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COASTAL HUNTER-GATHERERS FISHING FROM THE SITE RS-AS-01, ARROIO DO SAL, RIO GRANDE DO SUL, BRAZIL

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RESUMO

Foi realizada a análise dos vestígios arqueofaunísticos recuperados do sítio RS-AS-01 – Sambaqui Praia do Paraíso, localizado em Arroio do Sal (RS). O Número de Espécimes Identificados (NISP) foi calculado em 14.864 unidades distribuídas entre moluscos, equinodermos e vertebrados. O molusco *Mesodesma mactroides* (Deshayes, 1854) (marisco-branco) foi a espécie dominante em todos os níveis estratigráficos com um NISP de 9888, sendo seguida por *Donax hanleyanus* Philippi, 1847 (maçambique) com NISP = 1255. Dentre os vertebrados, os peixes apresentaram o maior número de peças identificadas, sendo representados em maior número pelas espécies *Genidens* sp. (Bagre Guri, NISP = 178), *Pogonias chromis* (Linnaeus, 1766) (Miraguaia, NISP = 151), *Menticirrhus littoralis* (Holbrook, 1847) (Papa-terra, NISP = 33) e *Micropogonias furnieri* (Desmarest, 1823) (Corvina, NISP = 29). Outras espécies com menor representação incluem *Paralonchurus brasiliensis* (Steindachner, 1875) (Maria-Luiza, NISP = 1), *Macrodon* sp. (Pescada, NISP = 1), *Cynoscion* sp. (Pescada, NISP = 2), *Mugil* sp. (Tainha, NISP = 8), *Paralichthys* sp. (Linguado, NISP = 6), *Urophycis* sp. (Abrótea, NISP = 4), duas espécies dulcícolas dos gêneros *Hoplias* (Traíra, NISP = 1) e *Microglanis* (Bagrinho malhado, NISP = 1), vértebras de Chondrichthyes e placas dentígeras de Myliobatidae. Foram também identificados fragmentos de carapaça pertencentes a Testudines (tartarugas ou cágados), um grande número de fragmentos ósseos de mamíferos sendo alguns desses fragmentos pertencentes à família Dasypodidae (tatu) e quatro unidades identificadas como *Blastocerus dichotomus* (Illiger, 1845). A análise tafonômica demonstrou a predominância dos eventos de quebra e baixo percentual de peças com indício de ação do fogo. A estimativa das dimensões corporais, com base nos otólitos das espécies de peixes com maior número de indivíduos, resultou em: *Genidens* sp. (Bagre Guri) = 92-290 mm, *Menticirrhus littoralis* (Papa-terra) = 54-399 mm e *Micropogonias furnieri* (Corvina) = 61-303 mm. Considerando dados atuais em relação às dimensões de armadilhas e redes, do comprimento e formato corporal dos espécimes, os dados obtidos conduzem à hipótese do uso de redes com malha padronizada, uma vez que as dimensões estimadas encaixam-se nos modelos previstos para esse método de pesca. A técnica utilizada para estimativa demostrou-se mais robusta que o uso

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de fórmulas genéricas ou estimativa de peso, uma vez que ambas podem trazer desvios que se tornam inconvenientes para a interpretação das tecnologias de pesca em contextos pré-históricos.

Palavras-chave: Zooarqueologia, Ictioarqueologia, Sambaquis.

