

MARINE AMPHIPODS OF THE FAMILIES AORIDAE AND NEOMEGAMPHOPIDAE FROM PHUKET, THAILAND

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ABSTRACT

Eight species of the family Aoridae and one species of the family Neomegamphopidae are recorded from Phuket, Thailand. In the Aoridae a new species of *Wombalano*, a new species of *Bemlos* and a new species of *Protolembos* are described. In the Neomegamphopidae a new species of *Konatopus* is described.

INTRODUCTION

Collections of amphipods were made by diving, by wading and by intertidal collecting during the Marine Crustacean Biodiversity workshop at the Phuket Marine Biological Center, Phuket in November–December 1998. Collections were made by the writer and by J.K. Lowry, R. Evans, M. Watson, M. Storey, P. Davie, G. Dinesen and by BIOSHELF scientists, S. Bussarawit and C. Aungtonya. Full details for the BIOSHELF stations and sampling sites of the collections during the workshop are given in 'The 1996–1998 BIOSHELF cruises' (Bussarawit and Aungtonya, 2002).

Eight species of Aoridae and one species of Neomegamphopidae are recorded of which four species were previously undescribed. The four new species are described in this paper, together with notes on the other five species recorded.

Family Aoridae

Wombalano rachayai sp. nov.
(Figs 1–2)

Material examined

Holotype: PMBC 17509, male 2.2 mm, BIOSHELF St. C1, 09°01'N, 098°03'E, Ockelmann sledge, 39 m, coll. S. Bussarawit and C. Aungtonya, 20.04.1998.

Paratype: PMBC 17510, 1 female 2.2 mm, same data as holotype.

Diagnosis

Male 2.2 mm, female 2.0 mm. Head lateral cephalic lobes moderately produced, very acute, eye large composed of relatively few large ommatidia. Pereon segment 1 enlarged. Antenna 1 peduncular article 1 a little shorter than head, other articles unknown. Antenna 2 short, slender, weakly setiferous, peduncular article 4 longer than peduncular article 5; flagellum much shorter than peduncular article 5, with 3 articles, the first article longer than combined length of remaining two. Labrum with triangular anterior margin. Maxilla 1 inner plate with single long distal seta. Maxilla 2 of normal aorid form. Mandible with well developed molar and row of 4 stout setae; palp articles in the basi-distal ratios 6:14:13, article 3 rod-shaped with three long distal setae only. Labium with mandibular processes acute. Maxilliped of normal aorid form, outer plate with broadly serrated stout setae, palp article 3 with distal, triangular projection on inner face. Male gnathopod 1 coxa sub-square, the anterior distal margin produced, subacute; basis more than twice as long as broad, anterior and posterior margins convex; carpus elongate, slender, broadening distally, over twice as long as broad; propodus shorter than carpus, with deep, triangular palmar excavation forming large posterodistal tooth and rendering the palm obsolete,

anterior margin of excavation with additional small tooth; dactylus elongate, falciform, overlapping propodal tooth. Female gnathopod 1 coxa not produced anterodistally, obtuse; basis more slender than that of male, anterior margin straight, carpus a little more elongate than that of male, propodus lacking excavation and with well developed palm, delimited from posterior margin by a right-angle and a stout seta; dactylus overlapping palm. Male gnathopod 2 coxa sub-square, anterior margin irregular, obtuse; basis very expanded, anterior

margin with bilobed flange; coxa flask-shaped broadest proximally, twice as long as broad, posterodistal margin with small tooth; propodus small, less than half length and half breadth of carpus, with deep triangular palmar excavation like that of male gnathopod 1, but with posterodistal tooth less divergent and lacking additional tooth on anterior margin; dactylus shorter than that of male gnathopod 1 but still strongly overlapping propodal tooth. Female gnathopod 2 very elongate and slender; propodus shorter than carpus, almost

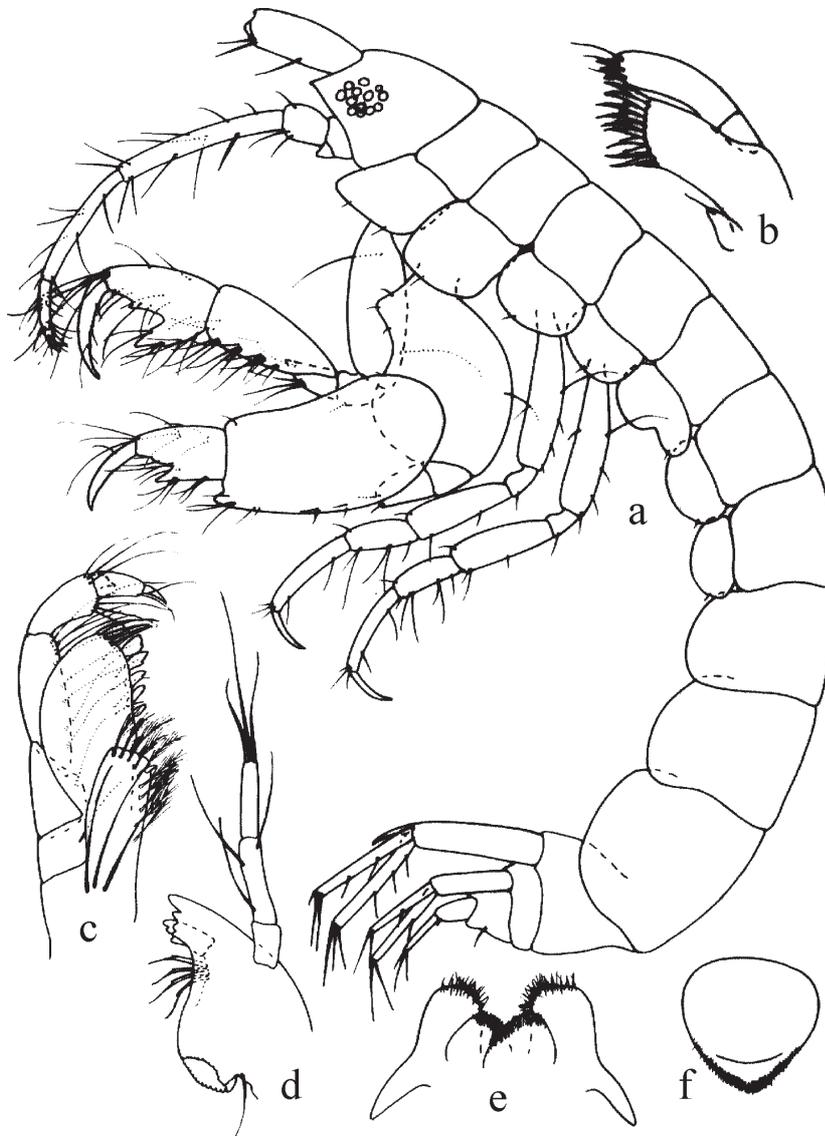


Figure 1 *Wombalano rachayai* sp. nov. Holotype, male, 2.2 mm: a) entire; b) maxilla 1; c) maxilliped; d) mandible; e) labium; f) labrum.

simple, palm very oblique and continuous with posterior margin; dactylus relatively short and stout. Pereopods 3–4 slender, dactylus shorter than propodus, Pereopods 5–7 unknown. Epimera 1–3 rounded. Uropod 1 peduncle with interramal spine less than one quarter length of peduncle, rami subequal in length and subequal in length with peduncle, with a few long stout setae. Uropod 2 lacking interramal spine, inner ramus longer than outer ramus and longer than peduncle. Uropod 3 peduncle short with one ramus, inner posterior

margin produced into a short tooth, single ramus twice length of peduncle with a small second article. Telson with weak dorsolateral crests, each with a long seta.

