



Scientific Note

Inshore occurrences of the pelagic stingray, *Pteroplatytrygon violacea*, (Bonaparte, 1832) (Elasmobranchii: Dasyatidae), in São Paulo State, southeastern Brazil

TEODORO VASKE JÚNIOR^{1*} & MATHEUS MARCOS ROTUNDO^{1,2}

¹Universidade Santa Cecília, Acervo Zoológico da Universidade Santa Cecília, AZUSC, UNISANTA, Rua Oswaldo Cruz, 266 – Bloco B - 3º andar/ sala B-31/A CEP: 11045-907, Santos-SP, Brazil. *E-mail: vaske@ig.com.br

²Programa de Pós-Graduação em Aqüicultura e Pesca do Instituto de Pesca, Av. Francisco Matarazzo, 455 Parque da Água Branca CEP: 05001-900, São Paulo, SP Brazil.

Abstract. Fifteen specimens of the pelagic stingray, *Pteroplatytrygon violacea* were caught in depth between 9 and 50 m off São Paulo State coast, among them the largest recorded size in nature with 90 cm disk width.

Key words: chondrichthyes, record, coastal waters

Resumo. Ocorrências costeiras da raia-pelágica, *Pteroplatytrygon violacea*, (Bonaparte, 1832) (Elasmobranchii: Dasyatidae), na costa do Estado de São Paulo, Sudeste do Brasil. Quinze espécimes da raia-pelágica, *Pteroplatytrygon violacea* foram capturados entre 9 e 50 metros de profundidade na costa de São Paulo, entre eles um recorde de tamanho na natureza com 90 cm de largura de disco.

Palavras chave: chondrichthyes, recorde, águas costeiras

The pelagic stingray *Pteroplatytrygon violacea* (Bonaparte, 1832), is the only pelagic dasyatid ray, occurring in the tropical and subtropical Atlantic, Indian and Pacific Oceans (Bigelow & Schroeder 1953; Mollet *et al.* 2002; Ellis 2007). Pelagic stingrays have no commercial value in Brazil and are occasionally captured by tuna longliners along the Brazilian coast. The first record in Brazilian waters was reported by Sadowski & Amorim (1977), in the southern region. Although the pelagic stingray is regularly caught by tuna longliners that operate along the oceanic Brazilian coast, in the last few years the species have also appeared in very shallow waters, close to shore in the São Paulo State coast. In a recent report in southeastern Brazil, eight specimens were captured in shallow waters between 30 and 45 m around coastal islands of the Rio de Janeiro coast (Siqueira & Sant'Anna 2007).

The present study reports new records of the pelagic stingrays in shallow coastal waters of São

Paulo State, and comment probable causes for these occurrences of a known oceanic epipelagic species.

The specimens were caught by pair-trawl fishing boats that have been operating from November 2007 to January 2011 between 15 and 50 m deep along the central coast of São Paulo State (Fig. 1). One specimen was caught in a trap net in a site with nine meters of depth in Toque-toque (23°47'S; 45°33'S), near São Sebastião Island, and another one at 48 m in front of the São Sebastião Island. The specimens were stored in ice and taken to the laboratory, where they had their disc width (DW) measured to the nearest centimeter, and total weight obtained in grams. Reproductive aspects and stomachs contents were also analyzed, with the food items being identified to the lowest possible taxon. A total of 15 specimens were analyzed, twelve of them being females ranging from 51.5 cm to 90.0 cm DW, and three males of 39.0, 47.0, and 52.0 cm DW (Table I).

