

# Checklist of the brachyuran crabs (Crustacea: Decapoda) in the rocky subtidal of Vitória Archipelago, southeast coast of Brazil

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**ABSTRACT:** Biodiversity can be useful as an ecosystem indicator for conservation and monitoring, through continuous assessment of its main properties including stability, primary productivity, exploitation tolerance and even global environmental changes. The main purpose of this study was to provide a checklist of the crabs associated with subtidal rocky bottoms at the Vitória Archipelago, southeastern Brazilian coast. Monthly collections were carried out from February 2004 through January 2006 on three islands at the Vitória Archipelago (23°44'S-45°01'W). The crabs were hand-caught by SCUBA divers during the daytime, in rock subtidal. A total of 3084 individuals were caught, belonging to 42 species, 28 genera, and 12 families, highlighting *Mithraculus forceps* (1528) and *Stenorhynchus seticornis* (407) representing more than 60% of the sample. On the other hand, *Dromia erythropus*, *Moreiradromia antilensis*, *Ebalia stimpsoni*, *Garthiope spinipes* and *Tumidothores maculatus* had only one individual sampled.

## INTRODUCTION

The Brazilian southeastern coast has two principal characteristics that make it an interesting area for studying marine biodiversity, 1) the interaction of two main water currents of the western Atlantic, the Brazil Current and the Malvinas (Falkland) Current, which in this region produce a hydrological and faunistic transition area (Coelho and Ramos 1972; Palacio 1982; Boltovskoy 1999; Boschi 2000a, b); and 2) a wide diversity of protected environments along the highly indented coastline of the states of Rio de Janeiro and São Paulo, which provide shelter for many marine species (Mahiques 1995).

However, despite the present perception of the necessity to conserve and preserve biodiversity, little has been done concerning the marine rocky-bottom (Witman and Dayton 2000). In addition, these authors also pointed to the urgency in increasing human understanding about subtidal environments, in both theory and practice, because most threats and impacts to marine biodiversity caused by fisheries, pollution, etc., will occur in regions along the tide line.

In marine environments, decapod crustaceans are among the most diverse and abundant animal groups. Human exploitation may disastrously impact this fauna, both through fisheries and through the aquarium trade (Calado *et al.* 2003; Costa *et al.* 2007; Balaji *et al.* 2009; Gregati *et al.* 2010). Often, laws regulating these activities are ignored, increasing the threat to this group. Continuous monitoring programs are required in order to evaluate the degree of conservation of these animals. Despite this, data concerning the crab biodiversity on rocky bottoms of the Brazilian southeastern coast remain sparse (Mantelatto *et al.* 2004a, b).

The present study aims to contribute to the knowledge of the richness of the brachyuran crabs on subtidal rocky bottoms in the Vitória Archipelago and enable to mapping the biodiversity of crabs in the Brazilian coast.

## MATERIALS AND METHODS

Crabs were obtained during a sampling program carried out on rocky subtidal bottoms at the Vitória Archipelago (Vitória Island 23°44'57"S, 45°01'02" W; Pescadores Island 23°44'13"S, 45°01'21"W; Cabras Island 23°44'17"S, 45°01'54" W) on the northeastern coast of São Paulo State in southeastern Brazil (Figure 1). Monthly manual samplings were carried out for two years, from February 2004 through January 2006 by SCUBA divers during the daytime for two collectors at a depth from 5 to 15 m. Rocky subtidal of these islands is composed of boulders of different sizes, with a low slope and a great variety of macroalgae and sessile invertebrates (*e.g.*, sponges, coral heads, mussels, ascidians) covering this area. The crabs were caught manually in rock openings, between rocks and between sessile organisms, and also along the sand bottom border.

Sampled individuals were stored in plastic bags and frozen, and posteriorly transferred to the laboratory of zoology of the University of Taubaté - UNITAU, where they were preserved in 70% ethanol and placed in labeled jars. The individuals were measured at their largest carapace width with vernier calipers (0.1 mm). In the laboratory, the sex and developmental stage of the animals were identified, based on the external morphology of the abdomen and its appendages (see Haefner 1990). The crabs were grouped according to sex and developmental stage as follows: adult male (M), adult female (F), ovigerous

female (OF) and juvenile (J). The brachyuran crabs were identified according to Melo (1996), and their taxonomic status was determined following Ng *et al.* (2008). All the crabs collected are deposited in the scientific collection of carcinology, Zoology Laboratory, University of Taubaté (UNITAU) and the carcinological collection of the Zoology Museum of the University of São Paulo (MZUSP).

## RESULTS AND DISCUSSION

A total of 3084 crabs were recorded, representing 12 families, 28 genera and 42 species. Families with the highest number of species were Majidae (10) and Xanthidae (10), followed by Panopeidae (8), Dromiidae (2), Epialtidae (2), Pilumnidae (2), Portunidae (2), Pinotheridae (2), Menippidae (1), Leucosidae (1), Inachidae (1) and Domeciidae (1) (Table 1).

### Order Decapoda Latreille, 1802

#### Suborder Pleocyemata Burkenroad, 1963

#### Superfamily Dromioidea De Haan, 1833

##### Family Dromiidae De Haan, 1833

##### Subfamily Dromiinae De Han, 1833

#### *Dromia erythropus* (George Edwards, 1771) (Figure 2A)

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Bermuda, Antilles, north of South America and Brazil (Fernando de Noronha and from Amapá to Santa Catarina) (Melo and Campos Jr. 1999; Viana *et al.* 2003a, b).

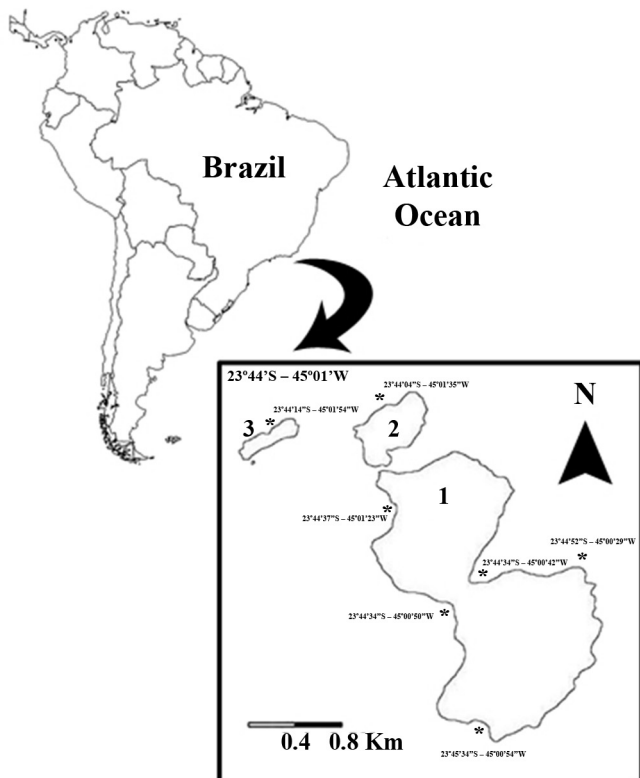


FIGURE 1. Map of South America, indicating the Vitória Archipelago. 1 – Vitória Island; 2 Pescadores Island; 3 – Cabras Island.

Material examined: 1 F, size 19.8 mm CW. Sponge fragments carried on the dorsal surface of the carapace. UNITAU 201201.

#### *Moreiradromia antillensis* (Stimpson, 1858)

Geographic distribution: Western Atlantic – North Carolina, Bermuda, Florida, Gulf of Mexico, Antilles, Venezuela, Guyana, Suriname, French Guyana and Brazil (from Amapá to Rio Grande do Sul) (Melo 2010). Central Atlantic – Ascencion I. (Manning and Chace, 1990, as *Dromidia antillensis*; Melo 1996, as *Cryptodromiopsis antillensis* (Coelho *et al.* 2008).

Material examined: 1 F, size 14.5 mm CW. Sponge fragments carried on the dorsal surface of the carapace. UNITAU 201202.

### Superfamily Eriphioidea MacLeay, 1838

#### Family Menippidae Ortmann, 1893

##### *Menippe nodifrons* Stimpson, 1859

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Central America, West Indies, north of South America and Brazil (from Pará to Santa Catarina). Eastern Atlantic – Cape Verde to Angola (Melo 1998; Coelho *et al.* 2008).

Material examined: 12 M, 4 F, 1 OF and 18 juveniles, size range:  $4.3 \leq CW \leq 73.5$  mm. Average:  $CW = 24.8 \pm 18.4$  mm. UNITAU 201203.

