

A new species of *Nannosquilla* (Crustacea: Stomatopoda: Nannosquillidae) from the eastern Pacific and new records of species of *Neogonodactylus* (Gonodactylidae) from the Pacific coast of Mexico

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Abstract.—A large series of specimens of stomatopods was collected from intertidal and shallow subtidal habitats along the Pacific coast of Mexico. A new species of *Nannosquilla* Manning is described from the southeastern part of the Baja California Peninsula, and new records are provided for species of *Neogonodactylus* Manning, including the first record for Mexico of *N. lalibertadensis* (Schmitt), previously known from Ecuador and Panama.

A total of 50 species and 22 genera of stomatopod crustaceans are known from the eastern Pacific. They belong to three of five currently recognized superfamilies of Stomatopoda: Gonodactyloidea, Lysiosquilloidea and Squilloidea (see Hendrickx & Salgado-Barragán 1991). Among these, 29 species are known from the Pacific coast of Mexico, eight species belong to the genus *Neogonodactylus* Manning, and seven to the genus *Nannosquilla* Manning.

Species of the family Nannosquillidae and Gonodactylidae have been somewhat rarely reported in literature dealing with the eastern Pacific. This is mostly due to three factors: with a few exceptions, they are of small size, they often are burrowing species or live among coral or rubble and they generally feature a depth range too shallow to be sampled by research vessels, yet often too deep to be visited by non-scuba divers.

Recent collection of specimens of crustaceans in intertidal and shallow subtidal habitats along the Pacific coast of Mexico yielded some interesting specimens of stomatopods, including an undescribed species of *Nannosquilla*. Additional material deposited in the crustacean collection of UNAM at Mazatlán and belonging to the recently described genus *Neogonodactylus* Manning (Manning 1995: 80) allows us to

report an additional species for the Pacific coast of Mexico and add records for two otherwise scarcely cited species.

Abbreviations and acronyms used are: coll., collector; TL, total length (in millimeters); EMU, Estación Mazatlán UNAM, Invertebrates Reference Collection; USNM, National Museum of Natural History, Smithsonian Institution, Washington D.C.; UABCS, Invertebrates Collection, Departamento de Biología, Universidad Autónoma de Baja California Sur. Latitude and longitude were obtained in the field with a ICOM global positioning system (GPS).

Family Nannosquillidae Manning, 1980
Nannosquilla raymanningi, new species
Figs. 1-3

Material examined.—Holotype, 1 female (TL 22.2 mm), Ensenada Grande, Isla Partida, Baja California Sur, Mexico (24°33'N, 110°24'W), 17 Aug 1994, 13.7 m, sandy bottom, scuba diving, collected by hand using quinaldina (coll. C. Sánchez Ortiz) (EMU-4620); paratypes 1 male (TL 20.3 mm) and 1 female (TL 22 mm), same locality (EMU-4621); paratypes 1 male (TL 20.7 mm) and 1 female (TL 23.6 mm), same locality (USNM 285512); paratypes 2 females (TL 20.3 and 21.0 mm), same lo-

