Latin American Journal of Aquatic Mammals
www.lajamjournal.org
Online ISSN: 2236-1057

Update on the current occurrence of *Tursiops truncatus* (Montagu, 1821) in Rio de Janeiro State

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Article Info

Manuscript type	Note
Article history	
Received	21 November 2011
Received in revised form	16 October 2012
Accepted	21 November 2012
Available online	29 December 2016
Responsible Editor: Gabriela Tezanos-Pinto	
Citation: Lodi, L. (2016) Update on the current occurrence of *Tursiops truncatus* (Montagu, 1821) in Rio de Janeiro State. *Latin American Journal of Aquatic Mammals* 11(1-2): 220-226. http://dx.doi.org/10.5597/lajam00231	

The common bottlenose dolphin (*Tursiops truncatus)* is broadly distributed in the coastal waters off Brazil, from Rio Grande do Sul State (32°07'S, 52°05'W; Castello and Pinedo, 1977) to Amapá State (the geographic coordinates were not mentioned by the authors; Siciliano *et al.,* 2008), and in oceanic areas around the Fernando de Noronha (03°50'S, 32°25'W; Silva Jr, 2010) and São Pedro and São Paulo (00°56'N, 29°22'W; Caon *et al.*, 2009) archipelagos, Trindade Island (20°30'S, 29°18'W; Carvalho and Rossi-Santos, 2011) and Rocas Atoll (03°50'S, 33°49'W; Baracho *et al.,* 2007).

The first recorded occurrence of the common bottlenose dolphin in Rio de Janeiro State (RJ), southeastern Brazil, was reported by Geise and Borobia (1988). This record involved a stranding on Flamengo Beach, Guanabara Bay, in April 1980. Except for the studies conducted by Gomes[1] off Arraial do Cabo and by Barbosa *et al.* (2008), Lodi *et al.* (2008), Lodi (2009) and Lodi and Monteiro-Neto (2012) in the Cagarras Archipelago, the available information on this species remains scarce and is generally limited to opportunistic records of sightings[2, 3], strandings (Geise and Borobia, 1988; Oliveira *et al.*, 1994), diet (Di Beneditto *et al.*, 2001; Santos and Haimovici, 2001), and age and growth (Siciliano *et al.*, 2007).

This note reviews and updates records (both sightings and strandings data) of bottlenose dolphin in Rio de Janeiro State, combining unpublished data with previously published information to evaluate the current state of knowledge of the occurrence of this species in the state. The note is presented as a contribution towards the goals of the Brazilian Action Plan for the Conservation of Small Cetaceans (ICMBio, 2011).

Information on sightings and strandings between April 1980 and May 2010 was compiled from the literature, the scientific collection of the *Setor de Mastozoologia do Museu Nacional/Universidade Federal do Rio de Janeiro - MN-RJ* (Mammal Sector of the National Museum/Federal University of Rio de Janeiro), and personal observations, as well as reliable personal communications from researchers and the general public based on familiarity with this species and confirmed by photographs and/or filming. This information has been obtained in a fragmented and opportunistic manner. The sightings made in the Cagarras Archipelago during austral winter and spring seasons from 2004 to 2010 were not detailed or itemized as records of individual sightings in this study due to the common seasonal pattern of occurrence of the species in this region (Lodi and Monteiro-Neto, 2012).

[1]Gomes, L.A. (1986) Análise sobre a ocorrência de *Tursiops truncatus* na região de Arraial do Cabo (Rio de Janeiro, Brasil). Pages 122-131 *in* Castello, H.P. and Wais, I.R. (Eds) Acta, *1a Reunión de Trabajo de Expertos em Mamíferos Acuáticos de América del Sur*, 25-29 July 2004, Buenos Aires, Argentina.

[2]Siciliano, S., Andrade, L. and Capistrano, L. (1987) Observações sobre a presença de *Tursiops truncatus* e *Steno bredanensis* na Baía de Guanabara, Rio de Janeiro- Brasil. Page 85 *in* Anais, *2a Reunião de Trabalho de Especialistas em Mamíferos Aquáticos da América do Sul*, 4-8 August 1986, Rio de Janeiro, Brazil.

