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

I. Mayr (1) & F. Ritter (2)

(1) Universität Salzburg, Naturwissenschaftliche Fakultät, Hellbrunner Straße 34, 5020 Salzburg, Austria
(2) M.E.E.R. e.V., Bundesallee 123, 12161 Berlin, Germany (e-mail: info@m-e-e-r.de)

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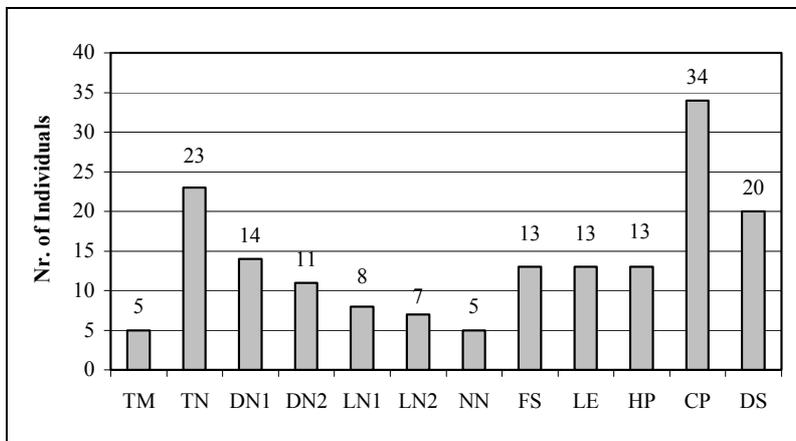
Table 1: Photo ID categories for rough-toothed dolphins off La Gomera

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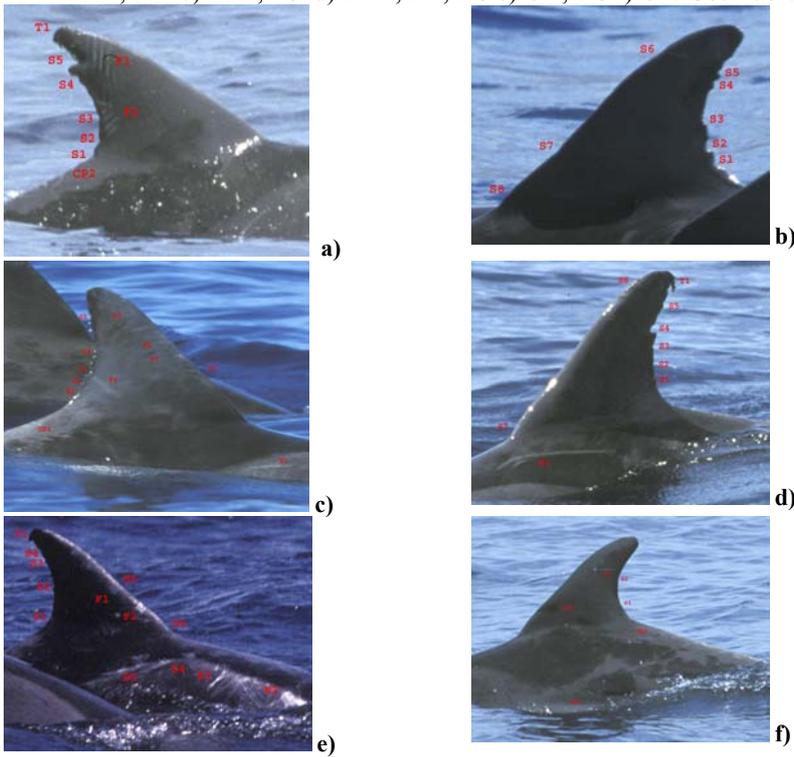
Fig. 3: Tightly swimming subgroup of rough-toothed dolphins off La Gomera

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.