



Scientific Note

Record of a pregnant *Mobula thurstoni* and occurrence of *Manta birostris* (Myliobatiformes: Mobulidae) in the vicinity of Saint Peter and Saint Paul Archipelago (Equatorial Atlantic)

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Abstract. In this study, the occurrence of a pregnant *Mobula thurstoni* and six specimens of *Manta birostris* from the Archipelago of St. Peter and St. Paul were recorded for the first time. The description of morphology and morphometrics of the embryo of *M. thurstoni* was also reported.

Keywords: oceanic island, chondrichthyes, elasmobranchii, devil rays, pelagic animal

Resumo. Registro de *Mobula thurstoni* prenhe e ocorrência de *Manta birostris* (Myliobatiformes: Mobulidae) no entorno do Arquipélago de São Pedro e São Paulo (Atlântico Equatorial). No presente trabalho, as ocorrências de uma *Mobula thurstoni* prenhe e de seis espécimes de *Manta birostris* no Arquipélago de São Pedro e São Paulo foram registradas pela primeira vez. A descrição morfológica e os dados morfométricos do embrião de *M. thurstoni* foram igualmente reportados.

Palavras chave: ilha oceânica, chondrichthyes, elasmobranchii, raias manta, animais pelágicos

The Mobulidae family is composed of 11 species and two genera: *Manta* and *Mobula* and is found typically in waters rich in secondary productivity, due to its planktonic food habits. This family is composed by pelagic species, distributed throughout all tropical and subtropical oceans (Bigelow & Schroeder 1953, Notarbartolo-di-Sciara 1987, Gadig *et al.* 2003, Marshall *et al.* 2009). In Brazil, six Mobulidae species have been so far recorded, one of the genus *Manta* and five of the genus *Mobula* (Gadig & Sampaio 2002). For the

latter, four species were recorded in the vicinity of the Saint Peter and Saint Paul Archipelago (SPSPA; 00°55'N, 29°21'W); *M. tarapacana* (Philippi, 1892), *M. thurstoni* (Lloyd, 1908), *M. japonica* (Müller & Henle, 1841) and *M. hypostoma* (Banckoff, 1831) (Lubbock & Edwards 1981, Feitoza *et al.* 2003, Vaske Jr. *et al.* 2005). However, the records on the occurrence of *M. hypostoma* needs confirmation (Feitoza *et al.* 2003, Vaske Jr. *et al.* 2005, Lessa & Vaske Jr. 2009).

The Saint Peter and Saint Paul Archipelago is a small group of islands located in the Mid-Atlantic Ridge situated between the northern and the southern hemispheres and between the African and the American continents. Such strategic position turns this place an important site for the aggregation of migratory species, such as tunas, billfishes, turtles, dolphins, whale sharks and rays (Vaske Jr. *et al.* 2003, Vaske Jr. *et al.* 2005, Hazin *et al.* 2008). Due to its relatively high productivity (Lessa *et al.* 1999a, Travassos *et al.* 1999) the SPSPA became an important fishing ground for the small scale Brazilian fleet based in Natal, northeastern Brazil (Vaske Jr. *et al.* 2005). The aim of this study was to record the occurrence of a pregnant smooth tail devil ray *Mobula thurstoni* catch by fishery boat, including data on the embryo and the occurrence of the six specimens of the *Manta birostris* sighted by free diving underwater in the vicinity of the SPSPA.

On March 7th 2010, one pregnant smooth tail devil ray female, with 1,800 mm of disk width (DW), was caught by the fishery boat Ave Maria II with the aid of a small longline installed at a distance of 500 m from the SPSPA. The female was eviscerated on board and its reproductive organs were collected. The reproductive organs collected from the *M. thurstoni* female corresponded to the left body side (Notarbartolo-di-Sciara 1988, White *et al.* 2006). Length and width of the uterus and ovary were measured and the embryo morphometric data were collected following the protocol of Notarbartolo-di-Sciara (1987). Apart from the biological material collected, photos and videos of other mobulid species were taken during free diving underwater survey for *Mobula tarapacana* (Mendonça, 2011). For identification the Mobulidae were used Notarbartolo-di-Sciara (1987) and Marshall *et al.* (2009).

The left ovary was 36 mm wide and 108 mm long, containing five vitellogenic oocytes ranging from 22.0 mm to 26 mm (mean of 24.6 mm) of width. The left uterus measured 170 mm of width and 91 mm of length and containing one embryo in initial stage of development, asymmetry were observed of the ovary and uterus with trophonemata. All measurements taken from the embryo is presented in Table I. No pigments were observed in the embryo which had a milky color in the center of the body and pink in the margins (Figure 1a). The material was fixed in 10% formalin solution, and deposited in the ichthyologic collection of the Fisheries Oceanography Laboratory (LOP), of Universidade Federal Rural de Pernambuco (UFRPE) (Figure 1b).

