Rough-Toothed Dolphin

Steno bredanensis

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Although widely distributed in all three major oceans, the rough-toothed dolphin has not been well studied. It is a tropical to warm-temperate species and is generally found in deep, offshore waters. In most areas where it is known, it does not appear to be among the most abundant of the small cetaceans. This means that it is not commonly encountered.

I. Characteristics and Taxonomic Relationships

The rough-toothed dolphin is very distinctive, when seen at close quarters. It is the only long-beaked dolphin with a

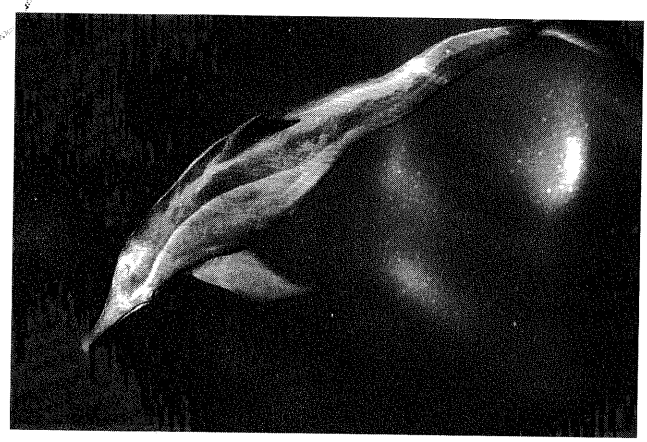

Figure 1 *A rough-toothed dolphin swimming just below the surface in clear waters off Hawaii showing the species' distinctive characteristics. Photo by B. Würsig.*

smoothly sloping melon that does not contain any hint of a crease as it blends into the upper beak (Fig. 1). These dolphins are not particularly slender, and the anterior part of the body may be stocky. The large flippers are set farther back on the body than in most other small cetaceans. They are equal to about 17–19% of the body length. The dorsal fin is tall and generally only slightly recurved. Some large males have a hump of connective tissue posterior to the anus, which gives the appearance of a pronounced keel. These are medium-sized dolphins that can weight up to 155 kg. Males grow to larger sizes than females (known maximums of 265 and 255 cm, respectively), and females may have proportionately longer beaks (Miyazaki and Perrin, 1994).

The color pattern is moderately complex, but consists generally of shades of black, white, and gray (Fig. 2). Rough-toothed dolphins are countershaded, with white bellies and black to dark gray backs. The sides are a medium shade of gray and are separated from the darker back by a dorsal cape that is narrow between the blowhole and the dorsal fin and wider behind the fin. The lower sides and mouth area are often dotted with white patches, splotches, and spots. Many of the white spots are thought to be scars from bites inflicted by cookie-cutter sharks. Young animals have a muted color pattern and generally lack the white spots (Miyazaki and Perrin, 1994).

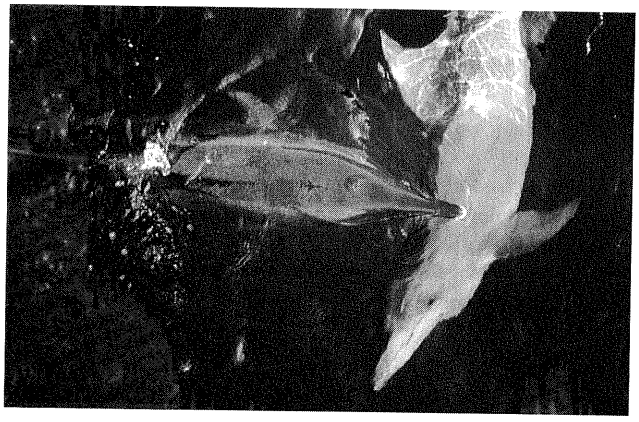

Figure 2 *Two rough-toothed dolphins socializing at the bow of a research vessel in the Gulf of Mexico. Photo by D. Weller.*

The skulls of rough-toothed dolphins (adult CBL = 472–555 mm) can be distinguished from those of all other dolphins (except humpback dolphins, *Sousa* spp.) by their combination of long beak, concave rostral and maxillary margins, long mandibular symphysis, and large temporal fossae (Fig. 3). Tooth counts can be used to distinguish them from humpback dolphins: rough-toothed dolphins have 19–28 teeth in each row and humpback dolphins usually have >30. The teeth of *Steno* often have longitudinal ridges, which is the reason for the species' common name (Neuville, 1928). Other differences from the skulls of humpback dolphins are the relatively large orbits and the prominent and long cylindrical ridge on the ventral part of the frontal bones in rough-toothed dolphins (Van Waerebeek *et al.*, 1999).