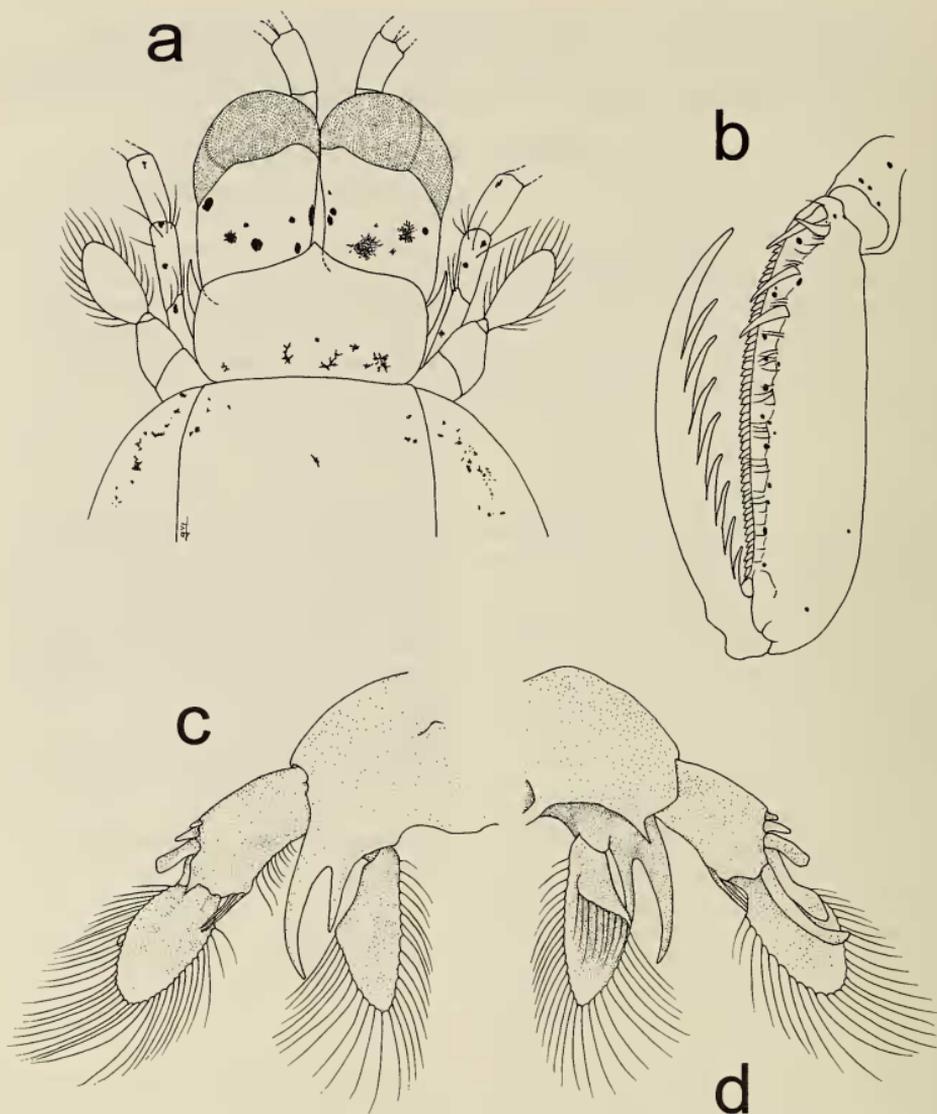


Fig. 1. *Nannosquilla raymanningi*, new species, female holotype. a, anterior part of body; b, right raptorial claw, inner face; c, right uropod, ventral view; d, right uropod, dorsal view (EMU-4620).

cality (EMU-4622); 1 male (TL 20.3 mm) and 1 female (TL 22.8 mm) (UABCS).

Description.—Eye small, short, not overreaching antennular peduncle. Cornea subglobular, not bilobed, set obliquely on

stalk and slightly expanded laterally. Ocular scales fused at base and most of length, but distinctly separated in distal portion; apex acute or rounded. Upper antennular flagellum with 11 free articles; lower longer, with

