JOURNAL OF NATURAL HISTORY, 2002, **36,** 1421–1461

Taylor & Francis
Taylor & Francis Group

New species and records of Asellota from the Indian Ocean (Crustacea: Peracarida: Isopoda)

BRIAN KENSLEY and MARILYN SCHOTTE

Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, DC, USA

(*Accepted 13 March 2001*)

In this study of asellote Isopoda from the Indian Ocean, 29 species in 11 genera and seven families are recorded. Twenty-one species are described as new: family Gnathostenetroididae, *Maresiella aldabrana*; family Janiridae, *Carpias mossambica*; family Joeropsidae, *Joeropsis algensis*, *J. arpedes*, *J. dimorpha*, *J. hamatilis*, *J. lentigo*, *J. pentagona*, *J. pleurion*; family Pleurocopidae, *Pleurocope wilsoni*; family Pseudojaniridae, *Pseudojanira meganesus*; family Santiidae, *Santia spicata*, *S. urospinosa*; family Stenetriidae, *Hansenium aldabrae*, *H. expansa*, *H. remocarpus*; *Mizothenar serratum*, *Stenetrium assumentum*, *S. quinquedens*, *S. zanzibarica*, *Stenobermuda brucei*. The first record of the family Pleurocopidae (*Pleurocope wilsoni*) and the genus *Mizothenar* (family Stenetriidae) from the Indian Ocean are included. Diagnoses of the genera and species are provided, and keys to the Indian Ocean species of most of the genera. The material comes primarily from Aldabra Atoll, the granitic Seychelles islands, Zanzibar Island, the Comoro Islands, and Phuket in Thailand. A few samples are from material of the International Indian Ocean Expedition carried out in the mid-1960s.

KEYWORDS: Crustacea, Peracarida, Isopoda, Asellota, Indian Ocean.

Introduction

This paper is part of a series that is based on accumulations of material from various sites around the Indian Ocean (see Kensley and Schotte, 2000). The material comes mainly from Aldabra Atoll, the granitic Seychelles, Zanzibar Island, Comoro Islands, and Phuket, Thailand, along with a few samples from the International Indian Ocean Expedition, off the east African coast and Madagascar.

About 160 species of asellote isopods have been recorded from the Indian Ocean (see Kensley, 2001). Not surprisingly, 42 of these (26%) come from deep water (exclusively from more than 200 m), this being the habitat where the Asellota have radiated with great success. In the present paper, 30 species (22 new) are recorded and diagnosed. Each of the 11 genera involved is diagnosed, and where appropriate, keys to their constituent Indian Ocean species are provided. Distribution of the species is provided in the keys as a further aid to separation. Revisionary works are referred to in the generic synonymies.

Journal of Natural History
ISSN 0022-2933 print/ISSN 1464-5262 online © 2002 Taylor & Francis Ltd
http://www.tandf.co.uk/journals
DOI: 10.1080/00222930110050401

The abbreviations used are: IIOE, International Indian Ocean Expedition; JDT, James Thomas field stations; JR, Jack Rudloe field stations; K, Brian Kensley field stations; MS, Marilyn Schotte field stations; USNM, United States National Museum; ZMUC, Zoological Museum, University of Copenhagen; sta, station.

Systematics

Suborder ASELLOTA
Family GNATHOSTENETROIDIDAE Kussakin, 1967
Genus *Maresiella* Fresi and Scipione, 1980

Maresia Fresi, 1973: 302.
Maresiella Fresi and Scipione, 1980: 313; Müller, 1992: 205.

Diagnosis. Cephalon with strong rostrum anteriorly concave or truncate; anterolateral corners rounded; antennal teeth lacking on anterior margin. Eyes dorsolateral, of three to eight ommatidia. Pereopod 1 in male with propodus longer than palm width, with band of elongate setae just mesial to anterior margin; posterior margin strongly setose; palm demarcated posterodistally by robust seta; palm straight, bearing row of oblique pectinate setae. Pereopod 1 in female, propodus less elongate than in male, lacking anteromesial row of elongate setae. Pereopods 2–7 biunguiculate. Pleopod 1 in male biramous, operculiform. Pleopod 2, rami fused in female, operculiform. Pleopod 2 in male with exopod short, lobate, terminal or subterminal on protopod; copulatory stylet of endopod widening distally to bilobed, setal fringed structure. Uropod biramous, with robust protopod.

Maresiella aldabrana sp. nov.
(figures 1, 2)

Type material. HOLOTYPE: USNM 253297, ♂ 2.0 mm, sta K-AL-124, coral rubble from fore-reef slope, Picard Island, Aldabra, 9°24′S, 46°12′E, 21 m, 13 April 1987. PARATYPES: USNM 253298, five ♂ 1.8–2.0 mm, 12 ovigerous ♀ 1.8–2.0 mm, seven ♀, same data as holotype.

Other material. USNM 253299, nine ♂, five ovigerous ♀, five ♀, two juveniles, coral rubble and coarse sediment from eight stations on Aldabra, 15–25 m.

Diagnosis. Rostrum wider than long, anterior margin concave. Eye consisting of five ommatidia. Pleotelson as wide as long, with single tooth on lateral margin. Antennular flagellum of three articles. Antennal flagellum of 16 articles. Pereopod 1 of male with rectangular carpus having setae on posterior margin; propodus about 2.5 times longer than wide, with row of about 25 elongate setae with inflated bases on mesial surface near anterior margin, row of about 18 setae along posterior margin; stout seta demarcating propodal palm, latter with four fringed setae; dactylus having five fringed setae on cutting edge. Pleopod 1 in male having eight distal margin setae on each ramus, latter about twice longer than greatest width. Operculum of female about 1.4 times longer than greatest width, distally bilobed, each lobe having four marginal setae.

Remarks. *Maresiella indica* Müller, 1992, from Réunion Island, and *M. polynesica* Müller, 1992, from the Society Islands, both have much shorter propodi and carpi of pereopod 1 in the male. The type species, *M. barringtoniana* (Fresi, 1973)

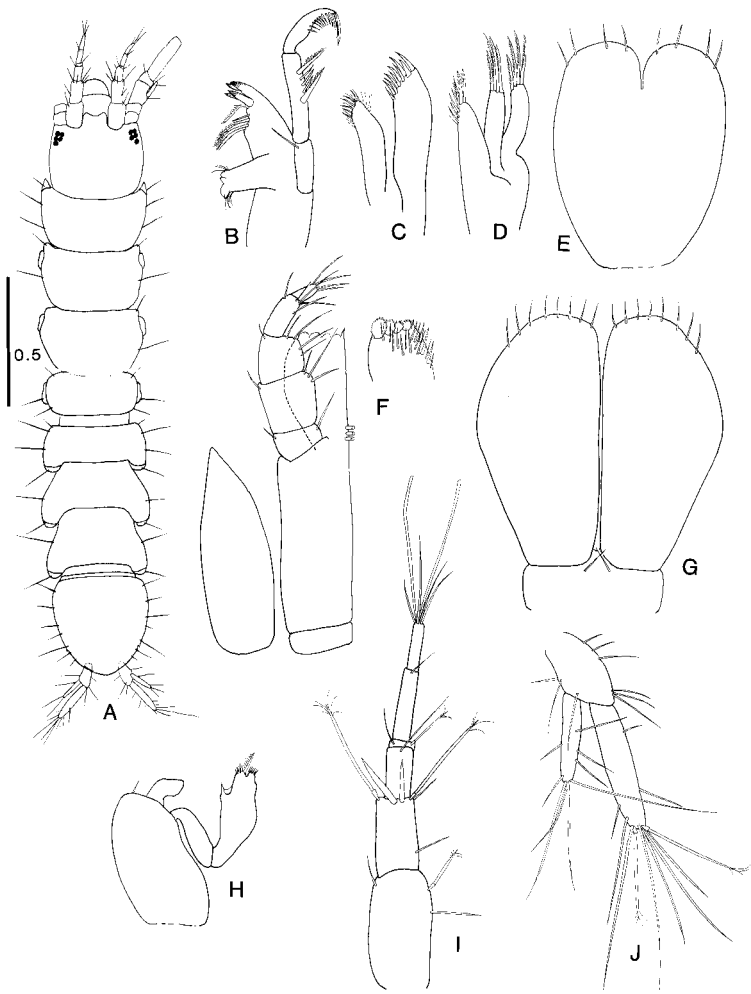

FIG. 1. *Maresiella aldabrana*, sp. nov.: (A) dorsal view; (B) mandible; (C) maxilla 1; (D) maxilla 2; (E) female operculum; (F) maxilliped; (G) male pleopod 1; (H) male pleopod 2; (I) antennule; (J) uropod.

from the Galapagos Islands, also has a less elongate propodus of pereopod 1 in the male, with a more diffuse band of elongate setae on the anteromesial surface, than is seen in *M. aldabrana*.

Etymology. The specific name derives from the type locality, Aldabra Atoll.

Family **JANIRIDAE** Sars, 1899

Genus ***Carpias*** Richardson, 1902

Carpias Richardson, 1902: 294; Pires, 1980: 96; Wilson and Wägele, 1994: 695.
Bagatus Nobili, 1906: 268; Pires, 1980: 96.

Diagnosis. Eyes dorsolateral. Cephalon lacking rostrum. Maxillipedal endite longer than wide; palp articles 1–3 expanded. Pereopod 1 sexually dimorphic, often enlarged and expanded in male, carpochelate, dactylus reduced. Pereopods 2–7,

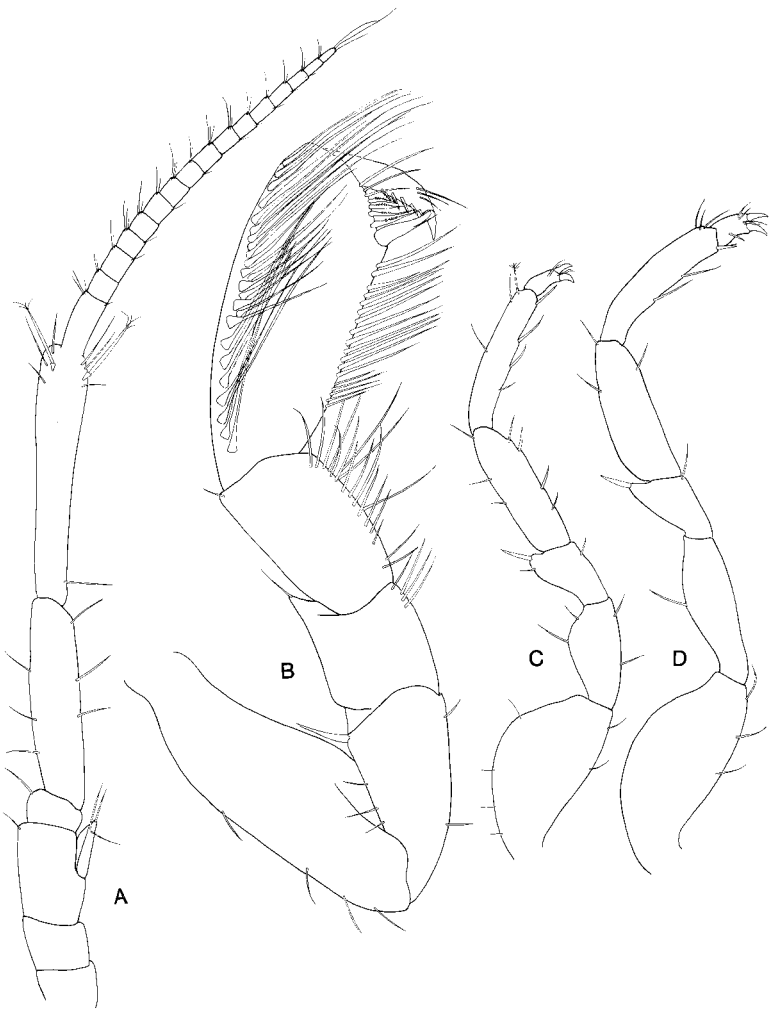

FIG. 2. *Maresiella aldabrana*, sp. nov.: (A) antenna; (B) pereopod 1; (C) pereopod 2; (D) pereopod 7.

dactyli having three claws. Coxae visible on pereonites 2–7 in dorsal view. Pleon consisting of short free anterior pleonite lacking free lateral margins, plus broad pleotelson. Uropods with elongate protopod and rami.

Remarks. The species of the genus *Carpias* are notoriously difficult to identify, not least because of the variation with age or moult-stage of the male pereopod 1, this latter being the most useful single feature to distinguish species. The distribution of the species is further complicated by the fact that these tiny animals have been shown to raft on floating algae (Morris and Mogelberg, 1973), and are also probably capable of clinging to fouling organisms on floating objects including ships. Eight species, including the three reported here, have been recorded from the Indian Ocean. Several have very wide distributions in more than one ocean. Unfortunately, until a range of material from each locality is examined, identifications will remain uncertain, and identification keys will have little meaning.

Carpias cf. *algicola* (Miller, 1941)
(figure 3)

Janira algicola Miller, 1941: 317, figure 4.
Carpias algicola: Kensley and Schotte, 1989: 83, figure 38.
Bagatus algicola: Pires, 1982: 247, figures 47–62.

Material examined. USNM 253312, 1720 specimens from 56 stations on Aldabra Atoll, intertidal to 22 m; USNM 253313, 500 specimens from 20 stations from Mahé Island, intertidal to 6 m; USNM 253314, 34 specimens from algal turf, Mayotte Island, Comoros, 3–5 m, 14 March 1991; USNM 253315, 150 specimens, IIOE sta HA-32, fish poison station on small reef, Strait of Jubal, northern Red Sea, 27°16′38″N, 33°47′01″E, 0–8 m, coll. H. A. Fehlmann, 4 January 1965; USNM 253316, 17 specimens Arsenal Bay, Mauritius, 15 June 1963.

Previous records. Caribbean; Gulf of Mexico; Florida Keys; Hawaii; India.

Diagnosis. Pereopod 1 in male, carpus about same width proximally as distally, with two strong distal teeth on posterior margin; propodus narrow, curved, tapering slightly, reaching proximally to merus; dactylus very short, biunguiculate in immature animal, becoming reduced to cluster of simple setae in mature animals.

Remarks. Identification of what is frequently the most abundant shallow water isopod in tropical regions is complicated by the variation with growth of the male pereopod 1. There is a progressive decrease and eventual loss of the dactylus, from a small biunguiculate article (at total length of about 1.5 mm), to the point where the dactylus is represented by a clump of elongate simple setae (total length 2.4–2.7 mm) (see Pires, 1982, figures 56–62). Given this variability with age, any species distinguished by characters of the male first pereopod must be treated with caution. A further complication is the fact that species of *Carpias* are known to raft on floating algae (e.g. Kensley *et al.*, 1995), thereby making even a tentative identification based on geography impossible. Given this rafting ability, it is possible that several species of *Carpias* have a tropical/subtropical distribution in several oceans. The male first pereopod of what is assumed to be *C. algicola* from the Caribbean (Belize and Cuba), and the Indian Ocean (Aldabra and Mahé), at various total body lengths is illustrated to demonstrate the variability mentioned above.

Carpias mossambica sp. nov.
(figure 4)

Type material. HOLOTYPE: USNM 253359, ♂ 2.5 mm, IIOE sta 401F, south of Beira, Mozambique, 20°30′S, 35°49′E, 32 m, 4 October 1964. PARATYPES: USNM 253360, two ♂ 1.5–2.0 mm, seven ovigerous ♀ 1.8–2.3 mm, one ♀, same data as holotype.

Diagnosis. Pleon greatest width 1.3 times midlength, margins entire. Pereopod 1 in male, carpus longer than wide, widening distally, with strong triangular posterodistal lobe, palm concave with single peg-like tooth and smaller low lobe close to propodal articulation; propodus about four times longer than wide; dactylus short, one-ninth length of propodus, biunguiculate. Pereopods 2–7 having triunguiculate dactyli. Pleopod 1 in male, rami tapering distally to narrow acute distolateral apex. Uropod longer than median length of pleon, exopod two-thirds length of endopod.

