

The striped dolphin, *Stenella coeruleoalba* (Cetacea: Delphinidae), on the coast of São Paulo State, southeastern Brazil

F. C. W. Rosas^{1,3}, E. L. A. Monteiro-Filho^{2,3}, J. Marigo⁴, R. A. Santos⁵,
A. L. V. Andrade⁶, M. Rautenberg³, M. R. Oliveira^{3,7}, and M. O. Bordignon³

¹Instituto Nacional de Pesquisas da Amazônia (INPA), Laboratório de Mamíferos Aquáticos, Caixa Postal 478, Manaus, AM, 69011-970, Brazil

²Universidade Federal do Paraná (UFPR), Departamento Zoologia, Caixa Postal 19020, Curitiba, PR, 81.531-970, Brazil

³Instituto de Pesquisas Cananêcia (IPEC), Rua João Salim, Lote 26, Quadra Y, Parque Xangrilá, Campinas, SP, 13.098-106, Brazil

⁴do Dr R. A. dos Santos, 420142, São Paulo, SP, 01231-010, Brazil

⁵Fundação Universidade do Rio Grande (FURG), Departamento Oceanografia, Rio Grande, RS, Brazil

⁶Universidade Federal de Pelotas (UFPEL), Inst. Biologia, Departamento de Morfologia, Pelotas, RS, Brazil

⁷Pós-Graduação em Zoologia, Centro de Estudos do Mar/UFPR, Pontal do Sul, PR, Brazil. Universidade Federal do Paraná, Departamento Zoologia, Caixa Postal 19020, Curitiba, PR, 81.531-970, Brazil

Abstract

Data on age, stomach contents, and parasites of a 244-cm long male striped dolphin, *Stenella coeruleoalba* (Meyen, 1833), stranded in São Paulo State, southeastern Brazil, are presented with the aim of contributing to better knowledge on the biology of this species in the southwestern Atlantic. The estimated age of the dolphin, according to the number of growth layer groups (GLGs) counted in the dentine, was eight years. Both testes had spermatozoa inside the seminiferous tubules, indicating it was sexually mature. The weight of the combined testes was 69.5 g and the testes mass/body mass ratio was 0.06%. Only cephalopod beaks of the Ommastrephidae and Enoploteuthidae families were found inside the stomach, all of them belonging to oceanic species. The cephalopods of the latter family are cited here for the first time as being part of the diet of *S. coeruleoalba*. Cysts of *Monorygia grimaldii* (found in the abdominal cavity, blubber, and epididymis), acantocephalans of the genus *Bolbossoma* (found in the intestines), and the nematodes, *Halocercus brasiliensis* (found in the lungs), and *Anisakis* sp. (found in the stomach and intestines) were recorded during the necropsy. This is the second record of *M. grimaldii* in Brazilian waters and the first record of *H. brasiliensis* in *S. coeruleoalba*. Although some of these parasites are common and non-pathogenic to dolphins in general, the high degree of parasite infestation observed may be related to the cause of the death of the dolphin. A review of records of *S. coeruleoalba* along the coast of Brazil is also presented and suggests that striped

dolphins have a much larger distribution than previously thought in the southwestern Atlantic.

Key words: striped dolphin, *Stenella coeruleoalba*, age, reproductive aspects, stomach content, parasites, Cananêcia, Brazil.

Introduction

The striped dolphin, *Stenella coeruleoalba* (Meyen, 1833), is an oceanic species, which occurs in temperate and sub-temperate waters throughout the world (Perrin *et al.*, 1994; Jefferson *et al.*, 1993; Pinedo *et al.*, 1992). It is characterized by distinct black stripes, which go from the eyes to the anus and from the eyes to the pectoral flippers. The dorsal color is dark gray, or blue-black graphite, and the belly is light-gray, or white. The beak is distinct, with a crease separating it from the melon (Perrin *et al.*, 1994; Jefferson *et al.*, 1993; Pinedo *et al.*, 1992). They are gregarious animals and can form groups of approximately 100-500 individuals (Jefferson *et al.*, 1993). They frequently associate with shoals of tuna, and can be incidentally caught in the eastern tropical Pacific (Jefferson *et al.*, 1993; Pinedo *et al.*, 1992).

