

Baba, 1989
CRUSTACEA LIBRARY
SMITHSONIAN INSTITUTION
RETURN TO W-119

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., 11, 1989,
section A, n° 4 : 921-975.

**Chirostylid and Galatheid Crustaceans of Madagascar
(Decapoda, Anomura)**

by Keiji BABA

Chirostylid and Galatheid Crustaceans of Madagascar (Decapoda, Anomura)

by Keiji BABA

Abstract. — The chirostylid and galatheid crustaceans from Madagascar and vicinity in the collection of the Muséum national d'Histoire naturelle, Paris, comprise 37 species (16 of Chirostylidae and 21 of Galatheidae) including nine new species : *Eumunida bispinata*, *E. similior*, *Uroptychus brevipes*, *U. crassior*, *U. crosnieri*, *U. longiocularis*, *Galathea anepipoda*, *G. robusta*, and *Munida remota*. Seventeen species are recorded for the first time from the western Indian Ocean. Twenty-four of the 38 Madagascar species occur in the Western Pacific. The chirostylid *Uroptychus granulatus* Benedict, 1902, previously known from only the Galapagos Islands, is recorded from Madagascar. The galatheids *Sadayoshia miyakei* Baba, 1969, and *S. acroporae* Baba, 1972, are synonymized with *S. edwardsii* (Miers, 1884) and *Liogalathea imperialis* (Miyake and Baba, 1967), is synonymized with *L. laevirostris* (Balss, 1913). A key to families, genera and species of the Madagascar chirostylids and galatheids is provided.

Résumé. — L'étude des Chirostylidae et des Galatheidae récoltés à Madagascar et dans les îles avoisinantes, conservés au Muséum national d'Histoire naturelle, a permis d'identifier 37 espèces (16 appartenant aux Chirostylidae et 21 aux Galatheidae). Neuf de ces espèces sont nouvelles pour la science : *Eumunida bispinata*, *E. similior*, *Uroptychus brevipes*, *U. crassior*, *U. crosnieri*, *U. longiocularis*, *Galathea anepipoda*, *G. robusta* et *Munida remota*. Dix-sept espèces sont signalées pour la première fois de l'océan Indien occidental. Vingt-quatre des 38 espèces trouvées à Madagascar vivent également dans l'Ouest-Pacifique. Le chirostylide *Uroptychus granulatus* Benedict, 1902, connu jusqu'à présent uniquement des Galapagos, est signalé à Madagascar. Les galathéides *Sadayoshia miyakei* Baba, 1969, et *S. acroporae* Baba, 1972, sont mises en synonymie avec *S. edwardsii* (Miers, 1884); de même *Liogalathea imperialis* (Miyake et Baba, 1967) est considérée comme étant un synonyme de *L. laevirostris* (Balss, 1913). Une clé d'identification des familles, genres et espèces, présents à Madagascar, est proposée.

K. BABA, Biological Laboratory, Faculty of Education, Kumamoto University, Kumamoto, 860 Japan.

The present material made available for study through Dr. Alain CROSNIER is largely a part of the collection made during 1971-1975 by him, mostly on board the RV "Vauban" of the ORSTOM, then at Nosy Be, Madagascar. Also included are several lots of shallow water galatheids that were obtained by Dr. Raphael PLANTE on the coast of Madagascar. A few more specimens taken in the vicinity of Madagascar (Aldabra, Glorieuses Islands, Comoro Islands and La Réunion, etc.) have kindly been selected for this study by Dr. CROSNIER from the collection of the Muséum national d'Histoire naturelle, Paris. The station data for the "Vauban" ("CH" under "Material" in this paper shows a trawling station) may be consulted in CROSNIER (1978 : 2-5, 185-192).

A series of systematic studies on the Madagascar brachyuran crabs Portunidae, Grapsidae and Ocypodidae and the penaeid prawns Aristeidae have been published in *Faune*

de Madagascar (CROSNIER, 1962, 1965, 1978). This paper constitutes a part of such serial studies. As far as the Madagascan galatheideans are concerned, there are only two papers : LENZ (1910) recorded *Galathea* [= *Allogalathea*] *elegans* Adams and White, 1848, from Tuléar and *Galathea spinosorostris* Dana, 1852 [= *G. aegyptiaca* Paulson, 1875, according to LEWINSOHN (1981 : 185)] from Europa Island in the Mozambique Channel; BABA and JAVED (1974 : 62) reported *Coralligalathea humilis* (Nobili, 1905) from Tuléar. Previous locality records for about 58 species of chirostylid and galatheid crustaceans (exclusive of deep-sea species of *Munidopsis*) from the western Indian Ocean including the Red Sea, Arabian Sea, Laccadives, Maldives and South Africa (STIMPSON, 1858; PAULSON, 1875; MIERS, 1884; ALCOCK, 1901; ALCOCK and ANDERSON, 1894; NOBILI, 1905, 1906; STEBBING, 1908, 1920; BALSS, 1913a, 1914, 1915; DOFLEIN and BALSS, 1913; LAURIE, 1926; BARNARD, 1950; TIRMIZI, 1964, 1966, 1980; KENSLEY, 1968, 1977, 1981; LEWINSOHN, 1969, 1981, 1982; BABA, 1974, 1977; BABA and JAVED, 1974; TIRMIZI and JAVED, 1976, 1980; TIRMIZI and KHAN, 1979; BABA and TIRMIZI, 1979; TÜRKAY, 1986) suggest that many of the species are expected here.

The specimens examined comprise 37 species (16 of Chirostylidae and 21 of Galatheidae), including nine new species. Deep-sea galatheids of the genus *Munidopsis* collected are excluded from this report. According to Dr. CROSNIER (personal communication), they comprise 20 species, four of which represent new species. These will be reported later by Mrs. DE SAINT LAURENT. *Coralligalathea humilis* previously known from Tuléar is not included in the present collections. Overall, a total of 38 (exclusive of *Munidopsis*) species are known from Madagascar. Recorded here for the first time from the western Indian Ocean are 17 species, six of which have been known from the western Pacific, and one of which occurs in the eastern Pacific. For the sake of convenience a key to families, genera and species of the Madagascan chirostylids and galatheids is presented at the beginning of the text.

Of the 38 Madagascan species, 24 occur in the Western Pacific, 11 are confined to the western Indian Ocean (the nine new species described here, *Bathymunida polae* Balss, 1914, and *Munida benguela* de Saint Laurent and Macpherson, 1988), two are known from only the eastern and western Indian Ocean [*Uroptychus dentatus* Balss, 1913, and *Paramunida tricarinata* (Alcock, 1894)], and the remaining one was previously recorded only from the Galapagos Islands (*Uroptychus granulatus* Benedict, 1902). Twenty Madagascan species occur also in the Malayan Archipelago; most of them (17) are distributed eastward to Japan, and two of these range further east to the Bonin Islands [*Uroptychus tridentatus* (Henderson, 1885) and *Galathea ternatensis* de Man, 1902], one extends the range to the Marshall Islands (*Galathea aegyptiaca* Paulson, 1875), three reach the Hawaiian Islands [*Galathea spinosorostris* Dana, 1852, *Munida japonica* Stimpson, 1858, and *Phylladorhynchus serrirostris* (Melin, 1939)], and another two are found in the Fiji Islands [*Allogalathea elegans* (Adams and White, 1848) and *Galathea affinis* Ortmann, 1892]. Three other Madagascan species also occur in Japan but lack locality records in the Indo-Malayan faunal region where in all probability they should be found by extensive surveys [*Uroptychus remotispinatus* Baba and Tirmizi, 1979, *U. soyomaruuae* Baba, 1981, and *Liogalathea laevirostris* (Balss, 1913)]. The remaining one (*Eumunida minor*) has been described very recently from New Caledonia by DE SAINT LAURENT and MACPHERSON (1990).

The species are arranged in alphabetical order. The measurements of the specimens examined are given in parentheses under "Material", showing minimum and maximum carapace lengths in millimeters taken between the rostral tip and midpoint of the posterior

margin of the carapace. Unless otherwise indicated, the collector in the list of material is A. CROSNIER. The material studied are deposited in the collection of the Muséum national d'Histoire naturelle, Paris, and part will be sent to the Smithsonian Institution, Washington, D.C., except for those species that are represented by a few specimens.

KEY TO FAMILIES, GENERA AND SPECIES OF THE CHIROSTYLIDS
AND GALATHEIDS (exclusive of *Munidopsis*) FROM MADAGASCAR

1. Sternal plate of last thoracic somite absent; antennal peduncle consisting of 5 segments, usually with antennal scale (family Chirostylidae)..... 2
- Sternal plate of last thoracic somite well developed, but free from preceding one; antennal peduncle consisting of 4 segments, lacking antennal scale (family Galatheidae)..... 17
2. Two pairs of supraocular spines (genus *Eumunida*) 3
- No supraocular spines (genus *Uroptychus*) 5
3. Spine on each side of fourth thoracic sternite..... *Eumunida similior*
- No spine on each side of fourth thoracic sternite 4
4. Cheliped palm with distinct pad of densely packed setae on ventral surface; carpus with 2 strong terminal spines *Eumunida bispinata*
- Cheliped palm with rudimentary pad on ventral surface; carpus with 3 strong terminal spines. *Eumunida minor*
5. Dactylus of walking legs subprehensile, distinctly more than two-thirds length of propodus. *Uroptychus crosnieri*
- Dactylus of walking legs not subprehensile, less than two-thirds length of propodus. 6
6. Rostrum with small lateral tooth near tip; dactylus of walking legs nearly straight *Uroptychus tridentatus*
- Rostrum without lateral tooth near tip; dactylus of walking legs curving 7
7. Carapace covered with granules..... *Uroptychus soyomaruuae*
- Carapace not covered with distinct granules 8
8. Carapace with lateral spines, in addition to anterolateral one..... 9
- Carapace without distinct lateral spines other than anterolateral one..... 11
9. Distal 2 segments of antennal peduncle short, antennal scale overreaching end of peduncle by length of ultimate segment *Uroptychus crassior*
- Distal 2 segments of antennal peduncle relatively long, antennal scale not exceeding beyond end of peduncle 10
10. Carapace with 4 strong lateral marginal spines behind cervical groove; anterior margin of third thoracic sternite widely V-shaped, without median notch *Uroptychus dentatus*
- Carapace with small lateral marginal spines; anterior margin of third thoracic sternite with 2 median spines *Uroptychus longiocularis*
11. Anterior margin of third thoracic sternite widely V-shaped without median spines or notch. *Uroptychus granulatus*
- Anterior margin of third thoracic sternite with median notch and/or 2 median spines 12
12. Anterior margin of third thoracic sternite with median notch, lacking median spines *Uroptychus brevipes*
- Anterior margin of third thoracic sternite with pair of median spines. 13
13. Terminal 2 spines of dactylar ventral spines of walking legs separated from proximal group of spines by some distance. 14
- Dactylar ventral spines of walking legs in regular arrangement 15

14. Carpus of walking legs about half as long as merus; third thoracic sternite strongly depressed; length of lateral margin of fourth thoracic sternite about 3 times that of preceding one *Uroptychus vandamae*
— Carpus of walking legs distinctly more than half length of merus; third thoracic sternite shallowly depressed; length of lateral margin of fourth thoracic sternite about twice that of preceding one *Uroptychus remotispinatus*
15. Two spines on anterior gastric region *Uroptychus nigricapillus*
— No gastric spines 16
16. Carapace markedly widened posteriorly; anterolateral angle of fourth thoracic sternite with strong spine extending as far forward as end of preceding sternite *Uroptychus acostalis*
— Carapace moderately widened posteriorly; anterolateral angle of fourth thoracic sternite with spine of moderate size *Uroptychus gracilimanus*
17. Rostrum triangular 18
— Rostrum spiniform 30
18. Lateral margin of rostrum with rudimentary teeth *Liogalathea laevirostris*
— Lateral margin of rostrum with distinct teeth 19
19. Endopod of uropod extremely wide *Lauriea gardineri*
— Endopod of uropod normal, about as long as wide 20
20. Rostrum extremely elongate with 5-9 lateral teeth *Allogalathea elegans*
Rostrum moderate in length, with 2-4 lateral teeth 21
21. Rostrum leaflet-like with tiny distolateral and distinct basilateral teeth. *Phylladorhynchus serrirostris*
— Rostrum with 3 or 4 distinct lateral teeth 22
22. Rostrum with 3 lateral teeth on each side; second segment of antennal peduncle lacking distomesial spine; third thoracic sternite strongly produced anteriorly, nearly triangular *Coralliogalathea humilis*
— Rostrum with 4 lateral teeth; second segment of antennal peduncle with distomesial and distolateral spines; third thoracic sternite relatively short and narrow, anterior margin distinctly or indistinctly bilobed (genus *Galathea*) 23
23. Gastric spines absent *Galathea ternatensis*
— Gastric spines present 24
24. Carapace and rostrum with pronounced plumose setae *Galathea aegyptiaca*
— Carapace and rostrum without pronounced plumose setae 25
25. Pterygostomial flap with spine near anterior end of pleural suture *Galathea affinis*
— Pterygostomial flap without spine near anterior end of pleural suture 26
26. Epipods absent from chelipeds *Galathea anepipoda*
— Epipods present on chelipeds 27
27. Distomesial spine on antennular basal segment well developed 28
— Distomesial spine on antennular basal segment reduced 29
28. Carapace without spinule between anterolateral spine and end of anterior bifurcation of cervical groove *Galathea amamiensis*
— Carapace with spinule between anterolateral spine and end of anterior bifurcation of cervical groove *Galathea spinosorostris*
29. Carapace excluding rostrum as long as wide, dorsal surface pronouncedly pubescent; eyestalks without concavity on mesial margin proximal to cornea *Galathea pubescens*
— Carapace excluding rostrum distinctly longer than wide, dorsal surface less pubescent; eyestalks with concave mesial margin proximal to cornea *Galathea robusta*
30. Two supraocular spines on each side *Sadayoshia edwardsii*
— One supraocular spine on each side 31

31. Rostrum extremely short; transverse ridges of carapace usually reduced. 32
— Rostrum spiniform, well developed; transverse ridges of carapace distinct (genus *Munida*). 33
32. Carapace with abnormally developed gastric and cardiac spines; first segment of antennal peduncle with short process *Bathymunida polae*
— Carapace covered with spinules, lacking abnormally developed gastric and cardiac spines; first segment of antennal peduncle with elongate process *Paramunida tricarinata*
33. Two epigastric spines *Munida incerta*
— More than 2 epigastric spines 34
34. Fourth abdominal segment with dorsal spines *Munida babai*
— Fourth abdominal segment spineless. 35
35. Third abdominal segment with spines *Munida kuboi*
— Third abdominal segment spineless 36
36. Ten to 14 epigastric spines; merus of third maxilliped with distodorsal spine; second segment of antennal peduncle with accompanying spine proximal to distomesial one. *Munida japonica*
— Six epigastric spines; merus of third maxilliped lacking distodorsal spine; second segment of antennal peduncle without accompanying spine proximal to distomesial one. 37
37. Eyes largely dilated; distomesial and distolateral spines on antennular basal segment subequal in size. *Munida benguela*
— Eyes moderately dilated; distolateral spine on antennular basal segment larger than distomesial one *Munida remota*

Family CHIROSTYLIDAE

Genus EUMUNIDA Smith, 1883

Eumunida bispinata new species

(Fig. 1)

MATERIAL. — **Madagascar**: “Vauban”, NW coast; 12°39.5' S, 48°15.6' E; 450 m; trawled: 1 Aug. 1973; 09.44 hr: 1 ♂ (11.3) [holotype, MNHN Ga 1506]. Madagascar (without detailed locality data): 2 ♂ (7.6+, 12.8) [paratypes, MNHN Ga 730].

DESCRIPTION OF HOLOTYPE

Carapace, excluding lateral and rostral spines, as long as wide, posteriorly widened. Dorsal surface with distinct but interrupted transverse ridges; 2 scalelike ridges on anterior median gastric region; oblique row of 3 distinct hepatic spines, anterior 2 spines small and subequal, hindmost somewhat larger; no other spinulation elsewhere on carapace. Lateral margins with 6 spines, with accompanying small one behind last (sixth) spine on left side or between third and fourth spines on right side; divergent posteriorly, convergent behind last spine.

Rostrum sharply spiniform, 0.6 as long as remaining carapace, inner supraocular spine ending opposite distal 3/8 of rostral spine, outer supraocular spine moderately remote from, and reaching midlength of, inner one.

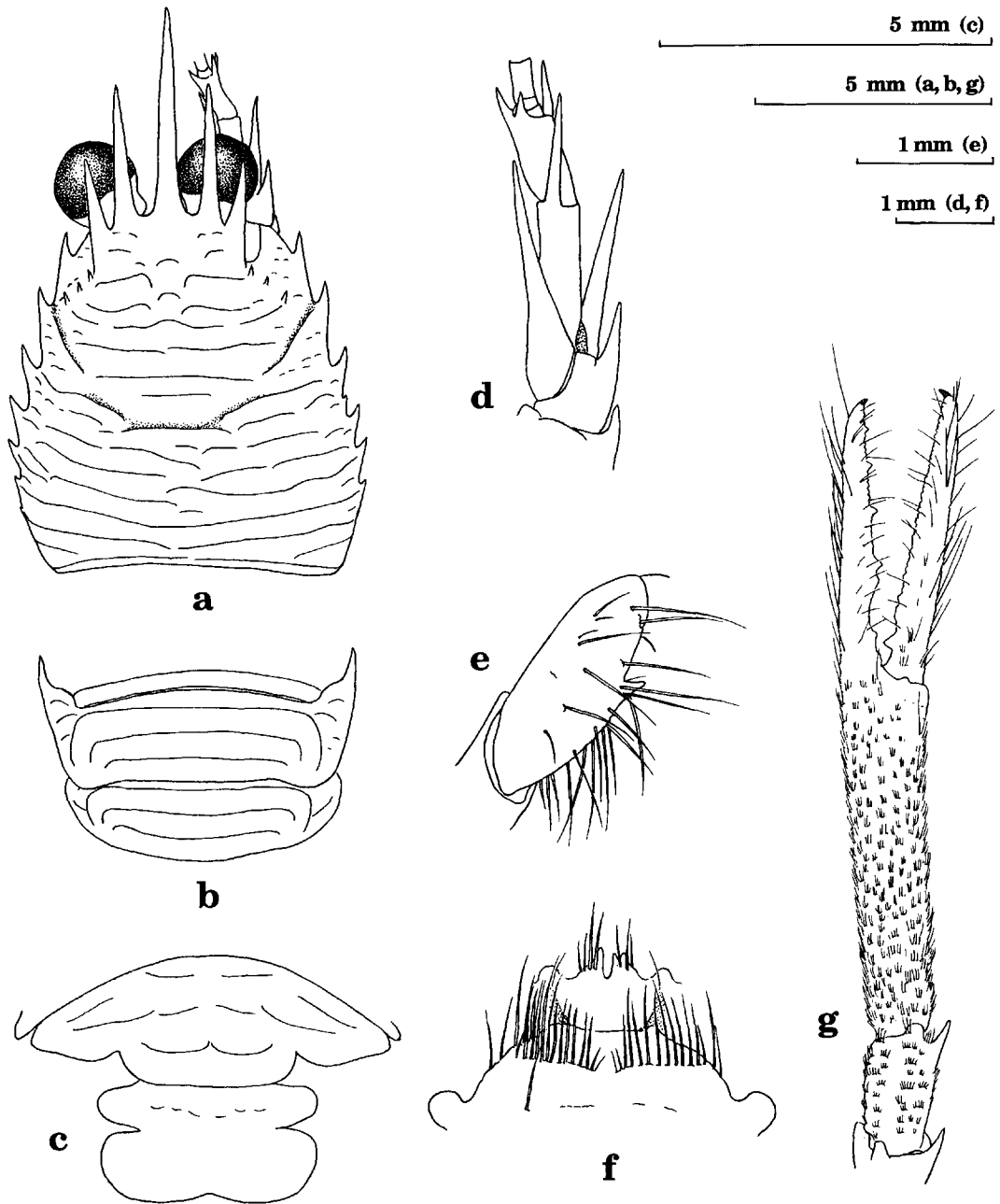


FIG. 1. — *Eumunida bispinata* new species, male holotype [MNHN Ga 1506] from northwest coast of Madagascar (no station number) : a, carapace, dorsal view; b, anterior part of abdominal segments; c, posterior part of abdominal segments and telson; d, left antennal peduncle, ventral view; e, merus of right third maxilliped, lateral view; f, anterior part of sternum; g, left chela, dorsal view.

Cornea dilated, extending beyond midlength of inner supraocular spine.

Second and third abdominal segments with 3 transverse ridges, as illustrated; fourth and fifth segments with 2 uninterrupted ridges, sixth segment as illustrated. Telson 1.9 times as wide as long, lateral margin strongly constricted and bilobed, posterior lobe wider; posterior margin also weakly bilobed.

Antennal peduncle as illustrated, all spines very acute and elongate.

Merus of third maxilliped with midventral spine, distolaterally unarmed.

Third thoracic sternite with 2 acute median spines on anterior margin, left one distally bifurcate; following sternite distinctly excavated in midline, laterally convex and unarmed.

Chelipeds 2.7 times as long as carapace including rostrum. Meri with 3 rows of spines: 10 ventromesial, 5 mesial, and 9 dorsal, also with distoventral spine. Carpi with distoventral and distomesial spines only. Palm finely granulate, covered with very short fine setae moderate in density, distally wider, length 4 times width of distal portion; ventral surface with line of 4 spines and pad of densely packed setae. Fingers with reduced granulation, 0.8 as long as palm, provided with coarse setae, opposable margin of movable finger tuberculate, bearing moderate-sized process near proximal end, that of fixed finger also tuberculate, interspersed by larger tubercular processes on distal 2/3 of length, remaining proximal 1/3 concave, tubercleless, with process somewhat distal to opposing process.

Meri of walking legs with 10-13 dorsal spines, all sharp on first and second walking legs, proximal 6 or 7 much reduced in size on third walking leg; ventromesially bearing line of tubercles or eminences. Carpi with 5 dorsal spines. Propodi with 8 or 9 ventral spinelets, distal one paired with another ventromesial one. Dactyli with 8 ventral serrae and spinelets.

PARATYPES : Larger male with broken carapace bearing posterior 3 transverse ridges uninterrupted. Smaller male with less pronounced setae on palm.

REMARKS

The new species belongs to Group B of GORDON (1930 : 742) that is characterized by the absence of a spine on each side of the sternum at the base of the cheliped. A pad of densely packed setae on the ventral surface of the cheliped palm, though small in *E. bispinata*, is also shared by *E. smithii* Henderson, 1885, and *E. gordonae* Baba, 1976. However, *E. bispinata* is unique in having two terminal spines alone on the cheliped carpus which separate it from the two related species as well as from possibly all the other known species. In addition, the last of the three hepatic spines is larger in *E. bispinata*, subequal to the anterior two in both *E. smithii* and *E. gordonae*; and *E. gordonae* has a midgastric spine and blunt anterior processes on the third thoracic sternite.

ETYMOLOGY : The combination of the Latin *bi* (two) plus *spinatus* (spined) refers to the two terminal spines on the cheliped carpus, which is the apparent distinguishing feature of the species.

RANGE : Known only from Madagascar; 450 m.

Eumunida minor de Saint Laurent and Macpherson, 1990

Eumunida minor de Saint Laurent and Macpherson, 1990 : 263, fig. 2 b-c, 13 a, c-e, g, i-l.

MATERIAL. — **Madagascar** : “Vauban”, CH 63; 23°36.3' S, 43°32.5' E; 250 m; 28 Feb. 1973; 06.30-07.30 hr : 2 ♀ (7.3+, 8.1). Madagascar (without detailed locality data) : 1 ♂ (7.2).

REMARKS

In an early draft of the manuscript the specimens listed above were identified as *E. balssi* Gordon, 1930, which has previously been known from Japan. On the occasion of my visit to the Paris Museum in 1989, however, Mrs. M. DE SAINT LAURENT kindly advised me to compare them with the male holotype of that species which she has retained on loan from the Zoologische Staatssammlung München (Cat. No. 10311). The Madagascan specimens are quite smaller than the type (about one-third the size of it), but have the cheliped palm with a very tiny crescent concavity on the distoventral portion that suggests a rudimentary pad. She was also kind to let me have a look at type material of *E. minor* from New Caledonia which she and E. MACPHERSON just described, and I came to the conclusion that the Madagascan and New Caledonian specimens are identical. The reader is referred to DE SAINT LAURENT and MACPHERSON (1990) for the detailed account of *E. minor*.

RANGE : New Calcedonia and Madagascar; 230-274 m.

Eumunida similior new species

(Figs 2, 3)

MATERIAL. **Madagascar** : “Vauban”, CH 38; 12°50.0' S, 48°09.1' E; 580-585 m; slightly calcareous sandy mud; 14 Sep. 1972; 17.03-18.05 hr : 1 ♂ (47.5) [holotype, MNHN Ga 729].

