

SUPPLEMENTARY MATERIAL

Feeding habits of the franciscana dolphin (*Pontoporia blainvillei*) in southeastern Brazil

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Table S1. Regression equations used to estimate fish and cephalopods lengths and weights and their sources are shown. SL, standard length (cm) for fish; TL, total length (cm) for fish; ML, mantle length (cm) for cephalopods; W, weight (g); OL, otolith length (mm); LRL, lower rostral length (mm); URL, upper rostral length (mm). Sources: (A) Di Benedetto *et al.* (2001), (B) Lopes *et al.* (2012), (C) Bassoi (2005), (D) Bastos (1990), (E) Henning *et al.* (2018), (F) Santos (1999), (G) Reference collection of CEPUSUL/IBAMA.

Species	Estimated length (cm)	Estimated weight (g)	Source
TELEOSTS			
<i>Anchoa filifera</i>	SL=(1,9674 x OL) + 1,0401	W=0,2984 x OL ^{2,4207}	A
<i>Anchoa</i> sp.	SL=1,831 x OL + 1,297	W=0,244 x OL ^{2,527}	B
<i>Anchoa tricolor</i>	SL=1,8311 x OL + 1,2976	W=0,2443 x OL ^{2,5275}	B
<i>Anchoviella lepidentostole</i>	SL=(1,9674 x OL) + 1,0401	W=0,2984 x OL ^{2,4207}	A
<i>Chirocentron bleekerianus</i>	SL=(3,5713 x OL) + 0,4534	W=0,7329 x OL ^{2,6309}	A
<i>Ctenosciaena gracilicirrhus</i>	SL=1,9064 x OL - 1,3718	W=0,0496 x OL ^{3,5123}	A
<i>Cynoscion guatucupa</i>	SL=(13,799 x OL ^{1,2007})/10	W=0,0186 x OL ^{3,7392}	C
<i>Cynoscion jamaicensis</i>	SL=1,7202 x OL - 1,1392	W=0,0288 x OL ^{3,4318}	A
<i>Cynoscion striatus</i>	SL=11,6079 x OL ^{1,2635}	W=0,0100 x OL ^{3,9686}	D
<i>Engraulis anchoita</i>	SL=(32,803 x OL ^{1,088})/10	W=0,1748 x OL ^{3,4088}	C
<i>Isopisthus parvipinnis</i>	SL=1,8563 x OL - 0,7437	W=0,0477 x OL ^{3,2867}	A
<i>Larimus breviceps</i>	SL=1,4164 x OL - 1,1364	W=0,0519 x OL ^{3,0227}	A
<i>Menticirrhus</i> sp.	SL=(15,141 x OL ^{1,318})/10	W=0,0131 x OL ^{4,4341}	C
<i>Micropogonias furnieri</i>	SL=(2,0304 x OL) - 2,2003	W=0,0445 x OL ^{3,3544}	B
<i>Mugil</i> sp.	SL=0,6505 x OL ^{1,69}	W=0,00412 x OL ^{5,16}	B
<i>Pagrus pagrus</i>	SL=(16,272 x OL ^{1,2296})/10	W=0,0669 x OL ^{3,6755}	C
<i>Paralonchurus brasiliensis</i>	SL=(2,016 x OL) - 1,8970	W=0,0195 x OL ^{3,8099}	A
<i>Pellona harroweri</i>	SL=(2,9827 x OL) - 1,4489	W=0,1224 x OL ^{3,6914}	A
<i>Pogonias cromis</i>	SL=3,718 + 0,696 x ln(OL)	W=(-0,541) + 2,216 x ln(OL)	E
<i>Sardinella brasiliensis</i>	SL=(3,5811 x OL) + 3,6082	W=5,3731 x e ^(0,71 x OL)	B
<i>Stellifer</i> sp.	SL=1,6064 x OL ^{1,0947}	W=0,0813 x OL ^{3,4157}	B
<i>Syacium</i> sp.	SL=(30,608 x OL ^{1,0528})/10	W=1,8824 x e ^(0,6416 x OL)	C
<i>Trachurus lathami</i>	TL=(20,417 x OL ^{1,1571})/10	W=0,0548 x OL ^{3,5828}	C
<i>Trichiurus lepturus</i>	SL=(17,533 x OL)-15,885	W=0,1042 x OL ^{4,6079}	A
<i>Umbrina</i> sp.	SL=(12,517 x OL ^{1,3266})/10	W=0,0196 x OL ^{4,1369}	C

