

## Decapod and stomatopod crustaceans from Santo Aleixo Island, state of Pernambuco, Brazil

Alexandre O. Almeida; Luis E. A. Bezerra; Jessor F. Souza-Filho; Sérgio M. Almeida; Débora L. Albuquerque, and Petrônio A. Coelho

(AOA) Universidade Estadual de Santa Cruz, Departamento de Ciências Biológicas. Rodovia Ilhéus-Itabuna, km 16. 45662-000, Ilhéus, BA, Brasil. Corresponding author. E-mail: aalmeida@uesc.br

(AOA, LEAB, JFSF, SMA, DLA, PAC) Universidade Federal de Pernambuco, Departamento de Oceanografia, Programa de Pós-Graduação em Oceanografia. Avenida Arquitetura, s/n, Cidade Universitária. 50670-901, Recife, PE, Brasil.

### Abstract

Santo Aleixo Island (08°36'40,15"S, 35°01'22,92"W) is the only coastal island of the state of Pernambuco in northeastern Brazil. It is located on the southern coast, about 2 km from the mouth of the Serinhaém River. The area is still in a good state of preservation, containing a wide diversity of coastal habitats such as sandy beaches, sandstone reefs, rocky shores, and a tiny area of mangroves, supporting high species richness. The objective of this contribution was to survey the decapod and stomatopod crustacean fauna of Santo Aleixo Island. Qualitative sampling was carried out at 8 stations, between November 2005 and April 2007. The specimens were collected by hand during low spring tide, by snorkeling or with artisanal traps; additional material was caught by trawling in the neighborhood of the study area. The material was deposited in the carcinological collection of the Departamento de Oceanografia, Universidade Federal de Pernambuco, Recife, Brazil. A total of 68 species were collected. Stomatopods were represented by the squillid *Alima hildebrandi* (Schmitt, 1940) and the gonodactylids *Neogonodactylus bredini* (Manning, 1969), *N. lacunatus* (Manning, 1966), and *N. torus* (Manning, 1969). Decapods were represented by 64 species distributed in 32 families. The shrimp *Thor manningi* Chace, 1972 (Caridea, Hippolytidae) is reorded for the first time from the coast of Pernambuco. The zoogeographic affinities of the species are brielly discussed.

Key-words: Pernambuco, Species richness, Marine crustaceans, Decapoda, Stomatopoda.

### Introduction

When available, reliable checklists are essential for ecological studies to understand the present distribution of marine species. Checklists are also important for environmental managers in need of information on marine and estuarine organisms for various purposes, including as conservation, proper management, and richness assessment.

Because of the large extent of its coast with a wide variety of habitats, Brazil has a diverse marine fauna. However, knowledge of the benthic invertebrates of Brazil is largely unsatisfactory (Amaral and Jablonski, 2005); therefore, checklists are an

important tool to define the present-day Brazilian biodiversity.

The large amount of information on crustacean biodiversity in the northern/northeastern (n/ne) part of the Brazilian coast comes from several oceanographic expeditions that sampled those regions, as well from coastal collections, which provided numerous new records and new species of marine and estuarine crustaceans (for a list of the Oceanographic expeditions, see Coelho *et al.*, 2004). The most comprehensive studies regarding the crustacean distribution in n/ne Brazil were published by Coelho and Ramos (1972), and Coelho *et al.* (1977/78; 1980; 2006; 2007). Pernambuco

has one of the best-known crustacean fauna of the states in n/ne Brazil, and yet some portions of the coast are still poorly known.

The Pernambuco coast is 187 km long. Several studies on the decapod and stomatopod fauna have been carried out in coastal habitats (e.g., Coelho, 1965/66a, b; Coelho and Coelho-Santos, 1990; Coelho and Lacerda, 1990; Austregésilo Filho and Ramos-Porto, 1994/95; Coelho and Ramos-Porto, 1995; Carvalho *et al.*, 1998; Coelho-Santos and Coelho, 2001). In addition a checklist of the decapod and stomatopod crustaceans of Santo Aleixo Island is provided in the present paper. Zoogeographic affinities of the decapoda fauna are briefly discussed.

## Material and Methods

Santo Aleixo Island is located in the municipality of Ipojuca, southern coast of Pernambuco state, Brazil (08°36'40.15"S, 35°01'22.92"W) (Fig. 1). The climate is pseudo-tropical humid (according to the Köppen classification). Most precipitation occurs between May and August, varying from 1,800 to 2,400 mm. The annual mean temperature is about 24°C. The island is situated 5 km from the coast, with the east side facing the ocean and the west side facing the continent. The central area is privately owned. The island is visited daily by small tourist boats from Barra do Sirinhaém and Porto de Galinhas (both in Ipojuca, Pernambuco) that land in area 1 (Fig. 1).

The samples were collected at eight stations along the coastline of Santo Aleixo Island (Fig. 1) in 04/XI/2005, 03/III/2006, 6/II/2007, and 19/

IV/2007 (see Table 1 for detailed information on each site). Specimens were collected mainly by hand during low spring tide. Additional samplings were carried out by snorkeling or with artisanal traps, and some material was caught with a trawl net in the neighborhood of the study area (mesh size not available). Substrates such as algae were isolated with plastic bags, and then detached and preserved in seawater. In the laboratory, these samples were washed and the specimens were carefully separated and preserved in 70% ethanol. The general classification adopted in the present contribution follows Martin and Davis' (2001) proposed scheme to family level, except for the Xanthoidea *sensu lato*, where Karasawa and Schweitzer's proposal was followed (2006). In each family, the order of genera and species is alphabetical. The material was deposited in the carcinological collection of the Departamento de Oceanografia of the Universidade Federal de Pernambuco – UFPE, Recife, Brazil (DOUFPE). Abbreviations used in *Material examined*: m = males, f = females, ni = sex not identified, juv = juvenile, St. = station.

## Results

### List of species

**Class Malacostraca Latreille, 1802**  
**Subclass Hoplocarida Calman, 1904**  
**Order Stomatopoda Latreille, 1817**  
**Superfamily Gonodactyloidea Giesbrecht, 1910**  
**Family Gonodactylidae Giesbrecht, 1910**  
*Neogonodactylus bredini* (Manning, 1969)

**Table 1.** Coordinates and characterization of the collection stations at Santo Aleixo Island, southern Pernambuco, Brazil.

Station	Coordinates	Characterization
1	8°36'42.37"S, 35°01'27.64"W	Sheltered sandy beach. The subtidal zone contains hard substrata in the form of fragments of sandstone reefs and coral, as well as blocks of dead calcareous algae scattered on a sandy bottom.
2	8°36'45.6"S, 35°01'27.96"W	An intrusion of rocky shore located between the sandy beach (station 1) and the sandstone reefs at stations 3 and 4.
3	8°36'46.31"S, 35°01'30.72"W	Rather flat sandstone reef, sheltered, with green seaweed ( <i>Halimeda</i> and <i>Caulerpa</i> ). A stretch about 15 m long is exposed during low tide.
4	8°36'49.64"S, 35°01'29.10"W	Sandstone reef in similar condition to that at station 3, but more exposed to wave action. Algae are mainly represented by <i>Halimeda</i> and <i>Caulerpa</i> , but <i>Sargassum</i> and <i>Hypnea</i> are also abundant in tide pools. A stretch about 30 m long is exposed during low tide.
5	8°36'42.56"S, 35°01'15.20"W	Rocky shore directly exposed to wave action.
6	8°36'50.5"S, 35°01'31.3"W	Small mangrove area.
7	8°36'32.38"S, 35°01'23.7"W	Rocky shore, less exposed than station 5.
8	8°36'32.25"S, 35°01'29.55"W	Rocky shore with one side sheltered and the other exposed to wave action. A seagrass meadow in the infralittoral zone in the sheltered area.

*Material examined:* 1m, 06/II/2007, St. 01, on rocks (DOUFPE#13508).

*Distribution:* Western Atlantic – Bermuda, Carolinas, northern Gulf of Mexico through the Caribbean to Aruba, Bonaire, Curaçao, and Brazil (from Amapá to Bahia) (Manning, 1969; Gomes Corrêa, 1986).

*Ecological notes:* All kinds of bottom, except mud. In sponges, rocks, and coral. Intertidal to 55 m (Manning, 1969; Gomes Corrêa, 1986).

*Neogonodactylus lacunatus* (Manning, 1966)

*Material examined:* 1f, 06/II/07, St. 01, on rocks (DOUFPE#13509).

*Distribution:* Western Atlantic – Caribbean, Nicaragua, Colombia, Virgin Islands, and Brazil (from Maranhão to Rio de Janeiro) (Manning, 1969; Gomes Corrêa, 1986).

*Ecological notes:* All kinds of bottom, from shallow water to 80 m (Gomes Corrêa, 1986).

*Neogonodactylus torus* (Manning, 1969)

*Material examined:* 1m, 03/III/06, St. 01, on rocks (DOUFPE#13433); 1f, 06/II/2007, St. 01, on rocks (DOUFPE#13510).

*Distribution:* Western Atlantic – North Carolina, southeast and northwest Florida, Yucatan, Cuba, Barbados, Panama, and Brazil (from Pará to Bahia) (Manning, 1969; Gomes Corrêa, 1986).

*Ecological notes:* On hard bottoms. In depths between 10 and 364 m (Manning, 1969; Gomes Corrêa, 1986).

Superfamily Squilloidea Latreille, 1802

Family Squillidae Latreille, 1802

*Alima hildebrandi* (Schmitt, 1940)

*Material examined:* 1m, 04/XI/2005, trawling (DOUFPE#13432).

*Distribution:* Western Atlantic – Panama, Cuba, and Brazil (from Ceará to Pernambuco, Bahia, and

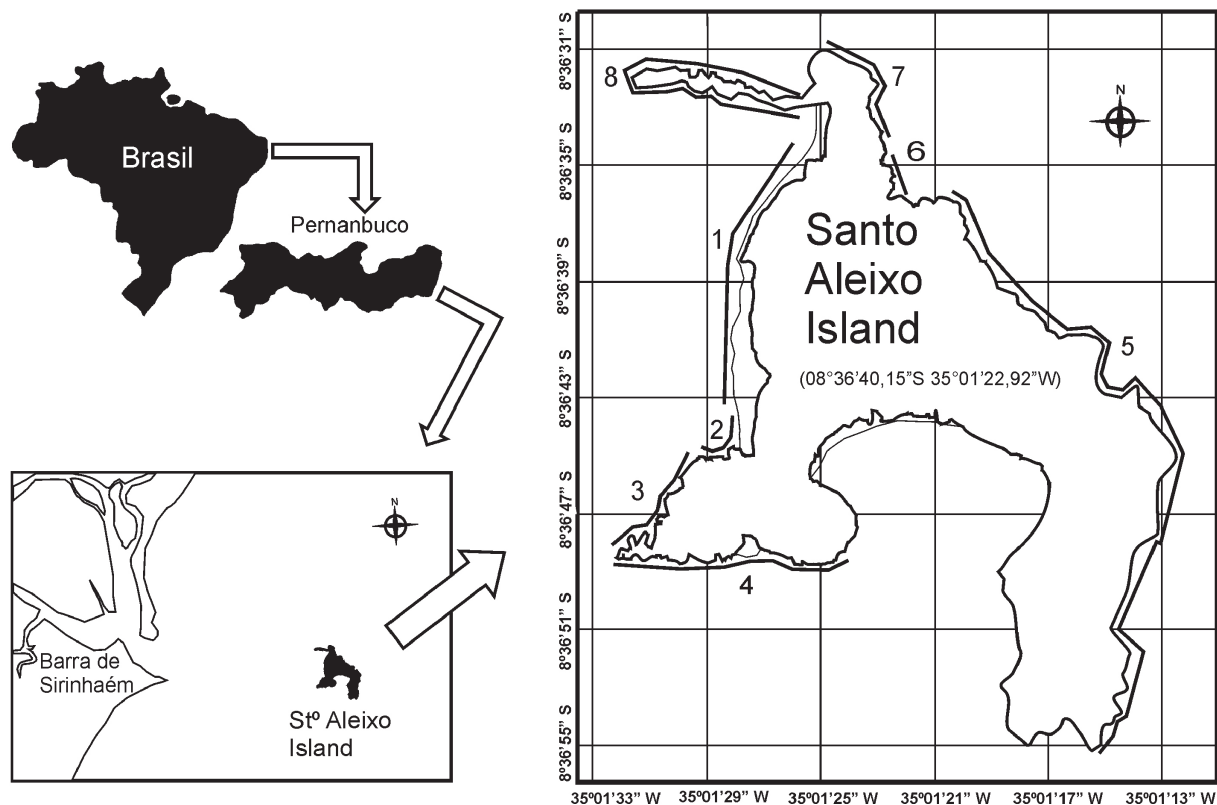


Figure 1. Location of Santo Aleixo Island, southern coast of the state of Pernambuco, Brazil.

