

STOMATOPODA AND DECAPODA ANOMURA ALONG THE NORTHEAST-BRAZILIAN CONTINENTAL SHELF AND SLOPE

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RESUMO

Stomatopoda e Decapoda Anomura da Plataforma e Talude Continental do Nordeste do Brasil

Crustacea Stomatopoda e Anomura (Paguridea, Galatheidea, Hippidea) foram coletados na plataforma e talude continental do Nordeste brasileiro (04° 05 ' a 07°42 ' S - 34°43 ' a 37°35 ' W) para avaliar sua diversidade taxonômica e sua distribuição. Amostragens foram efetuadas durante o Joint Oceanographic Projects-II Pernada 6 de 3 a 27 de março de 1995. Os espécimes e os sedimentos superficiais foram coletados com uma draga equipada com uma rede de 0,5cm tamanho de malha e sacos laterais para reter o sedimento. Dados abióticos (profundidade, sedimento, pH, salinidade e temperatura) foram obtidos simultaneamente. Onze espécies pertencentes a sete famílias foram identificadas. Cinco espécies pertencem às famílias Gonodactylidae, Diogenidae, Paguridae e Porcellanidae ocorreram na estação 14 (49m de profundidade, no sedimento de areia-cascalhosa). Cinco espécies pertencem às famílias Gonodactylidae, Pseudosquillidae, Diogenidae, Paguridae e Galatheidae ocorreram na estação 5 (200m profundidade, fundo de areia-lamosa). Três espécies das famílias Pseudoesquilidae, Diogenidae e Porcellanidae foram registradas na estação 10. Duas espécies ocorreram nas estações 6 e 13. Cada uma das demais estações apresentou uma espécie. *Pseudosquilla ciliata*, *Dardanus venosus*, *Pagurus brevidactylus*, *Clibanarius foresti*, *Pachycheles ackleianus*, *Gonodactylus bredini* e *Munida irrasa* podem ser consideradas euribáticas e euri térmicas. *Munida irrasa* e *Clibanarius foresti* foram registradas pela primeira vez para o Nordeste do Brasil e *Dardanus venosus* tem ocorrência também para o Estado da Paraíba.

Palavras chave: Crustacea; Stomatopoda; Decapoda; Nordeste; Brasil.

ABSTRACT

Crustacea Stomatopoda and Decapoda Anomura (Paguroidea, Galatheoidea, Hippoidea) were collected at the continental shelf and slope of Northeastern Brazil (04° 05 ' to 07°42 ' S - 34°43 ' to 37°35 ' W) to assess their taxonomic diversity and distribution. Samplings were carried out during the Brazilian-German Joint Oceanographic Projects – II (Leg 6) from March 3rd to 27th, 1995. The specimens and superficial sediments were collected with a dredge equipped with a net of 0.5cm mesh size and lateral sacks to retain the sediment. Abiotic data (depth, sediment, pH, salinity and temperature) were obtained simultaneously. Eleven species belonging to seven families were identified. Five species belonging to the families Gonodactylidae, Diogenidae, Paguridae and Porcellanidae occurred at station 14 (49m depth, gravel-sand sediment). Five species belonging to

the families Gonodactylidae, Pseudosquillidae, Diogenidae, Paguridae and Galatheididae occurred at station 5 (200m depth, muddy-sand bottom). Three species of the families Pseudosquillidae, Diogenidae and Porcellanidae were registered to station 10. Two species occurred at stations 6 and 13. Others stations presented each one species. *Pseudosquilla ciliata*, *Dardanus venosus*, *Pagurus brevidactylus*, *Clibanarius foresti*, *Pachycheles ackleianus*, *Gonodactylus bredini* and *Munida irrasa* can be considered euribatics and euritermics. *Munida irrasa* and *Clibanarius foresti* are registered for the first time in Rio Grande do Norte State and *Dardanus venosus* had its occurrence enlarged for Paraíba State.

Key words: Crustacea; Stomatopoda; Decapoda; Northeastern; Brazil

INTRODUCTION

The JOPS-II (Joint Oceanographic Projects) was a five month seagoing expedition aboard the German research vessel "Victor Hensen" in the Southwest Atlantic during austral Summer 1994/1995. This project was conducted as part of the Brazilian-German Bilateral Agreement on Science and Technology. The project was composed by 9 Legs, the cruise objectives of JOPS-II leg 6 being (1) the reconstruction and the Late Quaternary development of the North Brazil Current; (2) Quaternary reconstruction of the courses of the rivers on the continental shelf and slope and determination of recent input of the suspended matter and superficial sediments from rivers off Brazilian Northeastern Coast; and (3) to study the distribution and living conditions of benthic species on the Brazilian Northeastern continental shelf and slope, with special attention to the crustaceans and mollusks.

