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First record of cestodes cysts in coastal dusky dolphins (*Lagenorhynchus obscurus*) off Southwestern Atlantic Ocean --Manuscript Draft--

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Abstract:	the dusky dolphins, <i>Lagenorhynchus obscurus</i> (Gray, 1828), is a coastal small cetacean and is widespread in the southern hemisphere. Here, we present the first record of cestodes parasite present in the blubber of dusky dolphin off Southwestern Atlantic Ocean. The mature female was 15 years old and measured 171 cm. Helminths belonging to Cestoda family were found: cysts of <i>Phyllobothrium delphini</i> (Phyllobothriidae), from the subcutaneous blubber of the ventral surface. Here we present a new record of cestodes blubber cyst, expanding parasite-host relation for dusky dolphins and also we enlarges the scarce parasitological information for cetaceans of Argentina.

1 **RH: Research Note**

2 **First record of cestodes cysts in coastal dusky dolphins (*Lagenorhynchus obscurus*) off**

3 **Southwestern Atlantic Ocean**

4

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1 ABSTRACT, the dusky dolphins, *Lagenorhynchus obscurus* (Gray, 1828), is a coastal small
2 cetacean and is widespread in the southern hemisphere. Here, we present the first record of
3 cestodes parasite present in the blubber of dusky dolphin off Southwestern Atlantic Ocean.
4 The mature female was 15 years old and measured 171 cm. Helminths belonging to Cestoda
5 family were found: cysts of *Phyllobothrium delphini* (*Phyllobothriidae*), from the subcutaneous
6 blubber of the ventral surface. Here we present a new record of cestodes blubber cyst, expanding
7 parasite-host relation for dusky dolphins and also we enlarges the scarce parasitological
8 information for cetaceans of Argentina.

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10 Dusky dolphins (*Lagenorhynchus obscurus*) (Gray, 1828) is a pelagic small cetacean with
11 primary distribution in temperate and cold-temperate waters in the Southern Hemisphere
12 (Leatherwood and Reeves, 1983). Dusky dolphin is one of the most common species of small
13 cetacean off the Patagonian coast in the Southwestern Atlantic. Several aspects of its biology
14 have been studied previously (Crespo et al., 1997; Dans et al., 1997; Degradi et al., 2008;
15 Garaffo et al., 2010). Nevertheless, very little is known about its parasite fauna from
16 Southwestern Atlantic Ocean (Dans et al., 1999; Berón-Vera et al., 2008). The parasites of
17 marine mammals can provide data on the population ecology of their hosts; especially it can
18 help to identify foraging habitats, diet and distribution (Perrin and Powers, 1980; Dailey and
19 Vogelbein, 1991; Berón-Vera et al., 2001; Fernández et al., 2003). On 24th January 2012, a
20 dead female dusky dolphin was found stranded in Playa Bonita (43° 21'S 65°03'W), Chubut
21 Province, Argentina. Fortunately, the specimen was in fresh condition in order to perform
22 parasitological and diet studies. A complete necropsy was carried out in the Marine Mammal
23 Laboratory (LAMAMA-CONICET). Dusky dolphin specimen and parasites voucher are
24 available from Mammals Scientific Collection (Marine Mammal) at Centro Nacional
25 Patagónico (CENPAT-CONICET). Stomach, intestines, skull, teeth, postcranial skeleton, and