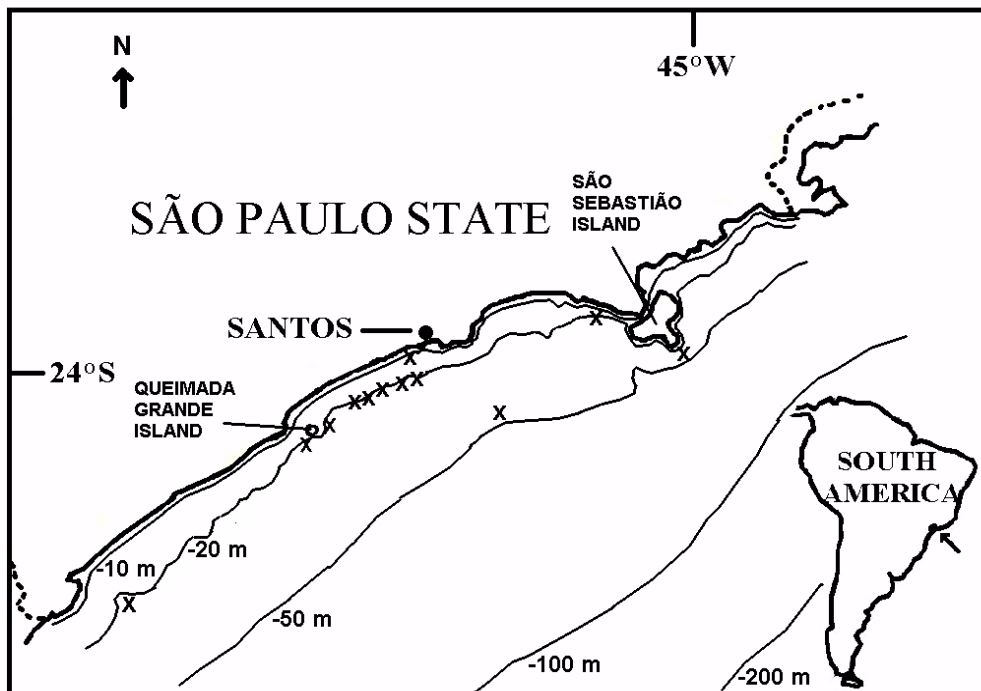


Figure 1. Occurrences of the pelagic stingray, *Pteroplatytrygon violacea* (x) in the coast of São Paulo State, Brazil.

A remarkable predominance of large females was observed with seven specimens being larger than 60 cm DW including the specimen measuring 90 cm DW 19.88 kg, which is the largest pelagic stingray ever captured according to available literature.

In the stomach contents of the 15 specimens, typical coastal fishes were found, including *Anchoa filifera* (Fowler 1915), *A. spinifera* (Valenciennes 1848), *A. spp.*, *Anchoviella lepidentostole* (Fowler 1911), *Chirocentron bleekermanus* (Poey 1867), *Dactylopterus volitans* (Linnaeus 1758), *Decapterus* sp., *Diapterus rhombeus* (Cuvier 1829), *Eucinostomus* sp., *Harengula clupei* Cuvier 1829, *Isopisthus parvipinnis* (Cuvier 1830), *Lycengraulis grossidens* (Spix & Agassiz 1829), *Pellona harroweri* (Fowler, 1917), *Sardinella brasiliensis* (Steindachner 1879), *Selene vomer* (Linnaeus 1758), *Seriola fasciata* (Bloch, 1793), *Trichiurus lepturus* Linnaeus 1758, Carangidae, Engraulidae, Sciaenidae, Serranidae and Teleostei (Table I). Two cephalopods were represented by the midwater octopus *Argonauta nodosa* Lightfoot 1786 and the squid *Loligo plei* (Blainville 1823). With the exception of *Dactylopterus volitans* and Serranidae, all prey were pelagic or midwater dwellers of coastal waters, which indicate a clear preference for active midwater fishes. The reproductive system showed only the left uterus functional, with not well

developed eggs and embryos in three individuals.

The three largest females (90.0, 77.0 and 73.0 cm DW) presented a clear scar in the lower mandible as a likely consequence of a knife cut made by fishermen to remove the hook (Fig. 2). The 90 cm specimen also presented a cut and a scarred tail. Literature references describe the pelagic stingray as epipelagic (Scott & Tibbo 1968; Wilson & Beckett 1970; Sadowski & Amorim 1977; Branstetter & McEachran 1983; Menni 1995; Forselledo *et al.* 2008). Another large records of disk width observed were two 80 cm DW females; one in the Northeast Atlantic (Wilson & Becket 1970; Schwartz 2005), and another one in the western central Atlantic (McEachran & Carvalho 2002), a 84 cm DW male in the southwestern Atlantic (Forselledo *et al.* 2008) and 88.5 cm DW female in southern Japan (Nakaya 1982). Nevertheless, the largest reported DW for the species in question was 96 cm, for a female that was maintained in captivity during nine years till its death in the Monterey Bay, California (Mollet *et al.* 2002). The individuals analyzed by Mazzoleni & Schwingel (2002) in Trindade and Martin Vaz islands ranged between 30 and 66 cm DW, which were respectively, the smallest and the largest DW observed for Brazilian waters, before the present report.

Table I. Data on the pelagic stingrays *Pteroplatytrygon violacea* captured in inshore waters of São Paulo State; date, local, depth, sex (male; m/female; f), disc width; total weight, uterus characteristics and stomach content.

