Zootaxa 1137: 1–36 (2006)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

1137

Pontoniine shrimps (Decapoda: Palaemonidae) from the island of Socotra, with descriptions of new species of *Dactylonia* Fransen, 2002 and *Periclimenoides* Bruce, 1990

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Accepted by J. Goy: 6 Jan. 2006; published: 2 Mar. 2006

Abstract

The present report provides information on 20 pontoniine shrimp taxa from the island of Socotra, collected by Dr Michael Apel, including two new species, of the genera *Dactylonia* Fransen and *Periclimenoides* Bruce. Thirteen species are reported from Yemen for the first time, 8 are newly recorded from the north western Indian Ocean. The record of *Periclimenoides* is the first occurrence of this genus in the western Indian Ocean. The number of pontoniine shrimps known from the north west Indian Ocean is now increased from 32 to 44 taxa.

Key words: Crustacea**,** Decapoda, Pleocyemata, Pontoniinae, *Dactylonia carinicula*, *Periclimenoides socotrae*, new species, Indian Ocean, Yemen, Socotra

Introduction

The pontoniine shrimp fauna of the south western Indian Ocean, principally Kenya, Tanzania, Zanzibar, Moçambique, Comoro Islands, Madagascar, and the Seychelle Islands, with their extensive coral reefs, has attracted continuous study since the time of Miers (1884), who reported the first pontoniine shrimp, *Coralliocaris graminea*, from the Seychelle Islands. The north western Indian Ocean, north of the Equator but not including the Red Sea, with its limited coral reefs, has attracted much less attention. The first record was of *Periclimenes brevicarpalis* by Henri Coutière in 1898, from Jibuti, but subsequent studies were relatively sparse and the fauna still remains little known. Forty four taxa are now known from the north western Indian Ocean (Somalia, Jibuti, Yemen and Oman), of which 12 are new records.

The present collection was made in 1999 by Dr Michael Apel of the Senckenberg Museum, Frankfurt. Full details of the of the present study are to be found in Simões *et al* (2001). The specimens are deposited in the collections of the Senckenberg Museum, Frankfurt (SMF) and the Natural History Collection, Yemen (NHCY), which are temporarily held in the Senckenberg Museum. Restricted synonymies only are provided. Fuller synonymies are to be found in Kemp (1922), Holthuis (1952), Chace and Bruce (1993) and Li (2000). CL refers to the postorbital carapace length.

Taxonomy

Sub-phylum Crustacea Brünnich, 1772

Order Decapoda Latreille, 1802

Family Palaemonidae Rafinesque, 1815

Subfamily Pontoniinae Kingsley, 1878

***Conchodytes meleagrinae* Peters, 1852**
Figure 1A–B

Conchodytes meleagrinae Peters, 1852: 594.

Material examined. (1) 2♂, 2 ovig. ♀, MAP-002, ST-008, 12°40.556'N 54°04.223'E, N coast between Hawlaf and Hadibo, 5–6 m, 28 February 1999, SMF 29191. (2) 1♂, 1 ovig. ♀, MAP-59, ST-016, 12°40.264'N 53°27.204'E, SW of Qualansiyah, NW coast of Socotra, 5–7m, 8 March 1999, coll. S. al-Moghrabi, NHCY. (3) 1♂, 1 ovig. ♀, MAP-070B, ST-17, Ras Asfar, N of Shuab, 10–11m, 9 March 1999, SMF 29192. (4) 11 spms (4 ovig. ♀), MAP-123, ST-63A, Qadub, W of Hadibo, N coast, 6–8 m, 18 March 1999, coll. S. al-Maghrabi, SMF 29193. (5) 1♂, MAP-140, ST-68, Hawlaf Bay, N coast 12–14 m, 19 March 1999, coll. A. Plaga, NHCY. (6) 2 ?♂, 1 ovig. ♀, MAP-173, ST-0 97, Roosh, 1 km E of Suqra, N coast, 12–14 m, 23 March 1999, NHCY. (7) 1♂, MAP-249, ST-147, off Di-Timri, N coast, 20–30 m, 3 April 1999, SMF 29194. (8) 2 ♂, 3 ovig. ♀, ST-149, 12°36.782'N 53°49.160'E, Qadub, W of Hadibo, N coast, 10–13 m, 6 April 1999, coll. Douad Naseeb, NHCY. (9) 6, (2 ovig.♀), F-061, ST-189/190, 2°14.5'N 52°04.0'E**,** Khaisat en-Naum, W coast of Abd-al-Kuri**,** 12–13 m, 10 April 1999**,** coll. Douad Naseeb, SMF 29195.

Hosts. All specimens were collected from *Pinctada radiata* (Leach), *Pinctada* sp., or large oysters (Bivalvia, Mollusca).

Regional records. Aden: Gold Mohur Bay (Bruce, 1978); Oman: Mirbar, Dhofar (Holthuis, 1986); Maldive Islands: Minicoy; Malé Atoll (Borradaile, 1917).

General distribution. Type locality: Ibo, Moçambique. Widespread throughout most tropical Indo-Pacific waters where pearl oysters occur, from the Red Sea to the Hawaiian Islands.

Remarks. The specimens of this well known species present no special features. The fingers of the second pereiopod chela of this species are illustrated by Fransen (1994, figure 21). In the fingers of some of the present specimens (Figure 1A) the dactylus is more slender and the teeth on the cutting edge (Figure 1B) are more developed. The dactylar tooth is compressed and finely denticulate: on the fixed finger, the proximal tooth is not compressed and is densely covered with minute acute tubercles, the distal tooth is compressed, with a denticulate edge,

***Coralliocaris* sp.**

Material examined.

1 juv., MAP-153, ST-093, 12°40.519'N 54°04.170'E, Hawlaf Bay, E. of Hadibo, N coast, 9–10 m, 21 March 1999, SMF 29196.

Host. Acropora valida (Dana) [Scleractinia].

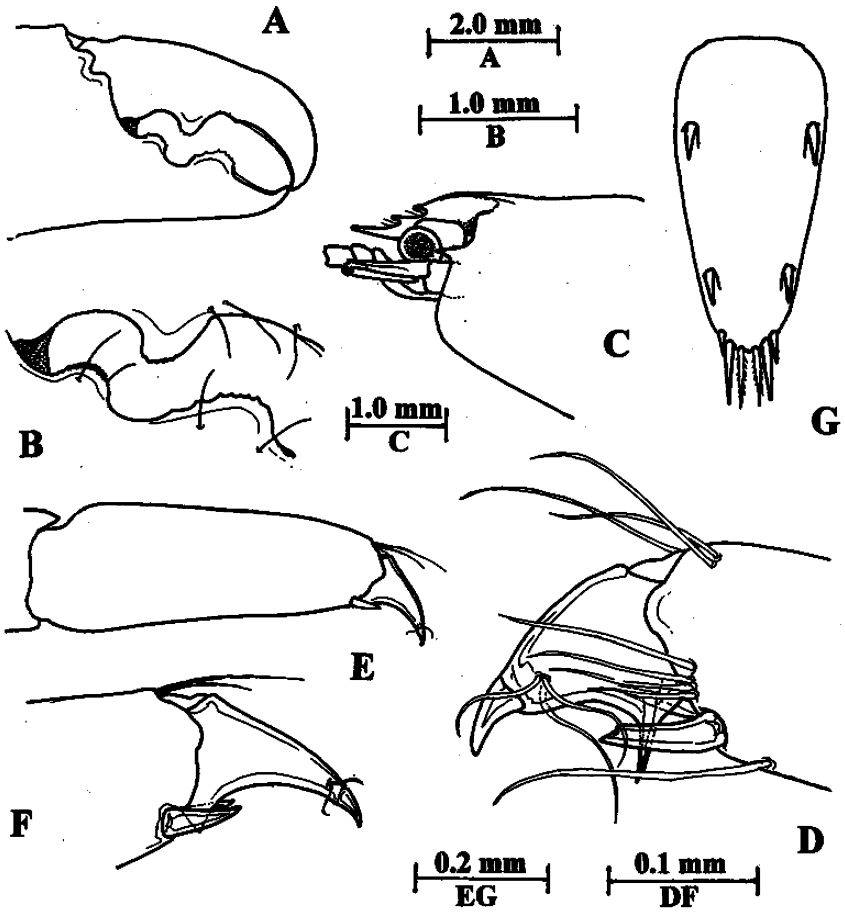

FIGURE 1. *Conchodytes meleagrinae* Peters, F-061, ST-189/190, (A), second pereiopod, fingers. (B), same, cutting edges. *Periclimenaeus nobilii* Bruce, MAP-139 , ST-O68, ovigerous female. (C), anterior carapace and appendages, lateral. Male. (D), third pereiopod, distal propod and dactyl. *Periclimenaeus* sp., aff. nobilii Bruce, MAP-070**A**, ST-017, female. (E), third pereiopod, propod and dactyl. (F), same, distal propod and dactyl. G, telson.

Remarks. The single small specimen has a rostral dentition of 5/1, with a well developed deep lamina, but lacks both second pereiopods, so cannot be specifically identified. It probably belongs to either C. graminea (Dana, 1852) or C. viridis Bruce, 1974a. This small collection of shrimps from Acropora hosts is remarkable for the lack of many of the usual associates of these hosts.

***Dactylonia carinicula* sp. nov.**
Figures 2–5

Diagnosis. Rostrum narrowly triangular, much shorter than antennular peduncles, dorsally

carinate, unarmed; maxilla with basal laciniae obsolete; ambulatory dactyls biunguiculate, with corpus bearing large blunt, distal tooth and several smaller acute ventral denticles, with large acute central accessory tooth, smaller interposed denticles distally, larger anteroverted denticles proximally; telson with two pairs of large dorsal spines.

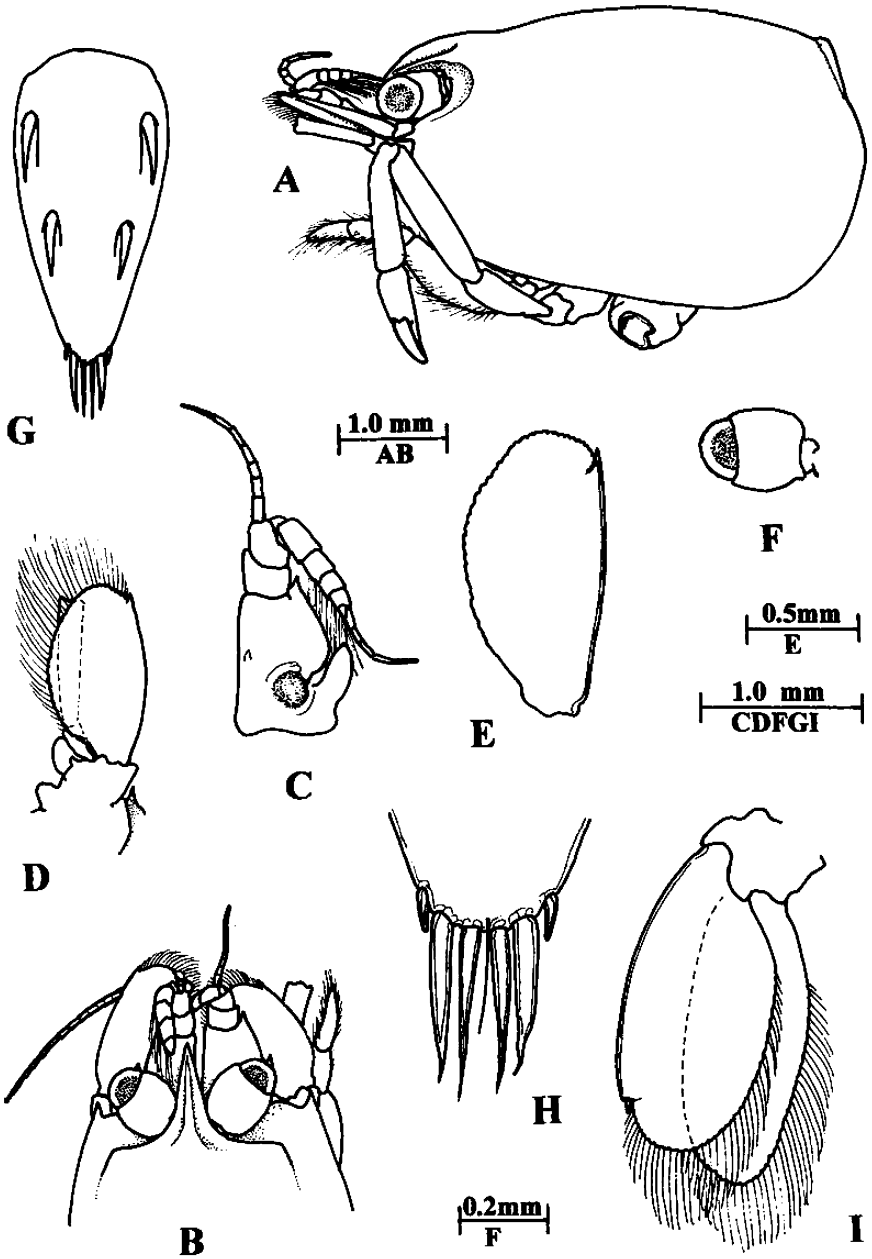

FIGURE 2. *Dactylonia carinicula* sp. nov., paratype. (A), carapace and appendages, lateral. (B), anterior carapace and appendages, dorsal. (C), antennule. (D), antenna. (E), scaphocerite. (F), eye, dorsal. (G), telson. (H), same, posterior spines. (I), uropod.

Material examined. 1 ovig. ♀, **holotype**, reg. N$^{o.}$ SMF 29116, 1 ♀, **paratype**, dissected, SMF 29117, MAP-137, ST-067, 12°40.429'N 54°11.731'E, Rhyi di Hamri, E of Hawlaf, N coast, 7–9 m, 19 March 1999, "from dead *Acropora*".

Description: Small sized pontoniine shrimp of stout subcylindrical body form.

