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Review of the Western Atlantic Porcellanidae (Crustacea: Decapoda: Anomura) with New Records, Systematic Observations, and Comments on Biogeography

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ABSTRACT.—Fifty years following a major revision by Haig (1956) and after numerous additions and changes of status, the porcelain crab fauna of the western Atlantic numbers 48 valid species plus two undescribed species herein reported (*Neopisosoma* sp. and *Pachycheles* sp.). Eleven genera are known for the region, including three new genera (*Neopisosoma*, *Clastotoechus*, and *Parapetrolisthes*). The monospecific genus *Madarateuchus*, established by Harvey (1999) to receive *Clastotoechus vanderhorsti*, is rejected. *Pisidia* was resurrected, and *Porcellanopsis* was combined with *Megalobrachium*. Prompted by our efforts to understand biogeographic relationships of porcellanids from Bocas del Toro, Panama, our study of over 400 western Atlantic records revealed undescribed species and northward range extensions for four species (*Petrolisthes quadratus* to U.S.A., *Petrolisthes rosariensis* and *P. sanmartini* to Belize, and *Megalobrachium mortenseni* to Honduras). Preliminary morphological and molecular studies have shown that *Petrolisthes armatus*, *P. galathinus*, and *P. tridentatus* present considerable intra-specific variability throughout their range, suggesting that further revisionary studies are required to fully resolve their taxonomic status.

KEYWORDS.—Porcellanids, porcelain crabs, Gulf of Mexico, distribution

INTRODUCTION

Porcellanidae Haworth, 1825, is a family of crab-shaped anomuran crustaceans commonly known as porcelain crabs. This family is considered a well-defined taxon within the superfamily Galatheoidea Samouelle, 1819 (see Haig 1960). Other members of the superfamily are Aeglidae Dana, 1852, Chirostylidae Ortmann, 1892, and Galatheidae Samouelle, 1819 (Martin and Davis 2001). Porcelain crabs number about 280 species partitioned among 30 genera. These crabs occur worldwide in primarily intertidal and sublittoral zones of tropical and subtropical regions, and occupy habitats such as depressions under stones, spaces in worm tubes, cavities of sponges, and excavations in coral reefs. Most species are free-living but a few live commensally (Haig 1960; Gore 1972b, 1982; Harvey 1999; Hernández 1999; Werding 1983b; Werding et al. 2003).

Nearly half of the species in this family have been recorded in the Americas (Gore 1982). Seven species are reported to occur on both the Atlantic and the Pacific coasts: *Pachycheles chacei* Haig, 1956, *P. monilifer* (Dana, 1852), *Petrolisthes armatus* (Gibbes, 1850), *P. galathinus* (Bosc, 1802), *P. robsonae* Glassell, 1945, *P. tonsorius* Haig, 1960, and *P. tridentatus* Stimpson, 1859 (see Haig 1956, 1960; Gore and Abele 1974; Scelzo 1982; Abele and Kim 1989; Hiller et al. 2004).

In the almost fifty years since the major revision of the Porcellanidae from the western North Atlantic by Haig (1956), important efforts have been made to better understand the composition, diversity, distribution, and relationships of these crabs in the western Atlantic (see Boschi 1963; Coêlho 1964, 1966; Rodrigues da Costa 1964, 1968; Rickner 1975b; Haig 1962, 1966; Gore 1970a, 1974, 1982, 1983; Gore and Abele 1974, 1976; Werding 1977, 1978a, 1978b, 1982, 1983a, 1984, 1986, 1996; Rodríguez 1980; Scelzo 1982, 1983; Silva et al.

TABLE 1. Studies on larval development of porcelain crabs from the western Atlantic (*incomplete development).

Species	Site of collection	Reference
1. *Clastotoechus nodosus* (Streets, 1872)	Cubagua Island, Venezuela	Hernández et al. 2003
2. *Clastotoechus vanderhorsti* (Schmitt, 1924)	Santa Marta, Colombia	Schoppe 1994
3. *Euceramus praelongus* Stimpson, 1860	York Spit Channel, Virginia, U.S.A.	Roberts 1968
	Mississippi Sound, Mississippi, U.S.A.	Maris 1983*
4. *Megalobrachium poeyi* (Guérin, 1855)	Punta Paitilla, Pacific side of Panama and Key Biscayne, Florida, U.S.A.	Gore 1971a
5. *Megalobrachium roseum* (Rathbun, 1900)	Margarita Island, Venezuela	Hernández et al. 2002
6. *Megalobrachium soriatum* (Say, 1818)	Vero Beach, Florida, U.S.A.	Gore 1973b
7. *Minyocerus angustus* (Dana, 1852)	Cubagua Island, Venezuela	Hernández, Bolaños, and Graterol 1996*; Hernández et al. in press
8. *Neopisosoma angustifrons* (Benedict, 1901)	Galeta Island, Panama	Gore 1977
9. *Neopisosoma neglectum* Werding, 1986	Santa Marta, Colombia	Werding and Müller 1990
10. *Pachycheles laevidactylus* Ortmann, 1892	Mar del Plata, Argentina	Boschi et al. 1967
11. *Pachycheles monilifer* (Dana, 1852)	Indian River Region, Florida, U.S.A.	Gore 1973a
12. *Pachycheles pilosus* (H. Milne Edwards, 1837)	La Tortuga Island, Venezuela	Piñate et al. 2005
13. *Pachycheles serratus* (Benedict, 1901)	Margarita Island, Venezuela	Rodríguez et al. 2004
14. *Petrolisthes armatus* (Gibbes, 1850)	Bermuda	Lebour 1943, 1950
	Biscayne Bay, Florida, U.S.A.	Gore 1970b
	Punta Paitilla, Pacific side of Panama	Gore 1972b
	Mississippi Sound, U.S.A.	Maris 1983*
	Margarita, Cubagua, and Coche Islands, Venezuela	Graterol 1996
15. *Petrolisthes caribensis* Werding, 1983	Near Rosario Islands, Colombia	Kraus et al. 2004
16. *Petrolisthes galathinus* (Bosc, 1802)	Beaufort, North Carolina, U.S.A.	Huni 1979
	Cubagua Island, Venezuela	Arana et al. 1996*; Muñoz 2001
17. *Petrolisthes jugosus* Streets, 1872	La Tortuga Island, Venezuela	Magán et al. 2003*
18. *Petrolisthes magdalenensis* Werding, 1978	La Tortuga Island, Venezuela, Santa Marta, Columbia	Magán 2001; Müller and Werding 1990
19. *Petrolisthes marginatus* Stimpson, 1859	La Tortuga Island, Venezuela	Piñate et al. (unpublished)*
20. *Petrolisthes politus* (Gray, 1831)	Cubagua Island, Venezuela	Hernández et al. 1995; Hernández et al. 2000
21. *Petrolisthes robsonae* Glassell, 1945	Sinaloa, Mexico (Pacific)	García-Guerrero et al. 2005
22. *Petrolisthes tonsorius* Haig, 1960	Patanemo Bay, Venezuela	Pellegrini and Gamba 1985
23. *Petrolisthes tridentatus* Stimpson, 1859	Punta Paitilla, Panama	Gore 1971b
24. *Pisidia brasiliensis* Haig (in Rodrigues da Costa, 1968)	Margarita Island, Venezuela	G. Hernández et al. (unpublished)
25. *Polyonyx gibbesi* Haig, 1956	Key Biscayne, Florida, U.S.A.	Gore 1968
26. *Porcellana sayana* (Leach, 1820)	Margarita Island, Venezuela	Hernández et al. 1998
27. *Porcellana sigsbeiana* A. Milne-Edwards, 1880	Straits of Florida, U.S.A.	Gore 1971c
	Continental shelf, Mississippi, U.S.A.	Maris 1983*

1989; Veloso and Melo 1993; Hernández and Bolaños 1995; Hernández 1999; Lemaitre and Campos 2000; Werding and Hiller 2002; Werding et al. 2001; Werding and Kraus 2002; Werding et al. 2003). The morphology of larval and megalopal stages of porcelain crabs is very useful in elucidating relationships among species. Ontogenetic studies are currently available for 27 species distributed in the western Atlantic (Table 1).

In addition to systematics, some progress has been made in ecological (e.g., Gray 1961; Gore and Shoup 1968; Sandifer 1973; Caine 1975; Markham 1975; Felder and Chaney 1979; Wenner and Read 1982; Young 1986; Schoppe and Werding 1996; Stillman and Somero 2000) and physiological fields (Teytaud 1971; Craig 1974; López-Greco et al. 2002). However, no comprehensive synthesis of the taxonomic literature of this group of anomurans is available for the western Atlantic. This review provides that synthesis and updates records since publication of Haig's (1956) monograph. It was undertaken as an essential step in ongoing molecular (Rodríguez et al. in review) and morphological studies of porcellanid crabs from the vicinity of Bocas del Toro, Panama, and adjacent western Atlantic waters.

Porcelain crabs numbered 29 species for the western North Atlantic at the time of Haig's (1956) compilation. *Pachycheles greeleyi* (Rathbun, 1900) and *P. laevidactylus* Ortmann, 1892, from Brazil were not included in that report. Taking these two species into account, the known porcellanid fauna of the western Atlantic was 31 species at that time. In the following decades, a number of additional species were described, and one species, *Petrolisthes robsonae,* previously known only from the eastern Pacific, was reported from the Caribbean (Haig 1960; Abele and Kim 1989). Some species have been recognized as synonyms, others as invalid, and many range extensions have been documented for the region. An updated list of 48 valid species and their distributional patterns was recently published (Werding et al. 2003).

As evident from literature, studies of porcellanids along mainland coastlines of Central America bordering the Caribbean Sea, especially in areas adjacent to Panama, are scarce; similarly, few works address specifically this fauna further north and within the Gulf of Mexico (Haig 1956; Rickner 1975b; Werding et al. 2003). Thorough compilation of Gulf of Mexico records and systematic re-examinations of materials upon which those records are based has never been undertaken, leaving much question as to their relationships with putative Caribbean conspecifics. In this study we focused on extensive new collections not only from the Caribbean coast of Panama, but also materials from the Gulf of Mexico and adjacent waters of Florida, U.S.A., Quintana Roo, Mexico, Belize, Honduras, and Venezuela. In addition, we included Pacific records of amphi-American species.

Materials and Methods

The synonymy for each genus is included in this review, with the generic type species shown in parenthesis. The status of each genus is discussed, followed by information for each species. Synonymies for species include references to the original description and type locality, followed by references subsequent to Haig's (1956) report.

Localities are listed in geographical order from north to south, west to east, and by country. In the western Atlantic, these are listed by zoogeographical provinces as follows: Virginian, from Cape Cod to Cape Hatteras; northern Warm-temperate (= Carolinian), from Cape Hatteras to Cape Canaveral; Gulf of Mexico Warm-temperate, from Cape Romano to Cape Rojo, Mexico; Caribbean, from Cape Rojo to the Orinoco Delta; West Indian, includes the Caribbean Islands; Brazilian, from the Orinoco Delta to Cape Frio; and Argentinian, from Cape Frio to 43/44°S (modified after Briggs 1974; Williams 1984; Boschi 2000). Pacific localities are treated at the end of accounts for materials examined. Additional information to support each record is provided in Appendix I (available at: www.caribjsci.org/dataarchive.html.

The majority of the material examined is part of the Zoological Collection of the University of Louisiana at Lafayette (ULLZ), where records resulted from 37 years of collecting effort, dating back to 1967. In the last 5 years, the number of these holdings doubled as the result of major field expeditions targeting coastal porcelain crabs and other decapods, including particularly productive efforts in the vicinity of Bocas del Toro on the Caribbean coast of Panama. Other primary sites for these collecting campaigns included Fort Pierce, Florida (July 2000, July-August 2001), southern Texas (September 2001), U.S.A.; Veracruz to Quintana Roo, Mexico (July 2002); Belize (October 2002); Pacific coast of Nicaragua (September 2000, November 2001); and Baja California, Mexico (December 2001). Specimens from Venezuela are also included in the study (March-June 1996, April-June, 2001, October 2004). The Colección Nacional de Crustáceos, Instituto de Biología, Universidad Nacional Autónoma de México, México, D. F., México (CNCR) and the National Museum of Natural History, Smithsonian Institution, Washington, D. C., U.S.A. (USNM), provided additional material for study. In addition to the records for the western Atlantic, those for the eastern Pacific are included for amphi-American species.

In the distributional accounts, localities are treated in geographic order as noted above. Those in the western Atlantic are cited first followed in succession by those in the eastern Pacific and those from the eastern Atlantic. No attempt was made to comprehensively include every mention of a species' name to be found in theses, dissertations, and meeting abstracts. We also did not exhaustively review listings in instructional manuals, keys lacking original illustrations or records, and textbooks. In those few cases where records have been based upon theses or abstracts, the specimen identifications were independently verified by one or more of the present authors.

Color photographs of selected Panamanian specimens featured herein were obtained in the field by posing freshly chilled specimens, submerged beneath water, under illuminantion from direct and reflected sunlight. Digital photographs were obtained with a 35 mm Fuji Finepix camera equipped with a Nikon 60 mm Micro Nikkor macrolens. Sex and carapace width (± 0.01 mm = cw) of each photographed specimen were determined prior to archival in the University of Louisiana Zoological Collections (ULLZ).

RESULTS

The porcellanid collection at ULLZ represents 467 records that include over 2,300 specimens belonging to more than 70 species. Sixteen countries and three oceanic regions are represented: the Indo-Pacific with 5 records, eastern Pacific with 75 records, and western Atlantic with 387 records. The western Atlantic component contains 206 records for the Gulf of Mexico. The following systematic account incorporates all the records for the western Atlantic, but only the amphi-American records of the eastern Pacific. Thirteen records from the CNCR and one from the USNM are also included.

Systematic Account

Family Porcellanidae Haworth, 1825
Genus *Clastotoechus* Haig, 1960

Clastotoechus Haig, 1960:175-176 (type species *Petrolisthes diffractus* Haig, 1957, by original designation).—Harvey, 1999:4-7.—Rodríguez et al., in review.

Madarateuchus Harvey, 1999:27 (type species *Clastotoechus vanderhorsti*, by monotypy).—Rodríguez et al., in review.

Remarks.—The genus *Clastotoechus* was proposed to include two western Atlantic species, *Petrolisthes nodosus* Streets, 1872, and *P. vanderhorsti* Schmitt, 1924, and one eastern Pacific species, *P. diffractus* Haig, 1957. Three more species of the genus were subsequently described: *C. gorgonensis* Werding and Haig, 1983, *C. hickmani* Harvey, 1999, and *C. lasios* Harvey, 1999, all from the eastern Pacific.

The monotypic genus *Madarateuchus* Harvey, 1999, was originally proposed to receive *Clastotoechus vanderhorsti* and distinguish this species from the rest of the

species in the genus *Clastotoechus*. However, this species shares unique characters with species of *Clastotoechus* that clearly set them apart from other genera within the family (see Haig 1960:175). Moreover, in recent studies based on molecular data, *C. nodosus* and *C. vanderhorsti* were clearly grouped closely together in a clade separated from other genera of the family (Werding et al. 2001, on the basis of partial DNA-sequences of COI gene; Rodríguez et al. in review, on the basis of partial sequences of the 16S rRNA gene). Further molecular studies including more species of the genus, should better clarify their relationships with *C. vanderhorsti*. Given this information and pending ongoing studies by Werding et al. (Werding, personal communication), recognition of the genus *Madarateuchus* is not justified and it is herein synonymized with *Clastotoechus*.

Clastotoechus nodosus (Streets, 1872)

Petrolisthes nodosus Streets, 1872:133 (type locality St. Martin Island).—Haig, 1956:27-28.—Rodríguez, 1980:218.

Clastotoechus nodosus.—Haig, 1960:177, fig. 5(3).—Rickner, 1975b:163.—Gore and Abele, 1976:15, fig. 2.—Werding, 1977:178, fig. 3 (not fig. 2).—Scelzo, 1982:1131.—Alvarez et al., 1999:9.—Harvey, 1999:7, figs. 2, 4-15.—Hernández, 1999:249, table 2.—Werding et al., 2001:108-109, table 3, fig. 2.—Werding et al., 2003:79-85, tables 1, 2.—Hernández et al., 2003:419-428, figs. 1-6.—Galicia-Castillo and Hernández-Aguilera, 2005:239, 241, fig. 2.—Rodríguez et al., in review.

Clastoechus nodosus.—Werding, 1978b: 215, figs. 1a, b (misspelling).

Clastoechus modosus.—Werding, 1978b: 220 (misspelling).

Material examined.—Punta Delgada (ULLZ 4092, 5233, 5367 to 5369), El Morro (ULLZ 5231, 5232), La Mancha (ULLZ 5370, 5371), Escondida Beach (ULLZ 5372), Veracruz, Mexico. Charagato Bay, Cubagua Island, Venezuela (ULLZ 5341).

