

PHOTO-IDENTIFICATION OF ROUGH-TOOTHED DOLPHINS (*STENO BREDANENSIS*) OFF LA GOMERA (CANARY ISLANDS) WITH NEW INSIGHTS INTO SOCIAL ORGANISATION

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INTRODUCTION Photo-identification has been established as a powerful tool in cetacean research. However, no study to date has applied this method to rough-toothed dolphins (*Steno bredanensis*). Off La Gomera, rough-toothed dolphins are present year round, distributed relatively close to shore and suspected to represent a resident population (Ritter, 2002; 2003), thus constituting an excellent target for such a study.

METHODS Photo-ID research and behavioural observations were conducted from 2000-2003 on board of whale watching vessels frequenting the waters south and southwest of the island, using single lens cameras equipped with 70-300mm lenses. Photographs made from 2000-2002 during 29 sightings served as baseline data. From March through June 2003, 71 additional trips were made. The Half Weight Index (HWI) was used to assess non random associations between individuals.

RESULTS 52 sightings were made (9 in 2000, 11 in 2001, 9 in 2002, and 23 in 2003). Total time of observation of rough-toothed dolphins was approximately 32 hours. From 2000-2002, 261 high quality photographs were made, which served as a baseline. In 2003, 26% of 1062 photographs were of high quality enabling identification. Thus, a total of 536 photographs from 52 sightings were analysed in this study. Rough-toothed dolphins showed distinct features suitable for individual identification, such as notch patterns on the fin, global fin shape, pigmentation and distinct scratches (see Figure 1). 12 ID categories were defined (see Table 1). Dolphins showing similar features were assigned to one or more of these categories. 63 individual rough-toothed dolphins could be identified. These were included into the world first electronic ID catalogue of rough-toothed dolphins. Identified individuals were ranked according to quality of photographs and recognisability of markings. Thus, measures of reliability for the re-identification were created. 65% of identified individuals were seen in more than one year, 37% in three or four years. Changes over time of different types of markings occurred, with colour/pigmentation patterns, global fin shape and notch patterns on the dorsal fin being the most stable ones, compared to tip appendices and superficial scratches, which were not found to be reliable on the long term.

The formation of tight and synchronously swimming subgroups (see Figure 3) is an outstanding behavioural peculiarity of rough-toothed dolphins. Subgroup composition was found to be dynamic, with subgroup sizes of 2-8 animals. The Half Weight Index (HWI) was used to assess non random associations between individuals. HWI values ranged from 0 to 0.89 (mean 0.06).

DISCUSSION Photo-identification has been established as a powerful tool in cetacean research (Hammond *et al.*, 1990, Whitehead *et al.*, 2000). With this study, rough-toothed dolphins were found to be a capable target to extend this method to a new species. The identification of 63 individuals, the majority of which were observed in more than one year, strongly suggests residency of rough-toothed dolphins in the Canary Islands. However, we do not know if there is a local population off La Gomera. Off Tenerife, rough-toothed dolphins are observed regularly (Urquiola & de Stephanis, 2000; Martín & Carillo, 2001). As rough-toothed dolphins are regarded as an offshore species (Miyazaki & Perrin 1994), inter-island movements are probable and the existence of an all-over-Canarian resident population is possible, too.

Rough-toothed dolphins show a fluid group composition, between and within observed groups, indicating the existence of a fission-fusion type of organisation of their population, like observed in other cetacean species (Connor *et al.*, 2000; Bruno *et al.* 2004). Association patterns showed that this species not only has strong social bonds between mother and calf/juvenile, but also between individuals of different age classes. These bonds may last for several years. The formation of tight subgroups appears to be a species-specific way how bonds are represented and strengthened.

This first of its kind study on rough-toothed dolphins showed that the use of whale watching vessels as research platforms is an excellent way to collect photo-ID data on a long-term basis. Although a number of restrictions have to be accepted (e.g. time frame and schedule of trips) and results must be dealt with care (see Ritter, 2003), the use of whale watching vessels as a platform of opportunity was proven to shed first light on the social life of a still not well understood species.

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Table 1: Photo ID categories for rough-toothed dolphins off La Gomera

TM	Top missing
TN	.....	Top notches
DN1	.....	1 distinct notch
DN2	.....	2 distinct notches
LN1	.....	1 less distinct notch
LN2	.....	2 less distinct notches
NN	.....	# notches
FS	.....	Fin shape
LE	.....	Leading edge
HP	.....	Hump
CP	.....	Colour pattern
DS	.....	Distinct scratches

Figure 1: Photo-ID features of rough-toothed dolphins off La Gomera. a) TM, DN1 b) DN2, LN, HP c) LN1, FS d) DN1, HP, DS e) CD, DS f) CP. Use Table 1 as a legend

