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STOMATOPOD CRUSTACEANS FROM THE CAROLINAS AND GEORGIA, SOUTHEASTERN UNITED STATES

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ABSTRACT Literature and specimen records are updated for stomatopod crustaceans known from the coasts of the Carolinas and Georgia. *Gibbesia*, new genus, is recognized for *Squilla neglecta*, and a new species, *Neogonodactylus wenneae*, is named for an offshore species of *Neogonodactylus* previously identified with the Caribbean shore species *N. bredini*. Fifteen species of stomatopods representing 12 genera are now known from the area: *Bigelowina biminiensis* (Bigelow), *Cloridopsis dubia* (Milne Edwards), *Coronis scolopendra* Latreille, *Gibbesia neglecta* (Gibbes), *Heterosquilloides armata* (Smith), *Meiosquilla quadridens* (Bigelow), *Lysiosquilla scabricauda* (Lamarck), *Lysiosquillina glabriuscula* (Lamarck), *Nannosquilla carolinensis* Manning, *N. whitingi* Camp & Manning, *Neogonodactylus torus* (Manning), *Neogonodactylus wenneae*, new species, *Platysquilloides enodis* (Manning), *Squilla deceptrix* Manning, and *S. empusa* Say. A key is provided to species known from the Carolinas and Georgia.

INTRODUCTION

Manning (1969) tentatively identified a single specimen of *Nannosquilla* taken at a depth of 15 meters off Sapelo Island, Georgia, with *N. grayi* (Chace 1958), a species otherwise known only from intertidal or shallow sublittoral habitats in Massachusetts. Camp & Manning (1982:2) suggested that the specimen from Georgia might be referable to one of two sublittoral species from the east coast of Florida described by them, *N. baliops* or *N. whitingi*, but at that time the specimen from Georgia was not available for study. Recently, we have been able to examine the specimen of *Nannosquilla* and all of the other stomatopod material in the collection of the University of Georgia.

The results of examining that collection are reported here, together with observations on stomatopods from localities in Georgia made by one of us (R.W.H.). We have expanded this study to include all records known to us for stomatopods from the Carolinas as well.

Five of the species reported here, *Cloridopsis dubia*, *Coronis scolopendra*, *Gibbesia* (= *Squilla*) *neglecta*, *Lysiosquilla scabricauda*, and *Squilla empusa*, frequent shallow, shore habitats (sensu Briggs 1961). The remainder of the species occur in offshore, sublittoral shelf habitats, several having been collected around Gray's Reef. One shore species, *Cloridopsis dubia* (Milne Edwards), has been taken only three times in Georgia since the late 1800s (see below, under species account). All but one of the species reported from the Carolinas by Lunz (1935) also are known from Georgia; Lunz included records for one species, *Lysiosquilla*

scabricauda (Lamarck), not yet known from Georgia.

Lysiosquilla scabricauda can be expected to occur in shallow habitats near shore as it and *Coronis scolopendra* commonly occur together in the Indian River estuary on the east coast of central Florida (R.B.M., personal observation). There, both of these stomatopods are abundant in shore habitats that they share with two callianassids that also are common in shallow water habitats in Georgia, *Biffarius biformis* (Biffar 1971) and *Callichirus major* (Say 1818).

Lysiosquillina glabriuscula, often found near coral reefs, can be expected to occur in the Gray's Reef area offshore where *Bigelowina biminiensis* appears to be rather common. Wenner et al. (1983) reported on the invertebrates associated with hard bottom habitats, like Gray's Reef, in the South Atlantic Bight; their collections included no stomatopods.

Three species, *Neogonodactylus torus*, *Coronis scolopendra*, and *Meiosquilla quadridens*, have not been recorded previously from Georgia, although Georgia is within their known range. Two species, *N. torus* and *M. quadridens*, have not been recorded previously from South Carolina. Three other species, *Bigelowina biminiensis*, *Heterosquilloides armata* and *Lysiosquilla scabricauda*, have not been recorded previously from off North Carolina.

Two other species, *Eurysquilla plumata* (Bigelow 1901) and *Heterosquilloides insolita* (Manning 1962), have been reported from shelf habitats off the east coast of Florida or in the Gulf of Mexico by Manning (1969) and Camp (1973) and might well occur on the continental shelf off the Carolinas and Georgia. They are not included

in the key given below. The only other species known to occur off the east coast of the United States north of Florida is *Nannosquilla grayi* (Chace).

Gore and Becker (1976) reported 17 species from the central eastern coast of Florida, of which eight also occur in the Carolinian region to the north: *Cloridopsis dubia*, *Gibbesia neglecta* (as *Squilla neglecta*), *Heterosquilloides armata*, *Lysiosquilla scabricauda*, *Meiosquilla quadridens*, *Neogonodactylus wenerae* (as *Gonodactylus bredini*), *Squilla deceptrix*, and *S. empusa*. Field work by one of us (R.B.M.) on the central east coast of Florida added another species, *Coronis scolopendra*, and a nineteenth species, *Nannosquilla whitingi*, was added by Camp and Manning (1982), so that 10 of the 19 species known from the central east coast of Florida also occur to the north.

Seven of the 13 species reported by Camp (1973) from the west coast of central Florida also are known from the Carolinas and Georgia: *Bigelowina biminiensis*, *Gibbesia neglecta*, *Lysiosquilla scabricauda*, *Meiosquilla quadridens*, *Neogonodactylus wenerae*, *Squilla deceptrix*, and *Squilla empusa*. A fourteenth species, *Coronisscolopendra*, has been taken by one of us (R.B.M.) off the central west coast of Florida, so eight of the 14 species known from that area also occur off the Carolinas and Georgia.

Manning (1974a) summarized the stomatopod fauna of the northeastern United States and provided information on the four species that occurred in this temperate region. Three of the four, *Heterosquilloides armata*, *Platysquilloides enodis*, and *Squilla empusa*, also are found off North Carolina. The fourth species, *Nannosquilla grayi* (Chace 1958) appears to be a northern form currently known only from Massachusetts waters.

MATERIAL AND METHODS

Sources of material include: South Carolina Wildlife and Marine Resources Department, Marine Resources Research Institute, Charleston (MRRRI); South Atlantic Benchmark Program (SABP); Savannah Science Museum (SSM).

Repositories include: Florida Marine Research Institute, St. Petersburg (FSBC); Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden, The Netherlands (RMNH); Museum of Natural History, University of Georgia, Athens (UG); National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM).

Additional abbreviations used include: aw = abdominal width at fifth somite = AWCLI, abdominal width-carapace length index (aw/cl x 100); cl = carapace length; cm = centimeters; ft = feet; GMR = Georgia Marine Resources; leg. = collector or collected by; m = meters; mm = millimeters; sta = station; tl = total length.

The measurement given after the number and sex of specimens in the material section is total length (tl), measured on the midline; in some cases carapace length (cl), also measured on the midline, is given instead of total length.

RESULTS

Key to Stomatopod Crustacea From the Carolinas and Georgia

1. Telson with distinct dorsal median carina. Propodi of 3rd & 4th maxillipeds slender, longer than broad, not beaded or ribbed ventrally 2
- Telson lacking distinct dorsal median carina. Propodi of third and fourth maxillipeds distinctly broader than long, beaded or ribbed ventrally. [*Lysiosquilloidea*] 8
2. Dactylus of claw unarmed. Propodus of claw lacking pectinations on opposable margin, propodus and dactylus inflated at their articulation. Telson with no more than 2 intermediate denticles (*Gonodactyloidea*, genus *Neogonodactylus*) 3
- Dactylus of claw with teeth. Propodus of claw with pectinations on opposable margin, propodus and dactylus not inflated at their articulation. Telson with 4 or more intermediate denticles. [*Squilloidea*] 4
3. Telson of *oerstedii* type, apices of intermediate marginal teeth sharp, separated from lateral edge of submedian teeth by distinct gap. Movable apices of submedian teeth usually present in adults *Neogonodactylus torus*
- Telson of *bredini* type, apices of intermediate marginal teeth blunt, appressed to lateral edge of submedian teeth. Movable apices of submedian teeth usually absent in adults *Neogonodactylus wenerae*, new species 4.
- 3 or 4 epipods present. Submedian teeth of telson usually with movable apices or their sockets (except in some very large specimens of *C. dubia*) 5
- 5 epipods present. Submedian teeth of telson with fixed apices 6
5. 3 epipods present. Eyes flask-shaped, broad proximally, narrowing adjacent to very small cornea. Dactylus of claw with 5-6 teeth. Anterior 5 abdominal somites with submedian carinae *Cloridopsis dubia*
- 4 epipods present. Eyes T-shaped, broadest at cornea. Dactylus of claw with 4 teeth. Anterior 5 abdominal somites lacking sub-median carinae *Meiosquilla quadridens*

6. Mandibular palp absent. Dactylus of claw with 5 teeth. Lateral process of fifth thoracic somite spatulate *Gibbesia neglecta*
 Mandibular palp present. Dactylus of claw with 6 teeth. Lateral process of fifth thoracic somite a curved spine, apex sharp. [Genus *Squilla*] 7
 7. Median carina of carapace lacking anterior bifurcation. Telson with numerous dorsal tubercles... *Squilla deceptrix*
 Median carina of carapace with distinct anterior bifurcation. Telson lacking dorsal tubercles.....
 *Squilla empusa*
 8. Distal segment of endopod of anterior two walking legs elongate, strap-shaped. Proximal portion of outer margin of uropodal endopod lacking triangular fold 9
 Distal segment of endopod of anterior two walking legs ovate or subcircular. Proximal portion of outer margin of uropodal endopod with distinct triangular fold 12
 9. Marginal teeth of telson indistinguishable from other marginal armature. Telson lacking movable marginal teeth. Size very large, total length to at least 300 mm. [Genera *Lysiosquilla* and *Lysiosquillina* 10
 Marginal teeth of telson distinct. Telson with movable apices on submedian marginal teeth..... 11
 10. Posterior margin of posterior two abdominal somites and dorsal surface of telson spinulose. Antennal scale strap-shaped, edged in dark pigment *Lysiosquilla scabricauda*
 Posterior margin of posterior two abdominal somites and dorsal surface of telson smooth. Antennal scale oval, with central patch of dark pigment
 *Lysiosquillina glabriuscula*
 11. Telson with 4 pairs of fixed marginal teeth, inner 2 pairs spatulate. Posterior margin of sixth abdominal somite and dorsal surface of telson without spinules *Platysquilloides enodis*
 Telson with 2 pairs of fixed marginal teeth. Posterior margin of sixth abdominal somite and dorsal surface of telson spinulose *Heterosquilloides armata*
 12. Rostral plate cordiform. Telson with 1 pair of fixed marginal teeth (laterals)... *Coronis scolopendra*
 Rostral plate rectangular. Telson with more than 1 pair of fixed marginal teeth 13
 13. Mandibular palp present. 5 epipods present. Dorsal surface of telson with fan-shaped, transverse row of 5 posterior spines *Bigelowina biminiensis*
 Mandibular palp absent. 4 epipods present. Posterior false cave on margin of telson unarmed posteriorly [Genus *Nannosquilla*] 14

14. Inner spine of basal prolongation of uropod longer than outer. Anterolateral corners of rostral plate rounded. Lateral most marginal tooth of telson placed on margin on each side, remainder submarginal *Nannosquilla whitingi*
 Spines of basal prolongation of uropod subequal. Anterolateral corners of rostral plate acute. Lateral most 2 marginal teeth of telson placed on margin on each side, remainder submarginal
 *Nannosquilla carolinensis*

An illustrated, electronic version of the above key is available on diskette in Adobe Acrobat™ format with a free Acrobat reader. Anyone interested in obtaining a copy of this key should contact the senior author directly.

Superfamily Gonodactyloidea Giesbrecht 1910
Family Gonodactylidae Giesbrecht 1910
Neogonodactylus torus (Manning 1969)
Figure 1.

Gonodactylus torus Manning 1969:335, Figure 90 [type locality off Palm Beach, Florida, depth 73-91 m; North Carolina, depth 46 m, to Panama].

Neogonodactylus torus.-Manning 1995:80 [transferred from *Gonodactylus*].

Material. North Carolina: 34°6.9'N, 76°11.5'W, 100 m, leg. *Eastward*, 7 Oct 1966:1♂1♀, (not measured)(RMNH).- Georgia: 31° 32'06"N, 79°44'06"W, depth 58 m, leg. MRRI, 29 Oct. 1981:1♂ 18.5 mm, 1♀, 17.0 mm (USNM 232669).

