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Short Note

Recurrence of Atypical Coloration in Guiana Dolphins (*Sotalia guianensis*; Van Bénéden, 1864; Cetartiodactyla: Delphinidae) in Northeastern Brazil

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The Guiana dolphin (*Sotalia guianensis*; Van Bénéden, 1864) is a small delphinid found in the Western Atlantic of South and Central America, from southern Brazil to Nicaragua, mostly in estuaries, bays, and other protected shallow coastal waters (Flores & Da Silva, 2009). Their typical coloration is light gray to bluish gray on the back and pinkish to light gray ventrally, with a distinct line from the mouth gape to the flipper's leading edge. There is a lighter area on the flank between the flippers and the dorsal (Flores & Da Silva, 2009). Unlike the Indo-Pacific humpback dolphin (*Sousa chinensis*; Osbeck, 1765) (Parra & Ross, 2009), Guiana dolphins do not become pink when they get older (Flores & Da Silva, 2009).

Due to the high anthropic pressure over its distribution, the Guiana dolphin is categorized as "Vulnerable" for conservation purposes in Brazil (Ministério deo Meio Ambiente [MMA], 2014), although it remains as "Data Deficient" on the International Union for Conservation of Nature (IUCN) *Red List* (Secchi, 2012). Although Guiana dolphins are certainly affected by several threat factors, including bycatch in fisheries, deliberate capture for bait, pollution, and habitat deterioration, no formal assessment to evaluate the risks of population decline has been performed (Secchi, 2012), and basic information on the species' biology is still lacking. This work reports recurrent cases of atypical coloration for *S. guianensis* off the coast of Rio Grande do Norte state in northeastern Brazil.

Observations using photo-identification techniques were recorded during research surveys to study the movement and population size of the species in the region since 2008 (e.g., Würsig & Jefferson, 1990). Photographs were taken with a digital camera Canon EOS 60D DSLR with 75- to 300-mm F4-5.6 zoom lens, and geographical coordinates for the sightings were obtained with a GPS Garmin eTrex Venture HC.

On 3 April and 10 July 2008, and again on 14 May 2015, the same individual adult Guiana dolphin with clearly atypical coloration was sighted swimming with other typical *S. guianensis* near Pipa Beach (06º 13' S, 35º 03' W) and Baía Formosa (06º 21' S, 35º 00' W), respectively (Figures 1 & 2). The well-marked dorsal fin confirms that it was the same dolphin despite the addition of new scars from 2008 to 2015. The body shape and size of this individual is typical of a Guiana dolphin, but the skin coloration was pinkish, characteristic of hypopigmentation (Dorp, 1987).

Another specimen, a calf, was observed near Pipa Beach on 2 November 2016 (Figure 3). The animal was sighted foraging with two adults and one juvenile between 0804 and 1142 h.

According to Perrin (2009), the pink coloration (due to dilation of subcutaneous blood vessels, presumably for thermoregulation purposes) in cetaceans is visible only in animals or parts of animals that are normally white (lacking melanin).

Without tissue samples, it is not possible to affirm that insufficient melanin production was congenital and, thus, a heritable disorder like albinism or leucism. In albinism, there is no melanin production, resulting in an entire lack of pigmentation in the skin, hair, and eyes; while in leucism, the melanin production is only reduced but not entirely blocked, so the eyes have normal color (Fertl & Rosel, 2009). Non-hereditary external factors, such as food deficiency, may temporarily change the skin coloration. Low consumption of foods that contain tyrosine may interrupt melanin synthesis; however, its production returns to normal levels when the shortage is suppressed (Grouw, 2012). Therefore, this hypothesis does not apply to the observed adult dolphin since it had been repeatedly sighted, with no change in coloration noted. Moreover, the other individuals of the population presented normal pigmentation during the sampling period; thus, it would be highly unlikely that one or two individuals exhibited hypopigmentation due to food deficiency but not others.