### Superfamily Leucosioidea Samouelle, 1819

#### Family Leucosiidae Samouelle, 1819

##### Subfamily Ebaliinae Stimpson, 1871

##### *Ebalia stimpsoni* A. Milne Edwards, 1880

Geographic distribution: Western Atlantic – North Carolina, Florida, Gulf of Mexico, Antilles, Colombia and Brazil (from Amapá to São Paulo) (Melo 1998).

Material examined: 1 F, size 4.1 mm CW. A single individual was captured on the border between rocks and sand, found on shell fragments. UNITAU 201204.

### Superfamily Majoidea Samouelle, 1819

#### Family Epialtidae MacLeay, 1838

##### Subfamily Pisinae Dana, 1851

##### *Apiomithrax violaceus* (A. Milne Edwards, 1868)

Geographic distribution: Western Atlantic – Venezuela and Brazil (from Ceará to Rio Grande do Sul) (Coelho *et al.* 2008; Mora-Day *et al.* 2008; Lira *et al.* 2010; Melo 2010). Eastern Atlantic – Cape Verde and from Cabo Branco to Angola. Central Atlantic – Ascencion Island (Melo 2010).

Material examined: 1 OF and 2 J, size range:  $1.6 \leq CW \leq 25.9$  mm. Average:  $CW = 10.9 \pm 13.1$  mm. The individuals had the carapace and pereopods decorated with filamentous algae, shell fragments and other ornaments. UNITAU 201205.

**Subfamily Tychinae Dana, 1851*****Pitho lherminieri* (Desbonne, in Desbonne and Schramm, 1867) (Figure 2B)**

Geographic distribution: Western Atlantic – From North Carolina to Florida, Gulf of Mexico, Antilles and Brazil (from Pará to São Paulo, and Fernando de Noronha) (Melo 1998).

Material examined: 3 M, 1 F and 2 OF, size range:  $5.8 \leq CW \leq 13.2$  mm. Average:  $CW = 9.6 \pm 3.0$  mm. UNITAU 201206.

**Family Inachidae MacLeay, 1838*****Stenorhynchus seticornis* (Herbst, 1788) (Figure 2C)**

Geographic distribution: Western Atlantic – Bermuda, North Carolina, Florida, Gulf of Mexico, Antilles, Colombia, Venezuela, Guyanas and Brazil (from Amapá to Rio Grande do Sul), Uruguay and Argentina (Melo 1998).

Material examined: 151 M, 37 F, 67 OF and 152 J, size range:  $1.8 \leq CW \leq 15.0$  mm. Average:  $CW = 7.2 \pm 2.7$  mm. UNITAU 201207.

**Family Majidae Samouelle, 1819****Subfamily Mithracinae MacLeay, 1838*****Microphrys antillensis* Rathbun, 1901 (Figure 2D)**

Geographic distribution: Western Atlantic – North Carolina, Florida, Gulf of Mexico, Antilles and Brazil (from

Paraíba to São Paulo) (Melo 1998; Alves *et al.* 2006).

Material examined: 2 M, 2 F, 10 OF and 2 J, size range:  $3.4 \leq CW \leq 9.0$  mm. Average:  $CW = 5.8 \pm 1.2$  mm. MZUSP 18035 (2), 18036 (2), 18037 (10) and 18038 (2).

***Mithraculus coryphe* (Herbst, 1801) (Figure 3A)**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Antilles, north of South America and Brazil (Fernando de Noronha and from Ceará to São Paulo) (Melo 1998).

Material examined: 2 M, 1 OF and 4 J, size range:  $4.6 \leq CW \leq 11.2$  mm. Average:  $CW = 8.5 \pm 2.5$  mm. UNITAU 201208.

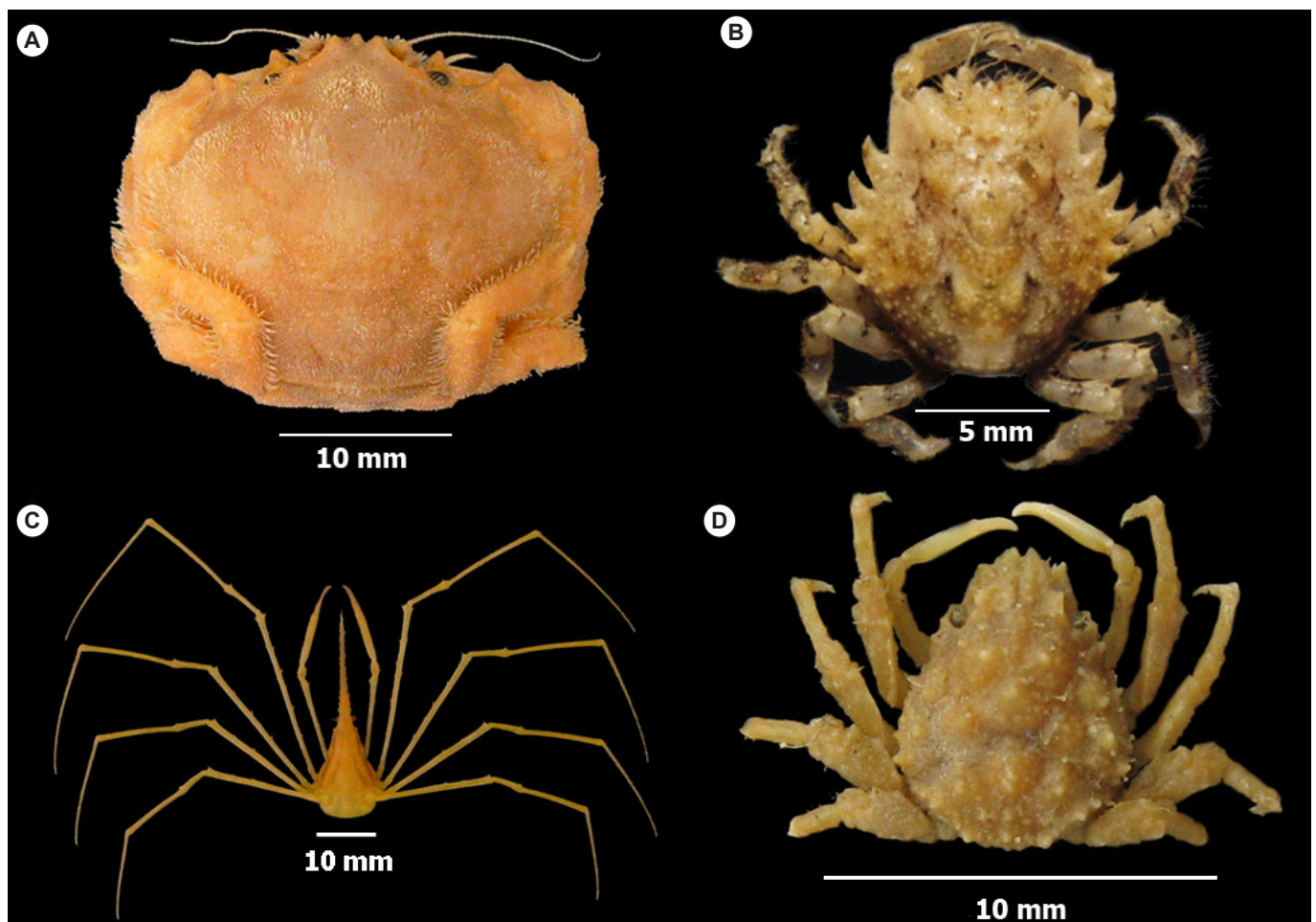
***Mithraculus forceps* A. Milne-Edwards, 1875 (Figure 3B)**

Geographic distribution: Western Atlantic – From North Carolina to south of Florida, Gulf of Mexico, Antilles, Venezuela and Brazil (Fernando de Noronha and Rocas, and from Maranhão to Santa Catarina) (Rieger and Giraldo 1996; Melo 1998).

Material examined: 553 M, 105 F, 379 OF and 491 J, size range:  $2.6 \leq CW \leq 21.8$  mm. Average:  $CW = 9.5 \pm 3.3$  mm. UNITAU 201209.

***Mithraculus sculptus* (Lamarck, 1818)**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Antilles and Brazil (from Fernando de Noronha, and from Bahia to São Paulo) (Melo 1998; Coelho *et al.* 2008; Camargo *et al.* 2010).



**FIGURE 2.** Brachyuran crabs from Vitória Archipelago, Brazil: A) *Dromia erythropus* (George Edwards, 1771); B) *Pitho lherminieri* (Desbonne, in Desbonne and Schramm, 1867); C) *Stenorhynchus seticornis* (Herbst, 1788); D) *Microphrys antillensis* Rathbun, 1901 (Photos: D.F.R. Alves).

Material examined: 1 M, 2 OF and 1 J, size range:  $5.6 \leq CW \leq 12.6$  mm. Average:  $CW = 10.0 \pm 3.1$  mm. MZUSP 18039 (1); UNITAU 201210 (3).

