

Notas / Notes

Finding of a dead rough-toothed dolphin *Steno bredanensis* (Cuvier and Lesson, 1828), stranded on the south Moroccan coast

A. G. de los Ríos¹ y O. Ocaña^{1,2}

The rough-toothed dolphin *Steno bredanensis* (Cuvier and Lesson, 1828) inhabits tropical and warm-temperatures seas. However, in many of these places, the specie has not been recorded yet, so the distribution is based on scarce watching and stranding data. There are so few data of this species from around the world that the International Union for the Conservation of Nature (IUCN) catalogues this animal with Insufficiently Known status, which makes any observation of this species extraordinarily valuable.

Most of the encounters with the rough toothed dolphin have taken place offshore (Addink & Smeenk, 2001; Ritter, 2002). Though there are records of shallow water watching, often associated with feeding behavior (Delgado Estrella, 1994), individual OR SINGLE stranding is not very common (Smeenk, pers. com.) but often they strand in groups (massive stranding) (Cadenat, 1949; Stinnintz *et al.*, 2000; Manasijevic *et al.*, 2002).

Between the 4th and the 11th of September 2002 we took part in an expedition through the western coast of Morocco and the Western Sahara (De los Ríos y Ocaña, in prep.) searching for sea turtle nesting evidences and feeding ecology data. During this expedition, we found a rough-toothed dolphin *Steno bredanensis*, dead for several weeks. We would like to present here the results of our identification and study of the specimen.

The coast of Tarfaya consists of a large sandy beach, full of sediments and debris due to strong currents. Almost any inert material is, therefore, washed ashore. Much plastic debris such as bags, bottles, etc., and even three hulks, stranded in less than half a mile, were found in the littoral area. From our starting point (waypoint N 27° 55'163'' W 012° 53'048''), walking to either side of the beach for about 2 km, we found two Loggerhead turtle (*Caretta caretta*) carcasses, one Common dolphin (*Delphinus delphis*) corpse, and another corpse later identified as a Rough-toothed dolphin, *Steno bredanensis* (Fig. 1). So, according to our observations and also to local fishermen, this long and sandy coast is an area where cetaceans and turtles usually strand throughout the year.

Identification of a dolphin which is alive, recently stranded or dead for just a few days, is not very difficult, especially for experts. Unfortunately, most of the times, we find the animal many days after death, lying on the beach, burnt by the sun, and even with some showing. In these cases, we have to perform anatomical analysis in order to make a proper identification, and the best part to do that on the skull, where the most differential characteristics are concentrated.

The carcass in question presented a level of putrefaction 3, as the skin was totally dry and petrified. The identification of the specimen turned out

¹ Departamento de Medio Marino, Red de Varamiento Asociación Septem Nostra, Dependencias del Antiguo Tanatorio Municipal, 51001 Ceuta. caretta@eresmas.net; lebruni@telefonica.net

² Correspondence: O. Ocaña. Instituto de Estudios Ceutíes (CECEL-CSIC), Paseo del Revellín, 28, 51001 Ceuta. lebruni@telefonica.net; ieceuties1@retemail.es



Fig. 1.— *Steno bredanensis* stranded at Tarfaya beach.

Fig. 1.— *Steno bredanensis* varado en la playa de Tarfaya.

to be very complicated due to condition of the body, and the necropsy was discarded at all. As a consequence of this, the skeleton became crucial for identification.

The head and one flipper were removed, stored and taken out to the base in Ceuta, North Africa (Spain), about 1000 km distance. Once at Ceuta, the remains of the dolphin were placed in a special area, prepared for work with this type of biological material, and covered by a thin layer of sand and gravel waiting for its decomposition. After recovery, the skeleton was treated following the recommendations of the First World Congress on the Preservation and Conservation of Natural History Collections (Rose *et al.*, 1992). The skeleton was gently cleaned up using soaps and several types of paintbrushes and then dried in the sun. Finally, a layer of special varnish was applied, and it was stored well protected from light and humidity (see Ocaña & De los Ríos, 2002). The material was labeled for the collection of Septem Nostra, Departamento de Medio Marino: CET/SB-1. The dolphin seemed to have died several months ago, so this made the identification even harder, and determination of the cause of the death very difficult. The general morphology and anatomy of the skeleton were studied by means of a stereo dissecting microscope.