Remarks. *Carpias brucei* Monod, 1974 (see Pires, 1982: 241, figure 35–41) from the Seychelles most closely resembles *C. mossambica* in the structure of the male pereopod 1. The carpal teeth in the two species are identical. *Carpias brucei*, however,

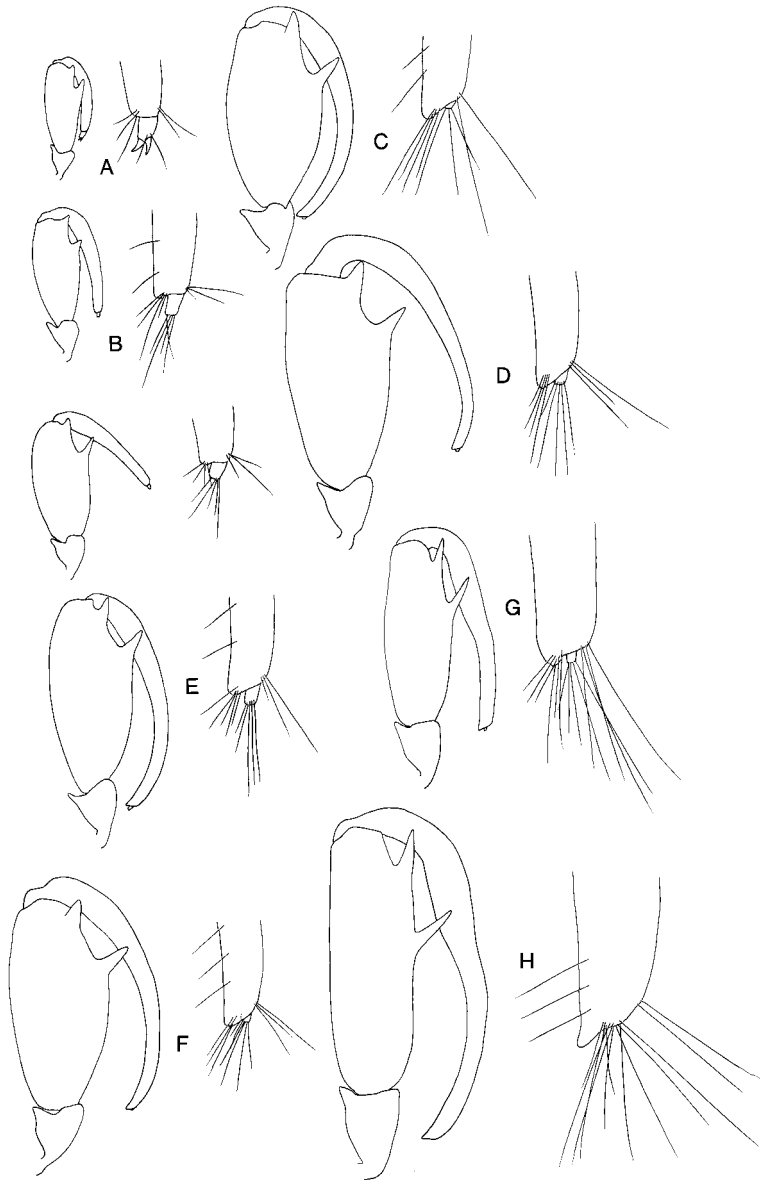

FIG. 3. *Carpias algicola*, pereopod 1 with dactylus enlarged, from variety of localities, total length included: (A) Belize 1.50 mm; (B) Belize 1.73 mm; (C) Cuba 2.20 mm; (D) Belize 2.18 mm; (E) Aldabra Atoll 2.14 mm; (F) Aldabra Atoll 2.40 mm; (G) Mahe Is. 2.40 mm; (H) Mahe Is. 2.73 mm.

possesses two strong teeth on the posterior margin of the propodus not seen in the present species. The first pleopod of the male is also very similar in both species. The earlier species, however, appears to have a more setose body, and to have more sensory setae on the propodi and carpi of the ambulatory pereopods. Pereopod 1 of *C. mossambica* shows no variation in the three male specimens available.

Etymology. The specific name derives from Mozambique, the country closest to the type locality.

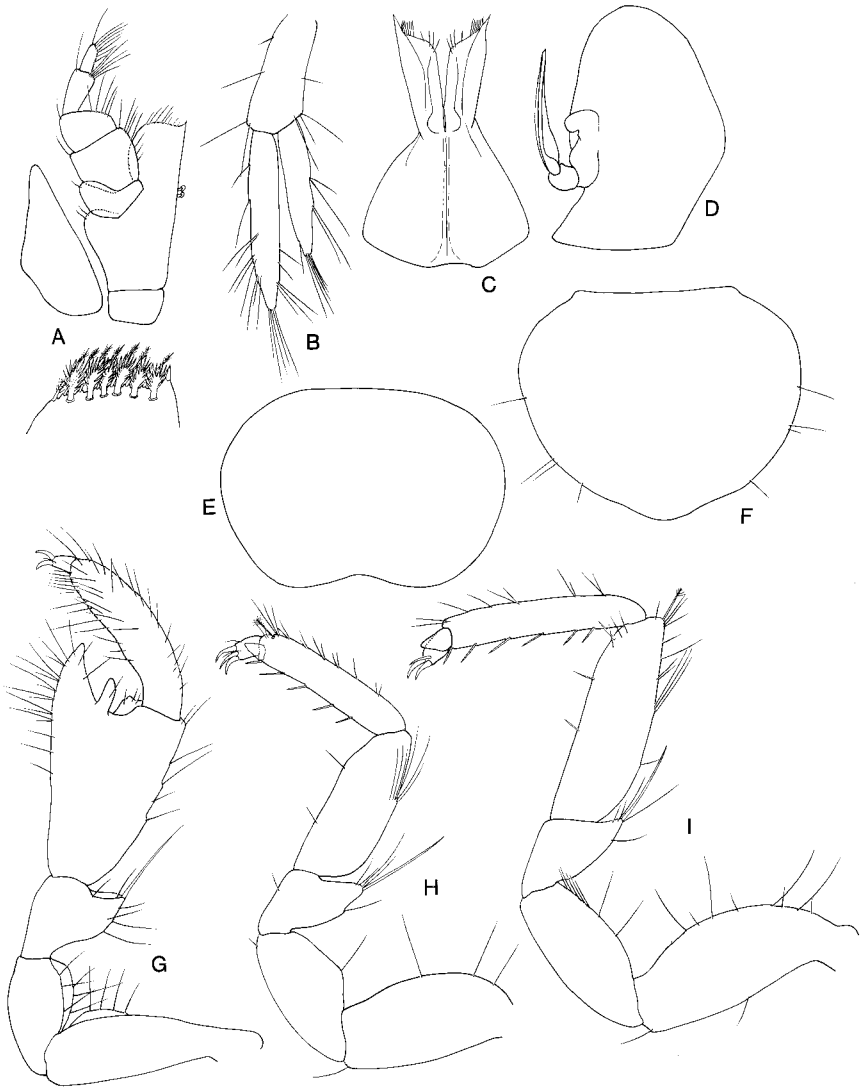

FIG. 4. *Carpias mossambica*, sp. nov.: (A) maxilliped, with distal setae enlarged; (B) uropod; (C) male pleopod 1; (D) male pleopod 2; (E) female operculum; (F) pleon; (G) male pereopod 1; (H) pereopod 2; (I) pereopod 7.

Carpias* cf. *triton (Pires, 1982)
(figure 5)

Bagatus triton Pires, 1982: 251, figures 72–84.
Carpias triton: Kensley and Schotte, 1989: 87, figure 39E–F.

Material examined. ZMUC, two ♂ 2.8 mm, six ovigerous ♀ 2.8–3.0 mm, 10 juveniles, sta CRU-1899, Matemwe, Zanzibar, 9°13′S, 35°10′E, intertidal, 25 September 1995.

Previous records. Carrie Bow Cay, Belize.

Diagnosis. Pereopod 1 in male, carpus about 2.6 times longer than greatest width, with two strong distal teeth on posterior margin; propodus curved, reaching

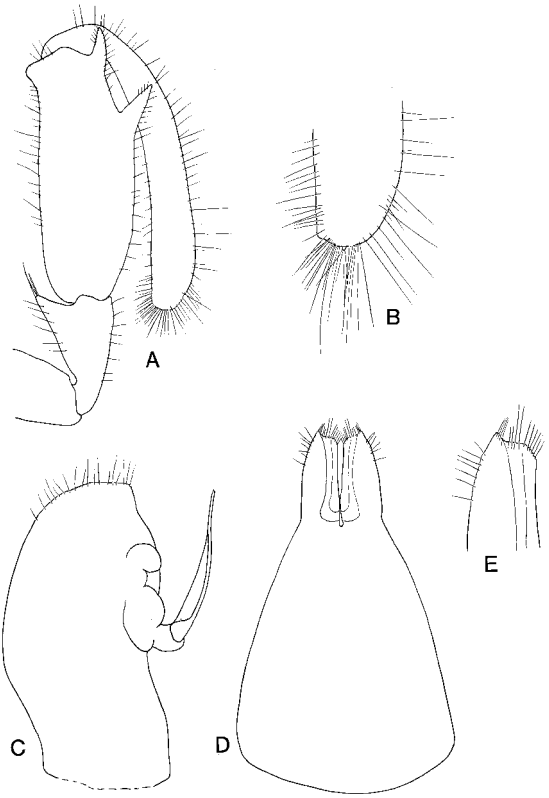

FIG. 5. *Carpias* cf. *triton*: (A) male pereopod 1; (B) pereopod 1, apex of propodus and dactylus; (C) male pleopod 2; (D) male pleopod 1; (E) apex of male pleopod 1 ramus.

proximally to distal margin of merus, widening distally to rounded apex; dactylus minute, bearing four simple setae.

Remarks. The same comments regarding the geographical distribution of *Carpias algicola* apply to this material, which most closely resembles *C. triton* (Pires, 1982).

Family JOEROPSIDAE Nordenstam, 1933

Genus *Joeropsis* Koehler, 1885

Joeropsis Koehler, 1885: 1; Kensley and Schotte, 1989: 87.

Diagnosis. Dorsolateral eyes present. Rostrum distinct, sometimes with flange of transparent scales. Antennule with basal article widest and longest, often with transparent flange of scales. Antennal peduncle articles 3–5 somewhat inflated, article 2 often with fringe of transparent scales; flagellum of about six short articles. Pleopod 1 of male, rami fused, elongate, distally rounded. Pleon consisting of single shield-shaped segment. Uropodal protopod short, usually with acute or tooth-like mesiodistal angle, tucked into sockets on either side of narrowly rounded posterior pleonal margin; rami reduced to small setose lobes.

Remarks. Species of the genus *Joeropsis* are widespread in tropical and temperate waters, occurring primarily in shallow habitats. Most are small (less than 5 mm total length), and morphologically very similar, with mouthparts, pereonal and

pleonal appendages showing little variation. Five characters which do vary have been used to separate species: degree of setation of the body; serration of the lateral margins of the cephalon; shape of the rostrum; presence or absence of a strong mesiodistal tooth on the uropodal protopod; serration of the lateral margins of the pleon. As with so many groups of crustaceans, species of *Joeropsis* can be easily separated when alive or freshly dead, on colour pattern alone. If the animals are preserved in alcohol, this pigmentation is lost with time.

Key to the Indian Ocean species of *Joeropsis*

1 Pleotelson margins entire 2
– Pleotelson margins toothed 5

2 Uropodal protopod bearing strong hook . . . . . *J. pleurion* sp. nov. [tl 1.4–2.2 mm. Aldabra]
– Uropodal protopod lacking hook, rounded 3

3 Body noticeably setose . . . . . *J. paulensis* Kensley, 1975 [tl 4.0 mm. St Paul and Amsterdam Is.]
– Body not setose 4

4 Pereopod 7 propodus seven times longer than wide, with seven setae on posterior margin. . . . . *J. interger* Kensley, 1984b [tl 3.5–3.9 mm. South Africa]
– Pereopod 7 propodus about four times longer than wide, with four setae on posterior margin . . . . . *J. bourboni* Müller, 1991a [tl 2.8 mm. Réunion]

5 Uropodal protopod lacking strong mesiodistal tooth 6
– Uropodal protopod having strong mesiodistal tooth 7

6 Lateral margin of pleotelson with four teeth; rostrum strong convex . . . . . *J. dimorpha* sp. nov. [tl 1.0–1.6 mm. Mahé Is.; Aldabra]
– Lateral margin of pleotelson with seven teeth; rostrum with slight mesial concavity . . . . . *J. waltervadi* Kensley, 1975 [tl 2.4–2.9 mm. Walter's Shoal]

7 Lateral margins of cephalon serrate or denticulate 8
– Lateral margins of cephalon entire 12

8 Lateral margins of pleotelson with fewer than seven teeth 9
– Lateral margins of pleotelson with seven or more teeth 10

9 Lateral margin of pleotelson having four indistinct teeth . *J. letourneuri* Müller, 1991a [tl 1.9 mm. Réunion]
– Lateral margin of pleotelson having two teeth in ♂, five or six in ♀ . . . . . *J. beuroisi* Kensley, 1975 [tl 4.2–6.0 mm. St Paul and Amsterdam Is.]

10 Lateral margins of pleotelson with seven teeth . . . . . *J. meteor* Müller, 1991b [tl 1.9 mm. Gulf of Aden]
– Lateral margins of pleotelson with more than seven teeth 11

11 Lateral margins of pleotelson with eight or nine teeth . . *J. marionis* Beddard, 1886 [tl 4.0 mm. Marion Is.]
– Lateral margins of pleotelson with 12–13 teeth . . . . . *J. serrula* Kensley, 1984b [tl 2.1–2.3 mm. South Africa]

12 Uropodal protopod lacking mesiodistal tooth 13
– Uropodal protopod having mesiodistal tooth 14

13 Lateral margins of pleotelson with three teeth . . . . *J. ceylonensis* Müller, 1991c [tl 2.7 mm. Sri Lanka]
– Lateral margins of pleotelson with five or six teeth . . . *J. sanctipauli* Kensley, 1989 [tl 2.0–2.2 mm. St Paul Is.]

14 Lateral margins of pleotelson having one tooth . . . *J. curvicornis* (Nicolet, 1849) [tl 5.0 mm. Marion Is.]
– Lateral margins of pleotelson with more than one tooth 15

15 Lateral margins of pleotelson with two teeth . . . . . *J. faurei* Müller, 1991a [tl 2.0 mm. Réunion]
– Lateral margins of pleotelson with more than two teeth 16

16 Lateral margins of pleotelson with three teeth . . . . . *J. pentagona* sp. nov. [tl 1.8–2.1 mm. Mahé Is.]
– Lateral margins of pleotelson with more than three teeth 17

17 Lateral margins of pleotelson having four teeth; rostrum weakly convex . . . . . *J. algensis* sp. nov. [tl 1.6–2.0 mm. Mahé Is.]
– Lateral margins of pleotelson with more than four teeth 18

18 Lateral margins of pleotelson with five teeth; rostrum truncate to weakly convex . . . . . *J. arpedes* sp. nov. [tl 1.5 mm. Mahé Is.]
– Lateral margins of pleotelson with six or seven teeth 19

19 Rostrum anteriorly convex 20
– Rostrum anteriorly concave 21

20 Rostrum anteriorly strongly convex; lateral margins of pleotelson with seven teeth . . . . . *J. wolffi* Müller, 1991b [tl 2.0 mm. Gulf of Aden]
– Rostrum weakly convex; lateral margins of pleotelson having six teeth *J. lentigo* sp. nov. [tl 1.0–1.8 mm. Mahé Is., Aldabra]

21 Rostrum three times wider than long, anteriorly weakly concave . *J. hamatilis* sp. nov. [tl 2.3–3.0 mm. Madagascar]
– Rostrum twice wider than long, anteriorly strongly concave . *J. indica* Müller, 1991c [tl 2.0 mm. Sri Lanka]

Joeropsis algensis sp. nov.
(figure 6A–C)

Type material. HOLOTYPE: USNM 253362, ♂ 1.7 mm, sta K-SEY-15, coral rubble with algal turf, Mahé Island, Seychelles, 2–3 m, 1 May 1984. PARATYPES: USNM 253213, two ♂ 1.6–2.0 mm, sta K-SEY-23, intertidal algal turf on reef crest, Mahé Island, Seychelles, 25 February 1989.

Diagnosis. Rostrum low, twice wider than midlength, anterior margin convex. Lateral margins of cephalon entire. Lateral margins of pleotelson with four small teeth. Uropodal basis with strong mediodistal tooth. Red-brown network of pigment on dorsal cephalon, faint pigment streaks on first four pereonites, two small patches anteriorly on pleotelson.

Etymology. The specific name, from the Latin meaning 'from algae', refers to the species' habitat.

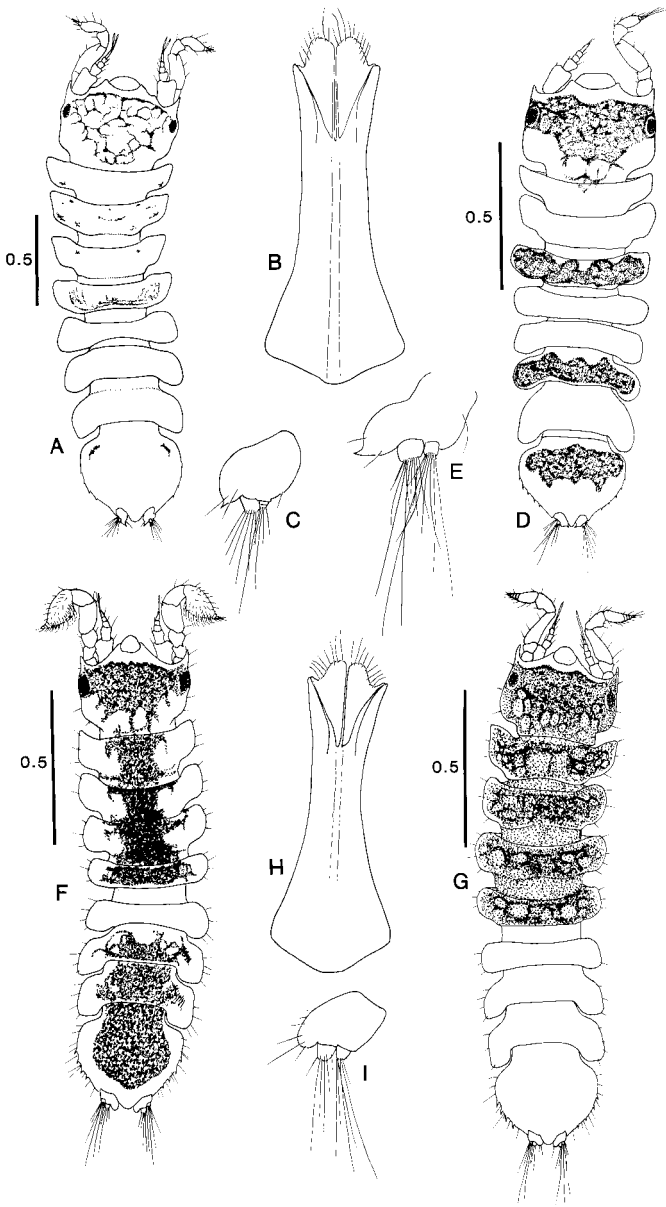

FIG. 6. (A) Male *Joeropsis algensis* sp. nov.; (B) male pleopod 1; (C) uropod; (D) male *Joeropsis arpedes* sp. nov.; (E) uropod; (F) male *Joeropsis dimorpha* sp. nov.; (G) female *Joeropsis dimorpha* sp. nov.; (H) male pleopod 1; (I) uropod.

