

STOMATOPOD CRUSTACEA FROM TOBAGO, WEST INDIES

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Abstract.—Eleven shore species of stomatopods are reported from localities around Tobago; only two species, *Gonodactylus oerstedii* Hansen and *G. bredini* Manning, had been recorded previously from the island. *Gonodactylus caribbaeus* and *Nannosquilla tobagoensis* are described as new. *Lysiosquilla biminiensis* Bigelow is referred to the new genus *Bigelowina*, and *Lysiosquilla floridensis* Manning is removed from the synonymy of *L. digueti* Coutière and is transferred to the new genus *Alachosquilla*; both of these species had been referred to *Acanthosquilla*.

Until now, only two stomatopods, *Gonodactylus bredini* Manning and *G. oerstedii* Hansen had been reported from Tobago (Manning 1969). A search of records in the stomatopod collection of the National Museum of Natural History yielded no new or unpublished records from Tobago other than those mentioned by Manning (1969). These species, along with *Pseudosquilla ciliata*, reported below, are the most common and widespread shore stomatopods in the north-western Atlantic.

During a survey in 1990 of invertebrates and fish in shore habitats off Tobago in the southeastern Caribbean Sea, nine species of stomatopod crustaceans were collected by one of us (MS) and other survey participants; two of the species proved to be new. Nearly all were collected at rotenone poison stations in coral habitats in depths between 11 and 13–28 meters. Subsequently, Richard Heard, Gulf Coast Research Laboratory, provided us with material of four species that he collected on Tobago in 1992. Two species that he collected were not represented in our collections from 1990. Thus the collections reported here provide a five-fold increase in the number of species of stomatopods known from Tobago. The collection also supplied valuable information on habitat and color in life of the species.

Since Manning's (1969) monograph on stomatopod crustaceans from the western Atlantic, a number of papers have cited range extensions for some members of the group into the Gulf of Mexico and southern Florida, e.g., Camp (1973) and Gore & Becker (1975, 1976). Studies by Adkison et al. (1983), Adkison & Hopkins (1984), Camp (1971), Camp & Manning (1982, 1986), Fausto-Filho & Lemos de Castro (1973), Hernández Aguilera & Hermoso Salazar (1988), Manning (1970, 1979), and Manning & Hart (1981), added 20 new species of stomatopods to the East American fauna. Only six of the 20 were discovered in the Caribbean Sea. Gómez & Ortiz (1985) reported that 18 species occurred in Cuban waters; five of these, e.g., *Acanthosquilla biminiensis* (Bigelow), *Gonodactylus bredini*, *G. oerstedii*, *Lysiosquilla glabriuscula* (Lamarck), and *Pseudosquilla ciliata* (Fabricius), are reported here from Tobago. A total of 22 stomatopod species were reported from the Caribbean coast of Colombia by Werding & Müller (1990), nine of which were new records for that area. Markham & Donath-Hernández (1990) and Markham et al. (1990) recently recorded five species from Quintana Roo, Mexico; four of these five also occur at Tobago.

The 20 East American species described since 1969 are:

Gonodactyloidea

Gonodactylidae:

Gonodactylus lightbourni Manning & Hart, 1981, Bermuda.

Gonodactylus moraisi Fausto-Filho & Lemos de Castro, 1973, Brazil.

Gonodactylus petilus Manning, 1970, southwestern Caribbean Sea.

Pseudosquillidae:

Parsquilla boschii Manning, 1970, Argentina.

Lysiosquilloidea

Coronididae:

Acoridon manningi Adkison, Heard, & Hopkins, 1983, Gulf of Mexico.

Nannosquillidae:

Mexisquilla horologii (Camp, 1971), Gulf of Mexico.

Nannosquilla adkisoni Camp & Manning, 1982, Gulf of Mexico.

Nannosquilla baliops Camp & Manning, 1982, Florida.

Nannosquilla candidensis Hernández Aguilera & Hermoso Salazar, 1988, Mexico.

Nannosquilla carolinensis Manning, 1970, North Carolina.

Nannosquilla dacostai Manning, 1970, Brazil.

Nannosquilla disca Camp & Manning, 1986, Gulf of Mexico.

Nannosquilla heardi Camp & Manning, 1982, Gulf of Mexico.

Nannosquilla taguensis Camp & Manning, 1982, U.S. Virgin Islands.

Nannosquilla vasquezi Manning, 1979, Panama.

Nannosquilla virginalis Camp & Manning, 1986, U.S. Virgin Islands.

Nannosquilla whitingi Camp & Manning, 1982, Florida.

Nannosquilla yucatanica Camp & Manning, 1986, Mexico.

Tetrasquillidae:

Tectasquilla lutzae Adkison & Hopkins, 1984, Gulf of Mexico.

Squilloidea

Squillidae:

Squilla decimdentata Manning, 1970, southwestern Caribbean Sea.

Abbreviations used below include: ft, feet; JTW, acronym for J. T. Williams' field stations; leg., collector; m, meters; mm, millimeters; sta, station; TL, total length, measured on the midline; TOB, acronym for Schotte's field stations. All measurements are in millimeters.

In the species accounts below, "Habitat" refers to habitat on Tobago. In the sections on "Material," the number in parentheses after the number of specimens is total length.

All of the material reported here is deposited in the collections of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM).

Systematic Account

Order Stomatopoda

Superfamily Gonodactyloidea

Family Gonodactylidae

Genus *Gonodactylus* Berthold, 1827

Gonodactylus bredini Manning, 1969

Gonodactylus bredini Dingle, 1969:108 [January].

Gonodactylus bredini Manning, 1969:315, figs. 87, 88 [April].

Material.—Sta TOB-16, east of North Point, 21 m: 1 ♂ (25).

Color in life.—Body color yellow-pink; posterior margins of carapace and all somites with small light brown patches dotting entire margin; carinae on telson with similar patches; medial brown patch of pigment at articulation of rostral plate and carapace; meral spot white, flanked by two small patches of dark brown; base of dactyl bright purple-pink; proximal end of prop-

odus with faint patches of brown; posterior margin of carpus olive-green.

Size.—Male (1), TL 25 mm. Manning (1969) studied specimens as large as 75 mm.

Habitat.—Rock wall to rubble flat at 21 m.

Remarks.—The specific name *bredini* was published twice in 1969. Under the present (third) edition of the International Code of Zoological Nomenclature, the specific name *bredini* Dingle, published three months before *bredini* Manning, has to be considered a nomen nudum. Dingle's use of the name, in an account of the behavior of larvae, is not accompanied by a description or words that distinguish his taxon from others and lacks a bibliographic reference to such a statement.

Gonodactylus bredini is one of the two most common shore species of *Gonodactylus* in the Caribbean, the other being *G. oerstedii*. In the field the two may be distinguished at once by the color of the meral spot in live specimens, white in *G. bredini*, reddish to purple in *G. oerstedii*.

