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PORCELLANA LILLYAE, NEW SPECIES (DECAPODA, ANOMURA, PORCELLANIDAE), FROM THE CARIBBEAN SEA, WITH A KEY TO THE WESTERN ATLANTIC SPECIES OF THE GENUS

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ABSTRACT

A new species of porcelain crab, *Porcellana lillyae*, from the continental shelf of the Caribbean coast of Colombia, is described. This new species, the fourth of the genus *Porcellana* Lamarck currently recognized from the western Atlantic, is most similar to *P. sigsbeiana* A. Milne-Edwards. The new species is distinguished primarily by the dentate condition of the frontal and lateral margins of the carapace and the presence of spines on the ventral margin of the rostrum. The new species is compared with *P. sigsbeiana*, and a key to aid in identification of western Atlantic species of the genus is presented.

During a recent survey of the crustacean fauna from the continental shelf of the Caribbean coast of Colombia, a new species of porcelain crab of the genus *Porcellana* Lamarck, 1801, was discovered. The specimens were collected in the Gulf of Morrosquillo during a joint expedition conducted by staff from Colombian research laboratories and the Smithsonian Institution on board the research vessel B/I *Ancón*. This new species, the fourth of the genus currently recognized in the western Atlantic, is fully described and illustrated. A key to the species of *Porcellana* from the western Atlantic is also included.

MATERIALS AND METHODS

Samples were obtained by using a 5-m-opening semi-balloon trawl net with steel doors built by Marinovich Trawl Co., Biloxi, Mississippi. The cod end was equipped with a 0.5-cm-mesh size net. Measurements of specimens were taken to the nearest 0.1 mm by using an ocular micrometer and are reported as carapace length (tip of rostrum to posteromedian end of carapace) × carapace width (maximum). The material used for this study is deposited in the Instituto de Ciencias Naturales, Museo de Historia Natural, Universidad Nacional de Colombia, Santa Fe de Bogotá (ICN–MHN–CR); Instituto de Investigaciones Marinas y Costeras, Santa Marta, Colombia (INVEMAR–CRU); and National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM). Abbreviations used are: sta., station; ov., ovigerous; CIOH, Centro de Investigaciones Oceanográficas e Hidrográficas, Armada Nacional de Colombia, Cartagena.

SYSTEMATIC ACCOUNT

Porcellana lillyae, new species
Figs. 1, 2a–c, 3a–c, g, h, 4a–c

Material Examined.—"Expedición CIOH–INVEMAR –Smithsonian", B/I *Ancón*. Holotype, ♂ (10.3 × 8.9 mm), Gulf of Morrosquillo, sta. T2, 9°38.31′N, 76°07.53′W to 9°36.06′N, 76°08.74′W, 68–67 m, 3 August 1995 (USNM 276162). Paratypes: 1 ♂ (10.2 × 8.7 mm), 1 ♀ ov. (7.8 × 7.0 mm), SW Isla Fuerte, sta. T6, 9°06.70′N, 76°31.27′W to 9°08.35′N, 76°29.94′W, 100 m, 4 August 1995 (INVEMAR–CRU 1347); 1 ♂ (9.1 × 8.5 mm), 1 ♀ (7.6 × 6.9 mm), same data as holotype (USNM 276163); 1 ♀ (6.0 × 5.4 mm), 1 ♀ ov. (7.3 × 6.4 mm), sta. T15, Islas de San Bernardo, NE Isla Tintipán, 9°56.44′N, 75°53.87′W to 9°56.59′N, 75°57.07′W, 108–125 m, 7 August 1995 (ICN–MHN–CR 1752).

Diagnosis.—Rostrum and lateral teeth (inner supraorbitals) with margins distinctly dentate; ventral margin of rostrum with 2–4 small spines. Lateral margins of carapace with minutely dentate margins and usually 1 or more small, well-spaced spines on anterior half; with deep, V-shaped cleft at end of cervical groove. Carpus of chelipeds with inner dorsal margins spinulose throughout.

