# The use of wildlife by Sambaquianos in Prehistoric Babitonga Bay, North Coast Of Santa Catarina, Brazil

## *El Uso de la fauna por constructores de concheros en la Prehistoria de la Bahía Babitonga, Costa Norte de Santa Catarina, Brasil*

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ABSTRACT

*The study of faunal remains from archaeological sites is based on qualitative and quantitative data that contribute to our understanding of the consumption of animal protein, environment, and lifestyle often goes beyond understanding daily activities. Indeed, faunal remains in archaeological sites vary among societies, as choices are both availability and culturally defined. Here I discuss available faunal data from shell mounds in the Babitonga Bay, in conjunction with the presence of pottery in some of their archaeological layers. Forte Marechal Luz, Enseada I, Bupeva II and Itacoara sites have pottery and two different stratigraphic horizons. The results show some interesting differences in taxa and quantity of the animal remains, when the different layers of the same site and between sites are compared. I discuss cultural identity and diversity of the prehistoric dwellers living in the Babitonga Bay, in the light of a relatively late introduction of ceramics that affected less than 10% of the shell mounds in the area.*

*Key Words: Animal, Shell mounds, coast of the state of Santa Catarina, Brazil*

RESUMEN

El estudio de los restos de fauna de los sitios arqueológicos se basa en datos cualitativos y cuantitativos que contribuyen a nuestra comprensión del consumo de proteínas de origen animal, el medio ambiente y estilo de vida, y van a menudo más allá de la comprensión de las actividades diarias. Aquí discuto los datos disponibles sobre la fauna de concheros en la Bahía Babitonga, en relación con la presencia de cerámica en algunas de sus capas arqueológicas. Los resultados muestran algunas diferencias interesantes en los taxa y la cantidad de restos de animales entre las diferentes capas del mismo sitio y entre sitios. Discuto la diversidad cultural y la identidad de los habitantes prehistóricos que vivían en Bahía Babitonga, a la luz de una introducción relativamente tardía de la cerámica que afectó a menos del 10% de los conchales en la área.

*Palabras Claves: Animales, conchales, litoral del Estado de Santa Catarina, Brasil*

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Although *sambaquis* are found all along the coast, bays and islands display a higher concentration of these sites, likely because those ecosystems had higher productivity (Odum, 1971). Babitonga Bay and São Francisco do Sul Island, located at the north of Santa Catarina State, South of Brazil are two of these regions where about 150 shell mounds have been identified (Figure 1). While they are commonly considered together, they display chronological, morphological and probably ethnic differences. The available 14C dates range from 5.420 ± 230 for Palmital shell mound to 1.160 ± 45 for Espinheiros II years BP (Bandeira, 2004).

Over the 60 years of research history in Babitonga Bay archaeology, methodology and focus have varied substantially. Problems of sampling classification and analysis of faunal material have been addressed previously (Reitz & Wing, 2001 among others) and new approaches were recommended for Brazilian sites, such as greater standardization of samples, and quantitative analyses of all layers, areas and structures in these sites (Scheel-Ybert *et al.,* 2006). Although faunal remains are typically the most abundant evidence of human activity in shell mounds, they were, until recently, considered less important and are often inadequately collected and de-contextualized.

The shell mound populations were considered hunter-gatherers, living mainly on mollusks. This interpretation was based on the apparent large amount of mollusk shells better preserved in the archaeological layers. Recent research indicated that fish and not the mollusks was the base of the diet among the shell mound populations (Figuti, 1993). Using stable isotopes De Masi (2009) proposed that mollusks were used as baits since they were not the food basis in shell mounds of Santa Catarina Island.

The ceramic shell mounds of Itacoara (Tiburtius *et al.,* 1950-1951, Bandeira, 2004), Bupeva II (Bandeira, 2004), Enseada I (Bandeira, 1992) and Forte Marechal Luz (Bryan, 1993) display the same type of ceramics, but only on upper layers. The ceramic style is characterized by small, dark, plain pieces for daily use that may have plastic decorations (Figure 2). Otherwise, they present some differences regarding the faunal remains.

