

*Short Communication*

## First record of the smooth hammerhead shark (*Sphyrna zygaena*) in Saint Peter and Saint Paul Archipelago: range extension for the equatorial region

Natalia Bezerra<sup>1</sup>, Bruno C.L. Macena<sup>1</sup>, Sibeles A. Mendonça<sup>1</sup>, Ramón Bonfil<sup>2</sup> & Fábio H.V. Hazin<sup>3</sup>

<sup>1</sup>Department of Oceanography, Postgraduate Program in Oceanography  
Federal University of Pernambuco, Recife, Brazil

<sup>2</sup>Océanos Vivientes A.C., Mexico City, Mexico

<sup>3</sup>Department of Fisheries and Aquaculture, Federal Rural University of Pernambuco, Recife, Brazil  
Corresponding author: Natalia Bezerra (natalia\_pab@hotmail.com)

**ABSTRACT.** A smooth hammerhead shark (*Sphyrna zygaena*) was found in Saint Peter and Saint Paul Archipelago in May 2015. This is the first confirmed occurrence of a smooth hammerhead shark in an equatorial oceanic island and suggests a geographic range extension for the species.

**Keywords:** *Sphyrna zygaena*, Sphyrnidae, new occurrence, oceanic island, equatorial Atlantic.

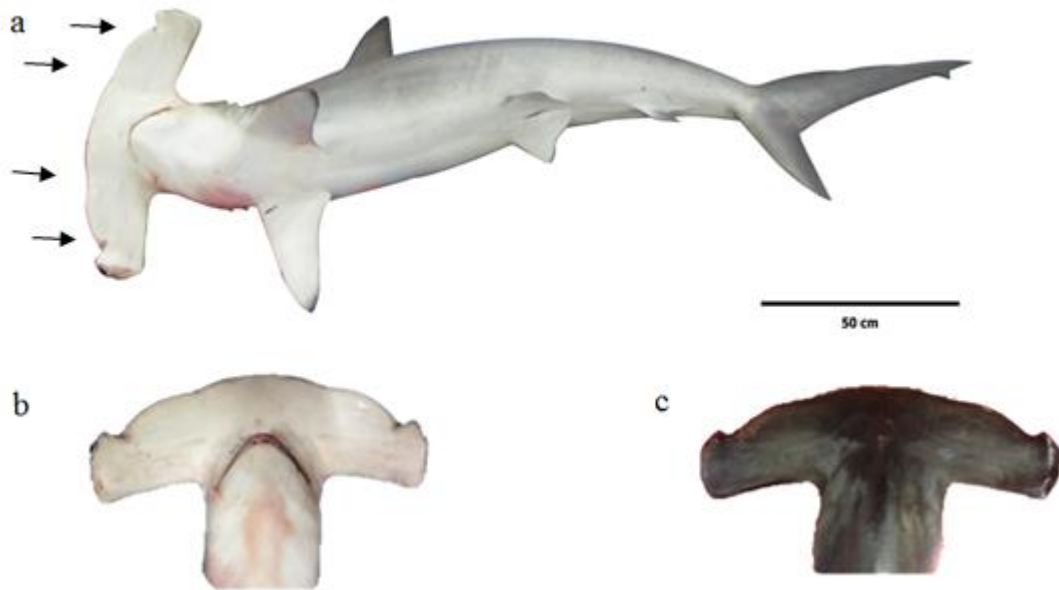
From all eight known shark orders, Carcharhiniformes presents the highest species diversity, including the smooth hammerhead shark (*Sphyrna zygaena* (Linnaeus, 1758)), which belongs to the Sphyrnidae family. Currently, the genus *Sphyrna* is composed by nine species, with six of them occurring in Brazilian waters: *Sphyrna media*, *Sphyrna mokarran*, *Sphyrna tiburo*, *Sphyrna tudes*, *Sphyrna lewini*, *S. zygaena* (Compagno, 1984), as well as the new species *Sphyrna gilberti* (Pinhal *et al.*, 2012).