Comments

The genus *Wombalano* described from the Great Barrier Reef, Australia (Thomas and Barnard, 1991) was previously monotypic. *Wombalano rachayai* differs from *W. yerang* from the great Barrier reef in a number of ways. In *W. rachayai*

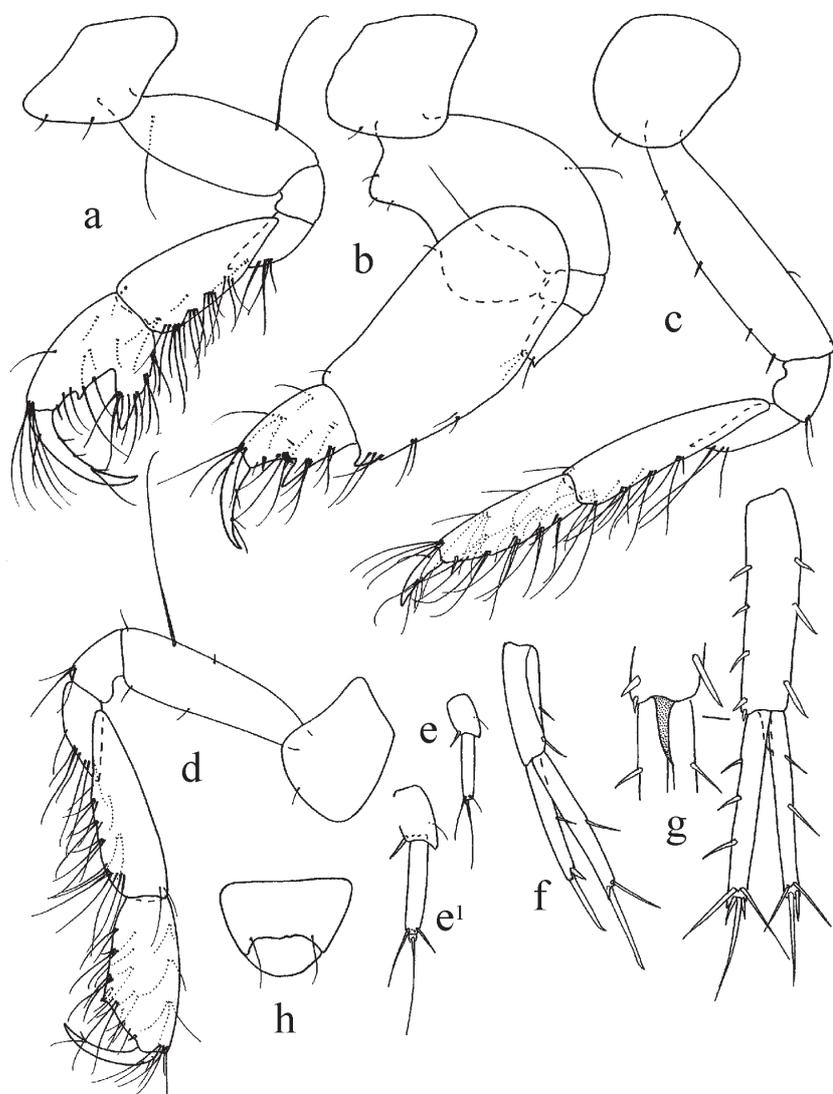


Figure 2 *Wombalano rachayai* sp. nov. Holotype, male, 2.2 mm: a) gnathopod 1; b) gnathopod 2; e) uropod 3; e¹) uropod 3 x 1.5; f) uropod 2; g) uropod 1 with enlarged distal end of peduncle; h) telson; paratype, female, 2.0 mm: c) gnathopod 2; d) gnathopod 1.

the male gnathopod 2 basis has the anterior margin sinuous with a large medial excavation (an even convex flange in *W. yerang*) and lacks robust setae on the posterior margin, the carpus is more slender and has a well developed tooth at the posterodistal corner; the male gnathopod 2 has a poorly expanded basis and a more slender and elongate carpus; the female gnathopod 2 is much more etiolated; pereopods 3–4 have almost linear bases (significantly expanded distally in *W. yerang*); uropod 3 is uniramous (biramous in *W. yerang*) and maxilla 1 has a single long distal seta (one short medial seta in *W. yerang*). Thomas and Barnard (1991) note of *W. yerang* that “the male is characterised by the formation of a large basket of interlocked spines on the bases of gnathopod 2. The bases are enlarged, flattened and curved inward to form a hollow with the concavity facing forward. We assume the basket is used to gather food” In *W. rachayai* the ‘spines’ (= robust setae) are entirely absent and the bases have a large “gap” when brought together, due to the deep excavation on the anterior flange. Clearly *W. rachayai* cannot use the male gnathopod 2 bases for food gathering. Also it would be surprising in males and females (which have quite different gnathopoda) were to employ different methods of feeding.

Wombalano is a sister taxon to *Acuminodeutopus* and *Zoedeutopus*. This group of three genera, is now known to be widely distributed in world seas. The triad is known from the Caribbean and western Atlantic (*Acuminodeutopus naglei*) the eastern Pacific (*A. heteruopus/A. periculosus* and *A. stenopodus*), Galapagos (*Zoedeutopus cinaloanus*) and Eastern Australia (*Wombalano yerang*) and the Andaman Sea (*Wombalano rachayai*).

Habitat

Muddy sand at a depth of about 40 m.

Etymology

Named after the type locality.

Bemlos quadrimanus (Sivaprakasam)

Lembos quadrimanus Sivaprakasam, 1970: 81, fig. 1.

Lembos waipio.—Ledoyer, 1972: 200, 21A, 22, 24 (not *L. waipio* Barnard, 1970: 85, 44–45).

Lembos quadrimanus mozambicus Myers, 1975: 359, figs 33–39.

Bemlos quadrimanus.—Myers, 1988: 282, fig. 14.

Material examined

PMBC 17516, 30 males, 37 females, 14 Immature, shore in front of PMBC, *Padina* sp. 0.5 m, coll. R. Evans and M. Huggett, 04.12.1998; PMBC 17517, 4 males, 5 females, near pier in front of PMBC, *Halimeda*, intertidal, coll. A. Myers, 04.12.1998; PMBC 17518, 3 males, 2 females, shore in front of PMBC, coral rubble, intertidal, coll. G. Dinesen, 08.12.1998.

Comments

For a full description and figures of this species see Myers (1975). An illustration of the complete animal is given by Myers (1988).

Habitat

In shallow water amongst algae, sponges and coral rubble.

