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Distribution and abundance of giant isopods *Bathynomus* (Crustacea, Isopoda, Cirolanidae) from Amazon Continental Shelf

Distribuição e abundância de isópodes gigantes *Bathynomus* (Crustacea, Isopoda, Cirolanidae) da Plataforma Continental Amazônica

Distribución y abundancia de isópodos gigantes *Bathynomus* (Crustacea, Isopoda, Cirolanidae) de la Plataforma Continental Amazónica

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Resumo

O presente estudo concentra-se na distribuição e abundância da comunidade de isópodes gigantes, com base em espécimes coletados com arrasto de camarão de fundo na plataforma continental da Amazônia durante pesquisas de pesca, em profundidades entre 81 me 626 m,

realizadas durante a REVIZEE/Score-North Programa entre 1996 e 1998. A área de estudo está localizada na zona econômica exclusiva do Brasil, entre os estados do Amapá e Pará. No total, foram coletados 170 espécimes, distribuídos nas duas espécies *Bathynomus giganteus* (n = 49) e *Bathynomus miyarei* (n = 121), nas quais 54% do material foi coletado no setor norte e 46% no setor sul do país. área de estudo. *B. miyarei* foi considerada a espécie dominante nos dois setores, enquanto *B. giganteus* era incomum no setor norte, mas abundante no setor sul. Ambas as espécies preferiram fundos de cascalho no setor norte e areia de cascalho no setor sul e foram mais abundantes durante a estação seca no setor norte, mas durante a estação chuvosa no setor sul. A menor fêmea de *B. giganteus* foi coletada no setor norte e a maior no setor sul, enquanto a maior e a menor fêmea *B. miyarei* foram capturadas no setor sul. Todas as amostras masculinas coletadas neste estudo foram capturadas no setor norte.

Palavras-chave: Litoral norte do Brasil; Programa revizee; Biodiversidade.

Abstract

The present study focuses on the distribution and abundance of the giant isopod community, based on specimens collected using the bottom shrimp trawling on the Amazon continental shelf during fishery surveys, at depths between 81 m and 626 m, conducted during the REVIZEE/Score-North Program between 1996 and 1998. The study area is located within the exclusive economic zone of Brazil, between the States of Amapá and Pará. In total, 170 specimens were collected, distributed in the two species *Bathynomus giganteus* (n = 49) and *Bathynomus miyarei* (n = 121), in which 54% of the material were collected in the northern and 46% in the southern sector of the study area. *B. miyarei* was considered to be the dominant species in both sectors, whereas *B. giganteus* was uncommon in the northern sector, but abundant in the southern sector. Both species preferred gravelly bottoms in the northern sector, and gravelly sand in the southern sector and were more abundant during the dry season in the northern sector, but during the rainy season in the southern sector. The smallest female *B. giganteus* was collected in the northern sector, and the largest in the southern sector, whereas both the largest and the smallest female *B. miyarei* were captured in the southern sector. All the male specimens collected in this study were captured in the northern sector.

Keywords: Northern coast of Brazil; Revizee program; Biodiversity.

Resumen

El presente estudio se enfoca en la distribución y abundancia de la comunidad de isópodos de distribución, basada en especímenes recolectados utilizando el arrastre de camarones de fondo

en la plataforma continental amazónica durante los estudios de pesca, a profundidades entre 81m y 626m, realizados durante el REVIZEE/Score-North Programa entre 1996 y 1998. El área de estudio se encuentra dentro de la zona económica exclusiva de Brasil, entre los estados de Amapá y Pará. En total, se recolectaron 170 especímenes, distribuidos en las dos especies *Bathynomus giganteus* (n = 49) y *Bathynomus miyarei* (n = 121), en las cuales el 54% del material se recolectó en el sector norte y el 46% en el sector sur del país. Área de estudio. Se consideró que *B. miyarei* era la especie dominante en ambos sectores, mientras que *B. giganteus* era poco común en el sector norte, pero abundante en el sector sur. Ambas especies prefirieron fondos de grava en el sector norte y arena de grava en el sector sur y fueron más abundantes durante la estación seca en el sector norte, pero durante la temporada de lluvias en el sector sur. La hembra más pequeña de *B. giganteus* se recolectó en el sector norte y la más grande en el sector sur, mientras que la hembra más grande y la más pequeña de *B. miyarei* fueron capturadas en el sector sur. Todos los especímenes machos recolectados en este estudio fueron capturados en el sector norte.

Palabras clave: Costa norte de Brasil; Programa revizee; Biodiversidad.

1. Introduction

A basic measure of the diversity of a biological community is the number of species, also known as species richness (Primack & Rodrigues, 2001). Regionally, the number of species found in a community varies according to the physical conditions of the environment, habitat heterogeneity, primary productivity, and dispersal potential (Ricklefs, 2003).

The order Isopoda contains approximately 10,000 species, which are found in marine, freshwater, and terrestrial environments. The largest species belong to the genus *Bathynomus* A. Milne-Edwards, 1879 (Bueno, 2007). Most isopods are found in marine environments, and are well-distributed in a variety of different niches (Loyola e Silva, 1999).

Isopods of the Family Cirolanidae (which includes the genus *Bathynomus*) are mostly free-living, are good swimmers, and tend to be abundant in shallow water habitats. Some species are troglobites, while others occur in deep oceanic environments. In both cases, the species are blind. The Family contains more than 300 species worldwide (Loyola e Silva, 1999).