[3]Ramos, R., Poletto, F., Moreira, S., Erber, C., Dafferner, G., Freitas, R., Figna, V., Miranda, C., Alencastro, P., Carneiro, A., Fortes, R., Rinaldi, G., Demari e Silva, E. and Barbosa, M. (2010) Família Delphinidae: outros pequenos golfinhos. Pages 649-728 *in* Ramos, R.M.A., Siciliano, S. and Ribeiro, R. (Eds) *Monitoramento da biota marinha em navios de sísmica: seis anos de pesquisa (2001-2007).* Everest Tecnologia em Serviços/PGS Investigação Petrolífera Ltda., Vitória, Brazil. Em mídia digital (DVD). Disponível em < http://ramosetal2010.blogspot.com>.

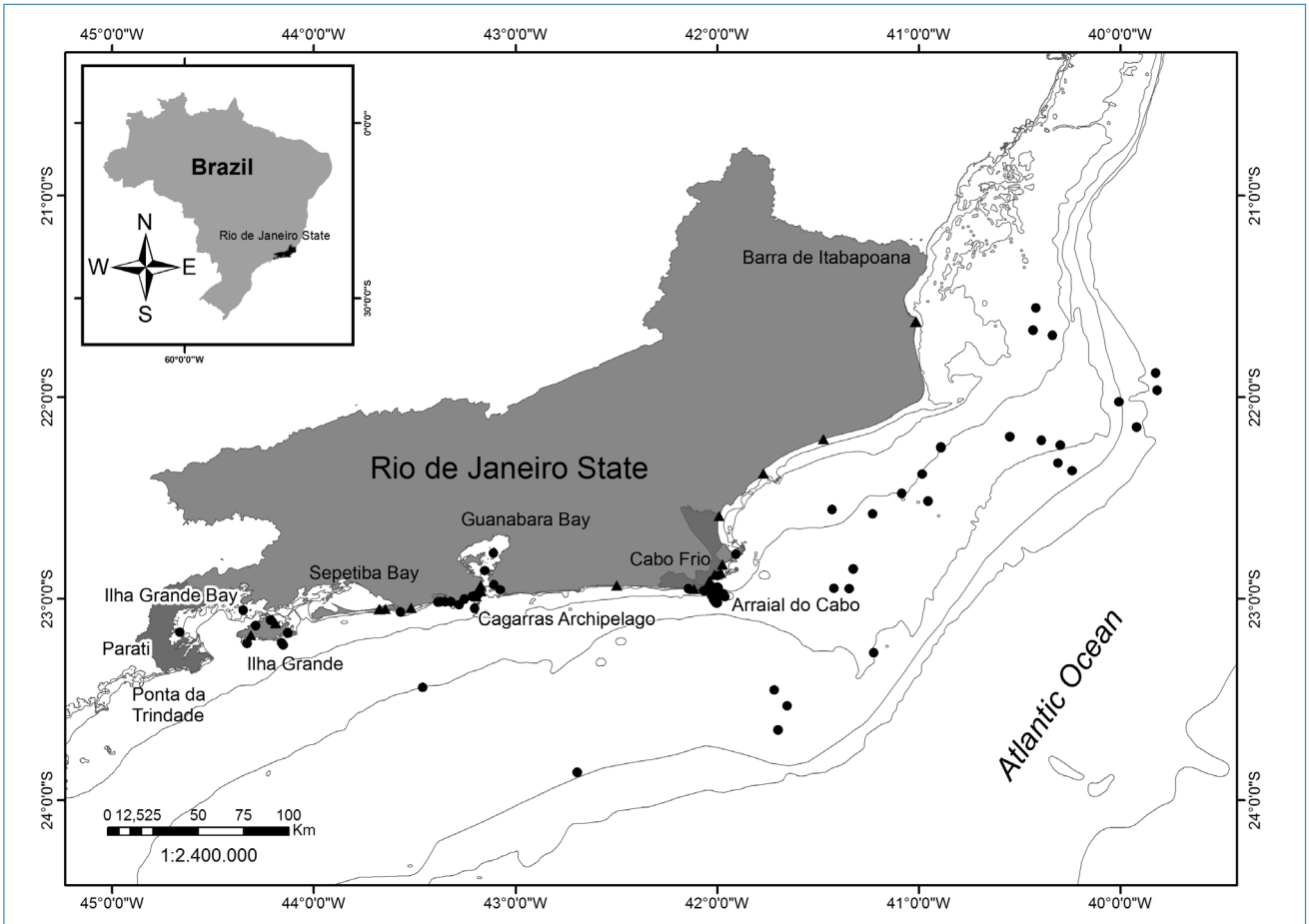

Figure 1. Records of strandings (▲) and sightings (●) of *Tursiops truncatus* in Rio de Janeiro State between 1980 and 2010 (n = 124).

These sightings totaled 219 hours of direct observation during this period, with 29 common bottlenose dolphins identified individually based on dorsal fin characteristics (Lodi, 2009). It is clear from Lodi (2009) and Lodi and Monteiro-Neto (2012) that the Cagarras Archipelago is an important site for bottlenose dolphin in the waters of Rio de Janeiro State.

The coastal zone of RJ (*ca.* 800km), including bays and inlets, extends from Ponta de Trindade (23°22'S, 44°44'W), municipality of Paraty, in the south, up to Barra de Itabapoana (21°23'S, 40°59'W), municipality of São Francisco de Itabapoana, on the border with Espírito Santo State. This area exhibits complex and dynamic oceanographic interactions involving the Brazil Current, the upwelling of the deep South Atlantic Central Water (SACW) and the waters of Guanabara, Sepetiba and Ilha Grande bays. These interactions produce a variety of physical processes near the coast, including the generation of cold upwelling plumes, warm plumes and strong fronts.

