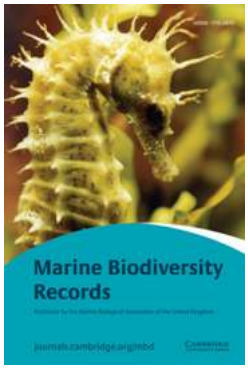

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Stranding pattern of Bryde's whales along the south-eastern coast of Brazil

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In this study we present data on 46 strandings of Bryde's whales along the coast of São Paulo and Rio de Janeiro States, south-eastern Brazil. The aim of this study was to evaluate the stranding pattern of Bryde's whales in south-eastern Brazil. The results show a relationship with annual increasing of strandings in a 20 year period of data collection (1990 – 2010). No significant seasonal trend was observed among four seasonal categories, but most whales stranded during winter (July – September). Males stranded more frequently than females. There was a significant trend in strandings of sexually mature whales (>11.12 m; 53.6%), but juveniles (≤8 m; 21.9%) were also relatively common. The present work confirms that Bryde's whales are common on the south-eastern Brazilian coast. Some discrepancy in published results from sightings and our results on strandings (e.g. seasonal pattern) was observed and may be related to environmental condition and the presence of inshore and offshore populations with differences in life history and behaviour. No whales showed signals of impact caused by human interactions, despite the potential threats in the study area. Future studies comparing morphology with genetics are suggested to be carried out to elucidate the taxonomic status of the Bryde's whales in Brazil.

Keywords: strandings, Brazil, Bryde's whale, stomach contents, *Balaenoptera edeni*

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INTRODUCTION

Bryde's whales (*Balaenoptera edeni,* Anderson, 1879) have been reported in tropical, subtropical and warm temperate oceans around the world (inhabiting waters about 16°C or warmer), between latitudes 40°N and 40°S (Jefferson *et al.*, 2008; Kato & Perrin, 2009). It is the only balaenopterid species that does not perform extensive latitudinal migratory movements, remaining in warm waters throughout the year (Kato & Perrin, 2009). *Balaenoptera edeni* is relatively common in Brazilian waters and it is known to occur over the coastal shelf until the bathymetry of 200 m, but appears to be more frequent in coastal areas of the south-eastern region wherever effort occurs (Zerbini *et al.*, 1997; Siciliano *et al.*, 2004).

Historically, *B. edeni* was exploited by two whaling stations in Brazilian waters: Costinha station (Paraíba State: 06°57′S 34°51′W) from 1910 to 1914 and from 1924 to 1985, and Cabo Frio station (Rio de Janeiro State: 22°53′S 42°01′W) from 1960 to 1963 (Williamson, 1975; Zerbini *et al.*, 1997). However, this whale was not distinguished from the Sei whale (*Balaenoptera borealis*) before 1967, which biased the catch number for the two species. The estimated total catches of Bryde's whales in Brazil were approximately 360 and 30 whales off Costinha and Cabo Frio stations, respectively (Williamson, 1975). This large cetacean was not heavily hunted when compared with other whales (e.g. blue, fin and Sei whales), but fewer than 8000 were taken in the southern hemisphere (Jefferson *et al.*, 2008).

Bryde's whale is found stranded along the Brazilian coast more often than all six balaenopterids (genus *Balaenoptera*: blue whale—*B. musculus*; fin whale—*B. physalus*; Sei whale—*B. borealis*; Bryde's whale—*B. edeni*; Antarctic minke whale—*B. bonaerensis*; and dwarf minke whale—*B. acutorostrata*) which are known to occur in the region, with the exception of dwarf minke whales (Zerbini *et al.,* 1997). However, despite the relatively large number of strandings in comparison to other balaenopterids, still little is known about its seasonal occurrence and biology, such as feeding habits. Worldwide, *B. edeni* is considered as 'data deficient' by the *IUCN Red List* (Reilly *et al.*, 2008) and it has been included in Appendix I of the Convention on International Trade in Endangered Species (CITES, 2011), and in Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS, 2009).

