

## Southward range extension of *Steno bredanensis* in the Southwest Atlantic and new records of *Stenella coeruleoalba* for Brazilian waters

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The present note reports on a southward range extension of the rough-toothed dolphin, *Steno bredanensis*, along the coastal waters of the Southwest Atlantic Ocean, and provides additional records of the striped dolphin, *Stenella coeruleoalba*, for the Brazilian coast. Biological and morphological information are given whenever possible, allowing for some insights into the natural history and ecology of these little known delphinids in Brazilian waters.

*Steno bredanensis* (Lesson, 1828)—A 267 cm male rough-toothed dolphin (GEMARS 0008) was found dead at 19 km south of the mouth of Tramandai river (30°08'S, 50°12'W), Rio Grande do Sul (RS), southern Brazil, on 9 November 1991. Analysis of the stomach contents revealed unidentified bonefish remains, trematodes (*Braunina cordiformis*), and an isopod ectoparasite of fish (*Nerocila* sp.). A second rough-toothed dolphin 265 cm in total length (GEMARS 0018) was collected at 60 km south of the mouth of Tramandai river (30°29'S, 50°20'W), on 15 December 1991. Severe mutilations on the ventral region of the carcass precluded the sex determination and collection of stomach contents. Nevertheless, since the largest males reported in the literature reach 265 cm in length, with females attaining a smaller size (255 cm) (Miyazaki and Perrin, 1994), this second specimen is probably also a male. Selected skull measurements and meristics of both specimens are presented (Table 1).

In addition to these animals found dead on the beach, three sightings of rough-toothed dolphins were conducted during onboard surveys in artisanal fishing vessels in the northern coast of Rio Grande do Sul. The characteristics of the sightings, including locality, date and time of the sighting, depth, water temperature, group composition and behavior displayed by the dolphins, are summarized (Table 2).

*S. bredanensis* has been usually described as a species of worldwide distribution in pelagic waters of tropical and warm temperature seas (Leatherwood and Reeves, 1983). However, the records presented in this paper, as well as the existing information about sightings (Lodi, 1992; S. Siciliano, pers. comm.) and incidental catches (Lodi and Capistrano, 1990) in Brazilian waters, suggest that this species presents coastal habits in this region, as originally pointed by Lodi (1992), occasionally even entering in coastal bays (Siciliano *et al.*, 1987) and possibly in lagoons (Ximenez and Flores, 1992).

The present standings and sightings constitute the southernmost records of *S. bredanensis* for coastal waters of Brazil and Southwest Atlantic Ocean. The most austral record of rough-toothed dolphins previously known for this area was Santa Catarina Island (27°30'S, 48°24'W), Santa Catarina (Praderi and Ximenez, 1987).

The occurrence of *S. bredanensis* in different seasons of the year and in a wide range of water temperature (13.5°C to 23°C) may indicate that this species is permanent year-round in the coast of Rio Grande do Sul, and demonstrates that rough-toothed dolphins can endure cold austral winter temperatures in Southwest Atlantic waters.

*Stenella coeruleoalba* (Meyen, 1833)—On 12 September 1992, a male striped dolphin of 227.5 cm (GEMARS 0047) was found dead at Praia do Pinhal (30°14'S, 50°14'W), RS. Necropsy revealed an empty stomach and a high degree of infestation of cestodes parasites (*Philobotrium delphinii*—larvae) in the whole blubber layer. Another striped dolphin (GEMARS 0104) was found dead at Praia Azul (29°28'S, 49°49'W), RS, on 7 September 1993. Since the body part posterior to the dorsal fin was mutilated, the standard length and the sex were not determined. The stomach of this specimen was also empty. Selected skull measurements and meristics of both specimens are presented (Table 1).