DESCRIPTION OF HOLOTYPE

Carapace excluding lateral and rostral spines slightly wider than long, dorsal surface covered with short fine setae, provided with distinct ridges, all incomplete or interrupted, not reaching to lateral ends, those on anterior gastric and lateral branchial regions scalelike. Three spines in oblique line on hepatic region, first (anterior) largest, second (median) smallest. Lateral margins convex and posteriorly divergent, bearing 7 spines followed by 1 or 2 eminences, first one anterolateral and most pronounced, third and last smaller than remainder.

Rostrum distally broken, sharply spiniform, length about 1/3 that of remaining carapace, inner supraocular spine fully half as long as rostral spine, directed somewhat laterad, outer supraocular spine barely half as long as inner one.

Second abdominal segment with 4 transverse ridges, first (anterior) ridge distinctly elevated, third ridge not complete, interrupted, laterally scalelike, all ridges with fine setae anteriorly directed; third segment similar to preceding; fourth segment with 3 ridges, each

with posteriorly directed fine setae; fifth and sixth segments as illustrated; telson divided into anterior and posterior lobes by distinct transverse fissure, posterior lobe wider and somewhat narrower, posterior margin bilobed.

Cornea dilated, reaching end of outer supraocular spine.

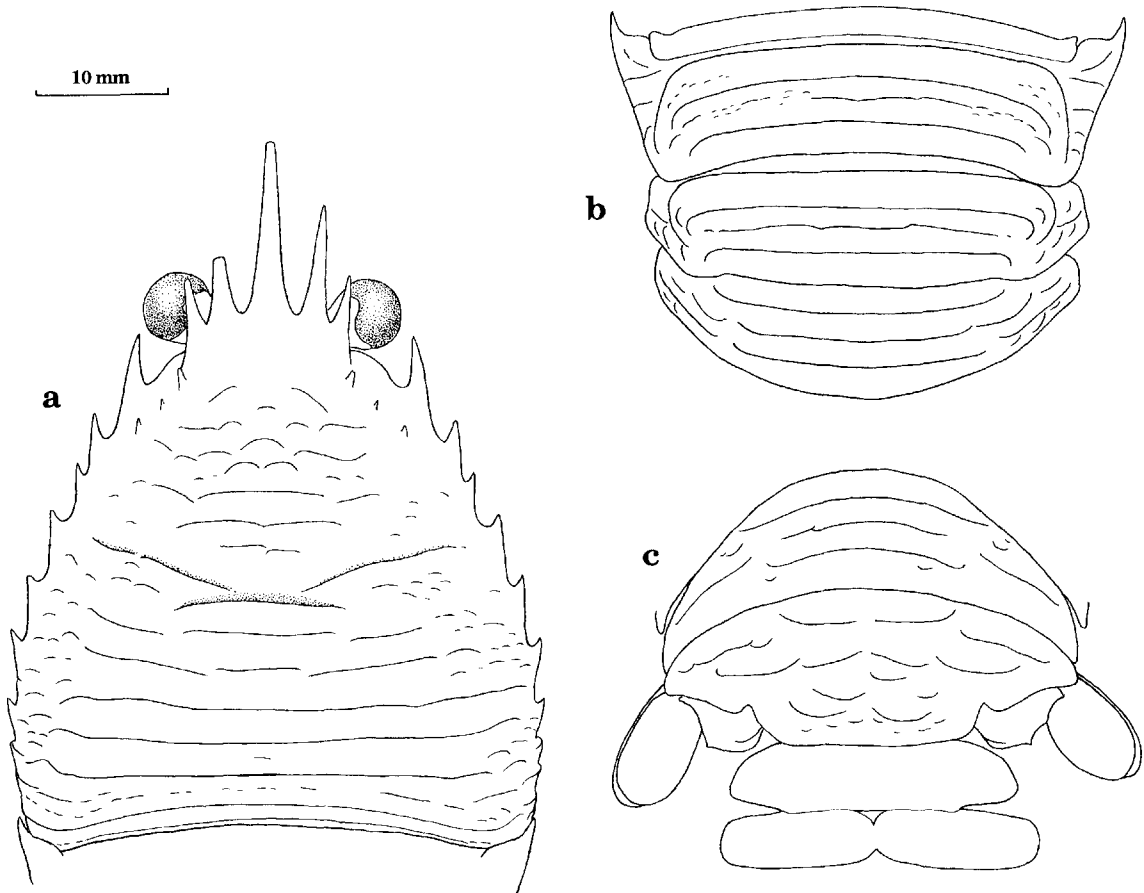


FIG. 2. — *Eumunida similior* new species, male holotype [MNHN Ga 729] from CH 38 : a, carapace, dorsal view; b, anterior part of abdominal segments; c, posterior part of abdominal segments and telson.

Antennal peduncle with spinous segments, distomesial spines on proximal second and third segments overreaching next segment distal to each.

Ischium of third maxilliped with 15 (left) or 12 (right) denticles on mesial ridge; merus with ventral spine at midlength, lacking distolateral spine.

Third thoracic sternite with 2 blunt but stout anterior processes, following sternite with small lateral spine on each side.

Right cheliped missing but basal portion remained undetached from body. Left cheliped granulose with short fine setae, very slender, subcylindrical, and about twice as long as

carapace including rostral spine. Merus with 4 rows of spines: 2 dorsal, 1 mesial and 1 ventral; ventral spines smaller. Carpus with 3 distal spines: 1 mesial, 1 ventromesial and 1 ventral; dorsally bearing 2 rows of tubercle-like spines. Palm slender, narrower than merus, about 7 times as long as wide, bearing line of 6 ventral spines of small size; ventral pad of setae present but small; fingers $3/4$ as long as palm, distally curving ventrad, opposable margins nearly straight, finely tuberculate, equidistantly interspersed by larger tubercles on fixed finger.

Walking legs relatively slender; first walking leg falling short of end of cheliped palm (reaching $3/4$ of palm). Merus with 7 dorsal marginal (1 or 3 of them tiny or obsolete, terminal

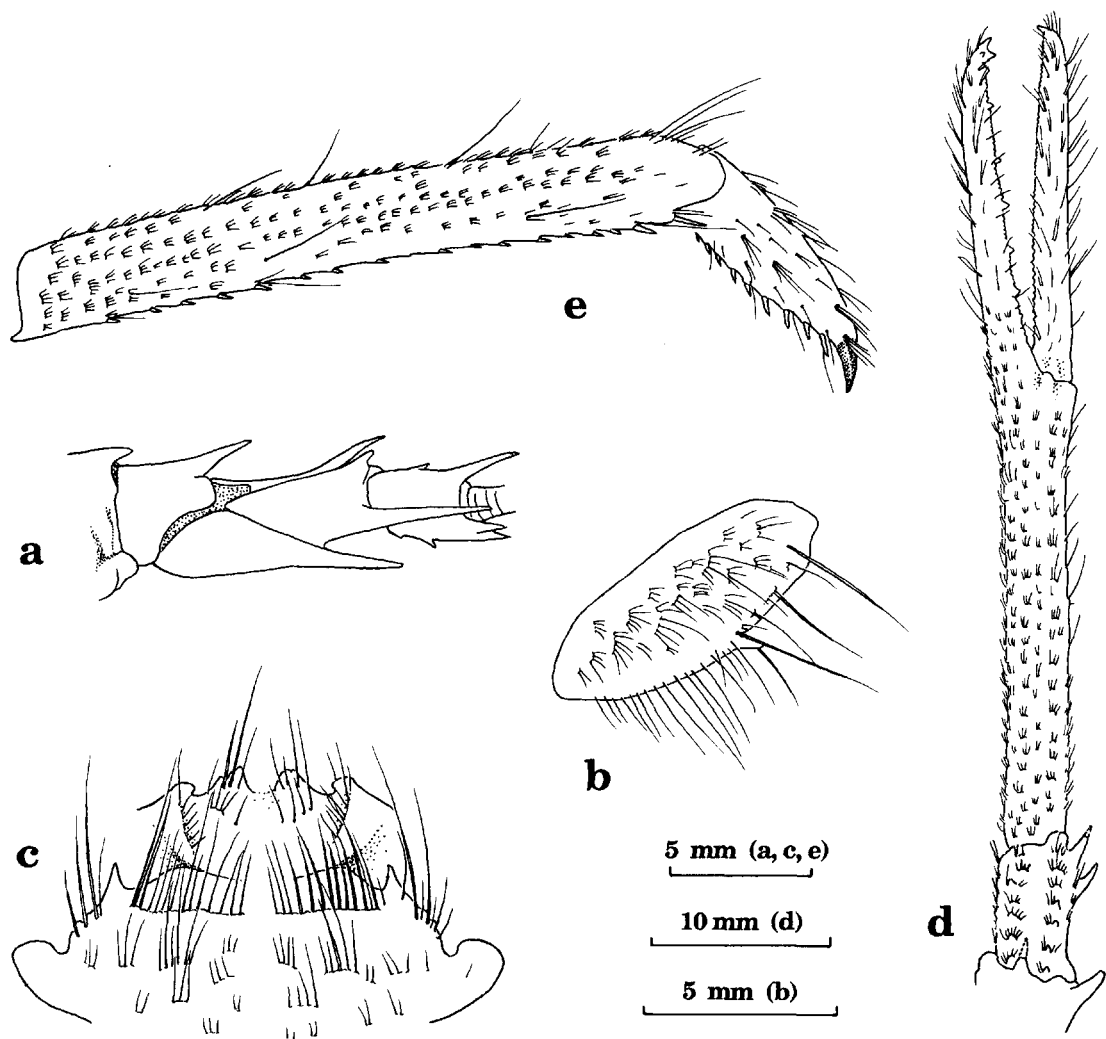


FIG. 3. — *Eumunida similior* new species, male holotype [MNHN Ga 729] from CH 38 : a, right antennal peduncle, ventral view; b, merus of right third maxilliped, lateral view; c, anterior part of sternum; d, left chela, dorsal view; e, distal two segments of right first walking leg, lateral view.

one prominent), 1 distal ventrolateral, and 7 ventromesial spines. Propodus 2.5 times as long as dactylus, with 18 slender ventral spinelets. Dactylus with 8-9 ventral spinelets. Second walking leg very similar to first, but merus lacking ventromesial marginal spines. Third walking leg with line of about 5 spines on dorsolateral surface; proximal 5 of dorsal spines rather lateral in position; propodal ventral spinelets numbering about 8.

REMARKS

Eumunida similior belongs to Group A of GORDON (1930 : 742), in which *E. picta* Smith, 1883, and *E. funambululus* Gordon, 1930, are grouped together, having a pad on the ventral surface of the cheliped palm. *Eumunida picta* is much closer to the new species in the shape of sternal segments, armature of both the third maxilliped and the walking legs, and size of the three hepatic spines. The left cheliped of the new species is apparently regenerated because of its smaller ischial portion as compared with that of the right cheliped. The complete elimination of spines from the palm seems to me to be characteristic of the new species in the belief that the spination of the cheliped may not be affected by regeneration, as has been shown in the case of *E. dofleini* (see BABA, 1981 : fig. 1). Examination of the male syntype (cl 23.6 mm) from off Delaware Bay (USNM 7304) and five additional specimens (1 male, cl 19.2 mm; 4 females, cl 19.0-27.5 mm) from the North Atlantic Ocean in Baltimore Canyon (USNM 213020, 213021) of *E. picta* both in the collection of the National Museum of Natural History, Smithsonian Institution, shows that the cheliped palm has two rows of spines : a ventral row consists of 5-8 (8 on the type) spines which are present along the mesial margin, and a dorsal row consists of 6-12 (12 on the type) spines which are distally near the mesial margin; the ventral spines are usually much stouter and no complete elimination of dorsal spines occurs. The lateral margin of the carapace in the type of *E. picta* bears seven spines that decrease in size posteriorly, while an additional small spine is present behind the second larger one on the anterior branchial region, followed by not five but four posterior branchial marginal spines in the new species. This difference, however, represents no systematic importance, for the spination as in *E. similior* is also displayed on the left side by the largest of the specimens of *E. picta* from Baltimore Canyon.

The following differences are also noticed, but their systematic importance should be evaluated by examination of more specimens of the new species : the transverse fissure divides the telson into anterior and posterior lobes in the new species whereas it is indistinct in *E. picta*; also, the posterior lobe is somewhat longer in *E. picta*; the anterior branchial region as well as the anterior part of the posterior branchial region, in particular directly posterior to the posterior bifurcation of the cervical groove, is devoid of ridges in *E. picta*; the first (anteriormost) of the three hepatic spines is relatively large and the second and third (posterior two) are small and of subequal size in *E. picta*, while the second is much smaller than the third in the new species.

Eumunida funambululus Gordon, 1930, the other relative within Group A of GORDON (1930 : 742), is much more distant, having the carapace with spines "α" and "β" of GORDON (1930 : fig. 5) and the walking legs with dorsal marginal spines on the propodi.

ETYMOLOGY : The Latin *similior* is the comparative of *similis* (like, similar), alluding to the close relationship with *E. picta*.

RANGE : Known only from the type-locality, Madagascar; 580-585 m.

Genus **UROPTYCHUS** Henderson, 1888

Uroptychus acostalis Baba, 1988

Uroptychus acostalis Baba, 1988 : 20, fig. 7.

MATERIAL. — **Madagascar** : “Vauban”, CH 35; 12°49.5' S, 48°05.9' E; 760-810 m; 14 Sep. 1972; 06.27-07.25 hr; on gorgonian corals : 1 ♂ (13.9). — CH 38; 12°50.0' S, 48°09.1' E; 580-585 m; 14 Sep. 1972; 17.03-18.05 hr : 1 ovig. ♀ (10.6). — CH 119; 12°50.7' S, 48°06.0' E; 750-765 m; quartz-calcareous sand; 10 Oct. 1974; 17.10-18.10 hr : 3 ♂ (8.5-10.0).

REMARKS

Uroptychus acostalis and *U. gracilimanus* (Henderson, 1885) are very similar to each other and occasionally taken together, as they are found in a lot from Station CH 35, though this fact does not directly indicate that they are sympatric. The former is easily distinguished from the latter by the third thoracic sternite that is deeply depressed with the posterior border strongly produced posteriorly, the fourth thoracic sternite that bears a strongly produced anterolateral angle, and the carapace that is markedly widened posteriorly, without a distinct ridge along the posterior portion.

RANGE : Makassar Strait and Madagascar; 580-1650 m. This is the first record from the western Indian Ocean.

Uroptychus brevipes new species

(Fig. 4)

MATERIAL. — **Madagascar** : “Vauban”, CH 104 : 22°15.7' S, 43°01.5' E; 750-810 m; 29 Nov. 1973; 14.45-15.35 hr : 1 ♂ (5.7) [holotype, MNHN Ga 1529].

DESCRIPTION OF HOLOTYPE

Carapace moderately convex dorsally, dorsal surface smooth, with very fine setae discernible only under high magnification. Greatest width measured at midlength, anterior and posterior widths subequal. Lateral margins somewhat convex, with small but distinct anterolateral spine and ridge arising from ordinary end of cervical groove, continued backward, bearing few tiny denticles anteriorly.

Rostrum broadly triangular, 0.57 as long as remaining carapace, dorsal surface distinctly excavated.

Eyes relatively short and wide, cornea ending opposite midlength of rostrum, eyestalk excluding cornea wider than long when measured on visible portion in dorsal view.

Pterygostomian flap with very tiny process at anterior end.

Ultimate segment of antennal peduncle fully 1.5 times as long as penultimate one, with tiny distomesial spine visible only under high magnification; penultimate segment unarmed. Antennal scale overreaching midlength of ultimate peduncular segment.

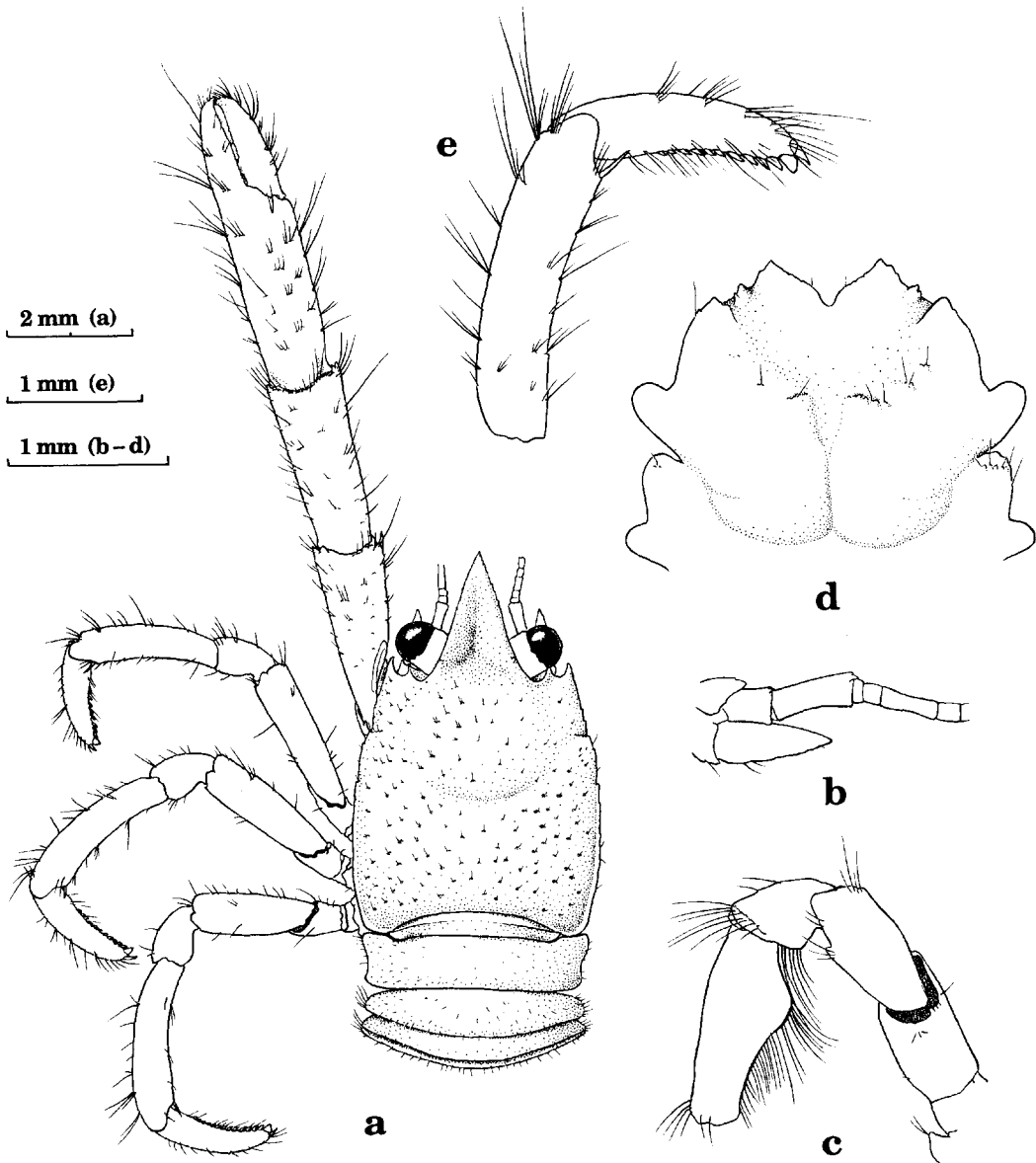


FIG. 4. — *Uroptychus brevipes* new species, male holotype [MNHN Ga 1529] from CH 104 : a, animal, dorsal view, right appendages omitted; b, left antennal peduncle, ventral view; c, endopod of left third maxilliped, lateral view, dactylus omitted; d, anterior part of sternum; e, distal two segments of right second walking leg, lateral view.

Merus of third maxilliped with blunt ventral process distal to midlength, but no other spinulation; ischium with about 30 closely placed denticles on mesial ridge.

Third thoracic sternite weakly depressed, median sinus in convex anterior margin without spines flanking it, lateral margin with small proximal process. Following sternite anterolaterally ending in rounded process, anterior lateral margin convex.

Chelipeds similar, about twice as long as carapace including rostrum; covered with feeble granules providing roots of setae; provided with fine coarse setae moderate in density. Meri with prominent distoventral spine near mesial margin. Carpi with 2 distoventral spines: one near mesial margin and other near lateral margin. Ischium with distodorsal spine of moderate size. Palm spineless, about as long as carpus, moderately depressed, 2.5 times as long as wide, mesial and lateral margins subparallel. Fingers 0.64 as long as palm, distally crossing, opposable margins finely tuberculate, feebly sinuous, with low, rounded proximal lobe on fixed finger.

Walking legs similar, moderately setose, right third walking leg missing. Meri and carpi spineless, but former with small distoventral spine on first leg, much smaller one on second leg, quite reduced one on third leg. Propodi curving, with pair of slender distoventral spinelets. Dactyli very feebly curving, ventral margin with 11-13 short blunt spinelets including terminal one, penultimate pronounced.

REMARKS

The new species seems to be related to *U. suluensis* van Dam, 1933, from the Sulu Sea in general features of the carapace, with a broadly triangular rostrum, the third thoracic sternite without median spines on the anterior margin, and the pereopods, in particular the propodi of the walking legs that lack ventral marginal spinelets but have a terminal pair. Rather brief though the original description is, *U. suluensis* seems to be distinguished by having eyestalks quite slender and distinctly narrowed distally. Examination of the syntypes (one male and one ovigerous female) from the "Siboga" Station 105 now deposited in the Zoological Museum, Amsterdam revealed further that *U. suluensis* differs from the new species in the following particulars: 1) the merus of the third maxilliped bears four or five closely placed short spines on the distoventral margin; 2) the lateral margin of the carapace is not distinctly ridged as in *U. brevipes*; 3) the dactyli of the walking legs are relatively short and more sharply narrowed distally with five very slender, elongate spinelets in addition to two stout distal ones on the ventral margin.

Uroptychus brevirostris van Dam, 1933, from the Sulu Archipelago resembles *U. brevipes* in the broad rostrum and the nonspinose lateral margin of the carapace, but it is distinguished by the third thoracic sternite that bears two contiguous median spines on the deeply concave anterior margin and the dactyli of the walking legs that are strongly curved, with prominent ultimate and penultimate ventral spines.

ETYMOLOGY: The Latin *brevis* (short) plus *pes* (foot) refers to the relatively short chelipeds of the species.

RANGE: Recorded here from Madagascar, in 750-810 m.

***Uroptychus crassior* new species**

(Fig. 5)

MATERIAL. — **Madagascar** : “Vauban”, CH 50; 15°19.0' S, 46°11.8' E; 405 m; slightly calcareous, sandy mud; 8 Nov. 1972; 12.30-13.50 hr : 1 ♀ (4.1) [holotype, MNHN Ga 1466].

DESCRIPTION OF HOLOTYPE

Carapace excluding rostrum distinctly wider than long, lateral margins divergent to point behind lateral spines, then convergent posterolaterally, dorsal surface moderately convex, smooth, very sparsely provided with fine setae, areas not distinct. Lateral margins bearing 5 (left) or 6 (right) spines, first one anterolateral, prominent, directed straight forward, second rather remote from first, present at end of indistinct cervical groove, remainder also remote from second, rather close to each other and present on anterior half of posterior branchial region, posteriorly diminishing in size, hindmost very tiny.

Rostrum sharply triangular, relatively long, about 2/3 as long as remaining carapace, dorsal surface excavated. Outer orbital angle produced.

Abdominal segments almost glabrous.

Pterygostomian flap with strong anterior spine.

Eyestalks elongate, fully reaching midlength of rostrum, cornea not dilated, length about 1/3 that of remaining eyestalk.

Antennal peduncle relatively short, distal 2 segments each with distomesial spine, ultimate segment longer than, but less than twice as long as penultimate; antennal scale not wider than opposite peduncular segments, overreaching end of peduncle by more than full length of ultimate segment.

Merus of third maxilliped with 2 denticles on distoventral margin, carpus with tiny but distinct distolateral spine.

Anterior part of sternum as illustrated; third thoracic sternite shallowly depressed, with anterolateral angle produced on left side, bifurcate on right side, anterior margin with very narrow, moderately deep median notch flanked by 2 tiny spines. Following sternite with lateral margin feebly convex, denticulate on anterior half, anteriorly produced into spine.

Chelipeds dissimilar, right cheliped much smaller with weaker spination on carpus and merus, possibly regenerated. Left cheliped massive, with coarse setae, 2.3 times as long as carapace including rostrum. Merus armed with spines : 1 distoventral, 2 strong mesial each accompanying smaller one dorsal to it, and 1 distodorsal in midline. Carpal spination as illustrated; both 1 distomesial and 2 distolateral spines ventral in position and not visible from dorsal aspect; line of 4 spines slightly dorsal to mesial margin, distal 3 of them doubled. Palm spineless, moderately depressed, distinctly longer than carpus, 1.6 times as long as movable finger, about twice as long as wide, Fingers relatively short, strongly curving distally to cross each other, opposable margins slightly gaping, each with low process proximal to midlength, that of movable finger more proximal to opposing process.