The *Stenella coeruleoalba* holotype comes from an animal harpooned near the mouth of the Rio de la Plata, in the southwestern Atlantic (Perrin *et al.*, 1994), and until recently, records of this species in the southwestern Atlantic have been reported only for the Argentinean, Uruguayan, and southern Brazilian (Rio Grande do Sul) coasts (Ximenez

et al., 1972; Brownell & Praderi, 1976; Pinedo & Castello, 1980; Ott & Danilewicz, 1996). However, Lucena *et al.* (1998) reported the stranding of a male of this species in 1990 on the Praia de Cabedelo, coast of Paraíba State, and Maia-Nogueira *et al.* (2001) reported a female on Praia do Forte, coast of Bahia State, both in northeastern Brazil.

In this paper, we report the occurrence of a live stranding, with subsequent natural death, of a striped dolphin on the Praia de Fora, on Ilha Comprida, in southeastern Brazil. Information on the stomach contents, parasites, age, and sexual maturity are presented, with the intention of providing a better knowledge of the biology of this species on the southwestern Atlantic coast.

Materials and Methods

The identification of the individual was based on the color of the animal, total length, and cranial characteristics (lack of deep palatal grooves, rostrum width at base greater than 1/3 of its length). The external measurements were carried-out according to Norris (1961). During necropsy, the testes, together with the epididymis, were removed and fixed in 10% formalin for 24 h and later preserved in 70% alcohol until they were prepared on histological slides. The measurements of gonad length and width were carried-out after fixation in the laboratory. The testes were weighed together with the epididymides.

The age of the specimen was estimated by counting the growth layer groups (GLGs) in the dentine and cementum. Four teeth were removed from the mandibles and after being decalcified in RDO (a commercial decalcifying agent), they were sectioned using a freezing microtome along the mid-longitudinal plane. Teeth sections of 25 µm were obtained for the buccal-lingual orientation. Only the central sections were used, which were stained with Harris's hematoxylin and mounted in pure glycerin, following the method described by Hohn *et al.* (1989).

Internal organs, such as lungs, stomach, and intestines were analyzed separately for the collection of metazoan parasites. The stomach was opened and washed using a sieve with a mesh-size of 150 µm. The stomach contents were sorted for the removal of parasites and identification of food items present. For the collection of intestinal helminths, the small and large intestines were not distinguished anatomically. The length of the intestine was measured and divided into three equal parts with the aim of identifying eventual characteristics of the parasites in relation to their positions throughout the intestine, following the method used by Andrade (1996). Each third of the intestine

was analyzed completely. The intestinal contents also were washed in water using a fine sieve (mesh=150 µm), and the parasites were removed and stained according to Dailey's (1978) method. The lung parasites were removed by making longitudinal cuts in the bronchi and bronchioles. The identification of parasite species was carried-out based on Davey (1971), Delyamure (1955), Dougherty (1944), and Yamaguti (1963).

Results

On 14 February 1999, a live specimen of *S. coeruleoalba* stranded in the municipality of Ilha Comprida, in São Paulo State, southeastern Brazil (25°03'S) (# IPeC 129; Fig. 1). According to the local fishermen, the animal was very weak and died soon after stranding. It was a male with a total length of 244 cm and weight of 115 kg. The external body measurements are given in Table 1. Externally, the dolphin did not have fish net marks. However, superficial lesions were observed on the skin, where large concentrations of *Monorygma grimaldii* cysts were found (Fig. 2).

