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SHORT COMMUNICATION

**ON THE FEEDING HABIT OF THE GUIANA DOLPHIN
SOTALIA GUIANENSIS (VAN BÉDÈN, 1864) (MAMMALIA:
CETARTIODACTYLA: DELPHINIDAE) IN SOUTHEASTERN BRAZIL
(~220S): HAS THERE BEEN ANY CHANGE IN MORE THAN TWO
DECADES?**

Ana Paula Madeira Di Benedetto, Clara da Cruz Vidart Badia & Salvatore Siciliano

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ON THE FEEDING HABIT OF THE GUIANA DOLPHIN *SOTALIA GUIANENSIS* (VAN BÉNEDÈN, 1864) (MAMMALIA: CETARTIODACTYLA: DELPHINIDAE) IN SOUTHEASTERN BRAZIL (~22°S): HAS THERE BEEN ANY CHANGE IN MORE THAN TWO DECADES?

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Abstract: Along the north and central coast of Rio de Janeiro State (22°25'S–23°00'S), southeastern Brazil, the Guiana Dolphin *Sotalia guianensis* forages on neritic prey, mainly fish. From the analysis of the dolphin's stomach contents and the identification of partially digested prey, it was verified that the most frequent prey species were young specimens of *Trichiurus lepturus*. Comparing our results with previous studies on the feeding habits of Guiana Dolphin in the same region, we noticed the maintenance of its feeding preferences during more than two decades, indicating little or no change in the use of prey by this top predator.

Keywords: Atlantic Ocean, Brazil, feeding habits, piscivory, *Sotalia guianensis*.

The Guiana Dolphin *Sotalia guianensis* (van Bénédèn, 1864) is a coastal delphinid species distributed along central and South America. This species inhabits

coastal and estuarine waters from Honduras (~14°N) to southern Brazil (~27°S) (da Silva & Best 1996), and is one of the most vulnerable dolphins along the southwestern Atlantic Ocean due to incidental interactions with artisanal fisheries (Barreto et al. 2010), and is categorized as a Data Deficient species (IUCN 2015).

The Guiana Dolphin is mainly piscivorous, being an opportunistic predator or having some food preferences. At least 70 fish species from 25 families are consumed by this dolphin along its distribution (Rosas et al. 2010). In southeastern Brazil, around 22°S, the feeding habit of this dolphin was previously described by Di Benedetto & Ramos (2004), whose study analyzed 77 dolphins collected from 1987 to 1998, and by Di Benedetto & Siciliano (2007), in which 10 dolphins obtained from

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2001 to 2005 were analyzed. The present study provides supplementary information on the feeding habits of the Guiana Dolphin (Image 1) in this region, discussing possible, if any, changes in its feeding preference in more than two decades (1987–2011).

METHODS

Regular beach surveys were conducted along the north and central coast of Rio de Janeiro State ($22^{\circ}25'S$ – $23^{\circ}00'S$) (Fig. 1), in 2010 and 2011, resulting in seven carcasses of Guiana Dolphins picked up for dissection, in various stages of decomposition, namely stages 2 to 4 (Geraci & Lounsbury 2005). We evaluated their stomach contents to investigate their feeding habits (Table 1). The recovered items, otoliths and supraoccipital bones (in the case of *Trichiurus lepturus*), were dry preserved and used to identify, quantify, and estimate the length and weight of the fish prey species, according to Di Benedetto et al. (2001). For



