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Redescriptions of *Oratosquilla indica* (Hansen) and *Clorida verrucosa* (Hansen), with accounts of a new genus and two new species (Crustacea, Stomatopoda)

RAYMOND B. MANNING

## ABSTRACT

Examination of the syntypes of *Oratosquilla indica* (Hansen) and *Clorida verrucosa* (Hansen), originally described from materials collected by the "Siboga" Expedition, has revealed that each of these species is based on two distinct species. A new genus is erected for *O. indica* and two previously undescribed species. One of the syntypes of *C. verrucosa* is identified with *C. merguensis* (Tiwari and Biswas, 1952).

## INTRODUCTION

As part of a long-term study of the Stomatopoda of the Indian Ocean, all available types of nominal species have been examined. Syntypes of *Oratosquilla indica* (Hansen, 1926) and *Clorida verrucosa* (Hansen, 1926), both based on materials collected in Indonesian waters by the "Siboga" Expedition, were examined at the Zoölogisch Museum, Amsterdam, in 1971, and, in both cases, the two syntypes were found to comprise two distinct species. *Oratosquilla indica* is transferred to a new genus, which includes two other new species, one based on a syntype of *O. indica* and one based on material from Madagascar and Indonesia. One of the two syntypes of *Clorida verrucosa* actually is referable to the very similar *C. merquiensis* (Tiwari & Biswas, 1952). Lectotypes are selected below for each of Hansen's species, which are redescribed and re-illustrated.

All of the specimens described below from the "Siboga" collections are in the Zoölogisch Museum, Amsterdam. The holotype of the new species from Madagascar and Indonesia described below is in the National Museum of Natural History, Smithsonian Institution (USNM). Terms and measurements used in the descriptions have been explained in earlier papers (Manning,

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1968 a, b). I thank J. H. Stock for providing working space and for the loan of the materials reported here. The illustrations were prepared by my wife Lilly. Studies on Indian Ocean stomatopods have been supported in part by the Smithsonian Institution through its Research Awards Program.

### **Areosquilla** new genus

Definition. — Eye of moderate size, cornea bilobed, noticeably wider than stalk. Inner margin of eye longer than outer. Ocular scales separate, subtruncate. Carapace with normal or reduced complement of carinae, median carina present, lacking anterior bifurcation. Anterolateral angles of carapace armed, posterolateral margins rounded. Mandibular palp absent. Two epipods present. Ischium of fifth maxilliped with ventrally-directed spine on posterior margin. Dactylus of claw with 6-8 teeth, opposable margin of propodus evenly pectinate. Lateral processes of fifth, sixth, and seventh thoracic somites bilobed, anterior lobe of process of fifth somite lower than posterior lobe. Abdomen with 8 carinae on anterior 5 somites, 6 on sixth somite, carinae unarmed anterior to fourth somite. Telson flattened, lacking supplementary dorsal ornamentation, submedian teeth with fixed apices; 3 pairs of marginal teeth and prelateral lobes present. Basal prolongation of uropod with inner margin crenulate, unarmed.

Type-species. — *Areosquilla indica* (Hansen, 1926).

Name. — Derived from the Greek, *araios*, thin, in combination with generic name *Squilla*. The gender is feminine.

Remarks. — The “*indica*” group was one of 8 groups of species in the genus *Oratosquilla* recognized by me in an earlier study (Manning, 1971: 3). The characteristics of this group included the absence of the mandibular palp, the reduction in numbers of epipods to 2, the reduction in numbers of armed carinae on the abdomen, and the presence of more than 6 teeth on the claw (one of the species described herein has but 6 teeth on the claw). All of these features can be used to separate members of this new genus from *Oratosquilla*. Of the other genera which share a bilobed lateral process on the fifth thoracic somite, *Carinosquilla*, *Dictyosquilla*, and *Lophosquilla*, all differ from both *Areosquilla* and *Oratosquilla* in having much more complex dorsal ornamentation on the body. *Alima* differs in having the lateral processes of the sixth and seventh thoracic somites at best indistinctly bilobed.

Chopra (1934: 37) commented on the unique combination of characters in *A. indica*, as follows: „Though *Squilla indica* has a superficial similarity with the species in the *nepa* group of the genus, it differs from all the members of this group in a number of very well-marked characters. The total suppression of the mandibular palp, the presence of epipodites on two legs only, and the possession of seven (or eight) teeth on the raptorial dactylus clearly separate this species from all its allies”. These are the main characters which can be used to distinguish representatives of *Areosquilla* from similar species now placed in *Oratosquilla*, such as *O. birsteini* Makarov, 1971.

The three species of *Areosquilla* can be distinguished by using the key given below.