**Table 1.** Selected skull measurements and meristics of *Steno bredanensis* and *Stenella coeruleoalba* from this study, collected in the coast of Rio Grande do Sul, southern Brazil (following Perrin 1975)

Measurements	<i>Steno bredanensis</i>		<i>Stenella coeruleoalba</i>	
	GEMARS 0008	GEMARS 0018	GEMARS 0047	GEMARS 0104
	mm	mm	mm	mm
1. Condylbasal length (CBL)	563.0	546.9	425.3	451.1
2. Length of rostrum	332.6	326.9	245.6	259.3
3. Width of rostrum at base	122.0	118.1	108.1	117.9
4. Width of rostrum 60 mm anterior to base	106.3	100.1	71.1	79.0
5. Width of rostrum at midlength	68.3	64.0	58.7	65.6
6. Width of rostrum at 3/4 length	44.4	40.6	45.2	50.0
7. Width of premaxillaries at midlength	44.6	40.2	27.6	29.9
8. Tip of rostrum to external nares	386.6	374.6	287.0	310.3
9. Tip of rostrum to internal nares	401.1	389.5	304.7	319.9
10. Greatest preorbital width	192.1	191.8	183.7	194.8
11. Greatest postorbital width	243.7	237.1	224.9	227.7
12. Greatest zygomatic width	251.1	240.6	221.9	224.4
13. Greatest width of external nares	58.5	58.2	46.0	49.7
14. Greatest width of internal nares	68.2	65.3	61.0	73.9
15. Greatest premaxillary width	86.7	86.8	81.3	88.7
16. Greatest parietal width	190.0	184.3	166.3	167.8
17. Greatest length of left posttemporal fossa	124.4	118.3	78.8	73.5
18. Greatest width of left posttemporal fossa	109.4	97.3	59.0	46.7
19. Length of mandibular symphysis	124.6	130.3	31.8	—
20. Greatest length of left ramus	471.5	465.4	370.4	389.0
21. Length of lower left tooth row	276.8	281.1	216.3	222.0
22. Length of upper left tooth row	273.6	277.4	215.8	223.3
23. Number of teeth (upper left)	24	23	—	—
24. Number of teeth (upper right)	24	24	—	—
25. Number of teeth (lower left)	24	24	44	—
26. Number of teeth (lower right)	25	24	44	—
27. Greatest height of left ramus	101.0	100.2	69.6	74.3
28. Length of left mandibular fossa	143.0	—	121.3	131.1

**Table 2.** Characteristics of the sightings of *Steno bredanensis* carried out along the coast of Rio Grande do Sul, southern Brazil

Locality	Date	Depth	Water surface temperature	Time of the sighting	Number of animals
12 miles off Torres (29°22'S, 46°30'W)	1 March 1992	30 m	—	17:00	10*
1 mile off Tramandaí (30°01'S, 50°06'W)	20 May 1994	20 m	23°C	11:45	5*
1.5 miles off Tramandaí (30°01'S, 50°05'W)	27 August 1994	21 m	13.5°C	13:20	3*

\*In all sightings carried out, the dolphins observed were always adult specimens displaying bow-riding behavior.

The striped dolphin inhabits tropical and warm-temperature waters around the world, generally occurring in offshore areas (Wilson *et al.*, 1987; Perrin *et al.*, 1993). Knowledge on the distribution and biology of *S. coeruleoalba* in the Western South Atlantic is almost nonexistent. Until the time of collection of the specimens presented here, the striped dolphin in this region was known only from

six confirmed records of stranded specimens, one sighting of a school, and the holotypes described by Meyen (1833) and Malm (1871). For a summary of records of striped dolphins stranded in the Southwest Atlantic see Table 3. It is important to note that the stranded delphinid reported to be a *S. coeruleoalba* by Secchi *et al.* (1991) for the coast of Rio Grande do Sul has been recently reidentified

**Table 3.** Summarized confirmed records of *Stenella coeruleoalba* stranded in the Southwest Atlantic coast (SL = standard length; M = male)

