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STOMATOPOD CRUSTACEA FROM THE ATLANTIC COAST OF NORTHERN SOUTH AMERICA

BY

RAYMOND B. MANNING

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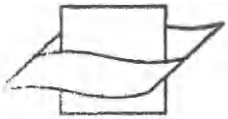
PLATES 1-11

BY

RAYMOND B. MANNING

THE MARINE LABORATORY

UNIVERSITY OF MIAMI



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INTRODUCTION

The stomatopod fauna of most areas in the western Atlantic is very poorly known; that of the Atlantic coast of northern South America is the least known of all. Records from this area are spotty and few, as pointed out by Holthuis (1959). His report on the stomatopods of Suriname and an earlier paper by Lemos de Castro (1955) on the stomatopods of Brazil are the only two papers dealing specifically with the group in South American waters. Holthuis dealt with 6 species and Lemos de Castro listed 13, yet Holthuis found none of the Brazilian species in Suriname.

In 1939 the Allan Hancock Foundation vessel VELERO III, under the direction of Captain Hancock, made a short cruise to the Atlantic coast of Panama, Colombia, and Venezuela. Until then, virtually no marine collections had been made in this area. The cruise was planned to provide comparative information on the faunas on either side of the isthmus of Panama. Garth (1945) gave an account of the cruise and the station records.

It was originally intended that the present report include only the material collected by the Hancock Expedition, which was taken primarily from inshore areas. However, it was felt that addition of the offshore material taken by the U. S. Fish and Wildlife Service vessel OREGON off Brazil and the Guianas in 1957-58 would beneficially round out the report so that most species known from Panama to northern Brazil could be included. The keys have been devised to cover all of the species previously reported from northern South America. Those not covered by the present report are bracketed in the keys, and locality in South America and sources of the records follow the species names.

ZOOGEOGRAPHIC NOTES

The stomatopod fauna of the Atlantic coast of northern South America is far richer than previously believed. The collections herein

reported bring the total number of species to 24, about two-thirds of the number of species now known from the entire western Atlantic. Manning (1959) reported only 19 species from the Gulf of Mexico, an area that has had much more intensive collecting than South America.

The geographic relationship of the 24 species from northern South America is summarized in Table 1, and the close ties of this fauna to that of the Caribbean Sea in general and the Gulf of Mexico can easily be seen. It is not surprising that the stomatopod fauna decreases sharply south of Recife, on the eastern coast of Brazil, for stomatopods are characteristically tropical and sub-tropical organisms; a similar decrease in species is encountered to the north, where the stomatopod fauna drops off sharply north of Florida.

TABLE 1.

Numbers of species of stomatopods from Northern South America also occurring in other areas. Data, in part, from Lemos de Castro (1955), Manning (1959), and Schmitt (1940).

	Northern South America	Brazil, south of Recife	Caribbean Sea	Gulf of Mexico	Eastern United States	Eastern Pacific
Squilla	13	4	7	7	8	1
Parasquilla	1	----	----	----	----	----
Pseudosquilla	2	----	2	1	2	1
Lysiosquilla	4	1	2	2	2	----
Gonodactylus	3	1	2	1	1	1
Odontodactylus	1	----	1	1	----	----
TOTAL	24	6	14	12	13	3

Although only three species are shared by the eastern Pacific region and northern South America, this is not really indicative of the close relationship of the stomatopods of the two areas. There are at least 16 pairs of analagous species on either side of the isthmus of Panama (Table 2). Complete comparisons of these faunas would be highly desirable.

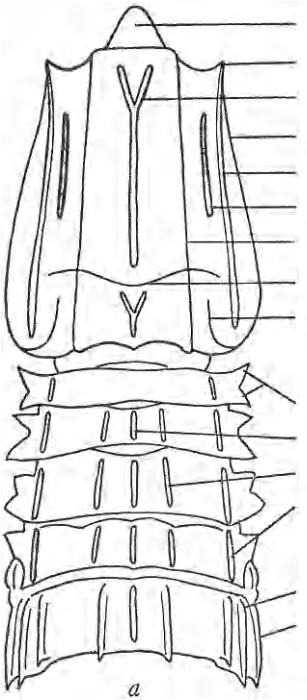
TABLE 2.

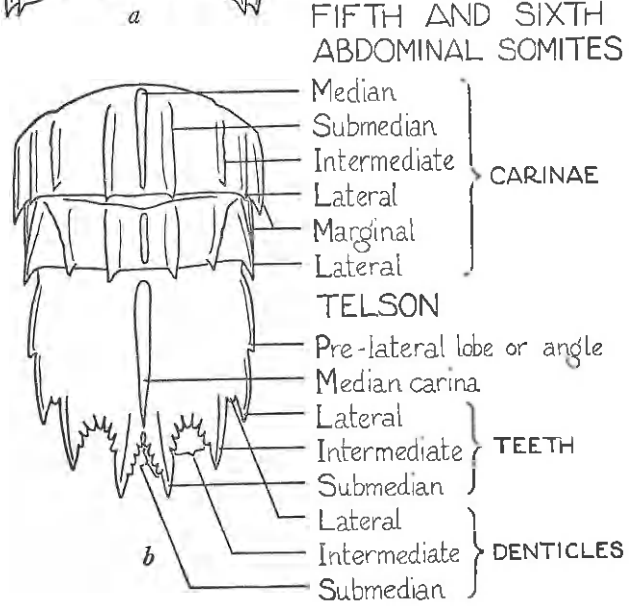
Analagous species of stomatopods on either side of the isthmus of Panama. Three tropical species, *Squilla dubia* Milne-Edwards, *Pseudosquilla oculata* (Brullè), *Gonodactylus oerstedii* Hansen, and two cold temperate species, *Squilla armata* Milne-Edwards and *Lysiosquilla polydactyla* von Martens, have been recorded on both sides of the Americas (Schmitt, 1940).

ATLANTIC	PACIFIC
Squilla quadridens Bigelow	*S. polita* Bigelow
Squilla tricarinata Holthuis	*S. swetti* Schmitt
Squilla alba Bigelow	*S. hildebrandi* Schmitt
Squilla brasiliensis Calman	*S. bigelowi* Schmitt
Squilla empusa Say	*S. aculeata* Bigelow
Squilla rugosa Bigelow	*S. hancocki* Schmitt
Squilla lijdingi Holthuis	*S. tiburonensis* Schmitt
Squilla edentata (Lunz)	*S. biformis* Bigelow
Squilla intermedia Bigelow	*S. panamensis* Bigelow
Squilla obtusa Holthuis	*S. parva* Bigelow
Pseudosquilla plumata (Bigelow)	*P. veleronis* Schmitt
Hemisquilla braziliensis (Moreira)	*H. stylifera* (Milne-Edwards)
Lysiosquilla grayi Chace	*L. decemspinosa* Rathbun
Lysiosquilla scabricauda (Lamarck)	*L. maculata* (Fabricius)
Lysiosquilla biminiensis Bigelow	*L. digueti* Coutière
Gonodactylus spinulosus Schmitt	*G. festae* Nobili

EXPLANATIONS AND ACKNOWLEDGEMENTS

In the following account, short descriptions are given for most of the species, except for new or poorly known forms which are described in some detail. Some general terms used in the descriptions and keys are illustrated in Plate 1. Synonymies are complete unless otherwise stated; for the most part, synonymies and accounts of the species are restricted to adults only. Total length is measured from the apex of the rostral plate to the tips of the submedian spines of the telson. Other length measurements are made along the midline, and width measurements are made at the widest point. The count for the teeth of the raptorial dactylus always includes the terminal tooth. An abdominal spine formula of submedian, 6; intermediate, 5-6; lateral, 5-6; marginal, 1-5; indicates that the submedian carinae terminate in spines on the sixth abdominal somite only, the intermediate carinae terminate in


CARAPACE AND ROSTRUM
Rostrum or rostral plate
Anterior lateral angle of carapace
Anterior bifurcated portion of median carina
Marginal
Lateral
Intermediate
CARINAE
Gastric groove
Cervical groove
Posterior reflected part of marginal carina
EXPOSED THORACIC SOMITES
Lateral processes of fifth thoracic somite
Median
Submedian
Intermediate
CARINAE
FIRST ABDOMINAL SOMITE
Lateral
Marginal
CARINAE
a


FIFTH AND SIXTH ABDOMINAL SOMITES
Median
Submedian
Intermediate
Lateral
Marginal
Lateral
CARINAE
TELSON
Pre-lateral lobe or angle
Median carina
Lateral
Intermediate
Submedian
TEETH
Lateral
Intermediate
Submedian
DENTICLES
b

spines on the fifth and sixth, and so on. A denticular formula of 1-3, (4)5-7(8), 1 indicates that there are one to three submedian denticles, four to eight, usually 5-7, intermediate denticles, and one lateral denticle.

The generic key is largely that of Schmitt (1940). The specific keys include all of the species heretofore reported between Panama and Recife, Brazil. One species reported from southern Brazil by Lemos de Castro (1955) (*Lysiosquilla excavatrix* Brooks) is also known from the southern United States but has not been been collected from intermediate areas and this species is not included in the keys.

The initials AHF (Allan Hancock Foundation), UMML (The Marine Laboratory, University of Miami), or USNM (U. S. National Museum) after each lot of material indicate where that material will be deposited.

In the "material examined" sections under each species, stations such as "A 14-39" are Allan Hancock Foundation stations. "A" refers to the Atlantic stations, and "-39" indicates the year.

I am indebted to Dr. John S. Garth of the Hancock Foundation for placing the stomatopod material of the Allan Hancock Atlantic Expedition at my disposal; Harvey R. Bullis, Jr., Base Director, South Atlantic Exploration and Gear Research, U. S. Fish and Wildlife Service, for making available material collected by the U.S.F.W.S. research vessels; Dr. Fenner A. Chace, Jr., Curator, Division of Marine Invertebrates, U. S. National Museum, for supplying comparative material, for providing working space at Washington, and for his comments on the manuscript; Dr. L. B. Holthuis, Rijksmuseum van Natuurlijke Historie, Leiden, for his comments on several systematic problems; Dr. Gilbert L. Voss, Curator of Marine Invertebrates, The Marine Laboratory, University of Miami, for reviewing the manuscript. This work was carried out with the support of the National Science Foundation, under Grant No. G-11235, and constitutes a technical report to that organization.

Plate 1. Diagrammatic sketches of *Squilla*, illustrating terms used in the descriptions (from Schmitt, 1940).