A number of past studies have focused on Brazilian isopods, identifying a number of new occurrences in the Alagoas state (Loyola e Silva et al., 1994), describing new species from southern Brazil (Araújo & Buckup, 1996), identifiying a parasitic species in the Paraná State (Oliveira & Masunari, 2006), re-describing a species from the state of Minas Gerais (Thatcher

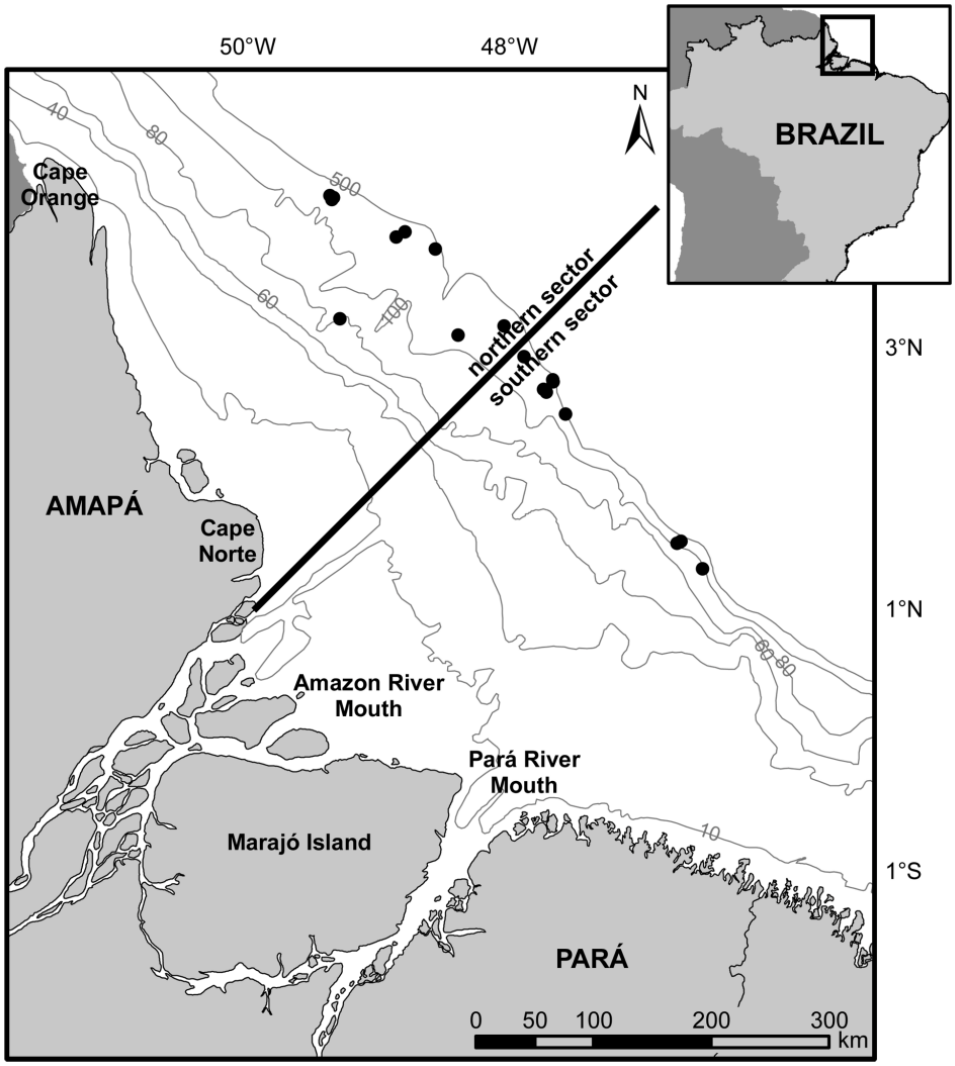
et al., 2009) and recording a number of terrestrial isopods from the Brazilian Atlantic Fores (Magrini et al., 2011). Other researches focused on the genus *Bathynomus*, such as that of Cintra *et al*. (1998) on the Northern coast of Brazil, Loyola e Silva (1999) in the Rio Grande do Sul state, and Magalhães & Young (2003) and Serejo et al. (2006) in Southeastern Brazil.

The Brazilian government created the REVIZEE Program (Evaluation of the Potential Sustainability of the Natural Resources of the Exclusive Economic Zone) in 1995 with the aim of managing and conserving natural resources for their sustainable exploitation. The present study focuses on the spatial distribution of these giant isopods off the mouth of the Amazon River, which is an atypical coastal environment, due to the enormous combined discharge of the Amazon and Tocantins rivers. In this context, even crustaceans which are not of direct interest to the fishery industry, but play an important ecological role in the food chain, for example, are of considerable interest for the understanding of the local ecosystem.

2. Materials and Methods

The study area encompasses the coastal zone of the Brazilian states of Amapá and Pará (Figure 1), which are part of the exclusive economic zone of Northern Brazil. Based on the physiographic characteristics of this area, a line was traced from Cape Norte at an angle of approximately 45°, to divide the region into two sectors, to the north and south of this cape, using the ArcGIS 9.3 program (ESRI - Environmental Systems Research Institute, 2008). The line originated at 00°59'09" N, 49°57'02" W. The division of the areas was conducted to assess the influence of the diversity of the Cape of the Amazon.

Figure 1: Map of the study area, showing sampling points for the collection of *Bathynomus giganteus* A. Milne-Edwards, 1879, and *Bathynomus miyarei* Lemos de Castro, 1978, and the division between the areas to the north and south of Cape Norte.



Source: Authors.

The specimens were captured using the shrimp trawls during the REVIZEE-Score Program between 1996 and 1998.

