

**STRANDINGS, FISHERY INTERACTIONS AND MORTALITY OF THE ESTUARINE DOLPHIN (*SOTALIA GUIANENSIS*, VAN BÉNÉDEN, 1864) IN THE ABROLHOS BANK, BETWEEN 2002 AND 2006.**

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**1. Introduction**

Gathering stranding data systematically are crucial to bring information about spatial distribution, seasonal movements, feeding habits and mortality causes in wild marine mammal populations (Woodhouse, 1991).

Since 1990, the Instituto Baleia Jubarte/ Humpback Whale Institute (IBJ) have been oportunistically collecting data on stranded animals along the Abrolhos Bank, Eastern Brazilian coast. More recently, in 2002, a Stranding Program was initiated, aiming a systematic attendance of any stranding along 420 km of coast.

Previous studies indicated that the Abrolhos Bank, located between Bahia and Espírito Santo States, is the area in which the estuarine dolphin *S. guianensis* goes far off the coast, reaching the Abrolhos archipelago, 70 km from the mainland (Borobia *et al.* 1991; Rossi- Santos *et al.* 2003b). This fact also highlights about the importance of obtaining information on mortality and impacts to these dolphins.

The present work aims to provide updated information about *S. guianensis* mortality in the Abrolhos Bank, analyzing stranding events of this species in a four year period.

**Material and Methods:**

*Study area*

The Abrolhos Bank is an enlargement of the eastern continental shelf, reaching about 240 km of extension in front of Caravelas city (Telles, 1998). Its southern limit lies at Rio Doce river mouth, in Espírito Santo State, whereas the northern limit is Prado City, in Bahia State (for a detailed description see Rossi-Santos and Wedekin, 2006).

Beyond humpback whales (*Megaptera novaengliae*), which use the region as a breeding ground (eg. Engel, 1996; Siciliano, 1997; Martins *et al.* 2001), other cetaceans are commonly registered for the Bank, as the southern right whale (*Eubalaena australis*) (Engel *et al.* 1997), the bottlenose dolphin (*Tursiops truncatus*), the rough-toothed dolphin *Steno bredanensis* and the estuarine dolphin (Rossi- Santos *et al.* 2003a).

*Field Procedures*

The sampled area covered about 420 km, from Belmonte city, Bahia State (20° 00 S ; 40° 09 W) to Barra do Riacho city, Espírito Santo State (15° 44 S ; 38° 53 W) (figura 01). Annually, informative campaigns were performed with distribution of posters and folders regarding the activities of our stranding response program. Classes were also performed for students, Fire Brigade and general community. Two telephones, plus one cellular phone were available, providing a response of 24 hours per day to any information about stranding events. The calls

were registered in a standard datasheet and a team, including a veterinarian, was mobilized to perform the stranding attendance *in situ*.

The utilized field protocol followed REMANE/ IBAMA (2005) registering stranding data such as date, place, total length of the animal and probable cause of death, whenever was possible. The carcasses were classified following codes proposed by Geraci and Lounsbury (1993): 01- Live Animals, 02- Carcass in Good Condition (Fresh/Edible), 03- Fair (Decomposed, but organs basically intact), 04- Poor (Advanced decomposition) and 05- Mummified or Skeletal Remains.

### Results:

During the period, comprising 1990 to 2001, before the Stranding Program implementation, just three *S. guianensis* strandings were registered, two of them coming from fishing net entanglement. These animals are not analyzed in the present study.

Nineteen *S. guianensis* strandings were registered between January 2002 and March 2006, in the study area plus one more in Ilhéus, Bahia State, about 120 km north of our study area's edge, totalizing 20 animals (table 1; figure 2).

Regarding carcasses decomposition, 10 were classified as code 01, three individuals as code 02, another three as code 03, three code 05 and one more unregistered. It was possible to identify the sex of 10 stranded animals (8 males and 2 females).

Anthropic signals, such as fishing net marks on the animal's body (figure 2A) or tissue cutting and removal (figure 2B), as well as fat, muscles and organs, were registered in 80% (n=16) of the strandings. Net marks appeared in 50% (n=10) of the cases, particularly the individual (05C1422/024), characterized by an old mark of amputation in the left pectoral fin. Tissue removal occurred in 35 % (n=7) of the strandings. In three animals we identified both anthropic signals.

The total length was defined for nine animals (45% of total), varying from 1,52 to 1,99 meters, with mean of 1,79 meters.