CEPHALOPODS

<i>Doryteuthis plei</i>	$ML=(67,431 \times URL^{1,2908})/10$	$W=8,8096 \times URL^{2,8564}$	F
	$ML=(64,303 \times LRL^{1,3143})/10$	$W=7,9418 \times LRL^{2,908}$	
<i>Doryteuthis sanpaulensis</i>	$ML=(13,546 \times e^{(1,211 \times URL)})/10$	$W=0,3408 \times e^{(2,766 \times URL)}$	E
	$ML=(13,173 \times e^{(1,211 \times LRL)})/10$	$W=0,2768 \times e^{(2,659 \times LRL)}$	
<i>Lolliguncula brevis</i>	$ML=(41,3751 \times URL + 3,3180)/10$	$W=6,0749 \times URL^{2,4677}$	G
	$ML=(42,8967 \times LRL + 1,8382)/10$	$W=5,9731 \times LRL^{2,5789}$	

Table S2. Published studies on feeding habits of franciscana dolphins, *Pontoporia blainvillei*, according to the Franciscana Management Areas (FMA) proposed by Secchi et al. (2003). The number of samples (total – N, male – M, female – F, unknown sex – U), the type of prey (Fish – F, Cephalopod – Ce, Crustacean - Cr), the main prey items quoted by species, and the source are presented.

FMA	N	M	F	U	Type of prey			Main Preys	Source
					F	Ce	Cr		
I	85	-	-	85	x	x	x	<i>Stellifer sp.</i>	Di Benedetto and Ramos (2001)
								<i>A. filifera</i>	
								<i>P. harroweri</i>	
	99	-	-	99	x	x	x	<i>Stellifer sp.</i>	Bittar and Di Benedetto (2009)
								<i>A. filifera</i>	
								<i>P. harroweri</i>	
18	-	-	18	x	x	x	<i>I. parvipinnis</i>	Rupil et al. (2019)	
							<i>C. bleekermanus</i>		
							<i>Stellifer sp.</i>		
II	8	3	2	3	x	x	x	<i>Stellifer rastrifer</i>	Cremer et al. (2012)
								<i>G. oceanicus</i>	
								<i>L. brevis</i>	

	58	24	34	-	x	x		<i>P. harroweri</i>	
								<i>D. plei</i>	Henning <i>et al.</i> (2018)
								<i>P. brasiliensis</i>	
	145	86	59	-	x	x	x	<i>P. harroweri</i>	
								<i>I. parvipinnis</i>	Present study
								<i>D. plei</i>	
III	11	-	-	11	x	x	x	<i>P. porosissimus</i>	Fitch and Brownell (1971)
								<i>T. lepturus</i>	
								<i>C. striatus</i>	
	-	-	-	-	x	x	x	<i>P. porosissimus</i>	Brownell (1975)
								<i>T. lepturus</i>	
								<i>C. guatucupa</i>	
	41	17	24	-	x	x		<i>P. porosissimus</i>	Tellechea <i>et al.</i> (2017)
								<i>M. furnieri</i>	

	38	25	13	-	x	x		<i>M. ancyllodon</i>	
								<i>M. furnieri</i>	Franco-Trecu <i>et al.</i> (2017)
								<i>A. Marinii</i>	
I - III	168	-	-	168		x		<i>D. sanpaulensis</i>	Santos and Haimovich (2001)*
								<i>M. furnieri</i>	
	110	59	39	12	x	x	x	<i>C. guatucupa</i>	Rodríguez <i>et al.</i> (2002)
								<i>D. sanpaulensis</i>	
IV	66	34	25	-	x	x	x	<i>C. guatucupa</i>	Paso-Viola <i>et al.</i> (2014)
								<i>D. sanpaulensis</i>	
	173	-	-	-	x	x	x	<i>C. guatucupa</i>	Denuncio <i>et al.</i> (2017)
								<i>D. sanpaulensis</i>	