Key to the Western Atlantic Genera of Crustacea Stomatopoda

1. Ischiomeral articulation of raptorial claw terminal; merus of raptorial claw grooved inferiorly throughout its length for the reception of the propodus; dactylus not inflated at base 2
   Ischiomeral articulation of raptorial claw not terminal, situated anterior to proximal end of merus; merus grooved for not more than three-fourths of its length for reception of propodus; dactylus inflated at base 6
2. Carapace usually with well-marked carinae; first five abdominal somites with longitudinal carinae 3
   Carapace without carinae; first five longitudinal somites without carinae 4
3. Basal prolongation of uropod with three spines, the outer much the longest; at most two intermediate denticles on telson; raptorial dactylus armed with three teeth . . *Parasquilla,* n. gen.
   Basal prolongation of uropod with two spines, the inner much the longer; more than three intermediate denticles on telson; raptorial dactylus armed with four or more teeth . . . *Squilla*
4. Abdomen depressed, noticeably flattened; telson without definite median carina; submedian teeth of telson, if movable, arising from submarginal (ventral) surface . . . . *Lysiosquilla*
   Abdomen compressed, rarely noticeably flattened; telson with well-marked median carina and additional longitudinal carinae on its dorsal surface; submedian marginal teeth of telson with movable tips 5
5. Raptorial dactylus armed on its inner margin, usually with three or four teeth . . . . . *Pseudosquilla*
   Raptorial dactylus armed only with terminal tooth . . . . . [*Hemisquilla*]
6. Raptorial dactylus unarmed except for terminal tooth . . . . . *Gonodactylus*
   Raptorial dactylus armed with six or more teeth . . . . . [*Odontodactylus*]

The genera *Hemisquilla* and *Odontodactylus*, each known from a single species in the western Atlantic, are not represented in the collections herein reported. *H. braziliensis* (Moreira, 1903) is known only from southern Brazil, in the waters off Rio de Janeiro (Lemos de Castro, 1955). *O. havanensis* (Bigelow, 1893) was reported from Curaçao by Rathbun (1919) and Holthuis (1941) and has a wide horizontal and vertical distribution, from the Bahamas and the Gulf of Mexico to Curaçao, in 0-163 fms (Manning, 1959).

Genus **Parasquilla**, new genus

Diagnosis: Dorsal surface of body roughened; rostral plate with a wide longitudinal groove on anterior half; antennal protopod with one ventral papilla; carapace rounded anterolaterally and posterolaterally, reflected marginal carinae present on posterior third only; cervical groove distinct across dorsum of carapace; last three exposed thoracic somites with submedian and intermediate carinae; sixth and seventh thoracic somites with a distinct lateral process; epipods present on first five thoracic appendages; mandibular palp present; raptorial claw short, heavy, dactylus armed with three teeth; propodus grooved for reception of dactylus, with three movable spines on inner, proximal margin, and a row of pectinations on upper margin; dorsal ridge of carpus with two strong teeth; merus grooved inferiorly throughout its length; inner branch of walking legs strap-shaped, two-segmented; first five abdominal somites with nine longitudinal carinae; six carinae on sixth abdominal somite; telson without prelateral lobes, with six strong posterior teeth, the apices of the submedian teeth movable; four to nine, usually nine, minute movable submedian denticles, two fixed intermediate denticles, and one lateral one; dorsal surface of telson with a sharp crest, flanked on either side by a converging row of pits; dorsal carinae, in addition to the carinae of the marginal spines, may be present; basal prolongation of uropod produced into three subequal teeth, the outer much the longest.

The name *Parasquilla* means "beside *Squilla*," and is derived from the Greek *para* meaning "beside" or "wrong in," and the generic name *Squilla*, from the Latin *scilla* and Greek *skilla*, meaning shrimp. The gender of the generic name is feminine.

Type species: *Parasquilla meridionalis*, new species.

Parasquilla meridionalis, new species

Plate 2.

Holotype: OREGON Sta. 2249; 07°40'N, 57°34'W; north of British Guiana; August 31, 1958; 30/27 fms; 1 ♀; USNM 105989.

Paratypes: OREGON Sta. 2267; 06°58'N, 56°02'W; north of Suriname; September 2, 1958; 25 fms; 1 ♂; USNM 105990. OREGON Sta. 2052; 04°03'N, 50°25'W; west of Cabo Caçipore, Brazil; November 13, 1957; 50 fms; 1 ♂; UMML 32.1171.

Measurements: The holotype is 92.2 mm in total length; the two paratypes are 91.0 and 99.4 mm in total length. Other measurements, holotype, in mm: carapace length, 23.2; length rostral plate, 2.8; width rostral plate, 5.5; length telson, 16.0; width telson, 16.3. Other measurements, ♂ paratype, OREGON Sta. 2267, in mm: carapace length, 22.1; length rostral plate, 2.6; width rostral plate, 5.7; length telson, 15.0; width telson, 15.8.

Description: Dorsal surface of all portions of body minutely pitted and corroded.

Eyes large, cornea bilobed, with large mesial lobe and smaller lateral lobe; eyes not extending to articulation of first and second segments of antennular peduncle.

Rostral plate deflexed, almost twice as broad as long, with a prominent longitudinal median groove in anterior half; rostrum completely covering base of eyes and dorsal processes of antennular and ophthalmic somites; lateral margins concave, anterolateral angles rounded; anterior margins converging at rounded, obtuse apex.

Antennular peduncle over one-half median length of carapace. Antennal protopodite with one ventral papilla.

Carapace without carinae except for marginals; marginals prominent posteriorly and recurving dorsally, extending to the cervical groove; cervical and gastric grooves present, with cervical groove distinct but reduced across dorsum of carapace; a distinct tubercle, just

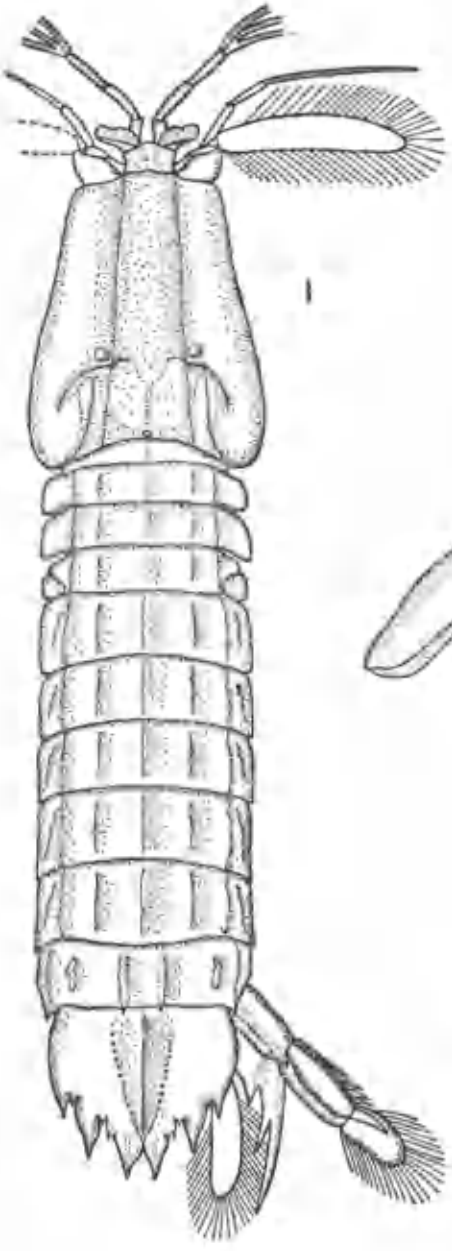
Plate 2. *Parasquilla meridionalis*, new genus, new species.

Fig. 1. Female holotype, OREGON Sta. 2249, north of British Guiana, dorsal view, x1.5.

Fig. 2. Male paratype, OREGON Sta. 2267, north of Suriname, rostral plate, x4.

Fig. 3. Female holotype, raptorial claw, x1.5.

Fig. 4. Female holotype, submedian denticles of telson, x4.



1

2

3

4

anterior to cervical groove, located lateral to each gastric groove; a median tubercle present on posterior margin; lateral lobes of carapace swollen, convex, with swelling diminishing posteriorly; anterolateral angles rounded, anterior margin concave; posterolateral angles broadly rounded, posterior margin strongly concave; anterolateral width about one-half median length, posterolateral width over three-fourths median length.

Epipods present on first five thoracic appendages. Mandibular palp present, three-segmented.

Dactylus of raptorial claw armed with three short teeth, outer, proximal margin faintly angled; propodus widening distally, with three movable teeth on inner, proximal margin, and a row of pectinations on outer margin; dorsal ridge of carpus with two subacute processes, neither spined; raptorial claw, when folded, extending posteriorly to cervical groove.

Exposed thoracic somites with traces of a median carina on the eighth and reduced submedian carinae on the sixth to eighth; intermediate carinae prominent, not spined; lateral processes of fifth somite blunt, inconspicuous; lateral process of sixth thoracic somite rounded anteriorly, sub-truncate posteriorly; that of the seventh rounded laterally and posteriorly; inner branches of walking legs two-segmented.

Abdomen noticeably depressed, with nine carinae on each of the first five somites, six on the last; the following abdominal carinae end in spines; submedian, 6; intermediate, 5; lateral, 6; marginal, (3) 4-5. Median carina of second to fifth somites notched; submedian carinae sinuous, not prominent, if notched, only on second somite; intermediate carinae prominent, notched anteriorly on second to fifth somite and reduced on sixth; lateral carinae short, reduced, interrupted anteriorly, extending dorsoventrally rather than parallel to body line; an immovable spine present ventrally on sixth somite in front of articulation of uropod.

Telson slightly wider than long, greatest width posterior to base; sharp dorsal crest present, obscurely notched anteriorly, terminating in a sharp spine; a row of pits either side of crest terminating under terminal spine; lateral carinae and two short submedian carinae present; posterior margin with six sharp spines, submedian pair with movable tips; 4-9 (usually 9) minute, movable, submedian denticles, and two intermediate and one lateral denticle.

Basal prolongation of uropod with three spines, outer longest, extending almost to distal margin of outer branch of uropod; median spine extending to distal margin of penultimate segment of uropod; inner spine extending to level of apex of lateral tooth, and armed with a row of tubercles on inner margin; ultimate segment of outer branch about two-thirds length of penultimate; outer margin of penultimate segment with 7-10 (usually 9), graded, movable spines, last spine extending past midpoint of ultimate segment.

Discussion: This species is closely related to the endemic Mediterranean species, *Pseudosquilla ferussaci* (Roux), which is here transferred to *Parasquilla*. Both *P. ferussaci* and *P. meridionalis* share characters which place them in an intermediate position between *Pseudosquilla* and *Squilla*. The short carinae on the carapace, cervical groove across the dorsum of the carapace, and longitudinal carinae of the abdomen are characteristic of *Squilla*. Although the telson and uropods of *Parasquilla* resemble those found in *Pseudosquilla*, no other species of the latter genus possesses the minute, movable submedian denticles of the telson. Both Miers (1880) and Kemp (1913) felt that *P. ferussaci* was more closely related to *Pseudosquilla* than to *Squilla*.

Since the time of Kemp's 1913 monograph of Indo-Pacific stomatopods, students of this group have been very cautious about erecting new genera for various species that seemed to fit none of the recognized genera. Hansen's *Coronidopsis* described in 1926 was the only exception, and that is the only genus to be described as new since before the turn of the century. Consequently, Kemp's generic diagnoses have been emended in several respects, and the genera as he saw them, notably *Pseudosquilla* and *Lysiosquilla*, have become "catch-baskets" for several species of indeterminate position. For example, Chace (1958) commented upon the heterogeneity of *Lysiosquilla*, and Chopra (1939) discussed the position of his *Lysiosquilla sewelli*, showing that it combined the characters of several genera, including *Lysiosquilla* and *Pseudosquilla*.

In my opinion, several new genera are needed to express more clearly the interrelationships of the stomatopods, and *Parasquilla* is one of these.