World Distribution

Indian Ocean endemic (East Africa, Madagascar, India, Thailand, Western Australia).

Bemlos delicatissima sp. nov.

(Figs 3–5)

Material examined

Holotype: PMBC 17511, male 2.5 mm, intertidal near PMBC jetty, coral rubble, coll. A. A. Myers, 08.12.1998.

Paratype: PMBC 17512, 1 male, 2 female, same data as holotype.

Diagnosis

Male 2.7 mm, female 3.5 mm. Head ocular lobes moderately produced, rounded. anteroventral

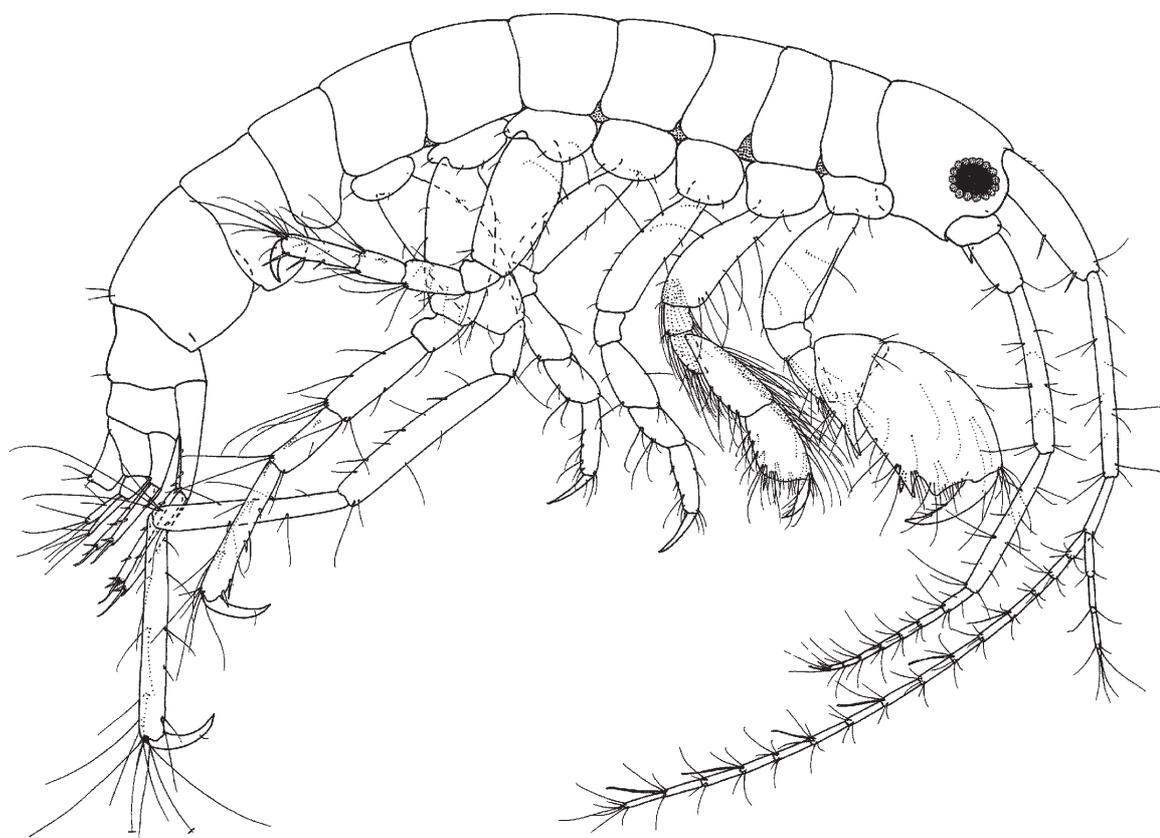


Figure 3 *Bemlos delicatissima* sp. nov. Holotype, male, 2.5 mm.

margin acute; eye moderately large, composed of many ommatidia. Male segments 2 and 3 with short sternal processes. Antenna 1 only a little shorter than body length, peduncular articles in the basi-distal ratios 7:10:3; primary flagellum longer than peduncle with about 16 articles some of which bear aesthetascs, accessory flagellum with 4 articles, the terminal article rudimentary. Antenna 2 about two thirds length of antenna 1, peduncular articles 4 and 5 subequal, flagellum with about 8 articles. Labrum anterior margin rounded. Maxilla 1 inner plate with a single, long terminal seta, inner plate with ten stout setae. Maxilla 2 normal for the genus. Mandible triturative, palp well developed, palp articles in the basi-distal ratios 1:2:3, article 3 scarcely falcate, with a few long setae and an understorey comb row of short setae. Labium mandibular process long and acute. Maxilliped inner plate, anterior margin without processes. Male gnathopod 1 coxa subrectangular, not produced;

basis not grossly expanded, anterior margin substraight; carpus short, cup-shaped, posterodistal margin produced into a long, slender, weakly deflected spine; propodus expanded, width about two-thirds length and about two and one half times the length of the carpus, palm weakly concave, separated from a posterodistal tooth by a deep triangular, round-bottomed excavation; posterodistal tooth with a stout seta inserted on the posterior margin at its base; dactylus stout, toothed on its posterior margin and overlapping palm. Female gnathopod 1 similar to that of male but coxa a little more rounded, carpus elongate, nearly twice as long as broad, lacking a posterodistal spine; propodus twice as long as broad, widest distally, palm broadly convex but weakly sinuous, defined by a stout seta; dactylus a little more elongate than that of male, overlapping palm. Male gnathopod 2 coxa subrectangular, basis flask-shaped, broadening distally, with a brush of

elongate slender setae on the posterodistal margin, carpus twice as long as broad, longer than propodus; propodus with palm regularly convex, defined by a stout seta, dactylus short, fitting palm, anterior margins of carpus and propodus densely clothed in very elongate, slender setae. Female gnathopod 2 similar to that of male but basis parallel-sided and lacking distal brush of setae, anterior margins of carpus and propodus lacking the very elongate setae. Pereopods 5–7 in the length ratios 3:5:9. Epimera 1–2 rounded, epimeron 3

posterodistal corner subquadrate. Uropod 1 peduncle with strong, acute, interramal spine, one quarter length of peduncle, rami subequal and a little longer than peduncle. Uropod 2 peduncle with strong, acute, interramal spine, one half length of peduncle, inner ramus longer than outer and one and one half length of peduncle, both rami with stout setae. Uropod 3 inner ramus twice length of peduncle and longer than outer ramus, with a small second article. Telson dorsolateral crests each with a single long slender seta.