The species comprising this genus are mainly distinguished due to the presence or absence of notches in the cephalic region, as well as other morphological aspects such as the size and position of fins, for example (Compagno *et al.*, 2005; Vooren *et al.*, 2005; Navia & Mejía-Falla, 2011). Among the species of *Sphyrna* commonly captured in Brazil, *S. zygaena*, *S. mokarran* and *S. lewini* are the largest and the ones that show a higher degree of morphological similarity. These three species are cosmopolitan, inhabit oceanic and coastal regions of tropical, subtropical and temperate seas, and are present along the entire coast of Brazil, with the exception of *S. zygaena* which is distributed mainly in latitudes greater than 20°S (Casper *et al.*, 2005; Compagno *et al.*, 2005).

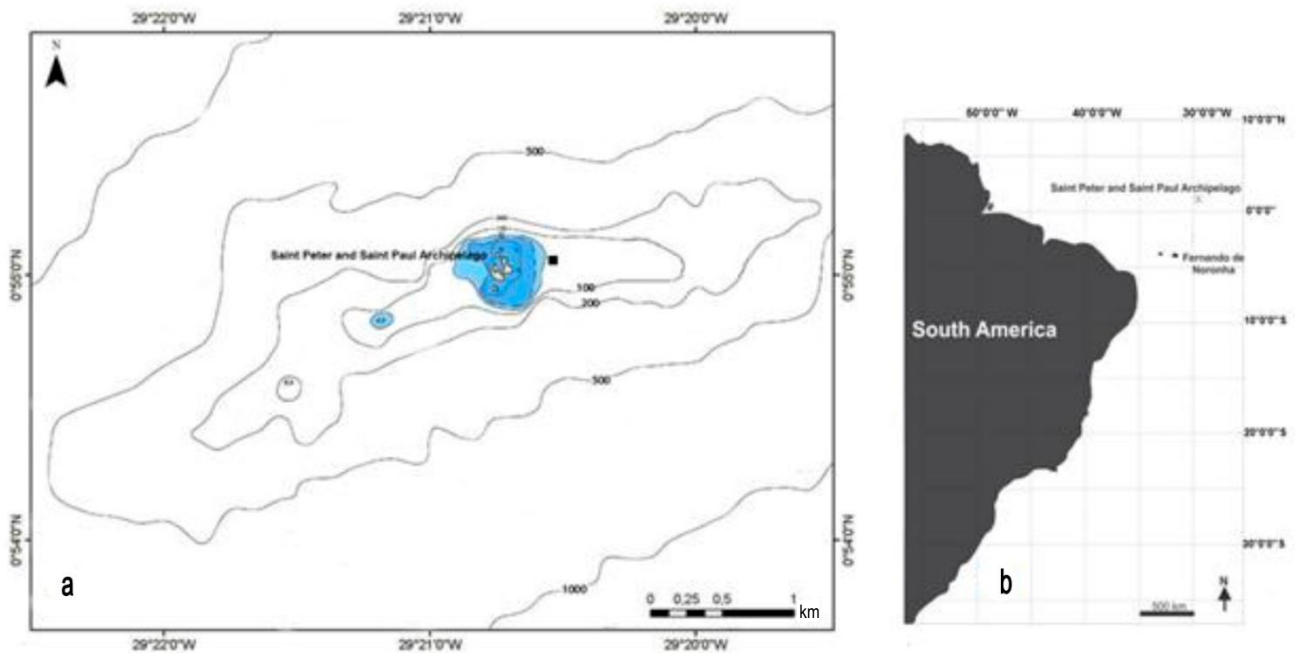
In the southeast and south regions of Brazil, the smooth hammerhead shark is caught near the coast using trawls and gill nets, and offshore in pelagic longline fisheries (Vooren *et al.*, 2005; Amorim *et al.*,

2011). Despite the general view that the area of occurrence for the species is limited to high latitudes, a smooth hammerhead shark (Fig. 1) was captured in the Saint Peter and Saint Paul Archipelago (SPSPA) (Fig. 2), a Brazilian group of oceanic equatorial islands. The SPSPA (0°55'02"N, 029°20'42"W) is formed by a group of small islands between the South American and African continents and southern and northern hemispheres, located about 1,100 km from the coast of Brazil and 1,700 km from the coast of Guinea-Bissau, Africa.