The name *meridionalis* is derived from the Latin, *meridies*, and refers to the geographic proximity of the species to the prime meridian.

Remarks: The color of this species is as follows: dorsal surface of carapace, exposed thoracic somites, and abdomen, light brown. Pos-

Outer margin of dactylus a simple curve; lateral process of fifth thoracic acute, sickle-shaped; denticles 3-10, 12-16, 1 . . . . . *S. edentata*

11. Rostral plate with short carina on anterior third; cornea of eye only slightly broader than stalk . . . . . [*S. surinamica* Holthuis, 1959; Suriname]
Rostal plate smooth, without median carina; eye T-shaped, cornea much broader than stalk 12
12. Lateral processes of fifth and sixth thoracic somites acute posteriorly; rostral plate subquadrate . . . . *S. lijdingi*
Lateral processes of fifth and sixth thoracic somites rounded posteriorly; rostral plate elongate-triangular . . *S. obtusa*

Squilla quadridens Bigelow, 1893

Plate 3, figs. 1, 2.

Squilla quadridens Bigelow, 1893, p. 101; Bigelow, 1894, p. 511; Holthuis, 1941, p. 32; Holthuis, 1959, p. 189, pl. IX, fig. 6; Manning, 1959, p. 20 (part).

Previous records:

Biscayne Bay, Florida, (Manning, 1959); off Key Largo, Florida, (Bigelow, 1893); northeast Gulf of Mexico, (Manning, 1959); Gairaca, Santa Marta, Colombia (Holthuis, 1941); off Suriname (Holthuis, 1959). Sublittoral to 56 fms. The specimen reported by Manning (1959) from Englewood Beach, Florida, is *S. schmitti* Lemos de Castro.

Material examined:

A14-39; 2 mi. S.W. of Cape la Vela, Colombia; April 8, 1939; 22 fms; 2♂♂, 1♀ (one damaged) (AHF; USNM).

OREGON Sta. 2249; 07°40'N, 57°34'W; north of British Guiana; August 31, 1958; 30/27 fms; 1♂ (USNM).

Measurements: Males, 29.8 to 33.4 mm, total length; female, 24.5 mm, total length.

Description: Eyes large, triangular, corneal and peduncular axes subequal; cornea placed obliquely on stalk; lateral margins of rostral plate tapering anteriorly to rounded apex; carapace without carinae except for posterior fourth of laterals and reflected portions of marginals; raptorial dactylus armed with four teeth; four epipods

present; mandibular palp absent; lateral process of fifth thoracic somite a sharp spine directed laterally, straight or slightly curved or an obtuse lobe, directed obliquely forward; lateral processes of sixth and seventh thoracic somites faintly emarginate anteriorly, rounded posteriorly; submedian carinae present only on sixth abdominal somite; other abdominal carinæ sharp, prominent, spined as follows: submedian, 6; intermediate, 5-6; lateral, 5-6; marginal, (4)-5; telson with sharp crest ending in a posterior spine; only submedian spines of telson carinate, the carinae extending forward to base of terminal spine of crest; submedian spines with movable tips; prelateral lobes absent; denticles 4-6, 8-9, 1; uropodal outer branch with 5 graded, movable spines on outer margin, the last extending to midpoint of ultimate segment; basal prolongation of uropods with 2-6, usually 3-4, immovable spines on inner margin of inner spine.

Discussion: This small species is closely related to *S. schmitti* Lemos de Castro and *S. tricarinata* Holthuis from which it differs in having short submedian carinae on the telson. *S. polita* Bigelow is the Eastern Pacific analogue of *S. quadridens*.

Remarks: The present material extends the range of this species in northern South America from Suriname to British Guiana and Colombia.

The male from OREGON Sta. 2249 has the margins of the telson and the carinae of the sixth abdominal somite noticeably swollen; this is probably a sexual character.

The shape of the lateral process of the fifth thoracic somite varies in the present material. In the type, from Florida, and the OREGON specimen, the process, in anterior view, is a thin, elongate, sharp spine. In the Colombia material, the process, in anterior view, is rounded, not acute laterally. The difference may be a specific character, but the material from the two locations shows no other important differences.

The color of this species is as follows: a broad transverse band of dark color extends across the posterior fourth of the carapace; there is a rectangular patch of dark color on the dorsum of the second abdominal somite; a short line of dark color is found on the last three thoracic and each abdominal somite at the intermediate carinae, and the line on the sixth abdominal somite is longer than on the anterior ones; there is a dark spot at each end of the median carina of telson; the inner branch and the distal segment of the outer branch of the uropods are lined with dark chromatophores.

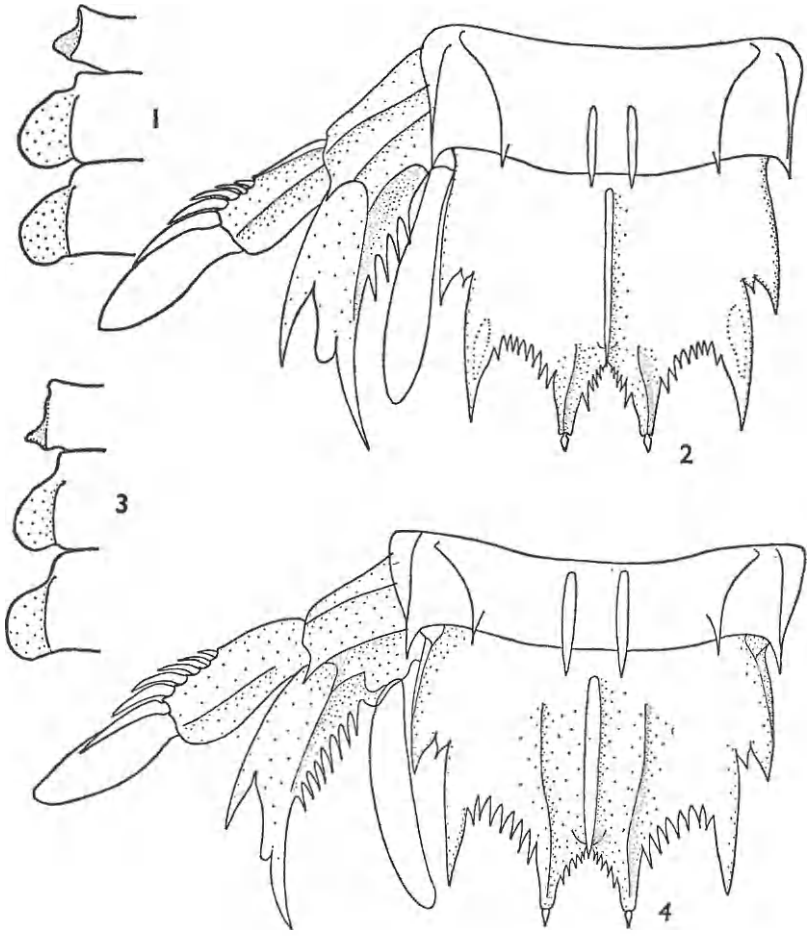


Plate 3. *Squilla quadridens* Bigelow

Fig. 1. Male, A14-39, 2 mi. S. W. of Cape la Vela, Colombia, lateral processes of fifth, sixth, and seventh thoracic somites, x11.6.

Fig. 2. Same, sixth abdominal somite, and telson and left uropod, x11.6.

Squilla schmitti Lemos de Castro

Fig. 3. Female, A14-39, 2 mi. S. W. of Cape la Vela, Colombia, lateral processes of fifth, sixth, and seventh thoracic somites, x11.6.

Fig. 4. Same, sixth abdominal somite, telson, and left uropod, x11.6.

Squilla schmitti Lemos de Castro, 1955

Plate 3, figs. 3-4.

Squilla schmitti Lemos de Castro, 1955, p. 8, text-figs. 5-8, pl. I, figs. 32-33.

Squilla quadridens, Manning, 1959, p. 20 (part); [*non Squilla quadridens* Bigelow, 1893, p. 101].

Previous records:

Rio de Janeiro Bay, Brazil (Lemos de Castro, 1955); Englewood Beach, Florida (as *S. quadridens* Bigelow; Manning, 1959). Littoral.

Material examined:

A14-39; 2 mi. S.W. of Cape la Vela, Colombia; April 8, 1939; 22 fms; 2♀♀ (one fragmented) (AHF).

Measurements: Female, 26.2 mm, total length.

Description: Eyes large, triangular, corneal and peduncular axes subequal, cornea placed obliquely on stalk; rostral plate subtriangular; carapace without carinae except for reflected marginals and posterior fourth of laterals; raptorial dactylus armed with four teeth; four epipods present; mandibular palp absent; lateral process of fifth thoracic somite an obtuse lobe, rounded laterally, vertical axis directed obliquely forward; lateral processes of sixth and seventh thoracic somites rounded laterally, that of the seventh less convex and wider; submedian carinae present on sixth abdominal somite only; other abdominal carinae present, spined as follows: submedian, 6; intermediate, 5-6; lateral, 5-6; marginal, 5; telson with sharp crest ending in a posterior spine; carinae of submedian spines extending forward to base of crest; no other carinae present dorsally on telson; submedian spines with movable tips; prelateral lobes absent; denticles 4-6, 8-9, 1; uropodal outer branch with 6 movable, graded spines, the last extending to midpoint of ultimate segment; basal prolongation of uropods with 5-8 immovable spines on inner margin of inner spine.

Discussion: This species differs from *S. quadridens* in having long submedian carinae on the telson and in lacking the short intermediate carinae of the carapace. *S. schmitti* has but two dorsal carinae on the telson, differing from *S. tricarinata* which has eight carinae in addition to the two long submedians.

Alima lebouri, described by Gurney (1946, p. 137, figs. 1-3) from Bermuda, is probably this species, as the post-larval specimen reported by him agrees in most respects with the present material. Gurney's larva had but two epipods as opposed to the four found in the adult. Because of the small number of epipods, Gurney felt that his material

was distinct from *S. quadridens*, of which a post-larval specimen was figured by Bigelow (1894, p. 547, fig. 27) who showed five epipods; Bigelow's figure may be in error, as the adult has but four epipods. However, two post-larval specimens of *S. quadridens* in the U. S. National Museum have only two epipods; the specimens are 11.9 mm (USNM 21482) and 12.4 mm (USNM 21483) in total length. A third specimen (USNM 96403) 14.2 mm in total length, has the full complement of four epipods. Gurney's post-larvae measured 12-14 mm in total length, so it is possible that the remainder of the epipods would be added during subsequent molts.

It is also possible that *A. lebouri* is the post-larva of *S. tricarinata,* which also has four epipods and long submedian carinae on the telson. Although the adult *S. tricarinata* has 8 supplementary carinae on the dorsal surface of the telson, Schmitt (1940, p. 162) pointed out that juveniles of *S. hancocki* did not possess additional carinae on the telson, although this was a characteristic feature of the adults. For this reason, *A. lebouri* cannot be assigned to either species until more of the intermediate larval stages are known.

Although Lemos de Castro (1955, p. 10) could find no traces of movable tips on the submedian teeth of the telson, the tips are clearly movable in the present material.

Remarks: The present material shows no distinctive color pattern. This species had not been reported outside of Brazil; the Colombia and Florida material extends the range considerably to the north and west.