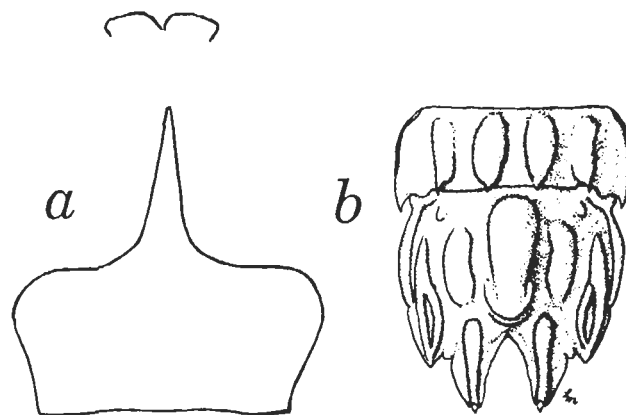


Figure 1. *Neogonodactylus torus* Manning. a, rostral plate and ocular scales; b, sixth abdominal somite and telson. (a from Manning & Hart 1981: Figure 2h; b from Manning 1969:Figure 90b).

Remarks. This species has not been recorded previously from off Georgia. There are no records of this species from off South Carolina. Manning (1995) recognized the genus *Neogonodactylus*, type species *Gonodactylus oerstedii* Hansen 1895 by original designation, for all of the American species previously assigned to *Gonodactylus*. The latter genus was restricted to five large species from the Indo-West Pacific region.

Neogonodactylus wenneae, new species

Figures 2, 3

Gonodactylus oerstedii. Lunz 1935:152, Figure 1 [off Cape Fear and off Beaufort, North Carolina; off Charleston Harbor, South Carolina]. [Not *G. oerstedii* Hansen 1895.]

Gonodactylus oerstedii. Pearse and Williams, 1951:144 [Beaufort, North Carolina]. [Not *G. oerstedii* Hansen 1895.]

Gonodactylus bredini. Manning 1969:315, Figure 88a-c [part; off North Carolina, including off New River and Beaufort, depths 27-35 m; off Charleston and Blackfish Banks, 12 miles off Charleston, South Carolina, and in depth of 33 m; off Georgia, depth 25 m; and Gulf of Mexico, off west coast of Florida]. Camp 1973:53, Figures 21-26, pl. 1 [color] [west coast of central Florida, depth 6-73 m]. Gore and Becker, 1976:154, 155, 156, 157, 159, 171 [part, offshore material only, east coast of central Florida, depth 13-40 m]. Morgan and Goy 1987:595-618 [larval development; off Frying Pan Shoals, North Carolina, depth 28 m].

Material. Holotype: South Carolina: 32°49'18"N, 78°39'24"W, depth 34 m, leg. MRRI, 3 Nov 1981: 1♀, 40 mm (holotype, USNM 232666). **Paratypes:** North Carolina: 34°23'18"N, 76°33'48"W, depth 18 m, leg. Duke University, 10 Nov 1981: 1♀, 44 mm (USNM 221022). South Carolina: 32°50'24"N, 78°35'48"W, depth 36 m, leg. R/V *Dolphin*, 20 Sep 1979: 2♂♂ 24 and 29 mm (USNM 186108). 32°50'06"N, 78°36'18"W, depth 35 m, leg. R/V *Dolphin*, 21 Sep 1979: 4% 27-35 mm, 2♀♀ both 30 mm (USNM 188106). 32°50'06"N, 78°35'48"W, depth 36 m, leg. R/V *Dolphin*, 20 Sep 1979: 1♂ 34 mm, 2♂♂ 25 and 35 mm (USNM 188105).-32°50'12"N, 78°36'18"W, depth 35 m, leg. R/V *Dolphin*, 21 Sep 1979: 1♀, 26 mm (USNM 186109). 32°49'48"N, 78°36'W, depth 35 m, leg. R/V *Dolphin*, 21 Sep 1979: 2♂♂ 22 and 27 mm (USNM 188107). 32°49'30"N, 78°39'18"W, depth 34 m, leg. MRRI, 3 Nov 1981: 1♂ 20 mm (USNM 232667). 32°48'24"N, 78°39'36"W, depth 33 m, leg. MRRI, 28 Feb 1981: 1♀, 12 mm (USNM 232653). 32°49'24"N, 78°39'12"W, depth 33 m, leg. MRRI, 27 Feb 1981: 1♀, 34 mm (USNM 232654). 32°49'18"N, 78°40'W, depth 33 m, leg. MRRI, 8 Aug 1981: 1♂ 29 mm (USNM 232661). 32°49'18"N, 78°39'42"W, depth 33 m, leg. MRRI, 28 Oct 1981: 1♀, 34 mm (USNM 232668).-32°49'12"N, 78°39'42"W, depth 33 m, leg. MRRI, 8 Aug 1981: 1♂ 32 mm (USNM 232663). 32°49'12"N, 78°39'42"W, depth 33 m, leg. MRRI, 8 Aug 1981: 1♀, 29 mm (USNM 232662).-32°49'06"N, 78°40'W, depth 34 m, leg. MRRI, 28 Feb 1981: 2♂♂ 12 and 19 mm, 1♀, 27 mm (USNM 232655). 31°44'06"N, 80°13'06"W, depth 33 m, leg. MRRI, 21 Feb 1980: 1♂ 14 mm (USNM 221023).-32°40'N,

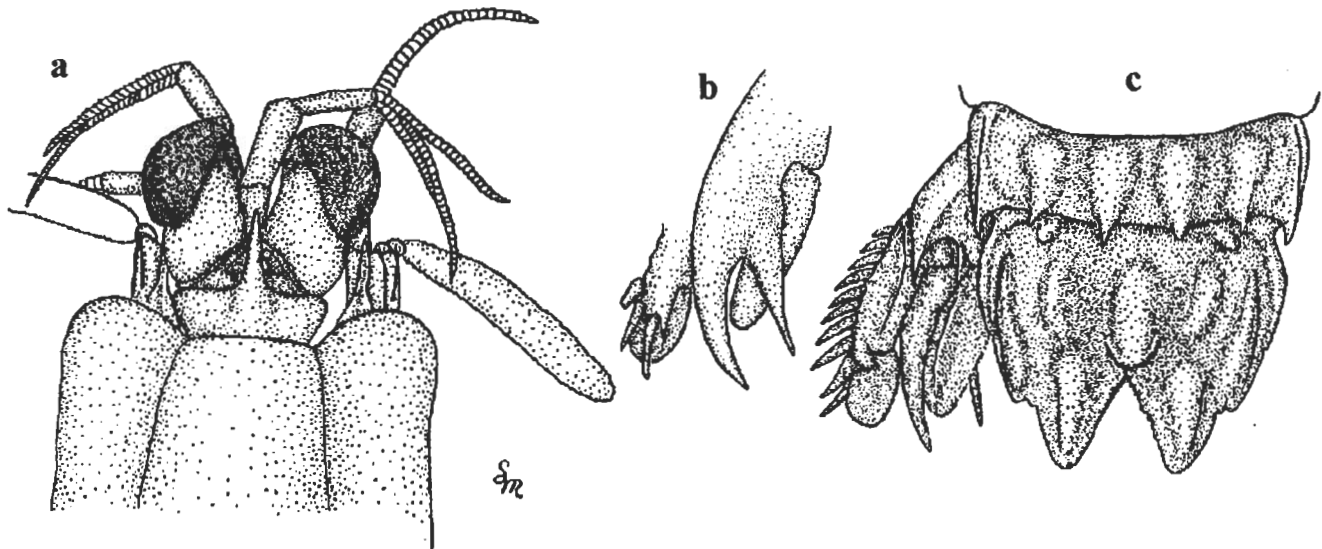


Figure 2. *Neogonodactylus wenneae*, new species. Off South Carolina, (holotype, tl 40 mm, USNM 232666). a, anterior part of body; b, uropod, ventral view; c, sixth abdominal somite, telson, and uropod.

78°47'W, depth 37 m, leg. SABP, 18 Aug 1977: 1♂ 16 mm, 3♀ 19-42 mm (USNM 174489). 32°40'N, 78°47'W, depth 37 m, leg. SABP, 18 Nov 1977: 1♂ 20 mm (USNM 174818). -32°30'54"N, 79°42'54"W, depth 20 m, leg. MRRI, 14 Mar 1984: 1♀, 13 mm (USNM 224095). 32°14'12"N, 79°45'06"W, depth 24 m, leg. R/V *Dolphin*, 2 Sep 1979: 2♂♂ 35 and 46 mm, 4♀♀ 34-42 mm (USNM 188104). Georgia: 31°41'18"N, 80°20'42"W, depth 27 m, leg. GMR, 23 Oct 1981: 1♀ 32 mm (USNM 232664). 31°41'12"N, 80°20'30"W, depth 27 m, leg. GMR, 9 Mar 1981: 1♀ 14 mm (USNM 232658). 31°41'06"N, 80°20'36"W, depth 28 m, leg. GMR, 9 Mar 1981: 1♀, 29 mm (USNM 232657). 31°41'06"N, 80°20'48"W, depth 28 m, leg. GMR, 9 Mar 1981: 1♀, 46 mm (USNM 232659). -31°41'N, 80°20'36"W, depth 27 m, leg. GMR, 29 Apr 1981: 1♀, 26 mm (USNM 232660). 31°40'54"N, 80°20'54"W, depth 27 m, leg. GMR, 24 Oct 1981: 1♀, 46 mm (USNM 232665). 31°23'24"N, 80°53'24"W, depth 17 m, leg. GMR, 4 Mar 1981: 1♂ 46 mm (USNM 232656). -Sta 354, 30°48'47"N, 80°08'30"W, depth 143 ft (= 44 m), leg. M. Gray, 12 Sep 1963: 1♀, 18 mm (UG). -Sta 64, Sapelo whistle [buoy] 342° 3 miles, depth 58 ft (= 18 m), leg. M. Gray, 8 Nov 1961: 1♂ 39 mm (UG). -Sta 272, 30°52'02"N, 80°01'14"W, depth 175 ft (= 53 m), tumbler dredge, leg. M. Gray, 23 Mar 1963: 1♂ 42 mm, 1♀, 36 mm (UG).

All specimens other than the holotype are paratypes.

Diagnosis. Size small, total length of adults less than 50 mm. Rostral plate as long as or slightly longer than broad, anterior spine appearing very elongate, spine about 1.5 times length of proximal, basal part of plate; anterolateral corners of plate acute but not sharp, slightly produced anteriorly. Ocular scales small, flattened dorsally, wider than high. Anterior five abdominal somites unarmed; sixth abdominal somite with 6 carinae, all usually armed posteriorly with sharp spine. Male (N=12) AWCLI 750-851, mean 796; female (N=18) AWCLI 775-893, mean 839. Telson as long as broad, of *bredini* type, lacking dorsal tubercles; carinae of telson well defined, all unarmed; anchor often with posterior median tubercle; knob inconspicuous.

Size. Males and females, tl 12-46 mm. Other measurements of female holotype, tl 40 mm: rostral plate length, width both 2.7 mm; carapace length 9.1 mm; fifth abdominal somite width 8.1 mm; telson length, width both 7.0 mm.

Remarks. In addition to habitat (sublittoral vs. shore) and their smaller size (specimens of *N. bredini* from the Caribbean may exceed 70 mm in length as adults), specimens of *N. wenerae* differ from *N. bredini* in having a much longer rostral spine, with the basal part of the plate correspondingly shorter. Camp (1973: Figures 21, 25) clearly showed the long rostral spine of specimens from the

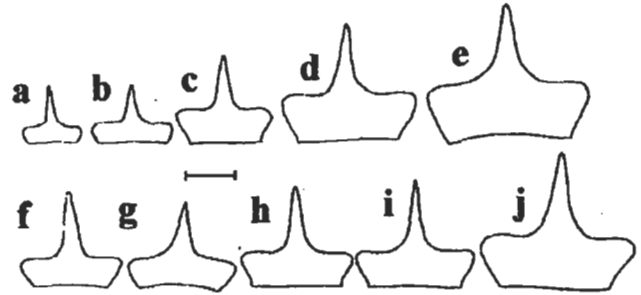


Figure 3. *Neonodactylus wenerae*, new species. Outlines of rostral plates of males (a-e) and females (f-j) at different total lengths. a, 12 mm, b, 18 mm, c, 28 mm; d, 35 mm, e, 46 mm; f, 25 mm, g, 27 mm; h, 29 mm; i, 30 mm; j, 42 mm. Scale = 1 mm.