Description.—Carapace (Fig. 1) about 1.1 times as long as wide. Dorsal surface slightly convex, naked or at most with scattered setae; smooth except for faint rugae and minute granules near fronto-orbital and lateral margins; regions indistinct or weakly marked by shallow grooves. Lateral margins broadly arched, thin,

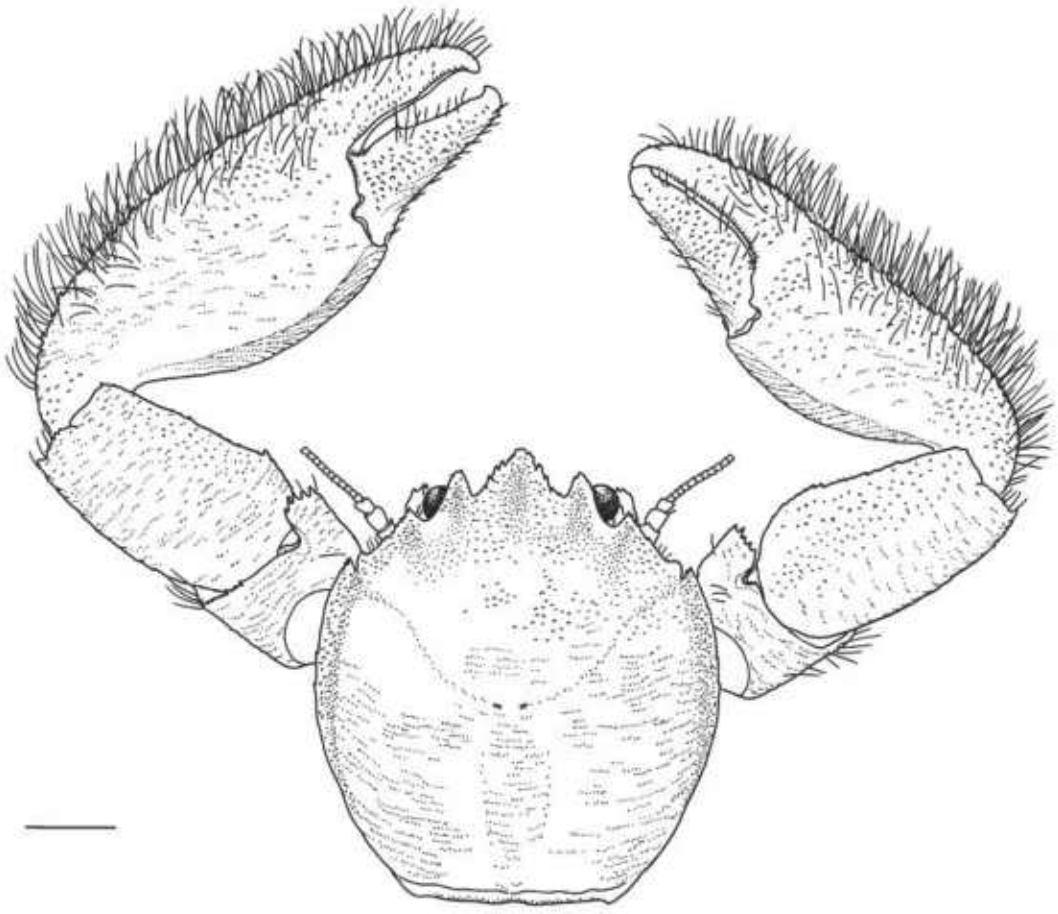

Fig. 1. *Porcellana lillyae*, new species. Holotype, ♂ (10.3 × 8.9 mm), Gulf of Morrosquillo, Colombia (USNM 276162): carapace and chelipeds, dorsal view (plumose condition of setae on chelae not shown). Scale equals 2 mm.

minutely dentate; usually with 1 or more small, well-spaced spines on anterior half; with deep V-shaped cleft at end of cervical groove; epibranchial angle strong and acute, with minute, often bifid terminal spine; margin posterior to epibranchial angle slightly upturned. Front (Figs. 1, 2a–c) strongly tridentate, consisting of rostrum and lateral teeth (inner supraorbitals); margins distinctly dentate; rostrum moderately concave dorsally, extending beyond narrower lateral teeth; ventral margin of rostrum (Fig. 2c) armed with 2–4 small spines. Orbits with margins nearly straight, not dentate; outer orbital angle produced into strong tooth. Lateral wall of carapace entire, with 2 or 3 distinct setose longitudinal ridges.

Basal segment of antennule (Fig. 2a) with 2 strong, frequently multifid spines on distal margin mesially; distolateral angle spinulose.