It has been suggested that Bryde's whales are opportunistic feeders preying upon schooling of small pelagic fishes, such as sardines and herrings (Gallardo *et al.*, 1983; Siciliano *et al.,* 2004). They can also feed on euphausids, copepods, cephalopods and pelagic crabs (Omura, 1962; Kawamura, 1977; Best, 2001; Kato & Perrin, 2009). In south-eastern Brazil, the Brazilian sardine (*Sardinella brasiliensis*) (which is abundant in the region (Matsuura, 1996)), appears to constitute an important prey item in the diet of *B. edeni* (Siciliano *et al.*, 2004). Fishes from the Engraulidae family seem to be also important in the diet of Bryde's whales from Brazil, as previously related by Lima *et al.* (2006) in an adult female stranded in north-eastern Brazil.

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The availability of food resources is an important parameter that determines the distribution pattern of cetaceans, especially non-migratory species, such as *B. edeni*. Bryde's whales seem to have a preference for habitats with a predictable biological abundance, for example along the continental shelf break of the north-eastern Gulf of Mexico, and regions subjected to coastal upwelling, such as Chile and Cabo Frio, in south-eastern Brazil (Gallardo *et al.*, 1983; Davis *et al.*, 2002; Jefferson *et al.*, 2008). Studies carried out in the last and current decade have addressed the taxonomic status of Bryde's whales and recognized different forms, or even species (Wada & Numachi, 1991; Best, 2001; Wada *et al.*, 2003; Sasaki *et al.*, 2006; Kato & Perrin, 2009). However, as a definite conclusion has not been reached so far on the taxonomic status or management groups based on different forms or species of the western South Atlantic specimens, we decided to use the denomination *Balaenoptera edeni*, Anderson, 1879, as standard form (Committee on Taxonomy, 2011).

The aim of this study is to evaluate the stranding pattern of Bryde's whales in south-eastern Brazil, based on literature reports and new information. In addition, we also present information on diet based on the examination of stomach contents.

MATERIALS AND METHODS

The region covered in this study comprises the States of Rio de Janeiro and São Paulo, located on the south-eastern coast of Brazil with approximately 1200 km of coastline (Figure 1).

The data of the present study are composed of published information, mainly from Siciliano *et al.* (2004) and Santos *et al.* (2010). Unpublished data were obtained from newspapers, TV news, provided by other researchers and personal observations through a monitoring programme established on the north coast of the study area. From 1999 to 2011 the marine mammal research group (GEMM-Lagos) regularly patrolled the coast of Rio de Janeiro State from São Francisco de Itabapoana (north: 21°25′10″S 41°00′36″W) to Saquarema (south: 22°55′12″S 42°30′37″W). During these surveys, awareness campaigns were implemented in the communities along the coast in order to promote a collaboration network and improve stranding reports.

The unpublished data out of the monitoring system was only considered for this study if the available material (films and photographs) showed taxonomic characteristics of the species (e.g. the three prominent ridges on the dorsal surface of the head; the shape and height of the dorsal fin; the coloration pattern; the extension of the ventral grooves in relation to the navel, etc.) (Figure 2). On some occasions the material examined allowed us to obtain information of gender and total body length. The taxonomic identification of the carcasses recorded was based on the careful examination of morphological features, following commonly used scientific guides for identification of marine mammals (Jefferson *et al.*, 2008; Kato & Perrin, 2009).

Stranding data were used as an additional tool to evaluate possible patterns related to the general distribution of the species. In this context, the location of each stranding event was converted into geographical coordinates in order to construct a spatial view of the distribution of the Bryde's whales using ESRI–ArcView 3.2® software. In these cases, the coordinates from the location of the records from the unpublished data (out of the monitoring programme) were obtained using the Google Earth® software.

