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# Sharks caught as by catch in Mozambican waters

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ABSTRACT

Results based on different sources of information namely data production, logbooks and on board sampling during 2010 in the Mozambican coast are presented. The catch composition from the longliners during 2010 was bigeye (20%) followed by shark , (11%), yellowfin (8%) and the remain percentage by other species. Twenty three species were observed during the observer trip, including 4 tuna species, 4 billfish species, 13 shark species, and 2 other species. The dominant shark species were *Carcharhinus sorrah, Galeocerdo cuvier*, *Squalus megalops and Sphyrna lewini*.

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## 1. INTRODUCTION

Little is known in Mozambique about sharks as tuna by catch. Few studies were undertaken such as ( Mihara e Donato 1986; Simões, 1984 e 1985 ;Moreira Rato, 1985 ), on deep water sharks caught by gill nets ( Palha de Sousa, 2009, Palha de Sousa, 2010**).**

Between 1976 and 1979, several programmes were implemented to develop the tuna fishery using the longline and pole and line fishing techniques. The results of those programmes are described by Simões (1984).

Several attempts were made at developing a national tuna fishery, which involved experimental fishing to determine catch rates for both longline and pole and line gears Simões (1984). Between 1976 and 1979, experimental longline fishing was carried out using 7 research vessels from the Soviet Union. Catch rates were generally good and higher in the north (north of Quelimane) and during the winter, except in the central region . The tuna species caught were predominantly yellowfin tuna (*Thunnus albacares*) and to a lesser extent bigeye (*Thunnus obesus*) and albacore tuna (*Thunnus alalunga*). Overall, billfishes contributed with about 8 percent of the catches and sharks were abundant particularly in the south (south of Inhambane).
Based on these results, Simões (1984) considers that a national longline fleet of 5 to 7 vessels is feasible. Each vessel would be expected to catch around 3,500 tonnes per year; 1,100 tonnes of tuna, 1,900 tonnes of shark and 500 tonnes of others, mainly billfish. The estimated catch of such a fleet would be from 17,500 to 24,500 tonnes per year.

Experimental fishing with pole and line using live bait was carried out in 1983, involving a chartered vessel from Cape Verde. Four surveys were undertaken with a progressive improvement in performance as a result of adaptations and training of the Mozambican and Capeverdean crew. The last survey, carried out in December, was in fact a commercial fishing trip, targeting skipjack tuna (*Katsuwonus pelamis*) at a time when it is known to be abundant in the south (east of Maputo).
During the experimental fishing the shark species caught were *Carcharhinus melanopterus* e *Carcharhinus obscurus*.

The country does not have a tuna national fleet but during 2010, there were four Chinese longline vessels licensed to fish on Mozambican coast and the target species were bigeye and yellowfin tuna, but sharks were also caught. The covered area was from Sangage lighthouse (Nampula province) to Ponta Závora (Inhambane province) (Figure 1).