Reproductive status and age

The average length and width of the testes was 12.36 cm and 2.32 cm, respectively. The combined weight of the gonads (left+right testes, plus epididymides) was 69.5 g, giving a testes mass/body mass ratio of 0.06%. The average diameter of 26 seminiferous tubules, which was measured at random, was 162.92 µm (\pm SE 8.92 µm). Histological analysis revealed the presence of Sertoli cells, spermatogonia, primary spermatocytes, spermatids, and spermatozoa in both testes, indicating that the animal was sexually mature.

In the dentine, eight GLGs were observed after the neonatal line, coinciding with the same number of layers counted in the cementum, giving an age of eight years to the specimen.

Stomach contents

Beaks of 13 cephalopods were found in the stomach, of which nine were identified at the specific epithet level (Table 2) and four were only identified as belonging to the Order Oegopsina. Using the rostral length of the beaks, it was possible to estimate the length of the dorsal mantle and the total weight of the ingested prey (Table 2). No signs of fish consumption were found in the stomach.

Parasites

A large number of parasites were found during necropsy, with cestoidean cysts spread throughout the abdominal cavity, blubber, and muscles. Cysts were removed from subcutaneous tissue and blubber from the ventral region. The same cysts also were found in the right epididymis and were

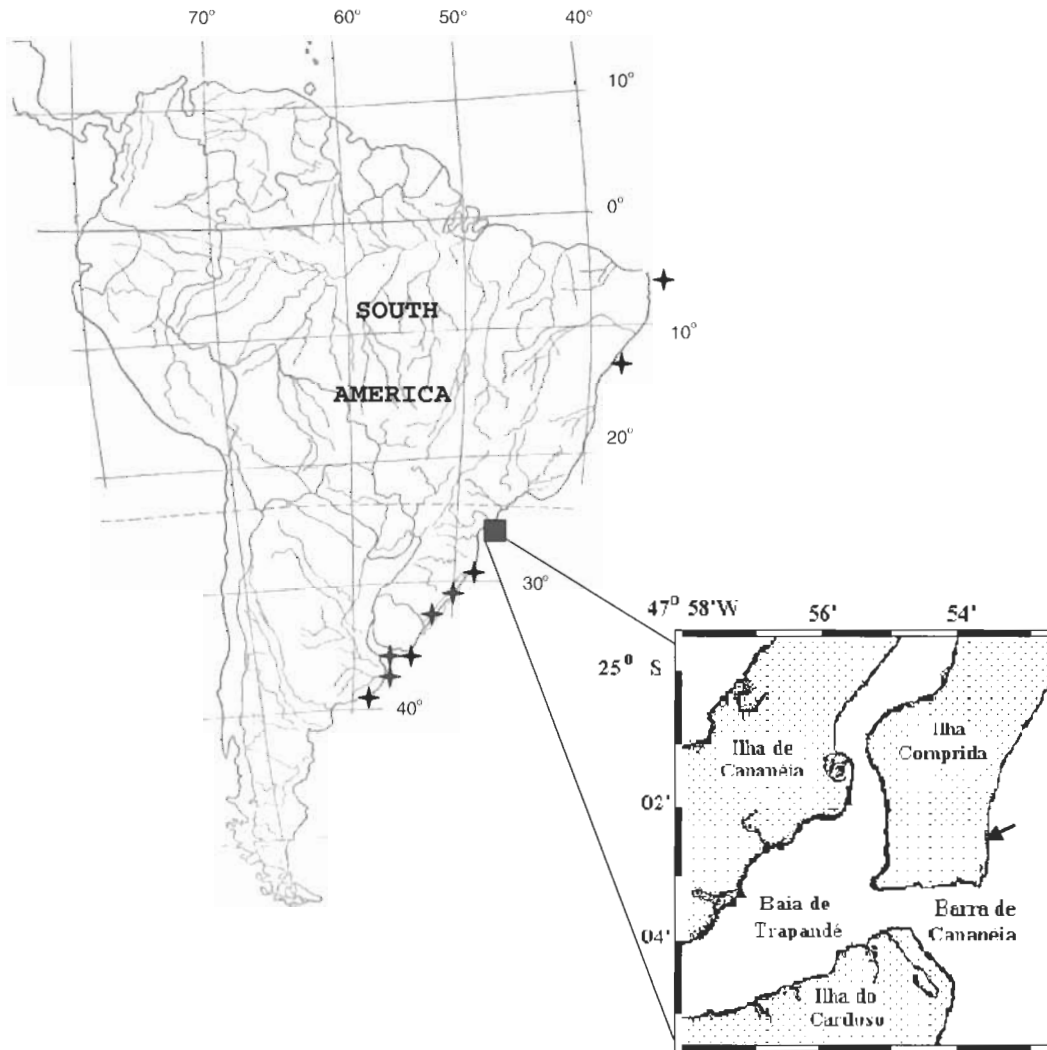


Figure 1. Records of *Stenella coeruleoalba* in the southwestern Atlantic coast. The square mark represents the present study. The arrow in the inset is the location of the stranding of the striped dolphin recorded on the coast of São Paulo State, southeastern Brazil.

identified as larvae of *Monorygmia grimaldii* (Cestoda:Tetraphyllidae). The nematode *Halocercus brasiliensis* (Nematoda:Pseudalidae) was found in the bronchi and bronchioles. In the stomach, sexually immature nematodes belonging to the Anisakidae family were collected.