Distribution.—Veracruz, Mexico; Galeta Island, Panama; Santa Marta, Colombia; Curaçao; La Tortuga and Cubagua Islands, Venezuela; Cuba; Puerto Rico; St. Martin.

Clastotoechus vanderhorsti (Schmitt, 1924)

Petrolisthes vanderhorsti Schmitt, 1924:73, pl. 8, fig. 7 (type locality Caracas Bay, Curaçao).—Haig, 1956:27.—Rodríguez, 1980:218.

Clastotoechus vanderhorsti.—Haig, 1960: 175, fig. 5 (2).—Lewis, 1960:426.—Haig, 1962:184.—Teytaud, 1971:43.—Markham, 1975:266.—Werding, 1977:180, fig. 2 (not fig. 3).—Scelzo, 1982:1131.—Werding, 1983b:3.—Schoppe, 1991:373.—Schoppe, 1994:107-119, figs. 1-8.—Schoppe and Werding, 1996:181-186.—Hernández, 1999: 246, 249, tables 1, 2.—Werding et al., 2001: 108-109, table 3, fig. 2.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., in review.

Clastoechus vanderhorsti.—Werding, 1978b:215, 220 (misspelling).

Madarateuchus vanderhorsti.—Harvey, 1999:27, figs. 64-75.

Material examined.—La Tortuga Island, Venezuela (ULLZ 5342).

Distribution.—Gulf of Urabá, Santa Marta, and Guajira Colombia; Curaçao and Bonaire; La Tortuga and Cubagua Islands, Venezuela; Cuba; St. Croix, Virgin Islands; Saba; Martinique; Barbados.

Genus *Euceramus* Stimpson, 1860

Euceramus Stimpson, 1860:445 (type species *Euceramus praelongus* Stimpson, 1860, by monotypy).—Haig, 1960:187-188.—Rodríguez et al., in review.

Remarks.—*Euceramus* occurs on both coasts of the Americas. *E. praelongus* Stimpson, 1860, is the only representative of the genus in the western Atlantic, where it is restricted to the northern temperate region in the Virginian and Warm-temperate Provinces (modified after Williams 1984). The species is remarkably rare (Haig 1956), being a highly adapted burrower in subtidal sandy and rubble-covered beaches (Williams 1984). In the eastern Pacific the genus is represented by two species, *E. panatelus* Glassell, 1938, and *E. transversilineatus* (Lockington, 1878) (see Haig 1960).

Euceramus praelongus Stimpson, 1860

Euceramus praelongus Stimpson, 1860: 444-445 (type locality Beaufort, North Carolina).—Haig, 1956:7.—Haig, 1960:187-190.—Tabb and Manning, 1961:599.—Williams, 1965:109, fig. 86.—Roberts, 1968: 121-130, figs. 1-3, table 1.—Rouse, 1970: 140.—Gosner, 1971:539-540, fig. 21-54B.—Menzel, 1971:78.—Van Engel and Sandifer, 1972:157.—Felder, 1973:32, pl. 4, fig. 11.—Sandifer, 1973:245.—Camp et al., 1977:29.—Young, 1978:176.—Maris, 1983:237-246, figs. 1-7.—Truesdale and Andryszak, 1983: 43, table 2.—Williams, 1984:239, fig. 174.—Abele and Kim, 1986:410, 424, 425, fig. a.—Ruppert and Fox, 1988:251, 404.—Britton and Morton, 1989:121, fig. 6-7 D, 245-246, fig 10-1 L, 258.—Williams et al., 1989:35.—Tunnell and Alvarado, 1996:136.—Camp et al., 1998:144.—Hernández, 1999:246, 249, tables 1, 2.—Werding et al., 2003:79-85, table 1.—Galicia-Castillo and Hernández Aguilera, 2005:237.

Material examined.—Fort Pierce, Florida (ULLZ 5245, 5806), offshore Louisiana (ULLZ 4575), Heald Banks, offshore Texas (ULLZ 4457), northern Gulf of Mexico (ULLZ 1308, 1309), U.S.A.

Distribution.—Chesapeake Bay North Carolina; Charleston, South Carolina; eastern and western Florida; Louisiana; and Texas; U.S.A.

Remarks.—The species is endemic to the Virginian and northern Warm-temperate Provinces in the western Atlantic.

Genus *Megalobrachium* Stimpson, 1858

Megalobrachium Stimpson, 1858:228 (type species *Megalobrachium granuliferum* Stimpson, 1858, by original designation).—Haig, 1960:212-213.—Rodríguez et al., in review.

Porcellanides Nobili, 1901:21 (type species *Porcellanides festae* Nobili, 1901, by monotypy).

Porcellanopsis Rathbun, 1910:601 (type species *Porcellanides festae* Nobili, 1901, by monotypy; *Porcellanides* preoccupied by *Porcellanides* Czerniavsky, 1884).—Rodríguez et al., in review.

Pisonella Glassell, 1938:436.

Remarks.—The genus *Megalobrachium* contains 12 species distributed on both coasts of the Americas. Haig (1956) reported *M. poeyi* (Guérin, 1855) as the only representative of this genus in the western North Atlantic, but included two species of *Porcellanopsis* Rathbun, 1910, *P. rosea* (Rathbun, 1900) and *P. soriata* (Say, 1818). *Porcellanopsis* was subsequently combined with *Megalobrachium* (Haig, 1960). Two more species were later described, *M. mortenseni* Haig, 1962, and *M. walteri* Rodrigues da Costa, 1968. The latter has been shown to be a synonym of *M. soriatum* (Veloso and Melo 1993). Four species of this genus are now recognized for the western Atlantic. Preliminary molecular analyses (Rodríguez et al. in review) suggest the validity of *Porcellanopsis* and the need for further study.

Megalobrachium mortenseni Haig, 1962
Plate 1, fig. A

Megalobrachium mortenseni Haig, 1962: 189, figs. 2-5 (type locality west of Congo Cay, northwest of St. John, Virgin Islands).—Gore, 1970a:965.—Coêlho, 1971: 233.—Coêlho and Ramos, 1972:175.—Werding, 1977:181, fig. 4.—Werding, 1978b: 215.—Corredor et al., 1979:32.—Gore, 1982: 6.—Scelzo, 1982:1131.—Werding, 1982: 441.—Veloso and Melo, 1993:175.—Hernández, 1999:249, table 2.—Melo, 1999: 218-219, figs. 141, 142.—Lira et al., 2001:55, 56, 62-64, fig. 4.—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—Caribe Point, Roatán, Bay Islands, Honduras (ULLZ 5450). Bocas del Toro, Panama (ULLZ 5998, 6005, 6007, 6088).

Distribution.—Roatán, Bay Islands, Honduras; Bocas del Toro and Limón Bay, Panama; Santa Marta, Colombia; Margarita Island, Venezuela; St. John, Virgin Islands; from Pará to Sao Paulo, Brazil.

Remarks.—The species is first recorded in Honduras and its range is extended northward. Two morphotypes have been observed among specimens from Panama. In one, the dorsal surface of the carpus and manus has longitudinal rows of pits and is covered with small, coarse granules, as originally described by Haig (1962). In the other, those longitudinal rows of pits cannot be clearly distinguished, and the dorsal surface of the carpus and manus is uneven

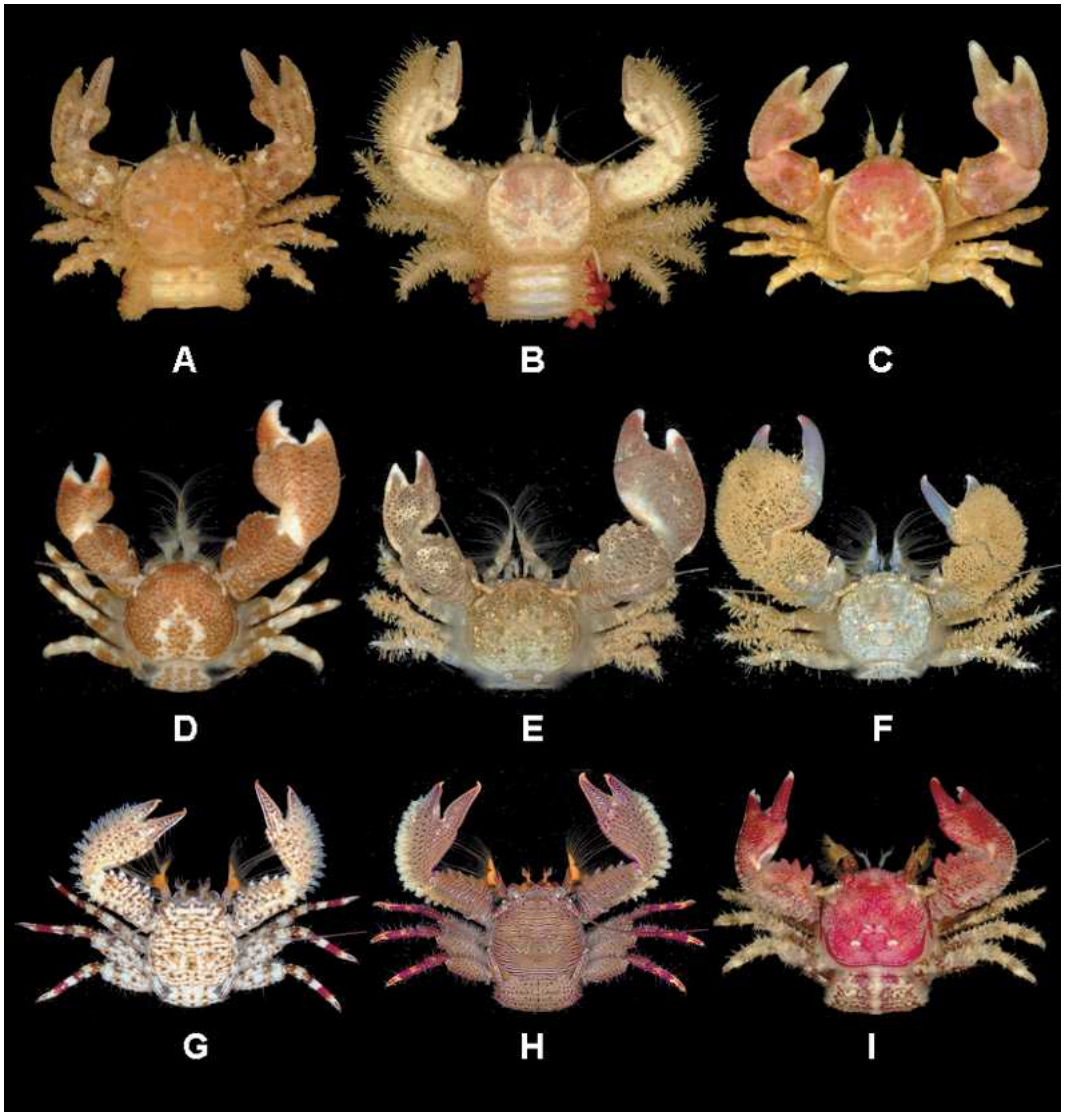

PLATE 1. Selected porcellanids from the vicinity of Bocas del Toro, Panama. A. *Megalobrachium mortenseni* Haig, 1962, female, cw = 2.60 mm, ULLZ 6088. B. *Megalobrachium poeyi* (Guérin, 1855), female, cw = 4.90 mm, ULLZ 6094. C. *Megalobrachium roseum* (Rathbun, 1900), female, cw = 3.46 mm, ULLZ 6095. D. *Pachycheles chacei* Haig, 1956, male, cw = 2.46 mm, ULLZ 6096. E. *Pachycheles cristobalensis* Gore, 1970, male, cw = 4.24 mm, ULLZ 6097. F. *Pachycheles serratus* (Benedict, 1901), male, cw = 5.40 mm, ULLZ 6098. G. *Petrolisthes caribensis* Werding, 1983, male, cw = 4.00 mm, ULLZ 5997. H. *Petrolisthes galathinus* (Bosc, 1802), female, cw = 11.32 mm, ULLZ 6087. I. *Petrolisthes jugosus* Streets, 1872, female, cw = 3.90 mm, ULLZ 6106.

and more heavily granulated (see Plate 1, fig. A).

Megalobrachium poeyi (Guérin, 1855)
Plate 1, fig. B

Porcellana poeyi Guérin, 1855, pl. 2, fig. 4 (type locality Cuba).

Megalobrachium poeyi.—Haig, 1956:33-34 [part, Atlantic only].—Haig, 1960:214-215 [part, Atlantic only].—Haig, 1962:188-189 [part, Atlantic only].—Haig, 1968:57, 71-72 [part, Atlantic only].—Coêlho, 1966:63 [part, Atlantic only].—Coêlho, 1971:233.—Gore, 1971a:404-425, figs. 2, 4, 6, 8, 10, 11C,

F, tables 1-3 [part, Atlantic only].—Gore, 1972a:67-90, figs. 13-18, table 5 [part, Atlantic only].—Gore, 1974:704.—Gore and Abele, 1974:559, 568-573, fig. E.—Gore and Abele, 1976:17.—Voss, 1976:92-93, fig.—Camp et al., 1977:29.—Werding, 1977:182, figs. 1b, 5.—Werding, 1978b:215.—Rodríguez, 1980:219.—Gore, 1982:6.—Scelzo, 1982:1131.—Werding, 1984:5.—Abele and Kim, 1986:412, 414, 415, fig. b.—Williams et al., 1989:35.—Camp et al., 1998:144.—Hernández, 1999:246, 249, tables 1, 2.—Lira et al., 2001:55, 56, 58-60, fig. 2.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:239, 243-244, fig. 5.—Rodríguez et al., in review.

Material examined.—Indian River, Fort Pierce, Florida, U.S.A. (ULLZ 3610). Chemuyil, Quintana Roo, Mexico (CNCR 9818). Bocas del Toro, Panama (ULLZ 6094). Barú, Colombia (ULLZ 4885). El Manglillo, Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5343).

Distribution.—Eastern Florida, U.S.A.; Quintana Roo, Mexico; Bocas del Toro and Caledonia Bay, Panama; Old Providence Island and continental coast of Colombia; Coche, Margarita, and Cubagua Islands, Venezuela; Greater and Lesser Antilles; Paraiba and Sao Paulo, Brazil.

Remarks.—Prior to restriction of this species to Atlantic representatives, references to it commonly encompassed its Pacific sibling, which is now recognized as *Megalobrachium pacificum* Gore and Abele, 1974.

Megalobrachium roseum (Rathbun, 1900)
Plate 1, fig. C

Porcellana rosea Rathbun, 1900:148, pl. 8, fig. 3 (type locality Mamanguape, Brazil).

Porcellanopsis rosea.—Haig, 1956:34-35.—Coêlho, 1966:59.—Rodríguez, 1980:219.

Megalobrachium roseum.—Haig, 1960:225, 227.—Haig, 1966:356.—Coêlho, 1971:233.—Coêlho and Ramos, 1972:175.—Scelzo and Boschi, 1973:213.—Gore and Abele, 1976:17.—Werding, 1977:183, fig. 6.—Werding, 1978b:217.—Gore, 1982:7.—Scelzo, 1982:1131.—Young, 1986:103.—Veloso and Melo, 1993:175.—Hernández, 1999:249, table 2.—Melo, 1999:220-221, figs. 143, 144.—Lira et al., 2001:55, 56, 60-62, fig. 3.—Hernández et al., 2002:113-125, figs. 1-6.—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—Bocas del Toro, Panama (ULLZ 6095, 6101). El Manglillo, Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5344).

Distribution.—Bocas del Toro, Panama; Santa Marta, Colombia; Margarita and Cubagua Islands, La Restringa Lagoon, Venezuela; Martinique; from Maranhao to Sao Paulo, Brazil.

Megalobrachium soriatum (Say, 1818)

Porcellana soriata Say, 1818:456 (type locality St. Catherine's Island, Georgia).—Pounds, 1961:28.—Leary, 1964:28.

Porcellanopsis soriata.—Haig, 1956:35-36.—Tabb and Manning, 1961:599.—Coêlho, 1964:255.—Bullis and Thompson, 1965:10.—Coêlho, 1966:60.—Menzel, 1971:79.