ABSTRACT

An analysis of the archaeofauna remains recovered in the site RS-AS-01 – Sambaqui Praia do Paraíso, located in Arroio do Sal (RS) was made. The Number of Identified Specimens (NISP) was calculated as 14,864 units distributed between molluscs, echinoderms and vertebrates. *Mesodesma mactroides* (Deshayes, 1854) (yellow clam) was the dominant species in all the stratigraphic levels with a NISP = 9888, followed by *Donax hanleyanus (*Philippi, 1842) (wedge clam) with a NISP = 1255. In the vertebrates, fish present the highest number of identified pieces, being represented mainly by the species *Genidens* sp. (Guri sea catfish, NISP = 178), *Pogonias chromis* (Linnaeus, 1766) (Black drum, NISP = 151), *Menticirrhus littoralis* (Holbrook, 1847) (Kingcroaker, NISP=33), *Micropogonias furnieri* (Desmarest, 1823) (Whitemouth croaker, NISP = 29) and other species with lower representativeness: *Paralonchurus brasiliensis* (Steindachner, 1875) (Banded croaker, NISP = 1), *Macrodon* sp. (King weakfish, NISP = 1), *Cynoscion* sp. (Stripped weakfish, NISP = 2), *Mugil* sp. (Mullet, NISP = 8), *Paralichthys* sp. (Flounder, NISP = 6), *Urophycis* sp. (Brazilian codling, NISP = 4); two freshwater species *Hoplias* sp. (Traíra, NISP = 1) and *Microglanis* sp. (NISP = 1); Chondrichthyes vertebrae and Myliobatidae dentigerous plates. Testudines (turtles or tortoise) fragments of carapace were identified, as well as a great number of mammal bone fragments, some belonging to the family Dasypodidae (armadillo), and four units identified as *Blastocerus dichotomus* (Illiger, 1845). The taphonomic analysis demonstrated the dominance of breaking events and low percentage of parts with fire action clue. The estimation of body size based on otoliths of fish species with a larger number of individuals resulted in: *Genidens* sp. (Guri sea Catfish) = 92-290 mm, *Menticirrhus littoralis* (Kingcroaker) = 54-399 mm and *Micropogonias furnieri* (Whitemouth croaker) = 61-303 mm. Current data regarding the dimensions of traps and nets, length and body shape of the specimens, lead to the assumption of the use of nets with standard mesh, once the estimated dimensions fit into the prescribed models for this fishing method. The technique used to these estimates demonstrated to be more robust than using generic formulas or weight estimation since both can bring strong bias to interpret fishing technology in prehistoric contexts.

Key words: Zooarchaeology, ictioarchaeology, shell-mound.

INTRODUCTION

According to Gaspar et al. (2008) the term “Sambaqui” (shell midden) is applied to cultural deposits of various sizes and stratigraphies in which shells are the main constituents. These structures are distributed in the Brazilian coastline from the state of Espírito Santo to the state of Rio Grande do Sul. These authors emphasize that these structures become smaller from the state of Rio Grande do

Sul until Uruguay, gradually giving way to the "Cerritos" that are structures with a similar character but built with land.

Schmitz (2006) characterized the pre-ceramic archaeological sites formed by shell accumulations in two different groups: the first is denominated "Cultura Sambaquieira" (sambaqui culture) formed by accumulations of shells, vertebrates' bones and a big number of burials; although formed by shell accumulations the second group has small dimensions and is characterized by the absence of burials. The author also stresses out that some of these sites have lithic materials with characteristics similar to the ones found in the plateau.

Available dating for the north coastal Sambaquis of the Rio Grande do Sul indicate an occupation between 3,050 ± 40 (Sítio Marambaia 1) and 3,660 ± 40 A.P. (Balneário Atlântico 9), setting the beginning of the local pre-ceramic occupation (Rogge; Schmitz, 2010). Wagner (2012) lists the Sambaquis of Itapeva (3,130 ± 40 A.P. in its Base), Recreio (3,310 ± 40 A.P. in Layer 1 and 3,540 ± 50 A.P. in Layer IV), Arroio Seco (3,310 ± 40 A.P. in its Base), Figueira (3,660 ± 40 A.P. in its Base), Camping (3,420 ± 60 A.P. Layers III and IV), with the Dorva sambaqui presenting only one more recent dating (1,110 ± 40 A.P. 1,110 73cm – Base).

From a zooarchaeological perspective the organic materials do not represent simple zoological specimens but cultural elements part of human daily life. Under this perspective, several works with this type of site denoted the use of coastal resources as a supply source, hunting having a complementary role. The author considers the coastal settlements or "Sambaquis rasos" (flat or shallow shell middens) a less permanent form of occupation that, similarly to the Sambaquis, represent the adaptation of human groups to the coastal ecosystems in order to decrease their displacements, restraining their activities to a central supply area (Rosa 2006).

Orssich (1954) already stated that shells were actually Sambaquis building materials and that the great quantity of shells remains creates a false impression on the importance of molluscs in the shell middens inhabitants' diet. Later works, especially Figuti (1989, 1993); Figuti & Klökler (1996) and Rosa (2006), demonstrated that the amount of meat effectively useable in relation to the volume of remains left was larger for the vertebrates in relation to the molluscs. Rosa (2006) considers that the centralization in the gathering of molluscs would be of low efficiency in terms of energetic gain. Meanwhile, all the above mentioned scholars agree with the important role of these animals as a nutritional complement. Consequently, it is logical that the intensive exploitation of the mollusc banks occurred in a season when they were highly productive.

