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NOTES ON GEOGRAPHIC DISTRIBUTION

First record of *Pontoporia blainvillei* (Gervais & d'Orbigny, 1844) (Mammalia, Cetacea, Pontoporiidae) on the coast of Arraial do Cabo, Rio de Janeiro state, southeastern Brazil

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Abstract. We report the first record of *Pontoporia blainvillei* (Gervais & d'Orbigny, 1844), Franciscana or La Plata River Dolphin, along the coast of Arraial do Cabo, southeastern Brazil. On 8 October 2017, a newborn was stranded in the surf zone of Prainha Beach and was returned to the sea. Although an occasional record, fills a distribution gap of the species' occurrence on the coast of Rio de Janeiro state and, consequently, helps clarify the distribution pattern of *P. blainvillei* along the coast of the Brazil.

Key words. Distribution extension, Franciscana, La Plata River Dolphin, newborn, Prainha Beach

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INTRODUCTION

Pontoporia blainvillei (Gervais & d'Orbigny, 1844), Franciscana or La Plata River Dolphin, is a small odontocete cetacean of the family Pontoporiidae. Adult males measure 1.2–1.5 m and adult females 1.3–1.7 m in total length (TL), while newborn calves are 55–80 cm (in TL). Adult weight varies from 33 to 55 kg and newborn calves from 5 to 7 kg (Siciliano et al. 2006; Rocha-Campos et al. 2010; Lodi and Borobia 2013).

The species occurs only in the Western South Atlantic Ocean, where it is restricted to the tropical and temperate coastal waters of eastern South America (Jefferson et al. 1993; Siciliano et al. 2006; Lodi and Borobia 2013; Monteiro-Filho et al. 2013). The northern limit of this species' geographic range is Itaúnas (18°S), Espírito Santo state, southeastern Brazil (Moreira and Siciliano 1991; Siciliano 1994; Siciliano et al. 2006; Lodi and Borobia 2013; Monteiro-Filho et al. 2013), and the southern edge is in the San Matías Gulf (42°S), Chubut province, Argentina (Crespo et al. 1998; Lodi and Borobia 2013; Monteiro-Filho et al. 2013). Recent studies have indicated that *P. blainvillei* is not continuously distributed along the coast of the Brazil and that two gaps exist. This fragmented distribution corresponds to the regions between Regência (19°S), Espírito Santo state, and Barra do Itabapoana (21°S), Rio de Janeiro state, and between Macaé (22°S) and Ilha Grande Bay (23°S), Rio de Janeiro state (Siciliano et al. 2002; Lodi and Borobia 2013). This discontinuity in distribution may be due to water temperature, depth, and transparency (Siciliano et al. 2002, 2006; Lodi and Borobia 2013), as well as the occurrence of predators (Siciliano et al. 2002, 2006).

Pontoporia blainvillei usually lives in shallow and turbid coastal waters, preferably shallower than 30 m, but occasionally at depths of 50–60 m (Pinedo et al. 1989; Di Beneditto and Ramos 2001; Lodi and Borobia 2013). The species is not common in bays, estuaries, or more protected environments (Lodi and Borobia 2013). In estuaries, *P. blainvillei* has already been recorded in the Babitonga Bay, Santa Catarina state, where its population is considered resident (Cremer and Simões-Lopes 2005, 2008; Lodi and Borobia 2013), in the Paranaguá Bay, Paraná state, and in the estuary-lagoon complex of Cananéia, São Paulo state

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(Lodi and Borobia 2013), as well as in the estuaries of the Paraguay and Uruguay river (Monteiro-Filho et al. 2013). In Brazil, Babitonga Bay is one of the few places where *P. blainvillei* is sighted relatively frequently (Lodi and Borobia 2013). This bay, which has a maximum depth of 28 m, is 20 km away from the main estuary mouth, and this site is used by this species throughout the year for foraging and socializing (Cremer and Simões-Lopes 2005, 2008).

Here, we report the first record of *P. blainvillei* from the coast of Arraial do Cabo, Rio de Janeiro state. This new record helps fills a distribution gap on the coast of Rio de Janeiro state.

METHODS

Anecdotical information was obtained through interviews with people who were on the site at the time of the stranding. Photographs of the animal were kindly provided by individuals that were on the site.

RESULTS

***Pontoporia blainvillei* (Gervais & d'Orbigny, 1844)**

New record. BRAZIL – Rio de Janeiro state • Arraial do Cabo Municipality; Prainha Beach; 22°57′33″S, 042°01′28″W; 8.X.2017; Maycon Victorino Cardoso obs.; stranded on beach (rescued and released), 1 newborn.