***Mithrax braziliensis* Rathbun, 1892**

Geographic distribution: Western Atlantic – Brazil (from Paraíba to São Paulo) (Melo 1998; Mantelatto et al. 2004a; Coelho et al. 2008).

Material examined: 1 M, 3 F and 7 J, size range:  $7.9 \leq CW \leq 21.7$  mm. Average:  $CW = 15.3 \pm 5.2$  mm. UNITAU 201211.

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

Geographic distribution: Western Atlantic – From Delaware to south of Florida, Gulf of Mexico, Antilles and Brazil (from Pará to Santa Catarina) (Melo 1998, Rieger and Gibaldi, 2001).

Material examined: 4 J, size range:  $4.8 \leq CW \leq 40.9$  mm. Average:  $CW = 17.7 \pm 16.5$  mm. Four of those crabs were collected. Two of them were initially identified as *Mithrax caribbaeus* Rathbun, 1920, according to Melo (1996). However, Windsor and Felder (2009) reported that this species is a junior synonym of *M. hispidus*, based on analysis of three mitochondrial genes (12s, 16s and COI). MZUSP 16709 (2); UNITAU 201234 (2).

***Mithrax tortugae* Rathbun, 1920**

Geographic distribution: Western Atlantic – Florida, Antilles, Colombia, Venezuela and Brazil (Pará, Pernambuco, Alagoas, Bahia to São Paulo and Santa Catarina) (Coelho et al. 1990; Melo 1998; Rieger and Gibaldi 2001; Coelho et al. 2002; Almeida et al. 2007).

Material examined: 22 M, 11 F, 29 OF and 55 J, size range:  $2.8 \leq CW \leq 60.0$  mm. Average:  $CW = 22.5 \pm 11.9$  mm. UNITAU 201212.

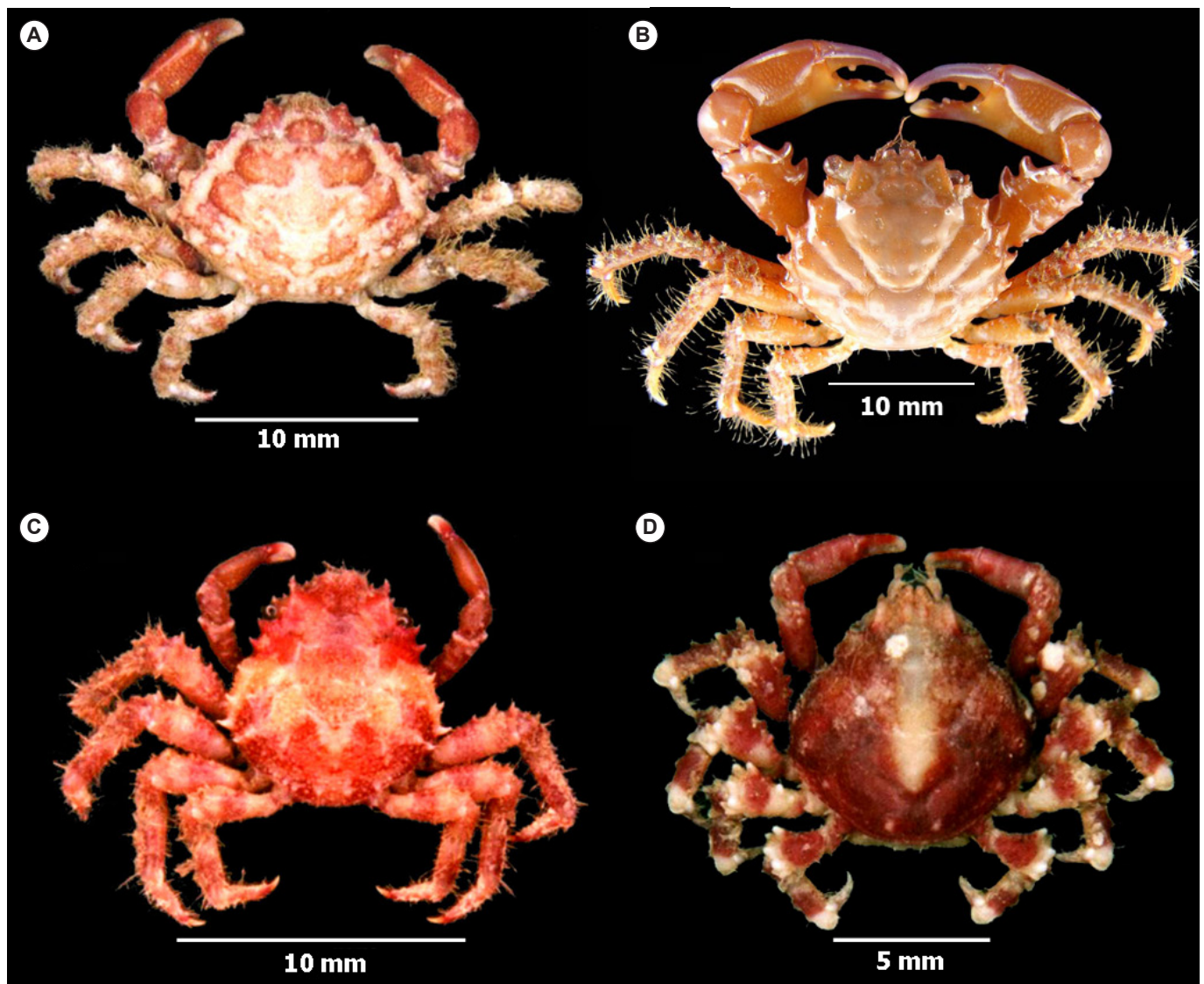
***Mithrax verrucosus* H. Milne Edwards, 1832 (Figure 3C)**

Geographic distribution: Western Atlantic – South Carolina, Florida, Gulf of Mexico, Antilles, Venezuela and Brazil (Fernando de Noronha, Rocas and São Paulo) (Melo 1998; Nizinski 2003; Alves et al. 2006).

Material examined: 2 M, 1 OF and 13 J, size range:  $4.8 \leq CW \leq 14.7$  mm. Average:  $CW = 8.6 \pm 3.1$  mm. MZUSP 16708 (1); UNITAU 201235(13).

***Nemausa acuticornis* (Stimpson, 1871)**

Geographic distribution: Western Atlantic – From North Carolina to Florida, Gulf of Mexico, Antilles and Brazil (Fernando de Noronha, Rocas and from Amapá to São



**FIGURE 3.** Brachyuran crabs from Vitória Archipelago, Brazil: A) *Mithraculus coryphe* (Herbst, 1801); B) *Mithraculus forceps* A. Milne-Edwards, 1875; C) *Mithrax verrucosus* H. Milne Edwards, 1832; D) *Teleophrys ornatus* Rathbun, 1901 (Photos: D.F.R. Alves).

Paulo) (Coelho 1971; Melo 1998; Alves *et al.* 2006; Coelho-Filho 2006).

Material examined: 4 J, size range:  $4.5 \leq CW \leq 6.5$  mm. Average:  $CW = 5.6 \pm 1.0$  mm. MZUSP 16704 (1); UNITAU 201240 (3).

### ***Teleophrys ornatus* Rathbun, 1901 (Figure 3D)**

Geographic distribution: Western Atlantic – Gulf of Mexico, Antilles and Brazil (Fernando de Noronha, Bahia and São Paulo) (Gouvêa 1986; Melo 1998; Alves *et al.* 2006).

Material examined: 2 OF, size range:  $7.3 \leq CW \leq 7.5$  mm. Average:  $CW = 7.4 \pm 0.1$  mm. MZUSP 16706 (1); UNITAU 201236 (1).

## **Superfamily Pilumnoidea Samouelle, 1819**

### **Family Piluminidae Samouelle, 1819**

#### **Subfamily Pilumninae Samouelle, 1819**

#### ***Pilumnus reticulatus* Stimpson, 1860**

Geographic distribution: Western Atlantic – Antilles, Central America, north of South America, Brazil (from Amapá to Rio Grande do Sul), Uruguay and Argentina. Eastern Pacific – Gulf of California to Gulf of Panama (Barreto *et al.* 1993; Hendrickx 1995; Melo 1998; Coelho *et al.* 2008).

Material examined: 5 M, 5 F and 1 OF, size range:  $5.8 \leq CW \leq 12.4$  mm. Average:  $CW = 7.3 \pm 1.8$  mm. UNITAU 201213.

#### ***Pilumnus spinosissimus* Rathbun, 1898**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Antilles, Central America, north of South America, Brazil (Paraíba, and from Bahia to Rio Grande do Sul), Uruguay and Argentina (Melo 1998; Melo and Veloso 2005; Serejo *et al.* 2006; Coelho *et al.* 2008).