Taking into account the considerations on the consumption of molluscs *versus* vertebrates obtained through archaeofauna remains studies, Rosa (2006) drew a picture that describes the majority of settlements established in the southern coasts of Santa Catarina and north of Rio Grande do Sul as consisting in familiar groups travelling across the region. These groups were establishing themselves in the proximities of ponds, taking advantage of the more abundant resources during these settlements: "frequent exploitation of *Mesodesma mactroides* (Deshayes, 1854) together with freshwater and seawater fish,

complemented by the occasional capture of different terrestrial vertebrate species (reptiles, birds, mammals)" (Rosa, 2006: 279; translation from the Portuguese original).

Concerning the site RS-LC-82, Silva da Silva & Rosa (2006) indicated that the difference in the number of zooarchaeological remains between the pre-ceramic and ceramic layers suggested a longer permanence period for the first group.

According to Scott (1996), taphonomical analysis of a site might give information on its use and can even be an important component for the ethnical identification of a certain archaeological site. Other characteristic related to the Southern coastal archaeological sites, known as "Sambaquis rasos", is their taphonomical constancy: shells have a high fragmentation (possibly due to trampling) and the bones of mammals and birds are found intentionally fractured (Rosa, 2006).

Due to the variety of dimensions and living habits of the fishes registered in the sites that they studied, Figuti (1989, 1993) and Klökler et al. (2010) stated that the Sambaquis inhabitants used several fishing arts. This is one of the several reasons that indicate the specialization of the sambaqui societies in the exploitation of marine resources. Ethno-historical data show that the native fishermen of several South American cultures used a variety of fishing equipment: nets, harpoons, spears, siege and waiting traps, bow and arrows, hooks and ichthyotoxic (Souza, 1851), Koch-Grunberg (1908a, b), Steward (1946). Archaeological cultural artefacts associated to fishing found in sambaqui sites are hooks, nets weights and fusiform artefacts (Rohr, 1977; Prous, 1992; Franco, 1998, Tiburtius et al., 2011). However, the hypothesis of the use of fish nets by the inhabitants of the sambaqui archaeological sites has been a "peaceful spot" among archaeologists (Gaspar et al., 2008), no longer being discussed if used, but how manufactured and used (Peixe et al., 2007).

The amplitude of size and body weight of the fishes in natural accumulations tend to show a lesser selectivity than the culturally created (Butler 1993, 1996; Greenspan 1998; Lyman 1994; Stewart 1989, 1991; Zohar et al., 2001). Greenspan (1998) used that concept to estimate the diversity of fishing arts in sites located in the Harney river basin, Oregon State. According to the author, the size patterns generated by the capture of fishes with nets might be directly correlated with the size of the nets knots.

Assuming that the remains of analyzed fishes were uniformly preserved, estimates of the size of the individuals were made aiming to show possible inferences connected to their size in relation to the fishing methods that could have been used by the inhabitants of the site of the studied material provenance.

METHODOLOGY

The site sambaqui Praia do Paraíso, RS-AS-01 is a unicomponential pre-ceramic site, located in the Arroio do Sal municipality, Rio Grande do Sul, Brazil. Central coordinates UTM: 22J E:615474 N:6742318. It has an area of approximately 487 m^2 and a maximum height of 0.91 meters (Figure 1).

The archaeofauna materials from the square PT A and test pits B were studied. Square PT A was excavated in seven stratigraphic levels of 5 cm each, reaching 35 cm of depth, in which a total collection was made. The material was sorted and conditioned in plastic bags in sequentially numbered lots. These could contain one or more pieces and were identified with labels containing information related to the project, archaeological site and nature of the piece.

For the counting, the remains were separated based on morphology, identified to the lowest taxonomical level. Diagnostic pieces were denominated according to Reis & Malabarba (1998) and Schaefer (1987) for the osseous fish, and Reitz & Wing (1999) for the remaining groups identified. Species nomenclature followed REIS et al. (2006) for the mammals and Eschmeyer (2015) for the fishes.

For the quantification, the Number of Identified Specimens per Taxon (NISP) (Grayson, 1984) was used. After organized in tables this abundance measurement was transformed in relative abundance measurement of the species represented in the form of percentage calculation and in frequency tables.

Bones with presence of indicators and records of human activity were classified as bone artefacts following Prous (1992) and Reitz & Wing (1999). Human activities related to the bone remains were: filleting, disarticulation, boiling and fabrication of utensils (Lyman, 1994). Burnt, carbonized or calcinated remains were diagnosed based on the patterns of coloration of the burn according to Stiner et al. (1995) but without establishing degrees.

By using a digital caliper we determined the length in millimeters of the *lapillus* or *sagitae* otoliths of the fish species most common in the site. Measurements were used for the estimative of the specimen's size. Di Beneditto et al. (2001) formulae of linear regression were used to obtain the total length of *Menticirrhus littoralis* (Holbrook, 1847) (n = 27) and *Micropogonias furnieri* (n = 32) respectively. Reis (1986) exponential regression was used for the estimation of total lengths.

