

# Crustaceans composition in sandy beaches of Sepetiba Bay, Rio de Janeiro, Brazil

Ricardo S. Cardoso<sup>1</sup>, Felipe Meireis<sup>1,2\*</sup> and Gustavo Mattos<sup>1,3</sup>

- 1 Universidade Federal do Estado do Rio de Janeiro, Instituto de Biociências, Departamento de Ecologia e Recursos Marinhos, Laboratório de Ecologia Marinha. CEP 22290-240. Rio de Janeiro, RJ, Brazil.
  - 2 Universidade Federal do Estado do Rio de Janeiro, Instituto de Biociências, Programa de Pós-Graduação em Ciências Biológicas (Biodiversidade Neotropical). CEP 22290-240. Rio de Janeiro, RJ, Brazil.
  - 3 Universidade Federal do Rio de Janeiro, Instituto de Biologia, Programa de Pós-Graduação em Ecologia, CEP 21949-900. Rio de Janeiro, RJ, Brazil.
- \* Corresponding author. E-mail: [meireisf@gmail.com](mailto:meireisf@gmail.com)

**ABSTRACT:** A crustacean survey was made in Sepetiba bay, Rio de Janeiro state, southeastern Brazil. Twelve sandy beaches were sampled on five islands in this embayment. A total of 3024 individuals were collected, belonging to 21 species, which are grouped in 16 families, seven infraorders, seven suborders, and four orders. Isopods, followed by amphipods and tanaids, showed the highest abundance, amounting to over 92% of the dominance of crustaceans. The main species were *Excirrolana armata*, *Excirrolana braziliensis* (isopods), *Atlantorchestoidea brasiliensis* (amphipod), and *Monokalliapseudes schubarti* (tanaid), which together accounted about 80% of crustaceans of the beaches studied. *Excirrolana braziliensis* had the highest frequency. The majority of species found are typical of sandy beaches, with large spatial distribution.

## INTRODUCTION

Crustaceans are typically marine invertebrates (Brusca and Brusca 2007), and are commonly found in coastal ecosystems, like estuaries, mangroves, rocky shores and sandy beaches (Ri-Qing *et al.* 1997; Smith 2005; Sanchez-Moyano and Garcia-Asencio 2011; Cardoso *et al.* 2011). Thus, many species have a great importance in the economy, since several species are part of the human diet as well as they are used as bait in fishing (Williams 1974; Brown 1995). Moreover, these invertebrates can be used in the assessment of environmental quality (Fowler *et al.* 1978; Bergamino *et al.* 2009; Amaral *et al.* 2010).

In sandy beaches all over the world, crustaceans usually show a high dominance and frequency, especially on beaches which are more exposed to waves (Defeo and McLachlan 2005). Among members of carcinofauna in this environment, peracarids (especially isopods, amphipods, and mysids) and decapods (anomurans and brachyurans) are the most abundant (McLachlan and Brown 2006).

Sepetiba Bay, located in the southern state of Rio de Janeiro is a tropical ecosystem near the city of Rio de Janeiro. This bay holds one of the most important commercial ports in the Brazilian southeast region, with intense touristic, fishing, and industrial activities. For this reason it is considered an area of potential development, emerging as a great industrial and tourist center (Lacerda *et al.* 1987).

The purpose of the present work was to list the species of crustaceans inhabiting sandy beaches distributed on islands in Sepetiba Bay, state of Rio de Janeiro, Brazil. Thereby, this study will enable future works about the ecology of these species and the responses to the influence of the harbor in this region.