Key to species of *Areosquilla*

- 1a. Carapace with median spine on posterior margin. Fifth thoracic somite with laterally-directed spine on dorsolateral carina. Dactylus of claw with 8 teeth . . . . . *A. hanseni* new species
- b. Carapace lacking spine on posterior margin. Fifth thoracic somite with dorsolateral carina unarmed. Dactylus of claw with 6 or 7 teeth . . . . . 2
- 2a. Submedian carinae of fifth abdominal somite armed. Dactylus of claw with 7 teeth . . . . . *A. indica* (Hansen)
- b. Submedian carinae of fifth abdominal somite unarmed. Dactylus of claw with 6 teeth . . . . . *A. interstincta* new species

*Areosquilla hanseni* new species (Fig. 1)

*Squilla indica* Hansen, 1926: 12 [part].

Material. — East side of Pajunga Island, Kwandang Bay (Pulau Pajunga, Kuandang Bay, north coast of Celebes Island, Indonesia); 31 m; "Siboga" Station 115; holotype (paralectotype of *S. indica* Hansen): 1♂, TL 22.5 mm.

Diagnosis. — Antennular peduncle of moderate size, slightly longer than carapace and rostral plate combined. Corneal index 357. Anterolateral spines of carapace (Fig. 1a) extending to base of rostral plate. Carapace lacking intermediate carinae dorsally, with strong median spine on posterior border (Fig. 1c). Dactylus of claw with 8 teeth. Lateral processes of fifth, sixth, and seventh thoracic somites bilobed, as figured (Fig. 1c). Fifth thoracic somite with short dorsolateral carina, armed laterally, above lateral process. Abdominal carinae well-developed, spined as follows: submedian 5 - 6, intermediate 4 - 6, lateral 3 - 6, marginal 1 - 5. Telson slightly longer than broad; denticles 3 - 4, 7, 1, outer submedian and inner and outer intermediates larger than remainder, rounded; ventral surface of telson with short postanal keel. Uropod (Fig. 1e) with 7 spines on outer margin of proximal segment of exopod, distalmost extending to midlength of distal segment; proximal segment of uropodal exopod 1.5 times as long as distal. Basal prolongation of uropod as illustrated (Fig. 1f).

Color pattern completely faded.

Measurements — Only specimen examined, male holotype, total length 22.5 mm. Other measurements, in mm: carapace length 5.0; cornea width 1.4; antennular peduncle length 5.2; rostral plate length 0.9, width 0.8; telson length 3.9, width 3.7.

Remarks. — In addition to the diagnostic characters given for this species in the key (above), there are several other features that will help to

