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A possible hybrid between the dusky dolphin (*Lagenorhynchus obscurus*) and the southern right whale dolphin (*Lissodelphis peronii*)

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Abstract

In Golfo Nuevo, Península Valdés, Argentina an unusual dolphin was sighted several times, always associated with dusky dolphins (*Lagenorhynchus obscurus*). Photographic evidence showed that the anomalous dolphin shared characteristics of a southern right whale dolphin (*Lissodelphis peronii*) and the dusky dolphin. The animal's features were a slender body of approximately 2.0–2.2 m in length. Like southern right whale dolphins, a sharp dividing line separated the black dorsal part from the white ventral part of the body, but the line in the area of the head did not extend below the eyes. The peduncle showed a patch of pale grey, similar to the lateral colour pattern of a dusky dolphin. Contrary to the southern right whale dolphin, the anomalous dolphin had a dorsal fin, which was smaller and more triangular than that of the dusky dolphin and located around two-thirds of the way along the back. Colour patterns of the dorsal fin were very similar to that of a dusky dolphin with its typical half-moon shape and pale grey colouration in the posterior part. Aerial behaviour of the unusual dolphin was very similar to previous observations of *L. peronii*. Based on the intermediate morphological features between *L. obscurus* and *L. peronii*, I proposed that the anomalous dolphin is a hybrid of these two dolphin species.

Key words: *Lagenorhynchus obscurus*, dusky dolphin, *Lissodelphis peronii*, southern right whale dolphin, anomaly, hybrid, aerial behaviour, interspecific interaction

Introduction

The waters of the Patagonian continental shelf of Argentina are the habitat for a high diversity of cetaceans, such as dusky dolphins (*Lagenorhynchus obscurus)* and southern right whale dolphins (*Lissodelphis peronii*). The association between dusky dolphins and southern right whale dolphins appears to be common in the whole Southern Hemisphere (Jefferson *et al.,* 1993; Carwardine, 1995). In New Zealand, dusky dolphins occasionally are seen in mixed species groups with southern right whale dolphins (Yin, 1999). Off Southwest Africa, mixed groups of both species were observed by Rose & Payne (1991) and Cruickshank & Brown (1981). In 1990, a large group of dusky dolphins (700–800) together with approximately 50 southern right whale dolphins was observed along the coast of southern Chile (Van Waerebeek, 1992).

On 6 December 1998, an unusual dolphin was sighted for the first time in Golfo Nuevo, Península Valdés, Argentina, within a group of dusky dolphins (R. Benegas, pers. comm.).

Materials and Methods

Resightings of the animal were attempted between 22 November 1999 and 16 March 2000, using a tourist vessel (11 m; Diesel Volvo Penta). During each dolphin sighting, I recorded time, position (Garmin GPS MAP 175), surface water temperature (Digital maximum-minimum thermometer) group size, and behaviour (Digital voice recorder DS-150, Olympus). Dolphins with conspicuous features were photographed (Nikon F601, AF; Sigma Zoom 28–200 mm D; Kodak-Elitechrome 200).

Results

The anomalous dolphin was always associated with dusky dolphins and was sighted 10 times (6% of the sightings) during the entire observation period (n=45.9 h at 32 days; Table 1). The specimen could not be identified via any of the available dolphin classification keys (e.g., Carwardine, 1995; Jefferson *et al.,* 1993).

Photographic data showed that it shared characteristics of a southern right whale dolphin (*Lissodelphis peronii*) and the dusky dolphin (Figs. 1–2, Table 2). The animal's features were a slender body of approximately 2.0–2.2 m in length.

Table 1. Sightings of the anomalous dolphin associated with the dusky dolphins in Golfo Nuevo, Argentina between 29 November and 16 March 2000; surface water temperature between 17.6 and 19.0°C.