## MATERIALS AND METHODS

The material studied is derived from project

“*Caracterização espacial da macrofauna de praias arenosas em cinco ilhas da Baía de Sepetiba, Rio de Janeiro*”. Sepetiba Bay (22°54' – 23°04' S; 44°34' – 44°10' W) is a sedimentary embayment located in Rio de Janeiro state, southeastern Brazil, with an area of 520 km<sup>2</sup> (Cardoso *et al.* 2011). On each twelve microtidal sandy beaches of five islands (Boi, Flexeiras, Catita, Escalhou, Bonita, Jardim, Gamboa, Leste, Estopa, Pitangueiras, Sul, and Pier) one sampling was carried during 2007 and 2008 (Figure 1). The collected sediment was sieved through a 0.50 mm mesh, and the retained material was taken to the laboratory, where the organisms were sorted by species, counted, and fixed in 5% buffered formalin. Identification was based on Mañé-Garzón (1949), Loyola e Silva (1960), Lemos de Castro and Brum (1969), Barnard and Karaman (1991), Melo (1996; 1999), Loyola e Silva and Alves (2000), Serejo (2004), Felder *et al.* (2009), and Souza-Filho (2011). Nomenclature and taxonomy were based on Martin and Davis (2001) and articles used to identification. The specimens were deposited in the crustaceans collection at Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ).

## RESULTS AND DISCUSSION

A total of 3024 individuals of carcinofauna were collected, belonging to 21 species, which are distributed in 16 families, seven infraorders, seven suborders, and four orders (Table 1). Isopods, in conjunction with amphipods and tanaids showed the highest abundance, amounting to over 92% of the dominance of crustaceans.

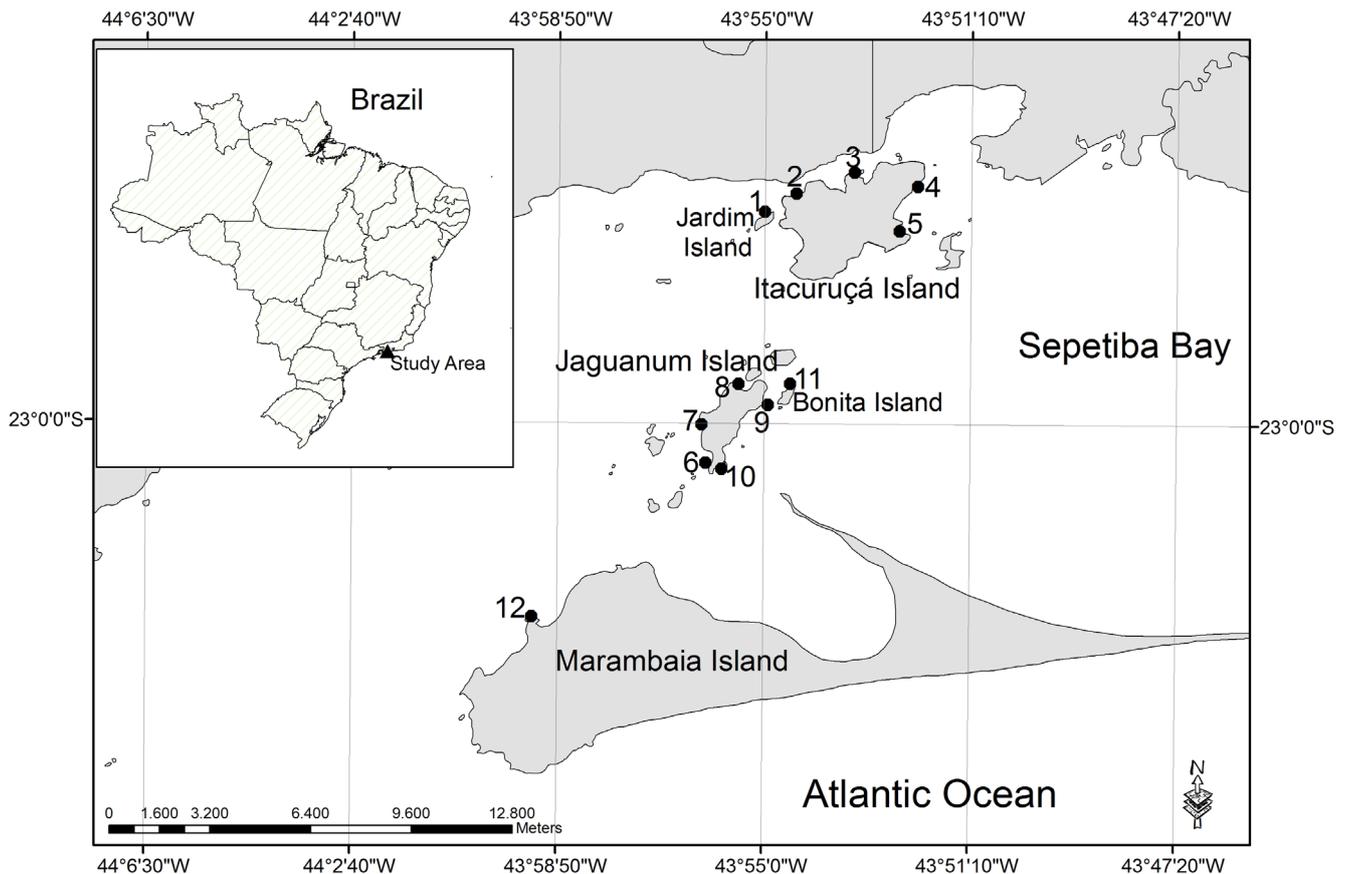
The main species were the peracarids *Excirrolana armata* Dana, 1853, *Excirrolana braziliensis* H. Richardson, 1912 (isopods) *Atlantorchestoidea brasiliensis* (Dana, 1853) (amphipod) and *Monokalliapseudes schubarti* (Mañé-Garzón, 1949) (tanaid), which together accounted for about 80% of crustaceans of the beaches studied. *Excirrolana braziliensis* had the highest frequency, occurring