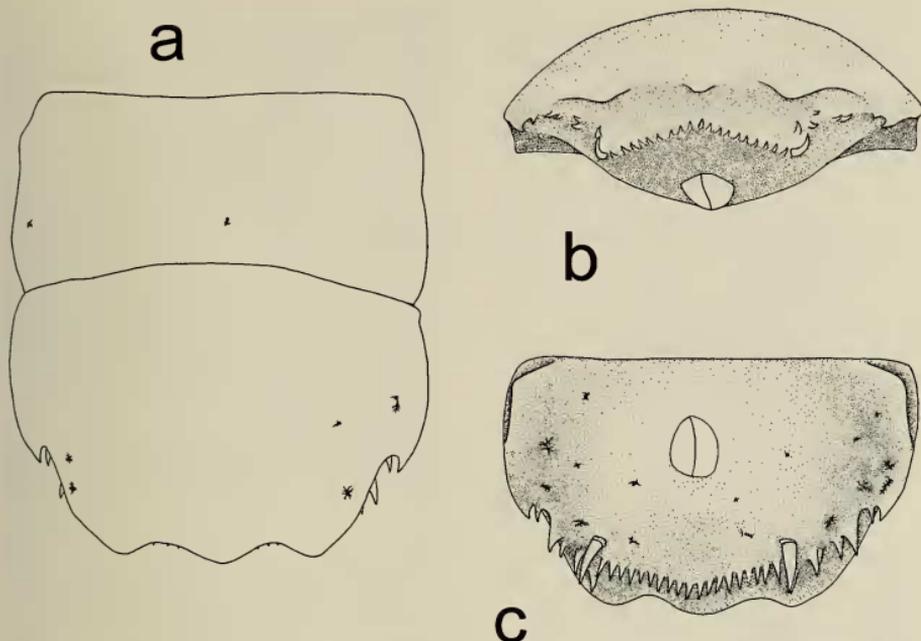


Fig. 2. *Nannosquilla raymanningi*, new species, female holotype. a, sixth abdominal somite and telson, dorsal view; b, telson, posterior view; c, telson, ventral view (EMU-4620).

8 to 10 (holotype with 9-9), lower shorter with 4 free articles; antennular process visible laterally, projecting beyond sides of rostral plate and overreaching anterolateral corners of rostral plate. Antennal peduncles short, not overreaching eyes, flagella with 11 articles; antennal scale not extending beyond midpoint of last segment of antennal peduncle. Rostral plate subrectangular, wider than long, covering only proximal margin of ocular peduncles; lateral margins subparallel, slightly convex, anterolateral corners rounded, anterior margins slightly concave, apex angled, not ending in spine. Mandibular palp absent, four epipods present. Propodus of raptorial claw with four movable teeth on proximal inner margin; dactylus with two proximal notches (in most specimens) and 9 to 11 teeth (9-10 in holotype), including terminal one. Sixth abdominal somite with posterolateral corners acute but not produced as spines. Telson

short in dorsal view, approximately 1.3 times wider than long. False eave trilobed, the median distinctly wider, rounded; lateral lobes obtuse in dorsal view; dorsum of telson with short, shallow sulcus on each side of median projection of false eave, converging to level of median projection; median projection of false eave low, ventrally curved posteriorly, flanked on each side by narrow, deeply concave depressions; submedian projections rounded. False eave merges with true margin at about level of last fixed lateral tooth. Marginal armature on each side of midline consisting of 9-12 denticles (holotype with 9-10), entire row forming an inverted (widely open) "V" in posterior view; 1 movable submedian tooth, originating anteriorly, and seven fixed lateral teeth and denticles; third denticle small and inserted at a lower (ventrally) level than second denticle; outermost denticle located on false eave. Basal segment of uropod