First and second walking legs present on each side, third and fourth missing. All legs provided with coarse setae as in chelipeds particularly on dorsal surface. Meri and carpi

unarmed. Propodi about 4 times as long as high, ventrally armed with 5 or 6 long, movable spinelets on distal half of length. Dactyli distinctly curving at proximal 1/3, 0.55 as long as propodi, exclusive of spines; ventral margin with 9 or 10 spines, ultimate slender, remaining stouter, erect but not perpendicular to ventral margin, proximally diminishing in size.

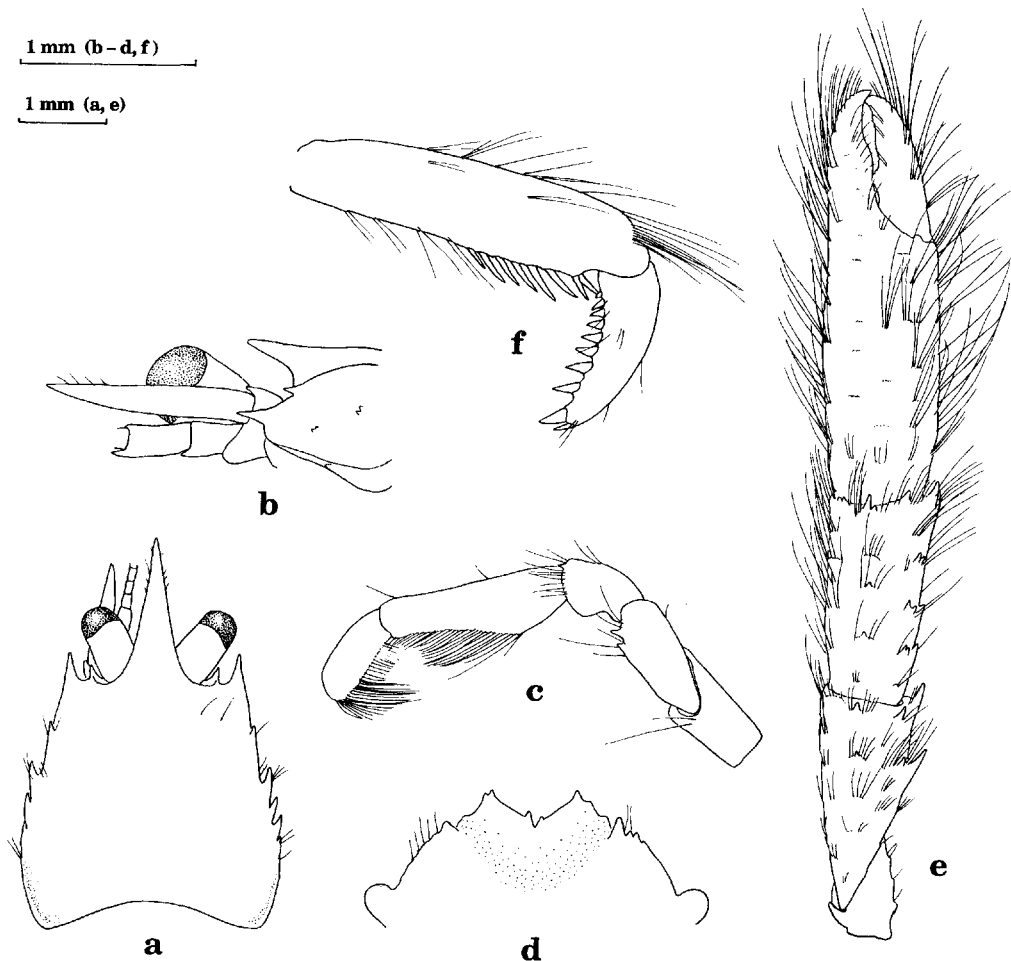


FIG. 5. — *Uroptychus crassior* new species, female holotype [MNHN Ga 1466] from CH 50 : a, carapace, dorsal view; b, anterior part of cephalothorax showing left antennal peduncle and anterior part of pterygostomian flap, ventrolateral view; c, endopod of left third maxilliped, lateral view; d, anterior part of sternum; e, left cheliped, dorsal view; f, distal two segments of right second walking leg, lateral view.

REMARKS

The new species strongly resembles *U. crassipes* van Dam, 1939, from the Kei Islands and the Philippines (VAN DAM, 1939 : 392; BABA, 1988 : 35) in the massive and setose chelipeds, elongate eyestalks, and spination of the third maxillipeds and antennal peduncles. However, the latter species has four strong, more distant spines on the lateral margin of the carapace. Comparison with the male holotype of *U. crassipes* now deposited in the Zoological Museum, Amsterdam, disclosed that they differ in the following details : in *U. crassipes*, the walking legs have only feebly curving dactyli, the ventral spines of which are slenderer and elongate, distinctly inclined and closer to each other, though the distal two are nearly as in *U. crassior*.

ETYMOLOGY : The Latin *crassior* (thicker, heavier) alludes to the stouter ventral spines on the dactyli of the walking legs by which the new species is readily distinguished from the close relative *U. crassipes*.

RANGE : Known from the unique holotype from Madagascar in 405 m.

***Uroptychus crosnieri* new species**

(Fig. 6)

MATERIAL. — **Madagascar** : “Vauban”, CH 66; 23°36.4'S, 43°31.1'E; 450-460 m; 29 Feb. 1973; 15.15-16.30 hr : 1 ♀ (7.5) [holotype, MNHN Ga 1468].

DESCRIPTION OF HOLOTYPE

Cephalothorax markedly lowered posteriorly (surface of thoracic sternal segments lifted posteriorly). Carapace excluding rostrum broader than long with spinose lateral ridge overhanging pterygostomian flap, margins diverging to greatest width between last lateral marginal spines, then narrowing behind end of last lateral spine; dorsally smooth, covered with very fine setae only discernible under high magnification, gastric region more or less convex. Nine lateral marginal spines : first anterolateral and pronounced, second largest, located directly behind ordinary end of cervical groove, remainder diminishing in size posteriorly, last one located at level of insertion of second walking leg.

Rostrum 0.57 as long as remaining carapace, triangular with moderate basal width, dorsal surface feebly excavated. Outer angle of orbit well defined.

Eyes small, terminating opposite midlength of rostrum, eyestalks elongate, much longer than cornea, cornea not swollen distally.

Ultimate segment of antennal peduncle barely 1.5 times as long as penultimate, distoventrally setose, distomesially bearing very tiny blunt process discernible under high magnification; penultimate segment with small spine and several setae on distomesial margin. Antennal scale overreaching midlength of ultimate peduncular segment.

Merus of third maxilliped rather truncate, ventral margin with few very tiny denticles or tubercles on distal half, distoventral margin rounded. Mesial ridge of ischium with very minute denticles, few of them rather remote from each other on proximal half, remainder contiguous on distal half.

Sternal segments very depressed posteriorly. Third thoracic sternite shallowly depressed, anterior margin widely V-shaped, with triangular anterolateral angle. Following sternite with somewhat convex lateral margin.

Left cheliped missing. Right cheliped 2.3 times as long as carapace including rostrum, covered with very fine short plumose setae, lacking spines except distodorsal one on ischium. Palm somewhat depressed, 1.2 times as long as carpus, fully 3 times as long as wide, not massive, mesial and lateral margins subparallel. Fingers about half as long as palm, provided with long coarse setae, distally crossing when closed, opposable margins finely denticulate, that of movable finger with low convex cutting edge fitting to longitudinal slit on opposing ventromesial surface when closed.

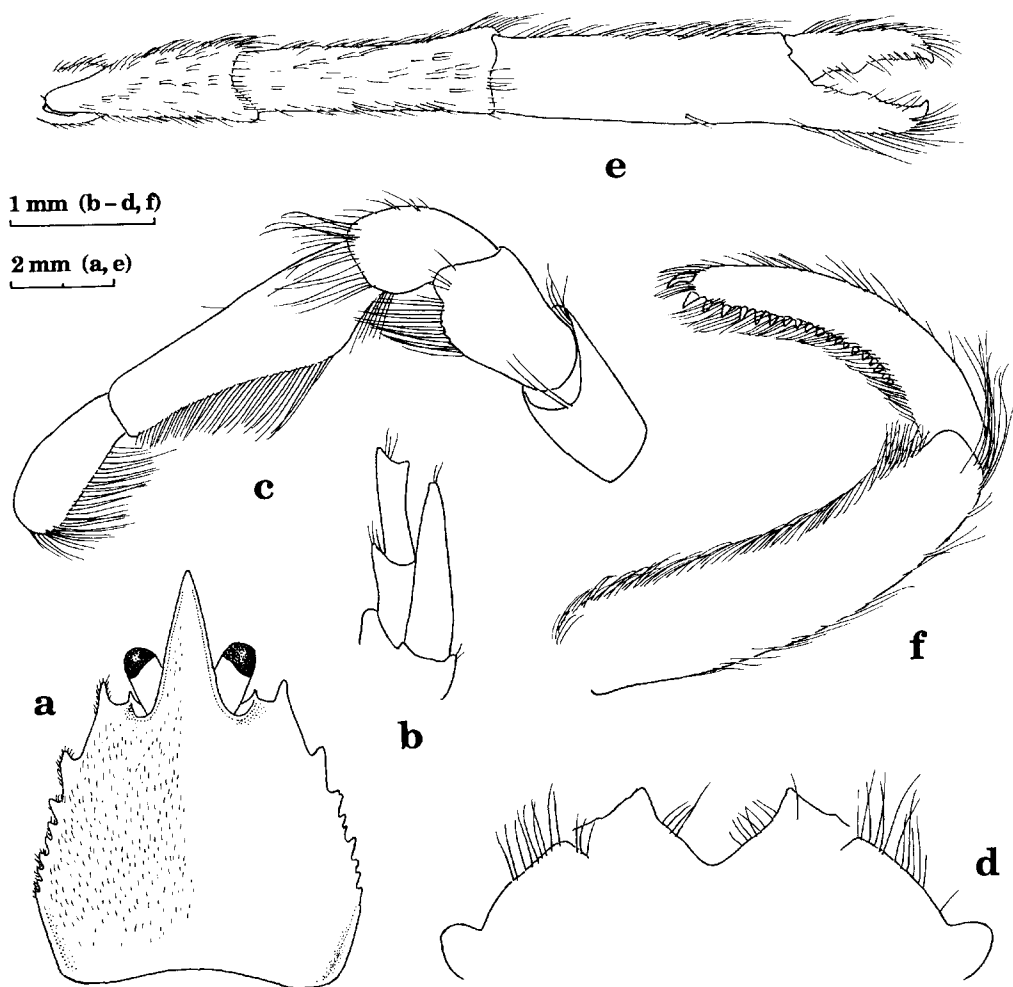


FIG. 6. — *Uroptychus crosnieri* new species, female holotype [MNHN Ga 1468] from CH 66 : a. carapace, dorsal view ; b. left antennal peduncle, ventral view ; c. endopod of left third maxilliped, lateral view ; d. anterior part of sternum ; e. right cheliped, dorsal view ; f. distal two segments of right first walking leg, mesial view.

Walking legs similar, but posteriorly shorter, especially meri; left first walking leg missing; covered with very fine plumose setae. Meri, carpi and propodi spineless. Distal 2 segments distinctly curving to make prehensile margins; dactylus about $\frac{3}{4}$ as long as propodus, ventral margin with 19-22 very short spinelets, all obscured by dense setae and decreasing in size proximally.

REMARKS

Uroptychus crosnieri resembles *U. fouslsii* Kensley, 1977, from South Africa in the spinose lateral margin of the carapace, the elongate eyestalks, and the widely V-shaped anterior margin of the third thoracic sternite, but *U. fouslsii* is distinct in having the rostrum much narrower relative to the carapace width, the chelipeds bearing scattered low tubercles on the merus and carpus, the former segment bearing a strong distomesial spine, and the dactyli of the walking legs bearing 8 strong ventral marginal spines. *Uroptychus dentatus* Balss, 1913, from off Somalia and southern Nias Canal west of Sumatra (BALSS, 1913a : 225; DOFLEIN and BALSS, 1913 : 137) also shares with this new species the spinose lateral margins of the carapace, the elongate eyestalks, and the widely V-shaped anterior margin of the third thoracic sternite without median spines. However, it is distinguished by the carapace covered with longer setae and armed with four strong spines on the lateral margin, the cheliped palm much longer, 3.5 times the length of the movable finger, the propodi of the walking legs twice as long as the dactyli, the latter less strongly curved, the penultimate of the dactylar ventral spinelets distinctly larger than the remainder, and the distal two segments of the antennal peduncle each armed with a distomesial spine.

Uroptychus onychodactylus Tirmizi, 1964, from the Maldives is also somewhat similar to *U. crosnieri* in having gaping prehensile margins between the propodus and dactylus of the walking legs; it is far distant, however, in having the carapace with an entire lateral margin except the anterolateral spine and the fingers of the cheliped very short and directed laterad.

ETYMOLOGY : This species is named for Dr. Alain CROSNIER who collected the studied materials and kindly placed them at my disposal.

RANGE : Recorded here from Madagascar in 450-460 m.

Uroptychus dentatus Balss, 1913

(Fig. 7)

Uroptychus dentatus Balss, 1913a : 225. — DOFLEIN and BALSS, 1913 : 137, fig. 5.

MATERIAL. — **Madagascar** : "Vauban" CH 104; 22°15.7' S, 43°01.5' E; 710-810 m; 29 Nov. 1973; 14.45-15.35 hr : 2 ♂ (14.0, 15.8), 2 ovig. ♀ (12.3, 14.1), 3 ♀ (7.4-11.8). — CH 107; 22°16.6' S, 43°01.9' E; 695-710 m; 30 Nov. 1973; 09.30-10.30 hr : 11 ♂ (8.1-14.2), 1 ovig. ♀ (11.8), 10 ♀ (8.8-13.3). — CH 108; 22°18.9' S, 43°01.1' E; 735-760 m; 30 Nov. 1973; 13.05-13.50 hr : 11 ♂ (6.8-13.3), 1 ovig. ♀ (12.3), 4 ♀ (10.7-12.8).

DESCRIPTION

Carapace widened posteriorly, dorsal surface with setae arising from scattered or moderately dense very fine granules and shallow pits, granules on anterior gastric region

occasionally tubercle-like; less setose and less granulose in smaller specimens. Cervical groove medially deep, separating moderately convex gastric and cardiac regions, laterally shallow, diminishing on anterior bifurcation. Lateral margins divergent posteriorly, but convergent behind last larger lateral tooth; anterolateral spine well developed, accompanied by few spinules in front of cervical groove, and 4 strong, anterolaterally directed spines behind it, occasionally with 1 or 2 additional spines both very small, anterior one of them often large but not exceeding size of preceding (one of 4 strong spines); posterolateral margin behind last strong spine distinctly ridged.

Rostrum sharply triangular, nearly straight and horizontal or feebly curving dorsad distally, basally wide, about half as long as remaining carapace, dorsal surface feebly or distinctly excavated; ventral surface with blunt longitudinal ridge.

Pterygostomian flap moderately granulose, anteriorly ending in very tiny spine.

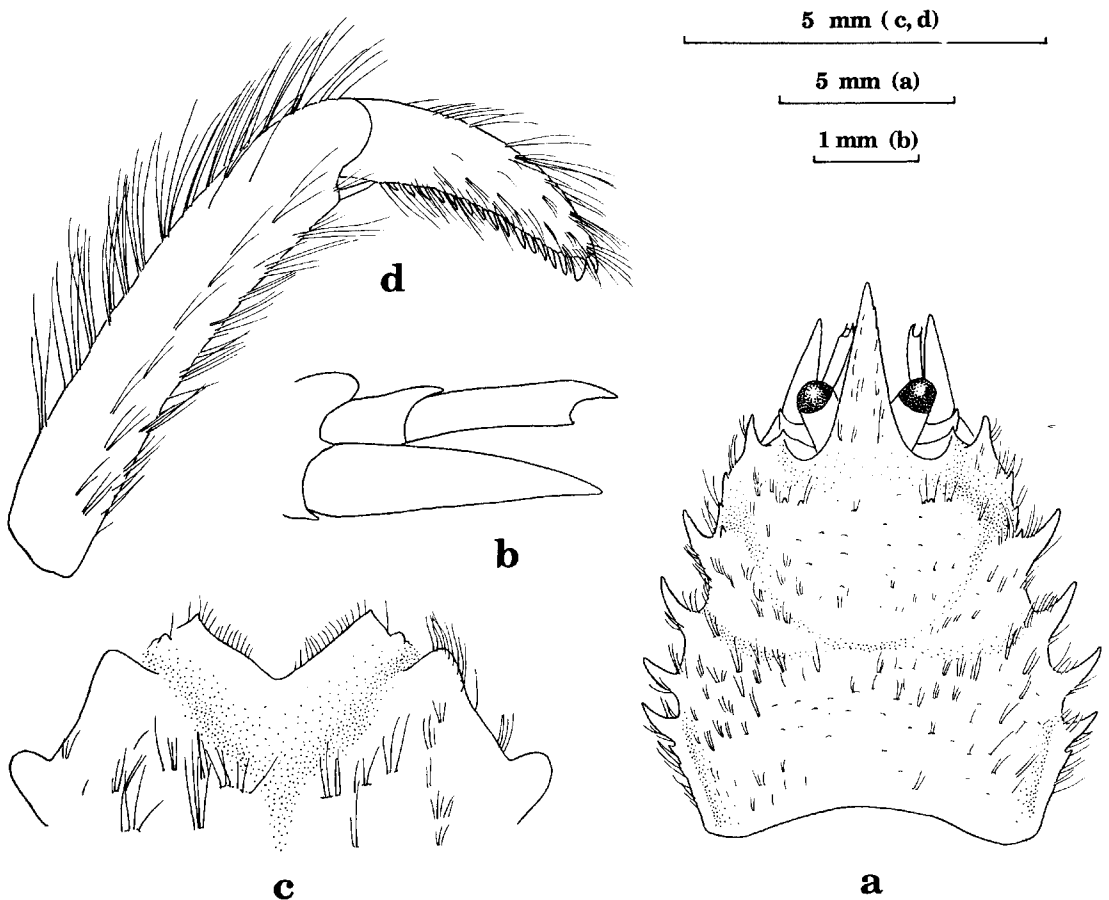


FIG. 7. — *Uroptychus dentatus* Balss, 1913, male (14.2 mm) [MNHN Ga 1517] from CH 107 : a, carapace, dorsal view; b, left antennal peduncle, ventral view; c, anterior part of sternum; d, distal two segments of right second walking leg, lateral view.

Outer orbital angle produced, ending in tiny spine.

Eyestalks relatively elongate, ending opposite midlength of rostrum, cornea much shorter than remaining eyestalk.

Antennal peduncle relatively large, distal 2 segments with strong distomesial spine, ultimate segment fully twice as long as penultimate one when measured on lateral margin. Antennal scale fully reaching end of ultimate segment. Basal segment proximal to scale distolaterally produced into small spine.

Ischium of third maxilliped with line of very tiny denticles, more than 40, on mesial ridge; merus and carpus spineless.

Third thoracic sternite shallowly depressed, anterior margin widely V-shaped, lateral margin with small process near posterior end. Following sternite with somewhat concave and relatively short lateral margin, anterolateral angle bluntly triangular, not strongly produced.

Chelipeds more than 3 times as long as carapace including rostrum, rather stout but not strongly massive; covered with granules and very fine, relatively long setae. Merus and carpus with distomesial ventral spine of small size. Palm unarmed, 1.3 times as long as carpus, moderately depressed, and distally somewhat widened. Fingers relatively short and stout, about 1/3 as long as palm, distally crossing when closed, opposable margins finely tuberculate and sinuous.

Walking legs similar, very setose, particularly on ventromesial surface. Meri and carpi spineless. Propodi somewhat curving ventrad, relatively high, about 5 times as long as high, ventral margin with 3-6 movable spinelets on distal portion, distal one paired with additional ventromesial one. Dactyli not slender, proportionately high, somewhat curving, ventrally bearing 13-18 somewhat inclined, closely placed spinelets, penultimate one stout.

REMARKS

The present specimens agree well with the original description which is rather brief; therefore an extensive description is provided above. The two young males from the "Valdivia" Station 196 off southern Nias (0°27' N, 98°7' E) (6.6 mm in carapace length) are noted to be different from the adult in the smooth, nongranulose carapace, the propodus of the cheliped having a few ventral spinelets, and the less numerous setae [on the body and appendages] (DOFLEIN and BALSS, 1913 : 138). But the smallest of the present specimens, which is as large as those young males, has no palmar spinulation.

RANGE : Off Somalia, Madagascar and southern Nias Canal west of Sumatra; 646-1079 m.

Urotychus gracilimanus (Henderson, 1885)

(Fig. 8a, b)

Diptychus gracilimanus Henderson, 1885 : 420.

Urotychus gracilimanus : HENDERSON, 1888 : 181, pl. 21, fig. 5. — BABA, 1988 : 35 (*ubi* ref. and syn.).

MATERIAL. — **Madagascar** : "Vauban", CH 35; 12°49.5' S, 48°05.9' E; 760-810 m; 14 Sep. 1972; 06.27-07.25 hr : 1 ovig. ♀ (9.0). CH 102; 22°20.3' S, 42°59' E; 995-1020 m; 7.35-8.35 hr; 27 Nov. 1973 :

4 ovig. ♀ (7.8-11.2), 1 ♀ (5.8). — CH 103; 22°18.2'S, 43°00.5'E; 880-920 m; 11.10-12.25 hr; 29 Nov. 1973 : 2 ♂ (9.6, 12.2), 1 ♀ (7.3). — CH 104; 22°15.7'S, 43°01.5'E; 750-810 m; 14.45-15.35 hr; 29 Nov. 1973 : 2 ♂ (7.8, 10.0), 3 ovig. ♀ (6.3-10.2), 6 ♀ (6.7-9.9). — CH 109; 22°16.9'S, 42°56'E; 1200 m; 16.20-17.20 hr; 30 Nov. 1973 : 1 ♂ (11.2), 2 ovig. ♀ (7.8, —). — CH 113; 22°19'S, 42°59.7'E; 990-1010 m; 19.25-20.25 hr; 1 Dec. 1973 : 4 ♂ (9.0-11.4). — CH 124; 17°40'S, 43°12'E; 1075-1115 m; 17.00-18.00 hr; 15 Jan. 1975 : 4 ♂ (8.3-11.4), 2 ovig. ♀ (9.6, 10.6), 3 ♀ (9.5-10.7). — CH 135; 13°01'S, 48°01'E; 1075-1110 m; calcareous mud; 2 Jan. 1975; 19.30-20.30 hr : 1 ♂ (8.1). — CH 139; 13°50.0'S, 47°37.0'E; 850-1125 m; 21.00 hr; 27 Feb. 1975 : 3 ♂ (7.9-9.8), 2 ovig. ♀ (11.7, 12.1), 2 ♀ (8.7, 11.0). — CH 141; 22°16.6'S, 43°01.9'E; 695-710 m; 9.30-10.30 hr; 30 Nov. 1973 : 1 ♀ (8.8). — CH 142; 13°45.6'S, 47°34.2'E; 1250-1300 m; 15.15 hr; 28 Feb. 1975 : 1 ovig. ♀ (10.7).

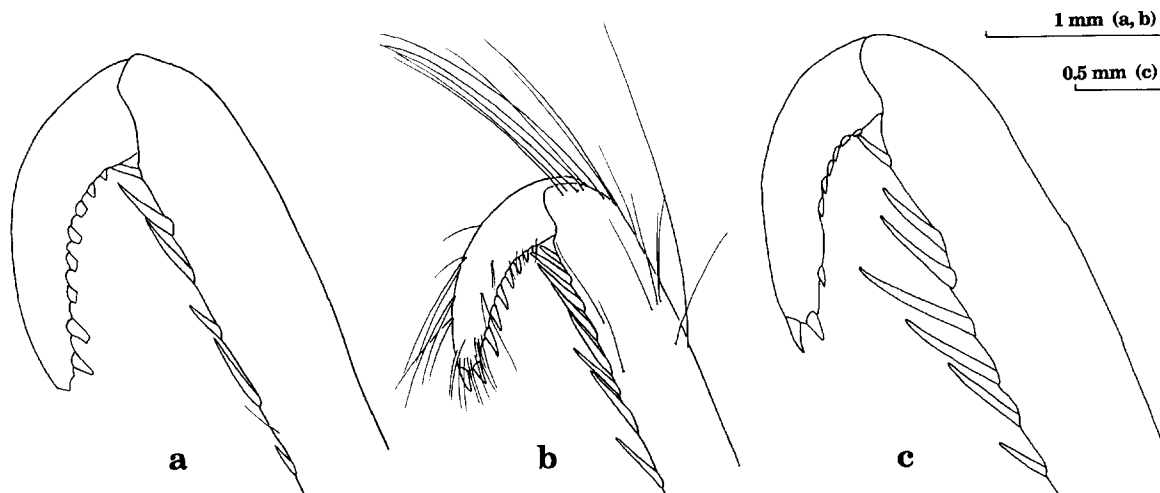


FIG. 8. — Distal segments of left first walking legs, lateral view : a, *Uroptychus gracilimanus* (Henderson, 1885), ovigerous female holotype (10.3 mm) from “Challenger” Station 164B (BM 88 : 33), setae omitted; b, same, female (10.9 mm) from CH 139 (MNHN Ga 1520); c, *U. vandamae* Baba, 1988 [= *U. gracilimanus* : DOFLEIN and BALSS, 1913 : 134], male (7.1 mm) from “Valdivia” Station 245 (SMF 4549), setae omitted.