Material examined: 8 M, 6 F and 5 OF, size range:  $5.5 \leq CW \leq 11.7$  mm. Average:  $CW = 8.0 \pm 1.5$  mm. UNITAU 201214.

## **Superfamily Portunoidea Rafinesque, 1815**

### **Family Portunidae Rafinesque, 1815**

#### **Subfamily Portuninae Rafinesque, 1815**

#### ***Achelous tumidulus* (Stimpson, 1871)**

Geographic distribution: Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Guyanas and Brasil (from Amapá to São Paulo) (Coelho and Ramos-Porto 1992; Melo 1998).

Material examined: 2 J, size range:  $13.9 \leq CW \leq 19.4$  mm. Average:  $CW = 16.6 \pm 3.9$  mm. UNITAU 201216.

#### ***Cronius ruber* (Lamarck, 1818)**

Geographic distribution: Western Atlantic – Virginia, North Carolina to southern of Florida, Gulf of Mexico, Central America, Antilles, north of South America, Guyanas and Brazil (from Amapá to Rio Grande do Sul). Eastern Atlantic – From Mauritania to Angola, Cape Verde, Príncipe, São Tomé and Annobon islands. Eastern Pacific – From Baja California to Peru and Galapagos Islands (Melo 2010).

Material examined: 2 M, 1 F, 1 OF and 11 J, size range:  $6.6 \leq CW \leq 53.2$  mm. Average:  $CW = 23.5 \pm 14.3$  mm. UNITAU 201215.

## **Superfamily Trapezioidea Miers, 1886**

### **Family Domeciidae Ortmann, 1893**

#### **Subfamily Domoeciinae Ortmann, 1893**

#### ***Domecia acanthophora* (Desbonne, in Desbonne and Schramm, 1867) (Figure 4A)**

Geographic distribution: Western Atlantic – North Carolina, Bermuda, Florida, Gulf of Mexico, Antilles, northeastern of the South America and Brazil (Reefs of the São Pedro - São Paulo, Rocas, Fernando de Noronha, Ceará, Pernambuco and São Paulo) (Melo 1998; Alves *et al.* 2006; Coelho-Filho 2006).

Material examined: 2 M, 6 F and 4 OF, size range:  $5.2 \leq CW \leq 10.8$  mm. Average:  $CW = 8.3 \pm 1.7$  mm. MZUSP 16705 (1); UNITAU 201237 (11).

## **Superfamily Xanthoidea MacLeay, 1838**

### **Family Panopeidae Ortmann, 1893**

#### **Subfamily Panopeinae Ortmann, 1893**

#### ***Acanthobulus schmitti* (Rathbun, 1930)**

Geographic distribution: Western Atlantic – Brazil (from Ceará to Santa Catarina) and Uruguay (Melo 1998).

Material examined: 17 M, 12 F, 2 OF and 2 J, size range:  $5.3 \leq CW \leq 14.1$  mm. Average:  $CW = 10.0 \pm 2.5$  mm. UNITAU 201217.

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

Geographic distribution: Western Atlantic – From Massachusetts to South Carolina, Florida, Gulf of Mexico, Antilles and Brazil (from Pernambuco to Santa Catarina) (Melo 1998).

Material examined: 41 M, 20 F, 7 OF and 3 J, size range:  $4.0 \leq CW \leq 17.6$  mm. Average:  $CW = 11.6 \pm 2.7$  mm. UNITAU 201218.

#### ***Hexapanopeus caribbaeus* (Stimpson, 1871)**

Geographic distribution: Western Atlantic – Antilles, northeastern of the South America, and Brazil (from Piauí to Rio Grande do Sul) (Rieger *et al.* 1996; Melo 1998; Coelho *et al.* 2008).

Material examined: 36 M, 62 F, 22 OF and 27 J, size range:  $2.2 \leq CW \leq 14.6$  mm. Average:  $CW = 8.1 \pm 2.2$  mm. UNITAU 201219.

#### ***Hexapanopeus paulensis* Rathbun, 1930**

Geographic distribution: Western Atlantic – South Carolina, Florida, Gulf of Mexico and Brazil (from Pará to Santa Catarina) (Melo 1998).

Material examined: 4 M, 18 F, 7 OF and 9 J, size range:  $2.6 \leq CW \leq 12.8$  mm. Average:  $CW = 7.9 \pm 2.6$  mm. UNITAU 201220.

***Panopeus austrobesus* Williams, 1983**

Geographic distribution: Western Atlantic – Brazil (from Rio de Janeiro to Rio Grande do Sul) and Uruguay (Melo 1998).

Material examined: 2 M and 6 J, size range:  $3.5 \leq CW \leq 7.8$  mm. Average:  $CW = 5.4 \pm 1.5$  mm. UNITAU 201221.

***Panopeus harttii* Smith, 1869**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Antilles and Brazil (Fernando de Noronha and from Maranhão to São Paulo). Central Atlantic – Ascension I. (Fausto-Filho 1974; Mannig and Chace 1990; Melo 1998). Material examined: 47 M, 19 F, 7 OF and 35 J, size range:  $3.0 \leq CW \leq 16.8$  mm. Average:  $CW = 7.9 \pm 3.1$  mm. UNITAU 201222.

***Panopeus occidentalis* Saussure, 1857**

Geographic distribution: Western Atlantic – From North Carolina to Florida, Gulf of Mexico, Central America, Antilles, northeastern of the South America, Guyanas and Brazil (from Maranhão to Rio Grande do Sul) (Powers 1977; Ramos-Porto et al. 1978; Melo 1998).

Material examined: 11 M, 5 F, 1 OF and 2 J, size range:  $3.3 \leq CW \leq 19.3$  mm. Average:  $CW = 10.0 \pm 4.0$  mm. UNITAU 201223.

***Panopeus rugosus* A. Milne-Edwards, 1880**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Central America, Antilles, northeastern of the South America and Brazil (from Alagoas to Rio Grande do Sul) (Melo 1998).

Material examined: 16 M, 8 F, 4 OF and 2 J, size range:  $5.8 \leq CW \leq 16.0$  mm. Average:  $CW = 10.4 \pm 3.0$  mm. UNITAU 201224.

**Family Xanthidae MacLeay, 1838****Subfamily Actaeinae Alcock, 1898*****Paractaea nodosa* (Stimpson, 1860) (Figure 4B)**

Geographic distribution: Western Atlantic – North Carolina, Florida, Gulf of Mexico, Antilles, northeastern of South America, Brazil (Fernando de Noronha and from Amapá to São Paulo) and Uruguay (Melo 1998; Cobo et al. 2002; Coelho-Filho 2006).

Material examined: 3 M, 8 F and 1 OF, size range:  $6.9 \leq CW \leq 22.8$  mm. Average:  $CW = 15.3 \pm 5.1$  mm. UNITAU 201225.

**Subfamily Euxanthinae Alcock, 1898*****Glyptoxanthus vermiculatus* (Lamarck, 1818) (Figure 4C)**

Geographic distribution: Western Atlantic – Venezuela, Guyanas and Brazil (Bahia, Espírito Santo and São Paulo) (Melo 1998; Cobo et al. 2002; Serejo et al. 2006).

Material examined: 2 M, 3 F and 4 J, size range:  $10.2 \leq CW \leq 28.7$  mm. Average:  $CW = 17.4 \pm 6.4$  mm. UNITAU 201226.

**Subfamily Xanthinae MacLeay, 1838*****Cataleptodius floridanus* (Gibbes, 1850)**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Bermuda, Antilles, Central America, northeastern of South America and Brazil (Rocas, Fernando de Noronha, and from Ceará to Rio Grande do Sul). Eastern Atlantic – Guinea to Gabon (Melo 1998).

Material examined: 5 F and 1 J, size range:  $6.3 \leq CW \leq 13.5$  mm. Average:  $CW = 9.5 \pm 2.9$  mm. UNITAU 201227.

***Cataleptodius parvulus* (Fabricius, 1793) (Figure 4D)**

Geographic distribution: Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Venezuela and Brazil (Rocas Atol, Fernando de Noronha, Rio Grande do Norte and São Paulo) (Melo 1998; Ferreira and Sankarankutty 2002; Alves et al. 2006).

Material examined: 2 M, 2 F and 1 J, size range:  $5.3 \leq CW \leq 11.4$  mm. Average:  $CW = 8.7 \pm 2.6$  mm. Identified by Melo (1996) as *Xanthodius parvulus* (Fabricius, 1793); however, according to Ng et al. (2008), this species must be viewed of *C. parvulus*. MZUSP16707 (1); UNITAU 201238 (4).

