

POTENTIAL CONFLICTS BETWEEN FISHERMEN AND *SOTALIA GUIANENSIS* (VAN BÉNÉDEN, 1864) (CETACEA, DELPHINIDAE) IN BRAZIL

CAMILAH ANTUNES ZAPPES¹, ARTUR ANDRIOLO², FERNANDO OLIVEIRA SILVA³ & EMYGDIO LEITE DE ARAÚJO MONTEIRO-FILHO⁴

¹Doutoranda do Programa de Pós-Graduação em Ecologia e Recursos Naturais, Laboratório de Ciências Ambientais, CBB, Universidade Estadual do Norte Fluminense, Campus Universitário Darcy Ribeiro, Avenida Alberto Lamego, 2.000, 28013-602, Campos dos Goytacazes, Rio de Janeiro (camilahaz@yahoo.com.br / camilah_az@yahoo.com.br)

²Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Juiz de Fora, Campus Universitário, s/nº, Bairro Martelos, 36036-900, Juiz de Fora, Minas Gerais

³Instituto de Pesquisas Cananéia, Ponto de Cultura 'Caiçaras', Rua Tristão Lobo, 199, Centro, 11990-000, Cananéia, São Paulo

⁴Departamento de Zoologia, Universidade Federal do Paraná, C. Postal 19029, 81531-970, Curitiba, Paraná

(Potential conflicts between fishermen and *Sotalia guianensis* (van Bénédén, 1864) (Cetacea, Delphinidae) in Brazil) – This study investigated the potential conflicts between artisanal fishermen and the estuarine dolphin (*Sotalia guianensis*), based on the experience of fishermen living in the states of Bahia, Espírito Santo, Rio de Janeiro and São Paulo, in Brazil. One hundred ethnographic surveys were performed with fishermen from five colonies located at the four above-mentioned states. For statistical analysis of the results, Kruskal-Wallis analysis of variance tests were performed where three or more variables were compared while the Mann-Whitney test was used for analysis of two independent variables involving qualitative data. All tests were conducted using the statistical program BioEstat 5.0. Accidental capture of estuarine dolphin individuals occurred in the five studied areas. The gillnet was reported as the only artifact responsible for these entanglements. The carcasses were consumed by the community, used as bait during fishing activities or discarded where they were found. Despite no conflict being mentioned by the fishermen, accidental capture has an impact over the estuarine dolphin but its magnitude could not be measured in this study. Studies and management actions must be carried out together in accordance with the local communities in order to propose strategies aiming to preserve the estuarine dolphin population.

Key words: Traditional knowledge, artisanal fishermen, Delphinidae.

(Potenciais conflitos entre pescadores e *Sotalia guianensis* (van Bénédén, 1864) (Cetacea, Delphinidae) no Brasil) – Este estudo investigou os potenciais conflitos entre os pescadores artesanais e o boto-cinza (*Sotalia guianensis*) assim como a possível influência negativa da pesca sobre a espécie, através do conhecimento de pescadores do extremo sul do Estado da Bahia, do litoral norte dos Estados do Espírito Santo e Rio de Janeiro e do litoral sul do Estado de São Paulo, Brasil. Foram feitas 100 entrevistas etnográficas com pescadores de cinco colônias residentes nos quatro Estados relatados. Para análises dos resultados, foram feitos os testes estatísticos de Kruskal-Wallis para análises de variância onde três ou mais variáveis foram comparadas enquanto o teste de Mann-Whitney foi utilizado para análise de duas variáveis independentes envolvendo os dados qualitativos. Todas as análises estatísticas foram feitas no programa estatístico BioEstat 5.0. Os resultados mostraram que há captura acidental de indivíduos de boto-cinza nas áreas estudadas. A rede de espera é relatada como o único artefato responsável pelos emalhamentos. As carcaças podem ser consumidas pela comunidade, usadas como iscas durante a pesca ou descartadas no local onde são encontradas. Apesar da ausência de conflito mencionada pelos pescadores, a captura acidental pode ser considerada como um impacto sobre o boto-cinza, mesmo sua magnitude não tendo podido ser mensurada neste estudo. Estudos e ações de manejo devem ser executados juntamente às comunidades locais e assim propor medidas voltadas para a conservação das populações de boto-cinza.

Palavras-chave: Conhecimento tradicional, pescador artesanal, Delphinidae.

INTRODUCTION

Accidental capture in fishing nets is the main cause of negative interactions between humans and cetaceans (DI BENEDETTO *et al.*, 2004). Because some species of delphinids have coastal habits and nets are placed next to the coast, these species became more vulnerable to entanglement (DI BENEDETTO *et al.*, 2001).