Megalobrachium soriatum.—Haig, 1960:229.—Williams, 1965:112, fig. 89.—Haig, 1966:356.—McCloskey, 1970:30.—Rouse, 1970:141.—Coêlho and Ramos, 1972:175.—Felder, 1973:32-35, pl. 4, fig. 12.—Gore, 1973b:837-856, figs. 1-5, tables 1, 2.—Gore and Abele, 1976:17, fig. 3.—Werding, 1977:185, fig. 7.—Gore et al., 1978:225.—Young, 1978:176.—Felder and Chaney, 1979:25, 28, fig. 3 table 1, appendices I, II.—Hernández-Aguilera and Sosa-Hernández, 1982:42-43.—Reed et al., 1982:768.—Scelzo, 1982:1131.—Wenner and Read, 1982:187, table 2.—Maris, 1983:237-246, figs. 1-7.—Williams, 1984:240, fig. 175.—Abele and Kim, 1986:412, 414, 415, fig. a.—Young, 1986:103.—Ruppert and Fox, 1988:249, 404.—Williams et al., 1989:35.—Markham et al., 1990:427.—Veloso and Melo, 1993:175.—Hernández, 1999:246, 249, tables 1, 2.—Melo, 1999, p. 222-223, figs. 145, 146.—Hernández-Aguilera et al., 1996:49.—Tunnell and Alvarado, 1996:136.—Camp et al., 1998:144.—Alvarez et al., 1999:9.—Lira et al., 2001:55, 56-68, fig. 1.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:239, 244-245, fig. 6.—Rodríguez et al., in review.

Megalobrachium walteri Rodrigues da Costa, 1968.—Veloso and Melo, 1993:175.

Material examined.—Fort Pierce (ULLZ 5964) and Bahia Honda State Park (ULLZ

5262), Florida; San Padre Island (ULLZ 2167, 5279) and 7½ Fathom Reef (ULLZ 2151 to 2166, 2168, 2169), Texas, U.S.A. Barra del Tordo, Tamaulipas (ULLZ 5819); Reef off Puerto Morelos, Quintana Roo (CNCR 5734), Mexico. Bocas del Toro, Panama (ULLZ 6002, 6086).

Distribution.—North Carolina, South Carolina, Georgia, eastern and western Florida, Texas, U.S.A.; Tamaulipas, Veracruz, Campeche, and Quintana, Mexico; Bocas del Toro and Bahía Caledonia, Panama; Santa Marta, Colombia; Margarita Island, Venezuela; Martinique; Barbados; from Ceará to Sao Paulo, Brazil.

Remarks.—While preliminary genetic analyses suggest that trans-Floridian populations of *Megalobrachium soriatum* are genetically divergent (Rodríguez et al. in review), differences in morphology were not readily apparent between specimens from eastern Florida (Bahia Honda, Florida Keys) to those from the Gulf of Mexico.

Genus *Minyocerus* Stimpson, 1858

Minyocerus Stimpson, 1858:229 (type species *Porcellana angusta* Dana, 1852, by original designation).—Haig, 1960:193.—Rodríguez et al., in review.

Porcellina Müller, 1862:194 (type species *Porcellina stellicola* Müller, 1862, by monotypy).

Remarks.—*Minyocerus* is represented by only two species, *M. angustus* (Dana, 1852) in the western Atlantic and *M. kirki* Glassell, 1938 in the eastern Pacific. Both species seem to be obligatory commensals on echinoderms, mainly confined to species of the genus *Luidia* (Asteroidea) and also found on a few genera of Ophiuroidea (Haig 1956, 1960; Werding 1983b).

Minyocerus angustus (Dana, 1852)

Porcellana angusta Dana, 1852:423 (type locality Rio de Janeiro, Brazil).

Minyocerus angustus.—Haig, 1956:30-31.—Holthuis, 1959:161.—Haig, 1962:184.—Rodrigues da Costa, 1964:565.—Haig, 1966:354.—Coêlho, 1966:61.—Fausto-Filho, 1967:12.—Gore and Shoup, 1968:240-248, figs. 1-3.—Gore, 1970a:967.—Coêlho, 1971:233.—Coêlho and Ramos, 1972:174.—Gore, 1974:705.—Werding, 1977:187, fig. 8.—Rodríguez, 1980:218.—Scelzo, 1982:1132.—Silva et al., 1989:138, figs. 8, 14.—Veloso and Melo, 1993:176.—Hernández, Bolaños, and Graterol, 1996:87-92, figs. 1-3.—Hernández, 1999:246, 249, tables 1, 2.—Melo, 1999:224-225, figs. 147, 148.—Werding et al., 2003:79-85, tables 1, 2.—Hernández et al., in press.

Material examined.—Punta Arenas, Cubagua Island, Venezuela (ULLZ 5966).

Distribution.—Belize; Honduras; Nicaragua; Costa Rica; Limón Bay and Colón, Panama; Gulf of Morosquillo and Santa Marta, Colombia; La Tortuga, Margarita, and Cubagua Islands, Venezuela; Suriname; from Pará to Santa Catarina, Brazil.

Genus *Neopisosoma* Haig, 1960

Neopisosoma Haig, 1960:123-124 (type species *Neopisosoma bicapillatum* Haig, 1960, by original designation).—Werding et al., 2001:105-110, tables 1-3.—Rodríguez et al., 2004:299, 306-307.—Rodríguez et al., in review.

Remarks.—*Neopisosoma* was proposed to contain a group of species from the two coasts of the Americas, which were previously grouped in the genera *Pisosoma* Stimpson, 1858, and *Pachycheles* Stimpson, 1858. In addition to the two species recognized by Haig (1956), *N. angustifrons* (Benedict, 1901) and *N. curacaoense* Schmitt, 1924, Werding (1986) described two other species, *N. neglectum* Werding, 1986 and *N. orientale* Werding, 1986, from the Caribbean. An undescribed species from Quintana Roo, Mexico, was found in the course of the present study and is being described at this time. The genus contains four valid species in the western Atlantic and three in the eastern Pacific, in addition to at least one more western Atlantic species currently in description.

Two morphologically different groups of *Neopisosoma* can be distinguished (see Haig 1960; Werding et al. 2001; Rodríguez et al. 2004). One group is characterized by the subquadrate carapace; side walls incomplete, with a narrow projection extending to mesobranchial level; chelipeds with flattened granules and carpus with crests; tel-

son 5 or 7-plated; and male pleopods present. This group includes *N. bicapillatum*, *N. curacaoense*, *N. mexicanum* (Streets, 1871), *N. neglectum*, and *N. orientale*. The second group has a rounded carapace; side walls incomplete, ending at the epibranchial level; chelipeds with rounded, projecting granules and no crests on carpus; telson 5-plated; no male pleopods. This group contains *N. angustifrons*, *N. dohenyi* Haig, 1960, and *Neopisosoma* sp. Additionally, the paraphyly of *Neopisosoma* was suggested by a molecular analysis (Werding et al. 2001).

The status of *Neopisosoma* as a distinct genus from *Pachycheles* was discussed by Gore (1977), Werding (1986), Werding and Müller (1990), Werding et al. (2001), and Rodríguez et al. (2004).

Neopisosoma angustifrons (Benedict, 1901)

Pisosoma angustifrons Benedict, 1901:135, pl. 3, fig. 6 (type locality Trinidad).—Haig, 1956:15.

Neopisosoma angustifrons.—Haig, 1960: 124, 131.—Haig, 1962:181.—Rickner, 1975b: 163.—Gore and Abele, 1976:18.—Gore, 1977:258-300, figs. 1-8.—Werding, 1977:187, fig. 9.—Werding, 1978b:217.—Rodríguez, 1980:214, pl. 2.—Scelzo, 1982:1132.—Abele and Kim, 1986:410, 424, 425, fig. b.—Werding, 1986:162, fig. 1.—Williams et al., 1989:35.—Hernández-Aguilera et al., 1996: 49.—Camp et al., 1998:144.—Alvarez et al., 1999:9.—Hernández, 1999:246, 249, tables 1, 2.—Werding et al., 2001:105-110, fig. 2, tables 1-3.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., 2004:301, 306, table 3.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 242-243.—Rodríguez et al., in review.

Material examined.—Punta Delgada (ULLZ 4091, 5235, 5373 to 5384, 5451), El Morro (ULLZ 5234), La Mancha (ULLZ 5385, 5386), Escondida Beach (ULLZ 5387), Veracruz, Mexico. Charagato Bay, Cubagua Island, Venezuela (ULLZ 5345).

Distribution.—Veracruz, Mexico; Galeta Island, Panama; Santa Marta, Colombia; Curaçao and Bonaire; La Tortuga, Margarita, and Cubagua Islands, Venezuela; Trinidad; Bahamas; Puerto Rico; Saba; Guadeloupe.

Neopisosoma curacaoense (Schmitt, 1924)

Pisosoma curacaoensis Schmitt, 1924:75, pl. 8, figs. 1-3 (type locality Spanish Bay, Curaçao).

Pisosoma curacaoense.—Haig, 1956:15-16.

Neopisosoma curacaoense.—Haig, 1960: 124, 126-127.—Haig, 1962:181.—Rodríguez, 1980:214.—Scelzo, 1982:1132.—Werding, 1986:162, 166, figs. 2a-j.—Markham et al., 1990:427.—Hernández, 1999:249, table 2.—Werding et al., 2001:107, table 1.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 242-243.

Neopisosoma caracaoensis.—Galicia-Castillo and Hernández-Aguilera, 2005: 243, fig. 4 (misspelling).

Not *Neopisosoma curacaoense*.—Werding, 1978b:213-214, 217-218, 220, figs. 2a, b.

Not *N. curacaoensis*.—Werding, 1978b: 214.

Material examined.—None.

Distribution.—Quintana Roo, Mexico; Aruba, Curaçao, and Bonaire; La Tortuga Island, Venezuela; Bahamas; Puerto Rico; St. Martin; Virgin Islands; Saba; Grenada.

Remarks.—The record for Quintana Roo, Mexico (Markham et al. 1990) was based on one specimen and no further material has been reported from the area. Markham et al. (1990) included Colombia in the distribution of *N. curacaoense,* based on the record presented in Werding (1978); however, this record was later described as *N. neglectum* Werding, 1986, thus excluding N. curacaoense from Colombia (see Werding 1986). Galicia-Castillo and Hernández-Aguilera (2005:243) in error listed Colombia as part of the range of *N. curacaoense.*

Neopisosoma neglectum Werding, 1986

Neopisosoma curacaoense.—Werding, 1978b:213-214, 217-218, 220, figs. 2a, b.

Neopisosoma neglectum Werding, 1986: 162, 169, fig. 3 (type locality Santa Marta, Colombia).—Werding and Müller, 1990: 363-374, figs. 1-6.—Hernández, 1999:246, 249, tables 1, 2.—Werding et al., 2001:105-110, tables 1-3, figs. 1, 2.—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—None.

Distribution.—Gulf of Darién, Gulf of Urabá, and Santa Marta, Colombia; St. Martin; Grenada.

Neopisosoma orientale Werding, 1986

Neopisosoma orientale Werding, 1986:162, 172, fig. 4 (type locality Blanchisseuse Bay, Trinidad).—Lira, 1997:57, fig. 15.—Hernández, 1999:249, table 2.—Werding et al., 2001:107, fig. 2, table 1.—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—La Pared, Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5346).

Distribution.—Margarita Island, Venezuela; Blanchisseuse Bay, Trinidad.

Neopisosoma sp.

Material examined.—Punta Nizuc, Cancún, Quintana Roo, Mexico (ULLZ 4844).

Remarks.—This is a new species currently being described by D. L. Felder and I. T. Rodríguez.

Genus *Pachycheles* Stimpson, 1858

Pachycheles Stimpson, 1858:228 (type species *Porcellana grossimana* Guérin, 1835, by original designation).—Haig, 1960:131-132.—Rodríguez et al., in review.

Pisosoma Stimpson, 1858:228 (type species *Porcellana pisum* H. Milne Edwards, 1837, by original designation).—Rodríguez et al., in review.

Remarks.—The genus *Pachycheles* is the second most speciose of the family and includes over 40 valid species worldwide distributed. Haig (1956) included seven species in her list, leaving out the Brazilian endemic *P. greeleyi* (Rathbun, 1900) and *P. laevidactylus* Ortmann, 1892. These species were initially described from Brazil and later recognized as valid species by Harvey and De Santo (1996), who also considered *P. haigae* Rodrigues da Costa, 1960, a junior synonym of *P. laevidactylus.* Subsequent to Haig's paper, three additional species have been described: *P. chubutensis* Boschi, 1963, a southern temperate species, *P. cristobalensis* Gore, 1970a, and *P. susanae* Gore and Abele, 1974, the latter two from the Caribbean Sea. A new species from Bocas del Toro, Panama, was found in this study and is being described. To date, there are 12 western Atlantic valid species in this genus. On the basis of molecular characters of the mitochondrial genes COI (Werding et al. 2001) and 16S rRNA (Stillman and Reeb 2001; Rodríguez et al. in review), the genus appears to be paraphyletic and is in need of revision.

Pachycheles ackleianus A. Milne-Edwards, 1880

Pachycheles ackleianus A. Milne-Edwards, 1880:36 (type localities west coast of Florida, U.S.A. and Jolbos Islands, Mexico).—Haig, 1956:13.—Haig, 1960:143-144.—Haig, 1962:182.—Coêlho, 1964:255.—Bullis and Thompson, 1965:10.—Coêlho, 1966:52.—Haig, 1966:352.—Gore, 1970a: 962.—Coêlho, 1971:233.—Coêlho and Ramos, 1972:173.—Gore, 1974:705, fig. 2.—Rickner, 1975b:162.—Werding, 1977:188, fig. 10.—Corredor et al., 1979:32.—Westinga and Hoetjes, 1981:141.—Gore, 1982:7.—Scelzo, 1982:1132.—Werding, 1982:441.—Werding, 1983b:5.—Abele and Kim, 1986:412, 416, 417, fig. d.—Williams et al., 1989:35.—Markham et al., 1990:427.—Veloso and Melo, 1993:176.—Camp et al., 1998:144.—Hernández, 1999:249, table 2.—Melo, 1999:228-229, figs. 149, 150.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., 2004:291.—Galicia-Castillo and Hernández-Aguilera, 2005:239, 245-246, fig. 7.—Rodríguez et al., in review.

Material examined.—Looe Key Reef, Florida (ULLZ 4824, 4826), off Tortugas, Florida (ULLZ 5798), offshore western Florida (ULLZ 5278), off Sanibel Island, western Florida, (ULLZ 5669), U.S.A. Roca Chica, Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5347).

Distribution.—Tampa Bay and Florida Keys, Florida, U.S.A.; Veracruz, Yucatán, and Quintana Roo, Mexico; Mulatas Archipelago and Canal Zone, Panama; Cabo de La Vela and Santa Marta, Colombia; Los Roques, Margarita, and Los Testigos Islands, Venezuela; Cuba; Jamaica; Dominican Republic; St. Thomas; Antigua; Martinique; St. Lucia; Barbados; Guyanas; Pernambuco to Bahia, Brazil.

Pachycheles chacei Haig, 1956
Plate 1, fig. D

Pachycheles chacei Haig, 1956:9, pl. 1, figs. 1-6 (type locality Caledonia Bay, Panama).—Haig, 1960:134, pl. 31, fig. 3.—Haig, 1968:57, 68.—Gore and Abele, 1976: 19.—Werding, 1977:190, fig. 11.—Werding, 1978b:217.—Corredor et al., 1979:32.—Gore, 1982:8.—Scelzo, 1982:1133.—Werding, 1982:441.—Werding, 1984:5.—Lemaitre and Alvarez-León, 1992:47, table 1.—Hernández and Bolaños, 1995:75-76.—Hernández, 1999:249, table 2.—Hernández et al., 1999:27-29, fig. 2, table 1.—Melo, 1999:230-231, figs. 151, 152.—Werding et al., 2001:107, table 1.—Werding et al., 2003: 79-85, tables 1, 2.—Rodríguez et al., 2004: 291.

Material examined.—Bocas del Toro, Panama (ULLZ 6096, 6102). Rosario Islands, Colombia (ULLZ 5294).

Distribution.—Western Atlantic: Bocas del Toro and Gulf of Darién, Panama, to Santa Marta, Colombia; Old Providence and Rosario Islands, Colombia; Margarita Island, Venezuela; Alagôas, Brazil. Eastern Pacific: San José, Guatemala; Acajutla, El Salvador; Verde Island and Piñas Bay, Panama; Humboldt Bay, Colombia; La Libertad and Santa Elena Bay, Ecuador.

Pachycheles chubutensis Boschi, 1963

Pachycheles chubutensis Boschi, 1963:35, figs. 2, 3a, e, g (type locality Gulf of San Matías, Chubut, Argentina).—Haig, 1966: 353.—Coêlho and Ramos, 1972:173.—Scelzo and Boschi, 1973:207, table 1.—Boschi, 1979:137.—Bremec and Cazzaniga, 1984:149-162, figs. 3, 4.—Silva et al., 1989: 135, figs. 3, 4, 17-21.—Veloso and Melo, 1993:177.—Hernández, 1999:249, table 2.—Melo, 1999:232-233, figs. 153, 154.—Werding et al., 2003:79-85, table 1.

Material examined.—None.

Distribution.—From Florianópolis, Brazil, to Chubut, Argentina.