***Garthiope spinipes* (A. Milne-Edwards, 1880)**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Antilles, Venezuela and Brazil (Maranhão, Rio Grande do Norte, Paraíba, Pernambuco, Espírito Santo and São Paulo) (Grajal and Laughlin 1984; Coelho and Ramos-Porto 1980; Coelho et al. 1986; Melo 1998; Coelho et al. 2002; Melo and Veloso 2005; Alves et al. 2006).

Material examined: 1 M,  $CW = 9.8$  mm. MZUSP 16711.

***Melybia thalamita* Stimpson, 1871 (Figure 5A)**

Geographic distribution: Western Atlantic – Florida, Gulf of Mexico, Antilles, northeastern of South America and Brazil (from Pará to São Paulo) (Melo 1998).

Material examined: 5 J, size range:  $2.5 \leq CW \leq 4.3$  mm. Average:  $CW = 3.0 \pm 0.7$  mm. UNITAU 201227.

***Micropanope nuttingi* (Rathbun, 1898)**

Geographic distribution: Western Atlantic – North Carolina, Florida, Gulf of Mexico, Antilles and Brazil (from Amapá to São Paulo) (Melo 1998).

Material examined: 114 M, 24 F, 2 OF and 6 J, size range:  $3.8 \leq CW \leq 7.6$  mm. Average:  $CW = 5.5 \pm 0.8$  mm. UNITAU 201228.

***Micropanope sculptipes* Stimpson, 1871 (Figure 5B)**

Geographic distribution: Western Atlantic – North and South Carolina, Florida, Gulf of Mexico, Antilles and Brazil (from Pará to São Paulo) (Melo 1998).

Material examined: 60 M, 90 F, 29 OF and 12 J, size range:  $2.5 \leq CW \leq 6.6$  mm. Average:  $CW = 4.8 \pm 0.8$  mm. UNITAU 201229.

***Xanthodius denticulatus* (White, 1848)**

Geographic distribution: Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Venezuela and Brazil (Reefs of São Pedro and São Paulo, from Ceará to Bahia, and São Paulo) (Melo 1998; Alves et al. 2006).

Material examined: 1 M, 3 F, 1 OF and 1 J, size range:  $9.8 \leq CW \leq 25.2$  mm. Average:  $CW = 17.8 \pm 5.5$  mm. MZUSP 16710 (1); UNITAU 201239 (5).

**Subfamily Zosiminae Alcock, 1898*****Platypodiella spectabilis* (Herbst, 1794)**

Geographic distribution: Western Atlantic – Bermuda, Florida, Gulf of Mexico, Antilles, Venezuela and Brazil (Fernando de Noronha, Trindade Island, and from Rio Grande do Norte to São Paulo) (Melo 1998).

Material examined: 11 M, 7 F, 3 OF and 2 J, size range:  $6.3 \leq CW \leq 21.1$  mm. Average:  $CW = 14.0 \pm 3.7$  mm. All individuals were found associated with *Palythoa caribaeorum* (Duchassaing and Michelotti, 1860). UNITAU201231.

**Superfamily Pinnotheroidea De Haan, 1833****Family Pinnotheridae De Haan, 1833****Subfamily Pinnotherinae De Haan, 1833*****Fabia byssomia* (Say, 1818) (Figure 5C)**

Geographic distribution: Western Atlantic – Brazil (from Rio de Janeiro to Rio Grande do Sul) and Argentina (Melo 1998).

Material examined: 2 F, size range:  $5.7 \leq CW \leq 6.0$  mm. Average:  $CW = 5.8 \pm 0.2$  mm. Identified by Melo (1996) as *Fabia emiliai* Melo, 1971; however, according to Ng et al. (2008), this species must be viewed as a junior synonym of *F. byssomia*. All individuals were found in the mantle of bivalves of the family Limidae Rafinesque, 1815. UNITAU

201232.

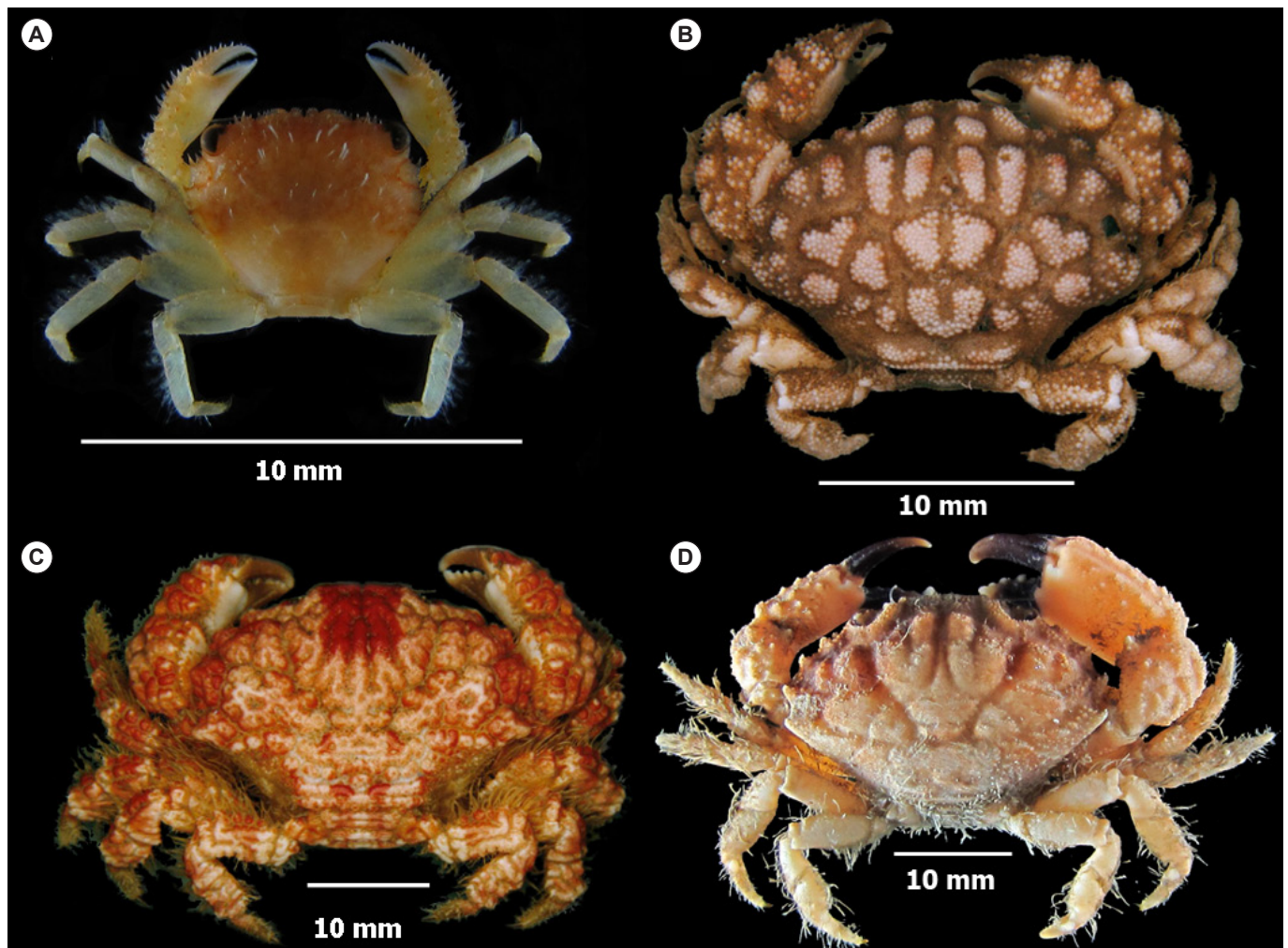
***Tumidotheres maculatus* (Say, 1818) (Figure 5D)**

Geographic distribution: Western Atlantic – From Massachusetts to Florida, Gulf of Mexico, Antilles, Venezuela and Brazil (from Maranhão to São Paulo), Uruguay and Argentina (Melo 1998; Hernández et al. 1999; Coelho et al. 2008).

Material examined: 1 F,  $CW = 4.0$  mm. UNITAU 201233.

The crab richness recorded for this region is the highest reported for this kind of habitat on the Brazilian coast, and comprises almost 20% of the total of species recorded from the entire Argentinean Biogeographical Province (see Boschi 2000a). Some studies have demonstrated the significant diversity of brachyuran crabs associated with unconsolidated bottoms on the southeastern Brazilian coast (Bertini and Fransozo 2004; Bertini et al. 2004; Braga et al. 2005; Bertini et al. 2010). Despite these available data, the ecology of brachyuran crabs of this region remains little explored, reinforcing the urgency of increasing the research effort to monitor this fauna on the Brazilian coast.