The aim of the present study was to perform a compilation of the available information of strandings, thus the data

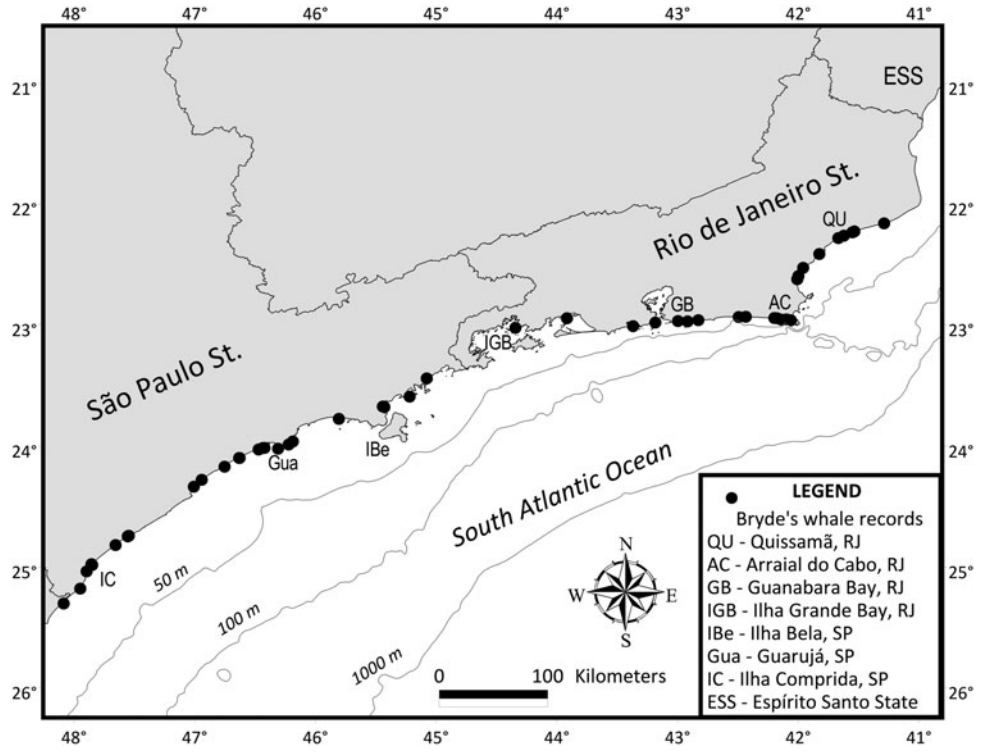

Fig. 1. Map of the study area including Rio de Janeiro and São Paulo States, south-eastern Brazil. The figure shows the locations of the strandings of Bryde's whales (*Balaenoptera edeni*).

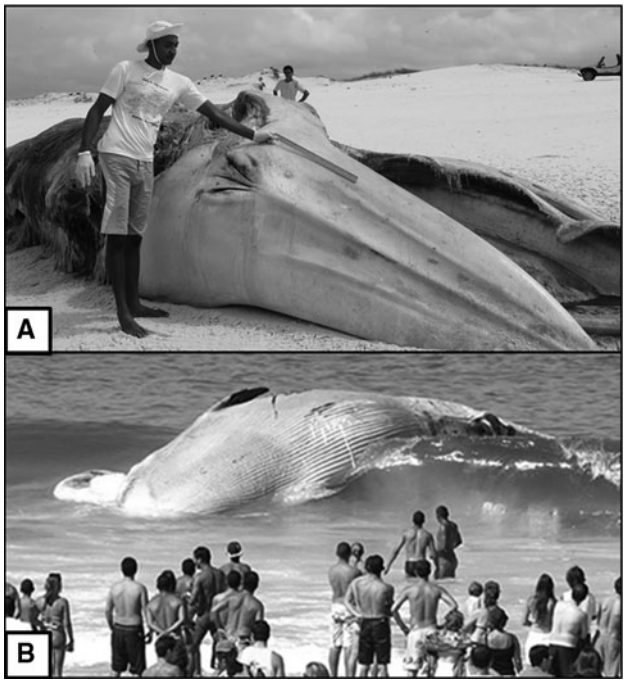

Fig. 2. Showing images of two Bryde's whales (*Balaenoptera edeni*) stranded along the coast of Rio de Janeiro State. (A) Dorsal surface of the head of a Bryde's showing the three prominent ridges (photograph S. Siciliano; Arraial do Cabo, RJ, 11 October 2008); (B) ventral view of a dead whale in the surf zone showing the ventral grooves extending over the navel region, a characteristic to identify this species (photograph Marcelo Piu, http://www.abi.org.br/paginaindividual.asp?id=2189).

collection has not been equally performed along the coastline of the study area. On the other hand we suppose that a stranding event rarely escapes notice from the media. Therefore we present the relationship of stranding events in the sampling area compared with 20 years of data collection. The year–stranding relationship was performed using simple linear regression (R^2) at a P value less than 0.05.