A total of 124 records (100 sightings and 24 strandings, of which 67.7% previously unpublished) were compiled between Rapada Island, Paraty Bay (23°10'S, 44°39'W) and Atafona (21°37'S, 41°00'W) (Figure 1 and Table 1). In Table 1, these records are presented in chronological order from south to north. This note describes the potential patterns and trends shown by the data gathered in this compilation. An accurate analysis is not possible with this type of sampling due to heterogeneous data.

An analysis of the temporal distribution of the available data indicated that most records occurred between 2001 and 2010 (80.6%), with the majority of strandings occurring between 1991 and 2000 (83.3%) and the majority of live sightings between 2001 and 2010 (90%). The greater number of records since the late 1990s coincides with the increase in research effort in the region and greater public awareness.

The data summarized in this note suggest that the distribution of common bottlenose dolphins is continuous and that the species may be common in the coastal waters of RJ. However, information about the occurrence of common bottlenose dolphins on the outer continental shelf and slope and in oceanic areas is still scarce, and a greater sampling effort is needed in all of these areas.

The highest frequency of records (61.2%, n = 76) was found in the northern area of RJ. The species was recorded in every month of the year, but the austral summer (50.8%, n = 63) appears to be the season with the greatest number of records of the common bottlenose dolphin for the state.

According to Ramos *et al.*[3] in an examination of the coast between the Pará/Maranhão and Santos sedimentary basins,