Areas of high species richness or areas that host endemic or threatened species are recognized as hotspots of diversity, and must be a priority for conservation policies (Myers et al. 2000; Margules et al. 2002; Fox and Beckley 2005; Tchouto et al. 2006). The large level of richness of



**FIGURE 4.** Brachyuran crabs from Vitória Archipelago, Brazil: A) *Domecia acanthophora* (Desbonne, in Desbonne and Schramm, 1867); B) *Paractaea nodosa* (Stimpson, 1860); C) *Glyptoxanthus vermiculatus* (Lamarck, 1818); D) *Cataleptodius parvulus* (Fabricius, 1793) (Photos: D.F.R. Alves).

crabs found in the Vitória Archipelago indicates its great degree of conservation, suggesting that the area must be recognized as an important region to be taken as a model for conservation management studies and policies along the southeastern Brazilian coast.

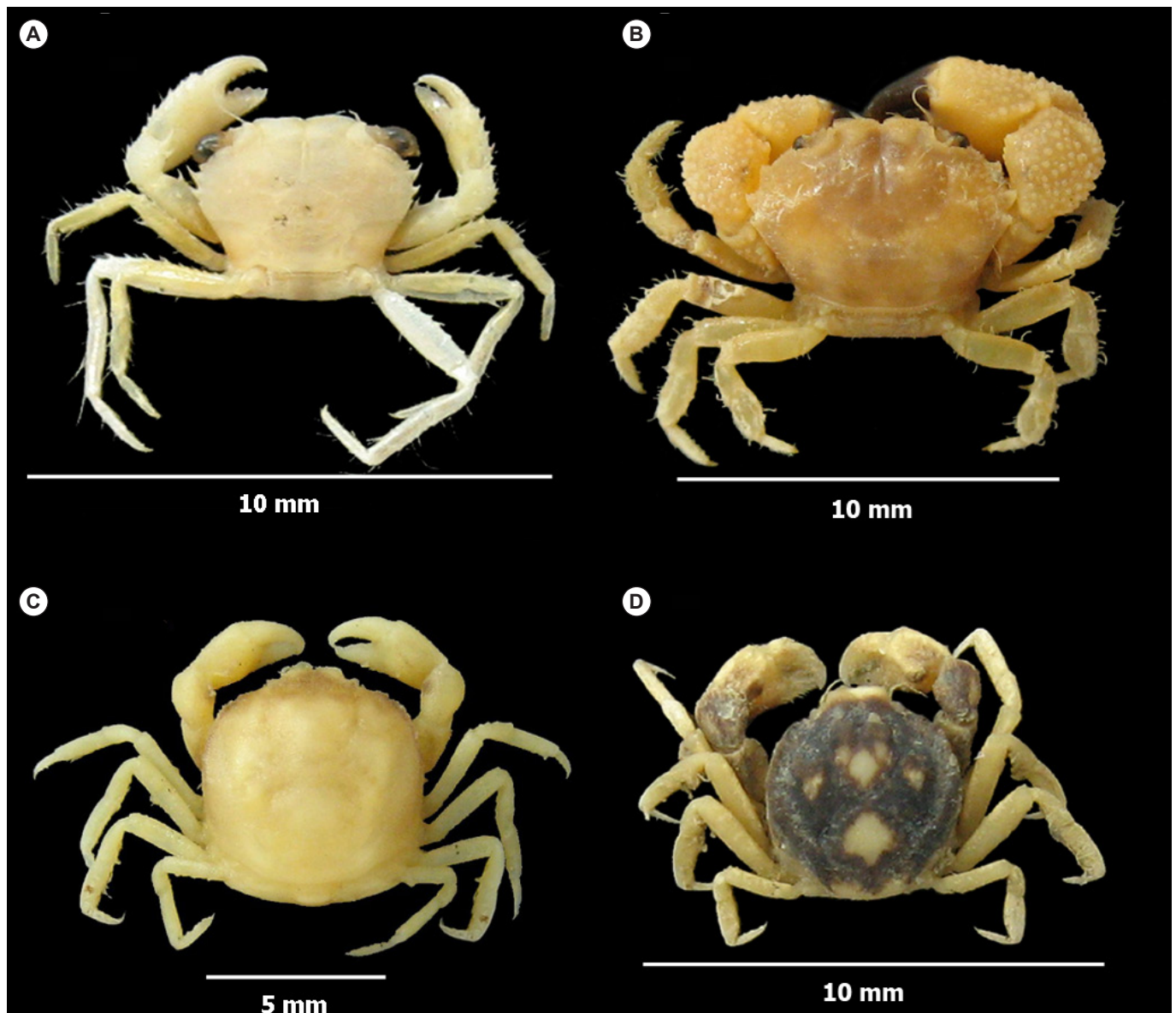
The Vitória Archipelago is located near the port of São Sebastião, one of the most important Latin American ports, which moves about 400,000 tons/year (SET 2007), especially oil. Despite its potential for economic development, this region is seriously threatened by the constant risk of oil spills. For example, in 1978 the cargo ship Brazilian Marina spilled about 6000 tons of oil on the Brazilian southeastern coast, and other, smaller spills are frequent (SET 2007).

In addition, the port areas are “entrance doors” for non-indigenous species, which could be introduced by ballast water or encrusted on the hulls of ships, as reported by Mansur *et al.* (2003), Alves *et al.* (2006) and Thayer and Stahlnecker (2006). Introduction of exotic species, especially in already impacted environments, could significantly change community relationships and even result in local extinctions of indigenous species

(Levin *et al.* 2002; Tavares and Mendonça Jr. 2004; Weigle *et al.* 2005).

Recent reports extending the known geographical distributions for one porcellanid and nine brachyuran crabs (see Alves *et al.* 2006; Camargo *et al.* 2010) reinforcing the necessity to increase research efforts concerning the biodiversity on subtidal rocky bottoms of the Brazilian coast. In addition, for many of these newly recorded species, a large discontinuity of occurrence along this coast was observed (*e.g.* *Teleophrys ornatus*, *Domecia acanthophora*, *Cataleptodius parvulus*, *Xanthodius denticulatus*). These gaps may result from insufficient collecting efforts in this kind of environment, or may indicate introductions by unnatural means of transport such as ship ballast water.

The Vitória Archipelago offers shelter and food for a wide diversity of marine animals, with a potential for recognition as a marine biological reserve. This concept must be seriously considered by the local governments, because this region seems to be a key site, or even a hotspot for the conservation of marine biodiversity of the southeastern Brazilian coast.



**FIGURE 5.** Brachyuran crabs from Vitória Archipelago, Brazil: A) *Melybia thalamita* Stimpson, 1871; B) *Micropanope sculptipes* Stimpson, 1871; C) *Fabia byssomia* (Say, 1818); D) *Tumidotheres maculatus* (Say, 1818) (Photos: D.F.R. Alves).



**TABLE 1.** List and number of species of the brachyuran crabs obtained in Vitoria Archipelago, São Paulo, Brazil. CI= Cabras Island; PI= Pescadores Island; VI= Vitoria Island.

SUPERFAMILY	FAMILY	SUBFAMILY	SPECIES	CI	PI	VI	N			
<b>Dromioidea</b>	Dromiidae	Dromiinae	<i>Dromia erythropus</i>	0	1	0	1			
			<i>Moreiradromia antillensis</i>	0	0	1	1			
<b>Eriphioidea</b>	Menippidae		<i>Menippe nodifrons</i>	13	4	18	35			
<b>Leucosioidea</b>	Leucosiidae	Ebaliinae	<i>Ebalia stimpsoni</i>	0	1	0	1			
<b>Majoidea</b>	Epiplatidae	Pisinae	<i>Apiomithrax violaceus</i>	0	0	3	3			
		Tychinae	<i>Pitho lherminieri</i>	1	1	4	6			
	Inachidae	Mithracinae	<i>Stenorhynchus seticornis</i>	105	87	215	407			
			<i>Microphrys antillensis</i>	1	0	15	16			
	Majidae	Mithracinae	<i>Mithraculus coryphe</i>	6	0	1	7			
			<i>Mithraculus forceps</i>	319	127	1082	1528			
			<i>Mithraculus sculptus</i>	1	0	3	4			
			<i>Mithrax braziliensis</i>	1	2	8	11			
			<i>Mithrax hispidus</i>	2	0	0	4			
			<i>Mithrax tortugae</i>	33	9	75	117			
			<i>Mithrax verrucosus</i>	0	0	16	16			
			<i>Nemausa acuticornis</i>	2	1	1	4			
			<i>Teleophrys ornatus</i>	1	1	0	2			
			<b>Pilumnoidea</b>	Pilumnidae	Pilumninae	<i>Pilumnus reticulatus</i>	5	0	6	11
<i>Pilumnus spinosissimus</i>	4	2			13	19				
<b>Portunoidea</b>	Portunidae	Portuninae	<i>Achelous tumidulus</i>	1	1	0	2			
			<i>Cronius ruber</i>	8	2	5	15			
<b>Trapezioidea</b>	Domeciidae	Domoeciinae	<i>Domecia acanthophora</i>	0	0	12	12			
<b>Xanthoidea</b>	Panopeidae	Panopeinae	<i>Acantholobulus schmitti</i>	5	5	23	33			
			<i>Hexapanopeus angustifrons</i>	20	6	45	71			
			<i>Hexapanopeus caribbaeus</i>	19	10	118	147			
			<i>Hexapanopeus paulensis</i>	5	6	27	38			
			<i>Panopeus austrobesus</i>	1	1	6	8			
			<i>Panopeus harttii</i>	26	9	73	108			
			<i>Panopeus occidentalis</i>	4	1	14	19			
			<i>Panopeus rugosus</i>	2	2	26	30			
			Xanthidae	Actaeinae	<i>Paractaea nodosa</i>	3	0	9	12	
					Euxanthinae	<i>Glyptoxanthus vermiculatus</i>	5	0	9	9
						Xanthinae	<i>Cataleptodius floridanus</i>	0	0	6
					<i>Cataleptodius parvulus</i>		2	1	2	5
			<i>Garthiope spinipes</i>	0	0	1	1			
	<i>Melybia thalamita</i>	0	0	5	5					
	<i>Micropanope nuttingi</i>	21	14	111	146					
	<i>Micropanope sculptipes</i>	36	9	146	191					
	<i>Xanthodius denticulatus</i>	0	1	5	6					
	Zosiminae		<i>Platypodiella spectabilis</i>	0	0	23	23			
	<b>Pinnotheroidea</b>	Pinnotheridae	Pinnotherinae	<i>Fabia byssomiae</i>	0	0	2	2		
<i>Tumidotheres maculatus</i>				0	0	1	1			