The head was the best preserved part of the body, which was good, since the skull reveals to be the key to distinguish the species properly. Some skin was still visible and the color was dark grey. The jaws were large, which explain one of the seve-

ral common names of this species: “Long beak dolphin”. The maxilla was bowed and did not seem to present a clear separation with the head, therefore it does not present an apparent melon. The teeth were apparent separated and not numerous (24) and the eyes were large. These characteristics gave the animal a strange appearance, different from the gentle morphology expected from delphinids.

The dental formula should serve as a start point, with about 24 teeth in each jaw. Teeth have many vertical ridges in the crown, well visible by means of a stereo dissecting microscope.

Apparently the skull looks similar to others members of the family, although some main differences were detected between the species studied by us in North Africa. According to Wilkie-Tinker (1988), *S. bredanensis* differs from the other species compared in having a more elongate and laterally compressed pointed skull (see Fig. 2). Other slight differences have been detected although they need a separate study (De los Ríos y Ocaña, in prep.). Nevertheless, the mandibles are the anatomic part of the skull offering a more significant and useful difference with the rest, as they are clearly bowed, thick and strong to hold the wide conical teeth, related to the type of habitat and feeding behavior developed by the species.

Steno bredanensis is a pan tropical species as it has been recorded in tropical areas of the Atlantic and the Indo pacific Oceans (see Evans, 1987), and it seems to be specially abundant on the Mexican coast (see Delgado-Estrella, 1994). It has also been recorded in the Mediterranean sea offshore Malta

Fig. 2.— Head skeleton of *S. bredanensis* specimen CET/SB-1 from West Sahara coast.

Fig. 2.— Cráneo de ejemplar de *S. bredanensis* CET/SB-1 hallado en la costa del Sahara Occidental.



(see Beaubrun *et al.*, 1995) and on the French coast (Fernández-Casado *et al.*, 1997), although the knowledge concerning this species in such areas is scarce. Generally, it should be considered an offshore species, being very uncommon to observe it near the shore. The species seems to be common off the Sahara coast and in the vicinity of the Cape Verde archipelago where, in summer 2002, a mass stranding were observed in Boavista Island (Pers. Obser.).

The sporadic presence of *S. bredanensis* in cold-temperate Sahara waters can be explained by the vicinity of the Canary Islands, where the species is often recorded (see Cañadas *et al.*, 1999; Ritter, 2002). According to this, populations of *S. bredanensis* from the Canary Islands may move to Saharan coast looking for food resources. As it is well known, all the continental shelf of the Sahara region from Cape Jubi (28°N) to Cape Blanco (21°N) is strongly influenced by seasonal upwelling, which produce important temperature falls, and increases in plankton production (see Longhurst, 1998). The common presence of *S. bredanensis* in deep waters, at least 175 meters deep, off Mauritania (see Addink & Smeenk, 2001) indicates its ability to change from temperate to cold waters temporarily. These data, along with the

abundance of cephalopods (one of the main prey for *S. bredanensis* —see Evans, 1987) along the Sahara coasts, support this idea.

ACKNOWLEDGEMENTS

We are grateful to C. Smeenk (curator of marine mammals from NNM), for encouraging us to study this wonderful animal and providing us with a copy of one of the best papers about *S. bredanensis*. This study was possible thanks to Francisca Serráis (secretary of Septem Nostra) who found the corpse in a remote zone of the beach and kindly reviews the English language of our paper. Thanks also to Manuel J. Vera (volunteer of Septem Nostra) for helping us in the always tough job of handling, managing and cleaning the animal remains. The government of Morocco made access to the beach and transport to the border with Spain possible. Thanks are also due to our colleague from Tetuan University Dr. Younes Saoud for his friendly collaboration and valuable advice.

The help of Mr. Antonio Troyano, head of cemeteries bureau, is gratefully acknowledged for providing a place where we can store and works on this type of material. Thanks are also due to the Autonomic Government of Ceuta and especially to the president Mr. Juan Vivas Lara for his support in many different ways for our current cetaceans research.