São Paulo). Eastern Atlantic – Ghana (Manning, 1969; Gomes Corrêa, 1986).

*Ecological notes:* On mud bottoms and in shallow waters, from 10 to 15 m (Gomes Corrêa, 1986).

*Remarks:* The species *A. hildebrandi* was resurrected from the synonymy of *A. hieroglyphica* (Kemp, 1911) and recognized for the Atlantic population. *Alima hieroglyphica* seems to be restricted to the Indo-West Pacific (Ahyong, 2001).

**Subclass Eumalacostraca Grobben, 1892**

**Order Decapoda Latreille, 1802**

**Suborder Dendrobranchiata Bate, 1888**

**Superfamily Penaeoidea Rafinesque, 1815**

**Family Penaeidae Rafinesque, 1815**

*Xiphopenaeus kroyeri* (Heller, 1862)

*Material examined:* 2f, 04/XI/2005, trawling (DOUFPE#13434).

*Distribution:* Western Atlantic – from Virginia to Brazil (from Amapá to Rio Grande do Sul). Eastern Atlantic – from Mexico to Peru (Costa *et al.*, 2003).

*Ecological notes:* Oceanic, demersal species, occurring up to 70 m deep, but most frequently from shallow waters to 50 m (D’Incao, 1998).

**Suborder Pleocyemata Burkenroad, 1963**

**Infraorder Caridea Dana, 1852**

**Superfamily Palaemonoidea Rafinesque, 1815**

**Family Palaemonidae Rafinesque, 1815**

**Subfamily Palaemoninae Rafinesque, 1815**

*Leander tenuicornis* (Say, 1818)

*Material examined:* 1f, 19/IV/2007, St. 01, on *Dictyota* sp. (DOUFPE#13539).

*Distribution:* Western Atlantic – Bermuda, from east coast of the United States, Gulf of Mexico, Central America, Antilles, northern South America, and Brazil (Fernando de Noronha, and from Maranhão to Bahia). Eastern Atlantic. Mediterranean. Indo-Pacific – Red Sea, from South Africa to Japan, Philippines, Indonesia, Australia, New Zealand, and South China Sea (Ramos-Porto, 1985/86, Li *et al.*, 2004). According to Williams (1984), in the western Atlantic this species occurs from Newfoundland (Canada) to the Falkland Is-

lands, but the record from the Falklands is doubtful (see Li *et al.*, 2004).

*Ecological notes:* On gravel and sand bottoms covered with seagrass. From shallow waters to 72 m (Ramos-Porto, 1985/86; Ramos-Porto and Coelho, 1998).

***Nematopalaemon schmitti* (Holthuis, 1950)**

*Material examined:* 2m, 1f, 04/XI/2005, trawling (DOUFPE#13435).

*Distribution:* Western Atlantic – Guyana and Brazil (from Amapá to São Paulo) (Ramos-Porto and Coelho, 1998).

*Ecological notes:* Mud, sand-mud, and gravel bottoms. From shallow waters to 60 m (Ramos-Porto and Coelho, 1998).

**Subfamily Pontoniinae Kingsley, 1878**

***Kemponia americana* (Kingsley, 1878)**

*Material examined:* 8ni, 03/III/2006, St. 01, on rocks (DOUFPE#13436); 11ni, 03/III/2006, St. 03, on rocks and *Halimeda* sp. (DOUFPE#13437); 1ni, 03/III/2006, St. 08 (DOUFPE#13438); 2m, 2f, 2 damaged, 06/II/2007, St. 01 (DOUFPE#13511); 4f, 1ni, 19/IV/2007, St. 01 (DOUFPE#13538).

*Distribution:* Western Atlantic – from North Carolina to western Gulf of Mexico, Antilles (West Indies to Aruba), and Brazil (Rocas Atoll, oceanic banks off Ceará, and from Amapá to Alagoas, Espírito Santo, and São Paulo) (Williams, 1984; Ramos-Porto and Coelho, 1998; Calado and Sousa, 2003).

*Ecological notes:* In sand and gravel bottoms, seagrass, tide pools, and in sponges. From shallow waters to 105 m (Ramos-Porto and Coelho, 1990; Ramos-Porto and Coelho, 1998; Calado and Sousa, 2003).

*Remarks:* This species was recently transferred from the genus *Periclimenes* to *Kemponia* (Bruce, 2004).

**Superfamily Alpheoidea Rafinesque, 1815**

**Family Alpheidae Rafinesque, 1815**

***Alpheus cf. armillatus* H. Milne Edwards, 1837**

*Material examined:* 2f, 03/III/2006, St. 01, on rocks (DOUFPE#13439); 2ni, 03/III/2006, St. 03, on *Halimeda* sp. (DOUFPE#13440); 1m, 06/II/2007, St. 01 (DOUFPE#13512); 1f, 19/IV/2007, St. 01 (DOUFPE#13540); 1m, 1f, 19/IV/2007, St. 01 (DOUFPE#13541).

*Distribution:* Western Atlantic – Bermuda and North Carolina to Brazil (from Ceará to Santa Catarina, Fernando de Noronha) (Christoffersen, 1998).

*Ecological notes:* Under rocks, in oyster banks, and in crevices of coral rocks; also common on seagrass flats. From shallow waters to about 9 m (Chace, 1972).

*Remarks:* *Alpheus armillatus* is a large species complex that includes at least seven species in the western Atlantic (A. Anker, pers. com.). Mathews (2006) analyzed the genetic structure of this species complex in the northern Caribbean, western Atlantic, and Gulf of Mexico, using mitochondrial and nuclear sequence data. She concluded that the complex includes at least three lineages that are probable reproductively isolated species. The identity of the Brazilian material remains unknown.

***Alpheus bouvieri* A. Milne-Edwards, 1878**

*Material examined:* 1f, 03/III/2006, St. 01, on rocks (DOUFPE#13441); 1ni, 06/II/2007, St. 01 (DOUFPE#13513).

*Distribution:* Western Atlantic – Bermuda, Florida, Cuba, Lesser Antilles, Trinidad and Tobago, Aruba, Panama, and Brazil (Fernando de Noronha, and from Ceará to Rio Grande do Sul) (Chace, 1972; Christoffersen, 1979, 1998). Central Atlantic – Ascension Island (Manning and Chace, 1990). Eastern Atlantic – Cape Verde, Senegal to Gulf of Guinea and Dem. Rep. of Congo (Crosnier and Forest, 1966).

*Ecological notes:* Intertidal species occurring among or under rocks, in rock crevices, in *Phragmatopoma* (Sabellariidae) reefs (Christoffersen, 1979).

*Remarks:* All records of *A. bouvieri* from the eastern Pacific (Kim and Abele, 1988) actually refer to

a transisthmian sister species of *A. bouvieri* (Williams *et al.*, 2001; A. Anker, pers. com.).

***Alpheus cf. formosus* Gibbes, 1850**

*Material examined:* 1ni, damaged, 19/VI/2007, St. 01, on *Halimeda* sp. (DOUFPE#13542).

*Distribution:* Western Atlantic – Bermuda, and from North Carolina through the Caribbean to Brazil (Fernando de Noronha, and from Ceará to São Paulo) (Christoffersen, 1998).

*Ecological notes:* Sand flats with *Porites* and other corals, seagrass flats with abundant coral rubble, rock-studded beaches, seawalls, wrecks, exposed and submerged reefs, *Phragmatopoma* reefs; rarely in sponges or bryozoan (*Schizoporella*) colonies, in crevices of corals or coral rubble, under rocks. Intertidal to 42 m (Chace, 1972; Christoffersen, 1979; 1980; A. Anker, pers. com.).

*Remarks:* Species complex, with at least two species in the western Atlantic (Knowlton and Mills, 1992).

***Alpheus cf. packardii* Kingsley, 1880**

*Material examined:* 1ni, 06/II/2007, St. 01 (DOUFPE#13514).

*Distribution:* Western Atlantic – Bermuda, from Virginia to South Carolina, Florida, Gulf of Mexico, Bahamas, Mexico (Quintana Roo and Yucatán), Antilles, and Brazil (Rocas Atoll, Fernando de Noronha, and from Amapá to São Paulo) (Christoffersen, 1979; 1998; Martínez-Iglesias *et al.*, 1996). Records from the eastern Pacific (Gulf of California to Panama, Galápagos) refer to at least two different species, one of them *A. normanni* Kingsley, 1878 (A. Anker, pers. com.).

*Ecological notes:* On mud, sand, calcareous algae, and broken shells, also on seagrass flats (*Thalassia* and *Diplanthera*), oyster banks, and in *Phragmatopoma* reefs. Common in polyhaline zones of estuaries. Intertidal to 73 m (Christoffersen, 1979, as *A. normanni*).

*Remarks:* *Alpheus packardii* is also a species complex, with at least three species in the western Atlantic and two species in the eastern Pacific (A. Anker, pers. com.).

***Synalpheus cf. fritzmuelleri* Coutière, 1909**

*Material examined:* 2ni, 03/III/2006, St. 01, on algae (DOUFPE#13442); 2ni, 03/III/2006, St. 03, on rocks (DOUFPE#13443); 2ni, 06/II/2007, St. 01, on rocks (DOUFPE#13515).

*Distribution:* Western Atlantic – Bermuda, Carolinas, Florida, northern Gulf of Mexico (Texas), Mexico (Veracruz, Quintana Roo), Colombia (Providencia), Antilles, Venezuela, and Brazil (St Paul's Rocks, Pernambuco to Santa Catarina) (Christoffersen, 1979; 1998; Holthuis *et al.*, 1980). Central Atlantic – Santa Helena Island, (Holthuis *et al.*, 1980), Ascension Island (Manning and Chace, 1990). Records from the eastern Pacific (e.g., Tres Mariás Archipelago, Mexico) refer to other species (A. Anker, pers. com.).