The total length of the intestine was 17.6 m, where acanthocephalans, nematodes, and cestodeans were recorded. Immature forms of *Bolbosoma* cf. *capitatum* and *Bolbosoma* cf. *turbinella* (Acanthocephala:Polymorphidae) were present throughout the intestine. An unidentified cestodean was found in the first and second thirds of the intestine, while larvae of the *Anisakis* sp. (Nematoda:

Anisakidae) were only present in the last third of the intestine.

Discussion

With the exception of the individuals of *S. coeruleoalba* mentioned by Lucena *et al.* (1998) for the coast of Paraíba State (06°S), and Maia-Nogueira *et al.* (2001) for the coast of Bahia State (12°S), all other records of this species on the southwestern Atlantic, including the holotype, occurred between the latitudes 29° and 38°S (Ximenez *et al.*, 1972; Brownell & Praderi, 1976; Pinedo & Castello, 1980; Ott & Danilewicz, 1996). The specimen of the

Table 1. External measurements of a *Stenella coeruleoalba* (# IPeC 129), stranded on Ilha Comprida, southern coast of São Paulo State, southeastern Brazil.

| Body region | Measurement (cm) |
|--|------------------|
| Total length | 244.0 |
| Tip of beak to centre of eye | 37.0 |
| Tip of beak to base of melon | 12.0 |
| Tip of beak to end of gape | 31.0 |
| Tip of beak to auditory meatus | 42.0 |
| Tip of beak to centre of blow hole | 37.0 |
| Tip of beak to base of dorsal fin | 111.0 |
| Tip of beak to flipper anterior origin | 54.0 |
| Tip of beak to anal opening | 174.5 |
| Span of flukes | 49.0 |
| Anterior length of flipper | 30.0 |
| Posterior length of flipper | 22.0 |
| Maximum width of flipper | 11.0 |
| Dorsal fin base | 43.0 |
| Dorsal fin height | 20.0 |
| Blowhole to base of dorsal fin | 73.0 |

present study is the first record of *S. coeruleoalba* for the coast of São Paulo State, southeastern Brazil, contributing to a better understanding of the

geographical distribution of this species. This record, together with those mentioned by Lucena *et al.* (1998) and Maia-Nogueira *et al.* (2001), suggest that the distribution of the striped dolphin is more extensive than previously supposed on the southwestern Atlantic coast.