One male was recorded from Tobago by Manning (1969); it lacked data on habitat and locality.

Distribution.—Bermuda, North Carolina, and Florida to Curaçao; shore to 55 m. Camp (1973) reported specimens from the Gulf of Mexico in depths to 73 m.

Gonodactylus caribbaeus, new species

Fig. 1

Material.—Sta TOB-12, off Little Tobago Island, 18 m: 1 ♂ (30.5), 1 ♀ (31.5), paratypes USNM 252678.—Sta TOB-13, cove near Speyside, 11 m: 2 ♂♂ (27.5–33), paratypes, USNM 252679.—Sta TOB-21, Buccoo Reef, 14 m: 1 ♂ (31), holotype, USNM 252677.—Sta TOB-40, St. Giles Island, 6–11 m: 1 ♂ (33), paratype, USNM 252680.

Diagnosis.—Rostral plate as long as broad, obtusely rounded laterally, anterior margins sloping to slender median spine. Ocular scales small, separate, erect. Anterior four abdominal somites unarmed posterolaterally, fifth with sharp posterolateral spines;

abdomen lacking distinct black chromatophores. Sixth abdominal somite with 6 carinae, each armed posteriorly, submedians and intermediates inflated. Abdominal width-carapace length indices 790–880 (mean 830). Telson slightly longer than broad, of oerstedii-type, with dorsal tubercles on carinae. Carinae of telson well-defined except for low accessory intermediates, not strongly inflated in males. Median carina broad, terminating in single tubercle. Accessory median carinae broad, with 1–3 tubercles dorsally. Knob rounded, with 2–4 tubercles. Anterior submedian carinae with 2 dorsal tubercles. Submedian marginal teeth slender, with 3–6 dorsal tubercles, inner margins lined with denticles, movable apices present. Intermediate marginal teeth sharp, with 0–1 dorsal tubercles. Intermediate denticles sharp, inner with 1–2 dorsal tubercles. Lateral carinae ending in blunt tooth. Uropodal exopod with 11–12 movable spines, distalmost largest.

Color in life.—Body pale yellow with thin blue bands at posterior margin of carapace and all somites; carinae on sixth abdominal somite and telson tinged with blue, green on median and submedian carinae; dactyl lavender-pink, propodus blue with olive-green and orange distally; carpus blue, olive-green distally; merus pale yellow, olive with dark blue tinges distally; meral spot white, flanked by two dark brown spots.

Size.—Males (5), TL 27.5–33 mm; female (1), TL 31.5 mm. Other measurements of male holotype, TL 31 mm: rostral plate length 2.3, width 2.1; carapace length 7.3; fifth abdominal somite width 6.2; telson length 5.3, width 4.9.

Habitat.—On Tobago, sublittoral on rough substrates, in depths between 6–11 m and 35 m, including at 14, 18, and 21 m, on bottoms with coral heads; covered with coral and sea whips; rock wall to rubble flat; sloping fore reef; and rock, rubble, and live and dead coral.

Remarks.—*Gonodactylus caribbaeus* resembles *G. curacaoensis* and differs from all other American species in having the fifth

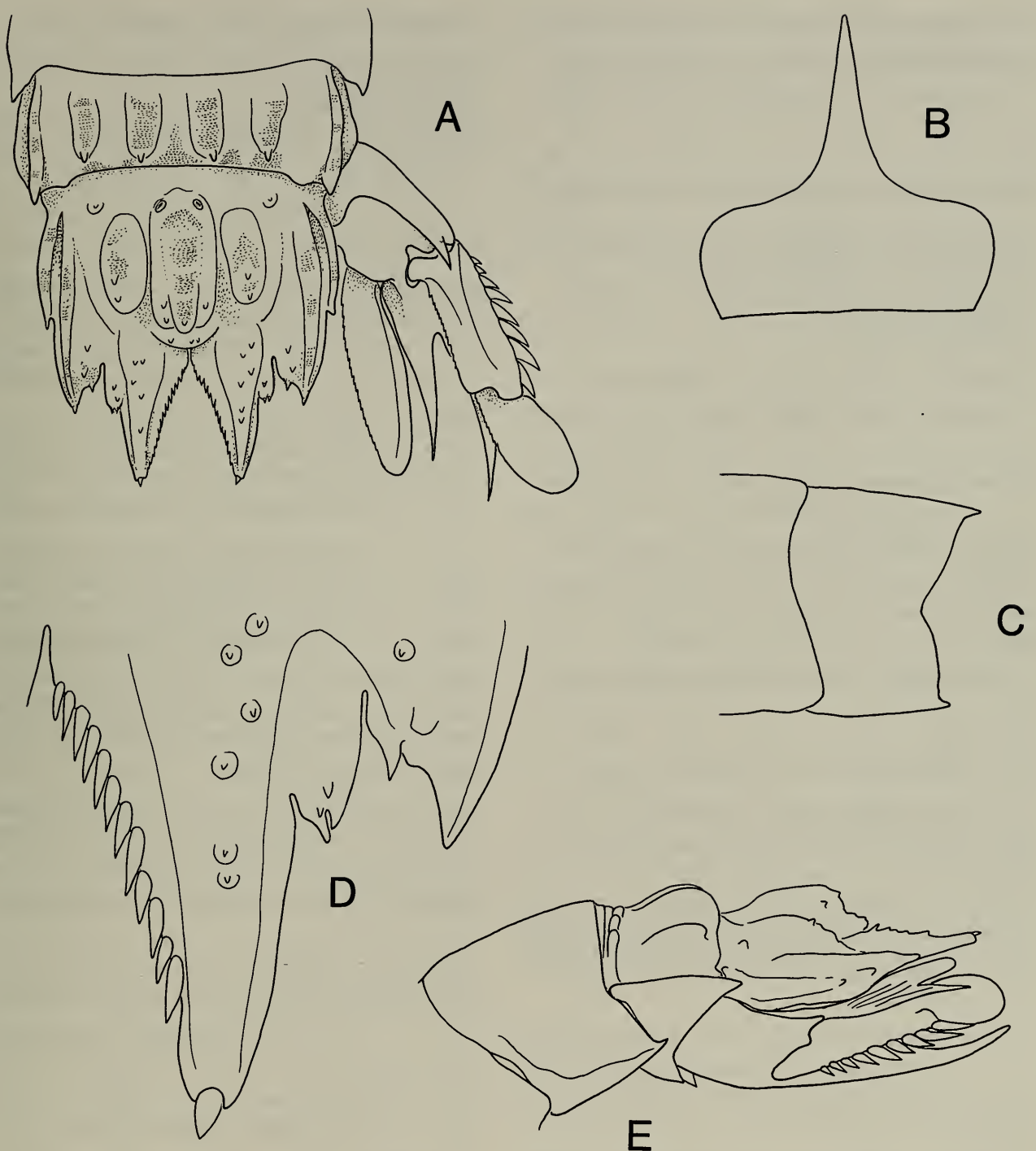


Fig. 1. *Gonodactylus caribbaeus*, new species, male holotype, TL 31 mm. A, Sixth abdominal somite, telson, and right uropod; B, Rostral plate; C, Fourth and fifth abdominal somites, lateral view of left side; D, Submedian and intermediate teeth of telson, right side; E, Posterior two abdominal somites, telson, and left uropod, lateral view.

abdominal somite armed with a spine at its posterolateral angle. It resembles both *G. spinulosus* Schmitt, 1924 and *G. minutus* Manning, 1969 in having the dorsal carinae of the telson ornamented with tubercles, but both of these species have rounded, unarmed posterolateral angles on the fifth abdominal somite. This new species can be

distinguished from *G. spinulosus* in the field by its lack of the dark patches of pigment on the sixth thoracic and first abdominal somites that are characteristic of the latter species.