The use of gillnets by fishermen is responsible for the accidental capture of dolphins in the Brazilian states of

Rio de Janeiro, Espírito Santo on the southeast of Brazil and Santa Catarina (DI BENEDETTO *et al.*, 2001; FREITAS NETTO, 2003; WEDEKIN *et al.*, 2005). The captured animals are usually discarded in the sea by fishermen. Estuarine dolphin *Sotalia guianensis* (van Bénédén, 1864) meat is also consumed by traditional communities in the states of Bahia (REIS, 2002), Espírito Santo (FREITAS NETTO, 2003) and in the state of Paraná (PRZYLSKI & MONTEIRO-FILHO, 2001). The adipose tissue in dolphin carcasses is used as shark bait in some artisanal fishery artifacts (DI BENEDETTO *et al.*, 2001; FREITAS NETTO, 2003).

The magnitude of impacts caused by human activities, and especially by the accidental capture of the estuarine dolphin species, is still unknown (IBAMA, 2001). The estuarine dolphin is one of the most vulnerable cetacean species to fishery artifacts (DI BENEDETTO & SICILIANO, 2007).

Ethnobiology's studies conducted with fishery communities are important because they may justify the inclusion of local fishermen in management decisions in priority conservation areas like the Atlantic Forest coast of Brazil (PAZ & BEGOSSI, 1996). Traditional knowledge in fishery communities must be treasured as information sources for research related to the preservation of coastal species such as the estuarine dolphin. The conservation process is easier when the species value is taken under consideration by the local community (WEDEKIN *et al.*, 2005).

The aim of this study was to identify the potential conflicts between fishermen and the estuarine dolphin in the states of Bahia, Espírito Santo, Rio de Janeiro and São Paulo, Brazil, based on the knowledge of artisanal fishermen.

MATERIALS AND METHODS

This study was developed in five artisanal fishery communities. One hundred fishermen were divided into groups and interviewed in all five areas as follows (Table 1, Fig. 1).

Information was collected between September 2005 and April 2006. Fishermen were interviewed based on a prepared standard questionnaire, with answers registered by hand and through tape recording. The questionnaire contained 25 questions related to: fishing activity (age of fisherman, fishing time, characteristics of the vessel, artifacts, place and time of fishing); dolphin characteristics (size, color, area of occurrence, behavior, diet), occurrence of entanglement, the area where the entanglement occurred and carcass destination (consumption, bait or discarded). As suggested by SANCHES (2004), selection of informants was made with the help of the president of each fishermen colony, since he knew all local fishermen. Interviewees ranged from 18 to 70 years old, with fishing experience varying from five to 30 years. Informants were selected based on their description of the characteristics of *S. guianensis*, such as: coloration (grey dorsum; white, brownish or pinkish

venter) according to RANDI *et al.* (2008); adult body length: 1-2.5 m; overall behavior (as to evasive behavior in presence of vessels and bathers) and the animal's occurrence site (shore, river, estuary and coastal sea). Selected fishermen were those that described the former features for the estuarine dolphin. The variables analyzed here were the diet of estuarine dolphins, the occurrence of entanglement or not, the area where entanglement occurs (spit, open sea, shore, estuary, coast and bay) and the posterior use of carcasses (for consumption, as bait or discarded).

The Kruskal-Wallis test was used for the analysis of variance where three or more variables were compared. The areas of entanglement in the five study sites were compared using this test. The Mann-Whitney test was used where two independent variables and qualitative data were involved. Occurrence of entanglement in the five study sites was compared using Mann-Whitney test. The statistical program used was BioEstat 5.0.

RESULTS

Local artisanal fisheries

The artisanal fishermen fish mainly in the sea (80%; n=94), using estuaries (10%; n=12) and rivers (10%; n=12) less frequently. They usually go out to the sea and come back on the same day but they can remain aboard for up to twenty days. They can use various fishing artifacts in a same day. The principal artifacts used are gillnet (33%; n=65), hand line (26%; n=49), trail gillnet or balloon (19%; n=37), "espinhel" (fishhook) (15%; n=28) and "cerco-fixo" ("fixed circle") (4%; n=7).

Gillnets are used all over the year and can be assembled in the deep (from 3 to 300 meters), in the middle of the water's column or in the surface. They are usually composed of panels measuring approximately 100 meters long. The mesh network ranges from 70 to 150 millimeters. The length depends on the size of the vessel, and can reach from 30 to 10,000 meters. Trail gillnet or balloon is chained at the stern of a boat from where it is dragged while the boat navigates dragging material from the sediment. During some months of the year the use of this artifact it is prohibited in order to protect the period of reproduction of some species. The "espinhel" (fishhook) is composed of one principal

Table 1. Areas studied and number of interviews.

