

HABITAT USE AND GROUP CHARACTERISTICS OF TUCUXI (*SOTALIA FLUVIATILIS*) (CETACEA: DELPHINIDAE) IN MARAPANIM BAY, PARÁ, BRASIL

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Abstract

We present aspects of habitat use and group size of *Sotalia fluviatilis* population that were monitored in Marapanim Bay on the Atlantic coast of Pará State, from January 2004 to March 2006. Tucuxis were sighted on 326 occasions, in groups ranged between one and sixty individuals (6.16 ± 7.20), the majority of the groups comprising one to five individuals (70%). Adults and calves are encountered in the area all over the year. The average of group size was significant higher in rainy seasons, when the fishes are more abounded than dry season. Groups with one or more calves had higher individuals than those comprising only adults and young. Calves' number varied from one to ten (2.09 ± 1.74) and on the contrary that we registered with the adult groups, no significant difference was found between the dry and rainy seasons. Feeding and displacement were the most observed behavior patterns in this area.

Resumo

Apresentamos aspectos do uso de habitat e características de grupo da população de *Sotalia fluviatilis* a qual foi monitorada na Baía de Marapanim, costa atlântica do estado do Pará, de janeiro de 2004 a março de 2006. Os Tucuxis foram avistados em 326 ocasiões em grupos que variaram entre um e sessenta indivíduos (6.16 ± 7.20), a maioria compostos de um a cinco Tucuxis (70%). Adultos e filhotes são encontrados na área durante todo o ano. A média de tamanho de grupo foi significativamente maior na estação chuvosa, quando os peixes são mais abundantes do que na estação seca. Grupos com um ou mais filhotes foram significativamente maiores que aqueles compostos somente por indivíduos adultos e jovens. O número de filhotes variou de um a dez (2.09 ± 1.74), e ao contrário do registrado em grupos de adultos, não encontramos diferenças significativas entre as estações. Alimentação e deslocamento foram os padrões comportamentais mais observados nesta área.

Key words: *Sotalia fluviatilis*, habitat use, group characteristics, behavioral patterns.

Introduction

Tucuxis *Sotalia fluviatilis* are found in coastal waters of South Atlantic from Honduras to Santa Catarina, Brazil (Silva and Best, 1996). This specie present costal and estuarine habit and the Marapanim Bay represent an important concentration of *S. fluviatilis* in coast of Pará State. Despite its near-shore distributions, this population is poorly known (Lima *et al.* in press).

Some studies report the habitat use and group characteristics for the Tucuxis. In Cispatá Bay, Colombia, the groups size were equal to or fewer than ten individuals and seasonal differences were not significant influence for group size (García and Trujillo, 2004). Observations of Tucuxi in Central Amazon (Amazon and Japurá Rivers) showed small groups formation, 98% ranged from one to six individuals (Martin *et al.* 2004). In southeast populations, in Guanabara Bay, the group size ranged from one to 40 individuals (Azevedo *et al.* 2005) and in Cananéia region the more common groups consisted of two to ten individuals (Geise *et al.* 1997). The population of Marapanim Bay, Pará, Brazil, is resident and the group

characteristics have not been reported. The aim of this work is to supply information regarding the use of the habitat and the formation groups characteristics, calves presence and patterns of behavior in the Pará coast.

Material e Methods

The study area

The estuary of the Marapanim river (Figure 1) is located in the northeast coast of Pará State (00°32'30"S, 00°52'30"S, 47°28'45"W and 47°45'00"W). The estuary is formed by low relief and dominated for semidiurne tide. It presents macro tides (>4.0m), that form sand banks in the riverbed and alterations in the canals depth (Prost, 2001). The saline tide's reach limit in the estuary varies between 42 km (rainy period) and 62 km (dry period) (Timouk *et al.* 2001).

Survey and data analyses

Fifty linear transects were conducted in Marapanim Bay from January of 2004 the March of 2006, in a motorized wooden boat (5,0 m). All the samples were collected in days with adjusted climatic conditions (sea Beaufort state ≤ 2). The location of each focal-group was obtained by the use of a Global Position System (GPS).

Group composition was determined through visual observation of the body size and categorized in adults/juveniles and calves. Calves were considered the animals measuring less than 2/3 of the adult body size, and regularly accompanying an adult animal (Azevedo *et al.* 2005). To register activity behavior pattern, the method used was "*scan-sampling*". The Shane method (1990) was used for established the following categories of activities: displacement, feeding, socialization, resting and not-identified.

Five categories of group size were established: 1-5, 6-10, 11-15, 16-20 and more than 20 individuals. A Mann-Whitney test permitted seasonal comparison among average, number of calves and group size. The Kruskal-Wallis test was used to compare group size with pattern behavior activity.

Results

During the research period occurred 326 sightings, in which 1806 Tucuxis were sight. The majority of Tucuxi was sighted during the flood tide (60% of the individuals sighted). Two areas with a soaring number of Tucuxis sightings occurred in the bay, with more than 40% of all contacts (Figure 1).