*Ecological notes:* In sponges, among ascidians and *Zoanthus* colonies, gorgonians, mangrove roots, among *Halimeda* clumps, calcareous algae, *Schizoporella* and *Phragmatopoma* colonies, corals, rock cavities, calcareous rocks. Intertidal to 75 m (Christoffersen, 1979).

*Remarks:* Another possible species complex, with several species in the western Atlantic and eastern Pacific (A. Anker, pers. com.). The identity of the Brazilian material requires further confirmation.

**Family Hippolytidae Dana, 1852*****Hippolyte obliquimanus* Dana, 1852**

*Material examined:* 1m, 3f, 06/II/2007, St. 01 (DOUFPE#13516); 1m, 1f, 19/IV/2007, St. 01, on rocks and *Halimeda* sp. (DOUFPE#13543).

*Distribution:* Western Atlantic – North Carolina, Florida, Antilles, Venezuela, and Brazil (Bahia and Rio de Janeiro) (Udekem d'Acoz, 1997).

*Habitat:* Shallow waters, among algae and seagrass meadows (Udekem d'Acoz, 1997).

*Remarks:* Udekem d'Acoz (1997) established *H. exilirostratus* Dana, 1852, and *H. curacaoensis* Schmitt, 1924, both previously cited from Brazil (Coelho and Ramos, 1972; Christoffersen, 1998), as junior synonyms of *H. obliquimanus*.

*Thor manningi* Chace, 1972 (Figs. 2-3)

*Material examined:* 2f, 1ni, 03/III/2006, St. 03 (DOUFPE#13444); 6f, 3ni, 06/II/2007, St. 01 (DOUFPE#13517).

*Distribution:* Western Atlantic – Bermuda, from North Carolina to Brazil (Seamounts of North Chain, Fernando de Noronha, from Ceará to Paraíba, Bahia, and São Paulo). Central Atlantic – Ascension Island. Eastern Pacific – Islas Tres Marias, Mexico (Manning and Chace, 1990; Christoffersen, 1998; Coelho-Filho, 2006).

*Habitat:* Commonly found on grass flats, but also on living and dead coral, and submerged timbers, from the tide line to 42 m (Chace, 1972).

*Remarks:* Nomorphological accounts of *T. manningi* were provided in the previous records from Brazil (Christoffersen, 1998; Morgado and Tanaka, 2001; Coelho-Filho, 2006). The most important diagnostic features of *T. manningi* are the presence of the supra-orbital tooth in the form of an obtuse prominence (Fig. 1A-C), the anterolateral margin of carapace is rounded and unarmed (Fig. 1B), the distal margin of the telson is provided with 3 pairs of spines (Fig. 1F, G), and the presence of 2-4 (more commonly 3) spinules on the flexor margin proximal to the distal pair of spines on the dactyls of pereopods 4 and 5 (Fig. 2E, G) (Chace, 1972). This is a partial protandric hermaphrodite shrimp (Bauer, 1986). Primary males have a prehensile third pair of pereopods: the distal end of the propodus is expanded and its lateral flexor margin is covered with long spatulate setae; the dactyl of the same pereopod is elongated compared to mature females, and similarly equipped with spatulate setae (for more details, see Bauer 1986, p. 14, figs. 1A-C; see also Chace, 1972, p. 137, fig. 59r). The other *Thor* species recorded from the Brazilian coast are *T. amboinensis* (De Man, 1888) and *T. floridanus* Kingsley, 1878 (Christoffersen, 1998; Coelho Filho, 2006). *T. amboinensis* has no trace of supra-orbital tooth, and *T. floridanus* bears 4-5 (rarely 3 or 6) spinules on the flexor margin proximal to the distal pair of spines on the dactyls of pereopods 4 and 5 (Chace, 1972). The present record is the first from the state of Pernambuco.

**Infraorder Thalassinidea Latreille, 1831****Superfamily Callianassoidea Dana, 1852****Family Upogebiidae Borradaile, 1903*****Upogebia noronhensis* Fausto Filho, 1969**

*Material examined:* 3f, 19/IV/2007, St. 01, on rocks (DOUFPE#13544); 1f, 19/IV/2007, St. 03, on rocks (DOUFPE#13545).

*Distribution:* Western Atlantic – Brazil (Fernando de Noronha, and from Maranhão to São Paulo) (Melo, 1999; Nucci and Melo, 1999).

*Ecological notes:* Shallow-water species found in the limit between the subtidal and intertidal zones, under rocks, in cavities, and in burrows (Melo, 1999; Nucci and Melo, 1999).

#### Infraorder Palinura Latreille, 1802

#### Superfamily Palinuroidea Latreille, 1802

#### Family Palinuridae Latreille, 1802

#### *Panulirus argus* (Latreille, 1804)

*Material examined:* field observation.

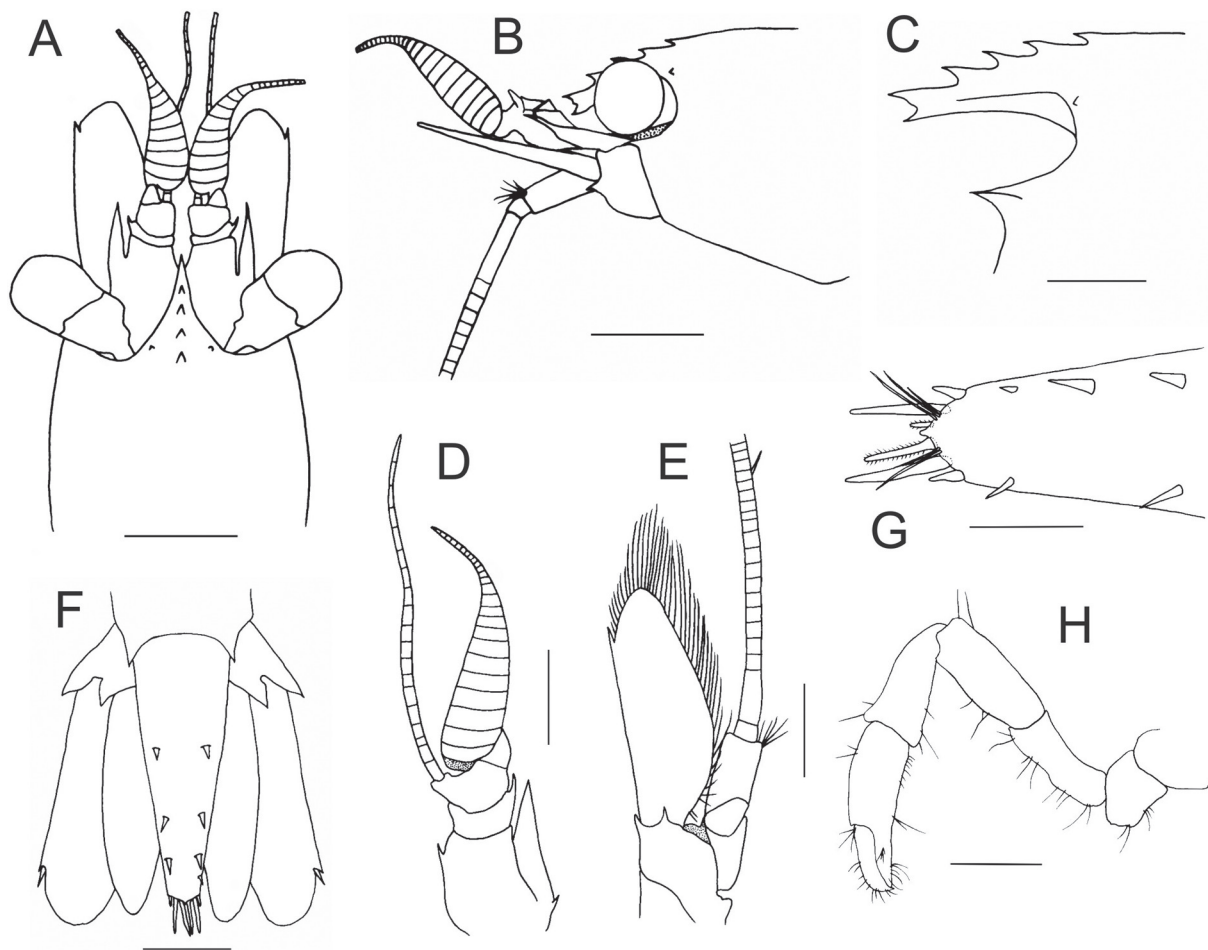
*Distribution:* Western Atlantic – Bermuda, from North Carolina to Florida, Gulf of Mexico, Central America, Antilles, northern South America, and Brazil (Fernando de Noronha, Rocas Atoll, and from Pará to São Paulo) (Melo, 1999). Eastern Atlantic – Cape Verde (Freitas and Castro, 2005).

*Ecological notes:* On reefs, among rocks, in sponges and other environments that provide shelter. It can also be found in sand and gravel bottoms. From shallow waters to 90 m (Melo, 1999).

#### *Panulirus echinatus* Smith, 1869

*Material examined:* 1f, 03/III/2006, St. 01, artisanal traps (DOUFPE#13446).

*Distribution:* Western Atlantic – Brazil (St. Paul's Rocks, Rocas Atoll, Fernando de Noronha, Trindade,



**Figure 2.** *Thor manningi* Chace, 1972, from Santo Aleixo Island, Pernambuco, Brazil. Ovigerous female. A. anterior region of carapace and frontal appendages, dorsal view; B. same, lateral view; C. rostrum, lateral view; D. right antennule, dorsal view; E. right antenna and scaphocerite, dorsal view; F. telson and uropods, dorsal view; G. tip of telson, dorsal view; H. left pereopod 1. Figures A, B, D, F – setae omitted. Scale bars: A, B = 1 mm; C-F, H = 0.5 mm; G = 0.25 mm.

and from Ceará to Rio de Janeiro). Central Atlantic – Ascension and Santa Helena Islands. Eastern Atlantic – Canary Islands and Cape Verde (Melo, 1999).

*Ecological notes:* In rock cavities, among pebbles, and in other environments that provide shelter. Nocturnal. From shallow waters to 35 m, preferentially shallower than 25 m (Melo, 1999).

*Panulirus laevicauda* (Latreille, 1817)

*Material examined:* field observation.

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Central America, Antilles, northern South America, Guyanas, and Brazil (Fernando de Noronha, and from Maranhão to São Paulo) (Coelho and Ramos-Porto, 1980; 1998).

*Ecological notes:* On reefs, rocks, and calcareous-algae bottoms. From shallow waters to 50 m (Melo, 1999).

Family Scyllaridae Latreille, 1825

*Parribacus antarcticus* (Lund, 1793)

*Material examined:* 1m, 04/XI/2005, trawling (DOUFPE#14447).

*Distribution:* Western Atlantic – Florida, Antilles, Central America, Guyanas, and Brazil (Fernando de Noronha, and from Ceará to São Paulo). Indo-Pacific – southeast South Africa to Hawaii, and Polynesia (Melo, 1999).

*Ecological notes:* Tropical species, mainly associated with coral and rocky bottoms. From shallow waters to 130 m (Melo, 1999).