The intra-specific normality of the data was determined by using the Shapiro-Wilk W test. The comparison between the estimated dimensions of the different species was made through an ANOVA test (variance analysis) followed by a Tukey test. All the statistical calculations were made with PAST 3.1 software (Hammer et al., 2001).

RESULTS

630 lots of faunal material were separated corresponding to a total of 22.537 pieces. 16.542 fragments were identified to the species level, belonging to 23 species distributed in the phyla Mollusca, Echinodermata and Chordata (Table 1). Shells of marine bivalves represent the majority of the remains: *Mesodesma mactroides* (Deshayes, 1854) with 9888 pieces (Figure 2) and *Donax hanleyanus (*Philippi, 1842) with 1255 pieces (Figure 3). Both species are common in southern Brazil shell middens (Schmitz, 2006). Other five marine species were recorded: *Crassostrea* sp. (NISP = 1), *Cyrtopleura costata* (Linnaeus, 1758) (NISP = 1), *Olivancillaria contortuplicata* (Reeve, 1850) (NISP = 4), *Olivancillaria*

vesica auricularia (Lamarck, 1811) (NISP = 40, Figure 4), *Pachycymbiola brasiliana* (Lamarck, 1811) (NISP = 3, Figure 5); one freshwater species: *Pomacea* sp. (NISP = 1); and a terrestrial species *Megalobulimus* sp. (NISP = 2).

Remains of ten species of marine fishes were identified: *Paralonchurus brasiliensis* (Steindachner, 1875) (NISP = 1), *Macrodon* sp. (NISP = 1), *Cynoscion* sp. (NISP = 2), *Micropogonias furnieri* (Desmarest, 1823) (NISP = 29) (Figure 7), *Menticirrhus littoralis* (Holbrook, 1847) (NISP = 33) (Figure 8), *Pogonias chromis* (Linnaeus, 1766) (NISP = 151) (Figure 9), *Mugil* sp. (NISP = 8), *Paralichthys* sp. (NISP = 6), *Genidens* sp. (NISP = 178) Figure 6), *Urophycis* sp. (NISP = 4). Two freshwater species were identified, namely *Hoplias* sp. (NISP = 1) and *Microglanis* sp. (NISP = 1). Chondrichthyes vertebrae, Myliobatidae dentigerous plates, remains of *Tupinambis* sp. (NISP=1) and *Blastocerus dichotomus* (NISP=4) were also identified.

Genidens sp. showed presumed sizes that vary between 92 and 291 mm, *Menticirrhus littoralis* between 55 and 399 mm, and *Micropogonias furnieri* between 61 and 303 mm (Figure 10).

The Shapiro-Wilk normality test demonstrated that normality exists in the standard sizes estimated for each species (Table 2); still, an inter-specific normality between *Genidens* sp., *Menticirrhus littoralis* and *Micropogonias furnieri* (Table 3) was not demonstrated.

TAPHOMICAL CHARACTERISTICS

The main taphonomical characteristic registered was the break of the material, varying between 42.6 and 98.49% (Table 4). A reduced number of burnt or carbonized materials occurred. Cut marks or wear indicators were also registered in the bone materials.

DISCUSSION

With the exception of *Macrodon* sp., *Cynoscion* and *Urophycis* sp., all other marine species registered are common inhabitants of the shallow part of the South Brazil coastline (Ramos; Vieira, 2001).

According to Araújo (1988) the abundance of Guri sea catfish of the genus *Genidens* in the Lagoa dos Patos did not had significant variations throughout the year. Nonetheless, the author understood that the species of that genus have density variations according to temperature variations. When the temperatures are lowest they tend to migrate to the interior of the pond and when the temperatures are higher they tend to get closer to the mouth of the estuary. The author also states that the catfishes of the genus *Genidens* form highly homogenous shoals in terms of individuals' size and age, increasingly migrating to the mouth of the estuary according to their development. In an estuarine system, this species might be captured during all the year, having diverse body dimensions. Nevertheless, their dimensions all bellow 400 mm in standard length do not demonstrated that they are individuals in a reproductive state, so they were not captured in the open sea.

Fishes of the genus *Menticirrhus* (Kingcroaker) are coastal marine with preferences from the surf zone of sandy or muddy beaches (Menezes &

Figueiredo, 1980; Carvalho-Filho, 1999). The species is one of the main components of the ichthyofauna from the sandy beaches and estuaries, although it has a higher occurrence during the hotter months of the year it has no seasonal occurrence but it is related to the tidal cycles (Ramos & Vieira, 2001; Braun & Fontoura, 2004; Félix-Hackradt et al., 2010).