To determine if there were seasonal trends of the strandings, the data were categorized into four seasons: January–March (summer); April–June (autumn); July–September (winter); and October–December (spring). A Chi-square test (χ^2) for equal proportions (at $P < 0.05$) was used to test differences in stranding frequencies between seasonal categories.

The whales were generally sexed when whale position allowed a view of the ventral region or when the carcasses were dissected. The total body length of the carcasses was measured from the tip of lower jaw to the caudal notch of the whales accessed. The whales were categorized into juvenile ($\leq$8 m), sexually imature ($>$8; $\leq$11.22), and sexually mature ($>$11.22) (Jefferson *et al.*, 2008). The Chi-square test was also used to verify some trends in the strandings for the body length categories.

Whenever possible, the stomach chambers were accessed to collect and identify food remains. The stomach contents analyses were only performed in two carcasses due to the difficulties in the field. The full stomach content of the two whales were recovered and carefully examined in order to identify all prey items, which were identified according to an illustrated key for the identification of Dendrobranchiata shrimps (Costa *et al.*, 2003).

RESULTS

A total of 46 stranded Bryde's whales were recovered between 1972 and April 2010. A positive relationship was observed between the number of strandings in the period from 1991 to 2010 ($R^2 = 0.5099$; $P < 0.05$) (Figure 3; Table 1). Although unevenly distributed over this 20 year period, there was a mean of two whales (standard deviation = 1.2).

From the 46 records of *B. edeni* in the study area 20, representing 43% of the strandings, are new and unpublished information. The stranding events were distributed along the study area. However, the strandings seem to have concentrated on the south-eastern coast of Rio de Janeiro State, where there is a narrow shelf, and on the central coast of São Paulo State. No stranded whales were found on the extreme northern coast of Rio de Janeiro State and only one was found inside the Ilha Grande Bay (Figure 1).

No whale with signals of fishery interaction was reported in this study; however it is important to highlight that some whales could have stranded as a result of entanglement, but during field analyses it was not possible to detect, mainly due to the decomposition stage of the carcasses. The majority of the carcasses ($>$ 75%) were classified as codes 3 and 4, according to the Geraci & Lounsbury (2005) protocol.

Data on body length were available for 41 specimens and these varied from 4 to 15 m. The data show that most of the whales that stranded were classified as sexually mature (52.4%) ($\chi^2 = 7.659$; $P < 0.05$), although sexually immature (24.4%) and juvenile (21.9%) whales were also representative (Figure 4). Two whales with body length indicative of newborn were registered in the study area. One newborn recovered in northern Rio de Janeiro State presented a scar in the umbilical region indicating that it was recently born (3.8 m of body length). Another whale with 4.5 m of body length was found in São Paulo State. The newborns recorded in Rio de Janeiro and São Paulo States were found in September 2006 and August 2007, respectively.

No statistical significance was observed in the frequency differences between males (N = 13) and females (N = 8) ($\chi^2 = 1.190$; $P > 0.05$). However, 54.3% of the carcasses could not be sexed due to the decomposition stage, or animal position on the beach. In addition, the higher number of males when compared with females may be due

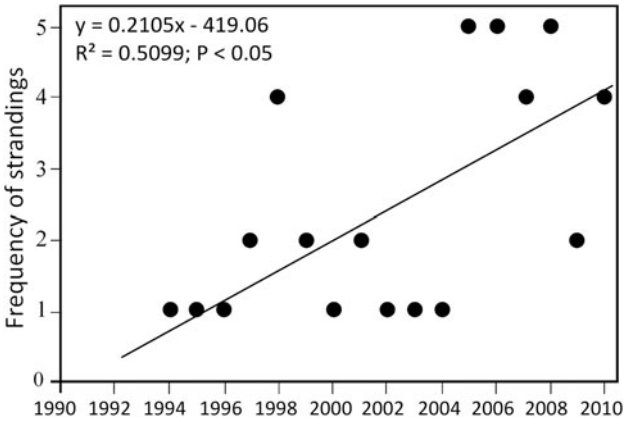

Fig. 3. Simple linear regression of the number of Bryde's whales (*Balaenoptera edeni*) stranded in the period from 1989 to 2008 (20 years) on the coasts of São Paulo and Rio de Janeiro States.