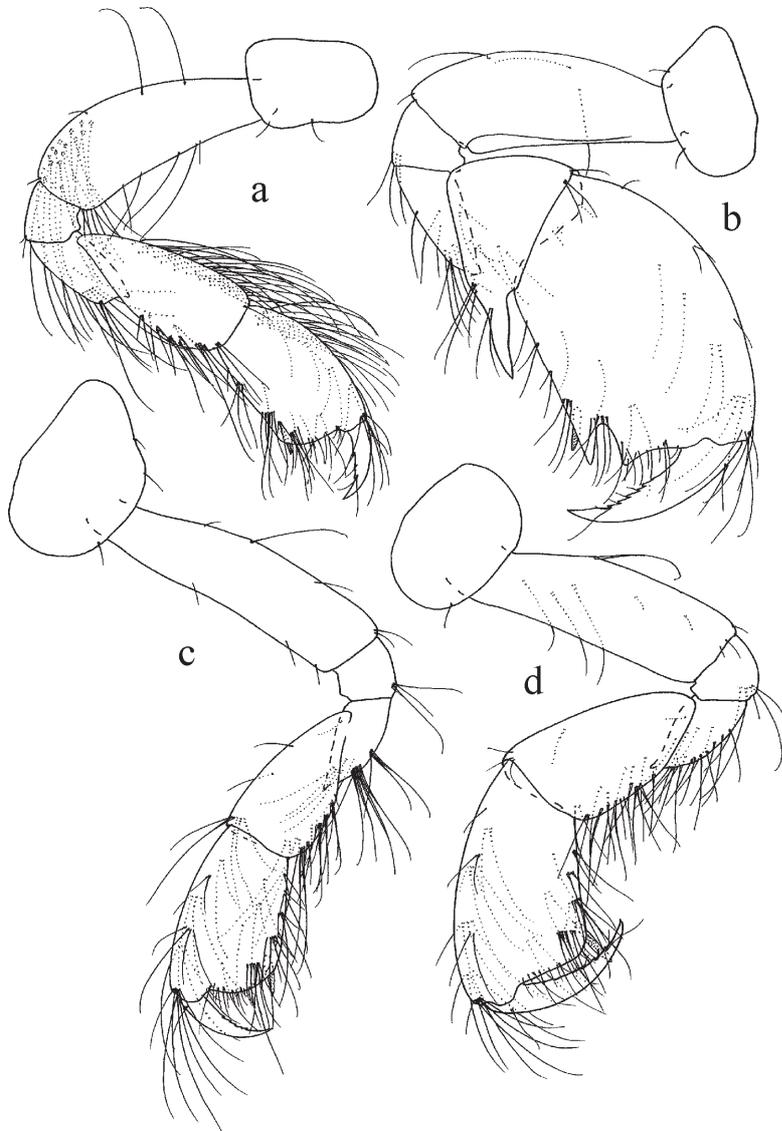


Figure 4 *Bemlos delicatissima* sp. nov. Holotype, male, 2.5 mm: a) gnathopod 2; b) gnathopod 1; paratype, female, 2.5 mm: c) gnathopod 2; d) gnathopod 1.

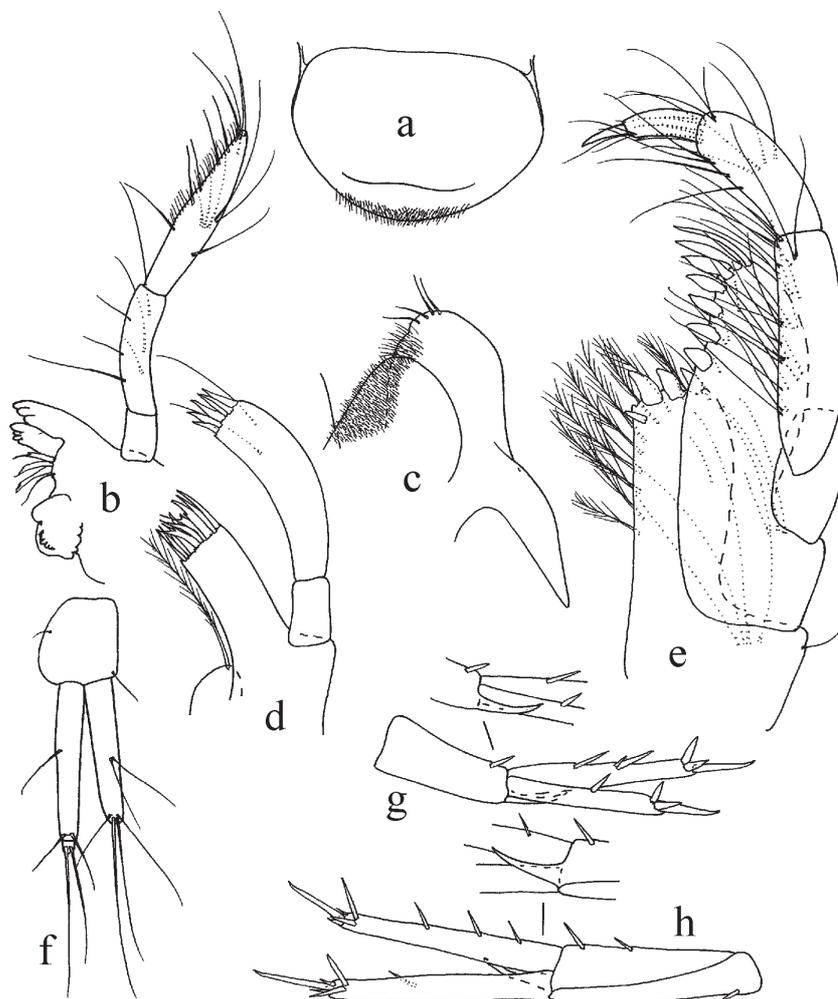


Figure 5 *Bemlos delicatissima* sp. nov. Holotype, male, 2.5 mm: a) labrum; b) mandible; c) labium (right side); d) maxilla 1; e) maxilliped; f) uropod 3; g) uropod 2 with enlarged distal end of peduncle; h) uropod 1.

Comments

Bemlos delicatissima sp. nov. superficially resembles *B. palmatus* (Myers), but that species lacks the very elongate setae on the basis and propodus of the male gnathopod 2, has a less elongate pereopod 7 and has a deep excavation on the palm of the female gnathopod 1. It also resembles *B. pseudopunctatus* Ledoyer from Mauritius, but that species lacks the long setae on the anterior margin of the carpus and of the propodus of the male gnathopod 2.

Habitat

Intertidal amongst coral rubble on muddy sand.

Grandidierella bonnieroides Stephensen

Grandidierella bonnieroides Stephensen, 1948: 12, fig. 3.— Myers, 1970: 141, figs 1–2; 1972: 790; 1981: 218; 1995: 36.— Asari and Myers, 1982: 252, figs 9–10.

Material examined

PMBC 17519, 1 male, 2 female, 1 immature, amongst mangrove detritus, Nam Bor Bay, hand-collected, coll. P. Davie and P. Ng, 11.12.1998.

Comments

This is a variable species which may eventually prove to be a species complex. For the Andaman Sea, consult the description and figures of Asari and Myers (1982).

Habitat

In areas of high detritus accumulation in shallow water.

World Distribution

Cosmopolitan, tropical to warm temperate.

***Grandidierella gilesi* Chilton**

Grandidierella gilesi Chilton, 1921: 552, fig. 11; 1925: 537.–Barnard, 1935: 300.–Schellenberg, 1938: 93.–Nayar, 1959: 40, pl. 14, fig. 6.–Imbach, 1967: 90, pl. 33.–Sivaprakasam, 1970: 157.–Ledoyer, 1979: 152, fig. 8.–Myers, 1981: 222, fig. 6.–Asari and Myers, 1982: 248, figs 7–8.