The telson of the specimen from sta TOB-40 is damaged; it lacks the left marginal tooth.

Etymology.—Named for the general area in which it was found, the Caribbean Sea.

Distribution.—Known only from Tobago.

Gonodactylus curacaoensis Schmitt, 1924

Gonodactylus oerstedii var. *curacaoensis* Schmitt, 1924a:80, pl. 8, fig. 6.

Gonodactylus curacaoensis.—Manning, 1969:307, fig. 85.

Material.—Sta TOB-6, off Speyside, 11 m: 1 ♀ (62).—Sta TOB-12, off Little Tobago Island, 18 m: 1 ♂ (27).—Sta TOB-16, east of North Point, 21 m: 1 ♂ (42).—Sta TOB-17, northeast of Charlotteville, 12 m: 2 ♂♂ (35, 57).—Sta TOB-21, Buccoo Reef, 14 m: 1 ♂ (21), 2 ♀♀ (24, 29).—Sta TOB-38, Buccoo Reef, 14 m: 1 ♂ (39).—Sta TOB-44, The Sisters, 18–26 m: 3 ♀♀ (21, 28, 50).

Color in life.—Body color variable: pale yellow, pinkish or pale to dark blue-green, especially in larger males; often with thin band of blue-green at posterior margin of all somites. Dactyl and distal part of propodus pale to bright purple-pink; rest of propodus, carpus, and articulation of merus variously outlined in blue; meral spot pale or white (sometimes with faint orange blush in large males) and flanked by two dark purple-brown spots.

Size.—Males (6), TL 21–57 mm; females (6), TL 21–62 mm. Manning (1969) reported males as large as 59 mm and females as large as 72 mm.

Habitat.—Taken in a variety of sublittoral coralline habitats in depths between 11 and 18–26 m: in coral heads, 18 m; from rock wall to rubble flat, crevices in 21 m; coral-encrusted rocks and ledges, 12 m; sloping fore reef in 14 m, and outer reef slope, coral with sand pockets in 14 m; vertical rock wall and slope, dead coral and rocks, 18–26 m.

Remarks.—This is the first record of this species from Tobago.

Distribution.—Bahamas and southern Florida to Colombia; shore and shallow sublittoral to 38 m, usually on coral reefs.

Gonodactylus oerstedii Hansen, 1895

Gonodactylus Oerstedii Hansen, 1895:65, footnote [part].

Gonodactylus oerstedii.—Manning, 1969:325, fig. 89.

Material.—Sta TOB-21, Buccoo Reef, 14 m: 2 ♀♀ (38, 58).—Heard sta 3, Lover's Beach, shore to about 2 m: 3 juvenile ♂ (9–16).—Heard sta 5, Sandy Bay, shore to 1.5 m: 15 ♂♂ (9.5–52), 19 ♀♀ (11–43), 3 juveniles (9), some early larvae.—Heard sta. 9, Petit Trou, 1–1.5 m: 1 ♀ (50).

Color in life.—Female: body color yellow or pale blue-green with overall speckling of dark chromatophores including merus; multiple blue and green bands on sixth abdominal somite and telson; dactyl bright pink at base, light blue distally; meral spot bright pink or pale purple-blue persisting in preservation, flanked by two dark blue or blue-brown spots. In preservative, female with numerous persistent black spots on body, in bands on claw.

Size.—Males (17), TL 9–52 mm; females (21), TL 11–58 mm; juveniles (3), TL 9 mm. Manning (1969) studied males with total lengths of up to 76 mm and females as large as 68 mm.

Habitat.—Shallow lagoon with turtle grass, bottom coarse sand to fine coralline silt, 1–1.5 m; shore to about 2 m on protected beach area; from washing of live rock taken between shore and 1.5 m; and from sloping fore reef at a depth of 14 m.

Remarks.—This species was recorded from Pigeon Point and Buccoo Reef, Tobago by Manning (1969).

Distribution.—Bermuda, Bahamas, southern Florida and throughout the Caribbean; shore and shallow sublittoral.

Gonodactylus spinulosus Schmitt, 1924

Gonodactylus oerstedii var. *spinulosus* Schmitt, 1924b:96, pl. 5, fig. 5.

Gonodactylus spinulosus.—Manning, 1969:299, fig. 83.

Material.—Sta TOB-6, off Speyside, 11

m: 1 ♀ (21).—Sta TOB-21, Buccoo Reef, 14 m: 1 ♀ (36).—Sta TOB-36, east side of North Point, 5–12 m: 1 ♀ (20).—Sta TOB-39, London Bridge Rock, 13–28 m: 1 ♂ (22).—Sta TOB-40, Saint Giles Island, 6–11 m: 1 ♂ (24).—Sta TOB-42, Bloody Bay, 0–3 m: 1 ♂ (18), 2 juveniles (7, 10.5).

Color in life.—Body color and chromatophore pattern as described in Manning (1969:303); meral spot without distinctive pigment, sometimes flanked by one or two blue spots.

Size.—Males (3), TL 18–24 mm; females (3), TL 20–36 mm; juveniles (2), TL 7 and 10.5 mm. Manning's (1969) material included males to TL 48 mm, females to TL 54 mm.

Habitat.—On Tobago, adults were taken in sublittoral habitats on rough bottoms in depths between 5–12 and 13–28 m on sloping fore reef; vertical wall with rock, coral, and rubble, 5–12 m; vertical rock wall to ledge, 13–28 m; in rock and rubble with live and dead coral, 6–11 m; and on vertical rock wall and slope with dead coral and rocks, 18–26 m. Juveniles were taken in shallower habitats, in 0–3 m on sand, algae and rocks.

Remarks.—This species has not been recorded previously from Tobago.

Distribution.—Bermuda and southern Florida to Tobago; shore and shallow sublittoral, on coral reefs.

Family Pseudosquillidae

Pseudosquilla ciliata (Fabricius, 1787)

Squilla ciliata Fabricius, 1787:333.