REMARKS

Relationships with the closer *U. acostalis* Baba, 1988, are discussed under the “Remarks” of the latter (see above).

The characteristic feature of the dactylar spination of the walking leg in *U. gracilimanus* is illustrated here from the ovigerous female holotype taken from Station 164B off Port Jackson of the “Challenger” Expedition and now deposited in the British Museum (Natural History) (BM 88 : 33) (see fig. 8a). One male of the three specimens of *U. gracilimanus* from the “Valdivia” Station 245 in Zanzibar Canal (DOFLEIN and BALSS, 1913 : 134) is now in the collection of the Senckenberg Museum at Frankfurt am Main (SMF 4549). Close examination of this specimen revealed that it should be referred to *U. vandamae* Baba, 1988, because the dactylar ventral spines of the walking legs are inclined, the distal three of which are arranged loosely as noted for the ovigerous female paratype of *U. vandamae* (fig. 8c; see BABA, 1988 : 52).

Uroptychus gracilimanus bidentatus that was proposed for the specimens from off Somalia (DOFLEIN and BALSS, 1913 : 135) will in all probability be referable to *U. vandamae*, for the

discriminating character stressed by DOFLEIN and BALSS falls within the limits of variation as noted under the Remarks of *U. vandamae* (see below, p. 949).

The remaining "Valdivia" records (DOFLEIN and BALSS, 1913 : 134) are removed until the identity of the material is confirmed by reexamination.

RANGE : Madagascar, Molucca Sea, New South Wales coast, East China Sea, and Japan; 421-1668 m.

***Uroptychus granulatus* Benedict, 1902**

(Fig.-9)

Uroptychus granulatus Benedict, 1902 : 293, fig. 37. — BABA, 1988 : 42, fig. 16.

MATERIAL. — **Madagascar** : "Vauban", CH 103; 22°18.2' S, 43°00.5' E; 880-920 m; 29 Nov. 1973; 11.10-12.25 hr : 2 ♂ (12.5, 14.9), 1 ♀ (12.0).

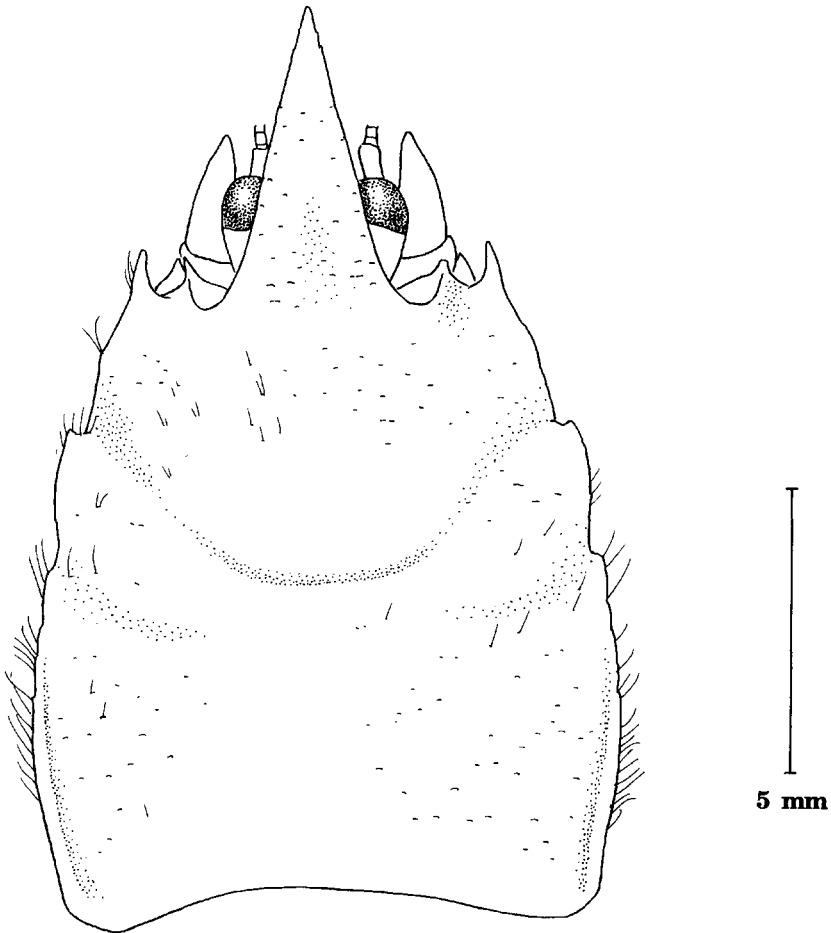


FIG. 9. — *Uroptychus granulatus* Benedict, 1902, male (14.9 mm) [MNHN Ga 1524] from CH 103 : carapace, dorsal view.

REMARKS

Except for the weaker spination of the lateral margin of the carapace (fig. 9), the specimens agree quite well with descriptions or descriptive remarks, and illustrations of the type material of *U. granulatus* provided by BENEDICT (1902 : 293, fig. 37) and BABA (1988 : 42, fig. 16). *Uroptychus occultispinatus*, formerly known as *U. granulatus japonicus* Balss, 1913 (see BABA, 1988 : 41), differs from this species in that : the distal two segments of the antennal peduncle bear an acute terminal spine; the cheliped has relatively stout fingers, the merus and carpus of the third maxilliped each bear a distolateral spine; and the walking legs bear less numerous and more elongate ventral spinelets on the dactyli (BABA, 1988 : 41).

RANGE : Previously known only from the Galapagos Islands, in 717 m. If the present identification is correct, occurrence in the Malay Archipelago and vicinity will be highly probable.

***Uroptychus longiocularis* new species**

(Fig. 10)

MATERIAL. — **Madagascar** : “Vauban”, CH 7; 12°42.4'S, 48°14.1'E; 375-380 m; slightly calcareous sandy mud; on gorgonian corals; 5 Mar. 1971; 15.00-16.00 hr : 1 ♂ (8.0) [holotype, MNHN Ga 1460]. — CH 8; 12°43.5'S, 48°14.3'E; 370 m; calcareous sand; 14 Apr. 1971; 05.54-06.54 hr : 1 ♂ (8.9) [paratype, MNHN Ga 1467]. — CH 10; 12°43'S, 48°15'E; 348-360 m; calcareous sand; 14 Apr. 1971; 15.30-17.30 hr : 1 ♀ (7.2) [paratype, MNHN Ga 1463]. — CH 11; 12°39.8'E, 48°15.2'E; 375-385 m; calcareous quartz sand and slightly calcareous mud; 14 Apr. 1971; 19.00-21.00 hr : 2 ♂ (7.4, 7.5), 1 ovig. ♀ (7.4) [paratypes, MNHN Ga 1459]. — CH 13; 12°41.3'S, 48°16'E; 308-314 m; calcareous sand; 15 Apr. 1971; 07.05-08.05 hr : 6 ♂ (4.9-8.1), 1 ♀ (7.7) [paratypes, MNHN Ga 737]. — CH 14; 12°43.3'S, 48°15.7'E; 245-255 m; calcareous sand; 15 Apr. 1971; 09.15-10.15 hr : 2 ovig. ♀ (6.2, 7.1) [paratypes, MNHN Ga 1464]. — CH 18; 12°41.0'S, 48°14.5'E; 290-295 m; slightly calcareous sandy mud; 18 Jan. 1972; 15.47-17.47 hr : 1 ♀ (7.1) [paratype, MNHN Ga 1465]. — CH 43; 15°24.5'S, 46°02.0'E; 250-265 m; moderately calcareous sand; 7 Nov. 1972; 10.13-11.02 hr : 1 ♂ (6.1), 1 ovig. ♀ (6.2) [paratypes MNHN Ga 1462]. — CH 45; 15°20.5'S, 46°09.5'E; 310-350 m; slightly calcareous sandy mud; 7 Nov. 1972; 15.50-16.40 hr : 1 ovig. ♀ (6.0) [paratype, MNHN Ga 1457]. — CH 121; 12°40.0'S, 48°14.0'E; 410 mm; calcareous mud; 11 Oct. 1974; 10.35-11.35 hr : 1 ovig. ♀ (8.9) [paratype MNHN Ga 1538]. — DR 2; 12°38.5'S, 48°16.5'E; 240 m; calcareous quartz sand; 11 Oct. 1974 : 1 ♂ (5.0), 4 ovig. ♀ (5.8-6.8) [paratypes, MNHN Ga 1536].

DESCRIPTION OF HOLOTYPE

Carapace somewhat widened posteriorly, postorbital carapace length distinctly more than greatest width. Gastric region somewhat elevated in anterior profile, with 2 tiny spines directly behind outer edges of eyestalks. Lateral margin with spines of irregular size; anterolateral spine pronounced, spine at ordinary end of cervical groove also pronounced and distinctly dorsal to level of remainder, with accompanying spinule dorsal to it on left side only; that at midlength larger than following ones and as large as anterolateral one; posterior 1/4 of length spineless, distinctly ridged.

Rostrum broadly triangular, length less than half that of remaining carapace; nearly straight, dorsally excavated. Eyestalks relatively long, but not reaching end of rostral tip, cornea moderately dilated and distinctly wider than remaining eyestalk.

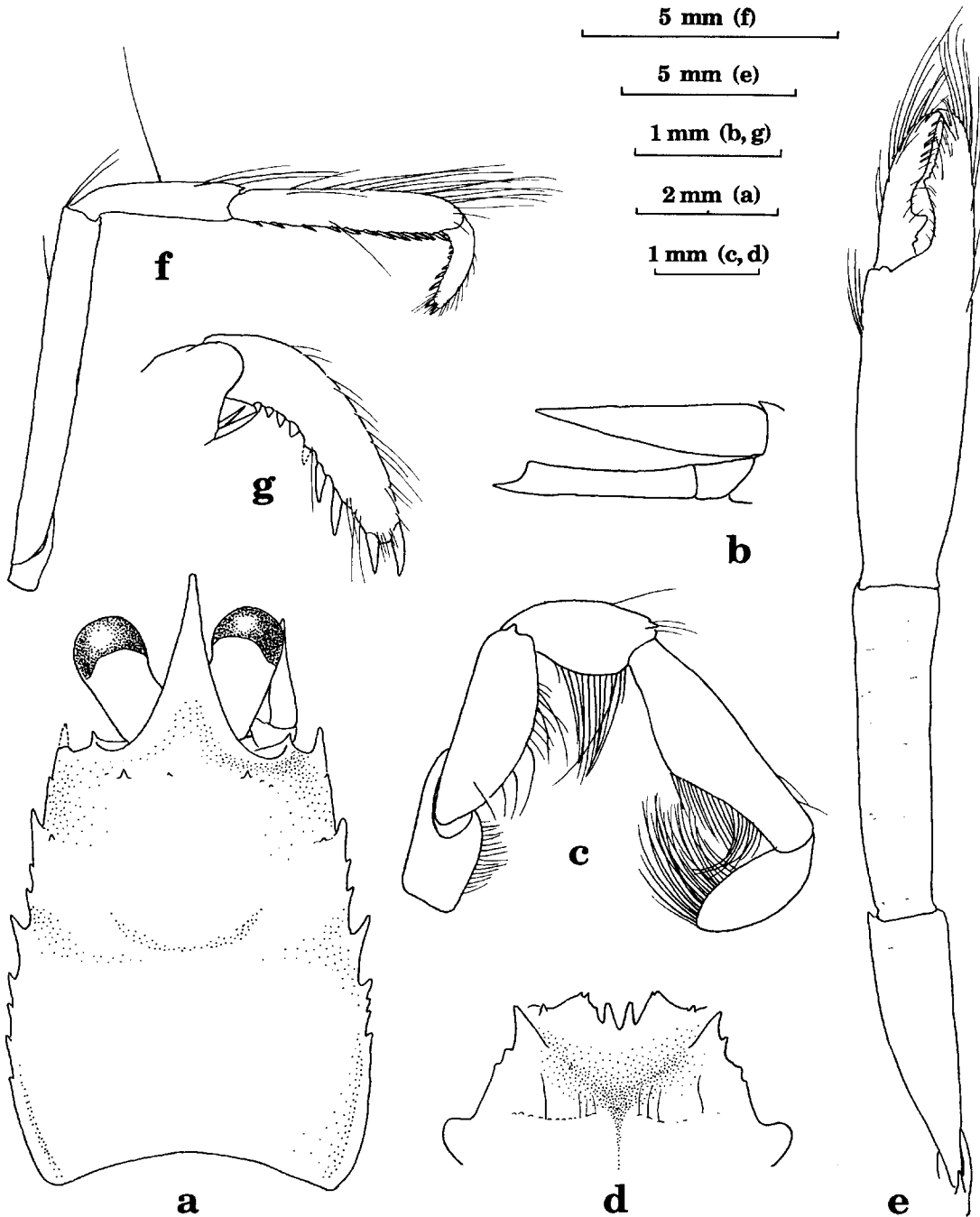


FIG. 10. — *Uroptychus longiocularis* new species, male holotype [MNHN Ga 1460] from CH 7 : a, carapace, dorsal view; b, left antennal peduncle, ventral view; c, endopod of right third maxilliped, lateral view; d, anterior part of sternum; e, right cheliped, lateral view; f, right first walking leg, lateral view; g, distal two segments of same.

Pterygostomial flap with subtruncate anterior margin ending in very tiny spine.

Distal 2 segments of antennal peduncle rather slender, ultimate segment about 4 times as long as penultimate when measured along mesial margin, distomesial angle with distinct spine. Antennal scale wider than peduncle, nearly reaching end of ultimate segment.

Endopod of third maxilliped slender, merus with small distolateral spine, ischium with 22 (left) or 20 (right) denticles on mesial ridge.

Third thoracic sternite strongly depressed, anterior margin rather narrow, deeply concave with 2 very strong submedian spines basally very close to each other and their mesial margins nearly V-shaped; lateral margin very oblique, bearing low process on each proximal portion. Following sternite relatively wide anteriorly, with strong anterolateral spine directed anterolaterad, followed by few processes.

Chelipeds 4.0 times as long as carapace including rostrum. Merus and carpus subcylindrical, merus with 3 terminal spines: distomesial and distolateral ones small, other somewhat larger and ventral to former. Palm as long as carpus, barely twice as long as movable finger, about 3 times as long as wide. Fingers distally setose, gaping on proximal half, movable finger with broad process (left) or distally sharpened process (right), fixed finger produced near midlength (slightly distal to midpoint), opposable margins fitting each other on distal halves and distally crossing when closed.

Walking legs slender, provided sparsely with long setae on carpi, moderately on propodi. First and second walking legs having meri fully larger than postorbital carapace, dorsally unarmed, ventrally bearing distal spine. Carpi about half as long as meri, distodorsally bearing small spine. Propodi 5.7 times as long as high, fully twice as long as dactyli, ventrally bearing 12 spinelets, distal one paired with another mesial to it. Dactyli relatively slender, proximally curving, with 9 ventral spinelets gradually decreasing in size toward base of segment. Right third walking leg missing, left one shorter, with fewer spinelets (7) on ventral margin of propodus.

VARIATIONS

The anterior border of the gastric region is usually elevated in profile, often bearing 2 small but distinct spines, occasionally very tiny tubercles instead, or accompanying tubercles. In smaller specimens the meral spination of the cheliped is pronounced, having a larger distomesial spine and a few mesial marginal spines of small size. The two submedian spines on the anterior margin of the third thoracic sternite are arranged as in the holotype in 14 of the 24 paratypes, much closer to each other in six paratypes, separated by a narrow U-shaped sinus in three specimens, and by a widely V-shaped notch in one specimen. The ratios of the length of the first walking leg merus to the postorbital carapace length vary from 1.10 to 1.39 (average 1.24), and the palm-dactylus ratios of the chelipeds vary between 1.6 and 2.3 (average 1.86). The spine at midlength of the lateral margin of the carapace is often pronounced, very occasionally as large as the anterolateral spine which is usually smaller than that directly behind the end of the cervical groove, rarely small and about as large as the following spine.

REMARKS

Elongate eyestalks, broadly triangular and dorsally excavated rostrum, laterally spinose carapace, size and arrangement of dactylar ventral spines of the walking legs strongly link the

new species to *U. sibogae* van Dam, 1933. On examination of the male holotype as well as additional material reported earlier of *U. sibogae* (BABA, 1981 : 119; 1988 : 45), *U. longioculus* is distinguished by the following particulars : 1) the length of the carapace (postorbital carapace length) is fully more than its greatest width in *U. longioculus*, nearly as long or shorter in *U. sibogae*; it is also distinctly less than the length of the merus of the first walking leg in *U. longioculus*, quite reverse in *U. sibogae*; 2) the spination of the lateral margin of the carapace is very pronounced in the new species, very reduced particularly on the posterior portion in *U. sibogae*; 3) in *U. longioculus*, the two anterior submedian spines of the third thoracic sternite are more prominent, only slightly falling short of the end of the sternum, and lack a notch between them, instead of having a U-shaped sinus flanked by moderate-sized median spines in *U. sibogae*; 4) the pereopods are much slenderer in *U. longioculus*; 5) the merus of the third maxilliped in *U. longioculus* bears a distolateral spine which is wanting in *U. sibogae*.

Ova measure 1.1-1.2 mm in diameter.

ETYMOLOGY : From the Latin *longus* (long) plus *oculus* (eye) referring to the elongate eyestalks.

RANGE : Recorded here from Madagascar; 240-410 m.

***Uroptychus nigricapillis* Alcock, 1901**

Uroptychus nigricapillis Alcock, 1901 : 283, pl. 3, fig. 3. — BABA, 1988 : 40 (*ubi* ref. and syn.).

MATERIAL. — **Madagascar** : “Vauban”, CH 109; 22°16.9' S, 42°56' E; 1200 m; 16.20-17.20 hr; 30 Nov. 1973 : 1 ovig. ♀ (13.4). — CH 131; 13°46' S, 47°33' E; 1490-1600 m; 14.45-15.45 hr; 20 Jan. 1975 : 1 ovig. ♀ (13.8). — CH 138; 13°48.8' S, 47°29.4' E; 1800-2000 m; 27 Feb. 1975 : 1 ovig. ♀ (8.3). — CH 142; 13°45.6' S, 47°34.2' E; 1250-1300 m; calcareous mud; 28 Feb. 1975 : 15.15 hr : 2 ♂ (12.5, 13.3), 6 ovig. ♀ (12.3-15.0).

REMARKS

U. nigricapillis strongly resembles *U. vandamae* Baba, 1988; their relationships are discussed under the “Remarks” of the latter (see below, p. 949).

RANGE : Zanzibar, Madagascar, Saya de Malha Bank, Maldives, South Arabian coast, Andaman Sea, Java Sea, Flores Sea, between Siquijor and Bohol, off southwestern Luzon, and Japan; 66-2000 m.

***Uroptychus remotispinatus* Baba and Tirmizi, 1979**

Uroptychus remotispinatus Baba and Tirmizi, 1979 : 52, figs 1, 2.

MATERIAL. — **Madagascar** : “Vauban”, CH 131; 13°46' S, 47°33' E; 1490-1600 m; 20 Jan. 1975; 14.45-15.45 hr : 1 ovig. ♀ (9.2). — CH 138; 13°48.8' S, 47°29.4' E; 1800-2000 m; 27 Feb. 1975; 16.00 hr : 12 ♂ (6.7-11.5), 18 ovig. ♀ (8.6-11.3), 19 ♀ (6.0-11.6). — CH 139, 13°50.0' S, 47°37.0' E; 850-1125 m; 27 Feb. 1975; 21.00 hr : 1 ovig. ♀ (10.5).

REMARKS

Uroptychus remotispinatus, originally known from two disjunct localities, Japan and the southern East African coast, is so similar to *U. vandamae* Baba, 1988, that careful examination

of the following is needed for discrimination : in *U. remotispinatus*, the third thoracic sternite is shallowly depressed with a less strongly produced posterior margin; the fourth thoracic sternite bears a shorter anterolateral margin that is only slightly longer than the posterolateral margin, instead of being twice as long in *U. vandamae*; the carpi and propodi of the walking legs are slenderer, the former being much longer relative to the latter.

RANGE : Off Durban, off Mozambique, Madagascar, and Japan; 850-2000 m.

Uroptychus soyomaruae Baba, 1981

Uroptychus soyomaruae Baba, 1981 : 129, figs 12, 13. — ZARENKOV and KHODKINA, 1981 : 89, fig. 5.

MATERIAL. — **Madagascar** : “Vauban”, CH 118; 12°49.0' S, 48°02.7' E; 925-975 m; calcareous sandy mud; 10 Oct. 1974; 14.15-15.15 hr : 1 ovig. ♀ (17.0).

REMARKS

This species is very much like *U. sternospinosus* Tirmizi, 1964, from the Maldives in having two prominent anterior gastric spines and granulose carapace and chelipeds. In addition to the discriminating characters given by BABA (1981 : 132) that seem consistent, this species is also distinguished by having the third thoracic sternite with two median spines on the anterior margin and the cornea not so markedly swollen as in TIRMIZI's species.

RANGE : Madagascar, southeast of Miyake-jima of the Izu Islands, and Marcus-Necker Rise; 860-1300 m.

Uroptychus tridentatus (Henderson, 1885)

Diptychus tridentatus Henderson, 1885 : 421.

Uroptychus tridentatus : HENDERSON, 1888 : 181, pl. 6, figs 1, 1a. — VAN DAM, 1933 : 30, figs 45, 46; 1937 : 99. — BABA, 1973 : 117.

Uroptychus zezuensis Kim, 1972 : 53, figs, 1, 2; 1973 : 171, fig. 17, pl. 64, figs 4a, 4b.

MATERIAL. — **Madagascar** : “Vauban”, CH 63; 23°36.3' S, 43°32.5' E; 250 m; 28 Feb. 1973; 06.30-07.30 hr : 2 ♂ (3.5, 6.7), 2 ♀ (5.5, 5.7). — CH 68; 25°08.9' S, 47°21.5' E; 255 m; 3 Mar. 1973; 08.00-09.00 hr : 1 ♂ (5.2).

REMARKS

The branchial marginal spines behind the ordinary end of the cervical groove are three in the holotype (HENDERSON, 1888 : 182), four or rarely six in the “Siboga” material (VAN DAM, 1933 : 31). In the present material they are usually four, occasionally five; in the latter case the hindmost one is very small. The partial reduction of these spines, in particular, from the posterior portion, which is displayed by specimens in the Copenhagen Museum collection (unpublished), indicates that *U. zezuensis* Kim, 1972, should be merged with this species, as suggested earlier in my previous paper (BABA, 1988 : 17). The meri of the walking legs, at least

of the first pair, bear dorsal spines along the whole length and ventral spines on the distal portion, which spination is not mentioned in previous descriptions. Inasmuch as no other characters separate this form from the typical *tridentatus*, however, the above-mentioned spinous specimens may be referred to *U. tridentatus*.

RANGE : Madagascar, north of the Sulu Islands, Taam Island of the Kei Islands, Ambon, Solor Strait, Yaeyama Group of the Ryukyus, the Korea Strait off Jejudo, off Hachija-jima of the Izu Islands, near Mukojima of the Bonin Islands; 27-305 m. This is the first record from the western part of the Indo-West Pacific.

Uroptychus vandamae Baba, 1988

(Fig. 8c)

Uroptychus gracilimanus : DOFLEIN and BALSS, 1913 : 134 (part) [not *U. gracilimanus* (Henderson, 1885)].

Uroptychus gracilimanus bidentatus Doflein and Balss, 1913 : 135.

Uroptychus vandamae Baba, 1988 : 49, fig. 21.