Pachycheles cristobalensis Gore, 1970
Plate 1, fig. E

Pachycheles cristobalensis Gore, 1970a:958, figs. 1, 2 (type locality Limón Bay, Panama).—Gore and Abele, 1976:19.—Werding, 1977:175.—Gore, 1982:8.—Scelzo, 1982:1133.—Hernández, 1999:249, table 2.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., 2004:291.

Material examined.—Bocas del Toro, Panama (ULLZ 6097, 6103).

Distribution.—Limón Bay, Bocas del Toro, and Galeta Island Panama.

Remarks.—This species is endemic to the Atlantic coast of Panama.

Pachycheles greeleyi (Rathbun, 1900)

Pisosoma greeleyi Rathbun, 1900:174, pl. 8, fig. 4 (type locality Coral Reef, Maceio, Alagôas, Brazil).

Pachycheles greeleyi.—Haig, 1956:9.—Haig, 1966:352.—Coêlho, 1966:52.—Coêlho, 1971:233.—Coêlho and Ramos, 1972:173.—Young, 1986:103.—Veloso and Melo, 1993: 177.—Hernández, 1999:249, table 2.—Melo, 1999:234-235, figs. 155, 156.—Werding et al., 2003:79-85, tables 1, 2.

Pachycheles greelei.—Werding et al., 2001: 107, table 1 (misspelling).

Material examined.—None.

Distribution.—From Pará to Espírito Santo, Brazil.

Remarks.—The species is endemic to Brazil.

Pachycheles laevidactylus Ortmann, 1892

Pachycheles laevidactylus Ortmann, 1892: 266, pl. 12, fig. 1 (type locality Brazil; this locality is incorrect *fide* Ortmann, 1897:293 *in* Haig, 1960:167).—Harvey and DeSanto, 1996:710, fig. 2.—Melo, 1999:236-237, figs. 157, 158.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguéz et al., 2004:291, 302-305, tables 1, 2.

Pachycheles grossimanus Ortmann, 1897: 292.—Haig, 1955:43 (in part).—Haig, 1960: 167, pl. 35, fig. 1 (in part).

Pachycheles haigae Rodrigues da Costa, 1960:21, figs. 1-4.—Boschi, 1963:31, figs. 1, 3.—Haig, 1966:353.—Boschi et al., 1967:6-26, figs. 1-8, table 1.—Coêlho and Ramos, 1972:173.—Scelzo and Boschi, 1973:207, table 1.—Boschi, 1979:137.—Bremec and Cazzaniga, 1984:149-162, fig. 2.—Silva et al., 1989:134, figs. 2, 11.—Boschi et al., 1992:

56.—Veloso and Melo, 1993:177.—Hernández, 1999:246, 249, tables 1, 2.

Pachycheles rudis Moreira, 1901:32, 91.

Pachycheles haige.—Coêlho, 1966:54 (misspelling).

Material examined.—Rio de Janeiro, Brazil (ULLZ 5439).

Distribution.—From Pernambuco to Santa Catarina, Brazil; Rocha, Uruguay; Mar de Plata and Miramar, Argentina.

Pachycheles monilifer (Dana, 1852)

Porcellana rugosimanus White, 1847:63 (*nomen nudum*).

Porcellana monilifera Dana, 1852:413; 1855, pl. 26, fig. 3 (type locality Rio de Janeiro, Brazil).

Pachycheles monilifer.—Rathbun, 1900: 148.—Haig, 1956:13.—Rodriguez, 1959: 274.—Haig, 1960:160-162, pl. 33, fig. 4.—Haig, 1962:183.—Rodrigues da Costa, 1962: 5, 7.—Rodrigues da Costa, 1964:565.—Coêlho, 1966:53.—Haig, 1966:353.—Coêlho and Ramos, 1972:172.—Gore, 1973a:132-150, figs. 1-6, table 1.—Gore, 1974:707.—Rickner, 1975b:162.—Camp et al., 1977: 29.—Werding, 1977:190, fig. 12.—Gore et al., 1978:225.—Rodríguez, 1980:213, pl. 1.—Reed et al., 1982:768.—Scelzo, 1982:1133.—Abele and Kim, 1986:412, 418, 419, fig. a.—Silva et al., 1989:133, figs. 1, 10.—Williams et al., 1989:35.—Veloso and Melo, 1993: 178.—Hernández-Aguilera et al., 1996:49.—Camp et al., 1998:144.—Alvarez et al., 1999: 9.—Hernández, 1999:246, 249, tables 1, 2.—Hernández et al., 1999:27, table 1.—Melo, 1999:238-239, figs. 159, 160.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., 2004:291, tables 1, 2.—Hiller et al., 2004: 130, 134, 135, table 1.—Galicia-Castillo and Hernández-Aguilera, 2005:239, 246-247, fig. 8.—Rodríguez et al., in review.

Material examined.—Fort Pierce (ULLZ 5246), Jenson Beach (ULLZ 3631), off St. Lucie (ULLZ 5823), eastern Florida; Atlantic coast of Florida (ULLZ 5644, 5657, 5956, 5957), U.S.A. Barra del Tordo, Tamaulipas (ULLZ 5821); Punta Delgada (ULLZ 5236), Escondida Beach (ULLZ 5388), Veracruz, Mexico. Charagato Bay, Cubagua Island, Venezuela (ULLZ 5348).

Distribution.—Western Atlantic: Eastern Florida, U.S.A.; Tamaulipas, Veracruz, Campeche, and Quintana Roo, Mexico; Santa Marta, Cabo de la Vela, and Rosario Islands, Colombia; Margarita and Cubagua Islands, Venezuela; Trinidad; St. Thomas and St. John; from Pará to Santa Catarina, Brazil. Eastern Pacific: La Libertad, Ecuador; Cancas, Peru.

Remarks.—Haig (1960) stated that her record of *Pachycheles monilifer* for the eastern Pacific was based on a single juvenile female and that it was tentatively referred to this species, but the exact determination of its status must await recovery of adult material from the Pacific coast. New records recently confirmed the presence of this species in the eastern Pacific (Hiller et al. 2004).

Pachycheles pilosus (H. Milne Edwards, 1837)

Porcellana pilosa H. Milne Edwards, 1837: 225 (type locality Charleston, South Carolina).

Pachycheles pilosus.—Schmitt, 1924:76.—Haig, 1956:11.—Haig, 1962:182.—Williams, 1965:108, fig. 84.—Werding, 1977:192, fig. 13.—Young, 1978:176.—Corredor et al., 1979:32.—Rodríguez, 1980:214.—Scelzo, 1982:1133.—Werding, 1982:441.—Werding, 1984:6.—Markham et al., 1990:427.—Williams 1984:241, fig. 176.—Abele and Kim, 1986:412, 416, 417, fig. a.—Scelzo and Varela, 1988:39, fig. 2.—Williams et al., 1989:35.—Martínez-Iglesias et al., 1993: 13.—Hernández-Aguilera et al., 1996:49.—Camp et al., 1998:144.—García et al., 1998: 28-29, table 1.—Hernández, 1999:249, table 2.—Nizenski, 2003:116.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., 2004:291.—Galicia-Castillo and Hernández-Aguilera, 2005:239, 247, fig. 9.—Piñate et al., 2005.—Rodríguez et al., in review.

Material examined.—Cancún (ULLZ 4845), Puerto Morelos (CNCR 5645), Majahual (ULLZ 5389), Quintana Roo, Mexico. Cayo de Indios, off Isle of Pines (= Isla de la Juventud), Cuba (ULLZ 5454). Punta Brava, Rosario Islands, Colombia (ULLZ 4483). La Tortuga Island, Venezuela (ULLZ 5349).

Distribution.—Charleston, South Carolina, Key Biscayne and Key West, eastern

Florida, Sarasota Bay, western Florida, U.S.A.; Campeche and Quintana Roo, Mexico; Cartagena, Santa Marta, Old Providence and Rosario Islands, Colombia; Aruba, Curaçao, and Bonaire; Aves, La Blanquilla, and La Tortuga Islands, Venezuela; Tobago; Bahamas; Cuba; Puerto Rico; St. Thomas; Guadeloupe; Barbados.

Pachycheles riisei (Stimpson, 1859)

Pisosoma riisei Stimpson, 1858:228 (*nomen nudum*), 1859:75 (type locality St. Thomas).

Pachycheles riisei.—Haig, 1956:12.—Haig, 1962:182.—Coêlho, 1966:54.—Coêlho and Ramos, 1972:172.—Fausto-Filho, 1974:8.—Werding, 1977:192, fig. 14.—Werding, 1978b:219.—Corredor et al., 1979:32.—Scelzo, 1982:1133.—Werding, 1982:441.—Werding, 1984:6.—Abele and Kim, 1986: 412, 416, 417, fig. b.—Young, 1986:103.—Williams et al., 1989:35.—Veloso and Melo, 1993:178.—Hernández and Bolaños, 1995: 75-76.—Camp et al., 1998:144.—Hernández, 1999:249, table 2.—Melo, 1999: 240-241, figs. 161, 162.—Werding et al., 2001:105-106, fig. 1.—Werding et al., 2003: 79-85, tables 1, 2.—Rodríguez et al., 2004: 291.

Material examined.—Carrie Bow Cay, Belize (ULLZ 5453). El Manglecito, Cubagua Island, Venezuela (ULLZ 5350).

Distribution.—Key West, Florida, U.S.A.; Carrie Bow Cay, Belize; Gulf of Darién, Santa Marta, Old Providence and Rosario Islands, Colombia; Margarita and Cubagua Islands, Venezuela; Tobago; Puerto Rico; St. Thomas; Barbados; Fernando de Noronha, Trindade, Paraíba and Alagôas, Brazil.

Remarks.—The first record for Belize is presented in this study.

Pachycheles rugimanus
A. Milne-Edwards, 1880

Pachycheles rugimanus A. Milne-Edwards, 1880:36 (type localities Contoy and west of Florida).—Haig, 1956:12.—Coêlho, 1964: 255.—Williams, 1965:108, fig. 85.—Cain, 1972:80.—Young, 1978:176.—Soto, 1980: 90.—Scelzo, 1982:1133.—Wenner and Read, 1982:186, 195, tables 2, 5.—Williams, 1984: 242, fig. 177.—Abele and Kim, 1986:412, 416, 417, fig. c.—Williams et al., 1989:35.—Markham et al., 1990:427.—Veloso and Melo, 1993:178.—Camp et al., 1998:144.—Alvarez et al., 1999:9.—Hernández, 1999: 249, table 2.—Melo, 1999:242-243, figs. 163, 164.—Werding et al., 2001:105-106, fig. 1.—Nizenski, 2003:117.—Werding et al., 2003: 79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:239, 247-248, fig. 10.

Material examined.—Off Florida (ULLZ 2043, 2048), off Tampa Bay, Florida (ULLZ 5824), U.S.A.

Distribution.—Beaufort and Cape Lookout, North Carolina and west Florida, U.S.A.; Veracruz and Quintana Roo, Mexico; St. Thomas, Virgin Islands; Suriname; from Amapá to Pernambuco, Brazil.

Pachycheles serratus (Benedict, 1901)
Plate 1, fig. F

Pisosoma serrata Benedict, 1901:135, pl. 3, fig. 7 (type locality Mayagüez, Puerto Rico).

Pachycheles serratus.—Haig, 1956:8-9.—Haig, 1962:181.—Gore, 1970a:962, fig. 2.—Gore and Abele, 1976:20.—Werding, 1977: 194, fig. 15.—Werding, 1978b:219.—Corredor et al., 1979:32.—Gore, 1982:9.—Scelzo, 1982:1133.—Werding, 1982:441.—Scelzo, 1983:80.—Hernández, 1999:246, 249, tables 1, 2.—Werding et al., 2001:107-109, fig. 2, tables 1, 3.—Lira et al., 2003:149-151.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., 2004:291-301, figs. 1-6, tables 1, 2.

Material examined.—Bocas del Toro, Panama (ULLZ 6001, 6098, 6104, 6108). Punta Bolívar, Colombia (ULLZ 5295).

Distribution.—Bocas del Toro and Caledonia Bay, Panama; Santa Marta and Punta Bolívar, Colombia; Margarita Island, Venezuela; Puerto Rico; St. Thomas.

Pachycheles susanae Gore and Abele, 1974

Pachycheles susanae Gore and Abele, 1974: 560, fig. 1 (type locality Galeta Island, Panama).—Gore and Abele, 1976:20.—Werding, 1977:195, fig. 16.—Werding, 1978b:219.—Corredor et al., 1979:32.—Gore, 1982:10.—Scelzo, 1982:1133.—Werding, 1982:442.—Scelzo, 1983:80.—Scelzo, 1984:374.—Hernández, 1999:249,

table 2.—Werding et al., 2001:105-106, fig. 1, table 1.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., 2004:291.—Galicia-Castillo and Hernández-Aguilera, 2005:237, 239, 248-249, fig. 11.—Rodríguez et al., in review.

Material examined.—Puerto Morelos, Quintana Roo, Mexico (CNCR 7273). Bocas del Toro (ULLZ 6089) and María Grande (ULLZ 5351), Panama. El Manglecito, Cubagua Island, Venezuela (ULLZ 5352).

Distribution.—Quintana Roo, Mexico; Bocas del Toro, María Grande, and Galeta Island, Panama; Rosario Islands and Santa Marta, Colombia; Isla Cubagua, Venezuela; Martinique.

Pachycheles sp.

Material examined.—Bocas del Toro, Panama (ULLZ 6107).

Distribution.—Bocas del Toro, Panama.

Remarks.—This is a new species being described by D. L. Felder and I. T. Rodríguez.

Genus *Parapetrolisthes* Haig, 1962

Parapetrolisthes Haig, 1962:173 (type species *Petrolisthes tortugensis* Glassell, 1945, by monotypy).—Rodríguez et al., in review.

Remarks.—The genus *Parapetrolisthes* Haig, 1962, was defined for a species previously included in the genus *Petrolisthes* Stimpson, 1858. *P. tortugensis* shows a number of characters not present in any other porcellanid species. The peculiar spoon-shaped finger tips and the compressed, truncate teeth that occur on the dactylus of the major cheliped have been considered homologous to those in the family Galatheidae (H. Kraus et al. unpublished). However, molecular analyses (partial sequences of the 16S rRNA gene) group this species within the clade of the *P. galathinus*-complex, supporting their close relationship (Rodríguez et al. in review). The presence of distinct, transverse, piliferous striations on the carapace seems to be a unifying character within the complex, while the shape of the fingers and chelipeds in *Parapetrolisthes*, appears to reflect feeding adaptations convergent with some galatheid forms.

Parapetrolisthes tortugensis (Glassell, 1945)

Petrolisthes tortugensis Glassell, 1945:228, fig. 2 (type locality Tortugas, Florida).—Haig, 1956:22.—Rodríguez, 1980:217.

Parapetrolisthes tortugensis.—Haig, 1962: 173, fig. 1.—Gore, 1974:707.—Corredor et al., 1979:32.—Scelzo, 1982:1131.—Werding, 1982:442, fig. 2.—Lemaitre, 1984:428.—Abele and Kim, 1986:410, 424, 425, fig. c.—Williams et al., 1989:35.—Camp et al., 1998: 144.—Hernández, 1999:249, table 2.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., in review.

Material examined.—Looe Key Reef, Florida Keys, U.S.A. (ULLZ 4825, 5825).

Distribution.—Looe Key Reef and Dry Tortugas, Florida, U.S.A.; Rosario Islands and Santa Marta, Colombia; La Tortuga Island, Venezuela; Bahamas; Virgin Islands.

Genus *Petrolisthes* Stimpson, 1858

Petrolisthes Stimpson, 1858:227 (type species *Porcellana violacea* Guérin, 1831, by original designation).—Haig, 1960:21-24.—Rodríguez et al., in review.

Remarks.—*Petrolisthes* is the most speciose of all porcellanid genera with over 100 valid species worldwide. Haig (1956) recognized ten species for the western North Atlantic and later classified two of them in the genus *Clastotoechus* Haig, 1960, and one in the genus *Parapetrolisthes* Haig, 1962. In the latter paper, she reincorporated *Petrolisthes jugosus* Streets, 1872, into the genus *Petrolisthes,* where it was initially included before being treated by Haig (1956) as *Pisosoma jugosum*. In the following decades eight new species from the western Atlantic were assigned to the genus (Gore 1983; Werding 1978a, 1978b, 1983a, 1996; Werding and Hiller 2002; Werding and Kraus 2002). *Petrolisthes tonsorius* Haig, 1960, formerly known from only the eastern Pacific, was reported from the southern Caribbean Sea (Werding 1977; Hernández et al. 1999), and *P. robsonae* Glassell, 1945, another Pacific species, apparently migrated through the Panama Canal and was reported several times on the Atlantic side of the Canal (Haig 1960; Abele and Kim 1989). *Petrolisthes cessacii* A. Milne-Edwards, 1878, from

the Gulf of Mexico and the Caribbean, was found to be a junior synonym of *P. marginatus* Stimpson, 1859 (see Gore 1982, 1983), and *P. serratus* Henderson, 1888 from Brazil, was concluded to be a junior synonym of *P. amoenus* (Guérin, 1855) (Rathbun 1900). *Petrolisthes costai* Rodrigues da Costa, 1968, was never confirmed as a valid species. To date, the genus includes 18 valid species in the western Atlantic.