Gulf of Mexico. That the rostral spine in *N. wenerae* is relatively long at all sizes is evident from Figure 3, where the rostral plates of males and females of different sizes are illustrated. All of the specimens identified here as *N. wenerae* represent the sublittoral form of *N. bredini* (Manning 1969) reported by Manning (1969) from off North Carolina, northeastern Florida and the Gulf of Mexico and reported by Camp (1973) based on material collected sub-littorally in the Gulf of Mexico. The larval development of *N. wenerae* was described by Morgan and Goy (1987), who pointed out that differences between members of the population from Bermuda and that from North Carolina suggested they represented different species.

Etymology. Named for our colleague and friend Elizabeth L. Wenner, South Carolina Marine Resources Research Institute, whose research has added significantly to our knowledge of the larger crustacean fauna of the Carolinean shelf area. Most of our specimens from off South Carolina, including the holotype, were taken during her field studies.

Superfamily Lysiosquilloidea Dana 1852

Family Heterosquillidae Manning 1995

Heterosquilloides armata (Smith 1881)

Figures 4, 5

Lysiosquilla armata Smith 1881:446 [type locality off Martha's Vineyard, Massachusetts, depth 65 and 120 fms (119 and 220 m)].

Heterosquilla(*Heterosquilloides*) *armata*. - Manning 1969:52, Figure 11 [Off New England, depth 96-218 m]. Gore and Becker, 1975:22, Figures 1-3 [off New Jersey, depth 128 m; off east coast of central Florida, depth 210 m]; 1976:148, 155, 160 [off east coast of central Florida, depth 210 m].

Heterosquilloides armata. - Camp, 1985: 465, Figure 1 [off New Jersey, depth 139 m; off Galveston, Texas, depth 121-181 m].

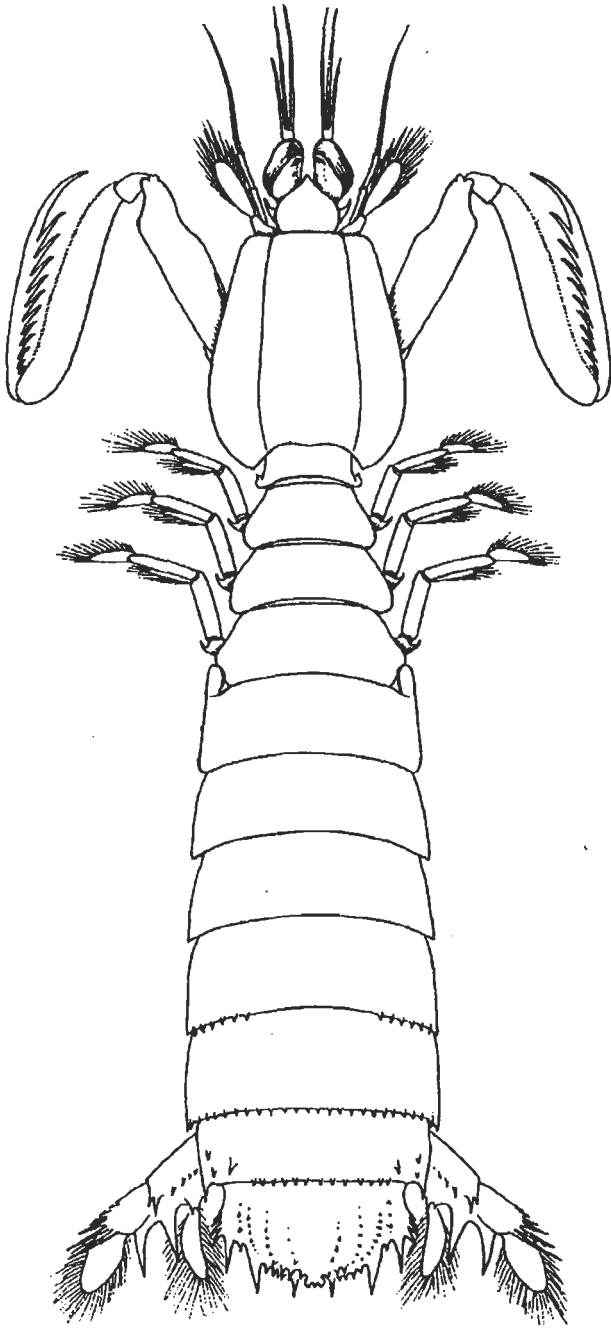


Figure 4. *Heterosquilloides armata* (Smith). Dorsal view. (from Manning 1969:Figure 11a).

Material. North Carolina: Off Cape Hatteras, 35°39'N, 74°50'W, leg. R/V *Delaware II*, cruise 70-7, sta 26, depth not given, from stomach of a butterflyfish, 9 Sep 1970: 1 (postlarva, tl ca. 9 mm, cl 1.9 mm, in poor condition (USNM 173096).

Remarks. This postlarva (Figure 5) is clearly identifiable with *H. armata*, as the movable spines on the uropodal exopod are all slender and evenly curved. None is spatulate and slightly recurved as in *Platysquilloides enodis*. Unlike the

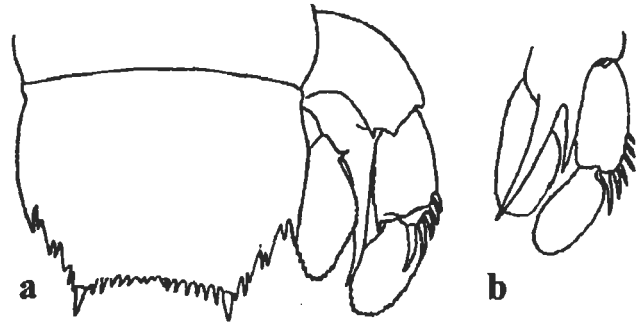


Figure 5. *Heterosquilloides armata* (Smith). Off Cape Hatteras, (postlarva, tl ca. 9 mm. a, sixth abdominal somite, telson, and uropod; b, uropod, ventral view.

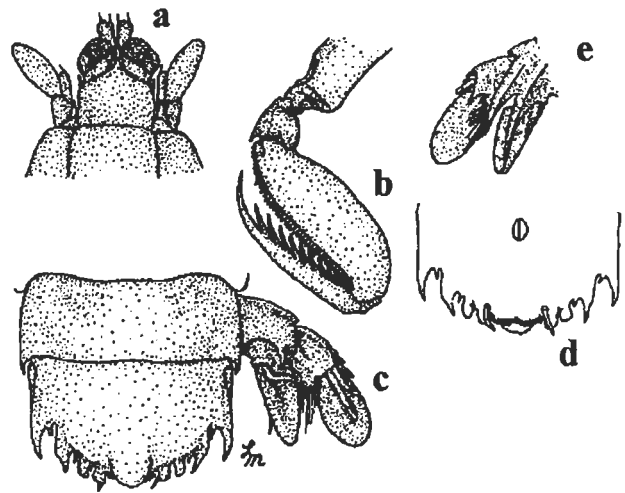


Figure 6. *Platysquilloides enodis* (Manning). a, anterior part of body; b, claw; c, sixth abdominal somite, telson, and uropod; d, telson, ventral view; e, uropod, ventral view. (from Manning & Camp 1981:Figure 2).

condition in the adult, in which the spines of the basal prolongation of the uropod are subequal, in the juvenile the inner spine is distinctly longer than the outer. The species is now known to occur in outer shelf depths from New England to Texas. It has not been recorded previously from North Carolina.

Platysquilloides enodis (Manning 1962)

Figure 6.

Lysiosquilla enodis Manning, 1962:220 [type locality off Vineyard Sound, Massachusetts, depth 31-49 m; off North Carolina, depth 49 m].

Platysquilla enodis. Manning 1969:91, Figure 25 [off Vineyard Sound, Massachusetts, depth 31-49 m; off North Carolina, depth 49 m]. Howells et al., 1980:101 [Off New Jersey, Maryland, and Virginia, depth 33-41 m].

Platysquilloides enodis. Manning and Camp 1981: Figure 2 [off New Jersey].

Family Lysiosquillidae Dana 1852
Lysiosquilla scabricauda (Lamarck 1818)
 Figures 7. a,b

Squilla scabricauda Lamarck 1818:188 [type locality l'Ocean Indien]. Gibbes, in Tuomey, 1848:xvi [South Carolina]; 1849:22 [Georgia]; 1850:199 [off Charleston Harbor, South Carolina]. Howard 1883:294 [South Carolina].

Lysiosquilla scabricauda. Lunz 1935:154 [off Charleston Harbor, South Carolina]. Manning 1969:24, Figures 2-4, 5a,b [Bermuda to Brazil]. Camp 1973:10, Figure 2 [west coast of central Florida, depth 55 m]. Gore and Becker, 1976:152, 153, 160, Figure 3 [east coast of central Florida, surface, subtidal, and at 10 m]. Wenner and Wenner 1989:160 [Carolinean shelf].

Material. North Carolina: Off Frying Pan Shoals, 33°45'N, 77°30'W, depth 85 ft (= 26 m), fish trap, 9 Sep 1976: 1♂ 271 mm (USNM 168867).

Remarks. This is the first record for the species from North Carolina. It apparently is not at all common in localities north of Florida.

Lysiosquillina glabriuscula (Lamarck, 1818)
 Figure 7. c,d

Squilla glabriuscula Lamarck 1818:188 [type locality l'Ocean Indien].

Lysiosquilla glabriuscula.-Sharp, 1893: 106 [Hilton Head, South Carolina; Florida].-Bullis and Thompson 1965:13 [South Carolina, depth 40 m].-Manning 1969:34, Figures 5c,d, 6 [Hilton Head, and off South Carolina, depth 40 m; Bahamas and Florida to Brazil].

Lysiosquillina glabriuscula. Manning 1995: 133 [transferred from *Lysiosquilla*].

Material. South Carolina: 32°49'18"N, 78°39'42"W, depth 33 m, leg. MRRI, 28 Oct 1981: 1 juvenile ♂ damaged, cl. 5.1 mm (USNM 221026).

Remarks. This species has not been recorded from North Carolina or Georgia and appears to be rare off South Carolina. Manning (1995) recognized the genus *Lysiosquillina* for three species previously assigned to *Lysiosquilla*, *L. glabriuscula* and two Indo-West Pacific species.

Family Nannosquillidae Manning 1980
Bigelowina biminiensis (Bigelow 1893)
 Figure 8.

Lysiosquilla biminiensis Bigelow 1893 b:102 [type locality Bimini, Bahamas].