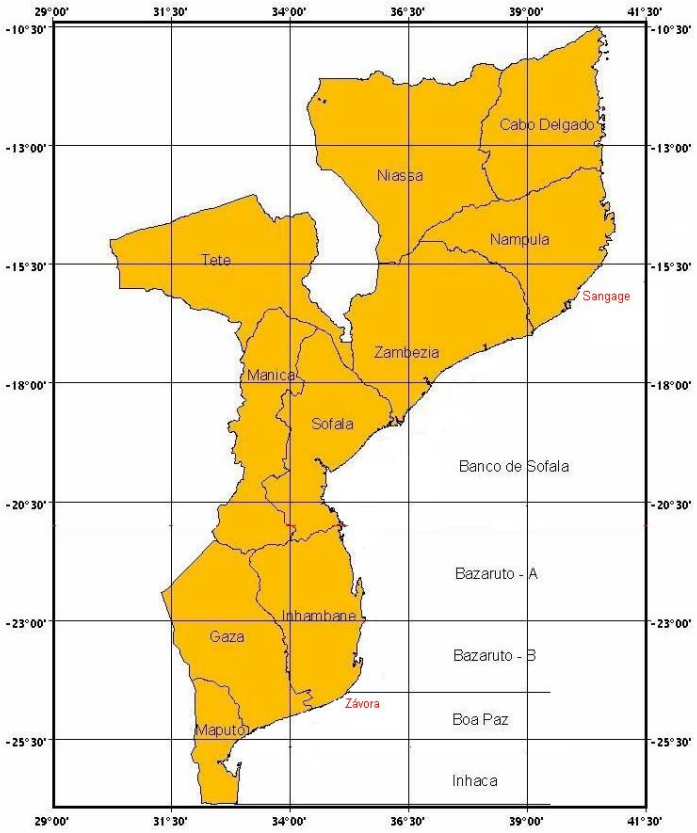



Fig. 1 Mozambique map with main fishing grounds.

## 2. Material and methods

There are different sources of information used such as data production from Fisheries Administration, a body belonging to the Ministry of Fisheries, logbooks and on board sampling from Fisheries Research Institute. The logbooks were filled by the fishing company and an observer from the Fisheries Research Institute was allowed to collect data on board during some months.

All the onboard data analyzed were collected by a single scientific observer on a commercial longline fishing vessel in Mozambique from March to July 2010.

Each longline has about 10 km and was deployed in four hours and collected after one to one and half days. The bait used was small specimens of *Auxis thazard* (Fig 2). Data production, logbooks and on board sampling sheets were organized in spreadsheets.