Traditionally, morphological characters have been used to infer a close relationship between the rough-toothed dolphin and two other genera of dolphins (*Sotalia fluriatilis*, the tucuxi, and *Sousa* spp., the humpback dolphins). Recent genetic analyses (LeDuc *et al.*, 1999) have supported the relationship with *Sotalia* (in the subfamily Stenoninae), but not with *Sousa*, which groups phylogenetically with the Delphininae. In captivity, hybrids between *Steno* and *Tursiops truncatus* (bottlenose dolphin) have occurred (Dohl *et al.*, 1974).

II. Distribution and Ecology

The rough-toothed dolphin is a tropical to warm temperate species and is usually found in oceanic waters (Fig. 4). Records from the Atlantic Ocean are mostly between the southeastern United States and southern Brazil across to the Iberian Peninsula and tropical West Africa, with some (probably extralimital) records from the English Channel and North Sea. The normal range includes the Gulf of Mexico, Caribbean Sea, and Mediterranean Sea.

In the Pacific, they occur from central Japan and northern Australia across to southern Baja California, Mexico, and southern Peru. In the eastern tropical Pacific, they are generally associated with warm, tropical waters lacking major upwellings. The range includes the southern Gulf of California and South China Sea. Records from the west coast of the United States and New Zealand are probably extralimital. In the poorly studied Indian Ocean, there are only a few scattered records, but the species probably has an extensive distribution there north of about 20°S.

Essentially nothing is known about population or stock structure in this species. In fact, the ecology and biology of the species are very poorly studied. There have been only a few reports of feeding habits for this species. In the wild, they feed on a variety of fish and cephalopod species, some coastal and some oceanic. Some large fish may be taken, as suggested by the robust dentition of the species. Algae has been found in the stomachs of stranded specimens, but this may have been ingested incidentally.

