Journal of Marine Animals and Their Ecology
Vol 2, No2, 2009
Printed in Canada

Variation in external morphology of resident bottlenose dolphins in Bahía San Antonio, Patagonia, Argentina

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Abstract
A photo-identification study carried out in Bahía San Antonio (Patagonia Argentina) showed a variation in external morphology among year-round resident bottlenose dolphins. Out of 63 individually identified bottlenose dolphins, 15 were considered year-round residents of which three show variations in external morphology: they have a more falcate dorsal fin, darker coloration and shorter beak, physical characteristics described for the regional form of bottlenose dolphins present in the more southern province Chubut. The three morphologic distinct individuals, with one associated calf, could be re-identified in the study area up to 10 times over all the different seasons and up to now, no other bottlenose dolphins with similar characteristics could be observed in the area. On all occasions, they were re-identified in close occasions with each other and on 8 occasions in close association with other identified individuals. So far it was believed that the two regional forms of bottlenose dolphins present in Argentina were isolated. This communication is meant to document the residency and interaction of both regional forms in the same area. [JMATE. 2009;2(2):3-6]

Introduction

The taxonomy of bottlenose dolphins has been a debate for a long time. At this moment two species of *Tursiops* are recognized being *T. truncatus* the common bottlenose dolphin and *T. adunctus* the Indo-Pacific bottlenose dolphin. In South America, the species *Tursiops gephyreus* was originally used for bottlenose dolphins from the southern Atlantic coast. However, its use gradually decreased when the morphological plasticity of the genus was recognized (2). Nowadays, up to 20 morphotypes are described worldwide but geographic variation remains poorly understood.

In Argentina, two geographic variations of bottlenose dolphins were described by Bastida & Rodriguez in 2003 (3). The bottlenose dolphins living along the coasts of the province of Buenos Aires are characterized by their triangular dorsal fin shape whereas bottlenose dolphins living more south along the coasts of the province of Chubut are characterized by their falcate dorsal fin shape. Bastida & Rodriguez further stated that 'their clear difference would indicate that both geographic forms are isolated' (3). Although it still remains unknown to which extent this morphologic variation is genetically correlated, this communication is meant to document the residency and interaction of both regional forms in Bahía San Antonio (province of Río Negro; Figure 1).

Figure 1: Map of the coast of Argentina indicating the study area.

Received September 6, 2009; Accepted December 15, 2009.
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Methods

A photo-identification study was made in Bahía San Antonio (BSA) (Figure 1) , a shallow bay (maximum depth <30 m), located in the northern region of the San Matías Gulf (40°50'S 64°50'W), Patagonia Argentina. The region is known for large seasonal fluctuations in sea surface temperature (up to ±16°C) and relative high salinity compared to the waters further south in the gulf (5). Boat-based observations were made from August 2006 up to August 2009. When dolphins were seen, an attempt was made to photograph the dorsal fins of all individuals in the group, regardless the presence of clear marks.

All clear pictures of dorsal fins were analysed using the computer assisted identification systems *FinEx* and *FinMatch* (EC EuroPhlukes Initiative, University of Leiden, The Netherlands). Marked dolphins were catalogued with the code RN-BSA-M(n°) standing for 'Rio Negro – Bahía San Antonio – Marybio (N°)'. Residency patterns were analysed regarding the presence or absence of dolphins in different seasons: Summer = January-February-March; Autumn = April-May-June; Winter = July-August-September; Spring = October-November-December. Dolphins re-identified during all four seasons (regardless of year) were defined as year-round residents while those re-identified only in specific seasons in two consecutive years were defined as seasonal residents (14). Calves were categorized as having 2/3 or less the length of an adult and mostly swimming in close association with an adult. Identified dolphins closely accompanied by a calf in at least two sightings were assumed to be females (6,7). Data on behaviour were recorded following the definitions of Bearzi (5), using a focal group five-minute point sampling mode (1,8), meaning that every five minutes, a point sample is taken of the predominating behaviour in the group.

Results

A total of 63 bottlenose dolphins could be individually identified due to their distinctive markings of which 15 were considered as year-round residents in the study area. Three of these year-round residents and one calf (RN-BSA-M55, M56+calf, M57) were noted to show variations in external morphology when compared to the other 62 catalogued dolphins, being Distinguishable by a more falcate dorsal fin (Figure 2), a darker coloration (Figure 2) and a notably shorter beak (Figure 3).

Figure 2: Variation in dorsal fin shape of year-round resident bottlenose dolphins. Left: RN-BSA-M39 and RN-BSA-M57. Right: adult females RN-BSA-M56 and RN-BSA-M6.

Figure 3: Comparison of external morphology of bottlenose dolphins in BSA. Left: bottlenose dolphin RN-BSA-M55, year-round resident in BSA. Right: bottlenose dolphin RN-BSA-M31, year-round resident in BSA.

This group of four morphological distinct bottlenose dolphins (M55, M56+calf and M57) were first observed inside BSA in September 2008 and were re-identified in this area on 10 different occasions since then, divided over all four seasons. On eight of these occasions, they were observed in close association with other catalogued bottlenose dolphins in groups of 11 individuals on average (SD=7) ranging from 6 to 25. On all times M55, M56+calf and M57 were seen in close association with each other and no other bottlenose dolphin with similar characteristics could be observed in the area up to now. An additional recapture of M55, M56+calf and M57 could also be made in Puerto Lobos, 150km south of the study area and at the border of the province of Chubut.

In further instance, the behaviour of the dolphin groups that included both forms could be observed in BSA during 380 min in total. These observations indicated that these dolphin groups spent 18% of their time feeding, 18% socialising, 17% slowly travelling and resting, 16% travelling in medium and fast speed and 7% milling. In total 24% of the behaviour could not be classified accurately.

Discussion

Four of the frequently observed bottlenose dolphins in BSA show variations in external morphology when compared to all other bottlenose dolphins observed in the study area. Similar characteristics were described for the bottlenose dolphins present in the area of the province of Chubut (3), studied by Würsig during the period from 1970-1980 (10-13). Würsig & Würsig were able to identify up to 53 bottlenose dolphins in the province of Chubut, all falcate dorsal fin shaped, and described these bottlenose dolphins as 'coastal' as they appeared 92% of their time in waters <10 m deep (12). Under the hypothesis that these four morphological distinct bottlenose dolphins are part of the population described in Peninsula Valdes based on their external characteristics, and based on the fact that the bottlenose dolphins in BSA were documented as coastal by Vermeulen & Cammareri (9), the mentioned differentiation may not be of the kind 'inshore vs. offshore'.

The behavioural interaction between both forms did not indicate a preferred behaviour during associations. Nevertheless, the relative high amount of observed socializing behaviour between both forms indicates the need of a continued monitoring. It seems also remarkable that only four of these individuals could be observed in BSA during a three-year study. And although it seems very preliminary to refer to on the presence or absence of intermediate characteristics, up to now, on all occasions a rather clear differentiation could be made between the two variations.

Although both forms show variations in external morphology, the extent to which this phenotypic variation is genetically correlated remains unknown. A clear insight on the differentiation between these regional forms might have important conservation implications for this species in Argentina. Further research and detailed studies seem therefore vital for the conservation of the species in Argentina.

Acknowledgments
Field research was supported by Cetacean Society International and Trigon N.V. Thanks to the Environmental Agency of Río Negro (Consejo de Ecología y Medio Ambiente de Río Negro [CODEMA]) and the Wildlife Service of Río Negro (Dirección de Fauna de Río Negro) for the field permits.

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