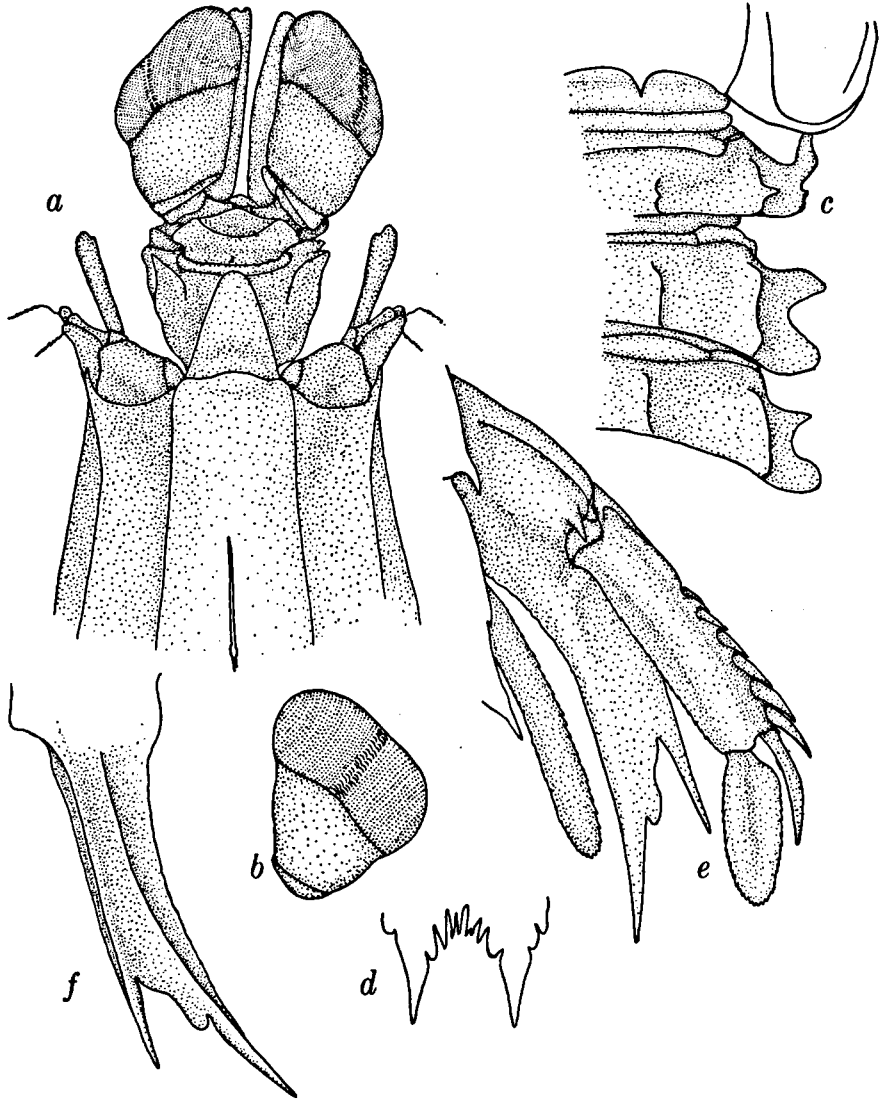


FIG. 1. *Areosquilla hanseni*, new species, male holotype, TL 22.5 mm: a, anterior portion of body; b, eye; c, lateral processes of fifth, sixth, and seventh thoracic somites; d, submedian teeth and denticles of telson, ventral view; e, uropod; f, basal prolongation of uropod (Setae omitted in all figures).

distinguish this small species. The anterior spines of the carapace are somewhat longer than in the other two species described herein, extending beyond the base of the rostral plate. There are no traces of intermediate carinae on the carapace. All of the marginal carinae of the abdomen are armed. The proximal segment of the uropodal exopod is comparatively much

longer in this species. It resembles *A. interstincta* and further differs from *A. indica* in having a very short postanal keel on the telson.

The species is named for H. J. Hansen.

***Areosquilla indica* (Hansen, 1926), new combination (Fig. 2)**

*Squilla indica* Hansen, 1926: 12, pl. 1 figs. 4a-c [part]. — Chopra, 1934: 35, fig. 5; 1939: 150. — Manning, 1968a: 135 [listed].

*Oratosquilla indica*. — Manning, 1971: 3 [discussion]. — ?Moosa, 1974: 16 [listed].

Material. — Lohio Bay, Buton Strait (Selat Butung, between Muna and Butung Islands, south Celebes Island, Indonesia); 22 m, sandy mud; "Siboga" Station 205; lectotype: 1 ♀, TL 33 mm.

Diagnosis. — Antennular peduncle elongate, noticeably longer than carapace and rostral plate combined. Corneal index 379 (about 370 recorded by Chopra (1939)). Anterolateral spines of carapace (Fig. 2a) not extending to base of rostral plate. Carapace (Fig. 2c) lacking median spine on posterior border. Intermediate carinae present dorsally on carapace. Dactylus of claw with 7 teeth. Lateral processes of fifth, sixth, and seventh thoracic somites bilobed, as figured (Fig. 2c). Fifth thoracic somite with short, unarmed carina above lateral margin. Abdominal carinae well-developed, spined as follows: submedian 5 - 6, intermediate 5 - 6, lateral 5 - 6, marginal 5 (submedian 5 - 6, intermediate (4) 5 - 6, lateral (4) 5 - 6, marginal 4 - 5 according to Chopra (1939)). Telson subquadrate, denticles 5 - 6, 10 - 12, 1, outer submedian and outer intermediate much the largest, rounded (Fig. 2d). Telson lacking postanal keel. Uropod (Fig. 2e) with 8 - 9 movable spines on outer margin of proximal segment of exopod, distalmost not extending to midlength of distal segment; proximal segment of uropod about 1.1 times as long as distal. Basal prolongation of uropod as illustrated (Fig. 2f).

Measurements. — Only specimen examined, female lectotype, total length 33 mm. A female 41 mm long was recorded by Chopra (1934), and the same author in 1939 recorded a female 24.5 mm long and a male 28.5 mm long. Other measurements in mm, of lectotype: carapace length 7.2; cornea width 1.9; antennular peduncle length 9.0; rostral plate length 1.1, width 1.2; telson length 4.7, width 5.6.

Remarks. — The specimen illustrated by Hansen (1926: pl. 1 figs. 4a-c) is here selected as the lectotype. The smaller male syntype, the paralectotype, originally reported by Hansen, is the holotype of *A. hanseni*, described above.

The long antennules, relatively large number of intermediate denticles on the telson, and complete absence of the postanal keel will help to distinguish this species from *A. hanseni* and *A. interstincta*.

The specimens reported by Chopra (1934, 1939) apparently belong to this species, but they should be re-examined. He noted that his specimens had but 7 teeth on the claw and reported a pattern of spination on the abdominal carinae resembling that of the type. The species was only listed by Moosa (1974), so it is not possible to definitely identify his material with *A. indica*.