1 samples of skin, blubber, kidney and liver were taken and preserved. Teeth were decalcified in
2 RDO, a commercial mixture of acids; sectioned with a freezing microtome at a thickness of
3 16–18 μm . Sections were stained with Mayer's hematoxylin and mounted with Canadian
4 Balsam (Hohn, 1980). Growth layer groups (GLGs) were observed with a stereomicroscope
5 (30 \times) under transmitted light. GLGs in dentine were counted assuming annual deposition
6 (Perrin and Myrick, 1980). Age was determined independently by two observers in order to
7 minimize counting errors. The animal age was 15 years old. Standard measurements of the
8 specimen were taken to the nearest centimeter (Norris, 1961) giving a total length of 171 cm.
9 The animal corresponded to a mature female; ovaries were measured, weighed and fixed in
10 10% formalin solution and 2-mm sections taken from the cortex (Kasuya and Marsh, 1984).
11 Corpora lutea (CL) and corpora albicantia (CA) were counted and measured with calipers.
12 They had at least one CL or CA in the ovaries, and had signs of pregnancy (*i.e.*, enlarge
13 uterine horns). Dans et al. (1997) found the youngest sexually mature female and the oldest
14 immature female were 6 and 7 yr old, respectively also that the smallest sexually mature
15 female and the largest immature female were 161 and 172 cm long. All stomach chambers
16 were observed separately to assess parasite distribution. We isolated the parasites from food
17 contents and recovered them with a 0.5-mm mesh sieve. We divided the intestines into 20
18 sections of equal length and washed the contents of each section through a 0.5-mm mesh
19 sieve. All parasites found were fixed in 70% ethanol and identified according to conventional
20 methods, also a sample of parasites were fixed in 100% ethanol for molecular analysis. In the
21 stomach we found 12 cephalopod beaks, belonging to argentine shortfin squid, *Illex*
22 *argentinus*, the beaks were identified by means of the reference collection of the LAMAMA.
23 The prey found in this study is consistent with previous studies that reported comprehensively
24 the prey items for dusky dolphins (Koen Alonso et al., 1998; Romero et al., 2012). The
25 gastrointestinal helminthes community shows to be depauperate, with low species richness

1 (Dans et al., 2010). Nematodes found in the intestines corresponded to Type II larvae of
2 *Anisakis*, sensu Berland, 1961 and another from genus *Stenurus* (family, *Pseudaliidae*). In the
3 stomach content 25 Type II larvae of *Anisakis* were found. Also, livers and lungs were
4 examined for parasites but none were found. Helminths belonging to Cestoda family were
5 found: cysts of *Phyllobothrium delphini* (*Phyllobothriidae*), from the subcutaneous blubber of
6 the ventral surface [Insert Figure 1]. In Argentina, blubber cysts were not reported for dusky
7 dolphins before. However, blubber cysts of cestodes were present in New Zealand dusky
8 dolphins (presumably *Phyllobothrium spp.*) (Cipriano, 1992) and in dusky dolphins from Peru
9 (*P. delphini*) (Van Waerebeek, 1992; Van Waerebeek et al., 1993) which are both pelagic
10 foragers, the first relying mainly on myctophid fish and the latter preying upon anchoveta
11 (Van Waerebeek, 1992). The absence of this parasite in the Southwestern Atlantic stock is in
12 accordance with a feeding based on coastal's prey (Dans et al., 2010). Additionally, in
13 Argentine waters blubber cysts of cestodes were recorded in several pelagic and deep feeder
14 cetaceans such as striped dolphin (*Stenella coeruleoalba*) (Loizaga de Castro et al., 2011),
15 sperm whales (*Physeter macrocephalus*), Gray's beaked whales (*Mesoplodon grayi*), Risso's
16 dolphins (*Grampus griseus*) and long-finned pilot whales (*Globicephala melas*), were the
17 most important prey in this environment are the squids *Kondakovia longimana*,
18 *Mesonychotheutis hamiltoni*, *Megalochranchia sp.* (Berón-Vera et al., 2008). Although we
19 examine a single individual, the occurrence of *P. delphini* in coastal foragers' dusky dolphins
20 may suggest the exploitation of more pelagic grounds. In these scenario, dusky dolphins could
21 probably be exploiting different ecological systems as part of individual foraging strategies or
22 there are two dusky dolphins' ecotypes (*i.e.*, inshore and offshore), in Argentine waters. An
23 alternative hypothesis that we cannot discard is that the host examined in the present work is a
24 migrant individual from another stock population. There is evidence of migration among
25 stocks (Cassens et al., 2005). Additional data on the host's habitat and trophic ecology and

1 parasite faunas are needed to reach conclusions about the foraging areas or ecotypes of dusky
2 dolphins in Southwestern Atlantic Ocean, as potentially indicated by cestodes parasites. This
3 study is the first record for cestodes in a coastal cetacean and enlarges the scarce
4 parasitological information for cetaceans of Argentina.

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12

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13

14 FIGURE CAPTION

15 FIGURE 1: Cestodes bubbler cysts in the ventral posterior area of coastal dusky dolphin
16 (*Lagenorhynchus obscurus*) at Playa Bonita, Argentina.

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1

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Figure 1

Figure 1
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