Acanthosquilla biminiensis. Manning 1969:63, Figures 14, 15 [Bahamas, Florida, Gulf of Mexico, Caribbean,

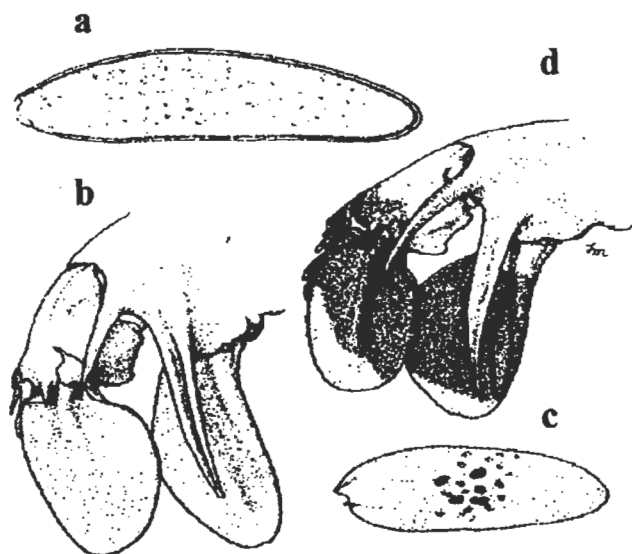
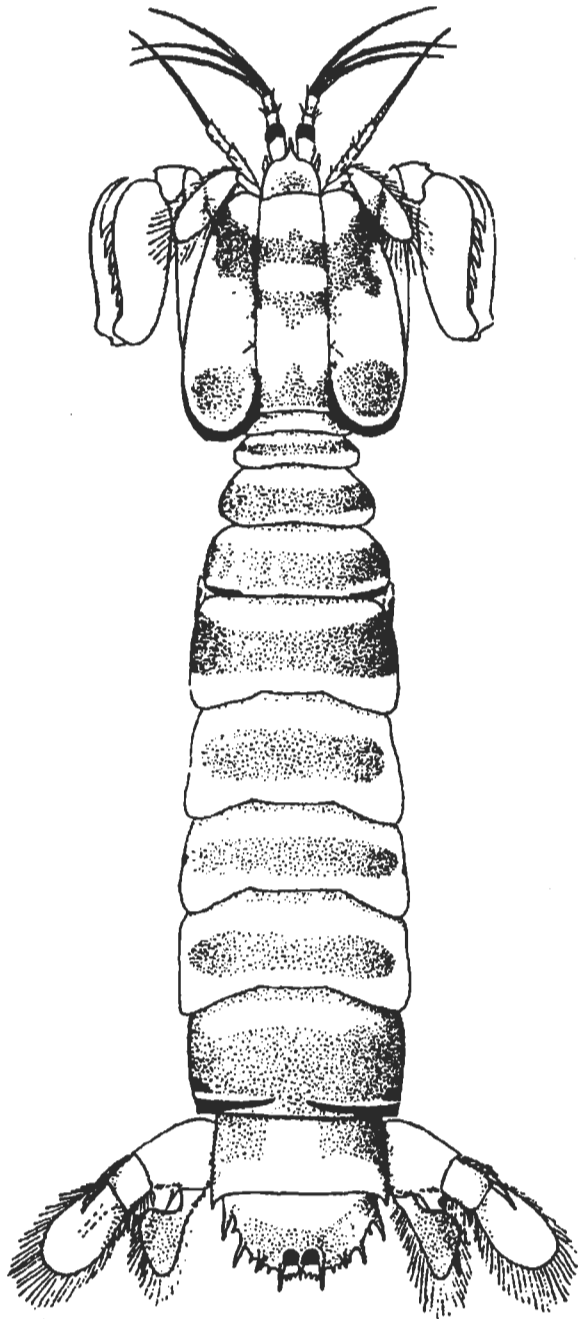


Figure 7. a,b. *Lysiosquilla scabricauda* (Lamarck). a, antennal scale; b, uropod, ventral view (from Manning 1969:Figure 5a,b). Figure 7 c,d. *Lysiosquillina glabriuscula* (Lamarck). c, antennal scale; d, uropod, ventral view (from Manning 1969:Figure 5c,d).

Brazil]. Camp, 1973:11, Figures 3, 4 [west coast of central Florida, depth 8 and 18 m].

Bigelowina biminiensis.-Schotte and Manning, 1993:574, Figure 4 [South Carolina, depth 37 m; Georgia, depth 14, 34, and 46 m; and northeastern Florida, depth 15 m; Tobago].

Material. North Carolina: 34°12'30"N, 76°07'48"W, depth 65 m, R/V *Eastward* sta 5962: 1♀, cl 10.5 mm (USNM 120228). South Carolina: 32°40'N, 78°47'W, depth 37 m, SABP, 18 Nov 1977: 1 juvenile (probably a postlarva), ca. 10 mm (USNM 174488). Georgia: Sta 335, 31°44'55"N, 80°49'51"W, depth 53 ft (= 16 m), bucket dredge, leg. M. Gray, 21 Aug 1963: 1 fragment (UG). 31°08'N, 80°50'W, depth 14 m, SABP, 25 Feb 1977: 3 juveniles, 8.5-13 mm (USNM 174484).-Sta 201, Sapelo Island, 31°06'N, 80°32'W, depth 96 ft (= 29 m), leg. Darby and Gray, 6 May 1963: fragments of 1 specimen (UG). 31°03'N, 80°26'W, depth 34 m, SABP, 24 Nov 1977: 1♀, 25 mm (USNM 174486).-30°59'N, 80°08'W, depth 46 m, SABP, 30 Aug 1977: 1♀, 12.5 mm (USNM 174487). Sta 246, 30°57'36"N, 80°55'W, depth 69 ft (= 21 m), leg. M. Gray, 23 Jul 1963: 1 juvenile, cl 9.5 mm (UG). Sta 376, Sapelo Island whistle buoy 320° 4.5-5 miles, depth 65 ft (= 20 m), leg. M. Gray, 19 Oct 1963: 1♀, 29.5 mm (UG). Sapelo Island, 3 miles south of whistle buoy, 16 miles east of island, sponge reef area, 2 Sep 1969: 1♂ 17.5 mm (USNM 128350).



R.P.B. del.

Figure 8. *Bigelowina biminiensis* (Bigelow). Dorsal view (from Manning 1969:Figure 14).

Remarks. This species appears to be a rather common component of the sublittoral habitats off Georgia, where it probably occurs in a restricted, specific type of substrate. Very large specimens, like the female from North Carolina with a carapace length of 10.5 mm, have a distinct mesial tubercle on the cornea. This is the first record for the species from North Carolina.

Coronis scolopendra Latreille 1828

Figure 9.

Coronis scolopendra Latreille 1828:474 [type locality Brazil]. Manning 1969:88, Figure 24 [Brazil]. Manning and Reaka 1989:213-219, Figures 1-4 [east coast of central Florida]. Rodrigues and Manning 1992:79-82, Figure 1 [larva; Brazil].

Lysiosquilla. Brooks 1885:10, 11 [Beaufort, North Carolina]; 1886a:166, 167, 168 [Beaufort, North Carolina]. Pearse et al., 1942: 144, 147, 148, 151, 153, 155, Figure 10 [Bird and Sheepshead Shoals and Fort Macon Beach, North Carolina].

Lysiosquilla excavatrix. Brooks 1886b:21, 51 [Beaufort, North Carolina]. Pearse et al. 1942:185, Figure 13 [Bird Shoal, on flat beaches, and outside Fort Macon, North Carolina]. Fox and Ruppert, 1985:316 [listed].

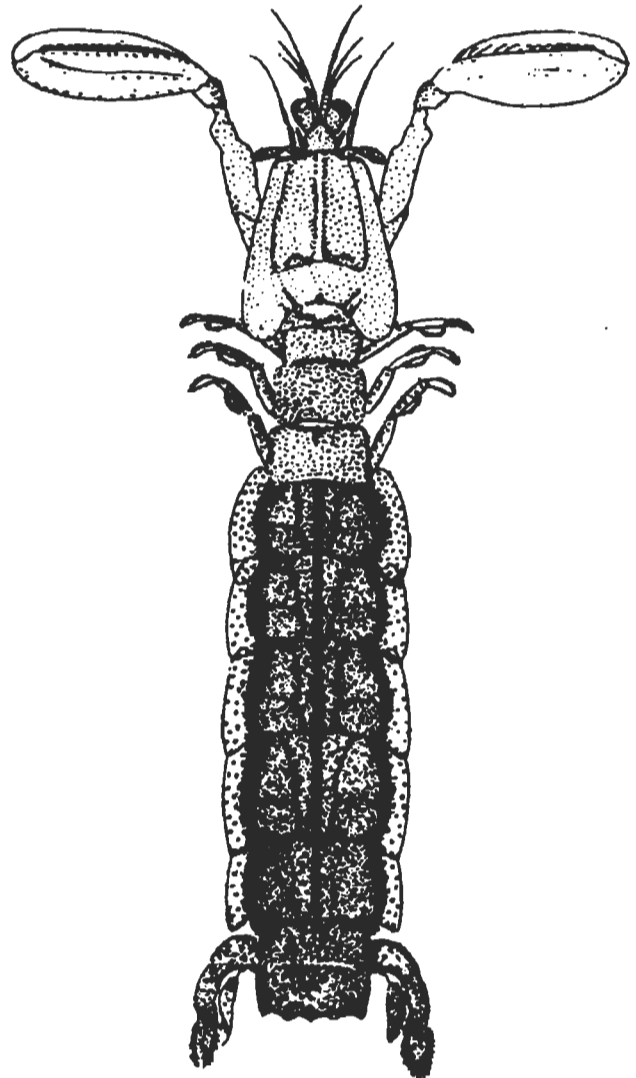


Figure 9. *Coronis scolopendra* Latreille. Dorsal view (from Brooks 1886b:pl. 10, Figure 8).

Lysiosquilla (Coronis) excavatrix Brooks, 1886b:48, 101, pl. 10, Figures 8-16 [adult], pl. 11, Figures 1-3 [larva] [type locality Beaufort, North Carolina].

Coronis excavatrix. Lunz, 1935:153, Figure 2 [Beaufort, North Carolina]. Manning 1969:84, Figures 22, 23 [Bogue Banks and Bird Shoal, Fort Macon; Fort Macon; Sheepshead Shoal; and Beaufort; all North Carolina; Gulf of Mexico from Mobile, Alabama to Port Aransas, Texas]. Boothe, 1977:163 [North Edisto River, South Carolina]. Fox and Ruppert, 1985:51, 121, 128, 187, 195, 258, 285, 316 [from beaches along South Carolina].

Material. North Carolina: Beaufort, H. W. Connley, Wesleyan University Collection #659: 1♂ 24 mm (USNM 150796). Buxton, at state campground on Route 30, caught by Hasty family on a fish hook, 13 Aug 1979: 1♀, 64 mm (USNM 181650). Onslow County, New River, spoil bank at east end of Courthouse Bay, leg. R. B. Manning and D. B. Bixler, 30 Jul 1989: 3♂♂, 28-55 mm, 1♀, 55 mm (USNM).- South Carolina: North end of South Creek, North Edisto River, leg. B. B. Boothe, 4 Mar 1976: 1♂ 22 mm (USNM 169199). Georgia: Southeast end of Sapelo Island, lower intertidal, leg. R. W. Heard, May 1988: 1♀, 23 mm, fragments of 4 juveniles (USNM). Tybee Island, Savannah Beach, tide pools, lower intertidal, sand bar, beach, leg. R. W. Heard, 8 Jul 1992: 3♂♂, 52-72 mm, 2(♀, 50-67 mm (USNM).

Remarks. Boothe (1977) recorded this species from South Carolina and Manning and Reaka (1989) reported it from the Indian River region of Florida. Its first larva was described by Rodrigues and Manning (1992).

Fox and Ruppert (1985) found this species to be common in all seasons but winter along protected beaches and southern open beaches of South Carolina. They reported that the burrows of this species were 1 cm across and (p 121) that the "holes open into straight, smooth-walled, usually rusty-brown, vertical shafts."

This species has not been recorded previously from Georgia, although that is well within its known range.

***Nannosquilla carolinensis* Manning 1970**

Figure 10.

Nannosquilla carolinensis Manning 1970:99, Figure 1 [type locality off North Carolina, depth 100 m].-Camp and Manning 1986:6 [off South Carolina, depth 34 m].

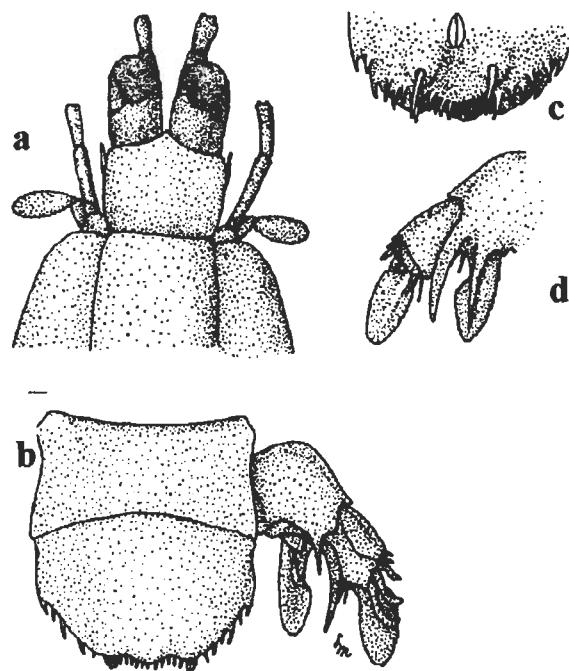


Figure 10. *Nannosquilla carolinensis* Manning. a, anterior part of body; b, sixth abdominal somite, telson, and uropod; c, telson, ventral view; d, uropod, ventral view. (from Manning 1970: Figure 1).

***Nannosquilla whitingi* Camp and Manning 1982**

Figure 11.

Nannosquilla grayi. Manning 1969:78 [part, specimen from off Sapelo Island only]. [Not *Lysiosquilla grayi* Chace, 1958.]