The United Nations Convention on the Law of the Sea (UNCLOS, article 55) establishes that the exclusive economic zone is an area beyond and adjacent to the territorial sea and shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured (UNCLOS, article 57) (DHN - Diretoria de Hidrografia e Navegação do Ministério da Marinha, 1995). In the present study, the Amazon continental shelf was defined as the shelf itself and the adjacent slope and base off the Brazilian states of Pará and Amapá.

The trawling were part of the activities of the northern coast REVIZEE-Score Program, and were conducted by the Northern Coast Research and Management of Fishery Resources Center's (CEPNOR) research vessel, the Almirante Paulo Moreira, between 1996 and 1998. Diurnal trawls were conducted between 06:00 h and 17:59 h, and nocturnal catches between 18:00 h and 05:59 h.

The isopods analyzed in the present study were captured with bottom shrimp trawl nets similar to those used by the local industrial shrimping fleet, with rectangular wooden doors and iron shoes.

Collected specimens were stored on ice in individually-identified baskets, labeled with the date, trawl number, and geographic position. The initial and final depth of each trawl, and the type of sediment were also recorded. As most of the sediments were classified as "indeterminate", however, the classification proposed by Figueiredo-Júnior et al. (2008) was used for the analysis of the data. Once landed, the specimens were kept in a cold storage chamber until analysis.

Collected material was identified subsequently at the CEPNOR Crustaceans Laboratory and the Carcinology Laboratory of the Federal Rural University of Pernambuco, including Schultz (1969), Lemos de Castro (1978), Takeda (1983), Martin & Davies (2001) and Brandt & Poore (2003). All the specimens were deposited in the CEPNOR Crustaceans Laboratory, under specific deposit numbers (Table 1).

Table 1: Codes of the vials of *Bathynomus giganteus* A. Milne-Edwards, 1879, and *Bathynomus miyarei* Lemos de Castro, 1978, deposited in the CEPNOR Crustaceans Laboratory. They were captured in the northern (NS) and southern (SS) sector within Amazon continental shelf using the shrimp trawl nets during the REVIZEE Program, between 1996 and 1998.

Sector	Specie	Collection number
NS	*B. giganteus*	100.1.1.A e 100.1.1.C
	B. miyarei	100.1.2.A e 100.1.2.B
SS	*B. giganteus*	100.1.1.G
	B. miyarei	100.1.2.F e 100.1.2.H

Source: Authors.

The frequency of occurrence of the different species, expressed as a percentage, was provided by the following formula: $A = (n \times 100)/N$, where n = the number of trawls containing the species, and N = the total number of trawls.

The results were classified according to the scheme of Santos (2000). For abundance, the categories were dominant (above 50%), abundant (30-50%), uncommon (10-29%), and rare (below 10%). For frequency, they were very frequent (above 70%), frequent (30-70%), infrequent (10-30%), and sporadic (below 10%).

Differences in the total number of specimens captured between the two study sectors (NCN and SCN) were tested using χ^2, with $\alpha = 0.05$. In order to evaluate whether the species found in both study sectors presented the same distribution patterns, the following variables were analyzed: (i) depth, based on the following categories (Nittrouer et al., 1986): inner shelf (up to 40 m), mid-shelf (40-60 m), outer shelf (60-100 m), and slope (100-200 m); (ii) sediment type – sand, gravelly sand, muddy sand, gravel, and mud (Figueiredo-Júnior et al., 2008); (iii) season – rainy season (high water), from December to May, and dry season (low water), from June to November (Oliveira et al., 2007).

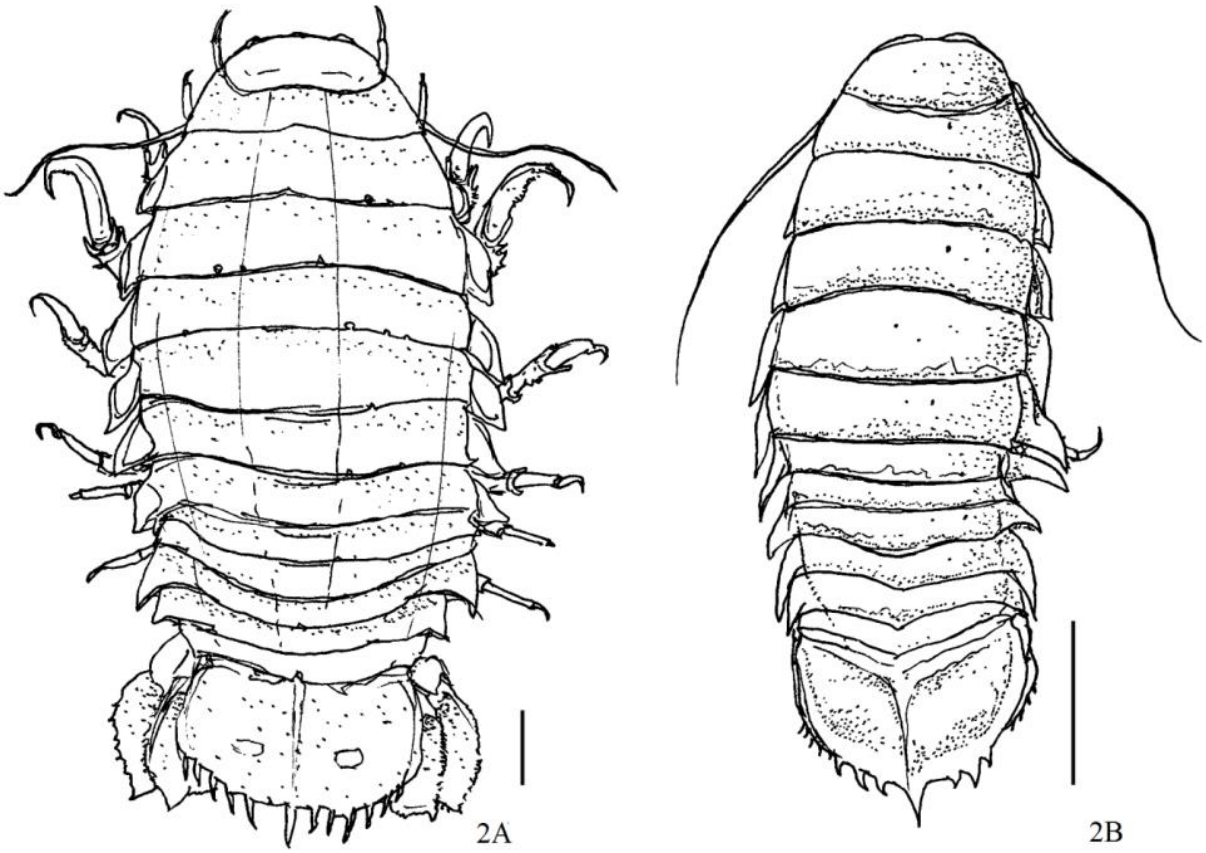
The specimens were also sexed and measured (total length). The identification of the sexes was based on the observation of the endopod of the second pleopod which normally presents a sharpened internal edge in the males, as well as the presence of the marsupium made of the oostegites in ovigerous females (Loyola e Silva, 1999). Total length was measured from the anterior margin of the rostral plate to the posterior extreme of the telson. The minimum and maximum values were determined, as well as the standard deviation, for males and females separately. When only one specimen was examined, its measurement was considered to be the maximum value.