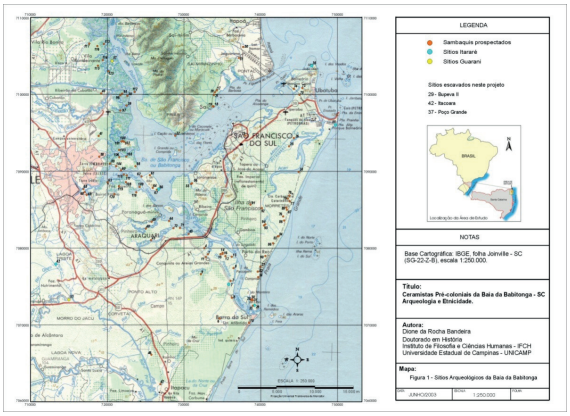


Figure 1: Shellmounds of Babitonga Bay and São Francisco do Sul Island, North of Santa Catarina State, Brazil (Adapted from Bandeira 2004).

*Figura 1: Conchales de bahía de Babitonga e Isla de São Francisco do Sul, Norte del Estado de Santa Catarina, Brasil (Adaptado de Bandeira 2004).*

Figure 2: Itacoara shell mound pot. Guilherme Tiburtius, collection in the Museu Arqueológico de Sambaqui de Joinville.

*Figura 2: Cerámica del conchal Itacoara, colección del Museu Arqueológico de Sambaqui de Joinville.*

We started from the conception that while the need for food is universal and people may consume among several kind of choices, they won't actually eat everything, as their choices are based on cultural prerogatives (Valeri, 1989). The diversity of food, the way in which the prey is caught, how it is prepared, consumed or rejected has historical, cultural and ethnic dimensions. The choices and the practices are different for each group and feeding habits of a given group have strong relationships with their ethnical identity (Jones, 1997 and others).

## CERAMIC SHELL MOUNDS OF THE BABITONGA BAY: A SHORT DESCRIPTION ABOUT VERTEBRATE REMAINS

The faunal material from Bupeva II (Bandeira 2004) (excavated by Bandeira in 2003, the collection is in the Archaeological Museum of Joinville, Santa Catarina, Brazil) consists of 16.871 pieces of vertebrates (NISP). Out of these, 16.627 are fish remains (99%), and only 1% comes from the other classes: 221 mammal (110 terrestrial, 111 marine) and 11 birds. Vertebrate remains in Bupeva II are more frequent in aceramic layer –6504 (NISP) and increase in ceramic layers– 8367 (NISP). The fish was the most abundant category in both, followed by mammals. This shell mound is located within the sand on the East Coast of São Francisco Island (Praia Grande), 480m from the ocean and 370m from the Linguado chanel, that separates the island from the mainland, near salt marsh vegetation and mangroves (Figure 3).

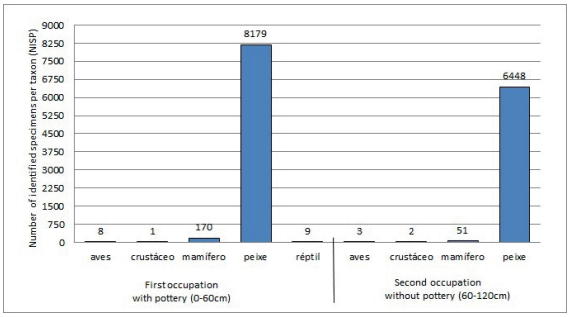


Figure 3: Distribution of faunal remains (NISP – Number of identified specimens per *taxon*) by class (Osteichyties and Chondrichyties bones are being presented altogether) in ceramic and no-ceramic levels of Bupeva II shellmound (Bandeira 2004).

*Figura 3: Distribución de los restos de fauna (NISP – Número de especímenes por taxon) por clase (los huesos de Osteichyties y Chondrichyties se presentan juntos) en los niveles con y sin cerámica del conchal Bupeva II (Bandeira 2004).*

All the fishes identified in Bupeva II are marine species and the diversity is large. Twenty three different species and/or genera were identified. Fragments of cartilaginous fishes occur as well, but in a smaller frequency (2%) when compared to the bone ones. Based on the minimum number of individuals (MNI) the most popular fish in both aceramic and ceramic layers were the barred grunt (*Conodon nobilis*), the fat snook (*Centropomus parallelus*) and the sword-fish (*Trichiurus lepturus*). Those are small and medium sized species that can be captured along all seasons, but are more abundant in the summer (Bandeira, 1992).

Mammals are mainly represented the cetaceans whose fragments are hard to identify to a specific taxonomic level but we believe to be Balaenidae or Balaenopteridae families. Terrestrial mammals, as the peccary (*Tayassu sp*) is the second most popular mammal and the paca (*Agouti paca*) the third one. In terms of minimum number of individuals (MNI), frequencies are similar for all mammals. Most of the cetacean bones are relatively large in size, brittle and easily fragmented, which might have artificially inflated their representation.