The expected body weight (*W*) of a male *Stenella coeruleoalba* with a total length (*L*) of 244 cm would be 175 kg, calculated from the equation: $\log W = -1.856 + 2.975 * \log * \log L$, presented by Miyazaki *et al.* (1981). This value is 1/3 (60 kg) greater than the weight of the stranded dolphin on Ilha Comprida (115 kg), probably indicating some malnutrition of this dolphin.

The smallest mature male *S. coeruleoalba* observed by Kasuya (1972) had a total length of 240 cm; only 4 cm smaller than the specimen of this study. However, according to Perrin & Reilly (1984), the average size of sexual maturity in males of this species varies from 195 to 220 cm. The combined weight of the testes and the age at which 50% of the males reach sexual maturity was estimated by Miyazaki (1977) as 31 g and 8.7 years, respectively. However, males can be sexually mature at seven years (Perrin *et al.*, 1994). Therefore, the results of the gonad weight and age of the specimen presented here fit well with the above-mentioned values.



Figure 2. Male *Stenella coeruleoalba* (# IPeC 129) stranded on the coast of São Paulo State, southeastern Brazil. The arrow indicates the wound on the skin with a high concentration of *Monorygma grimaldii* cysts.

Table 2. Mantle length and total weight estimates of species of cephalopods found in the stomach of *Stenella coeruleoalba* stranded on Ilha Comprida, southern coast of São Paulo State, southeastern Brazil.

| Family | Species | Mantle Length (mm) | Total Weight (g) |
|-----------------|----------------------------------|--------------------|------------------|
| Enoploteuthidae | <i>Abralia veranyi</i> | 40.3 | 3.3 |
| Enoploteuthidae | <i>Abralia veranyi</i> | 40.3 | 3.3 |
| Ommastrephidae | <i>Illex argentinus</i> | 180.0 | 112.5 |
| Ommastrephidae | <i>Ornithoteuthis antillarum</i> | 77.9 | 10.0 |
| Ommastrephidae | <i>Ornithoteuthis antillarum</i> | 214.5 | 91.6 |
| Ommastrephidae | <i>Ornithoteuthis antillarum</i> | 223.6 | 100.3 |
| Ommastrephidae | <i>Ornithoteuthis antillarum</i> | 205.5 | 83.4 |
| Ommastrephidae | <i>Ornithoteuthis antillarum</i> | 187.6 | 68.3 |
| Ommastrephidae | <i>Ornithoteuthis antillarum</i> | 210.0 | 87.4 |

The average diameter of the seminiferous tubules of mature males, obtained by Miyazaki (1977), was 130.8 μm ; approximately 24% smaller than the mean value obtained for the specimen of Ilha Comprida. However, the variation observed in the diameter of the seminiferous tubules of this dolphin was relatively large (SE = 28.92 μm , range 112.0 to 224.0 μm), as was the range of values observed by Miyazaki (1977) in 220 mature males (45.0 to 214.0 μm). This would apparently indicate the normal variation for this species.

Following the maturity criteria adopted by Miyazaki (1977), the stranded dolphin on Ilha Comprida belonged to the category of mature male 'type MII', in which spermatozoa are encountered in more than one, but in less than 20 seminiferous tubules chosen at random. The results of the weight and histological characteristics of the testes, as well as the age of this specimen, revealed that it was young (eight years), but sexually mature.

Information about the feeding habits of *S. coeruleoalba* in the southwestern Atlantic is non-existent. The two specimens which stranded in Rio Grande do Sul (southern Brazil) had empty stomachs (Ott & Danilewicz, 1996), and nothing is mentioned by Lucena *et al.* (1998) and Maia-Nogueira *et al.* (2001) about stomach contents of the striped dolphins stranded along the northeastern coast of Brazil.

Concerning the cephalopods identified in the stomach of the *S. coeruleoalba* here analyzed, it is important to mention that they occur mainly beyond the continental shelf (Nesis, 1987), which certainly reflects the pelagic habit of this dolphin.