Antennae with basal segment (Fig. 1, 2a) forming partial suborbital margin. Basal segment strongly produced anteriorly, terminating in strong spine (visible in dorsal view of carapace), and small spines distolaterally. Movable segments far removed from orbit. Flagellum longer than carapace length, with inconspicuous, short setae.

Third maxilliped (Fig. 3h) with outer face of ischium, merus and carpus having weak, transverse or oblique rugae and scattered plumose setae. Propodus and dactyl with long, non-plumose setae on ventral and ventrodistal margins respectively. Sternite (Fig. 3h) trilobate anteriorly; median lobe broadly subtriangular, with blunt tip and short setae distally.

Chelipeds (Fig. 1) slightly unequal, strong; surfaces smooth or minutely granulose and with faint rugae; outer margins of chelae

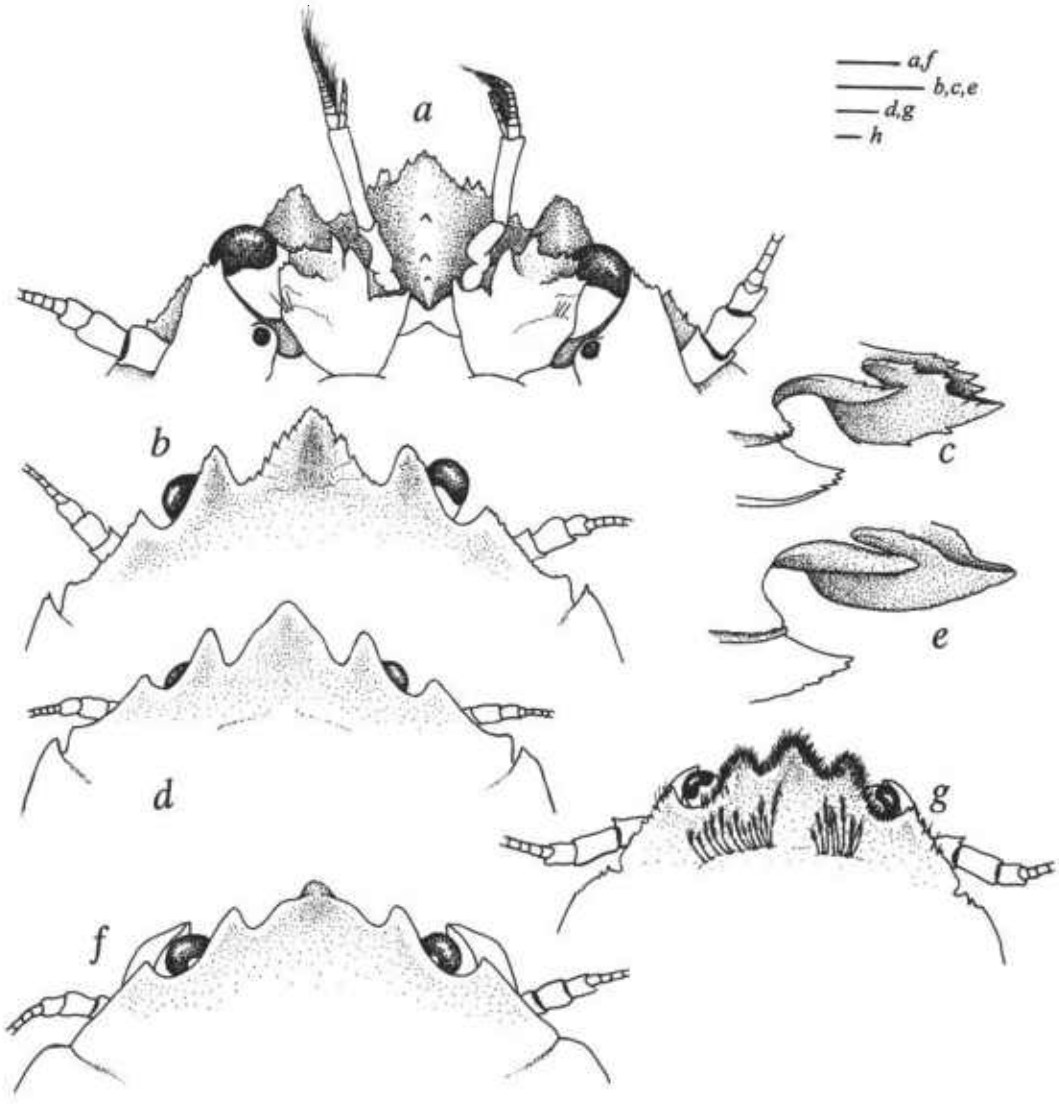

Fig. 2. Frontal region of carapace in western Atlantic species of *Porcellana* Lamarck, 1801. a–c, *P. lillyae*, new species, holotype, ♂ (10.3 × 8.9 mm), Caribbean Sea (USNM 276162): a, ventral view, showing antennules and antennal peduncle; b, dorsal view; c, lateral view. d,e, *P. sigsbeiana* A. Milne-Edwards, 1880, ♀ ov. (12.3 × 11.6 mm), western Atlantic, 33°34′N, 76°41′W (USNM 275827): d, dorsal view; e, lateral view. f, *P. sayana* (Leach, 1820), ♂ (10.0 × 9.5 mm), Caribbean Sea, Virgin Islands (USNM 275822): dorsal view. g, *P. platycheles* (Pennant, 1777), ♂ (10.7 × 10.0 mm), eastern Atlantic, Chausey Islands, France (USNM 264676): dorsal view. Scales equal 1 mm.

fringed with dense and finely plumose setae (plumose condition not shown in Fig. 1) often covering about half outer face of chelae. Fingers with tips strongly curved inwards, crossing when closed; cutting edges consisting of series of small, fused calcareous teeth. Dactyl about 0.6 as long as inner margin of palm. Palm and fixed finger with outer margins spinulose; inner face with oblique rugae, and low but distinct dorsal longitudinal ridge. Carpus (Fig. 3a–c) with inner dorsal margin spinulose (spines diminishing in size distally), with or without distinct spine proximally; with small spine on outer distal angle and row of small spines on outer half of dorsodistal margin; outer face with oblique rugae. Merus inner angle forming subrectangular lobe with small spines distally.