Image 1. Guiana Dolphin *Sotalia guianensis*

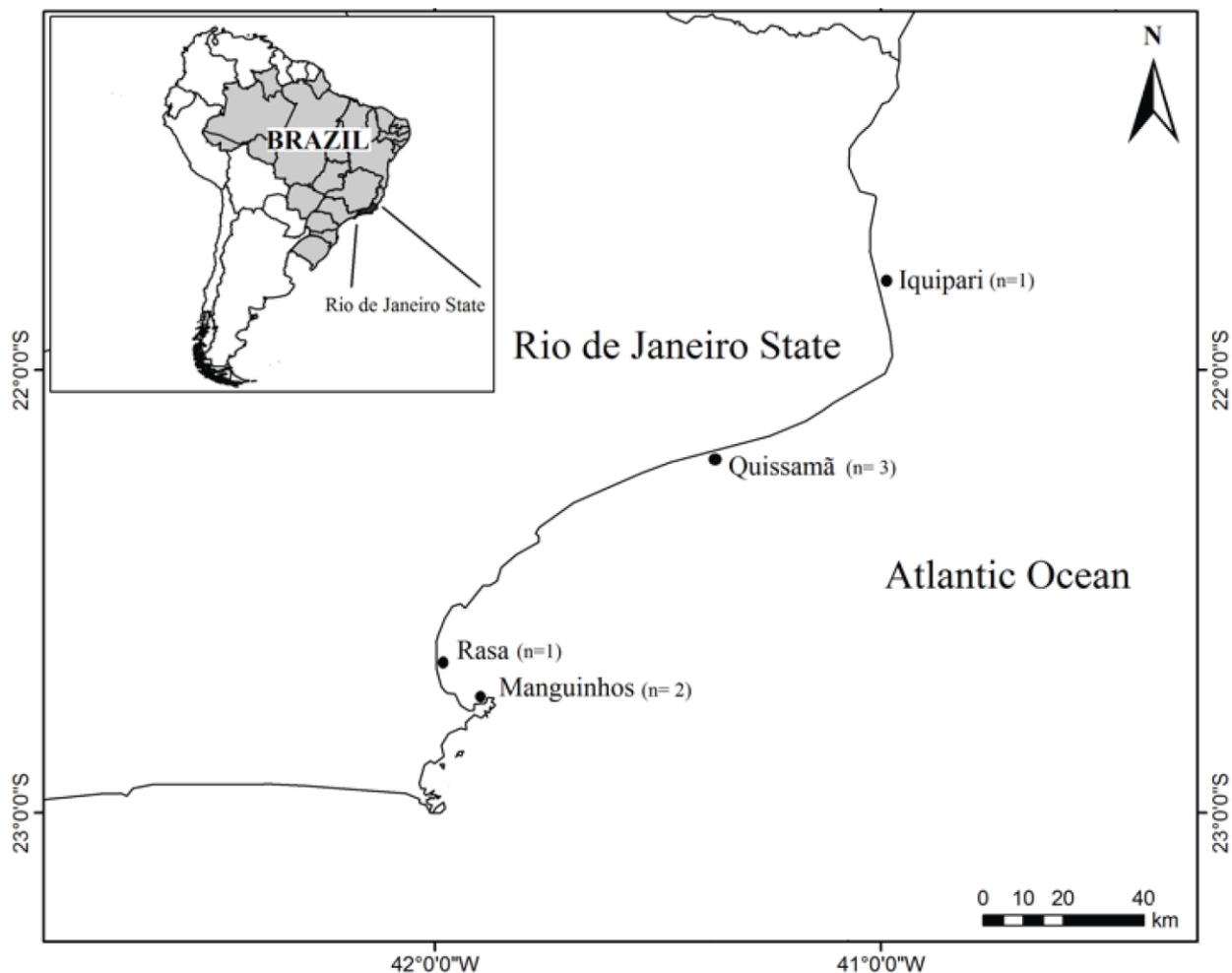


Figure 1. Stranding areas of the Guiana Dolphin specimens in the north and central coast of Rio de Janeiro State, southeastern Brazil.

each stomach, the maximum number of otoliths (left or right) or supraoccipital bones was used to indicate the total number of fish ingested. The Index of Relative Importance: $IRI = [(\%NF + \%BF) \times \%OF]$, proposed by Pinkas et al. (1971), determined the representativeness of each fish species, considering NF as numeric frequency, BF as biomass frequency, and OF as occurrence frequency.

After the stomach contents analysis, the recovered items were discarded. The dolphins' carcasses are deposited in the cetaceans collection of the Grupo de Estudos de Mamíferos Marinhos da Região dos Lagos.

RESULTS AND DISCUSSION

Eight fish species (105 individuals and 10,945.5g) were identified in the stomach contents of the seven evaluated specimens (Table 2). The number of fish species per stomach varied from one to four. Back calculations of fish lengths indicate that the dolphin preyed mainly upon juvenile individuals (Table 2). These eight-fish species inhabit neritic waters and are abundant all year round in the study region (Di Benedetto & Lima 2003). In general, the prey species have low commercial value or are considered by-catch in the local artisanal fisheries (Di Benedetto et al. 1998).