Records of anomalous pigmentation are available for more than 20 different species of cetaceans (Fertl & Rosel, 2009; Filatova et al., 2016). Nascimento et al. (2008) observed an adult Guiana dolphin with the same pattern of coloration described herein at Barra de Tabatinga and

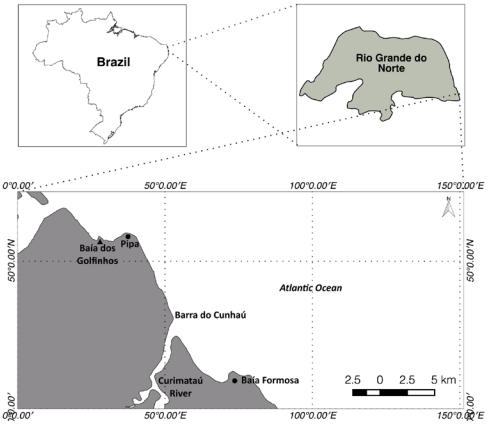

Figure 1. Records of a Guiana dolphin (*Sotalia guianensis*) with atypical coloration in Rio Grande do Norte state, northeastern Brazil. Black circles = atypical adult specimen; black triangle = atypical calf specimen.

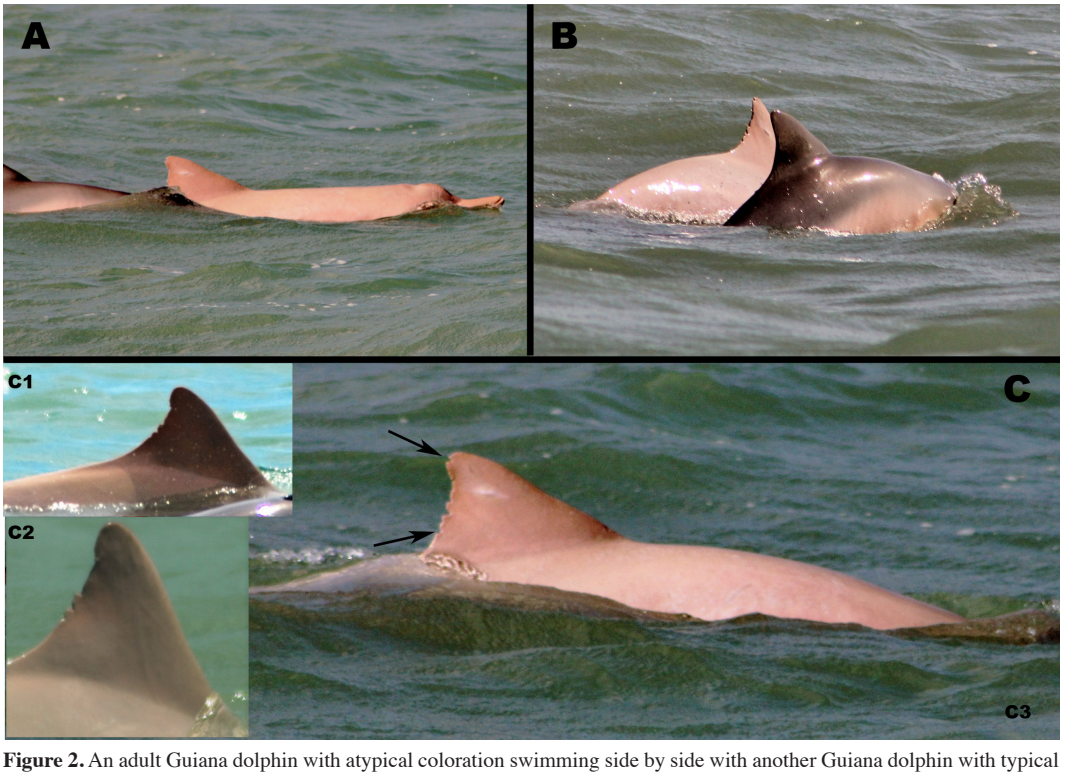

Figure 2. An adult Guiana dolphin with atypical coloration swimming side by side with another Guiana dolphin with typical skin color (A & B). (C) Sightings (photo-identification opportunities) of the atypical Guiana dolphin: C1: 3 April 2008; C2: 10 July 2008; and C3: 14 May 2015 (arrows indicating new scars). (*Photo credits:* All photos by Gustavo A. C. Toledo, except C1 and C2 by Alexandre Paro)