Rostrum: (Figure 5A) about 0.19 of carapace length, depressed, reaching to about 0.8 of proximal segment of antennular peduncle, subequal to anteroverted corneal margin (Figure 2B), acute, about 1.8 times longer than basal width, distally rounded, inclined ventrally, with two upper setae, one lower seta, dorsally convex, carinate, without teeth, lateral carinae distinct, merging posteriorly with orbital margin, ventral carina concave, without subapical tooth.

Carapace: (Figure 2A) smooth, subcylindrical, glabrous, orbit moderately developed, with broadly rounded inferior orbital angle, acute marginal antennal spine, anterolateral margin of branchiostegite slightly produced, broadly rounded.

Abdomen: well developed, feebly swollen, sixth segment short, about 0.29 of carapace length, 1.5 times length of fifth, about 1.8 times wider than long, depressed, with acute posteroventral angle, lateral posterolateral angle reduced, rounded, pleura of first three segments large, broadly rounded, fourth and fifth small, rounded, not produced.

Telson: (Figure 2G) about 0.33 of CL, about 2.1 times longer than maximal width at 0.3 of length, lateral margins feebly convex and posteriorly convergent, with 2 pairs of large submarginal dorsal spines at about 0.2 and 0.55 of length, anterior spines slightly longer than posteriorly, about 0.23 of telson length, posterior margin broadly convex, without median point, about 0.3 of maximal width, with 3 pairs of spines (Figure 2H), lateral spines small, about 0.25 of intermediate spine length, intermediate spines robust, proximally slightly swollen, about 0.18 of telson length, submedian spines more slender subequal to intermediate spine length, setulose. Antennule: (Figure 2C) small, exceeding rostrum by about 0.25 of proximal segment length, proximal segment about 1.3 times longer than basal width, with small ventromedial tooth, anterolateral angle acute, reaching to about middle of intermediate segment length, lateral margin convex, stylocerite phylliform, slightly exceeding half segment length, statocyst normally developed with circular statolith; intermediate and distal segments short, stout, of subequal length, combined length about 0.9 of proximal segment length; upper flagellum short, subequal to peduncle length, fused rami with four stout segments, with about eight groups of aesthetascs, shorter free ramus single segmented, longer ramus with six slender segments.

Antenna: (Figure 2D) short, with carpocerite reaching to about distal margin of distal segment of antennular peduncle; basicerite normal, unarmed, antennal gland aperture tuberculate; carpocerite subcylindrical, 5.2 times longer than distal width, reaching to distal margin of scaphocerite; flagellum short, reaching to about posterior carapace margin, scaphocerite (Figure 2E) normal, reaching to distal end of carpocerite, about two times longer than wide, maximal width distally at about half length, lamella broadly rounded distally, lateral margin feebly convex, with small stout acute tooth distally, falling

distinctly short of distal margin of lamella (Figure 5B).

Eye: (Figure 2F) small**,** with cornea hemispherical, well pigmented, transverse, diameter about 0.15 of CL, without accessory pigment spot, stalk, subcylindrical, swollen, medially flattened, about 1.2 times longer than wide.

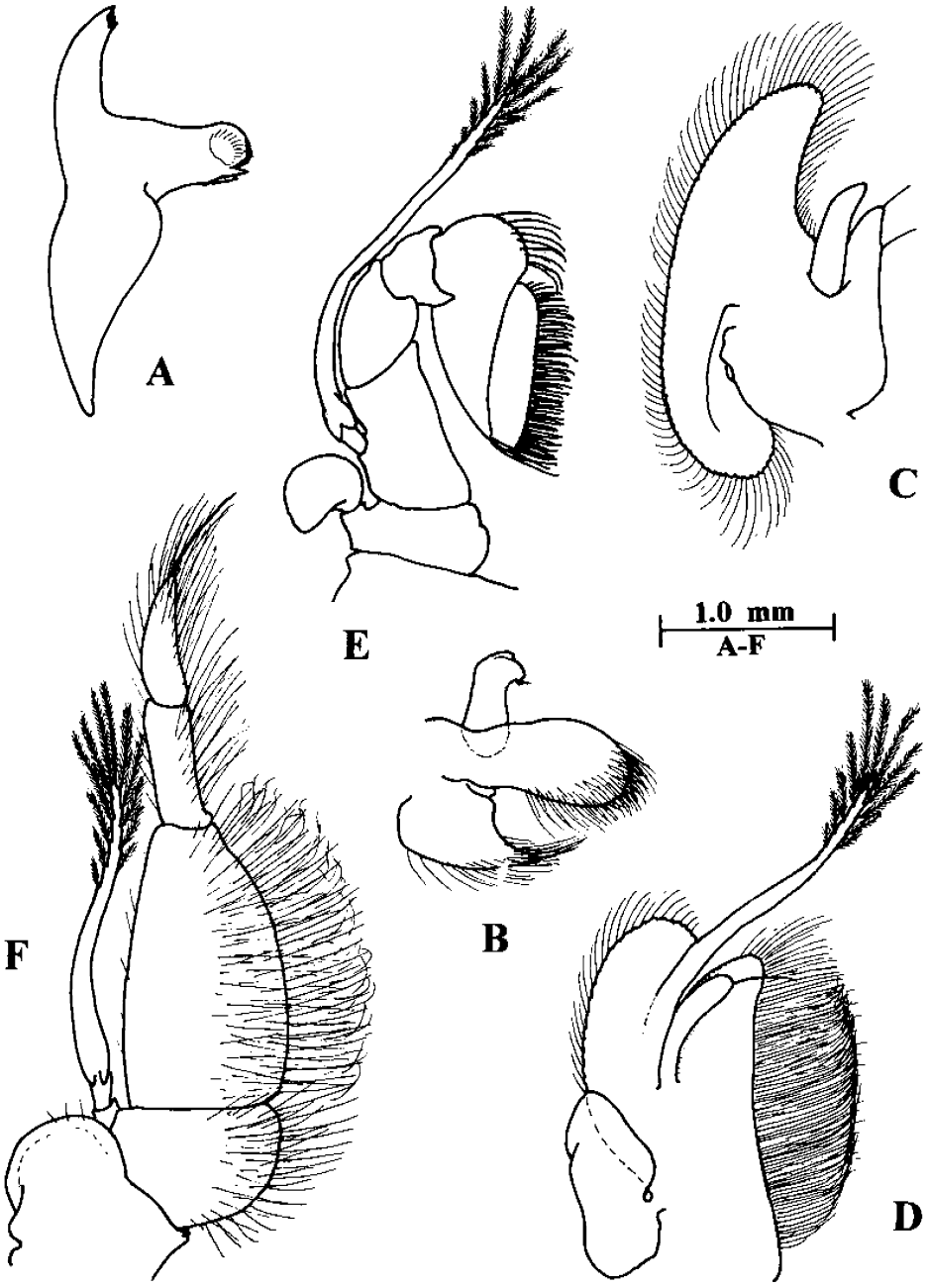

FIGURE 3. *Dactylonia carinicula* sp. nov.. paratype. (A), mandible. (B), maxillula. (C), maxilla. (D), first maxilliped. (E), second maxillped. (F), third maxilliped.

Mandible: (right) (Figure 3A) with corpus robust; incisor process (Figure 5E) normal, distal margin oblique with stout medial and lateral teeth, with three smaller intermediate teeth, medial margin laminar with five small denticles distally; molar process (Figure 5C, D) stout, subcylindrical, distally trullate, anterior margin laminar, with band of short setae ventrally, two stout teeth posteriorly; without palp.

Maxillula: (Figure 3B) with palp (Figure 5F) normal, feebly bilobed, with small ventral tubercle with minute simple terminal seta; upper lacinia suboval about seven short submarginal spines distally, four longer distomarginal spines, densely setose ventrally; lower lacinia short, broad based, tapering strongly, distally acute, densely setose.

Maxilla (Figure 3C) with simple non-setose tapering palp, basal endite with laciniae obsolete, with short, simple preterminal and terminal simple setae only (Figure 5G), proximal margin broadly rounded, non-setose; scaphognathite normal, three times longer than central width, anterior lobe tapering, medially concave.

First maxilliped: (Figure 3D) with slender palp, with single simple terminal seta; basal and coxal endites completely fused, basal portion narrow, medial margin concave, densely fringed with long, finely plumose setae; exopod well developed, with slender ramus with numerous plumose setae distally, caridean lobe large narrow; epipod well developed feebly bilobed, anterior lobe much larger than posterior.

Second maxilliped: (Figure 3E) with normal endopod, dactylar segment about four times longer than central width, densely fringed with robust spines medially, propodal segment with anterior margin broadly rounded with numerous spiniform setae; endopod similar to first maxilliped without caridean lobe; coxa with feeble medial process, epipod small, rounded, without podobranch.

Third maxilliped: (Figure 3F) reaching anteriorly to middle of carpocerite; endopod with ischium and merus completely fused, antepenultimate segment deeply bowed ventrally, sub-operculate, 1.7 times longer than central width, tapering distally, basal width three times distal width, lateral margin feebly convex, medial margin strongly convex, ventomedial surface densely setose, with long silky finely plumose setae, carpal segment subcylindrical, 3.4 times longer than width, about 0.5 of ischiomeral segment length, with numerous long slender setae ventromedially, terminal segment tapering distally, subequal to carpal segment length, about 3.6 times longer than basal width, with long spiniform terminal seta, dense ventromedial setae; basal segment broadly convex medially, without medial process, densely setose, exopod well developed, slender, with numerous plumose setae distally; coxa stout, feebly concave medially, non-setose, with well developed rounded lateral plate, without arthrobranch.

Thoracic sternites: third and fourth broad, unarmed.

First pereiopod: (Figure 4A) normal, neither long nor short, moderately robust, exceeding proximal segment of antennular peduncle by distal third of merus, carpus and chela; *chela* (Figure 4B) with palm about 1.3 times longer than deep, compressed, dorsal margin feebly convex, ventral border straight, sparsely setose, fingers slender, tapering, with numerous groups of long setae, dactylus about 1.2 of palm length, straight, four times

longer than basal width, tapering strongly to slightly dilated tip with single small acute hooked tip, cutting edges straight, sharp, entire, fixed finger similar to dactylus, 2.7 times longer than basal width, cutting edge sharp, entire, tip with small hooked tooth; *carpus* subequal to chela length, about 3.6 times longer than central width, tapering proximally, *merus* moderately slender, 6.2 times longer than central width, situated at 0.5 of length, tapering distally and proximally, about 1.2 times carpus length, unarmed; *ischium* short, 0.5 of merus length, robust, unarmed; *basis* and *coxa* short, stout, ventrally setose, without special features; coxa without ventral process.

Second pereiopods: well developed, unequal in length, dissimilar in shape. *Major second pereiopod***:** (Figure 4C) about 1.75 of CL (holotype); *chela* (Figure 4D) with palm, compressed, smooth, two times longer than deep, slightly swollen centrally, strongly carinate ventrally, feebly dentate with numerous very long rigid simple setae, fingers about 0.28 of palm length, dactylus (Figure 4F) compressed, slightly overreaching tip, cutting edge concave, sharp, entire, with single large acute tooth at about half length; fixed finger, three times longer than deep, dorsal margin moderately convex, with acute tip, cutting edge concave, sharp, entire, with single large acute tooth at about half length, ventrally carinate continuously with palm, with numerous very long rigid simple setae, with acute feebly hooked tip, cutting edge with distal third sharp, entire, as on dactylus, proximal two thirds with two low distal teeth and larger more acute proximal tooth; *carpus* articulating obliquely with propod, about 0.27 of palm length, 1.5 times longer than distal width, tapering strongly proximally, distally excavate, unarmed; *merus* about 0.36 of palm length, two times longer than central width, unarmed, *ischium* 0.75 of meral length, 1.8 times longer than distal width, tapering strongly proximally, unarmed; *basis* and *coxa* robust, without special features.

Minor second pereiopod: (Figure 4E) with *chela* about 1.3 times CL (holotype), 10.5 times (paratype) 0.75 of major chela length (paratype): with palm, compressed, smooth, 1.8 times longer than deep, slightly swollen distally, strongly carinate ventrally, feebly dentate with numerous very long rigid setae, fingers about subequal to palm length, dactylus slender, compressed, slightly overreaching fixed finger, about six times longer than deep, dorsal margin convex, with acute tip, cutting edge concave, sharp, entire, with single small acute tooth proximally; fixed finger about 2.7 times longer than basal width, ventrally carinate continuously with palm, with numerous very long rigid simple setae, with acute feebly hooked tip, cutting edge proximally cannulate (Figure 4F), distally sharp, entire, proximally with two small blunt teeth, inner edge with three smaller rounded teeth; *carpus* articulating transversely with propod, robust, about 0.38 of palm length, 1.1 times longer than distal width, unarmed; *merus* about 0.66 of palm length, 1.7 times longer than distal width, tapering slightly proximally, unarmed, *ischium* 0.9 of meral length, 48 times longer than distal width, tapering strongly proximally, unarmed; *basis* and *coxa* robust, without special features.