The prey species are demersal (*Sciaenidae* family species, *Porichthys porosissimus* and *Ariosoma opisthophthalma*) or pelagic-demersal (*T. lepturus*), indicating that the Guiana Dolphin captures their prey along the water column. Previous studies described 36 prey species, among fish and squids, in stomach contents of the Guiana Dolphins along the study region (Di Benedetto & Ramos 2004; Di Benedetto & Siciliano 2007). The results of the present study (Table 2)

Table 1. Field data on the specimens of Guiana Dolphin *Sotalia guianensis* recovered along the north and central coast of Rio de Janeiro State, southeastern Brazil.

Date	Area	Total length (cm)	Sex
21.viii.2010	Manguinhos	-	-
27.viii.2010	Manguinhos	190.0	Female
29.ix.2010	Quissamã	180.0	Male
21.xi.2010	Quissamã	187.0	-
06.i.2011	Quissamã	195.0	Female
28.i.2011	Rasa	195.0	-
14.ii.2011	Iquipari	-	-

together with these previous studies point to *T. lepturus* as the main prey species, with IRI around 5,000, which is three or five times greater than the IRI of the second most consumed species. Additionally, Di Benedetto et al. (2011) and Kehrig et al. (2013) verified by mercury concentration and nitrogen stable isotope (^{15}N) analysis that *T. lepturus* is the most assimilated prey in Guiana Dolphin diet, corroborating the local importance of this fish as a food resource to this predator. Santos et al. (2002) analyzed the stomach content of 16 Guiana Dolphin specimens stranded along the São Paulo State (~25°S), also in south-eastern Brazil; however, those authors recorded fish from *Sciaenidae* family as the most important prey species. Differences in the Guiana Dolphin feeding habits along its distributional range are probably related to the local features, as salinity, river discharges and interspecific relationships, reflecting in prey occurrence and abundance. Additionally, temporal variation among the studies and differences in sampling

Table 2. Fish species found in the Guiana Dolphin *Sotalia guianensis* stomachs in the north and central coast of Rio de Janeiro State, southeastern Brazil.

	NF (%)	BF (%)	OF (%)	IRI	Density (n) per stomach Mean _ SD	Size (cm) Mean _ SD	Biomass per stomach (g) Mean _ SD
Teleosts							
<i>Trichiurus lepturus</i> ¹	39.1	57.8	57.1	5532.9	10 ± 12	64.2 ± 15.2	154.4 ± 174.8
<i>Porichthys porosissimus</i> ¹	27.6	17.1	42.8	1913.2	10 ± 9	18.0 ± 3.0	64.4 ± 31.0
<i>Cynoscion jamaicensis</i> ²	17.1	13.1	28.6	863.7	9 ± 8	15.8 ± 2.5	79.8 ± 28.7
<i>Isopisthus parvipinnis</i> ²	8.6	4.1	42.8	543.6	3 ± 2	11.3 ± 5.6	49.9 ± 101.9
<i>Ariosoma opisthophthalma</i> ¹	4.8	4.0	14.3	125.8	5	47.3 ± 9.7	87.7 ± 70.6
<i>Menticirrhus americanus</i> ²	0.9	3.5	14.3	62.9	1	25.9	378.1
<i>Cynoscion guatucupa</i> ¹	0.9	0.4	14.3	18.6	1	17.0	47.2
<i>Larimus breviceps</i> ²	0.9	0.02	14.3	13.2	1	3.8	2.3

1 - total length; 2 - standard length; NF - numeric frequency; BF - biomass frequency; OF - occurrence frequency; SD - standard deviation; IRI - Index of Relative Importance: $[(\%NF + \%BF) \times \%OF]$.

methods may also explain the different results.