The data were considered simultaneously for the calculation of relative abundance, frequency of occurrence, and ecological indices, as well as bathymetric distribution, type of sediment, sex ratio, and total length.

3. Results

A total of 170 giant isopods were collected, representing the species *Bathynomus giganteus* A. Milne-Edwards, 1879 and *Bathynomus miyarei* Lemos de Castro, 1978 (Figure 2). More than two-thirds (71%) of the specimens belonged to the species *B. miyarei*, with the other 29% belonging to *B. giganteus*. The specimens were distributed relatively evenly between sectors, with 54% being captured in the northern sector and 46% in the southern sector.

Figure 2: Dorsal view of (2A) *Bathynomus giganteus* and (2B) *Bathynomus miyarei*. Scale bar = 2.0 cm.



Source: Authors.

Specimens were collected in 19 fishing throws out during seven fishery surveys. Fishing throws lasted between 30 minutes and 1 hour, with 16 being conducted during the day, and three, at night (Table 2). While *B. miyarei* was dominant in both areas (Table 3), in terms of their relative abundance, *B. giganteus* was uncommon in the northern sector of the study area, but abundant in the southern sector. Both species were classified as very frequent in the two study sectors (Table 3), and there was no significant difference in the numbers of individuals captured in the different sectors (Table 4).

The isobaths and types of sediments from which the specimens of the two species were collected in both sectors of the study area are shown in Figure 3. The isopod specimens were collected at depths of between 81 m and 626 m. However, while the majority of the specimens in the northern sector were captured in the mesopelagic range of the slope (300-500 m), these organisms were collected exclusively from this zone, primarily at depths of between 400 m and 500 m (Figure 3).

Table 2: Fishery survey number (FS), fishing throws number (H), date, sector of collection (NS=north sector; SS= south sector), latitude, longitude, sediment type, mean depth in meters (MD), absolute number of captured isopods (N), trawling duration in hours (TD) and period of the day (P: D=daytime, N=night),of the sampled areas containing giant isopods in Amazon continental shelf, using the bottom shrimp trawl nets during the Northern REVIZEE Score program (1996-1998). Total number of trawls: 19.

FS	H	Date	Sector	Latitude	Longitude	Sediment	MD	N	TD	P
II	5	06/10/1996	NS	04°07'N	49°21'W	muddy sand	312	2	1h	D
II	6	06/10/1996	NS	04°08'N	49°20'W	muddy sand	394	8	1h	D
II	7	06/10/1996	NS	03°12'N	49°17'W	gravel	81	2	1 h	D
III	3	15/11/1996	NS	03°50'N	48°51'W	gravel	356	29	1 h	D
III	4	15/11/1996	NS	03°52'N	48°47'W	gravel	458	20	1 h	D
III	5	16/11/1996	NS	03°44'N	48°33'W	gravel	459	4	1 h	D
III	9	18/11/1996	NS	03°05'N	48°23'W	muddy sand	121	4	1 h	D
III	12	19/11/1996	NS	03°09'N	48°02'W	gravel	453	11	1 h	D
III	13	19/11/1996	SS	02°55'N	47°53'W	muddy sand	458	4	1 h	N
IV	1	07/12/1996	SS	02°44'N	47°39'W	gravel	621	2	1 h	D
IV	2	07/12/1996	SS	02°40'N	47°44'W	muddy sand	434	2	1 h	D
IV	3	08/12/1996	SS	02°29'N	47°34'W	muddy sand	429	1	1 h	D
IV	9	12/12/1996	SS	01°30'N	46°41'W	gravelly sand	484	15	1 h	D
IV	10	12/12/1996	SS	01°30'N	46°42'W	gravelly sand	320	17	1 h	D
VII	3	20/03/1998	SS	02°43'N	47°39'W	gravel	626	16	1 h	D
VII	4	20/03/1998	SS	02°39'N	47°43'W	muddy sand	456	2	1 h	D
VIII	1	31/03/1998	NS	04°09'N	49°22'W	muddy sand	422	11	1 h	D
IX	9	02/05/1998	SS	01°29'N	46°43'W	gravelly sand	214	1	1 h	N
X	4	01/06/1998	SS	01°18'N	46°31'W	muddy sand	240	19	30 min	N
Total								170		

Source: Authors.