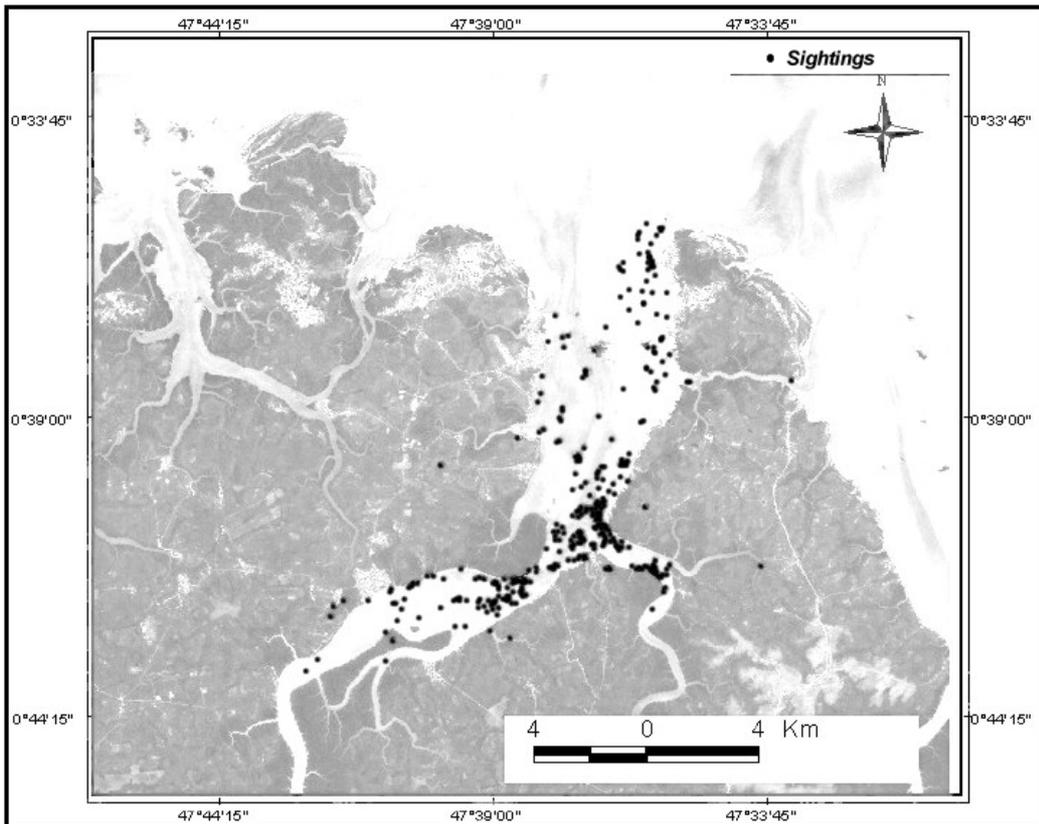


Figure 1. Tucuxi's group sighted in Marapanim Bay, Pará State, Brazil (map adapted from Rodrigues, 2005).

The group size varied between one and sixty individuals (mean = 6.16 ± 7.20). The solitary individuals consist 8% of all the sighted ones. The most common groups comprised one to five individuals (70% of the observations) (Figure 2).

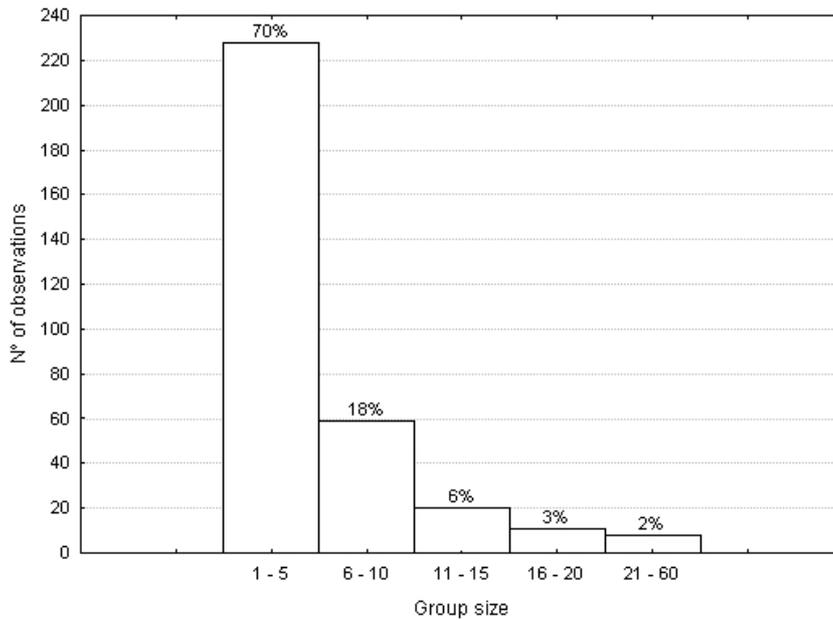


Figure 2. Distribution of Tucuxis' group size in Marapanim Bay, Pará.