CONCLUSION

The present study provides supplementary information on the feeding habits of the Guiana Dolphin in southeastern Brazil. It confirms this dolphin as primarily piscivorous, feeding preferentially on *T. lepturus*, along the north and central coast of Rio de Janeiro State. The presence of this prey species as the main food item for Guiana Dolphins in more than two decades indicates the massive and regular abundance of this resource along the study area. Thus, we can conclude that little or nothing has changed in the feeding habit of the Guiana Dolphin during this period, and the prey availability does not compromise the presence of this species in the region. We bring attention to the significance of the present information and its consideration in future evaluation of the status and strategies for the conservation of the Guiana Dolphin.

REFERENCES

- Barreto, A.S., C.C. Rocha, F.W. Rosas, J.M. Silva Jr., L.D. Rosa, P.A.C. Flores & V.M.F. da Silva (2010). Plano de ação nacional para a conservação dos mamíferos aquáticos: pequenos cetáceos. Instituto Chico Mendes de Conservação da Biodiversidade, Brasília, Brasil, 132pp. Available at <http://www.icmbio.gov.br/portal/images/stories/docs-plano-de-acao/pan-peqs-cetaceos/pan-pequenoscetaceos-web.pdf>
- da Silva, V.M.F. & R.C. Best (1996). *Sotalia fluviatilis*. *Mammalian Species* 527: 1–7.
- Di Benedetto, A.P. & N.R.W. Lima (2003). Biometria de teleósteos da costa norte do Estado do Rio de Janeiro para estudos sobre piscivoria. *Biotemas* 16(1): 135–144.
- Di Benedetto, A.P. & R. Ramos (2004). Biology of the marine Tucuxi Dolphin (*Sotalia fluviatilis*) in south-eastern Brazil. *Journal of the Marine Biological Association of the United Kingdom* 84(6): 1245–1250; <http://doi.org/10.1017/S0025315404010744h>
- Di Benedetto, A.P., R.M.A. Ramos & N.R.W. Lima (2001). *Os Golfinhos: Origem, Classificação, Captura Acidental, Hábito Alimentar*. Editora Cinco Continentes, Porto Alegre, 148pp.
- Di Benedetto, A.P.M. & S. Siciliano (2007). Stomach contents of the marine Tucuxi Dolphin (*Sotalia guianensis*) from Rio de Janeiro, south-eastern Brazil. *Journal of the Marine Biological Association of the United Kingdom* 87(1): 253–254; <http://doi.org/10.1017/S0025315407053647>
- Di Benedetto, A.P., R. Ramos & N.R.W. Lima (1998). Fishing activity in Northern Rio de Janeiro State (Brazil) and its relation with small cetaceans. *Brazilian Archives of Biology and Technology* 41(3): 296–302.
- Di Benedetto, A.P.M., C.M.M. Souza, H.A. Kehrig & C.E. Rezende (2011). Use of multiple tools to assess the feeding preference of coastal dolphins. *Marine Biology* 158(10): 2209–2217.
- Geraci, J.R. & V.J. Lounsbury (2005). *Marine Mammals Ashore: A Field Guide for Strandings*. Texas A&M University, Galveston, 371pp.
- Kehrig, H.A., T.G. Seixas, O. Malm, A.P.M. Di Benedetto & C.E. Rezende (2013). Mercury and selenium biomagnification in a Brazilian coastal food web using nitrogen stable isotope analysis: A case study in an area under the influence of the Paraíba do Sul River plume. *Marine Pollution Bulletin* 75(1–2): 283–290.
- Pinkas, L., M.S. Oliphant & I.K. Iverson (1971). Food habits of albacore, bluefin tuna and bonito in Californian waters. *California Fishery and Game* 152: 1–105.
- Rosas, F.C.W., J. Marigo, M. Laeta & M.R. Rossi-Santos (2010). Natural history of dolphins of the genus *Sotalia*. *Latin American Journal of Aquatic Mammals* 8(1–2): 57–68; <http://doi.org/10.5597/lajam00154>
- Santos, M.C.O., S. Rosso, R.A. Santos, S.H.B. Lucato & M. Basso (2002). Insights on small cetacean feeding habits in southeastern Brazil. *Aquatic Mammals* 28(1): 38–45.
- The IUCN Red List of Threatened Species (2015). Version 2015-4. Available at www.iucnredlist.org. Accessed in 21 April 2016.



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