Stomatopod and decapod crustaceans have been well studied in Brazil (Rodrigues da Costa, 1962; Coelho, 1967/69; Coelho and Ramos, 1972; Coelho *et al.*, 1977/78; 1980; Coelho, *et al.* 1983,1986; Gomes-Correa, 1986; Calado, 1987; 1996; Barreto *et al.*, 1991/93; 1993 and Melo, 1999 among others) although no detailed studies had been done relating the species distribution and bionomy to the sediment variables in the continental shelf and slope.

This research was carried out to assess the taxonomy and geographical distribution of the Crustacea Decapoda Anomura and Stomatopoda and to relate them to the sediment variables along the Northeastern Brazilian continental margin.

AREA DESCRIPTION

The region surveyed is situated between 4° to 8°S and 34° to 39°W and it is characterized by a high variability in shelf width which ranges from almost 100 Km off Fortaleza to about 15-30 Km between Natal and Recife in the southern part. The upper slope is steep and narrow. The continental shelf is mostly shallower than 40 m, except northwest of Natal where much of it is shallower than 20 m while its edge is about 60-70m deep (Tintelnot e Morais, 1996). This reduced width seems to be related to low continental erosion rates and the narrow marine sedimentation zone (Summerhayes *et al.*, 1976). The shallow depth is attributed to inefficient marine erosion processes during the Pleistocene, and to recent uplift (Mabesoone, 1994).

The shelf area has a rather flat surface regulated by erosion and deposition processes. The relief features of the shelf have for the greater part been shaped through reworking of the mobile components of its sedimentary cover. Existing sand banks transversal or oblique to the coastline have been interpreted as consequence of this coastline retreat together with the action of the ocean during the Holocene transgression (Ponte and Asmus, 1978).

Variations in climatic and oceanographic conditions in this region are responsible for a geographic division into two parts. The northern part is exposed to a semi-arid climate. The coast is more or less straight and depositional, with beach ridges and sand dunes (some sandy beaches are

backed by extensive dune fields) alternating with lagoons and salt marshes. Between Natal and Recife, under humid tropical conditions with annual rainfall of 1000 to 2000 mm and a lengthy dry summer season, the coast shows cliffs cut into the Barreiras Group and beach ridge plains with some sand dunes (Tintelnot and Morais, 1996).

In relation to the benthic ecosystems the area was defined by Kempf (1979) as a tropical Brazilian region, characterized by the occurrence of hermatypic corals, mangrove forests, seagrass beds and vermetid reefs on the shallow areas.

MATERIAL AND METHODS

The sampling took place from 13/03 to 26/03/1995 on Board “Victor Hensen”, in an area extending from Fortaleza to Recife along the northeastern coast of Brazil. To collect the benthos samples, a dredge was used at 11 stations, with one town per station (fig. 1). The dredge was composed by a net of 0,5 cm mesh size for the macrofauna, and by two lateral sacks to retain the sediment. The macrofauna samples were conditioned in plastic sacks and preserved in 75% alcohol. In laboratory, crustaceans were sorted and identified under a stereomicroscope using specialized literature as Gomes-Correa (1986), Calado (1987), Barreto *et al.* (1993) and Calado (1996).

To obtain hydrological data (pH, conductivity and water temperature) a CTD Transect (Conductivity-Temperature-Deep-Transect) was used.

The granulometric fractions were determined by mechanical sieving and sedimentation method according to Kempf *et al.* (1970).