Necropsies were conducted in 10 animals, in which the probable cause of death in nine individuals was the fishing net entanglement and in one animal the cause of death was a lung edema. We could not state the cause of death in 50% of the cases, either because the late decomposition of the animal or because the tissue removal by local people. Parasites were found in the stomach of five animals (one identified as *Braunina cordiformis*) and in the lungs of another one.

We also collected stomach contents for eight individuals, finding partially digested fish (one identified as *Trichiuridae*) and otholits in seven dolphins, squid beaks in two animals and shrimps in only one individual.

A computerized tomography of two *S. guianensis* heads (05C1421/039 e 05C1422/060) aiming to initiate the standardization of this technique for estuarine dolphins.

### Discussion:

After the Stranding Program establishment we verified an increase of stranding attendance, comparing with a previous opportunistic approach (1990 to 2001: 3 strandings and mean = 0,25 animals/year), registering 20 individuals (mean = 4,75 animals/year) in a four years period.

The proportion male: female was 8:2, in the animals we could define the sex. Even the small sample does not allow for a statistic analysis, we found similarities in this proportion to the literature, also finding a higher occurrence of male strandings, as Freitas-Neto and Barbosa (2003), which identified a whole sample of eight stranded *S. guianensis* as males. Melo and Di

Benedito (2003), sampling 80 stranded estuarine dolphins, found 50 males and 30 females. In our study, six of eight registered males presented signals of fishing net entanglement.

The dietary differences among males and females, as well the population's sexual structure exposed to entanglements is pointed as probable influences in the differences of strandings regarding animal sexes (Oliveira, 2003). Beyond this, the behavioral differences must be considered, in which a mother (female) could increase efforts to avoid nets and protect their calves and, in contrary the males could behave in a more exploratory way.

In the necropsied animals we could state the major cause of death as being the fishing net entanglement, registering a very high occurrence of anthropic signals with 80% of the animals presenting net marks and/or tissue removal. At least in two cases we could confirm with fishermen that the animal would be utilized for shark bait, as usual in the Abrolhos Bank region (IBJ unpublished data).

This isolated fact plus the results presented herein highlights for the importance to quantify in future studies the fisheries impacts for the estuarine dolphins in the region.

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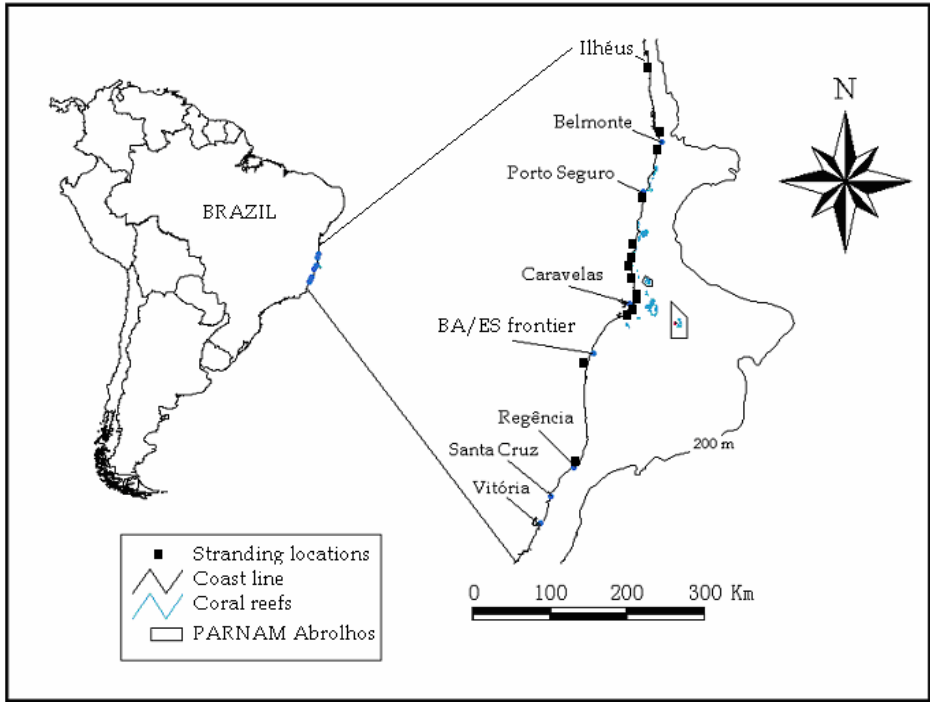


Figure 1. Study area map in the Bahia and Espírito Santo States, encompassing the Abrolhos Bank. Stranding locations are represented by black squares.



Figure 2: Types of Anthropic signals, indicated by narrows: (A) fishing net marks and (B) tissue remotion by cutting.