Date	Time	Location	Group size of the dusky dolphins	Behaviour of the group
29 November 1999	1111	42°36.19′S/64°17.21′W	50-100	feeding
29 November 1999	1155	42°36.18′S/64°18.35′W	50	feeding
28 January 2000	1310	42°43.30′S/64°58.04′W	>100	socializing, aerial behaviour
8 February 2000	1335	42°43.03′S/64°57.15′W	50-100	socializing, aerial behaviour
10 February 2000	1245	42°43.26′S/64°56.84′W	50	social travel, aerial behaviour
15 February 2000	0958	42°44.58′S/64°58.58′W	8	socializing
15 February 2000	1034	42°44.46′S/64°58.48′W	20-30	socializing
15 February 2000	1100–1126	42°44.40′S/64°57.15′W-42°44.84′S/64°57.92′W	10	following the boat, bow-wave riding, aerial behaviour, socializing
20 February 2000	1358	42°43.41′S/64°58.37′W	>100	socializing, feeding, aerial behaviour
16 March 2000	1238	42°40.26′S/64°49.87′W	>100	feeding, social travel

Like in southern right whale dolphins, a sharp dividing line separated the black dorsal part from the white ventral part of the body, but the line in the area of the head did not extend below the eyes. The peduncle showed a patch of pale grey, similar to the lateral colour pattern of a dusky dolphin. Contrary to the southern right whale dolphin, the anomalous dolphin had a dorsal fin, which was smaller and more triangular than that of the dusky dolphin and located around two-thirds of the way along the back. Colour patterns of the dorsal fin were very similar to that of a dusky dolphin with its typical half-moon shape and pale grey colouration in the posterior part (Fig. 2 A).

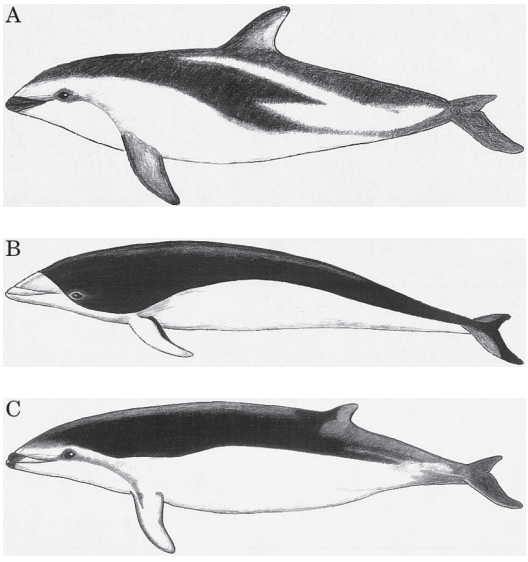

Figure 1. Morphological characteristics of (A) the dusky dolphin (*Lagenorhynchus obscurus*); drawing according to the most common phenotype, observed in Golfo Nuevo, Argentina; (B) the southern right whale dolphin (*Lissodelphis peronii*) according to Cawardine 1995, Torres & Aguayo 1979, Aguayo 1975; and (C) an anomalous dolphin, based on my photographs, recorded in Golfo Nuevo, Argentina.

It can not be excluded that there was more than one unusual dolphin among the dusky dolphins in Golfo Nuevo, Argentina. However, based on 10 sightings on seven different days (between 22 November 1999 and 16 March 2000; Table 1), available photographs (at 15 February 2000 and 16 March, 2000) and video tape recordings (in December 1999 and at 15 February 2000) the observed anomalous dolphin had the same individually-distinctive features (Figs. 1–2).

Discussion

Colour pattern

Geograhic variations of colour fields and anomalous pigmentation were previously reported for *L. obscurus* (Van Waerebeek, 1992; Gallardo, 1912). Dusky dolphins from the Península Valdés area greatly vary in their degree of melanization (Van Waerebeek, 1992). Van Waerebeek (1992) distinguished a heavily melanized and a light-coloured phenotype. However, most specimens were intermediates between the two extreme forms (Fig. 1).