Table 1. Data on the strandings of Bryde's (*Balaenoptera edeni*) whales along the coasts of São Paulo and Rio de Janeiro States, south-eastern Brazil. Coordinates in decimal degrees. BL, body length, ♂, female; ♀, male.

Localities	Date	Sex	BL (m)	Latitude	Longitude	References
Cananéia, SP	August 1972	–	12.5	−24.985265	−47.839604	Zerbini *et al.*, 1997
Rio de Janeiro, RJ	28 January 1983	♂	7.1	−22.958046	−42.129867	Geise & Borobia, 1988
Itanhaém, SP	1986	–	-	−24.170972	−46.742521	Zerbini *et al.*, 1997
Angra dos Reis, RJ	3 April 1989	♂	10.6	−23.026696	−44.333047	Zerbini *et al.*, 1997
Ilha Comprida, SP	November 1994	–	14	−24.748223	−47.544246	Siciliano *et al.*, 2004
Saquarema, RJ	7 April 1995	–	12.4	−22.936423	−42.483538	Zerbini *et al.*, 1997
Ilha do Cardoso, SP	3 September 1996	♀	14	−25.180578	−47.937810	Siciliano *et al.*, 2004
Ilha Comprida, SP	30 January 1997	–	11	−24.820080	−47.645310	Siciliano *et al.*, 2004
Peruíbe, SP	7 December 1997	–	15	−24.336410	−46.997009	Siciliano *et al.*, 2004
Quissamã, RJ	June 1998	♀	8	−22.160644	−41.278725	Siciliano *et al.*, 2004
Guarujá, SP	18 June 1998	♀	12.4	−23.962527	−46.176785	Siciliano *et al.*, 2004
Rio de Janeiro, RJ	22 August 1998	–	10	−22.982276	−43.173853	Siciliano *et al.*, 2004
Praia Grande, SP	22 September 1998	–	14	−24.015935	−46.411389	Siciliano *et al.*, 2004
Mongaguá, SP	9 April 1999	–	12	−24.098591	−46.617475	Siciliano *et al.*, 2004
Praia Grande, SP	21 August 1999	–	12.2	−24.016657	−46.425892	Siciliano *et al.*, 2004
Praia do Félix, Ubatuba, SP	24 July 2000	♀	14	−23.444673	−45.067476	Siciliano *et al.*, 2004
Juréia, SP	April 2001	♂	15	−23.774929	−45.795524	Siciliano *et al.*, 2004
Barra de São João, Casmiro de Abreu, RJ	11 December 2001	–	9	−22.597275	−41.988780	Siciliano *et al.*, 2004
Ilha do Cardoso, SP	September 2002	♂	12	−25.304011	−48.075637	Siciliano *et al.*, 2004
Maricá, RJ	30 January 2003	♀	12	−22.962186	−42.817817	Siciliano *et al.*, 2004
Lagoa do Paulista, Quissamã, RJ	26 February 2004	–	9.5	−22.234613	−41.542016	GEMM 052
Praia do Abricó, Rio das Ostras, RJ	23 January 2005	–	–	−22.529314	−41.949033	GEMM 078
Maricá, RJ	14 February 2005	♂	15	−22.973176	−42.906982	Present study
Barra da Tijuca, Rio de Janeiro, RJ	6 August 2005	–	11	−23.011976	−43.358308	Present study
São Sebastião, SP	13 October 2005	♂	12	−23.677675	−45.418965	Santos *et al.*, 2010
Figueira, Arraial do Cabo, RJ	3 September 2005	–	–	−22.945002	−42.187759	GEMM 088
Praia do Boqueirão, Ilha Comprida, SP	9 June 2006	♂	8	−25.038191	−47.884930	Present study
Praia de Ilha Comprida, Ilha Comprida, SP	12 August 2006	–	12	−24.978744	−47.845315	Present study
Praia de Unamar, Cabo Frio, RJ	28 September 2006	♂	12	−22.623823	−41.998097	GEMM 112
Praia do Pecado, Macaé, RJ	30 September 2006	–	3.8	−22.415099	−41.815281	Present study
São Sebastião, SP	23 October 2006	♂	12.8	−23.590358	−45.208520	Santos *et al.*, 2010
Praia de Itaipuaçu, Maricá, RJ	14 February 2007	♂	14	−22.970080	−42.986474	Present study
Peruíbe, SP	20 July 2007	–	12	−24.279198	−46.931951	Santos *et al.*, 2010
Praia Grande, SP	12 August 2007	♀	4.5	−24.028602	−46.460665	Santos *et al.*, 2010
Praia Grande, Arraial do Cabo, RJ	18 August 2007	–	–	−22.963196	−42.051759	GEMM 130
Figueira, Arraial do Cabo, RJ	15 April 2008	–	–	−22.946690	−42.166112	GEMM 145
Guarujá, SP	8 March 2008	♂	8.4	−24.021746	−46.298953	Santos *et al.*, 2010
Ilha de Águas Lindas, Itacuruçá, Mangaratiba, RJ	September 2008	–	10	−22.946754	−43.906454	Present study
Praia do Afonso, Arraial do Cabo, RJ	11 October 2008	–	14.1	−22.955629	−42.087114	GEMM 157
Praia das Palmeiras, Caraguatatuba, RJ	14 October 2008	–	7	−23.672973	−45.431257	Present study
Praia de Ilha Comprida, Ilha Comprida, SP	27 April 2009	–	9	−24.743223	−47.536152	Present study
Guarujá, SP	25 July 2009	♂	13	−23.987592	−46.211244	Santos *et al.*, 2010
Lagoa Comprida, Jurubatiba, Macaé, RJ	8 March 2010	♂	7.17	−22.28294	−41.65830	GEMM 183
Mongaguá, Mongaguá, SP	13 June 2010	♀	7	−24.098611	−46.621080	Present study
Praia de Carapebus, Carapebus, RJ	30 October 2010	♀	8.8	−22.262948	−41.612350	GEMM 234
Praia do Visgueiro, Quissamã, RJ	9 March 2011	–	8	−22.226907	−41.525071	GEMM 280