State	Study area	Fishermen colony	Interviewees
Bahia	Prado (17°20'S 39°13'W)	Z-23	11
Bahia	Nova Viçosa (17° 53'S 39° 22' W)	Z-29	15
Espírito Santo	Barra do Riacho (19°49'S 40°16'W)	Z-7	14
Rio de Janeiro	Baía de Sepetiba (22°54'S 43°12'W)	Z-15	19
São Paulo	Cananéia (25°00'S 47°55'W)	Z-9	18
Total			77

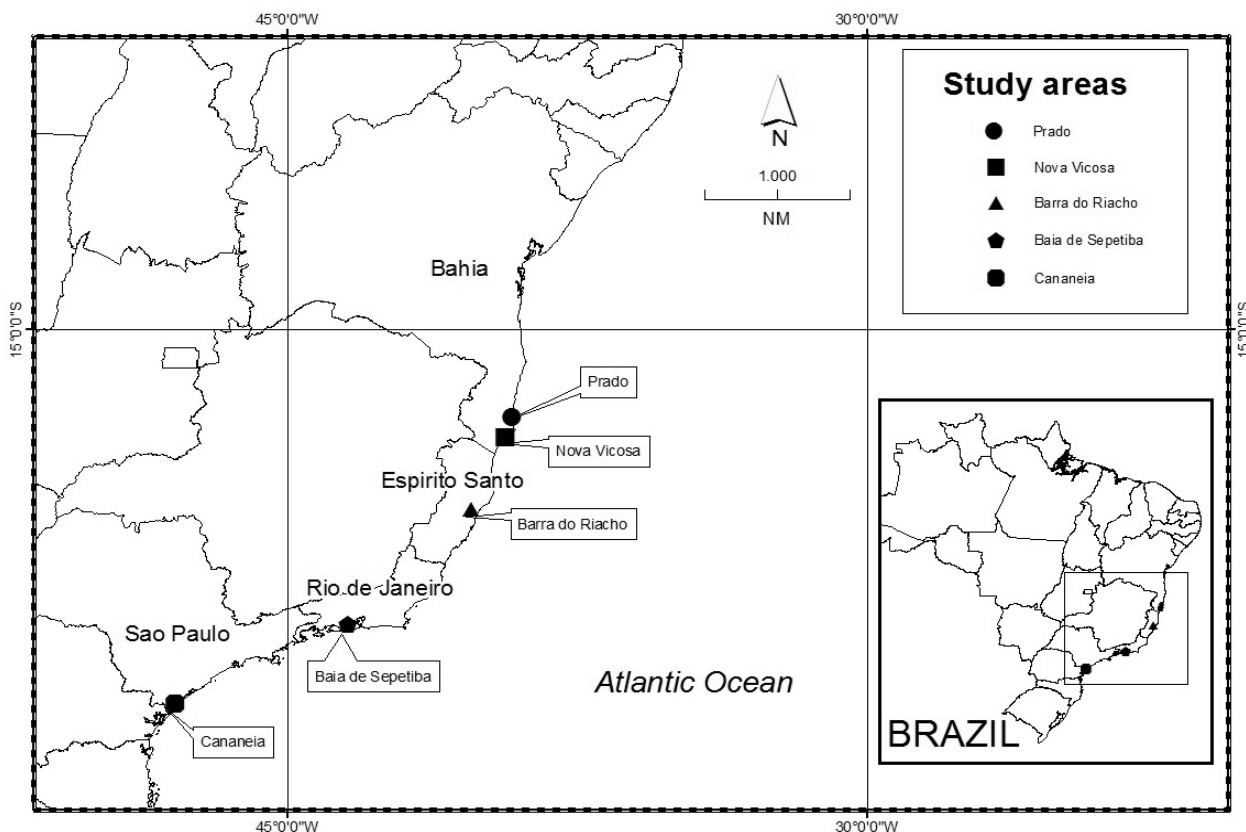


Fig. 1. Map of the study areas located on the Brazilian coast.

line made of synthetic yarns from where secondary lines with hooks in the tips are hung on being used all the year round. The “cercos-fixos” (i.e. “fixed circle”) trap is totally artisanal, made from wire and bamboo, measuring from 25 to 33 meters in circumference. It is built near the coast and used all the year round. The boats are built of bark of trees and they can either have a galley or not. The power of the motors can vary from 50 to 150 horse power (HP). Some fishermen use sail boats. Boat length can vary from six to 15 meters.

Diet of estuarine dolphins

Interviewees reported that estuarine dolphins feed on many species of fish. They described the popular names of the prey of the estuarine dolphin. These names were compared with the common names of fish found on fisheries identification catalogs for each of the five areas studied here. Through this comparison eight families of fish were identified: Characidae, Sciaenidae, Scombridae, Engraulidae, Pomatomidae, Pristigasteridae, Clupeidae e Mugilidae. Each fisherman reported more than one family and species like prey.

Entanglement

Seventy-seven fishermen provided a satisfactory description of *S. guianensis* characteristics. Among them 76% (n=58) affirmed that entanglement of animals occurs in

the study areas. The gillnet was described as the only artifact in which accidental entanglement of estuarine dolphin individuals happens. The frequency of entanglement reports differed significantly among the studied areas ($U=2.00$; $p=0.02$). In Barra do Riacho (ES), 24% (n=14) of the interviewees affirmed that estuarine dolphins were found enmeshed in their artifacts at least once. This value reached 16% in Prado (BA) (n=9) and Sepetiba Bay (RJ) (n=9) and 22% in Nova Viçosa (BA) (n=13) and Cananéia (SP) (n=13) (Fig. 2).