MATERIAL. — **Madagascar** : “Vauban”, CH 9; 12°42' S, 48°13.5' E; 455-460 m; 14 Apr. 1971; 08.05-09.05 hr : 1 ♂ (8.0). — CH 29; 12°43.1' S, 48°11.1' E; 540 m; 13 Sep. 1972; 06.38-07.38 hr : 1 ♂ (8.6). — CH 30; 12°40.0' S, 48°09.5' E; 595-605 m; 13 Sep. 1972; 08.37-09.37 hr : 1 ♂ (9.6), 1 ovig. ♀ (8.9). — CH 37; 12°51.0' S, 48°06.3' E; 675-705 m; 14 Sep. 1972; 15.15-15.55 hr : 8 ♂ (5.0-9.4), 4 ovig. ♀ (6.9-8.8), 2 ♀ (6.8, 8.7). — CH 92; 21°26.5' S, 43°11' E; 810-1020 m; 26 Nov. 1973; 14.15-15.30 hr : 1 ♂ (7.8). — CH 95; 22°21.6' S, 43°04.3' E; 450 m; 27 Nov. 1973; 13.50-14.50 hr : 1 ♀ (7.2). — CH 98; 22°17.3' S, 43°12.7' E; 600-605 m; 28 Nov. 1973; 07.35-08.35 hr : 6 ♂ (6.7-9.2), 3 ovig. ♀ (6.4-8.0), 11 ♀ (6.3-9.0). — CH 102; 22°20.3' S, 42°59' E; 995-1020 m; 29 Nov. 1973; 07.35-08.35 hr : 3 ♂ (6.9-7.1), 1 ovig. ♀ (7.4), 4 ♀ (6.3-8.7). — CH 107; 22°16.6' S, 43°01.9' E; 695-710 m; 30 Nov. 1973; 09.30-10.30 hr : 3 ♀ (7.6-8.6). — CH 108; 22°18.9' S, 43°01.1' E; 735-760 m; 30 Nov. 1973; 13.05-13.50 hr : 1 ♀ (7.7). — CH 109; 22°16.9' S, 42°56' E; 1200 m; 30 Nov. 1973; 16.20-17.20 hr : 3 ♂ (6.5-8.1), 1 ovig. ♀ (7.8), 2 ♀ (6.1, 12.5). — CH 112; 22°18' S, 43°02.2' E; 640-660 m; 1 Dec. 1973; 14.40-16.40 hr : 12 ♂ (7.3-10.6), 1 ovig. ♀ (7.3), 11 ♀ (5.9-9.0). — CH 113; 22°19' S, 42°59.7' E; 990-1010 m; 1 Dec. 1973; 19.25-20.25 hr : 1 ♂ (8.2). — CH 119; 12°50.7' S, 48°06.0' E; 750-765 m; 10 Oct. 1974; 17.10-18.10 hr : 1 ♀ (7.5). — CH 122; 12°43.0' S, 48°12.0' E; 500 m; 11 Oct. 1974; 13.40-14.40 hr : 1 ovig. ♀ (8.7).

REMARKS

The types from Indonesian waters in the Molucca Sea and the Makassar Strait have the carapace smooth and unarmed on the dorsal surface (BABA, 1988 : 49). However, in the present specimens there is considerable variation in the armature of the gastric region, ranging from a complete elimination of spines to occurrence of two distinct or pronounced spines : In 16 of the 86 specimens examined (18.6%) there are two distinct epigastric spines which are very pronounced in 6 of them; 26 specimens (30.5%) have two rudimentary spines instead, 20 (23.5%) have two granular elevations, and in 21 (24.7%) specimens there is no sign of spination. The first of the above-listed variations suggests that this species strongly resembles *U. nigricapillis* Alcock, 1901, from which, however, it clearly differs in the dactyli of the walking legs that bear two groups of inclined spinelets on the ventral margin, and in the third thoracic sternite that is strongly depressed, with a produced posterior margin.

It is suggested that one male of *U. gracilimanus* from the “Valdivia” Station 245 and *U.*

gracilimanus bidentatus Doflein and Balss, 1913, should be called *U. vandamae* (see "Remarks" of *U. gracilimanus* in this paper).

RANGE : Madagascar, Makassar Strait and Molucca Sea; 455-1200 m.

Family GALATHEIDAE

Genus ALLOGALATHEA Baba, 1969

Allogalthea elegans (Adams and White, 1848)

Galathea elegans Adams and White, 1848 : pl. 12, fig. 7.

Allogalthea elegans : BABA, 1969 : 6, fig. 1 (*ubi* ref. and syn.); 1988 : 54.

MATERIAL. — **Madagascar, NW coast** : Near Tany-Kely; 13°28' S, 48°12' E; 28 m; sand and sponge; trawled; 26 Feb. 1971; 9.30 hr : 1 ovig. ♀ (9.7). — Iles Mitsio; 60 m; sand; Feb. 1960 : 3 ♂ (7.3-10.1), 6 ovig. ♀ (7.8-10.9), 2 ♀ (9.2, 11.8). — 12°49.5' S, 48°30.0' E; 55 m; trawled; 2 Aug. 1973; 12.02 hr : 2 ♂ (8.2, 9.4), 1 ♀ (4.4). **Madagascar, W coast** : "FAO 26", 17°05' S, 43°50' E; 40-46 m; 26 Sep. 1973 : 1 ovig. ♀ (10.5). — Banc de Pracel; 55 m; muddy sand; Jun. 1959 : 1 ovig. ♀ (10.3). **Madagascar, S coast** : "Vauban", CH 74; 25°04.8' S, 46°55.7' E; 28 m; 4 Mar. 1973; 08.43-08.50 hr : 5 ♂ (5.0-9.2), 1 ovig. ♀ (8.9), 1 ♀ (5.5).

RANGE : Red Sea, east coast of Africa, eastward to Fiji Islands via the Malayan Archipelago, northward to Japan and southward to eastern and western Australia; intertidal to 146 m (BABA, 1988 : 54).

GENUS BATHYMUNIDA Balss, 1914

Bathymunida polae Balss, 1914

(Fig. 11)

Bathymunida polae Balss, 1914 : 138; 1915 : 5, figs 2-5. — VAN DAM, 1938 : 202. — LEWINSOHN, 1969 : 132.

MATERIAL. — **Madagascar** : "Vauban", CH 14; 12°43.3' S, 48°15.7' E; 245-255 m; calcareous sand; 15 Apr. 1971; 09.15-10.15 hr : 11 ♂ (3.2-5.7), 8 ovig. ♀ (3.6-4.1), 3 ♀ (3.3-3.6). — 12°19' S, 48°27' E; 250 m; Oct. 1971; coll. G. CASELLATO : 1 ♂ (3.7). — CH 52; 15°21.0' S, 46°12.5' E; 150 m; moderately calcareous sand; 8 Nov. 1972; 16.40-17.40 hr : 10 ♂ (4.3-5.6), 1 ♀ (5.0). — 12°40.0' S, 48°18.0' E; 185-205 m; dredged; 1 Aug. 1973; 18.30 hr : 2 ovig. ♀ (3.6, 4.3). — DR 2; 12°38.5' S, 48°16.5' E; 240 m; calcic-quartz sand; 11 Oct. 1974 : 7 ♂ (3.9-5.9), 17 ovig. ♀ (3.7-4.9), 3 ♀ (2.9-4.1).

REMARKS

The specimens generally fit the descriptions given by BALSS (1915 : 5) and VAN DAM (1938 : 202) except for the rostrum and chelipeds that are mentioned below : Twenty of the 63

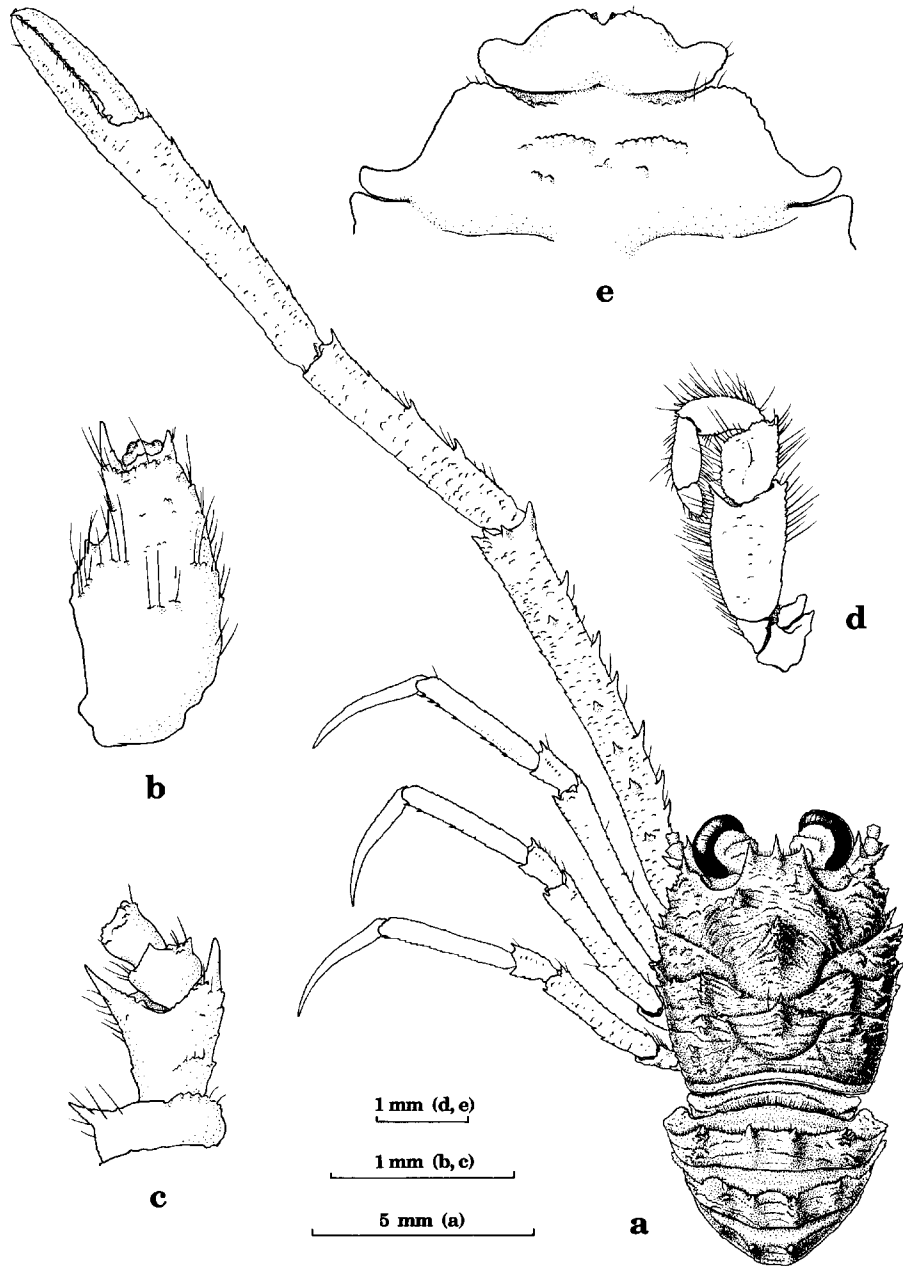


FIG. 11. — *Bathymunida polae* Balss, 1913, male (5.6 mm) [MNHN Ga 707] from CH 52 : a, animal, dorsal view ; b, basal segment of right antennule, ventral view ; c, left antennal peduncle, ventral view ; d, left third maxilliped, exopod omitted, lateral view ; e, anterior part of sternum.

specimens examined have intact chelipeds at least on one side. Most of them (16) are small (3.3-4.3 mm), including ovigerous females, and have carapace-cheliped length ratios varying between 1.8 and 2.5 (average, 2.2) just as illustrated by BALSS (1915 : fig. 2) and as defined by VAN DAM (1938 : 202); however, there are four exceptions : they are all males of larger size (5.1-5.6 mm), having the ratios ranging from 3.0 to 4.7. This fact seems at variance with the definition of *B. polae* given by VAN DAM (1938 : 202) and suggests that the specimens having such longer chelipeds approach *B. balssi* van Dam, 1938, in which the ratio is noted to be about 4, being represented by males only (VAN DAM, 1938 : 199). Also different from the previous accounts of *B. polae* are the length of rostrum relative to supraocular (lateral) spines. Among 56 of the 63 specimens in which rostral and supraocular spines are intact, only three specimens, all females, have a shorter rostrum as illustrated by BALSS, 28 have equal sized rostral and lateral spines, 24 have a slightly longer rostrum, and the remaining one (male) has a more elongate, slender rostrum. Thus it is not unlikely that *B. balssi* and *B. polae* are conspecific; however, the extremely short rostrum noted to be characteristic of *B. balssi* (see VAN DAM, 1938 : 199) is not found on any of the available specimens.

One male (4.3 mm) from Sta CH 52 bears a bopyrid parasite on the right branchial cavity, and another female (5.0 mm) from the same station bears rhizocephalan parasites on the abdomen.

RANGE : Previously known from the Red Sea; 212 m.

Genus **CORALLIOGALATHEA** Baba and Javed, 1974

Coralliogalatea humilis (Nobili, 1905)

Galathea humilis Nobili, 1905 : 396; 1906 : 124, pl. 8, figs 8, 8a. — LEWINSOHN, 1969 : 117, fig. 22.

Galathea megalochira Nobili, 1907 : 376, pl. 1, figs 12, 12a, 12 b.

Galathea tridentirostris Miyake, 1953 : 202, figs 3, 4.

Coralliogalatea humilis : BABA and JAVED, 1974 : 62, fig. 1. — BABA, 1977 : 250; 1982a : 61.

MATERIAL : None.

RANGE : Red Sea, Djibouti, Madagascar, New Guinea, Palau Islands, Ryukyu Islands, and Polynesia; intertidal.

Genus **GALATHEA** Fabricius, 1793

Galathea aegyptiaca Paulson, 1875

Galathea aegyptiaca Paulson, 1875 : 94, pl. 12, figs 1, 1a, 1b. — BABA, 1977 : 244 (*ubi* syn. and ref.); 1979b : 645; 1982a : 59. — GARTH *et al.*, 1987 : 252.

MATERIAL. — **Madagascar** : NW coast, Nosy Be (Pointe à la Fièvre); intertidal; 8 Feb. 1974; coll. Bernard and Michel Opic : 1 ♂ (5.8). — W coast, Banc de Pracel, 50 m; muddy sand; Jun. 1959 : 1 ♂ (4.6).

REMARKS

The color illustrations of fresh specimens, showing color patterns C and E of MIYAKE and BABA (1966 : 63, fig. 5), are published by KAMEZAKI *et al.* (1988 : 95).

RANGE : Red Sea, Madagascar, Amirante, Saya de Malha Bank, Cargados Carajos, Ternate, Timor, Obi Island, Talaud Island, Hollandia Bay (New Guinea), Loyalty Islands, Western Australia, Palau Islands, Ryukyu Islands, Bonin Islands, and Marshall Islands; intertidal to 146 m.

Galathea affinis Ortmann, 1892

Galathea affinis Ortmann, 1892 : 252, pl. 11, figs 9a, 9i. — BABA, 1977 : 247 (*ubi ref.* and syn.); 1979*b* : 646; 1982*a* : 59. — GARTH *et al.*, 1987 : 252.

MATERIAL. — **Comoro Islands** : Mayotte, north reef; 20 m; Apr. 1959 : 3 ♂ (4.2-5.3), 1 ovig. ♀ (4.9).

RANGE : Red Sea, Madagascar, Mauritius, Saya de Malha Bank, Farquhar Island, Coëtivy Island, Chagos Archipelago, north coast of New Guinea, Bandanaira, Ternate, Loyalty Islands, Timor, Palau Islands, Marshall Islands, Ryukyu Islands, Fiji Islands, Tuamotu Islands, Rotuma Island, and Ellice Island; intertidal to 48 m.

Galathea amamiensis Miyake and Baba, 1966

Galathea amamiensis Miyake and Baba, 1966 : 75, figs 13, 14. — BABA, 1979*b* : 647, fig. 1.

MATERIAL. — **Madagascar** : W coast, Banc de Pracel; 50 m; Jun. 1959 : 1 ♂ (3.8), 1 ovig. ♀ (4.2).

REMARKS

The coloration in a fresh specimen is provided by KAMEZAKI *et al.* (1988 : 96).

RANGE : Madagascar, Moluccas, and Ryukyu Islands; intertidal to 50 m. This is the first record from the western part of the Indo-West Pacific as well as from the Indian Ocean.

Galathea anepipoda new species

(Fig. 12)

MATERIAL. — **Madagascar** : "Vauban", CH 52; 15°21.0' S, 16°12.5' E; 150 m; moderately calcareous mud; 8 Nov. 1972; 16.40-17.40 hr : 1 ♂ (6.3) [holotype, MNHN Ga 710]. — CH 72; 25°11.2' S, 47°14.7' E; 85-90 m; 3 Mar. 1973; 17.08-18.08 hr : 1 ovig. ♀ (6.1) [paratype, MNHN Ga 711].

DESCRIPTION OF HOLOTYPE

Carapace excluding rostrum slightly longer than wide, dorsal surface with rugae as illustrated; anterior first stria with 2 epigastric spines, second stria present on protogastric region, followed behind by large scalelike stria provided with 2 median pits suggesting roots of

stiff setae. Lateral margins subparallel, armed with 5 spines, first anterolateral and moderately large, second situated directly behind end of anterior bifurcation of cervical groove, somewhat smaller than both first and third, fourth situated at midlength and largest, fifth (hindmost) very small.

Rostrum triangular, 1.8 times as long as wide, 0.54 as long as remaining carapace, lateral margin with 4 deeply incised teeth including basal one, dorsal surface flattish and feebly granulose. Outer orbital angle with small spine directed moderately anterolaterad.

Pterygostomian flap as illustrated, anterior end terminating in blunt process.

Second and third abdominal segments each with 2 transverse ridges, anterior ridge somewhat elevated, posterior ridge with distinct accompanying groove anterior to it on second segment, indistinct one on third segment. Fourth abdominal segment with anterior ridge only.

Antennular basal segment with 3 terminal spines : mesial, lateral and dorsal ; mesial and lateral subequal in size. Antennal peduncle having first (basal) segment with strong, elongate spine on distomesial margin, second segment with distomesial and distolateral spines, third segment with distomesial spine.

Third maxilliped having ischium somewhat shorter than merus when measured in midlateral line, with moderate-sized distoventral spine, mesial ridge with 24 denticles. Merus with 2 ventral spines, proximal strong and present at midlength, distal much smaller ; dorsal margin with 2 processes of small size. Dactylus distally narrowed, not truncate.

Third thoracic sternite wider than long, posteriorly narrowed, laterally somewhat convex, anteriorly very shallowly V-shaped.

Chelipeds about twice as long as carapace including rostrum. Spination and setation as illustrated. Merus with about 5 ventral and 1 distal ventrolateral spines both invisible from dorsal aspect. Carpus with 3 rows of spines and 2 small distoventral spines, distal second of mesial marginal spines very strong. Palm fully twice as long as wide, distolateral spine much pronounced, situated somewhat proximal to base of fixed finger ; 2 mesial spines invisible in accompanying figure. Fingers distally fitting each other with intermeshing teeth when closed ; feebly gaping on left chela, distinctly gaping on right chela ; somewhat shorter than palm ; right chela having fixed finger with single process somewhat proximal to midlength of opposable margin, movable finger with 2 teeth on gaping portion ; left chela having movable finger with basal tooth proximal to opposing process of fixed finger.

Left first and third walking legs missing. First and second walking legs similar in shape, but merus of first leg somewhat longer and narrower. Meri with 6 dorsal and 1 distoventral spines, lateral surface with rugae very feebly elevated. Carpi with 4 dorsal spines, terminal one prominent. Propodi about twice as long as dactyli, ventrally provided with 4 movable spinelets. Meri and carpi sparsely bearing long coarse setae, propodi more setose. Dactyli strongly spiniform distally and curving ventrad, ventral margin with 7 teeth decreasing in size toward base of segment, each tooth with spine-like inclined seta. Third walking leg having shorter merus with 1 middorsal and 1 distoventral spines, carpal spines reduced to only 1 small distodorsal one, propodal and dactylar spination as in first walking leg.

Epipods absent from all pereopods.

PARATYPE : Ovigerous female paratype in general agreement with holotype. Left chela missing. Right chela with fingers not gaping, without process on opposable margins.

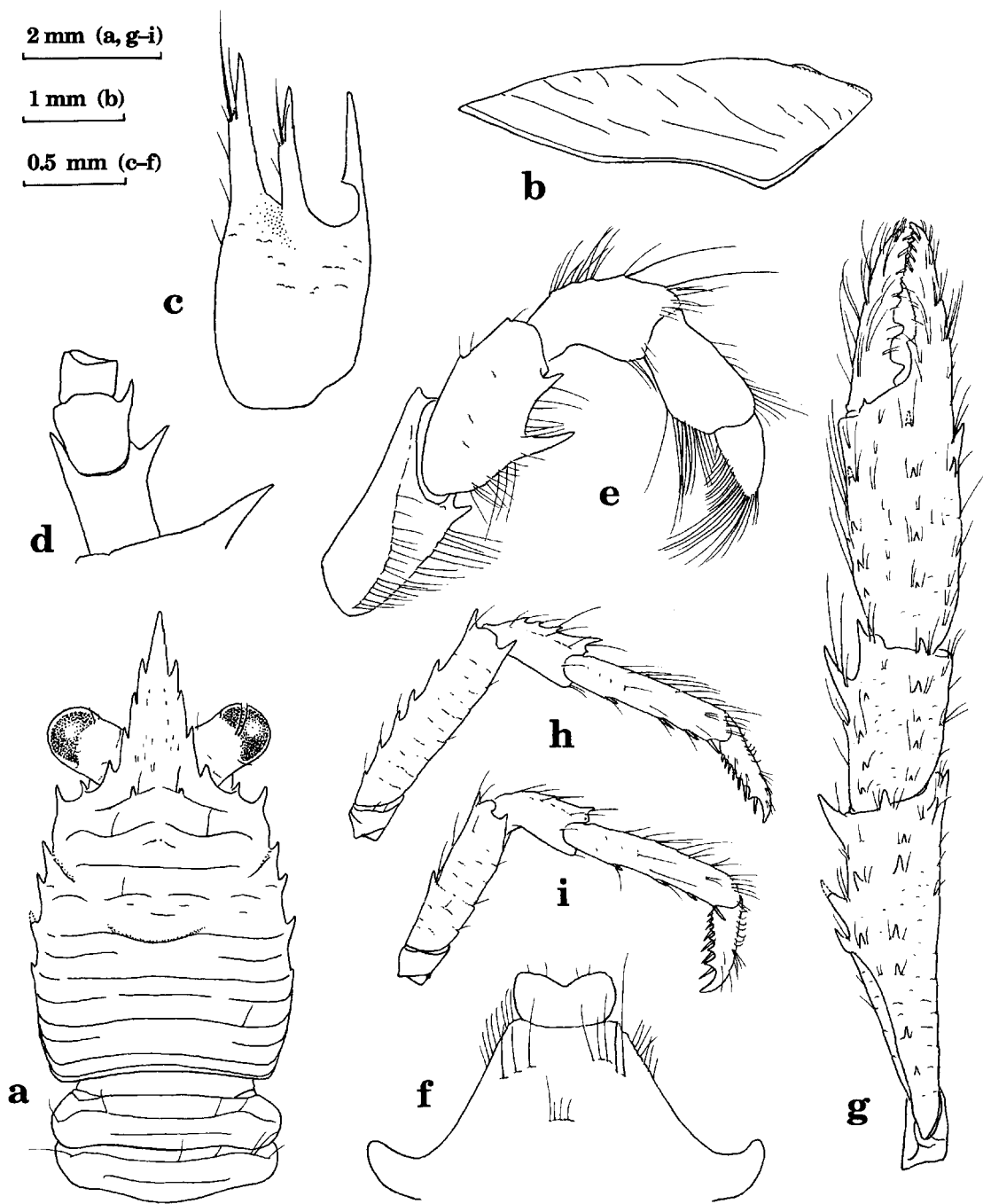


FIG. 12. — *Galathea anepipoda* new species, male holotype [MNH Ga 710] from CH 52 : a, carapace and anterior part of abdominal segments, dorsal view ; b, right pterygostomian flap ; c, basal segment of right antennule, ventral view ; d, right antennal peduncle, ventral view ; e, endopod of right third maxilliped, lateral view ; f, anterior part of sternum ; g, right cheliped, dorsal view ; h, right first walking leg, lateral view ; i, right third walking leg, lateral view.

REMARKS

The carapace, that bears two epigastric spines but lacks a lateral marginal spine between the anterolateral spine and the end of cervical groove, links the species to *G. ohshimai* previously known from the Palau Islands and the Moluccas (MIYAKE and BABA, 1967a : 207; BABA, 1977 : 250; 1979b : 648; 1982a : 60); *Galathea anepipoda* differs from that species in lacking epipods on all pereopods. The pterygostomial flap also differs from that of *G. ohshimai* which bears a distinct spine on the anterior surface and ends in an acute anterior spine.

ETYMOLOGY : The combination of the Greek *an* (the prefix meaning absence of something) plus *epipodos* (epipod) was suggested by the absence of epipods from the pereopods which separates the species from the related *G. ohshimai*.

RANGE : Recorded here from Madagascar; 85-150 m.

***Galathea pubescens* Stimpson, 1858**

Galathea pubescens Stimpson, 1858 : 252. — BABA, 1988 : 76 (*ubi* ref. and syn.).

MATERIAL. — **Madagascar** : “Vauban”, CH 44; 15°25.7' S, 46°01.0' E; 200-210 m; moderately calcareous sand; 7 Nov. 1972; 13.20-14.20 hr : 3 ♂ (6.0-7.0), 1 ♀ (5.9). — CH 45; 15°20.5' S, 46°09.0' E; 310-350 m; slightly calcareous sandy mud; 7 Nov. 1972; 15.50-16.40 hr : 1 ♀ (4.5). — CH 52; 15°21.0' S, 46°12.5' E; 150 m; moderately calcareous mud; 8 Nov. 1972; 16.40-17.40 hr : 1 ♂ (6.3). — 13°22' S, 47°38' E; Grand Schmidt, 0-2000 m; 4 Dec. 1974 : 1 ♂ (7.5).