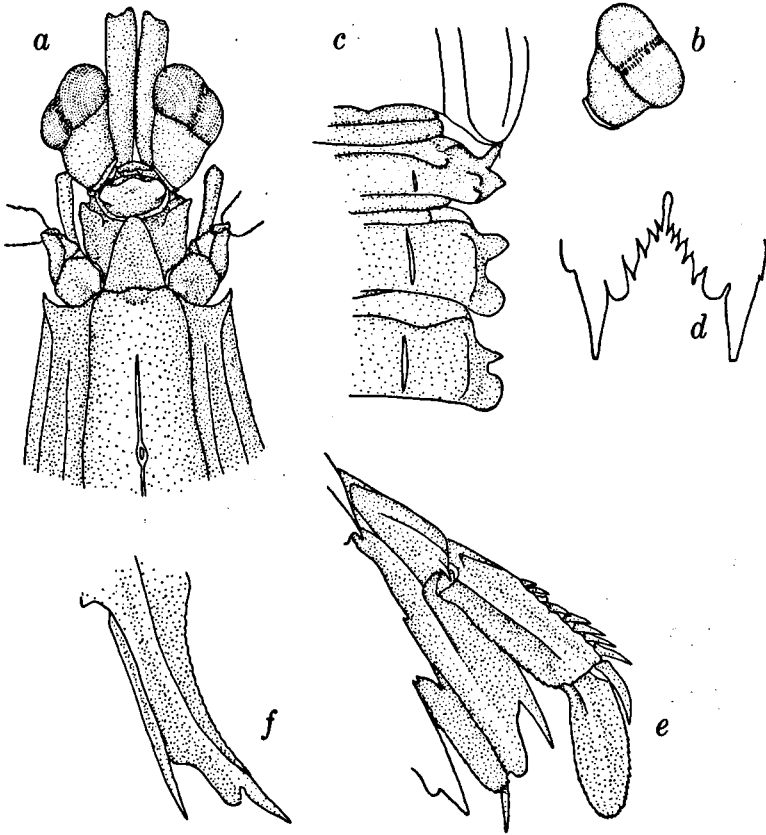


FIG. 2. *Areosquilla indica* (Hansen, 1926), female lectotype, TL 33 mm: a, anterior portion of body; b, eye; c, lateral processes of fifth, sixth, and seventh thoracic somites; d, submedian teeth and denticles of telson, ventral view; e, uropod; f, basal prolongation of uropod (Setae omitted in all figures).

**Distribution.** — Indo-West-Pacific region, from a few localities between Indonesia and the Maldivé Islands, in depths ranging from 22 - 46 m. Records in the literature include: Lohio Bay, Buton Strait, Indonesia, in 22 m (Hansen, 1926); Indonesia (Moosa, 1974); Octavia Bay, Nancoury Harbour, Nicobar Islands, in 13 fms (24 m) (Chopra, 1934); Maldivé area (2 stations), in 27 - 46 m (Chopra, 1939).

### *Areosquilla interstincta* new species (Fig. 3)

*Squilla oratoria* var. *perpensa*. — Hansen, 1926: 11 [part] [not *Oratosquilla perpensa* (Kemp)].

**Material.** — Grand Recif, Tulear, Madagascar; sand; B. Thomassin; 5 March 1963; USNM 136300; holotype: 1♂, TL 33 mm. Kambaragi-bay, Tanah Djampeah (Tanahdjampea Island), Indonesia; 32 m; coral, coral sand; "Siboga" Station 64; paratype: 1♂ (broken), CL 9.0 mm. Anchorage east of

Dangar Besar, Saleh-bay, Sumbawa, Indonesia; 36 m; sand, coral, and mud; "Siboga" station 313; paratype: 1♂ (broken), CL 8.9 mm.

Diagnosis. — Antennular peduncle elongate, longer than carapace and rostral plate combined. Corneal indices 346 - 379. Anterolateral spines of carapace (Fig. 3a) not extending to base of rostral plate. Carapace (Fig. 3d) lacking median spine on posterior border. Dactylus of claw with 6 teeth. Lateral processes of fifth, sixth, and seventh thoracic somites bilobed, as figured (Fig. 3d). Fifth thoracic somite with dorsolateral carina, not spined but with dorsal tubercle. Abdominal carinae well-developed, armed as follows: submedian 6, intermediate 4 - 6, lateral 4 - 6, marginal 4 - 5. Telson subquadrate, denticles 5, 8, 1, outer submedian and outer intermediate much the largest, rounded. Ventral surface of telson with short postanal tubercle. Uropodal exopod (Fig. 3f) with 7 movable spines on outer margin of proximal segment, distalmost not extending to midlength of distal segment; proximal segment of uropodal exopod about 0.9 times as long as distal. Basal prolongation of uropod as illustrated (Fig. 3g).