to the fact that males are easier to identify, especially when the penis is exposed.

The observed differences in strandings between seasons were not statistically significant ($\chi^2 = 4.156$; $P > 0.05$) (Figure 5). Although, most strandings occurred during winter (N = 17; 37.7%) with a great frequency in August (N = 7), followed by April and September (N = 06). Strandings in summer (N = 10), autumn (N = 10) and spring (N = 08) were almost equally distributed.

The analyses of stomach contents were made in samples from two whales as already stated. Both whales presented a large amount of aviu shrimp (*Acetes americanus*) as the unique prey consumed. The degree of digestion of the shrimps consumed in both whales suggests these prey species were ingested few times before death.

DISCUSSION

The results show that Bryde's whales are common along the south-eastern coast of Brazil and seem to be present there throughout the year, as described in previous studies (Omura, 1962; Zerbini *et al.*, 1997; Siciliano *et al.*, 2004). This species is commonly observed in Brazilian coastal waters mainly on the Rio de Janeiro and São Paulo coasts where the present study is focused (Gonçalves, 2006). However, the scarcity of records offshore is more related to the research effort in the oceanic region than the absence of the whales. As an example, Andriolo *et al.* (2010) observed Bryde's whales in low density in offshore waters of north-eastern Brazil varying from 800 to 2900 m isobaths. The presence of whales in south-eastern Brazil may be related to the