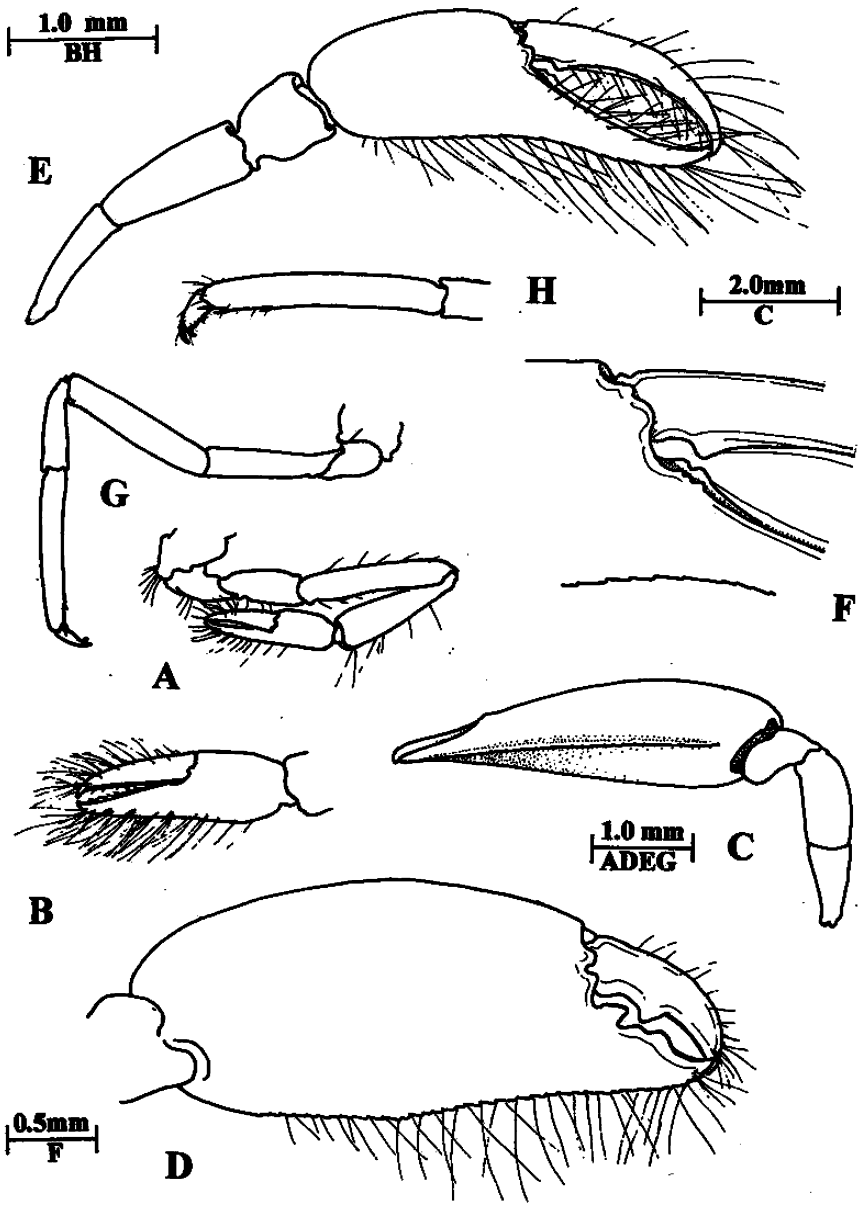

FIGURE 4. *Dactylonia carinicula* sp. nov. (A), first pereiopod. (B), same, chela. (C), major second pereiopod, ventral. (D), same, chela, medial. (E), minor second pereiopod. (F), same, hinge region of fingers. (G), third pereiopod. (H), same, propod and dactyl. (ABG), paratype; (C–F), holotype.

Third pereiopod: (Figure 4G) exceeding basicerite by distal fourth of merus, dactylus (Figure 5I) about 0.25 of propod length, with unguis distinctly obliquely demarcated, about 0.7 of length of dorsal corpus length, slender, curved, acute, about 1.8 times longer than basal width, with minute accessory denticle distodorsally (Figure 5J), corpus strongly

compressed, dorsal border feebly convex, ventral margin with stout blunt curved tooth distally, ventral margin feebly convex otherwise, with small acute anteroverted tooth at about half length, with two very small acute denticles distally, three small acute teeth, of decreasing size, proximally; *propod* (Figure 4H) about 0.42 of CL, compressed, sparsely setose, five times dactylus length, 7.25 times longer than maximal width, subuniform, feebly bowed, ventral border concave, with stout subequal medial and lateral distoventral spines (Figure 5H), similar subterminal ventral spine, single distal ventral spine at about 0.7 of propod length, about 0.8 of corpus length, ventral border straight, unarmed; *carpus* 0.5 of propod length, slender, four times longer than distal width, tapering proximally, unarmed; *merus* robust, subequal to propod length, 5.2 times longer than central width, compressed, subuniform, unarmed; *ischium* equal to 0.8 of propod length, 4.7 times longer than distal width, tapering proximally; *basis* and *coxa* robust, without special features. *Fifth pereiopod*: more slender, generally similar to third pereiopod, propod about 0.57 of CL, 1.2.times third pereiopod propod length, slightly tapering distally, 9.0 times longer than wide, ventral margin with distoventral spines and setae, 3 ventral spines.

Pleopods: without special features.

Uropod: (Figure 2I) with protopod unarmed posterolaterally; ***e**ndopod* slightly exceeding posterior telson margin, exopod slightly shorter; exopod broad, about two times longer than wide, lateral margin convex, sparsely setose, unarmed, with minute acute distolateral tooth with larger stout mobile spine medially (Figure 5K), not reaching level of distal border of exopod, without distinct diaeresis; *endopod* 1.1 times exopod length, 2.4 times longer than broad, slightly exceeding endopod.

Ova: numerous and small, about 50.

Measurements. Holotype; carapace 3.5 mm, carapace and rostrum 3.9 mm, total body length (approx.) 10.5 mm, major second pereiopod chela 4.8 mm, minor second pereiopod chela 4.2 mm: paratype; carapace 3.8 mm, carapace and rostrum 4.6 mm, total body length (approx.) 120.0 mm, minor second pereiopod chela 3.7 mm, length of ovum 0.5 mm.

Colour pattern. Not noted.

Host/Habitat: Not identified, presumably from encrusting tunicate (Ascidiacea).

Etymology: From *carina* (Latin), a keel, diminutive.

Distribution: Known from the type locality only.

Sy*stematic Position*: *Dactylonia carinicula* appears to be most closely similar to *Dactylonia anachoreta* Kemp which has relatively few teeth on the flexor margin of the ambulatory dactyls, a short dorsally carinate rostrum, but which lacks a distinct ventral carina and has no significant orbital development. The figures of *D. anachoreta* provided by Fransen (1994, 2002) shows a shorter broader rostrum with a shorter, lower dorsal carina, and which bears a minute distal subapical ventral tooth, lacking in *D. carinicula*. In *D. carinicula* the scaphocerite extends distinctly beyond the end of the carpocerite but is subequal in *D. anachoreta.* The ambulatory dactyls are similar in general shape but differ in several details. In *D. carinicula* the corpus has the distal (primary) tooth blunt, the next

largest (secondary) tooth at about half the ventral margin length, with two small denticles between it and the primary tooth, with four small acute teeth proximally (in *D. anachoreta* the secondary tooth is long and acute, close to the primary tooth, without intervening denticles, with about five smaller teeth proximally, these teeth finely denticulate distally, a feature not present in *D. carinicula.*

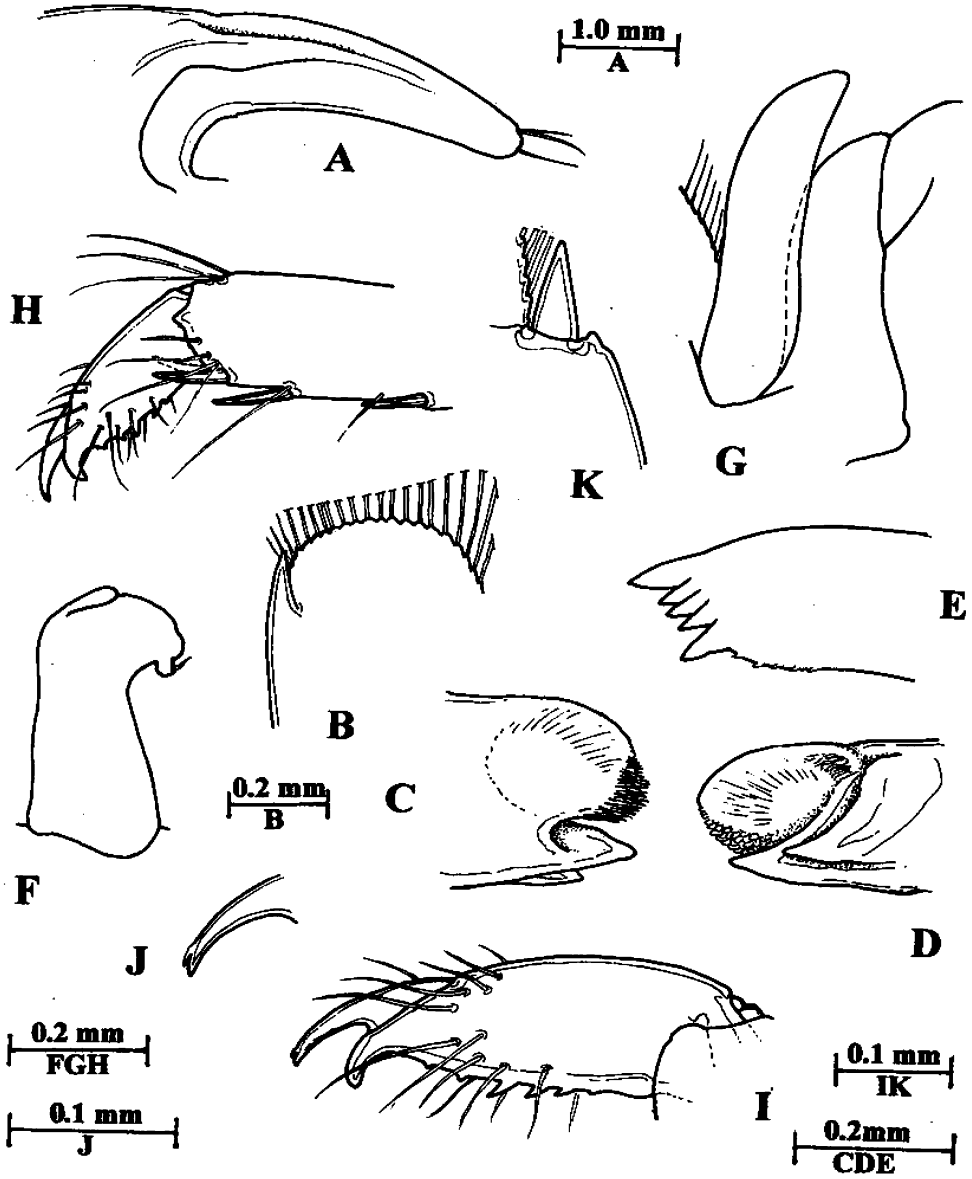

FIGURE 5. *Dactylonia carinicula* sp. nov., paratype. (A), rostrum. (B), scaphocerite, distal margin. (C), right mandible, molar process, lateral. (D), same, medial. (E), incisor process. (F), maxillula, palp. (G), maxilla, palp and endites. (H), third pereiopod, distal propod and dactyl. (I), same, dactyl. (J), same, tip of unguis. (K), exopod of uropod, posterolateral spine.

Dactylonia carinicula appears also to be closely similar to *D. ascidicola* Borradaile in many of the features of its general morphology. Common features include a short rostrum, narrow in dorsal view, with a dorsal median carina, unequal dissimilar second pereiopod chelae, with two pairs of large dorsal telson spines. Borradaile (1898) does not mention the dorsal rostral carina in his descriptions (1898, 1899), although he notes the absence of a ventral carina, which is distinct in *D. carinicula.* Its presence is indicated by Holthuis (1952), although it is not shown in his figure 79b. *Dactylonia carinicula* differs particularly in the complete absence of laciniae on the basal endite of the maxilla and the quite different dactyl of the third pereiopod which is elongate, biunguiculate, with a series of numerous blunt ventral accessory denticles of progressively diminishing size proximally. The fingers of the minor second pereiopod are distinctly longer than the palm, but markedly shorter in *D. ascidicola. Dactylonia carinicola* also resembles *D. monnioti* Bruce, 1990, but which has a much narrower rostrum in dorsal view, with feebly developed orbits, and the carinate rostrum, which well exceeds the anteroverted corneal margin, and bears a small distoventral tooth. The maxilla has two small laciniae and the ambulatory dactyl resembles that of *D. ascidicola.*

Remarks: The recognition of *Dactylonia carinicula* sp. nov. raises to 8 the number of Indo-West Pacific species of this genus. All are probably associates of tunicate hosts. A key for the preliminary identification of these species is presented below.

As noted for *D. okai* by Holthuis (1952) the upper antennular flagella of *D. carinicula* are carried in a reflexed position, a common feature of many *"Pontonia"*-like specimens.

Key to the Indo-West Pacific Species of *Dactylonia* Fransen, 2002
(modified from Fransen, 2002)

1. Paragnath with one median oblong carina; rostrum exceeding proximal border of antennal peduncle; flexor margin of dactyli of ambulatory pereiopods with row of distally denticulate processes 2
- Paragnath with two submedian carinae; rostrum not exceeding proximal border of antennal peduncle; flexor margin of dactyli of ambulatory pereiopods with row of blunt tubercles ..... *D. medipacifica** (Edmondson, 1935)
2. Flexor margin of dactyli of ambulatory pereiopods with 4–6 processes; fingers of minor second chela with long setae 3
- Flexor margin of dactyli of ambulatory pereiopods with 7–14 processes; fingers of minor second chela with short setae 4
3. Rostrum about 0.8–1.3 times longer than basal width, extending well beyond level of tip of stylocerite, with very distinct dorsal carina; flexor margin of dactyli of ambulatory pereiopods with teeth subacute, increasing in size distally, teeth with fine distal denticulations ..... *D. anachoreta* (Kemp, 1922)

* See addendum

- Rostrum about 1.8 times as long as basal width, extending only to level of tip of stylocerite, with feeble dorsal carina; flexor margin of dactyli of ambulatory pereiopods with central teeth very acute, larger than proximal and distal teeth, teeth without fine distal denticulations..... *D. carinicula* sp. nov.

4. Third maxilliped long, reaching beyond scaphocerite; carpus of first pereiopod slightly shorter than chela 6
- Third maxilliped short, reaching half-length of scaphocerite; carpus of first pereiopod slightly longer than chela 5

5. Dactyls of ambulatory pereiopods with unguis slender, subacute, without distodorsal denticles, distal accessory tooth blunt, without distal denticles, ventral accessory teeth simple, distally blunt; major second pereiopod chela with ventral margin entire..... .....*D. franseni* Bruce, 2003
- Dactyls of ambulatory pereiopods with unguis and distal accessory tooth very acute, with distal denticles, ventral accessory teeth truncate, with terminal denticulations; major second pereiopod chela with ventral margin serrate..... ..... *D. ascidicola (*Borradaile, 1898)

6. Penultimate segment of third maxilliped about four times as long broad; ultimate segment less than half length of penultimate segment .....*D. okai* (Kemp, 1922)
- Penultimate segment of third maxilliped about twice as long broad; ultimate segment somewhat shorter than half length of penultimate segment..... 7

7. Rostrum with subdistal ventral tooth; dactylus of ambulatory pereiopods relatively long with about 13 tubercles on flexor margin .....*D. monnioti* (Bruce, 1990)
- Rostrum without subdistal ventral tooth; dactylus of ambulatory pereiopods relatively short with about 8 tubercles on flexor margin.....*D. holthuisi* Fransen, 2002

Harpiliopsis depressa (Stimpson, 1860)

Harpilius depressus Stimpson, 1860: 38.
Harpiliopsis depressus —Holthuis, 1951: 70–75, pl. 21 a–i, 22 a–f.