Locality	Date	SL (cm)	Sex	Collection Number	Reference
<i>Brazil</i>					
20 km north of the access channel into Patos Lagoon Rio Grande do Sul (32°00'S, 51°40'W)	22 November 1977	235.0	—	MORG 064	Pinedo & Castello (1980)
Praia do Cabedelo—Paraíba—(6°58'S, 34°49'W)	7 July 1990	214.0	M	UFPB 2002	Paludo & Lucena (1994)
Praia do Pinal—Rio Grande do Sul (30°14'S, 50°14'W)	12 September 1992	227.0	M	GEMARS 00437	This study
Praia Azul—Rio Grande do Sul—(29°28'S, 49°49'W)	7 September 1993	—	—	GEMARS 0104	This study
<i>Uruguay</i>					
Punta Jose Ignacio—Maldonado (34°51'S, 54°37'W)	—	—	—	Lost	Ximenez <i>et al.</i> (1972); Brownell & Praderi (1976)
Balneario Solymar—Canelones—(34°49'S, 55°55'W)	23 August 1959	242.0	M	MNHNM 1305	Ximenez <i>et al.</i> (1972); Brownell & Praderi (1976)
<i>Argentina</i>					
Miramar—Provincia de Buenos Aires (38°17'S, 57°50'W)	—	—	—	MACNBA 2625	Brownell & Praderi (1976)
Balneario San Bernardo—Provincia de Buenos Aires (36°42'S, 46°40'W)	—	—	—	RP 642*	Ximenez & Praderi (1992)

\*RP = Ricardo Praderi field number, MACNB = Museo Argentino de Ciencias Naturales "Bernardino Rivandá", Buenos Aires, Argentina, MNHNM = Museo Nacional de Historia Natural de Montevideo, Montevideo, Uruguay, MORG = Museu Oceanográfico "Prof. Eliezer de Carvalho Rios", Rio Grande, Brazil, GEMARS = Grupo de Estudos de Mamíferos Aquáticos do Rio Grande do Sul, Porto Alegre, Brazil, UFPB = Universidade Federal da Paraíba, João Pessoa, Brazil.

as *Delphinus delphis* (E. R. Secchi, pers. comm.). Information concerning the locality of the sighting of a school of *S. coeruleoalba* reported by Pinedo and Castello (1980) must be viewed with caution, since there is some confusion in the text about the position of the sighting.

The published information on *S. coeruleoalba* suggests that in the Western South Atlantic Ocean this species is likely distributed continuously along the waters of northern Argentina, Uruguay and southern Brazil. Nevertheless, the record of a stranded animal in the coast of Paraíba, northeastern Brazil (Paludo and Lucena, 1994), indicates that this species might have a much wider distribution along the Atlantic coast of South America. An increase in observation efforts is required for a better understanding on the distribution patterns and movements of *S. coeruleoalba* in the Southwest Atlantic waters.

#### Acknowledgements

We would like to thank Loredana Susin, Luis Henrique Sacchi-Santos, Rodrigo Mondin-Machado and very specially Ignacio Benites Moreno for their assistance in the collection of data and necropsy of the specimens. We also thank Norma Luiza Würdig and Irajá Damiani Pinto for the constant support and encouragement. Pablo Bordino and Nélio Barros identified the parasites. Alineide Lucena provided the collection number and coordinated of the striped dolphin from northeastern Brazil. Fisherman from Torres and Tramandaí/Imbé communities made possible the onboard surveys. Mônica Borobia, Nélio Barros, Salvatore Siciliano, Paulo César Simões-Lopez, Liliane Lodi and Ricardo Praderi read the manuscript and made useful suggestions for the improvement of the text. The authors have been partially supported by Cetacean Society International (CSI) and United Nations Environmental Program (UNEP).