Material examined

PMBC 17520, 1 male, 1 female, amongst mangrove detritus, Nam Bor Bay, hand-collected, coll. P. Davie and P. Ng, 11.12.1998.

Comments

For a recent description see Asari and Myers (1982).

Habitat

Muddy and silty bottoms where it builds tubes on mollusc shells or stones.

World Distribution

India, Thailand, Java, South China Sea, Australia, ?Madagascar (material from Madagascar may be referable to an undescribed species).

***Leptocheirus dufresni* Ledoyer**

Leptocheirus dufresni Ledoyer, 1982: 294, fig. 109.

Material examined

PMBC 17521, 1 female, BIOSHELF St. C1, 09°00'N, 098°03'E, Box corer, 40 m, coll. S. Bussarawit and C. Aungtonya, 20.04.1996.

Comments

This species was formerly known only from Madagascar (see Ledoyer, 1982), so this is a substantial range extension.

Habitat

Amongst calcareous algae in 86–105 m depth (Madagascar) and on muddy sand with shell fragments in about 40 m depth (Thailand).

World Distribution

Madagascar, Thailand.

***Protolembos tegulapodus* sp. nov.
(Figs 6–8)****Material examined**

Holotype: PMBC 17513, male 4.0 mm, intertidal near PMBC jetty, coral rubble, coll. A. Myers, 08.12.1998.

Paratypes: PMBC 17514, 2 male, 8 female, 2 immature, same data as holotype.

Diagnosis

Male 4.0 mm, female 7.0 mm. Head ocular lobes moderately produced, rounded, anteroventral margin acute; eye moderately large composed of many ommatidea. Male pereon segments 3–4 with strong, spine-like sternal processes.

Antenna 1 about two-thirds body length, peduncular articles in the basi-distal ratios 5:7:2. primary flagellum one and a half times length of peduncle with about 17 articles most of which bear aesthetascs, accessory flagellum with 6 articles, the terminal article rudimentary. Antenna 2 about two thirds length of antenna 1, peduncular articles 4 and 5 subequal, flagellum with about 6 articles.

Labrum anterior margin rounded. Maxilla 1 inner plate with a single long terminal seta, inner plate with 10 terminal stout setae. Maxilla 2 normal for the genus. Mandible triturative, palp well developed, palp articles in the basi-distal ratios 2:4:5, article 3 weakly falcate with a few long setae and an understory comb row of short setae. Labium mandibular process very long and acute. Maxilliped inner plate, anterior margin with rounded process, palp slender, article four narrow. Male gnathopod 1 coxa subquadrangular, basis enlarged, anterior margin substraight, outer face of anterior margin excavate; carpus short, cup-shaped, posterior distal margin not produced, propodus more than twice length of carpus, subrectangular, anterior distal margin strongly crenate, resembling the overlapping tiles of a roof, palm straight, minutely irregular, with deep distal excavation separating a slender triangular tooth from the short anterior part of the palm, tooth with a stout seta

inserted at its base, posteriorly; dactylus strongly overlapping palm. Female gnathopod 1 coxa subquadrangular, basis stout, three times as long as broad, carpus longer than that of male, subtriangular, two-thirds length of propodus, propodus palm weakly sinuous, dactylus slender, greatly overlapping palm. Male gnathopod 2 coxa subcircular, basis elongate, anterior margin concave; carpus and propodus, subequal in length, each article two times as long as broad. Female gnathopod 2 similar to that of male, but basis anterior margin substraight, propodus a little longer and broader distally than carpus. Pereopods 5–7 in the length ratios 5:8:12. Epimera 1–3 with small distoventral notch. Uropod rami with finely pleated margins. Uropod 1 peduncle with strong, acute interramal spine almost two-thirds length of peduncle, rami slender, spinous, subequal, distinctly longer than peduncle. Uropod 2 peduncle with strong, acute, interramal spine only a little

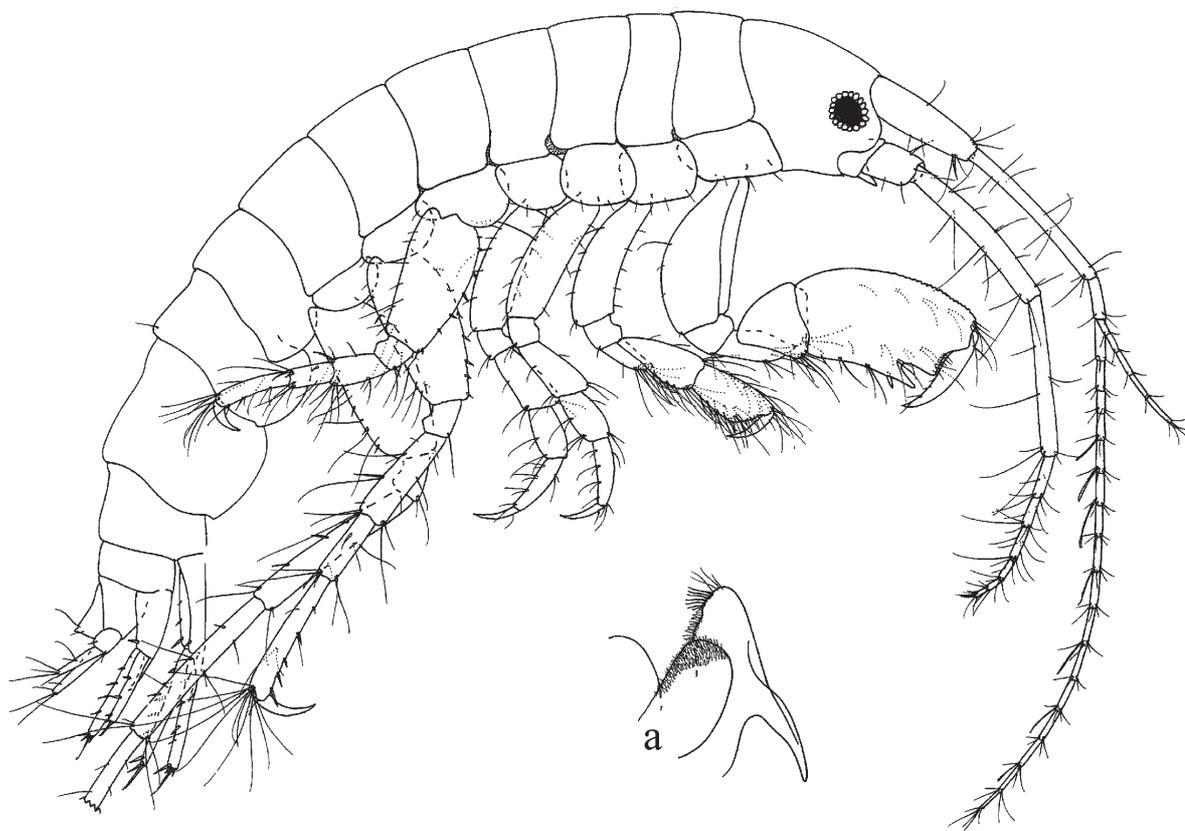


Figure 6 *Protolembos tegulapodus* sp. nov. Holotype, male, 4.0 mm: a) labium (right side).

shorter than peduncle, rami slender, inner ramus one and one half times length of peduncle, outer ramus a little shorter than inner ramus, margins of both rami with stout setae. Uropod 3 inner ramus longer than outer and twice length of peduncle, both rami with stout marginal setae, inner ramus lacking a second article. Telson dorsolateral crests each with a single long slender seta.