Color. — Eye and basal segments of antennules and antennae ornamented with small black chromatophores. Carinae and grooves of carapace outlined in dark pigment; diffuse dark bar present across posterior fourth of carapace. Claw with dark pigment on ischium, dark chromatophores in dorsolateral patch on merus, and line of dark pigment distally on propodus. Exposed thoracic somites with dark posterior line, each somite with lateral patch of

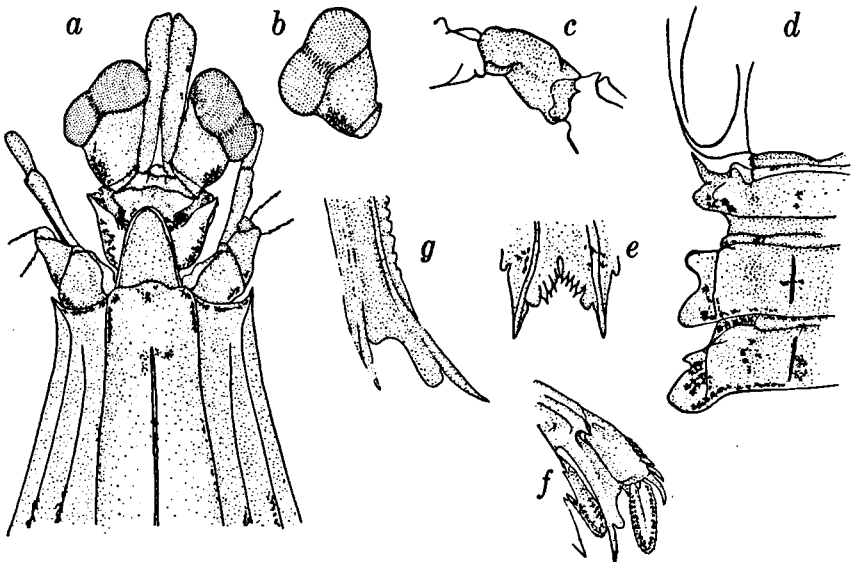


FIG. 3. *Areosquilla interstincta*, new species, male holotype, TL 33 mm: a, anterior portion of body; b, eye; c, carpus of claw; d, lateral processes of fifth, sixth, and seventh thoracic somites; e, submedian teeth and denticles of telson, dorsal view; f, uropod; g, basal prolongation of uropod (Setae omitted in all figures).

dark pigment above margin. Abdomen with scattered dark chromatophores dorsally; dark line on posterior margin of each somite interrupted; second and fifth somites with mid-dorsal patch of dark chromatophores; posterolateral angles of sixth somite black. Telson with dark, subtriangular patch under apical spine of median carina, curved lines of dark pigment dorsally, and edges of marginal teeth dark. Distal segment of uropodal exopod black with lighter center line; uropodal endopod with dark chromatophores distally.

Measurements. — Only specimen examined, male holotype, total length 33 mm. Other measurements, in mm: carapace length 7.2; cornea width 1.9; antennular peduncle length 8.4; rostral plate length 1.3, width 1.2; telson length 5.3, width 5.3.

Remarks. — This species can immediately be recognized by the unarmed submedian carinae of the fifth abdominal somite and the presence of 6 teeth on the claw. The proximal segment of the uropodal exopod is shorter in this species than in either of the other two species in the genus.

The specific name is from the Latin, "interstinctus", variegated, alluding to the well-marked color pattern.

#### *Clorida merguiensis* (Tiwari & Biswas, 1952) (Fig. 4)

*Squilla microphthalma*. — Kemp & Chopra, 1921: 299 [part] [not *S. microphthalma* H. Milne-Edwards].

*Squilla verrucosa* Hansen, 1926: 3 [part].

*Squilla merguiensis* Tiwari & Biswas, 1952: 350, fig. 1a. — Manning, 1968a: 124 [listed]; 1968b: 5 [key].

not *Clorida merguiensis*. — Blumstein, 1974: 116, fig. 4 [lacks mandibular palp; probably a distinct species].

Material. — Lesser Sunda Islands, Indonesia; 08°00'S, 118°34.7'E; 13-31 m; "Siboga" Station 47; paralectotype of *Squilla verrucosa* Hansen: 1 ♀, TL 24 mm.

Diagnosis. — Eye (Figs. 4a, b) flask-shaped, slender, cornea bilobed, wider than adjacent stalk; length of eye 2 times greatest width. Corneal index 613. Rostral plate (Fig. 4a) triangular, length slightly greater than width, lacking median carina. Anterolateral margins of carapace straight or slightly convex, anterolateral angles armed (Fig. 4a). Mandibular palp and 4 epipods present. Dactylus of claw (Fig. 4c) with 5 teeth, outer margin lacking conspicuous angled lobe. Lateral process of fifth thoracic somite (Fig. 4d) a sharp, anterolaterally-directed spine, sharp ventral spine also present on each side. Lateral processes of sixth and seventh thoracic somites (Fig. 4c) rounded anterolaterally and posterolaterally, process of seventh somite flattened laterally, appearing subtruncate. Thoracic somites lacking submedian carinae. Anterior 4 abdominal somites lacking submedian carinae (Fig. 4e); low submedian carinae present on fifth somite; abdominal carinae spined as follows: submedian 6, intermediate 4-6, lateral 4-6, marginal 4-5 (in holotype of *C. merguiensis*, submedian 6, intermediate 3-6, lateral 3-6, marginal 5).