The following locations were described as entanglement areas: spit (also *bar*) (n=1), open sea (n=28), shore (n=12), estuary (n=4), coast (n=3), and bay (1). Five fishermen did not know the answer for this question and 23 interviewees did not answer to the question. Open sea is described as the site where accidental capture of the estuarine dolphin most often happens, i.e., 37% of the occurrences. Fishermen considered “offshore” as the remote area from 1 to 3 kilometers from the coast. There was a significant difference in the reports of possible areas of entanglement of *S. guianensis* according to the five study areas ($H=14.96$; $g.l.=7$; $p=0.03$). Figure 3 shows the areas of entanglement described in each location.

Destination of carcasses

A total of 27% (n=21) of the interviewees reported that the carcasses of accidentally entangled *S. guianensis*

individuals were used for consumption by the fishermen and their families: 19% (n=4) of the fishermen in Prado (BA), 24% (n=5) in Nova Viçosa (BA) and 57% (n=12) in Barra do Riacho (ES). Carcass consumption was not reported in Sepetiba Bay (RJ) and Cananéia (SP) (Fig. 4). Three fishermen (4%) did not know whether carcasses were destined for consumption, while 69% (n=53) did not answer that carcasses were consumed but that they could be used as bait or discarded in the sea.

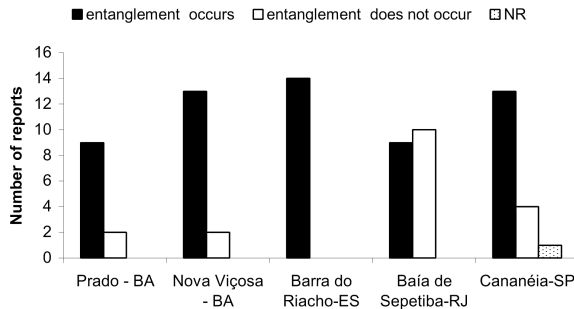


Fig. 2. *Sotalia guianensis* entanglement in artisanal fishery artifacts in Prado (BA), Nova Viçosa (BA), Barra do Riacho (ES), Sepetiba Bay (RJ) and Cananéia (SP), based on data collected from local fishermen. NR = No response: number of fishermen who did not answer to the question.

Among the interviewees, 47% (n=36) reported that dolphin carcasses found either floating or entangled in a net were used as bait in the long-line artifact for shark capture. Fourteen interviewees from Nova Viçosa (BA) (93%) and Barra do Riacho (ES) (100%) reported using the meat as bait. Seven fishermen reported this kind of use in Prado (BA) (64%), and one in Sepetiba Bay (RJ) (5%). The use of carcasses as bait was not reported in Cananéia (SP) (Fig. 5). Four of the interviewees (5%) did not know whether carcasses were used as bait, while 48% (n=37) did not stated that carcasses were used as bait but affirmed that they could be used for consumption or discarded in the sea.

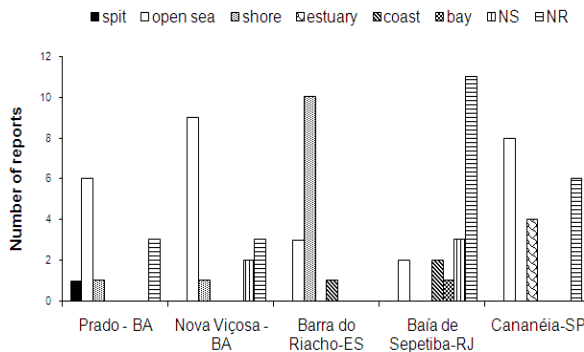
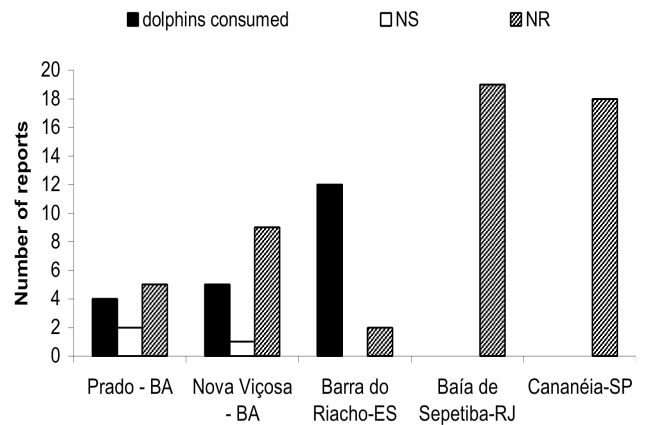