Pseudosquilla ciliata.—Manning, 1969:264, fig. 74.

Material.—Sta TOB-21, Buccoo Reef, 14 m: 1 ♂ (43).—Heard sta 3, Lover's Beach, shore to about 2 m: 1 postlarva (19).—Heard sta 9, Petit Trou, 1–1.5 m: 1 ♀ (43).

Color in life.—Body pale pink-white with diffuse pink mottling overall including dactyl, propodus, and merus; dark lateral spots on first thoracic and first abdominal somites; two dark spots at base of telson; spines and carinae of sixth abdominal segment and

telson banded with bright pink; meral spot without distinctive pigment, flanked by two pink-purple patches.

Size.—Male (1), TL 43 mm; female (1), TL 43 mm; postlarva (1), TL 19 mm. Specimens reported by Manning (1969) included males to 80 mm long, females to 89 mm, and postlarvae ranging from 18 to 24 mm.

Habitat.—Shore to about 2 m on a beach and shallow reef area; in a shallow lagoon with turtle grass, bottom from coarse sand to fine coralline silt, in 1–1.5 m; and sublittoral, on sloping fore reef at a depth of 14 m.

Remarks.—This species has not been reported previously from Tobago.

Distribution.—Widely distributed in all tropical oceans except the eastern Pacific. In the western Atlantic it occurs from Bermuda, the Bahamas, and Florida, southward to Brazil; shore and shallow sublittoral.

Superfamily Lysiosquilloidea

Family Lysiosquillidae

Lysiosquilla glabriuscula (Lamarck, 1818)

Fig. 2

Squilla glabriuscula Lamarck, 1818:188.

Lysiosquilla glabriuscula.—Manning, 1969: 34, figs. 5c–d, 6.

Material.—Sta TOB-16: Tobago, east of North Point, 21 m: 1 ♀ postlarva (29).

Color in life.—Body yellow-white; antennal scale, propodus and merus of claw with median spotted areas; carapace with three bands of brown pigment, posteriormost diffuse; thoracic somites with diffuse brown band at posterior margin; abdominal somites with diffuse, broken bands anteriorly and dark, thinner bands at posterior margin, usually interrupted at midline; telson with three large dark spots; endopod and exopod dark, without pigment near margins.

Size.—Postlarval female (1), TL 29 mm. Adults of this species exceed 200 mm in total length (Manning 1969).

Habitat.—Sublittoral, rock wall to rubble flat, crevices, at a depth of 21 m.

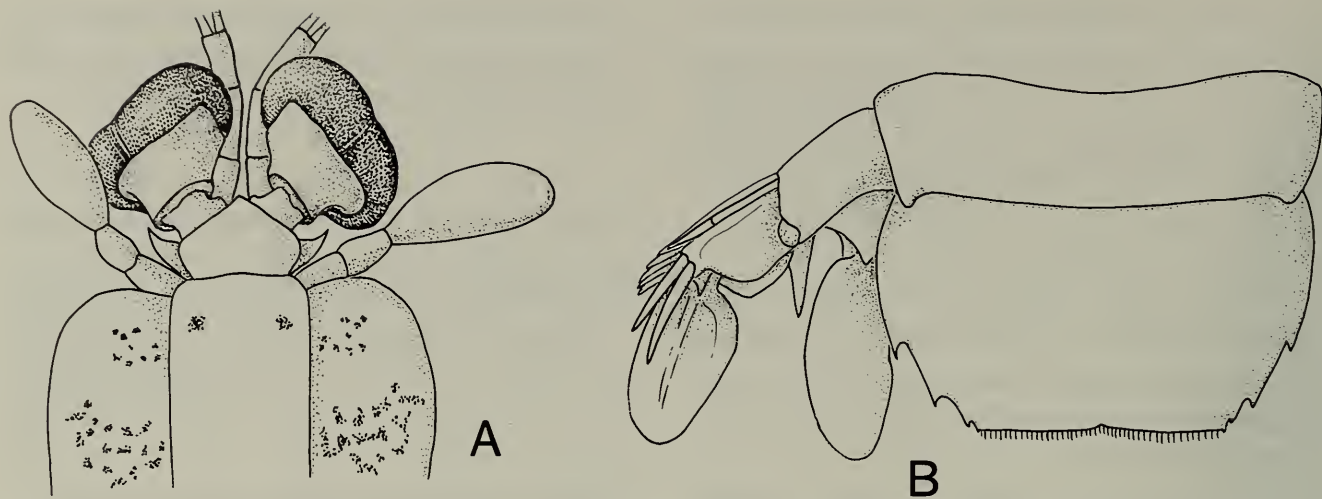


Fig. 2. *Lysiosquilla glabriuscula* (Lamarck), female postlarva, TL 29 mm. A, Anterior part of carapace and frontal appendages; B, Sixth abdominal somite, telson and left uropod.

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

We take this opportunity to provide a figure of the postlarva, which differs from the adult in having distinct submedian denticles.

This species apparently replaces *L. scabricauda* (Lamarck, 1818) in reef habitats; *L. scabricauda* is the common species of the genus in other shore habitats in the western Atlantic.

Distribution.—South Carolina and Florida to Brazil; shore and shallow sublittoral, near coral reefs.

Family Nannosquillidae
Alachosquilla, new genus

Diagnosis.—Size small, TL less than 50 mm. Cornea subglobular. Antennal peduncle with 2 papillae, 1 mesial, 1 ventral. Rostral plate rectangular, with 3 apical projections. Mandibular palp present or absent. Five epipods present. Claw lacking distal ventral spine on ischium. Sixth abdominal somite with posterolateral spines; posterior margin unarmed ventrally. Telson with 5 spines dorsally, 4 pairs of fixed primary marginal teeth, submedians, intermediates, laterals, and marginals, and 1 pair of movable submedian teeth; ventral surface with-

out spinules. Spines of uropodal exopod sharp.

Type species.—*Lysiosquilla floridensis* Manning, 1962, by present designation.

Derivation of name.—From the Greek, *alachos*, bedfellow, in combination with the generic name *Squilla*, alluding to the association of members of this genus with balanoglossid worms. Coutière (1905) recorded the association of *A. digueti* with a polychaete and a balanoglossid. Holthuis (1967:25) noted that all specimens of *A. vicina* then known were taken with balanoglossids, and Rodrigues (1971:209), in the original account of *Callianassa guassutunga*, recorded the occurrence of *A. floridensis* with balanoglossids in Brazil.

Included species.—Two from the Americas, *Alachosquilla digueti* (Coutière, 1905:174), new combination, from the eastern Pacific and *Alachosquilla floridensis* (Manning, 1962), new combination, from the western Atlantic. It also includes *Alachosquilla vicina* (Nobili, 1904:229), new combination, from the Red Sea, the Gulf of Aden, and the Philippines in the Indo-West Pacific (Nobili 1904, Kemp 1915, Holthuis 1967).