Material examined. (1) 1 spm, MAP-125, ST-063A, 12°38.9'N 53°56.0'E, Qadub, W of Hadibo, N coast, 6–8 m, 18 March 1999, SMF 29197. (2) 2 adults, ? 4 juvs., MAP-136, ST-067, 12°40.429'N 54°11.731'E, Rhyi di Hamri, North coast, 7–9 m, 19 March 1999, NHCY. (3) 3 spms, MAP-170, ST-097, 12°37.179'N 54°21.107'E, Roosh, 1 km E of Suqra, N coast, 12 m, 23 March 1999, SMF 29198.

Hosts: (1), (2); *Pocillopora damicornis* (Linnaeus); (3), *Pocillopora eydouxi* Edwards & Haime [Scleractinia].

Regional: Reported from Aden (Bruce, 1978), Maldive Islands (Borradaile, 1917; Bruce,1973).

General distribution: Type locality: Hawaii. Distributed throughout the whole Indo-West Pacific, where there are coral reefs, and extending to the Pacific coast of America

from Gulf of California to Colombia.

Remarks: Adults with second pereiopods, in good condition; juveniles without second pereiopods, in poor condition. The Suqra specimens were found in association with *H. spinigera*. A common associate of *Pocillopora* corals.

Harpiliopsis spinigera (Ortmann, 1890)

Anchistia spinigera Ortmann, 1890: 511, pl. 36, Figure. 23.
Harpilius depressus var. *gracilis* Kemp, 1922: 234, Figure 71.
Harpiliopsis depressus var. *spinigerus*—Holthuis, 1952: 184–185.

Material examined. 3 ovig.♀, MAP-170, ST-097, 12°37.179'N 54°21.107'E, Roosh, 1 km E of Suqra, N coast, 12 m, 23 March 1999, SMF 29199.

Hosts: *Pocillopora eydouxi* Edwards & Haime [Scleractinia].

Regional records: In the north west Indian Ocean reported only from the Maldive Islands (Garth, 1976; Bruce, 1976a).

General distribution: Type locality: Samoa. Distributed throughout much of Indo-West Pacific, where there are coral reefs, and extending to the Pacific coast of America from Panama and Colombia.

Remarks: The specimens were found in association with *H. depressa*.

Jocaste japonica (Ortmann, 1890)

Coralliocaris superba var. *japonica* Ortmann, 1890: 509.
Jocaste japonica—Holthuis, 1952: 193–195 (partim).
Jocaste japonica—Patton, 1966: 279–280, Figure 3B.

Material examined. (1) 1 ovig. ♀, MAP-158, ST-095, 12°40.156'N 54°02.850'E, Shanitan, E of Hadibo, N coast, 8 m, 22 March 1999, SMF 29200. (2) 1 spm., MAP-159, ST-095, 12°40.156'N 54°02.850'E, Shanitan, E of Hadibo, N coast, 8 m, 22 March 1999, NHCY.

Hosts: *Acropora* cf. *valida* (Dana) [Scleractinia].

Regional records: Not reported from the Red Sea, but known from Maldive Islands (Borradaile, 1917).

General distribution: Type locality: Kagoshima, Kyushu, Japan. Reported throughout much of the Indo-West Pacific region, where there are coral reefs, east to New Caledonia and the Fijian Islands.

Remarks: This report constitutes the most north westerly record from the Indian Ocean. Specimens (1) found in association with *J. lucina*. A common associate of *Acropora* corals.

Jocaste lucina (Nobili, 1901)

Coralliocaris lucina Nobili, 1901: 5.
Jocaste lucina—Holthuis, 1952: 193–195, Figure 94 (*partim*).
Jocaste lucina—Patton, 1966: 278–279, Figure 3A.

Material examined. (1) 2 spms, MAP-064, ST-016, 12°40.264'N 53°27.204'E, SW of Qualansiyah, NW-coast, 5–7 m, 3 March 1999, NHCY. (2) 7 spms (4 ovig.♀), MAP-158, ST-095, 12°40.156'N 54°02.850'E, Shanitan, E of Hadibo, N coast, 8 m, 22 March 1999, SMF 29201.

Hosts: (2), *Acropora* cf. *valida* (Dana) [Scleractinia].

Regional records: Numerous records from the Red Sea and also reported from Aden (Bruce, 1969) and the Maldive Islands (Bruce, 1969).

General distribution: Type locality: Eritrea. Common throughout much of the Indo-West Pacific, where there are coral reefs, east to the Fijian Islands and Johnson Atoll.

Remarks: Specimens (1) in poor condition. Specimens (2) found in association with *Jocaste japonica.* A common associate of *Acropora* corals.

Kemponia elegans (Paulson, 1875)

Anchistia elegans Paulson, 1875, 113, pl. 17, figure 1.
Periclimenes (Ancylocaris) elegans—Kemp, 1922: 215–218, figures. 60–62.
Kemponia elegans—Bruce, 2004: 14–15.

Material examined 1♂, 1 ovig. ♀, 1juv., MAP-151, ST-092, 12°40.519'N 4°04.170'E, Hawlaf Bay, E. of Hadibo, N coast, 4–5 m, 21 March 1999, 1 spm SMF 29211, 2 spms NHCY.

Habitat: Dead *Acropora.*

Regional records: Previously reported from Sa'udi Arabia (Holthuis, 1952), Koweit (Kemp, 1922), Aden (Bruce, 1971).

General distribution: Type locality: Red Sea. Ranges from the Red Sea to the Philippines, Marshall Islands and Great Barrier Reef.

Remarks: The specimens present no special features. It is suggested in Chace & Bruce (1993) that this species and *K. grandis* (Stimpson, 1860) may be junior synonyms. The situation is still in need of clarification.

Kemponia grandis (Stimpson, 1860)

Anchistia grandis Stimpson, 1860: 39.
Periclimenes grandis — Borradaile, 1898: 382.
Kemponia grandis — Bruce, 2004: 16.

Material examined. 1 ovig. ♀, MAP-158, ST-095, 12°40.156'N 54°02.850'E, Shanitan, E of Hadibo, N coast, 8 m, 22-March 1999, SMF 29212.

Host: *Acropora* cf. *valida* (Dana) (Scleractinia).

Regional records: Jibuti (Nobili, 1906), Yemen (Bruce, 1971).

General distribution: Type locality: Oshima, Japan. Extensively distributed from the Egyptian Red Sea to the Tuamotu Islands.

Remarks: The single specimen agrees well with previous descriptions. See *Remarks* above.

***Kemponia longirostris* (Borradaile, 1915)**

Palaemonella longirostris Borradaile, 1915: 210.
Periclimenes (Falciger) affinis Borradaile, 1915: 211.
Periclimenes (Ancylocaris) proximus Kemp, 1922: 201–204, figures 51–53.
Periclimenes (Harpilius) longirostris — Holthuis, 1958: 3–6, figure 1.
Periclimenes longirostris — Bruce, 1981: 195–196, figures 4, 18a,d.
Kemponia longirostris — Bruce, 2004: 17.

Material examined. (1) 3 spms, MAP-137, ST-067, 12°40.429'N 54°11.731'E, Rhyi di Hamri, E of Hawlaf, 7–9 m, 19 March 1999, NHCY. (2) 9 spms (1♂, 2 ovig. ♀), MAP-154, ST-093, 12°40.519'N 54°04.170'E, Hawlaf Bay, E. of Hadibo, N coast, 9–10 m, 21 March 1999, SMF 29215.

Habitat: (2), dead *Acropora* (Scleractinia).

Regional records: Zanzibar: Chukwani (Bruce, 1976), Seychelle Islands (Fransen, 1994). Also known from the Red Sea: Israel (Holthuis, 1958).

General distribution: Type locality: Naifaro, Fadiffolu Atoll, Maldive Islands. Scattered records throughout the Indo-West Pacific coral reefs, east to the Marshall Islands.

Remarks: (1) mainly juveniles, with many pereiopods detached.

***Odontonia sibogae* Bruce, 1972**

Pontonia sibogae Bruce, 1972: 182–185, figure 1.
Odontonia sibogae — Fransen, 2002, 371–382, figs 241–246, pl. 19.

Material examined: (1) 1♂, MAP-137B, ST-067, 12°40.429'N 54°11.731'E, Rhyi di Hamri, N coast, Socotra, 7–9 m, 19 March 1999, SMF 29217. (2) 1 ovig. ♀, MAP-137, stn 67, 12°40.429'N 54°11.731'E, Rhyi di Hamri, E of Hawlaf, 7–8 m, 19 March 1999, in dead *Acropora*, NHCY.

Host: No data. Usually associated with tunicate hosts.

Regional records: Previously reported from Oman by Holthuis (1986).

General distribution: Type locality: Port Curtis, Queensland, Australia. In the Indian Ocean, otherwise only known from Madagascar (Bruce, 1978a) and the Seychelle Islands (Fransen, 1994). Also known from Indonesia.

Remarks: Only the second pereiopods of the male are preserved, but the species can be readily identified by the presence of five pairs of dorsal telson spines, the only species of the genus with this feature.

***Palaemonella rotumana* (Borradaile, 1898)**

Periclimenes (*Falciger*) *rotumanus* Borradaile, 1898: 383.
Palaemonella vestigialis Kemp, 1922: 123–126, Figures 1–2, pl. 3, figure 2.
Palaemonella rotumana — Bruce, 1970: 276–279, pl. 1 e–f.

Material examined. (1), 12 spms, MAP-060, ST-016, 12°40.264'N 53°27.204'E, SW of Qualansiyah, NW-coast, 5–7m, 8 March 1999, SMF 20202. (2) 1 spm, MAP-061, ST 016, 12°40.264'N 53°27.204'E, SW of Qualansiyah, NW-coast, 5–7 m, 8 March 1999, NHCY. (3) 1 ovig. ♀, MAP-125, ST-063A, 12°38.9'N 53°56.0'E, Qadub, W of Hadibo, N coast, 6–8 m, 18 March 1999, NHCY (4) 1 spm, MAP-136, ST-067, 12°40.429'N 54°11.731'E, Rhyi di Hamri, N coast, 7–9 m, 19 March 1999, NHCY. (5) 2 spms, MAP-137, stn 067, Rhyi di Hamri, E of Hawlaf, 7–8, 19 March 1999, SMF 29203. (6) 6 spms (4 ovig. ♀), MAP-151, ST-092, 12°40.519'N 54°04.170'E, Hawlaf Bay, E. of Hadibo, N coast, 4–5 m, 21 March 1999, SMF 29204. (7) 1 spm, MAP-154, ST-093, 12°40.519'N 54°04.170'E, Hawlaf Bay, E. of Hadibo, N coast, 9–10, 21 March 1999, NHCY. (7A) 1♂, 1 ovig. ♀, MAP-158, ST-095, 12°40.156'N 54°02.850'E, Shanitan, E of Hadibo, N coast, 8 m, 22-3-99, SMF 29205. (8) 1 spm, MAP-226, ST-129, 12°21.280'N 53°32.614'E, Quatanhan Bay, SW-coast, 10–11 m, 31 March 1999, SMF 29206.

Habitats: (1), dead coral; (2), dead *Pocillopora*; (3); *Pocillopora damicornis* (Linnaeus; (5), *Pocillopora* sp.; (6, 7),dead *Acropora*; (8),.*Galaxea astreata* (Lamarck) (Scleractinia).

Regional records: Previously reported from Aden (Bruce, 1971) and the Maldive Islands (Bruce, 1976a).

General distribution: Type locality: Rotuma, Fijian Islands. Very common and widespread throughout the Indo-West Pacific region, from the northern Red Sea and Suez, to the Hawaiian Islands, and now extending into the eastern Mediterranean Sea.

Remarks: Specimens (2) and (8) lacked all pereiopods except the first pair and so cannot be considered as identified with absolute certainty. In all discernible features they corresponded exactly with the other specimens so that there is probably little doubt over their identity. Apparently free-living, but often found in both dead and live corals.

The specimens (6) were smaller, with a particularly acute lateral tooth on the second

pereiopod carpus, in comparison with the other specimens, and the mandibular palp in a dissected specimen consisted of two short subequal segments, unlike the elongated distal segment shown in Holthuis (1952, figure 3A).

Periclimenaeus ? sp.

Material examined: 1♂, 1 ovig.♀, MAP-064, ST-016, 12°40.264'N 53°27.204'E, SW of Qualansiyah, NW-coast, 5–7, 3 March 1999.

Remarks: The two specimens unfortunately lack their second pereiopods but retain some first pereiopods and some ambulatory pereiopods.

The specimens appear closely related to *P. nobilii* and have the rostrum deep, dorsally convex and carinate proximally, slender and up-turned distally, particularly in the female, reaching to the level of the distal border of the proximal antennular segment, with a dentition of 2/0 in the female and 3/0 in the male. The scaphocerite has a small distolateral tooth, not exceeding the anterior margin of the lamella.

The third ambulatory dactyl in the female is also similar to *P. nobilii* in that it lacks a distal accessory tooth, but a small acute proximal tooth is present. The unguis shows a characteristic distodorsal emargination that is not present in the *P. nobilii* holotype. It is exactly the same in both third pereiopods and so is unlikely to be due to accidental damage. The single female fourth pereiopod dactylus is similar but the ungual emargination is less marked.

The collection was noted as associated with *Jocaste lucina* specimens, and coming from a live *Stylophora* sp., presumably from an encrusting tunicate host.