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#### LITERATURE CITED

Almeida, A.O., P.A. Coelho, J.T.A. Santos and N.R. Ferraz. 2007. Crustáceos estomatópodos e decápodos da costa de Ilhéus, Bahia, Brasil. *Atlântica* 29(1): 5-20.

Alves, D.F.R., V.J. Cobo and G.A.S. Melo. 2006. Extension of the geographical distribution of some brachyuran and porcellanid decapods (Crustacea) to the coast of the State of São Paulo, Brazil. *Revista Brasileira de Zoologia* 23(4): 280-283.

Balaji, K., G. Thirumaran, R. Arumugan, K.P. Kumaragurusagam

and Anantharaman, P. 2009. A review on marine ornamental invertebrates. *World Applied Sciences Journal* 7(8): 1054-1059.

Barreto, A.V., P.A. Coelho and M. Ramos-Porto. 1993. Distribuição geográfica dos Brachyura (Crustacea, Decapoda) coletados na plataforma continental do Norte e Nordeste do Brasil. *Revista Brasileira de Zoologia* 10(4): 641-656.

Bertini, G. and A. Fransozo. 2004. Bathymetric distribution of brachyurans (Crustacea, Decapoda) communities in soft bottom from southeastern Brazil. *Marine Ecology - Progress Series* 279: 193-200.

Bertini, G., A. Fransozo and G.A.S. Melo. 2004. Biodiversity of brachyuran crabs (Crustacea: Decapoda) from non-consolidated sublittoral bottom on the northern coast of São Paulo State, Brazil. *Biodiversity and Conservation* 13: 2185-2207.

Bertini, G., A. Fransozo and Negreiros-Fransozo, M.L. 2010. Brachyuran soft-bottom assemblage from marine shallow waters in the southeastern Brazilian littoral. *Marine Biodiversity* 40: 277-291.

Bezerra, J.F.A., A.O. Almeida and P.A. Coelho. 2005. Primeiro registro de *Apiomithrax violaceus* (A. Milne Edwards) e *Hypoconcha arcuata* Stimpson (Crustacea, Decapoda, Brachyura) para o litoral do Ceará, Brasil. *Revista Brasileira de Zoologia* 22(4): 919-922.