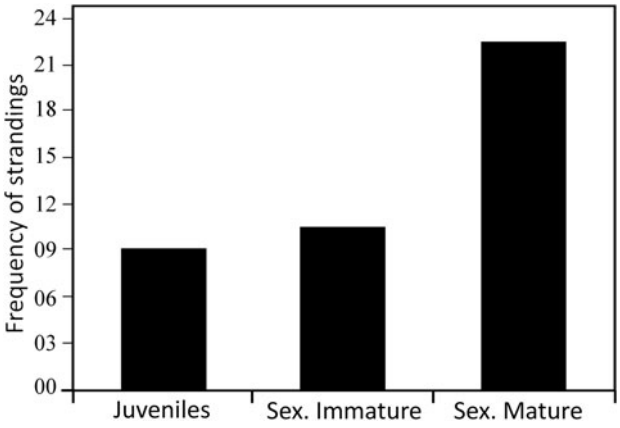

Fig. 4. Number of strandings of Bryde's whales (*Balaenoptera edeni*) in age categories along the south-eastern Brazil coast, between 1972 and 2011.

food availability of highly productive and upwelled waters, mainly on the eastern coast of Rio de Janeiro State. Bryde's whales tend to inhabit areas of unusually high productivity (Jefferson *et al.*, 2008).

Data on sightings and strandings seem to vary in relation to the seasons of the years. As an example Zerbini *et al.* (1997) in a review of the genus *Balaenoptera* recorded more sightings of Bryde's whales during summer along the Brazilian coast. Carneiro (2005) also found more Bryde's whales during summer and spring in the region around Arraial do Cabo, Rio de Janeiro State, through land based observation activities. Gonçalves (2006) found similar results through boat surveys off São Paulo State. In contrast, our data, as well as the results presented by Zerbini *et al.* (1997) and Siciliano *et al.* (2004), indicate that there is no pattern of strandings among seasons, with a smooth tendency of stranding during winter. The environmental influences (e.g. wind direction and intensity and ocean currents behaviour) in the carcasses at sea may play an important role in increasing the encounter rate of whales ashore, mainly during winter when the prevalence of south-south-west winds may force the whale landward. Despite being not statistically significant, most whales stranded during winter in this present study. However we need to consider the actual poor taxonomic description of

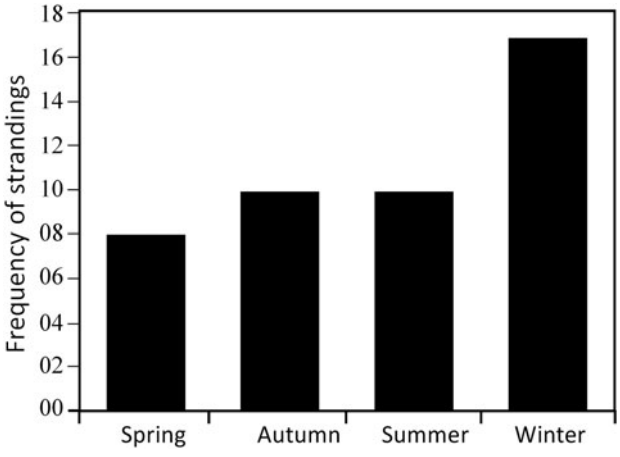

Fig. 5. Number of strandings of Bryde's (*Balaenoptera edeni*) whales per season on the south-eastern Brazil coast, between 1991 and 2011.

Bryde's whales in Brazilian waters and the identification of distinct populations. In South Africa, Best (1977) identified two allopatric forms of Bryde's whales being recognized as inshore and offshore whales. The inshore form is restricted to coastal areas of less than 20 miles and is observed year round. In contrast, the offshore form inhabits water 50 miles over the coast, and performs a latitudinal migration to the equatorial region during winter. Zerbini *et al.* (1997) classified one stranded whale as being 'offshore' based on the baleen measurements following the description by Best (1977). According to Best (1977), the baleen plate length/width ratio does not exceed 2.24 in offshore ecotypes and generally is more than 2.25 in inshore ecotypes. Additional observations on the presence and classification of offshore/inshore Bryde's whales along the Brazilian coast have not been evaluated. If we consider the presence of both inshore and offshore forms in our data and assume the life history differences for both forms (distribution, seasonality, body size, baleen shape, scarring, food type and possibly breeding behaviour) (Best, 2001) this study is subject to some degree of bias. During field examination no morphological differences were observed that should be attributed to the recognizable ecotypes of Bryde's whales (e.g. inshore/offshore and small/large forms) (Best, 2001; Kato & Perrin, 2009). Bryde's whales are commonly sighted in shore waters of the study area, mainly around the coast of Arraial do Cabo, which may indicate the presence of an inshore form. However, future studies on population genetics should be carried out to elucidate the taxonomic status of the Bryde's whales' complex in Brazilian waters (Sasaki *et al.*, 2006).