Analyses of stomach contents of *S. coeruleoalba* from the coasts of South Africa and Japan revealed a predominance of fish, while cephalopods dominated in the stomachs of specimens of this dolphin in the Mediterranean Sea, including the coasts of France, Spain, and Italy (Perrin *et al.*, 1994). Of the

10 families of cephalopods cited by Perrin *et al.* (1994) as being found in the stomach contents of striped dolphins in the Mediterranean Sea, only Ommastrephidae was recorded in the dolphin analyzed in this study. On the other hand, the Enoploteuthidae family appears to be mentioned here for the first time as being part of the diet of *S. coeruleoalba*. The estimated size of the cephalopod mantles ingested by the stranded animal on Ilha Comprida gave a greater range (40.3 to 223.6 mm) than the size of the cephalopod mantles ingested by *S. coeruleoalba* on the coast of Japan (90.0 to 210.0 mm) (Miyazaki *et al.*, 1973). However, they are different cephalopod species, from different oceans, and therefore do not permit further discussion.

The occurrence of acanthocephalans of the genus *Bolbosoma* and cysts of *Monorygma grimaldii* in *S. coeruleoalba* appear to be directly related to the habitat of the species, since these parasites are present mainly in cetaceans with an oceanic distribution (Dailey & Brownell, 1972). Also, in the same study area, odontocetes with a more coastal distribution, such as *Sotalia guianensis*, *Pontoporia blainvillei*, *Tursiops truncatus*, and *Stenella frontalis*, presented trematodes of the genus *Hadwenius* in their intestines, which apparently reveals a certain degree of overlap in the utilization of food sources for these hosts (Marigo *et al.*, 1999; Andrade *et al.*, 1999). The absence of these trematodes, as well as the exclusive presence of oceanic squid beaks in the stomach contents of this specimen analyzed, corroborate its use of the pelagic habitat.

The occurrence of *Monorygma grimaldii* cysts in the subcutaneous tissue and body cavities has been recorded for several species of cetaceans (Dailey & Brownell, 1972), including *S. coeruleoalba* (Maia-Nogueira *et al.*, 2001). This is the second record of *M. grimaldii* in Brazilian waters and the first record of *Halocercus brasiliensis* for the striped

dolphin. According to Delyamure (1955), *M. grimaldii* uses marine mammals as intermediate hosts (reservoirs), completing their cycle when they reach the adult form in some species of shark. According to Ott & Danilewicz (1996), the necropsy of a *S. coeruleoalba* at Rio Grande do Sul (southern Brazil) in 1992, revealed a high degree of larvae infestation of another cestodean, *Phyllobothrium delphinii*, present throughout the blubber. However, parasites of the genus *Phyllobothrium* were not found in the dolphin of this study.

The nematode *Halocercus brasiliensis* is known to infect the lungs of *Sotalia guianensis* on the Brazilian coast (Lins de Almeida, 1933; Santos *et al.*, 1996; Marigo *et al.*, 2000). However, the method of infection and the area of distribution of this nematode are still unknown.

Although the parasite species identified in the specimen of this study are common in dolphins, it is possible, based on the data presented here, that the high degree of infestation may be related to its death. Death caused by a large number of parasites also appears to be corroborated by the low body weight recorded for the animal (115 kg), even though it was feeding, as demonstrated by the presence of food in its stomach. This diagnosis strengthens the statement made by Hammond (1981 *apud* Perrin *et al.*, 1994) that parasitism is probably the greatest cause of natural death of these dolphins.

The results presented and discussed here demonstrate the necessity to collect as much biological information as possible from strandings. Only from these procedures will it be possible to know better the causes of deaths and other aspects of natural history of the species in the southwestern Atlantic.