Joeropsis arpedes sp. nov.
(figure 6D, E)

Type material. HOLOTYPE: USNM 253214, ♀ 1.5 mm, sta K-SEY-23, algal turf on reef crest, Mahé Island, Seychelles, 0.5 m, 25 February 1989.

Diagnosis. Rostrum wider than long, anterior margin straight. Lateral margins of cephalon entire. Pleotelson wider than median length, lateral margins bearing five

small spines on each side. Uropodal basis with mesiodistal spine. Dark purple-red pigment in band on cephalon between eyes, produced posteromedially; pereonites 3 and 6, and anterior pleotelson with transverse band of pigment.

Etymology. The specific name, from the Latin for flat or level, refers to the species' truncate rostrum.

Joeropsis dimorpha sp. nov.
(figure 6F–I)

Type material. HOLOTYPE: USNM 253215, ♂ 1.6 mm, sta K-SEY-16, algal turf on dead coral, Mahé Island, Seychelles, 2–3 m, 1 May 1984. PARATYPES: USNM 253216, 10 ♂ 1.0–1.6 mm, three ♀ 1.2–1.5 mm, sta K-SEY-16, same data as holotype; USNM 253217, 21 ♂, eight ♀, sta K-SEY-21, clumps of *Amphiroa* on reef flat, Mahé Island, Seychelles, 1 m, 25 February 1989.

Other material. USNM 253218, 18 ♂, four ovigerous ♀, three ♀, sta K-SEY-22, algal turf on granite boulders, Mahé Island, Seychelles, 25 February 1989; USNM 253219, one ♂, nine ♀, sta K-SEY-23, algal turf on reef crest, Mahé Island, Seychelles, 25 February 1989; USNM 253220, one ♀, sta K-SEY-34, encrusting coralline algae, Anse Royale, Mahé Island, Seychelles, 15 August 1992; USNM 253221, one ♀, sta K-AL-14, dense clumps of *Halimeda* alga on dead coral heads, Cinq Cases, Aldabra, 3 April 1983.

Diagnosis. Rostrum as long as wide, subcircular. Lateral margins of cephalon entire. Lateral margins of pleotelson bearing four teeth. Uropodal basis with mesiodistal corner rounded. Red-brown pigment in female fairly dense, somewhat reticulated, on cephalon and pereonites 1–4; in male, on cephalon, pereonites 1–4, 6–7 plus pleotelson, concentrated along midline, pereonite 5 lacking pigment.

Etymology. The specific name refers to the sexually dimorphic pigment pattern of this species.

Joeropsis hamatilis sp. nov.
(figure 7A–C)

Type material. HOLOTYPE: USNM 253236, ♂ 3.0 mm, sta JR-19, sand flat with *Cymodocea* seagrass and algae, Nosy Bé, Madagascar, 13°31″50′S, 48°32″10′E, <1 m, 31 December 1963. PARATYPES: USNM 253237, two ♂ 2.3–2.8 mm, one ovigerous ♀ 2.5 mm, one ♀ 2.3 mm, sta JR-19, same data as holotype.

Diagnosis. Rostrum about three times wider than median length, anterior margin faintly concave. Lateral margins of cephalon entire. Lateral margins of pleotelson having six or seven teeth. Uropodal protopod with mesiodistal corner bearing strong tooth. Sparse line of red-brown pigment on anterior cephalon between eyes.

Etymology. The specific name, from the Latin meaning 'with hooks', refers to the strong hook-like tooth on the uropodal protopod.

Joeropsis indica Müller, 1991c
(figure 7G–I)

Material examined. USNM 253227, five ♂, nine ♀, one juvenile, sta K-SEY-21, clumps of *Amphiroa* alga on reef flat, Anse Marie Louise, Mahé Island, Seychelles, 1 m, 5 February 1989; USNM 253229, three ♂, two ♀, from four stations, Mahé

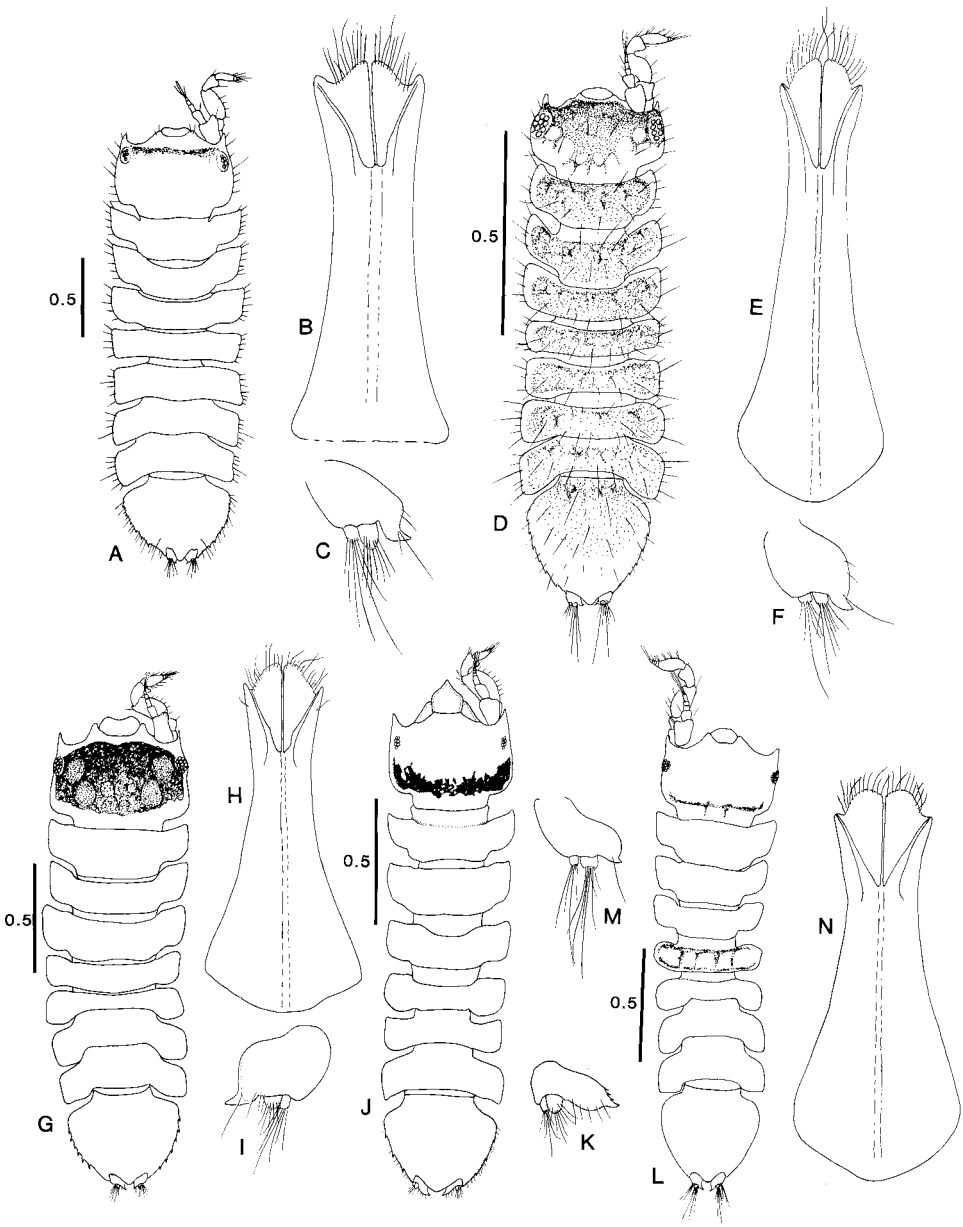

FIG. 7. (A) Male *Joeropsis hamatilis* sp. nov.; (B) male pleopod 1; (C) uropod; (D) male *Joeropsis lentigo* sp. nov.; (E) male pleopod 1; (F) uropod; (G) male *Joeropsis indica*; (H) male pleopod 1; (I) uropod; (J) male *Joeropsis pentagona* sp. nov.; (K) uropod; (L) male *Joeropsis pleurion* sp. nov.; (M) uropod; (N) male pleopod 1.

Island, Seychelles, intertidal to 1 m; USNM 253230, two ♂, one ovigerous ♀, two ♀, one juvenile, from three stations on Aldabra, intertidal to 3 m; ZMUC, one ovigerous ♀, one ♀, two juveniles, sta CRU-1899, intertidal reef flat, Matemwe, Zanzibar, 9°13′S, 35°10′E, 5 September 1995; ZMUC, one ♂, sta CRU-1901, in *Sargassum* alga, reef pools, Matemwe, Zanzibar, 9°13′S, 35°10′E, 25 November 1995.

Diagnosis. Rostrum about twice wider than long, anterior margin straight, truncate. Lateral margins of cephalon entire. Lateral margins of pleotelson having four to six teeth, interspersed with fine setae. Uropodal basis having strong mesiodistal hook. Broad red-brown band of pigment on cephalon, stretching between eyes laterally, falling short of anterior and posterior margins of cephalon.

Previous records. Sri Lanka, intertidal.

Joeropsis lentigo sp. nov.
(figure 7D–F)

Type material. HOLOTYPE: USNM 253222, ♂ 1.5 mm, sta K-SEY-16, algal turf on dead coral, Anse à la Mouche, Mahé, Seychelles, 2–5 m, 1 May 1984. PARATYPES: USNM 253223, one ♂ 1.3 mm, one ovigerous ♀ 1.2 mm, one ♀ 1.3 mm, sta K-SEY-16, same data as holotype; USNM 253224, one ♂ 1.8 mm, one ovigerous ♀ 1.3 mm, sta K-AL-86, reef crest rubble with encrusting red coralline algae, Picard Island, Aldabra, 9°24′S, 46°12′E, 1 m, 12 March 1986; USNM 253225, two ♂ 0.9–1.2 mm, one ovigerous ♀ 1.4 mm, one ♀ 1 .0 mm, sta K-SEY-15, coral rubble with encrusting red coralline algae, Anse à la Mouche, Mahé Island, Seychelles, 2.5–5 m, 1 May 1984.

Other material. USNM 253226, one ♂, five ovigerous ♀, one ♀, two juveniles, from four stations, on Aldabra, 2–16 m.

Diagnosis. Integument bearing numerous scattered setae. Rostrum broader than long, anterior margin evenly convex. Lateral margins of cephalon entire. Pleotelson width subequal to median length, lateral margins of pleotelson bearing three to six spines on each side. Diffuse dorsal red-brown pigment on cephalon, all pereonites, and anterior pleotelson, strongest on cephalon.

Etymology. The specific name, from the Latin meaning 'lentil-shaped', refers to the pigment pattern on the cephalon of this species.

Joeropsis pentagona sp. nov.
(figure 7J–L)

Type material. HOLOTYPE: USNM 253231, ovigerous ♀ 2.0 mm, sta K-SEY-21, clumps of *Amphiroa* alga on reef flat, Mahé Island, Seychelles, 1 m, 25 February 1989. PARATYPES: USNM 253232, two ♀ 1.8–2.1 mm, same data as holotype.

Diagnosis. Rostrum as long as wide, pentagonal, apically subacute. Lateral margins of cephalon entire. Lateral margins of pleotelson having three widely spaced teeth, interspersed with fine setae. Uropodal basis having strong mesiodistal hook, three small teeth on distomesial margin. Narrow red-brown band of pigment along posterolateral and posterior margin of cephalon.

Etymology. The specific name refers to the five-sided rostrum.

Joeropsis pleurion sp. nov.
(figure 7L–N)

Type material. HOLOTYPE: USNM 253233, ♂ 2.2 mm, sta K-AL-70, algal turf of *Halimeda* and *Gracillaria* on reef flat, Aldabra, 1 m, 25 February 1989. PARATYPES: USNM 253234, two ♀ 1.4–2.0 mm, sta K-ALD-70, same data as holotype; USNM 253235, one ♂ 1.7 mm, sta K-ALD-13, coralline-encrusted rubble under *Thalassodendron* seagrass, Aldabra, 6 m, 3 April 1983.

Diagnosis. Rostrum basally broader than long, anterior margin truncate. Lateral margins of cephalon entire. Pereonite 4 with two low, rounded, submedian longitudinal ridges. Lateral margins of pleotelson entire. Uropodal basis with mesiodistal hook. Red-brown transverse band of pigment across posterior half of cephalon, and across pereonite 4.

Etymology. The specific name, from the Latin for 'rib', refers to the two rounded ridges on pereonite 4.

Joeropsis waltervadi Kensley, 1975

Joeropsis waltervadi Kensley, 1975: 367–369, figures 1, 2.

Material examined. USNM 253238, four ♂, one ovigerous ♀, five ♀, IIOE R/V Anton Bruun, cruise 7, sta 381-A, 33°13′S, 43°51′E, near Walter's Shoal, Madagascar Plateau, 46 m, 30 August 1964; USNM 253239, five ♂, one ovigerous ♀, four ♀, seven juveniles, IIOE R/V Anton Bruun, cruise 7, sta 381-B, 33°13′S, 43°51′E, near Walter's Shoal, Madagascar Plateau, 38 m, 30 August 1964.

Diagnosis. Rostrum with slight median concavity. Lateral margins of cephalon entire. Lateral margins of pleotelson having seven teeth. Uropodal protopod mesiodistally rounded.

Previous records. Walter's Shoal, south-west Indian Ocean, 38–46 m.

Family PLEUROCOPIDAE Fresi and Schiecke, 1972

Genus *Pleurocope* Walker, 1901

Pleurocope Walker, 1901: 297; Kensley and Schotte, 1989: 97.

Diagnosis. Eyes present on lateral extension of cephalon. Antennular flagellum of four articles. Antennal flagellum of six or seven articles. Mandibular palp lacking. Some pereonites with narrow lobe-like extension laterally, often bearing one or two stout setae. Pereopod 1 subchelate. Pereopods 2–7 with single claw. Coxae of pereopods 5–7 visible in dorsal view. Uropods inserted dorsolaterally on proximal pleon. Pleon tapering posteriorly to acute apex.

Pleurocope wilsoni sp. nov.

(figure 8)

Type material. HOLOTYPE: USNM 253308, ovigerous ♀ 1.0 mm, IIOE cruise 1, sta 18A, off Phuket Island, Thailand, 7°34′N, 98°00′E, 77 m, 21 March 1963. PARATYPES: USNM 253309, three ovigerous ♀, one ♀, same data as holotype; USNM 253310, one ♂ 0.6 mm, sta JDT-AL-13, coral rubble on fore-reef, Picard Island, Aldabra, 9°24′S, 46°12′E, 10 April 1983.

Other material. USNM 253311, one ovigerous ♀, two ♀, coral rubble from two stations on reef slope, Picard Island, Aldabra, 6–16 m.

Diagnosis. Pereonite 1, lateral lobe bearing single spine; pereonites 2 and 3 each bearing two setae; pereonite 4 lacking lateral lobe or setae; pereonites 5 and 6 each with two setae on lateral lobe; pereonite 7 lacking lateral lobe and setae. Pleon length twice basal width. Mesial lobe of antennal peduncle article 3 bearing seven setae. Pleopod 1 ♂, each ramus bearing four distal setae. Uropodal protopod with two distal setae; exopod with two distal setae; endopod with single distal seta.

Remarks. Two species of *Pleurocope* have been described: *P. dasyura* Walker, 1901 (the type species), from the Mediterranean, and *P. floridensis* Hooker, 1985,

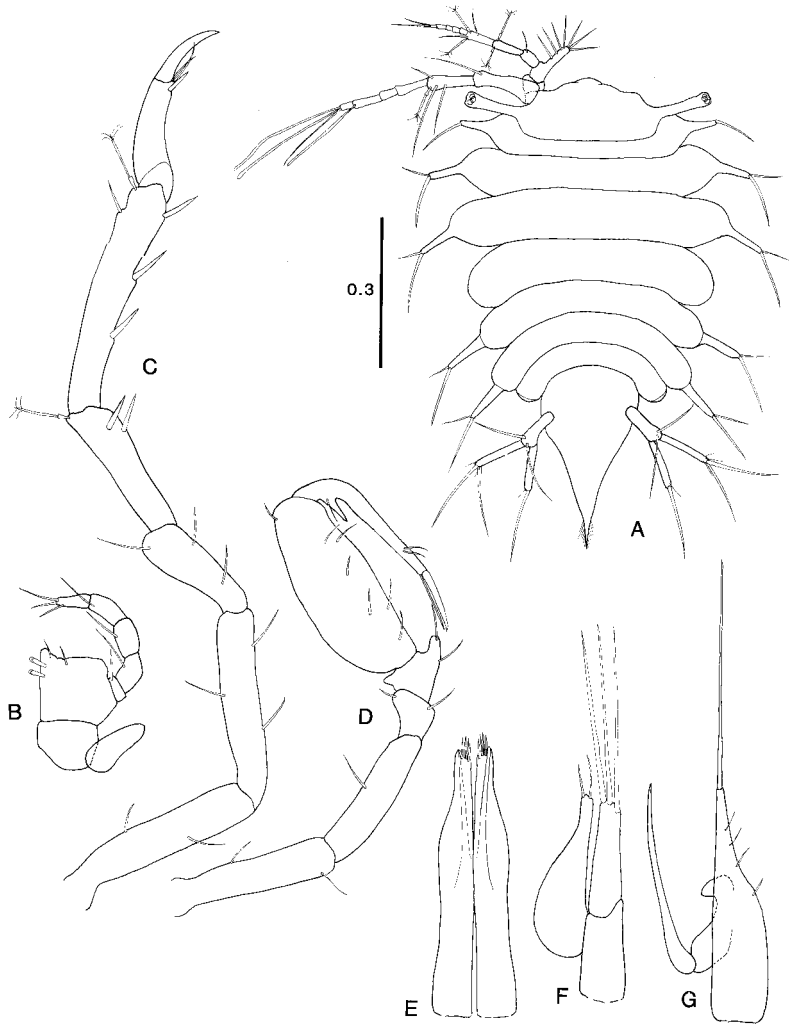

FIG. 8. *Pleurocope wilsoni* sp. nov.: (A) male dorsal view; (B) maxilliped; (C) pereopod 2; (D) pereopod 1; (E) male pleopod 1; (F) pleopod 3; (G) male pleopod 2.

from the eastern Gulf of Mexico and Caribbean. *Pleurocope wilsoni* differs from both in lacking a lateral lobe and setae on pereonite 4. *Pleurocope dasyura* lacks a lobe on pereonite 4, but does have a single seta, and possesses three, rather than two setae on the lateral lobes of pereonites 2–3 and 5–6. *Pleurocope floridensis* lacks a lobe and setae on the first pereonite.