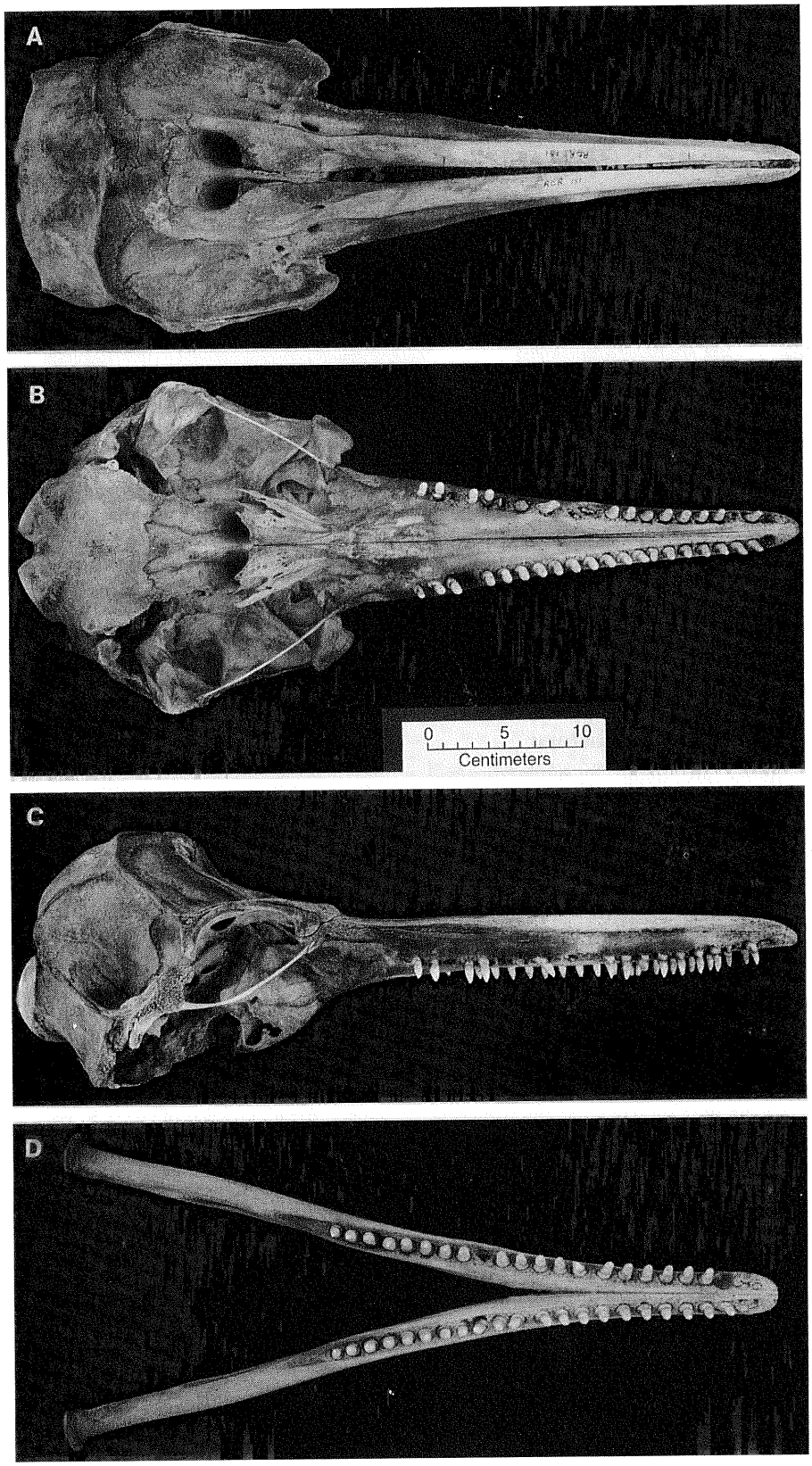

Figure 3 *Dorsal, ventral, and lateral views of the cranium and dorsal view of the mandible of a rough-toothed dolphin. Photos courtesy of W. F. Perrin.*