An individual of *P. blainvillei* ran aground alive on Prainha Beach (Figure 1), and quickly attracted the attention of the passersby. It was a newborn with a TL of approximately 75–80 cm and of about 5–7 kg (Figure 2). It was not possible to determine the sex of the individual. Immediately after being stranded, the specimen was returned to the sea by a person who was passing by. The animal has not been seen since.

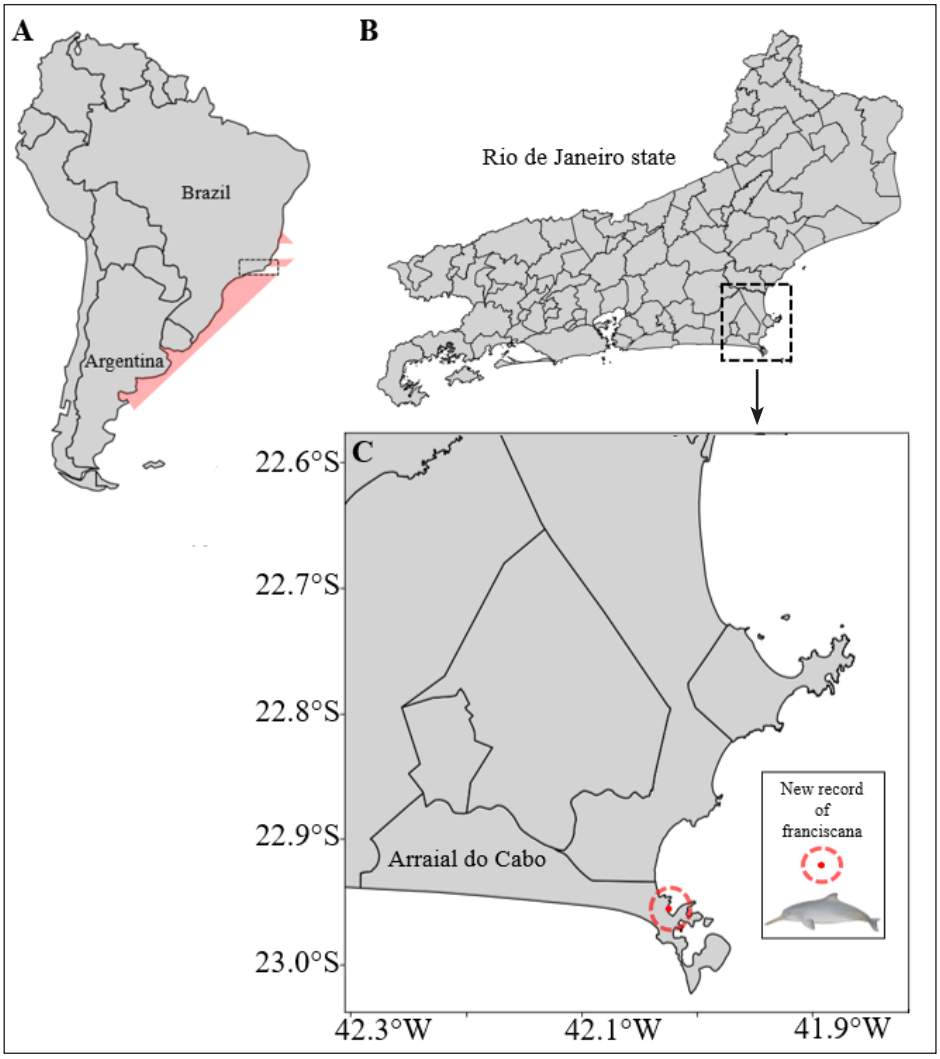

Figure 1. Distribution of *Pontoporia blainvillei*. **A.** Distribution range in eastern South America (pink polygon) showing the two gaps along its occurrence area on the Brazilian coast. **B.** East coast of Rio de Janeiro state. **C.** New record (red dot and dashed circle) from Prainha Beach, on the coast of Arraial do Cabo. Map by UGMJ.