Petrolisthes amoenus (Guérin, 1855)

Porcellana amoena Guérin, 1855, pl. 2, fig. 2 (type locality Cuba).

Petrolisthes amoenus.—Haig, 1956:25-26.—Chace, 1956a:152.—Haig, 1962:177.—Rodrigues da Costa, 1964:565.—Haig, 1966: 352.—Coêlho, 1971:233.—Coêlho and Ramos, 1972:173.—Gore, 1974:707, fig. 3.—Werding, 1977:198, fig. 17.—Rodríguez, 1980:217.—Scelzo, 1982:1133.—Werding, 1984:7, fig. 1.—Veloso and Melo, 1993: 179.—Hernández, 1999:249, table 2.—Melo, 1999:246-247, figs. 165, 166.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 249, fig. 12.

Petrolisthes serratus Henderson, 1888:107, pl. 11, figs. 2, 2a.—Coêlho, 1966:58.—Fausto-Filho, 1975:80.

Petrolisthes? serratus.—Fausto-Filho, 1974:8.

Material examined.—El Manglecito, Cubagua Island, Venezuela (ULLZ 5353).

Distribution.—Florida Straits, U.S.A.; Yucatán, Mexico; Old Providence Island and Santa Marta, Colombia; Curaçao and Bonaire; Los Roques and Cubagua Islands, Venezuela; Trinidad; Cuba; Puerto Rico; Barbados; Alagôas and Bahia, Brazil.

Petrolisthes armatus (Gibbes, 1850)

Porcellana armata Gibbes, 1850:190 (type locality Florida).

Petrolisthes armatus.—Haig, 1956:19.—Chace, 1956b:14, 17-21, fig. 5.—Haig, 1959: 328.—Parker, 1959:2132, 2135, 2161, pl. IV, fig. 22a, b, appendix table II.—Haig, 1960: 25, 50-55, 57, 59, 269-272, 386-387, pl. 19, fig. 2, table 11.—Tabb and Manning, 1961: 599.—Haig, 1962:178.—Leary, 1964:27-28.—Bullis and Thompson, 1965:10.—Haig, 1968:57, 62.—Coêlho, 1966:55.—Westervelt, 1967:34-37, 129, fig. 10.—Fausto-Filho, 1970: 58.—Gore, 1970a:964.—Gore, 1970b:75-89, figs. 1-6.—Rouse, 1970:140.—Coêlho, 1971: 233.—Coêlho and Ramos, 1972:174.—Gore, 1972a:12-66, figs. 1-12, tables 1-3.—Gore, 1972b:67-83, figs. 1-6, tables 1, 2.—Brusca, 1973: 229-230, fig. 7.32.—Felder, 1973:33—35, pl. 4, fig. 13.—Fausto-Filho, 1974:8.—Gore, 1974:709.—Fotheringham and Brunenmeister, 1975:17, 28, 138, 167, fig. 2.14.—Gore and Abele, 1976:21.—Camp et al., 1977:30.—Werding, 1977:198, fig. 18.—Werding, 1978b:219.—Corredor et al., 1979: 32.—Brusca, 1980:262, 264, 266, pl. 2, fig. 17.1.—Carvacho, 1980:250, table 1.—Rodríguez, 1980:215.—Markham and McDermott, 1981:1271.—Gore, 1982:11.—Scelzo, 1982:1134.—Werding, 1982:442.—Coen and Heck, 1983:213.—Maris, 1983: 237-246, figs. 1-7.—Abele and Kim, 1986: 413, 420, 421, fig. c.—Chace et al., 1986:338, pl. 10.3, 10.4.—Raz Guzmán et al., 1986: 348.—Campos-González and Macías-Chávez, 1987: 241-244, table 1.—Abele and Kim, 1989:21.—Britton and Morton, 1989: 45-46, 68, 80, 82, 90-91, figs. 3-2 H, 4-3 C, 5-1 M.—Camp et al., 1998:144.—Silva et al., 1989:136, figs. 5, 16.—Williams et al., 1989: 35.—Markham et al., 1990:427.—Martínez-Iglesias and Alcolado, 1990:table 26.—Human, 1992:164-165.—Lemaitre and Alvarez León, 1992:48, table 1.—Veloso and Melo, 1993:179.—Hernández-Alvarez, 1995:35-36, pl. 7, fig. 1.—Osawa, 1995:167, table 5.—Graterol, 1996:1-100.—Hernández-Aguilera et al., 1996:50.—Tunnell and Alvarado, 1996:136.—Alvarez et al., 1999:9.—Hernández, 1999:246, 249, tables 1, 2.—Hernández et al., 1999:27, table 1.—Melo, 1999:248-249, figs. 167, 168.—Knott et al., 2000:404.—Stillman and Somero, 2000:200-208, figs. 1-4.—Villalobos, 2000:184, 186-188, pl. 4, fig. 1, table 5.—Diaz-Ferguson and Vargas-Zamora, 2001: 97-101.—Stillman and Reeb, 2001:236-243, tables 1-3, figs. 1, 2.—Nizenski, 2003:117.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 249-250, fig. 13.—Garcia-Guerrero et al., 2005:339, 347, 348, table 1.—Rodríguez et al., in review.

Material examined.—Western Atlantic:

Wilmington, North Carolina (ULLZ 4247); Sea Island, Georgia (ULLZ 5261); Fort Pierce, Florida (ULLZ 3646, 4484, 4656, 4848, 5247 to 5253), Hutchinson Island, Florida (ULLZ 3767), Atlantic coast of Florida (ULLZ 5656, 5903), Ambersands Beach, Sebastian, Florida (ULLZ 5959), Looe Key, Florida (ULLZ 5263), Everglades City, Florida (ULLZ 5962), Naples, Florida (ULLZ 5961),Tampa, Florida (ULLZ 5274 to 5276, 5960), Santa Teresa, Florida (ULLZ 3946, 5273), Port St. Joe, Florida (ULLZ 5901); Chandeleur Island, Louisiana (ULLZ 57), Lake Grand Ecaille, Louisiana (ULLZ 2073), California Bay, Louisiana (ULLZ 2075), Breton Island, Louisiana (ULLZ 82), Grand Isle, Louisiana (ULLZ 3779), Lake Pelto, Louisiana (ULLZ 2072, 3101, 5277); Sea Rim State Park, Texas (ULLZ 3889), Port Aransas, Texas (ULLZ 531, 552, 1564, 2076, 2077, 5282 to 5284, 5958, 5963), Aransas Pass, Texas (ULLZ 1103, 1104, 5285 to 5292), Kline's Point, Aransas, Texas (ULLZ 921, 2074), Stedman Island, Texas (ULLZ 924, 1766, 1767), Corpus Christi, Texas (ULLZ 1563, 2071, 5528), Mustang Island, Texas (ULLZ 1566, 2069), Port Isabel, Texas (ULLZ 474, 716, 1565), South Padre Island, Texas (ULLZ 1664, 2067, 5280, 5281, 5293), U.S.A. Nuevo Torno Grande, Tabasco (ULLZ 5390); Isla Aguada, Campeche (ULLZ 1460), Puente Santa Rosalía, Campeche (ULLZ 4064), Villamar, Campeche (ULLZ 5395 to 5400), Punta Xen, Campeche (ULLZ 5391 to 5394), Champotón, Campeche (ULLZ 2068, 5237, 4056, CNCR 8455), Campeche, Campeche (ULLZ 2070), Mexico. Dangriga (ULLZ 5419 to 5423), Twin Cays (ULLZ 5416 to 5418, 5424, 5425), Carrie Bow Cay (ULLZ 5426, 5427, 5822), Belize. Bocas del Toro, Panama (ULLZ 5993, 5995, 5996, 6003, 6093). Barú (ULLZ 4884), Punta Calixto (ULLZ 5296), Colombia. Cubagua Island (ULLZ 5354, 5969), Margarita Island (ULLZ 5965, 5967, 5968), Venezuela. Eastern Pacific: Puertecitos, Baja California (ULLZ 5329), Santispac, Mulegé, Baja California Sur, (ULLZ 4137, 5328) Mexico. Potosí (ULLZ 5311 to 5313), Santa Julia (ULLZ 5314), Estero Aserradores (ULLZ 5310, 5315), Nicaragua. Naos, Panama City, Panama (ULLZ 5973).

Distribution.—Western Atlantic: Connecticut (extralimital); Wilmington, North Carolina; Sea Island, Georgia; eastern and western Florida; Lousiana; Texas; U.S.A.; Tamaulipas, Veracruz, Tabasco, Campeche, and Quintana Roo, Mexico; Belize; Gulf of Nicoya, Costa Rica; Bocas del Toro, Colón, and Caledonia Bay, Panama; Punta Calixto, Colombia; Curaçao; Cubagua and Margarita Islands, Venezuela; Bermuda; Bahamas; Cuba; Jamaica; Puerto Rico; Virgin Islands; Bahia, Rio de Janeiro, and Santa Catarina, Brazil. Eastern Pacific: Sonora and Baja California in the Gulf of California, Nayarit, Jalisco, Oaxaca, Mexico; Puerto el Triunfo and Bahía de la Unión, El Salvador; Gulf of Fonseca, Honduras; Potosí, Santa Julia, and Estero Aserradores, Nicaragua; Panama City, Punta Patillo, Fortified, Toboga, and Flamenco Islands, Panama; Buenaventura, Colombia; Bahía and Punta Santa Elena, Ecuador; Galápagos Islands; Matapalo and Las Vacas, Peru. Eastern Atlantic: Gibraltar; Senegal to Angola; Ascension Island.

Remarks.—*Petrolisthes armatus* is the most widespread species in the western Atlantic and also has a wide range in the eastern Pacific. It is the only porcellanid species in Bermuda and it also occurs in the eastern Atlantic (Africa). It was reported by Smith (1880) from as far north as Connecticut, an extralimital record for the western Atlantic (Haig 1960). In the last decade the species established in South Carolina, showing a tendency to extend northward (Knott et al. 2000). The record from Wilmington, North Carolina, confirms this tendency as well. Santa Catarina, Brazil, a subtropical area, is the southern limit of its distribution in the western Atlantic. Populations of this species from different localities show considerable morphological variation. Particularly, the manus of the chelipeds varies from slender to robust and with spines and setae along the outer margin to completely unarmed and hairless. These variations, however, also occur between specimens of different sizes from the same locality. As Haig (1960) reported for Pacific materials, morphological variations could not be correlated with geography. In contrast, based on molecular data (Rodríguez et al. in review), three distinct lineages were found,

which correspond to defined geographic regions: the Warm-temperate and Caribbean Provinces in the western Atlantic, and the eastern Pacific. These lineages might in the future be regarded as distinct species, provided preliminary molecular evidence for separations is strongly supported by additional molecular and morphological studies.

Petrolisthes bolivarensis Werding and Kraus, 2002

Petrolisthes bolivarensis Werding and Kraus, 2002:1141-1147, figs. 1, 2 (type locality San Martín de Pajarales Island, Rosario Islands, Colombia).

Petrolisthes sp. Werding et al., 2003:79-85, tables 1, 2.

Material examined.—None.

Distribution.—San Bernardo and Rosario Islands, Colombia.

Petrolisthes caribensis Werding, 1983
Plate 1, fig. G

Petrolisthes caribensis Werding, 1983a:411, figs. 1, 4 (type locality Rosario Islands, Colombia).—Hernández, 1999:249, table 2.—Werding et al., 2003:79-85, tables 1, 2.—Kraus et al., 2004:85-90.—Rodríguez et al., in review.

Material examined.—Boca Raton (ULLZ 5264), Looe Key Reef (ULLZ 5265, 5266), American shoal (ULLZ 2852), Florida, U.S.A. Enmedio Island, Veracruz (ULLZ 5447), Puerto Morelos, Quintana Roo (CNCR 4895, 5675, 9701), Mexico. Twin Cays (ULLZ 5428), Carrie Bow Cay (ULLZ 4222, 4317, 4852, 5429), Belize. Bocas del Toro, Panama (ULLZ 5994, 5997, 6004, 6006, 6091).

Distribution.—Boca Raton and Florida Keys, Florida, U.S.A.; Veracruz and Quintana Roo, Mexico; Twin and Carrie Bow Cays, Belize; Bocas del Toro, Panama; Old Providence and Rosario Islands, and Santa Marta, Colombia; Venezuela; Puerto Rico.

Remarks.—The first records of this species for Mexico and Belize are presented.

Petrolisthes columbiensis Werding, 1983

Petrolisthes columbiensis Werding, 1983a: 413, figs. 2, 5 (type locality Rosario Islands, Colombia).—Hernández, 1999:249, table 2.—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—None.

Distribution.—Rosario Islands, Colombia; Cuba.

Petrolisthes dissimulatus Gore, 1983

Petrolisthes cessacii.—Werding, 1982:442 (in part).

Petrolisthes dissimulatus Gore, 1983:94, figs. 2-4 (type locality St. John, Virgin Islands).—Werding, 1984:9, fig. 3.—Hernández, 1999:249, table 2.—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—None.

Distribution.—Old Providence and Rosario Islands, and Santa Marta, Colombia; Curaçao; Cuba; Puerto Rico; Virgin Islands; Martinique; Barbados.

Petrolisthes galathinus (Bosc, 1802)
Plate 1, fig. H

Porcellana galathina Bosc, 1802:231-233, pl. 6, fig. 2 (type locality unknown).

Petrolisthes galathinus.—Haig, 1956:22.—Chace, 1956a:152.—Holthuis, 1959:162.—Haig, 1960:22, 25, 36-39, 41, 260-261, 386, 387, pl. 19, fig.4, table 6.—Tabb and Manning, 1961:599.—Haig, 1962:175.—Pounds, 1961:28.—Leary, 1964:28.—Bullis and Thompson, 1965:10.—Williams, 1965:107, fig. 83.—Coêlho, 1966:56.—Haig, 1966: 352.—Fausto-Filho, 1968:43.—Gore, 1970a: 964.—McCloskey, 1970:30.—Rouse, 1970: 141.—Coêlho, 1971:233.—Coêlho and Ramos, 1972:174.—Felder, 1973:33-35, pl. 4, fig. 14.—Gore, 1974:712.—Rickner, 1975b: 164.—Gore and Abele, 1976:21.—Camp et al., 1977:30.—Werding, 1977:201, fig. 20.—Werding, 1978b:219.—Young, 1978:176.—Corredor et al., 1979:32.—Felder and Chaney, 1979:8, 15, 25, 28-29, fig. 4, tables 1, 2, appendices I, II.—Huni, 1979:21-40, figs. 1-4.—Rodríguez, 1980:217.—Gore, 1982: 13.—Scelzo, 1982:1133.—Wenner and Read, 1982:187, table 2.—Werding, 1983b:443.—Werding, 1984:10.—Williams, 1984:243-244, fig. 178.—Abele and Kim, 1986:413, 420, 421, fig. b.—Raz Guzmán et al., 1986:349.—Young, 1986:103, 111.—Ruppert and Fox, 1988:249-250, 404.—Abele and Kim, 1989: 21.—Silva et al., 1989:137, figs. 6, 15.—

Williams et al., 1989:35.—Markham et al., 1990:427.—Martínez-Iglesias and Alcolado, 1990:table 26.—Veloso and Melo, 1993: 179.—Arana et al., 1996:217.—Hernández-Aguilera et al., 1996:50.—Camp et al., 1998: 144.—García et al., 1998:28-29, table 1.—Alvarez et al., 1999:9.—Hernández, 1999: 246, 249, tables 1, 2.—Hernández et al., 1999:27, table 1.—Melo, 1999:252-253, figs. 171, 172.—Stillman and Somero, 2000:200-208, figs. 1-4.—Muñoz, 2001:1-53.—Stillman and Reeb, 2001:236-245, figs. 1, 2, tables 1-3.—Werding et al., 2001:108-109, fig. 2, table 3.—López-Greco et al., 2002:40-46.—Werding and Hiller, 2002:849-850.—Nizenski, 2003:117.—Werding et al., 2003: 79-85, tables 1, 2.—Hiller et al., 2004:131, 134-135, table 1.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 251, fig. 14.—Rodríguez et al., in review.

Petrolisthes sexspinosus Gibbes, 1850: 190.—Pounds, 1961:28.—Leary, 1964:28 (as per Gore and Abele, 1976, this record assignable to *P. galathinus*).