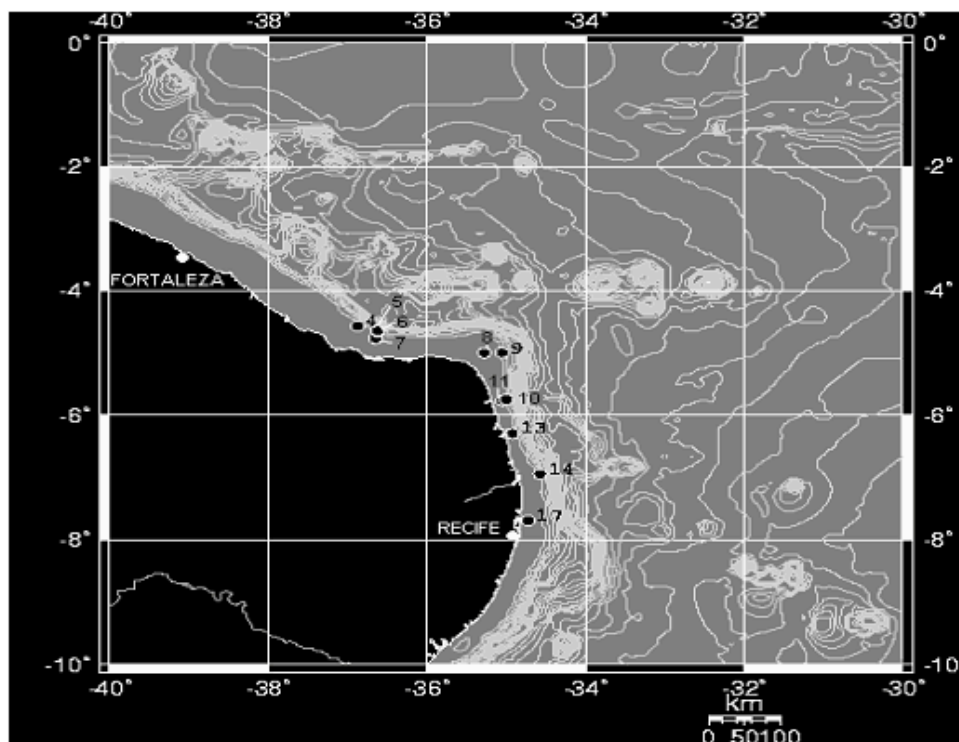


Figure 1– Northeast-Brazilian continental shelf and slope station Map.

RESULTS

The Stomatopod and anomuran crustaceans were represented by 11 species distributed in 7 families belonging to 2 orders: Stomatopoda with 2 families and 4 species and Decapoda with 5 families and 7 species (table 1). The stations data, species and abiotics factors are also table 2.

Table 1– Species by dredge.

SPECIES	STATION
<i>Gonodactylus bredinni</i> Maning, 1969	05 (2 F)
<i>Gonodactylus minutus</i> Maning, 1969	06(1M),13(1M), 14(1M, 1F)
<i>Gonodactylus torus</i> Maning, 1969	17(1F)
<i>Pseudosquilla ciliata</i> (Fabricius, 1787)	04(2M), 05(1M), 06(2M,1F),09(2F),10(1F)
<i>Clibanarius foresti</i> Holthuis, 1959	05(fragments), 13(2M)
<i>Dardanus venosus</i> (H. Milne-Edwards,1848)	08 (1F); 10(1M), 14(1F)
<i>Pagurus brevidactylus</i> (Stimpson, 1859)	05(1M, 1ovigera F), 11(1F), 14(1M,1F)
<i>Munida irrasa</i> A. Milne Edwards,1880	05(2M, 5F).
<i>Pachycheles ackleianus</i> A. Milne Edwards, 1880	10(1F), 14(2F)
<i>Pachycheles rugimanus</i> A. Milne Edwards, 1880	14(2F)
<i>Albunea paretii</i> Guérin-Ménéville, 1853	07(1F)

F = female, M = male

Pseudosquilla ciliata presented widest distribution (stations 04, 05, 06, 09 and 10) between 60 and 330 meters depth and from 08.43°C to 28.36°C. *Dardanus venosus* was the second most important species occurring in the stations 08, 10 and 14, from 20 to 330 meters depth and from 8.43° to 28.55° C. *Pagurus brevidactylus* occurred in stations 05, 11 and 14, between 20 to 200 meters depth and temperature between 11.89° and 28.36°C.

Station 05 presented the largest number of species and specimens *Pseudosquilla ciliata* (1), *Gonodactylus bredini* (2), *Clibanarius foresti* (1), *Pagurus brevidactylus* (1) *Munida irrasa* (8); followed by station 14 *Gonodactylus minutus* (2), *Dardanus venosus* (1), *Pagurus brevidactylus* (2), *Pachycheles ackleianus* (2), *P. rugimanus* (2). Stations 05 and 14 presented the largest number of species, the earlier out numbering in specimens also. *Pseudosquilla ciliata*, *Dardanus venosus*, *Pagurus brevidactylus*, *Clibanarius forestii*, *Pachycheles ackleianus*, *Gonodactylus bredini* and *Munida irrasa* are euribatic and euritermic.

Munida irrasa and *Clibanarius foresti* had their first occurrence registered for Northeast Brazil and *Dardanus venosus* had its occurrence enlarged to Paraíba State.

Table 2 – Station position and species habitat characteristic.