Etymology. The species is named for Dr George (Buz) Wilson of the Australian Museum, in recognition of his research on isopods.

Family PSEUDOJANIRIDAE Wilson, 1986

Genus *Pseudojanira* Barnard, 1925

Pseudojanira Barnard, 1925: 406; Kensley, 1977: 251; Wilson, 1986: 351; Poore and Just, 1990: 520; Serov and Wilson, 1999: 72.

Diagnosis. Rostrum well developed, reaching to distal margin of first antennular article, margins often dentate. Antennal spine of cephalon frontal margin reduced

or absent. Eyes dorsolateral. No coxae visible in dorsal view. Pereopod 1 robust, subchelate, strongly setose in male. Pleon consisting of one dorsally free pleonite anteriorly plus pleotelson. Pleopods 1 and 2 in male not opercular. Pleopod 1 in male, rami distally free, rounded, fused basally to protopod; latter with two rows of fine setae flanking medial depression. Pleopod 2 in male distally obliquely truncate. Pleopod 2 in female opercular. Pleopod 3 in both sexes opercular. Uropods short, inserted ventrally. Pleon consisting of pleonite 1 visible dorsally, lacking free lateral margins, pleonite 2 and 3 only visible ventrally, plus pleotelson.

Key to Indian Ocean species of *Pseudojanira*

1 Rostrum anteriorly broadly rounded 2
– Rostrum anteriorly narrowly rounded to subacute . . . . . *P. fremantlensis* Serov and Wilson, 1999 [Fremantle, Western Australia]

2 Rostral margin dentate; rami of pleopod 1 in male distally rounded . . . . . *P. meganesus* sp. nov. [Natal, South Africa; central Mozambique; Madagascar]
– Rostral margin entire; rami of pleopod 1 in male distally truncate . . . . . *P. stenetrioides* Barnard, 1925 [Zululand, South Africa; southern Mozambique]

Pseudojanira meganesus sp. nov.
(figures 9, 10)

Type material. HOLOTYPE: USNM 253317, ♂ 4.0 mm, IIOE sta JR-28, Nosy Bé, Madagascar, 13°29′S, 48°14′E, shallow water, 9 January 1964. PARATYPES: USNM 253318, six ♂ 2.8–4.0 mm, two ovigerous ♀ 2.9–3.1 mm, three ♀, nine juveniles, IIOE sta JR-28, same data as holotype.

Other material. USNM 253319, one ♂ 2.2 mm, IIOE sta 357B, off Natal, South Africa, 29°11′S, 32°02′E, 69 m, 30 July 1964; USNM 253320, one ♀, one juvenile, IIOE sta 372B, off Inhambane, Mozambique, 24°48′S, 34°59′E, 42 m, 19 August 1964; USNM 253321, three ♂, two juveniles, IIOE sta 403E, north of Beira, Mozambique, 19°09′S, 36°55′E, 88 m, 9 October 1964.

Diagnosis. Rostrum broadly rounded, basally wider than midlength, anterior margin having about ten teeth. Cephalon having low rounded bump in position of antennal tooth; anterolateral tooth large, acute, not reaching anteriorly as far as rostrum. Eyes reniform, composed of 13 ommatidia arranged in 2.5 rows. Pleotelson width about one-third greater than middorsal length, lateral margin with single small tooth. Pereopod 1 in male with merus having anterior and posterior patches of elongate setae on mesial surface, stout anterodistal seta present; carpus with anterior and posterior dense patch of elongate setae; propodus longer than wide, widening distally, with band of dense elongate setae on anterior margin, palm demarcated by stout seta, followed by nine or ten more slender fringed setae; dactylus with ten fringed setae on posterior margin. Pereopod 2, ischium having rounded flange on anterior margin bearing six stout setae; merus with anterodistal lobe bearing single stout seta; carpus rectangular, having three stout setae on posterior margin; propodus shorter than carpus, rectangular, with four stout setae on posterior margin; dactylus with two strong ungui plus smaller more proximal seta.

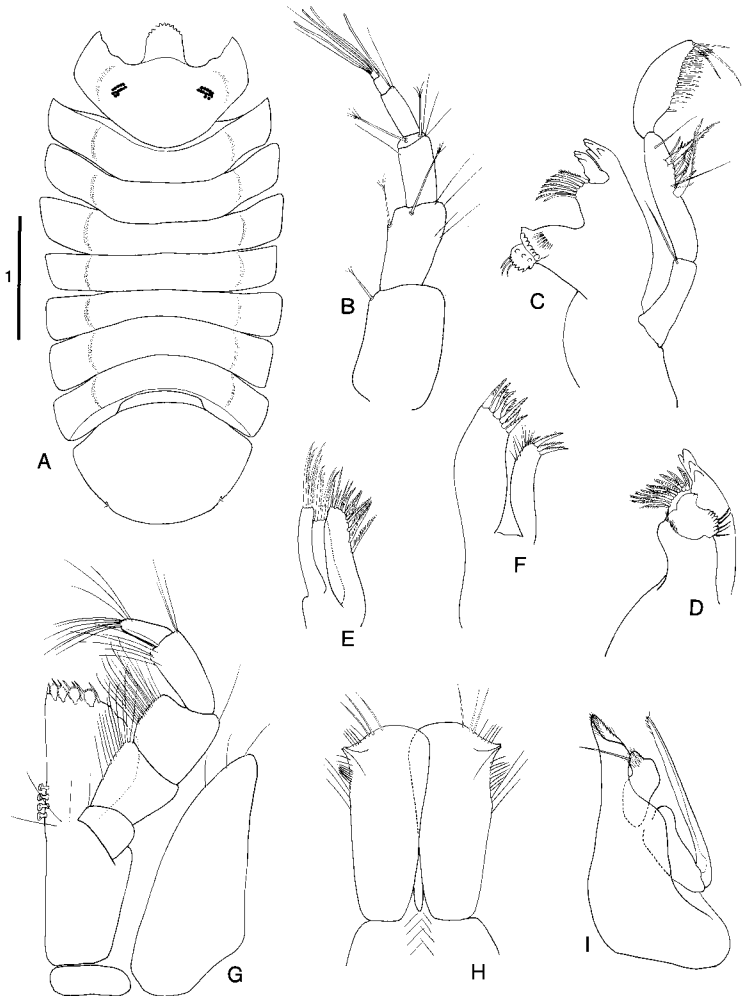

FIG. 9. *Pseudojanira meganesus* sp. nov.: (A) male dorsal view; (B) antennule; (C) right mandible; (D) left mandible, palp omitted; (E) maxilla 2; (F) maxilla 1; (G) maxilliped; (H) male pleopod 1; (I) male pleopod 2.

Remarks. The easiest difference to detect, between the present species and *P. stenetrioides* lies in the rostrum: rounded and entire in the earlier species, rounded and toothed in *P. meganesus*. The latter is dorsally very sparsely setose, unlike *P. stenetrioides* which is fairly densely setose. The pattern of dense elongate setae on the mesial surface of pereopod 1 in the male differs between the two species, with a distinctive anterior and posterior patch on both the merus and carpus in *P. meganesus*. This species apparently also lacks the strong patch of pigment on the dorsum of the cephalon seen in the earlier species.

The three species of *Pseudojanira* recorded from Australia (*P. investigatoris* Poore and Just, 1990; *P. justi* Serov and Wilson, 1999; *P. fremantlensis* Serov and Wilson, 1999) all possess narrowly triangular rostra, unlike the two western Indian Ocean species.

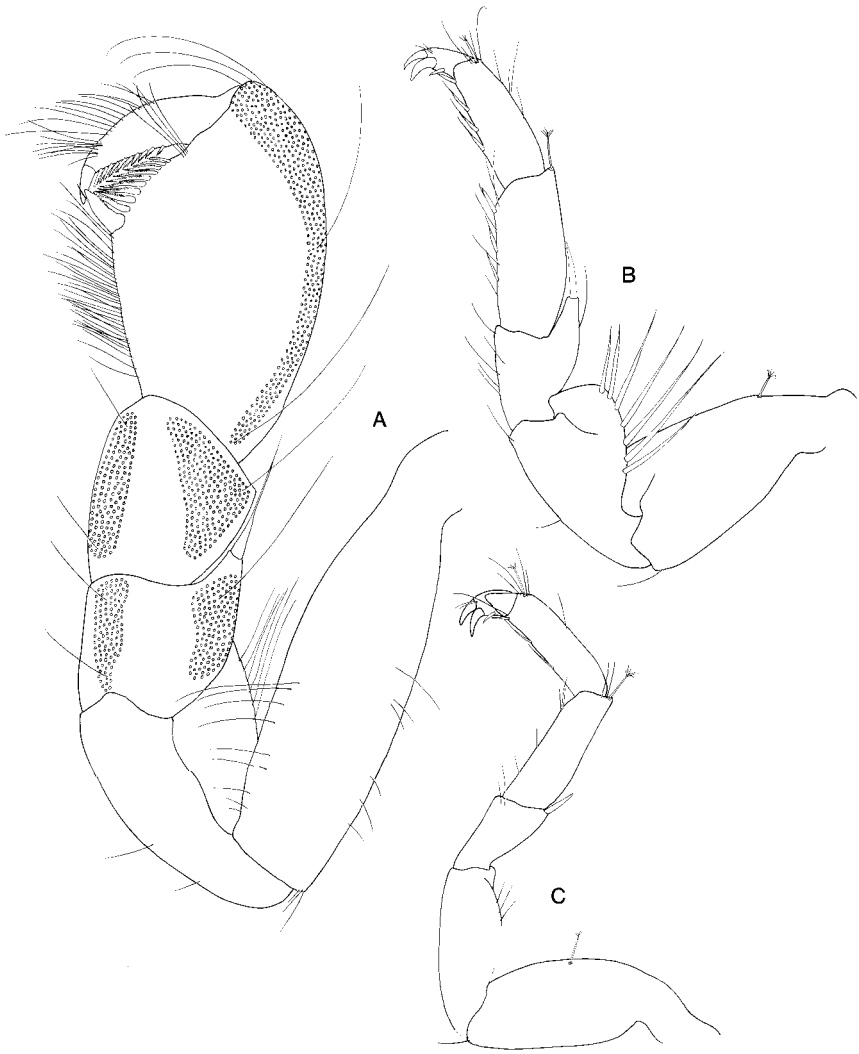

FIG. 10. *Pseudojanira meganesus* sp. nov.: (A) male pereopod 1; (B) pereopod 2; (C) pereopod 7.

Etymology. The specific name is derived from the Greek for 'large island' referring to the type locality, Nosy Bé in Madagascar.

Pseudojanira stenetrioides Barnard, 1925

Pseudojanira stenetrioides Barnard, 1925: 406; Wolff, 1962: 252; Kensley, 1977: 251; Wilson, 1986: 351; Poore and Just, 1990: 521; Serov and Wilson, 1999: 73.

Material examined. USNM 253322, six ♂ 2.1–3.2 mm, three ovigerous ♀ 2.5–3.2 mm, one ♀, two juveniles, IIOE sta 400C, south of Beira, Mozambique, 19°51′S, 36°21′E, 62 m, 3 October 1964; USNM 235323, one ♂, one ♀, three juveniles, IIOE sta 372G, off southern Mozambique, 24°53′S, 34°56′E, 55 m, 19 August 1964.

Previous records. Zululand coast, South Africa, in coral 1–2 m; southern Mozambique, grey sand, 55 m.

Remarks. The distinctive colour pattern of this species consists of strong red-brown pigment on most of the dorsum of the cephalon, a small median spot on pereonite 5, and a more diffuse reticulation on the pleotelson. Contrary to Wilson (1986), examination of the type material (SAM-A15345) shows that *P. stenetrioides* does have a tiny tooth and associated seta on each side of the pleon. The rostrum of this species is anteriorly rounded with a hyaline margin, but never toothed.

Family SANTIIDAE Kussakin, 1988

Genus *Santia* Sivertsen and Holthuis, 1980

Santia Sivertsen and Holthuis, 1980: 89; Kussakin, 1988: 230; Kensley and Schotte, 1989: 98; Wolff, 1989: 182.
Antias Richardson, 1906: 16.

Diagnosis. Maxillipedal palp articles all slender. Pereopod 1 subchelate or carpochelate. Pereopods 2–7, dactyli each biunguiculate. Coxae visible on pereonites 2–7, sometimes only on 5–7 in dorsal view. Uropods pedunculate, biramous, usually large, inserted dorsally or laterally. Pleopod 1 in male, rami fused. Pleon consisting of single anterior pleonite lacking free lateral margins, plus pleotelson.

Key to the Indian Ocean species of *Santia*

1 Dorsum of pereon armed with stout spinose setae . . . . . *S. spicata* sp. nov. [Somalia; Aldabra]
– Dorsum of pereon not armed with stout spinose setae 2
2 Lateral margins of pleon armed with hook-like setae . *S. uncinata* (Vanhöffen, 1914) [False Bay, South Africa]
– Lateral margins of pleon unarmed 3
3 Uropods subequal in length to pleon, bearing elongate setae . *S. urospinosa* sp. nov. [Aldabra; Zanzibar]
– Uropods much shorter than pleon, lacking elongate setae . . . . . *S. marmorata* (Vanhöffen, 1914) [St Paul Is.]

Santia spicata sp. nov.
(figure 11)

Type material. HOLOTYPE: USNM 253300, ovigerous ♀ 0.9 mm, IIOE cruise 9 sta 453, off Somalia, 11°11′N, 51°14′E, 47–49 m, 17 December 1964. PARATYPES: USNM 253301, one ♂, six ovigerous ♀, two ♀, one juvenile, same data as holotype.

Other material. USNM 253302, 12 ♂, 60 ovigerous ♀, 41 juveniles, same data as holotype; USNM 253303, one ♂, sta K-AL-50, on purple sponge, outer reef slope, Picard Island, 9°24′S, 46°12′E, 25 m, 15 April 1983.

Diagnosis. Cephalon and pereonites 1–6 each with two pairs of stiff dorsal setae; lateral cephalic lobe with single stiff seta; low submedian lobes on anterior margin of cephalon each with two setae; coxa of pereopod 2 having five stiff setae, of pereopods 3–6 each with four setae, of pereopod 7 with single stiff seta. Maxilliped with two coupling hooks. Pereopod 1, carpus with three strong posterodistal setae, propodus with three smaller proximal setae. Pleon midlength about 1.4 times basal width, with single lateral stiff seta and pair of submesial posterior setae. Pleopod 1 in male distally truncate, each ramus with six distal setae. Uropodal protopod having three distal stiff spines; exopod and endopod each with four distal stiff setae.