Petrolisthes palathinus.—Werding, 1977: 208 (misspelling).

Petrolisthes galatinus.—Hernández-Aguilera and Sosa-Hernández, 1982:39-40, fig. 19. (misspelling).

Not *Petrolisthes galathinus*.—Haig, 1960: 34, 47, 50.

Material examined.—Atlantic: Florida Keys, Florida (ULLZ 1986, 1991, 2850, 4524, 4525, 5267 to 5271, 5983); 7½ Fathom Reef, Texas (ULLZ 2054, 2055, 2057 to 2064), U.S.A. Barra del Tordo, Tamaulipas (ULLZ 5820); Topatilla Reef, off Antón Lizardo, Veracruz (ULLZ 5238), Cancún, Quintana Roo (ULLZ 5449), Puerto Morelos, Quintana Roo (ULLZ 2056, CNCR 9718, 10937), Majahual, Quintana Roo (ULLZ 5401), Mexico. Carrie Bow Cay, Belize (ULLZ 4851, 5430 to 5432). Bocas del Toro, Panama (ULLZ 6000, 6087, 6090, 6099, 6105, 6109). Cubagua Island (ULLZ 5355, 5970), Margarita Island (ULLZ 5356), Venezuela. Pacific: Estero Aserradores, Nicaragua (ULLZ 5316).

Distribution.—Western Atlantic: From Cape Hatteras, North Carolina, South Carolina, Florida Keys, Texas, U.S.A.; Tamaulipas, Veracruz, Campeche, Yucatán, and Quintana Roo, Mexico; Carrie Bow Cay, Belize; Bocas del Toro, Colón, and Caledonia Bay, Panama; Rosario Islands and Santa Marta, Colombia; Aruba, Curaçao, and Bonaire; Los Roques, Margarita, and Cubagua Islands, Venezuela; Trinidad; Cuba; Jamaica; Puerto Rico; Virgin Islands; Barbados; Pernambuco, Alagôas, Bahia, Rio de Janeiro, Sta. Catarina, and Trinidade, Brazil. Eastern Pacific: San Lucas Island, Costa Rica; Estero Aserradores, Nicaragua; Panama City and Isla Tobaguilla, Panama; La Libertad, Ecuador.

Remarks.—*Petrolisthes galathinus* has been treated as a widespread species ranging from North Carolina, U.S.A., to Santa Catarina, Brazil, in the western Atlantic (Haig 1956; Williams 1984), and from San Lucas Island, Costa Rica, to La Libertad, Ecuador, in the eastern Pacific (Abele and Kim 1989; Hiller et al. 2004). Various authors recognized the presence of different color forms within the species. Benedict (1901) described two different color forms from Puerto Rico; Rickner (1975b) noted considerable color variation in specimens from the east coast of Mexico as did Abele and Kim (1989) for specimens from the Caribbean and Pacific coast of Panama; and Williams (1984) cited different color forms described by other authors. Werding (1977) was the first to attempt systematic revisions of this species complex, initially separating *P. rosariensis* Werding, 1978, on the basis of different coloration and presence of a second epibranchial spine. Two additional species were described based on coloration, epibranchial spination, and the number of movable spines on the dactylus of the walking legs: *P. caribensis* Werding, 1983, and *P. columbiensis* Werding, 1983. Two more variations were recently described: *P. sanmartini* Werding and Hiller, 2002, and *P. bolivarensis* Werding and Kraus, 2002. This complex includes species from the eastern Pacific (*P. glasselli*) and the Indo-Pacific (*P. bispinosus, P. boscii, P. decacanthus, P. eldredgei,* and *P. moluccensis*), accounting for a total of 12 species (Werding and Hiller, unpublished). More sibling species from the Caribbean and the Gulf of Mexico remain to be described. The identity of *P. galathinus* continues to be unclear, in part because the species was superficially described by Bosc

(1802). Gibbes (1854) provided a detailed description and suggested that the original material might have originated from the southern Atlantic coast of the United States. Werding and Hiller (2002) postulated "… as the typical form of *P. galathinus* a morph exhibiting a striped colour pattern, bearing one epibranchial spine, a supraocular and an infraocular spine, and three movable spines on the dactylus of all walking legs". However, those characters are not sufficient to distinguish *P. galathinus* from *P. bolivarensis* and other diverse morphs that remain undescribed. The distribution and identity of *P. galathinus* remains questionable (Hiller et al. 2004). In another aspect, the reproduction of specimens from Venezuela is currently under study (I. G. Hernández-Ávila et al. unpublished).

Petrolisthes gertrudae Werding, 1996

Petrolisthes gertrudae Werding, 1996:306, figs 1, 2 (type locality Guadeloupe).—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—None.

Distribution.—Bonaire and Guadeloupe.

Petrolisthes jugosus Streets, 1872
Plate 1, fig. I

Petrolisthes jugosus Streets, 1872:134 (type locality St. Martin Island).—Haig, 1962: 180.—Rickner, 1975b:164.—Gore and Abele, 1976:22.—Werding, 1977:303, fig. 21.—Werding, 1978b:219.—Corredor et al., 1979:32.—Gore, 1982:14.—Scelzo, 1982: 1134.—Werding, 1982:443.—Werding, 1984:11.—Abele and Kim, 1986:413, 420, 421, fig. a.—Williams et al., 1989:35.—Markham et al., 1990:427.—Martínez-Iglesias et al., 1993:13.—Hernández-Aguilera et al., 1996:51.—Camp et al., 1998: 144.—Alvarez et al., 1999:9.—Hernández, 1999:249, table 2.—Werding et al., 2001:108-109, table 3, fig. 2.—Magán et al., 2003.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 251-252, fig. 15.—Rodríguez et al., in review.

Pisosoma jugosum.—Haig, 1956:16.—Rodríguez, 1980:215.

Material examined.—Looe Key Reef, Florida Keys, U.S.A. (ULLZ 4823). Punta Delgada, Veracruz (ULLZ 5402, 5452), El Morro, Veracruz (ULLZ 5239, 5240), La Mancha, Veracruz (ULLZ 5403, 5404), Escondida Beach, Veracruz (ULLZ 5405), Enmedio Island, Veracruz (ULLZ 4850), Cancún, Quintana Roo (ULLZ 4843), Puerto Morelos, Quintana Roo (ULLZ 5407, 5408), Majahual, Quintana Roo (ULLZ 5406), Mexico. Carrie Bow Cay, Belize (ULLZ 5433). Bocas del Toro, Panama (ULLZ 6092, 6100, 6106). Punta Brava, Colombia (ULLZ 4482). Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5357).

Distribution.—The Florida Keys and Charlotte Harbor, western Florida, U.S.A.; Veracruz, Campeche, Yucatán, and Quintana Roo, Mexico; Carrie Bow Cay, Belize; Bocas del Toro and Caledonia Bay, Panama; Santa Marta and Punta Brava, Colombia; Curaçao and Bonaire; La Tortuga, Margarita, and Cubagua Islands, Venezuela; Tobago; Cuba; Puerto Rico; St. Martin; Virgin Islands; Barbados.

Remarks.—Morphological differences were observed between material examined from Panama and specimens from other localities. The chelipeds and walking legs are more densely setose and the carapace has more rugae on the lateral margins from epibranchial to posterior regions, in the Panamanian materials.

Petrolisthes magdalenensis Werding, 1978

Petrolisthes sp. II Werding 1977:209, fig. 27.

Petrolisthes magdalenensis Werding, 1978a: 307, fig. 1 (type locality Chengue Bay, Santa Marta, Colombia).—Gore, 1982:16.—Scelzo, 1982:1134.—Scelzo, 1983:80.—Müller and Werding, 1990:257-270, figs. 1-7.—Osawa, 1995:167, table 5.—Hernández, 1999:246, 249, tables 1, 2.—Werding et al., 2001:108-109, fig. 2, table 3.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:237, 241, 252-253, fig. 16.—Rodríguez et al., in review.

Petrolisthes lewisi.—Magán, 2001:1-39.

Material examined.—Roatán, Bay Islands, Honduras (ULLZ 5442). Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5358).

Distribution.—Quintana Roo, Mexico; Roatán, Bay Islands, Honduras; Portobelo, Panama; Gulf of Darién, Cartagena, and Santa Marta, Colombia; Margarita Island, Venezuela; Trinidad and Tobago.

Remarks.—The first record of the species for Honduras is reported. Morphological differences between *Petrolisthes magdalenensis* and *P. lewisi* are to be published (G. Hernández et al. unpublished).

Petrolisthes marginatus Stimpson, 1859

Petrolisthes marginatus Stimpson, 1858: 227 (*nomen nudum*); 1859:74 (type locality Barbados).—Haig, 1956:26-27 (in part).—Chace, 1962:620, 622.—Rodríguez, 1980: 218.—Scelzo, 1982:1134.—Gore, 1982:17.—Gore, 1983:91, fig. 1.—Werding, 1984:12.—Veloso and Melo, 1993:180.—García et al., 1998:28-29, table 1.—Alvarez et al., 1999: 9.—Melo, 1999:254-255, figs. 173, 174.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 253-254, fig. 17.—Rodríguez et al., in review.

Petrolisthes cessacii A. Milne-Edwards, 1878:229.—Chace, 1956b:14-17, fig. 4.—Coêlho, 1971:233.—Coêlho and Ramos, 1972:173.—Gore, 1974:710.—Rickner, 1975b:163.—Werding, 1977:176, 197, 199-200, fig. 19.—Corredor et al., 1979:32.—Scelzo, 1982:1133.—Scelzo, 1983:80.—Hernández, 1999:249, table 2.—Melo, 1999: 250-251, figs. 169, 170.

Not *Petrolisthes marginatus*.—Haig, 1960: 47-50, pl. 20, fig. 1, table 10.—Carvacho, 1980:250, table 1.

Material examined.—Punta Delgada (ULLZ 5241), El Morro (ULLZ 5242), La Mancha (ULLZ 5409, 5410), Escondida Beach (ULLZ 5411), Montepío (CNCR 17749), Veracruz, Mexico. El Maguey, Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5359).

Distribution.—Western Atlantic: Veracruz, Mexico; Gulf of San Blás, Panama; Old Providence and Rosario Islands, and Santa Marta, Colombia; Curaçao; Los Roques, Aves, and Margarita Islands, Venezuela; Trinidad and Tobago; Puerto Rico; Barbados; Sao Luis and Fernando de Noronha, Brazil. Eastern Atlantic: Cape Verde Islands to Annobon Island, off western Africa.

Remarks.—*Petrolisthes haigae* Chace, 1962, is the geminate species of *P. marginatus* in the Pacific. The identity of *P. marginatus* was reviewed by Gore (1983), who concluded that *P. cessacii* was its junior synonym. The larval development of *P. marginatus* is currently being described (M. Piñate et al. unpublished).

Petrolisthes politus (Gray, 1831)

Porcellana polita Gray, 1831:14 (type locality not designated).

Petrolisthes politus.—Haig, 1956:21.—Haig, 1962:178.—Gore, 1974:713, fig. 5.—Rickner, 1975b:164.—Werding, 1977:203, fig. 22.—Corredor et al., 1979:32.—Rodríguez, 1980:217.—Scelzo, 1982:1134.—Werding, 1982:444.—Werding, 1984: 12.—Abele and Kim, 1986:413, 420, 421, fig. d.—Williams et al., 1989:35.—Hernández et al., 1995:2.—Hernández-Aguilera et al., 1996:51.—Camp et al., 1998:144.—García et al., 1998:28-29, table 1.—Alvarez et al., 1999: 9.—Hernández, 1999:246, 249, tables 1, 2.—Hernández et al., 2000:143-156, figs. 1-6 tables 1, 2.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:241, 254, fig. 18.—Rodríguez et al., in review.

Material examined.—Tuxpan, Veracruz (ULLZ 5243), Enmedio Reef, Veracruz (ULLZ 5742), Topatilla Reef, off Antón Lizardo, Veracruz (ULLZ 5244), Cancún, Quintana Roo (ULLZ 4847), Chemmuyil, Quintana Roo (CNCR 9814), Majahual, Quintana Roo (ULLZ 5412), Mexico. Carrie Bow Cay, Belize (ULLZ 5434). El Manglecito, Cubagua Island, Venezuela (ULLZ 5360).

Distribution.—Florida Keys, U.S.A.; Veracruz and Quintana Roo, Mexico; Carrie Bow Cay, Belize; Colón, Panama; Old Providence and Rosario Islands, and Santa Marta, Colombia; Aruba, Curaçao, and Bonaire; Los Roques, Aves, and Cubagua Islands, Venezuela; Tobago; Bahamas; Puerto Rico; Virgin Islands; Antigua; Guadeloupe; Barbados.

Remarks.—The first record of the species is reported.

Petrolisthes quadratus Benedict, 1901

Petrolisthes quadratus Benedict, 1901:134, pl. 3, fig. 4 (type locality Ponce, Puerto Rico).—Haig, 1956:18.—Haig, 1962:179.—Chace and Hobbs, 1969:121, fig. 32.—Rickner, 1975b:164.—Werding, 1977:204, fig. 23.—Corredor et al., 1979:32.—Rodríguez, 1980:216.—Scelzo, 1982:1134.—Werding, 1982:444.—Markham et al., 1990: 427.—Hernández-Aguilera et al., 1996:51.—Alvarez et al., 1999:9.—Hernández, 1999: 249, table 2.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:240, 255, fig. 19.—Rodríguez et al., in review.

Material examined.—Looe Key (ULLZ 1987), Pelican Shoals (ULLZ 5272), Florida, U.S.A. Cozumel Island, Quintana Roo, Mexico (CNCR 3724). Carrie Bow Cay, Belize (ULLZ 4221). La Tortuga Island, Venezuela (ULLZ 5361).

Distribution.—Florida Keys, U.S.A.; Veracruz, Campeche, Yucatán, and Quintana Roo, Mexico; Carrie Bow Cay, Belize; Caledonia Bay, Panama; Old Providence and Rosario Islands, and Santa Marta, Colombia; Aruba, Curaçao, and Bonaire; La Tortuga and Cubagua Islands, Venezuela; Trinidad; Bahamas; Puerto Rico; Virgin Islands; Dominica.

Remarks.—The first records of the species for U.S.A. and Belize are presented, and its distribution is extended northward.

Petrolisthes robsonae Glassell, 1945

Petrolisthes robsonae Glassell, 1945:227, fig. 3 (type locality Miraflores Locks, Panama Canal, Panama).—Haig, 1960:57, pl. 18, fig. 2.—Haig, 1968:65.—Gore and Abele, 1974:567, fig. 3c.—Gore and Abele, 1976:24.—Carvacho, 1980:250, table 1.—Gore, 1982:19.—Moran, 1984:80.—Abele and Kim 1989:22.—Hernández-Alvarez, 1995:52-53, pl. 13, fig. 2.—Werding et al., 2003:79-85, table 1.—García-Guerrero et al., 2005:339-349, figs. 1-6, table 1.

Material examined.—None.

Distribution.—Western Atlantic: Gatun Locks, Panama. Eastern Pacific: Oaxaca, Mexico; El Salvador; Miraflores Locks, Panama City, Panama; Guayaquil, Ecuador.

Remarks.—This species is widely distributed in the eastern Pacific, with occasional migrations through the Panama Canal up to Gatun Locks. In the western Atlantic, Haig (1960) was the first to report a single specimen collected by Hildebrand in 1935. Later, Abele and Kim (1989) reported 4 juveniles in the same locality.

Petrolisthes rosariensis Werding, 1978

Petrolisthes sp. I Werding, 1977:208, fig. 26.

Petrolisthes rosariensis Werding, 1978b:214 (type localities Santa Marta and Nenguange, Colombia).—Corredor et al., 1979: 33.—Gore, 1982:19.—Werding, 1982:444, fig. 3 (?-see Remarks below).—Werding, 1983a:410.—Young, 1986:103, 111.—Veloso and Melo, 1993:180.—Hernández, 1999:249, table 2.—Melo, 1999:256-257, figs. 175, 176.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., in review.

Material examined.—Carrie Bow Cay, Belize (ULLZ 5435, 5445). Bocas del Toro, Panama (ULLZ 5974).

Distribution.—Carrie Bow Cay, Belize; Limón Bay and Bocas del Toro, Panama; Rosario Islands and Santa Marta, Colombia; Paraiba to Bahia, Brazil.