Acknowledgments

We thank Mr. Athaliberto L. Pereira from Instituto de Pesquisas Cananãia (IPeC) for recovering the dolphin from the beach and telling us about the stranding, and Kesä K. Lehti who translated the manuscript from Portuguese to English. Ana Paula M. Di Benedetto, Jeanette A. Thomas, and one anonymous referee for comments and suggestions on the manuscript.

Literature Cited

- Andrade, A. L. V. (1996) *Comunidade componente de helmintos gastrointestinais da Franciscana, Pontoporia blainvillei (Cetacea: Pontoporiidae), no Rio Grande do Sul, Brasil, e sua utilização como marcador biológico na identificação de estoques*. MSc. Thesis. Universidade do Rio Grande, Brazil.
- Andrade, A. L. V., Marigo, J. & Rosas, F. C. W. (1999) Intestinal trematodes of dolphins from Paraná coast, Brazil. *Abstracts XIII Biennial Conference on the Biology of Marine Mammals*, 28 Nov-3 Dec, 1999, Maui, Hawaii.
- Brownell, R. L. & Praderi, R. (1976) Records of the delphinids genus *Stenella* in the western south Atlantic waters. *Scientific Reports of the Whales Research Institute* **28**, 129-135.
- Dailey, M. D. (1978) Preparation of parasites for identification and cataloging. *Journal of Zoo Animal Medicine* **9**, 13-15.
- Dailey, M. D. & Brownell, R. L. (1972) A Checklist of marine mammals parasites. In: S. Ridgway (ed.), *Mammals of the Sea: Biology and Medicine*. Pp. 528-598. Charles C. Thomas Publisher, Springfield, Illinois, USA.
- Davey, J. T. (1971) A revision of the genus *Anisakis* Dujardin, 1845 (Nematoda: Ascaridata). *Journal of Helminthology* **45**, 51-72.
- Delyamure, S. F. (1955) *Helminthofauna of Marine Mammals*. In: K. I. Skrjabin (ed.), 522 pp. Academy of Science of the U.S.S.R., Moscow U.S.S.R. (Translated by M. Raveh. Israel Scientific Translations, Jerusalem, Israel (1968).)
- Dougherty, E. C. (1944) The lungworms (Nematoda: Pseudalidae) of the Odontoceti. Part. 1. *Parasitology* **36**, 80-94.
- Hohn, A. A., Scott, M. D., Wells, R., Sweeney, J. C. & Irvine, A. B. (1989) Growth layers in teeth from known-age, free-ranging bottlenose dolphins. *Marine Mammal Science* **5**, 315-342.
- Jefferson, T. A., Leatherwood, S. & Webber, M. A. (1993) *Marine Mammals of the World*. UNEP/FAO, FAO Species identification guide.
- Kasuya, T. (1972) Growth and reproduction of *Stenella coeruleoalba* based on the age determination by means of dental growth layers. *Scientific Reports of the Whales Research Institute* **24**, 57-79.
- Lins de Almeida, J. (1933) Sobre as espécies do gênero *Halocercus* Baylis & Daubney, 1925 (Nematoda: Pseudalidae). *Archivos da Escola Superior de Agricultura e Medicina Veterinária* **10**, 153-162.
- Lucena, A., Paludo, D. & Langguth, A. (1998) New records of Odontoceti (Cetacea) from the coast of Paraíba, Brazil. *Revista Nordestina de Biologia* **12**, 19-27.
- Maia-Nogueira, R., Farias, T. S., Cunha, I. F., Dórea-Reis, L. W. & Braga, F. L. (2001) Primeiro registro de *Stenella coeruleoalba* Meyen, 1833 (Cetacea, Delphinidae) no litoral do Estado da Bahia, incluindo uma revisão da espécie em águas brasileiras. *Bioikos*, **15**, 45-49.
- Marigo, J., Rosas, F. C. W. & Andrade, A. L. V. (1999) Intestinal parasites of *Sotalia fluviatilis guianensis* and *Pontoporia blainvillei* from the States of Paraná and São Paulo, Brazil. *Abstracts XIII Biennial Conference on the Biology of Marine Mammals*, 28 Nov-3 Dec, 1999, Maui, Hawaii.
- Marigo, J., Andrade, A. L. V. & Rosas, F. C. W. (2000) Parasitos pulmonares de cetáceos do litoral do Estado do Paraná, Brasil. *Abstracts IX Reunión de Trabajo de Especialistas en Mamíferos Acuáticos de América del Sur*, 30 Oct-3 Nov, 2000, Buenos Aires, Argentina.