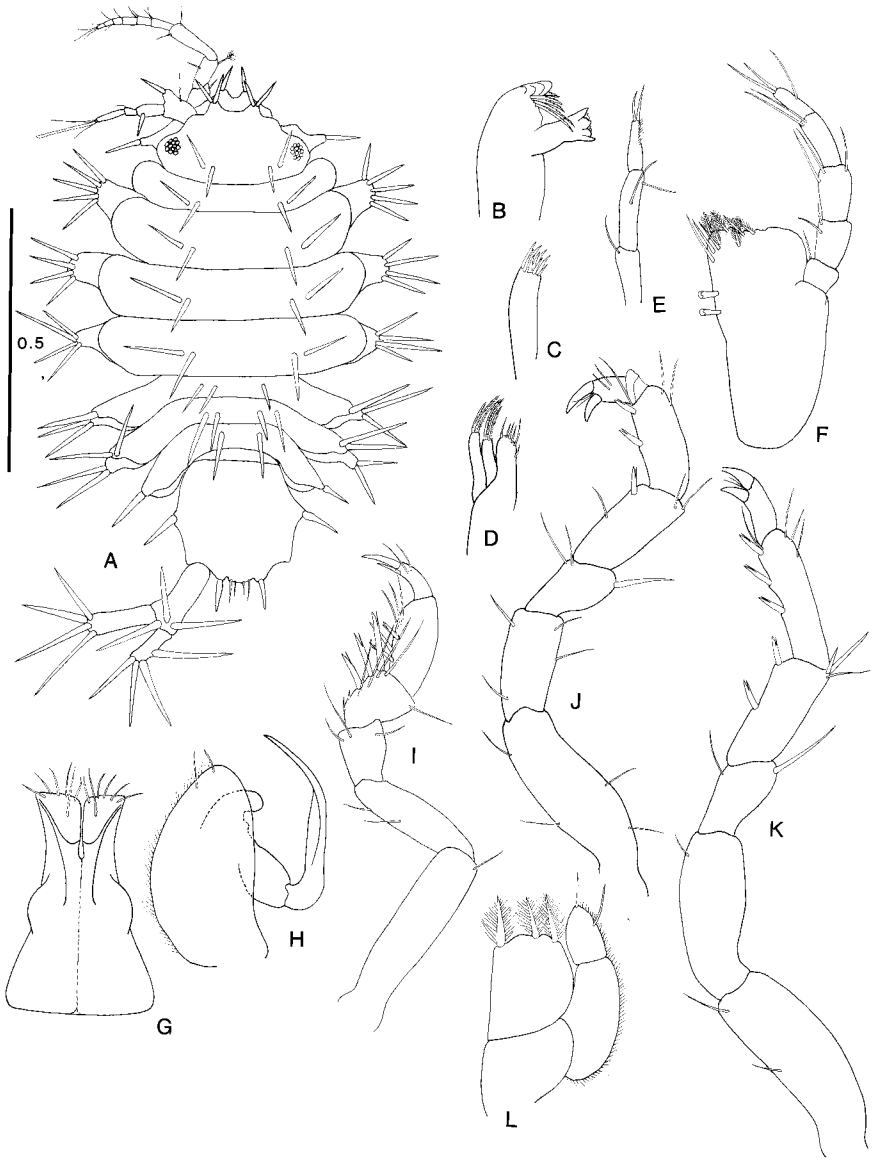

FIG. 11. *Santia spicata* sp. nov.: (A) male dorsal view; (B) mandible; (C) maxilla 1; (D) maxilla 2; (E) mandibular palp; (F) maxilliped; (G) male pleopod 1; (H) male pleopod 2; (I) pereopod 1; (J) pereopod 2; (K) pereopod 7; (L) pleopod 3.

Remarks. See 'Remarks' section after *Santia urospinosa*.

Etymology. The specific name, from the Latin for spike, refers to the overall spiky appearance of the animal.

Santia urospinosa sp. nov.
(figure 12)

Type material. HOLOTYPE: USNM 253304, ♂ 1.5 mm, sta K-AL-50, purple sponge on outer reef slope, Picard Island, Aldabra, 9°24′S, 46°12′E, 25 m, 15 April

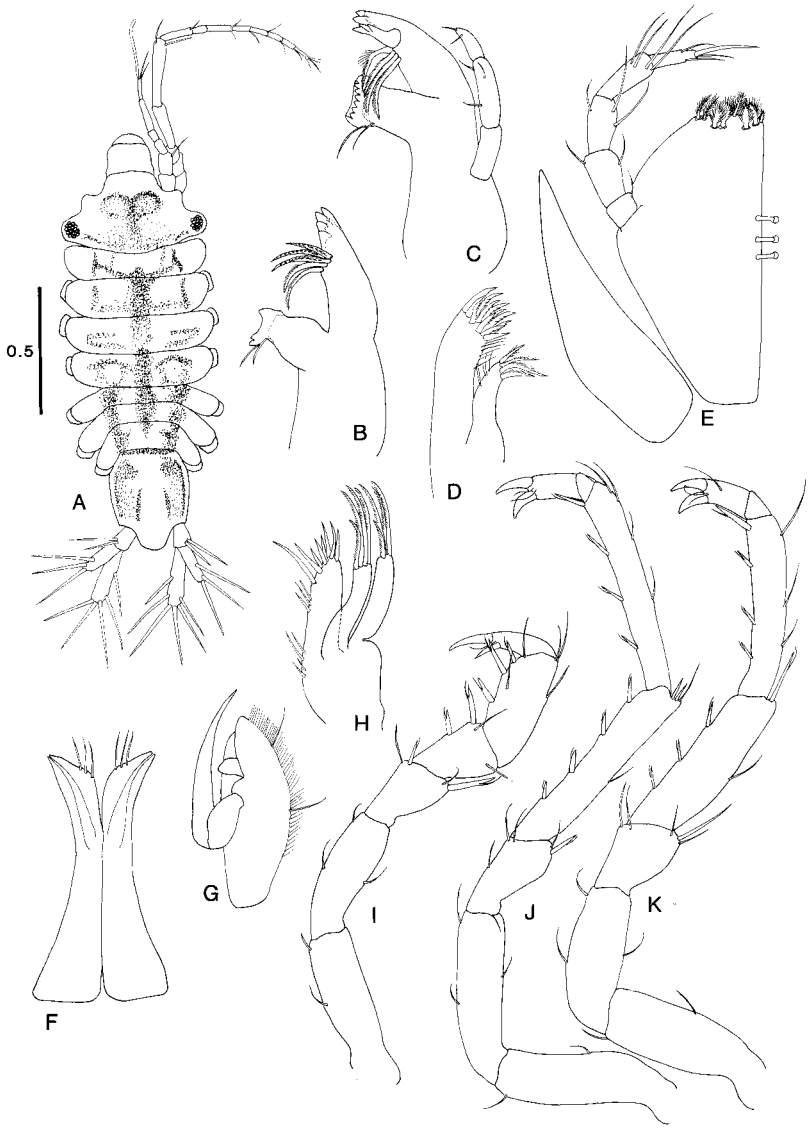

FIG. 12. *Santia urospinosa* sp. nov.: (A) male dorsal view; (B) right mandible, palp omitted; (C) left mandible; (D) maxilla 1; (E) maxilliped; (F) male pleopod 1; (G) male pleopod 2; (H) maxilla 2; (I) pereopod 1; (J) pereopod 7; (K) pereopod 2.

1983. PARATYPES: USNM 253305, four ovigerous ♀, five ♀, eight juveniles, same data as holotype.

Other material. USNM 253306, three ♂, seven ovigerous ♀, three ♀, from coarse sand and rubble from five stations off Picard Island, Aldabra, 1–26 m; USNM 253307, nine ovigerous ♀, eight ♀, one juvenile, coral rubble and algal turf from seven stations on Mahé Island, Seychelles, 1–6 m; ZMUC, one ♂, 16 ovigerous ♀, three ♀, sta CRU-1904, intertidal reef flat, Bawe Island, Zanzibar, 6°08′S, 39°08′E, 26 September 1995.

Diagnosis. Cephalon and pereonite lacking stiff setae or armature. Maxilliped with three coupling hooks. Pereopod 1, merus with single strong anterodistal seta, carpus with two strong posterodistal setae, propodus barely inflated, with three strong posterodistal setae. Coxae visible on pereonites 2–7 in dorsal view. Pleon length 1.8 times basal width, lateral margins unarmed, posterior margin between uropodal bases broadly convex. Uropodal protopod having two distal setae; exopod with three distal setae; endopod with five or six distal setae. Each lobe of pleopod 1 of male having three distal setae.

Remarks. The only species of *Santia* known from the Indian Ocean are *S. uncinata* (Vanhöffen, 1914) from False Bay, South Africa, and *S. marmorata* (Vanhöffen, 1914) from St Paul Island. The lateral pleonal spines of the former species easily separate it from the two species described here. The latter species is dorsally unarmed, and possesses relatively small non-spinose uropods which are very different from those of *S. spicata* or *S. urospinosa*. *Santia hispida* (Vanhöffen, 1914) from the Antarctic is a spinose species bearing a superficial resemblance to *S. spicata*, but has far more, smaller stiff setae than seen in the tropical species.

Etymology. The specific name refers to the prominent setae present on the uropods.

Family STENETRIIDAE Hansen, 1905

Key to the genera of the Stenetriidae

1 Eyes reniform, with ommatidia arranged in kidney shape, or eyes absent 2
– Eyes with ommatidia in roughly circular group 5

2 Pereopod 1 in male, carpus produced into posterodistal lobe . . . . . *Hansenium* Serov and Wilson, 1995
– Pereopod 1 in male, carpus not produced 3

3 Pereopod 1 in male, propodus usually longer than width of palm 4
– Pereopod 1 in male, propodus usually as long as width of palm . . . . . *Tenupedunculus* Schultz, 1982

4 Pleopod 1 in male, lateral margin angular . . . *Lexcenium* Serov and Wilson, 1999
– Pleopod 1 in male, lateral margin evenly convex . . . *Stenetrium* Haswell, 1881

5 Eyes consisting of three to five ommatidia 6
– Eyes consisting of eight or more ommatidia 8

6 Rostrum triangular 7
– Rostrum short, anterior margin convex . . . . *Liocoryphe* Serov and Wilson, 1995

7 Rostrum narrowly triangular; pereopod 1 in male, propodus about twice longer than palm width . . . . . *Stenobermuda* Schultz, 1979
– Rostrum broad-based, distally narrowed; pereopod 1 in male, propodus slightly longer than palm . . . . . *Tristenium* Serov and Wilson, 1995

8 Rostrum poorly defined or absent . . . . . *Mizothenar* Serov and Wilson, 1995
– Rostrum large, triangular or linguiform . . . . . *Protallocoxa* Schultz, 1978

Genus *Hansenium* Serov and Wilson, 1995

Hansenium Serov and Wilson, 1995: 72; Bolstad and Kensley, 1999: 164.

Diagnosis. Cephalon with anterolateral tooth well developed; antennal tooth acute or rounded; rostrum short, rectangular, anterior margin truncate; eyes

reniform, of 13–19 ommatidia. Pereopod 1 in male, carpus strongly produced posterodistally; propodus longer than width of palm. Pleopod 1 in male, appendix masculina distally widened, truncate.

Key to the Indian Ocean species of *Hansenium*

1 Pereopod 1 in male, carpal lobe reaching no more than halfway along posterior margin of propodus 2
– Pereopod 1 in male, carpal lobe reaching to posterodistal angle of propodus or beyond 4

2 Pereopod 1 in male, propodal palm with strong gap between posterodistal and rest of palm 3
– Pereopod 1 in male, propodal palm lacking strong gap, continuous *H. aldabrae* sp. nov. [Aldabra Atoll]

3 Pereopod 1 in male, propodal palm bearing six teeth; pereopod 1 in female, propodal palm bearing six teeth . . . . . *H. monodi* (Nordenstam, 1946) [Gulf of Suez; Sri Lanka; Seychelles]
– Pereopod 1 in male, propodal palm bearing five teeth; pereopod 1 in female, propodal palm bearing seven teeth . . . . . *H. dodo* (Müller, 1991d) [Réunion Island]

4 Pereopod 1 in male, propodal palm with subspherical posterodistal lobe; carpal lobe broadly ovate, not reaching beyond posterodistal angle of palm *H. expansum* sp. nov. [Nosy Bé, Madagascar; Zanzibar]
– Pereopod 1 in male, propodal palm lacking strong lobe; carpal lobe longer than wide, reaching beyond posterodistal angle of palm . . . . . *H. remocarpus* sp. nov. [Mahé Island, Seychelles]

Hansenium aldabrae sp. nov.
(figure 13)

Type material. HOLOTYPE: USNM 253194, ♂ 4.0 mm, sta K-AL-124, coral rubble on fore-reef slope, Picard Island, Aldabra, 9°24′S, 46°12′E, 21 m, 13 April 1987. PARATYPES: USNM 253195, two ♂ 3.2–3.5 mm, four ovigerous ♀ 3.2–4.4 mm, three ♀, four juveniles, sta K-AL-124, same data as holotype; USNM 253196, two ♂ 4.0 mm, one ovigerous ♀ (damaged), three juveniles, sta K-AL-53, coral rubble on fore-reef slope, Picard Island, Aldabra, 21 m, 15 April 1983.

Other material. USNM 253197, three ♂, six ovigerous ♀, seven ♀, six juveniles, 11 stations off Picard Island, Aldabra, 2–25 m. ZMUC, one ♂, sta CRU-1982, Phuket Island, Thailand, 5 December 1995.

Diagnosis. Rostrum wider than long, anterior margin straight. Lateral margin of pleotelson with single tooth. Eyes reniform. Red-brown pigmentation in anterior band on cephalon between eyes and on pereonites 2 and 4; scattered patches on pereonites 1, 3, 4–7; pleotelson with patchy pigment denser in anterior region. Pereopod 1 in male, carpus with broad rounded setose posterodistal lobe not reaching midlength of posterior margin of propodus; expanded propodus with convex anterior margin densely setose, palm with three low teeth, strong articulated posterodistal seta; dactylus just reaching beyond propodal posterodistal seta. Operculum of female pentagonal, about 1.3 times longer than wide.

Etymology. The specific name derives from the type locality, Aldabra Atoll.

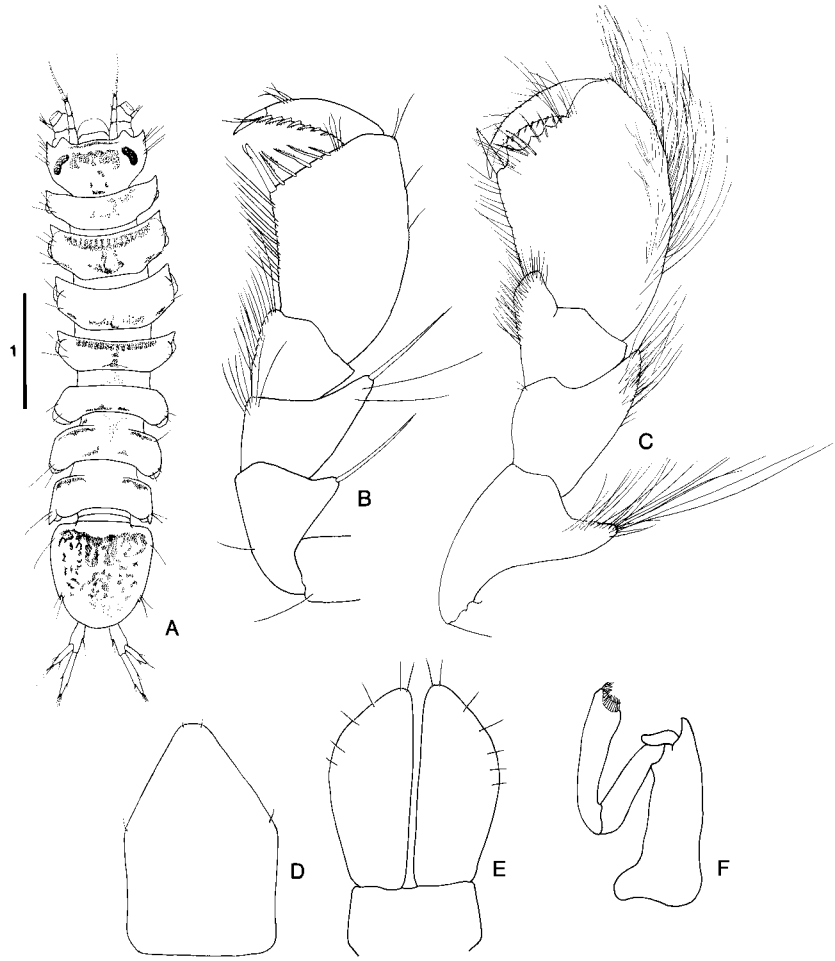

FIG. 13. *Hansenium aldabrae* sp. nov.: (A) male dorsal view; (B) female pereopod 1; (C) male pereopod 1; (D) female opercular pleopod 2; (E) male pleopod 1; (F) male pleopod 2.

Hansenium expansum sp. nov.
(figure 14)

Type material. HOLOTYPE: USNM 253205, ♂ 3.1 mm, sta JR-33A, Nosy Bé, Madagascar, 1 m, 15 January 1964. PARATYPES: USNM 253206, two ♂ 2.8–3.1 mm, four ovigerous ♀ 2.9–3.0 mm, four juveniles, same data as holotype; USNM 253207, two ♂ 2.8 mm, three ♀, sta JR-29A, Nosy Bé, Madagascar, 1.5 m, 11 January 1964.

Other material. ZMUC, two ♂, one ovigerous ♀, one ♀, sta CRU-1893, coral from Murogo Reef, Zanzibar, 14 m, 20 September 1995; ZMUC, four ♂, two ovigerous ♀, two ♀, five juveniles, sta CRU-1926, Murogo Reef, Zanzibar, 9 m, 20 September 1995.

Diagnosis. Rostrum basally wider than long, tapering to truncate anterior margin. Pleotelson 1.2 times wider than midlength, lateral margin with single tooth. Eyes reniform. Pereopod 1 in male, carpus with lateral surface expanded into broad subcircular lobe bearing fringe of setae; propodus with proximal region of posterior

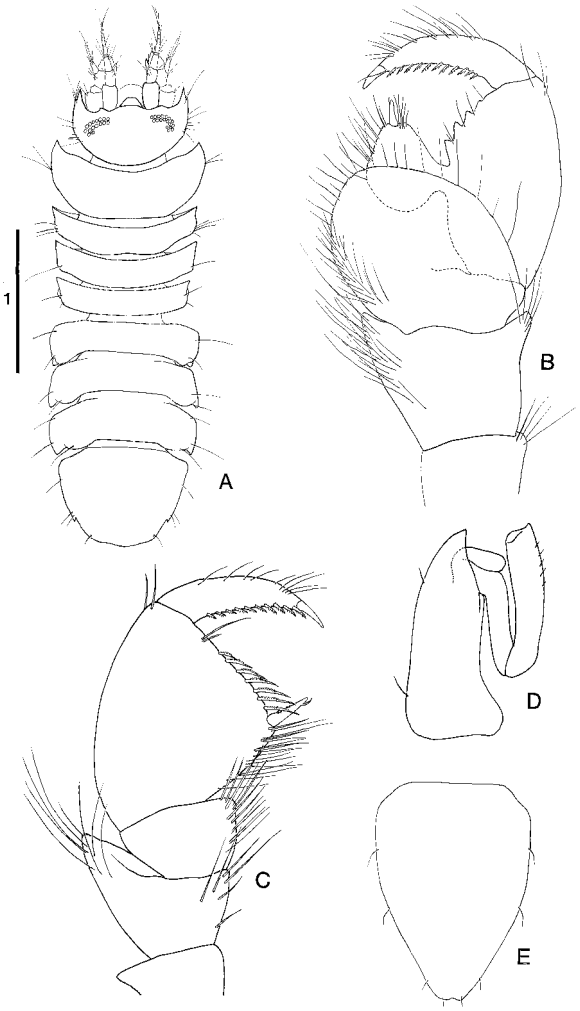

FIG. 14. *Hansenium expansum* sp. nov.: (A) male dorsal view; (B) male pereopod 1; (C) female pereopod 1; (D) male pleopod 2; (E) female opercular pleopod 2.

margin expanded into broad setose lobe bearing single articulated robust seta, distinctly offset from rest of palm, latter with four low triangular teeth; dactylus with row of 12 short serrate setae on posterior margin. Operculum of female shield-shaped, 1.5 times longer than greatest width.