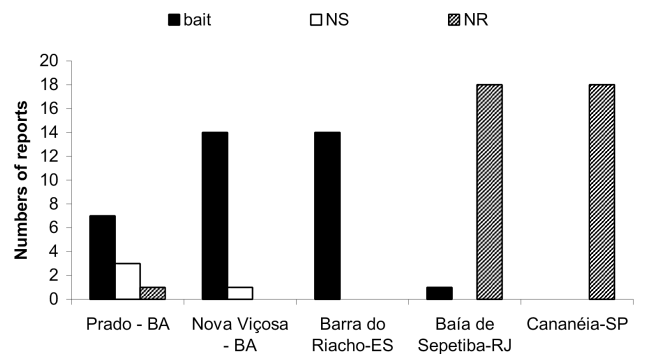
Fig. 3. Areas described by the artisanal fishermen as *Sotalia guianensis* accidental entanglement sites in Prado (BA), Nova Viçosa (BA), Barra do Riacho (ES), Sepetiba Bay (RJ) and Cananéia (SP). NS = Do not know: number of interviewees that did not know the answer for this question; NR = No Response: number of fishermen who did not answer to the question. NR and NS categories are independent of each other. Interviewees NS are not part of the number of respondents NR.

A total of 22% (n=17) of interviewees stated that they discarded the carcasses entangled dolphins in the water. Informants reported that carcasses are discarded in only two regions, Sepetiba Bay (RJ) 12% (n=2) and Cananéia (SP) 88% (n=15). Some interviewees did not know whether the carcasses were discarded or not, while others did not answer that the carcasses were discarded but that they could be used as bait or for consumption.

In Sepetiba Bay (RJ), some fishermen reported delivering the carcasses to environmental agencies (i.e., Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA), whereas in Cananéia (SP) some interviewees said that carcasses were delivered to local research institutes (i.e., Instituto de Pesquisas Cananéia – IPeC and Instituto Oceanográfico da Universidade de São Paulo–IOUSP).



4. Frequency of reports on the consumption of *Sotalia guianensis* accidentally captured by artisanal fishery in five study areas of northeastern and southeastern Brazil. NS = Do not know: number of interviewees that did not know the answer for this question, and NR = No Response: number of interviewees who did not answer to the question. NR and NS categories are independent of each other. Interviewees NS are not part of the number of respondents NR.



5. Frequency of reports on using the accidentally captured *S. guianensis* meat as bait in artisanal fishery. NS = Do not know: number of interviewees that did not know the answer for this question, and NR = No Response: number of interviewees who did not answer to the question. NR and NS categories are independent of each other. Interviewees NS are not part of the number of respondents NR.

DISCUSSION AND CONCLUSIONS

Estuarine dolphins entanglement was reported in the five areas investigated here. Some interviewees did not report accidental dolphin capture probably due to entanglement being a controversial issue (FERREIRA, 2004). Accidental entanglement in artifacts used in artisanal fishery is reported in northeastern, southeastern and southern Brazil (SIMÕES-LOPES & XIMENEZ, 1990; SICILIANO, 1994; SIMÕES-LOPES & PAULA, 1997; PRZBYLSKI & MONTEIRO-FILHO, 2001; REIS, 2002; FERREIRA *et al.*, 2006; BENEDITTO & SICILIANO, 2007; SOUZA & BEGOSSI, 2007).

Fishermen use different fishing tactics according to the kind of prey to be caught (BEGOSSI, 1992). Interviewees from the five areas sampled in this study reported that gillnets are considered the only artifacts responsible for the estuarine dolphin entanglement. According to LODI & RODRIGUES (2007), cetaceans suffer wounds and are frequently killed in fishing nets. Dolphin entanglement in nets must be monitored since this is the artifact most frequently used artifact during artisanal fishing activities.

A positive correlation probably exists between the economic value of fish species captured by fishermen and those consumed by estuarine dolphins (ZAPPES, 2007). This fact could indicate a possible existence of the competition between artisanal fishermen and estuarine dolphins because both of them have interest in same fish species. Eight families of fish have been described as prey of estuarine dolphin, and seven of them are described as present in its diet (MONTEIRO-FILHO, 1995; SILVA & BEST, 1996; DI BENEDITTO, *et al.*, 2001; REIS, 2002; SANTOS *et al.*, 2002; DI BENEDITTO & RAMOS, 2004). These fish can be found throughout the water column, and probably during the predation. The estuarine dolphins can be possible captured by gillnets at different depths. This fact indicates the existence of the superposition between artisanal fishermen and estuarine dolphins because both of them have interest in some species fish in common. However, there is no direct competition by preys of economic value captured by fishermen and preys present in the animal's diet as suggested by REIS (2002) and FERREIRA (2004), because is necessary consider the large of existent fishery stocks and prey amplitude captured by fishermen and estuarine dolphins. Future studies are necessary to confirm the inexistence of direct competition between fishermen and *S. guianensis*, by analyzing stomach contents from natural dead animals found stranded on the coast.