During free diving underwater surveys besides the three species of Mobulidae rays which had already been previously recorded Mobulidae (*M. japanica*, *M. tarapacana* and *M. thurstoni*), six specimens of the *Manta birostris* were also sighted: one in 2010, in August; and five in 2011: one in January, February, two in March and one June. Two females had estimated disc widths (DW) of 3,0 m and 4,5 m DW, one male measured 2,5 m and another specimen with undetermined sex measured 3,5 m DW. The other 2 specimens could not be measured (Figure 2A). Five mantas were sighted in the western side of the SPSPA and one in the northeastern side. The most common species in the vicinity of the SPSPA is *M. tarapacana*, but *M. japanica* and *M. thurstoni* were also recorded either in groups or solitaries, during the day or night. *Mobula japanica* and *M. thurstoni* were often sighted jumping out of the water, spinning once or twice around its own longitudinal axis. Those species can be observed in the SPSPA, in some instances associated with *M. tarapacana* or with the whale shark (*Rhincodon typus*). One *M. birostris* was recorded in association with a *M. tarapacana*. In this occasion, the *M. tarapacana* followed passively the *M. birostris* for 5 min until they disappear into the deep (Figure 2B).

In Brazil, *M. thurstoni* was also recorded off the States of São Paulo (Gadig *et al.* 2003, Casas *et al.* 2006) and Ceará (Jucá-Queiroz *et al.* 2008). A few pregnant females and embryos were recorded for the *Mobula* genus (Notarbartolo-di-Sciara 1988, White *et al.* 2006, Casas *et al.* 2006). The pregnant *M. thurstoni* observed in the present study was only the second record of a pregnant specimen for Brazil (Casas *et al.* 2006). Asymmetry of the ovary and uterus (Notarbartolo-di-Sciara 1988) and trophonemata (characteristic of the Myliobatiformes rays that has viviparity with histotrophy) (Wourms 1981, Hamlet & Hysell 1998) were observed.

The first pregnant *M. thurstoni* recorded in Brazil was caught in the southeastern region in the austral winter season (July) and was in mid-term stage development (Casas *et al.* 2006). In the same region, Gadig *et al.* (2003) observed adult males with well developed claspers and characteristics that indicated a probable mating behavior during January. Notarbartolo-di-Sciara (1988) recorded two pregnant *M. thurstoni* during summer season (July) in the Gulf of California (Mexico) with all embryos close to be born, while in October all females (n= 4) examined had embryos in the initial stage of development. Judging from its small size (17.9 cm DW) the embryo found in the present study (March)

was in early gestation since the size at birth is between 65 and 85 cm of DW (Notarbartolo-di-Sciara 1988). Notarbartolo-di-Sciara (1988) suggested a gestation period of one year for *M. thurstoni* with females giving birth every two years or more, during boreal summer when there is an increase of food availability.

The occurrence of Mobulidae in the vicinity of the SPSPA is very common, except for *Manta birostris* which had not been previously recorded for that area. The presence of *M. hypostoma* was recorded by Lubbock & Edwards 1981 and *M. thurstoni*, *M. japanica* and *M. tarapacana* by Gadig & Sampaio 2002, Vaske Jr. *et al.* 2005, Feitoza *et al.* 2003. However, the record of *M. hypostoma* may have been either the result of a misidentification (Feitoza *et al.* 2003, Vaske Jr. *et al.* 2005, Lessa &

Vaske Jr. 2009) or the occurrence of the species in that area is very sporadic since it has not been sighted throughout the period of this study.

The occurrence of *M. birostris* in the SPSPA is not surprising, considering the highly migratory nature of this species, as well as its wide distribution in all tropical and temperate oceans (Compagno & Last 1999, Last & Stevens 2009), including the Brazilian and Uruguayan coast (Figueiredo 1977, Lessa *et al.* 1999b, Oddone & Milessi 2003, Yokota & Lessa 2006, Luiz Jr. *et al.* 2009). According to the previous records of four species of the genus *Mobula* plus the new occurrence of another species of the genus *Manta* by the present work, the SPSPA is the Brazilian territory with the largest Mobulidae diversity.