Vertebrate remains in Enseada I shell mound (Bandeira, 1992) (site excavated in the 1970s and 1971 by Anamaria Beck, the collection is in the Museum of Archaeology and Ethnology Oswaldo Rodrigues Cabral State University of Santa Catarina, Brazil) are four times more frequent in the upper, ceramic-bearing layer. The aceramic occupation provided 7.196 bone pieces (NISP) while ceramic occupation provided 32.440 (NISP). Fish is present in both layers and the proportions are the same with MNIs of 823 for fish, 14 for mammal 6 for birds and 2 for reptilians in the aceramic layer and 4949 for fish, 41 for mammal, 16 for birds and 3 for reptilians in ceramic occupation (Figure 4). This shell mound is located on the West coast to the North of São Francisco do Sul Island, on a rocky outcrop between Prainha and Praia Grande beaches, near salt marsh vegetation, mangroves and Atlantic Forest.

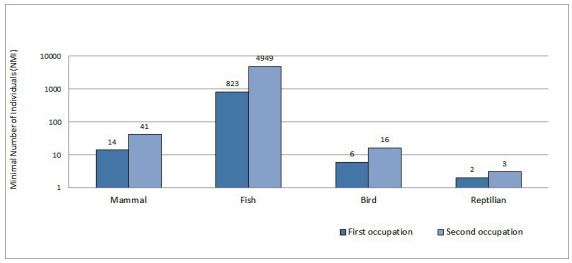


Figure 4: Minimal Number of Individuals (MNI) of vertebrate for ceramic (second occupation) and no-ceramic (first occupations) layers of Enseada I shell mound (Bandeira 1992).

*Figura 4: Número Mínimo de Individuos (MNI) de vertebrados en los niveles con (segunda ocupación) y sin cerámica (primera ocupación) del conchal Enseada I (Bandeira 1992).*

There is little variation in the distribution of fish species between the two layers (with

ceramic and without ceramic). The sword-fish (*Trichiurus lepturus*) is the most popular species (1967 MNI/11478 MNI) followed by the puffer (*Lagocephalus laevigatus)* (26 MNI/740 MNI), *the* whitemouth croaker (*Micropogonias furnieri*) (179 MNI/2436 MNI) and the sand tiger shark (*Odontaspis sp*) (29 MNI/404 MNI) in aceramic and ceramic bearing layer respectively. The result is similar for NISP and MNI (Bandeira 1992). The first two species are common during the summer, the whitemouth croaker is the most abundant in the winter and the fourth most abundant fish species are of small to medium size. Bandeira (1992) identified predominance of small and small-medium species.

Based on NISP, the most frequent mammals associated with aceramic layer are the cetaceans followed by the pacas (*Agouti paca*). The most frequent mammal in the ceramic occupation is the peccary (*Tayassu* sp) followed by the cetaceans.

Bryan (1993), reported higher frequency of bone fragments associated with pottery layers in Forte Marechal Luz (Bryan, 1993) shell mound (excavated by Alan Bryan in the late 1950s, the collection is in the National Museum of the Federal University of Rio de Janeiro, Brazil). The most popular species were the puffer (*Lagocephalus laevigatus*) and the porgy (*Archosargus probatocephalus*). Both fishes are of medium to small sizes and more abundant along the coast of Santa Catarina during the summer. Considering that the most parts of the skeletal structure of the cartilaginous fishes (sharks and rays) are not preserved, the 136 bones (34% of the material) of this category in the ceramic layers are suggestive of their importance. Perhaps the biggest motivation to capture those fishes was to obtain the teeth and the ray stings often used to make many of the shell mound artifacts while they certainly might have been consumed as food. In the layers without ceramic, the most popular fishes were the puffer (*Lagocephalus laevigatus*) and the atlantic spadefish (*Chaetodipterus faber*). Both species of medium sizes occurs all the yearlong, but in higher numbers in the summer. The atlantic spadefish, that occur in shoals, is especially abundant. The results shows a substantial increase in fish remains associated with pottery-bearing layers. Terrestrial mammals also increase in frequency in zones with ceramic. The most frequent animals are the boar (*Tayassu* sp) and the paca (*Agouti paca*). Marine mammals are predominantly in the layers with no ceramic (60%) (Figure 5). The Forte Marechal Luz shell mound is settled on the slopes of João Dias Mount, Northwest of São Francisco do Sul Island, next to the channel separating the mainland, near salt marsh vegetation, mangroves and Atlantic Forest