#### References

- Brownell, R. L., Jr. & Praderi, R. (1976) Records of the delphinid genus *Stenella* in the Western South Atlantic waters. *Scientific Report of Whales Research Institute* **28**, 129–135.
- Leatherwood, S. & Reeves, R. R. (1983) Rough-toothed dolphin. In: *The Sierra Club Handbook of Whales and Dolphins*. pp. 180–183. Sierra Club Books: San Francisco, CA.
- Lodi, L. (1992) Epimeletic behavior of free-ranging rough-toothed dolphins, *Steno bredanensis*, from Brazil. *Marine Mammal Science* **8**, 284–287.
- Lodi, L. & Capistrano, L. (1990) Capturas acidentais de pequenos cetáceos no litoral norte do Estado do Rio de Janeiro. *Biotemas* **3**, 47–65.
- Malm, A. W. (1871) Hvaldjur i Sveriges Museer ar 1869. *Kongl Svenska Vetenskaps Akademiens Handlingar* **9**(2), 1–104.
- Meyen, F. J. F. (1833) Beiträge zur Zoologie, gesammelt auf einer Reise um die Erde. *Verhandlungen der Kaiserlichen Leopoldinsch-carolinischen Akademie der Naturforscher* **16**(2), 551–610.
- Miyazaki, N. & Perrin, W. F. (1994) Rough-toothed dolphin *Steno bredanensis* (Lesson 1828). In: S. H. Ridgway and R. Harrison (eds) *Handbook of Marine Mammals*. Volume 5, pp. 1–21. Academic Press: London.
- Paludo, D. & Lucena, A. C. P. (1994) Notas sobre a ocorrência de mamíferos aquáticos no litoral paraibano. In: “Abstracts of” *Vigésimo Congresso Brasileiro de Zoologia*. p. 116. Rio de Janeiro, Brasil, 24–29 July 1994.
- Perrin, W. F. (1975) Variation of spotted and spinner porpoise (genus *Stenella*) in the eastern tropical Pacific and Hawaii. *Bulletin of the Scripps Institution of Oceanography of the University of California* No. 21. 206 pp.
- Perrin, W. F., Wilson, C. E. & Archer II, F. I. (1993) Striped dolphin *Stenella coeruleoalba* (Meyen, 1883). In: S. H. Ridgway and R. Harrison (eds) *Handbook of Marine Mammals*. Volume 5, pp. 129–159. Academic Press: London.
- Pinedo, M. C. & Castello, H. P. (1980) Primeiros registros dos golfinhos *Stenella coeruleoalba* S. cfr. *plaigidon* e *Steno bredanensis* para o sul do Brasil, com notas osteológicas. *Boletim do Instituto Oceanográfico de São Paulo* **29**, 313–317.
- Praderi, R. & Ximenez, A. (1987) Presencia del delfin de dientes rugosos, *Steno bredanensis*, en el litoral catarinense, Brasil. In: “Proceedings of” *Segunda Reunión de Trabajo de Especialistas em Mamíferos Aquáticos da América do Sul*. Rio de Janeiro, Brazil, 4–8 August 1986. pp. 79–80.
- Secchi, E. R., Vaske, T. Jr. & Santos, E. P. (1991) Sightings and standings of cetaceans from 1987 to 1991 in the southern Brazil. In: *Abstracts of the Ninth Biennial Conference on the Biology of Marine Mammals*. Chicago, Illinois, 5–9 December. pp. 62.
- Siciliano, S., Andrade, L. & Capistrano, L. (1987) Observações sobre a presença de *Tursiops truncatus* e *Steno bredanensis* na Baía de Guanabara, Rio de Janeiro—Brasil. In: “Proceedings of” *Segunda Reunión de Trabajo de Especialistas em mamíferos Aquáticos da América do Sul*. pp. 85. Rio de Janeiro, Brazil, 4–8 August 1986.
- Wilson, C. E., Perrin, W. P., Gilpatrick, J. W., Jr. & Leatherwood, S. (1987) Summary of worldwide locality records of the striped dolphin, *Stenella coeruleoalba*. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-TM-NMF-SWFC-90, 65 p.
- Ximenez, A., Langguth, A. & Praderi, R. (1972) Lista sistemática de los mamíferos del Uruguay. *Anales del Museo Nacional de História Natural de Montevideo*. **8**(5), 49 p.
- Ximenez, A. & Flores, P. A. (1992) Ocorrência do golfinho de dentes rugosos *Steno bredanensis* (Lesson, 1828) na Lagoa da Conceição, Ilha de Santa Catarina, Brasil. In: “Abstracts of” *Quinta Reunión de Especialistas em mamíferos Aquáticos de América del Sur*. pp. 71.

Buenos Aires, Argentina, 28 September-02 October 1992.  
Ximenez, A. & Pranderi, R (1992) Nuevos aportes sobre el conocimiento de delfines del género *Stenella* para el

Atlántico Sudoccidental. In: "*Proceedings of*" *Terceira Reunión de Trabajo de Especialistas en Mamíferos Acuáticos de América del Sur*. pp. 72-79. Montevideo, Uruguay, 25-30 July 1988.