in more than 80% of beaches.

The cirrolanid isopods are considered generalists in terms of occupation of the adverse environment that represent the sandy beaches (McLachlan and Brown 2006), justifying the fact that these isopods were the most frequent crustaceans on the beaches studied. Among the species of cirrolanids, *E. brasiliensis* and *E. armata* noteworthy for having a broad geographical distribution, often being found in coexistence (Defeo et al. 1997). The first occurs in tropical, subtropical and temperate along the coasts of the Atlantic and North Pacific (Cardoso and Defeo 2003) while the second is more restricted, occurring from Rio de Janeiro to Argentina (Ribetti and Roccatagliata

2006).

The high abundance of *A. brasiliensis* found on the beaches studied corroborate with the study by Veloso et al. (2003), showing that this species is typically found in high abundance on the exposed sandy beaches of Rio de Janeiro. Besides this amphipod, the tanaid *M. schubartii*, had high abundances, however occurring only at two beaches (Gamboa and Pier beaches), which one are characterized by fine sediment (Cardoso et al. 2011). It can be explained by the fact that this species is related to high concentrations of organic matter that is usually associated with fine sediment (Bemvenuti et al. 1978; McLachlan and Brown 2006).



**FIGURE 1.** Location map of the 12 beaches sampling in Sepetiba Bay, also showing the bay mouth and Atlantic Ocean. 1: Jardim; 2: Flexeiras; 3: Gamboa; 4: Leste; 5: Boi; 6: Sul; 7: Escalhou; 8: Estopa; 9: Pitangueiras; 10: Catita; 11: Bonita; 12: Pier.

Other species founded, but not with high abundances and frequencies, are typical inhabitants of sandy beaches and have a large spatial distribution as the mole crab *Emerita brasiliensis* Schmitt, 1935 (decapod) that is commonly found in the intertidal of reflective sandy beaches along the Atlantic coast of South America from Rio de Janeiro (Brazil) to Montevideo (Uruguay) (Defeo and Cardoso 2004). Accordingly, the blue crab of genus *Callinectes* Stimpson 1860 is a swimming decapod that is widely distributed from Nova Scotia to northern Argentina (Norse 1977). Another common species of sandy beaches which was found in only two beaches was the hermit crab *Pagurus criniticornis* Dana, 1852. These high abundances of hermit crabs may be related with the dominance of gastropods *Cerithium atratum* in these beaches (Cardoso et al. 2011), since *P. criniticornis* has a clear preference for

living in empty shells of this gastropod (Dominciano et al. 2009).