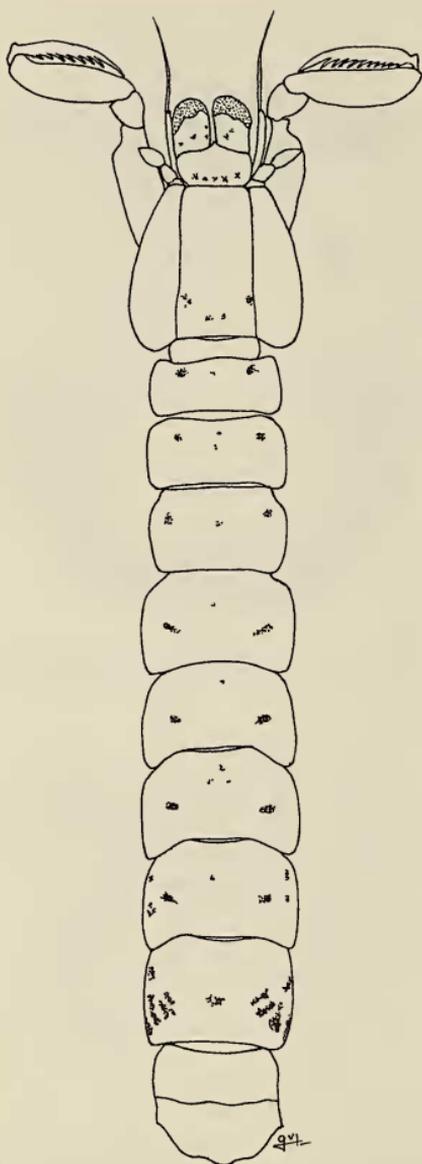


Fig. 3. *Nannosquilla raymanningi*, new species, dorsal view of female paratype (EMU-4622).

with ventral, proximal tubercle. Dorsal spine of basal segment of uropod short, not extending to midpoint of endopod. Outer spine of basal prolongation curved, much

longer than inner one which is much narrower and almost straight. Proximal segment of exopod with 1-4 stiff setae (holotype with 2 on each side) on inner distal corner, and 5 to 6 spatulate spines on outer distal margin (holotype with 5-5).

Color.—Specimens in ethanol are pale, with few, variable, stellate chromatophores distributed over the eyes, rostral plate and dorsum. Carapace, thoracic and abdominal segments 1-4 with sparse chromatophores; a pair of chromatophores lateral to the dorsal midline. Fifth abdominal somite with posterolateral regions bearing a symmetrical dark area (Fig. 3).

Remarks.—*Nannosquilla raymanningi* is so far the only species of *Nannosquilla* from the eastern Pacific with the external spine of the basal prolongation of the uropod considerably longer than the inner spine. Five out of the seven species of *Nannosquilla* previously reported from this region feature a longer inner spine: *N. decemspinosa* (Rathbun, 1910); *N. similis* Manning, 1972b; *N. galapagensis* Manning, 1972b; *N. canica* Manning & Reaka, 1979; *N. anomala* Manning, 1967. The other two species feature subequal spines. The new species, however, does not show the 10-12 projections seen on the false eave of *N. californiensis* (Manning, 1961a); it also possesses 9-12 submedian fixed denticles on the telson instead of eight denticles, and rounded anterolateral angles of the rostral plate contrary to acute angles in *N. californiensis*. It is also easily distinguished from *N. chilensis* (Dahl, 1954), a species with rostral plate with a broadly rounded anterolateral angle, and the dactylus of the raptorial claw with 17 teeth (9-11 in *N. raymanningi*). The Atlantic species of *Nannosquilla* with the external spine of the basal prolongation of the uropod either longer or similar in size to the inner spine, have few (4-7) submedian denticles and, at most, nine teeth on the dactylus of the raptorial claw; these species are *Nannosquilla adkinsoni* Camp & Manning, 1982; *N. antillensis* (Manning, 1961b); *N. carolinensis* Man-

ning, 1970; *N. disca* Camp & Manning, 1986; *N. heardi* Camp & Manning, 1982; *N. tobagoensis* Schotte & Manning, 1993; *N. virginialis* Camp & Manning, 1986; *N. yucatanica* Camp & Manning, 1986.

The specimens were collected in an area inhabited by the gregarious "garden eel", *Taenioconger digueti* Pellegrin, on sandy bottom, near reefs. Although the specimens of *N. raymanningi* and *T. digueti* were obtained in the same sample, there is no evidence the stomatopods use the burrows of eels as a shelter.

Etymology.—We are pleased to name this new species in honor of Raymond B. Manning, worldwide expert in stomatopod taxonomy and ecology, for his astounding contribution to the knowledge of this group of crustaceans.

Family Gonodactylidae Giesbrecht, 1910

Neogonodactylus lalibertadensis

(Schmitt, 1940)

Fig. 4

Gonodactylus festae lalibertadensis
Schmitt, 1940:223, fig. 33.

Gonodactylus lalibertadensis.—Manning, 1974:102.—Reaka & Manning, 1980: 5.—Hendrickx & Salgado-Barragán, 1991:29 (table 6).