Comments

The well-developed process on the anterior margin of the inner plate of the maxilliped, together with the sinuous palm of the female gnathopod 1,

align this species with other *Protolembos* species. The peculiar crenulations on the male gnathopod 1 propodus are not known in any other aorid amphipod.

Habitat

Amongst coral rubble.

Etymology

From the Latin *tegula* meaning roof tile, referring to the tiled appearance of the anterior margin of the propodus of the male gnathopod 1.

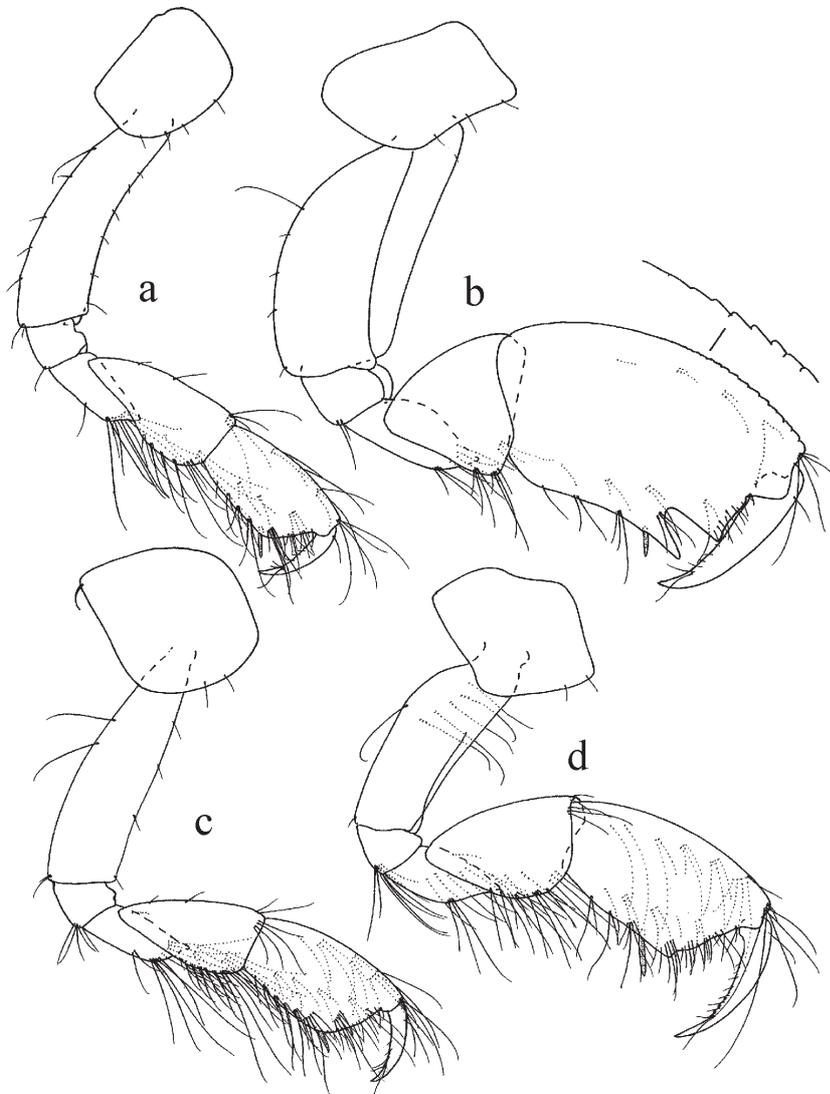


Figure 7 *Protolembos tegulapodus* sp. nov. Holotype, male, 4.0 mm: a) gnathopod 2; b) gnathopod 1; paratype, female, 7.0 mm: c) gnathopod 2; d) gnathopod 1.

***Xenocheira* sp.**

Xenocheira seurati Ledoyer, 1984: 41, fig. 19
(?*X. seurati* Chevreux, 1907).

Xenocheira ?seurati Moore, 1988: 712, figs 4–7.

Xenocheira sp. Myers, 1998: 208.

Material examined

PMBC 17522, 1 female, BIOSHELF St. C1,
09°00'N, 098°03'E, Box corer, 40 m, coll. S.
Bussarawit and C. Aungtonya, 20.4.1996.

Comments

Xenocheira seurati was first described from
Iles Gambier (Tuamotu Archipelago) by Chevreux