According to the interviewees, the enmeshed animals can cause damage to the fishing artifacts, since the animals steal fish from the nets and may tear them apart causing immediate losses for the fishermen. This damage already is reported by SIMÕES-LOPES (2005) from Santa Catarina state in south Brazil. Installing warning indicators on nets is a strategy that may decrease the number of accidental estuarine dolphin capture in gillnets. The pulse emitted make the artifact visible, since these animals "can visualize" the environment through sound. Changing the net placement pattern in water is also recommended, since

the nets are usually placed near to the coast which is a typical site for dolphin occurrence according to BOROBIA *et al.* (1991), SILVA & BEST (1996), HAYES (1998), GEISE *et al.* (1999) and AZEVEDO *et al.* (2005; 2007).

The accidental capture sites were different according to the location. Probably the environment became the act of fishing takes place in variable environment condition in each area.

The interviewees reported that when an accidental capture of estuarine dolphin occurs, the carcass can be used as food, bait or simply be discarded. Consumption would be a kind of utilization of the enmeshed animal carcass and does not indicate a common eating habit. The killing of these animals is described as sporadic and accidental by the fishermen, and therefore is not considered intentional. SICILIANO (1994), PRZBYLSKI & MONTEIRO-FILHO (2001), FERREIRA (2004) and FERREIRA *et al.* (2006) also described the consumption of dolphin meat by traditional communities in the north, northeast, southeast and south of Brazil.

In this study, the non-consumption of enmeshed of estuarine dolphin was explained by the excess of fat found in the animal's body since this can cause intestinal illness, besides giving the meat a bad taste. In some reports, communities claimed not to consume the dolphin carcasses due to their thick layer of fat (FERREIRA *et al.*, 2006). The fact that the fishermen in Sepetiba Bay (RJ) did not report dolphin meat consumption can be explained by the presence of research institutions which carry out projects geared towards environmental education in these communities. This may interfere with the utilization of dolphin carcasses by the community, decreasing or perhaps impeding this practice in these locations. Fishermen from Cananéia (SP) did not report dolphin meat consumption since discarding the dead enmeshed dolphins is a local common practice.

In Prado (BA), Nova Viçosa (BA), Barra do Riacho (ES) and Sepetiba Bay (RJ), the meat is reported to be used as bait in shark fishing, with the skin and fat being chopped up and placed in the gillnets. According to the interviewees, the meat is only used as bait when the animal is found dead on the artifact. Apparently there is no intention to capture the dolphin, and this entanglement is considered accidental. SICILIANO (1994) and REIS (2002) also report the use of carcasses as bait in artisanal fishery in Brazil.

Some fishermen in Cananéia (SP) reported that when carcasses of *S. guianensis* individuals are found, the fishermen collect and take them to the Instituto Oceanográfico from the Universidade de São Paulo (IOUSP) or to the Instituto de Pesquisas Cananéia (IPEC). This attitude helps further research on this species and can be related to the conduction of projects in both areas that promote environmental education in the community, informing them about the importance of preserving the species and the benefits gained from organized dolphin-watching tourism.

Despite the absence of conflict between *S. guianensis* and the fishermen being mentioned by the fishermen, the accidental capture can be considered a real

impact over the estuarine dolphin. Accidental capture in artifacts used in artisanal fishery is the main negative human influence on sea mammal species (SIMÕES-LOPES & PAULA, 1997), especially due to the fact that some dolphin groups live in certain areas on the Brazilian coast, which may lead to a decrease in the number of these individuals in these locations (ROSSI-SANTOS *et al.*, 2007).

Even with the presence of institutes located in Sepetiba Bay (RJ) and Cananéia (SP) which work for the preservation of *S. guianensis* in conjunction with the community, entanglement of estuarine dolphin still occurs in these places. Measures must be taken to encourage studies related to the preservation of the species (SIMÕES-LOPES & PAULA, 1997) in addition to other that envision a new scenario for biological knowledge of delphinids in the South Atlantic (SICILIANO *et al.*, 2007). These tasks must be done with the active participation of local communities (SILVANO & BEGOSSI, 2002; SOUZA & BEGOSSI, 2007) where

the environmental educational programs may serve as a vehicle for conservation, and key individuals from each community should be included in management programs as proposed by FILLA *et al.* (2008). Information gathered in this study contributes to define strategies for estuarine dolphin conservation by supporting discussion and social strategies to reduce the negative anthropic impacts on the species' natural population.

ACKNOWLEDGMENTS

We would like to thank the Programa de Pós-graduação em Ciências Biológicas Comportamento e Biologia Animal at Universidade Federal de Juiz de Fora, Brazil, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES, the Instituto de Pesquisas Cananéia, the Instituto Aqualie, the fishermen living in the study areas, Carlos Alberto Botti by elaboration of the questionnaire, Luiz Cláudio P. S. Alves by review in English, Sérgio Carvalho Moreira by elaboration of the map and Natália dos Santos Mamede.

