants and animals is unique.

Remarks

Gammaropsis pistoris sp. nov. resembles, in many respects, species in the *G. atlantica* group, having reniform eyes, setose antennae, sub-rectanglar propodus of the male gnathopod 2, smooth urosome segments, non-acute epistome and non-serrate coxae—but it differs from all of them in its non-reniform eye and relatively short antennae. The shape of the palm of the male gnathopod 2 distinguishes the new species from all previously described species.

UNCIOLIDAE

Wombalano yerang Thomas & Barnard, 1991b
(Figure 12)

Wombalano yerang Thomas & Barnard, 1991, 319–24, 3 figures.

Material examined

One male, Sanur-Bali, stones covered with algae: *Utricularia*, also *Aglaophenia*. 0.5–1 m depth, 27 July 1993. Collected by T. Krapp-Schickel and F. Krapp.

Remarks

Present material agrees well with that described by Thomas & Barnard, 1991b from the Great Barrier Reef, Australia.

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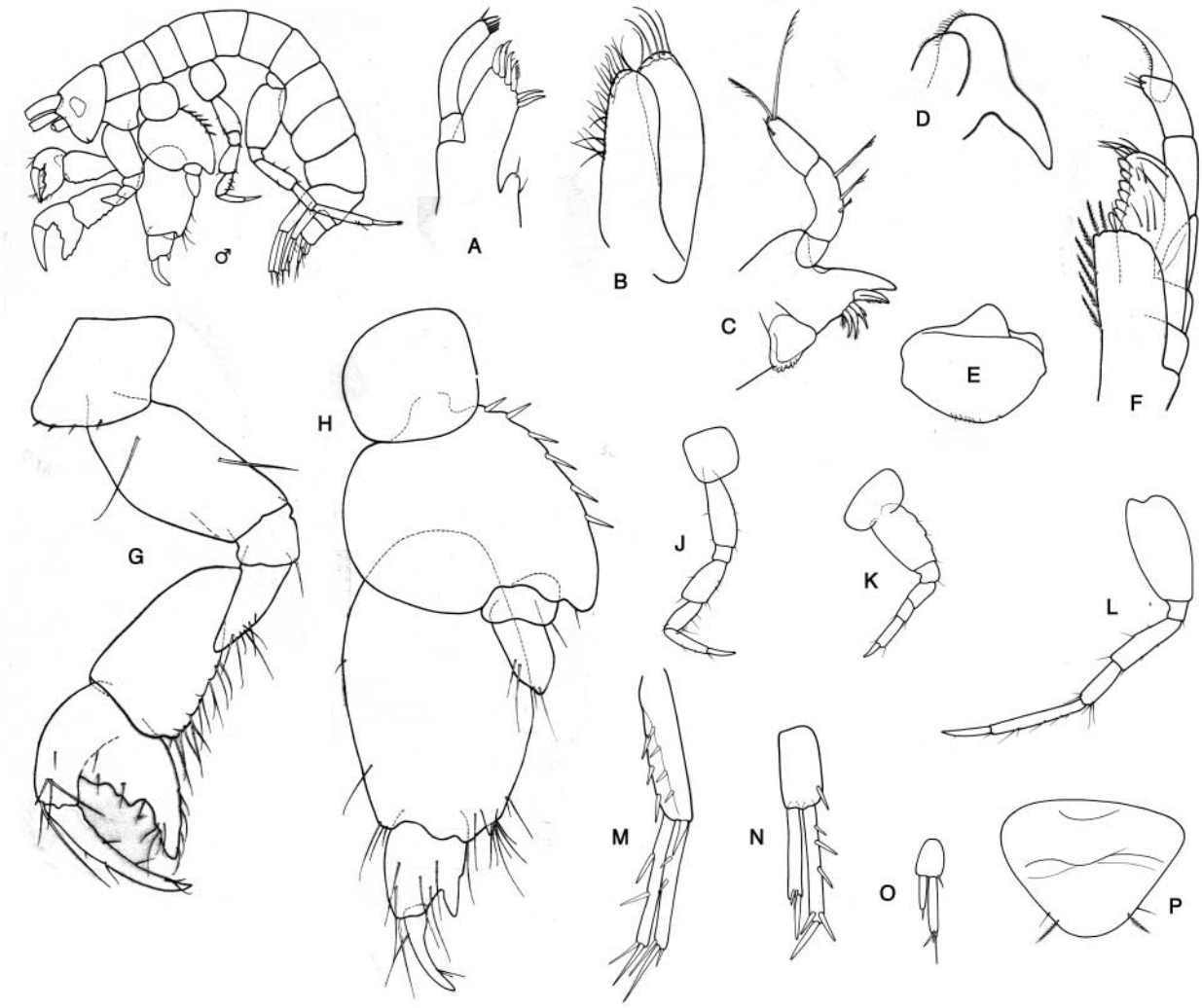

Figure 12. *Wombalano yerang* Thomas & Barnard, 1991 (Bali, Indonesia): habitus male; (A & B) maxilla 1, 2; (C) mandible; (D) lower lip; (E) upper lip; (F) maxilliped; (G) gnathopod 1 male; (H) gnathopod 2 male; (J) peraeopod 4; (K) peraeopod 5; (L) peraeopod 6; (M & O) uropods 1–3; and (P) telson.

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