Squilla rugosa Bigelow, 1893

Plate 4, figs. 1-3.

Squilla rugosa Bigelow, 1893, p. 102; Bigelow, 1894, p. 541, figs. 23, 24; Boone, 1927, p. 7; Chace, 1954, p. 449; Holthuis, 1959, p. 174, pl. VIII, figs. 1-2; Manning, 1959, p. 20.

Chloridella rugosa var. *pinensis* Lunz, 1937, p. 12, text-fig. 6.

Squilla rugosa pinensis, Manning, 1959, p. 20 (part).

Previous records:

Alabama (Archer, 1948); Gulf of Mexico, east and west coasts of Florida, Little Bahama Bank, Cuba, north of British Guiana (Manning, 1959); off Suriname (Holthuis, 1959; Manning, 1959).

Material examined:

OREGON Sta. 2244; 08°12′N, 58°21′W; north of British Guiana; August 31, 1958; 31/39 fms; 1 ♂ (UMML).

OREGON Sta. 2249; 07°40′N, 57°34′W; north of British Guiana; August 31, 1958; 30/27 fms; 2 ♂♂, 9 ♀♀ (USNM).

OREGON Sta. 2250; 07°38′N, 57°34′W; north of Suriname; August 31, 1958; 27/26 fms; 2 ♂♂, 2 ♀♀ (USNM).

OREGON Sta. 2261; 07°20′N, 56°49′W; north of Suriname; September 1, 1958; 33 fms; 1 ♀ (UMML).

OREGON Sta. 2262; 07°18′N, 56°49′W; north of Suriname; September 1, 1958; 33/30 fms; 2 ♂♂, 5 ♀♀ (UMML).

OREGON Sta. 2267; 06°58′N, 56°02′W; north of Suriname; September 2, 1958; 25 fms; 7 ♂♂, 2 ♀♀ (USNM).

OREGON Sta. 2276; 06°42′N, 55°37′W; north of Suriname; September 3, 1958; 23/22 fms; 1 ♂ (USNM).

Measurements: Males, 58.3 to 101.5 mm, total length; females, 82.7 to 114.3 mm, total length.

Description: Eyes large, bilobed; rostral plate elongate, without carinae; median carina of carapace indistinct anteriorly, not bifurcate; anterolateral spines of carapace not extending to rostral base; raptorial claw large, dactylus armed with six teeth, outer margin of dactylus a simple curve; five epipods present; mandibular palp present; lateral process of fifth thoracic somite convex anteriorly, directed laterally; lateral processes of sixth and seventh thoracic somites convex, apices acute, directed posteriorly; an inconspicuous tubercle present anteriorly on the process of the sixth somite; submedian carinae present on last three thoracic and all abdominal somites; abdominal carinae sharp, spined as follows: submedian, 5-6; intermediate, (2)3-6; lateral, 1-6; marginal, 1-5; posterior margin of fifth abdominal somite with 0-4 accessory spinules between the submedian and intermediate carinae; sixth abdominal somite with 0-5 accessory spinules; telson without prelateral lobes, with 10 supplementary carinae, some complete, some broken, either side of crest; denticular formula 4-6, (7-8)9-11, 1; basal prolongation of uropod with (7-8)9-12(13) fixed spines on inner margin of inner spine; 7-8 movable spines on outer margin of penultimate segment of outer branch.

Discussion: As suggested by Holthuis (1959), *S. rugosa pinensis* is not distinct from *S. rugosa*. The specimen from East Florida reported by Manning (1959) under the subspecies is an undescribed species.

S. rugosa is closely allied to *S. hancocki* Schmitt, 1940, from the eastern Pacific; the latter species has definite prelateral lobes on the telson, lacks the accessory spinules on the last two abdominal somites, and has a forwardly-curved spine on the lateral process of the fifth thoracic somite.

Remarks: The color pattern is quite distinctive. There is a black line on the anterodistal fourth of the antennal scale. The merus of the raptorial claw has a dark line across its distal end. There is a black line posterolaterally on the eighth thoracic somite, and a black rectangular patch on the dorsum of the second and fifth abdominal somite; the latter also has posterolateral spots. The median portion of each abdominal somite is outlined in black. There is a broad, median patch of black on the posterior half of the telson, and the distal portion of the inner branch as well as the last segment of the outer branch of the uropods are black.

Squilla empusa Say, 1818

Plate 4, figs. 4-5.

Restricted synonymy:

Squilla empusa Say, 1818, p. 250; Holthuis, 1941, p. 31 (part); Holthuis, 1959, p. 177, text-fig. 76a, pl. VIII, figs. 3-4; Manning, 1959, p. 19.

Previous records:

Massachusetts to Campeche Bank, Trinidad, French Guiana (Manning, 1959); Margarita Island, Venezuela (Holthuis, 1959); Suriname (Holthuis, 1959; Manning, 1959). 0 to 84 fms.

Material examined:

OREGON Sta. 2208; 09°55′N, 60°53′W; southeast of Trinidad; Au-

Plate 4. *Squilla rugosa* Bigelow

Fig. 1. Male, OREGON Sta. 2267, north of Suriname, anterior portion of carapace and rostral plate, x6.

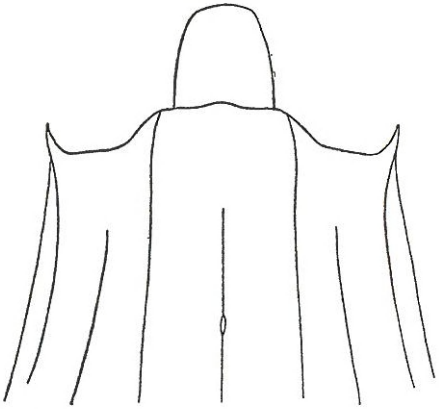
Fig. 2. Same, lateral processes of fifth, sixth, and seventh thoracic somites, x6.

Fig. 3. Male, Dry Tortugas, Florida, sixth abdominal somite, telson and right uropod, x1.7.

Squilla empusa Say

Fig. 4. Female, OREGON Sta. 2279, north of Suriname, lateral processes of fifth, sixth, and seventh thoracic somites, x5.

Fig. 5. Same, anterior portion of carapace and rostral plate, x5.



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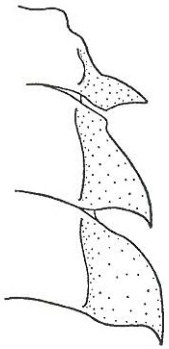

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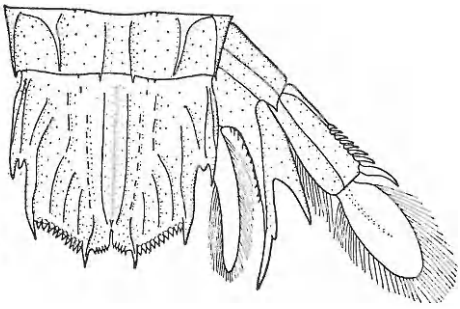

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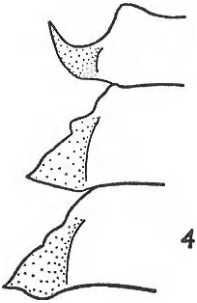

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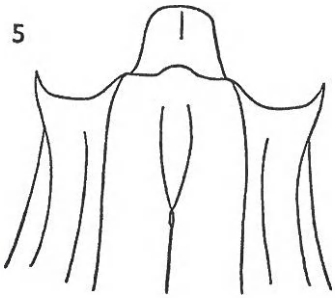

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gust 26, 1958; 34/35 fms; 4 ♂ ♂, 1 ♀ (USNM).

OREGON Sta. 2209; 09°45′N, 60°47′W; southeast of Trinidad; August 26, 1958; 20/22 fms; 1 ♀ (UMML).

OREGON Sta. 2279; 06°20′N, 55°34′W; north of Suriname; September 3, 1958; 14/7 fms; 3 ♂ ♂, 1 ♀ (USNM).

OREGON Sta. 2327; 06°26′N, 54°20′W; north of Suriname; September 15, 1958; 17 fms; 1 ♂, 2 ♀ ♀ (UMML).

Measurements: Males, 75.4 to 130.2 mm, total length; females, 80.0 to 143.0 mm, total length.

Description: Eyes large, bilobed; rostral plate subquadrate, with short median carina on anterior half; bifurcation of median carina of carapace open for at least 4/5 the distance from the dorsal pit to the anterior margin; anterolateral spines of carapace occasionally extending to rostral base; outer margin of raptorial dactylus sinuate, inner margin armed with six teeth; mandibular palp present; five epipods present; lateral process of fifth thoracic somite sharp, acute, curved forward; lateral processes of sixth and seventh thoracic somites acute, directed posteriorly, each with a small anterior tubercle; submedian carinae present on last three thoracic and all abdominal somites; abdominal carinae spined as follows: submedian, (4) 5-6; intermediate, (2-3) 4-6; lateral, 1-6; marginal, 1-5; telson with six strong marginal spines, prelateral lobe present; denticles 3-4, 6-9, 1.

Remarks: The color is as follows: last three thoracic and first five abdominal somites with a dark line along posterior margin; second abdominal somite with a median rectangular dark patch; bases of submedian teeth of telson dark; distal half of penultimate segment and proximal half of ultimate segment of uropodal exopod dark; distal half of inner branch of uropod also dark.

Squilla edentata (Lunz, 1937)

Plate 5

Squilla intermedia Bigelow, 1893, p. 102 (part; Gulf of Mexico specimen only); Bigelow, 1894, p. 530, fig. 19 (part; Gulf of Mexico specimen only); Chace, 1954, p. 449 (part; Gulf of Mexico specimen only); Manning, 1959, p. 19 (part).

Chloridella edentata Lunz, 1937, p. 14, figs. 7-10.

Squilla edentata, Chace, 1954, p. 449; Manning, 1959, p. 19.

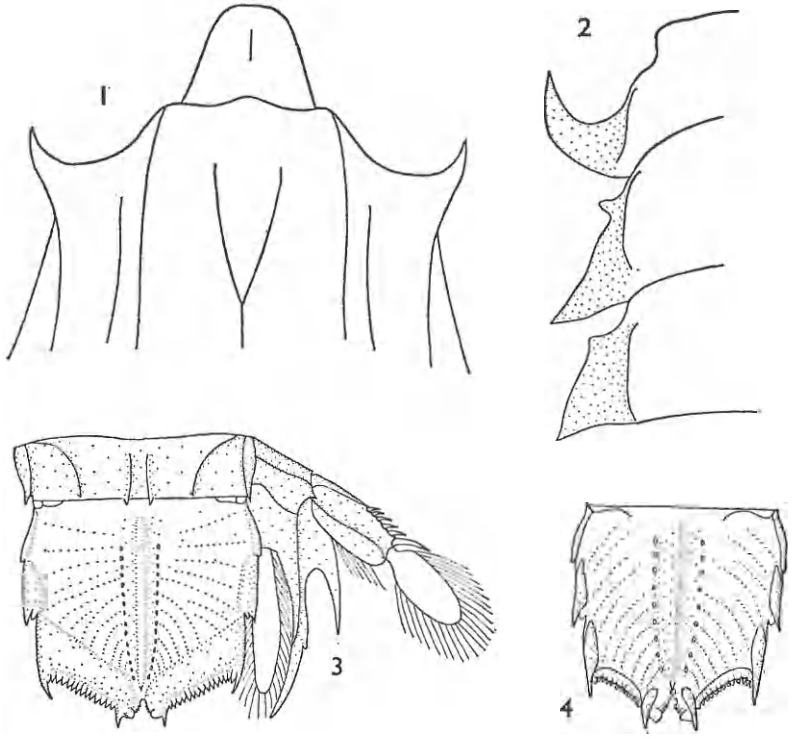


Plate 5. *Squilla edentata* (Lunz)

Fig. 1. Male, OREGON Sta. 1983, north of British Guiana, anterior portion of carapace and rostral plate, x3.3.