the rate of occurrence of common bottlenose dolphins was highest in the Campos Basin. The species occurred most frequently during the summer. The most important river mouths in RJ, including the mouths of the Itabapoana, Paraíba do Sul, Macaé and São João rivers, are concentrated in the northern area of the state. These river mouths are associated with strong effects on the inner continental shelf due to the contribution of freshwater and sediments by the rivers. Of the records obtained in the northern area, 50 were located between Arraial do Cabo and Cabo Frio (65.7%), with 46 (92%) occurring in the summer. In contrast, Gomes[2] reported that the highest frequency of occurrence of the species off Arraial do Cabo was in the autumn and winter. The region between Arraial do Cabo and Cabo Frio is characterized by a narrow continental shelf, with depths of 50 to 100m near the coast. In this region, high primary productivity and biological diversity are associated with the occurrence of upwelling (Muehe and Valentini, 1998). The emergence of the SACW over the inner domain of the continental shelf, typically characterized by temperatures below 20°C and by salinities between 34.6 and 36psu (Miranda, 1985), is responsible for the abundant nutrients that favor new primary production during the austral summer in the region (Gonzales-Rodriguez *et al.*, 1992). In turn, the high frequency of occurrence of bottlenose dolphins observed in the present study (based on the data available) from December through March could indicate a relationship with the availability of resources and suggests the possible characterization of this area as an important feeding site. According to Carbonel and Galeão (2007), the plumes of the upwelling during the austral summer show a tendency to concentrate primarily between Cabo Frio and Guanabara Bay. The plumes are accompanied by the formation of filaments, which frequently elongate and extend to the southeast. These features could influence the apparent predominant occurrence of bottlenose dolphins in the central area, as also observed during this season. However, the records of the species also appeared to be very frequent during the autumn in this area. This possible trend requires further investigation. The records for the southern area appeared to be more frequent during the autumn and spring. This finding could be related to movements between areas in search of food.

The common bottlenose dolphins identified individually in the Cagarras Archipelago in 2004 and 2006 were resighted in 2005 in the vicinity of Jorge Grego Island, Ilha Grande Bay, approximately 100km southwest of the archipelago (Lodi *et al.*, 2008). Therefore, it is important to conduct individual identification studies to gather further information about the movements of bottlenose dolphins along the coast of RJ.

Large numbers of adults (total length ≥ 2.5 m) were recorded in the sightings made in the Cagarras Archipelago during the austral summer and autumn, in contrast to the low number of calves (up to 1/2 of adult size) observed (pers. obs). Observations of calves are common in the austral winter and spring and support the hypothesis that the archipelago may be used as a nursing or calving area by bottlenose dolphin during this particular time of year. The average number of immature individuals observed in groups during the austral winters and springs is consistent with this hypothesis (Lodi, 2009; Lodi and Monteiro-Neto, 2012).

Despite its wide distribution, the bottlenose dolphin is included in the category 'Data Deficient' in the *Plano de Ação para Mamíferos Aquáticos do Brasil, Versão II* (Action Plan for Aquatic Mammals of Brazil, Version II) (IBAMA, 2001). For this reason, obtaining more information on the areas of occurrence, habitat use and seasonality of common bottlenose dolphins is important to guide studies that can contribute to management and conservation policies. In March 2010, the *Rede de Colaboradores do Projeto Golfinho-flíper* (Network of Collaborators of the Common Bottlenose Dolphin Project) was established with the aim of extending the knowledge of the occurrence of this species in RJ.

Systematic and long-term studies of common bottlenose dolphins, especially in the areas where the species is primarily concentrated, deserve more attention. In addition, the absence of inshore coastal sightings north of Cabo Frio should be investigated. The research priorities suggested were based on a comparative analysis in which the existing information on common bottlenose dolphins in RJ was reviewed to identify the gaps in the knowledge of the species in this area.

Acknowledgments

The authors wish to thank Berenice G. de Souza, Bruno da S.B. Carvalho, Carlos Augusto Rangel, Fábio Soares da Cruz, Luiza Perin, Marcelo Tardelli Rodrigues and Monica Borobia, who kindly provided information on records of sightings and strandings. João Alves and Stella Franco kindly supplied information about the osteological collection of National Museum. Sérgio C. Moreira prepared Figure 1. Monica Borobia, Gabriela Tezanos-Pinto and three anonymous reviewers provided valuable suggestions on the original manuscript.

Table 1. Confirmed records of sightings (Sigh., n = 100) and strandings (Stra., n = 24) of *Tursiops truncatus* in Rio de Janeiro State between 1980 and 2010. Data used in this study. MN/RJ = Museu Nacional/Universidade Federal do Rio de Janeiro.