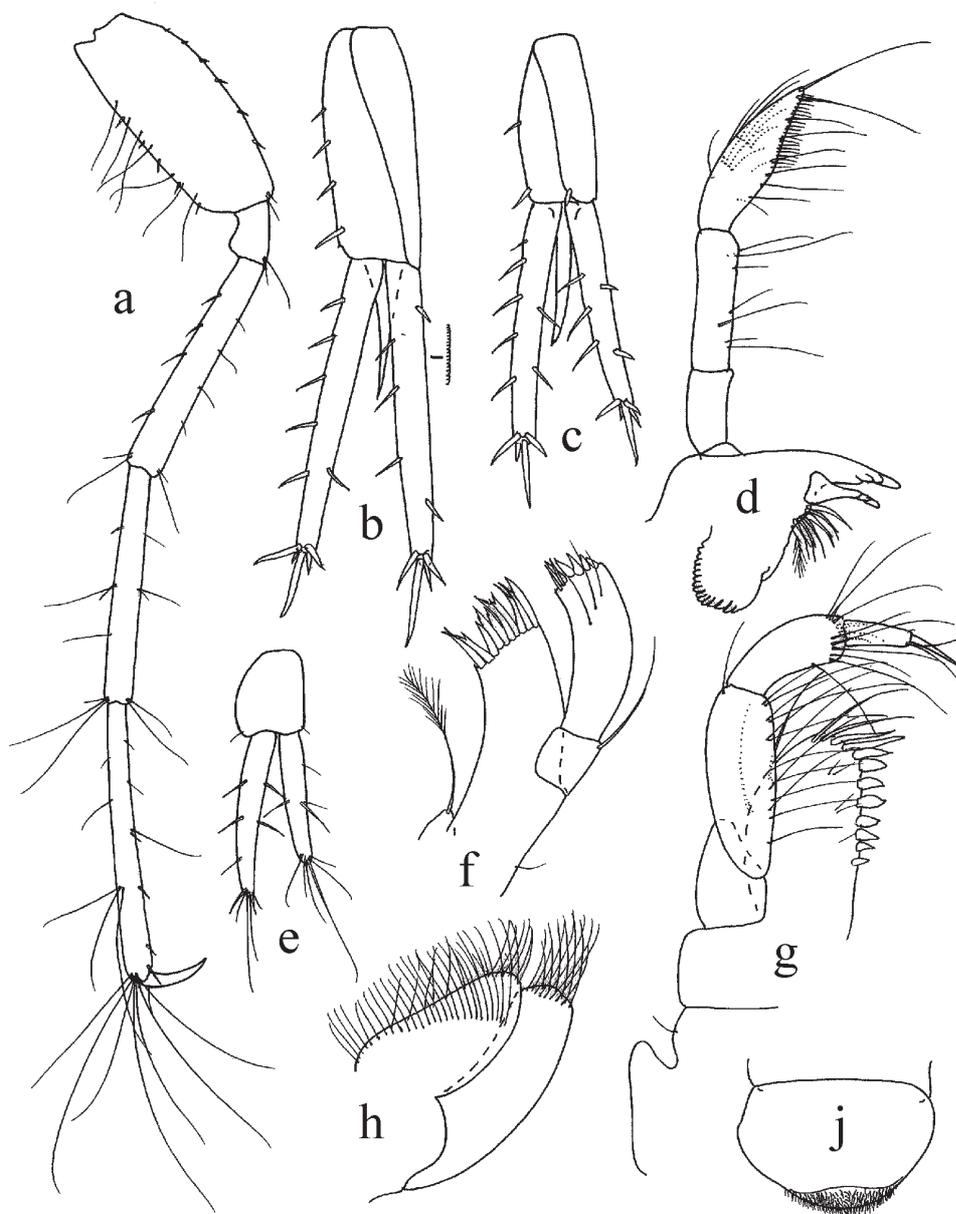


Figure 8 *Protolembos tegulapodus* sp. nov. Holotype, male, 4.0 mm: a) pereopod 7; b) uropod 1; c) uropod 2; d) mandible; e) uropod 3; f) maxilla 1; g) maxilliped; h) maxilla 2; j) labrum.

(1907). Moore (1988) examined type material and compared it with material collected in Western Australia and with material described by Ledoyer (1984) from New Caledonia. He was unable to convince himself about the conspecificity of the Gambier material with the other two, in part due to the poor state of the type material. The record of a female from Fiji (Schellenberg, 1938) also remains enigmatic. For a fuller discussion see Myers (1998).

Habitat

Muddy bottoms with algae, coral rubble and shell fragments.

World Distribution

Unclear due to taxonomic confusion. Species of the *X. seurati* complex have been recorded from Western Australia, New Caledonia, Thailand, the Gambier Archipelago and Fiji.

Family Neomegamphopidae

Konatopus storeyae sp. nov. (Figs 9–11)

Material examined

Holotype: PMBC 17515, male 2.6 mm, Racha Yai Island, Phuket, washes from coral rubble, 9–20 m, donated M. Storey, 3.12.1998.

Diagnosis

Male 2.6 mm. Head elongate, laterocephalic lobes strongly produced, anteroventral margin strongly excavate; eye large, dorsoventrally elongated. Pereon segment 1 very enlarged and swollen. Antenna 1 and 2 missing. Labrum asymmetrical, anterior margin notched. Maxilla 1 inner plate with 2 elongate setae. Maxilla 2 inner plate with oblique setal row. Mandible well developed, tritirative, with row of 6 stout setae; palp articles in the basi-distal ratios 1:3:2, article 3 spatulate. Labium outer plate with short, subacute

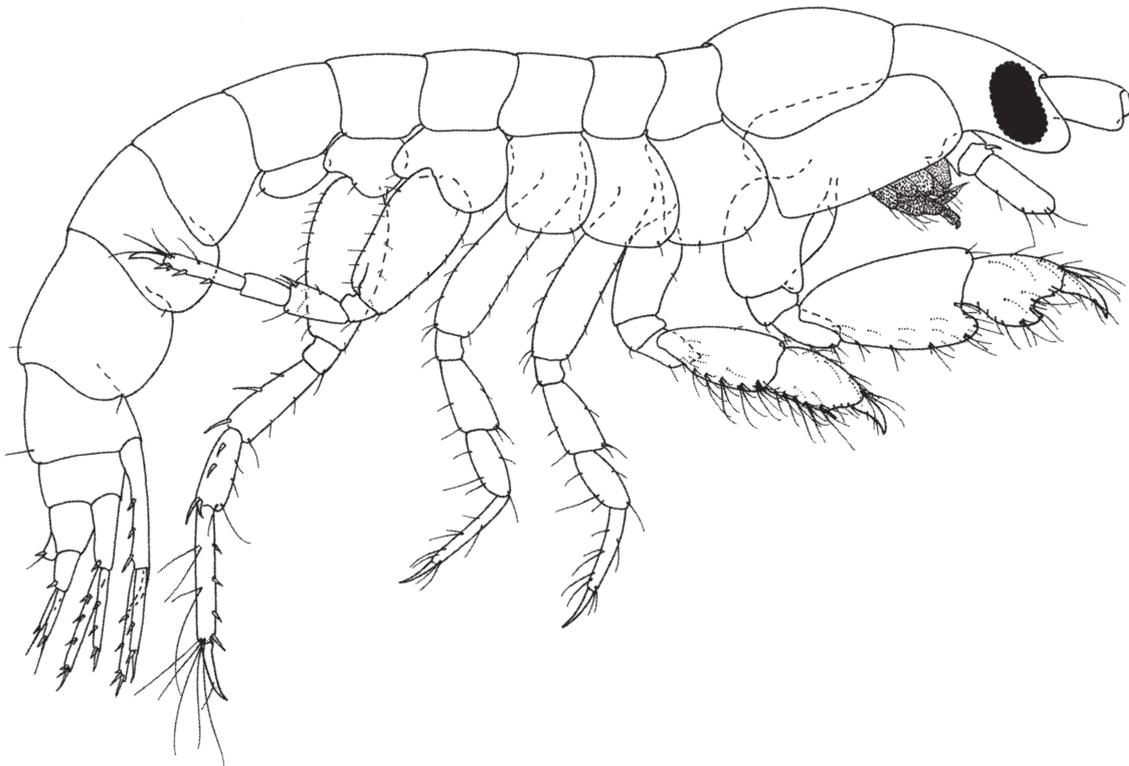


Figure 9 *Konatopus storeyae* sp. nov. Holotype, male, 2.6 mm.

mandibular processes. Maxilliped article 4 with long slender terminal stout seta exceeding length of article 4. Male gnathopod 1 weakly setiferous, coxa enlarged, subrectangular, twice as broad as deep, strongly produced forward; basis swollen, two-thirds as broad as long, anterior margin convex and excavate on outer face for reception of carpus, carpus enlarged, subtriangular, posterior margin extended into a flange and produced at the posterodistal corner into a rounded process,

propodus two-thirds length of carpus, narrow proximally, broadening distally, palm with round-bottomed excavation bordered on each side by a small tooth, dactylus stout, of moderate length, overlapping palm. Male gnathopod 2 coxa subquadrangular, of equal depth with coxa 1, basis stout, twice as long as broad, carpus subrectangular, twice as long as broad, propodus shorter than carpus, palm oblique, weakly concave, delimited by a stout seta, dactylus short,