DATE	LOCAL	DEPTH (m)	SEX	DISK WIDTH (cm)	TOTAL WEIGHT (g)	UTERUS	STOMACH CONTENT
DEC 2007	São Sebastião	48	f	63.8	No data	No data	<i>Argonauta nodosa</i> beak, <i>Carangidae</i> , <i>Decapterus</i> sp., <i>Harengula clupeola</i> , <i>Serranidae</i> , Teleostei
NOV 2007	Santos	50	f	57.5	No data	No data	Teleostei
JAN 2008	Forte Itaipu	15	f	54.5	No data	No data	No data
DEC 2009	Toque-toque	9	f	62.0	8,708	No data	No data
DEC09	Praia Grande	26	f	62.0	8,070	Left empty	Teleostei
DEC 2009	Praia Grande	26	m	39.0	3,471	No data	Teleostei
MAI 2010	Praia Grande	26	f	70.0	11,082	Left empty	<i>Dactylopterus volitans</i>
SEP 2010	Queimada	28	f	66.0	8,623	Left with two eggs	Empty
NOV 2010	Queimada	26.5	f	51.5	5,586	Left with two eggs	<i>Anchoviella lepidentostole</i> , <i>Doryteuthis plei</i> , <i>Sardinella brasiliensis</i>
DEC 2010	Praia Grande	26	f	77.0	13,965	Left empty	<i>Anchoviella lepidentostole</i> , <i>Anchoa spinifera</i> , <i>Selene vomer</i> , <i>Seriola fasciata</i>
DEC 2010	Praia Grande	26	f	90.0	19,884	Left with one embryo	<i>Anchoviella lepidentostole</i> , <i>Doryteuthis plei</i> , <i>Sardinella brasiliensis</i> , <i>Diapterus rhombeus</i> , <i>Chirocentrodon bleekermanus</i> , <i>Anchoa</i> sp., <i>Trichiurus lepturus</i> , Sciaenidae
JAN 2011	Praia Grande	26	f	52	4,528	No data	<i>Doryteuthis plei</i>
JAN 2011	Cananéia	26	f	73	12,115	Left empty	<i>Chirocentrodon bleekermanus</i> , <i>Pellona harroweri</i> , <i>Anchoa filifera</i> , <i>Lycengraulis grossidens</i> , <i>Eucinostomus</i> sp.
JAN 2011	Cananéia	26	m	47	2,909	Clasper calcified	<i>Isopisthus parvipinnis</i>
JAN 2011	Cananéia	26	m	55	3,435	Clasper calcified	<i>Chirocentrodon bleekermanus</i> , Engraulidae

The pelagic stingray is an epipelagic predator that feed mainly upon salps, small crustaceans, especially hiperiids, brachyuran megalopae, pteropods and heteropods (Neer 2008; Vêras *et al.* 2009), but also occasionally prey upon

large fish and squids as those used as bait in the longline. In former studies, Bigelow & Schroeder (1962) found in one specimen, two seahorses *Hippocampus* sp., two small shrimps, and fragments of squid. Scott & Tibbo (1968), found parts of a

thalassid decapod in a specimen from northwest Atlantic and Wilson & Beckett (1970) found sargassum weed, squid beaks, seahorses, unidentified fish and coelenterate in 16 specimens from North Atlantic. These results contrast with the diverse and coastal fish fauna found in the stomach of the specimens reported in the present paper, showing that the pelagic stingray switches the diet and even increases the diet spectrum in shallow waters. The region where the rays were caught is characterized by an enlarged continental shelf with a marked seasonal variation of the water masses. During summer, the South Atlantic Central Water (SACW) penetrates over the shelf reaching coastal waters with a remarkable thermocline between 10 and 15 meters (Pires-Vanin *et al.* 1993). During winter the SACW draw back and the Tropical Water (TW) fills the space. Due to the penetration of the South Atlantic Central Water (SACW) a high phytoplanktonic production is observed with blooms

of diatoms and trophic aggregates, including salps (Pires-Vanin *et al.* 1993) that are consumed by pelagic stingrays in the open ocean. In this way, it is likely that the large specimens came from open waters to inshore waters influenced by the intrusion of the SACW during summer, since fourteen of the fifteen specimens were caught in summer months (Table I). The typical coastal prey items found in the stomachs indicate that the rays remain in coastal waters and feed normally on local fauna. The presence of eggs and embryos found in the uterus of some females indicate a probable reproductive activity associated with coastal feeding influenced by currents that carry this typical oceanic epipelagic species close to the shores. Ribeiro-Prado & Amorim (2008) recorded of females with embryos in oceanic waters along the southern Brazil. They also found that the left uterus was significantly more developed than the right one in stingrays from southern Brazil.