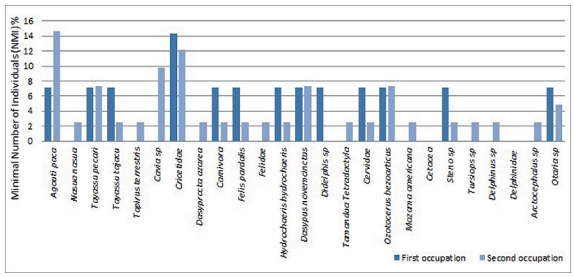


Figure 5: Minimal Number of Individuals (NMI) of different mammal species in the ceramic (second occupations) and no-ceramic (first occupations) layers of Forte Marechal Luz shell mounds (Bandeira 1992).

*Figura 5: Número Mínimo de Individuos (MNI) de distintas especies de mamiferos en los niveles con (segunda ocupación) y sin cerámica (primera ocupación) del conchal Forte Marechal Luz (Bandeira 1992).*

In terms of faunal remains of Itacoara shell mound (Bandeira 2004) (excavated by Dione da Rocha Bandeira between 2001 and 2003, the collection is in the Archaeological Museum of Shellmound Joinville, Santa Catarina, Brazil), there are meaningful differences between the layers in NISP. While in layer I (with ceramic), 82,7% of the bones belong to mammals and 15,2% belong to fishes, in the layer II (without ceramic), the amount of mammals is lower, 58,3% while the amount of fish increases to 37% (Figure 6). This shell mound is located in the rural zone in of Joinville, on the banks of Lagoa Grande and Piraí rivers, amid rainforest, about 30km away from the Atlantic ocean. In Itacoara shell mound it was recovered two lythic artifacts (a grinder and a stone-fishing net) made from rhyolite and arenite, raw-material only available far from the sea, in the countryside (Bandeira, 2004).

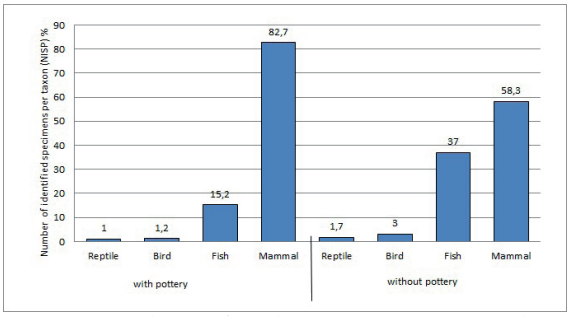


Figure 6: Distribution of vertebrates remains (NISP – Number of identified specimens per *taxon*) by class in ceramic and no-ceramic levels of Itacoara shellmound (Bandeira 2004).

*Figura 6: Distribución de los restos de vertebrados (NISP – Número de especímenes por taxon) por clases en los niveles con (segunda ocupación) y sin cerámica (primera ocupación) del conchal Itacoara (Bandeira 2004).*

Among mammal species the peccary (Tayassu sp) and the capybara (*Hidrochaeris hidrochaeris*) are the most dominant in both layers. Given the late date of occupation of the site the paleoenvironment should have been similar to that at the beginning of European settlement in the region in 1500 AD, in which these animals might have found in large numbers around the site (Canevari & Vaccaro, 2007). The adults are medium to big in size and both live in groups, and hunting would have been a very profitable activity (Bandeira, 1992).

Fluvial fish predominate in both ceramic and non-ceramic layers. There are, however artifacts made from shark teeth which may be explained either by fishing tours or by exchange with other groups that lived closer to the sea. The absence of other bones suggests trade as only the teeth were brought to the site. Similar behaviors were found in riverine shell mounds in the state of São Paulo where "the use of marine origin objects [...] show a strong network between riverine shell mounds and occupations on the coast [...]" (Plens, 2008: 230).

The most representative species of fish in the ceramic bearing Layer I are the carp (*Rhamdia sp)* and the catfish (f. *Aridae)*. In layer II, they are the trahira (*Hoplias sp)* and the carp (*Rhamdia sp)*. Most of them are species of medium sizes that could be found throughout the year and have a solitary and nightly behavior.