Etymology. The specific name refers to the expanded nature of the carpus of pereopod 1 in the male.

Hansenium monodi (Nordenstam, 1946)
(figure 15)

Stenetrium chiltoni non Stebbing, Monod, 1933: 171, figure 3.
Stenetrium monodi Nordenstam, 1946: 19, 22; Wolff, 1962:22; Schultz, 1982: 20.

Material examined. USNM 253191, one ♂, one ovigerous ♀, one ♀, two juveniles, sta MS-SEY-1, coral rubble, Mahé Island, Seychelles, 1–2 m, 29 April 1984;

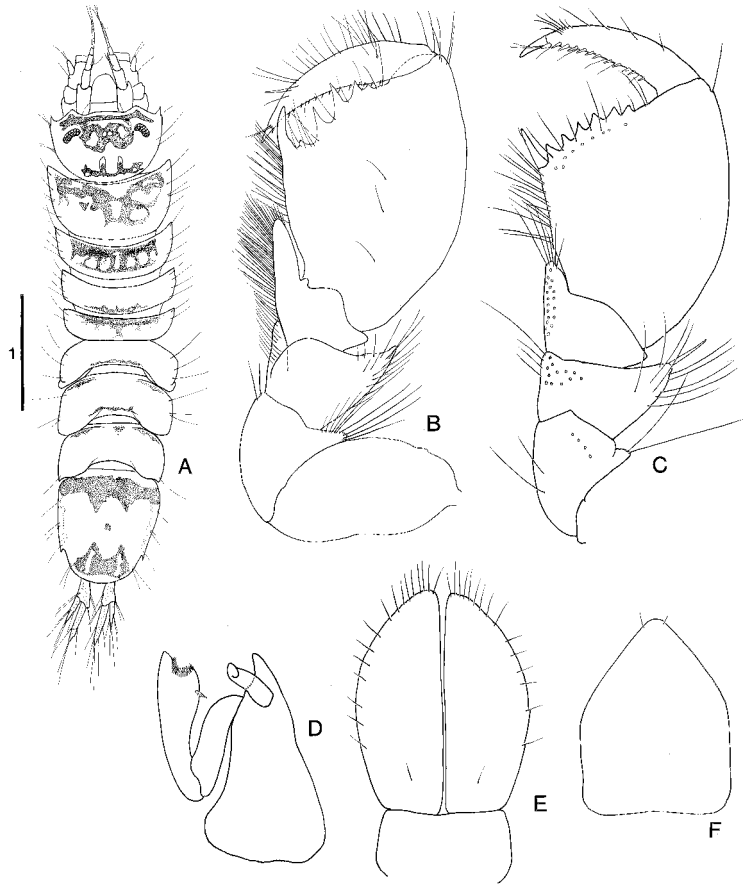

FIG. 15. *Hansenium monodi*: (A) male dorsal view; (B) male pereopod 1; (C) female pereopod 1; (D) male pleopod 2; (E) male pleopod 1; (F) female opercular pleopod 2.

USNM 253192, one ♂, one ovigerous ♀, sta K-SEY-16, algal turf on dead coral, Anse à la Mouche, Mahé Island, Seychelles, 2–5 m, 1 May 1984; USNM 253193, four ♀, algal turf from three stations on Mahé Island, Seychelles, 0.5–6 m, 29 April to 2 May 1984.

Diagnosis. Rostrum wider than long, anterior margin straight. Lateral margin of pleotelson with single tooth. Eyes reniform. Red-brown pigmentation in broad anterior band on cephalon, narrower posterior band, most of dorsum of pereonites 1 and 2, narrow bands on pereonites 3–6, anterior and posterior band on pleotelson. Pereopod 1 of male, carpus with digitiform posterodistal extension; expanded propodal palm with six teeth, outermost largest; posterior margin of carpus and propodus densely setose; dactylus reaching beyond outermost propodal tooth. Operculum of female pentagonal, length 1.25 times width.

Previous records. Gulf of Suez; Sri Lanka; Amirante Islands.

Remarks. Nordenstam (1946) noted that the male described by Monod (1933) from the Gulf of Suez as *S. chiltoni* Stebbing, 1905, could not be that species, given the single pleotelsonic tooth (instead of serrate lateral margins of the pleotelson). Nordenstam proposed the name *S. monodi*, but gave no further description. Monod's

figures of the Gulf of Suez material, however, showing the cephalon, pleotelson, and pereopod 1 all agree closely with the present material. *Stenetrium dodo* Müller, 1991d from Réunion Island is very similar to the present species. As indicated in the key above, a difference of one tooth on the propodal palm in both male and female seems to be the major differences between the species. The colour pattern as illustrated by Müller (1991d, figure 16) is also very similar to *H. monodi*.

Hansenium remocarpus sp. nov.
(figure 16)

Type material. HOLOTYPE: USNM 253198, ♂ – 3.4 mm, sta K-SEY-15, coral rubble and encrusting coralline algae, Anse à la Mouche, Mahé Island, Seychelles, 2–5 m, 1 May 1984. PARATYPES: USNM 253199, three ♂ 2.5–3.0 mm, one ovigerous ♀ 3.4 mm, two ♀, same data as holotype; USNM 253200, one ovigerous ♀ 2.5 mm, sta K-SEY-16, algal turf on dead coral, Anse à la Mouche, Mahé Island, Seychelles, 2–5 m, 1 May 1984.

Diagnosis. Rostrum wider than long, anterior margin straight. Pleotelson width subequal to middorsal length; lateral margin with single tooth. Eyes reniform. Dorsum with scattered red-brown pigment, not in any clearly defined pattern. Pereopod 1 in male, carpus with broadly ovate posterodistal lobe almost reaching distal margin of propodus, margins setose; propodal palm with two triangular teeth and single low bump; dactylus just overreaching outermost propodal tooth. Operculum of female shield-shaped, about 1.20 times longer than wide.

Etymology. The specific name is a combination of *remo-* from the Latin *remus*, an oar or paddle, plus *-carpus*, the fifth article of the pereopod, and refers to the shape of the carpus of pereopod 1 in the male.

Genus ***Liocoryphe*** Serov and Wilson, 1995

Liocoryphe Serov and Wilson, 1995: 73.

Diagnosis. Cephalon lacking anterolateral and antennal teeth. Eye consisting of three or four ommatidia. Pereopod 1 in male strongly setose; ischium and merus anterodistally produced into setose lobes; carpus with posterodistal corner somewhat produced, rounded, setose; propodus expanded, as wide as long, palm oblique, with few low rounded teeth. Pleopod 2 in male, appendix masculina distally widened, truncate, with subdistal row of short barbs.

Key to the Indian Ocean species of *Liocoryphe*

1 Pereopod 1 in male, propodal palm bearing two low teeth; carpus about as long as wide . . . . . *L. siamensis* (Hansen, 1905) [Thailand]

– Pereopod 1 in male, propodal palm bearing three low rounded teeth; carpus wider than long . . . . . *L. gertrudae* (Müller, 1991e) [Réunion Island]

Liocoryphe siamensis (Hansen, 1905)
(figure 17)

Stenetrium siamense Hansen, 1905: 327, pl. 21, figure 2a–i.

Type material. LECTOTYPE: ZMUC, ♂ 4.1 mm (damaged), Mellem Koh Mesan, Thailand, coll. T. Mortensen, 7 February 1900.

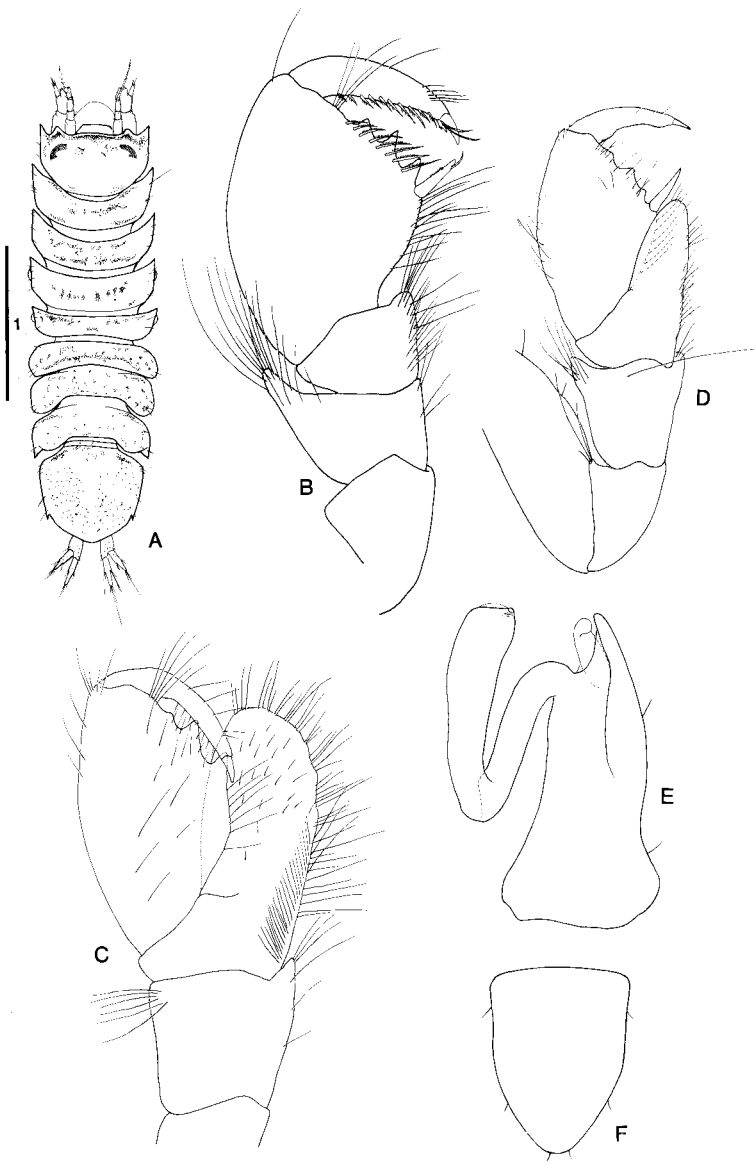

FIG. 16. *Hansenium remocarpus* sp. nov.: (A) male dorsal view; (B) female pereopod 1; (C) male pereopod 1; (D) juvenile male pereopod 1; (E) male pleopod 2; (F) female opercular pleopod 2.

Other material. ZMUC, two ovigerous ♀, sta CRU 1896, Bawe Island, Zanzibar, sand, 10 m, 21 September 1995; ZMUC, one ♂, sta CRU 2008, Ko Lon, Phuket Island, Thailand, small rubble, 6.8 m, 23 November 1995; ZMUC, one ♂, one ovigerous ♀, sta CRU 2015, Ko Mai Ton, Phuket Island, Thailand, dead compacted coral, 3 m, 26 November 1995; ZMUC, one ♂, one ♀, sta CRU 2021, Ko Aeo, Phuket Island, Thailand, sand, 3 m, 29 November 1995.

Remarks. Comparison with Hansen's type material (1905) of *L. siamense*, collected by Theo Mortensen in 1900 at Koh Mesan, Thailand, and especially of the male pereopod 1, revealed no differences from the present material.

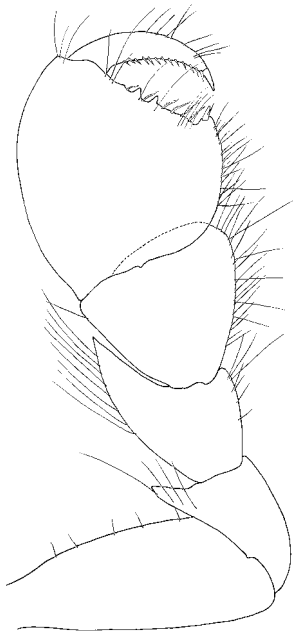

FIG. 17. *Liocoryphe siamensis*, lectotype pereopod 1.

Genus *Mizothenar* Serov and Wilson, 1995

Mizothenar Serov and Wilson, 1995: 76.

Diagnosis. Cephalon with short anterolateral tooth; antennal tooth absent; rostrum poorly defined or absent. Eye consisting of rounded group of nine or ten ommatidia. Pereopod 1 in male, carpus not posterodistally produced; propodus expanded, as wide as long, palm bearing row of oblique dentate setae. Pleopod 2 in male distally widened, truncate.

Remarks. Two species of *Mizothenar* have been described: *M. patulipalma* (Kensley, 1984a) from Belize, and *M. maharepa* (Müller, 1991e) from Moorea. The Caribbean species differs from the latter species in lacking serrations or dentition on the lateral margins of the pleotelson. The female operculum in *M. maharepa* is distally more narrowed than in *M. serratum*, with the fused section about 1.8 times longer than the unfused part. In the latter species, the fused part is about 2.5 times longer than the unfused. These two species are remarkably similar, morphologically, and with no male material from the Indian Ocean, further comparisons are difficult.

Mizothenar serratum sp. nov.
(figure 18)

Type material. HOLOTYPE: USNM 253201, ovigerous ♀ 2.2 mm, sta K-AL-124, coral rubble on fore-reef slope, Picard Island, Aldabra, 9°24′S, 46°12′E, 21 m, 13 April 1987. PARATYPES: USNM 253202, one ♀ 2.1 mm, sta K-AL-24, live broken coral, fore-reef slope, Picard Island, Aldabra, 12 m, 6 April 1983; USNM 253203, three ♀ 2.1–2.2 mm, sta K-AL-65, coralline-encrusted rubble, mouth of Passe Gionnet, Aldabra, 16 m, 17 March 1985; USNM 253204, one ♀ 2.0 mm, sta K-SEY-15, coral rubble on fore-reef slope, Cinq Cases, Aldabra, 13 m, 4 April 1983.

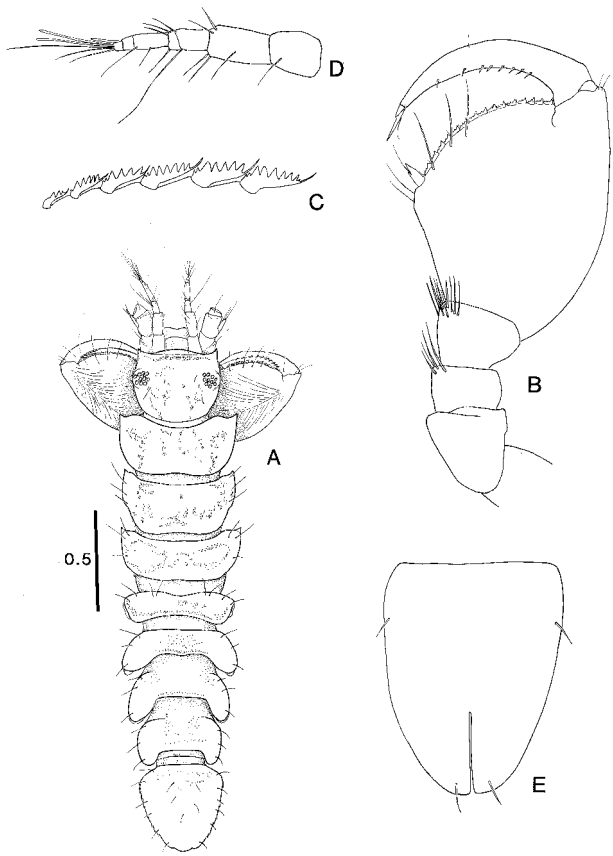

FIG. 18. *Mizothenar serratum* sp. nov.: (A) female dorsal view; (B) female pereopod 1; (C) pereopod 1 palmar setae; (D) antennule; (E) female opercular pleopod 2.

Other material. ZMUC, two ♀, sta CRU-1896, sand, Bawe Island, Zanzibar, 10 m, 21 September 1995; ZMUC, one ♀, sta CRU-1926, Murogo Reef, Zanzibar, 9 m, 20 September 1995.

Diagnosis. Discrete rostrum lacking, anterior margin of cephalon slightly concave between antennular bases. Pleotelson very slightly longer than greatest width, lateral margin with about ten spines. Ommatidia arranged roughly in circle. Dorsum with scattered red-brown pigmentation, not in any clearly defined pattern. Pereopod 1 in female with propodus distally broadly expanded, palm convex, with row of about 14 short serrate setae, single strong articulated posterodistal robust seta. Operculum of female with slit in distal third.

Etymology. The specific name refers to the serrate lateral margins of the pleotelson.

Genus *Stenetrium* Haswell, 1881

Stenetrium Haswell, 1881: 478; Serov and Wilson, 1995: 49.