Fig. 2. Same, lateral processes of fifth, sixth, and seventh thoracic somites, x3.3.

Fig. 3. Male (different specimen), OREGON Sta. 1983, sixth abdominal somite, telson and right uropod, x1.

Fig. 4. Female, same, telson, x1.

Previous records:

Off Pensacola, Florida (Lunz, 1937): the following records were listed by Manning (1959) as *S. intermedia*: Gulf of Mexico, SILVER BAY Sta. 182 and 8 OREGON Stats.; Caribbean Sea (OREGON Sta. 1883); north of British Guiana (OREGON Sta. 1983); north of Suriname (OREGON Stats. 2285, 2286, 2288); north of French Guiana (OREGON Sta. 2295). 95 to 200 fms.

Material examined:

OREGON Sta. 2351; 11°31′N, 62°24′W; northwest of Trinidad; September 23, 1958; 200/185 fms; 1 ♂ (USNM).

OREGON Sta. 1983; 09°53′N, 59°53′W; north of British Guiana; November 3, 1957; 125 fms; 1 ♂, 3 ♀ ♀ (UMML).

OREGON Sta. 1985; 09°41′N, 59°47′W; north of British Guiana; November 3, 1957; 150 fms; 1 ♂, 2 ♀ ♀ (USNM).

OREGON Sta. 2285; 07°27′N, 54°54′W; north of Suriname; September 8, 1958; 135/150 fms; 2 ♂ ♂ (UMML).

OREGON Sta. 2286; 07°26′N, 54°49′W; north of Suriname; September 8, 1958; 105/120 fms; 4 ♂ ♂ (USNM).

OREGON Sta. 2288; 07°26′N, 54°40′W; north of Suriname; September 8, 1958; 95 fms; 4 ♂ ♂, 4 ♀ ♀ (USNM).

OREGON Sta. 2295; 07°27′N, 53°47′W; north of French Guiana; September 9, 1958; 120/125 fms; 4 ♂ ♂ (UMML).

OREGON Sta. 2021; 07°18′N, 53°22′W; north of French Guiana; November 8, 1957; 100 fms; 1 ♂ (USNM).

Measurements: Males, 81.9 to 137.7 mm, total length; females, 60.6 to 147.5 mm, total length.

Description: Eyes very large, cornea set obliquely on stalk; ocular plates rounded dorsally; rostral plate subtriangular, apex rounded, sharp median carina on anterior half; median carina of carapace bifurcated anterior to dorsal pit, distance from dorsal pit to bifurcation less than distance from bifurcation to anterior margin; anterolateral spines of carapace falling short of rostral base; lateral margins of carapace strongly angled posteriorly; mandibular palp present; five epipods present; raptorial claw large, dactylus armed with six teeth; dorsal ridge of raptorial carpus with two teeth; lateral process of fifth thoracic somite sharp, sickle-shaped; lateral processes of next two somites with a small anterior lobule and larger posterior lobe, acute, directed laterally; submedian and intermediate carinae present on last

three thoracic and all abdominal somites; abdominal carinae spined as follows: submedian, 5-6; intermediate, (1)2-6; lateral, 1-6; marginal, 1-5; telson with six strong posterior teeth, prelateral lobes well-defined; denticles small, denticular formula (3)4-6(7-10), (12)13-16, 1; outer submedian denticle the largest, rounded; margins of telson much swollen in adult male, swellings interrupted at teeth; post-anal keel present; uropods with 6-8 graded, movable spines on outer margin of penultimate segment of outer branch, the last not reaching midpoint of ultimate segment.

Discussion: This species is very closely related to *S. intermedia,* differing from it in the following characters: the cornea is comparatively smaller; the ocular plates are rounded dorsally; on the median carina of the carapace, the distance from the dorsal pit to the anterior bifurcation is less than the distance from the bifurcation to the anterior margin; the outer submedian denticle is larger than the others, and is rounded.

The type is a juvenile, and thus appeared to have but one large submedian denticle.

Bigelow's description of *S. intermedia* in 1893 and 1894 was based on two specimens, a male from the Gulf of Mexico and a female from the Bahamas. The Bahama female (USNM 11543) is here selected as the lectotype of *S. intermedia.* The Gulf of Mexico male described and figured by Bigelow is actually *S. edentata* (Lunz, 1937). The name *intermedia* could be applied to either species, as Bigelow had material of both at the time of his description. However, since the name *edentata* is available for the Gulf of Mexico and Caribbean species, it should be applied to that species, and *intermedia* should be retained for the distinct form outside of the Caribbean.

Remarks: S. edentata is found in somewhat shallower water than *S. intermedia,* which has been taken as deep as 338 fms (lectotype, USNM 11543). Also, *S. edentata* extends from the northern Gulf of Mexico, through the Caribbean Sea, to French Guiana on the northern coast of South America, while *S. intermedia* is known only from east of Florida to north of Cuba (Manning, 1959) and from West Africa (Ingle, 1960).

The color of the material has completely faded. Unfortunately, the color pattern of neither *S. intermedia* nor *S. edentata* has been described.

Squilla lijdingi Holthuis, 1959

Plate 6

Squilla lijdingi Holthuis, 1959, p. 181, text-figs. 76 b-d, pl. IX, figs. 1-2.

Squilla brasiliensis, Manning, 1959, p. 18 (part); [*non Squilla brasiliensis* Calman, 1917, p. 139, figs. 1-3].

Previous records:

Off Trinidad (OREGON Sta. 2207), Venezuela, British Guiana and Suriname (as *S. brasiliensis,* Manning, 1959); Suriname (Holthuis, 1959).

Material examined:

OREGON Sta. 2207; 09°58′N, 61°11′W; south of Trinidad; August 26, 1958; 20/22 fms; 1 ♂ (UMML).

OREGON Sta. 2226; 08°32′N, 59°05′W; north of British Guiana; August 28, 1958; 28/33 fms; 4 ♀ ♀ (USNM).

OREGON Sta. 2231; 08°32′N, 58°42′W; north of British Guiana; August 29, 1958; 45/48 fms; 1 ♂, 1 ♀ (UMML).

OREGON Sta. 2228; 08°30′N, 58°56′W; north of British Guiana; August 28, 1958; 37 fms; 1 ♂, 9 ♀ ♀ (USNM).

OREGON Sta. 2250; 07°38′N, 57°34′W; north of British Guiana; August 31, 1958; 27/26 fms; 2 ♂ ♂ (USNM).

OREGON Sta. 2276; 06°42′N, 55°37′W; north of Suriname; September 3, 1958; 23/22 fms; 1 ♀ (USNM).

OREGON Sta. 2272; 06°30′N, 55°52′W; north of Suriname; September 3, 1958; 17 fms; 1 ♂ (USNM).

OREGON Sta. 2327; 06°26′N, 54°20′W; north of Suriname; September 15, 1958; 17 fms; 2 ♂ ♂, 5 ♀ ♀ (UMML).

OREGON Sta. 2306; 05°58′N, 52°24′W; north of French Guiana; September 11, 1958; 30/31 fms; 1 ♀ (UMML).

OREGON Sta. 2307A+B; 05°56-57′N, 52°20′W; north of French Guiana; September 11, 1958; 31/28 fms; 8 ♂ ♂, 5 ♀ ♀ (USNM).

Measurements: Males, 42.3 to 91.7 mm, total length; females, 44.3 to 97.3 mm, total length.

Description: Eyes large, cornea elongate; rostral plate squarish, without median carina; median carina of carapace not bifurcate anteriorly; anterolateral spine of carapace not extending past rostral base; raptorial dactylus with six teeth, outer margin a simple curve; mandibular palp present; five epipods present; lateral process of fifth thoracic

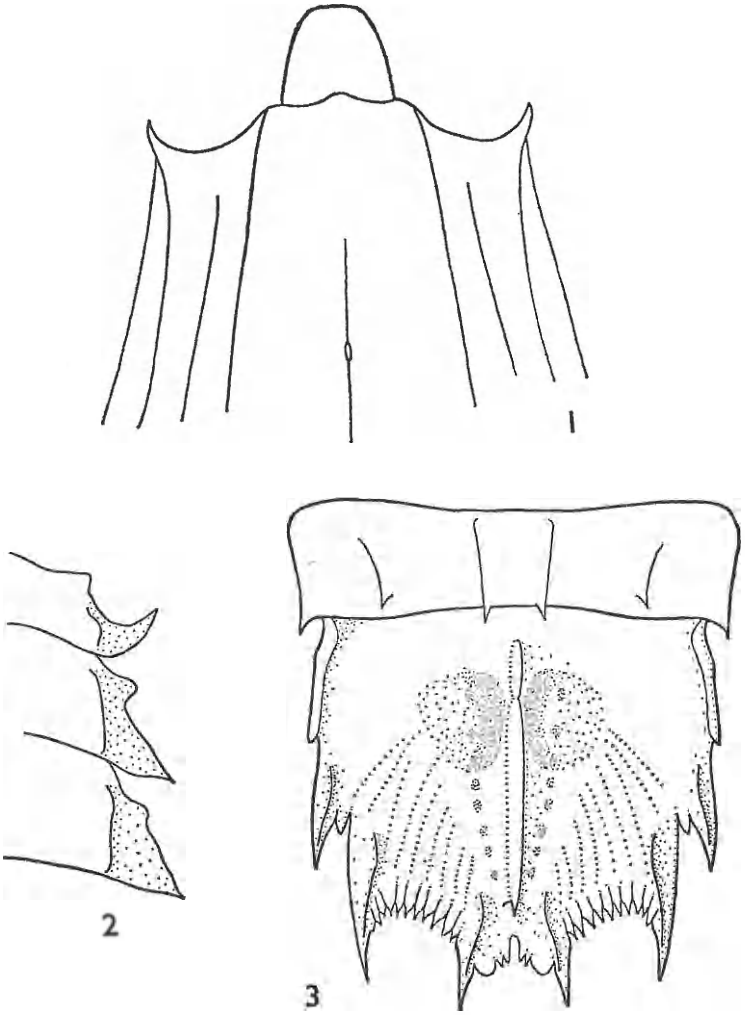


Plate 6. *Squilla lijdingi* Holthuis

Fig. 1. Male, OREGON Sta. 2307 A+B, north of French Guiana, anterior portion of carapace and rostral plate, x6.3.

Fig. 2. Same, lateral processes of fifth, sixth, and seventh thoracic somites, x6.3.