Nannosquilla baliops Camp and Manning 1982:6, Figure 5 [type locality off Hutchinson Island, east coast of central Florida, depth 11 m]; 1986:15 [in key].

Nannosquilla whitingi Camp and Manning 1982:11, Figures 3e,f, 8, 9 [type locality off Hutchinson Island, east coast of central Florida, depths 8 and 11 m]; 1986:15 [in key].

Material. Georgia: Off Sapelo Island, Doboy Sound sea buoy 3 miles 274°, depth 15 m, leg. Frankenberg and Gray, 4 Feb 1963: 1♀, 27 mm (UG).

Remarks. Reexamination of this specimen, first identified by Manning (1969) with *Nannosquilla grayi* (Chace), has confirmed that it can be identified with *N. whitingi*, as suggested by Camp and Manning (1982). We also believe that *N. baliops* can be identified with *N. whitingi*. The only differences between *N. baliops* and *N. whitingi* are in the extent of pigmentation of the body. The only other offshore species of *Nannosquilla* is *N. carolinensis* Manning, known only from the Carolinas. That species differs from *N. whitingi* in having sharp posterolateral angles on the fifth abdominal somite, the

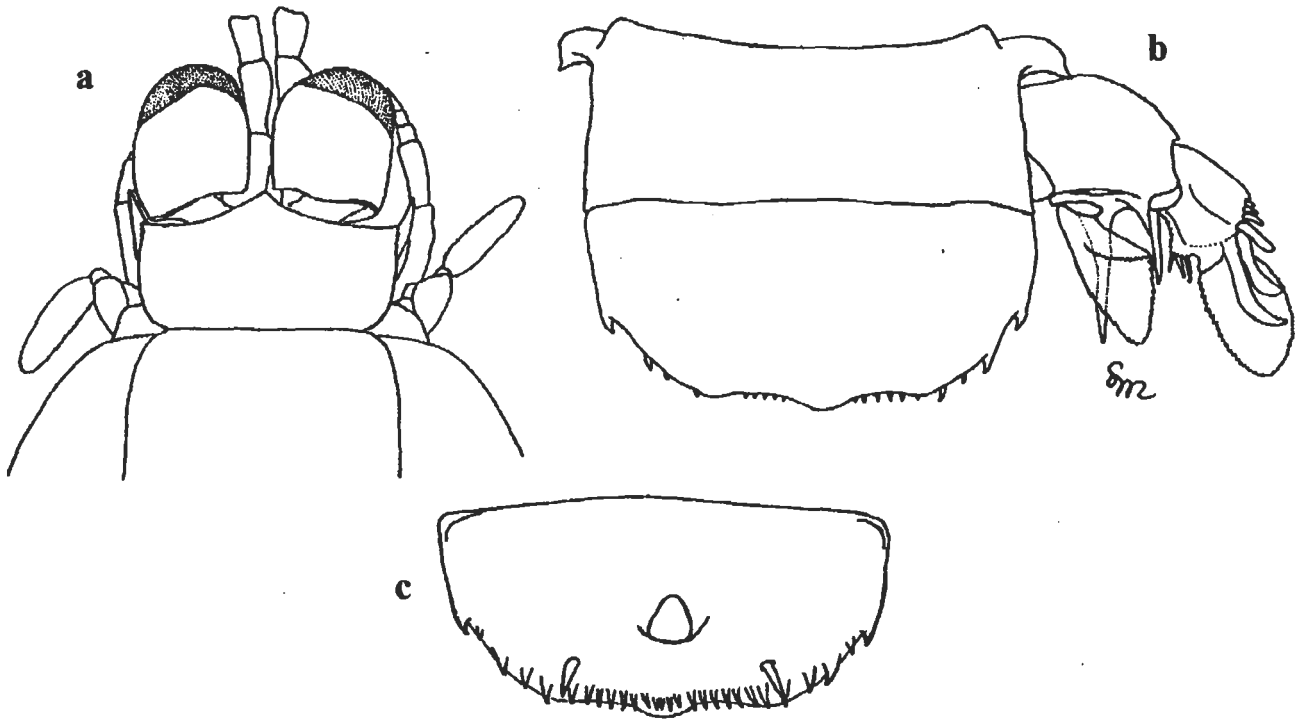


Figure 11. *Nannosquilla whitingi* Camp and Manning. Off Sapelo Island, ♀, tl 27 mm. a, anterior part of body; b, sixth abdominal somite, telson, and uropod; c, telson, ventral view.

spines of the basal prolongation of the uropod subequal in length, and two of the marginal teeth of the telson on the margin rather than just one tooth on the margin.

Superfamily Squilloidea Latreille 1803
 Family Squillidae Latreille 1803
Cloridopsis dubia (Milne Edwards 1837)
 Figure 12.

Squilla dubia Milne Edwards 1837:522 [type locality l'Amerique]. Gibbes, in Tuomey, 1848:xvi [South Carolina]; 1849:22 [Georgia]; 1850:200 [Charleston Harbor, South Carolina]. Howard 1883:294 [South Carolina]. Rathbun 1883:121-130 [Savannah, Georgia]. Bigelow 1894:518 [Charleston, South Carolina; Savannah, Georgia].

Chloridella dubia. Lunz 1935:157, Figure 5 [Charleston, South Carolina].

Cloridopsis dubia. Manning 1969:141, Figures 39b, 41 [Charleston, South Carolina; Savannah, Georgia; Florida to Brazil]. Gore and Becker, 1976:152, 153, 161, Figure 4 [east coast of central Florida; intertidal].

Material. South Carolina: Cherry Point, in mud at base of dock, leg. E. Morris, 14 Jun 1980: 1♂ cl 31 mm (FSBC I 59907). Georgia: Off Green Island, Chatham County, Ossabaw Sound, depth 4-5 m, bottom mud and sand, trawl, leg. G. Williamson, 21 Oct 1972: 1♂ cl 22.8 mm (USNM 274360).

Remarks. Manning (1968:128) and (1969:140), in diagnoses of *Cloridopsis*, stated that the submedian teeth of the telson had fixed rather than movable apices.

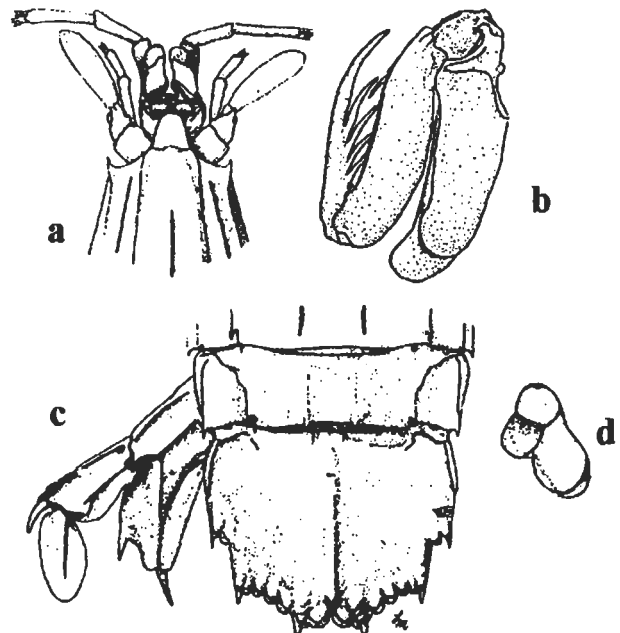


Figure 12. *Cloridopsis dubia* (Milne Edwards). a, anterior part of body; b, raptorial claw; c, posterior two abdominal somites, telson, and uropod; d, eye. (a,c,d from Manning 1969:fig. 41a,b,f; b, ♀, tl 103 mm, Miami, Florida, USNM 119184).

Manning (1974b:107, Figure 3) corrected this statement and pointed out that the movable apices were visible in smaller specimens and that their sockets were visible in larger specimens. Although the apices or sockets were visible in all specimens examined by us, they may not be detectable in very large specimens (David Camp pers comm). The specimen recorded here from Georgia is the first reported from that state since the last century. It could be much more common off the Carolinas and Georgia than indicated by the small number of recent records. Lunz (1935:157) noted that "although it occurs regularly at Charleston, it is by no means abundant." The species is not known to occur in North Carolina.

Gibbesia, new genus

Diagnosis. Size large, total length to more than 100 mm in adults. Eye large, cornea bilobed, inner margin of eye longer than outer. Ocular scales separate. Carapace with median carina. Mandibular palp absent. 5 epipods present. Dactylus of claw with 5 teeth, outer margin of dactylus sinuate. Lateral process of fifth thoracic somite a spatulate lobe. Lateral processes of sixth and seventh thoracic somites indistinctly bilobed, posterior lobe much the larger, bluntly rounded laterally. Abdominal somites 1-5 with 4 pairs of carinae, medians absent. Telson with median carina only. Apices of submedian teeth of telson fixed.

Type species. *Squilla neglecta* Gibbes 1850, by present designation and monotypy.

Etymology. Named for Lewis Reeve Gibbes (14 August 1810-21 November 1894) (Figure 13), chemist and naturalist, the author of the type species. Gibbes was a remarkable scientist whose interests extended from natural history to physics and chemistry. He was born at Charleston and was graduated from the Medical College of South Carolina in 1836. He subsequently studied in Paris, but he never practiced medicine, preferring research and teaching. He was professor in the College of Charleston from 1838 to 1892, where he occupied the chair in mathematics and also that of astronomy and physics. His expertise included astronomy, mathematics, chemistry, physics, botany, and zoology. Among his accomplishments was an early classification of the elements, his "Synoptical Tables of the Chemical Elements" (Taylor 1941; Weeks 1956). He is known to carcinologists primarily for his synopsis on the crustaceans in collections in the United States (1850), in which he named *Squilla neglecta*. A short biography was published by Porcher (1920) in *American Medical Biographies*.

Remarks. Members of *Gibbesia* can be distinguished from members of *Squilla* sensu Manning 1969 in that the

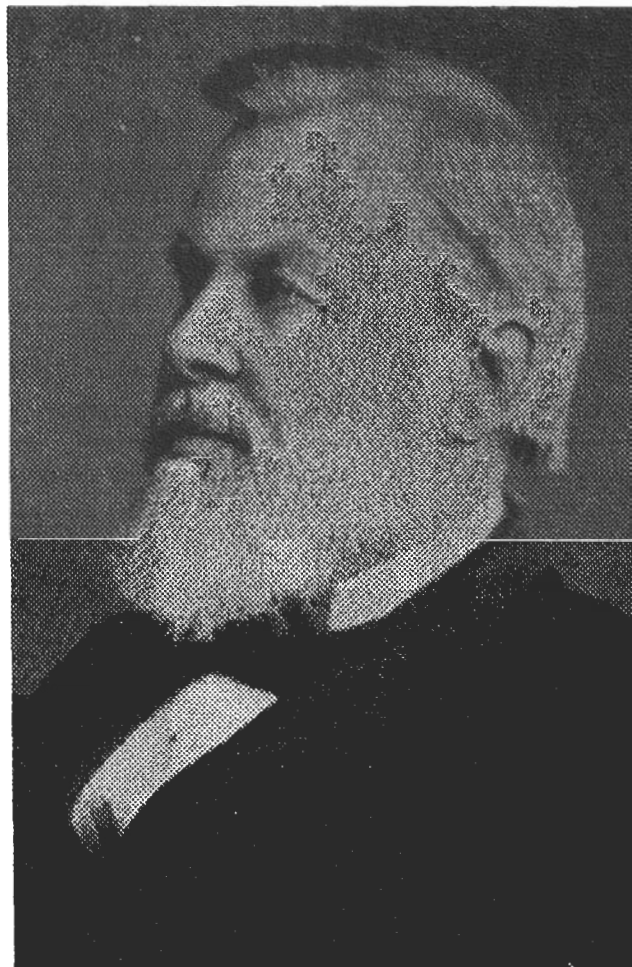


Figure 13. Lewis Reeve Gibbes, 14 August 1810-21 November 1894 (from Division of Crustacea files, USNM).

dactylus of the claw is armed with five rather than six teeth and the mandibular palp is completely suppressed. In their account of the genus *Fennerosquilla*, Manning and Camp (1983) noted that since Manning's (1968) restriction of *Squilla* to Atlanto-East Pacific species, several features, including the number of teeth on the claw and the presence or absence of the mandibular palp, are now recognized as important characters at the generic level. The recognition of *Gibbesia* here is based on these features, the most important of which is the condition of the mandibular palp.