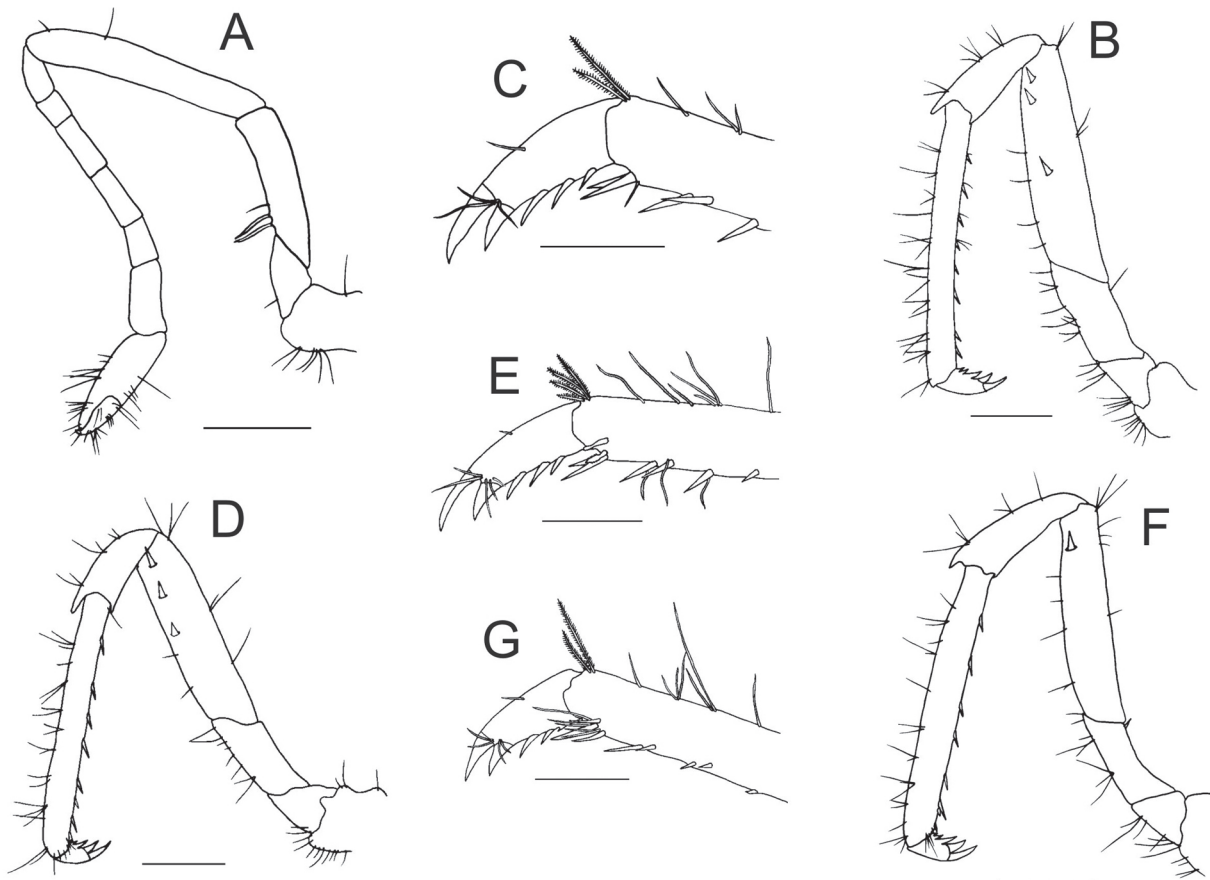
Infraorder Anomura MacLeay, 1838

Superfamily Galatheaidea Samouelle, 1819

Family Porcellanidae Haworth, 1825

*Megalobrachium mortenseni* Haig, 1962

*Material examined:* 1f, 06/II/2007, St. 08 (DOUFPE#13518).



**Figure 3.** *Thor manningi* Chace, 1972, from Santo Aleixo Island, Pernambuco, Brazil. Ovigerous female. A. left pereopod 2; B. left pereopod 3; C. right pereopod 3, distal portion; D. left pereopod 4; E. right pereopod 4, distal portion; F. left pereopod 5; G. right pereopod 5, distal portion. Scale bars: A, B, D, F = 0.5 mm; C, E, G = 0.25 mm.



*Distribution:* Western Atlantic – Central America, Antilles, Colombia, and Brazil (from Pará to São Paulo). Eastern Pacific – Gulf of California to Panama (Melo, 1999).

*Ecological notes:* Mainly on rocky bottoms, from shallow waters to 30 m (Melo, 1999).

***Megalobrachium roseum* (Rathbun, 1900)**

*Material examined:* 1f, 04/XI/2005, St. 02 (DOUFPE#13450).

*Distribution:* Western Atlantic – Central America, Colombia, Venezuela, and Brazil (from Maranhão to São Paulo) (Melo, 1999).

*Ecological notes:* Associated with coral reefs, also found under rocks in the intertidal zone (Melo, 1999).

***Pachycheles greeleyi* (Rathbun, 1900)**

*Material examined:* 1f, 1ni (damaged), 03/III/2006, St. 03 (DOUFPE#13449); 1juv, 06/II/2007, St. 01 (DOUFPE#13519); 2ni, 03/III/2006, St. 03 (DOUFPE#13449).

*Distribution:* Western Atlantic – Brazil (from Pará to Espírito Santo) (Melo, 1999).

*Ecological notes:* Shallow-water species, living on reefs and under rocks (Melo, 1999).

***Pachycheles laevidactylus* Ortmann, 1892**

*Material examined:* 1ni, 06/II/2007, St. 08 (DOUFPE#13520).

*Distribution:* Western Atlantic – Brazil (from Pernambuco to Rio Grande do Sul), Uruguay, and Argentina (Melo, 1999).

*Ecological notes:* Frequently found among rocks, algae, and mussel banks. Intertidal (Melo, 1999).

***Porcellana sayana* (Leach, 1820)**

*Material examined:* 2m, 04/XI/2005, trawling (DOUFPE#13448).

*Distribution:* Western Atlantic – North Carolina to Florida, Bahamas, Gulf of Mexico, Central Amer-

ica, Antilles, northern South America, Guyanas, Brazil (from Amapá to Rio Grande do Sul), and Uruguay (Melo, 1999).

*Ecological notes:* On mud, sand, and shell bottoms. Usually found in association with pagurid and diogenid species, and with the gastropod *Strombus gigas*. Intertidal to 92 m. (Melo, 1999).

*Remarks:* The analyzed specimens were found in association with the diogenid *Petrochirus diogenes*.

**Superfamily Paguroidea Latreille, 1802**

**Family Diogenidae Ortmann, 1892**

***Calcinus tibicen* (Herbst, 1791)**

*Material examined:* 1m, 2f, 04/XI/2005, St. 02 (DOUFPE#13451); 1m, 1f, 03/III/2006, St. 01, on rocks (DOUFPE#13452); 2m, 2f, 03/III/2006, St. 03 (DOUFPE#13453); 2m, 1f, 03/III/2006, St. 08 (DOUFPE#13454); 1m, 06/II/2007, St. 08 (DOUFPE#13521); 7m, 5f, 19/IV/2007, St. 01, on rocks and *Halimeda* sp. (DOUFPE#13546).

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Panama, Colombia, Venezuela, and Brazil (Fernando de Noronha, from Ceará to São Paulo, and Santa Catarina) (Rieger and Giraldi, 1997; Melo, 1999).

*Ecological notes:* Commonly found on hard substrata. Intertidal to 30 m (Melo, 1999).

***Clibanarius antillensis* Stimpson, 1859**

*Material examined:* 1m, 1f, 2juv, 03/III/2006, St. 01, on rocks (DOUFPE#13455); 1m, 04/XI/2005, St. 3 (DOUFPE#13456); 1ni, damaged, 04/XI/2005, St. 4 (DOUFPE#13457); 3f, 03/III/2006, St. 03 (DOUFPE#13458); 1m, 1f, 4juv, 03/III/2006, St. 08 (DOUFPE#13459); 1m, 06/II/2007, St. 07 (DOUFPE#13522); 1m, 2f, 19/IV/2007, St. 01, on rocks (DOUFPE#13547).

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Panama, Antilles, northern South America, and Brazil (Rocas Atoll, and from Ceará to Santa Catarina) (Melo, 1999).

*Ecological notes:* In rock cavities, reefs, and *Halodule* meadows. Intertidal (Melo, 1999).

***Petrochirus diogenes* (Linnaeus, 1758)**

*Material examined:* 1m, 1f, 04/XI/2005, trawling (DOUFPE#13461).

*Distribution:* Western Atlantic – from North Carolina to Gulf of Mexico, Antilles, Venezuela, Surinam, Brazil (from Amapá to Rio Grande do Sul), and Uruguay (Melo, 1999).

*Ecological notes:* On mud, mud and shell, sand, and *Thalassia* bottoms. From shallow waters to 130 m (Melo, 1999).

**Family Paguridae Latreille, 1802*****Pagurus brevidactylus* (Stimpson, 1859)**

*Material examined:* 1m, 1juv, 03/III/2006, St. 08 (DOUFPE#13460); 2ni, 19/IV/2007, St. 01, on rocks (DOUFPE#13548).

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of México, Antilles, Central America, northern South America, and Brazil (Fernando de Noronha, and from Pernambuco to Santa Catarina) (Melo, 1999).

*Ecological notes:* On sandy bottoms, among algae and on rocks. From shallow waters to 50 m (Melo, 1999).

**Infraorder Brachyura Latreille, 1802****Section Dromiacea de Haan, 1833****Superfamily Dromioidea de Haan, 1833****Family Dromiidae de Haan, 1833*****Dromia erythropus* (G. Edwards, 1771)**

*Material examined:* field observation.

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, northern South America, and Brazil (Fernando de Noronha, and from Maranhão to Santa Catarina) (Melo and Campos Jr., 1999; Viana *et al.*, 2003). Central Atlantic – Ascension Island (Manning and Chace, 1990).

*Ecological notes:* In hard substrata, e.g., coral, broken shells, and rocks. From shallow waters to 360 m. Carapace frequently covered with ascidians, hydrozoans, polychaetes, and algae (Melo and Campos Jr., 1999).

**Section Eubrachyura de Saint Laurent, 1980****Superfamily Calappoidea H. Milne Edwards, 1837****Family Callapidae H. Milne Edwards, 1837*****Calappa sulcata* (Rathbun, 1898)**

*Material examined:* 1m, 04/XI/2005, trawling (DOUFPE#13463).

*Distribution:* Western Atlantic – North Carolina, Florida, Gulf of Mexico, Antilles, Colombia, Venezuela, Guyanas, and Brazil (from Amapá to Espírito Santo, and Paraná) (Melo, 1996).

*Ecological notes:* On sand, mud, and calcareous algae bottoms. From shallow waters to 200 m (Melo, 1996).

**Family Hepatidae Stimpson, 1871*****Hepatus pudibundus* (Herbst, 1785)**

*Material examined:* 1m, 1f, 04/XI/2005, trawling (DOUFPE#13462).

*Distribution:* Western Atlantic – Georgia, Gulf of Mexico, Antilles, Venezuela, Guyanas, and Brazil (from Amapá to Rio Grande do Sul) (Melo, 1996).

*Ecological notes:* Mud, sand, and shell bottoms. From shallow waters to 160 m (Melo, 1996).

**Superfamily Leucosioidea Samouelle, 1819****Family Leucosiidae Samouelle, 1819*****Persephona lichtensteinii* Leach, 1817**

*Material examined:* 9m, 8f, 04/XI/2005, trawling (DOUFPE#13464).

*Distribution:* Western Atlantic – Venezuela, Surinam, French Guyana, and Brazil (from Amapá to São Paulo) (Melo, 1996).