REFERENCES

- AZEVEDO AF, SC VIANA, AM OLIVEIRA & M VAN SLUYS. 2005. Group characteristics of marine tucuxis (*Sotalia fluviatilis*) (Cetacea: Delphinidae) in Guanabara Bay, south-eastern Brazil. **J. Mar. Biol. Ass. UK.** 85: 209-212.
- AZEVEDO AF, AM OLIVEIRA, SC VIANA & M VAN SLUYS. 2007. Habitat use by marine tucuxis (*Sotalia guianensis*) (Cetacea: Delphinidae) in Guanabara Bay, south-eastern Brazil. **J. Mar. Biol. Ass. UK.** 87: 201-205.
- BEGOSSI A. 1992. The use of optimal foraging theory in the understanding of fishing strategies: A case from Sepetiba Bay (Rio de Janeiro State, Brazil). **Hum. Ecol.** 20(4): 463-475.
- BOROBIA M, S SICILIANO, L LODI & W HOEK. 1991. Distribution of the South American dolphin *Sotalia fluviatilis*. **Can. J. Zoo.** 69: 1025-1039.
- DI BENEDITTO APM, RMA RAMOS, NRW LIMA & I MANICA (eds.). 2001. **Os golfinhos: origem, classificação, captura accidental, hábito alimentar.** Porto Alegre: Cinco Continentes Editora.
- DI BENEDITTO APM, CE REZENDE & LR MONTEIRO. 2004. **Guia para estudo de cetáceos. Interações com atividades de pesca v. 1.** Campos dos Goytacazes, Universidade Estadual do Norte Fluminense Darcy Ribeiro.
- DI BENEDITTO APM & RMA RAMOS. 2004. Biology of the marine tucuxi dolphin (*Sotalia fluviatilis*) in south-eastern Brazil. **J. Mar. Biol. Ass. UK.** 84: 1245-1250.
- DI BENEDITTO APM & S SICILIANO. 2007. Stomach contents of the marine tucuxi dolphin (*Sotalia guianensis*) from Rio de Janeiro, south-eastern Brazil. **J. Mar. Biol. Ass. UK.** 87: 253-254.
- FERREIRA MCE. 2004. **Percepção da comunidade local sobre o boto-cinza *Sotalia guianensis* (Cetacea: Delphinidae) na APA de Anhatomirim: etnoecologia, conservação e conflitos ambientais.** Univ. Fed. de Santa Catarina. Florianópolis, Monogr.
- FERREIRA MCE, N HANAZAKI & PC SIMÕES-LOPES. 2006. Os conflitos ambientais e a conservação do boto-cinza na visão da comunidade da Costeira da Armação, na APA de Anhatomirim, Sul do Brasil. **Natureza & Conservação** 4(1): 64-74.
- FILLA GF, ACG ATEM, TL BISI, LV OLIVEIRA, C DOMIT, M GONÇALVES, L HAVUKAINEN, F OLIVEIRA, RG RODRIGUES, FCW ROSAS, AR SANTOS-LOPES & ELA MONTEIRO-FILHO. 2008. Proposal for creation of a "zoning with regulation of use in the Cananéia estuarine-lagoon complex" aiming the conservation of the estuarine dolphin *Sotalia guianensis* (van Bénédén, 1864) (Cetacea: Delphinidae). **Panajás** 3: 75-83.
- FREITAS NETTO R. 2003. **Levantamento das artes de pesca no litoral do estado do Espírito Santo e suas interações com cetáceos.** Univ. Est. do Norte Fluminense Darcy Ribeiro. Campos Dos Goytacazes, MSc Diss.
- GEISE L, N GOMES & R CERQUEIRA. 1999. Behaviour, habitat use and population size of *Sotalia fluviatilis* (Gervais, 1853) (Cetacea, Delphinidae) in the Cananéia Estuary region, São Paulo, Brazil. **Revta. Bras. Zoo.** 59(2): 183-194.
- HAYES AJS. 1998. **Aspectos da actividade comportamental diurna da forma marinha do tucuxi *Sotalia fluviatilis* Gervais, 1853 (Cetacea - Delphinidae), na Praia de Iracema (Fortaleza - Ceará - Brasil).** Univ. do Algarve. Faro, Rel. de licenciatura.
- INSTITUTO BRASILEIRO DO MEIO AMBIENTE E DOS RECURSOS NATURAIS RENOVÁVEIS (IBAMA). 2001. **Mamíferos Aquáticos do Brasil: Plano de Ação, versão II.** LC MACHADO (Coord.). Brasília: MMA/IBAMA.
- LODI L & MT RODRIGUES. 2007. Southern right whale on the coast of Rio de Janeiro State, Brazil: conflict between conservation and human activity. **J. Mar. Biol. Ass. UK.** 87: 105-107.
- MONTEIRO-FILHO ELA. 1995. Pesca interativa entre o golfinho *Sotalia fluviatilis guianensis* e a comunidade pesqueira da região de Cananéia. **Bol. Inst. Pesca** 22(2): 15-23.
- PAZ VA & A BEGOSSI. 1996. Ethnoichthyology of Gamboa fishermen of Sepetiba Bay, Brazil. **Journal of Ethnobiology** 16 (2): 157-168.
- PRZYBSKI CB & ELA MONTEIRO-FILHO. 2001. Interação entre pescadores e mamíferos marinhos no litoral do Estado do Paraná-Brasil. **Biotemas** 14(2): 141-156.
- RANDI MAF, P RASSOLIN, FW ROSAS & ELA MONTEIRO-FILHO. 2008. Padrão de cor de pele, p. 11-16. *In:* ELA MONTEIRO-FILHO & KDKA MONTEIRO (orgs.). **Biologia, Ecologia e Conservação do Boto-cinza.** São Paulo: Páginas e Letras Editora e Gráfica.
- REIS MSS. 2002. **O boto *Sotalia fluviatilis* (Gervais, 1853) (Cetacea, Delphinidae) no litoral de Ilhéus, Bahia: comportamento e interações com as atividades pesqueiras.** Univ. Est. de Santa Cruz. Ilhéus, MSc. Diss.
- ROSSI-SANTOS MR, L WEDEKIN & ELA MONTEIRO-FILHO. 2007. Residence and site fidelity of *Sotalia guianensis* in the Caravelas