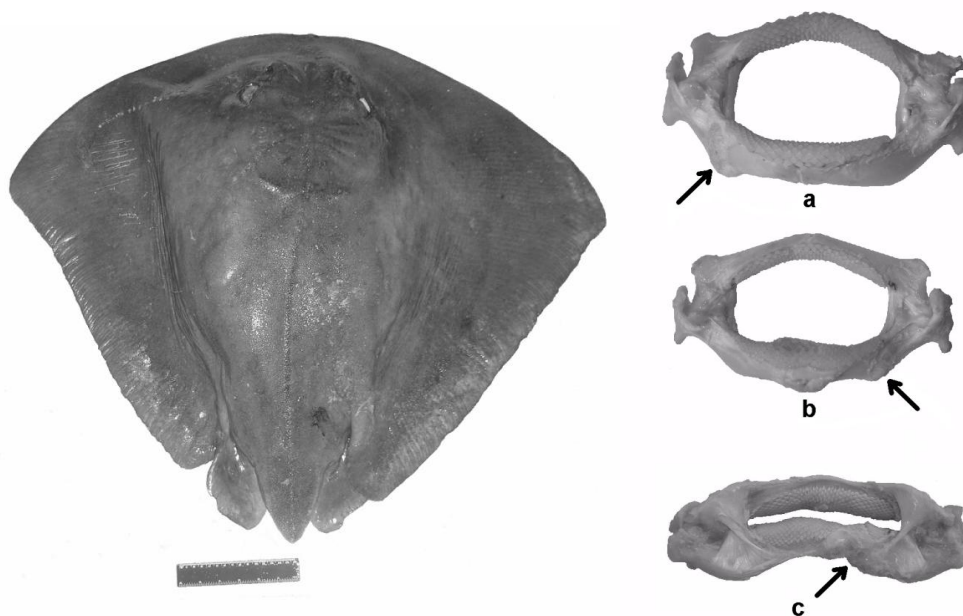


Figure 2. A 90.0 cm disc width female pelagic stingray, *Pteroplatytrygon violacea*, captured off São Paulo State coast (left) and jaws collected from this specimen (a) and from another 77.0 and 73.0 cm disk width female specimen respectively (b and c). Arrows indicate the scar provoked by the knife cut of the fishermen.

In the southern Brazilian longline fishery the species is wholly discarded after their jaws are removed from the hook by one knife cut in the mouth and the tail or either smashing the fish against the rail, with serious mouth and/or jaw damage with low chance of survival (Domingo *et al.* 2005). Nevertheless, the scars found in the mandibles in some individuals of the present study show that the ray can survive after the injuries when return into the

water. Moreover, one of the pelagic stingrays also had a scarred tail, which was likely a result of an amputation done by the fishermen to avoid the spines.

Acknowledgements

The authors are grateful to the fishermen who kindly allowed the sampling by the Pro-Pesca Project in Santos-SP.