Remarks.—The first record of this species for Belize is presented and its distribution is extended northward. The taxonomic history of *P. rosariensis* is confusing, in large part due to the publication of the name and association of this name with a description well in advance of the date intended by the author. Because Werding (1978) used the name *P. rosariensis* and associated it with materials listed, illustrated, and briefly diagnosed in a previously published account for "*Petrolisthes* sp. I" (Werding 1977), the name became valid in 1978. That publication date meets minimum criteria for a published description well in advance of the date that the intended description of this species (Werding 1982) was actually published. Thus, the materials listed in Werding (1977) become the syntypes for this species. In acknowledgement of this situation, Werding (1983a) invoked Article 16 of

the ICZN in an attempt to designate as a lectotype the specimen listed as the holotype in Werding (1982); however, this does not appear to be a justifiable case under the Code, and the types must thus remain those presumed syntypes from Santa Marta and Nenguange, Colombia, listed and described in Werding (1977). The "holotype" and "paratypes" listed for *P. rosariensis* from the Rosario Islands, Colombia, as designated in Werding (1982), could be regarded as simply additional materials assigned to this species, were if not for yet other complications. The illustration for *Petrolisthes* sp. I in Werding (1977:fig. 26) shows unmistakable presence of a strong supraocular spine on each side of the carapace, along with a pair of epibranchial spines. The only North Atlantic species in which this condition is reported to occur is *P. columbiensis* Werding, 1983, yet another species based on materials from the Rosario Islands; however, other characters would appear to exclude it from being confused with *P. rosariensis*. Werding (1982:444) notes specifically in the course of describing materials as *P. rosariensis* that there is "No strong superocular spine…" Unfortunately, in subsequent publications (Werding (1983b), Werding and Hiller (2002), Werding and Kraus (2002), and Werding et al. (2003)) no attempt was made to rectify this disparity in accounts. Thus, the identity of *P. rosariensis* remains somewhat uncertain. For the present, we must conservatively adhere to the description as published in Werding (1977) for assignment of our specimens. In so doing, we are assigning our materials with a strong supraocular spine to *P. rosariensis*. At the same time, some of the literature records included above are likely based upon materials that lack this spine, and may thus represent a second species. All of the following are possibilities: The illustration in Werding (1977) or Werding (1982) may have been in error; the development of the supraocular spine may be variable; or, an additional undescribed species may be represented by materials listed in Werding (1982) or our materials and perhaps others cited above. Only study of the original syntypes is likely to resolve this uncertainty.

Petrolisthes sanmartini Werding and Hiller, 2002

Petrolisthes sanmartini Werding and Hiller, 2002:849-857, figs. 1-3 (type locality San Martin Island, Rosario Islands, Colombia).—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—Carrie Bow Cay, Belize (USNM 335750). Bocas del Toro, Panama (ULLZ 5999).

Distribution.—Carrie Bow Cay, Belize; Bocas del Toro, Panama; Rosario Islands, Colombia.

Remarks.—The first records of the species for Belize and Panama are presented and the distribution of the species is extended northward.

Petrolisthes tonsorius Haig, 1960

Petrolisthes tonsorius Haig, 1960:85, pls. 3, 26, fig. 1, table 24 (type locality Berkeley Cape, Albemarle Island, Galápagos Islands).—Haig, 1968:57, 66.—Gore and Abele, 1976:8, 13, table 3.—Werding, 1977: 205, fig. 24.—Werding, 1978b:220.—Brusca, 1980:263, 265, fig. 17.9.—Carvacho, 1980: 250, table 1.—Gore, 1982:20.—Scelzo, 1982: 1134.—Scelzo, 1983:80.—Pellegrini and Gamba, 1985:251-267, figs. 1-8.—Lemaitre and Alvarez-León, 1992:49, table 1.—Hernández-Alvarez, 1995:54-55, pl. 14, fig. 2.—Osawa, 1995:167, table 5.—Hernández, 1999:246, 249, tables 1, 2.—Hernández et al., 1999:27, table 1.—Werding et al., 2001:108-109, fig. 2, table 3.—Werding et al., 2003: 79-85, tables 1, 2.—Rodríguez et al., in review.

Material examined.—Western Atlantic: Boca del Río, Margarita Island, Venezuela (ULLZ 5362). Eastern Pacific: Puerto Vallarta, Jalisco, Mexico (ULLZ 5340).

Distribution.—Western Atlantic: Gulf of Darién and Santa Marta, Colombia; Margarita Island and central coast of Venezuela. Eastern Pacific: Baja California Sur, Revillagigedo Islands off Colima, Jalisco, Guerrero, and Oaxaca, Mexico; Port Parker and Cocos Islands, Costa Rica; Malpelo Island, Colombia; Punta Santa Elena and Galápagos Islands, Ecuador.

Remarks.—*Petrolisthes tonsorius* was originally described from Galápagos Islands, in

the tropical eastern Pacific. It is a species widely distributed in both tropical coasts of the Americas.

Petrolisthes tridentatus Stimpson, 1859

Petrolisthes tridentatus Stimpson, 1858:227 (*nomen nudum*), 1859:75, pl. 1, fig. 4 (type locality St. Thomas and Barbados).—Haig, 1956:18-19.—Haig, 1960:81-83, pl. 25, fig. 4.—Haig, 1962:179.—Haig, 1968:57, 65.—Gore, 1971b:485-501, figs. 1-6.—Gore, 1972a:186-208, figs. 36-41, table 12.—Gore and Abele, 1976:24.—Werding, 1977:208, fig. 25.—Corredor et al., 1979:33.—Rodríguez, 1980:215.—Gore, 1982:20.—Scelzo, 1982:1134.—Werding, 1982:444.—Werding, 1984:13.—Lemaitre and Alvarez-León, 1992:49, Table 1.—Osawa, 1995:167, table 5.—Hernández, 1999:246, 249, tables 1, 2.—Stillman and Somero, 2000:200-208, figs. 1-4.—Stillman and Reeb, 2001:236-245, figs. 1, 2, tables 1-3.—Werding et al., 2003: 79-85, tables 1, 2.—Rodríguez et al., in review.

Material examined.—Western Atlantic: Majahual, Quintana Roo, Mexico (ULLZ 5413 to 5415). Falmouth, Jamaica (ULLZ 5441). Boca del Río, Margarita Island, Venezuela (ULLZ 5363). Eastern Pacific: Estero Nagualapa (ULLZ 5324), Estero Aserradores (ULLZ 5306, 5307), Nicaragua. Naos Island, Panama (ULLZ 5364, 5975).

Distribution.—Western Atlantic: Quintana Roo, Mexico; Caledonia Bay, Panama; Old Providence and Rosario Islands, and Santa Marta, Colombia; Margarita and Cubagua Islands, Venezuela; Trinidad; Bahamas; Cuba; Jamaica; St. Thomas; Antigua; Barbados. Eastern Pacific: Salinas Bay and Port Parker, Costa Rica; San Juan del Sur, Nicaragua; Honda Bay, Tobaguilla Island, Perlas Islands, and Guayabo Chiquito, Panama; Limón Bay, Colombia; Santa Elena Bay and Puná Island, Ecuador.

Remarks.—The first records of the species for Mexico and Jamaica are presented. *Petrolisthes tridentatus* comprises a species complex and cryptic species remain to be described (Rodríguez et al. in review).

Genus *Pisidia* Leach, 1820

Pisidia Leach, 1820:53 (type species *Pisidia linnaeana* Leach, 1820, designation by Haig, 1960).—Haig, 1960:207-209.—Rodríguez et al., in review.

Porcellanides Czerniavsky, 1884:109 (type species *Porcellanides kriczagini* Czerniavsky, 1884, by original designation).

Streptochirus Stimpson, 1907:188 (type species *Porcellana serratifrons* Stimpson, 1858, designation by Haig, 1960).

Remarks.—*Pisidia brasiliensis* Haig in Rodrigues da Costa (1968) from Brazil was the first species of the genus reported in the western Atlantic. It has also been found in the southern Caribbean Sea (Werding 1977 and this report). A second species from Brazil, *P. melloleitaoi* Rodrigues da Costa, 1968, could not be confirmed as valid (Veloso and Melo 1993). *P. magdalenensis* (Glassell, 1936) is the only representative of the genus in the eastern Pacific.

Pisidia brasiliensis Haig (in Rodrigues da Costa, 1968)

Pisidia brasiliensis Haig (in Rodrigues da Costa, 1968):406-R (type localities Capanea and Sao Sebastiao, Sao Paulo, Brazil).—Coêlho, 1971:233.—Werding, 1977: 211, fig. 28.—Scelzo, 1982:1132.—Scelzo, 1983:80.—Veloso and Melo, 1993:180.—Hernández, Bolaños et al., 1996:21.—Hernández, 1999:246, 249, tables 1, 2.—Melo, 1999:258-259, figs. 177, 178.—Werding et al., 2003:79-85, tables 1, 2.

Pisidia sp.?: Coêlho and Ramos, 1972:175.

Material examined.—Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5365, 5971, 5972).

Distribution.—Cartagena, Ciénaga Grande de Santa Marta, and Santa Marta, Colombia; Margarita Island, Venezuela; Pará to Pernambuco, Brazil.

Remarks.—The species was briefly described without an illustration; a detailed description of the species is to be published (C. Lira et al., unpublished). The population structure, reproductive aspects, and the larval development of the species are currently under study (G. Hernández et al., unpublished).

Genus *Polyonyx* Stimpson, 1858

Polyonyx Stimpson, 1858:229 (type species *Porcellana macrocheles* Gibbes, 1854, by

original designation).—Haig, 1960:232-233.—Rodríguez et al., in review.

Polyonx.—Menzel, 1971:79 (misspelling).

Remarks.—Only one species of *Polyonyx* occurs in the western Atlantic, *P. gibbesi* Haig, 1956; three other species of the genus occur in the eastern Pacific: *P. confinis* Haig, 1960, *P. nitidus* Lockington, 1878, and *P. quadriungulatus* Glassell, 1935. The species in this genus live as commensals in the tubes of *Chaetopterus* (Annelida: Polychaeta) (Haig 1960; Werding 1983b).

Polyonyx gibbesi Haig, 1956

Porcellana macrocheles Gibbes, 1850:191 (type locality South Carolina, U.S.A.).

Polyonyx gibbesi Haig, 1956:28.—Haig, 1960:238-239.—Gray, 1961:353-359.—Williams, 1965:113, fig. 90.—Coêlho, 1966: 63.—Haig, 1966:356.—Gore, 1968:111-129, figs. 1-8.—Rouse, 1970:141.—Dudley and Judy, 1971:3-6, 9, tables 1-3, 5.—Gosner, 1971:539, fig. 21.53A.—Coêlho and Ramos, 1972:174.—Van Engel and Sandifer, 1972: 158.—Felder, 1973:33-36, pl. 4, fig. 10.—Sandifer, 1973:245.—Craig, 1974:235-243.—Gore, 1974:713.—Caine, 1975:283, fig. 3.—Rickner, 1975a:313-314.—Young, 1978: 176.—Felder and Chaney, 1979:8, 15, 25, appendix I.—Scelzo, 1982:1132.—Maris, 1983:237-246, figs. 1-7.—Truesdale and Andryszak, 1983:43, table 2.—Williams, 1984: 244, fig. 179.—Abele and Kim, 1986:410, 424, 425, fig. d.—Ruppert and Fox, 1988: 204-205, figs. 201, 250, 404.—Britton and Morton, 1989: 193-194, fig 7.10 F.—Williams et al., 1989:35.—Martínez-Iglesias et al., 1993:13.—Veloso and Melo, 1993: 181.—Camp et al., 1998:144.—Hernández, 1999:246, 249, tables 1, 2.—Melo, 1999:260-261, figs. 179, 180.—Nizenski, 2003:117.—Werding et al., 2003:79-85, tables 1, 2.—Rodríguez et al., in review.

Polyonx macrocheles.—Menzel, 1971:79 (misspelling).

Polyonyx gibbesii.—Rodrigues da Costa, 1964, p. 325 (misspelling).

Polyonix gibbesi.—Silva et al., 1989:137, figs. 7, 12 (misspelling).

Material examined.—Fort Pierce, eastern Florida (ULLZ 5254 to 5259), Turkey Pt., Florida (ULLZ 3559), Destin, Florida (ULLZ 1989), U.S.A.

Distribution.—Massachusetts, Rhode Island, North Carolina, South Carolina, eastern and western Florida, Texas, U.S.A.; Caledonia Bay, Panama; Punta Papuy, Venezuela; Trinidad; Cuba; Puerto Rico; Rio de Janeiro to southern Brazil; La Paloma, Uruguay.

Remarks.—The distribution of this species is mostly antitropical; it is sporadically found in tropical waters. In this study, slight morphological differences in the carapace were observed between specimens from both sides of the Florida Peninsula.

Genus *Porcellana* Lamarck, 1801

Porcellana Lamarck, 1801:153 (type species *Cancer platy-cheles* Pennant, 1777, by monopyty).—Haig, 1960:196-197.—Haig, 1978:706-714.—Rodríguez et al., in review.

Platycheles Billberg, 1820:134 (type species *Cancer platy-cheles* Pennant, 1777, by tautonymy).

Enostea Gistel, 1848:159, 196 (substitute name for *Porcellana* Lamarck, 1801; taking the same type species, *Cancer platy-cheles* Pennant, 1777).

Remarks.—*Porcellana sayana* (Leach, 1820), *P. sigsbeiana* A. Milne-Edwards, 1880, and *P. stimpsoni* A. Milne-Edwards, 1880, were included in Haig's (1956) report for the western North Atlantic. *Porcellana paivacarvalhoi* Rodrigues da Costa, 1968, was later incorporated in the western Atlantic revision of the genus (Haig 1978). Subsequently, *P. stimpsoni* was considered a junior synonym of *P. sayana* in Lemaitre and Campos (2000), and *P. paivacarbalhoi* was considered a junior synonym of *P. platycheles* by Veloso and Melo (1993). Only one male represented the latter species in the western Atlantic; this species is better known from the eastern Atlantic (Haig 1978; Veloso and Melo 1993). The report of only one specimen of *P. platycheles* in the western Atlantic raises questions about its recognition as a component of the porcellanid fauna of the region. Additional records are desirable in order to confirm the establishment of the species in this region. With the recent description of *P. lillyae* Lemaitre and Campos, 2000, the genus contains three species in the western Atlantic.

Porcellana lillyae Lemaitre and Campos, 2000

Porcellana lillyae Lemaitre and Campos, 2000:259-265, figs. 1, 2 a-c, 3 a-c, g, h, 4 a-c (type locality Gulf of Morrosquillo, Colombia).—Werding et al., 2003:79-85, tables 1, 2.

Material examined.—None.

Distribution.—Reported only from the Caribbean coast of Colombia between Gulf of Morrosquillo and San Bernardo Islands.

Porcellana sayana (Leach, 1820)

Pisidia sayana Leach, 1820:54 (type localities Georgia and Florida).

Porcellana sayana.—Haig, 1956:31-33.—Chace, 1956a:152.—Holthuis, 1959:161.—Haig, 1962:186.—Coêlho, 1964:255.—Leary, 1964:27-28.—Bullis and Thompson, 1965: 10.—Williams, 1965:110, fig. 87.—Coêlho, 1966:62.—Haig, 1966:354.—Gore, 1970a: 963.—Rouse, 1970:141.—Coêlho, 1971: 233.—Menzel, 1971:79.—Coêlho and Ramos, 1972:175.—Felder, 1973:34-36, pl. 4, fig. 15.—Gore, 1974:715.—Fotheringham and Brunenmeister, 1975:61, 63, 167, fig. 3.23.—Rickner, 1975b:162.—Voss, 1976:92-93, fig.—Werding, 1977:212, fig. 29.—Haig, 1978:707.—Young, 1978:176.—Corredor et al., 1979:33.—Felder and Chaney, 1979:25, fig. 4, appendix I.—Rodríguez, 1980:218.—Hernández-Aguilera and Sosa-Hernández, 1982:41-42, fig. 20.—Scelzo, 1982:1132.—Wenner and Read, 1982:186, 194, 195, tables 2, 5.—Werding, 1982:446.—Maris, 1983: 237-246, figs. 1-7.—Werding, 1984:13.—Williams, 1984:245, fig. 180.—Abele and Kim, 1986:413, 422, 423, fig. b.—Ruppert and Fox, 1988:250, 404.—Britton and Morton, 1989: 245, 247, 258, fig. 10-1 G1.—Silva et al., 1989:138, figs. 9, 13.—Williams et al., 1989:35, pl. 1, third appendix page.—Markham et al., 1990:427.—Human, 1992: 164-165, middle color plate.—Veloso and Melo, 1993:182.—Hernández-Aguilera et al., 1996:53.—Tunnell and Alvarado, 1996: 136.—Camp et al., 1998:144.—Hernández et al., 1998:101-118, tables 1-3, figs. 1-7.—Alvarez et al., 1999:9.—Hernández, 1999: 246, 249, tables 1, 2.—Hernández et al., 1999:27, table 1.—Melo, 1999:266-267, figs. 183, 184.—Lemaitre and Campos, 2000:264, figs. 2f, 3f .—Nizenski, 2003:117.—Werding et al., 2003:79-85, tables 1, 2.—Galicia-Castillo and Hernández-Aguilera, 2005:237, 240, 255-256, fig. 20.—Rodríguez et al., in review.