Gibbesia neglecta (Gibbes, 1850), new comb.

Figure 14.

Squilla neglecta Gibbes, in Tuomey, 1848:xvi [South Carolina; nomen nudum]; 1849:22 [Georgia; nomen nudum]; 1850:200 [type locality Charleston Harbor, South Carolina]. Howard 1883:294 [South Carolina]; Lunz 1933:3, 4, 5 6 7, pl. 1 [Charleston Harbor, South Carolina];

1935:154, Figure 4 [Beaufort, North Carolina; Charleston Harbor, South Carolina]. Manning 1969:181, Figure 50b, 51 [off Cape Hatteras, North Carolina, depth 25 m; Isle of Palms, Charleston Harbor, off Kiawah Island and Rockville, South Carolina; off Sapelo Island, Georgia; and Florida to Brazil].-Dörjes 1972:190, Figure on pl. 1 [Sapelo Island, Georgia]. Camp 1973:37, Figure 13 [west coast of central Florida; depth 6 and 18 m]. Howard and Frey, 1975a:12 [Sapelo Sound, Georgia]. Gore and Becker, 1976:152, 156, 157, 158, 169, Figure 10 [east coast of central Florida; depths 10, 26, and 28 m]. Wenner and Wenner, 1989:159, 160, 161, 167, 172, fig. 4 [North Carolina to east coast of central Florida, depths 4-20 m].

Chloridella neglecta. Lunz 1935:154, Figure 4 [North Carolina].

Material. North Carolina: 5°07'12"N, 5°25'42"W to 35°06'48"N, 75°24'42"W, depth 23-25 m, leg. R/V *Gillis* sta 6, 13 Nov 1974: 1♀, 40 mm (USNM 151555). Southeast of Cape Hatteras, 4°31'N, 75°55'W, depth 35 fm (67 m), M/V *Combat* sta 396, 21 Jun 1957: 1♂ 93 mm (USNM 170198). 33°35'N, 8°05'W, depth 18 m, leg. SABP, 16 Aug 1977: 1♂, 100 mm, 1♀, 88 mm (USNM 174018). South Carolina: south end of Hilton

Head Island, Calibogue Sound, leg. Anderson, 15 Aug 1957: 1♀, 35 mm (USNM 153961). Georgia:[Ossabaw, Wassaw Sound, and St. Andrews Sounds, Leg. SSM], Wassaw Sound STERI sta. W-4-T, 14 May 1972: 1♂ 23 mm (USNM). Wassaw Sound, STERI sta. W-7-T, 14 May 1972 3 ♀♀ 43-77 mm (USNM). Wassaw Sound, STERI sta. W-6-T, 19 Apr 1972 2 ♂♂, 52-65 mm, 1♀, 46 mm (USNM). Ossabaw Sound, STERI sta. O-2-T, 4 April 1972 1♀, 48 mm (USNM). Ossabaw Sound, STERI sta. O-1-T, 4 Apr 1972 1♀, 83 mm (USNM). Ossabaw Sound (off Pine Island), 13 May 1972 1♀, 44 mm (USNM). St. Andrews Sound (off Little Cumberland), 10 Jul 1974 1♀, 71 mm (USNM). 31°24'13"N, 81°09'44"W, depth 30 ft (9 m), leg. A.S. Leiper, sta 548, Sep 1970: fragments (UG). 31°23'18"N, 81°12'27"W, depth 28 ft (8.5 m), leg. A.S. Leiper, sta 553, Nov 1970: 1♀, 28 mm (UG). Same data, sta 544: 1♂, 16.5mm (UG). 31°05'27"N, 81°06'57"W, depth 35 ft (11 m), leg. A.S. Leiper, sta 549, Sep 1970: 1 juvenile, 13 mm (UG). Marsh Island, Sapelo, 27 Jul 1961: 7♂♂ 38-60 mm, 5♀♀ 27-42 mm (UG). Sapelo Beach, coming out of holes in sand, 28 Jul 1973: 1♂, 40 mm, 6♀♀ 30-38 mm (UG). Dobby Sound, Sapelo Island, shrimp trawl, leg. M. Gray, drag 7, 28 Jan 1961: 1♀, 82 mm (UG). South end of Nannygoat Beach, Sapelo Island, in mud, low tide, 7 Aug 1971: 1♂, 49 mm (UG). Off Sapelo Island, 6 miles 90° from sea buoy, depth 41 ft (= 12.5 m), leg. M. Gray, drag 52, 26 Oct 61: 1♀, 32 mm (UG).

Remarks. Characteristics of the species are clearly visible even in the smallest specimens examined. The specimens from Marsh Island were taken together with *S. empusa*. Only one specimen of *G. neglecta* was taken by Howard and Frey (1975a) on the Atlantic side of Sapelo Sound where the observed salinity ranged from 20.5-32.8 (mean 28.9). In contrast, 15 specimens of *S. empusa* were collected at the same station and a total of 120 specimens of the latter species were taken during their study. Wenner and Wenner (1989) reported that this species was found in 49% of the trawl tows they made in depths of 4 to 20 m between Cape Fear, North Carolina and Cape Canaveral, Florida. The number of individuals per tow was highest in substrates off Georgia in seasons other than winter, when none were found there.

Meiosquilla quadridens (Bigelow 1893)

Figure 15.

Squilla quadridens Bigelow 1893a:101 [type locality, Key Largo, Florida, depth 102 m].

Meiosquilla quadridens.-Manning 1969: 106, Figures 31, 33a [North Carolina, depth 89 m; Bahamas and Florida

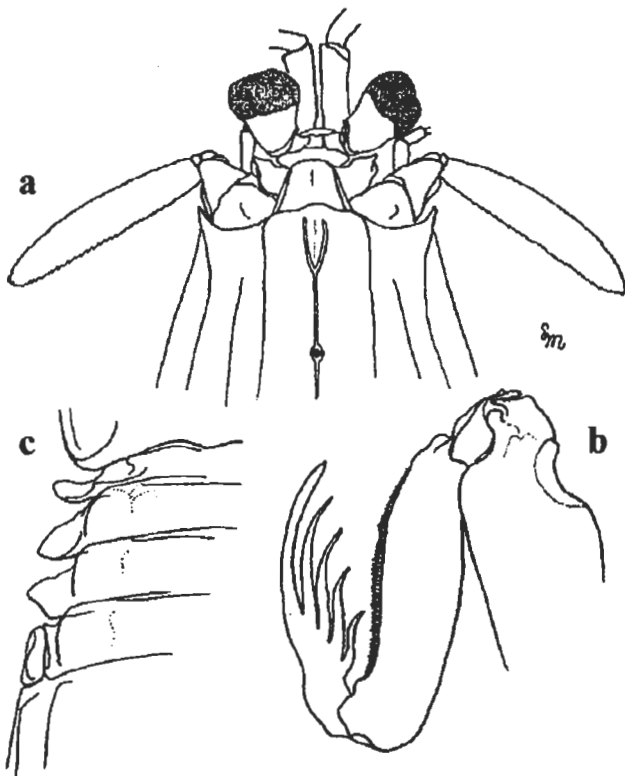


Figure 14. *Gibbesia neglecta* (Gibbes). Sapelo Island, ♀, tl 82 mm. a, anterior part of body; b, raptorial claw; c, lateral processes of exposed thoracic and first abdominal somites.

to Surinam]. Camp 1973:18, Figures 6, 7 [west coast of central Florida, depths 37, 55, and 73 m]. Gore and Becker, 1976:156, 158, 162, Figure 5 [east coast of central Florida, depths 50 and 64 m].

Material. South Carolina: 32°49'30"N, 78°39'42"W, depth 33 m, leg. MRRI, 3 Nov 1981: 1♂, 13.5 mm (USNM 232652). 32°49'24"N, 78°39'30"W, depth 33 m, leg. MRRI, 3 Nov 1981: 3♂♂ 11-12 mm (USNM 232649). 32°29'06"N, 78°49'18"W, depth 52 m, leg. MRRI, 6 Aug 1981: 1♀, 11.5 mm (USNM 221024). 31°32'N, 79°44'24"W, depth 56 m, leg. MRRI, 10 Mar 1981: 1♀, 17 mm (USNM 232651). 31°31'54"N, 79°44'24"W, depth 60 m, leg. MRRI, 8 Mar 1980: 1 fragment of ♂, cl 3.8 mm (USNM 221021). Georgia: 31°41'06"N, 80°20'48"W, depth 27 m, leg. GMR, 5 Nov 1981: 1 juvenile ♂, 12 mm (USNM 232650). 31°03'N, 80°26'W, depth 34 m, SABP, 16 May 1977: 1 juvenile ♂, 12 mm (USNM 174491).

Remarks. Both specimens from Georgia, although young, are clearly identifiable with *M. quadridens*, each having 4 epipods, rounded lateral processes on the sixth

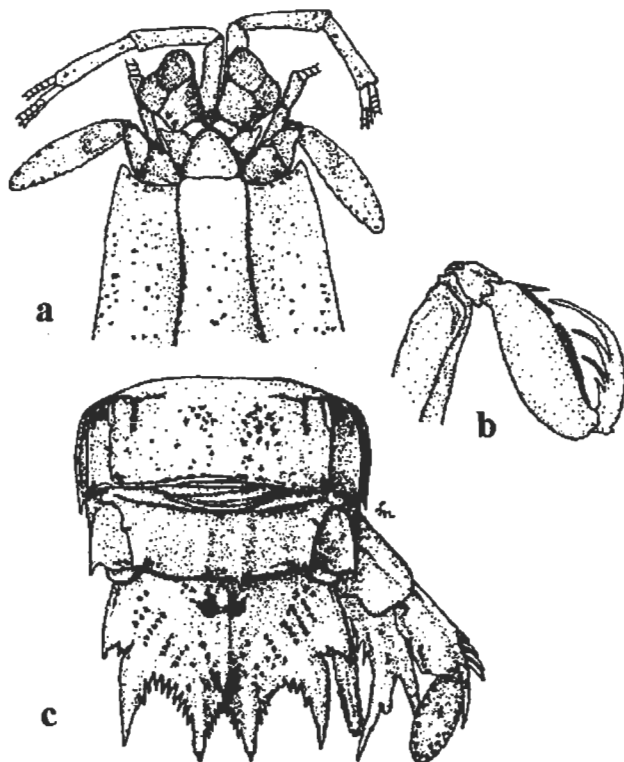


Figure 15. *Meiosquilla quadridens* (Bigelow). a, anterior part of body; b, raptorial claw; c, posterior two abdominal somites, telson, and uropod. (a, c from Manning 1969: Figure 31a, d; b, (holotype, tl 23 mm, off Key Largo, Florida, USNM 11547).

and seventh thoracic somites, and short submedian carinae on the telson. This species has not been recorded previously from off South Carolina or Georgia.

Squilla deceptrix Manning 1969

Figure 16.

Squilla discors Manning 1962:217 [part - the original account included material of two species; North Carolina, depth 49 fms (90 m)].

Squilla deceptrix Manning 1969:165, figs. 44b, 46 [type locality off Panama, depth 137 m; North Carolina, depths 89 and 100 m; Florida and Caribbean, depths 49 to 309-346 m]. Camp 1973:1, 33, Figure 12 [west coast of central Florida, depths 37, 55, and 73 m].- Gore and Becker 1976:154, 156, 157, 158, 159, 164, fig. 7 [east coast of central Florida; depths 37, 40, 45, 48, 64, and 100-97 m].

Squilla empusa Say, 1818

Figure 17.