AREA/DATE	LOCALITY	LATITUDE LONGITUDE	EVENT	GROUP SIZE	TOTAL LENGHT (m)	SOURCE	REMARKS
South							
14 September 1986	Sul Beach, Ilha Grande Bay	23°11'S 44°16'W	Stra.			This study	Borobia[4]
19 February 1990	Saco do Céu, Ilha Grande Bay	23°10'S 44°20'W	Sigh.	> 50		This study	Pers. obs.
30 October 1992	Ponta do Drago, Ilha Grande Bay	23°11'S 44°22'W	Sigh.	50		This study	Pers. obs.
31 October 1993	Sítio Forte Harbor, Ilha Grande Bay	23°07'S 44°17'W	Sigh.	15		This study	Pers. obs.
21 May 1994	Barra de Guaratiba	23°02'S 43°41'W	Sigh.	02		Oliveira *et al.* (1994)	
27 August 1994	Gipóia Island, Ilha Grande Bay	23°00'S 44°19'W	Sigh.	20		This study	Pers. obs.
10 December 1994	Restinga da Marambaia	23°07'S 43°39'W	Stra.		3.00	Oliveira *et al.* (1994)	MN/RJ 50111
28 May 1995	Restinga da Marambaia	23°07'S 43°39'W	Stra.		2.51	Oliveira *et al.* (1994)	MN/RJ 52457
18 May 1996	Restinga da Marambaia	23°00'S 43°39'W	Stra.		2.95	Oliveira *et al.* (1994)	MN/RJ 52810
April 2000	Ilha Grande, Ilha Grande Bay	23°10'S 44°20'S	Stra.			This study	MN/RJ 66398
04 April 2005	Rapada Island, Paraty Bay	23°10'S 44°39'W	Sigh.	15		This study	Pers. obs.
24 November 2005	Jorge Grego Island, Ilha Grande Bay	23°21'S 44°15`W	Sigh.	20		Lodi *et al.* (2008)	
21 July 2008	Lopes Mendes Beach, Ilha Grande Bay	23°10'S 44°07'W	Sigh.	15		This study	Pers. obs.
Central							
13 April 1980	Flamengo Beach	22°54'S 43°12'W	Stra.			Geise and Borobia (1988)	
04 September 1984	Guanabara Bay	22°54'S 43°12'W	Sigh.	30		Siciliano *et al.*[1]	
01 April 1985	Copacabana Beach	22°59'S 43°11'W	Stra.			This study	Pers. obs.
07 March 1986	Paquetá Island, Guanabara Bay	22°54'S 43°12'W	Sigh.	06		Siciliano *et al.*[1]	
30 December 1998	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	05		This study	Pers. obs.
14 March 1999	Cagarras Archipelago	23°00'S 43°12'W	Sigh.	05		This study	Pers. obs.
28 April 2001	Macumba Beach	23°00'S 43°39'W	Stra.			This study	MN/RJ 62821
16 February 2002		23°26'S 43°27'W	Sigh.	02		Ramos *et al.*[3]	
19 March 2002	Ipanema Beach	22°45'S 43°00'W	Sigh.	30		This study	Pers. obs.
28 December 2003		23°51'S 42°41'W	Sigh.	50		Ramos *et al.*[3]	
25 February 2004	Barra da Tijuca Beach	23°02'S 43°25'W	Sigh.	10		This study	Pers. obs.
14 May 2004	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	70		This study	Pers. obs.
08 June 2004	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	16		This study	Pers. obs.
16 December 2004	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	12		This study	Pers. obs.
08 May 2005	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	01		This study	Pers. obs.
08 June 2005	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	13		This study	Pers. obs.
16 February 2006	Ipanema Beach	22°45'S 43°00'W	Sigh.	15		This study	Pers. obs.
17 February 2006	Barra da Tijuca Beach	23°02'S 43°25'W	Sigh.	15		This study	Pers. obs.
08 April 2006	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	08		This study	Pers. obs.
17 December 2006	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	07		This study	Pers. obs.
17 March 2007	Barra da Tijuca Beach	23°02'S 43°25'W	Sigh.	30		This study	Pers. obs.
10 February 2008	Copacabana Beach	22°59'S 43°11'W	Sigh.	20		This study	Pers. obs.
12 April 2008	Arpoador Beach	22°45'S 43°00'W	Stra.		2.00	This study	Pers. obs.
19 April 2008	Cagarras Archipelago	23°01'S 43°12'W	Sigh.	03		This study	Pers. obs.
19 April 2008	Ipanema Beach	22°45'S 43°00'W	Sigh.	03		This study	Pers. obs.
20 June 2008	Piratininga Beach	22°57'S 43°04'W	Sigh.	04		This study	Pers. obs.
28 January 2009	Copacabana Beach	22°58'S 43°10'W	Sigh.	30		This study	Pers. obs.
01 April 2009	Charitas Beach	22°53'S 43°06'W	Sigh.	01		This study	Perin5
06 December 2009	Arpoador Beach	22°59'S 43°11'W	Sigh.	08		This study	Pers. obs.
08 February 2010	Ilha do Meio	23°01'S 43°16'W	Sigh.	07		This study	Pers. obs.
13 March 2010	Between Redonda and Comprida islands	23°03'S 43°11'W	Sigh.	> 50		This study	Pers. obs.
16 March 2010	Ipanema Beach	22°45'S 43°02'W	Sigh.	> 50		This study	Pers. obs.