Periclimenaeus nobilii Bruce, 1974

Figure 1 C–D

Periclimenaeus nobilii Bruce, 1974: 1577–1581, Figures. 13f, 14.

Material examined: 1♂, MAP-070, ST-017, 12°39.398'N 53°24.117'E, Ras Asfar, North of Shuab, N of Shuab, NW-coast, 10–11 m, 9 March 1999, NHCY. (2) 1 ♂, MAP-070B, ST-017, 12°39.398'N 53°24.117'E, Ras Asfar, N of Shuab, NW coast, 10–11 m, 9 March 1999, NHCY. (3) 1♂, 1 ovig. ♀, MAP-139, ST-068, 12°41.062'N 54°04.508'E, Hawlaf Bay, E of Hadibo, N coast 12–14 m, 19 March 1999, SMF 29207.

Host: (1), dead coral; (2), no data. Presumably from tunicate host (Ascidiacea)..

Regional records: No previous regional records.

General distribution: Type locality: Red Sea, without precise locality. Also reported only from La Réunion**:** (Bruce, 1983) and New Caledonia (Bruce, 1991).

Remarks: Specimen (1), CL 2.6 mm, lacks the minor second pereiopod. It has a rostral dentition of 2/0, with rostrum depressed, acute, distally up-curved, with the posterior part

strongly carinate and slightly eaved (Figure 1C), reaching to middle of intermediate segment of antennular peduncle.

Specimen (2), CL 6.0 mm, has a similar rostrum. It lacks the major second pereiopod and all ambulatory pereiopods, so cannot be identified with certainty. The minor second pereiopod chela is 1.4 times the CL and has the dactylus about 0.36 of the palm length, subequal to the fixed finger length, with a feebly sinuous denticulate cutting edge, bearing about 60 minute denticles, with the teeth on the distal third distinctly larger than the proximal teeth. The cutting edge of the fixed finger is deeply channelled, a character probably overlooked in the original description. The telson corresponds with the description of *P. nobilii* (see below).

Specimens (3), CLs male 1.9 mm, ovigerous female 2.0 mm, are similar, without second pereiopods and with few ambulatory pereiopods. The male third pereiopod has a particularly long and slender acute basal process on the dactylar corpus (Figure 1D).

The form of rostrum in all specimens closely resembles that of the *P. nobilii* holotype (Bruce, 1974, figure 14d) which has two dorsal teeth, posteriorly strongly carinate, reaching to well beyond the anteroverted cornea, to the distal border of the intermediate antennular peduncular segment, with a convex ventral margin, and in specimen (2), the dactyl of the minor chela also scarcely over-reaches the fixed finger, with a similar dentition.

Periclimenaeus aff. *nobilii* Bruce, 1974

Figure 1E–G

Material examine: 1♀, MAP-070**A**, ST-017, 12°39.398’N 53°24.117’E**,** Ras Asfar, N of Shuab, NW-coast, 10–11 m, 9 March 1999, SMF 29209.

Host: Under stones, dead coral. Presumably from encrusting tunicate (Ascidiacea).

Remarks: The single small specimen, CL 1.5 mm, may be immature or adult of a small species. The rostrum is short, reaching only just beyond eyes, to distal margin of proximal antennular segment, with four acute dorsal teeth only. All pereiopods except the right third pereiopod are missing. The third ambulatory dactylus (Figure 1F) corresponds closely to that of *P. nobilii*, lacking a distal accessory tooth on the corpus but with an acute basal tooth and the propod is armed with a pair of short robust distoventral spines only. The short, four toothed rostrum does not correspond with the *P. nobilii* type specimen, which has only two dorsal teeth, and without the second pereiopods the specimens identity cannot be established with certainty. In *P. nobilii* the third pereiopod propod is about 6.5 times longer than the dactylus as opposed to 4.0 times in the present specimen (Figure 1E), and the dactylar corpus appears stouter (Bruce, 1974). The telson (Figure 1G) differs in that the dorsal spines are more robust, about 0.1 of the telson length, and situated at 0.28 and 0.75 of the telson length, instead of 0.13 of the telson length and at 0.33 and 0.66 of the telson length as in *P. nobilii*.

Periclimenella petitthouarsii (Audouin, 1826)

Palaemon Petitthouarsii Audouin, 1826: 91.
Periclimenes Petitthouarsi — Borradaile, 1898: 381.
Periclimenella petitthouarsi — Duris & Bruce, 1995: 645–656, figures 13–18.

Material examined 7 spms (5 ovig.♀), MAP-151, ST-092, 12°40.519'N 54°04.170'E, Hawlaf Bay, E. of Hadibo, N coast, 4–5 m, 21 March 1999, 4 spms SMF 29210, 3 spms NHCY.

Habitat: Dead *Acropora* (Scleractinia).

Regional records: First reported from Yemen at Perim by Nobili (1906). Numerous records from throughout the Red Sea, Arabian Peninsula and Persian Gulf.

General distribution: Type locality: Egypt. Also known from Kenya, Zanzibar, Tanganyika, Comoro Islands and Madagascar.

Remarks: Generally common in the north western Indian Ocean and associated seas, but replaced in the rest of the Indo-West Pacific region by *Periclimenella spinifera* (De Man, 1902). Overlap of the two species distribution may occur.

Periclimenes imperator Bruce, 1967

Periclimenes imperator Bruce, 1967: 53–62, figures. 23–25.
Periclimenes imperator. — Fransen & Goud, 2000: 273–283, figures 1–4.:

*Material examined***.** 3 juv., MAP-202, ST-119, 12°42.434'N 53°37.605'E , off Madinah, N coast, 17–18 m, 29 March 1999, 2 spms SMF 29213, 1 spm NHCY.

Host: Unidentified holothurian (Holothuria, Echinodermata).

Regional records: Not previously reported in the north western Indian Ocean.

General distribution: Type locality:**:** Chumbe Island, Zanzibar. Found on Indo-West Pacific coral reefs from the northern Red Sea to the Hawaiian Islands in association with nudibranchs and holothurians.

Remarks: Associated with a variety of holothurian genera as adults and also with a variety of nudibranch hosts, often as juveniles. The specimens are morphologically typical of this species. A wide variety of colour patterns exist in life in this species, mainly variations of red and yellow/white, which suggests that a complex of sibling species may exist, one of which may be *Periclimenes rex* Kemp 1922, with separate host associations.

Periclimenes incertus Borradaile, 1915

Periclimenes (Cristiger) incertus Borradaile, 1915: 210.
Periclimenes (Cristiger) incertus — Borradaile, 1917: 364, pl. 53 figure. 7.

Periclimenes (Periclimenes) impar Kemp, 1922: 147–149, figures 16–17, pl. 3 figure 1.
Periclimenes (Periclimenes) incertus — Holthuis, 1959: 193–194.

Material examined. (1) 1 spm, MAP-060, ST-016, 2°40.264'N 53°27.204'E, SW of Qualansiyah, NW-coast, 5–7 m, 8 March 1999, NHCY. (2) 1 ovig. ♀, MAP-060, ST-016, 12°40.264'N 53°27.204'E, 5–6 m, 8 March 1999, SMF 29214.

Habitat: (1), no data; (2),.dead coral.

Regional records: Gold Mohur Bay, Aden (Bruce, 1971). Not known from the Red Sea.

General distribution: Type locality: S. Nilandu Atoll, Maldive Islands. Range extends from Aden to New Caledonia.

Remarks: Specimen (1) in poor condition. Usually associated with sponges. Recorded to a depth of 53 m.

***Periclimenes soror* Nobili, 1904**

Periclimenes soror Nobili, 1904: 232.
Periclimenes (Periclimenes) soror — Holthuis, 1952: 51–53, figure 17.
Periclimenes soror — Bruce, 1978b: 299–306, figures 1–6.

Material examined. 2♂, 3 ovig.♀, MAP-139A, ST-109, 12°37.357'N 54°17.694'E, W of Sagra, N coast, 25–30 m, 25 March 1999, SMF 29216.

Host: Unidentified sea star (MAP-183) (Asteroidea).

Regional records: Jibouti (Nobili, 1904, 1906), Saudi Arabia (Bruce, 1978b).

General distribution: Type locality: Jibouti. Found throughout the Indo-West Pacific region east to Hawaiian Islands, Society Islands, Tuamotu Islands, also extending to Mexico, Panama, and Colombia (Bruce,1978b)..

Remarks: The specimens present no special features. One of the few Indo-West Pacific shrimps to extend east to the American seabord.

***Periclimenoides socotrae* sp. nov.**
Figures 6–9

Diagnosis: Rostrum with 5 dorsal, 1 distoventral tooth, supraorbital teeth or tubercles absent, first abdominal tergite without anterior lobe, scaphocerite normal, with small distolateral tooth not exceeding lamella, first pereiopods with fingers subequal to palm, slender, spatulate, non-denticulate, second pereiopods slightly unequal and similar, chelae smooth, fingers simple, cutting edges finely denticulate, merus ventrally tuberculate, chela with dactyls elongate, fixed finger with cutting edge longitudinally grooved, third pereiopod with unguis short, stout, ventrally laminate, corpus with larger bluntly curved

distal accessory tooth only, propod with three robust distoventral spines only, merus unarmed, uropodal exopod with distolateral tooth and spinule only, telson with normal dorsal spines at about 0.3 and 0.7 of telson length, with 3 pairs of normal posterior spines.

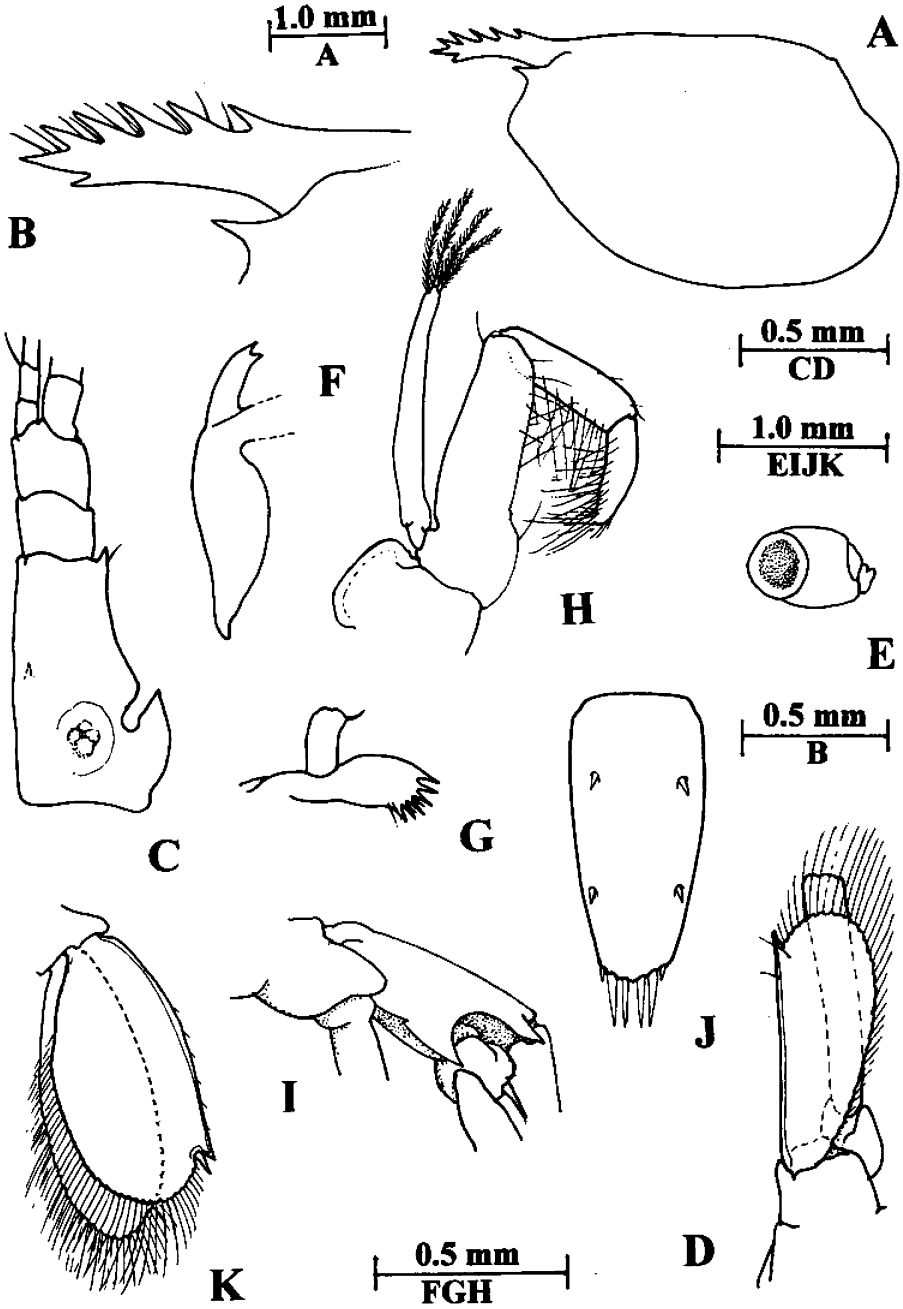

FIGURE 6. *Periclimenoides socotrae* sp. nov. (A), carapace and rostrum. (B), rostrum. (C), antennular peduncle. (D), antennal peduncle. (E), eye. (F), mandible. (G), maxillula, lacking lower lacinia. (H), third maxilliped. (I), fifth and sixth abdominal segments, lateral. (J), telson. (K), uropod. (A–H,J), ovigerous female paratype, (I), ovigerous female holotype.

Material examined. (1) 1 ovig.♀, **holotype**, MAP-060, ST-016, 12°40.264'N 53°27.204'E, SW of Qualansiyah, NW-coast, 5–7 m, 8 March 1999, reg N^{o}. SMF 29114. (2) 1 ovig.♀ , **paratype** (dissected), MAP-137, ST-067, 12°40.429'N 54°11.731'E, Rhyi di Hamri, E of Hawlaf, N coast, 7–9 m, 19 March 1999, reg N^{o}. SMF 29115.

Description: Medium sized pontoniine shrimp of stout subcylindrical body form.