Remarks.—The rectangular rostral plate with three anterior projections and the subglobular cornea will distinguish members of this genus from members of *Acan-*

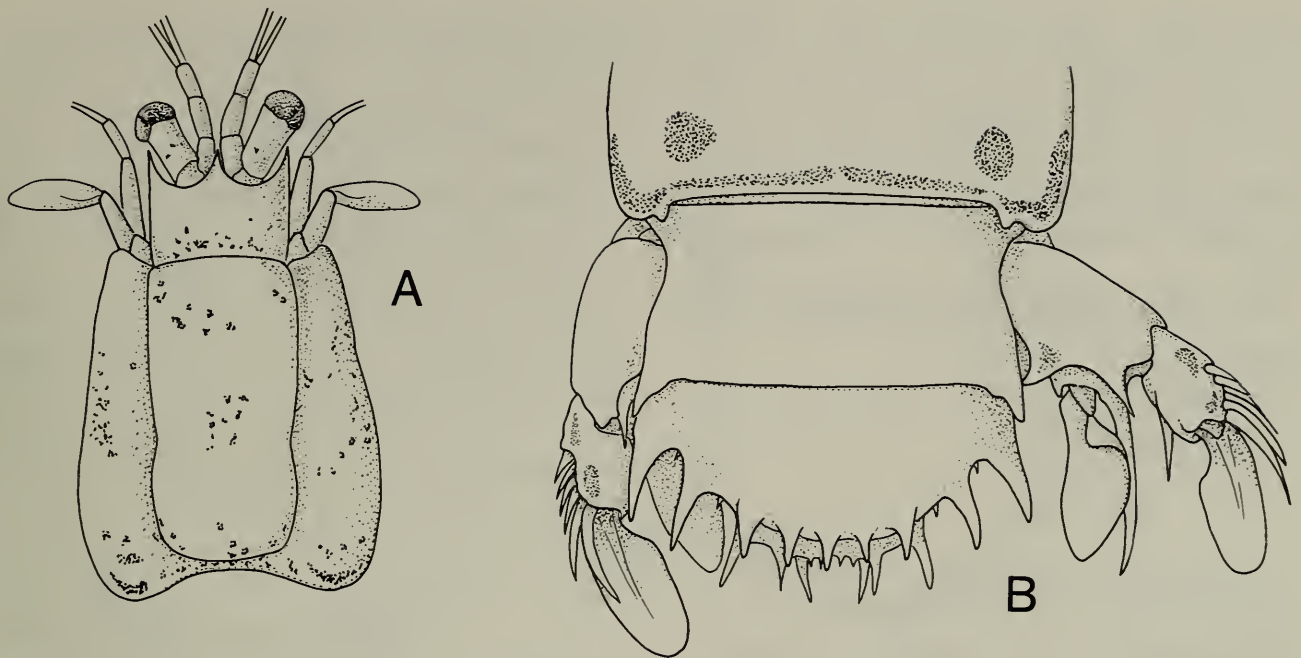


Fig. 3. *Alachosquilla floridensis* (Manning), male, TL 33 mm. A, Carapace and frontal appendages; B, Sixth abdominal somite, telson and uropods.

thosquilla sensu stricto in which the rostral plate is triangular, with a single apical spine, and the cornea is bilobed (see Chopra 1939: fig. 8).

Members of this genus are unique in the Nannosquillidae in having the presence of the mandibular palp variable. In some specimens it is present on one side, absent on the other.

Alachosquilla floridensis (Manning, 1962),
new combination

Fig. 3

Lysiosquilla floridensis Manning, 1962a:
221; 1969:67, fig. 16.

Material.—Sta TOB-39, Saint Giles Island, 13–28 m: 1 ♂ (30).—Sta TOB-40, London Bridge Rock, 6–11 m: 1 ♂ (33).

Color in life.—Body cream-colored; carapace speckled with brown chromatophores, posterolateral angles outlined with dark semi-circles; diffuse speckled bands plus dark brown bands on posterior margins on all body segments; sixth abdominal somite with dark posterolateral spots and color bands on lateral margins; submedian dorsal spines with two dark basal spots; en-

dopod dark, diffuse brown pigment on basal segment of exopod.

Size.—Males (2), TL 30 and 33 mm. Manning (1969) studied males 45–48 mm long.

Habitat.—Sublittoral, in 6–11 and 13–28 m; from rock, rubble, with live and dead coral, 6–11 m; and vertical rock wall to ledge, 13–28 m. This species, which burrows in level bottom substrates, certainly was taken from sand on the ledge rather than on the wall itself.

Remarks.—Manning (1974:105) synonymized the western Atlantic *Lysiosquilla floridensis* Manning, 1962 with *L. digueti* (Coutière, 1905) from the eastern Pacific; both were then in *Acanthosquilla*, where they were placed by Manning (1963). We now believe that they should be recognized as distinct species. In all specimens of *A. floridensis* available for study, the median black spot on the telson is distinctly divided into two spots, whereas all specimens of *A. digueti* that we have examined have a single black spot on the telson.

In addition to the material from Florida and Brazil recorded by Manning (1969), there are specimens in the national collec-

tions from Lake Worth Inlet, Florida (USNM 256863, ♀ TL 49 mm), from Virgin Gorda, U.S. Virgin Islands (USNM 170214, 3 ♂, TL 36, 38, and 44 mm), Isla Margarita, Venezuela (USNM 170214, ♀, TL 14 mm), and Bahia, Brazil (USNM 150780, ♂, TL 33 mm).

The mandibular palp is absent in both specimens from Tobago.

Distribution.—Southern Florida to Brazil; shore.

Bigelowina, new genus

Diagnosis.—Size small, TL less than 50 mm in adults. Cornea subglobular. Antennal peduncle with 2 papillae, 1 mesial, 1 ventral. Rostral plate quadrangular, with apical spine. Mandibular palp present. Five epipods present. Claw lacking distal ventral spine on ischium. Sixth abdominal somite with posterolateral spines, posterior margin unarmed ventrally. Telson with 5 submarginal spines dorsally, marginal armature comprising 2 pairs of primary marginal teeth, laterals and marginals; ventral surface unarmed. Spines of uropodal exopod sharp.

Type species.—*Lysiosquilla biminiensis* Bigelow, 1893.

Included species.—Two, the amphio-American *Bigelowina biminiensis* (Bigelow, 1893), new combination, and the eastern Atlantic *Bigelowina septemspinosa* (Miers, 1881:368), new combination (see Manning 1977 for an account of this species).

Etymology.—Named for Robert Payne Bigelow (10 July 1863–6 September 1955), zoologist and educator, who was the American pioneer in studies on the systematics of stomatopods. The gender is feminine.