A female *S. zygaena* was captured in 15 May 2015, during shark fishing operations for telemetry studies. The shark was caught in the eastern part of the archipelago on a drum line composed of 16 circle hooks size 16, using flying fish (*Cheilopogon cyanopterus*) as bait. Unfortunately the shark did not survive the capture procedure. The smooth hammerhead shark was easily identified by the following key diagnostic features: head arched with four notches and without a median indentation; first dorsal fin moderately high, with second dorsal and pelvic fins low; pelvic fins not falcate; and lower caudal fin lobe without a dark blotch on it. The shark was eviscerated and measured right after it was landed, presenting the following measurements: 226 cm total length ( $L_T$ ), 173 cm fork length, 157 cm precaudal length and 57 cm interdorsal space. The total and eviscerated weights were 49.2 kg and 46.1 kg, respectively. The gonadal macroscopic analysis



**Figure 1.** a) Female of smooth hammerhead shark caught in Saint Peter and Saint Paul archipelago, b) ventral, c) dorsal head view. ( → Four notches).



**Figure 2.** New occurrence location of the smooth hammerhead shark: Saint Peter and Saint Paul Archipelago (SPSPA). a) Capture area (■) in SPSPA, and b) SPSPA location.

showed the female smooth hammerhead shark was developing by Stehmann (2002) maturity scale, although Vooren *et al.* (2005), in the southern region of Brazil, have registered adult females with shorter lengths (between 198 cm and 210 cm  $L_T$ ) than the one described in this study.

The degree of stomach repletion was 25% with the presence of unidentified cephalopod tissues and some

beaks. Cephalopods are commonly an important diet item for this species (Rogers *et al.*, 2012; Galván-Magaña *et al.*, 2013; Bornatowski *et al.*, 2014). The specimen is kept in the biological collection of the Oceanography Fisheries Laboratory of the Federal Rural University of Pernambuco, Brazil. *S. zygaena* is the second hammerhead shark species to be reported for the SPSPA, however, the occurrence of the other

species, *S. lewini*, in the archipelago is considered common (Lubbock & Edwards, 1981; Vaske Jr. *et al.*, 2005). Bezerra *et al.* (2016) reported significant catches of hammerhead sharks around the archipelago, yet, it was not possible to identify the different species in order to confirm the presence of *S. zygaena* in the area. A possible occurrence of a smooth hammerhead shark near the equatorial region was listed by Soto (2001), in the Fernando de Noronha Archipelago. Nonetheless, according to the author, the record requires confirmation. Smooth hammerhead sharks may seek shelter and food in island ecosystems, such as scalloped hammerhead sharks, which usually form aggregations in these environments (Hearn *et al.*, 2010; Bessudo *et al.*, 2011; Ketchum *et al.*, 2014).

In almost 20 years of intense monitoring around the SPSPA, however, the smooth hammerhead shark had never been reported. The species of the genus *Sphyrna* are usually identified in longline fishing logbooks only as "hammerhead", which hinders the understanding of their geographic distribution, abundance, and importance in fisheries catches, thus contributing to a higher risk for these species (Gallagher *et al.*, 2014). This study confirms the presence of the smooth hammerhead shark in the Atlantic equatorial zone, indicating a possible range extension for the species. Delimiting the occurrence area of the species is extremely important to decide effective management and conservation measures for smooth hammerhead sharks, which are classified as vulnerable in the IUCN (International Union for the Conservation of Nature) Red List of Threatened Species (Casper *et al.*, 2005).

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