Micropogonias furnieri is a marine species that uses the estuaries as a reproduction and growth environment, can form shoals that even step into the less brackish areas of estuaries. They are mainly recorded in coastlines with sandy or muddy beaches (Menezes & Figueiredo, 1980).

We have to emphasize that although currently rare, *Pogonias chromis* is very common in regional archaeological sites (Wagner, 2012; Rogge & Schmitz, 2010) and abundantly recorded in historical times (Von Ihering, 1885).

The freshwater species recorded (*Hoplias* sp. and *Microglanis* sp.) are commonly found in ponds, rivers and estuaries, but also in small streams and wetlands common in the existing coastal cord between the coastline and ponds (Malabarba et al., 2013).

Hilbert (2008) evidenced a synergetic relation between the ichthyofaunal species from the Barreira de Itapeva sites and the occupation levels, presenting almost every time a dominant species in the archaeological record. Still, we understood that *Genidens* sp. (Guri sea catfish) is a species present in all the records and *Mugil* sp. (mullet) particularly in the beginning of the sites formation and in the sites near to the shoreline. The author also concluded that “The combination of the main species caught (mullet, Guri sea catfish, kingfish and whitemouth croaker) strongly suggests that the fishing technique was the fishing net” (translation from the Portuguese original).

The fish specimens dimensions in Sambaqui sites has been object of study by other researchers. Lima (1991), Figutti (1998) and Klökler (2008) realize that the size of Guri sea catfish specimens (*Genidens* sp.) and withemouth croaker (*M. furnieri*) estimated from otoliths, were mostly specimens smaller than 200 mm but without applying more accurate statistical analyses.

All the fishing arts are selective in terms of the species and the fish sizes (Hovgård, 2000). The shape and size of the *M. furnieri* and *M. americanus* species influence the catch rates. Nets with sizes of 50 and 70 mm between knots are more efficient to catch these species (Reis; Pawson, 1999). The estimated lengths of each species perfectly fit the normal curves that do not overlap. *Genidens* sp. as the lowest mean and the mean values of the standard length of *M. furnieri* are slightly on the left of the *M. americanus* values. Considering that besides the shape accessory structures (pectoral and dorsal spurs) might influence the catch rates (Greenspan, 1998), we can suppose that the inferior standard length represented by *Genidens* sp. is due to the fact that this species presents pectoral and dorsal spurs that would facilitate its trapping in nets where the majority of other species would not get caught.

Fracturing is the most common event in sites composed by shells due to its fragility and consequent lesser resistance to trampling and pressure of upper layers (Child & Bulter, 1996; Wolverton, Randklev & Kennedy, 2010). Although the causes are others, a high number of fracturing in mammal bones and Guri

sea catfish (*Genidens* sp.) spurs was also noted. Mammal bones recorded in archaeological sites are normally fractured due to marrow extraction or the confection of artefacts (Lyman, 1994; Reitz & Wing, 1999; Buc, 2011) but no artefacts were recorded and the Guri sea catfish spurs were possibly broken after its capture with the intention to disarm the captured animal. This is seen nowadays among the fishermen as a method for prevention of accidents with these fish's spurs (Wheeler & Jones, 1989).

The records with indicators of fire action was small (Table 2). Binford (1981) describes the patterns of dispersal for the consumed remains in relation to the fireplace. According to the author, in open areas the remains tend to be thrown away from the fire. Although the sampling is small we can assume that the fireplaces were well delimited and the majority of the remains were not thrown into its interior.

CONCLUSIONS

Besides the presence of a high quantity of marine molluscs, seven of the ten species of marine fishes recorded are coastal species. Remains of unidentified Chondrichthyes, two freshwater fish species, testudines and one species of terrestrial mammal were also identified. These remains show a pattern of coastline marine exploitation complemented by hunting. The presence of high sea species might be interpreted as an occasional occurrence.

The taphonomical data indicate a high trampling activity but the differences evidenced between levels cannot be adequately explained. The breaks in the Guri sea catfish spurs suggest the post-capture disarm of these animals, common occurrence between current fishermen. Even if the presence of pieces with burnt signs suggests the use of fire directly in the local of material disposal, it does not suggest an intentionality in throwing the food remains directly to the interior of the fires.