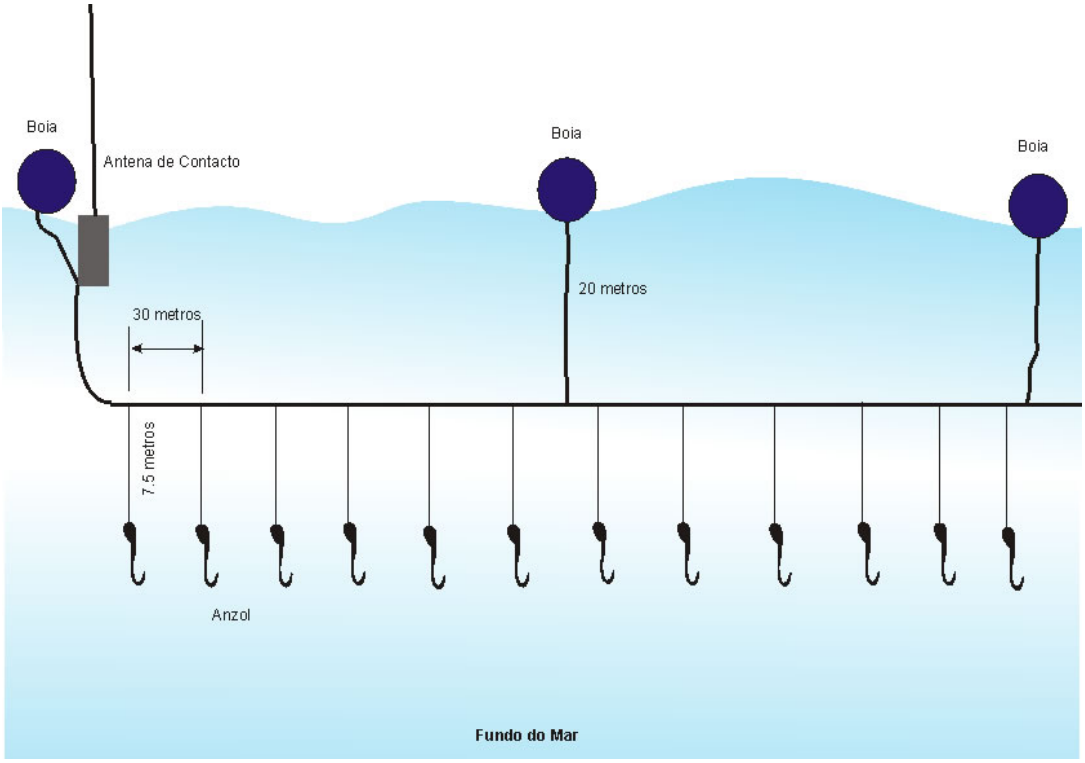
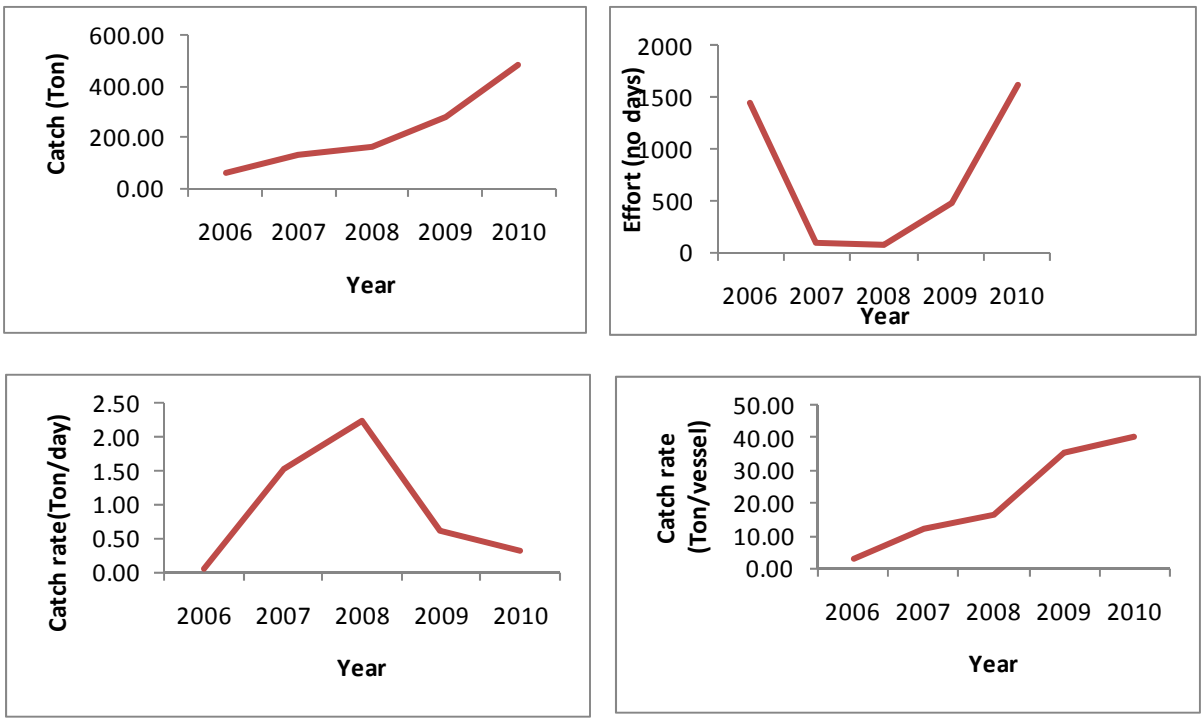



Fig . 2 Longline scheme used in the vessel.

## 3. Results and Discussion

### 3.1 Catch and effort

Based on data production from 2006 to 2010 graphs were produced for total catch , total effort, catch rate by vessel and by day (Figures 1, 2, 3 and 4).




Figures 1, 2, 3 and 4 Catch, effort, catch rate per day and vessel for shark.

Annual total catches ranged from 63 to 482 tons and annual total effort from 74 to 1620 days and 8 to 20 vessels. Catches increased from 2006 to 2010, while effort decreased from 2006 to 2007 and increased again in the last two years. Probably these trends are related with the fishing target or other factors which might influence. However, future studies should be carried out to explain the trends. Catch rate (ton/day) ranged from 0.04 to 2.22. The best catch rates were in 2007 and 2008. Catch rate (ton/vessel) varied from 3.17 to 40.14 and increase from 2006 to 2010.

As it was mentioned above the other source of information are the logbooks. Based on information obtained from the Chinese longliners logbooks some graphs were produced for shark. These longliners covered fishing grounds from $16^0$ 00´ to $25^0$60´, mainly Sofala Bank, Bazaruto A and B and Boa Paz as shown in the map (Fig. 1). These vessels have 35 m total length and 274 t GT.