* Focus was exclusive to cephalopods

REFERENCES

- Basso M** (2005) *Feeding ecology of franciscana dolphin, Pontoporia blainvillei (Cetacea: Pontoporidae), and oceanographic processes on the Southern Brazilian coast*. PhD thesis. Graduate School of the National Oceanography Centre, Southampton, England.
- Bastos GC** (1990) *Morfologia de otólitos de algumas espécies de Peciformes (Teleostei) da costa Sudeste-Sul do Brasil*. Master's dissertation. Universidade de São Paulo, São Paulo, Brazil.
- Bittar VT and Di Benedetto APM** (2009) Diet and potential feeding overlap between *Trichiurus lepturus* (Osteichthyes: Perciformes) and *Pontoporia blainvillei* (Mammalia: Cetacea) in northern Rio de Janeiro, Brazil. *Zoologia* **26**, 374-378.
- Brownell RL** (1975) Progress Report on the Biology of the Franciscana Dolphin, *Pontoporia blainvillei*, in Uruguayan Waters. *Journal of the Fisheries Research Board of Canada* **32**, 1073-1078.
- Cremer MJ, Pinheiro PC and Simões-Lopes PC** (2012) Prey consumed by Guiana dolphin *Sotalia guianensis* (Cetacea, Delphinidae) and franciscana dolphin *Pontoporia blainvillei* (Cetacea, Pontoporiidae) in an estuarine environment in southern Brazil. *Iheringia, Série Zoologia* **102**, 131-137.
- Denuncio P, Paso-Viola MN, Machovsky-Capsuka GE et al.** (2017) Population variance in prey, diets and their macronutrient composition in an endangered marine predator, the Franciscana dolphin. *Journal of Sea Research* **129**, 70–79.
- Di Benedetto APM and Ramos RMA** (2001) Biology and conservation of the franciscana (*Pontoporia blainvillei*) in the north of Rio de Janeiro State, Brazil. *Journal of Cetacean Research and Management* **3**, 185-192.
- Di Benedetto APM, Ramos RMA and Lima NRW** (2001) *Os golfinhos: origem, classificação, captura acidental, hábito alimentar*. Porto Alegre: Ed. Cinco Continentes.
- Fitch JE and Brownell RL** (1971) Food habits of the franciscana *Pontoporia blainvillei* (Cetacea: Platanistidae) from South America. *Bulletin of Marine Science* **21**, 626-636.
- Franco-Trecu V, Drago M, Costa P, Dimitriadis C and Passadore C** (2017) Trophic relationships in apex predators in an estuary system: A multiple-method approximation. *Journal of Experimental Marine Biology and Ecology* **486**, 230-236.

- Henning B, Carvalho BS, Pires MM, Bassoi M, Marigo J, Bertozzi C and Araújo MS** (2018) Geographical and intrapopulation variation in the diet of a threatened marine predator, *Pontoporia blainvillei* (Cetacea). *The Association for Tropical Biology and Conservation* **50**, 157–168.
- Lopes XM, Silva E, Bassoi M., Santos RA and Santos MCO** (2012) Feeding habits of Guiana dolphins, *Sotalia guianensis*, from south-eastern Brazil: new items and a knowledge review. *Journal of the Marine Biological Association of the United Kingdom* **92**, 1723-1733.
- Paso-Viola MN, Denuncio P, Negri MF, Rodríguez D, Batista R and Cappozzo HL** (2014) Diet composition of franciscana dolphin *Pontoporia blainvillei* from southern Buenos Aires, Argentina and its interaction with fisheries. *Revista de Biología Marina y Oceanografía* **49**, 393-400.
- Rodríguez D, Rivero L and Bastida R** (2002) Feeding ecology of the franciscana (*Pontoporia blainvillei*) in marine and estuarine waters of Argentina. *The Latin American Journal of Aquatic Mammals Special Issue* **1**, 77-94.
- Rupil GM, Barbosa L, Marcondes MCC, Carvalho BM and Farro APC** (2019) Franciscana dolphin (*Pontoporia blainvillei*) diet from Northern Espírito Santo State coast, Brazil. *Revista Biotemas* **32**, 87-96.
- Santos RA** (1999) *Cefalópodes nas relações tróficas do sul do Brasil*. PhD thesis. Fundação Universidade do Rio Grande, Rio Grande, Brazil.
- Santos RA and Haimovici M** (2001) Cephalopods in the diet of marine mammals stranded or incidentally caught along southeastern and southern Brazil. *Fisheries Research* **52**, 99-112.
- Tellechea JS, Perez W, Olsson D, Lima M and Norbis W** (2017) Feeding habits of franciscana dolphins (*Pontoporia blainvillei*): Echolocation or passive listening?. *Aquatic Mammals* **43**, 440-448.