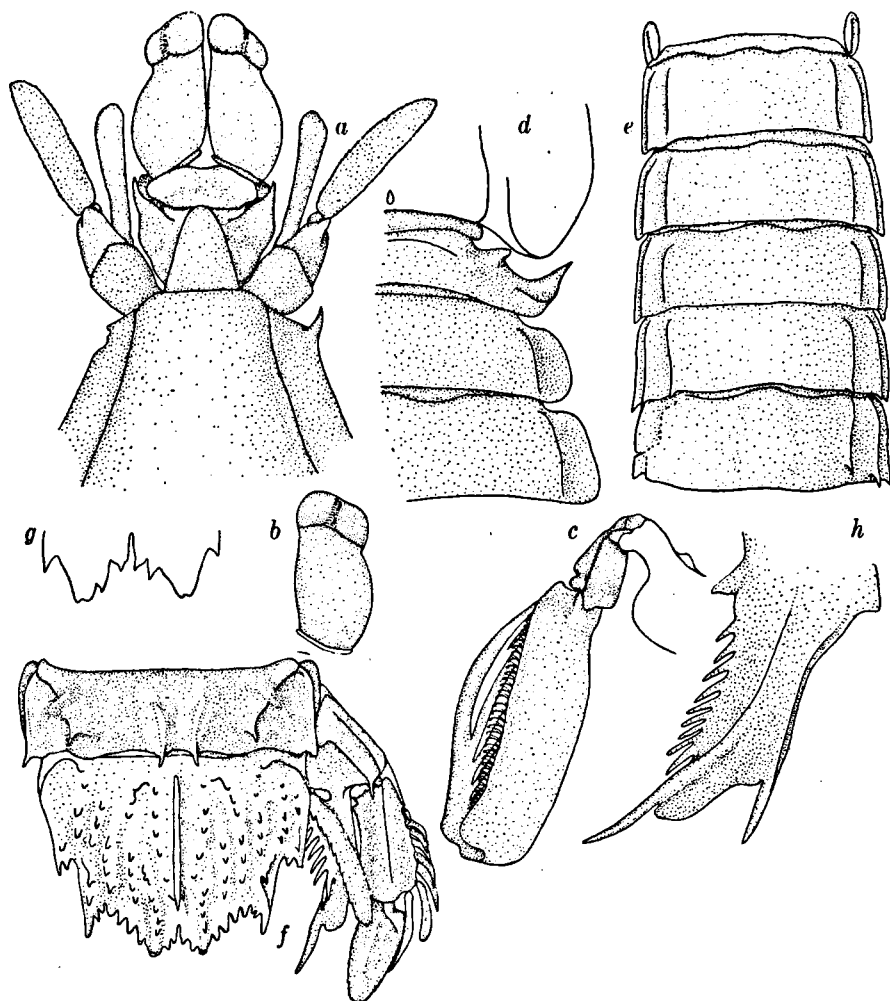


FIG. 4. *Clorida merguensis* (Tiwari and Biswas, 1952), female, TL 24 mm: a, anterior portion of body; b, eye; c, carpus, propodus, and dactylus of claw; d, lateral processes of fifth sixth, and seventh thoracic somites; e, anterior 5 abdominal somites, dorsal view; f, sixth abdominal somite, telson, and uropod; g, submedian teeth and denticles of telson; h, basal prolongation of uropod (Setae omitted in all figures).

Sixth abdominal somite lacking supplementary spinules on posterior margin, dorsal surface lateral to submedian carinae rugose. Telson lacking prelateral lobes, dorsal ornamentation as illustrated (Fig. 4f); short, strong postanal keel present ventrally. Marginal denticles of telson 2, 6, 1, outer margin of intermediate tooth smooth. Uropodal exopod (Fig. 4f) with 8 movable spines on outer margin of proximal segment, distalmost slender, extending beyond midlength of distal segment, distal segment slender, as long as or shorter than proximal. Basal prolongation of uropod (Fig. 4h) with 9 fixed spines on inner

margin and larger spine at base of endopod; lobe between apical spines large, rounded.

Color pattern completely faded.

Measurements. — Only specimen examined, female paralectotype of *S. verrucosa* Hansen, total length 24 mm. Tiwari & Biswas (1952) recorded a male 40 mm long. Other measurements of female examined, in mm: carapace length 4.9; cornea width 0.8; antennular peduncle length 3.9; rostral plate length 0.9, width 0.8; fifth abdominal somite width 5.2; telson length 3.7, width 4.4.

Remarks. — The small female from the “Siboga” collections agrees in almost all details with my notes based on an examination of the type of *C. merguensis*, the main difference being in the spination of the abdominal carinae (see description) and on the “Siboga” specimen the distal spine on the uropodal exopod is sharper. These differences are probably a reflection of the size difference of the two known specimens; additional material might show that the “Siboga” specimen represents a distinct species, but for now it seems best to refer it to *C. merguensis*.