**Table 1.** Strandings of *Sotalia guianensis* recorded by IBJ between January 2002 and March 2006.

| Date       | Locality                | Latitude/ Longitude     | Sex    | Total Length (m) | Status of the carcass | Necropsy | Anthropic/ Interaction           | Cause of Death | IBJ register |
|------------|-------------------------|-------------------------|--------|------------------|-----------------------|----------|----------------------------------|----------------|--------------|
| 23/03/2002 | Corumbau (BA)           | 16,88333 S / 39,11666 W | Indef. | 1,99             | 4                     | Não      | Não                              | Desc.          | 05C1420/022  |
| 11/04/2002 | Belmonte (BA)           | 15,74702 S / 38,89029 W | Indef. | ---              |                       | Sim      | Emalhe                           | Emalhe         | 05C1420/021  |
| 11/04/2002 | Alcobaça (BA)           | 17,54083 S / 39,19075 W | Indef. | ---              | 2*                    | Não      | Emalhe & Retalhado               | Emalhe         | 05C1420/023  |
| 13/11/2002 | Belmonte (BA)           | 15,85830 S / 38,89170 W | F      | ---              | 2                     | Não      | Emalhe e amputação de peitoral** | Desc.          | 05C1422/024  |
| 17/11/2002 | Caravelas (BA)          | 17,75949 S / 39,20361 W | Indef. | ---              | 2                     | Não      | Emalhe & Retalhado               | Emalhe         | 05C1420/025  |
| 03/02/2003 | Alcobaça (BA)           | 17,47292 S / 39,19282 W | Indef. | 1,52             | 4                     | Sim      | Não                              | Desc.          | 05C1420/026  |
| 01/03/2003 | Caravelas (BA)          | 17,73995 S / 39,18987 W | Indef. | ---              | 5                     | Não      | Retalhado                        | Desc.          | 05C1420/027  |
| 17/03/2003 | Caravelas (BA)          | 17,74703 S / 39,23587 W | M      | ---              | 2                     | Sim      | Emalhe & Retalhado               | Emalhe         | 05C1421/028  |
| 31/05/2003 | Caravelas (BA)          | 17,72908 S / 39,18049 W | Indef. | ---              | 2                     | Não      | Retalhado                        | Desc.          | 05C1420/029  |
| 30/08/2003 | Alcobaça (BA)           | 17,6896 S / 39,1359 W   | M      | 1,9              | 2                     | Sim      | Emalhe                           | Emalhe         | 05C1421/032  |
| 09/01/2004 | Sta. Cruz Cabralia (BA) | 16,33937 S / 39,00804 W | M      | 1,82             | 3                     | Sim      | Emalhe                           | Emalhe         | 05C1421/038  |
| 13/01/2004 | Regência (ES)           | 19,67110 S / 39,88291 W | M      | 1,71             | 2                     | Sim      | Emalhe                           | Emalhe         | 05C1421/039  |
| 24/02/2005 | Prado (BA)              | 17,34563 S / 39,21594 W | M      | 1,82             | 2                     | Sim      | Emalhe                           | Emalhe         | 05C1421/049  |
| 21/03/2005 | Prado (BA)              | 17,32435 S / 39,21939 W | M      | ----             | 3                     | Não      | Emalhe                           | Emalhe         | 05C1421/050  |
| 24/03/2005 | Prado (BA)              | 17,06265 S / 39,17218 W | M      | 1,54             | 3                     | Sim      | Não                              | Desc.          | 05C1421/051  |
| 21/04/2005 | Ilhéus (BA)             | 14,84008 S / 39,03781 W | F      | 1,98             | 2                     | Sim      | Não                              | Edema Pulmonar | 05C1422/060  |
| 12/07/2005 | Prado (BA)              | 17,30770 S / 39,22138 W | Indef. | ---              | 5                     | Não      | Retalhado                        | Desc           | 05C1420/052  |
| 26/09/2005 | Itaunas (ES)            | 18,42489 S / 39,70154 W | M      | 1,86             | 4                     | Sim      | Não                              | Desc           | 05C1421/054  |
| 23/11/2005 | Prado (BA)              | 17,11608 S / 39,18456 W | Indef. | ---              | 2                     | Não      | Retalhado                        | Desc           | 05C1420/059  |
| 09/03/2006 | Itaunas (ES)            | 18,25466 S / 39,42086 W | Indef. | ---              | 5                     | Não      | Não                              | Desc           | 05C1420/075  |

\* Fishermen brought only axial skeleton.

\*\* Old process, healed, no relation to death.