Relatively pronounced colour variations also occurred in the body, fluke, and flippers pigmentation of *L. peronii* (D'Orbigny & Gervais, 1847; Philippi, 1893; Lillie, 1915; Fraser, 1955; Aguayo, 1975, Torres & Aguayo, 1979; Baker, 1981; Cruickshank & Brown, 1981; Rose & Payne, 1991) and pure white animals also have been recorded (Brown, 1973). Juveniles have colour patterns identical to those of the adults, but some submerged smaller calves appeared to be grey dorsally (Cruickshank & Brown, 1981). As opposed

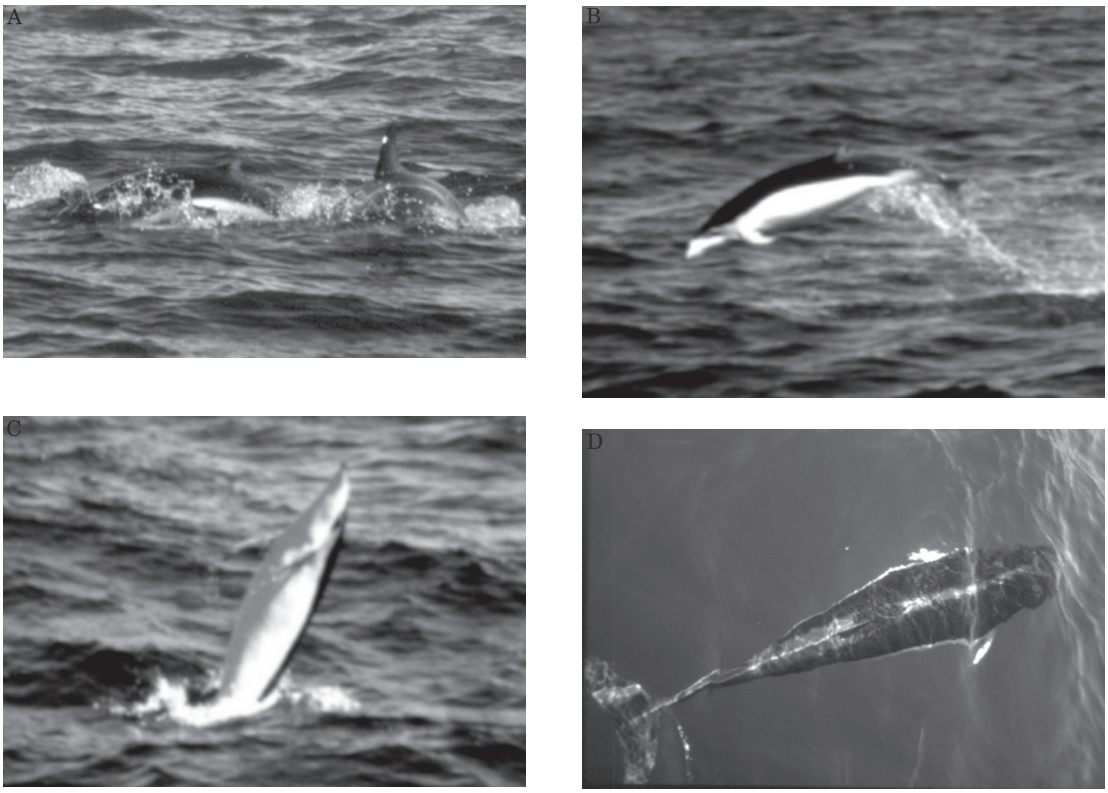

Figure 2. The anomalous dolphin observed in the Golfo Nuevo, Argentina (A) associated with dusky dolphin, (B) during a wide- and low-angled leap with head re-entry, (C) exposing belly and ventral part of the flippers during back-slapping, and (D) exposing dorsal part of the body: All photographs were recorded on 15 February 2000 between 1000 and 1100 h.

to these previous observations on known species, the presence of the small dorsal fin strongly suggests that the unusual dolphin does not represent a colour variant of a southern right whale dolphin.

Features of the anomalous dolphin bear same resemblance to the spectacled porpoise (*Phocoaena dioptrica*). This species is known primarily from the southern coast of eastern South America (Jefferson *et al.,* 1993). Adults are 1.3–2.2 m long and a sharp demarcation exists between the black dorsal and the white ventral part. Female spectacled porpoises have low and triangular-shaped dorsal fins (Cawardine, 1995). However, further characteristics of *P. dioptrica*, (typical porpoise body shape, absence of a beak, a black patch around the eyes, surrounded by a fine white line) (Cawardine 1995; Jefferson *et al.,* 1993) do not apply to the anomalous dolphin.