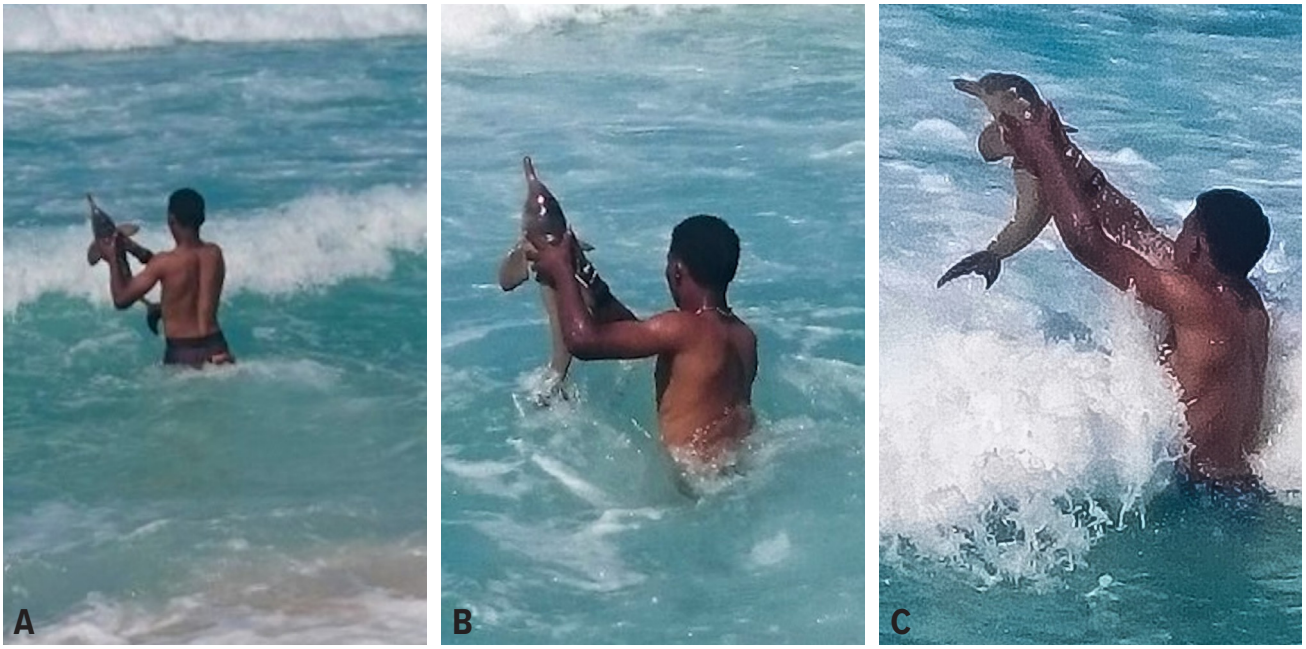

Figure 2. Newborn specimen of *Pontoporia blainvillei* found alive on Prainha Beach, Arraial do Cabo, on 8 October 2017. **A, B,** and **C.** The newborn was returned to the sea by a passerby. Photographs by Maycon Victorino Cardoso, used with permission.

Identification. The animal was identified as *P. blainvillei* by its external morphological appearance. The body is short, and there is an extremely long narrow rostrum. In adults this is 10–15% of TL, but longer in adult females than in adult males; in calves, the rostrum is shorter and relatively thicker (the relative length and width of the rostrum in relation to the TL increase with age, so that adults have proportionally larger beaks than calves). The melon is small but well defined and rounded. The eyes are small. The pectoral fins (flippers) are short, wide, and spatula-shaped, sometimes with irregular or wavy posterior edges, and they have a darker along both edges; in young animals especially, there are visible crests (lumps) that correspond to the phalange bones. The dorsal fin is relatively small, low, triangular, and smoothly contoured, with the end rounded and slightly curved backwards. The dorsal fin is just beyond the longitudinal center of the back. Although the marks and scars on the posterior edge of the dorsal fin differ among individuals, making individual identification possible, they are not so evident. The large caudal fin (tail) has pointed tips and a small central indentation. This species of dolphin is light brown or almost yellowish-brown to light gray, or pinkish, on the belly and flank; the back is brownish to dark gray, and a lighter line may be present laterally at the base of the dorsal fin. A dark area surrounds the eyes (Hetzel and Lodi 1993; Jefferson et al. 1993; Lodi and Borobia 2013; Monteiro-Filho et al. 2013; Miranda et al. 2019).

DISCUSSION

The discontinuous distribution of *Pontoporia blainvillei* may be related to water temperature, depth, and transparency (Siciliano et al. 2002, 2006; Lodi and Borobia 2013), or occurrence of predators (Siciliano et al. 2002, 2006).

The coast of the Arraial do Cabo region has two important characteristics: there is a unique oceanic promontory, which is one of the places along the Brazilian coast that dramatically projects seaward; and there is upwelling of deep cold waters rich in nutrients (Valentin 1994; Rodrigues 2011). This phenomenon occurs in the spring and summer (September to March, with its peak in January) and only occasional during the autumn and winter (Valentin and Coutinho 1990; Valentin 1994; Elias 2009; Calado et al. 2010). For this reason, contradictorily, the waters of Arraial do Cabo are colder and more nutrient-rich in the summer than in the winter. During summer, the predominant wind is the northeast and the water temperature is normally 15–18 °C (minimum 12 °C). The reverse effect occurs during autumn and winter, with the water temperature is higher, reaching beyond 24 °C (Valentin 1994). The nutrients available during this upwelling of cold and nutrient-rich waters are generates high primary productivity and consequently benefits the entire marine trophic structure, in addition to fishing (Valentin 2001; Silva et al. 2006).