Porcellana sayana?.—Gore, 1983:22.

Porcellana stimpsoni A. Milne-Edwards, 1880:35.—Haig, 1956:33.—Haig, 1978: 707.—Abele and Kim, 1986:413, 422, 423, fig. a.—Williams et al., 1989:35.—Camp et al., 1998:144.—Lemaitre and Campos, 2000: 264.

Material examined.—Bethel Shoal, off Fort Pierce, eastern Florida (ULLZ 5260), off Sanibel Island, Florida (ULLZ 1908), off Destin, Florida (ULLZ 2044), Florida (ULLZ 267); off Mississippi, (ULLZ 1101, 1102, 1701, 1809, 2047); North Gulf of Mexico (ULLZ 1350, 1351); Grand Isle, Louisiana (ULLZ 3100), Eugene Island, Louisiana (ULLZ 392), offshore Louisiana (ULLZ 4574); off Port Aransas, Texas (ULLZ 2046), North Padre Island, Texas (ULLZ 2049), UT Longhorn, Texas (ULLZ 1515), 7 ½ Fathom Reef, Texas (ULLZ 2045, 2050, 2052, 2053), U.S.A. Off Champotón, Campeche, Mexico (ULLZ 2051). Twin Cays, Belize (ULLZ 5436 to 5438). Guayacanecito, Macanao Peninsula, Margarita Island, Venezuela (ULLZ 5366).

Distribution.—North Carolina, South Carolina, Georgia, eastern and western Florida, Mississippi, Louisiana, and Texas, U.S.A.; Tamaulipas, Veracruz, Campeche, and Yucatán, and Quintana Roo, Mexico; Twin Cays, Belize; Caledonia Bay, Panama; La Guajira, De La Vela Cape, and Santa Marta, Colombia; Los Roques, Margarita, Cubagua, and Coche Islands, Venezuela; Bahamas; Cuba; Jamaica; Puerto Rico; Virgin Islands; Antigua; Barbados; Guyanas; southward to Rio Grande do Sul, Brazil.

Remarks.—The first record of this species for Belize is presented. As noted by Lemaitre and Campos (2000), the status of *Porcellana stimpsoni* is reviewed by Werding (Werding in preparation).

Porcellana sigsbeiana A. Milne-Edwards, 1880

Porcellana sigsbeiana A. Milne-Edwards, 1880:35 (type localities off delta of Mississippi, north of Yucatán, and Flannegan Pas-

sage, Virgin Islands).—Haig, 1956:33.—Bullis and Thompson, 1965:10.—Williams, 1965:111, fig. 88.—Dawson, 1966:177, table 1.—Gore, 1970a:964.—Pequegnat and Chace, 1970: 162-164, 166, 168, tables 5-2, 5-4.—Gore, 1971c:344-355, figs. 1-6.—Gosner, 1971:539.—Gore, 1972a:122-156, figs. 24-29, tables 8, 9.—Van Engel and Sandifer, 1972:158.—Felder, 1973:34-36, pl. 4, fig.16.—Gore, 1974:716.—Haig, 1978:707.—Young, 1978:176.—Coêlho et al., 1980:39.—Scelzo, 1982:1132.—Wenner and Read, 1982:187, 194, tables 2, 5.—Maris, 1983: 239.—Truesdale and Andryszak, 1983:43, 49, table 2.—Williams, 1984:246, fig. 181.—Abele and Kim, 1986:413, 422, 423, fig. c.—Williams et al., 1989:35.—Veloso and Melo, 1993:182.—Hernández-Aguilera et al., 1996: 53.—Camp et al., 1998:144.—Alvarez et al., 1999:9.—Hernández, 1999:246, 249, tables 1, 2.—Melo, 1999:268—269, figs. 185, 186.—Lemaitre and Campos, 2000:259, 264, figs. 2d, e, 3d, 4d.—Nizenski, 2003:117.—Werding et al., 2003:79-85, tables 1, 2.—Lalana et al., 2004:6, table 1.—Castillo and Hernández-Aguilera, 2005:240, 256-257, fig. 21.—Rodríguez et al., in review.

Material examined.—Straits of Florida (ULLZ 4481), Gulf of Mexico (ULLZ 736, 1352), off Mississippi (ULLZ 1663, 4837), off Louisiana (ULLZ 1990, 5448, 5455, 5902), U.S.A.

Distribution.—Massachusetts, North Carolina, Florida, Mississippi, Louisiana, northern Gulf of Mexico, U.S.A.; Tamaulipas, Veracruz, Tabasco, Campeche, and Yucatán, Mexico; Honduras; Colombia; Venezuela; Trinidad; Cuba; Virgin Islands; Suriname; Pará and Maranhao, Brazil.

DISCUSSION

The porcellanid fauna of the western Atlantic numbers 48 valid species plus two undescribed species herein reported (*Neopisosoma* sp. and *Pachycheles* sp). Of the western Atlantic species described since Haig (1956), 17 have been subsequently recognized as valid (*Megalobrachium mortenseni, Neopisosoma neglectum, N. orientale, Pachycheles chubutensis, P. cristobalensis, P. susanae, Petrolisthes bolivarensis, P. caribensis, P. columbiensis, P. dissimulatus, P. gertrudae, P. magdalenensis, P. rosariensis, P. sanmartini, P. tonsorius, Pisidia brasiliensis,* and *Porcellana lillyae*), six species have been determined to be junior synonyms (*Megalobrachium walteri, Pachycheles haigae, Petrolisthes cessacii, P. serratus, Porcellana paivacarvalhoi,* and *P. stimpsoni*), two have been considered invalid (*Petrolisthes costai* and *Pisidia melloleitaoi*), and one (*Porcellana platycheles*) has been excluded because only one specimen has been reported questionably for the western Atlantic. Similarly, 11 genera are now known for the region, three of these (*Neopisosoma, Clastotoechus,* and *Parapetrolisthes*) were recognized after Haig's revisions (Haig 1956, 1960, 1962). *Pisidia* was resurrected and *Porcellanopsis* was combined with *Megalobrachium* (Haig 1960). The monospecific genus *Madarateuchus,* established by Harvey (1999) to receive *Clastotoechus vanderhorsti,* is not found justified.

Regarding the porcellanids from Florida and the Gulf of Mexico, this study shows that the family is well represented in the literature for the region. Only *Petrolisthes quadratus* is herein reported for the first time in Florida and its range is extended northward to the U.S.A. However, previously unreported intra-specific morphological variation was observed among some species. Several morphotypes of *P. galathinus* occur in Florida, Texas, Veracruz, and other localities of this study. These likely correspond to undescribed species currently confused under a *P. galathinus*-complex of species (Werding 1982, 1983a; Werding and Hiller 2002; Werding and Kraus 2002).

Another case of intra-specific morphological variability is that of *Polyonyx gibbesi*. Although few specimens were available for examination, differences in the shape of the carapace were observed between samples from the two sides of the Florida Peninsula. Different populations or cryptic species within *P. gibbesi* might be recognized, as are known among populations of other trans-Floridian decapods of the genera *Sesarma, Uca, Callichirus,* and *Pagurus* (see Felder and Staton 1994; Staton and Felder 1995; Young et al. 2002). Preliminary molecular evidence of divergence was observed in

trans-Floridian specimens of *Megalobrachium soriatum,* which suggests that this taxon may contain cryptic species (Rodríguez et al. in review). In this case however, no morphological variation could be correlated to geography.

Examination of materials from Quintana Roo, on the Caribbean coast of Mexico, Belize, and Honduras resulted in the discovery of an undescribed species of the genus *Neopisosoma* and the range extension of three species northward: *Megalobrachium mortenseni, Petrolisthes rosariensis,* and *P. sanmartini*. Three species are recorded for the first time in Mexican waters: *Petrolisthes caribensis*, *P. tridentatus,* and the undescribed species of *Neopisosoma*. Seven species are new for Belize: *Pachycheles riisei, Petrolisthes caribensis, P. politus*, *P. quadratus, P. rosariensis, P. sanmartini,* and *Porcellana sayana*. The two species from Honduras, *Megalobrachium mortenseni* and *Petrolisthes magdalenensis,* were not previously known in the area. These findings confirm that the porcellanid fauna in this region remains poorly known.

Porcellanids from the southern Caribbean are fairly well known (Werding 1996; Werding et al. 2003). Even so, in this study an undescribed species of the genus *Pachycheles* is reported from Panama, and *Petrolisthes sanmartini* is reported for the first time from that country. In the Antilles, *Petrolisthes tridentatus* is recorded for the first time from Jamaica.

Fourty-eight valid species plus two undescribed species are currently known for the western Atlantic. Particularly variable are *Petrolisthes galathinus, P. armatus,* and *P. tridentatus*. *Petrolisthes galathinus* is now known to consist of a complex of at least six species in the southern Caribbean Sea: *P. bolivarensis, P. caribensis, P. columbiensis, P. rosariensis, P. sanmartini,* and *P. galathinus* itself (see Werding and Hiller 2002). The latter continues to group a series of morphologically and genetically variable forms still in need of more detailed revision (Stillman and Reeb 2001; Rodríguez et al. in review).

Petrolisthes armatus shows considerable morphological variation throughout its wide range (Chace 1956b; Haig 1956, 1960). Evidence from the morphology of the larvae suggests that the populations are divergent. The larvae of Atlantic and Pacific specimens described by Gore (1970b, 1972b) differ in several important features. Similarly, zoeal and megalopal stages of *P. armatus* from Venezuelan islands differed in several characteristics from those from Bermuda, Florida, the Gulf of Mexico, and the eastern Pacific (Graterol 1996). Specimens of *P. armatus* from the Gulf of California and from each coast of Panama were included in a molecular study by Stillman and Reeb (2001), where specimens from the two Pacific localities grouped more closely together than with Atlantic specimens, to the exclusion of other species of the genus. An additional third population distributed in the northern Gulf of Mexico and eastern coast of the U.S.A. was suggested in preliminary molecular studies (Rodríguez et al. in review). Although molecular data have shown that populations of *P. armatus* present differences throughout their ranges, and thus might be regarded as distinct species, morphological examinations of extensive series from the eastern Pacific (Haig 1960) and the western Atlantic (this study) concluded that variations in morphology did not consistently correlate with geography.

The third species-complex, *Petrolisthes tridentatus,* is also amphi-American and has been subject to morphological and genetic comparative studies that showed differences between specimens from both sides of the Isthmus of Panama (Gore 1971b; Stillman and Reeb 2001). Materials examined in this study from the northern Caribbean Sea and from Venezuela were morphologically distinct from those from Panama. This distinction was supported in preliminary molecular analyses (Rodríguez et al. in review). These findings coupled with additional morphological and molecular analyses, are likely to result in the description of new species.

Biogeographic considerations

The porcellanid fauna in the western Atlantic is for the most part Caribbean (Werding et al. 2003). Of the recorded species in

TABLE 2. Distribution of porcelain crabs by zoogeographic provinces in the western Atlantic. Provinces modified after Briggs (1974), Williams (1984), and Boschi (2000) as follows: Virginian, from Cape Cod to Cape Hatteras; N Warm-temperate, eastern U.S.A. from Cape Hatteras to Cape Canaveral (= Carolinian); Gulf of Mexico Warm-temperate, from Cape Romano to Cape Rojo, Mexico; Caribbean, from Cape Rojo to Orinoco Delta; West Indian, the Caribbean Islands; Brazilian, from the Orinoco Delta to Cape Frio; and Argentinian, from Cape Frio to 43/4°S. The occurrence of porcellanids in the eastern Pacific is marked in the final column.

Species	Virginian	N Warm-temperate	Gulf of Mexico Warm-temperate	Caribbean	West Indian	Brazilian	Argentinian	Eastern Pacific
Clastotoechus nodosus (Streets, 1872)				●	●			
Clastotoechus vanderhorsti (Schmitt, 1924)				●	●			
Euceramus praelongus Stimpson, 1860	●	●	●					
Megalobrachium mortenseni Haig, 1962				●	●			
Megalobrachium poeyi (Guérin, 1855)				●	●	●		
Megalobrachium roseum (Rathbun, 1900)				●	●	●		
Megalobrachium soriatum (Say, 1818)		●	●	●	●	●		
Minyocerus angustus (Dana, 1852)				●		●	●	
Neopisosoma angustifrons (Benedict, 1901)				●	●			
Neopisosoma curacaoense (Schmitt, 1924)				●	●			
Neopisosoma neglectum Werding, 1986				●	●			
Neopisosoma orientale Werding, 1986				●				
Neopisosoma sp.				●				
Pachycheles ackleianus A. Milne-Edwards, 1880				●	●	●		
Pachycheles chacei Haig, 1956				●		●		●
Pachycheles chubutensis Boschi, 1963							●	
Pachycheles cristobalensis Gore, 1970				●				
Pachycheles greeleyi (Rathbun, 1900)						●		
Pachycheles laevidactylus Ortmann, 1892						●	●	
Pachycheles monilifer (Dana, 1852)				●	●	●		
Pachycheles pilosus (H. Milne Edwards, 1837)		●		●	●			
Pachycheles riisei (Stimpson, 1859)				●	●	●		
Pachycheles rugimanus A. Milne-Edwards, 1880				●	●	●		
Pachycheles serratus (Benedict, 1901)				●	●			
Pachycheles susanae Gore and Abele, 1973				●	●			
Pachycheles sp.				●				
Parapetrolisthes tortugensis (Glassell, 1945)				●	●			
Petrolisthes amoenus (Guérin, 1855)				●	●	●		
Petrolisthes armatus (Gibbes, 1850)	●	●	●	●	●	●	●	●
Petrolisthes bolivarensis Werding and Kraus, 2002				●				

TABLE 2. Continued.

Species	Virginian	N Warm-temperate	Gulf of Mexico Warm-temperate	Caribbean	West Indian	Brazilian	Argentinian	Eastern Pacific
Petrolisthes caribensis Werding, 1983				●	●			
Petrolisthes columbiensis Werding, 1983				●	●			
Petrolisthes dissimulatus Gore, 1983				●	●			
Petrolisthes galathinus (Bosc, 1802)		●	●	●	●	●	●	●
Petrolisthes gertrudae Werding, 1996				●	●			
Petrolisthes jugosus Streets, 1872				●	●			
Petrolisthes magdalenensis Werding, 1978				●				
Petrolisthes marginatus Stimpson, 1859				●	●	●		
Petrolisthes politus (Gray, 1831)				●	●			
Petrolisthes quadratus Benedict, 1901				●	●			
Petrolisthes robsonae Glassell, 1945				●				●
Petrolisthes rosariensis Werding, 1982				●		●		
Petrolisthes sanmartini Werding and Hiller, 2002				●				
Petrolisthes tonsorius Haig, 1960				●				●
Petrolisthes tridentatus Stimpson, 1859				●	●			●
Pisidia brasiliensis Haig, 1968				●		●		
Polyonyx gibbesi Haig, 1956	●	●	●	●	●	●	●	
Porcellana lillyae Lemaitre and Campos, 2000				●				
Porcellana sayana (Leach, 1820)		●	●	●	●	●	●	
Porcellana sigsbeiana A. Milne-Edwards, 1880	●	●	●	●	●	●		
Total number of species	4	8	7	46	32	20	7	6

this study, only four have not been found in the Caribbean Province. *Euceramus praelongus* is entirely a northern temperate species, *Pachycheles chubutensis* is exclusively distributed in the southern temperate zone, *P. laevidactylus* lives in this zone but also reaches tropical Brazil, and *P. greeleyi* is endemic to tropical Brazil (Table 2). Zoogeographic affinities of porcelain crabs were discussed by Werding et al. (2003), who noted that the fauna from the West Indian Province of Briggs (1974) was distinguished from that of the southern Caribbean by having a lower species number (34 versus 40 species). In this study we found that all species in the West Indian Province (32 species) were also present in the Caribbean Province (46 species) (Table 2). Therefore only 14 species in the Caribbean were not found in the West Indies. Because some of these species were recently described, it is probable that they too will be found there eventually. Some of the Caribbean species clearly have a wider distribution than previously thought (e.g., *Minyocerus angustus*, *Neopisosoma orientale*, *Petrolisthes magdalenensis*, *P. rosariensis*, *P. sanmartini*, and *Pisidia brasiliensis*). We suggest that the West Indian Province should be considered an indistinguishable component of the Caribbean Province regarding the porcellanid fauna.

Knowledge of the Porcellanidae in the western Atlantic has been improved with the study of larval development and the use of molecular data, in addition to traditional studies of adult morphology. Even so, detailed studies focused on particular species and genera are required to clarify taxonomic status, phylogenetic relationships, and biogeographic patterns. Further explorations in many parts of Central America, the Antilles, and the Guyanas are essential to better understanding porcellanid composition and distribution in the region.

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