According to his biography on p. 396 of *The National Cyclopaedia of American Biography*, vol. 46, R. P. Bigelow was educated at Harvard and Johns Hopkins University. He joined the Massachusetts Institute of Technology in 1893 as an instructor in biology and retired as professor of zoology in 1933. He led the Johns Hop-

kins zoological expeditions to Jamaica in 1891 and 1893. In 1892 he was joined by E. A. Andrews and T. H. Morgan on an expedition to Bimini, a trip chronicled in Andrews, Bigelow & Morgan (1945), during which they drank from the "Fountain of Youth" (p. 339). They may well have sampled waters from the fountain of youth, for as they noted in 1945, their combined ages then totalled nearly 250 years. L. B. Holthuis (in litt., 9 Aug 1992) remarked that he purchased Bigelow's stomatopod library for \$35 in 1952 and met Bigelow in 1953.

Bigelow's published work on stomatopods (1891, 1893a, 1893b, 1894, 1901, 1926, 1931, 1941), though not voluminous, established a firm foundation for subsequent work on the systematics of American members of the group.

Remarks.—Members of *Bigelowina*, which until now have been placed in *Acanthosquilla* Manning, 1963, resemble species of *Acanthosquilla* in having a submarginal, fan-shaped row of five dorsal spines on the telson. Species of *Bigelowina* can be distinguished from those of *Acanthosquilla* by their rectangular rather than triangular rostral plate and by their subglobular cornea; the cornea is bilobed in species of *Acanthosquilla* sensu stricto. The characteristic rostral plate and cornea of *Acanthosquilla* are well-illustrated in Chopra (1939:fig. 8).

Members of *Bigelowina* differ from species of *Alachosquilla* in having a single rostral spine and in having four rather than two pairs of primary marginal spines on the telson.

Many of the species now placed in *Acanthosquilla* will be assigned to other genera in a revision of the stomatopod genera now in preparation.

Bigelowina biminiensis (Bigelow, 1893),
new combination

Fig. 4

Lysiosquilla biminiensis Bigelow, 1893b:
102.

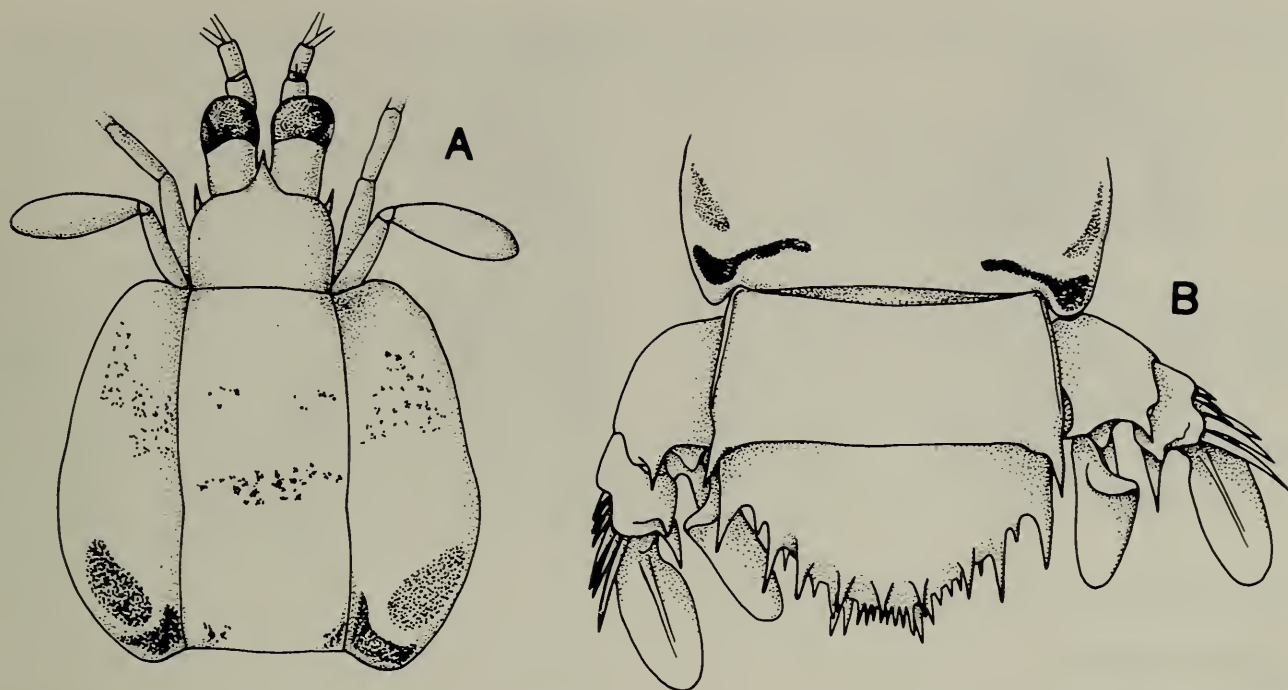


Fig. 4. *Bigelowina biminiensis* (Bigelow), female, TL 45 mm. A, Carapace and frontal appendages; B, Sixth abdominal somite, telson and uropods.

Acanthosquilla biminiensis. —Manning, 1969:63, figs. 14, 15.

Material. —Heard sta 4, Bloody Bay, shore to about 2 m: 1 ♀ (45).

Color. —Color in life not recorded. In preservative, posterolateral angle of carapace ringed with black semicircle containing dusky circle in center; thoracic somite 8 with short black line on each side of posterior margin; sixth abdominal somite with short, dark line posterolaterally, flanked anteriorly by dusky circle.

Size. —Female (1), TL 45 mm. Males measuring 16–62 mm and females 21–50 mm long have been recorded in the literature (Manning 1969, 1974).

Habitat. —On sand bottom with some rocks between beach and 2 m depth.

Remarks. —Additional material of this species added to the national collections since Manning's (1969) monograph has provided a much clearer picture of the distribution of this species. There is material from off South Carolina in 37 m (USNM 174488), off Georgia in 14, 34 and 46 m (USNM 128350, 174484, 174486, and 174487), and

off northeastern Florida in 15 m (USNM 174485).

Distribution. —Bahamas and South Carolina to Brazil in the western Atlantic and from Panama in the eastern Pacific (Manning 1974); shore and shallow sublittoral to a depth of 46 meters.

Genus *Nannosquilla* Manning, 1963
Nannosquilla tobagoensis, new species
Fig. 5

Material. —Sta TOB-21, Buccoo Reef, 14 m: 1 ♂ (20), holotype, USNM 252681.

Diagnosis. —Eye small, extending to end of second segment of antennular peduncle. Cornea subglobular, width 0.8 times rostral plate length. Ocular scales with bases fused medially, apices distinct, rounded. Anterior margin of ophthalmic somite produced into blunt median projection, ventral spine also present.