AREA/DATE	LOCALITY	LATITUDE LONGITUDE	EVENT	GROUP SIZE	TOTAL LENGHT (m)	SOURCE	REMARKS
25 March 2010	São Conrado Beach	23°04'S 43°15'W	Sigh.	20		This study	Pers. obs.
31 March 2010	Barra da Tijuca Beach	23°02'S 43°25'W	Sigh.	15		This study	Pers. ob.
16 May 2010	Copacabana Beach	22°59'S 43°11'W	Sigh.	15		This study	Pers. obs.
North							
April 1983 to April 1984	Arraial do Cabo	22°57'S 42°01'W	Sigh.	2 to > 100		Gomes[2]	
26 July 1984	Foguete Beach, Cabo Frio	22°05'S 41°00'W	Stra.			Geise and Borobia (1988)	
September 1991	Farol de São Tomé	22°05'S 41°00'W	Stra.		1.62	Siciliano *et al.* (2007)	MN/RJ 53657
June 1992	Atafona	21°37'S 41°00'W	Stra.		1.84	Siciliano *et al.* (2007)	MN/RJ 53660
June 1992	Atafona	21°37'S 41°00'W	Stra.		2.37	Siciliano *et al.* (2007)	MN/RJ 53658
June 1992	Macaé	22°25'S 41°47'W	Stra.		2.00	Siciliano *et al.* (2007)	MN/RJ 53659
October 1996	Farolzinho	22°00'S	Stra.		1.66	Siciliano *et al.* (2007)	MN/RJ 53661
14 July 2000	Ilha Grande, Arraial do Cabo	22°57'S 42°06'W	Stra.			This study	MN/RJ 61931
03 March 2001	Barra de São João Beach	22°35'S 41°59'W	Stra.			This study	MN/RJ 63011
10 November 2001		23°27'S 41°42'W	Sigh.	30		Ramos *et al.*[3]	
27 December 2001		23°16'S 41°13'W	Sigh.	01		Ramos *et al.* [3]	
03 January 2003	Focinho do Cabo, Arraial do Cabo	22°59'S 42°00'W	Sigh.	20		This study	Rodrigues[6]
05 January 2003	Ilha Grande, Arraial do Cabo	22°59'S 42°00'W	Sigh.	20		This study	Rodrigues[6]
06 January 2003	Ilha Grande, Arraial do Cabo	22°57'S 42°03'W	Sigh.	20		This study	Rodrigues[6]
17 December 2003	Focinho do Cabo, Arraial do Cabo	22°56'S 42°00'W	Sigh.	25		This study	Rodrigues[6]
23 December 2003	Gruta Azul, Arraial do Cabo	22°59'S 42°00'W	Sigh.	25		This study	Rodrigues[6]
28 December 2003		21°41'S 40°20'W	Sigh.	04		Ramos *et al.*[3]	