RANGE : Zanzibar, Madagascar, Western Australia, Philippines, East China Sea, and Japan; 40-499 m.

***Galathea robusta* new species**

(Fig. 13)

MATERIAL. — **Madagascar** : “Vauban”, CH 71; 25°13.1' S, 47°17.8' E; 105-115 m; 3 Mar. 1973; 14.45-15.40 hr : 1 ♂ (8.3) [holotype, MNHN Ga 712].

DESCRIPTION OF HOLOTYPE

Carapace excluding rostrum 1.3 times as long as wide, dorsally robust, with incomplete, interrupted transverse ridges and scattered tubercle-like small spines, sparsely bearing stiff, plumose setae, as illustrated; gastric region anteriorly bordered by distinct groove, with several tubercle-like epigastric, small protogastric and lateral mesogastric spines; anterior branchial region also with dorsal spinule on level between third and fourth lateral marginal spines; cardiac region with somewhat elevated rugae bearing few tubercular spines. Postcervical spine distinct on each side, left one broken. Lateral margins moderately convex, greatest width measured at midlength; bearing 7 spines : first anterolateral, not pronounced, second much

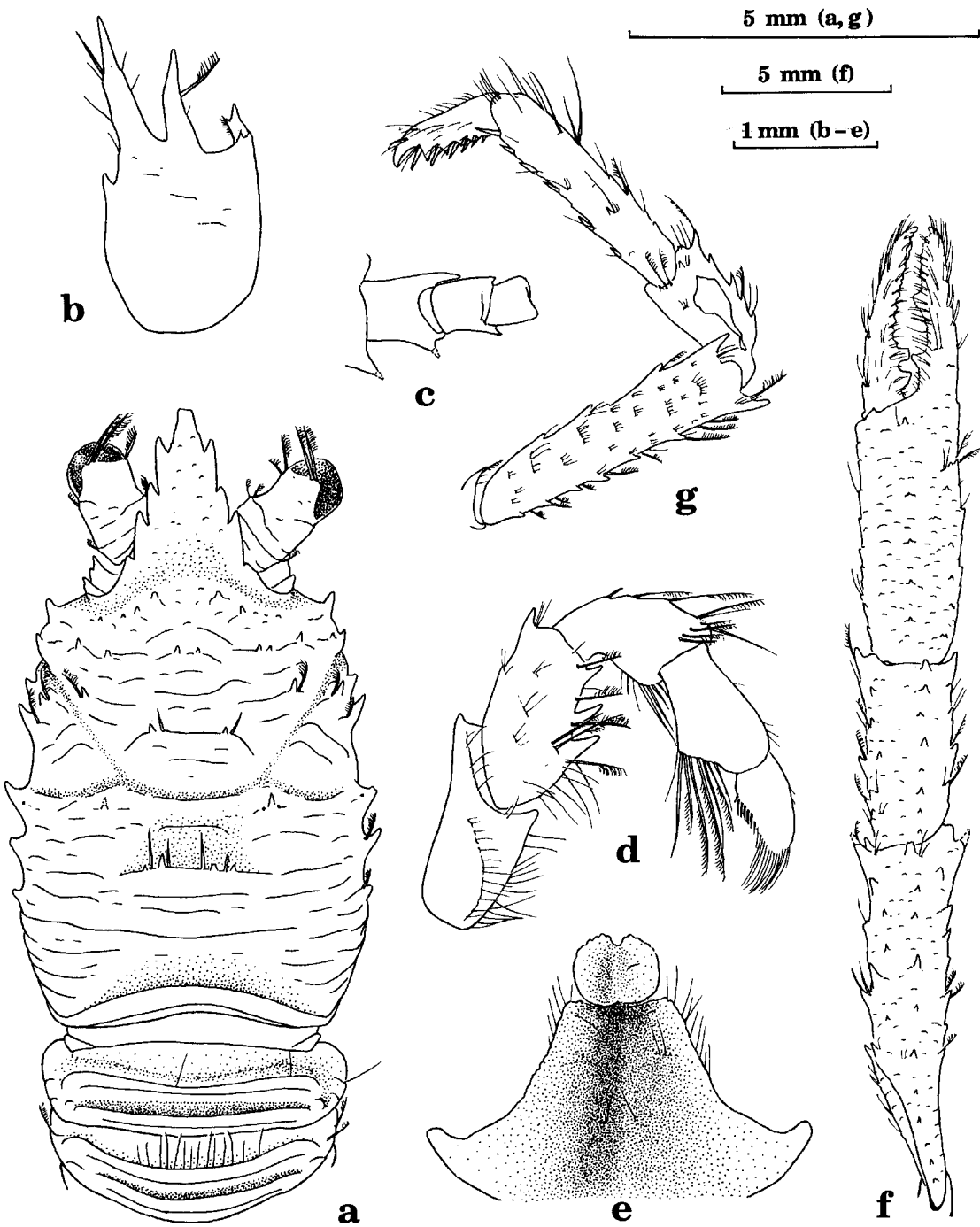


FIG. 13. — *Galathea robusta* new species, male holotype [MNHN Ga 712] from CH 71 : a, carapace and anterior part of abdominal segments, dorsal view; b, basal segment of right antennule, ventral view; c, right antennal peduncle, ventral view; d, endopod of right third maxilliped, lateral view; e, anterior part of sternum; f, right cheliped, dorsal view; g, left first walking leg, lateral view.

smaller than first, third directly behind end of anterior bifurcation of cervical groove, followed by fourth of same size, fifth largest, situated at midlength and rather distant from preceding, sixth slightly smaller than fifth, seventh very small. Outer orbital angle produced but not sharply spiniform, curving laterad.

Rostrum broadly triangular, distally broken, laterally armed with 4 teeth including basal one, length barely twice space between level of basal lateral tooth and midcervical groove. Outer orbital angle produced but not sharply spiniform, curving laterad.

Second and third abdominal segments each with 4 transverse ridges, first (anteriormost) ridge elevated, third ridge with distinct groove anterior to it. Second, third and fourth ridges on next segment interrupted at median portion. Line of pronounced plumose setae on first ridges of third and fourth segments.

Pterygostomian flap with blunt anterior end, lacking spines on surface.

Eyestalks robust, basal portion wide with distinct rugae, portion proximal to cornea narrowed with few plumose setae, cornea not wider than distal portion of remaining eyestalk.

Basal segment of antennule relatively wide, with 3 terminal spines: mesial one rather small, accompanying tiny spine ventral to it, dorsolateral one larger than ventrolateral one, accompanying 1 distinct spine (right) or 2 tubercle-like low processes (left) proximal to it; distal segment with several short terminal setae, lacking pronounced tuft of setae. Antennal peduncle having first segment with small distomesial process, second segment with 2 terminal spines, distolateral larger; third segment with small distomesial spine.

Third maxilliped with ischium shorter than merus when measured in midlateral line, distoventrally armed with short doubled spines, distodorsally bearing small sharp spine, mesial ridge with 21 (left) or 22 (right) denticles. Merus with 3 ventral spines on distal half of length, proximal and median larger and subequal; dorsal margin with distinct terminal spine. Carpus unarmed, bearing few eminences.

Third thoracic sternite slightly longer than wide, depressed in midline, anterior margin tuberculate and rounded with median notch, lateral margin convex. Fourth thoracic sternite as illustrated, anteriorly narrowed and strongly depressed in midline.

Chelipeds dissimilar, left one somewhat shorter and narrower, possibly regenerated. Right cheliped fully more than 3 times as long as carapace including rostrum, rather massive and robust, sparsely setose, setae mostly plumose, spination as illustrated. Merus with 2 rows of low spines invisible in dorsal view. Carpus with 3 ventral spines also invisible, lacking pronounced spines on mesial margin. Palm 2.4 times as long as wide, 1.3 times as long as movable finger, somewhat depressed. Fingers largely gaping, distally fitting each other with 4 intermeshing teeth when closed, opposable margins with 2 processes each as illustrated. Left cheliped with relatively pronounced spination, opposable margins of fingers with 1 process each.

Walking legs robust, sparsely setose, setae on meri and carpi plumose. First walking leg reaching end of merus of cheliped when extended forward. Merus with 7 or 8 dorsal and 4 ventral spines proximally diminishing in size. Carpus with 6 less pronounced dorsal spines. Propodus with 3 small spines on proximal portion of dorsal margin and 7 movable slender spinelets on ventral margin. Dactylus more than half length of propodus, ending in curved claw, ventrally armed with 6 teeth decreasing in size proximally, ultimate (distal) one most pronounced, each tooth with stiff seta-like spine. Second walking leg very similar to first, but meral ventral spines reduced except for terminal, also propodal dorsal marginals. Third

walking leg having shorter merus with 5 dorsal and 1 distoventral spines, and line of 5 spinules on dorsolateral surface.

Epipods present on chelipeds, absent from walking legs.

REMARKS

The characteristic shapes of the rostrum, antennules, antennae, walking legs and third maxillipeds, spination of the anterior part of carapace and lack of prominent spines on the mesial margin of the cheliped carpus are shared by *G. albatrossae* Baba, 1988, from the Sulu Sea and the South China Sea off the Philippines (BABA, 1988 : 65). The new species differs from that species in that : 1) the carapace is more robust with more dorsal spinules on the posterior portion, even on the cardiac region, and the fifth of the lateral marginal spines is considerably remote from the fourth one ; 2) the first stria where epigastric spines are usually present is indistinct ; 3) the eyestalks are distally narrowed, bearing a concave distomesial margin ; and 4) the distal segment of the antennule lacks a pronounced tuft of terminal setae. The chelae that are largely gaping with one or two processes on the opposable margins of the fingers, and the narrowed third thoracic sternite once seemed to help separate the two species, but these characters proved to be inconstant after examination of additional material from Mauritius in the collection of the Copenhagen Museum (unpublished), a variability that will be reported elsewhere.

ETYMOLOGY : The Latin *robustus* (robust) refers to the robust carapace and appendages of the species.

RANGE : Known from the unique holotype from Madagascar in 105-115 m.

Galathea spinosorostris Dana, 1852

Galathea spinoso-rostris Dana, 1852 : 480.

Galathea algae Baba, 1969 : 11, fig. 2.

Galathea tanegashimae Baba, 1969 : 16, fig. 4. — LEWINSOHN, 1981 : 182.

Galathea longimana : LEWINSOHN, 1969 : 107, fig. 20 [not *G. longimana* Paulson, 1875].

Galathea spinosorostris : BABA, 1988 : 78 (*ubi* syn. and ref.).

MATERIAL. — **Madagascar** : Banc Vert, NW coast ; 14 m ; Jan. 1959 : 2 ♂ (4.7, 5.3), 1 ovig. ♀ (4.0), 1 sp. (3.1). Banc de Pracel, W coast ; 50 m ; muddy sand ; Jun. 1959 : 1 ♂ (6.2), 4 ovig. ♀ (4.9-6.0). — Ste. Luce, S coast ; 60 m ; May 1960 : 1 ♂ (3.2). — “Vauban”, DR 4 ; 12°36.0' S, 48°17.3' E ; 310 m ; calciquartz sand ; 11 Oct. 1974 : 1 ovig. ♀ (3.6). **Iles Glorieuses** : 11°33.4' S, 47°19.7' E ; < 20 m ; dredged ; Jan. 1973 ; coll. C. JOUANNIC : 6 ♂ (2.9-4.6). **Comoro Islands** : Mayotte ; 30 m ; Sep. 1959 : 1 ♂ (3.4), 1 ovig. ♀ (4.5). **La Réunion** : 30 m ; on alcyonacean ; Nov. 1973 ; coll. J. BENETEAU : 1 ♂ (3.5).

REMARKS

In his report on *G. tanegashimae* Baba, 1969, from Somalia, LEWINSOHN (1981 : 184) discussed in considerable detail the identity of previously reported specimens of *G. spinosorostris* Dana, 1852, which he believed is very near or identical with *G. tanegashimae*, and recommended that topotypic specimens of *G. spinosorostris* should be redescribed because

the original description is too brief, and none of the available descriptions of that species is sufficient to establish its identity. The topotypic specimens were briefly discussed in my previous paper (BABA, 1988 : 78).

The three hepatic spinules that are usually present in the Hawaiian specimens (BABA, 1988 : 78) are variable in the present material : the spinule near the extremity of the second stria is absent in all the specimens examined ; that behind and mesial to the outer orbital angle is present on one side in only one specimen ; and the remaining spinule between the anterolateral spine and the end of the anterior bifurcation of the cervical groove is barely discernible in three specimens. The distal of the two ventral spines on the merus of the third maxilliped is much smaller than in the topotypic specimens, but in one of the six males from Iles Glorieuses this spine is only slightly smaller ; two other specimens in the same lot have three spines at least on one side, the proximal spine being the larger. Reexamination of one of the Palauan specimens of *G. algae* Baba, 1969 (see BABA, 1982a : 60), which species has been synonymized with *G. spinosorostris* (see BABA, 1988 : 78), showed that the distal spine is likewise reduced. The above mentioned variability as well as that noted earlier for the "Snellius" material (BABA, 1977 : 249) suggests that *G. tanegashimae* should also be merged with *G. spinosorostris*.

Two specimens from Iles Glorieuses bear bopyrid parasites.

RANGE : Red Sea, Zanzibar, Somalia, Madagascar, Providence, Amirante, Seychelles, Coëtivy, Saya de Malha Bank, Cargados Carajos, Chagos, Timor, Moluccas, Obi Island, Ternate, off northern and western Luzon, Palau Islands, Japan, and Hawaiian Islands; intertidal to 410 m.

Galathea ternatensis de Man, 1902

Galathea orientalis var. *ternatensis* de Man, 1902 : 714.

Galathea ternatensis : MELIN, 1939 : 67, figs 39-42. — BABA, 1988 : 80 (*ubi* ref. and syn.).

MATERIAL. — **Madagascar, NW coast** : N of Iles Mitsio ; 64 m ; muddy sand ; trawled ; 28 Jul. 1958 : 1 ovig. ♀ (7.0), 1 ♀ (6.8). — Iles Mitsio : 1 ♂ (8.7). — Iles Mitsio, NW coast ; 30 m ; sand : 1 ♂ (5.6), 2 ovig. ♀ (5.2, 6.0). — CH L2 ; SW of Iles Mitsio, NW coast of Madagascar ; 60 m ; sand ; Feb. 1960 : 5 ♂ (6.-7.3), 3 ovig. ♀ (5.5-8.3), 3 ♀ (4.3-7.3). — Baie d'Ambaro, NW coast of Madagascar ; 30 m ; mud ; dredged ; Mar. 1959 : 1 ovig. ♀ (7.6). — Baie de Tsimipaika ; 35 m ; from *Lithothamnites* ; 28 May 1968 ; coll. R. PLANTE : 1 ♂ (4.4). — CH 27 ; 13°27' S, 48°12' E ; 30 m ; 24 Aug. 1967 ; 13.40-14.10 hr ; coll. R. PLANTE : 1 ♂ (5.5), 1 ovig. ♀ (8.6) — Nosy Be ; 47 m ; *Assymetron* sand ; coll. R. PLANTE : 2 ♂ (4.0, 6.5). — Near Tany-Kely ; 13°28' S, 48°12' E ; sand and sponges ; 28 m ; 26 Feb. 1972 ; 09.30 hr : 9 ♂ (4.2-8.5), 5 ovig. ♀ (5.5-8.0), 1 ♀ (3.8). — Nosy Kisimany ; 25 m ; from sponge ; trawled ; Feb. 1958 : 3 ♂ (4.9-5.7), 4 ovig. ♀ (4.9-6.3). — Near Baie des Russes (vicinity of Nosy Be) ; 25 m ; trawled ; 6 Dec. 1973 : 1 ♀ (6.5). Nosy Iranja ; 30 m ; on *Solenocaulon* sp. : 2 ♂ (5.5, 6.0), 1 ovig. ♀ (6.1). **Madagascar, W coast** : "FAO 26" ; 17°13' S, 43°21' E ; 52 m ; 26 Sep. 1973 : 1 ♂ (7.8). **Madagascar, S and SE coast** : Fort Dauphin ; 50 m ; muddy sand ; trawled ; 19 Oct. 1958 : 2 ♂ (3.0, 3.7), 2 ovig. ♀ (5.7, 5.8). Ste. Luce ; 50 m ; sand, hydroids ; trawled ; Oct. 1958 : 12 ♂ (5.7-7.6), 13 ovig. ♀ (5.2-7.1), 11 ♀ (6.9-8.7). **Madagascar** : CH 71 ; 25°13.1' S, 47°17.8' E ; 105-115 m ; 3 Mar. 1973 ; 14.45-15.40 hr : 2 ♂ (4.2, 6.0), 1 ovig. ♀ (6.0). — CH 72 ; 25°11.2' S, 47°14.7' E ; 85-90 m ; 3 Mar. 1973 : 13 ♂ (4.4-6.2), 14 ovig. ♀ (4.4-6.3), 2 ♀ (5.1, 5.6+). — CH 80 ; 25°02.7' S, 47°05.8' E ; 65-70 m ; 4 Mar. 1973 ; 19.10-20.10 hr : 1 ovig. ♀ (8.1), 1 ♀ (4.6). "Vauban", — 12°55.2' S, 48°28.2' E ; 42 m ; trawled ; 2 Aug. 1973 ; 14.07 hr : 10 ♂ (4.3-7.5), 10 ovig. ♀ (5.3-7.2). — 12°44.0' S, 48°24.7' E ; 72 m ; dredged ; 2 Aug. 1973 ; 09.07 hr : 1 ♂ (6.8). — 12°49.5' S, 48°30.0' E ; 55 m ; trawled ; 2 Aug. 1973 ; 12.02 hr : 7 ♂ (6.0-7.2), 16 ovig. ♀ (5.7-7.6), 1 ♀ (5.3). — 12°44.5' S, 48°25.2' E ; 73 m ; trawled ; 2 Aug. 1973 ; 09.42 hr : 1 ovig. ♀ (6.4).

REMARKS

This species has been reported repeatedly in my previous paper (see BABA, 1988 : 80). No additional characters of significance were noted.

Sixteen of the specimens examined are infested by rhizocephalan parasites.

RANGE : In addition to the specimen reported earlier from New Caledonia (BABA, 1979a : 525), there are additional materials from that island in the collection of the Muséum national d'Histoire naturelle, Paris : RÉVEILLÈRE, 1883 : 1 ♂ (6.3) [Ga 759]; Nouméa, 7 Aug. 1890 : 1 ♂ (7.0), 2 ♀ (6.9, 7.5) [Ga 748]; coll. A. M. EDWARDS : 1 ♂ (6.2), 1 ovig. ♀ (6.8) [Ga 747, 749].

Previously reported from Providence Island, Maldives, Western Australia, New Caledonia, Ternate, north coast of New Guinea, Sibuyan Sea north of Cebu, Sulu Archipelago, Japan and the Bonin Islands; 20-210 m.

Genus LAURIEA Baba, 1971

Lauriea gardineri (Laurie, 1926)

Galathea gardineri Laurie, 1926 : 131, pl. 9, figs 1-5.

Lauriea gardineri : BABA, 1971 : 53, fig. 1a; 1988 : 80 (*ubi* ref. and syn.).

MATERIAL. — **Madagascar, S coast** : CH 3; Ste Luce; 50 m; coralline sand; Oct. 1958 : 1 ♂ (4.0).

REMARKS

The coloration in a fresh specimen is provided by KAMEZAKI *et al.* (1988 : 99). No additional characters of significance were noted.

RANGE : Red Sea, Madagascar, Providence Island, Seychelles, Sulu Archipelago, Kepulauan Talaud, Western Australia, Palau Islands, Ryukyu Islands and Japan; 6-106 m.

Genus LIOGALATHEA Baba, 1969

Liogalathea laevirostris (Balss, 1913)

Galathea laevirostris Balss, 1913a : 221. — DOFLEIN and BALSS, 1913 : 140, fig. 7; pl. 12, fig. 1. —

LAURIE, 1926 : 135.

Galathea imperialis Miyake and Baba, 1967b : 213, figs 1, 2.

Liogalathea imperialis : BABA, 1969 : 3.

MATERIAL. — **Madagascar** : "Vauban", CH 37; 12°51.0' S, 48°06.3' E; 675-705 m; quartz-calcareous sand; 14 Sep. 1972; 15.15-15.55 hr : 1 ovig. ♀ (7.1).

REMARKS

Liogalathea imperialis was originally differentiated from *Galathea laevirostris* by having the anterolateral spine of the carapace not dorsal as illustrated by DOFLEIN and BALSS (1913 : pl. 1, fig. 1). Inasmuch as most of the essential features are shared by both, however, it is my conclusion that *L. imperialis* should be merged with *L. laevirostris*. The present specimen has

the rostrum with three (left) or four (right) small lateral marginal teeth, the carapace with a more rugose dorsal surface, and a distinct midlateral spine that is absent in the "Valdivia" specimen (DOFLEIN and BALSS, 1913 : pl. 1, fig. 1).

Liogalathea is monotypic; it differs from *Galathea* in the fewer spines on the lateral margin of the carapace, the less rugose carapace, the reduced teeth on the lateral margin of the rostrum, and the very short and laterally expanded third thoracic sternite with produced anterolateral angles.

RANGE : Madagascar, Amirante, Nicobar Islands and Japan; 160-805 m.

Genus **MUNIDA** Leach, 1820

Munida babai Tirmizi and Javed, 1976

? *Munida gracilis* : BALSS, 1915 : 4, fig. 1.

Munida babai Tirmizi and Javed, 1976 : 81, figs 1-3. — BABA, 1988 : 89, fig. 32.

MATERIAL. — **Madagascar** : "Vauban", CH 44; 15°25.7' S, 46°01.0' E; 200-210 m; moderately calcareous sand; 7 Nov. 1972; 13.20-14.20 hr : 1 ♂ (7.5), 1 ♀ (6.2). — 12°40.0' S, 48°18.0' E; 185-205 m; dredged; 1 Aug. 1973; 18.30 hr : 1 ♂ (5.7).

REMARKS

The abdominal spination in the specimens here examined are as described for the holotype (TIRMIZI and JAVED, 1976 : 81), although there is some variation in the "Albatross" Philippine material (BABA, 1988 : 89). Epigastric spines in the present specimens range between 12 and 18, the largest number resulting from some doubled spines as illustrated for the female paratype (TIRMIZI and JAVED, 1976 : fig. 3A). Also variable is the number of propodal ventral spinelets of the walking legs : 10-14 on the first leg; 10-12 on the second and third legs, 10 in the type, and 15 in the "Albatross" samples (BABA, 1988 : 90).

In the course of reviewing the literature, attention was paid to the "Pola" material of *Munida gracilis* Henderson, 1885, which BALSS (1915 : 4) doubtfully identified and the identity of which was questioned by LEWINSOHN (1969 : 132) from a viewpoint of zoogeography. The short supraocular spines, the second, third and fourth abdominal segments having four, two, and two spines respectively, and the lack of spines behind the line of epigastric spines, all characters which are apparent in BALSS (1915 : fig. 1), suggest that the "Pola" material from the Red Sea will in all probability be referable to *M. babai*.

RANGE : Red Sea, off Natal, Madagascar, between Samar and Leyte, and off Hong Kong; 112-341 m.

Munida benguela de Saint Laurent and Macpherson, 1988

Munida benguela de Saint Laurent and Macpherson, 1988 : 106, figs 1, 2a, 2c, 3a, 3d, 3f-3i.

MATERIAL. — **Madagascar** : "Vauban", CH 34; 12°27.0' S, 48°08.5' E; 695-705 m; calcareous sandy mud; 13 Sep. 1972; 18.55-19.57 hr : 1 ovig. ♀ (32.9). — CH 38; 12°50.0' S, 48°09.1' E; 580-585 m; slightly

calcareous, sandy mud; 14 Sep. 1972; 17.03-18.05 hr : 1 ♂ (23.0). — CH 60; 23°36.5' S, 43°28.8' E; 710 m; 27 Feb. 1973; 12.08-13.38 hr : 1 ♀ (22.4). — CH 96 : 22°21.3' S, 43°03.7' E; 480-500 m; 27 Nov. 1973; 16.45-17.45 hr : 2 ♂ (15.8, 23.9).

REMARKS

This species was very recently described by DE SAINT LAURENT and MACPHERSON (1988 : 106) from the south African coast between southern Namibia and Natal. They regarded *M. sanctipauli* Henderson, 1885, to be the closest relative of *M. benguela*, and also *M. africana* Doflein and Balss, 1913, and *M. andamanica* Alcock, 1894, to be the other related species. However, spinations of the carapace and abdomen, shapes of antennules, antennae, third maxillipeds and anterior sternal segments, and more numerous epigastric spines (8-10) displayed by the present material seem to me to link the species more strongly to *M. militaris* Henderson, 1885, than to *M. sanctipauli*.