Fishing operations took place from April to November and started in northern Mozambique. These vessels fished between 90 to 120 days per month. Total catches per month ranged from 7 to 54 tons and total effort per month from 48000 to 175000 hooks. The target species was

bigeye, followed by sharks and yellowfin tuna. Effort was higher in April-May, September and November.

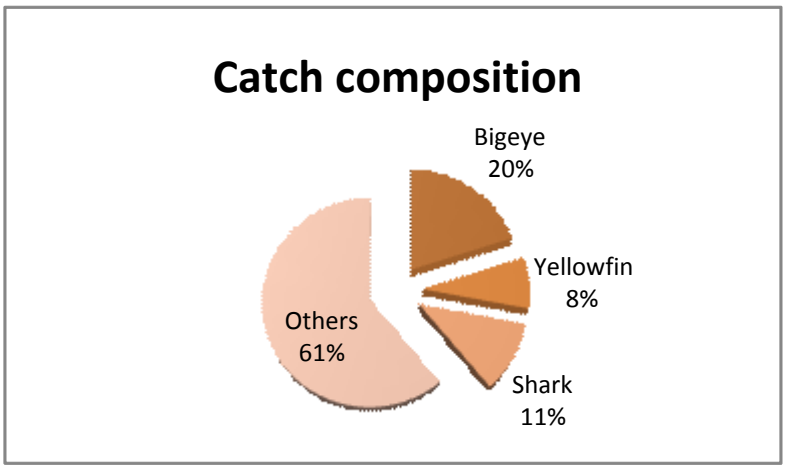
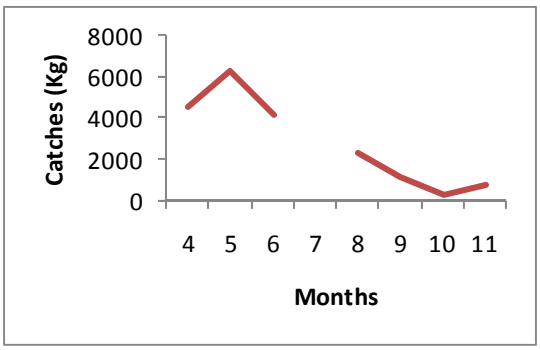
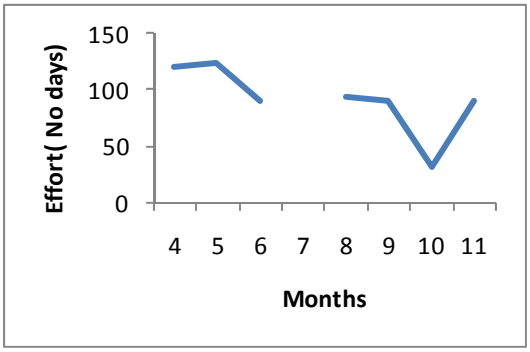


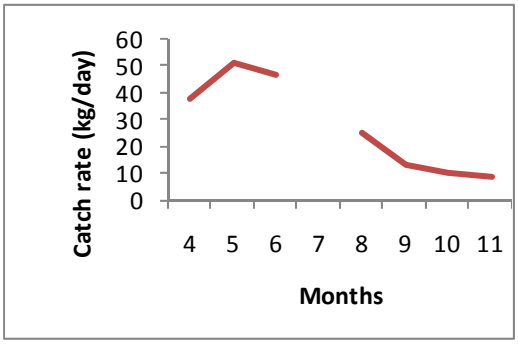

Fig. 5 Catch composition of Chinese longliners.