14 January 2004	Franceses Island, Arraial do Cabo	22°59'S 42°01'W	Sigh.	20		This study	Rodrigues[6]
22 January 2004	Focinho do Cabo, Arraial do Cabo	22°56'S 42°00'W	Sigh.	25		This study	Rodrigues[6]
25 January 2004	Focinho do Cabo, Arraial do Cabo	22°56'S 42°00'W	Sigh.	25		This study	Rodrigues[6]
06 February 2004		23°05'S 42°20'W	Sigh.	04		This study	Cruz[7]
06 February 2004		23°17'S 42°45'W	Sigh.	04		This study	Cruz[7]
21 April 2004		22°19'S 40°18'W	Sigh.	05		Ramos *et al.*[3]	
03 May 2004		22°22'S 40°14'W	Sigh.	01		Ramos *et al.*[3]	
16 May 2004	Peró Beach, Cabo Frio	22°52'S 42°01'W	Stra.			This study	Rodrigues[6]
17 December 2004	Ilha Grande, Arraial do Cabo	22°57'S 42°01'W	Sigh.	08		This study	Rodrigues[6]
27 December 2004		22°01'S 40°00'W	Sigh.	07		Ramos *et al.*[3]	
13 January 2005		22°34'S 41°13'W	Sigh.	06		Ramos *et al.*[3]	
21 March 2005	Foguete Beach, Cabo Frio	22°52'S 42°01'W	Stra.			This study	Rodrigues[6]
09 April 2005		22°30'S 40°57'W	Sigh.	05		Ramos *et al.*[3]	
14 April 2005		21°52'S 39°49'W	Sigh.	04		Ramos *et al.*[3]	
07 June 2005	Foguete Beach, Cabo Frio	22°52'S 42°01'W	Stra.		2.75	This study	Rodrigues[6]
07 June 2005	Foguete Beach, Cabo Frio	22°52'S 42°01'W	Stra.		2.86	This study	Rodrigues[6]
12 June 2005		22°25'S 40°89'W	Sigh.	10		Lodi *et al.* (2008)	
12 June 2005		22°24'S 40°89'W	Sigh.	07		Lodi *et al.* (2008)	
12 June 2005		22°19'S 40°54'W	Sigh.	> 50		Lodi *et al.* (2008)	
12 June 2005		22°21'S40°39'W	Sigh.	05		Lodi *et al.* (2008)	
14 June 2005		22°55'S 41°42'W	Sigh.	06		Lodi *et al.* (2008)	
15 June 2005		22°23'S 40°29'W	Sigh.			Lodi *et al.* (2008)	
27 June 2005		22°08'S 39°55'W	Sigh.	81		Ramos *et al.*[3]	
24 November 2005		22°47'S 41°08'S	Sigh.	15		Lodi *et al.* (2008)	
02 December 2005		21°66'S 40°43'W	Sigh.	12		Lodi *et al.* (2008)	
02 December 2005		21°55'S 40°41'W	Sigh.	07		Lodi *et al.* (2008)	