Behaviour

In most of the sightings, this specimen was observed in groups of dusky dolphins greater than 20 animals (Table 1). On 15 February 2000, the unusual dolphin and approximately 10 dusky dolphins followed the boat for one half hour at a mean speed of approximately 10 km/h. During this time, the anomalous dolphin was videotaped (by L. Pettite, camera: Panasonic M 9000). Based on these recordings, the following behavioural elements were analysed:

(a) bow-wave riding,
(b) fast exit out of the water until the body stands vertically above the water surface, falling down head first. This behaviour was observed while the animal kept its head in the water or during low leaps of approximately 50 cm height,
(c) low leap approximately 1 m high, with 180° spin to the right; head re-entry with belly up,
(d) back-slaps without or with 180° spin (Fig. 2 C) to right and left,
(e) side-slaps with 90° spin to left and right,
(f) belly-slap with 180° spin to right,
(g) tail-slaps, and
(h) rapid acceleration during swimming on the side just below the surface, and three wide- and

Table 2. Distinctive features of dusky dolphins (*Lagenorhynchus obscurus*), southern right whale dolphins (*Lissodelphis peronii*), and the anomalous dolphin observed in Golfo Nuevo, Argentina.

Morphological parameters	*Lagenorhynchus obscurus*	*Lissodelphis peronii*	Anomalous dolphin
Bodylength	Adult: 1.6–2.1 m[1]	Adult: 1.8–2.9 m[1]	2.0–2.2 m (estimated)
Bodyshape	Body small and moderately robust	Long and slender, narrow tail stock[2]	Moderately long and slender
Colour pattern	Sides marked with blazes and patches of pale grey; front of the flank patch splits into 2 blazes, a shorter ventral and a longer dorsal one (this latter narrows and stretches-up onto the back, almost to the blowhole); a recurved stripe leads from the beak to the flippers and forms a broad, continuous grey band; the eye is set in a small patch of grey-black	A sharp line demarcating black above and white below runs from the tail stock forward, dips down to the flipper insertion, and then sweeps back-up to cross the melon between the blowhole and snout crease; the white colouration of the ventral area extends well up to the sides[2], younger animals can be grey dorsally[1,3]	A sharp line demarcating black above and white below runs from the flank forward to the head; peduncle patch splits into two blazes, shorter ventral and longer dorsal one, that forms a broad dorsal grey line; a dorsal grey line insert approximately 20 cm in front of the dorsal fin and leads-up to snout; a recurved stripe leads from the beak to the flippers and forms a broad, continuous grey band
Dorsal fin	Conspicuous, moderately falcate and pointed (variable); frontal dark grey, fading to pale grey in the posterior part	Absent[1,2]	Small, slightly falcate dorsal fin; located about two-thirds of the way along the back; anterior dark grey, fading to pale grey in the posterior part
Fluke	Grey above and below, sometimes fading to pale grey on the leading edge	White below; above dark grey, fading to white on the leading edge[1,2]	Pale grey below, but dark around the trailing edge; above grey, fading to pale grey on the leading edge
Flippers	Moderately curved, grey (variable), sometimes darkened around the edges	Recurved; white; trailing edge with black band[1,2]	Recurved; pale grey, but dark around the edges; a black patch at the shoulder
Beak	Short, grey-black around the tip, tapering back to darken just the lips near the gape (variable)	Short; white; the tip of the lower jaw protudes a bit beyond the upper one[4]	Short; white behind and dark grey in front; the lower jaw protudes a bit beyond the upper one; white tip

According to [1]Carwardine (1995), [2]Jefferson *et al.* (1993), [3]Cruickshank & Brown (1981), [4]Aguayo (1975)

low-angled leaps (height: 1 1.50 m; distance up to 6 m) with head re-entry (Fig. 2 B), rapid up and down tail movements while breaking the water surface.