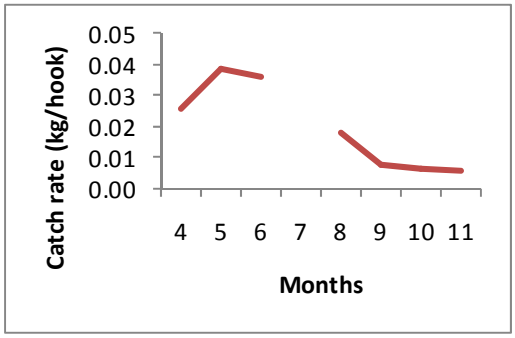
The catch composition for the whole period was bigeye (20%) followed by shark , (11%), yellowfin (8%) and the remain percentage by other species.

Shark catches ranged from 308 to 6306 kg (Figure 6). Catch rate (kg/day) varied from 8.56 to 50.85 and catch rate (kg/100 hook), from 0.56 to 3.85 (Figures 8 and 9). It looks like the best catches and catch rates were in April, May and June, but more data needs to be collected in the future in order to get consistent information. Unfortunately, these vessels are not fishing in 2011. Most of the fishing was undertaken around $19^0$ and the best catches were between $17^0$ and $19^0$(Sofala Bank fishing ground). As it was found during experimental fishing (1976 to 1979) sharks were abundant in the area south of Inhambane.




Figures 6, 7,8 and 9 Catch, effort, catch rate by day and by hook for shark.

Table 1, summarizes all the information available.

**Table 1 Catches ( min and max), total effort (no days) and catch rates per day ( min and max).**

| Months | Vessels | Min Catch | Max Catch | Tot Effort (No days) | Min C.rate (Kg/day) | MaxC.rate (Kg/day) |
|---|---|---|---|---|---|---|
| April-Nov | Vessel 1 | 2113 | 5655 | 91 | 117.39 | 471.25 |
| April-Nov | Vessel 2 | 1398 | 10578 | 76 | 116.5 | 881.50 |
| April-Nov | Vessel 3 | 1659 | 8410 | 74 | 139.08 | 546.92 |
| April-Nov | Vesssel 4 | 850 | 8336 | 86 | 71.66 | 541.23 |

Twenty three species were observed during this observer trip, including 4 tuna species, 4 billfish species, 13 shark species, and 2 other species (Table 2). The dominant shark species were *Carcharhinus sorrah, Galeocerdo cuvier*, *Squalus megalops* and *Sphyrna lewini*. No sea birds, turtles and marine mammals were caught during the trip.

## 4. Recommendations

- On board sampling should continue in order to collect information on species composition and biological characteristics which is one of the big gap.
- Enforcement to fill logbooks should be carried out to get better quality on catch and effort data.

## 5. References

Mihara, T. , J. Donato- 1986 Guia para a captura e o aproveitamento artisanal do tubarão em Moçambique. Boletim de divulgação: 47 p.

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**Table 2 List of observed species in the Chinese longline observer trip during March-July 2010.**

| Category | Scientific name | Common name |
|---|---|---|
| **Sharks** | *Carcharhinus sorrah* | Spottail shark |
| | *Carcharhinus obscurus* | Dusky shark |
| | *Sphyrna zygaena* | Smooth hammerhead |
| | *Sphyrna mokarran* | Great hammerhead |
| | *Sphyrna lewini* | Scalloped hammerhead |
| | *Alopias superciliosus* | Bigeye thresher |
| | *Galeocerdo cuvier* | Tiger shark |
| | *Squalus acanthias* | |
| | *Squalus megalops* | Shortnose spurdog shark |
| | *Squalus mitsukurii* | Shortspine spurdog shark |
| | *Prionace glauca* | Blue shark |
| | *Heptranchias perlo* | Sharpnose sevengill shark |
| | *Isurus oxyrinchus* | Short fin mako |
| Billfish | *Istiophorus platypterus* | Sailfish |
| | *Tetrapturus audax* | Stripped marlin |
| | *Xiphias gladius* | Swordfish |
| | *Makaira indica* | Black marlin |
| | *Coryphaena hippurus* | Dolphinfish |
| | *Rachycentron canadum* | Cobia |
| Tuna | *Thunnus obesus* | Bigeye |
| | *Thunnus alalunga* | Albacore |
| | *Thunnus albacares* | Yellowfin |
| | *Thunnus tonggol* | Longtail |