Table 3: Classification of the relative abundance and their frequency of occurrence of the giant isopods captured in the two study sectors (NS and SS) of the Amazon continental shelf during the Northern REVIZEE Score program (1996-1998).

Sector	Specie	Relative abundance (%)	Classification	Frequency relative (%)	Classification
NS	*B. giganteus*	25.27	uncommon	88.89	very frequent
	B. miyarei	74.73	dominant	100.00	very frequent
SS	*B. giganteus*	32.91	abundant	80.00	very frequent
	B. miyarei	67.09	dominant	80.00	very frequent

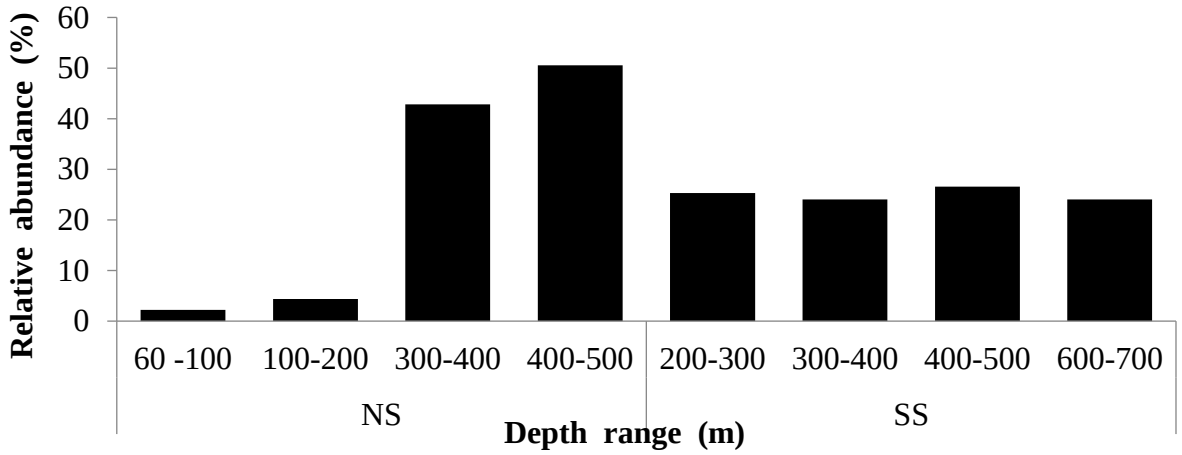
Source: Authors.

Table 4: The number of isopod specimens collected in the two study sectors (NS and SS) using the bottom shrimp trawl nets during the Northern REVIZEE Score program between 1996 and 1998.

Number of individuals			
NS	**SS**	**Total**	**χ^2**
91	79	170	0.85

Source: Authors.

Figure 3: Distribution of the number of the giant *Bathynomus giganteus* and *B.miyarei* in different depth classes in the northern (NS) and southern (SS) sectors of the Amazon continental shelf. The specimens were captured using the bottom shrimps trawls nets dutring the REVIZEE-Score Program (1996-1998).

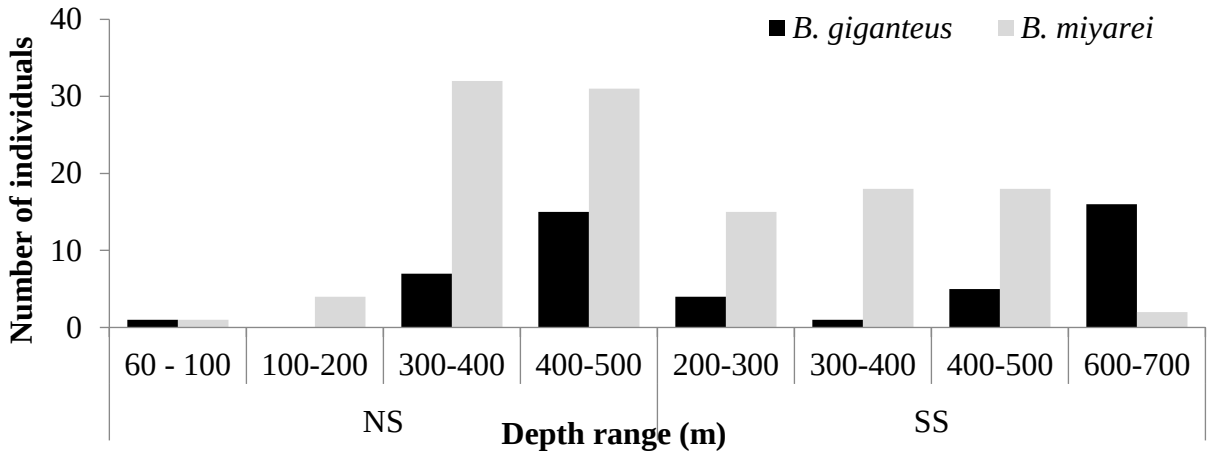


Source: Authors.

Larger numbers of *B. giganteus* were collected at depths of below 400 m and 500 m in the northern sector and between in the southern sector 600 m and 700 m, whereas *B. miyarei*

was more abundant at depths of below 300 m and 400 m in the northern sector and between 300 m and 500 m in the southern sector (Figure 4).