Fig. 3. Same, sixth abdominal somite and telson, x6.3.

somite acute, curved forward; lateral process of sixth thoracic somite bilobed, anterior lobe rounded, posterior lobe acute, directed posteriorly; lateral process of seventh thoracic somite with anterior lobe broader, less prominent than on the sixth; abdominal carinae spined as follows: submedian, (4) 5-6; intermediate, (2) 3-6; lateral, 1-6; marginal, 1-5; telson with prelateral lobe; denticles 2-3, 8-10, 1; outer submedian denticle the largest; 7-8 movable spines on outer margin of penultimate segment of uropodal outer branch.

Discussion: Until Holthuis' description of *S. lijdingi* in 1959, material of this species was placed in *S. brasiliensis* by several workers, including myself. Holthuis pointed out the differences between the two species. *S. brasiliensis* has not yet been reported north of Cabo Frio, Brazil, while *S. lijdingi* is now known from the area between French Guiana and Trinidad.

The Gulf of Mexico material reported as *S. brasiliensis* by Springer and Bullis (1956) and Manning (1959) is an undescribed species.

Remarks: The present material extends the depth range of this species from 55 meters (Holthuis, 1959) to 45/48 fms. It occurs as shallow as 3 fms on mud and shell bottom.

One female, 46.9 mm, total length, from OREGON Sta. 2307 A + B, held a loosely cemented egg-mass between her third and fourth thoracic appendages. The eggs were .25-.30 mm in diameter, and were in an early stage of development.

The color of this species is as follows: posterior margin of carapace, last three thoracic, and first five abdominal somites lined posteriorly with dark pigment; second abdominal somite with a median dorsal rectangular black patch; telson with a dark circle on either side of anterior portion of crest, the inner portions of the circle darker than the outer; concentric rows of pits on telson darkly colored; inner side of last two segments of uropodal outer branch are dark, as is the distal half of the uropodal inner branch; raptorial merus with a longitudinal line of dark pigment on upper margin of outer face.

Squilla obtusa Holthuis, 1959

Plate 7

Squilla intermedia, Bigelow, 1902, p. 159; Manning, 1959, p. 19 (part).

Squilla brasiliensis, Manning, 1959, p. 18 (part).

Squilla obtusa Holthuis, 1959, p. 186, text-figs. 76 h-j, pl. IX, figs. 3-4.

Previous records:

Puerto Rico (Bigelow, 1902); Curaçao (as *S. intermedia*; Manning, 1959); off Trinidad (as *S. brasiliensis*, USNM, OREGON Stats. 2208, 2209; Manning, 1959); Suriname (Holthuis, 1959).

Material examined:

OREGON Sta. 2208; 09°55′N, 60°53′W; southeast of Trinidad; August 26, 1958; 34/35 fms; 2♂♂, 2♀♀ (USNM).

OREGON Sta. 2209; 09°45′N, 60°47′W; southeast of Trinidad; August 26, 1958; 20/22 fms; 1♂, 2♀♀ (UMML).

Measurements: Males, 49.0 to 62.1 mm, total length; females, 46.8 to 65.9 mm, total length.

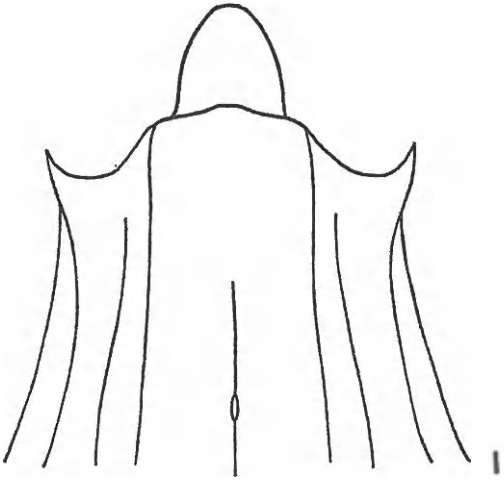
Description: Eyes large, bilobed; rostrum elongate-triangular, without median carina; median carina of carapace not bifurcate anteriorly; anterolateral spines of carapace not extending to rostral base; raptorial dactylus armed with six teeth, outer margin of dactylus a simple curve; mandibular palp present; five epipods present; lateral process of fifth thoracic somite a broad spine, curved anteriorly; lateral processes of next two somites bilobed, anterior lobe triangular, posterior lobe rounded; anterior lobe of lateral process more prominent on sixth somite than on seventh; submedian carinae present on last three thoracic and all abdominal somites; abdominal carinae spined as follows: submedian, 5-6; intermediate, (2) 3-6; lateral, 2-6; marginal, 1-5; telson with prelateral lobes; denticles 3-5, 8-9, 1, outer submedian denticle the largest; 8-9 movable spines on outer margin of penultimate segment of uropodal outer branch, the last not reaching midpoint of ultimate segment.

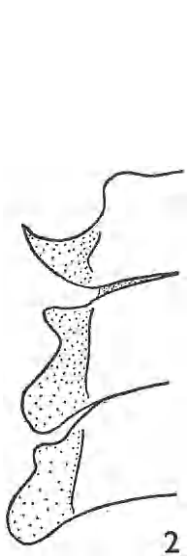
Discussion: The rounded posterior lobe of the lateral processes of the sixth and seventh thoracic somites, the smaller cornea, and the elongate rostrum separate this species from *S. lijdingi.*

Remarks: The present material extends the vertical range of this species from 13 to 35 fms.

Bigelow felt that his Puerto Rico material was probably the juvenile of *S. intermedia*, although he pointed out several differences between the Puerto Rico specimens and the larger specimens available to him.

The color is as follows: carinae and grooves of the carapace are indicated by dark lines; posterior margin of the carapace, last three thoracic somites, and the six abdominal somites are lined posteriorly with dark pigment; second and fifth abdominal somites with a median patch of dark pigment; anterolateral angle of sixth abdominal somite





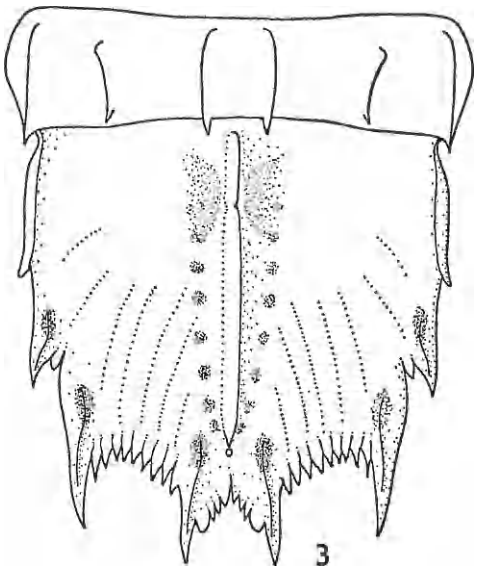


Plate 7. *Squilla obtusa* Holthuis

Fig. 1. Male, OREGON Sta. 2209, southeast of Trinidad, anterior portion of carapace and rostral plate, x6.3.

Fig. 2. Same, lateral processes of fifth, sixth, and seventh thoracic somites, x6.3.

Fig. 3. Same, sixth abdominal somite and telson, x6.3.

with a dark patch; crest and bases of marginal teeth of telson are dark; there is a black patch on anterior half of telson either side of the crest; uropods with prominent line of dark pigment on dorsal surface of penultimate segment of outer branch, with entire distal segment of outer branch black; distal half of inner branch of uropods black; merus of raptorial claw with a line of dark pigment on upper, lower, and anterior margins of outer face.

Genus **Lysiosquilla** Dana, 1852

The two species described below bring the number of western Atlantic species in this genus to 10. Chace (1958) commented upon the heterogeneity of the genus and reviewed the possible evolution of the telson in the western Atlantic. In his key to the eight species from that area, the present new species would both fall near *L. grayi* Chace, 1958.

In addition to these two new species, *L. grayi, L. chilensis* Dahl, 1954, and *L. decemspinosa* Rathbun, 1910, are the only other known species in the genus which lack the mandibular palp and the papillae on the antennal protopod, and in which a reduction in the number of epipods occurs. Schmitt (1940) gave a partial list of species of *Lysiosquilla* which have one or more papillae on the antennal protopod. The importance of these characters at the generic level will not be known until the entire genus is surveyed.

Key to the Species of **Lysiosquilla** From the Atlantic Coast of Northern South America

1. Ventral surface of telson without submarginal spines; posterior marginal spines immovable; mandibular palp present 2
   Ventral surface of telson with submarginal spines, the submedian pair movable; mandibular palp absent 3
2. Abdomen unarmed; raptorial dactylus armed with five or six teeth . . . . . [*L. glabriuscula* (Lamarck, 1818); Brazil, Lemos de Castro, 1955]
   Posterior margin of fifth and sixth abdominal somites spinous; raptorial dactylus armed with eight to twelve teeth . . . [*L. scabricauda* (Lamarck, 1818); Brazil, Lemos de Castro, 1955]

3. Anterolateral margins of rostral plate acute; raptorial dactylus armed with ten teeth; 22 submedian denticles in row across midline of telson . . . . . *L. hancocki*, n. sp.
Anterolateral margins of rostral plate rounded; raptorial dactylus armed with eight teeth; 15 submedian denticles in a transverse row on ventral surface of telson . . . *L. antillensis*, n. sp.

Lysiosquilla hancocki, new species

Plate 8

Holotype: Female, Sta. A27-39, Cubagua Island, Venezuela, April 5, 1939, 2-5 fms, collected by VELERO III (AHF 3918).

Measurements: The female holotype is 21.0 mm in total length. Other measurements: carapace length, 3.1 mm; length rostral plate, 0.9 mm; width rostral plate, 1.5 mm; length telson, 1.5 mm; width telson, 2.6 mm.

Description: Eyes subglobular, cornea slightly overhanging lateral margins of stalk; eyes not extending to end of antennular peduncle.

Rostral plate subquadrate, much broader than long, lateral margins subparallel, anterolateral angles rectangular; anterior margins concave, sloping forward to obtuse, unspined, apex.

Antennal scale short, as long as ocular peduncle; antennal protopod without papillae.

Carapace short, one-seventh total length, without carinae or spines; gastric grooves distinct, cervical groove indicated on lateral plates only; carapace rounded anterolaterally and posterolaterally.

Epipods present on first four thoracic appendages; mandibular palp absent; propodus of fourth thoracic appendage almost twice as broad as long, twice as broad as propodi of third and fifth thoracic appendages.

Raptorial dactylus armed with 10 teeth on inner margin; outer margin of dactylus a simple curve, with a strong basal notch followed by a low, obtuse lobe; raptorial propodus armed with four movable teeth, second much the smallest, on inner, proximal margin, and a row of pectinations on outer, upper margin; dorsal ridge of carpus obscure, undivided, ending in a blunt tooth.

Thoracic somites without carinae; lateral margins of last three thoracic somites subtruncate, slightly concave laterally; inner branch of walking legs circular on appendages of sixth and seventh thoracic somites, more ovate on the appendage of the eighth somite.