- Boschi, E.E. 2000a. Species of decapod crustaceans and their distribution in the American marine zoogeographic provinces. *Revista de Investigación y Desarrollo Pesquero* 13: 7-136.
- Boschi, E.E. 2000b. Biodiversity of marine decapod brachyurans of the Americas. *Journal of Crustacean Biology* 20(special number 2): 337-342.
- Braga, A.A., A. Fransozo, G. Bertini and P.B. Fumis. 2005. Composição e abundância dos caranguejos (Decapoda, Brachyura) nas regiões de Ubatuba e Caraguatatuba, litoral norte paulista, Brasil. *Biota Neotropica* 5(2): 1-34.
- Boltovskoy, D. 1999. *South Atlantic Zooplankton*. Leiden: Backhuys: 1705p.
- Calado, R., J. Lin, A.L. Rhyne, R. Araujo and L. Narciso. 2003. Marine ornamental decapods – popular, pricey and poorly studied. *Journal of Crustacean Biology* 23(4): 963-973.
- Camargo, F.V., D.F.R. Alves and V.J. Cobo. 2010. Range extensions for three majoid crabs (Crustacea, Decapoda, Brachyura) on the coast of São Paulo state, Brazil. *Panamjas* 5(1): 169-172.
- Cobo, V.J., A.P. Pinheiro, F.A.M. Freire and I.A. Martins. 2002. Range extension of the geographic distribution of the lobsters (Palinuroidea) and crabs (Xanthoidea) in the Brazilian coast. *Nauplius* 10(2): 155-158.
- Coelho, P.A. 1971. Nota prévia sobre os Majidae do Norte e Nordeste do Brasil (Crustacea, Decapoda). *Arquivos do Museu Nacional* 54: 137-143.
- Coelho, P.A. and M.A. Ramos. 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 do Instituto de Oceanografia da UFPE* 13: 133-236.
- Coelho, P.A. and M. Ramos-Porto. 1980. Crustáceos decápodos da costa do Maranhão, Brasil. *Boletim do Instituto Oceanográfico* 29(2): 135-138.
- Coelho, P.A. and M. Ramos-Porto. 1992. Sinopse dos crustáceos decápodos brasileiros (Portunidae). *Revista Brasileira de Zoologia* 9(3/4): 291-298.
- Coelho, P.A., M. Ramos-Porto and T.C.S. Calado. 1986. Litoral do Rio Grande do Norte: Decapoda. *Cadernos Ômega, Universidade Federal Rural de Pernambuco, Série Ciências Aquáticas* 2: 79-105.
- Coelho, P.A., M. Ramos-Porto and G.A.S. Melo. 1990. Crustáceos decápodos do estado de Alagoas. *Anais da Sociedade Nordestina de Zoologia* 3(3): 21-24.
- Coelho, P.A., A.O. Almeida and L.E.A. Bezerra. 2008. Checklist of the marine and estuarine Brachyura (Crustacea: Decapoda) of northern and northeastern Brazil. *Zootaxa* 1956: 1-58.
- Coelho, P.A., M.A. Coelho-Santos, M.F.A. Torres, B.R. Monteiro and V.A.K. Almeida. 2002. Reino Animalia: Filo (ou Subfilo) Crustácea no Estado de Pernambuco; p. 429-482 In M. Tabarelli and J.M.C. Silva (ed.). *Diagnóstico da biodiversidade de Pernambuco*: Massagana, Recife.
- 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.
- Costa, R.C., A. Fransozo, F.A.M. Freire and A.L. Castilho. 2007. Abundance and ecological distribution of the 'sete-barbas' shrimp *Xiphopenaeus kroyeri* (Heller, 1862) (Decapoda, Penaeoidea) in three bays of the Ubatuba region, southeastern Brazil. *Gulf and Caribbean Research* 19: 33-41.
- Fausto-Filho, J. 1974. Stomatopod and decapods crustaceans of the Archipelago of Fernando de Noronha, Northeast Brazil. *Arquivos de Ciências do Mar* 14(1): 1-35.
- Ferreira, A.C. and C. Sankarankutty. 2002. Estuarine carcinofauna (Decapoda) of Rio Grande do Norte, Brazil. *Nauplius* 10(2): 121-129.
- Fox, N.J. and L.E. Beckley. 2005. Priority areas for conservation of Western Australian coastal fishes: a comparison of hotspot, biogeographical and complementarity approaches. *Biology Conservation* 125: 399-410.
- Gouvêa, E.P. 1986. A carcinofauna do litoral rochoso de Salvador, BA, e alguns aspectos ecológicos. *Ciência e Cultura* 38(2): 346-354.
- Grajal, P.A. and G.R. Laughlin. 1984. Decapod crustaceans inhabiting live and dead colonies of three species of *Acropora* in the Roques Archipelago, Venezuela. *Bijdragen tot de Dierkunde* 54(2): 220-230.
- Gregati, R.A., V. Fransozo, L.S. López-Greco and M.L. Negreiros-Fransozo. 2010. Reproductive cycle and ovarian development of the marine ornamental shrimp *Stenopus hispidus* in captivity. *Aquaculture* 306: 185-190.
- Haefner Jr., P.A. 1990. Morphometry and size at maturity of *Callinectes ornatus* (Brachyura: Portunidae) on Bermuda. *Bulletin of Marine Science* 46(2): 274-286.
- 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.
- Hernández, G., L.B. Lares, J.A. Bolaños & J.E. Hernández. 1999. Crustáceos decápodos bentônicos del Monumento Natural Laguna de las Marites, Isla de Margarita, Venezuela. *Boletín del Instituto Oceanográfico de Venezuela, Universidad de Oriente* 38(2): 25-31.
- Levin, P.S., J.A. Coyer, R. Petrik and T.P. Good. 2002. Community-wide effects of nonindigenous species on temperate rocky reefs. *Ecology* 83(11): 3182-3193.
- Lira, C., J. Bolaños, G. Hernández, J. Hernández and R. López. 2010. Primer hallazgo de *Apiomithrax violaceus* (A. Milne-Edwards) (Brachyur: Epialtidae: Pisinae) para el Caribe. *Boletín de Investigaciones Marinas y Costeras* 39(2): 417-425.
- Mahiques, M.M. 1995. Sedimentary dynamics of the bays off Ubatuba, State of São Paulo. *Boletim do Instituto Oceanográfico* 43: 111-122.
- Manning, R.B. and F.A. Chace Jr. 1990. Decapod and Stomatopod Crustacea from Ascension Island, South Atlantic Ocean. *Smithsonian Contributions to Zoology* 503: 1-91.
- Mansur, M.C.D., C.P. Santos, G. Darrigan, I. Heydrich, C.T. Callil and C.P. Cardoso. 2003. Primeiros dados quali-quantitativos do mexilhão-dourado, *Limnoperna fortunei* (Dunker), no Delta do Jacuí, no Lago Guaíba e na Laguna dos Patos, Rio Grande do Sul, Brasil e alguns aspectos de sua invasão no novo ambiente. *Revista Brasileira de Zoologia* 20(1): 75-84.
- Mantelatto, F.L.M., R. Biagi, F.C.R. Faria, A.L. Meireles and G.A.S. Melo. 2004a. Checklist on brachyuran fauna (Decapoda) from infralittoral rocky/sandy bottom of Anchieta Island, São Paulo State, Brazil. *Nauplius* 12(2): 135-142.
- Mantelatto, F.L.M., F.C.R. Faria, R.G. Garcia and G.A.S. Melo. 2004b. Majoid crabs community (Crustacea: Decapoda) from infralittoral rocky/sandy bottom of Anchieta Island, Ubatuba. *Brazilian Archives of Biology Technology* 47(2): 273-279.
- Margules, C.R., R.L. Pressey and P.H. Williams. 2002. Representing biodiversity: data and procedures for identifying priority areas for conservation. *Journal of Bioscience* 27: 309-326.
- 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. 1998. Malacostraca-Eucarida. Brachyura. Oxyrhyncha and Brachyrhyncha; p. 455-515 In P.S. Young (ed.). *Catalogue of Crustacea of Brazil*. Rio de Janeiro: Museu Nacional.
- Melo, G.A.S. 2010. The Brachyura (Decapoda) of Ilha Grande Bay, Rio de Janeiro, Brazil. *Nauplius* 16(1): 1-22.
- Melo, G.A.S. and O. Campos Jr. 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.
- Melo, G.A.S. and V.G. Veloso. 2005. The Brachyura (Crustacea: Decapoda) of the coast of the State of Paraíba, Brazil, collected by Project Algas. *Revista Brasileira de Zoologia* 22(3): 796-805.
- Mora-Day, J., L. Mesa and J.C. Capelo. 2008. Crustáceos decápodos; p. 53-72. In: C. Lasso and J.C. Señaris (eds.). *Biodiversidad animal del caño Macareo, Punta Pescador y áreas adyacentes, Delta del Orinoco. Fundación La Salle de Ciencias Naturales-StatOilHydro, Caracas*.
- Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. Da Fonseca and J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 40: 853-858.
- Ng, P.K.L., D. Guinot and P.J.F. Davie. 2008. Systema brachyurorum: Part I. An annotated checklist of extant brachyuran crabs of the world. *Raffles Bulletin of Zoology* 17: 1-208.
- Nizinski, M.S. 2003. Annotated checklist of decapod crustaceans of Atlantic coastal and continental shelf waters of the United States. *Proceedings of the Biological Society of Washington* 116(1): 96-157.
- Palacio, F.J. 1982. Revisión zoogeográfica marina del sur del Brasil. *Boletim do Instituto Oceanográfico* 31(1): 69-92.
- Powers, L.W. 1977. A catalogue and bibliography to the crabs (Brachyura) of the Gulf of Mexico. *Contributions of Marine Science* 20: 1-190.
- Ramos-Porto, M., M.M. Ferreira-Correia and N.R. Sousa. 1978. Levantamento da fauna aquática da ilha de São Luís (Estado do Maranhão, Brasil). II. Crustacea. *Boletim do Laboratório de Hidrobiologia* 2(1): 77-88.
- Rieger, P.J. and J.B. Giraldi. 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 J.L.B. Giraldi. 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.
- Rieger, P.J., R.R.R. Vieira and S. Santos. 1996. *Hexapanopeus caribbaeus* (Stimpson, 1871) novo registro de Brachyura (Decapoda, Xanthidae) para o litoral do Rio Grande do Sul. *Nauplius* 4: 169-170.
- Serejo, C., P.S. Young, I. Cardoso, C.R. Tavares and C.R. Abreu Jr. 2006. Filo Arthropoda, Subfilo Crustácea; p. 299-337 In: H.P. Lavrado and B.L. Ignácio (eds.). *Biodiversidade bentônica da região central da Zona Econômica Exclusiva Brasileira*. Rio de Janeiro: Museu Nacional.
- SET - Secretaria de Estado dos Transportes: Governo do Estado de São Paulo. <http://www.transportes.sp.gov.br/v20/portosaosebastiao.asp>. Captured on 6 December 2007.
- Tavares, M. and J.B. Mendonça Jr. 2004. Introdução de Crustáceos

- Decápodes exóticos no Brasil: uma roleta ecológica; p. 59-76 In J.S.V. Silva and R.C.C.L. Souza (ed.). *Água de lastro e bioinvasão*. Rio de Janeiro: Interciência.
- Tchouto, M.G.P., M. Yemefack, W.F. De Boer, J.J.F.E. De Wilde, L.J.G. Van Der Maesen and A.M. Cleef. 2006. Biodiversity hotspots and conservation priorities in the Campo-Ma'an rain forests, Cameroon. *Biodiversity and Conservation* 15: 1219-1252.
- Thayer, P.E. and J.F. Stahlnecker, 2006. [http://www.maine.gov/dep/blwq/report/marine\\_invasive\\_2006.pdf](http://www.maine.gov/dep/blwq/report/marine_invasive_2006.pdf). Captured on 10 February 2010.
- Viana, G.F.S., M. Ramos-Porto, M.C.F. Santos, K.C.A. Silva, I.H.A. Cintra, E. Cabral, M.F.A. Torres and F.D. Acioli. 2003a. Caranguejos coletados no norte e nordeste do Brasil durante o programa REVIZEE (Crustacea, Decapoda, Brachyura). *Boletim Técnico-Científico do Cepene* 11(1): 117-144.
- Viana, G.F.S., M. Ramos-Porto, P.E.P.F. Travassos and G. Carvalho. 2003b. Registro de *Dromiaerythropus* (G. Edwards, 1771) para o Arquipélago de Fernando de Noronha, Brasil (Crustacea, Decapoda, Dromiidae). *Boletim Técnico-Científico do Cepnor* 3(1): 215-218.
- Weigle, S.M., L.D. Smith, J.T. Carlton and J. Pederson. 2005. Assessing the risk of exotic species introductions via the live marine species trade. *Conservation Biology* 19(1): 213-223.
- Windsor, A.M. and D.L. Felder. 2009. Re-evaluation of species allied to *Mithrax hispidus* (Decapoda: Brachyura: Majoidea: Mithracidae) based on three mitochondrial genes. *Zootaxa* 2302: 61-68.
- Witman, J.D. and P.K. Dayton. 2000. Rocky subtidal communities; p. 339-366 In M.D. Bertness, S.D. Gaines and M. Hay (ed.). *Marine community ecology*. Sunderland: Sinauer Press.

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