The authors are especially grateful to Dr. José Templado for his friendly collaboration and good understanding in reviewing and editing the manuscript.

References

- ADDINK, M. J. & SMEENK, C., 2001. Opportunistic feeding behavior of rough-toothed dolphin *Steno bredanensis* off Mauritania. *Zoologische Verhandlungen (Leiden)*, 334: 37-48.
- BEAUBRUN, P. C., BAYED, A., BOMPAR, J. M., BOUTIBA, Z., FORCADA, J., GANNIER, A., GIORDANO, A., MAIGRET, J., NATARBARTOLO DI SCIARA, G., OZTURK, B. & RIPIO, T. H., 1995. *Atlas préliminaire de distribution des cétacés de Méditerranée*. Comisión Internationale pour l'Exploration Scientifique de la mer Méditerranée, Musée Océanographique. Monaco. 87 pp.
- CADENAT, J., 1949. Notes sur les cétacés observés sur les cotes du Sénégal de 1941 à 1948. *Bulletin de l'Institut Français d'Afrique Noire*, 11: 1-15.
- CAÑADAS, A., URQUIOLA, E. & SAGARMINAGA, R., 1999. Recopilación, Análisis, Valoración y Elaboración de Protocolos sobre las Labores de Observación, Asistencia a Varamientos y Recuperación de Mamíferos y Tortugas Marinas de las Aguas Españolas. SEC-MMA. Madrid. 500 pp.
- DELGADO ESTRELLA, A., 1994. Presencia del delfín de dientes rugosos o esteno (*Steno bredanensis*) en la costa de Tabasco, Mexico. *Anales del Instituto de Biología, Universidad Nacional Autónoma de México, Serie Zoología*, 65(2): 303-305.
- EVANS, P. G. H., 1987. *The Natural History of Whales & Dolphins*. Christopher Helm. London. 344 pp.
- FERNÁNDEZ-CASADO, M., FERNÁNDEZ, E., LÓPEZ, J. A., MALDONADO, D., MARTÍN, J. J., MONS, J. L., RODRÍGUEZ, J. A. & RUEDA, J., 1997. *Mamíferos marinos y tortugas del mar de Alborán. Guía de especies marinas amenazadas*. Consejería de Medio Ambiente. Junta de Andalucía. Málaga. 119 pp.
- LONGHURST, A., 1998. *Ecological Geography of the Sea*. Academic Press. San Diego, London, etc. 398 pp.
- MANASIJEVIC, M., EWING, R. & KEITH, E. O., 2002. Histopathologic characterization of cardiovascular changes observed in 42 rough toothed dolphins (*Steno bredanensis*) stranded in three mass stranding events on Florida panhandle in 1997, 1998 and 2001.
- OCAÑA, O. & DE LOS RÍOS, A. G., 2002. *Las poblaciones de tortugas marinas y cetáceos de la región de Ceuta y áreas próximas*. Ceuta. 173 pp.
- RITTER, F., 2002. Behavioural observations of rough-toothed dolphins (*Steno bredanensis*) off La Gomera, Canary Islands (1995-2000), with special reference to their interactions with humans. *Aquatic Mammals*, 28(1): 46-59.
- ROSE, C. L., WILLIAMS, S. L. & GISBERT, J., (Eds.), 1992. *Current issues, initiatives, and future directions for the preservation and conservation of natural history collections. Based on the International Symposium and First World Congress on the Preservation and Conservation of Natural History Collections, Madrid, 10-15 May 1992*. Volumen 3. Consejería de Educación y Cultura, Comunidad de Madrid, y Dirección General de Bellas Artes y Archivos, Ministerio de Cultura. Madrid. xxviii + 439 pp.
- STININTZ, W. D. J., KUCKLICK, J. R. & BECKER, P. R., 2000. Organochlorines in Rough-toothed dolphins (*Steno bredanensis*) sampled during an unusual mass stranding event. *Atlantic Dolphin Research cooperative (ADRC) Newsletter*. 8 pp.
- WILKIE-TINKER, S., 1988. *Whales of the world*. E.J. Brill and New York & Bess. Leiden & Honolulu. x + 310 pp.

Recibido, 9-X-2003
 Aceptado, 3-III-2004
 Publicado, 25-VIII-2004