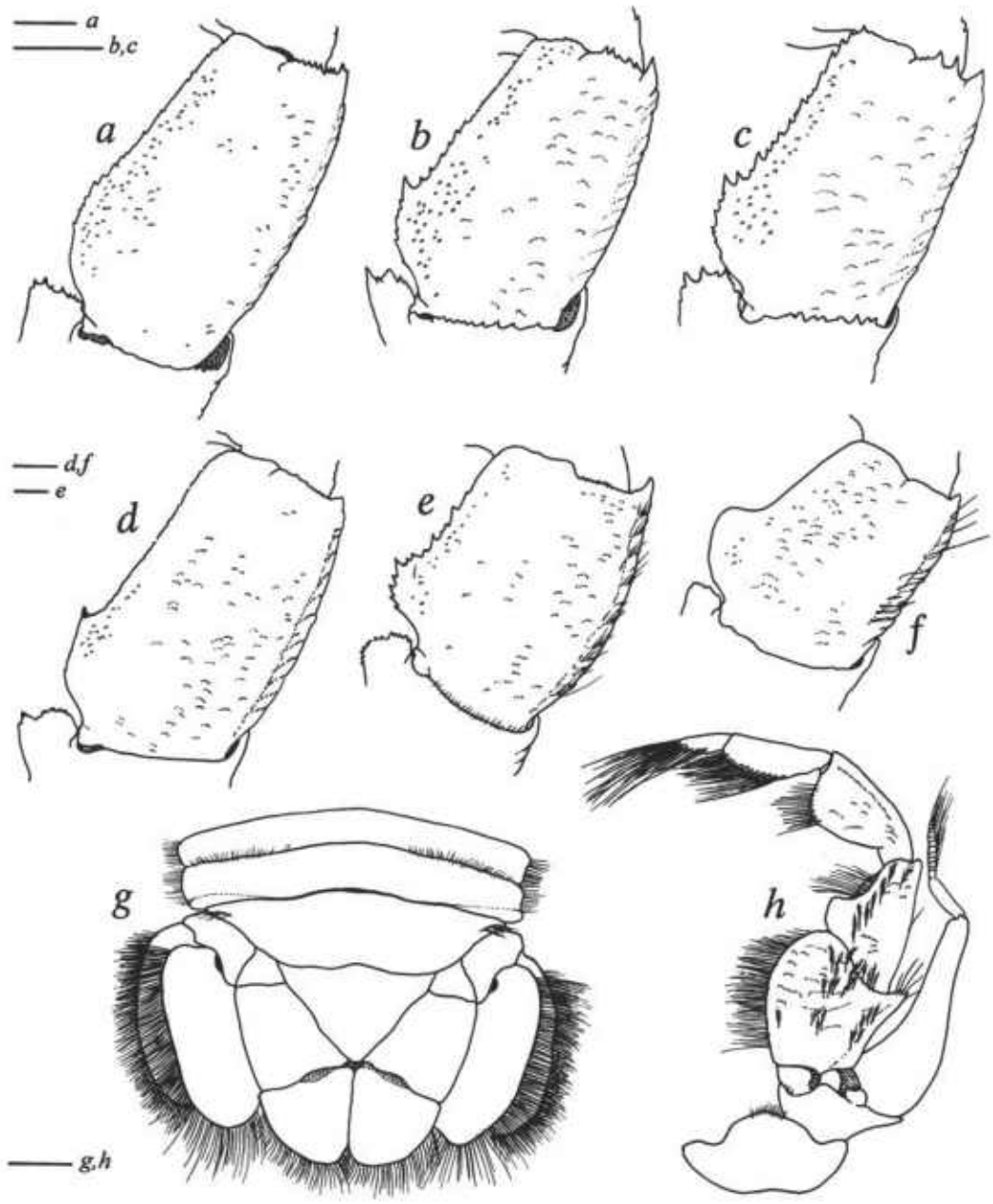

Fig. 3. a–f, carpus of right cheliped in species of *Porcellana* Lamarck, 1801, dorsal view: a–c, *P. lillyae*, new species; d, *P. sigsbeiana* A. Milne-Edwards, 1880; e, *P. platycheles* (Pennant, 1777); f, *P. sayana* (Leach, 1820). g, h, *P. lillyae*, new species: g, telson, dorsal view; h, left third maxilliped and sternite, outer view. Scales equal 1 mm. [a, holotype, ♂ (10.3 × 8.9 mm) (USNM 276162); b, paratype, ♀ ov. (7.6 × 6.9 mm) (USNM 276163); c, paratype, ♀ ov. (7.8 × 7.0 mm) (INVEMAR–CRU 1347); d, *P. sigsbeiana* A. Milne-Edwards, 1880, ♀ ov. (12.3 × 11.6 mm), western Atlantic, 33°34′N, 76°41′W (USNM 275827); e, *P. platycheles* (Pennant, 1777), ♂ (10.7 × 10.0 mm), eastern Atlantic, Chausey Islands, France (USNM 264676); f, *P. sayana* (Leach, 1820), ♂ (10.0 × 9.5 mm), Caribbean Sea, Virgin Islands (USNM 275822)].