Neogonodactylus lalibertadensis.—Manning, 1995:80.

Material examined.—Sayulita Bay, Jalisco (20°52.3'N, 105°28.0'W), 10 Apr 1996, 1 male (TL 20.6 mm) and 1 female (TL 16.7 mm), rocks and algae, 2 m (EMU-4623).—Chilenos Bay, Baja California Sur (22°56.0'N, 109°48.0'W), 1 female (TL 13.1 mm), coral and algae, 4 m, 20 Jul 1996 (EMU-4624).

Previous records.—Known only from La Libertad, Santa Elena Bay, Ecuador (type locality), and Taboga, Panama (Manning 1974).

Color.—The three specimens examined were preserved in ethanol. They have a very similar pattern of chromatophores and dark spots, with only slight variations.

Propodus and dactylus of first maxilliped darkened; a dark spot close to the colored spot of the merus of the raptorial claw. There are two submedian spots in the posterior dorsal half of the carapace. The female specimen from Chilenos features two additional marginal spots anteriorly. The male sixth thoracic somite bears two submedian spots, two intermediate spots, and a lateral spot; females show a similar pattern. Abdominal segments 1–5 bear a pair of large submedian boomerang-shaped spots and a pair of intermediate spots; spots are more diffuse in the female specimens. The fifth abdominal segment has an additional central spot on all three examined specimens. There are two anterior submedian spots on the telson of the Sayulita male and Chilenos female (Fig. 4).

Remarks.—The specimens examined agree well with the original description of *N. lalibertadensis*, including the laterally projected ocular scales and the anterolateral angle of rostral plate which is apically blunt [not spiny or sharp, as in *N. festae* (Schmitt, 1940) or *N. bahiahondensis* (Schmitt, 1940)]. Number and location of spines and spinules also correspond to the original description of *N. lalibertadensis*, except for a higher number of spines on the intermediate accessory carinae of examined females (Table 1). The only male specimen collected presents an inflated telson with a reduced number of dorsal spines.

The material cited under *G. lalibertadensis* by Manning (1972a) was later recognized by Manning & Reaka (1979) as an undescribed species, which they described and named *G. costaricensis*.

Neogonodactylus stanschi (Schmitt, 1940)

Gonodactylus stanschi Schmitt, 1940:215, Fig. 30.—Steinbeck & Ricketts, 1941: 429.—Manning, 1972a:110.—Reaka & Manning, 1980:8.—Hendrickx & Salgado-Barragán, 1989:244 (table 6); 1991: 36, fig. 17.