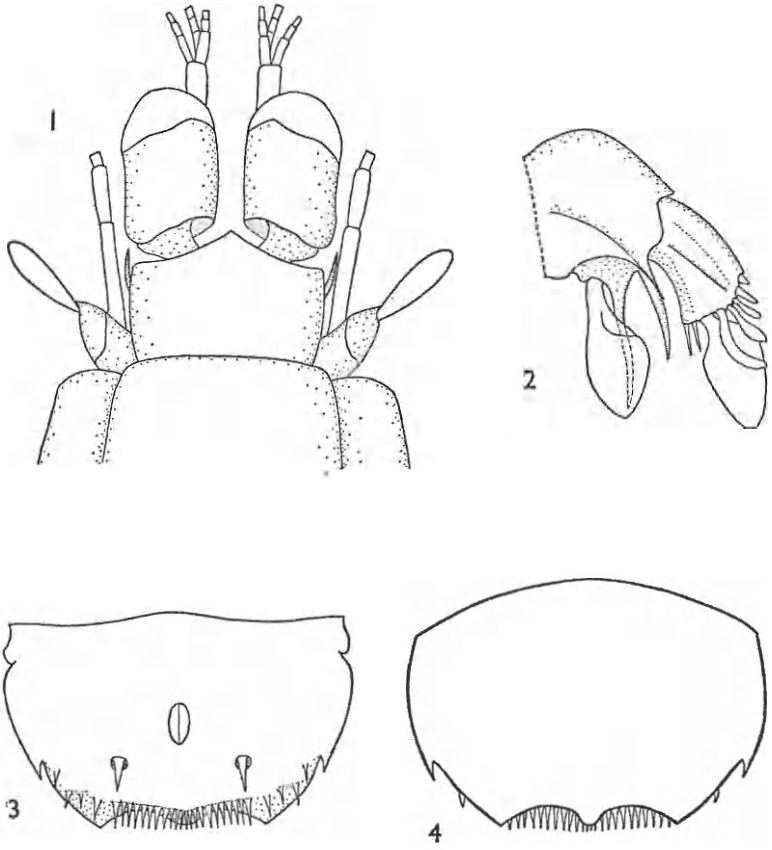


Plate 8. *Lysiosquilla hancocki*, new species

Fig. 1. Female holotype, A27-39, Cubagua Island, Venezuela, anterior portion of body, x16.

Fig. 2. Same, right uropod, x18.3.

Fig. 3. Same, ventral view of telson, x18.3.

Fig. 4. Same, dorsal view of telson, x18.3.

Abdomen flattened, loosely articulated, without carinae or spines except at posterolateral angles of sixth somite.

Telson smooth dorsally, much broader than long, posterior margin forming a false eave over true posterior spines; false eave with rounded median projection, flanked by a deep concavity on either side; lateral spines and apices of submedian denticles visible dorsally; submarginal armature, on either side, consisting of a row of 11 submedian denticles, increasing in size laterally, a movable submedian spine, anterior to outermost denticles, and a curved row of five fixed spines lateral to the outermost denticle; second and fourth fixed spine smaller than the remainder.

Uropodal outer branch with 5 graded, movable, spatulate spines on outer margin of penultimate segment, last spine extending past midpoint of ultimate segment; inner distal margin of penultimate segment of outer branch with two slender, movable spines; inner spine of basal prolongation much the longer.

Discussion: *L. hancocki* is closely related to *L. grayi* Chace, from which it can be separated by the rectangular anterolateral angles of the rostral plate, the small number of teeth on the raptorial claw (10 on *L. hancocki*, 11-15 on *L. grayi*), and the spination and sculpture of the telson. In *L. hancocki* there are 22 submedian denticles, as opposed to 15-18 in *L. grayi*; the movable submedian spines are anterior to the outermost denticle, not adjacent to it as in *L. grayi*, and the depressions on either side of the false eave are deeper and more angulated laterally than in *L. grayi*.

L. hancocki is also related to *L. decemspinosa* Rathbun and *L. chilensis* Dahl from the eastern Pacific. It differs from both in having a deep concavity lateral to the median projection of the false eave of the telson; also, *L. chilensis* has many more spines on the raptorial dactylus, 12-17, the rostral plate is rounded anterolaterally, and the two spines of the basal prolongation are subequal. *L. hancocki* differs from *L. decemspinosa* chiefly in the shape of the false eave and in the arrangement of the denticles and teeth of the telson.

The species is named for Captain Allan Hancock, in recognition of his support of the marine sciences.

Remarks: Upon first examination, I felt that this specimen would be referred to *L. decemspinosa*, a species known only from the eastern Pacific. Direct comparison with the type and other available material of

that species showed that *L. hancocki* was distinct from the Pacific species.

The holotype has faded to an even cream color, with one large pair of dark pigment spots on the carapace, and scattered chromatophores on the carapace and the remainder of the body. There is also an indication of a large pigment spot on the anterolateral portions of the telson.

Lysiosquilla antillensis, new species

Plate 9

Holotype: Female, Sta. A24-39, Cubagua Island, Venezuela, April 14, 1939, 2-5 fms, collected by Velero III (AHF 3919).

Paratypes: Off Yawsi Point, Lameshur Bay, St. John, Virgin Islands; December 21, 1958; 30 feet; collected by J. Randall and L. P. Thomas; 3♂♂, 3♀♀ (UMML 32.1174; USNM 106055).

Measurements: Female holotype, 24.5 mm, total length. Other measurements of holotype: carapace length, 4.9 mm; length rostral plate, 1.2 mm; width rostral plate, 1.6 mm; length telson, 1.8 mm; width telson, 3.1 mm. Paratypes: males, 17.6 to 20.2 mm, total length; females, 20.5 to 20.8 mm, total length.

Description: Eyes subglobular, cornea slightly overhanging lateral margins of stalk; eyes not extending to end of antennular peduncle.

Rostral plate subquadrate, broader than long; lateral margins slightly convex, subparallel; anterolateral angles acute; anterior margins concave, apex acute, slightly in advance of anterolateral angles.

Antennal scale short, not as long as ocular peduncle; antennal protopod without papillae.

Carapace short, one-fifth total length, without carinae or spines; gastric grooves distinct, cervical grooves indicated on lateral plates only; anterolateral and posterolateral angles rounded.

Epipods present on first four thoracic appendages; mandibular palp absent; propodus of fourth thoracic appendage much broader than long, broader than propodi of third and fifth thoracic appendages.

Raptorial dactylus armed with seven to eight teeth on inner margin; outer margin of dactylus a simple curve, with a deep notch at base followed by an obtuse lobe; inner margin of propodus with four movable teeth, second much the smallest, on inner, proximal margin, and a row of pectinations on outer, upper margin; dorsal ridge or carpus obscure, undivided, ending in a blunt lobe.

ber of teeth on the raptorial dactylus, and the smaller number of submedian denticles on the telson.

Remarks: The color is completely faded except for a few dark chromatophores scattered over the light surface.

The name is derived from the location of the first lot of specimens examined, St. John in the Lesser Antilles.

Genus **Pseudosquilla** Dana, 1852

This genus has gradually become one of the more diverse and poorly defined of the stomatopod genera. In the western Atlantic, for example, two distinct groups are easily recognized. The first contains *P. ciliata* (Fabricius, 1787) and *P. oculata* (Brullé, 1835-44); these species are perhaps typical of the genus. In the second group are *P. plumata* (Bigelow, 1902) and *P. maiaguesensis* (Bigelow, 1902), which are somewhat aberrant forms resembling both *Lysiosquilla* and *Pseudosquilla*. If *Parasquilla* were not yet separated from *Pseudosquilla*, a third distinct group would exist within the genus. The entire genus is in need of revision; if this is done, it is doubtful whether *P. maiaguesensis* and its allies can be retained in *Pseudosquilla*.

Only two species are known from the northern coast of South America, *P. ciliata* and *P. oculata*. The latter was reported from northern Brazil by Rathbun (1900) and Lemos de Castro (1955). *P. ciliata* is the only species in the present collections.

Key to the Species of **Pseudosquilla** From the Atlantic Coast of Northern South America

1. Cornea subglobular, only slightly overhanging stalk laterally; rostral plate rounded anteriorly; telson with three longitudinal carinae either side of crest . . . . . *P. ciliata*
   Cornea expanded laterally, much broader than stalk; rostral plate spined anteriorly; telson with four longitudinal carinae either side of crest . . . . . [*P. oculata* (Brullé, 1835-1844); Brazil, Lemos de Castro, 1955]

Pseudosquilla ciliata (Fabricius, 1787)

Plate 11, figs. 1-2.

Restricted synonymy:

Squilla ciliata Fabricius, 1787, p. 333.

Pseudosquilla ciliata, Bigelow, 1902, p. 154, figs. 3-4; Holthuis, 1941, p. 35; Lemos de Castro, 1955, p. 26, text-figs. 20, 21, pls. VII, fig. 39, and XVI, fig. 51; Manning, 1959, p. 18.

Previous records:

Bermuda and Bahamas to Brazil; Indo-Pacific (Manning, 1959).

Material examined:

A50-39; Caledonia Bay, Panama; April 26, 1939; shore; 1 ♀ (USNM).

A57-39; Caledonia Bay, Panama; April 27, 1939; shore; 1 ♂ (AHF).

A15-39; 2 mi. off Bahia Honda, Colombia; April 8, 1939; 1 ♂, 3 ♀ ♀ (1 damaged) (AHF).

Measurements: Males, 29.2 to 65.1 mm, total length; females, 32.6 to 37.2 mm, total length.

Description: Eyes cylindrical; rostral plate wider than long, without spines; carapace smooth, without carinae; raptorial dactylus armed with three slender teeth; thoracic and abdominal somites strongly convex; abdomen with posterolateral spines on fourth and fifth somites; dorsal surface of telson with crest and three pairs of longitudinal carinae; tips of submedian teeth movable; basal prolongation of uropod with two spines, inner slightly longer.

Remarks: A beautifully colored species. Background color yellow brown, with two pairs of dark spots along gastric grooves on carapace; a black spot on lateral margin of sixth thoracic and first abdominal somites, with less prominent lateral spots on remainder of abdominal somites; telson dark anteriorly, dark area divided by crest; dark spot at bases of intermediate teeth of telson; spines of basal prolongation and movable spines of uropod banded yellow and white; appendages bright yellow, and raptorial dactylus pinkish, with yellow and white spots.

Genus Gonodactylus Latreille, 1825

The status of this genus in the western Atlantic is not yet fully understood. One nominal species, *G. oerstedii* Hansen, 1895, occurs throughout the Caribbean, from North Carolina to Brazil (Manning,

1959). Schmitt is the only worker who has intensively studied the American species of the genus, and he described two varieties of *G. oerstedii* from the Caribbean. *G. oerstedii* var. *spinulosus* Schmitt, 1924 (a), was described from Barbados, and differs from *G. oerstedii* in that the dorsal surface of the telson is spinulose. The second variety, *G. oerstedii* var. *curacaoensis* Schmitt, 1924, was described from Curaçao, and was separated from *G. oerstedii* because the three carinae of the telson were sharp and spined posteriorly, not swollen dorsally and rounded posteriorly as in the typical form.