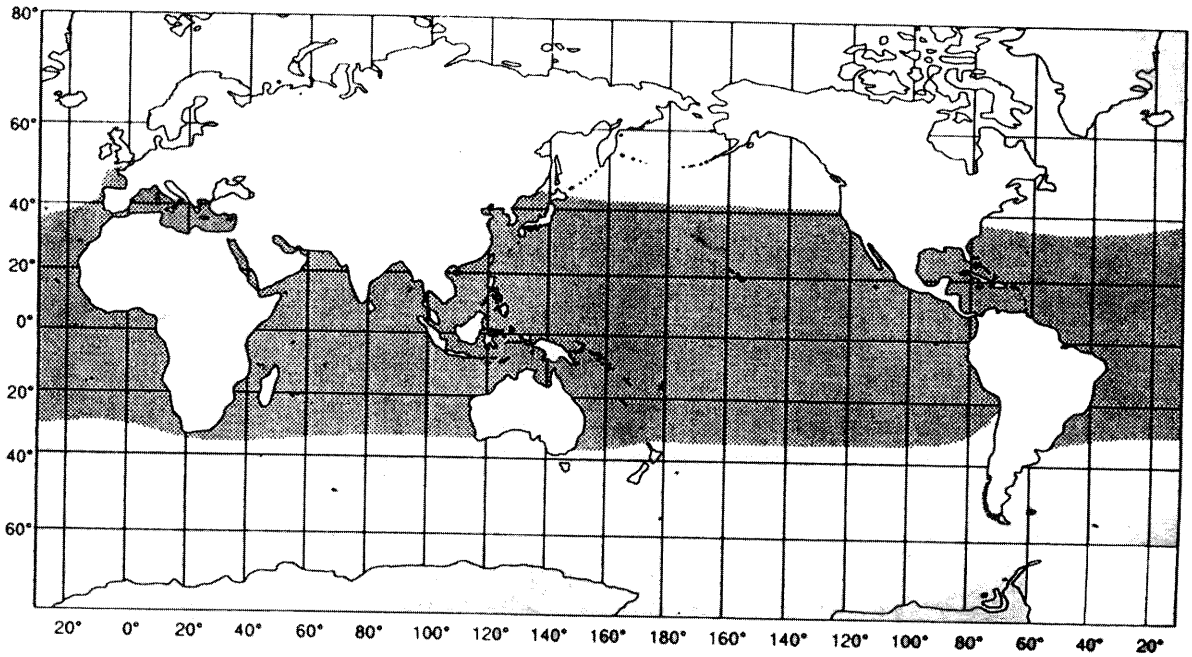

Figure 4 *The approximate distribution of the rough-toothed dolphin. It should be noted that few surveys for marine mammals have been conducted in offshore areas or in the Indian Ocean, so distribution in these regions is especially poorly known.*

III. Behavior and Life History

Rough-toothed dolphins are found in moderate-sized groups, most commonly of 10–20 dolphins, although larger groups have been seen in some areas—over 50 in the eastern tropical Pacific, 300 in Hawaii, and 160 in the Mediterranean (Miyazaki and Perrin, 1994). Mass STRANDINGS have been recorded in several areas of the species' range. They frequently associate with other species of cetaceans, especially other delphinids in the eastern tropical Pacific, where they also often associate with flotsam. Lone animals have been seen with short-finned pilot whales (*Globicephala macrorhynchus*) and Fraser's dolphins (*Lagenodelphis hosei*) in the Sulu Sea.

These animals are not generally fast swimmers and they often appear rather sluggish in the wild. They do ride bow waves and are known for their habit of skimming along the surface at moderate speed with a distinctive splash. Although not highly acrobatic, various leaps and other aerial behaviors have been seen. Rough-toothed dolphins can be found in some shallow, coastal waters in Brazil and elsewhere; in such areas, photo-identification of individual dolphins is considered feasible (Flores and Ximinez, 1997).

Although the maximum recorded dive was only to 70 m, rough-toothed dolphins can probably dive much deeper than this. Behavioral and morphological evidence suggests that they are well adapted for long, deep dives. Submergences of up to 15 min have been recorded. A variety of clicks and whistles have been recorded from these dolphins. Highly directional ECHOLOCATION clicks, with some pulses as high as 200 kHz, are known.

Detailed studies of life history have only been conducted in Japanese waters. There, males reach sexual maturity at about 14 years and 225 cm, and females at 10 years and 210–220 cm. The maximum age is 32–36 years, although some animals may live significantly longer (Miyazaki, 1980: Miyazaki and Perrin, 1994).

IV. Interactions with Humans

Although not generally the major target, rough-toothed dolphins have been taken in directed dolphin fisheries in Japan, Sri Lanka, Indonesia, the Solomon Islands, Papua New Guinea, St. Vincent, West Africa, and possibly St. Helena in the South Atlantic (Miyazaki and Perrin, 1994). Probably much more significant is the incidental kill of dolphins in fishing nets. Takes in tuna purse seine nets are known for the eastern tropical Pacific, and gill-net catches have been documented at least in Sri Lanka, Brazil, and the offshore North Pacific. Undocumented catches probably occur in most other areas of the range.

Habitat degradation impacts and effects of pollutants are probably much less severe for this species than for other, more coastal small cetaceans. Organochlorine levels have generally been much lower than for other species. However, conservation-oriented studies are almost nonexistent, and therefore the uncertainty that exists about population status for this species should be acknowledged.

Rough-toothed dolphins have been held captive in a number of oceanaria, and some success has been encountered in keeping them alive in the captive environment, especially in Hawaii. One specimen lived for over 12 years in captivity. They have been found to be bold and inventive, and one "creative porpoise" at Sea Life Park in Hawaii astounded its trainers by grasping the concept of inventing novel behaviors (Pryor *et al.*, 1969).

See Also the Following Articles

Captivity ■ Delphinids ■ Skull Anatomy ■ Teeth

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