Sighting of Bryde's whales through land based observations carried out in Arraial do Cabo peninsula (Rio de Janeiro State) and in adjacent coastal waters shows that this whale is particularly common in the area in summer and spring (Carneiro, 2005; Gonçalves, 2006). These sightings coincide with the strong seasonal upwelling which contributes with an ideal condition for a large whale such as Bryde's (Valentin, 2001; Davis *et al.*, 2002; Siciliano *et al.*, 2004).

Interestingly, two whales dissected presented the stomach chambers full of aviu shrimp, *Acetes americanus*. The aviu shrimp is distributed from pelagic zones to shallow waters on the Atlantic coasts of the Americas, from Cape Hatteras (USA) to Rio Grande do Sul (southern Brazil) (Oshiro & Omori, 1996). This shrimp is commonly found on the Brazilian coast and seems to inhabit an important hole in the food web, preying upon a variety of organisms, such as diatoms and copepods, and being predated by several species of fishes and other invertebrates (Xiao & Greenwood, 1993).

Additionally to the other results, previous studies suggest that the whales feed on small fishes (mainly *Sardinella brasiliensis*) in coastal waters, generally showing interspecific feeding association with seabirds and large fishes (Siciliano *et al.*, 2004). Best (2001) studied the feeding differences in preys consumed by offshore and inshore forms of Bryde's whales taken off South Africa. According to this author, the inshore form show a high preference for small pelagic fishes (genera *Engraulis*, *Trachurus* and *Sardinops*), while the offshore form prefer euphasiids (*Euphausia lucens* and *E. recurva*) and in low frequency mesopelagic fish (*Maurolicus* and *Lestidium*). If this difference is applicable in southern Brazil we should speculate that these two whales may belong to the offshore population. On the other hand, the coastal

habits of *A. americanus* on the Brazilian coast also suggest that it may represent an important prey for coastal whales considering a non-potential latitudinal migrating species.

Our results show high frequency of sexually mature whales followed by juveniles, including two newborns stranded in different areas, but in close months (August and September). As additional information, two mother–calf pairs were sighted in November 2006 and December 2003 to January 2004 around Búzios Peninsula (22°44'S 41°48'W), Rio de Janeiro State during land based activities (J.F. Moura & S. Siciliano, personal observations). According to Best (2001), there is no seasonal trend in reproduction of inshore Bryde's whales, while offshore reproduction occurs during autumn (March–May). However, Kato & Perrin (2009) suggest that peaks for breeding and calving of the pelagic population are in winter. In the Azores most calves are observed in summer time and they are speculated to have been born during last winter period (Steiner *et al.*, 2008). No whales presented evidence of accidental or intentional capture in fishing apparatus or collision with ships, but we have to highlight that these threats are potentially present in the study area. Along the study area there are passive fishery activities which can promote negative impact to the whales, principally in coastal waters. In addition, the study area is responsible for more than 80% of the national oil and petroleum produced and the presence of important large harbours which are associated with the intensive movements of large ships that elevate the risk of whale collision. In conclusion, the present work confirms that Bryde's whales are common on the south-eastern Brazilian coast. The discrepancy in results from sightings and strandings (e.g. seasonal pattern) may be related to environmental conditions (e.g. wind direction and intensity and ocean currents) and possibly the presence of different forms (inshore and offshore). No whales showed signs of impact caused by human interactions, despite the potential threats in the study area. Future studies comparing morphology and genetics are suggested to be carried out to elucidate the taxonomic status of the Bryde's whale in Brazil. In addition, the collection and storage of biological samples are specially needed to better understand the stranding pattern of this whale.

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