AREA/DATE	LOCALITY	LATITUDE LONGITUDE	EVENT	GROUP SIZE	TOTAL LENGHT (m)	SOURCE	REMARKS
18 December 2005	Brava Beach, Arraial do Cabo	22°59'S 42°00'W	Sigh.	25		This study	Rodrigues[6]
19 December 2005		22°57'S 41°25'W	Sigh.	03		Ramos *et al.*[3]	
December 2005		22°51'S 41°19'W	Sigh.	02		Ramos *et al.*[3]	
22 December 2005	Focinho do Cabo, Arraial do Cabo	22°57'S 42°00'W	Sigh.	20		This study	Rodrigues[6]
27 December 2005	Focinho do Cabo, Arraial do Cabo	22°57'S 42°00'W	Sigh.	30		This study	Rodrigues[6]
03 January 2006	Focinho do Cabo, Arraial do Cabo	22°56's 42°00'W	Sigh.	35		This study	Rodrigues[6]
04 January 2006	Focinho do Cabo, Arraial do Cabo	22°57'S 42°00'W	Sigh.	35		This study	Rodrigues[6]
05 January 2006	Focinho do Cabo, Arraial do Cabo	22°57'S 42°00'W	Sigh.	35		This study	Rodrigues[6]
19 February 2006	Brava Beach, Arraial do Cabo	22°59'S 42°01'W	Sigh.	15		This study	Rodrigues[6]
20 August 2005		22°23'S 40°59'W	Sigh.	10		This study	Cruz[7]
13 January 2007		23°39'S 41°04'W	Sigh.	50		Ramos *et al.*[3]	
14 January 2007	Saco dos Ingleses, Arraial do Cabo	22°59'S 42°00'W	Sigh.	15		This study	Rodrigues[6]
15 January 2007		23°31'S 41°03'W	Sigh.	12		Ramos *et al.*[3]	Rodrigues[6]
23 January 2007	Ilha Grande, Arraial do Cabo	22°57'S 42°04'W	Sigh.	35		This study	Rodrigues[6]
06 February 2007	Gruta Azul, Arraial do Cabo	22°59'S 42°00'W	Sigh.	15		This study	Rodrigues[6]
14 February 2007	Peró Beach, Cabo Frio	22°52'S 42°01'W	Stra.		1.20	This study	Rodrigues[6]
07 March 2007	Saquarema	22°56'S 42°30'W	Stra.		2.00	This study	Rodrigues[6]
12 March 2007	Saco do Meteoro, Arraial do Cabo	22°59'S 42°00'W	Sigh.	10		This study	Rodrigues[6]
14 April 2007	Arraial do Cabo	22°59'S 41°59'W	Sigh.	> 50		This study	Rodrigues[6]
05 January 2008	Focinho do Cabo, Arraial do Cabo	22°57'S 41°59'W	Sigh.	35		This study	Rodrigues[6]
08 January 2008	Focinho do Cabo, Arraial do Cabo	22°57'S 41°59'W	Sigh.	15		This study	Rodrigues[6]
24 February 2008	Saco dos Ingleses, Arraial do Cabo	22°59'S 42°00'W	Sigh.	15		This study	Rodrigues[6]
25 February 2008	Gruta Azul, Arraial do Cabo	22°59'S 42°00'W	Sigh.	35		This study	Rodrigues[6]
03 March 2008	Ilha Grande, Arraial do Cabo	22°57'S 42°01'W	Sigh.	35		This study	Rodrigues[6]
09 March 2008	Focinho do Cabo, Arraial do Cabo	22°57'S 41°59'W	Sigh.	20		This study	Rodrigues[6]
16 June 2008	Cabo Frio Island, Arraial do Cabo	22°59'S 41°59'W	Sigh.	> 50		This study	Carvalho[8]
09 July 2008	Prainha, Arraial do Cabo	22°56'S 42°01'W	Sigh.	08		This study	Rangel[9]
01 August 2008	Foguete Island, Cabo Frio	22°55'S 42°01'W	Stra.			This study	Rodrigues[6]
13 August 2008	Geribá Beach, Búzios	22°46'S 41°54'W	Sigh.	20		This study	Pers. obs.
24 January 2009		23°20'S 42°00'W	Sigh.	04		This study	Souza[10]
16 February 2009	Brava Beach, Arraial do Cabo	22°53'S 41°59'W	Sigh.	08		This study	
18 February 2009	Brava Beach, Arraial do Cabo	22°59'S 42°01'W	Sigh.	10		This study	Rodrigues[6]
31 May 2009		21°58'S 39°49'W	Sigh.	30		This study	Carvalho[8]

[4]M. Borobia, pers. comm., 5 March 2010
[5]L. Perin, pers. comm., 5 April 2009
[6]M.T. Rodrigues, pers. comm., 16 March 2009
[7]F.S. Cruz, pers. comm., 7 June 2004
[8]B.S.B. Carvalho, pers. comm., 20 May 2010
[9]C.A. Rangel, pers. comm., 10 September 2008
[10]B.G. Souza, pers. comm., 26 January 2009

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