



PHYTOPLANKTON BLOOM AND SEASONAL PRESENCE OF WHALE SHARK (*RHINCODON TYPUS*) ALONG THE COAST OF DJIBOUTI - GULF OF ADEN

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ABSTRACT

During a 5 days research expedition performed in January, some observations on a whale shark population were performed. Just 7 specimens have been observed and identified. This number of sharks is lower than that observed in previous reports in the same period for similar research efforts. Recent remote sensing studies showed summer phytoplanktonic bloom higher than in autumn, but no sharks have been recorded suggesting that the quantity of phytoplankton could be not linked with the presence of the whale sharks.

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INTRODUCTION

Whale sharks (*Rhincodon typus*) are panoceanic planktivores that were first described from a specimen captured in the Western Indian Ocean in 1828 (Smith, 1828). The pad-like filtering apparatus of the *R. typus* is unlike that of the other filter feeding sharks. *Rhincodon typus* are able to feed by suction, which may allow them to target more mobile prey and so they are better suited to dense prey aggregations, while *C. maximus* and *M. pelagios* are apparently better adapted to feeding on lower densities of prey organisms, filtering large volumes of water (Taylor *et al.*, 1983). Whale sharks can be uniquely identified by spot patterns on their skin, the area posterior to the fifth gill slit being particularly suited to this purpose (Arzoumanian *et al.*, 2005). Anecdotal reports suggested that whale sharks occur during the months of October to February in the Arta Bay area, (11° 35'N, 42° 49'E) on the southern coast of the western end of the Gulf of Tadjoura some 33 km from Djibouti city (Rowat *et al.*, 2007). Waters in the lower central gulf and southern coastal region demonstrated maximum Chl-a concentrations during autumn (late November), indicating that the major phytoplankton growth period in these regions occurs during the northeast monsoon when the northeasterlies prevail (Gittings *et al.*, 2017). The improved spatial coverage of OC-CCI data in the

Gulf of Aden allowed, for the first time, an investigation into the full seasonal succession of phytoplankton biomass and analysis of indices of phytoplankton phenology (bloom timing). This revealed distinct phytoplankton growth periods in different parts of the gulf: a large peak during August (mid-summer) in the western part of the gulf, and a smaller peak during November (mid-autumn) in the lower central gulf and along the southern coastline. The summer bloom developed rapidly at the beginning of July, and its peak appeared approximately three times higher than that of the autumnal bloom (Gittings *et al.*, 2017). Despite the presence of large planctonic blooms, during summer whale shark presence was not observed.

MATERIAL AND METHODS

The Gulf of Tadjoura, (11° 40'N, 43° 00'E) at the southern entrance to the Red Sea, is an inlet of the Indian Ocean caused by the fault line of the northerly end of the East African Rift Valley that transects Djibouti, Ethiopia and Kenya (Rowat *et al.*, 2007). Data were collected from 16th to 20th January 2017 between Arta Beach (11°34'N, 42°49'E), Ras Korali (11°34'N, 42°47'E) and Escape Bay (11°34'N, 42°49'E). Daily, 3 whale sharks monitoring activities were performed from two tenders at the following day time: 07-09, 11-13 and 15-17. Observations were randomly performed 50m far the coast, covering an area of about 20 km of diameter from Ras Korali. The recognition of individuals was made by underwater cameras; time of observation and location were

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recorded. Chemical and physical analysis of water were daily monitored, plankton samples were collected with a WP2 plankton net (200 µm mesh net) at the passage of the whale sharks.

RESULTS

About 60 hours have been dedicated to the monitoring of animals. During this time, 7 specimens of whale shark were photographed and identified. Their sizes ranged between <2 m and <4.5 m. Among these animals, 4 were males, 1 was female, and for 2 the sex determination was not possible.

CONCLUSIONS

Whale shark monitoring showed that sharks are still present in January but fewer than in previous reports in the same period, 23 specimens have been observed in 2006 by Rowat *et al.* (2006), 20 and 16 in 2007 and 2009 by Rezzolla *et al.* (2010). No information are available if sharks are present also in summer. Monitoring will be continued in summer (August) when important phytoplankton blooms occur. More detailed information must be collected in order to check if differences existed between summer and autumn planktonic biodiversity.

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