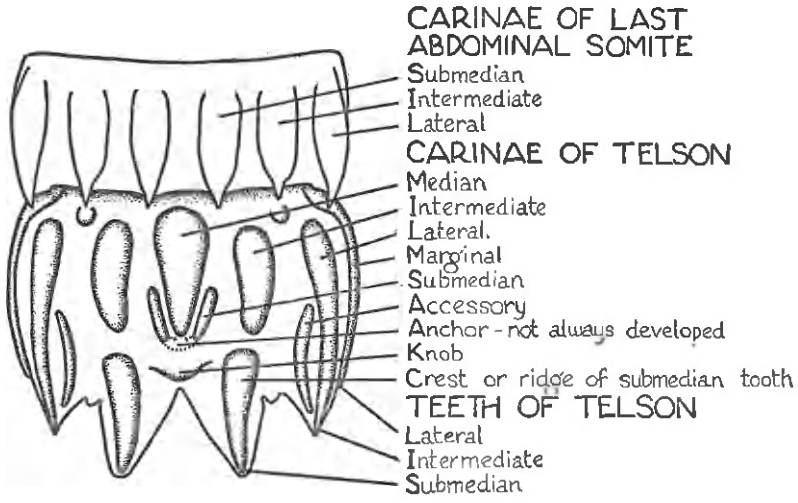


Plate 10. Diagrammatic illustration of a *Gonodactylus* telson, showing terms used in the descriptions (from Schmitt, 1940).

In my opinion, both are good species. *G. spinulosus* is the western Atlantic counterpart of *G. festae* and its allies from the eastern Pacific. *G. curacaoensis*, in addition to the shape of the dorsal carinae of the telson, has the telson longer than wide and has an entirely different color pattern from *G. oerstedii*. I have seen freshly preserved material from Cay Sal Bank (UMML) in which there was no evidence of the mottled color normally found in *G. oerstedii*; the specimens are a bright orange, with the carinae of the telson striped blue longitudinally; the thoracic and abdominal somites are lined posteriorly with red. Schmitt (1924) did not give specific rank to *G. curacaoensis* because the juve-

niles of it and *G. oerstedii* could not be differentiated; this is probably an expression of their close relationship, but need not indicate that the forms are identical, as the young of several groups, particularly xanthid crabs, are indistinguishable.

A diagrammatic drawing of the telson of *Gonodactylus*, to illustrate the terms used in the key and the descriptions, is shown in Plate 10.

Key to the Species of Gonodactylus From the Atlantic Coast of Northern South America

1. Dorsal surface of telson armed with numerous small spinules; sixth thoracic and first abdominal somites with a rectangular patch of dark chromatophores . . . . . *G. spinulosus*
   Dorsal surface of telson not armed with small spinules; no rectangular patches of chromatophores on sixth thoracic and first abdominal somites 2
2. Dorsal carinae rounded, sometimes swollen, not armed posteriorly . . . . . *G. oerstedii*
   Dorsal carinae of telson sharp, not swollen, armed posteriorly with a strong spine . [*G. curacaoensis* Schmitt, 1924; Curaçao]

Gonodactylus spinulosus Schmitt, 1924

Plate 11, figs. 3-4.

Gonodactylus oerstedii var. *spinulosus* Schmitt, 1924(a), p. 96, pl. V, fig. 5; Bigelow, 1931, p. 123; Lemos de Castro, 1955, p. 45.

Previous records:

Barbados (Schmitt, 1924a); Playa de Ponce Reef, Porto Rico (Bigelow, 1931): Virgin Islands (?) (Hansen, 1926); Gulf of Panama (?) (Hansen, 1926); Trinidad (Lemos de Castro, 1955); Cape St. Roque, Brazil (Bigelow, 1931).

Material examined:

A46-39; Vista Alegre, Curaçao; April 23, 1939; shore; 3♂♂ (AHF; USNM).

Measurements: Males, 30.6 to 34.6 mm, total length.

Description: Anterolateral angles of rostral plate rounded; ocular plates rounded dorsally; telson with accessory carina mesial to lateral carina; dorsal surface of telson armed with numerous small spinules, arranged as follows: one posteriorly on median carina; one posteriorly on each submedian carina; one posteriorly and one dorsally on each intermediate carina; two on the knob; 3-7 on the ridge of the submedian

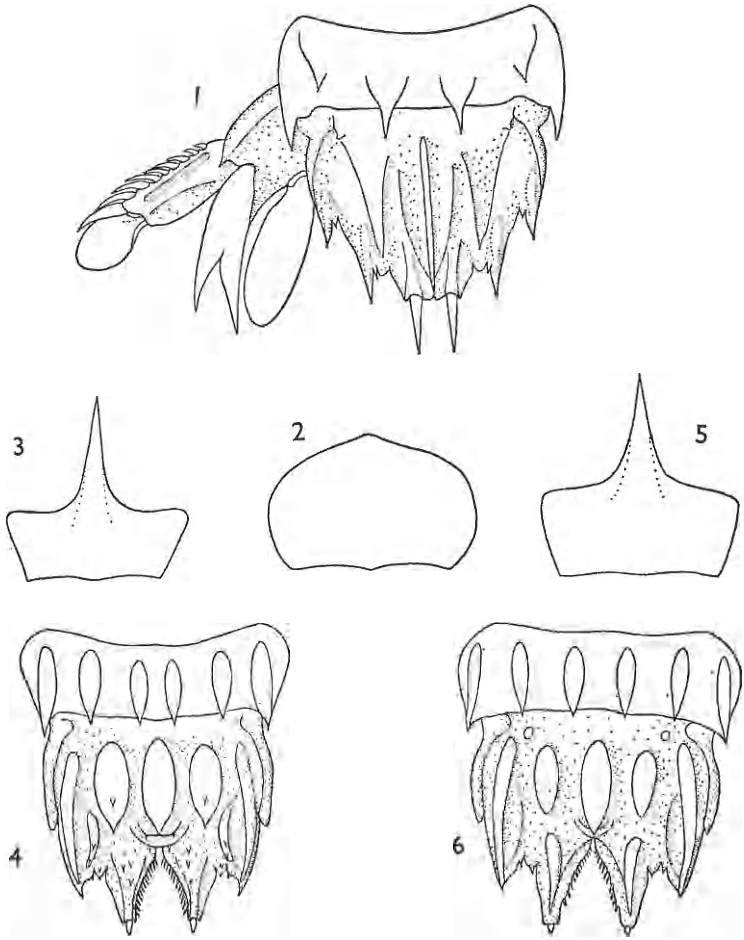


Plate 11. *Pseudosquilla ciliata* (Fabricius)

Fig. 1. Female, A15-39, 2 mi. off Bahia Honda, Colombia. Sixth abdominal somite, telson, and left uropod, x6.7.

Fig. 2. Same, rostral plate, x11.7.

Gonodactylus spinulosus Schmitt

Fig. 3. Male, A46-39, Vista Alegre, Curaçao, rostral plate, x9.5.

Fig. 4. Same, sixth abdominal somite and telson, x5.5.

Gonodactylus oerstedii Hansen

Fig. 5. Male, A8-39, Caledonia Bay, Panama, rostral plate, x11.3.

Fig. 6. Same, sixth abdominal somite and telson, x9.5.

tooth; one dorsally on the larger intermediate denticle; and one to three on each accessory carina. There are 11-12 movable submedian denticles, and two intermediate ones, the inner the larger, both spine-tipped.

Discussion: The rostral plate and ocular plates are identical to those found in *G. oerstedii*, which differs from *G. spinulosus* in the smooth dorsal surface of the telson and in lacking the characteristic black markings on the sixth thoracic and first abdominal somites.

G. spinulosus is the Atlantic analogue of *G. festae* Nobili from the Eastern Pacific (see Schmitt, 1940). *G. spinulosus* differs from *G. festae* and the other eastern Pacific species with spinulose telsons in that the anterolateral angles of the rostral plate are rounded; in the eastern Pacific species, the angles of the rostral plate are acute and even spiniform, as in *G. bahiahondensis* Schmitt.

Bigelow (1931) felt that the following characters, in addition to the dorsal spinules on the telson, separated *G. spinulosus* from *G. oerstedii:* the median spine of the rostral plate does not reach the cornea, and the anterior margins of the rostral plate are transverse; the uropodal outer branch is longer than the basal prolongation; and at least two of the mobile spines on the penultimate segment of the uropodal outer branch are recurved. These characters are, however, variable, and are not diagnostic, as they can be found in *G. oerstedii* as well as *G. spinulosus*. The only apparent differences between the two species are the presence in the latter of dorsal spinules on the telson and the dark-pigmented areas on the sixth thoracic and first abdominal somites.

Remarks: The color of this species is the same as in *G. oerstedii*, except for the two dark areas on the sixth thoracic and first abdominal somites aptly described by Schmitt (1924a) as "Chinese ideographs."

Gonodactylus oerstedii Hansen, 1895

Plate 11, figs. 5-6.

Restricted synonymy:

Gonodactylus oerstedii Hansen, 1895, p. 65, footnote; Schmitt, 1940, p. 211, figs. 26-29; Holthuis, 1941, p. 38; Lemos de Castro, 1955, p. 42, text-figs. 30-31, pls. XII, fig. 44, and XVIII, fig. 56; Manning, 1959, p. 16.

Previous records:

North Carolina to Brazil, including Bermuda and the Bahamas; eastern

Pacific from the Gulf of California to Ecuador, and the Galapagos (Manning, 1959).

Material examined:

A8-39; Caledonia Bay, Panama; April 4, 1939; shore; 1 ♂ (AHF).

A50-39; Caledonia Bay, Panama; April 26, 1939; shore; 8 ♂♂, 5 ♀♀ (USNM).

A57-39; Caledonia Bay, Panama; April 27, 1939; shore; 4 ♂♂, 15 ♀♀ (AHF).

A12a-39; 11 mi. S.W. of Cape la Vela, Colombia; April 8, 1939; 5 fms.; 2 ♂♂, 3 ♀♀ (USNM).

A15-39; 2 mi. off Bahia Honda, Colombia; April 8, 1939; 9-10 fms; 14 ♂♂, 15 ♀♀, 1 post larva (AHF).

A16-39; Pta. Basora, Aruba, Netherlands West Indies; April 10, 1939; shore; 5 ♂♂, 1 ♀ (USNM).

A46-39; Vista Alegre, Curaçao, Netherlands West Indies; April 23, 1939; shore; 1 ♂, 1 ♀ (AHF).

A24-39; Cubagua Island, Venezuela; April 14, 1939; 2-5 fms; 2 ♂♂, 2 ♀♀ (AHF).

A25-39; Cubagua Island, Venezuela; April 14, 1939; shore; 5 ♂♂, 1 ♀ (USNM).

A27-39; Cubagua Island, Venezuela; April 15, 1939; 2-5 fms; 10 ♂♂, 5 ♀♀ (AHF).

A35-39; Port of Spain, Trinidad, British West Indies; April 18, 1939; 1 fm; 2 ♂♂ (USNM).

A41-39; Buccoo Reef, Tobago Island, British West Indies; April 20, 1939; shore; 16 ♂♂, 10 ♀♀ (AHF).

Measurements: Males, 12.9 to 66.2 mm, total length; females, 13.6-63.1 mm, total length; post-larva, 8.2 mm, total length.

Remarks: This is the most common western Atlantic stomatopod. As Hansen (1895, footnote) pointed out, the accessory carina on the telson is the only difference between this species and the widely distributed *G. chiragra* of the Pacific; the character, although minor, is nevertheless constant.

The color is extremely variable, usually a mottled green on a light background. In the present material, the ventral surface of the males is darker than that of the females, and this was the only sexual difference noted.

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