Diagnosis. Cephalon with anterolateral and antennal teeth well developed, subequal; rostrum short, rounded to subtriangular. Eye reniform, of about 18–26

ommatidia. Pereopod 1 in male, carpus rarely produced; propodus longer than width of palm. Pleopod 2 in male, appendix masculina distally widened, with subdistal row of barbs.

Remarks. The approximately 20 species of *Stenetrium* (see Serov and Wilson, 1995: 81) show considerable variation in rostral form, structure of the male pereopod 1, and pleopod 2. The genus is not well defined by clear synapomorphies, and may well be further divided in the future.

Key to the Indian Ocean species of *Stenetrium*

Note: *Stenetrium truncatum* Nicholls, 1929, was described from a single specimen that had lost almost all of its legs; it is not included in the following key.

1 Rostrum rectangular, anterior margin straight 2
– Rostrum triangular, apex acute or rounded, or anterior margin with rounded bump or convexity 3

2 Pereopod 1 in male, propodal palm with deep emargination; carpus not produced . . . . . *S. assumentum* sp. nov. [Zanzibar Island]
– Pereopod in male, propodal palm lacking any emargination; carpus having broadly rounded posterodistal lobe . . . . . *S. zanzibaricum* sp. nov. [Zanzibar Island]

3 Lateral margins of pleotelson serrate . . . . . *S. esquartum* (Schultz, 1982) [South Africa]
– Lateral margins of pleotelson entire 4

4 Pereopod 1 in male, propodal palm bearing two teeth . *S. magnimanum* (Schultz,1982) [South Africa]
– Pereopod 1 in male, propodal palm bearing more than two teeth 5

5 Pereopod 1 in male, propodal palm bearing three teeth . *S. crassimanus* (Barnard, 1914) [South Africa; St Paul and Amsterdam Islands]
– Pereopod 1 in male, propodal palm bearing more than three teeth 6

6 Pereopod 1 in male, propodal palm bearing four teeth 7
– Pereopod 1 in male, propodal palm bearing five teeth . *S. bartholomei* (Barnard, 1940) [South Africa]
– Pereopod 1 in male, propodal palm bearing six teeth . *S. perestrelloi* (Kensley, 1984b) [South Africa]

7 Rostrum subtriangular, fringed with small denticles . . *S. spinirostrum* (Nicholls, 1929) [Rottnest Island, Western Australia]
– Rostrum subtriangular, margins entire . . . . *S. macrochirium* (Nicholls, 1929) [Western Australia]

Stenetrium assumentum sp. nov.
(figure 19)

Type material. HOLOTYPE: ZMUC, ♂ 4.9 mm, sta CRU-1904, intertidal reef flat, Bawe Island, Zanzibar, 26 September 1995. PARATYPES: ZMUC, two ♂ 3.5–4.8 mm, one ovigerous ♀ 6.0 mm, USNM 253292, one ♂ 4.5 mm, sta CRU-1890, coral heads in sand, Changuu Island, Zanzibar, 7 m, 19 September 1995.

Diagnosis. Cephalon with strong anterolateral and antennal teeth; rostrum basally broader than long, anterior margin straight. Eyes reniform. Scattered reticulation of red-brown pigment on cephalon, pereonites and pleotelson, latter with large

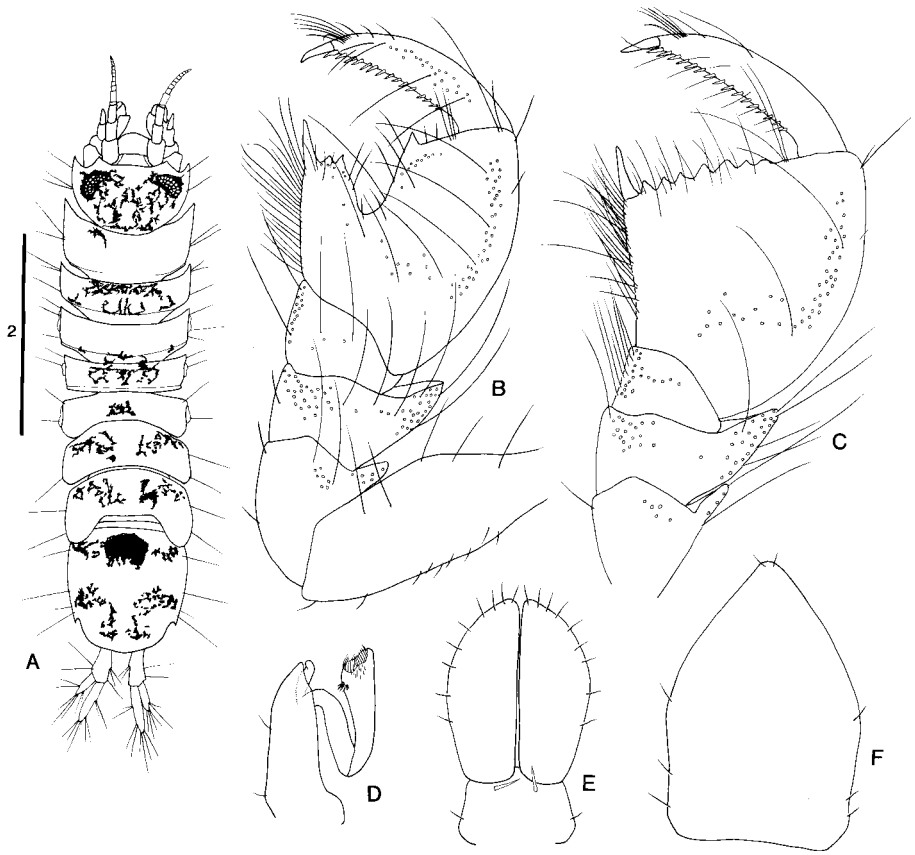

FIG. 19. *Stenetrium assumentum* sp. nov.: (A) male dorsal view; (B) male pereopod 1; (C) female pereopod 1; (D) male pleopod 2; (E) male pleopod 1; (F) female opercular pleopod 2.

strongly pigmented middorsal patch at base. Pereopod 1 of male, carpus not produced posterodistally; propodus expanded, with strong tooth demarcating palm, followed by two small teeth, deep U-shaped emargination plus single tooth close to articulation of dactylus; latter with about 15 small setae on cutting margin. Operculum of female roughly pentagonal, 1.5 times longer than wide.

Etymology. The specific name, from the Latin *assumentum*, a patch, refers to the strong blob of pigment at the base of the pleotelson.

Stenetrium bartholomei Barnard, 1940

Stenetrium bartholomei Barnard, 1940: 431, figure 19; Kensley, 1978: 145, figure 65C, D.

Material examined. USNM 253294, one ♂, one ovigerous ♀, one ♀, IIOE cruise 8, sta 400C, south of Beira, Mozambique, 19°51′S, 36°21′E, 62 m, 3 October 1964.

Previous records. False Bay to Natal, South Africa, intertidal to 22 m.

Remarks. This record extends the northward range of the species by about 800 km.

Stenetrium quinquedens sp. nov.
(figure 20)

Type material. HOLOTYPE: USNM 253208, ♂ 2.0 mm, algal turf, Mayotte, Comoro Islands, 3–5 m, 14 March 1991. PARATYPES: USNM 253209, three ♂ 1.9–2.2 mm, two ovigerous ♀ 2.0 mm, four ♀, algal turf, Mayotte, Comoro Islands, 3–5 m, 14 March 1991.

Other material. USNM 253210, one ♂, one ovigerous ♀, one ♀, sta K-AL-24, encrusting coralline algae, fore-reef slope, Picard Island, Aldabra, 9°24′S, 46°12′E, 10 m, 6 April 1983; USNM 253211, two ♂, sta K-AL-124, coral rubble on outer reef slope, Aldabra, 22 m, 13 April 1987; ZMUC, one ♂, sta CRU-1891, coral on Murogo Reef, Zanzibar, 16 m, 20 September 1995; ZMUC, one ♂, one ovigerous ♀, sta CRU-1902, off Matemwe, Mnemba Island, Zanzibar, 9°13′S, 35°10′E, 25 m, 25 September 1995.

Diagnosis. Cephalon having strong anterolateral tooth, lacking antennal tooth; rostrum much wider than long, anterior margin straight. Lateral margin of pleotelson

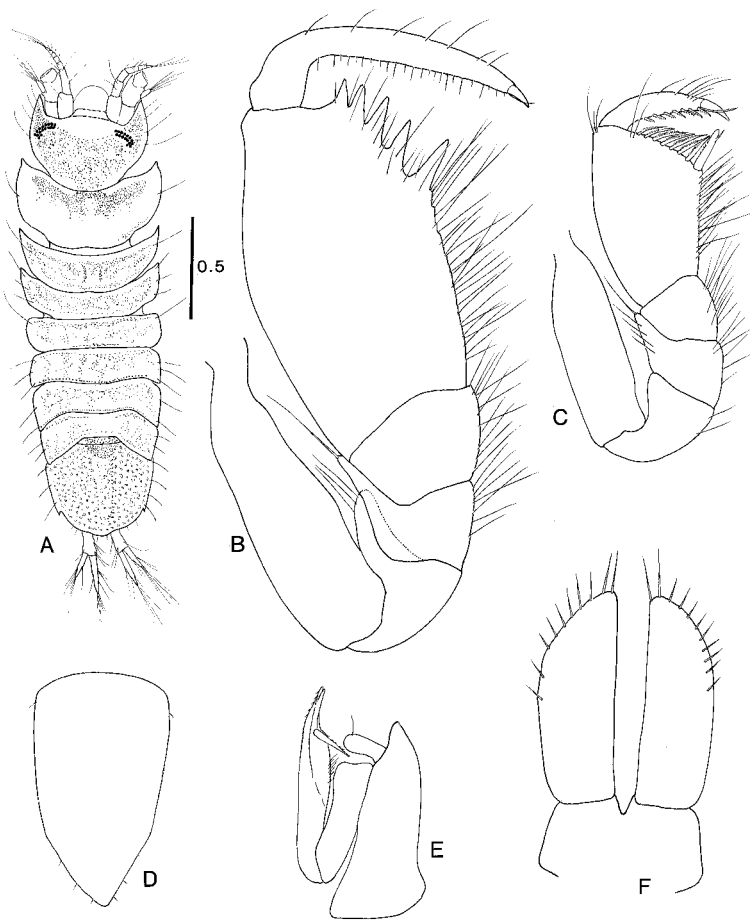

FIG. 20. *Stenetrium quinquedens* sp. nov.: (A) male dorsal view; (B) male pereopod 1; (C) female pereopod 1; (D) female opercular pleopod 2; (E) male pleopod 2; (F) male pleopod 1.

with single tooth. Eyes reniform. Red-brown pigment in broad rather diffuse bands on cephalon, anterior half of pereonite 1, on pereonites 2–7, and over most of pleotelson, with small darker patch middorsally at base of pleotelson. Pereopod 1 in male with carpus not produced; propodus about 1.6 times longer than greatest width, with five strong teeth on oblique poorly defined palm; dactylus when folded against propodus reaching just beyond proximalmost propodal tooth. Operculum of female roughly pentagonal, about 1.8 times longer than wide. Pleopod 2 in male, copulatory stylet distally tapered to narrow tubular apex, with strong spinose subapical process directed laterally.

Remarks. Two characters separate this species from almost all other species of *Stenetrium*, namely the distally tapered copulatory stylet with its subapical spinose process, and the relatively long and narrow pereopod 1 in the male, with its strongly oblique spinose palm. Typical *Stenetrium* species have a distally truncate copulatory stylet and a pereopod 1 propodus about as long as wide, with a transverse palm. Whether these two characters are sufficient to justify a separate genus is doubtful, given the degree of variability seen among species of *Stenetrium*. Nevertheless, attention is drawn to the unusual features of this species by implying some doubt as to its generic placement. *Stenetrium glauerti* Nicholls, 1929, from Rottnest Island, Western Australia, appears to have a similar pleopod 2 in the male.

Etymology. The specific name refers to the five propodal teeth on pereopod 1 of the male.

Stenetrium zanzibarica sp. nov.
(figure 21)

Type material. HOLOTYPE: ZMUC, ♂ 6.5 mm, sta CRU-1893, Murogo Reef, Zanzibar, 14 m, 20 September 1995. PARATYPES: ZMUC, one ovigerous ♀ 5.0 mm, two ♀, two juveniles, same data as holotype; USNM 253293, one ♂ 4.5 mm, three ovigerous ♀ 4.5–5.1 mm, one ♀, two juveniles, sta CRU-1896, sand on Bawe Island reef, Zanzibar, 10 m, 21 September 1995.

Other material. ZMUC, one ♂, one ♀, sta CRU-1891, coral from Murogo Reef, Zanzibar, 16 m, 20 September 1995; ZMUC, two ♀, sta CRU-1902, off Matemwe, Mnemba Island, Zanzibar, 9°13′S, 35°10′E, 25 m, 25 September 1995; ZMUC, one ovigerous ♀, one ♀, sta CRU-1903, off Matemwe, Mnemba Island, Zanzibar, 15 m, 25 September 1995; ZMUC, two ovigerous ♀ 5.0–5.2 mm, three ♀, five juveniles, sta CRU-1926, Murogo Reef, Zanzibar, 9 m, 20 September 1995; ZMUC, one ovigerous ♀ 5.0 mm, sta CRU-1927, Murogo Reef, Zanzibar, 8 m, 20 September 1995.

Diagnosis. Cephalon with anterolateral and antennal teeth low; rostrum basally wider than long, anterior margin straight. Eyes reniform. Red-brown scattered reticulation on cephalon and pereonites, and over most of dorsum of pleotelson. Pereopod 1 of male, setose carpus produced posterodistally into broadly rounded lobe reaching midlength of posterior margin of propodus; latter longer than wide, strongly setose on mesial surface, with robust seta demarcating palm, latter having five triangular teeth; dactylus having about 19 small setae on cutting margin. Operculum of female roughly pentagonal, about 1.6 times longer than basal width.

Etymology. The species is named for the type locality, Zanzibar Island.

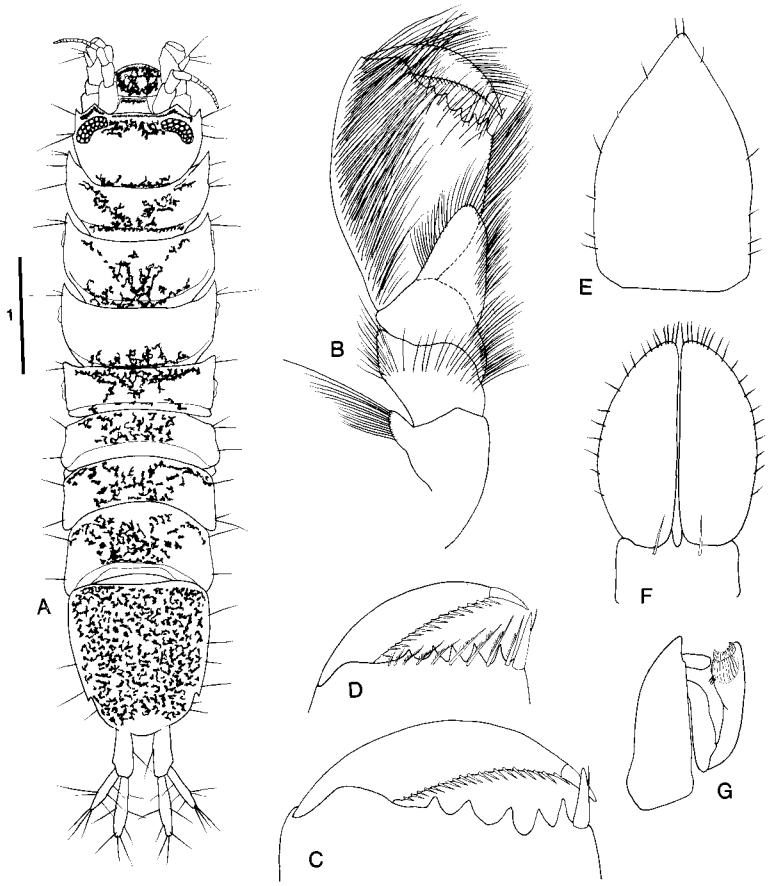

FIG. 21. *Stenetrium zanzibarica* sp. nov.: (A) male dorsal view; (B) male pereopod 1; (C) male pereopod 1 dactylus and propodal palm; (D) female pereopod 1 dactylus and propodal palm; (E) female opercular pleopod 2; (F) male pleopod 1; (G) male pleopod 2.

Genus *Stenobermuda* Schultz, 1979

Stenobermuda Schultz, 1979: 904; Serov and Wilson, 1995: 77.
Stenetrigus Schultz, 1982: 58.

Diagnosis. Cephalon with anterolateral tooth well developed; antennal tooth shorter; rostrum narrow, triangular. Eye of three or four ommatidia. Pereopod 1 in male, carpus not produced; propodus about twice longer than palm, latter bearing row of pectinate setae. Pleopod 2 in male with distal fringed lamella and short sperm tube.

Key to the Indian Ocean species of *Stenobermuda*

1 Pereopod 1 in male, propodal palm bearing 10–12 oblique pectinate setae; dactylus bearing about 10 setae on cutting edge . . . . . *S. syzygus* (Barnard, 1940) [South Africa]

– Pereopod 1 in male, propodal palm bearing about four oblique pectinate setae; dactylus bearing about four setae on cutting edge . . . . . *S. brucei* sp. nov. [Zanzibar]

Stenobermuda brucei sp. nov.
(figure 22)

Type material. HOLOTYPE: ZMUC, ♂ 3.1 mm, sta CRU-1894, sand from reef, Bawe Island, Zanzibar, 25 m, 21 September 1995. PARATYPES: ZMUC, one ovigerous ♀ 2.5 mm, one ♀ 2.2 mm, same data as holotype.