*Ecological notes:* On mud, sand, and calcareous algae bottoms. From shallow waters to 70 m (Melo, 1996).

***Persephona punctata* (Linnaeus, 1758)**

*Material examined:* 18m, 18f, 04/XI/2005, trawling (DOUFPE#13465).

*Distribution:* Western Atlantic – Antilles, Colombia, Venezuela, Guyanas, and Brazil (from Amapá to Rio Grande do Sul) (Melo, 1996).

*Ecological notes:* Occurs on mud, but also present on sand and shell bottoms. From shallow waters to 50 m (Melo, 1996).

#### Superfamily Majoidea Samouelle, 1819

##### Family Epialtidae MacLeay, 1838

###### *Acanthonyx dissimulatus* Coelho 1991/93

*Material examined:* 1ni, 02/III/2006, St. 02, on *Sargassum* sp. (DOUFPE#13466); 2m, 1f, 06/II/2007, St. 01, on rocks (DOUFPE#13523); 2f, 06/II/2007, St. 08 (DOUFPE#13524); 1m, 1f, 19/IV/2007, St. 01, on rocks (DOUFPE#13549).

*Distribution:* Western Atlantic – Brazil (from Maranhão to Bahia) (Coelho and Torres, 1991/93; Melo, 1996), and São Paulo (Dall’Occo *et al.*, 2004).

*Ecological notes:* On rock and sand bottoms. Intertidal to 25 m (Coelho and Torres, 1991/93; Melo, 1996).

###### *Epialtus bituberculatus* H. Milne Edwards, 1834

*Material examined:* 2f, 03/III/2006, St. 03 (DOUFPE#13467); 2m, 06/II/2007, St. 01 (DOUFPE#13525).

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Antilles, Colombia, Venezuela, and Brazil (from Ceará to São Paulo) (Melo, 1996).

*Ecological notes:* Shallow-water species living on algae and seagrass meadows, on hard bottoms, and in tide pools (Melo, 1996).

##### Family Inachidae MacLeay, 1838

###### *Podochela brasiliensis* Coelho, 1972

*Material examined:* 1f, 06/II/2007, St. 01, on algae (DOUFPE#13526).

*Distribution:* Western Atlantic – Brazil (from Ceará to Bahia) (Melo, 1996).

*Ecological notes:* On calcareous-algae bottoms, from 20 to 50 m (Melo, 1996).

##### Family Inachoididae Dana, 1851

###### *Inachoides forceps* A. Milne Edwards, 1879

*Material examined:* 1m, 1f, 03/III/2006, St. 01 (DOUFPE#13468); 1m, 19/IV/2007, St. 01 (DOUFPE#13550).

*Distribution:* Western Atlantic – from North Carolina to Florida, Gulf of Mexico, Antilles, Guyanas, and Brazil (from Amapá to Rio de Janeiro) (Melo, 1996).

*Ecological notes:* On sand, gravel, and coral bottoms, occasionally on calcareous algae. From shallow waters to 70 m (Melo, 1996). On rocks, covered by algae (this study).

##### Family Mithracidae Balss, 1929

###### *Microphrys bicornutus* (Latreille, 1825)

*Material examined:* 5m, 4f, 04/XI/2005, St. 3 (DOUFPE#13469); 2f, 04/XI/2005, St. 4 (DOUFPE#13470); 4m, 3f, 1juv, 03/III/2006, St. 03, on rocks (DOUFPE#13471); 1f, 03/III/2006, St. 08 (DOUFPE#13472); 6m, 5f, 19/IV/2007, St. 01, on rocks (DOUFPE#13552).

*Distribution:* Western Atlantic – from North Carolina to southern Florida, Bermuda, Gulf of Mexico, Antilles, Central America, Venezuela, and Brazil (Fernando de Noronha, and from Maranhão to Rio Grande do Sul) (Melo, 1996).

*Ecological notes:* Species common in coral reefs and in a wide variety of shallow-water marine environments. Carapace frequently covered with anemones, algae, or sponges. Intertidal to 70 m (Melo, 1996).

###### *Mithraculus forceps* (A. Milne Edwards, 1875)

*Material examined:* 5m, 1f, 03/III/2006, St. 01, on rocks (DOUFPE#13473); 2m, 03/III/2006, St. 03, on rocks and algae (DOUFPE#13474); 2m, 06/II/2007, St. 01, on rocks (DOUFPE#13527); 11m, 3f, 19/IV/2007, St. 01, on rocks and *Halimeda* sp. (DOUFPE#13551).

*Distribution:* Western Atlantic – from North Carolina to southern Florida, Gulf of Mexico, Antilles, Venezuela, and Brazil (St. Paul’s Rocks, Fernando de Noronha, and from Maranhão to Santa Catari-

na (Holthuis *et al.*, 1980; Melo, 1996; Rieger and Giraldi, 1996).

*Ecological notes:* On hard bottoms, also on sand, coral, or algae, or associated with sponges. Shallow waters to 90 m (Melo, 1996).

***Mithrax braziliensis* Rathbun, 1892**

*Material examined:* 1f, 03/III/2006, St. 03 (DOUFPE#13475).

*Distribution:* Western Atlantic – Brazil (from Piauí to Rio de Janeiro) (Melo, 1996).

*Ecological notes:* Mainly on reef bottoms. From shallow waters to 8 m (Melo, 1996).

***Mithrax hispidus* (Herbst, 1790)**

*Material examined:* 2m, 1f, 03/III/2006, St. 01 (DOUFPE#13476).

*Distribution:* Western Atlantic – from Delaware to southern Florida, Gulf of Mexico, Antilles, and Brazil (from Pará to Santa Catarina) (Melo, 1996; Rieger and Giraldi, 2001).

*Ecological notes:* On sand, shell, rock, and coral bottoms, occasionally in *Halodule* meadows. Juveniles found on sponges. From shallow waters to 65 m (Melo, 1996).

**Family Tychidae Dana, 1851**

***Pitho lherminieri* (Schramm, 1867)**

*Material examined:* 1m, 03/III/2006, St. 01, on rocks (DOUFPE#13477); 3m, 19/IV/2007, St. 01, on rocks (DOUFPE#13553).

*Distribution:* Western Atlantic – from North Carolina to Florida, Gulf of Mexico, Antilles, and Brazil (Fernando de Noronha, and from Pará to São Paulo) (Melo, 1996).

*Ecological notes:* On mud, sand, shell, rock, and coral bottoms. From shallow waters to 28 m, exceptionally to 200 m (Melo, 1996).

**Superfamily Carpilioidea Ortmann, 1893**

**Family Carpiliidae Ortmann, 1893**

***Carpilius corallinus* (Herbst, 1783)**

*Material examined:* field observation.

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Antilles, Colombia, Venezuela, and Brazil (Fernando de Noronha, and from Ceará to Pernambuco) (Melo, 1996).

*Ecological notes:* On reefs and sandy bottoms. From shallow waters to 20 m (Melo, 1996).

**Superfamily Xanthoidea MacLeay, 1838**

**Family Panopeidae Ortmann, 1893**

***Acantholobulus schmitti* (Rathbun, 1930)**

*Material examined:* 1m, 1f, 06/II/2007, St. 01, on rocks (DOUFPE#13528); 3m, 2f, 19/IV/2007, St. 01, on rocks (DOUFPE#13555).

*Distribution:* Western Atlantic – Brazil (from Ceará to Santa Catarina) and Uruguay (Melo, 1996).

*Ecological notes:* On sand, mud, and shell bottoms. Intertidal to 25 m (Melo, 1996).

***Hexapanopeus angustifrons* (Benedict and Rathbun, 1891)**

*Material examined:* 2m, 1f, 03/III/2006, St. 03, on *Halimeda* sp. (DOUFPE#13484);

*Distribution:* Western Atlantic – East coast of the United States, Antilles, and Brazil (from Pernambuco to Santa Catarina) (Melo, 1996).

*Ecological notes:* On sand, mud, shell, and gravel bottoms. From shallow waters to 140 m (Melo, 1996).

***Panopeus harttii* Smith, 1869**

*Material examined:* 2m, 3f, 1juv, 03/III/2006, St. 01, on rocks (DOUFPE#13502); 1f, 03/III/2006, St. 08 (DOUFPE#13503); 1m, 1f, 03/III/2006, St. 04 (DOUFPE#13504); 2m, 2f, 06/II/2007, St. 01, rocks (DOUFPE#13529); 1m, 2f, 19/IV/2007, St. 01, on rocks (DOUFPE#13556).

*Distribution:* Western Atlantic – east coast of the United States, Antilles, and Brazil (from Maranhão to São Paulo) (Melo, 1996). Central Atlantic – Ascension Island (Manning and Chace, 1990).

*Ecological notes:* Under rocks, on rock and coral reefs. Shallow waters to 25 m (Melo, 1996).

***Panopeus lacustris* Desbonne, 1867**

*Material examined:* 1m, 1f, 06/II/2007, in a tide pool near St. 06 (DOUFPE#13530).

*Distribution:* Western Atlantic – Bermuda, Florida, Antilles, Colombia, and Brazil (from Pará to Rio de Janeiro) (Melo, 1996; Barros *et al.*, 1997).

*Ecological notes:* Under rocks, in estuaries, bays, and channels. It can be found in areas affected by pollution (Melo, 1996).

**Family Pilumnidae Samouelle, 1819**

***Pilumnus dasypodus* Kingsley, 1879**

*Material examined:* 2m, damaged, 03/III/2006, St. 03, on algae (DOUFPE#13486); 2m, 2f, 03/III/2006, St. 01, on rocks (DOUFPE#13505); 2f, 1juv, 06/II/2007, St. 01 (DOUFPE#13531); 4m, 1f, 19/IV/2007, St. 01, on rocks and *Halimeda* sp. (DOUFPE#13557).

*Distribution:* Western Atlantic – North Carolina, South Carolina, Florida, Gulf of Mexico, Antilles, northern South America, and Brazil (from Paraíba to Santa Catarina) (Melo, 1996).

*Ecological notes:* On sand, shell, and coral bottoms, also on mangrove roots and jetties. Intertidal to 30 m (Melo, 1996).

***Pilumnus reticulatus* Stimpson, 1860**

*Material examined:* 3m, 03/III/2006, St. 01, on rocks (DOUFPE#13506); 2f, 19/IV/2007, St. 01, on rocks (DOUFPE#13558).

*Distribution:* Western Atlantic – Central America, Antilles, northern South America, and Brazil (from Pará to Rio Grande do Sul) (Melo, 1996). Eastern Pacific – from the Gulf of California to the Gulf of Panama (Hendrickx, 1995).

*Ecological notes:* On mud and shell bottoms. Intertidal to 75 m (Melo, 1996).

**Family Xanthidae MacLeay, 1838**

***Cataleptodius floridanus* (Gibbes, 1850)**

*Material examined:* 4m, 1f, 03/III/2006, St. 08 (DOUFPE#13483); 1m, 03/III/2006, St. 01, on rocks (DOUFPE#13507); 1m, 06/II/2007, St. 07 (DOUFPE#13532).

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Bermuda, Antilles, Central America, northern South America, and Brazil (Rocas Atoll, Fernando de Noronha, and from Ceará to Rio Grande do Sul). Eastern Atlantic – from Guinea to Gabon (Melo, 1996).

*Ecological notes:* On coral and rocky bottoms, on *Sargassum*, and inside live sponges. Intertidal to 35 m (Melo, 1996).