I have examined on loan all the type material of *M. militaris* (see HENDERSON, 1888 : 138) now deposited in the British Museum (Natural History). The material from the "Challenger" Station 200 that was listed in HENDERSON (1885 : 411) but removed from the subsequent extensive description (HENDERSON, 1888) could not be located. Four of the five specimens from Station 173 off the Fiji Islands agree well with the original description, but the remaining one should be *M. japonica* Stimpson, 1858. Also two females from Station 192 off Little Ki Island have been misidentified; one proved to be referable to *M. inornata* Henderson, 1885, and the other to *M. japonica*. The male from Ambon has been correctly identified. The selection of the lectotype, therefore, would be desirable, but all these details will be discussed later elsewhere.

Munida benguela differs from *M. militaris* in the following details : spination of the chelipeds is very pronounced in *M. benguela*. In addition, the movable finger in *M. militaris* bears only a basimesial marginal spine while that of *M. benguela* bears an additional subterminal and a few (2-4) dorsomesial spines; complete elimination of such extra spines has not been found in any of the material here examined or in 109 specimens from South Africa off Durban and off Natal in the collection of the "Galathea" Expedition (unpublished). In *M. benguela*, the walking legs have the dactyli with six to eight (mostly seven) ventral spinelets on the first and second pairs and five to six (mostly five) spinelets on the third pair, the ultimate of which is rather distant from the toe end (DE SAINT LAURENT and MACPHERSON, 1988 : fig. 3o). On the other hand, the ventral spinelets in *M. militaris* are about 10 in number, the ultimate of which is very near the base of the corneous distal claw.

RANGE : South African coast between southern Namibia and Natal, and Madagascar; 460-1000 m.

Munida incerta Henderson, 1888

Munida incerta Henderson, 1888 : 130, pl. 13, figs 4, 4a. — BABA, 1988 : 106 (*ubi* ref. and syn.).

MATERIAL. — Madagascar : "Vauban", CH 1; 12°52.0' S, 48°10.3' E; 420-428 m; quartz-calcareous sand; 4 Mar. 1971; 12.20-13.05 hr : 2 ♂ (11.6, 12.3), 5 ovig. ♀ (10.5-39.4). — CH 2; 12°53.3' S, 48°09.4' E; 480-520 m; quartz-calcareous sand; 4 Mar. 1971; 14.20-15.10 hr : 2 ♂ (14.7, 17.0), 1 ovig. ♀ (33.3), 2 ♀ (19.8, 20.0), 2 spec. (sex indeterminate) (15.0, 17.2). — CH 3; 12°52.3' S, 48°10.4' E; 403-415 m; quartz-calcareous sand; 4 Mar. 1971; 22.30-23.00 hr : 1 ♂ (14.0), 4 ♀ (17.5-19.3). — CH 4; 12°52.4' S, 48°10.4' E;

400-410 m; quartz-calcareous sand; 4 Mar. 1971; 23.55-24.20 hr : 1 ♂ (15.3), 1 ovig. ♀ (23.3). — CH 5; 12°44.8' S, 48°10.6' E; 563-570 m; slightly calcareous, sandy mud; 5 Mar. 1971; 08.18-09.18 hr : 13 ♂ (14.7-38.5), 3 ovig. ♀ (32.5-33.5), 1 spec. (17.2). — CH 6; 12°42.7' S, 48°12.8' E; 435-444 m; calcareous sand; 5 Mar. 1971; 11.35-12.35 hr : 5 ♂ (20.5-24.8), 4 ovig. ♀ (24.9-29.5). — CH 9; 12°42' S, 48°13.5' E; 455-460 m; slightly calcareous, sandy mud; 14 Apr. 1971; 08.05-09.05 hr : 4 ♂ (19.3-23.6), 6 ovig. ♀ (19.3-31.7), 1 ♀ (21.3). — CH 19; 12°39.7' S, 48°13.4' E; 394-403 m; calcareous mud; 18 Jan. 1972; 19.03-20.03 hr : 1 ♂ (17.9). — CH 21; 12°27.7' S, 48°12.5' E; 600-605 m; calcareous sandy mud; 19 Jan. 1972; 10.13-11.13 hr : 4 ♂ (14.0-39.0), 5 ovig. ♀ (23.0-34.0), 2 ♀ (20.0, 31.5+). — CH 22; 12°27.0' S, 48°10.0' E; 680-700 m; calcareous sandy mud; 19 Jan. 1972; 12.30-14.30 hr : 1 ♂ (25.7), 1 ovig. ♀ (32.9). — CH 23; 12°28.2' S, 48°11.8' E; 600-605 m; calcareous sandy mud; 19 Jan. 1972; 18.35-20.35 hr : 8 ♂ (12.2-36.5), 2 ovig. ♀ (35.4, 35.8), 1 ♀ (22.6). — CH 25; 12°43.0' S, 48°10.8' E; 545-550 m; slightly calcareous, sandy mud; 12 Sep. 1972; 12.45-13.45 hr : 1 ♂ (24.5), 1 ovig. ♀ (31.2). — CH 39; 12°46.5' S, 48°10.4' E; 495-500 m; slightly calcareous, sandy mud; 15 Sep. 1972; 06.10-07.10 hr : 3 ♂ (8.4-32.0), 5 ♀ (17.9-25.7), 3 spec. (sex indeterminate). — CH 40; 12°46.4' S, 48°11.5' E; 405-410 m; slightly calcareous, sandy mud; 15 Sep. 1972; 08.40-09.40 hr : 1 ♂ (19.3), 3 ovig. ♀ (21.2-25.3), 1 ♀ (24.4). — CH 58; 23°36.2' S, 43°30.5' E; 510 m; 27 Feb. 1973; 07.43-08.43 hr : 3 ♂ (26.5-33.2), 1 ovig. ♀ (23.5).

RANGE : Delagoa Bay off southern Mozambique, Zanzibar, Madagascar, Malay Archipelago between Moluccas and Luzon, Okinawa Trough, and the Pacific coast of Honshu, Japan; 17-658 m.

Munida japonica Stimpson, 1858

Munida japonica Stimpson, 1858 : 252. — BABA, 1988 : 108 (*ubi* ref. and syn.).

MATERIAL. — **Madagascar** : "Vauban", CH 44; 15°25.7' S, 46°01.0' E; 200-210 m; moderately calcareous sand; 7 Nov. 1972; 13.20-14.20 hr : 1 ♂ (8.3). — CH 47; 15°20.0' S, 46°11.8' E; 245-250 m; slightly calcareous, sandy mud; 7 Nov. 1972; 19.30-20.35 hr : 1 ♂ (15.7). — CH 52; 15°21.0' S, 46°12.5' E; 150 m; moderately calcareous mud; 8 Nov. 1972; 16.40-17.40 hr : 24 ♂ (4.8-13.7), 16 ovig. ♀ (11.1-14.9), 11 ♀ (6.0-12.0). — CH 53; 15°21.7' S, 46°12.6' E; 90-130 m; moderately calcareous mud; 8 Nov. 1972; 18.08-19.00 hr : 2 ♂ (13.5, 15.9), 2 ovig. ♀ (12.2, 16.0). — CH 71; 25°13.1' S, 47°17.8' E; 105-115 m; 3 Mar. 1973; 14.45-15.40 hr : 4 ♂ (7.0-10.7), 1 ovig. ♀ (8.1). — CH 72; 25°11.2' S, 47°14.7' E; 85-90 m; 3 Mar. 1973; 17.08-18.08 hr : 1 ♂ (5.5), 2 ovig. ♀ (7.4, 8.5). — CH 75; 25°06.1' S, 46°56.2' E; 42 m; 4 Mar. 1973; 09.23-09.53 hr : 1 ovig. ♀ (5.9). — CH 86; 18°55' S, 43°56.5' E; 195-205 m; 24 Nov. 1973; 13.25-14.25 hr : 2 ♂ (13.2, 13.4). — CH 130; 15°20' S, 46°11.5' E; 170-175 m; slightly calcareous, sandy mud; 19 Jan. 1975; 21.05-21.55 hr : 15 ♂ (9.1-15.8), 7 ovig. ♀ (11.5-14.0), 2 ♀ (13.0, 15.0). — Ste. Luce, S coast; 50 m; sand, on sponge; trawled; Oct. 1958 : 1 ovig. ♀ (7.0).

RANGE : Red Sea, Zanzibar, Madagascar, Providence Island, Mauritius, Western Australia, Indonesia, Philippines, East China Sea, and Japan including the Bonin Islands; 30-900 m.

Munida kuboi Yanagita, 1943

Munida kuboi Yanagita, 1943 : 20, figs 5, 6. — BABA, 1988 : 109, fig. 40.

MATERIAL. — **Madagascar** : "Vauban", CH 45; 15°20.5' S, 46°09.5' E; 310-350 m; slightly calcareous, sandy mud; 7 Nov. 1972; 15.50-16.40 hr : 1 ♀ (rostrum broken). — CH 46; 15°19.1' S, 46°11.8' E; 400 m; slightly calcareous, sandy mud; 7 Nov. 1972; 17.25-18.25 hr : 1 ♂ (17.3). — CH 50; 15°19.0' S, 46°11.8' E; 405 m; slightly calcareous, sandy mud; 8 Nov. 1972; 12.30-13.50 hr : 1 ♀ (19.5). — CH 88; 18°54' S, 43°55' E; 280-310 m; 24 Nov. 1973; 17.16-18.16 hr : 1 ♂ (22.0). — CH 94; 22°18' S, 43°04.7' E; 400 m; 27 Nov. 1973; 11.10-12.10 hr : 49 ♂ (9.9-23.0), 2 ovig. ♀ (18.9, 12.0+), 12 ♀ (9.4-19.0).

REMARKS

Dactylar ventral spinelets on the walking legs, usually seven or eight (rarely 11) in number on the first pair, vary between five and nine (mostly seven) on the second pair, but those on the third pair are likely to be reduced or rudimentary, numbering from four to two.

This species resembles *Munida prominula* Baba, 1988, from the South China Sea off southwestern Formosa in shape and ornamentation of the carapace and abdomen, from which it differs in that : 1) the second segment of the antennal peduncle bears no spine directly proximal to the distomesial spine; 2) the distomesial spine of the antennular basal segment is distinctly shorter than the distolateral one; 3) the dactyli of the walking legs are 0.8 as long as the propodi on the first pair, 0.8 to 0.9 as long on the second pair, and nearly equal to the propodi on the third pair; 4) the propodal ventral spinelets are fewer, as noted above.

RANGE : Previously known from Toyama Bay in the Sea of Japan and the Philippines off southwestern Mindanao, between Cebu and Bohol, and off southwestern Luzon; 78-366 m. This is the first record from the western part of the Indo-West Pacific.

Munida remota new species

(Fig. 14)

MATERIAL. **Madagascar** : "Vauban", CH 142; 13°45.6' S, 47°34.2' E; 1250-1300 m; calcareous mud; 28 Feb. 1975; 15.15 hr : 1 ♂ (18.3) [holotype, MNHN Ga 1489].

DESCRIPTION OF HOLOTYPE

Carapace distinctly longer than wide, dorsal surface rather smooth, very sparsely provided with long setae, transverse ridges more or less elevated, cervical groove well developed. Gastric region somewhat convex, with 3 pairs of epigastric spines, mesial pair small, median pair directly behind supraocular spines prominent, lateral pair slightly larger than mesial one and somewhat posterior in position; lateral protogastric spine distinct on each side. Anterior branchial region with small spine directly behind midlength of anterior bifurcation of cervical groove on left side, no spine there on right side. Postcervical spine present on each side. Cardiac region somewhat elevated, lacking spine. Lateral margins convex in front of and deeply constricted at end of anterior bifurcation of cervical groove, subparallel between anterior branchial regions, feebly convergent behind them; first (anterolateral) spine sharp, directed anterolaterad, space between anterolateral spines less than posterior margin of carapace; second marginal spine lateral to and somewhat smaller than preceding one, following 5 spines present on anterior branchial region. Front margin somewhat oblique.

Rostral spine distally broken, laterally ridged, feebly upcurved distally, length barely half that of remaining carapace. Supraocular spines relatively stout, but somewhat slenderer than and remote from rostrum, and divergent.

Second to fifth abdominal segments each with 2 transverse ridges, anterior ridge of second segment elevated, bearing line of 8 spines.

Eyes moderately dilated.

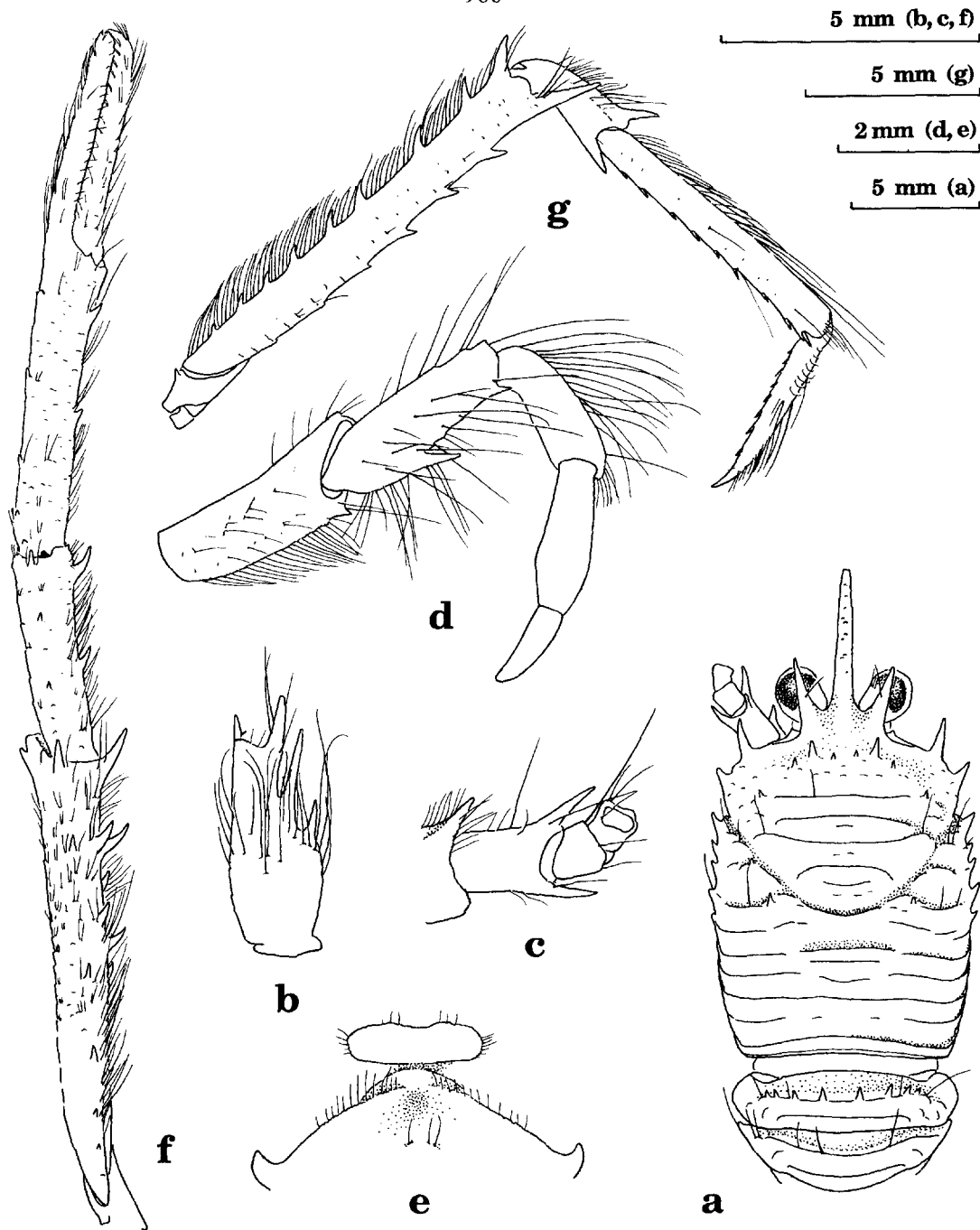


FIG. 14. — *Munida remota* new species, male holotype [MNHN Ga 1489] from CH 142 : a, carapace and anterior part of abdominal segments, dorsal view ; b, basal segment of left antennule, ventral view ; c, left antennal peduncle, ventral view ; d, endopod of right third maxilliped, lateral view, setae omitted from distal two segments ; e, anterior part of sternum ; f, left cheliped, dorsal view ; g, right first walking leg, lateral view.

Antennular basal segment elongate, ventrally bearing long setae; mesial terminal spine rather reduced in size, lateral terminal well developed; elongate lateral spine directed strongly anterodorsad, accompanying smaller spine proximal to it. Antennal peduncle having first segment with sharp, slender distomesial spine; second segment with 2 prominent terminal spines, third segment spineless.

Third maxilliped moderately setose, having ischium as long as merus when measured in midlateral line, distoventrally bearing small spine, mesial ridge with about 28 denticles. Merus distally slender, ventrally bearing 2 spines very prominent, one about at 1/3 from proximal end, terminal one very small on right appendage, barely discernible on left appendage. Distal 2 segments slender.

Third thoracic sternite very short relative to width, anterior margin somewhat tuberculate and feebly bilobed, posterior margin nearly straight, contiguous with narrow anterior end of following sternite. Fourth thoracic sternite 2.4 times as wide as preceding sternite.

Right cheliped missing. Left cheliped slender, subcylindrical, about 2.5 times as long as carapace including rostrum. Spination and setation as illustrated. Five other ventral spines on merus invisible in dorsal view. Carpus also with 1 midventral spine. Palm slightly depressed, fully 5 times as long as wide, about 1.2 times as long as movable finger, armed with 3 mesial and 4 lateral spines, but no other spinulation on ventral surface. Fingers somewhat longer than carpus, curving as figured, distally crossing, movable finger spineless on mesial margin, fixed finger with 2 distolateral spines, opposable margins not gaping, lined with minute tubercles.

Walking legs relatively slender, finely granulate on lateral surface, dorsally provided with plumose setae on meri and carpi, sparsely bearing coarse setae on distal 2 segments. First walking leg reaching end of carpus of cheliped when extended forward. Merus with 9 (left) or 10 (right) dorsal and 6 (left) or 4 (right) ventral spines, distoventral one prominent, fully reaching midlength of carpus. Carpus with 2 dorsal (one of them middorsal and small) and 1 distoventral spines. Propodus nearly straight, 9 times as long as high, ventrally bearing 9 movable spinelets. Dactylus 0.64 as long as propodus, feebly curving distally, with 8 inclined ventral spinelets, ultimate rather distant from distal end. Right and left second walking legs dissimilar, left one with fewer (4) spines on dorsal margin of merus; right one very similar to first but carpus lacking middorsal spine and merus and propodus shorter; dactylus relatively long, 0.72-0.74 as long as propodi. Right third walking leg missing. Left third walking leg shorter than preceding legs, merus lacking dorsal spines, ventrally bearing distinct distal spine and 2 tubercular processes, propodus with 5 ventral spinelets, dactylus with 6 ventral spinelets.

Two pair of gonopods present.

Epipods absent from all pereopods.

REMARKS

Munida remota strongly resembles *M. crassa* Baba, 1982, from the East China Sea west of the northern Ryukyu Islands and Okinawa Trough (BABA, 1982b : 107; BABA in BABA, HAYASHI and TORIYAMA, 1986 : 169, 289, pl. 120), in spination of the lateral margin of the carapace, abdominal segments and third maxillipeds, as well as in shape of the eyes. However, it differs from that species in that : the cheliped is slender and less setose, lacking mesial and lateral spines on the fingers; the epigastric region bears an additional pair of spines medially; the walking legs have relatively slenderer dactyli that are feebly curving distally, with the

terminal one of the ventral spines rather remote from the toe end; the antennular basal segment is more sharply elongate; and both the lateral protogastric and the postcervical spines are distinct.

ETYMOLOGY : The Latin *remotus* (distant) alludes to the ventral terminal spine of the dactylus of the walking legs that is remote from the toe end.

RANGE : The holotype is from Madagascar; 1250-1300 m.

Genus **PARAMUNIDA** Baba, 1988

Paramunida tricarinata (Alcock, 1894)

(Fig. 15b)

Munida tricarinata Alcock, 1894 : 324. — ALCOCK and ANDERSON, 1895 : pl. 12, fig. 1. — ALCOCK, 1901 : 246. — LAURIE, 1926 : 138. — TIRMIZI, 1966 : 202, fig. 21.
Paramunida tricarinata : BABA, 1988 : 175.

MATERIAL. — **Madagascar** : “Vauban”, CH 1; 12°52.0' S, 48°10.3' E; 420-428 m; quartz-calcareous sand; 4 Mar. 1971; 12.20-13.05 hr : 8 ♂ (8.8-14.0), 10 ovig. ♀ (10.3-12.4). — CH 3; 12°52.3' S, 48°10.4' E; 403-415 m; quartz-calcareous sand; 4 Mar. 1971; 22.30-23.00 hr : 3 ♂ (10.5-12.7), 6 ovig. ♀ (11.8-13.2). — CH 6; 12°42.7' S, 48°12.8' E; 435-444 m; calcareous sand; 5 Mar. 1971; 11.35-12.35 hr : 2 ♂ (11.7, 12.7), 8 ovig. ♀ (10.5-15.2), 1 ♀ (11.6). — CH 7; 12°42.4' S, 48°14.1' E; 375-380 m; slightly calcareous, sandy mud; 5 Mar. 1971; 15.00-16.00 hr : 1 ♂ (12.1), 1 ovig. ♀ (12.0). — CH 11; 12°39.8' S, 48°15.2' E; 375-385 m; calci-quartz sand and slightly calcareous mud; 14 Apr. 1971; 19.00-21.00 hr : 3 ovig. ♀ (10.7-13.8), 1 ♀ (9.6). — CH 13; 12°41.3' S, 48°16' E; 308-314 m; calcareous sand; 15 Apr. 1971; 07.05-08.05 hr : 1 ovig. ♀ (12.6). — CH 32; 12°34.1' S, 48°18.3' E; 310-320 m; calci-quartz sand; 13 Sep. 1972; 14.27-15.10 hr : 1 ovig. ♀ (9.6). — CH 40; 12°46.4' S, 48°11.5' E; 405-410 m; slightly calcareous sandy mud; 15 Sep. 1972; 08.40-09.40 hr : 1 ♂ (11.0), 1 ovig. ♀ (11.0), 2 ♀ (10.2, 11.2).

REMARKS

The specific name alludes to the three sharply spinous carinae that longitudinally traverse the carapace (ALCOCK, 1894 : 325). In all the present material as well as in the “John Murray” material (TIRMIZI, 1966 : 202) that I examined in the British Museum (Natural History), the carinae are very feeble and not so pronounced as shown in ALCOCK and ANDERSON (1895 : pl. 12, fig. 1); the spine directly behind either epigastric spine is very small if present, but occasionally absent, and the carina running there is barely discernible; also the lateral carina on each branchiocardiac boundary is more or less distinct on the anterior half, bearing four (rarely three or five) spines, but it is indistinct on the posterior portion. The median row of spines is about as described by ALCOCK (1894 : 324). These features suggest that the present material identified as *P. tricarinata* also approaches *P. scabra* (Henderson, 1885). However, examination of the female syntype (16.7 mm) of *P. scabra* (BM 88 : 33) and additional topotypic material of that species from the Kei Islands in the collection of the Copenhagen Museum (unpublished) revealed that both species differ in the following regards : the second segment of the antennal peduncle has a shorter distomesial spine reaching at most to the midlength of the fourth (ultimate) peduncular segment in *P. scabra* (see fig. 15a), and

considerably overreaching the end of the peduncle in *P. tricarinata* (see fig. 15b); the median gastric region in *P. scabra* bears usually one or two spines, in case of two the posterior being smaller, instead of usually three as in *P. tricarinata*. No other characters that separate the two were found. The above mentioned differences are so slight that future examination of more material may show wider variation to overlap. In that case, they may eventually be considered identical.

RANGE : Zanzibar, Madagascar, Saya de Malha Bank, Providence, Maldives, Arabian Sea off north Maldivé Atoll, and Andaman Sea; 205-457 m.

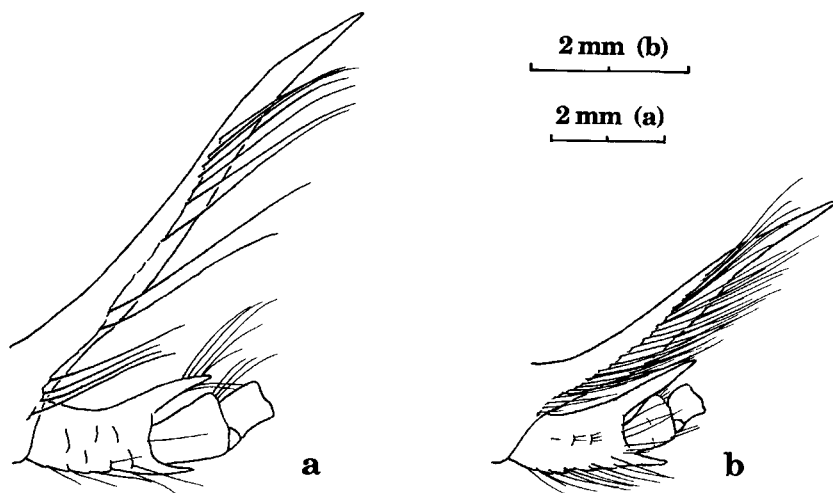


FIG. 15. — Antennal peduncles, ventral view : a, *Paramunida scabra* (Henderson, 1885), female syntype (16.7 mm) from Little Ki Island (BM 88 : 33); b, *Paramunida tricarinata* (Alcock, 1894), ovigerous female (11.0 mm) [MNHN Ga 686] from Sta CH 11.