In comparison to dusky dolphins, this rare specimen was capable of higher swimming speeds and almost exploding movements. Its behaviour was similar to southern right whale dolphin activities. Rose & Payne (1991) reported *L. peronii* 'exploding' at high-speed action for 1–2 min, successive high jumps, and side-slaps. Its extremely attenuate body can allow it to take three or four rapid propulsive strokes with its flukes while its anterior body is in the air, thus reducing drag (Norris & Dohl, 1980). Cruickshank & Brown (1981) observed fast and surface swimming accompanied by a series of low angle jumps, animals bouncing themselves with well-timed flick of their tails as they broke the water surface (Cruickshank & Brown, 1981). This movement pattern also was observed in the unusual dolphin. Due to its long and slender body shape, which is more *Lissodelphis*-like, it is evident that its body movements are more similar to a southern right whale dolphin.

Dusky dolphins are very acrobatic leapers, and show several types of aerial behaviour. Würsig & Würsig (1980) termed 'clean' leaps (headfirst re-entry leaps), 'noisy' leaps (dolphin's headfirst exit from the water, and falling back into water on its side, back, or belly) and 'acrobatic noisy' leaps (head-over-tail and spin) on dusky dolphins. During the study period, five types of 'clean' leaps, nine 'noisy' leaps, and five different 'acrobatic' leaps were analysed (unpublished data). The unusual dolphin did not show any head-over-tail leaps during the sightings. The total observation time of dusky dolphins groups associated with the anomalous dolphin was relatively short (total observation time = 5.1 h at 7 days).

Distribution and migration

Lissodelphis peronii normally is considered to live in offshore waters (Rose & Payne, 1991) and is rarely sighted near shore. However, in Golfo Nuevo, three southern right whale dolphins were observed once during summer 1992, apparently associated with dusky dolphins (R. D. Orri, pers. comm.). *Lissodelphis peronii* also has been observed close to the coast of Chile (Aguayo, 1975), where deep waters occur in the immediate vicinity of the coast. In Lüderitz, Namibia, *L. peronii* was observed in inshore waters throughout the year (Rose & Payne, 1991), possibly related to the strong upwelling in this area (Rose & Payne, 1991).

Gaskin (1968) reported that southern right whale dolphins prefer waters between the Subtropical Convergence and the Antarctic Convergence and surface water temperatures of 9–16°C. However, this species is not restricted to these temperatures, because sightings at temperatures of up to 20.1°C have been confirmed (Cruickshank & Brown, 1981). *Lissodelphis peronii* occurs in cold waters off Santa Cruz Province, Argentina and the Falklands Islands (Lesson, 1826), as well as off Tierra del Fuego (Lahille, 1899; Goodall, 1978). The cold Falkland Current leads along the Patagonian Continental Shelf to the north, whereby a small separation flows to the coast, into Golfo Nuevo and further along the shore of Península Valdés up to Mar de Plata (source: Satellite picture of National Metereologic Service, Argentina 13–14 February 1985). However, specimens of *L. peronii* were recorded in coastal areas off Mar de Plata (Gallardo, 1912) and up to southeastern Brazil, off the coast of São Paulo State (Martuscelli *et al.,* 1996). This area receives both the influence of the warm Brazilian Current and the cold Falkland Current, the latter prevailing during the austral winter (Martuscelli *et al.,* 1996).

Unfortunately, systematic data on dusky dolphins in the Golfo Nuevo during the winter are not available. Some individuals of the local population may migrate out of the Gulf, similar to dusky dolphins in Golfo San José (Würsig & Bastida, 1986), probably to feed on southern anchovies (*Engraulis anchoita*), found off Mar de Plata from September through November (Brandhorst & Castello, 1971). During the migration up to Mar de Plata (Würsig & Bastida, 1986), they could have contact with groups of southern right whale dolphins, which follow the Falkland Current. Based on stomach contents, epipelagic coastal food habits (Torres & Aguayo, 1979), meso-pelagic (Baker, 1981) or both, epi- and meso-pelagic feeding (Crovetto *et al.,* 1992) were suggested for *L. peronii*.