Antennular peduncle short, less than half as long as carapace. Upper flagellum with 15–16 articles, longer lower flagellum as long as upper, with 16–17 articles, shorter lower flagellum with 8 articles. Antennular pro-

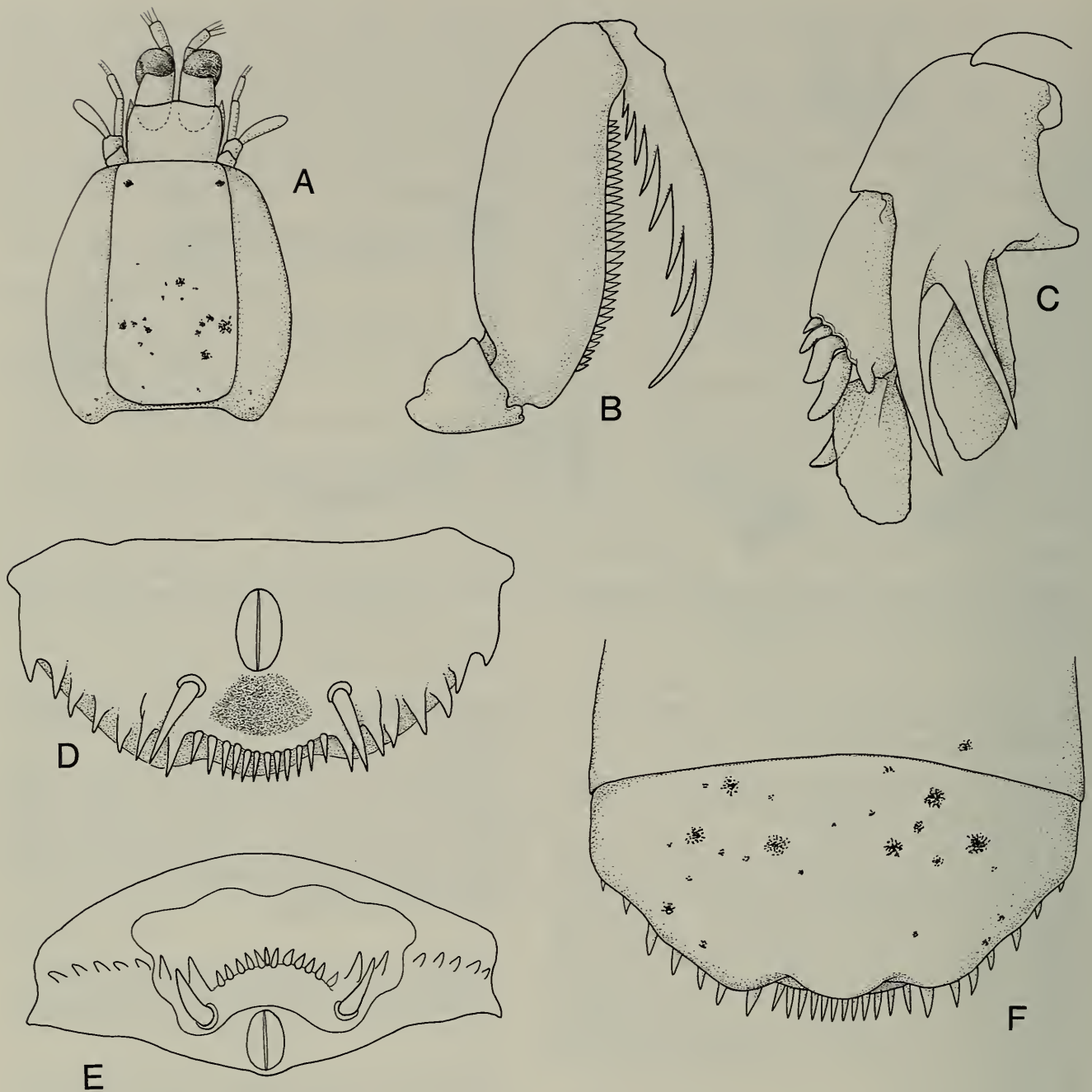


Fig. 5. *Nannosquilla tobagoensis*, new species, male holotype, TL 20 mm. A, Carapace and frontal appendages; B, Claw; C, Right uropod, ventral view; D, Telson, ventral view; E, Telson, posterior view; F, Posterior part of sixth abdominal somite and telson.

cesses visible as anteriorly-directed spines projecting beyond sides of rostral plate, barely overreaching anterolateral corners of plate.

Antennal peduncle falling short of anterior margin of eye. Flagellum with 11–12 articles. Antennal scale short, extending about to middle of distal segment of antennal peduncle.

Rostral plate subquadrangular, length 0.8

times width, apex falling short of midlength of eyestalks. Lateral margins of plate parallel, convex. Anterolateral corners forming rounded right angles. Anterior margin shallowly biconcave, low, obtuse median projection not extending beyond anterolateral corners of plate.

Mandibular palp absent. Four epipods present.

Dactylus of claw with 8 teeth. Proximal

notch on outer margin of dactylus flanked by subacute proximal lobe and more rounded, larger distal lobe. Carpus with angled projection distally on upper margin.

Basal segments of walking legs unarmed.

Sixth abdominal somite with acute posterolateral angles.

Telson width about twice median length, with broad, obtuse median projection, separated from lateral projections by shallow submedian concavities. Marginal armature consisting of, on each side of midline, 6 submedian denticles, a movable submedian tooth near the posterior margin, and 7 lateral teeth.

Uropodal exopod with 5 movable spines on outer margin of proximal segment, distal 2 spatulate; inner margin of proximal segment with 2 stiff setae. Outer spine of basal prolongation of uropod the longer.

Color in life. — Body color off-white with sparse, scattered brown chromatophores on all somites except sixth abdominal somite, densest pigment on fifth abdominal somite.

Size. — Male (1), TL 20 mm. Other measurements of unique male holotype: carapace length 3.5; rostral plate length 1.0, width 1.4; telson length 1.4, width 2.8.

Habitat. — Sublittoral, in 14 m on sloping fore reef.

Remarks. — This is the twenty-sixth species of the genus, all but one of which occur only in the Americas; six species are known from the Caribbean (Camp & Manning 1982, 1986; Manning 1970, 1979). This genus has not been recorded previously from the Trinidad and Tobago region.

This species resembles *N. virginalis* Camp & Manning, 1986, differing from it in having a more quadrate rostral plate with a lower anterior projection, longer antennular processes that extend beyond the anterolateral corners of the rostral plate, a shorter antennal peduncle that does not extend beyond the end of the eye, and eight rather than seven teeth on the claw.

Etymology. — Named for the type locality.

Distribution. — Known only from the type locality.

Superfamily Squilloidea

Family Squillidae

Alima alba (Bigelow, 1893)

Squilla alba Bigelow, 1893:103.

Alima hyalina. — Manning, 1962b:496; 1969:128, figs. 37, 38, 39a. [Not *Alima hyalina* Leach, 1817, a larva.]