Diagnosis. Cephalon with antennal tooth low, subacute, anterolateral tooth acute, surpassing antennal tooth; rostrum narrowly triangular, reaching beyond anterolateral tooth. Eye weakly pigmented, consisting of four ommatidia. Pleotelson length subequal to basal width, with single lateral tooth. Pereopod 1 male, ischium, merus, carpus and propodus having stout elongate setae on mesial surface near anterior margins; carpus having cluster of five stout fringed setae posterodistally; propodus subcircular, with three stout fringed setae on posterior margin, robust seta demarcating palm, latter having four slender fringed setae; dactylus having four fringed setae on cutting margin. Pereopod 2, carpus 3.5 times longer than wide, with

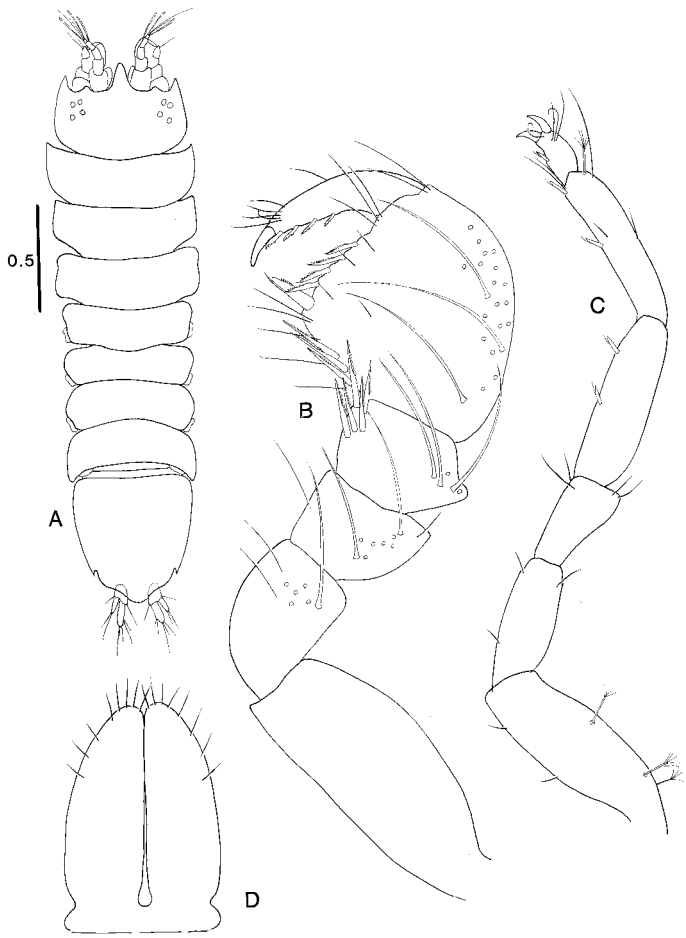

FIG. 22. *Stenobermuda brucei* sp. nov.: (A) male dorsal view; (B) male pereopod 1; (C) pereopod 2; (D) male pleopod 1.

two robust setae on posterior margin; propodus with two robust setae on posterior margin; dactylus biunguiculate, with small additional seta on posterior margin.

Remarks. *Stenobermuda syzygus* (Barnard, 1940), recorded from the south-west Indian Ocean at Still Bay, South Africa, is the only *Stenobermuda* known from the Indian Ocean. This is a much larger species (6.5 mm) than the present species, and possesses a narrower propodus of pereopod 1 in the male. The two species recorded from Bermuda (*S. acutirostrata* Schultz, 1979, and *S. iliffei* Kensley, 1994) both possess much narrower propodi of pereopod 1 in the male, than is seen in *S. brucei*.

Etymology. The species is named for Dr Niel Bruce of the National Institute of Water and Atmospheric Research, Wellington, New Zealand, who collected this species along with several others described here.

Acknowledgements

This work would not have possible without the labours of many collectors. In addition to the anonymous collectors of the International Indian Ocean Expedition, we are very grateful to the following: Mr Jack Rudloe, who collected at Nosy Bé, Madagascar, during the IIOE; Dr Kristian Fauchald, Dr James Thomas, Ms Janice Clark Walker, Ms Linda Ward, all of the Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, who participated in the Smithsonian's Aldabra Research Program; Dr Niel Bruce, late of the Zoological Museum, Copenhagen, who contributed rich collections from Zanzibar and Phuket; Drs Stephen Grabe and John McCain who collected material in the Persian Gulf off Kuwait and Saudi Arabia during the course of environmental studies; Mrs Michelle van der Merwe of the South African Museum and Dr Peter Davies of the Queensland Museum, Australia, who made material available on loan. We wish to acknowledge with thanks the assistance given to Dr Niel Bruce in the field by Matt Richmond, and the generous provision of facilities by the Institute of Marine Sciences, University of Dar es Salaam at Zanzibar. We thank the Smithsonian Institution's Office of the former Assistant Secretary for Science, and the Office of the Director, National Museum of Natural History, for financial support during five collecting seasons on Aldabra Atoll during the 1980s. We thank the Seychelles Islands Foundation for logistic support and permission to collect on both Aldabra Atoll and in the granitic Seychelles.

References

Barnard, K. H., 1914, Contributions to the crustacean fauna of South Africa. 1. Additions to the marine Isopoda, *Annals of the South African Museum*, **10**, 197–230.

Barnard, K. H., 1925, Contributions to the crustacean fauna of South Africa. 9. Further additions to the list of Isopoda, *Annals of the South African Museum*, **20**(5), 381–412.

Barnard, K. H., 1940, Contributions to the crustacean fauna of South Africa. 12. Further additions to the Tanaidacea, Isopoda and Amphipoda, together with keys for the identification of hitherto recorded marine and fresh-water species, *Annals of the South African Museum*, **32**, 381–543.

Beddard, F. E., 1886, Report on the Isopoda collected by HMS Challenger during the years 1873–76. Part 2, *Report of the Voyage of the Challenger*, **17**, 1–178.

Bolstad, K. S. and Kensley, B., 1999, Two new species of *Hansenium* (Crustacea: Isopoda: Asellota) from Madang, Papua New Guinea, *Proceedings of the Biological Society of Washington*, **112**(1), 164–174.

Fresi, E., 1973, *Maresia barringtonia* n. g. n. sp. (Asellota Parastenetroidea). Un nuovo

Crostaceo Isopodo delle isole Galapagos, *Galapagos, Studi e Richerche, Spedizione L. Mares, G.R.S.T.S., Firenze*, 1–12.

Fresi, E. and Schiecke, U., 1972, *Pleurocope dasyura* Walker, 1901, and the Pleurocopidae new family (Isopoda, Asellota), *Crustaceana Supplement*, **3,** 207–213.

Fresi, E. and Scipione, M. B., 1980, *Maresiella* nomen novum pro Maresia Fresi, 1973, a gnathostenetroid asellote isopod from Galapagos Islands, *Galapagos Studi e Richerche, Spedizione L. Mares, G.R.S.T.S., Firenze*, 313–314.

Hansen, H. J., 1905, On the morphology and classification of the Asellota-group of Crustacea, with descriptions of the genus *Stenetrium* Haswell, and its species, *Proceedings of the Zoological Society of London* (*1904*), **2**(2), 302–331.

Haswell, W. A., 1881, On some new Australian Marine Isopoda. Part I, *Proceedings of the Linnean Society of New South Wales*, **5**, 470–481.

Hooker, A., 1985, New species of Isopoda from the Florida Middlegrounds (Crustacea: Peracarida), *Proceedings of the Biological Society of Washington*, **98**(1), 255–280.

Kensley, B., 1975, Five species of *Jaeropsis* from the southern Indian Ocean (Crustacea, Isopoda, Asellota), *Annals of the South African Museum*, **69**, 367–380.

Kensley, B., 1977, New records of marine Crustacea Isopoda from South Africa, *Annals of the South African Museum*, **72**(13), 239–265.

Kensley, B., 1978, *Guide to the Marine Isopods of Southern Africa* (Cape Town: South African Museum), 173 pp.

Kensley, B., 1984a, The Atlantic Barrier Reef ecosystem at Carrie Bow Cay, Belize, III: new marine Isopoda, *Smithsonian Contributions to the Marine Sciences*, **24**, 1–81.

Kensley, B., 1984b, The South African Museum's Meiring Naude Cruises. Part 15. Marine Isopoda of the 1977, 1978, 1979 Cruises, *Annals of the South African Museum*, **93**(4): 213–301.

Kensley, B., 1989, Marine isopod crustaceans from the St. Paul and Amsterdam Islands, southern Indian Ocean, *Bulletin du Muséum National d'Histoire Naturelle*, *Paris*, 4 ser. 11 (A) (1), 147–164.

Kensley, B., 1994, Records of shallow-water marine isopods from Bermuda with descriptions of four new species, *Journal of Crustacean Biology*, **14**(2), 319–326.

Kensley, B., 2001, Biogeography of the marine Isopoda of the Indian Ocean, with a checklist of species and records, *Crustacean Issues*, **13**, 205–264.

Kensley, B. and Schotte, M., 1989, *Guide to the Marine Isopod Crustaceans of the Caribbean* (Washington, DC: Smithsonian Press), 308 pp.

Kensley, B. and Schotte, M., 2000, Anthuridean isopods of the Indian Ocean, *Journal of Natural History*, **34**, 2057–2121.

Kensley, B., Nelson, W. G. and Schotte, M., 1995, Marine isopod biodiversity of the Indian River Lagoon, Florida, *Bulletin of Marine Science*, **57**(1), 136–142.

Koehler, R., 1885, Description d'un Isopode nouveau, le *Joeropsis brevicornis*, *Annales des Sciences Naturelles, (Zoologie), Paris*, **19**(6), 1–7.

Kussakin, O. G., 1967, Isopoda and Tanaidacea from the coastal zones of the Antarctic and Subantarctic, *Issledovaniya Fauny morei*, **4**(12), 220–380 [in Russian].

Kussakin, O. G., 1988, Marine and brackish isopods (Isopoda) of cold and temperate waters of the northern hemisphere. Volume 3. Suborder Asellota. Part 1. Families Janiridae. Santiidae, Dendrotionidae, Munnidae, Paramunnidae, Haplomunnidae, Mesosignidae, Haploniscidae, Mictosomatidae, Ischnomesidae, *Oprede-liteli Faune SSSR*, **152**, 1–500.

Miller, M. A., 1941, The isopod Crustacea of the Hawaiian Islands, II. Asellota, *Occasional Papers of the Bernice P. Bishop Museum*, **16**(13), 305–320.

Monod, T., 1933, Tanaidacea et Isopoda. Mission Robert-Ph. Dollfus en Egypte, *Mémoires de l'Institute d'Egypte*, **21**, 161–264.

Monod, T., 1974, Nouvelles observations sur le genre *Bagatus* (Crustacea Isopoda), *Bulletin du Muséum National d'Histoire Naturelle, Paris, (242) Zoologie*, **166**, 1121–1135.

Morris, B. F. and Mogelberg, D. D., 1973, Identification manual to the pelagic *Sargassum* fauna, *Bermuda Biological Station for Research*, *Special Publication*, **11**, 1–63.

Müller, H.-G., 1991a, Coral-reef inhabiting Joeropsidae from Réunion Island, southern Indian Ocean (Crustacea: Isopoda: Asellota), *Senckenbergiana Biologia*, **71**(1/3), 155–168.

Müller, H.-G., 1991b, Four new species of shallow-water Asellota from the Gulf of Aden (Crustacea: Isopoda), *Senckenbergiana maritima*, **21**(5/6), 205–214.

MÜLLER, H.-G., 1991c, Two new species of *Joeropsis* Koehler from a sabellid reef at the south-west coast of Sri Lanka, *Zoologische Abhandlungen, Staatliches Museum für Tierkunde Dresden*, **46**(8), 121–130.

MÜLLER, H.-G., 1991d, Stenetriidae from coral reefs at Réunion Island, southern Indian Ocean. Description of three new species, *Senckenbergiana biologica*, **71**(4/6), 303–318.

MÜLLER, H.-G., 1991e, The marine isopod family Stenetriidae from coral reefs at Bora Bora and Moorea, Society Islands, with descriptions of four new species (Crustacea), *Revue Suisse de Zoologie*, **98**(1), 51–76.

MÜLLER, H.-G., 1992, The distribution of *Maresiella* Fresi and Scipione 1980 in the world oceans, with descriptions of three new species, *Senckenbergina Biologia*, **72**(1/3), 205–217.

NICHOLLS, G. E., 1929, Some new species of *Stenetrium* from Western Australia, *Proceedings of the Linnean Society of New South Wales*, **54**, 361–374.

NICOLET, H., 1849, Crustaceos, *Historia fiscia y politica de Chile* (*zoologia*), **3**, 1–547.

NOBILI, G., 1906, Diagnoses préliminaires de Crustaces, Decapodes et Isopodes nouveaux recueilles par M. le Dr. G. Seurat aux iles Touamotou, *Bulletin du Muséum National d'Histoire Naturelle, Paris*, **12**, 256–270.

NORDENSTAM, A., 1933, Marine Isopoda of the families Serolidae, Idotheidae, Pseudidotheidae, Arcturidae, Parasellidae, and Stenetriidae mainly from the South Atlantic, *Further Zoological Results of the Swedish Antarctic Expedition, 1901–1903*, **3**(1), 1–284.

NORDENSTAM, A., 1946, Marine Isopoda from Professor Dr. Sixten Bock's Pacific Expedition 1917–1918, *Arkiv for Zoologi*, **37A**(7), 1–31.

PIRES, A. M. S., 1980, Revalidation and redescription of the genus *Carpias* Richardson, 1902 (Isopoda, Asellota), *Crustaceana*, **39**(1), 95–103.

PIRES, A. M. S., 1982, Taxonomic revision of *Bagatus* (Isopoda, Asellota) with a discussion of ontogenetic polymorphism in males, *Journal of Natural History*, **16**, 227–259.

POORE, G. C. B. and JUST, J., 1990, *Pseudojanira investigatoris*, a new species from southern Australia: second species in the Pseudojaniridae (Isopoda: Asellota) with new morphological information and interpretations, *Journal of Crustacean Biology*, **10**(3), 520–527.

RICHARDSON, H., 1902, The marine and terrestrial isopods of the Bermudas, with descriptions of new and little known species, *Proceedings of the United States National Museum*, **11**, 277–310.

RICHARDSON, H., 1906, Sur les isopodes de l'Expédition française antarctique, *Bulletin du Muséum National d'Histoire Naturelle, Paris*, **4**, 187–188.

SARS, G. O., 1899, *An Account of the Crustacea of Norway*, Vol. 2, *Isopoda* (Bergen), parts 13–14, pp. 233–270.

SCHULTZ, G. A., 1978, Protallocoxoidea new superfamily (Isopoda Asellota) with a description of *Protallocoxa weddellensis* new genus, new species from the Antarctic Ocean, *Crustaceana*, **34**, 245–250.

SCHULTZ, G. A., 1979, A new asellote (Stenetriidae) and two, one new, Anthuridea (Anthuridae) from Bermuda (Crustacea, Isopoda), *Proceedings of the Biological Society of Washington*, **91**, 904–911.

SCHULTZ, G. A., 1982, Species of Protallocoxoidea and Stenetroidea (Isopoda, Asellota) from the Antarctic and southern seas, *Antarctic Research Series*, **32**, 7–62.

SEROV, P. A. and WILSON, G. D. F., 1995, A review of the Stenetriidae (Crustacea: Isopoda: Asellota), *Records of the Australian Museum*, **47**(1), 39–82.

SEROV, P. A. and WILSON, G. D. F., 1999, A revision of the Pseudojaniridae Wilson, with a description of a new genus of Stenetriidae Hansen (Crustacea: Isopoda: Asellota), *Invertebrate Taxonomy*, **13**, 67–116.

SIVERTSEN, E. and HOLTHUIS, L. B., 1980, The marine isopod Crustacea of the Tristan da Cunha Archipelago, *Gunneria*, **35**, 1–128.

STEBBING, T. R. R., 1905, Report on the Isopoda collected by Professor Herdman at Ceylon, in 1902, in *Report to the Government of Ceylon on the Pearl Oyster Fisheries in the Gulf of Manaar* (London: Royal Society).

VANHÖFFEN, E., 1914, Die Isopoden der Deutschen Südpolar-Expedition 1901–1903, *Deutsche Südpolar-Expedition 1901–1903*, *25* (*Zoologie*), **7**, 447–598.

WALKER, A. O., 1901, Contributions to the Malacostracan fauna of the Mediterranean, *Journal of the Linnean Society of London*, *Zoology 28*, **182**, 290–307.

WILSON, G. D. F., 1986, Pseudojaniridae (Crustacea: Isopoda), a new family for *Pseudojanira stenetrioides* Barnard, 1925, a species intermediate between the asellote superfamilies Stenetrioidea and Janiroidea, *Proceedings of the Biological Society of Washington*, **99**(2), 350–358.

WILSON, G. D. F. and WÄGELE, J.-W., 1994, Review of the family Janiridae (Crustacea: Isopoda: Asellota), *Invertebrate Taxonomy*, **8**, 683–747.

WOLFF, T., 1962, The systematics and biology of bathyal and abyssal Isopoda Asellota, *Galathea Reports*, **6**, 1–320.

WOLFF, T., 1989, The genera of Santiidae Kussakin, 1988, with the description of a new genus and species (Crustacea, Isopoda, Asellota), *Steenstrupia*, **15**, 177–191.