Squilla empusa Say 1818:250 [type locality Rhode Island]. Gibbes, in Tuomey, 1848:xvi [South Carolina]; 1849:22 [Georgia]; 1850:199 [Charleston Harbor, South Carolina]. Coues and Yarrow 1878:298 [Fort Macon, North Carolina]. Howard 1883:274 [South Carolina]. Brooks 1885:10, 11 [Beaufort, North Carolina]; 1886a:166, 168 [Beaufort, North Carolina]; 1886b:101, pl. 1, Figures 4, 5 [larva], pl. 2, Figure 7 [Beaufort, North Carolina]. Sharp 1893:107 [Beaufort, North Carolina; Hilton Head, South Carolina]. Lunz 1937:8 [mouth of Wilmington River and St. Simon's Sound, Georgia]. Manning 1969:201, Figures 57a, 58, 59 [Massachusetts to Surinam, including numerous localities off the Carolinas and Georgia, depths 9-55 m, usually less than 25 m]. Frey and Howard 1969:440, pl. 4, Figure 2, table 1 [Sapelo Island]. Dahlberg and Heard 1969:24 [Sapelo Island beach, Doboy Sound, Mud River, and Wassaw Sound, Georgia; from stomach of southern stingray]. Dörjes 1972:190 [Sapelo Island]. Hoese, 1973:79, 80 [off Sapelo Island, 9-12 fms (16-22 m) and Upper Duplin River (6 m)]. Camp 1973:39, Figure 14 [west coast of central Florida, depths 6 and 18 m]. Howard and Frey 1975a:12 [North and South Newport Rivers and adjacent parts of Sapelo and St. Catherine's Sounds, Georgia]; 1975b:55, Figure 3a [Georgia estuaries]. Gore and Becker, 1976: 154, 155, 156, 157, 158, 159, 168, Figure 9 [east coast of central Florida, depths 18 100 m]. Anderson et al. 1977:9 [Folly Beach, South Carolina, in surf zone]. Fox and Ruppert 1985:51, 69, 121, 137, 147, 195, 207, 258, 285 [sounds and

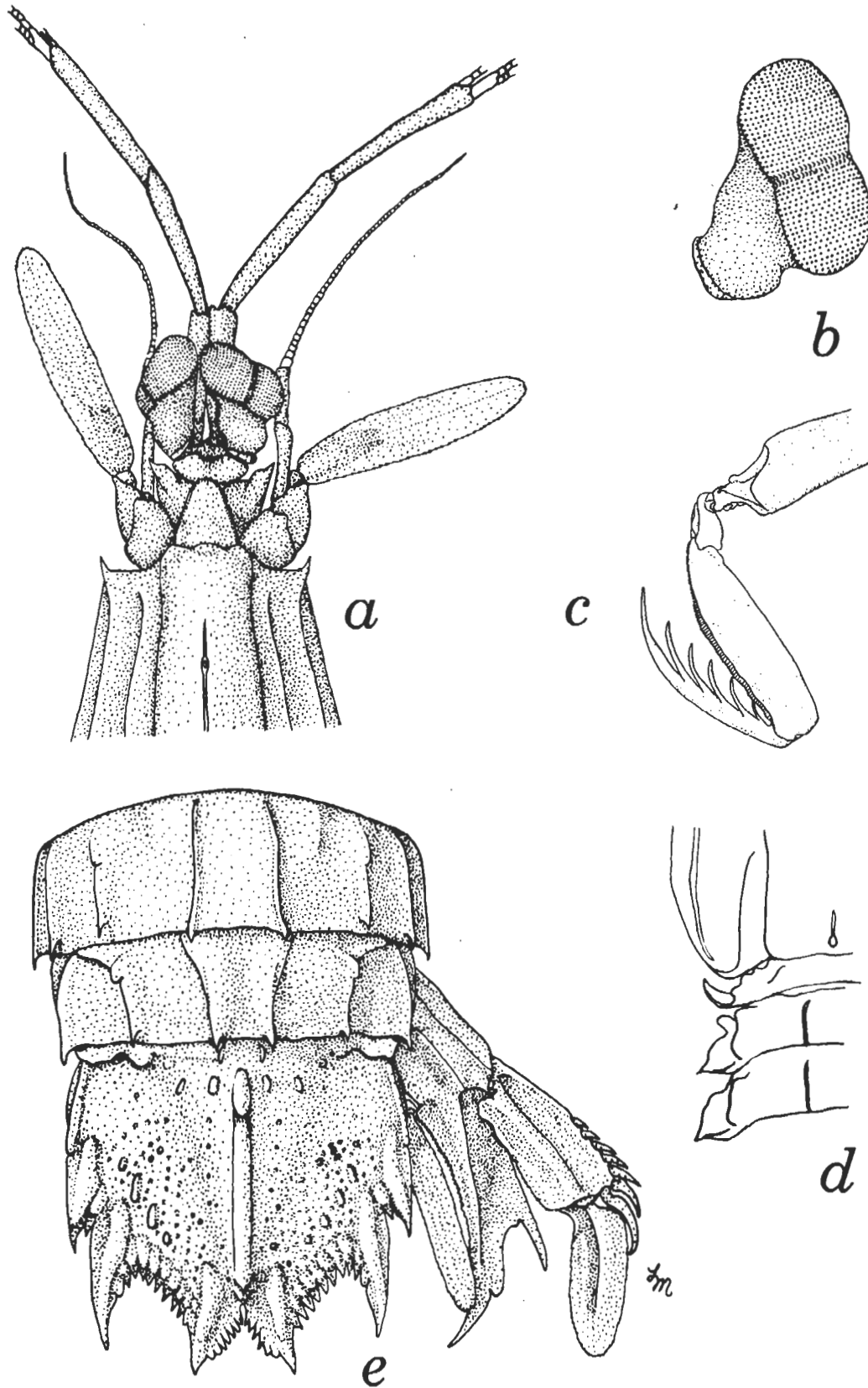


Figure 16. *Squilla deceptrix* Manning. a, anterior part of body; b, eye; c, raptorial claw; d, lateral processes of exposed thoracic somites; e, posterior two abdominal somites, telson, and uropod. (a,b,d,e, from Manning 1969: Figure 46a-c,e; c, ♂ holotype, tl 67 mm, off Panama, USNM 119169).

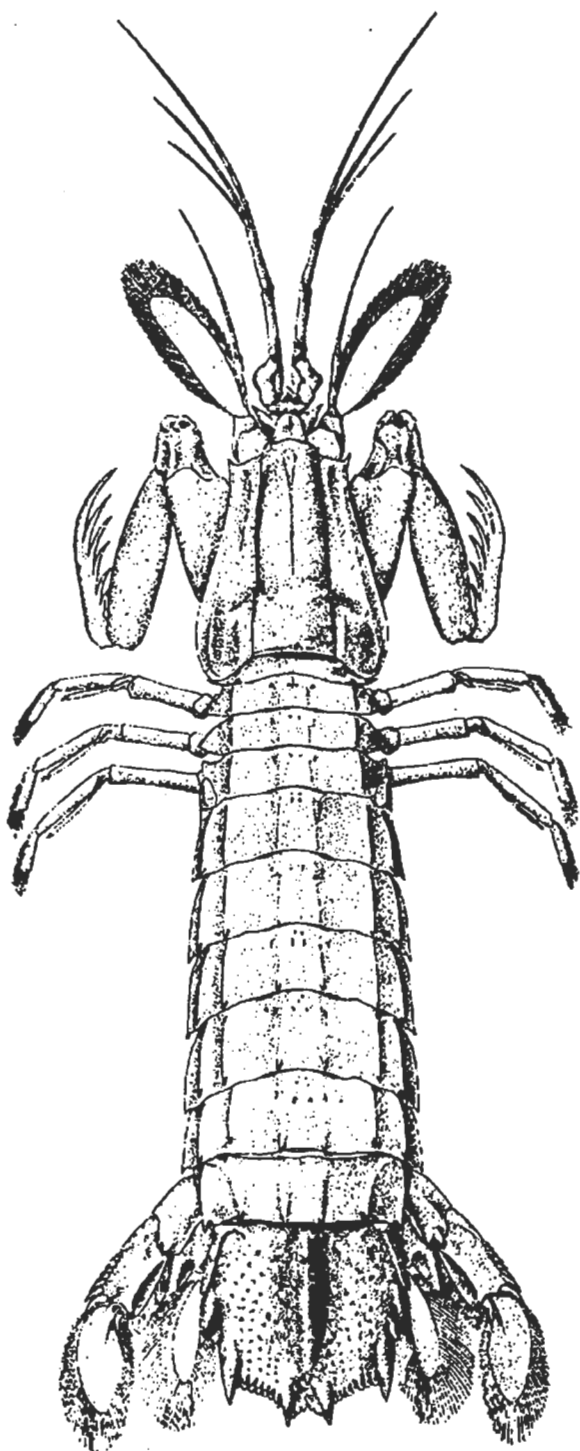


Figure 17. *Squilla empusa* Say. Dorsal view (from Rathbun 1893: pl. 274).

protected beaches along entire South Carolina coast]. Wenner and Wenner 1989:159, 160, 161, 164, 167, 172, Figure 4 [Cape Fear, North Carolina to Cape Canaveral, Florida, depth 4-20 m].

Chloridella empusa. Lunz 1935:157, Figure 6 [North and South Carolina].-Pearse et al. 1942:185 [Fort Macon and near Bird Shoal, Beaufort, North Carolina].

Chloridella. Pearse et al. 1942:146 [Bogue Bank, North Carolina, depths 3 and 15 m].

Squilla sp. Hertweck 1972:125, 126, 136, Figure 6a, pl. 1, Figure 14 [upper and upper part of lower offshore, Sapelo Island, Georgia, depths 1.6 to 12 m; burrow structure].

Material. North Carolina: 35°20'N, 75°20'48"W, 25 m, 17 Sep 1980: 1♀, 97 mm (USNM 189982). 34°59'N, 75°20'W, depth 35 fm (64 m), Combat sta 379, 17 Jun 1957: 1♂, 128 mm (USNM 170197). South Carolina: Hilton Head Island, leg. G. Ehnat: 1♂, 86 mm, 1♀, 112 mm (USNM 173112). Georgia:31°13'N, 81°13'W, 11 m, SABP, 31 Aug 1977: 1♂, 100 mm, 1♀, 117 mm (USNM 174479). Duplin River, leg. J. Kraeuter, Mar 1973: 1♂, 57 mm (UG). Savannah and Brunswick, 2-7 Apr 1973: 4♂♂, 50-70 mm (UG). Marsh Island, Sapelo, 27 Jul 1961: 1♀, 58 mm (UG).

Remarks. The specimen from Marsh Island was taken together with *G. neglecta*.

This species and *G. neglecta* were taken together at one station in Sapelo Sound, Georgia by Howard and Frey (1975a), but more than 100 other specimens of *S. empusa* were taken by them at nine other stations in the North and South Newport Rivers and St. Catherines and Sapelo Island Sounds, in surface salinities ranging from 11.7-34.1‰. Apparently *S. empusa* is common locally in Georgia estuaries but not in deeper estuarine channels (Howard and Frey 1975b). Frey and Howard (1969:pl. 4, Figure 2) and Howard and Frey (1975b:Figure 3a) showed a cast of the burrow of *S. empusa*, which consists of several inter-connected sections; it is described by Frey and Howard (1969:440) as "irregular, branched or unbranched, broadly U-shaped burrows 2 to 4 cm in diameter and a meter or more in length."

Dahlberg and Heard (1969:25) reported that *S. empusa* was found in the stomach contents of a southern stingray, *Dasyatis americana* Hildebrand and Schroeder taken in Wassaw Sound, Georgia. Fox and Ruppert (1985) considered this species to be common all year along the South Carolina coast. In the waters adjacent to Sapelo Island, Ga., Hoese (1973:75) reported that "Mantis shrimp [*Squilla empusa*] were most common offshore [central Georgia inshore continental shelf] in 9-12 fms. However, none were found there in the summer months (May-August). In the bay [Doboy Sound] large numbers were taken at night in October, February and April. In August, however, few were taken during the day or night, and there was no marked nocturnal abundance.

The summer absence is not explained but may be related to spawning, because larvae and young were found only during the summer. This species constructs a crawfish-like burrow, where it apparently remains by day. Only two were taken in the upper Duplin [tidal tributary of Doboy Sound].”

Hertweck (1972) described the burrow structure of a species of *Squilla*. The burrows were found offshore in depths of 1.6 to 12 m in fine sand with silt or medium sand. They most likely are the burrows of *S. empusa*.

Wenner and Wenner (1989) reported that this species ranked second to *Portunus gibbesii* Stimpson in total catch and that it occurred in 78% of the trawl tows made in their study area, the Carolinian shelf between Cape Fear, North Carolina and Cape Canaveral, Florida, in depths between four and 20 m. In biomass, *S. empusa* constituted 11% of the total catch and was outranked only by the blue crab, *Callinectes sapidus* Rathbun.