The material identified with this species by Blumstein (1974) lacked a mandibular palp and certainly represents a different, probably undescribed, species.

The submedian carinae of the fifth abdominal somite are very low and difficult to detect unless the specimen is dry.

As suggested by Hansen’s identification of this specimen with *C. verrucosa* and by its placement with that species in the same couplet of a key to species of *Clorida* which I published in 1968 (Manning, 1968b: 4—5), *C. merguensis* is very similar to *C. verrucosa*. It differs in lacking a carina on the rostral plate, having fewer abdominal carinae armed, lacking submedian carinae on the fourth abdominal somite, having a much shorter postanal keel, in having longer movable spines on the uropodal exopod, and in having a longer proximal segment on the uropodal exopod. In addition, *C. merguensis* may occur in shallower water than does *C. verrucosa*, for the type of the latter species was taken in 247 m and the two known specimens of *C. merguensis* were taken in 13—31 and 60 m.

Distribution. — Indo-West-Pacific region, where it is known from two localities. The type was collected from 4 miles NNE of Kabusa Island, Mergui Archipelago, in 33 fms (60 m). The “Siboga” specimen was taken in the Lesser Sunda Islands, Indonesia (08°00’S, 118°34.7’E) in 13—31 m.

### *Clorida verrucosa* (Hansen, 1926) (Fig. 5)

*Squilla verrucosa* Hansen, 1926: 3, pl. 1 figs. 1a-d. — Manning, 1968a: 124 [listed]; 1968b: 5 [key].  
*Clorida verrucosa*. — Anonymous, 1972: 27 [listed]. — Blumstein, 1974: 116.

Material. — Lesser Sunda Islands, Indonesia; 08°27’S, 122°54.5’E; 247 m, sandy mud; “Siboga” Station 306; lectotype: 1♂, TL 45.5 mm.