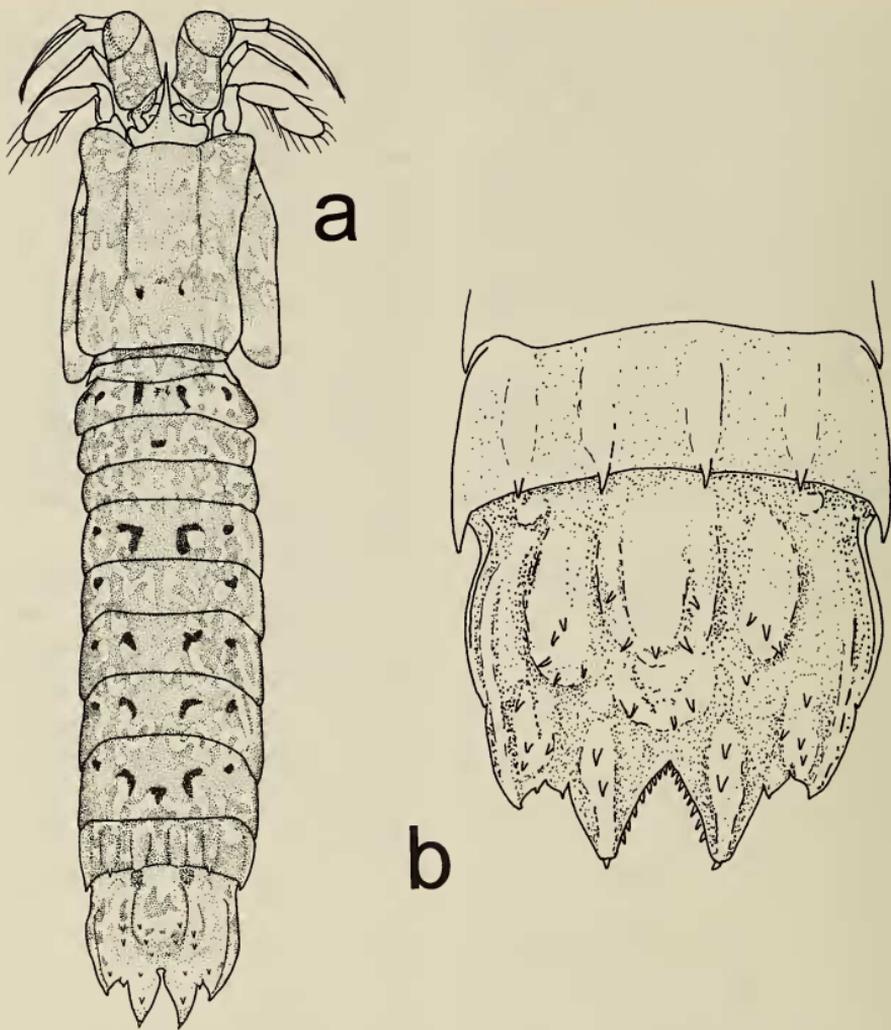


Fig. 4. *Neogonodactylus lalibertadensis* (Schmitt, 1940). a, body of male in dorsal view; b, telson of female, dorsal view (EMU-4623).

Neogonodactylus stanschi.—Manning, 1995:80.

Material examined.—San Juan de Alima, Michoacán (18°36.1'N, 103°42.1'W), 5 Nov 1996, 1 male (TL 9.8 mm), intertidal, rocks and algae (EMU-4233).—Punta Santiago, Manzanillo, Colima, (19°06.5'N, 104°21.0'W), 6 Nov 1996, 1 male (TL 30.5

mm) and 1 juvenile (TL 7.2 mm), 2–3 m, rocks and algae (EMU-4234).—El Tamarindo Beach, Tenacatita Bay, Jalisco (19°15.9'N, 104°47.9'W), 4 Nov 1996, 2 males (TL 13.2 and 18.8 mm), 1 female (TL 11.8 mm), and 2 juveniles (TL 7.4 and 7.5 mm), 1–2 m, rocks and algae (EMU-4235).—Ensenada de Litigu, Nayarit

Table 1.—Pattern of dorsal spination of telson in several *Neogonodactylus* from the eastern Pacific region. Modified from Manning (1972a) and Schmitt (1940).

	<i>bahiahondensis</i>	<i>festae</i>	<i>costaricensis</i>	<i>stanschi</i>	<i>lalibertadensis</i>	<i>lalibertadensis</i>		
						Male from Sayulita	Female from Sayulita	Female from Chilenos Bay
Median Carina	1	0-1	1	1	1	1	1	1
Accessory Median	0-1	0-4	1	1	2-3	2	2	3
Anchor	absent	3-4	absent	absent	absent	absent	absent	absent
Knob	2	4-5	4	—	2-4	2-3?	3	4
Anterior Submedian	1 + 1-2	1 + 0-3	1 + 1	1	2-5	2 + 2	5 + 4	3 + 3
Submedian	1-3	4-6	2	0-1	2-5	2	2	2
Accessory Intermediate	in 1 row	in 2 rows	in 1 row	—	2-3	1 + 1	4 + 4	3 + 4
Lateral Denticle	—	+	—	—	—	—	—	—