Alima neptuni. — Manning & Lewinsohn, 1986:13, 15 [not *Cancer neptuni* Linnaeus, 1768, a larva].

Material. — Heard sta 10A, Buccoo Reef, about 2 m: 1 ♂ (46).

Size. — One male only collected, TL 46 mm.

Habitat. — Sand patch in back reef area in a depth of about 2 m.

Remarks. — Manning (1962) identified a pelagic larva originally described from the Gulf of Guinea, *Alima hyalina* Leach, 1817 as the larva of the species then known as *Squilla alba* Bigelow, 1893. Subsequently, Manning reported two different species of *Alima* from localities in the western Atlantic (1969) and the eastern Atlantic, *A. hyalina* (Leach) and *A. hieroglyphica* (Kemp, 1911). In 1986 Manning & Lewinsohn identified *A. hyalina* with a larval form named by Linnaeus.

We question the wisdom of using names based on larval forms for adult species unless the adult can be raised from larvae from a known parent, especially in stomatopods in which there are so many larval forms. The *alima* larva reported by Manning (1962) that metamorphosed into a postlarva that could be identified with *Squilla alba* certainly resembled the larva named by Leach, but with two adults of the same genus occurring in the area from which Leach's larva was taken, the Gulf of Guinea, there is no way to positively identify his larva with either of the two adults. For the same reason the name used by Linnaeus, based on a larva from the central Atlantic, cannot be used

for the species. We believe it is best to use the name based on the adult for the species, that used by Bigelow in 1893.

There is an adult female, TL 42 mm, of this species in the national collections taken by D. L. Felder and colleagues from a tidal flat exposed at low water at Peanut Island in Lake Worth, Palm Beach County, Florida, on August 1987.

This species has not been reported previously from Tobago.

Acknowledgments

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- TOB-17: Tobago, northeast of Charlotteville (11°19'N, 60°33'W), coral-encrusted rocks and ledges, depth 40 ft (12 m), rotenone, 8 Sep 1990, leg. M. Schotte, et al.: *Gonodactylus curacaoensis*.
- TOB-21: Tobago, Buccoo Reef (11°11'N, 60°49'W), sloping force reef, depth 45 ft (14 m), rotenone, 10 Sep 1990, leg. M. Schotte, et al.: *Gonodactylus caribbaeus*, new species, *G. curacaoensis*, *G. oerstedii*, *G. spinulosus*, *Nannosquilla tobagoensis*, new species, *Pseudosquilla ciliata*.
- TOB-36 (= JTW 90-9): Tobago, Man O'War Bay, east side of North Point (11°20'N, 60°33'W), vertical wall with rock, coral, and rubble, depth 15–40 ft (5–12 m), rotenone, 8 Sep 1990, M. Schotte, et al.: *Gonodactylus spinulosus*.
- TOB-38 (= JTW 90-10): Tobago, Buccoo Reef (11°11'N, 60°49'W), outer reef slope, coral with sand pockets, depth 45 ft (14 m), rotenone, 10 Sep 1990, leg. M. Schotte, et al.: *Gonodactylus curacaoensis*.
- TOB-39 (= JTW 90-14): Tobago, St. Giles Island, London Bridge Rock (11°21'N, 60°32'W), vertical rock wall to ledge, depth 40–80 ft (13–28 m), rotenone, 12 Sep 1990, leg. J. T. Williams, et al.: *Alachosquilla floridensis*, *Gonodactylus spinulosus*.
- TOB-40 (= JTW 90-15): Tobago, Saint Giles Island (11°21'N, 60°31'W), rock, rubble, live and dead coral, depth 20–35 ft (6–11 m), 12 Sep 1990, rotenone, leg. J. T. Williams, et al.: *Alachosquilla floridensis*, *Gonodactylus caribbaeus*, new species, *Gonodactylus spinulosus*.
- TOB-42 (= JTW 90-16): Tobago, Bloody Bay (11°18'N, 60°38'W), mouth of Bloody Bay River, sand, algae, and rocks, depth 0–10 ft (0–3 m), rotenone, 13 Sep 1990, leg. J. T. Williams, et al.: *Gonodactylus spinulosus*.
- TOB-44: Tobago, The Sisters (11°20'N, 60°39'W), vertical rock wall and slope, dead coral and rocks, depth 60–85 ft (18–26 m), rotenone, 14 Sep 1990, leg. J. T. Williams, et al.: *Gonodactylus curacaoensis*.

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Appendix—Station Data

A. Station Data and Species List for Collections Made by M. Schotte and Others, 1990

TOB-6 (= JTW 90-4): Tobago; off Speyside (11°18'N, 60°32'W), leeward side of Little Tobago Island, 35 ft (11 m), rotenone, 6 Sep 1990, leg. D. Johnson, et al.: *Gonodactylus curacaoensis*, *G. spinulosus*.

TOB-12 (= JTW 90-5): Tobago, off Little Tobago Island (11°18'N, 60°30'W), coral heads, depth 60 ft (18 m), rotenone, 7 Sep 1990, leg. D. Johnson, et al.: *Gonodactylus caribbaeus*, new species, *G. curacaoensis*.

TOB-13: Tobago, cove near Speyside (11°18'N, 60°32'W), large rock covered with coral and sea whips, depth 35 ft (11 m), rotenone, 7 Sep 1990, leg. M. Schotte, et al.: *Gonodactylus caribbaeus*, new species.

B. Station Data and Species List for Collections Made by R. Heard, 1992 and 1993

Heard Sta. 3: Tobago, Lover's Beach, protected beach and shallow reef area on northwest corner of Man O'War Bay (11°19'N, 60°34'W), shore to a depth of about 2 m, 6 Apr 1992: *Gonodactylus oerstedii*, *Pseudosquilla ciliata*.

Heard Sta 4: Tobago, Bloody Bay (11°18'N, 60°38'W), sand bottom with some rocks, beach to a depth of about 2 m, 4 Apr 1992: *Bigelowina biminiensis*.

Heard Sta 5: Tobago, Sandy Bay (= Milford Bay,

11°09'N, 60°50'W), near Pigeon Point, west end of island, protected sand beach bordered by Buccoo Reef, from shore to a depth of 1.5 m, washing of live rock, 7 Apr 1992: *Gonodactylus oerstedii*.

Heard Sta 9: Tobago, Petit Trou (= Lowlands Lagoon, 11°08'N, 60°47'W), a shallow lagoon with rich

patches of turtle grass, bottom varied from coarse sand to fine coralline silt, depth 1–1.5 m, 7 Apr 1992: *Gonodactylus oerstedii*, *Pseudosquilla ciliata*.

Heard Sta 10: Tobago, Buccoo Reef, sand patch in back reef area, depth about 2 m, 11 Jun 1993: *Alima alba*.