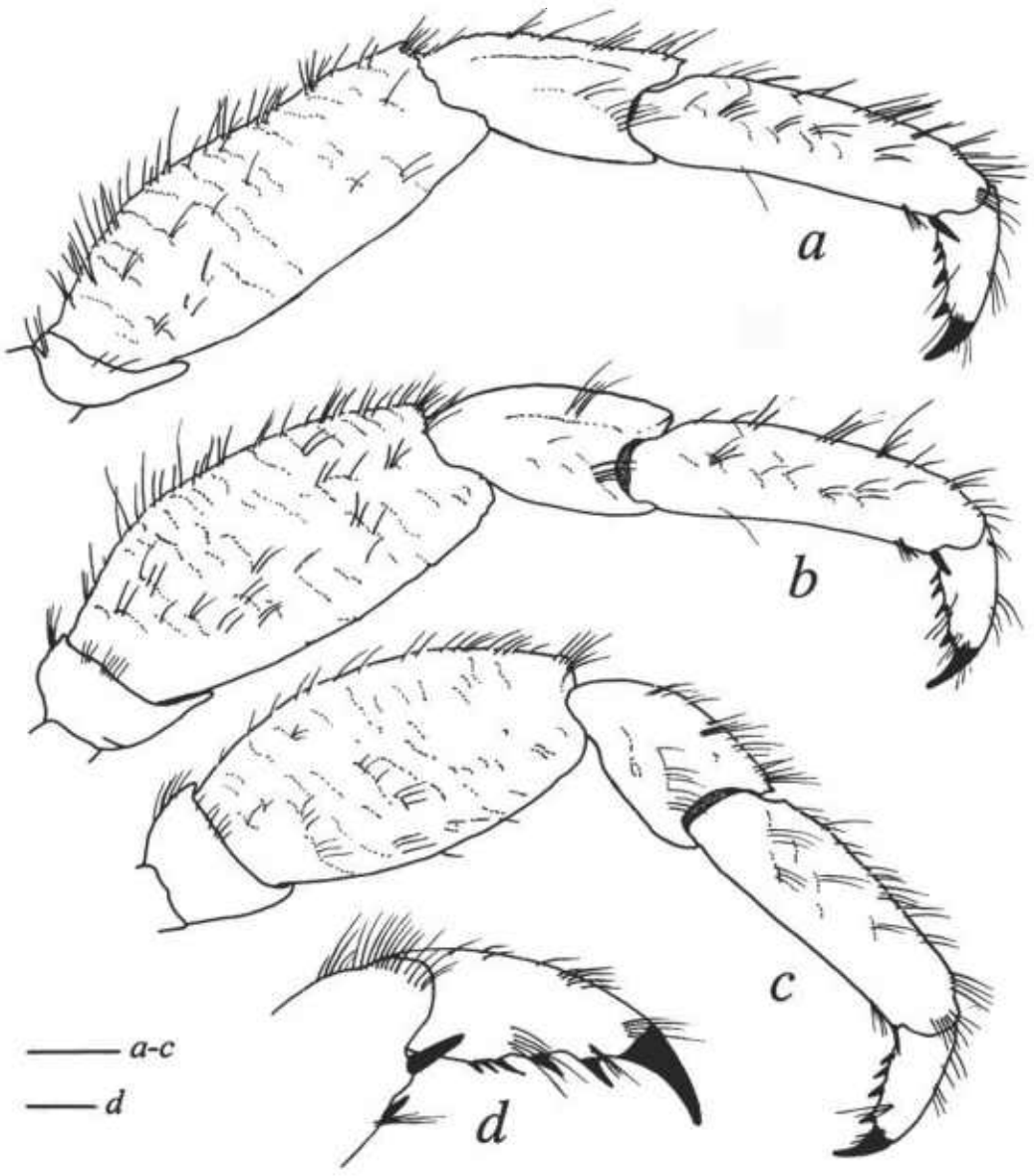

Fig. 4. a–c, *Porcellana lillyae*, new species, holotype (USNM 276162), right ambulatory legs, dorsal view: a, first; b, second; c, third. d, *P. sigsbeiana* A. Milne-Edwards, 1880, ♀ ov. (12.3 × 11.6 mm), western Atlantic, 33°34′N, 76°41′W (USNM 275827): dactyl of right first ambulatory leg, dorsal view. Scales equal 1 mm (a–c), and 0.5 mm (d).

Ambulatory legs (second to fourth pereiopods, Fig. 4a–c) with faint rugae and finely plumose setae on anterior and posterior faces; dorsal margins of meri, carpi, and propodi with plumose setae. Dactyl about half as long as propodus, terminating in sharp, inwardly curved, corneous claw; ventral margin with 4 or occasionally 5 movable, corneous spines increasing in size distally. Propodus with ventral margin having distal pair of slender, movable spines (usually only 1 visible in posterior view) and often 1 small, subdistal movable spine masked by tuft of setae. Carpus frequently armed with small dorsodistal spine. Merus decreasing in length and increasing in height from anterior to posterior legs.

Abdomen smooth; lateral margins of segments with plumose setae. Uropods and telson with plumose setae on margins. Telson (Fig. 3g) consisting of 7 plates.

Habitat.—Found on mud bottom with abundant shell rubble.

Distribution.—Known only from the Gulf of Morrosquillo region, on the Caribbean coast of Colombia. Depth: 67 to 125 m.

Etymology.—This species is named in honor of Lilly King Manning, wife and long time illustrator of Dr. Raymond B. Manning, and recognizes their teamwork. Lilly's art work has always been an integral part of the numerous studies produced by her husband.

Similarities.—Among the western Atlantic species of *Porcellana*, *P. lillyae*, new species, is most similar to *P. sigsbeiana* A. Milne-Edwards, 1880. The two can be differentiated primarily by the frontal and lateral margins of the carapace and the ventral margin of the rostrum. In *P. lillyae*, new species, the margins of the frontal region are distinctly dentate (Figs. 1, 2a–c), whereas in *P. sigsbeiana* the margins are entire or at most minutely granulose (Fig. 2d, e). The lateral margin of the carapace in the new species has minute spines (Fig. 1); the margins are unarmed in *P. sigsbeiana*. The ventral margin of the rostrum (Fig. 2c) in the new species has two to four small spines, whereas in *P. sigsbeiana* the margin is unarmed (Fig. 2e).