- River Estuary, eastern Brazil. **J. Mar. Biol. Ass. UK.** 87: 207-212.
- SANCHES RA. 2004. Caiçaras e a Estação Ecológica de Juréia-Itatins. Histórico de ocupação no contexto político, econômico, social e ambiental do Vale do Ribeira, p. 349-359. *In*: OAV MARQUES & W DULEBA (eds.). **Estação Ecológica Juréia-Itatins. Ambiente físico, flora e fauna.** Ribeirão Preto: Holos Editora.
- SANTOS MCO, S ROSSO, RA SANTOS, SHB LUCATO & M BASSOI. 2002. Insights on small cetacean feeding habits in southeastern Brazil. **Aquatic Mammals** 28(1): 38-45.
- SICILIANO S. 1994. Review of small cetaceans and fishery interactions in coastal waters in Brazil. **Rep. Int. Whal. Commn.** 15: 241-250.
- SICILIANO S, RAM RAMOS, APM Di BENEDITTO, MCO SANTOS, AB FRAGOSO, J LAILSON BRITO JR, AF AZEVEDO, AF VICENTE, E ZAMPIROLI, FS ALVARENGA, L BARBOSA & NRW LIMA. 2007. Age and growth of some delphinids in south-eastern Brazil. **J. Mar. Biol. Ass. UK.** 87: 293-303.
- SILVA VMF & RC BEST. 1996. Freshwater dolphin/fisheries interactions in the central Amazonian (Brazil). **Amazoniana** 14(1/2): 165-175.
- SILVANO RAM & A BEGOSSI. 2002. Ethnoichthyology and fish conservation in the Piracicaba River (Brazil). **Journal of Ethnobiology** 22(2): 285-306.
- SIMÕES-LOPES PC & A XIMENEZ. 1990. O impacto da pesca artesanal em área de nascimento do boto-cinza, *Sotalia fluviatilis*, (Cetacea, Delphinidae) SC, Brasil. **Biotemas** 3(1): 67-72.
- SIMÕES-LOPES PC & GS PAULA. 1997. Mamíferos aquáticos e impacto humano: diretrizes para conservação e “utilização não letal”. **Aquitaine Ocean** 3: 69-78.
- SIMÕES-LOPES PC. 2005. Perseguição implacável: o homem contra a fauna, p. 246-252. *In*: J. GEHLEN (ed.). **O Luar do Delfim.** Joinville: Editora Letradágua.
- SOUZA SP & A BEGOSSI. 2007. Whales, dolphins or fishes? The ethnotaxonomy of cetaceans in São Sebastião, Brazil. **Journal of Ethnobiology and Ethnomedicine** 3: 9.
- WEDEKIN LL, MA DA-RÉ, FG DAURA-JORGE & PC SIMÕES-LOPES. 2005. O uso de um modelo conceitual para descrever o cenário de conservação do boto-cinza na Baía Norte, Sul do Brasil. **Natureza e Conservação** 3(1): 59-67.
- ZAPPE CA. 2007. **Estudo etnobiológico comparativo do conhecimento popular de pescadores em diferentes regiões do litoral brasileiro e implicações para a conservação do boto-cinza *Sotalia guianensis* (van Bénédén, 1864) (Cetacea, Delphinidae).** Univ. Fed. de Juiz de Fora. Juiz de Fora, MSc. Diss.