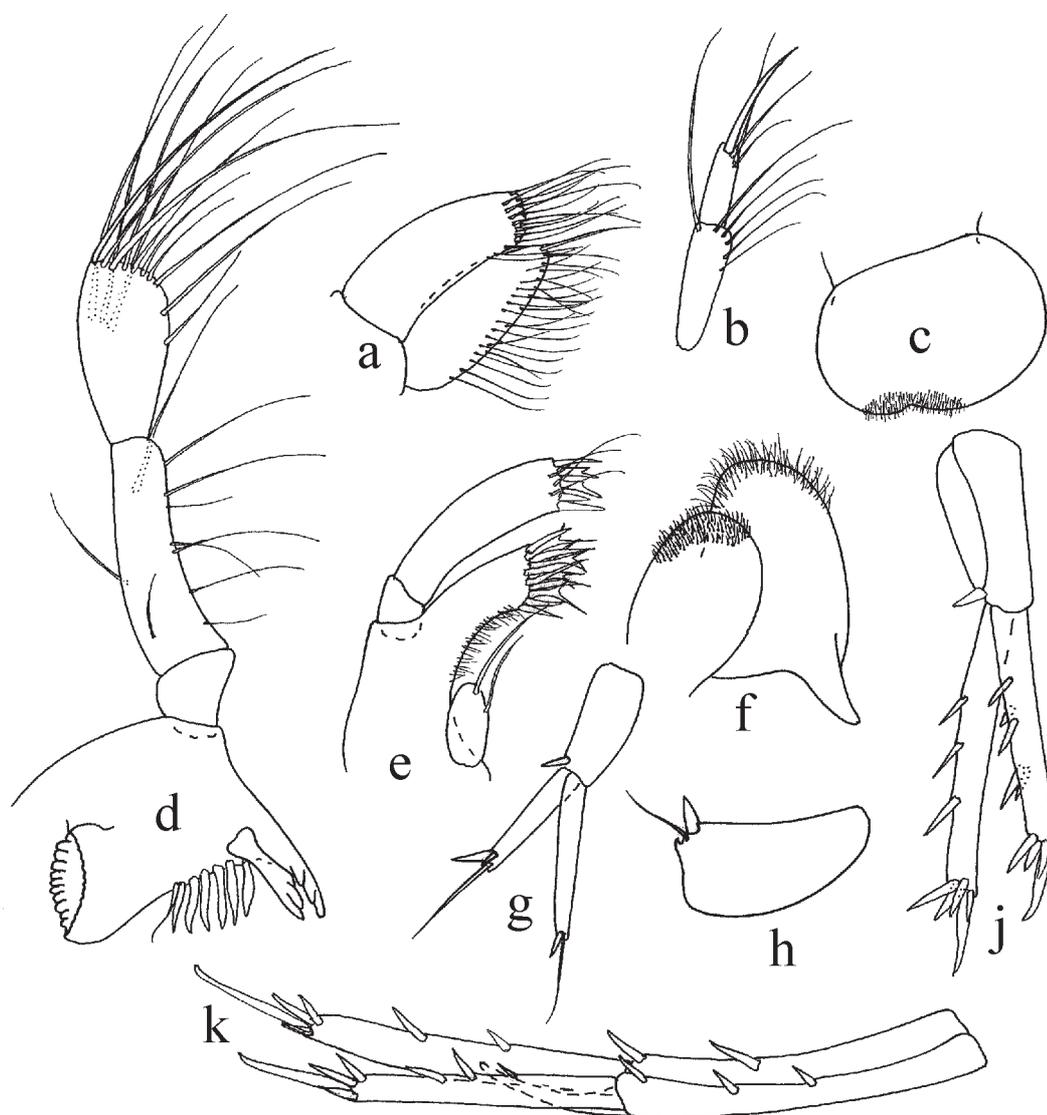


Figure 10 *Konatopus storeyae* sp. nov. Holotype, male, 2.6 mm: a) maxilla 2; b) maxilliped palp terminal articles; c) labrum; d) mandible; e) maxilla 1; f) labium; g) uropod 3; h) telson lateral view; j) uropod 2; k) uropod 1.

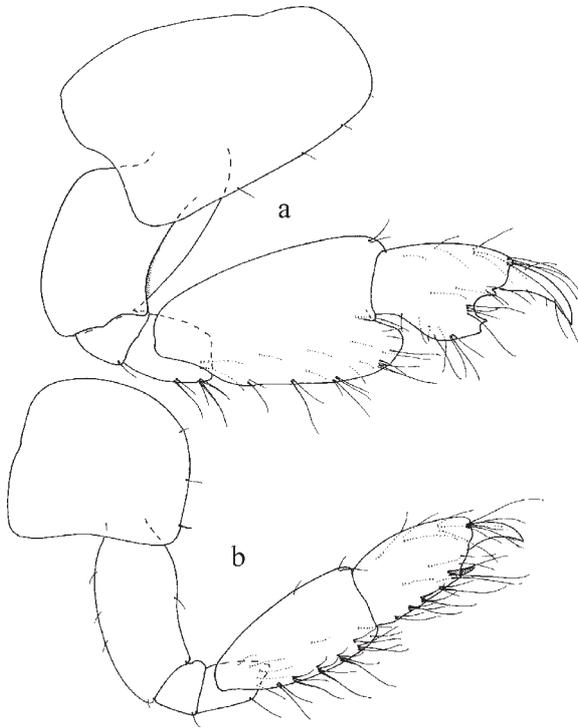


Figure 11 *Konatopus storeyae* sp. nov. Holotype, male, 2.6 mm: a) gnathopod 1; b) gnathopod 2.

scarcely overlapping palm. Pereopods 3–4 similar, of moderate length, dactylus about half length of propodus. Pereopod 5 basis with weak posterior flange. Pereopod 6 one and one half times length of pereopod 5. Pereopod 7 missing. Epimeron 3 rounded with small posteroventral notch bearing a small seta. Uropod 1 with well developed interramal spiniform process, two-fifths length of peduncle, inner ramus a little longer than outer and a little shorter than peduncle. Uropod 2 peduncle lacking

an interramal process, inner ramus longer than outer and one and one half times length of peduncle. Uropod 3 inner ramus longer than outer and longer than peduncle, each ramus terminating in a single long slender seta and 1–2 short stout setae. Telson with a stout seta and a slender seta on each dorsolateral crest.

Comments

This species differs from the only other known species in the genus, *K. pao* Barnard, 1870, from Hawaii, in the more strongly produced ocular lobes with larger eye, in the much more slender pereopods 3 and 4 with sub-linear basis, in the slender rami of uropod 3, which lack lateral stout setae, and in small differences in the shape of the male gnathopod 1. This is the first record of the genus from the Indian Ocean.

Habitat

From dead coral rubble.

Etymology

Named after Melissa Storey, who donated the material.

ACKNOWLEDGEMENTS

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