Other characters allowing differentiation between *P. lillyae*, new species, and *P. sigsbeiana* were observed on the chelipeds and dactyls of ambulatory legs. These characters, however, are subject to variation and are less reliable. The inner dorsal margin of the carpus of the cheliped is spinulose throughout in the new species (Fig. 3a–c), whereas in *P. sigsbeiana* there is only a distinct proximal spine (Fig. 3d). The ventral margin of the dactyls of the ambulatory legs have four (Fig. 4a–c) or occasionally five corneous spines in the new species; the ventral margin usually has five spines in *P. sigsbeiana* (Fig. 4d).

Remarks.—In Haig's (1978) revision of the genus *Porcellana*, she included four taxa from the western Atlantic: *P. sigsbeiana*; *P. sayana* (Leach, 1820); *P. stimpsoni* A. Milne-Edwards, 1880; and *P. paivacarvalhoi* Rodrigues da Costa, 1968. However, Veloso and Melo (1993) considered *P. paivacarvalhoi* to be a junior synonym of *P. platycheles* (Pennant, 1777), a species known from the eastern Atlantic (e.g., Chace, 1956; Haig, 1978; Ingle, 1997). *Porcellana stimpsoni* was briefly described by A. Milne-Edwards (1880) from a single female from Woman Key, south Florida, and subsequently was discussed and illustrated by A. Milne-Edwards and Bouvier (1923). The specimen of A. Milne-Edwards has been found to have an abnormal left cheliped and frontal region, and his taxon is considered a junior synonym of *P. sayana* (B. Werding, in litt.).

In the western Atlantic *Porcellana platycheles* has been found only in the State of São Paulo, Brazil (Veloso and Melo, 1993; Veloso, 1998; Melo, 1999). In contrast, *Porcellana sayana* and *P. sigsbeiana* are widely distributed in the western Atlantic (e.g., Felder, 1973; Gore, 1974; Gore and Abele, 1976; Werding, 1977; Haig, 1978; Rodríguez, 1980; Williams, 1984; Abele and Kim, 1986; Veloso, 1998; Melo, 1999). The new species described herein as *P. lillyae* has been found only on the Caribbean coast of Colombia.

Key to Western Atlantic Species of *Porcellana*

1. Margins of rostrum and lateral teeth (inner supraorbitals) with dense, stout plumose setae (Fig. 2g); dorsal surface of carapace setose (often densely so), with short transverse rows or tufts of plumose setae ..... *P. platycheles* (Pennant, 1777)
   (western Atlantic: São Paulo, Brazil; eastern Atlantic; intertidal to 6 m)
   – Margins of rostrum and lateral teeth (inner supraorbitals) naked, lacking plumose setae; dorsal surface of carapace naked or at most with scatttered setae 2
2. Lateral margin of carapace with deep V-shaped cleft at end of cervical groove; inner dorsal margin of carpus of cheliped spinulose (Fig. 3d, e) 3
   – Lateral margin of carapace with shallow indentation at end of cervical groove (Fig. 2f); inner dorsal margin of carpus of cheliped not spinulose, entire (Fig. 3f) ..... *P. sayana* (Leach, 1820)
   (eastern United States; Gulf of Mexico; Caribbean Sea; Brazil; shallow water to 92 m)
3. Frontal region with margins of rostrum and lateral teeth (inner supraorbitals) dentate (Fig. 2a,b); ventral margin of rostrum with 2 to 4 small spines (Fig. 2c) ..... *P. lillyae*, new species
   (Caribbean Sea; 67 to 125 m)
   – Frontal region with margins of rostrum and lateral teeth (inner supraorbitals) entire or minutely granulose, lacking teeth (Fig. 2d); ventral margin of rostrum unarmed (Fig. 2e) ..... *P. sigsbeiana* A. Milne-Edwards, 1880
   (eastern United States; Gulf of Mexico; Caribbean Sea; Brazil; 16 to 393 m)

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Literature Cited

Abele, L. G., and W. Kim. 1986. An illustrated guide to the marine decapod crustaceans of Florida. Parts 1 & 2. Florida State University, Tallahassee, Florida. 760 pp.