The use of otoliths size through interpolation of curves for the estimation of the specimens size and appropriate statistical analysis, resulted in the presence of a dimension pattern that might be associated to the use of standardized fishing nets with mesh of small dimensions, capable of capturing fishes with sizes between 55 and 399 mm. The use of other types of traps cannot be discarded, notwithstanding the case in study presents high evidence represented by the standardization of the fish body dimensions. As a technique, together with the interpretation of environmental data may aid in the interpretation of the technologies used by the South Atlantic coast hunter-gatherer-fishers.

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Table 1: Number of Identified Specimens per Taxon (NISP) of Sambaqui Praia do Paraíso site - RS-AS-01.

TAXON	COMMON NAME	TOTAL NISP
PHYLUM MOLUSCA		
CLASS BIVALVIA		
FAMILY: OSTREIDAE	oyster	
Crassostrea sp.		1
FAMILY PHOLADIDAE		
Cyrtopleura costata (Linnaeus, 1758)	-	3
FAMILY DONACIDAE		
*Donax hanleyanus (*Philippi, 1842)	wedge clam	1255
FAMILY MESODESMATIDAE		
Mesodesma mactroides (Deshayes, 1854)	yellow clam	9888
CLASS GASTROPODA		
FAMILY OLIVIDAE		
Olivancillaria contortuplicata (Reeve, 1850)		4
Olivancillaria vesica auricularia (Lamarck, 1810)	Sea snail	44
FAMILY VOLUTIDAE		
Pachycymbiola brasiliana (Lamarck, 1811)		3
FAMILY AMPULLARIIDAE		
Pomacea sp.	Channeled Applesnail	1
FAMILY MEGALOBULIMIDAE		
Megalobulimus sp.	Aruá-do-mato	2
PHYLUM EQUINODERMATA		1
CLASS ECHINOIDEA		6
PHYLUM CHORDATA		
CLASS CHONDRICHTHYES		71
FAMILY MYLIOBATIDAE		13
CLASS ACTINOPTERYGII		4454
ORDER PERCIFORMES		106
FAMILY SCIAENIDAE		12
Paralonchurus brasiliensis (Steindachner, 1875)	Banded croaker	1
Pogonias chromis (Linnaeus, 1766)	Black drum	151
Macrodon sp.	King weakfish	1
Cynoscion sp.	Stripped weakfish	2
Micropogonias furnieri (Desmarest, 1823)	Whitemouth croaker	29
Menticirrhus littoralis (Holbrook, 1847)	Kingcroaker	33
FAMILY MUGILIDAE		
Mugil sp.	Mullet	8
FAMILY BOTHIDAE		
Paralichthys sp.	Flounder	6
ORDER SILURIFORMES		31
FAMILY ARIIDAE		
Genidens sp.	Guri sea catfish	178
FAMILY PSEUDOPIMELODIDAE		
Microglanis sp.		1
FAMILY PHYCIDAE		
Urophycis sp.	Hake	4
ORDER CHARACIFORMES		
FAMILY ERYTHRINIDAE		
Hoplias sp.	Traíra	6
CLASS REPTILIA		
ORDER TESTUDINES		101

TAXON	COMMON NAME	TOTAL NISP
ORDER SQUAMATA		
FAMILY TEIDAE		
Tupinambis sp.	Teiú	1
CLASS AVES		16
CLASS MAMIFERA		96
ORDER EDENTATA		
FAMILY DASYPODIDAE		5
ORDER ARTIODACTYLA		
FAMILY CERVÍDAE		4
Blastocerus dichotomus (Illiger, 1845)	Marsh deer	4
TOTAL		16542

Table 2: Shapiro-Wilk W test for the standard lengths estimated in *Genidens* sp., *Micropogonias furnieri* and *Menticirrhus littoralis*.

	***Genidens* sp.**	***Micropogonias furnieri***	***Menticirrhus littoralis***
N	33	27	32
Shapiro-Wilk W	0.9189	0.9071	0.9075

Table 3: Normality (Tukey Paired test) of estimated Standard Lengths of (mm) de *Genidens* sp., *Menticirrhus littoralis* and *Micropogonias furnieri*.

	***Genidens* sp.**	***Micropogonias furnieri***	***Menticirrhus littoralis***
	X = 162.82 ± 43.02 mm N = 33	X = 198.09 ± 44.09 mm N = 27	X = 282.83 ± 62.69 mm N = 32
Genidens sp.		p = 0.0226	p = 0.000106
Micropogonias furnieri			p = 0.00010

Table 4: Percentage of alterations in the PT A square faunal remains.