Female. *Carapace*: (Figure 6A) smooth, compressed, without epigastric or hepatic spines, supraorbital spines or tubercles.

Rostrum: (Figure 6B) about 0.4 of carapace length, reaching to about middle of intermediate segment of antennular peduncle, slightly exceeding anteroverted corneal margin, slender, compressed, horizontal, with five slender acute subequal dorsal teeth, with sparse plumose interdental setae, first tooth situated anterior to postorbital notch, without distinct lateral carinae, inferior margin convex, with small acute distal tooth, slightly in advance of first dorsal tooth in holotype, slightly more posteriorly in paratype, non-setose, inferior orbital angle obsolete, antennal spine acute, marginal, anterolateral margin of branchiostegite slightly produced, broadly rounded.

Abdomen: well developed, swollen, first segment without median anterodorsal lobe, sixth segment short, about 0.25 of carapace length, subequal to length of fifth, length subequal to depth, depressed, with acute posterolateral and posteroventral angles (Figure 6I), pleura of first three segments large, broadly rounded, fourth and fifth small, rounded, feebly produced.

Telson: (Figure 6J) about 0.65 of CL, about twice as long as maximal width, near anterior margin, lateral margins feebly convex and posteriorly convergent, with two pairs of small submarginal dorsal spines at about 0.3 and 0.7 of length, anterior pair stouter than posterior pair, about 0.05 of telson length, posterior spines smaller, posterior margin (Figure 8I) broadly convex, without median point, about 0.5 of maximal width, with three pairs of spines, lateral spines small, about 0.3 of intermediate spine length, intermediate spines robust, about 0.22 of telson length, submedian spines slightly shorter and more slender than intermediate spines, sparsely setulose.

Antennule: (Figure 6C) with peduncle short, well exceeding carpocerite and rostrum, proximal segment about two times longer than greatest width, lateral margin feebly concave, bluntly angular proximally, tapering slightly distally, with small acute distolateral tooth, ventromedial margin with small acute tooth at 0.5 of length, stylocerite short, acute, reaching to about 0.4 of segment length, statocyst normal, with small granular statolith; intermediate and distal segments short, robust, subequal, together about 0.6 of proximal segment length; flagella short, upper flagellum biramous, proximal four segments of rami fused, stout, subequal to length of distal peduncular segments, short ramus single segmented, with about eight groups of aesthetascs extending along whole length of short fused ramus, longer ramus with five plus segments, lower flagellum simple, with about 12 slender subcylindrical segments, subequal to CL.

Antenna (Figure 6D)) short, with carpocerite reaching to distal margin of intermediate

segment of antennular peduncle; basicerite normal, unarmed, antennal gland aperture not discernible,; carpocerite subcylindrical, 5.5 times longer than distal width, distinctly exceeding scaphocerite; flagellum short, reaching to about posterior carapace margin. *Scaphocerite*: normal, distinctly shorter than carpocerite, about 2.6 times longer than wide, maximal width distally at about level of distolateral tooth, broadening distally, lamella distally broadly rounded, lateral margin straight with short stout acute tooth distally, falling distinctly short of distal margin of lamella.

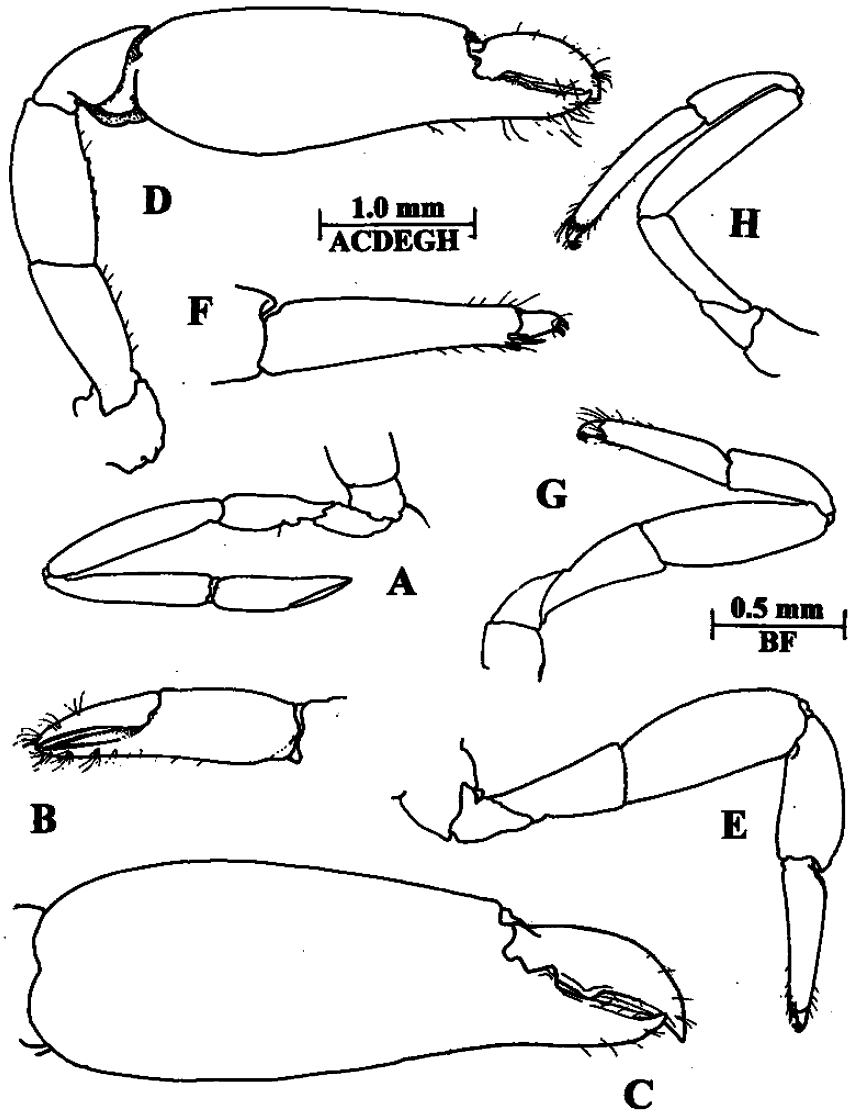

FIGURE 7. *Periclimenoides socotrae* sp. nov. (A), first pereiopod. (B), same, chela. (C), major second pereiopod, chela, holotype. (D), minor second pereiopod. (E), third pereiopod. (F), same, propod and dactyl. (G), fourth pereiopod. (H), fifth pereiopod. (AB-D-J), ovigerous female paratype, (C), ovigerous female holotype.

Eye (Figure 6E)) with cornea hemispherical, well pigmented, oblique, diameter about 0.18 of CL, without accessory pigment spot, stalk subcylindrical, swollen, medially flattened, about 1.2 times longer than wide.

Mouthparts: closely similar to *Periclimenoides odontodactylus* (Fujino & Miyake, 1968). *Mandible*: right, (Figure 6F) with incisor process (Figure 8A) slender, with 2 small acute teeth distally, proximal tooth smaller and less acute than distal, molar process lost in dissection; without palp. *Maxillula*: (Figure 6G) with short feebly bilobed palp (Figure 8C), lower lobe with single slender simple seta; upper lacinia broad (Figure 8C) as long as wide, distally convex with five acute non articulated teeth (Figure 8D) and sparse simple setae.

Third maxilliped: (Figure 6H) reaching to about distal border of scaphocerite, ischiomerus and basis completely fused; with small arthrobranch.

Thoracic sternites: narrow, unarmed, broadening posteriorly.

First pereiopod: (Figure 7A) normal, neither long nor short, slender, exceeding proximal segment of antennular peduncle by carpus and chela; *chela* (Figure 7B) with palm about 1.9 times longer than deep, compressed, dorsal margin feebly convex, ventral border straight, sparsely setose, fingers slender, feebly spatulate, with several groups of short setae, dactylus about 0.7 of palm length, straight, 4.0 times longer than basal width, tapering strongly to slightly dilated tip with single small acute hooked tip (Figure 8E), cutting edges straight, sharp, entire, fixed finger similar to dactylus, two times longer than basal width, cutting edge sharp, entire, tip with small hooked tooth; *carpus* 1.25 times chela length, about 6.0 times longer than central width, tapering proximally; *merus* moderately slender, 6.0 times longer than central width, situated at 0.5 of length, tapering distally and proximally, about 1.1 times carpus length, unarmed; *ischium* short, 0.45 of merus length, robust, unarmed; *basis* and *coxa* short, stout, without special features, coxa without ventral process.

Second pereiopods: slightly unequal in length and similar in shape (Figure 7D) well developed, both present in holotype, one only in paratype female. *Major pereiopod*: (holotype) chela (Figure 7C) about 1.28 times CL, 1.15 times minor chela length, palm about twice as long as deep, slightly compressed, tapering distally, smooth, glabrous, fingers with cutting edges finely denticulate, dactylus about 0.4 of palm length, about three times longer than deep, compressed, distally acute, with tip extending well beyond fixed finger, with low acute tooth at about half length, fixed finger grooved, without molar process and fossa, with proximal tooth. *Minor (?) pereiopod:* (female paratype) (Figure 7D) smaller, about 1.2 of CL, *chela* with palm glabrous, subcylindrical, slightly compressed, 2.5 times longer than deep, slightly swollen proximally, fingers (Figure 7F, 5A) about 0.38 of palm length, dactylus (Figure 7G) compressed, distinctly overreaching fixed finger, three times longer than deep, dorsal margin moderately convex, with feebly blunt tip, cutting edge concave, finely denticulate, with about 25 low subacute denticles (damaged in dissection), decreasing in size proximally, with fixed finger about two times

longer than basal width, with subacute feebly hooked tip, cutting edge with distal half finely denticulate as on dactylus, proximal half grooved, lateral ridge with long low tubercle (Figure 9C) bearing numerous minute acute conical denticles, medial ridge (Figure 9B) similar, with more acute tuberculate tooth; *carpus* articulating preterminally with propod, about 0.4 of palm length, 1.5 times longer than distal width, tapering strongly proximally, distally excavate, unarmed; *merus* about 0.5 of palm length, two times longer than central width, tapering slightly distally, ventral margin with five small acute tubercles; *ischium* subequal to meral length, 2.6 times longer than distal width, tapering strongly proximally, unarmed; *basis* and *coxa* robust, without special features.

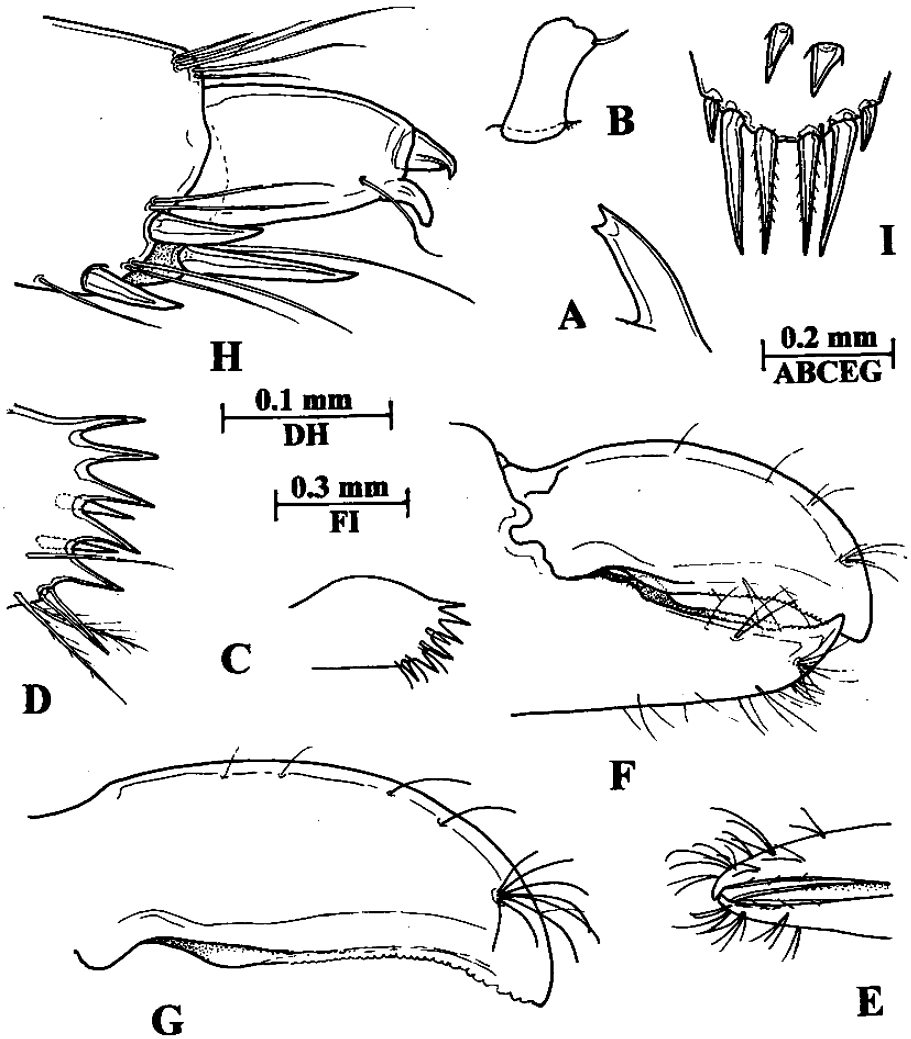

FIGURE 8. *Periclimenoides socotrae* sp. nov., paratype. (A), mandible, incisor process. (B), maxillula, palp. (C), same, upper lacinia. (D), same, cutting edge. (E), first pereiopod, tips of fingers. (F), minor second pereiopod, fingers. (G), same, dactylus. (H), third pereiopod, distal propod and dactylus, medial aspect. (I), telson, posterior spines: inset above, dorsal spines, anterior spine, right; posterior spine, left.