Regarding water depth, Praderi et al. (1989) and Pinedo (1994) carried out a study of franciscanas in Uruguay in which they observed that despite changes in fishing areas from 1969 to 1975 (concentrated in water depths ranging from 20 to 30 m) to the 1980–1982 period (concentrated in water depths ranging from 6 to 15 m), there was no difference in the age-frequency of the caught animals between the two periods.

Secchi et al. (1997) studied *P. blainvillei* in Rio Grande do Sul state and found differences in the mean depth of bycatch between males (31 m) and females (22 m). Rosas et al. (2002) also suggested that some spatial segregation may exist for the franciscanas on the coast of Paraná state and the southern coast of São Paulo state, where immature individuals use shallower waters than adult ones. However, the studies by Secchi et al. (1997) and Rosas et al. (2002) are based on small sample sizes and their results should be viewed with caution. Danilewicz et al. (2009) studied the patterns of habitat use of 181 *P. blainvillei* (107 males and 74 females of varying age, size, and reproductive condition) in relation to water depth and found individuals of all sizes use nearly the entire range of depths. This indicates that age and body size are not limiting factors for the occurrence of this species in deeper or offshore waters.

Shallow waters have been considered a protective environment for cetaceans because encounters with predators are thought to be less frequent in these areas (Norris and Dohl 1980; Wells et al. 1987). Norris and Dohl and Wells et al. suggested that *Stenella longirostris* (Gray, 1828) and *Tursiops truncatus* (Montagu, 1821), respectively, use coastal and shallow habitats as a strategy to avoid encounters with predatory sharks. However, according to Heithaus (2001), the relationship between water depth and shark predation risk is not fully understood and may be complex and geographically highly variable. Heithaus and Dill (2002) studied the habitat use of *Tursiops aduncus* (Ehrenberg, 1833) in Shark Bay, Australia, and demonstrated a trade-off between energy intake and predation risk. According to Heithaus and Dill, habitat characteristics and shark density transform shallow waters into a relatively riskier environment in some times of the year, which makes dolphins choose deeper waters to rest. According to Praderi (1985), Ott and Danilewicz (1998), and Santos and Netto (2005), coastal turbid waters may be more dangerous for dolphins than clear pelagic waters depending on the species of shark. Very shallow waters also decrease the effectiveness of dolphin echolocation and make it difficult for these animals to escape predators.

Pontoporia blainvillei are preyed by both sharks and *Orcinus orca* (Linnaeus, 1758) (Praderi 1985; Ott and Danilewicz 1998; Santos and Netto 2005), and the seasonal occurrence of *O. orca* in shallow waters of Rio de Janeiro state (Siciliano et al. 1999) may be one of the reasons for the absence of *P. blainvillei* on the coast of Arraial do Cabo and in adjacent areas. According to Siciliano et al. (1999), potential prey of *O. orca* includes *P. blainvillei*, well as other dolphin species. Ott and Danilewicz (1998) reported the presence of remains of three *P. blainvillei* in the stomach of a female *O. orca* that had stranded in southern Brazil, and Santos and Netto (2005) reported the predation of an adult *P. blainvillei* by an adult or large subadult male *O. orca* in northern Paraná coastal waters. Sharks also are a potential predator (Brownell Jr 1975; Praderi 1985; Di Beneditto 2004). Praderi (1985) found remains of *P. blainvillei* in the stomachs of 17% of *Notorynchus cepedianus* (Péron, 1807) and 4.3% of *Sphyrna* spp. analyzed in Uruguayan waters. Monzón et al. (1994) studied the rate of shark predation on *P. blainvillei* by examining scars caused by shark bites found in dolphins incidentally caught along the Argentine coast. They suggested that shark attacks could be an important factor in the natural mortality of this species.

The new record presented here, despite being occasional, fills a distribution gap of *P. blainvillei* on the coast of Rio de Janeiro state and helps clarify this species' distribution along the Brazilian coast.

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ADDITIONAL INFORMATION

Conflict of interest
The authors declare that no competing interests exist.

Ethical statement
No ethical statement is reported.

Author contributions
Conceptualization: MTR, DS, BAPG, RC. Methodology: MTR, DS, BAPG, RC. Software: UGMJ, SFA. Validation: MTR, DS, BAPG, RC. Formal analysis: MTR, RC. Investigation: MTR, DS, BAPG, RC. Resources: MTR, DS, BAPG, RC. Data curation: MTR. Writing – original draft: MTR. Writing – review and editing: MTR, DS, BAPG, RC. Visualization: MTR, DS, BAPG, RC, UGMJ, SFA. Supervision: MTR, DS, BAPG, RC, UGMJ, SFA. Project administration: MTR.

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Data availability
All data that support the findings of this study are available in the main text.

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