Level (cm)	Taphonomic Characteristics			
	Broken (%)	Burned (%)	Carbonized (%)	Calcined (%)
0-5	69.54	0.00	0.00	0
5-10	95.12	0.12	0.11	0
10-15	61.03	0.00	0.00	0
15-20	89.58	0.06	0.08	0
20-25	70.44	0.06	0.15	0
25-30	98.49	0.00	0.15	0
30-35	42.60	0.00	0.00	0

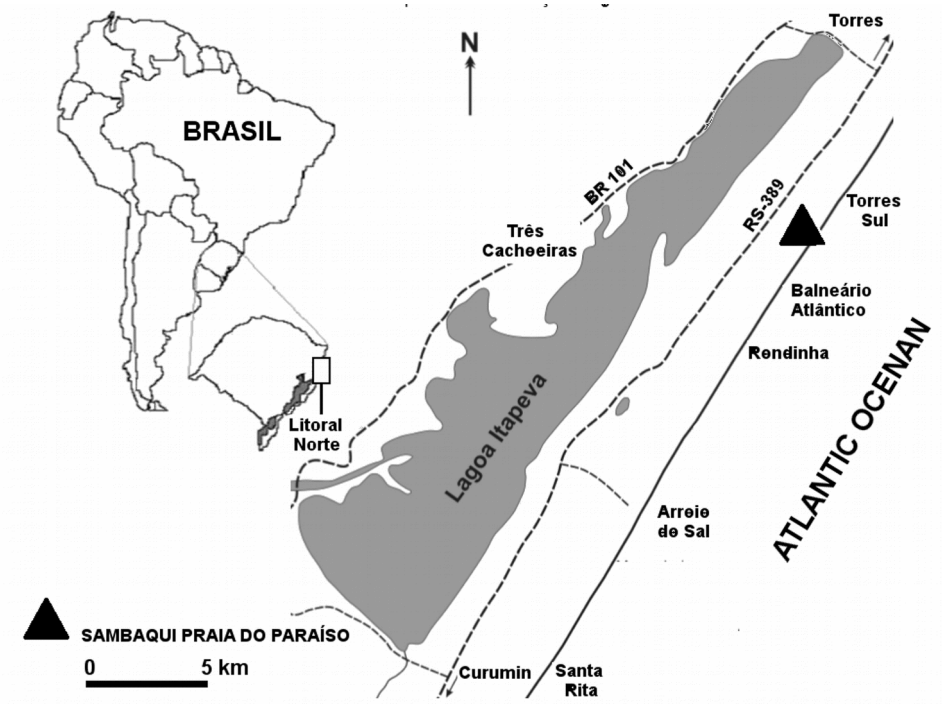

Figure 1: Geographical location of the site Sambaqui, Praia do Paraíso, Arroio do Sal municipality, Rio Grande do Sul, Brazil (UTM: 22J 615474E/6742318N).