## THE USE OF VERTEBRATE FAUNA IN POTTERY BEARING SHELL MOUNDS: FOOD AND IDENTITY

The present data indicate that fish was the most important protein source for the groups of Taquara-Itararé Tradition in Babitonga Bay, except for Itacoara site where, although fish plays an important role in diet, terrestrial mammals are more abundant. There is substantial variation in the consumed species even between those sites that exploited similar environments, like Enseada I, Bupeva II and Forte Marechal Luz, the first two placed in Praia Grande São Francisco do Sul (the second near the South channel) and the last one at the entrance of the North channel to the Babitonga Bay. The predominant species in all sites were the swordfish (*Trichiurus lepturus*), the barred grunt (*Conodon nobilis*) and the puffer (*Lagocephalus laevigatus*) all of which are more abundant in the summer (Menezes *et al.,* 2003). The data seems to indicate that there was a certain level of specialization in fishing practices at these shell mounds and that they are more intensively used in the summer. Similar results have been indicated for other Brazilians shell mounds by Figuti (1993). It is possible that during the winter and autumn, seasons when the marine resources are slightly (Menezes *et al.,* 2003), part of these human groups moved towards other regions in search of resources.

Recent studies have identified pine fruit (*Araucaria angustifolia*) phytolite and starch in human dental calculus from Enseada I and Itacoara shell mounds (Wesolowski *et al.,* 2010). This is a native species, a rich source of carbohydrates, that fruits during the autumn/winter period (Menezes *et al.,* 2003). It is a food staple for Je-speaking groups in the mainland. The area of the pines is coincident with the area of the Taquara-Itararé sites. Recent data reinforces the thesis that Itararé ceramists from the coast came from the countryside or had contact with that region (Bastos, 2009). This is further confirmed by presence of lithic artifacts (a grinder and fishing net stone) made from rhyolite and arenite, raw-material only available far from the sea, in the countryside (Bandeira, 2004).

Besides the abundant presence of freshwater fish in Itacoara shell mound, as mentioned, there is also a high frequency of terrestrial mammals in the levels with and without ceramic. This should be considered in the classification of this site as more hunting than a fishing settlement. Exploring fluvial resources might be associated with hunting activities suggesting they were exploring a different economic niche, both before and after the ceramic rise.

Considering the fauna, the sites Enseada I, Forte Marechal Luz and Bupeva II have similar subsistence strategies with variation on the favorite fish species. The site Itacoara, on the other hand, despite displaying a ceramic that is similar to the others, displays a different pattern of subsistence. As there is no large distance in chronological terms, maybe it could be thought as a culturally different group living in the bay surroundings. The faunal data indicate that these could be compared to the differences that should exist between Jê indians from Santa Catarina State – Xokleng and Kaingang (Lavina, 2000).

The C14 chronology available for the layers with ceramic indicates that the first settlements were in the northeast of São Francisco do Sul Island, in Enseada I shell mound (1390 ± 40 year BP) (De Masi 2009). The ceramic layer of Itacoara shell mound has close dates (1250 years), suggesting that the contact with ceramic was driven to the Southwest. A later period of ceramist occupation was in Forte Marechal Luz shell mound, dated from 800 ± 100 to 620 ± 10 years BP (Bryan, 1993).

The objective of this study was to compare shellmidden dwellers of different sites in Babitonga Bay that produced Taquara-Itararé type of pottery. Based on faunal remains, and other relevant information I attempted to examine whether there could be indication of different ethnic groups. The definition of an ethnic identity in archaeology is difficult as it can change, without any reflection in material culture, while material culture can change substantially in the same ethnic group (Jones & Graves-Brown, 1996; Jones, 1997, 1998; Poutignat & Streiff-Fenart, 1998). Consequently, it is difficult to assign ethnic identity to archaeological groups studied exclusively through their partial and fragmented material culture. Humans however, have a capacity and need to giving meaning to the world around them and connect all material things to their beliefs, values, habits without a direct connection between material and symbolical worlds.

Taking into account the faunal data available for sites with Taquara-Itararé ceramic in Babitonga Bay presented above, I can signal out the differences observed in Itacoara shell mound in relation to others: in the location, the characteristics of the mound, the raw material of some artifacts and faunal resources where terrestrial mammals and species of riverine environment dominate. These data suggest that the site was occupied by an ethnic group different from the others, even though there is a similarity between the potteries that occurs in all of them. However indicating it is dangerous to choose an element of material culture to establish cultural ties. If the study of remains of fauna exploited by prehistoric groups, even detailed, has limitations to answer questions related to ethnic identity is a great element to be considered in conjunction with other material evidence to address this issue.

In short, I believe that groups that lived by the sea primarily exploiting abundant marine resources would not seek totally different environment resources even temporarily abandoning their traditional territory making use of other raw materials to produce their artifacts. This situation seems to be better explained by cultural differences.

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