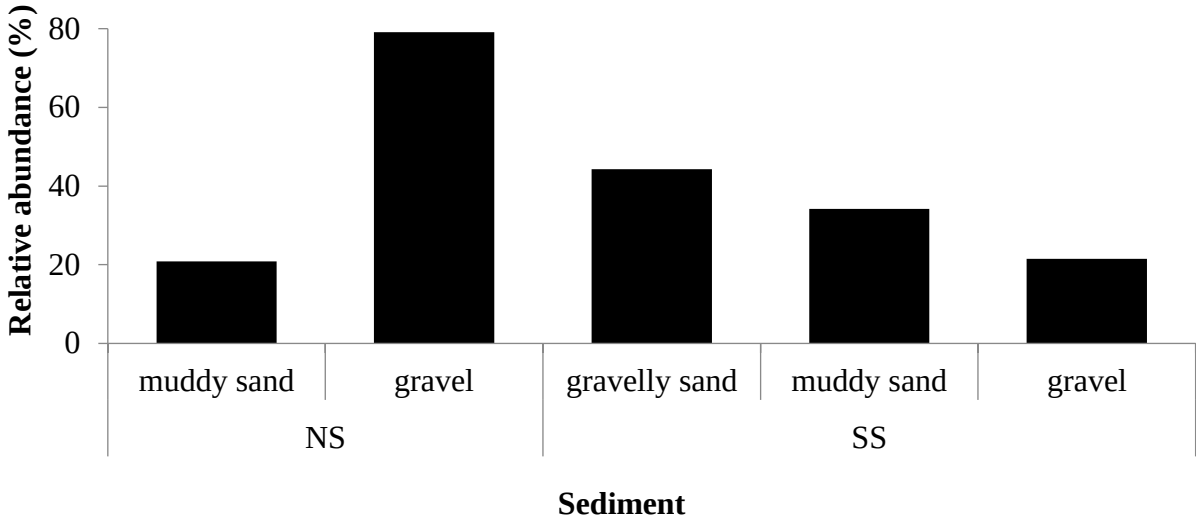
Figure 4: Distribution of the number of giant isopods *Bathynomus giganteus* and *B.miyarei* in different types of sediment in the northen NS and southern SS sectors of the Amazon continental shelf. The specimens were captured using the bottom shrimp trawl nets during the Northern REVIZEE Score program (1996-1998).



Source: Authors.

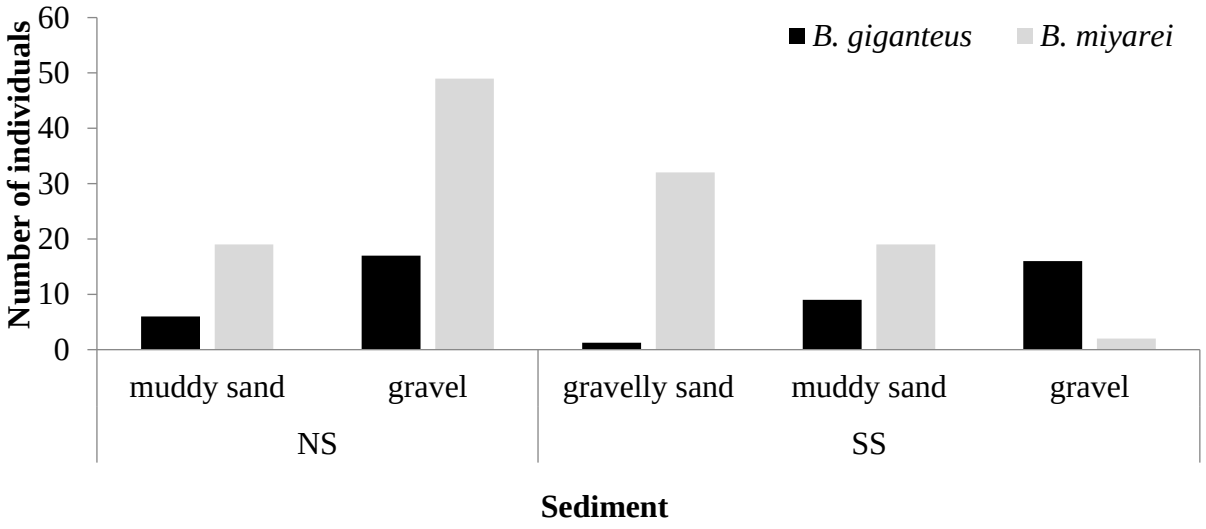
The isopods were found primarily over gravel bottoms in the northern sector of the study area, but were associated with gravelly sand in the southern sector (Figure 5). While *B. giganteus* preferred gravel bottoms in both sectors, *B. miyarei* was associated with gravel in the northern sector, and gravelly sand in the southern sector (Figure 6). Both species were more abundant in the northern sector of the study area during the dry season, but were more abundant during the wet season in the southern sector (Figure 7). The two species also preferred the dry season in the northern sector, and the rainy season in the southern sector (Figure 8).

Figure 5: Relative abundance of *Bathynomus* isopods captured in sediments in the NS and SS using the bottom shrimp trawl nets during the Northern REVIZEE Score program between 1996 and 1998.