Reproduction

Copulations between dolphins of different species are not uncommon. The same dusky dolphins of Golfo Nuevo were acompanied frequently by a male bottlenose dolphin (*Tursiops truncatus*) and two female long-beaked common dolphins (*Delphinus capensis*). Four times these were observed in cross-species (cross-genera) sexual interactions and copulations. In the Bahamas, interspecific mating interactions with penile intromission were reported between Atlantic spotted dolphins (*Stenella frontalis*) and bottlenose dolphins (Herzing & Johnson, 1997).

Testes of adult dusky dolphins off Peru reach their maximum size in September and October, in synchrony with the peak period of conception (Van Waerebeek & Read, 1994). Small calves (about equal to or less than one-third adult size) were seen in the Golfo San José from November through

February (Würsig & Würsig 1980) and several calves were sighted during aerial surveys in Golfo Nuevo in November and December (Dans *et al.,* 1997). Dans *et al.* (1997) suggested that the calving season of northern Patagonian dusky dolphins extends from spring to autumn. Assuming a gestation period of 11 months (Dans, 1999), most conceptions should occur from September to February.

Unfortunately, there are no published reports on the reproductive cycle of *L. peronii*. Since associations between dusky and southern right whale dolphins were observed in the Golfo Nuevo in summer 1992 (R. Orri, pers. comm.), the copulations and conceptions could have occured inside or outside the Golfo Nuevo.

Hybrids of different cetacean species have been recorded in captivity and in the field. A hybrid of a female rough-toothed dolphin (*Steno bredanensis*) and male bottlenose dolphin was born at Sea Life Park in Hawaii, showing intermediate features between the two parental species (Dohl *et al.,* 1974). Sylvestre & Tasaka (1985) recorded thirteen births of hybrids between bottlenose dolphins and Risso's dolphins (*Grampus griseus*) in Enoshima Marineland, Japan and four hybrids between bottlenose dolphin and false killer whale (*Pseudorca crassidens*) in Kamogawa Sea World, Japan. A near-term foetus of a bottlenose dolphin and long-finned pilot dolphin (*Globicephala macrorhynchus*) exhibiting a combination of intermediate characteristics was recorded in Sea World of San Diego, California (Antrim & Cornell, 1981). Three anomalous dolphins stranded together in Blacksod Bay, Ireland were probably hybrids between *T. truncatus* and Risso's dolphins (Fraser, 1940), suggesting that these three dolphins were the calves of the same cow (Sylvestre & Tasaka 1985). Reyes (1996) reported a stranding of a strange dolphin together with dusky dolphins. The animal showed intermediate characters between the common and dusky dolphin. Heide-Jørgensen & Reeves (1993) examined an anomalous whale's skull, found in West Greenland, suggesting a narwhal (*Monodon monoceros*) and beluga (*Delphinapterus leucas*)-hybrid (Heide-Jørgensen & Reeves, 1993). Hybrids between fin (*Balaenoptera physalus*) and blue whales (*B. musculus*) are documented from morphological and molecular evidence (Berube & Aguilar, 1998; Spilliaert *et al.,* 1991). Arnason (1994) found a fertile female hybrid between blue and fin whale and demonstrated the close relatedness of these two species.

Species showing close genetic similitaries, and in particular when two species are able to produce viable adult hybrids, should be included in a single genus (Dubois, 1981). Le Duc *et al.* (1999) showed with molecular methods that four species of *Lagenorhynchus* (*L. obscurus, L. obliquidens, L. cruciger, L. australis*), are closely related to *Lissodelphis* (*L. peonii, L. borealis*) and *Cephalorhynchus* (*C. commersonii, C. eutropia, C. heavisidii C. hectori*) and placed all these named species in the genus *Sagmatias*. According to the classification of Le Duc *et al.* (1999) the anomalous dolphin that I reported here is a hybrid between two closely related species. This sheds new light on the taxonomic classification of *Lagenorhynchus obscurus* and *Lissodelphis peronii.*

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