- Meyen, F. J. F. (1833) Beiträge zur Zoologie, gesammelt auf Reise um die Erde. *Verhandlungen der Kaiserlichen Leopoldinisch-carolinischen Akademie der Naturforscher* **16**, 551–610.
- Miyazaki, N. (1977) Growth and reproduction of *Stenella coeruleoalba* off the coast of Japan. *Scientific Reports of the Whales Research Institute* **29**, 21–48.
- Miyazaki, N., Fujise, Y. & Fujiyama, T. (1981) Body and organ weight of striped and spotted dolphins off the Pacific coast of Japan. *Scientific Reports of the Whales Research Institute*, **33**, 27–67.
- Miyazaki, N., Kusaka, T. & Nishiwaki, M. (1973) Food of *Stenella coeruleoalba*. *Scientific Reports of the Whales Research Institute*, **25**, 265–275.
- Nesis, K. N. (1987) *Cephalopods of the World. Squids, Cuttlefishes, Octopuses and Allies*. TFH Publications, Neptune City, New Jersey: 1: 351.
- Norris, K. S. (1961) Standardized methods for measuring and recording data on the smaller cetaceans. *Journal of Mammalogy* **42**, 471–476.
- Ott, P. H. & Danilewicz, D. (1996) Southward range extension of *Steno bredamensis* in the Southwest Atlantic and new records of *Stenella coeruleoalba* for Brazilian waters. *Aquatic Mammals* **22**, 185–189.
- Perrin, W. F. & Reilly, S. B. (1984) Reproductive parameters of dolphins and small whales of the family Delphinidae. In: W. F. Perrin, R. L. Brownell & D. P. DeMaster (eds.). *Reproduction in Whales, Dolphins and Porpoises. Reports of the International Whaling Commission*. (Cambridge, UK. **Special Issue 6**, 97–133.
- Perrin, W. F., Wilson, C. E. & Archer II, F. I. (1994) Striped dolphin, *Stenella coeruleoalba* (Meyen, 1833). In: S. H. Ridgway & R. Harrison. (eds.). *Handbook of Marine Mammals*. Academic Press, London: vol. 5: 129–159.
- Pinedo, M. C. & Castello, H. P. (1980) Primeiros registros dos golfinhos *Stenella coeruleoalba*, *Stenella* cfr. *plagiodon* e *Steno bredamensis* para o sul do Brasil, com notas osteológicas. *Boletim do Instituto Oceanográfico* **29**, 313–317.
- Pinedo, M. C., Rosas, F. C. W. & Marmontel, M. (1992) *Cetáceos e Pinípedes do Brasil. Uma Revisão dos Registros e Guia para Identificação das Espécies*. UNEPI FUA, Manaus, Brasil: 1: 213.
- Santos, C. P., Rohde, K., Ramos, R. M. A. & Di Benedetto, A. P. M. (1996) Helminths of cetaceans on the southeastern coast of Brazil. *Journal of the Helminthological Society of Washington* **63**, 149–152.
- Ximenez, A., Langguth, A. & Praderi, R. (1972) Lista sistemática de los mamíferos del Uruguay. *Anales del Museo Nacional de Historia Natural de Montevideo* **8**, 49 pp.
- Yamaguti, S. (1963) Acanthocephala. In: *Systema Helminthum*. Wiley Interscience Publ. Co., vol. 5, New York, USA.