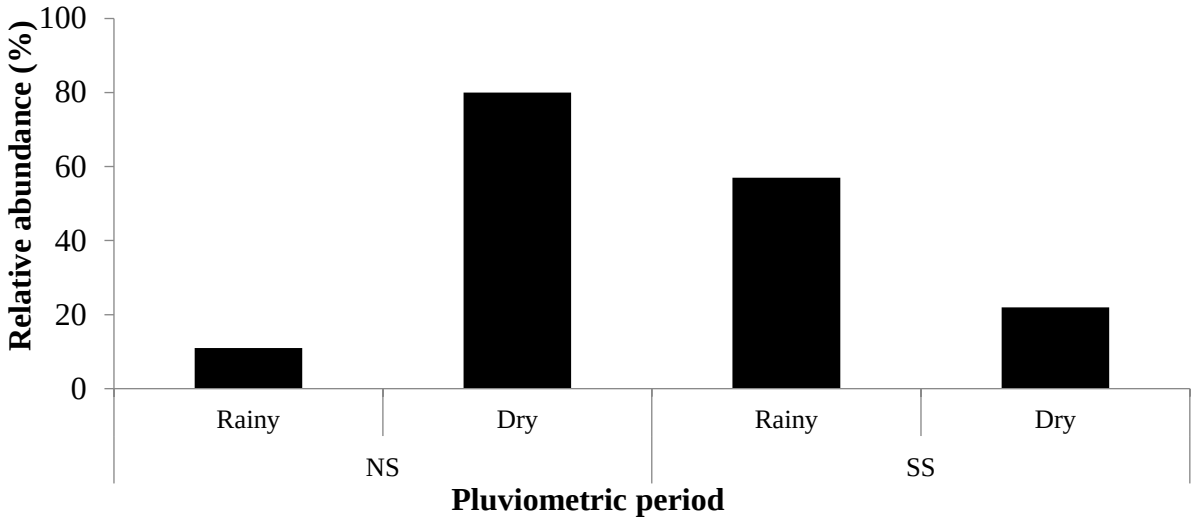
Source: Authors.

Figure 6: Number of *Bathynomus* specimens captured on different types of sediment in NS and SS in bottom shrimp trawl nets during the Northern REVIZEE Score program (1996-1998).



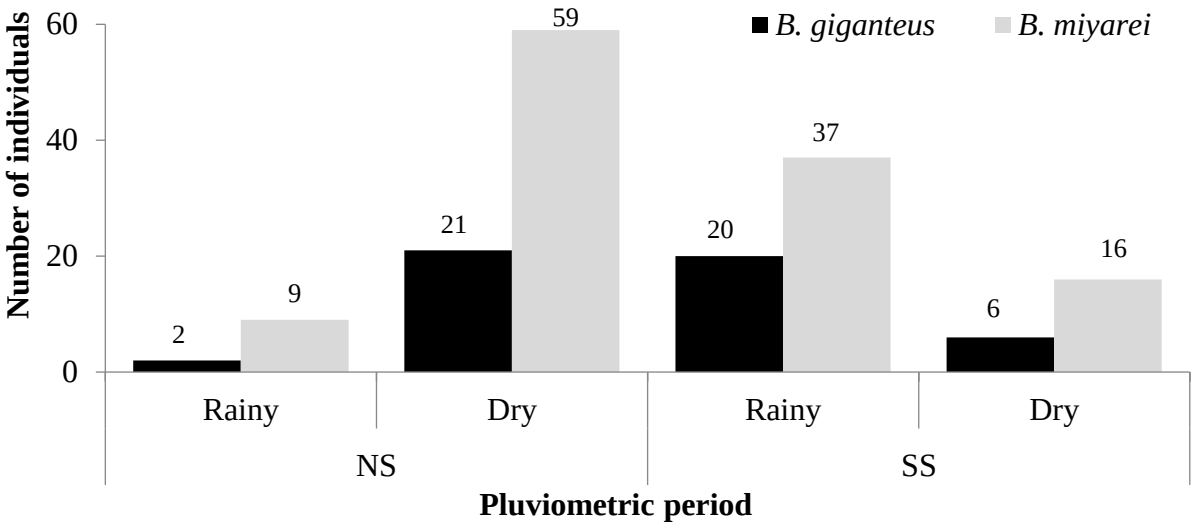
Source: Authors.

Figure 7: Relative abundance of the two isopod species collected during the different seasons in the two study sectors (NS and SS) using the bottom shrimp trawl nets during the Northern REVIZEE Score program (1996-1998).



Source: Authors.

Figure 8: Number of specimens of the two *Bathynomus* species captured using the bottom shrimp trawl nets during the Northern REVIZEE Score program (1996-1998) during the rainy and dry seasons in the two survey sectors.



Source: Authors.

A total of 15 female *B. giganteus* were collected in the northern sector of the study area, and six in the southern sector. The smallest female was collected in the northern sector, and the largest in the southern sector. All six males were collected in the northern sector (Table 5). It was not possible to sex two specimens from the northern sector, whereas a total of 19

individuals from the southern sector were not sexed. Only one female with a marsupium was collected in the southern sector, at a depth of 429 m, on a muddy substrate during the rainy season.

Table 5: Descriptive statistics for *Bathynomus giganteus* and *Bathynomus miyarei* captured in the two study sectors (NS and SS) using the bottom shrimp trawl nets during the Northern REVIZEE Score program (1996-1998).

Specie	Sector	Female					Male				
		Min.	Average	Max.	Standart deviation	N	Min.	Average	Max.	Standart deviation	N
B. giganteus	NS	5.02	15.77	25.44	8.11	15	9.6	13.63	22	5.53	6
B. giganteus	SS	7.16	16.36	27.00	7.29	6					
B. miyarei	NS	5.30	9.03	14.30	2.64	33				2.4	1
B. miyarei	SS	4.42	9.84	17.04	3.83	18					

Source: Authors.

In the case of *B. miyarei*, 33 females were captured in the northern sector, and 18 in the southern sector. The smallest and largest females were both collected in the southern sector. Only a single male was identified, in the northern sector (Table 5), although a much larger number of specimens – 29 in the northern sector and 35 in the southern sector – were not sexed, in comparison with *B. giganteus*.