St.	D (m)	Lat. S	Long. W	Temp °C	Sal. ppt	pH	Sediment	Species
4	70	4° 34'	36° 53'				sandy-gravel	<i>Pseudosquilla ciliata</i>
5	200	4° 39'	36° 36'	11.89	34.84	9.3	muddy-sand	<i>Gonodactylus bredini</i> <i>Pseudosquilla ciliata</i> <i>Clibanarius forestii</i> <i>Munida irrasa</i>

St.	D (m)	Lat. S	Long. W	Temp °C	Sal. ppt	pH	Sediment	Species
6	60	4° 40'	36° 37'	28.00	35.6	7.8	calcareous	<i>Pagurus brevidactylus</i> <i>Gonodactylus minutus</i> <i>Pseudosquilla ciliata</i>
7	21	4° 46'	36° 39'	28.46	36.43	7.72	sandy	<i>Albunea paretii</i>
8	20	5° 00'	35° 17'	28.55	36.74	7.69	gravelly- sand	<i>Dardanus venosus</i>
9	62	5° 00'	35° 03'	27.35	36.72	7.76	sandy-gravel	<i>Pseudosquilla ciliata</i>
10	330	5° 45'	35° 00'	8.43	34.42	9.7	muddy-sand	<i>Pseudosquilla ciliata</i> <i>Dardanus venosus</i> <i>Pachycheles ackleiamus</i>
11	20	5° 46'	35° 03'				gravelly	<i>Pagurus brevidactylus</i>
13	20	6° 18'	34° 55'	29.17	36.96	7.62	sandy-gravel	<i>Gonodactylus minutus</i> <i>Clibanarius foresti</i>
14	49	6° 57'	34° 34'	28.36	37.03	7.66	gravelly- sand	<i>Gonodactylus minutus</i> <i>Dardanus venosus</i> <i>Pagurus brevidactylus</i> <i>Pachyclelesa</i> <i>ackleiamus</i> <i>Pachycheles rugimanus</i>
17	20	7° 42'	34° 43'	29.01	36.90	7.58	muddy-sand	<i>Gonodactylus torus</i>

St. = station; D = depth; temp.= temperature; sal = salinity; F= female; M= male

DISCUSSÃO

The sediments in the studied area showed a predominance of gravelly-sand sediment with a calcareous dominance, being the terrigenous sediments confined to the inner shelf stations, especially off river mouths. Although most of the sampling was carried out in gravelly-sand sediments, the largest number of species occurred in muddy-sand sediments. Geological studies carried out in this area by Tintelnot e Morais (1996) showed that sedimentation on the narrow and shallow NE-Brazil continental shelf reflects the source of geology, climate, drainage and tectonic setting; partly, tropical climate along a narrow coastal belt and arid hinterland conditions, resulted in negligible terrigenous sedimentation, being responsible for the biogenic carbonates dominating most parts of the middle shelf and the entire outer shelf regions. These carbonate sediments are predominately recent calcareous algae, with *Halimeda* and branching corallines.

Gonodactylus bredini was found in muddy-sand sediment in a depth of 200m, being considered euribatic. Gomes - Corrêa (1986) considered this species estenobatic as specimens were only found in shallow waters. On the other hand, *Gonodactylus torus* which was collected at 20m depth on muddy-sand sediment was registered by Gomes - Corrêa (1986) as euribatic, with occurrence on hard bottom from shallow waters up to 125m depth. In relation to *Gonodactylus minutus* occurring between 20 and 60 m on calcareous, gravelly-sand and sandy-gravel sediment, Gomes - Corrêa (1986) registered a wider depth range from 12 to 95m depth on all bottoms, except mud bottom. These results show that is more sampling effort necessary to characterize the distribution of these species.

Gomes - Corrêa (1986) cited *Pseudosquilla ciliata* (from 15 to 540 m depth), on several bottoms types agreeing with the data for these species in the present study.

Munida irrasa occurred in muddy-sand sediment at 200m of depth, being it the first occurrence in Rio Grande do Norte State. Melo (1999) cited this species for Southeastern Brazil in depths ranging from 15 to 475m and to Maranhão state.

Pachycheles rugimanus occurred at 49m depth on gravelly-sand sediment. According to Melo (1999) this species occurs down to 150m.

Clibanarius foresti occurred from 20 to 200m depths in muddy-sand and sandy-gravel sediment, being registered by the first time to Rio Grande do Norte. *C. foresti* was cited to Maranhão by Coelho (1967/69). Melo (1999) registered *Clibanarius foresti* in shallower depth (down to 75m) generally on muddy bottoms.

Albunea paretii was registered in shallow waters in Northeastern Brazil (21m depth). Similar data was found by Melo (1999), which registered *Albunea paretii* occurring from shallow waters down to 38m depth.

Dardanus venosus occurred off Rio Grande do Norte and Paraíba, enlarging this species distribution in Northeastern Brazil. This species was registered by Coelho and Ramos Porto (1987) for Paraíba State and by Melo (1999) only to Rio Grande do Norte State.

ACKNOWLEDGMENTS

Our special thanks to ZMT, Bremen and the Alfred-Wegener-Institute, Bremerhaven, which organized the JOPS II aboard the Victor Hensen Vessel. Thanks also to FACEPE, that supported part of this research.

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