Third pereiopod: (Figure 7E) exceeding basicerite by carpus, propod and dactyl; *dactylus* (Figure 8H) about 0.2 of propod length, with unguis distinctly demarcated, short, stout, subconical with ventomedial laminar flange, with minute strongly hooked styliform tip, about 0.2 of corpus length, about as long as basal width; about 1.5 times longer than deep, corpus strongly compressed, dorsal border feebly convex, ventral margin with stout blunt curved tooth distally, otherwise unarmed, sharp ventrally, with single distolateral sensory seta only; *propod* (Figure 7F) about 0.4 of CL, compressed, sparsely setose, 5.0 times dactylus length, 3.6 times longer than maximal width, situated at 0.25 of length, tapering distally, distal width about 0.6 of maximal width, ventral border straight, with stout lateral, ventral and medial distoventral spines, distomedial spine twice length of other spines, about 0.8 of corpus length, ventral border straight, unarmed; *carpus* 0.95 of propod length, swollen, 2.3 times longer than maximal width, tapering proximally, unarmed; *merus* robust, about 1.2 times propod length, 2.3 times longer than central width, compressed, tapering proximally and distally, unarmed; *ischium* equal to 0.9 of propod length, 2.1 times longer than distal width, tapering proximally; *basis* and *coxa* robust, without special features.

Fourth pereiopod (Figure 7G) generally similar to third, more slender, dactylus (Figure 9D) , about 0.9 of third propod length, 4.0 times longer than wide, propod with three similar distoventral spines, carpus about 0.75 of third carpus length, more slender, 2.7 times longer than wide, merus 0.9 of third merus length, 3.2 times longer than wide, propod (Figurer 3J) about 0.37 of carapace length.

Fifth pereiopod (Figure 7H) more slender, dactylus (Figure 9E) similar to third pereiopod, propod about 0.45 of carapace length, 1.1.times third pereiopod propod length, subuniform, 5.7 times longer than wide, ventral margin with numerous slender spiniform setae distally, without spines.

Uropod (Figure 6K) with protopod unarmed posterolaterally; *exopod* broad, about 1.9 times longer than wide, lateral margin convex, sparsely setose, unarmed, with small acute distolateral tooth, with larger mobile spine medially, not reaching level of distal border of exopod, without distinct diaeresis; *endopod* 1.1 times exopod length, 2.6 times longer than broad, slightly exceeding endopod.

Ova: moderately numerous, about 40 (paratype), 60 (holotype), small.

Measurements (mm): Female holotype: total body length (approx.) 16.0; carapace length 3.5; carapace and rostrum 5.8; second pereiopod, major chela, 4.5; minor chela, 3.9; length of ovum, 0.55. Paratype: CL 2.5.

Host and colouration: Unknown.

Systematic Position: *Periclimenoides socotrae* is closely related to the only other species of the genus, *P. odontodactylus* (Fujino & Miyake, 1968; *cf*. Bruce, 1990) and does not require any major modification to the generic definition other than that the rostrum may have a ventral tooth and the ambulatory dactylus may be simple or biunguiculate. The unusual bidentate incisor process is confirmed as a generic character.

Periclimenoides socotrae may be distinguished from *P. odontodactylus* by the following features:

	P. socotrae sp. nov.	*P. odontodactylus* (Fujino & Miyake)
1	Rostrum with five dorsal teeth	Rostrum with 6-8 dorsal teeth
2	Rostrum with acute ventral tooth	Rostrum without ventral tooth
3	Antennule with small distolateral tooth, not nearly reaching distal margin of intermediate segment	Antennule with large distolateral tooth, nearly reaching to distal margin of intermediate segment
4	Distolateral tooth of scaphocerite small, not reaching anterior margin of lamella	Distolateral tooth of scaphocerite larger, reaching anterior margin of lamella
5	Carpocerite clearly exceeding scaphocerite	Carpocerite not exceeding scaphocerite
6	Upper lacinia of maxillula with few fixed teeth distally; palp feebly bilobed	Upper lacinia of maxillula with numerous slender articulated spinules distally; palp strongly bilobed
7	First pereiopod chela with fingers slender, feebly spatulate; dactylus laterally simple; carpus subequal to chela length	First pereiopod chela with fingers broader, laterally expanded; dactylus laterally pectinate; carpus distinctly longer than chela
8	Second pereiopods with cutting edges of finger each with finely denticulate tubercle proximally	Second pereiopods with cutting edge of fixed fingers without denticulate tubercles
9	Ambulatory dactyls biunguiculate, unguis with ventral lamina; propods distoventrally spinulate only, spines large	Ambulatory dactyls simple, unguis without ventral lamina; propods with ventral spines, distoventral spines small
10	Dorsal telson spines smaller, not all on anterior of half of telson	Dorsal telson spines larger, all on anterior half of telson

Remarks: The second pereiopods were left attached to the holotype and not removed for examination. The delicate denticulate cutting edges of the fingers of the paratype were damaged in the course of examination and the rigid dactyls of the holotype indicated that further examination would result in extensive damage to the specimen.

The type specimen of *Periclimenoides odontodactylus* was found in association with the sponge *Ircinia fasciculatas* (Pallas) (Fujino & Miyake, 1968). The present species probably has a similar association.

Periclimenoides odontodactylus, type locality Ushibuka, Amakusa Island, Kyushu, Japan, is also known from Hong Kong (Bruce, 1990), Philippine Islands (Chace & Bruce, 1993), Western Australia and Queensland (Bruce, 1981a, 1983a), to depths of 38 m, and has not as yet been found in the western Indian Ocean.

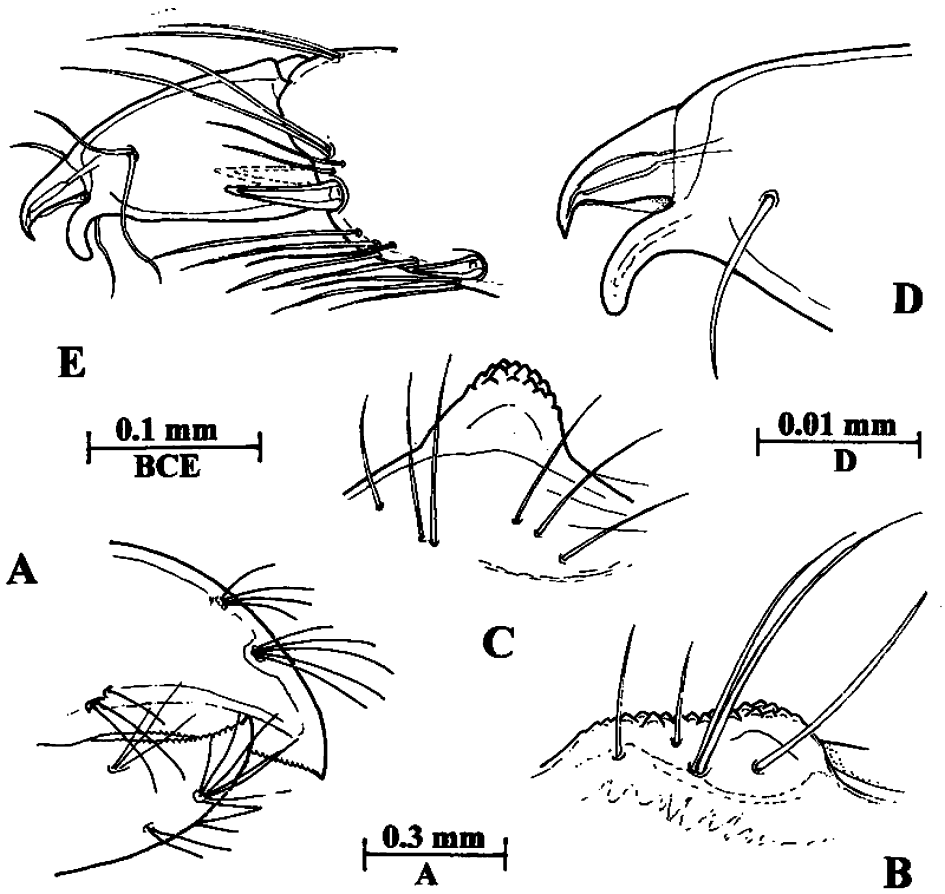

FIGURE 9. *Periclimenoides socotrae* sp. nov., paratype. (A), minor second pereiopod, tips of fingers. (B), same, proximal cutting edge of fixed finger, medial ridge. (C), same, lateral ridge. (D), fourth pereiopod, distal dactylus. (E), fifth pereiopod, distal propod and dactylus.

Discussion

The first pontoniine shrimp to be reported from the north-west Indian Ocean region was recorded by Henri Coutière (1898), who reported *Periclimenes brevicarpalis* (as *Bithynis* sp.) from Jibuti. These specimens were subsequently described as *Palaemonella aberrans* by Nobili (1904), which was later recognised as a synonym of *P. brevicarpalis* (Schenkel) by Kemp (1922). Forsskål (1775) had earlier reported a shrimp from Yemeni coasts, from Loheia, but this lies in the southern Red Sea. Nobili (1904) also reported from Jibuti *Periclimenes soror, Periclimenaeus hecate* (as *Coralliocaris hecate*), *P. rhodope* (as *Coralliocaris rhodope*), *P. bouvieri* (*as Typton bouvieri*), and *Onycocaris aualitica* (as *Coralliocaris (Onycocaris) aualitica*), from specimens also collected by Coutière. Nobili (1906) reported further additionalpontoniine shrimps from the same region, including

Periclimenella petitthouarsi (as *Periclimenes*), *Periclimenes ensifrons* (a dubious species), *Coralliocaris superba*, *Jocaste lucina* (as *Coralliocaris*), *Harpiliopsis beaupressii* (as *Harpilius*), *Anchistus custos* (as *Pontonia pinnae*) and *Conchodytes meleagrinae*. No further reports occurred until Kemp (1922) reported *Harpiliopsis beaupressii* from Aden. Balss (1925) reported *Periclimenes laccadivensis* from off Somalia, at 628–823 m. In 1939, Calman described *Periclimenaeus arabicus* (as *Periclimenes (Periclimenaeus) arabicus*), *Periclimenaeus crassipes* (as *Periclimenes (Periclimenaeus) crassipes*) and *Pontonia anachoreta* from off the Omani coast and the Gulf of Aden.

More recently, the International Indian Ocean Expedition, 1964, based on the R.V. *Anton Bruun*, provided further information with reports of *Palaemonella rotumana, Periclimenella petitthouarsi, Kemponia elegans, K. grandis* (as *Periclimenes elegans* and *P. grandis), Periclimenes incertus* and *P. diversipes* from Aden and *Periclimenes lanipes* and *P. latipollex* from off Somalia (Bruce, 1971). Later, from the same expedition material, the following species from off Somalia were added (Bruce,1978): *Thaumastocaris streptopus, Periclimenaeus rhodope, P. minutus, P. spinimanus*, with *Harpiliopsis depressa* and *Jocaste lucina* from Aden. Holthuis (1986) reported on a small collection of shrimps from Oman, including *Neoanchistus nasalis*, together with *Conchodytes meleagrinae* and *Jocaste lucina*. Most recently, Bruce (1997) reported *Yemenicaris trullicauda* from Yemen, with also *Coralliocaris viridis* and *Periclimenes obscurus*. These reports recorded together the presence of 32 pontoniine species in the North West Indian Ocean. The present report increases this total to 44 species. The general distribution of these shrimps is outlined in Table 1.

Acknowledgements

The material was collected in the framework of the GEF-funded project Conservation and Sustainable Use of Biodiversity of Socotra Archipelago executed by the United Nations Office for Project Services (UNOPS YEM/96/G32) in conjunction with the Environmental Protection Council (EPC) of Yemen. Thanks are due to Dr Michael Apel from the Senckenberg Research Institute in Frankfurt along with his team members for collecting the material. The staff of the Project Implementation Unit (PIU), especially Mrs Catherine Cheung and Dr Edoardo Zandri, and the representatives of EPC are thanked for their assistance and support of the team during its field work. The assistance of Dr Michael Apel and Andreas Allspach is also much appreciated. The study of these shrimps was carried out with the support of the Australian Biological Resources Study.

TABLE 1. Pontoniine shrimps from North-west Indian Ocean: Djibuti, Somalia, Yemen (Incl. Socotra), and Oman.

Species	Jibouti	Somalia	Yemen	Oman
Anchistus custos (Forsskal, 1775)	*			
Conchodytes meleagrinas Peters 1852			#	*
Coralliocaris superba (Dana, 1852)	*		#	
Coralliocaris viridis Bruce, 1974			*	
Coralliocaris sp.			#	
Harpiliopsis beaupressii (Audouin, 1826)	*		*	
Harpiliopsis depressa (Stimpson, 1860)			*	
Harpiliopsis spinigera (Ortmann, 1890)			#	
Jocaste japonica (Ortmann, 1890)			#	
Kemponia elegans (Paulson, 1875)			*	
Kemponia grandis (Stimpson, 1860)	*		#	
Kemponia longirostris (Borradaile, 1915)			#	
Jocaste lucina (Nobili, 1901)			*	*
Neoanchistus nasalis Holthuis, 1986				*
Onycocaris aualitica (Nobili, 1904)			*	
Palaemonella rotumana (Borradaile, 1898)			*	
Palaemonella tenuipes Dana, 1852				*
Periclimenaeus arabicus (Calman, 1939)	*			*
Periclimenaeus bouvieri (Nobili, 1904)	*	*		
Periclimenaeus djiboutensis Bruce, 1970	*			
Periclimenaeus hecate (Nobili, 1904)	*			
Periclimenaeus minutus Holthuis, 1952		*		
Periclimenaeus nobilii Bruce, 1974	*		#	
Periclimenaeus rhodope (Nobile, 1904)	*	*		
Periclimenaeus spinimanus Bruce, 1978	*			
Periclimenaeus sp.			*	
Periclimenella pettitthouarsii (Audouin, 1826)			*	
Periclimenes brevicarpalis (Schenkel, 1902)	*		*	
Periclimenes diversipes Kemp, 1922			*	
Periclimenes imperator Bruce, 1967			#	
Periclimenes incertus Borradaile, 1915			#	
Periclimenes laccadivensis (Alc. & And., 1894)	*	*		
Periclimenes lanipes Kemp, 1922		*		
Periclimenes latipollex Kemp, 1922	*	*		

(To be continued)

TABLE 1 (continued)

Periclimenes obscurus Kemp, 1922	*		*		
Periclimenes soror Nobili, 1904	*		#		
Periclimenoides socotrae **sp. nov.**			#		
Philarius gerlachei (Nobili, 1905)				*	
Pontonia anachoreta Kemp, 1922			*		
Pontonia sibogae Bruce, 1972			#		
Pontonia stylirostris Holthuis, 1952				*	
Pontonia carinicula **sp. nov**.			#		
Thaumastocaris streptopus Kemp, 1922	*	*			
Yemenicaris trullicauda Bruce, 1997			*		

* Previous reports; # This report (Socotra).