During the identification of specimens for this work, a new genus and new species was found and described by Souza-Filho (2011). It is the amphipod *Ruffosius fluminensis* (Figure 2) that was found in four of the beaches studied.

The description of this new genus and new species shows the importance of a taxonomic survey in environments where the studies are scarce, thus sandy beaches of Sepetiba Bay are a potential area for the discovery of new species and new occurrences. Moreover, these organisms that inhabit this environment can be used as bioindicators, once the beaches are ecosystems that suffer with the human action, for example recreation, cleaning and pollution (Defeo et al. 2009).

**TABLE 1.** List of crustacean species found on 12 beaches studied from Sepetiba Bay.

ORDER	SUBORDER	INFRAORDER	FAMILY	SPECIES	VOUCHER	
Amphipoda	Gammaridea	Talitrida	Talitridae	<i>Atlantorchoestoidea brasiliensis</i> (Dana, 1853)	MNRJ23146	
		Gammarida	Cheidae	<i>Ruffosius fluminensis</i> Souza-Filho, 2011	MNRJ21823	
	Corophiidea	Corophiida	Ampithoidae	<i>Cymadusa filosa</i> Savigny, 1816	MNRJ23169	
		Caprellida	Caprellidae	<i>Caprella penantis</i> Leach, 1814	MNRJ23147	
				<i>Monoliropus enodis</i> Rayol and Serejo, 2003	MNRJ23148	
Isopoda	Cymothoidea		Cirolanidae	<i>Excirrolana armata</i> (Dana, 1853)	MNRJ23149/23150	
				<i>Excirrolana brasiliensis</i> Richardson, 1912	MNRJ23151/23152	
				<i>Metacirolana cf. riobaldoi</i> (Lemos de Castro and Lima, 1976)	MNRJ23153	
	Sphaeromatidea		Sphaeromatidae	<i>Sphaeromopsis mourei</i> (Loyola e Silva, 1960)	MNRJ23154	
	Oniscidea		Tylidae	<i>Tylos niveus</i> Budde-Lund, 1885	MNRJ23155	
Tanaidacea	Apseudomorpha		Kalliapseudidae	<i>Monokalliapseudes schubarti</i> (Mañé-Garzón, 1949)	MNRJ23156/23157	
Decapoda	Pleocyemata	Caridea	Alpheidae	<i>Alpheus nuttingi</i> (Schmitt, 1924)	MNRJ23158	
			Hippidae	<i>Emerita brasiliensis</i> Schmitt, 1935	MNRJ23164	
			Paguridae	<i>Pagurus criniticornis</i> (Dana, 1852)	MNRJ23165	
		Anomura	Thalassinidea	Upogebiidae	<i>Upogebia vasquezi</i> Ngoc-Ho, 1989	MNRJ23166/23167
				Portunidae	<i>Callinectes</i> sp.	MNRJ23159
					Panopeidae	<i>Panopeus americanus</i> de Saussure, 1857
		Brachyura		Pinnotheridae	<i>Pinnixa chaetoptera</i> Stimpson, 1860	MNRJ23162
					<i>Dissodactylus crinitichelis</i> Moreira, 1901	MNRJ23163
					Aethridae	<i>Hepatus gronovii</i> Holthuis, 1959

**FIGURE 2.** *Ruffosius fluminensis* Souza-Filho, 2011. Sul beach, Sepetiba Bay, Rio de Janeiro, MNRJ21823. Scale bar: 0.5 mm.

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