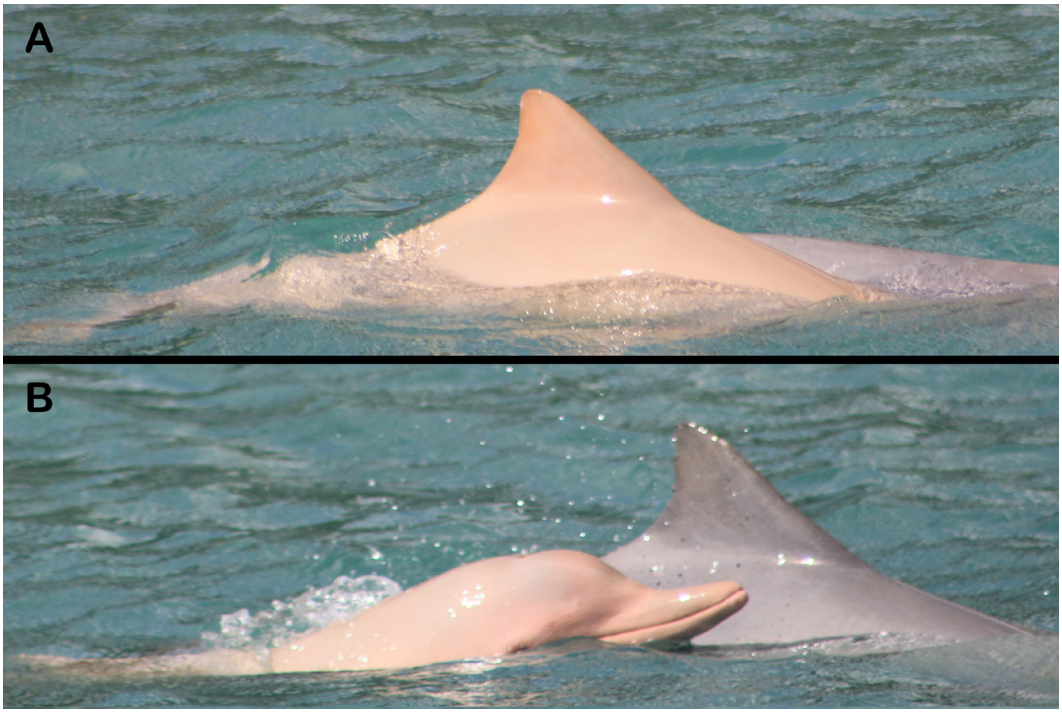

Figure 3. A Guiana dolphin calf with atypical coloration swimming side by side with another Guiana dolphin with typical skin color. (A) Dorsal fin in detail (photo-identification), and (B) forehead in detail. (*Photo credit*: Gustavo A. C. Toledo)

Pipa Beaches, about 20 km from the place we sighted the adult individual. This dolphin was regularly recorded between 1999 and 2004 (21 times), but the photos of the dorsal fin published by Nascimento et al. (2008) do not allow for comparison with ours, so it is not possible to determine whether this atypical Guiana dolphin is the same adult individual recorded in our sightings.

If the sightings from Nascimento et al. (2008) are from the same adult dolphin, this specimen is at least 22 y old, accounting for 16 y between the first (1999) and the last record (2015), plus on additional 6 y to reach physical maturity (Ramos, 1997; Rosas, 2000). It is assumed that the dolphin sighted at Baía Formosa is a female because it was always observed in groups containing immature individuals (Mann et al., 2000) and, at least in some occasions, swimming with a calf in very close proximity with its mid-lateral flank, which is described as echelon position (McBride & Kritzler, 1951; Mann & Smuts, 1999). Based on these estimates, it may have completed about five breeding cycles (calving interval of 22 to 24 mo) (Flores & Da Silva, 2009).

Up to now, data revealed that some Guiana dolphins have high rates of residency in the southern region of Rio Grande do Norte and that the estimated population size is between 192 and 297 (Paro, 2010). The presence of two, or possibly three, hypopigmented specimens (one of them a calf) in this population draws attention and begs these questions: What is the reason for these particular cases in this region? Could it be random mutation, recessive gene expression, or signals of endogamy? None of these can be answered with the current information, which indicates the need of new methodological approaches in this area. Biopsy darting, for example, is a remote sampling strategy that has been employed in several cetacean species and has been recommended for genetic studies of natural populations, especially those where it can combine with field data on known individuals in monitored populations (Cunha et al., 2010).

The southern coast of Rio Grande do Norte is an international tourist destination where the main recreational activity is watching Guiana dolphins from motorized boats (Tosi & Ferreira, 2008). Absence of planning, adequate management, and effective control throughout the years have resulted in negative effects to the population (Lunardi, 2011). Cases of atypical coloration could be related to changes in population dynamics and possible inbreeding. Long-term monitoring

(photo-identification and bioacoustics) has been performed, and the next step will be to conduct a study of population genetics. These combined techniques could elucidate the real source of the atypical coloration in these individuals, and they could further advance what is known about the population structure of this species among areas of northeastern Brazil which have different levels of anthropogenic pressure.

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