References

Audouin, V. (1826) Éxplication sommaire des planches de Crustacés de l'Égypte et de la Syrie, publiées par Jules-César Savigny, membre de l'Institute, offrant un exposé des caractères naturelles des genres avec la distinction des espèces. Description de l'Égypte ou receuil des observations et des recherches qui on été faites en Égypte pendant l'expédition de l'armée francaise. Histoire Naturelle, 1, 77–98.

Balss, H. (1915) Die Decapoden des Roten Meeres. I. Die Macruren. Expeditionen S.M. Schiff, "Pola" in das Rote Meer. Nördliche und südliche Hälfte 1895/96–1897/98. Zoologische Ergebnisse XXX. Berichte der Kommission für ozeanographische Forschungen. *Denkschriften der Akademie der Wissenschaften, Wien*, 91 suppl., 1–38.

Balss, H. (1925) Macrura der Deutschen Tiefsee-Expedition. 2. Natantia. Teil A. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia"; 1898–1899*, 20, 217–315.

Borradaile, L.A. (1898) A revision of the Pontoniidae. *Annals and Magazine of Natural History*, 2, 376–391.

Borradaile, L.A. (1899) On some Crustaceans from the South Pacific. Part III. Macrura. *Proceedings of the Zoological Society of London*, 1898, 1000–1015.

Borradaile, L.A. (1915) Notes on Carides. *Annals and Magazine of Natural History*, 15, 205–213.

Borradaile, L.A. (1917) On the Pontoniinae. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr J. Stanley Gardiner. *Transactions of the Linnean Society of London, Zoology*, 17, 323–396.

Bruce, A.J. (1967) Notes on some Indo-Pacific Pontoniinae, III–IX. Descriptions of some new genera and species from the western Indian Ocean and South China Sea. *Zoologische Mededelingen, Leiden*, 87, 1–73.

Bruce, A.J. (1969) Observations upon the host-specificity and distribution of *Jocaste japonica* (Ortmann) and *Jocaste lucina* (Nobili) (Decapoda Natantia, Pontoniinae). *Crustaceana*, 17, 298–302.

Bruce, A.J. (1970) Observations on the Indo-West Pacific species of the genus *Palaemonella* Dana, 1852 (Decapoda, Pontoniinae). *Crustaceana*, 19, 273–287.

Bruce, A.J. (1971) Pontoniinid shrimps from the Ninth Cruise of the R/V Anton Bruun, IIOE, 1964:

I. *Palaemonella* Dana and *Periclimenes* Costa. *Smithsonian Contributions to Zoology*, 82, 1–13.

Bruce, A.J. (1972) Notes on some Indo-Pacific Pontoniinae, XX. *Pontonia sibogae* sp. nov., a new species of *Pontonia* from eastern Australia and Indonesia (Decapoda, Natantia, Palaemonidae). *Crustaceana*, 23, 182–186.

Bruce, A.J. (1973) The pontoniinid shrimps collected by the Yale-Seychelles Expedition, 1957–58 (Decapoda, Palaemonidae). *Crustaceana*, 24, 132–142.

Bruce, A.J. (1974) Observations upon some specimens of the genus *Periclimenaeus* Borradaile (Decapoda Natantia, Pontoniinae) originally described by G. Nobili. *Bulletin du Muséum National díHistoire Naturelle, Paris*.(3), no. 258, Zool., 180, 1557–1583 (1975).

Bruce, A.J. (1974a) *Coralliocaris viridis* sp. nov., a preliminary note (Decapoda Natantia, Pontoniinae). *Crustaceana*, 26 (2): 222–224.

Bruce, A.J. (1976) A report on a small Collection of Shrimps from the Kenya National Marine Parks at Malindi, with Notes on Selected Species. *Zoologischen Verhandlingen, Leiden*, 145, 1–72.

Bruce, A.J. (1976a) A report on a small Collection of Pontoniine Shrimps from the Northern Indian Ocean. *Journal of the Marine Biological Association of India*, 16, 1974, 437–545.

Bruce, A.J. (1976b) A synopsis of the Pontoniinid Shrimp Fauna of Central East Africa. *Journal of the Marine Biologiacal Association of India*, 16, 1974, 462–490.

Bruce, A.J.1978. Pontoniinid shrimps from the Ninth Cruise of the R/V *Anton Bruun*; I.I.O.E. 1964, II. The remaining genera. *Bulletin of Marine Science*, 28, 118–136.

Bruce, A.J. (1978a) A report on a collection of pontoniine shrimps from Madagascar and adjacent seas. *Zoological Journal of the Linnean Society*, 62, 205–290.

Bruce, A.J. (1978b) *Periclimenes soror* Nobili, a pontoniin shrimp new to the American fauna, with observations on its Indo-West Pacific distribution. *Tethys*, 8, 1976, 299–306.

Bruce, A.J. (1981) Decapod Crustacea: Pontoniinae. *In*: Résultats des campagnes MUSORSTOM. I. Phillippines (18–29 mars 1976), 1 (8), *Mémoires ORSTOM*, 91, 189–215.

Bruce, A.J. (1981a) Pontoniine shrimps of Heron Island. *Atoll Research Bulletin*, 245, 1–33.

Bruce, A.J. (1983) A note on the pontoniine shrimp fauna of La Réunion. *Bulletin of Marine Science*, 33, 165–166.

Bruce, A.J. (1983a) The pontoniine shrimp fauna of Australia. *Australian Museum Memoir*, 18, 195–218 (1982).

Bruce, A.J. (1990) Additions to the marine shrimp fauna of Hong Kong. *In*: Morton, B. (ed.), Proceedings of the Second International Marine Biological Workshop: The Marine flora and fauna of Hong Kong and Southern China, Hong Kong, 1986: 611–648.

Bruce, A.J. (1991) Crustacea Decapoda: Further deep-sea Palaemonoid shrimps from New Caledonian waters. *In*: A. Crosnier (ed.), Résultats des campagnes MUSORSTOM, 9, *Mémoires du Muséum National díHistoire Naturelle*, (A), 152, 299–411.

Bruce, A.J. (1997) A new pontoniine shrimp from the Yemen, with a note on other species. *Journal of Natural History*, 31, 1213–1222.

Bruce, A.J. (2004) A partial revision of the genus *Periclimenes* Costa, 1884 (Crustacea: Decapoda: Palaemonidae). Zootaxa, 582: 1–26.

Calman, W.T. (1939) Crustacea : Caridea. *Scientific Reports of the John Murray Expedition*, 6, 183–224.

Chace, F.A., Jr., & Bruce, A.J. (1993) The Caridean Shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition 1907–1910, Part 6: Superfamily Palaemonoidea. *Smithsonian Contributions to Zoology*, 543, i–vii, 1–252.

Coutière, H. (1898) Notes sur la faune des récifs madreporiques de Djibouti. *Bulletin du Muséum d'Histoire Naturelle, Paris*, 4: 195–198.

Dana, J.D. (1852) Conspectus Crustaceorum quae in Orbis Terrarum circumnavigatione, Carolo

Wilkes e Classe Reipublicae Foederatae e Duce, lexit et descripsit. *Proceedings of the Academy of Natural Sciences, Philadelphia,* 1852: 10–28.

Duris, Z., & Bruce, A.J. (1995) A revision of the `petitthouarsii' species group of the genus *Periclimenes* Costa, 1844 (Crustacea: Decapoda: Palaemonidae). *Journal of Natural History,* 29, 610–671.

Forsskål, P. (1775) *Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium; quae in Itinere Orientali Observavit*, pp 19, i– xxxii, 1–164 pages. Haunia: Heineck et Faber.

Fransen, C.H.J.M. (1994) Marine palaemonid shrimps of the Netherlands Seychelles Expedition 1992–1993. *Zoologischen Verhandlingen, Leiden,* 297, 85–152.

Fransen, C.H.J.M. (2002) Taxonomy, phylogeny, historical biogeography, and historical ecology of the genus *Pontonia* Latreille (Crustacea: Decapoda: Caridea: Palaemonidae). *Zoologische Verhandelingen., Leiden,* 336, :3–433.

Fransen, C.H.J.M. & Goud, J. (2000) *Chromodoris magnifica* (Quoy & Gaimard, 1832) a new nudibranch host for the shrimp *Periclimenes imperator* Bruce, 1967 (Pontoniinae). *Zoologische Mededelingen., Leiden,* 73, 273–283.

Fujino, T., & Miyake, S. (1968) Descriptions of two new species of pontoniid shrimps (Crustacea, Decapoda, Palaemonidae) commensal with sponges. *OHMU, Occasional Papers of the Zoological laboratory, Faculty of Agriculture, Kyushu University,* 1, 85–96.

Garth, J.S. (1976) Decapod crustaceans inhabiting reef-building corals of Ceylon and the Maldive Islands. *Journal of the Marine Biological Association of India,* 15, 195–212.

Holthuis, L.B. (1951) A general Revision of the Palaemonidae (Crustacea Decapoda Natantia) of the Americas. II. The Subfamilies Euryrhynchinae and Pontoniinae. *Allan Hancock Foundation Publication, Occasional Paper,* 11, 1–332.

Holthuis, L.B. (1952) The Decapoda of the Siboga Expedition. Part XI. The Palaemonidae collected by the Siboga and Snellius Expeditions with remarks on other species. II. Subfamily Pontoniinae. *Siboga Expedition Monograph,* 39a [10], 1–252.

Holthuis, L.B. (1958) Contributions to the Knowledge of the Red Sea, 8. Crustacea Decapoda from the northern Red Sea (Gulf of Aqaba and Sinai Peninsula). 1. Macrura. *Bulletin of the Sea Fisheries Research Station, Israel,* 17, 1–40.

Holthuis, L.B. (1959) Results of the re-examination of the type specimens of some species belonging to the subfamilies Pontoniinae and Palaemoniinae (Crustacea Decapoda Macrura). *Zoologische Mededelingen, Leiden,* 36, 193–200.

Holthuis, L.B. (1986) Some Pontoniinae (Crustacea: Decapoda: Palaemonidae) from Southern Oman. *Zoologische Verhandelingen, Leiden,* 60, 263–272.

Kemp, S. (1922) Notes on Crustacea Decapoda in the Indian Museum. XV. Pontoniinae. *Records of the Indian Museum,* 24, 113–288.

Li, Xinzheng, (2000) *Catalog of the Genera and Species of Pontoniinae Kingsley, 1878*. Xueyuan Press, Beijing, pp. 319.

Man, J.G. de. (1902) Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. In: Kükenthal, W. Ergebnisse einer zoologischen Forschungsreise in den Molukken und Borneo. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft*, 25, 467–929.

Miers, E.J. (1884) Crustacea. *Report of the Zoological Collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. "Alert"* 1881–2. 178–322, 513–575.

Miyake, S. & Fujino, T. (1968) Pontoniinid shrimps from the Palau Islands (Crustacea, Decapoda, Palaemonidae). *Journal of the Faculty of Agriculture, Kyushu Imperial University,* 10, 339–431.

Nobili, G. (1901) Decapodi e Stomatopodi Eritrei del Museo Zoologico dell'Universita di Napoli. *Annuario del Museo Zoologico della R. Universita di Napoli*, 1, 1–20.

Nobili, G. (1904) Diagnoses préliminaires de vingt-huit espèces nouvelles de Stomatopodes et Décapodes Macroures de la Mer Rouge. *Bulletin du Muséum d'Histoire Naturelle, Paris*, 10, 228–238.

Nobili, G. (1906) Faune carcinologique de la Mer Rouge. Décapodes et Stomatopodes. *Annales des Sciences Naturelles (Zoologie)*, 4, 1–347.

Ortmann, A. (1890) Die Unterordnung Natantia Boas. Die Dekapoden Krebse des Strassburger Museums, mit besonderer Berucksichtigung der von Herrn Dr. Döderlein bei Japan und bei der Liu-Kiu-Inseln gesammelten und z.Z. in Strassburger Museum aufbewahrten Formen. I. Theil. *Zoologischer Jahrbücher Abteilung für Systematik, Geographie und Biologie der Thiere*, 5, 437–542.

Patton, W.K. (1966) Decapod crustacea commensal with Queensland branching corals. *Crustaceana*, 10, 271–295.

Paulson, O. (1875) *Investigations on the Crustacea of the Red Sea* w*ith notes on Crustacea of adjacent seas. Part 1. Podophthalmata and Edriophthalmata (Cumacea),* pp. i–xiv, 1–144. Kiev.

Peters, W. (1852) *Conchodytes*, eine neue in Muscheln lebende Gattung von Garneelen. *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der K. Preuss. Akademie der Wissenschaften zu Berlin*, 1852, 588–595.

Simões, N., Apel, A. & Jones, D.A. (2001) Intertidal habitats and decapod faunal assemblages (Crustacea: Decapoda) of Socotra Island, Republic of Yemen. *Hydrobiologia*, 449, 81–97.

Stimpson, W. (1860) Prodromus descriptionis animalium evertebratorum quae in Expeditione ad Oceanum Pacificum Septemtrionalem a Republica Federato missa, C. Ringgold et J. Rodgers Ducibus, Observavit et descripsit. *Proceedings of the Academy of Natural Sciences of Philadelphia.* 1860, 22–48.

Addendum

Dactylonia medipacifica (Edmondson) has recently been transferred to the genus *Cainonia* Bruce, 2005.

Bruce, A.J. (2005) Pontoniine shrimps from Papua New Guinea, with the designation of two new genera, *Cainonia* and *Colemonia* (Crustacea: Decapoda: Palaemonidae). *Memoirs of the Queensland Museum*, 51, 333–383.