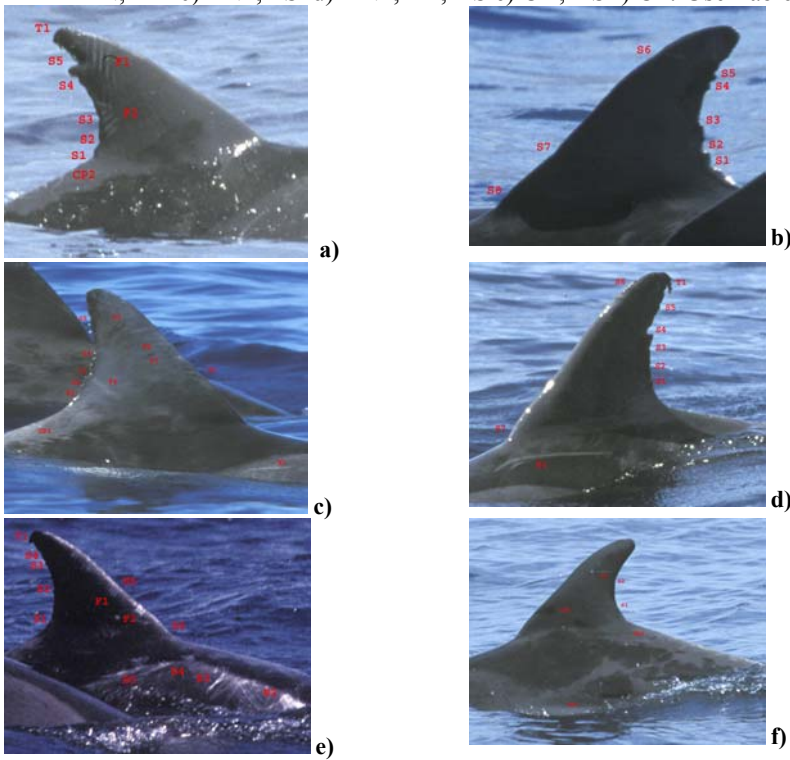


Fig. 3: Tightly swimming subgroup of rough-toothed dolphins off La Gomera

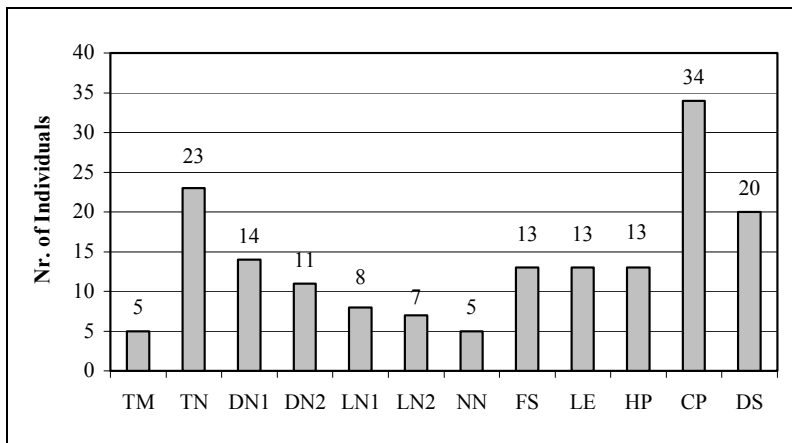


Figure 2: Photo ID categories for rough-toothed dolphins off La Gomera and the number of individuals in each category. Use Tab. 1 as a legend.

The rough-toothed dolphin (*Steno bredanensis*) is a species of dolphin that can be found in deep warm and tropical waters around the world. The species was first described by Georges Cuvier in 1823. The genus name *Steno*, of which this species is the only member, comes from the Greek for 'narrow', referring to the animal's beak which is a diagnostic characteristic of the species. The specific name honours van Breda, who studied Cuvier's writings. There are no recognised subspecies. Genus *Steno* – rough-toothed dolphins *Steno bredanensis*. Genus *Tursiops* – bottlenose dolphins *Tursiops aduncus* *Tursiops truncatus*. Family *Iniidae* – river dolphins. With its blowhole, flipper forelimbs and fluked tail it was recognizable as what we now think of when discussing cetaceans. While the different genera of *Basilosauridae* varied they can be grouped into two distinct body types – long snake-like bodies and shorter dolphin-like bodies. The serpentine *Basilosauruses* could reach up to 17 m in length and likely swam with sinuous movements of the entire body. Meanwhile, the shorter *Basilosaurs*, called *Dorudontines*, had 4 m long dolphin-like bodies and would have used up and down motions of their tail and fluke to swim like modern cetaceans. The results provide new insights into the population structure for New Zealand as the assignment of pattern of mtDNA diversity associated with habitat special- individuals to populations was not possible. ization and ecotype formation among *T. truncatus* worldwide. Pacific Ocean Dataset Materials and Methods Excluding samples collected in New Zealand, a total of 218 samples representing 62 unique mtDNA control region New Zealand Dataset sequences (i.e., haplotypes) were available from 8 populations from the CWP and 1 haplotype (represented On March 2, 2005 ~70 rough-toothed dolphins (*Steno bredanensis*) mass stranded along mud flats and associated canals on the Atlantic Ocean side of Marathon Key, Florida. Forty-six were necropsied and placed into two groups for analysis: Group-1 animals (N = 34; 65%) that died prior to medical intervention and rehabilitative efforts and Group-2 animals (N = 12; 35%) that died in rehabilitation. The findings from this *Steno* stranding provide a unique window into baseline individual and population clinical conditions and additional perspective into potential clinical sequelae of rehabilitation efforts. Introduction.