Chace, F. A., Jr. 1956. Porcellanid crabs.—Expédition Océanographique Belge dans les eaux côtières africaines de l'Atlantique sud (1948–1949). Résultats scientifiques 3: 1–54.

Felder, D. L. 1973. An annotated key to crabs and lobsters (Decapoda, Reptantia) from coastal waters of the northwestern Gulf of Mexico.—Center for Wetland Resources, Louisiana State University Sea Grant Publication Number LSU–SG–73–02: 1–103.

Gore, R. H. 1974. On a small collection of porcellanid crabs from the Caribbean Sea (Crustacea, Decapoda, Anomura). Biological results of the University of Miami Deep-Sea Expeditions. 102.—Bulletin of Marine Science 24: 700–721.

———, and L. G. Abele. 1976. Shallow water porcelain crabs from the Pacific coast of Panama and adjacent Caribbean waters (Crustacea: Anomura: Porcellanidae).—Smithsonian Contributions to Zoology 237: 1–30.

Haig, J. 1978. Contribution toward a revision of the porcellanid genus *Porcellana* (Crustacea: Decapoda: Anomura).—Proceedings of the Biological Society of Washington 91: 706–714.

Ingle, R. 1997. Crayfishes, lobsters and crabs of Europe, an illustrated guide to common and traded species. Chapman and Hall, London. 281 pp.

Lamarck, J. B. P. A. (Monet, chevalier de). 1801. Système des animaux sans vertèbres, ou tableau général des classes, des ordres et des genres de ces animaux. . . . Paris. viii + 432 pp.

Leach, W. E. 1820. Galatéadées. Dictionnaire des Sciences Naturelles 18: 49–56. Paris.

Melo, G. A. S. de. 1999. Manuel de identificação dos Crustacea decapoda di litoral brasileiro: Anomura, Thalassinidea, Palinuridea. Editoria Plêiade, Fundação de Amparo à Pesquisa do Estado de São Paulo. 551 pp.

Milne-Edwards, A. 1880. Report on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico, and in the Caribbean Sea, 1877, '78, '79, by the United States Coast Survey Steamer "Blake", Lieut. Commander C. D. Sigsbee, U.S.N., and Commander J. R. Bartlett, U.S.N., commanding. 8. Études préliminaires sur les crustacés.—Bulletin of the Museum of Comparative Zoölogy at Harvard College 8: 1–68, pls. 1, 2.

———, and E. L. Bouvier. 1923. Report on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877–78), in the Caribbean Sea (1878–79), and along the Atlantic coast of the United States, by the U.S. Coast Survey Steamer "Blake", Lieut.-Com. C. D. Sigsbee, U.S.N., and Commander J. R. Bartlett, U.S.N., commanding. 47. Les porcellanides et dcs brachyures.—Memoirs of the Museum of Comparative Zoölogy at Harvard College 47: 289–395, pls. 1–12.

Pennant, T. 1777. Crustacea, Mollusca, Testacea.—British Zoology edition 4, 4: 1–136, pls. 1–93.

Rodrigues da Costa, H. 1968. Novas espécies de Porcellanidae Brasileiros (Crustacea Anomura).—Anais Academia Brasileira de Ciências 40: 405–406.

Rodríguez, G. 1980. Crustáceos decápodos de Venezuela. Instituto Venezolano de Investigaciones Científicas, Caracas. 494 pp.

Veloso, V. G. 1998. Malacostraca–Eucarida. Porcellanidae. Pp. 399–405 *in* P. S. Young, ed. Catalogue of Crustacea of Brazil. Rio de Janeiro, Museo Nacional (Série Livros 6).

———, and G. A. S. de Melo. 1993. Taxonomía e distribuçao da família Porcellanidae (Crustacea, Decapoda, Anomura) no litoral brasileiro.—Iheringia, Serie Zoologia 75: 171–186.

Werding, B. 1977. Los porcelánidos (Crustacea: Anomura: Porcellanidae) de la región de Santa Marta, Colombia.—Anales del Instituto de Investigaciones Marinas de Punta de Betín 9: 173–214.

Williams, A. B. 1984. Shrimps, lobsters, and crabs of the Atlantic coast of thc eastern United States, Maine to Florida. Smithsonian Institution Press, Washington, D.C. 550 pp.

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