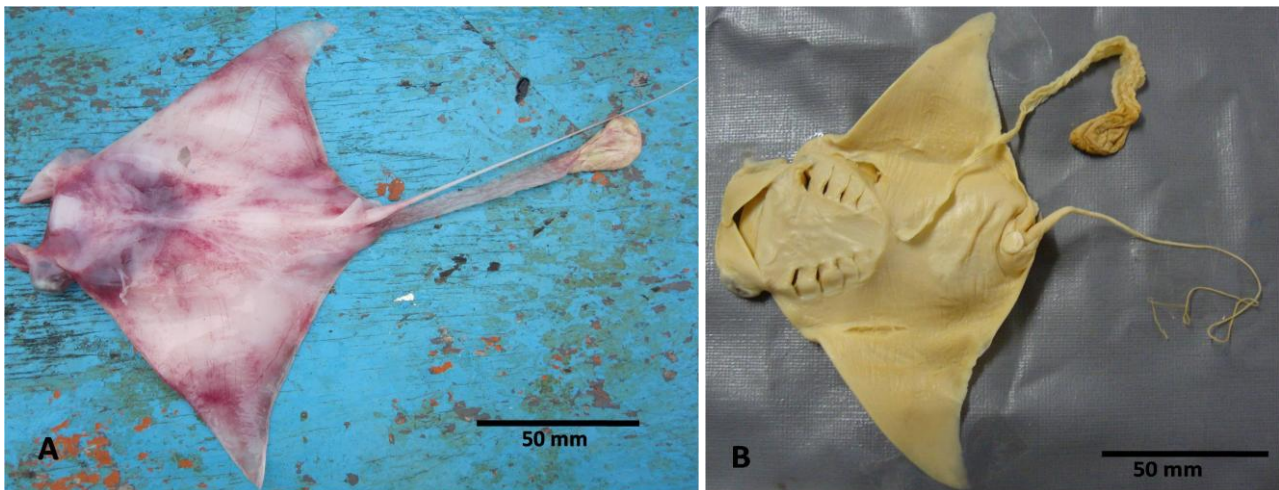


Figure 1. A. Dorsal view of *Mobula thurstoni* embryo after capture in the Saint Peter and Saint Paul Archipelago; and B. Ventral view of *Mobula thurstoni* embryo after fixation with formalin solution in the Fisheries Oceanography Laboratory (LOP).

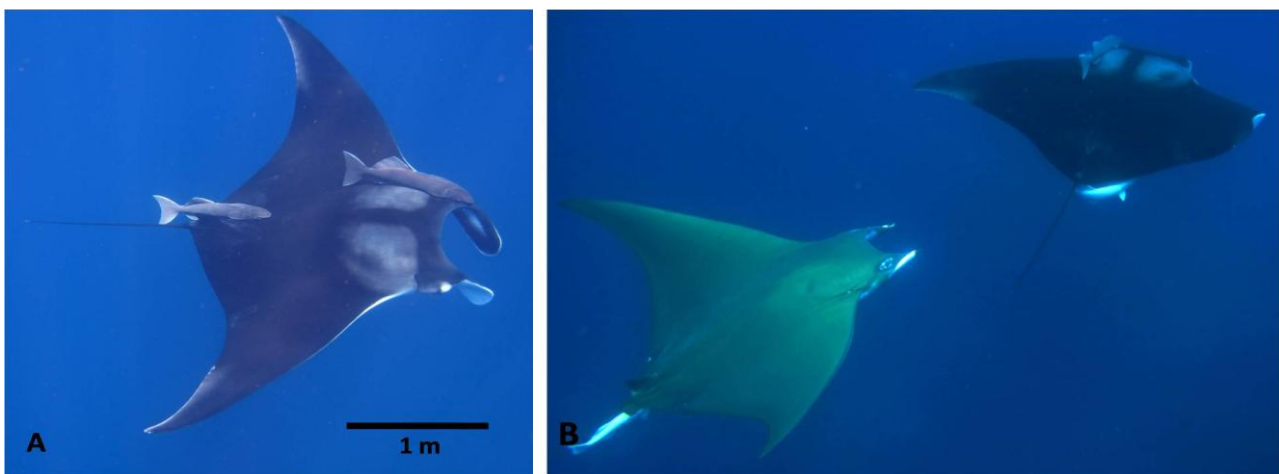


Figure 2. A. *Manta birostris* recorded in Saint Peter and Saint Paul Archipelago by the free diving underwater survey; and B. Interaction between *Manta birostris* and *Mobula tarapacana* in the vicinity of the Saint Peter and Saint Paul Archipelago. Photos: Rômulo P. Ferreira.

Table I. Morphometry in mm of the *Mobula thurstoni* embryo collected in the Saint Peter and Saint Paul Archipelago.

Description	Measurements (mm)
Disc width	179
Disc length	101
Anterior projection	6
Predorsal length	96
Dorsal fin base length	10
Dorsal fin height	9
Precloacal distance	94
Tail length	240
1st gill slit opening length	9
2nd gill slit opening length	7
3rd gill slit opening length	8
4th gill slit opening length	7
5th gill slit opening length	5
Between first gill slits	26
Between fifth gill slits	15
Rostrum to first gill slits	2
Rostrum to fifth gill slits	43
Pelvic fin length	14
Cephalic fin length	18
Cephalic fin width	11
Orbit height	4
Between antorbitals	41
Preoral length	11
Head length	22
Mouth width	27
Internarial distance	25

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