**Superfamily Eriphioidea MacLeay, 1838**

**Family Eriphiidae MacLeay, 1838**

***Eriphia gonagra* (Fabricius, 1781)**

*Material examined:* 1m, 03/III/2006, St. 03 (DOUFPE#13481); 1m, 03/III/2006, St. 08 (DOUFPE#13482); 1f, 04/XI/2005, St. 4 (DOUFPE#13487).

*Distribution:* Western Atlantic – Bermuda, North Carolina, Florida, Gulf of Mexico, Central America, Antilles, northern South America, and Brazil (from Pará to Santa Catarina) (Melo, 1996).

*Ecological notes:* On coral and rocks, under rocks, in crevices in the intertidal zone, also on algae and sponges. Intertidal to 5 m (Melo, 1996).

***Menippe nodifrons* Stimpson, 1859**

*Material examined:* 1m, 03/III/2006, St. 01 (DOUFPE#13485).

*Distribution:* Western Atlantic – east coast of the United States, Central America, Antilles, northern South America, and Brazil (from Maranhão to Santa Catarina). Eastern Pacific – from Cape Verde to Angola (Melo, 1996).

*Ecological notes:* In intertidal pools, under rocks and jetties. Shallow waters (Melo, 1996).

**Superfamily Portunoidea Rafinesque, 1815**

**Family Portunidae Rafinesque, 1815**

***Callinectes danae* Smith, 1869**

*Material examined:* 1m, 3f, 04/XI/2005, trawling (DOUFPE#13479).

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Colombia, Venezuela, and Brazil (from Pará to Rio Grande do Sul) (Melo, 1996; Barros *et al.*, 1997).

*Ecological notes:* Occurs in brackish to high-salinity waters, in mangroves, and muddy estuaries. Also in sandy beaches and the open sea. Intertidal to 75 m (Melo, 1996).

#### *Callinectes larvatus* Ordway, 1863

*Material examined:* 1m, 03/III/2006, St. 01, on sand (DOUFPE#13480).

*Distribution:* Western Atlantic – Bermuda, North Carolina to Florida, Gulf of Mexico, Antilles, Colombia, Venezuela, and Brazil (from Pará to São Paulo) (Melo, 1996; Barros *et al.*, 1997).

*Ecological notes:* On sand and mud bottoms and in mangroves, also in brackish water. Rarely in the open sea. Shallow waters to 25 m (Melo, 1996).

#### *Callinectes ornatus* Ordway, 1863

*Material examined:* 10m, 3f, 04/XI/2005, trawling (DOUFPE#13478).

*Distribution:* Western Atlantic – from North Carolina to Florida, Gulf of Mexico, Antilles, Colombia, Venezuela, Guyanas, and Brazil (from Amapá to Rio Grande do Sul) (Melo, 1996).

*Ecological notes:* On sand and mud bottoms, up to 75 m (Melo, 1996).

#### *Cronius tumidulus* Stimpson, 1871

*Material examined:* 2m, 19/IV/2007, St. 1, on rocks (DOUFPE#13554).

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Guyanas, and Brazil (from Pará to São Paulo) (Melo, 1996).

*Ecological notes:* On sand, rock, coral, and algae bottoms. From shallow waters to 75 m (Melo, 1996).

#### Superfamily Ocypodoidea Rafinesque, 1815

##### Family Ocypodidae Rafinesque, 1815

#### *Ocypode quadrata* (Fabricius, 1787)

*Material examined:* field observation.

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Central America, Antilles, northern South America, Guyanas, and Brazil (Fernando de Noronha, and from Pará to Rio Grande do Sul) (Melo, 1996).

*Ecological notes:* Supralittoral species inhabiting sandy beaches. Juvenile crabs burrow close to water line and among beach vegetation. Also along wave-exposed shores, protected harbor beaches, bays, intracoastal canals, and lagoons (Powers, 1977; Melo, 1996).

#### *Uca leptodactyla* Rathbun, 1898

*Material examined:* 2m, 1f, 04/XI/2005, St. 06, mangrove (DOUFPE#13488); 1m, 1f, 03/III/2006, St. 06, mangrove (DOUFPE#13491).

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Antilles, Venezuela, and Brazil (from Maranhão to Santa Catarina) (Melo, 1996; Calado and Souza, 2003).

*Ecological notes:* On sandy tidal flats of marine habitats; sometimes in supratidal zone. Occasionally in mud or clay substrates, in partial shade of mangrove trees (Powers, 1977; Melo, 1996).

#### *Uca rapax* (Smith, 1870)

*Material examined:* 1m, 1f, 04/XI/2005, St. 06, mangrove (DOUFPE#13490); 2m, 1f, 03/III/2006, St. 06, mangrove (DOUFPE#13492).

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Antilles, Venezuela, and Brazil (from Pará to Santa Catarina) (Melo, 1996).

*Ecological notes:* On mud, sand-mud, and mud-sand flats; burrows are excavated on edges of mangroves (Powers, 1977; Melo, 1996).

#### *Uca thayeri* Rathbun, 1900

*Material examined:* 1m, 04/XI/2005, St. 06, mangrove (DOUFPE#13489).

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Antilles, Guatemala, Panama, Venezuela, and Brazil (from Maranhão to Santa Catarina) (Melo, 1996).

*Ecological notes:* On mud banks of streams and estuaries; burrows are often shaded by vegetation (Powers, 1977; Melo, 1996).

### Superfamily Grapsoidea MacLeay, 1838

#### Family Grapsidae MacLeay, 1838

##### *Goniopsis cruentata* (Latreille, 1803)

*Material examined:* 1f, exuvia, 04/XI/2005, St. 6, mangrove (DOUFPE#13494);

*Distribution:* Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Guyanas, and Brazil (Fernando de Noronha, Rocas Atoll, and from Pará to Santa Catarina) (Melo, 1996, Targino *et al.*, 2001).

*Ecological notes:* In mangroves, under roots and trunks of trees. In muddy beaches, along inlets or estuaries. Intertidal and supratidal zones (Melo, 1996).

##### *Pachygrapsus transversus* (Gibbes, 1850)

*Material examined:* 3f, 04/XI/2005, St. 3 (DOUFPE#13495); 1m, 1f, 04/XI/2005, St. 4 (DOUFPE#13496); 1f, 03/III/2006, St. 7 (DOUFPE#13497); 1m, 2f, 3juv, 06/II/2007, St. 07 (DOUFPE#13534).

*Distribution:* Western Atlantic – Bermuda, from Cape Cod to Florida, Gulf of Mexico, Antilles, northern South America, Brazil (Trindade, and from Ceará to Rio Grande do Sul), and Uruguay. Eastern Atlantic – from southern Portugal to Namibia, including Madeira, Canary, and Cape Verde Islands. Mediterranean – from Alboran Sea to the Levant basin. Eastern Pacific – from Lower California to Peru, including the oceanic island groups of Revillagigedo, Clipperton, and the Galápagos (Melo, 1996; Poupin *et al.*, 2005).

*Ecological notes:* Intertidal species, inhabiting rocky bottoms and jetties. Occasionally found on sandy beaches, and among mangrove roots (Melo, 1996).

### Family Plagusiidae Dana, 1851

#### *Plagusia depressa* (Fabricius, 1775)

*Material examined:* 1f, 04/XI/2005, St. 5 (DOUFPE#13493); 1m, 06/II/2007, St. 08 (DOUFPE#13535).

*Distribution:* Western Atlantic – North Carolina, South Carolina, Florida, Gulf of Mexico, Antilles, and Brazil (from Ceará to Bahia). Eastern Atlantic – Azores and Madeira, and from Senegal to Angola (Melo, 1996).

*Ecological notes:* In crevices of rocks and coral, and tidal pools. Intertidal species (Melo, 1996).

### Family Sesarmidae Dana, 1851

#### *Aratus pisonii* (H. Milne Edwards, 1837)

*Material examined:* 1f, 06/II/2007, St. 06, mangrove (DOUFPE#13536).

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Antilles, northern South America, Guyanas, and Brazil (from Pará to São Paulo) (Barros *et al.*, 1997, Melo, 1996). Eastern Pacific – from Magdalena Bay, Baja California, and the southwestern Gulf of California, to Peru (Hendrickx, 1995).

*Ecological notes:* Adults are supratidal. Very common in estuaries, where it is found on rocks and jetties, or climbing on mangrove trees (Melo, 1996).

#### *Armases angustipes* (Dana, 1852)

*Material examined:* 1f, 19/IV/2007, St. 6, mangrove (DOUFPE#13559).

*Distribution:* Western Atlantic – Mexico, Antilles, and Brazil (from Pará to Santa Catarina) (Melo, 1996; Barros *et al.* 1997).

*Ecological notes:* Around estuaries, on rocky shores, and in bromeliads. Found in the same habitats as *Sesarma rectum* (Melo, 1996).

#### *Sesarma rectum* Randall, 1840

*Material examined:* 1m, 04/XI/2005, St. 6, mangrove (DOUFPE#13498); 3m, 2f, 06/II/2007, St. 06, mangrove (DOUFPE#13537).

*Distribution:* Western Atlantic – Granada (Antilles), Venezuela, Guyanas, and Brazil (from Amapá to Santa Catarina) (Melo, 1996, Schubart *et al.*, 1999).

*Ecological notes:* Euryhaline species, found in burrows in the shade of mangrove trees (Melo, 1996).

**Family Varunidae H. Milne Edwards, 1853**  
*Cyclograpsus integer* (H. Milne-Edwards, 1837)

*Material examined:* 1m, 06/II/2007, St. 06, mangrove (DOUFPE#13533)

*Distribution:* Western Atlantic – Florida, Gulf of Mexico, Central America, northern South America, and Brazil (from Ceará to Santa Catarina). Eastern Atlantic – from Cape Verde to Senegal. Indo-Pacific (Melo, 1996).

*Ecological notes:* In galleries in marshy marine areas. On rocky beaches, also in estuaries and on reefs. Intertidal and supratidal zones (Melo, 1996).

## Discussion

Analysis of the known distributions of the species reported in the present contribution, based on the proposal of Melo (1985), allows identification of four patterns of longitudinal distribution: circum-tropical species, amphi-American species, amphi-Atlantic species, and western Atlantic species. The circum-tropical species are *Leander tenuicornis*, *Parribacis antarcticus*, *Cyclograpsus integer*, and *Pachygrapsus transversus*. The amphi-American group represented in Santo Aleixo comprises *Xiphopenaeus kroyeri*, *Megalobrachium mortenseni*, *Pilumnus reticulatus*, and *Aratus pisonii*. *Alima hildebrandi*, *Alpheus bouvieri*, *Panulirus argus*, *P. echinatus*, *Menippe nodifrons*, *Cataleptodius floridanus*, and *Plagusia depressa* constitute the group of amphi-Atlantic species. The distribution of *Thor manningi* seems to be amphi-American. Chace (1972), when describing this species, mentioned the existence of material from Islas Tres Marias, off the west coast of Mexico, that seemed to be indistinguishable from the lots of *T. manningi* examined by him from the western Atlantic (North Carolina to Tobago and Curaçao). Subsequently,

Manning and Chace (1990) extended the known range of this shrimp to the central Atlantic (Ascension). Today, the species ranges, in the western Atlantic, from Bermuda and North Carolina to the east coast of Brazil (São Paulo). *Synalpheus* cf. *fritzmulleri* was not included in the amphi-American group because it is probably a species complex.