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LITERATURE CITED

- Anderson, W. D., Jr., J. D. Dias, R. K. Dias, M. Cupka, and N. A. Chamberlain. 1977. The macrofauna of the surf zone off Folly Beach, South Carolina. NOAA Tech Rep NMFS SSRF-704:23 p.
- Biffar, T. A. 1971. New species of *Callinassa* (Decapoda, Thalassinidea) from the western Atlantic. *Crustaceana* 21(3):225-236.
- Bigelow, R. P. 1893a. Preliminary notes on the Stomatopoda of the *Albatross* collections and on other specimens in the National Museum. Johns Hopkins University Circulars 12(106):100-102.
- . 1893b. The Stomatopoda of Bimini. Johns Hopkins University Circulars 12(106):102-103.
- . 1894. Report upon the Crustacea of the Order Stomatopoda collected by the Steamer *Albatross* between 1885 and 1891, and on other specimens in the U. S. National Museum. *Proc U S Nat Mus* 17:489-550.
- . 1901. The Stomatopoda of Porto Rico. *Bulletin of the United States Fish Comm* 20(2)[for 1900]:149-160.
- Boothe, B. B. 1977. Record of *Coronis excavatrix* Brooks (Crustacea, Stomatopoda) from South Carolina, U.S.A. *J Elisha Mitch Sci Soc* 92(4):163.
- Briggs, J. C. 1961. The East Pacific Barrier and the distribution of marine shore fishes. *Evolution* 15(4):545-554.
- Brooks, W. K. 1885. Notes on the Stomatopoda. Johns Hopkins University Circulars 5 (43):10-11.
- . 1886a. The Stomatopoda of the "Challenger" collection. Johns Hopkins University Circulars 5(49):83-85
- . 1886b. Report on the Stomatopoda collected by H.M.S. Challenger during the years 1873-76. Report of the Scientific Results of the Challenger Expedition, 1873-76, *Zoology* 16:1-116, pls. 1-16.
- Bullis, H. R., Jr., and J. R. Thompson. 1965. Collections by the exploratory fishing vessels *Oregon*, *Silver Bay*, *Combat*, and *Pelican* made during 1956-1960 in the southwestern north Atlantic. *U S Fish and Wildl Serv, Spec Sci Rep Fish* 510:130 p.
- Camp, D. K. 1973. Stomatopod Crustacea. *Memoirs of the Hourglass Cruises* 3(2):1-100.
- . 1985. Occurrence of *Heterosquilla armata* (Smith) in the northwestern Gulf of Mexico, with notes on variation within the species (Crustacea: Stomatopoda: Lysiosquillidae). *J Crustacean Biol* 5(3):465-467.
- , and R. B. Manning. 1982. Five new species of *Nannosquilla* from the northwestern Atlantic (Crustacea: Stomatopoda). *Smithson Contrib Zool* 368:15 p.
- , and ———. 1986. Observations on *Nannosquilla*, with descriptions of three new species from the northwestern Atlantic (Crustacea: Stomatopoda). *Smithson Contrib Zool* 444:17 p.
- Chace, F. A., Jr. 1958. A new stomatopod crustacean of the genus *Lysiosquilla* from Cape Cod, Massachusetts. *Biol Bull* 114(2):141-145, pl. 1.
- Coues, E., and H. C. Yarrow. 1878. Notes on the Natural History of Fort Macon, N.C. and vicinity. (No. 5). *Proc of the Acad Nat Sci Phila* 1878:297-315.
- Dahlberg, M. D., and R. W. Heard, Jr. 1969. Observations on elasmobranchs from Georgia. *Quart J Florida Acad Sci* 32(1):21-25.
- Dörjes, J. 1972. Distribution and zonation of macrobenthic animals. Georgia coastal region, Sapelo Island, U.S.A. *Sedimentology and Biology, VII. Senckenbergiana maritima* 4:183-216, pls. 1-2.
- Fox, R. S., and E. S. Ruppert. 1985. Shallow-water marine benthic macroinvertebrates of South Carolina: Species identification, community composition and symbiotic associations. *Belle W. Baruch Libr in Mar Sci*, 14:330 p.
- Frey, R. W., and J. D. Howard. 1969. A profile of biogenic sedimentary structures in a Holocene barrier island-salt marsh complex, Georgia. *Trans Gulf Coast Assoc Geol Soc* 19:427-444.
- Gibbes, L. R. 1848. Catalogue of the fauna of South Carolina, pp. i-xxiv, appendix. In M. Tuomey, Report on the geology of South Carolina, vi + 293 p. Charleston.

- . 1849. Crustacea, pp. 21-24. In White, G., Catalogue of the fauna and flora of the State of Georgia. Statistics of the State of Georgia: including an account of its natural, civil, and ecclesiastical history; together with a particular description of each county, notices of the manners and customs of its aboriginal tribes, and a correct map of the state. W. Thorne Williams, Savannah.
- . 1850. On the carcinological collections of the United States, and an enumeration of the species contained in them, with notes on the most remarkable, and descriptions of new species. Proceedings of the American Association for the Advancement of Science, 3rd Meeting: 167-201.
- Gore, R. H., and L. J. Becker. 1975. Rediscovery and extension of range of *Heterosquilla armata* (Smith, 1881). Studies on stomatopod Crustacea of the Indian River region of Florida, I. Proc Biol Soc Wash 88:21-27.
- , and —. 1976. An annotated check list of the mantis shrimps of the central eastern Florida coast. Studies on stomatopod Crustacea from the Indian River region of Florida, II. Proc Biol Soc Wash 89:147-183.
- Hansen, H. J. 1895. Isopoden, Cumaceen und Stomatopoden der Plankton expedition. Ergebnisseder Plankton expedition der Humboldt-Stiftung 2(Gc):1-105, pls. 1-8.
- Hertweck, G. 1972. Distribution and environmental significance of Lebensspuren and in-situ skeletal remains. Georgia coastal region, Sapelo Island, U.S.A. Sedimentology and biology, V. Senckenbergiana maritima 4:125-167.
- Hocse, H. D. 1973. A trawl study of the near-shore fishes and invertebrates of the Georgia coast. Contrib Mar Sci 17:63-98.
- Howard, J. D., and R. W. Frey. 1975a. Introduction. Estuaries of the Georgia coast, U.S.A.: Sedimentology and Biology, I. Senckenbergiana maritima 7:1-31.
- , and —. 1975b. Regional animal-sediment characteristics of Georgia estuaries, II. Estuaries of the Georgia coast, U.S.A.: Sedimentology and biology. Senckenbergiana maritima 7:33-103.
- Howard, L. O. 1883. A list of the invertebrate fauna of South Carolina. Chap. 11, pp. 265-310. In South Carolina. Resources and population, institutions and industries, viii + 726 pp. State Board of Agriculture, South Carolina, Charleston.
- Howells, R. G., C. Karp, and R. W. Langton. 1980. Occurrence of a rare mantis shrimp, *Platysquilla enodis* (Manning, 1962), in the Middle Atlantic Bight region (Stomatopoda). Crustaceana 38(1):101-104.
- Lamarck, J. B. P. A. de. 1818. Histoire naturelle des animaux sans vertèbres, présentant les caractères généraux et particuliers de ces animaux, leur distribution, leur classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent; précédée d'une introduction offrant la détermination des caractères essentiels de l'animal, sa distinction du végétal et des autres corps naturelles, enfin, l'exposition des principes fondamentaux de la zoologie. Déterville, Paris 5:612 p.
- Latreille, P. A. 1828. Squille, *Squilla*. Encyclopédie méthodique. Histoire naturelle, entomologie, ou histoire naturelle de Crustacés, des Arachnides, et des Insectes. Agasse, Paris 10:467-475.
- Lunz, G. R., Jr. 1933. The rediscovery of *Squilla neglecta* Gibbes. The Charleston Museum Leaflet No. 5:1-8, pl. 1.
- . 1935. The stomatopods (mantis shrimps) of the Carolinas. J Elisha Mitch Sci Soc 51(1):151-159.
- . 1937. Stomatopoda of the Bingham Oceanographic Collection. Bull Bing Oceanog Coll 5(5):1-19.
- Manning, R. B. 1962. Seven new species of stomatopod crustaceans from the northwestern Atlantic. Proc Biol Soc of Wash 74:215-222.
- . 1968. Preliminary revision of the genera *Pseudosquilla* and *Lysiosquilla* with descriptions of six new genera (Crustacea: Stomatopoda). Bull Mar Sci Gulf Caribb 13(2):308-328.
- . 1969. Stomatopod Crustacea of the western Atlantic. Studies in Tropical Oceanography, Miami 8:380 pp.
- . 1970. Nine new American stomatopod crustaceans. Proc Biol Soc Wash 83:99-114.
- . 1974a. Crustacea: Stomatopoda. Marine fauna and flora of the northeastern United States. NOAA Tech Rep NMFS CIRC-387:1-6.
- . 1974b. Stomatopods collected by Th. Mortensen in the Eastern Pacific region. Steenstrupia, 3:101-109.
- . 1995. Stomatopod Crustacea of Vietnam: The legacy of Raoul Serène. Crustacean Research, The Carcinological Society of Japan, special number 4:viii + 339 p 38 colored pls. Tokyo.
- , and D. K. Camp. 1981. A review of the *Platysquilla* complex (Crustacea, Stomatopoda, Nannosquillidae), with the designation of two new genera. Proc Biol Soc Wash 94(2):591-597.
- , and —. 1983. *Fennerosquilla*, a new genus of stomatopod crustacean from the north-western Atlantic. Proc Biol Soc Wash 96(2):317-322.
- , and C. W. Hart, Jr. 1981. *Gonodactylus lightbourni*, a new stomatopod crustacean from Bermuda. Proc Biol Soc Wash 94(3):708-712.
- , and M. L. Reaka. 1989. Preliminary observations on the biology of *Coronis scolopendra* at Fort Pierce, Florida. Pp. 213-219 in E. A. Ferrero, ed., Biology of Stomatopods. Mucchi, Modena. Selected Symposia and Monographs U.Z.I. 3.
- Milne Edwards, H. 1837. Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification des animaux. Roret, Paris 2:1-532.
- Morgan, S. G., and J. W. Goy. 1987. Reproduction and larval development of the mantis shrimp *Gonodactylus bredini* (Crustacea: Stomatopoda) maintained in the laboratory. J Crustacean Biol 7(4):595-618.
- Pearse, A. S., H. J. Humm, and G. W. Wharton. 1942. Ecology of sand beaches at Beaufort, North Carolina. Ecol Monog 12(2):135-190.
- , and L. J. Williams. 1951. The biota of the reefs off the Carolinas. J Elisha Mitch Sci Soc 67(1):133-161.
- Porcher, W. P. 1920. Gibbes, Lewis Reeve (1810-1894). p. 434 in H. A. Kelly and W. A. Burrage, American Medical Biographies. The Norman, Remington Company, Baltimore.
- Rathbun, R. 1883. Collection of economic crustaceans, worms, echinoderms, and sponges, B. Great International Fisheries Exhibition, London, 1883. U S Nat Mus Bull 27:109-137 (p. 3-31 on separate).
- . 1893. Natural history of economic crustaceans, p. 763-830, pls. 260-275, cxxi. Washington. (extracted from Bulletin of the United States Fish Commission for 1889).
- Rodrigues, S. A., and R. B. Manning. 1992. First stage larva of *Coronis scolopendra* Latreille (Stomatopoda: Nannosquillidae). J Crustacean Biol 12(1):79-82.
- Say, T. 1817-1818. An account of the Crustacea of the United States. J Academy Natural Sci Philadelphia 1(1)[1817]:57-63, 65-80, 97-101, 155-169; 1(2)[1818]:235-253, 313-319, 374-401, 423-444, 445-458, pl. 4.

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- Schotte, M., and R. B. Manning. 1993. Stomatopod Crustacea from Tobago, West Indies. *Proc Biol Soc Wash* 106(3):566-581.
- Sharp, B. 1893. Catalogue of the crustaceans in the museum of the Academy of Natural Sciences of Philadelphia. *Proc Academy Natural Sci Philadelphia* 1893:104-127.
- Smith, S. I. 1881. Preliminary notice of the Crustacea dredged, in 64 to 325 fathoms, off the south coast of New England, by the U.S. Fish Comm in 1880. *Proc US Nat Mus* 3:413-452.
- Wenner, E. L., D. M. Knott, R. F. Van Dolah, and V. G. Burrell, Jr. 1983. Invertebrate communities associated with hard bottom habitats in the South Atlantic Bight. *Estuarine Coastal and Shelf Sci* 17:143-158.
- , and C. A. Wenner. 1989. Seasonal composition and abundance of decapod and stomatopod crustaceans from coastal habitats, southeastern Fish Bull U.S. 87:155-176.