References

- Bigelow, H. B. & Schroeder, W. C. 1953. Sawfishes, guitarfishes, skates and rays. Pp. 1-514 *In*: Tee-Van, J. (Ed.) **Fishes of the Western North Atlantic, Part 2**, Memoir Sears Foundation Marine Research, Yale Univ., New Haven. 588 p.
- Branstetter, S. & McEachran, J. C. 1983. A first record of the bigeye thresher, *Alopias superciliosus*, the blue shark, *Prionace glauca*, and the pelagic stingray, *Dasyatis violacea*, from the Gulf of Mexico. **Northeast Gulf Science**, 6: 59-61.
- Domingo, A., Menni, R. C. & Forselledo, R. 2005. Bycatch of the pelagic stingray *Dasyatis violacea* in Uruguayan longline fisheries and aspects of distribution in the southwestern Atlantic. **Scientia Marina**, 69 (1): 161-166.
- Ellis J. R. 2007. Occurrence of pelagic stingray *Pteroplatytrygon violacea* Bonaparte, 1832) in the North Sea. **Journal of Fish Biology**, 71: 933-937.
- Forselledo, R., Pons, M., Miller, P. & Domingo, A. 2008. Distribution and population structure of the pelagic stingray, *Pteroplatytrygon violacea* (Dasyatidae), in the south-western Atlantic. **Aquatic Living Resources**, 21: 357-363.
- McEachran, J. D. & Carvalho, M. R. 2002. Batoid Fishes: technical terms, general remarks, and key to families. Pp. 508-514. *In*: Carpenter, K. E. (Org.). **The Living Marine Resources of the Western Central Atlantic. Volume 1: Introduction, Molluscs, Crustaceans, Hagfishes, Sharks, Batoid fishes and Chimaeras**. Roma: FAO, vol.1.
- Mazzoleni, R. C. & Schwingel, P. R. 2002. Aspectos da biologia das espécies capturadas por espinhel pelágico na região sul das ilhas de Trindade e Martin Vaz no verão de 2001. **Notas Técnicas FACIMAR**, 6: 51-57.
- Menni, R. C., Hazin, F. H. & Lessa, R. P. T. 1995. Occurrence of the night shark *Carcharhinus signatus* and the pelagic stingray *Dasyatis violacea* off northeastern Brazil. **Neotropica**, 41(105-106): 105-110.
- Mollet, H. F., Ezcurra, J. M. & O'Sullivan, J. B. 2002. Captive biology of the pelagic stingray, *Dasyatis violacea* Bonaparte, 1832). **Marine and Freshwater Research**, 53: 531-541.
- Nakaya, K. 1982. *Dasyatis violacea*. Pp. 54, 55 and 315. *In*: Okamura, O. (Ed.). **Fishes of the Kyushu-Palau ridge and Tasa Bay**. JAMARC, Tosho Printing. CO. Tokyo, 436 p.
- Neer, J. A. 2008. The Biology and Ecology of the Pelagic Stingray, *Pteroplatytrygon violacea* (Bonaparte, 1832), Pp. 152-158. *In*: Cahmi, M. D., Pikitch, E. K. & Babcock, E. A. **Sharks of the Open Ocean. Biology, Fisheries and Conservation**. Blackwell Publishing, Oxford. 502 p.
- Pires-Vanin, A. M. S., Rossi-Wongstowski, C. L. D. B., Aidar, E., Mesquita, H. S. L., Soares, L. S. H., Katsuragawa, M. & Matsuura, Y. 1993. Estrutura e função do ecossistema de plataforma continental do Atlântico Sul brasileiro: síntese dos resultados. **Publicação Especial do Instituto Oceanográfico**, São Paulo, 10: 217-231.
- Ribeiro-Prado, C. C. & Amorim, A. F. 2008. Fishery biology on pelagic stingray *Pteroplatytrygon violacea* caught off southern Brazil by longliners settled in São Paulo State (2006-2007). **Collection of Volumes of Scientific Papers ICCAT**, 62(6): 1883-1891.
- Sadowski, V. & Amorim, A. F. 1977. Primeiro registro de ocorrência da arraia pelágica *Dasyatis violacea* (Bonaparte, 1832) nas águas do Atlântico sul ocidental. **Ciência e Cultura**, 29 (7): 792.
- Schwartz, F. J. 2005. Tail spine characteristics of stingrays (Order Myliobatiformes) found in the northeast Atlantic, Mediterranean, and Black Seas. **Electronic Journal of Ichthyology**, 1: 1-9.
- Scott, W. B. & Tibbo, S. N. 1968. An occurrence of the pelagic stingray, *Dasyatis violacea*, in the Northwest Atlantic. **Journal of Fishery Research Board Canada**, 25: 1075-1076.
- Siqueira, A. E. & Sant'anna, V. B. 2007. Data on the pelagic stingray, *Pteroplatytrygon violacea* (Bonaparte, 1832) (Myliobatiformes: Dasyatidae) caught in the Rio de Janeiro coast. **Brazilian Journal of Oceanography**, 55 (4): 323-325.
- Véras, D. P., Vaske Jr, T., Hazin, F. H. V., Lessa, R. P., Travassos, P. E., Tolotti, M. T. & Barbosa, T. M. 2009. Stomach contents of the pelagic stingray (*Pteroplatytrygon violacea*) (Elasmobranchii: Dasyatidae) from the tropical Atlantic. **Brazilian Journal of Oceanography**, 57 (4): 339-343.
- Wilson, P. C. & Beckett, J. S. 1970. Atlantic Ocean distribution of the pelagic stingray, *Dasyatis violacea*. **Copeia**, 4: 696-707.

Received February 2012

Accepted August 2012

Published online November 2012