The remaining 51 species are endemic to the western Atlantic. The only species endemic to the Brazilian coast are *Upogebia noronhensis*, *Pachycheles greeleyi*, *Acanthonyx dissimulatus*, *Podochele brasiliensis*, and *Mithrax brasiliensis*. All of them can be considered species of the Brazilian Province, which extends from the state of Maranhão to Cape Frio, Rio de Janeiro (Coelho and Ramos, 1972; Coelho *et al.*, 1977/78). However, the distributions of *U. noronhensis* and *A. dissimulatus* extend farther south, to the state of São Paulo (Melo, 1999; Nucci and Melo, 1999; Dall'Occo *et al.*, 2004); whereas *P. greeleyi* ranges to northern Brazil (Pará). *Alpheus* cf. *armillatus*, *A. cf. formosus*, and *A. cf. packardii* are alpheids known to be species-complexes in the western Atlantic (Knowlton and Mills, 1992; Mathews, 2006; A. Anker, pers. com.). Finally, *Dromia erythropus* and *Panopeus harttii* are western Atlantic species that are also represented in the central Atlantic (Ascension) (Manning and Chace, 1990).

Although the material analyzed in the present contribution was obtained through qualitative sampling, we note the high species richness found at station I, which harbored 48.5% of the fauna listed herein. Conditions there are very particular, with subtidal hard substrata in the form of fragments of sandstone reefs and coral, as well as blocks of fused dead calcareous algae scattered on a sandy bottom. The presence of hard substrata provides a firm surface for algae, with a characteristic group of adapted species (e.g., the carideans *Kemponia americana*, *Leander tenuicornis*, and *Hippolyte obliquimanus*, and the brachyurans *Acanthonyx dissimulatus*, *Epialtus bituberculatus*, *Microphrys bicornutus*, and *Pitho lherminieri*). Another group of species is found mainly on the rock surfaces: the diogenid *Calcinus tibicen*, the mithracid *Mithraculus forceps*, the panopeids *Acantholobulus schmitti* and *Panopeus harttii*, and the pilumnids *Pilumnus dasypodus* and *P. reticulatus*, but are probably also associated with algae. Finally, a third group of species live in rock cavities and crevices, such as gonodactylids, alpheids, upogebiids, porcellanids and mithracids, with some species acting as



true bioeroders. The sandstone reef at stations III and IV, also supports a high species richness, probably underestimated here, with 27.9% of the total collected species. Both types of bottom have high structural complexity. The presence of several microhabitats allows more species to coexist through the differential use of each. The species can use a given substrate as shelter, as a feeding site (for grazing or food capture), and as a source of nutrition (detrital mud, algae, etc.), thus reducing competitive interactions, and increasing the number of species present (Abele, 1972; 1974).

However, the crustacean fauna of Santo Aleixo Island is very similar to that found on the adjacent coast. Dispersal is an important process in evolution and speciation (Givnish and Renner, 2004; de Queiroz, 2005) and has been considered, together with vicariance events, responsible for the colonization of coastal and oceanic islands (Cowie and Holland, 2006). Thus, due to the proximity with the coast, allied to the presence of suitable habitats, most probably the crustacean fauna of Santo Aleixo Island has its origin in the adjacent coastal waters. Marine and estuarine crustaceans have planktonic larvae that are easily carried out by ocean currents, which allows them to colonize adjacent habitats and islands. On the other hand, some species that are very common on the continental coast and that have planktonic larvae, such as *Cardisoma guanhumi* Latreille, 1825, *Uca maracoani* (Latreille, 1801-02) and *Ucides cordatus* (Linnaeus, 1763), are not present on Santo Aleixo Island. Thus, the availability of suitable habitats as well as the capacity for dispersal are very important to allow colonization of the island by the species.

The high diversity of habitats found in such a restricted area, and the considerable species richness, make the island of great interest for further ecological studies, such as quantitative descriptions of the crustacean community, estimates of abundance, larval dispersion, and distribution of species.

### Acknowledgements

To Dr. Janet W. Reid for assistance with the English text. To Dr. Arthur Anker for criticisms on the alpheid section. To Dr. Petrônio A. Coelho Filho, Catarina L. A. Silva, Ricardo J. C. Paiva, Filipe de Souza, and Thiago N. V. Reis for their support in field and laboratory activities. P. A. Coelho thanks Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for a research productivity scholarship.

S. M. Almeida and J. F. Souza-Filho were supported by M.Sc. scholarships from CNPq. L. E. A. Bezerra thanks Pró-Reitoria para assuntos de Pesquisa e Pós-graduação of the Universidade Federal de Pernambuco (PROPESQ/UFPE) for the provision of a Ph.D. scholarship.

### References

- Abele, L.G. 1972. Comparative habitat diversity and faunal relationships between the Pacific and Caribbean Panamanian decapod Crustacea: a preliminary report, with some remarks on the crustacean fauna of Panamá. *Bulletin of the Biological Society of Washington*, 2:125-138.
- Abele, L.G. 1974. Species diversity of decapod crustaceans in marine habitats. *Ecology*, 55:156-161.
- Ahyong, S.T. 2001. Revision of the Australian Stomatopod Crustacea. *Records of the Australian Museum, Supplement*, 26:1-326.
- Amaral, A.C.Z. and Jablonsky, S. 2005. Conservation of marine and coastal biodiversity in Brazil. *Conservation Biology*, 19(3):625-631.
- Austregésilo Filho, P.T. and Ramos-Porto, M. 1994/95. Crustáceos decápodos coletados nos arrecifes da praia do Paiva, PE. *Trabalhos Oceanográficos da Universidade Federal de Pernambuco*, 23:191-198.
- Barros, M.P.; Pimentel, F.R. and Silva, S.B. 1997. Novos registros de Brachyura (Crustacea, Decapoda) para o litoral do Estado do Pará, Brasil. *Nauplius*, 5(2):161-163.
- Bauer, R.T. 1986. Sex change and life history pattern in the shrimp *Thor manningi* (Decapoda: Caridea): a novel case of partial protandric hermaphroditism. *Biological Bulletin*, 170:11-31.
- Bruce, A.J. 2004. A partial revision of the genus *Periclimenes* Costa, 1884 (Crustacea: Decapoda: Palaemonidae). *Zootaxa*, 582:1-26.
- Calado, T.C.S. and Sousa, E.C. 2003. Crustáceos do complexo estuarino-lagunar Mundaú/Manguaba Alagoas. Maceió, FAPEAL, 116 p.
- Carvalho, P.V.V.D.B.C.; Botter-Carvalho, M.L. and Ramos-Porto, M. 1998. Lista dos crustáceos decápodos coletados na zona recifal da praia do Janga – PE. *Caderno Ômega da Universidade Federal Rural de Pernambuco*, 4:131-156.
- Chace, Jr., F.A. 1972. The shrimps of the Smithsonian-Bredin Caribbean Expeditions with a summary of the West Indian shallow-water species (Crustacea: Decapoda: Natantia). *Smithsonian Contributions to Zoology*, 98:1-179.
- Christoffersen, M.L. 1979. Decapod Crustacea: Alpheoidea. *Campagne de la Calypso au large des côtes atlantiques de l'Amérique du Sud (1961-1962)*. I. 36, *Annales de l'Institut Océanographique, Monaco, (Suppl.)*, 55:297-377.
- Christoffersen, M.L. 1980. Taxonomia e distribuição dos Alpheoidea (Crustacea, Decapoda, Natantia) do Brasil, Uruguai e norte da Argentina, incluindo considerações sobre a divisão do sul do continente em províncias biogeográficas marinhas. 467 p. PhD Thesis. Instituto de Biociências, Universidade de São Paulo, Brasil.
- Christoffersen, M.L. 1998. Malacostraca. Eucarida. Caridea. Crangonoidea and Alpheoidea (except Glyphocrangonidae and Crangonidae). Pp. 351-372. *In*: Young, P.S. Ed.