Diagnosis. — Eye (Figs. 5a, b) flask-shaped, slender, cornea bilobed, wider

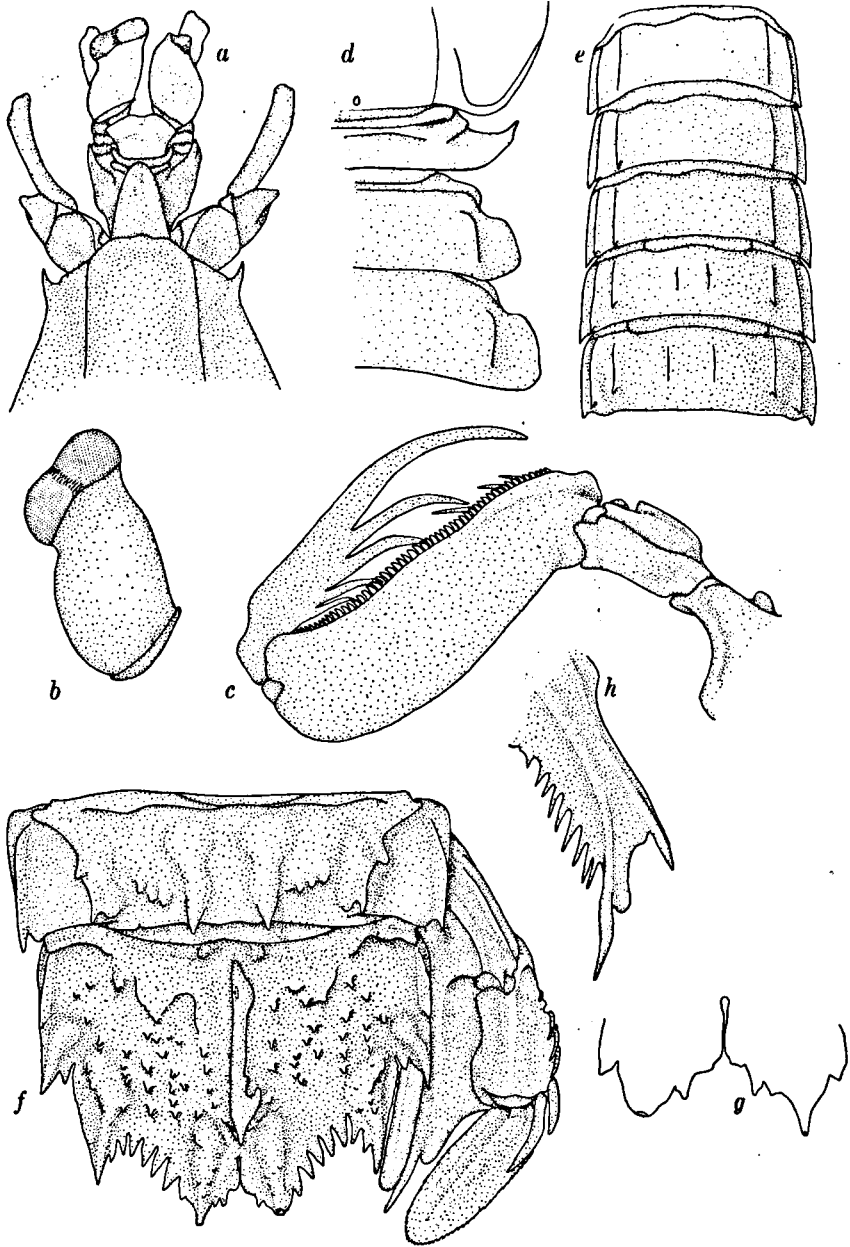


FIG. 5. *Clorida verrucosa* (Hansen, 1926), male lectotype, TL 45.5 mm: a, anterior portion of body; b, eye; c, carpus, propodus, and dactylus of claw; d, lateral processes of fifth, sixth, seventh thoracic somites; e, anterior 5 abdominal somites, dorsal view; f, sixth abdominal somite, telson, and uropod; g, submedian teeth and denticles of telson; h, basal prolongation of uropod (Setae omitted in all figures).

than adjacent stalk; length of eye 2.0 times greatest width. Corneal index 733. Rostral plate (Fig. 5a) triangular, longer than broad, with low median keel anteriorly. Anterolateral margins of carapace (Fig. 5a) straight or slightly concave, anterolateral angles armed. Mandibular palp and 4 epipods present. Dactylus of claw (Fig. 5c) with 5 teeth, outer margin lacking conspicuous angled lobe. Lateral process of fifth thoracic (Fig. 5d) somite a sharp, anterolaterally-directed spine, sharp ventral spine also present. Lateral processes of sixth and seventh thoracic somites (Fig. 5d) rounded anterolaterally and posterolaterally, process of seventh somite flattened laterally, appearing subtruncate. Thoracic somites lacking submedian carinae. Anterior 3 abdominal somites (Fig. 5e) lacking submedian carinae, fourth and fifth somites with short, unarmed submedian carinae. Abdominal carinae spined as follows: submedian 6, intermediate 2-6, lateral 2-6, marginal 2-5. Sixth abdominal somite lacking supplementary spinules on posterior margin, dorsal surface lateral to submedian carinae tuberculate. Telson with wellmarked prelateral lobes, dorsal ornamentation as illustrated (Fig. 5f) (left submedian tooth damaged); well-developed postanal keel present ventrally. Marginal denticles of telson 3, 7, 1, outer margin of intermediate tooth slightly tuberculate. Uropodal exopod (Fig. 5f) with 8 movable spines on outer margin of proximal segment, distalmost slender, not extending to midlength of distal segment; distal segment elongate, longer than proximal. Basal prolongation of uropod (Fig. 5h) with 8-9 slender, fixed spinules and 1-2 tubercles on inner margin and larger lobe at base of endopod; lobe between apical spines large, rounded.

Color pattern completely faded.

Measurements. — Only specimen examined, male lectotype, total length 45.5 mm. Measurements were not given by Anonymous (1972) and Blumstein (1974). Other measurements of lectotype, in mm: carapace length 8.8; cornea width 1.2; antennular peduncle length 4.9; rostral plate length 1.7, width 1.3; fifth abdominal somite width 10.0; telson length 6.0, width 8.3.

Remarks. — The larger of the two syntypes, the male specimen illustrated by Hansen (1926: pl. 1 figs. 1a-d) is here selected as the lectotype. The smaller syntype, the paralectotype, appears to be identifiable with *C. merguiensis* (see above).

As suggested by Hansen (1926: 4) the transverse crease in the rostral plate, which he figured, is artificial. The short, low anterior carina is present.

Differences between this species and the very similar *C. merguiensis* have been discussed under the account of that species.

It is not certain whether the two post-1926 references to this species are based on material of this species or of *C. merguiensis*. The lectotype of *C. verrucosa* was collected at a depth of 247 m, whereas the specimens reported by Anonymous (1972) and Blumstein (1974) were taken in depths of 25–30 m and 20–25 m, respectively. In addition, the material reported by Blumstein lacked the ventral spine on the fifth thoracic somite; that spine is present in both *C. merguiensis* and *C. verrucosa*.

Distribution. — Indo-West-Pacific region, where it is known with certainty from the Lesser Sunda Islands, Indonesia (08°27'S, 122°54.5'E), in 247 m. It has also been recorded from Piru Bay, Ceram, Indonesia (03°08'20"S, 28°08'10"E), in 25—30 m (Anonymous, 1972) and from the Gulf of Tonkin, in 20—25 m on muddy sand and clay and sandy mud (Blumstein, 1974).

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Dr. RAYMOND B. MANNING  
Invertebrate Zoology (Crustacea)  
National Museum of Natural History  
Smithsonian Institution  
Washington, D.C. 20560  
U.S.A.