The average of group size was five individuals (mean = 5.54 ± 6.38), and it was verified a significant difference between the rainy (mean = 6.83) and dry (mean = 4.10) seasons for the group size (Mann-Whitney test, $U = 9905.00$, $P < 0.05$).

The calves' number for group varied from zero to ten (mean = 2.24 ± 1.85). 44% of the groups sighted had no calves and 48% of the groups containing calves had only one calf among them. More than two calves were found at the majority of the groups (52%). The average of calves in the rainy seasons was larger (2.63) than that found in dry (1.84) seasons, however the difference was no significant (Mann-Whitney test, $U = 1918.00$, $p > 0.05$).

The most observed behavior patterns activity were feeding and displacement (39% and 37%, respectively) (Figure 3). The average of group size was bigger in the activity feeding with significant difference between the other activities (Kruskal-Wallis test, $H_{4,264} = 38.67$; $P < 0.05$).

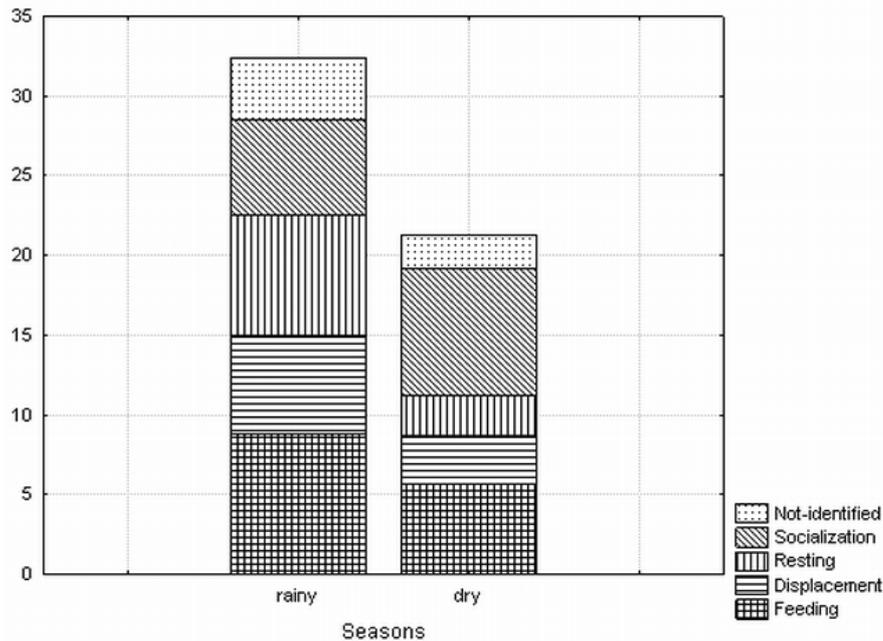


Figure 3. Differences in behaviour pattern of Tucuxis between the seasons in Marapanim Bay.

Discussion

The variation in number of found individuals (1 - 60) was bigger than the observed ones in other studies. However, Marapanim Bay presented, on average, smallest groups (mean = 5.54) (Geise *et al. op. cit.*; Di Benedetto *et al.* 2001; García and Trujilo, 2004; Azevedo *et al. op. cit.*), except in the high Amazon River that the population presents on average 3,9 individuals per group (Vidal *et al.* 1997).

Small groups, formed from one to five individuals in the Marapanim Bay, were observed more frequently (70%). This information corroborates with what Geise (1997) found for *S. fluviatilis* in Cananéia (one to five individuals) and Azevedo *et al.* (2005) in Guanabara Bay (2 to 10, 53.9%). However, our findings disagree from the observed in Atafona Bay, which 86.4% of the groups were formed for more than ten individuals (Di Benedetto *et al.* 2001).

The average group size was significant higher in rainy season comparing to dry season. This difference in the group size between the seasons can be related to the fishes abundance in the coast that occur mainly in the rainy season, when the strong discharge of Amazon river dislocates the estuarine waters for east of the Pará State (Isaac & Barthem, 1995). This water mass is proceeding from areas periodically flooded provide great portion of energy base, that supports the fishing resource (Barthem & Fabr e, 2004). It was not observed significant difference among the seasons for the group size in Guanabara Bay (Azevedo *et al.* 2005).

The group size with calves was higher than that without calves, corroborating with the data presented for the population of Guanabara Bay (Azevedo *et al.* 2005). Although it was found more calves in rainy season, the difference between the dry and rainy season was not significant, as well as what was found in Guanabara Bay (Azevedo *et al.* 2005) and Atafona Bay (Di Benedetto *et al.* 2001). In Cananéia region it was observed irregular distribution of calves through the months, but it was not registered any influence by seasons (Geise *et al.* 1997).

The more frequently activity categories observed were feeding and displacement in Marapanim Bay. In Cananéia (Geise *et al.* 1997) and in the Cispatá Bay (García and Trujillo, 2004) these two categories also were registered as the most frequent.

This research provided pioneering data about group characteristics and habitat use of Tucuxis in Marapanim Bay and it should support important studies about conservation of this species in the region.

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