- Catalogue of Crustacea of Brazil. Museu Nacional, Rio de Janeiro.
- Coelho, P.A. 1965/66a. Estudo ecológico da Lagoa Olho D'Água, Pernambuco, com especial referência aos crustáceos decápodos. Trabalhos do Instituto Oceanográfico da Universidade Federal de Pernambuco, 7/8:51-70.
- Coelho, P.A. 1965/66b. Os crustáceos decápodos de alguns manguezais Pernambucanos. Trabalhos do Instituto Oceanográfico da Universidade Federal de Pernambuco, 7/8:71-90.
- Coelho, P.A.; Almeida, A.O.; Bezerra, L.E.A. and Souza Filho, J.F. 2007. An updated checklist of decapod crustaceans (infraorders Astacidea, Thalassinidea, Polychelida, Palinura, and Anomura) from the northern and northeastern Brazilian coast. *Zootaxa*, 1519, p. 1-16.
- Coelho, P.A.; Almeida, A.O.; Souza Filho, J.F.; Bezerra, L.E.A. and Giralde, B.W. 2006. Diversity and distribution of the marine and estuarine shrimps (Dendrobranchiata, Stenopodidea and Caridea) from North and Northeast Brazil. *Zootaxa*, 1221:41-62.
- Coelho, P.A. and Coelho-Santos, M.A. 1990. Crustáceos decápodos e estomatópodos do rio Paripe, Itamaracá – PE. *Anais da Sociedade Nordestina de Zoologia*, 3:43-61.
- Coelho, P.A. and Lacerda, P.R. 1990. Levantamento preliminar dos braquiúros (Crustacea, Decapoda) dos arrecifes da praia de Piedade, Jaboatão – PE. *Anais da Sociedade Nordestina de Zoologia*, 3:35-42.
- Coelho, P.A. and Ramos, M.A. 1972. A constituição e a distribuição da fauna de decápodos do litoral leste da América do Sul entre as latitudes 5°N e 39°S. *Trabalhos Oceanográficos da Universidade Federal de Pernambuco*, 13:133-236.
- Coelho, P.A. and Ramos-Porto, M. 1980. Crustáceos decápodos da costa do Maranhão, Brasil. *Boletim do Instituto Oceanográfico*, 29(2):135-138.
- Coelho, P.A. and Ramos-Porto, M. 1995. Crustáceos da região de Tamandaré, Estado de Pernambuco, Brasil. *Boletim Técnico-Científico de CEPENE*, 3(1):57-80.
- Coelho, P.A. and Ramos-Porto, M. 1998. Malacostraca. Eucarida. Palinuridea. Pp. 387-392. *In*: Young, P.S. eds. *Catalogue of Crustacea of Brazil*. Museu Nacional, Rio de Janeiro.
- Coelho, P.A., Ramos-Porto, M. and Koenig, M.L. 1977/78. Crustáceos marinhos do Brasil, do Uruguai e da Argentina (ao norte de Mar del Plata), considerações biogeográficas. *Anais da Universidade Federal Rural de Pernambuco*, 2/3:227-256.
- Coelho, P.A.; Ramos-Porto, M.; Koenig, M.L. 1980. Biogeografia e Bionomia dos Crustáceos do Litoral Equatorial Brasileiro. *Trabalhos Oceanográficos, Universidade Federal de Pernambuco*, 15:7-138.
- Coelho, P.A., Santos, M.A.C., Torres, M.F.A., Monteiro, B.R. and Almeida, V.A.K. 2002. Reino Animalia: Filo (ou Subfilo) Crustacea no Estado de Pernambuco. Pp. 429-482. *In*: Diagnóstico da biodiversidade de Pernambuco (M. Tabarelli and J.M.C. Silva, eds.). Vol. 2. Massangana, Recife, Brazil.
- Coelho, P.A., Tenório, D.O., Ramos-Porto, M. and Mello, R.L.S. 2004. A fauna bêntica do Estado de Pernambuco. Pp. 477-527. *In*: E. Eskinazi-Leça, Neumann-Leitão, S. and Costa, M.F. (Eds), *Oceanografia: um cenário tropical*. Bagaço, Recife, Brasil.
- Coelho, P.A. and Torres, M.F.A. 1991/93. Taxonomia e distribuição das espécies do gênero *Acanthonyx* Latreille no Brasil (Crustacea, Decapoda, Majidae). *Trabalhos Oceanográficos da Universidade Federal de Pernambuco*, 22:221-241.
- Coelho Filho, P.A. 2006. Checklist of the Decapods (Crustacea) from the outer continental shelf and seamounts from Northeast of Brazil – REVIZEE Program (NE III). *Zootaxa*, 1184:1-27.
- Coelho-Santos, M.A. and Coelho, P.A. 2001. Crustacea Decapoda of the Paripe river estuary, Pernambuco, Brazil. *Hydrobiologia*, 449(1-3):77-79.
- Costa, R.C.; Fransozo, A.; Melo, G.A.S. and Freire, F.A.M. 2003. Chave ilustrada para identificação dos camarões Dendrobranchiata do litoral norte do Estado de São Paulo, Brasil. *Biota Neotropica*, Campinas, 3(1): <http://www.biotaneotropica.org.br/v3n1/pt/abstract?identification-key+BN0150301>
- Cowie, R.H. and Holland, B.S. 2006. Dispersal is fundamental to biogeography and the evolution of biodiversity on oceanic islands. *Journal of Biogeography*, 33:193-198.
- Crosnier, A. and Forest, J. 1966. Campagne de la "Calypso" dans le Golfe de Guinée et aux Iles Principe, São Tomé et Annobon, et Campagne aux Iles du Cap Vert (1959). (suite). 19. Crustacés Décapodes: Alpheidae. *Annales de l'Institut Océanographique, Paris*, 44:199-314.
- Dall'Occo, P.; Campos Jr., O. and Melo, G.A.S. 2004. The brachyuran (Crustacea: Decapoda) fauna from the coast of the State of São Paulo. *O Mundo da Saúde*, 28(4):456-462.
- D'Incao, F. 1998. Malacostraca. Eucarida. Dendrobranchiata, Pp. 311-321. *In*: Young, P.S. ed. *Catalogue of Crustacea of Brazil*. XVIII+717 p. Museu Nacional, Rio de Janeiro.
- Freitas, R. and Castro, M. 2005. Occurrence of *Panulirus argus* (Latreille, 1804) (Decapoda, Palinuridae) in the northwest islands of the Cape Verde Archipelago (central-east Atlantic). *Crustaceana*, 78(10):1191-1201.
- Givnish, T.J. and Renner, S.S. 2004. Tropical intercontinental disjunctions: Gondwana breakup, immigration from the boreotropics, and transoceanic dispersal. *International Journal of Plant Science*, 165(Suppl.):S1-S6.
- Gomes Corrêa, M.M. 1986. Stomatopoda do Brasil (Crustacea-Hoplocarida). 320 Pp. PhD Thesis. *Zoologia, Instituto de Biociência da Universidade de São Paulo, Brazil*.
- Hendrickx, M.E. 1995. Checklist of brachyuran crabs (Crustacea: Decapoda) from the eastern tropical Pacific. *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Biologie*, 65:125-150.
- Holthuis, L.B.; Edwards, A.J. and Lubbock, H.R. 1980. The Decapod and Stomatopod Crustacea of St Paul's Rocks. *Zoologische Mededelingen*, 56(3):27-51.
- Karasawa, H. and Schweitzer, C.E. 2006. A new classification of the Xanthoidea *sensu lato* (Crustacea: Decapoda: Brachyura) based on phylogenetic analysis and traditional systematics and evaluation of all fossil Xanthoidea *sensu lato*. *Contributions to Zoology*, 75(1/2):23-73.
- Kim, W. and Abele, L.G. 1988. The snapping shrimp genus *Alpheus* from the eastern Pacific (Decapoda; Caridea: Alpheidae). *Smithsonian Contributions to Zoology*, 454:1-119.
- Knowlton, N. and Mills, D.K. 1992. The systematic importance of color and color pattern: evidence for

- complexes of sibling species of snapping shrimp (Caridea: Alpheidae: *Alpheus*) from the Caribbean and Pacific coasts of Panama. *Proceedings of the San Diego Society of Natural History*, 18:1-5.
- Li, X.; Bruce, A.J. and Manning, R.B. 2004. Some palaemonid shrimps (Crustacea: Decapoda) from northern South China Sea, with descriptions of two new species. *The Raffles Bulletin of Zoology*, 52(2):513-553.
- Manning, R.B. 1969. Stomatopod Crustacea of the Western Atlantic. *Studies on Neotropical Oceanography*, 8:1-380.
- Manning, R.B. and Chace, Jr., F.A. 1990. Decapod and Stomatopod Crustacea from Ascension Island, South Atlantic Ocean. *Smithsonian Contributions to Zoology*, 503:1-91.
- Martin, J.W. and Davis, G.E. 2001. An Updated Classification of the Recent Crustacea. *Natural History Museum of Los Angeles County, Science Series*, 39:1-124.
- Martínez-Iglesias, J.C., Ríos, R. and Carvacho, A. 1996. Las especies del género *Alpheus* (Decapoda: Alpheidae) de Cuba. *Revista de Biología Tropical*, 44(3):401-429.
- Mathews, L.M. 2006. Cryptic biodiversity and phylogeographic patterns in a snapping shrimp species complex. *Molecular Ecology*, 15:4049-4063.
- Melo, G.A.S. 1985. Taxonomia e padrões distribucionais e ecológicos dos Brachyura (Crustacea, Decapoda) do litoral sudeste do Brasil. 216 p. PhD Thesis, Universidade de São Paulo, Brazil.
- Melo, G.A.S. 1996. Manual de identificação dos Brachyura (caranguejos e siris) do litoral brasileiro. São Paulo, Editora Plêiade, 603 p.
- Melo, G.A.S. 1999. Manual de identificação dos Crustacea Decapoda do litoral brasileiro: Anomura, Thalassinidea, Palinuridea, Astacidea. São Paulo, Editora Plêiade, 551 p.
- Melo, G.A.S. and Campos Jr., O. 1999. A família Dromiidae de Haan no litoral brasileiro, com descrição de uma nova espécie (Crustacea, Decapoda, Brachyura). *Revista Brasileira de Zoologia*, 16(2):273-291.
- Morgado, E.H. and Tanaka, M.O. 2001. The macrofauna associated with the bryozoan *Schizoporella errata* (Walters) in southeastern Brazil. *Scientia Marina*, 65(3):173-181.
- Nucci, P.R. and Melo, G.A.S. 1999. Novas ocorrências de crustáceos decápodos no litoral do Estado de São Paulo, Brasil. *Nauplius*, 7:191-192.
- Poupin, J.; Davie, P.J.F. and Cexus, J.-C. 2005. A revision of the genus *Pachygrapsus* Randall, 1840 (Crustacea: Decapoda: Brachyura, Grapsidae), with special reference to the Southwest Pacific species. *Zootaxa*, 1015:1-66.
- Powers, L.W. 1977. A catalogue and bibliography to the crabs (Brachyura) of the Gulf of Mexico. *Contributions in Marine Science*, 20(Suppl.):1-190.
- de Queiroz, A. 2005. The resurrection of oceanic dispersal in historical biogeography. *Trends in Ecology and Evolution*, 20:68-73.
- Ramos-Porto, M. 1985/86. Revisão das espécies do gênero *Leander* E. Desmarest que ocorrem no litoral brasileiro. *Trabalhos Oceanográficos da Universidade Federal de Pernambuco*, 19:7-26.
- Ramos-Porto, M. and Coelho, P.A. 1990. Sinopse dos crustáceos decápodos brasileiros (família Palaemonidae). *Anais da Sociedade Nordestina de Zoologia*, 3(3):93-111.
- Ramos-Porto, M. and Coelho, P.A. 1998. Malacostraca. Eucarida. Caridea (Alpheoidea excluded), p. 325-350. *In*: Young, P.S. ed. *Catalogue of Crustacea of Brazil*. Rio de Janeiro, Museu Nacional.
- Rathbun, M.J. 1937. The oxystomatous and allied crabs of America. *Bulletin of the United States National Museum*, 166:1-278.
- Rieger, P.J. and Giraldi, J.B. 1996. *Mithraculus forceps* (Edwards, 1875) novo registro de Brachyura (Decapoda, Majidae) para o litoral do Estado de Santa Catarina, Brasil. *Trabalhos Oceanográficos da Universidade Federal de Pernambuco*, 24:237-240.
- Rieger, P.J. and Giraldi, J.B. 1997. *Calcinus tibicen* (Herbst, 1791) e *Paguristes tortugae* Schmitt, 1933, novo registro de Diogenidae (Decapoda, Anomura) para o litoral de Santa Catarina, Brasil. *Nauplius*, 5(2):159-161.
- Rieger, P.J. and Giraldi, J.B. 2001. *Mithrax hispidus* (Herbst) e *Mithrax tortugae* Rathbun novos registros de Brachyura (Decapoda, Majidae) para o litoral de Santa Catarina, Brasil. *Revista Brasileira de Zoologia*, 18(2):653-654.
- Schubart, C.D.; Horst, D. and Diesel, R. 1999. First record of *Sesarma rectum* Randall (Brachyura, Sesarminae) from the Lesser Antilles. *Crustaceana* 72(5):537-538.
- Targino, S.G.; Campos, C.E.C.; Silva, M.B.; Melo, C.E.D.C.A. and Macedo, G.D. 2001. First record of the mangrove crab *Goniopsis cruentata* (Latreille, 1803) (Brachyura: Grapsidae) in Atol das Rocas, Brasil. *Nauplius*, 9(2):169-170.
- Udekem d'Acoz, C.d'. 1997. Redescription of *Hippolyte obliquimanus* Dana, 1852, and comparison with *Hippolyte williamsi* Schmitt, 1924 (Decapoda, Caridea). *Crustaceana*, 70(4):469-479.
- Viana, G.F.S.; Ramos-Porto, M.; Travassos, P.E.P.F. and Carvalho, G. 2003. Registro de *Dromia erythropus* (G. Milne Edwards, 1771) para o Arquipélago de Fernando de Noronha, Brasil (Crustacea, Decapoda, Dromiidae). *Boletim Técnico-Científico do CEPNOR, Belém*, 3(1):215-218.
- Williams, A.B. 1984. *Shrimps, Lobsters and Crabs of the Atlantic coast of the Eastern United States, Maine to Florida*. Smithsonian Institution Press, Washington, 550 pp.
- Williams, S.T., Knowlton, N., Weigt, L.A. and Jara, J.A. 2001. Evidence for three major clades within the snapping shrimp genus *Alpheus* inferred from nuclear and mitochondrial gene sequence data. *Molecular Phylogenetics and Evolution*, 20:375-389.

Received: November 2007

Accepted: February 2008