(20°47.4'N, 105°31.9'W), 9 Apr 1996, 1 female (TL 29.4 mm), 1 m, dead coral (EMU-4236).—Chilenos Bay, Baja California Sur (22°56.0'N, 109°48.0'W), 20 Jul 1996, 2 females (TL 29.1 and 30.5 mm), 3-5 m, coral and rocks (EMU-4237).—Playa Calerita, La Paz, Baja California Sur (24°21.0'N, 110°16.0'W), 18 Jul 1996, 1 male (TL 23.7 mm), 1 juvenile (TL 13 mm), 2-3 m, rocks and algae (EMU-4238).—Los Algodones Bay, Guaymas, Sonora (27°58.6'N, 111°07.7'W), 25 Mar 1997, 1 female (TL 18.3 mm), 1.5-2.5 m, rocks and algae (EMU 4239).

Previous records.—El Dátil, Espíritu Santo, Angel de La Guarda, Isabel and Tres Mariás Islands, Gulf of California; San Carlos Bay, Sonora, Tangola-Tangola Bay and Puerto Huatulco, Oaxaca; Punta Mita, Nayarit; Guaymas, Sonora; Teacapán, Sinaloa; Barra de Navidad, Jalisco; Zihuatanejo, Guerrero; Puerto Lobos and Punta Márquez, Baja California Sur; Chamela, Jalisco, Mexico. Salera and del Caño Islands, Costa Rica (Hendrickx & Salgado-Barragán 1991).

Remarks.—Present records are the first available for the coast of Colima and Michoacán, Mexico.

Neogonodactylus zacae (Manning, 1972a)

Gonodactylus oerstedii Schmitt, 1940:221 (part) figs. 27-28 (not fig. 26 = *G. oerstedii* Hansen, 1895; not fig. 29 = *G.*

punilus Manning, 1970).—Steinbeck & Ricketts, 1941:428 (not *G. oerstedii* Hansen, 1895).

Gonodactylus zacae Manning, 1972a:107, fig. 3; 1974:103, fig. 1; 1976:223.—Reaka & Manning, 1980:8.—Brusca, 1980:244, figs. 13-10.—Hernández-Aguilera et al., 1986:190.—Hendrickx & Salgado-Barragán, 1991:39, fig. 19.
Neogonodactylus zacae.—Manning, 1995: 80.

Material examined.—El Tesoro Beach, La Paz, Baja California Sur (24°18.0'N, 110°19.0'W), 17 Jul 1996, 5 males (TL 25.2-33.5 mm) and 5 females (TL 25.2-35.8 mm), intertidal to 1 m, rocks and algae (EMU-4240).—Calerita Beach, La Paz, Baja California Sur (24°21.0'N, 110°16.0'W), 18 Jul 1996, 1 male (TL 23.7 mm), 1 female (TL 13 mm), 1.5-2.5 m, rocks, algae and sponges (EMU-4625).—San Juan de la Costa, La Paz, Baja California Sur (24°27.0'N, 110°42.0'W), 19 Jul 1996, 4 males (TL 11.5-27.7 mm), 3 females (TL 10.8-32.9 mm), and 10 juveniles (TL 5.8-9.3 mm), rocks, algae and sponges, 1-2 m (EMU-4626).—Sendero Viejo Bay, Guaymas, Sonora (27°52.0'N, 110°52.4'W), 27 Mar 1997, 1 male (TL 13 mm), 1-3 m, rocks and algae (EMU-4627).

Previous records.—Puerto Huatulco, Oaxaca; Santa Inés Bay, Concepción Bay, Arena Bank, Gorda bank and Puerto Escondido, Baja California Sur; Revillagigedo

and Tres Marias Islands, Mexico. Puerto Parker and Isla del Coco, Costa Rica. Honda Bay, San José and Perlas Islands, Panama. La Plata and Galapagos Islands, Ecuador (Camp & Kuck 1990, Hendrickx & Salgado-Barragán 1991).

Remarks.—Material from Guaymas, Sonora, corresponds to the first continental record on the east coast of the Gulf of California. It also represents a slight extension of the northernmost distribution limit of *N. zaca*.

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