Genus **PHYLLADIORHYNCHUS** Baba, 1969

Phylladorhynchus serrirostris (Melin, 1939)

Galathea serrirostris Melin, 1939 : 72, figs 43-47.

Phylladorhynchus serrirostris : BABA, 1969 : 4 (*ubi* syn. and ref.); 1977 : 251; 1979b : 644. — TIRMIZI and JAVED, 1980 : 260, fig. 3. BABA, 1982a : 61; 1988 : 3. — GARTH *et al.*, 1987 : 252. — BABA, 1988 : 3.

MATERIAL. — Madagascar, S coast : Ste. Luce; 60 m; May 1960 : 1 ovig. ♀ (2.9).

REMARKS

This genus now contains six species, five from the Indo-West Pacific (*P. antonbruuni* Tirmizi and Javed, 1980; *P. bengalensis* Tirmizi and Javed, 1980; *P. ikedai* (Miyake and Baba,

1965); *P. pusilla* (Henderson, 1885); *P. serrirostris* (Melin, 1939)), and one from the western Atlantic (*P. caribensis* Mayo, 1972). *Phylladiorhynchus integra* (Benedict, 1902) has been synonymized with *P. pusilla* (see MIYAKE and BABA, 1967c : 234). A specimen of *Galathea integra* reported by LAURIE (1926 : 135) from Providence Island will in all probability be identical with *P. serrirostris* because of having two gastric spines.

RANGE : Off South Africa, Mozambique Channel, off Somalia, Madagascar Providence Island, Andaman Sea, Moluccas, Ternate, Palau Islands, Ryukyu Islands, off southern Kyushu (Japan), Bonin Islands, Marshall Islands, and Hawaiian Islands; subtidal to 138 m.

Genus SADAYOSHIA Baba, 1969

Sadayoshia edwardsii (Miers, 1884)

Munida edwardsii Miers, 1884 : 560, pl. 50, figs A and a. — DE MAN, 1888 : 453.

Sadayoshia miyakei Baba, 1969 : 19, figs 5, 6; 1988 : 185.

Sadayoshia acroporae Baba, 1972 : 43, figs 1, 2. — TIRMIZI, 1980 : 108, figs 1-7.

MATERIAL. — **Madagascar** : "Vauban", CH 130; 15°20' S, 46°11.5' E; 170-175 m; 19 Jan. 1975; 21.05-21.55 hr : 1 spec. (sex indeterminate, 3.3). **Aldabra** : 23 May 1954 : 1 ♂ (6.4).

REMARKS

DE MAN (1888 : 454) mentioned that *Munida* [= *Sadayoshia*] *edwardsii* from Ambon bears two spines on the first [= second] abdominal segment but two of the ten specimens he examined do not. TIRMIZI (1980 : 108) reported from the Andaman Sea and Mozambique Channel *Sadayoshia acroporae* that has a detached walking leg with a distinct dorsal marginal spine on the proximal portion of the propodus. The specimen of *S. miyakei* identified by me and reported by KAMEZAKI *et al.* (1980 : 100) from the Ryukyu Islands has no abdominal spines nor dorsal marginal spines on the propodi of the walking legs. In the present material the outer second of the usual four pairs of epigastric spines is wanting on each side, the merus of the third maxilliped bears two ventral spines of subequal size, and the propodal spines on the dorsolateral surface are missing on the left first and right second walking legs. Rather brief though the description of MIERS (1884 : 560) is, the above mentioned variability suggests that *S. acroporae*, *S. miyakei*, and even *S. edwardsii* are identical.

The juvenile from Station CH 30 may be referable to this species; it bears fewer (4) epigastric spines, an unarmed second abdominal segment, spineless propodi on the walking legs, and a very prominent ultimate ventral spine on the dactyli of the walking legs, but protogastric, postcervical and anterior branchial spines are distinct as in *S. edwardsii*.

The color illustration in a fresh specimen is provided by KAMEZAKI *et al.* (1988 : 100).

RANGE : Mozambique Channel, Madagascar, Ile des Neufs, Andaman Islands, Ambon, Philippines in the Sibuyan Sea, between Burias and Luzon and off northern Luzon, and southern Kyushu, Japan; subtidal to 1225 m.

Acknowledgements

I thank Dr. Alain CROSNIER for making the study material available to me and for kindly verifying locality data in a draft of the manuscript. I also thank Dr. Raymond B. MANNING of the Smithsonian Institution and Dr. M. TÜRKAY of the Senckenberg Museum at Frankfurt am Main for loaning comparative and/or type materials. The type material was also examined at the British Museum (Natural History), London, and the Zoological Museum, Amsterdam. I am indebted to Drs. R. W. INGLE and J. H. STOCK for laboratory facilities during my visits there. I acknowledge Dr. Austin B. WILLIAMS of the National Marine Fisheries Service, Washington, D.C., Miss Janet HAIG of the Allan Hancock Foundation, Los Angeles, and Dr. A. CROSNIER and Mrs. M. DE SAINT LAURENT of the Muséum national d'Histoire naturelle, Paris, for critically reviewing the manuscript. Figures 4 and 11 were drawn by Mr. C. MURAKAMI of Kumamoto University.

REFERENCES

- ADAMS, A., and A. WHITE, 1848. — Crustacea. *In* : A. ADAMS, The Zoology of the Voyage of H.M.S. Samarang, under the Command of Captain Sir Edward Belcher, C.B., F.R.A.S., F.G.S., during the years 1843-1846. London. viii + 66 pp., 13 pls.
- ALCOCK, A., 1894. — Natural History Notes from H.M. Indian Marine Survey Steamer « Investigator », Commander R. F. Hoskyn, R.N., late commanding. — Series II, No. 1. On the results of the Deep-Sea Dredging during the Season 1890-91 (continued). *Ann. Mag. nat. Hist.*, (6), 13 : 225-245, 321-334.
- 1901. — A descriptive catalogue of the Indian Deep-sea Crustacea Decapoda, Macrura and Anomala in the Indian Museum. Being a revised account of the deep-sea species collected by the Royal Indian Marine Survey Ship Investigator. Calcutta. 286 + iv pp., 3 pls.
- ALCOCK, A., and A. R. S. ANDERSON, 1894. — Natural History Notes from H.M. Indian Marine Survey Steamer 'Investigator', Commander C. F. Oldham, R.N., commanding. Series II, No. 14. An Account of a Recent Collection of Deep Sea Crustacea from the Bay of Bengal and Laccadive Sea. *J. Asiat. Soc. Beng.*, 63 (II : 3) : 141-185, pl. 9.
- ALCOCK, A., and A. R. S. ANDERSON, 1895. — Crustacea. Part III. Illustrations of the zoology of the Royal Indian Marine Surveying Steamer « Investigator », pls. 9-15, Calcutta.
- BABA, K., 1969. — Four new genera with their representatives and six new species of the Galatheidae in the collection of the Zoological Laboratory, Kyushu University, with redefinition of the genus *Galathea*. *OHMU, Occ. Pap. Zool. Lab. Fac. Agr., Kyushu Univ.*, 2 (1) : 1-32.
- 1971. — *Lauriea*, a New Genus Proposed for *Galathea gardineri* Laurie (Crustacea, Anomura, Galatheidae). *Mem. Fac. Educ. Kumamoto Univ.*, section 1 (Nat. Sci.), 19 : 51-53.
- 1972. — A new Species of the Galatheidean Crustacea from the Ryukyu Islands (Decapoda, Anomura). *Mem. Fac. Educ. Kumamoto Univ.*, section 1 (Natural Science), 20 : 43-48.
- 1973. — Remarkable Species of the Chirostylidae (Crustacea, Anomura) of Japanese waters. *Mem. Fac. Educ. Kumamoto Univ.*, section 1 (Natural Science), 22 : 117-124, pl. 4.
- 1974. — *Munida brucei* sp. nov., A New Galatheid (Decapoda, Anomura) from the East Coast of Africa. *Annotnes zool. jap.*, 47 (1) : 55-60.
- 1976. — A New Species of the Genus *Eumunida* (Crustacea, Anomura, Chirostylidae) off Torishima in the Western Pacific. *Bull. natn. Sci. Mus., Tokyo*, (A-Zool.), 2 (1) : 15-18.
- 1977. — The galatheid Crustacea of the Snellius Expedition. *In* : Biological results of the Snellius Expedition XXVIII. *Zool. Meded., Leiden*, 50 (15) : 243-259.

- 1979a. — First record of chirostylid and galatheid crustaceans (Decapoda, Anomura) from New Caledonia. *Bull. Mus. natn. Hist. nat., Paris*, 4^e sér., 1, section A, (2) : 521-529.
- 1979b. VII. Galatheid Crustaceans (Decapoda, Anomura). In : Expéditions Rumphius II (1975). Crustacés parasites, commensaux, etc. (Th. Monod et R. Serène, éd.). *Bull. Mus. natn. Hist. nat., Paris*, 4^e sér., 1, section A, (3) : 643-657.
- 1981. — Deep-Sea Galatheidean Crustacea (Decapoda, Anomura) Taken by the R/V *Soyo-Maru* in Japanese Waters. I. Family Chirostylidae. *Bull. natn. Sci. Mus., Tokyo* (A-Zool.), 7 (3) : 111-134.
- 1982a. — Galatheids and Pagurids of the Palau Islands (Crustacea : Anomura). *Proc. jap. Soc. syst. Zool.*, 23 : 56-70.
- 1982b. — Deep-Sea Galatheidean Crustacea (Decapoda, Anomura) Taken by the R/V *Soyo-Maru* in Japanese Waters. II. Family Galatheididae. *Bull. natn. Sci. Mus., Tokyo*, (A-Zool), 8 (3) : 103-118, pls. 1, 2.
- 1988. — Chirostylid and Galatheid Crustaceans (Decapoda : Anomura) of the « Albatross » Philippine Expedition, 1907-1910. *Res. Crust.*, Special Number 2 : v + 203 pp.
- BABA, K., K. HAYASHI and M. TORIYAMA, 1986. — Decapod crustaceans from continental shelf and slope around Japan, 336 pp. Tokyo : Japan Fisheries Resource Conservation Association.
- BABA, K., and W. JAVED, 1974. — *Coralliogalatea*, A New Genus of Galatheididae (Crustacea, Anomura) with Further Notes on its Type-Species. *Annotnes zool. jap.*, 47 (1) : 61-64.
- BABA, K., and N. M. TIRMIZI, 1979. — A new chirostylid (Crustacea, Decapoda, Anomura) from deeper parts of the Japanese waters and off the east coast of Africa. *Proc. jap. Soc. syst. Zool.*, 17 : 52-57.
- BALSS, H., 1913a. — Neue Galatheiden aus der Ausbeute der deutschen Tiefsee-Expedition. « Valdivia ». *Zool. Anz.*, 41 (5) : 221-226.
- 1913b. — Ostasiatische Decapoden I. Die Galatheiden und Paguriden. In : DOFLEIN, F., Beiträge zur Naturgeschichte Ostasiens. *Abh. K. bayer. Wiss., math.-phys. Kl.*, (suppl.) 2 (9) : 1-85, pls. 1, 2.
- 1914. — Übereinige interessante Decapoden der « Pola »-Expedition in das Rote Meer. *Sber. Akad. Wiss. Wien, math.-phys., Kl.*, 1914 : 133-139.
- 1915. Die Decapoden des Roten Meeres, II, Anomuren, Dromiaceen und Oxystomen. Expeditionen S.M. Schiff « Pola » in das Rote Meer. Nördliche und südliche Hälfte 1895/96-1897/98. Zoologische Ergebnisse XXXI. Berichte der Kommission für ozeanographische Forschungen. *Denkschr. Akad. Wiss. Wien, Math.-naturwiss. Kl.*, 92 : 1-20.
- BARNARD, K. H., 1950. — Descriptive catalogue of South African decapod Crustacea (crabs and shrimps). *Ann. S. Afr. Mus.*, 38 : 1-827.
- BENEDICT, J. E., 1902. — Descriptions of a new genus and forty-six new species of crustaceans of the family Galatheididae, with a list of the known marine species. *Proc. U. S. natn. Mus.*, 26 : 243-334.
- CROSNIER, A., 1962. — Crustacés Décapodes Portunidae. *Faune Madagascar*, 16 : 1-154, pls. 1-13.
- 1965. — Crustacés Décapodes Grapsidae et Ocypodidae. *Faune Madagascar*, 18 : 1-143, pls. 1-11.
- 1978. — Crustacés Décapodes, Pénéides Aristeidae (Benthescyminae, Aristeinae, Solenocerinae). *Faune Madagascar*, 46 : 1-197.
- DAM, A. J. VAN, 1933. — Die Decapoden der Siboga-Expedition. VIII. Galatheidea : Chirostylidae. *Siboga Exped.*, 39a7 : 1-46.
- 1937. — Einige neue Fundorte von Chirostylidae. *Zool. Anz.*, 120 : 99-103.
- 1938. — Die Gattung *Bathymunida* Balss. *Zool. Anz.*, 121 : 194-202.
- 1939. — Ueber einige *Uroptychus*-Arten des Museums zu Kopenhagen. *Bijdr. Dierk.*, 27 : 392-407.
- DANA, J. D., 1852. — Crustacea, Part 1. In : United States Exploring Expedition, during the years 1838, 1839, 1840, 1841, under the command of Charles Wilkes, U.S.N., 13 : viii + 685 pp., Philadelphia.
- DOFLEIN, F., and H. BALSS, 1913. — Die Galatheiden der Deutschen Tiefsee-Expedition. *Wiss. Ergebn. dt. Tiefsee-Exped. « Valdivia »*, 20 : 125-184, pls. 12-17.

- GARTH, J. S., J. HAIG and J. W. KNUDSEN, 1987. Crustacea Decapoda (Brachyura and Anomura) of Enewetak Atoll. In : DEVANEY, D. M., E. S. REESE, B. L. BURCH, and P. HELFRICH (Eds.), The Natural History of Enewetak Atoll. Volume II, Biogeography and Systematics, Chapter 23, pp. 235-261. U.S. Dept. Energy, Office Sci. Techn. Info., Oak Ridge, Tennessee.
- GORDON, I., 1930. — On the Species of the Galatheid Genus, *Eumunida* (Crustacea, Decapoda). *Proc. zool. Soc. Lond.*, 1929 : 741-753.
- HENDERSON, J. R., 1885. — Diagnoses of the new Species of Galatheidea collected during the 'Challenger' Expedition. *Ann. Mag. nat. Hist.*, (5) **16** : 407-421.
- 1888. — Report on the Anomura collected by H.M.S. Challenger during the Years 1873-76. *Rep. scient. Res. Voy. Challenger, Zool.*, **27** : vi + 221 pp., 21 pls.
- KAMEZAKI, N., K. NOMURA, T. HAMANO and H. OMAE, 1988. — Crustacea. In : Illustrated Encyclopedia of the Coastal Marine Animals on Okinawa. 232 pp. Okinawa : Shinsei-Tosho Printing, Inc.
- KENSLEY, B., 1968. — Deep sea decapod Crustacea from west coast of Cape Point, South Africa. *Ann. S. Afr. Mus.*, **50** (12) : 283-323.
- 1977. — The South African Museum's Meiring Naude Cruises, Part 2. Crustacea, Decapoda, Anomura and Brachyura. *Ann. S. Afr. Mus.*, **72** (9) : 161-188.
- 1981. — The South African Museum's Meiring Naude Cruises. Part 12. Crustacea Decapoda of the 1977, 1978, 1979 Cruises. *Ann. S. Afr. Mus.*, **83** (4) : 49-78.
- KIM, H. S., 1972. — A new species of family Chirostylidae (Crustacea : Anomura) from Jeju Island, Korea. *Korean J. Zool.*, **15** (2) : 53-56.
- 1973. — Illustrated Encyclopedia of Fauna and Flora of Korea. Vol. 14, Anomura and Brachyura. Seoul, 694 pp.
- LAURIE, R. D., 1926. — Anomura collected by Mr. J. Stanley Gardiner in the western Indian Ocean in H.M.S. « Sealark ». In : Reports of the Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner, M.A. Vol. 8. No. VI. *Trans. Linn. Soc. Lond.*, (2-Zool.), **19** : 121-167, pls. 8, 9.
- LENZ, H., 1910. — Crustaceen von Madagascar, Ostafrika und Ceylon, pp. 539-576. In : VOELTZKOW, A. (ed.), Reise in Ostafrika in den Jaren 1903-1905 mit Mitteln der Hermann und Elise geb. Heckmann Wentzel-Stiftung ausgeführt. Stuttgart. E. Schweizerbart'sche Verlagsbuchhandlung, Nägele & Dr. Sprosser. Vol. 2.
- LEWINSOHN, C., 1969. — Die Anomuren des Roten Meeres (Crustacea Decapoda : Paguridea, Galatheidea, Hippidea). *Zool. Verh., Leiden*, **104** : 213 pp. 2 pls.
- 1981. — Researches on the coast of Somalia. *Galathea tanegashimae* Baba (Crustacea Decapoda) from Somalia and notes on *Galathea spinosorostris* Dana. *Monitore zool. ital.*, n. s. suppl. **14** (12) : 181-188.
- 1982. — *Phylladorhynchus integrirostris* (Dana) und *Lauriea gardineri* (Laurie) (Decapoda, Anomura) aus dem nördlichen Roten Meer. *Crustaceana*, **42** (3) : 295-301.
- MAN, J. G. DE, 1888. — Bericht über die von Herrn Dr. J. Brock im indischen Archipel gesammelten Decapoden und Stomatopoden. *Arch. Naturgesch.*, **53** : 215-600, pls 7-22a.
- 1902. — Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. *Abh. senckenb. naturforsch. Ges.*, **25** : 467-929, pls 19-27.
- MAYO, B. S., 1972. — Three new species of the family Galatheidae (Crustacea, Anomura) from the western Atlantic. *Bull. mar. Sci.*, **22** (2) : 522-535.
- MELIN, G., 1939. — Paguriden und Galatheiden von Prof. Dr. Sixten Bocks Expedition nach den Bonin-Inseln 1914. *K. svenska. VetenskAkad. Handl.*, (3), **18** (2) : 1-119.
- MIERS, J. E., 1884. — Crustacea. In : Report on the Zoological Collections Made in the Indo-Pacific Ocean during the Voyage of H.M.S. « Alert », 1881-82, Part I. The collections from Melanesia ; Part II. The collections from the western Indian Ocean, London, pp. 178-322, 513-575, pls. 18-34, 46-52.

- MIYAKE, S., 1953. — On three new species of *Galathea* from the western Pacific. *J. Fac. Agric. Kyushu Univ.*, **10** (2) : 199-208.
- MIYAKE, S., and K. BABA, 1965. — Some galatheids obtained from the Bonin Islands (Crustacea, Anomura). *J. Fac. Agric. Kyushu Univ.*, **13** (3) : 585-593.
- MIYAKE, S., and K. BABA, 1966. — Descriptions of galatheids collected from coral reefs of the Ryukyu Islands (Crustacea, Anomura). *J. Fac. Agric. Kyushu Univ.*, **14** (1) : 57-79.
- MIYAKE, S., and K. BABA, 1967a. — Descriptions of new species of galatheids from the western Pacific. *J. Fac. Agric. Kyushu Univ.*, **14** (2) : 203-212.
- MIYAKE, S., and K. BABA, 1967b. — New and rare species of the family Galatheidae (Crustacea, Anomura) from the Sagami Bay in the collection of the Biological Laboratory, Imperial Household, Japan. *J. Fac. Agric. Kyushu Univ.*, **14** (2) : 213-224.
- MIYAKE, S., and K. BABA, 1967c. — Galatheids of the East China Sea (Chirostylidae and Galatheidae, Decapoda, Crustacea). *J. Fac. Agric. Kyushu Univ.*, **14** (2) : 225-246.
- NOBILI, G., 1905. — Diagnoses préliminaires de 34 espèces et variétés nouvelles et de 2 genres nouveaux de Décapodes de la Mer Rouge. *Bull. Mus. Hist. nat., Paris*, **11** (6) : 393-411.
- 1906. — Faune carcinologique de la Mer Rouge. Décapodes et Stomatopodes. *Annls Sci. nat., Zool.*, (9) **4** : 1-347, pls. 1-11.
- 1907. — Ricerche sui Crostacei della Polinesia. Decapodi, Stomatopodi, Anisopodi e Isopodi. *Memorie Accad. Sci. Torino*, (2) **57** : 351-430, pls. 1-3.
- ORTMANN, A., 1892. — Die Decapoden Krebse des Strassburger Museums IV. Die Abtheilungen Galatheidea und Paguridea. *Zool. Jb., Syst.*, **6** : 241-326, pls. 11, 12.
- PAULSON, O., 1875. — Podophthalmata and Edriophthalmata (Cumacea). Studies on Crustacea of the Red Sea with notes regarding other seas, Part 1. xiv + 144 pp., 21 pls. Kiev. [Original in Russian. Printed in 1961, with different pagination, by the Israel Program for Scientific Translations, Jerusalem].
- SAINT LAURENT, M. DE, and E. MACPHERSON, 1988. — *Munida benguela*, espèce nouvelle d'Afrique du Sud. Comparaison avec *Munida sanctipauli* Henderson, 1885 (Crustacea Decapoda Galatheidae). *Bull. Mus. natn. Hist. nat., Paris*, 4^e sér., **10**, section A, (1) : 105-115.
- SAINT LAURENT, M. DE, and E. MACHPERSON, 1990. — Crustacea Decapoda : Le genre *Eumunida* Smith, 1883 (Chirostylidae) dans les eaux néo-calédoniennes. In : A. CROSNIER (éd.), Résultats des campagnes MUSORSTOM, 6. *Mém. Mus. natn. Hist. nat., Paris*, (A), **145** : 227-288.
- SMITH, S. I., 1883. — Preliminary report on the Brachyura and Anomura dredged in deep water off the south coast of New England by the United States Fish Commission in 1880, 1881, and 1882. *Proc. U. S. natn. Mus.*, **6** : 1-57, pls. 1-6.
- STEBBING, T. R. R., 1908. — South African Crustacea (Part IV). *Ann. S. Afr. Mus.*, **6** : 1-96, pls. 1-15.
- 1920. — South African Crustacea (Part X of S.A. Crustacea, for the marine investigations in South Africa). *Ann. S. Afr. Mus.*, **17** : 231-272, pls 18-27.
- STIMPSON, W., 1858. — Prodromus descriptionis animalium everttebratorum, quae in expeditione ad Oceanum Pacificum Septentrionalem a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit. Pars VII. Crustacea Anomura. *Proc. Acad. nat. Sci. Philad.*, **10** : 225-252.
- TIRMIZI, N. M., 1964. — Crustacea : Chirostylidae (Galatheidea). *Scient. Rep. John Murray Exp.*, **10** (8) : 385-415.
- 1966. — Crustacea : Galatheidae. *Scient. Rep. John Murray Exped.*, **11** (2) : 167-234.
- 1980. — An Indian Ocean record for *Sadayoshia acroporae* Baba (Decapoda, Anomura). *Crustaceana*, **38** (1) : 108-110.
- TIRMIZI, N. M., and W. JAVED, 1976. — A new species of *Munida* from the Indian Ocean with a redescription of a syntype of *Munida spinulifera* Miers, 1884 (Decapoda, Galatheidea). *Crustaceana*, **31** (1) : 81-89.

- TIRMIZI, N. M., and W. JAVED, 1980. — Two new species and one new record of *Phylladorhynchus* Baba from the Indian Ocean (Decapoda, Galatheidae). *Crustaceana*, **39** (3) : 255-262.
- TIRMIZI, N. M., and B. KHAN, 1979. — Two species of *Chirostylus* from the Indian Ocean with observations on the generic characters (Decapoda, Chirostylidae). *Crustaceana*, suppl., **5** : 77-88.
- TÜRKAY, M., 1986. — Crustacea Decapoda Reptantia der Tiefsee des Roten Meeres. *Senckenberg. marit.*, **18** : 123-185.
- YANAGITA, I., 1943. — Revision of *Munida*, a genus of decapod crustaceans found in Japanese Waters. *Bull. biogeogr. Soc. Japan*, **13** : 13-32.
- ZARENKOV, N. A., and I. V. KHODKINA, 1981. — Decapoda. In : KUZNETSOV, A. P. and MIRONOV, A. N. (Eds.), Benthos of the Submarine Mountains Marcus-Necker and Adjacent Pacific Regions. *Academija Nauk SSSR, Moscow*, pp. 83-93.