4. Discussion

The two giant isopod species, collected during the present study, belong to the suborder Flabellifera Sars, 1882, the family Cirolanidae Dana, 1852 and to the genus *Bathynomus* A. Milne-Edwards, 1879. Isopods belonging to four suborders were collected during the Central REVIZEE Program, of which Anthuridea was the most abundant (47.9%), followed by Asellota (28%), Flabellifera (24%) and Valvifera, with only 0.1% (Serejo et al., 2006). Anthuridea contains approximately 500 known species, while Asellota includes 2037 species, and Flabellifera, 1897 (Schotte et al., 1995).

Relatively large number of these species were collected during the Central REVIZEE/Score Program between Salvador, in the Brazilian state of Bahia (13°S) and the region of Cape de São Tomé, in the Rio de Janeiro state, at 22°30'S (Serejo *et al.* 2006). These authors reported that, prior to this survey, only two species (*B. giganteus* and *B. miyarei*) were

known to occur off the Brazilian coast, and that a new species (Bathynomus obtusus Magalhães & Young, 2003) was found, which is endemic to the states of Bahia and Espírito Santo, at depths of between 232 m and 840 m. While this species has not yet been collected in northern Brazil, it seems possible that it may be encountered in future studies of deep water environments.

Both the species recorded in the present study could be classified as very frequent, with values of over 70% in both sectors. At other Brazilian sites, these species were considered to be sporadic (below 19.9%), as confirmed by (Severino-Rodrigues et al., 2007) during a survey of the diversity of the catches of bottom-trawl fishery operations targeting the langoustine, *Metanephrops rubellus* (Moreira 1903).

In the present study, the specimens were captured at typical depths for the genus, *Bathynomus* Milne Edwards, 1879, which normally inhabits relatively deep ocean environments. These isopods can be found at depths of between 22 m and 2140 m, although they are most abundant between 310 m and 1280 m (Loyola e Silva, 1999). On the Brazilian coast, they are relatively common on the slope of the continental shelf (Magalhães & Young, 2003). Serejo et al., (2006) report the sampling of species of this genus at depths of between 233 m and 2271 m from Bahia to northern Rio of Janeiro states, during the Central REVIZEE/Score program.

B. giganteus is found in the Indian, Pacific and western Atlantic oceans, in the latter case, between Florida and Brazil (Serejo et al., 2006). Similar to the present study, Cintra et al. (1998) captured the species at depths of between 356 m and 458 m off Amapá, and 320-621 m off Pará in northern Brazil.

Loyola e Silva (1999) concluded that *B. miyarei* occurs throughout Brazilian shelf and slope. The species was collected previously at depths of 312-458 m in the Amapá coast, and 320 m in the Pará coast (Cintra et al., 1998), although it was captured in shallower waters in the Northeast, in Ceará (80 m) and Rio Grande do Norte (22 m). At the southernmost point of the country (Rio Grande do Sul), the species was collected at a depth of 280 m (Loyola e Silva, 1999). Serejo et al. (2006) also reported the species from the states of Bahia, Espírito Santo, and Rio de Janeiro, at depths of between 230 m and 800 m.

Both isopod species studied here tended to prefer the dry season in the northern sector of the study area, that is, between June and December, when the plume of the discharge of the Amazon River is at its minimum level (Lentz, 1995). During this period, wind-generated waves represent an important factor in the dynamics of the waters of the Amazon continental shelf, causing an intense mixing of oceanic waters and the fluvial discharge of the Amazon, resulting

in reduced salinity close to the mouth of this river, even when its discharge is at its lowest level (Silva et al., 2001).

In the southern sector, by contrast, both *B. giganteus* and *B. miyarei* appear to prefer the rainy season, when the plume formed by the discharge of the Amazon reaches it maximum levels, in particular between March and May (Lentz, 1995). The region of the Amazon continental shelf does not have a clearly-defined dry season, although rainfall levels decline steadily during the second half of the year, reaching minimum levels in October or November, resulting in a reduction in the fluvial discharge of the Amazon. This results in an increase in the salinity of the inner continental shelf in comparison with the rainy season, even though a wedge of brackish water is still formed over the oceanic water (Silva et al., 2001).

In some isopod groups, the males are much smaller than the females (Loyola e Silva, 1999), but retain the normal isopod form, whereas the much larger females tend to develop considerable (parasitic) distortions of bodily proportions. Male *B. miyarei* from Rio Grande do Sul were 19.5-28 cm in length, whereas a male of 21 cm was collected off Ceará (Acaraú) and one of 17 cm off Natal, in Rio Grande do Norte (Loyola e Silva, 1999). As only one male was captured in the present study, it is only possible to conclude that the maximum size of the males of this species was lower than that recorded in Rio Grande do Sul.

The specimens collected in the present study were consistent with the known size of *Bathynomus* isopods, which may reach a length of 35 cm (Magalhães & Young, 2003). The largest females of both species were collected in the southern sector of the study area, and males exclusively in the northern sector, although the small size of the sample did not permit a more systematic analysis of this distribution.

5. Conclusion

In this study, the isopods *Bathynomus giganteus* and *Bathynomus miyarei* were recorded, being the second most abundant. It is noted that the distribution of both species is uniform in the studied sectors, being present in gravel bottoms in the northern sector of the study area, but were associated with sandy sand in the southern sector.

Both species were more abundant in the northern sector of the study area during the dry season, but were more abundant during the wet season in the southern sector. The two species also preferred the dry season in the northern sector, and the rainy season in the southern sector.

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