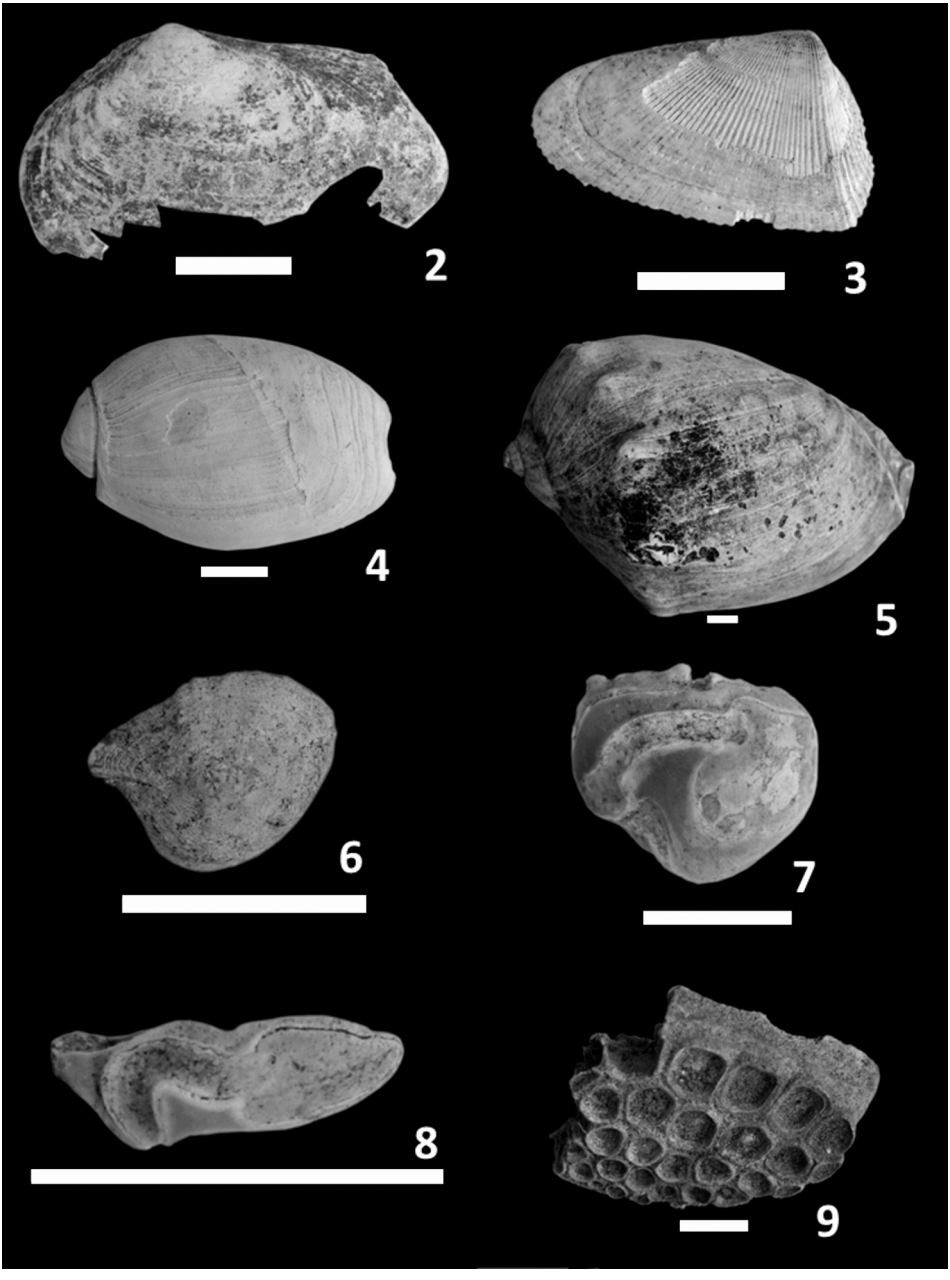

Figure 2-9: Most common archaeofauna remains in the Site Sambaqui Praia do Paraíso – RS-AS-01: 2 = *Mesodesma mactroides* valve (left), 3 = *Donax hanleyanus* valve (right), 4 = *Olivancillaria vesica auricularia* shell, 5 = *Pachycymbiola brasiliana* shell, 6 = *Genidens* sp. otolith (left), 7= *Micropogonias furnieri* otolith (left), 8 = *Menticirrhus littoralis* otolith (left), 9 = *Pogonias chromis* pharyngeal plate.

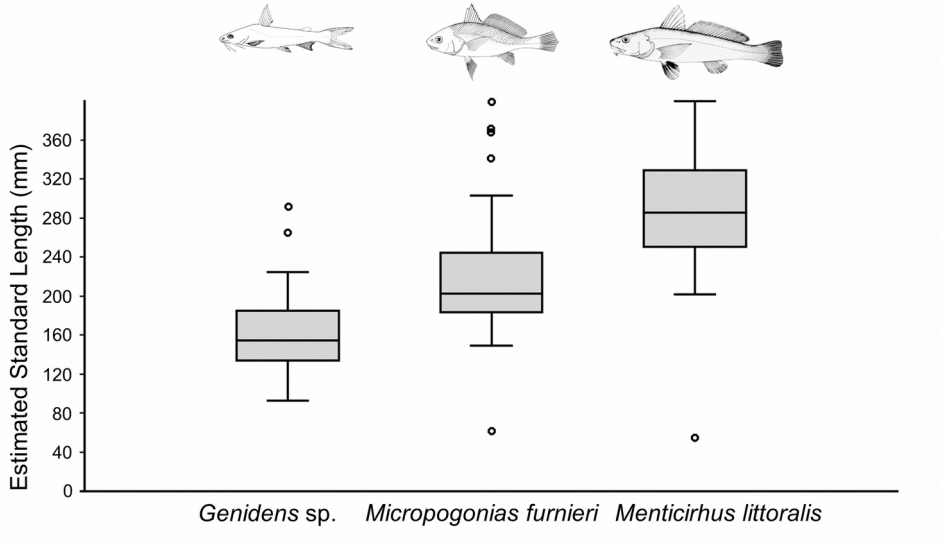

Figure 10: *Genidens* sp., *Micropogonias furnieri* and *Menticirrhus littoralis* mean length and standard deviation. *Outliers* are shown by circles.