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Sharks caught in Mozambican waters

Barbara Palha de Sousa

Instituto Nacional de Investigação Pesqueira
Av. Mao Tse Tung, 389, Maputo
Mozambique
e-mail: bsousa2@gmail.com

ABSTRACT

Mozambique has no national fleet for tuna and tuna like species so tuna (Thunnus albacares, Thunnus obesus and T.alalunga) are caught by foreign fleet. However since 2011 a national flagged longliner started fishing in Mozambican coast. Catch composition showed that sixty percent of the catch was made up shark and the main species caught were Prionace glauca, Isurus oxyrinchus, Carcharinus sorrah , Squalus asper and Carcharinus leucas. The best catches and catch rates were obtained in July and September.

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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**).**

During the experimental fishing for tuna (Simões, 1984) the shark species caught were *Carcharhinus melanopterus* e *Carcharhinus obscurus*.

Since 2008 an experimental fishing for gulper shark (*Centrophorus* spp.) and dogfish started in Mozambique using gill nets. During the beginning, fishing was carried out south of Save river but after three or four months they move to another fishing ground because these specimens are slow growing , late maturation and difficult to recover and the catch rates started to decline. In the first year, three vessels were fishing some months each one and from the second year onwards only two vessels were engaged in the fishery. (Palha de Sousa, 2009, Palha de Sousa, 2010**).** The sharks were caught exclusively for their liver, which forms about 25% of their body weight. The liver oil is rich in squalene and was exported.

According to the Master Plan (2010-2019) the potential catch for sharks was 17918 tons and the level of exploitation was considered low to moderate. However, it is important to point out that sharks are the target species in the gulper shark fishery and is caught as a by catch on deep water shrimp fishery and by tuna purse seiners and longliners foreign fleets (Table 1).

Table1. Estimated potential and catch estimate (tons) as well as the level of exploitation for important resources, which is given in the Fisheries. (Anon, 2010)

Resource	Potential (t)	Catch estimate(tons)	Level of Exploitation
Crustaceans			
Penaed shrimp	9240-10050	7500	Intense, overexploited
Sergestidae	2000-2800	2444	Intense
Deep water shrimp	2900-3100	1432	Moderate
Deep water lobster	0.5-8	4	Non target species
Deep water crayfish	150-400	100	Low to moderate
Deep water crab	250-400	73	Low
Shovel nose lobster	2800		Low
Mangrove crab	5700		Moderate to intense
Marine Fish			
Large demersals	29500	7338	
Large pelagics		6568	Moderate to intense
Sharks	5129-17918		Low
Small demersals	6100-12190	15875	Low
Small pelagics	55000-85.200	56000-65000	Low to moderate
Bottom fish	500	250	Low
Molluscs and others			
Sea cucumbers	750		Intense
Cephalopods	2000	773	Low
Algae	500		Low
Clams and other bivalves	2200	1000	Moderate to intense
Freshwater fish			
Kapenta (Cahora Bassa)	12000	12000	Intense
Other fish (Cahora Bassa)	15000	12000	Moderate
Utaka Nyassa lake)	2000	1000	Low
Ussipa Nyassa lake	5000	2000	Low to moderate
Other fishes Nyassa lake	1500	800	Low to moderate
Freshwater fishes	35500	27800	Low

The country does not have a tuna national fleet but since 2011, one national flagged longliner was licensed to fish on Mozambican coast swordfish and other species, but sharks were also caught. The covered area was from 17^0 00´S (Nampula province) to $19^0$30' (Sofala province) (Figure 1).

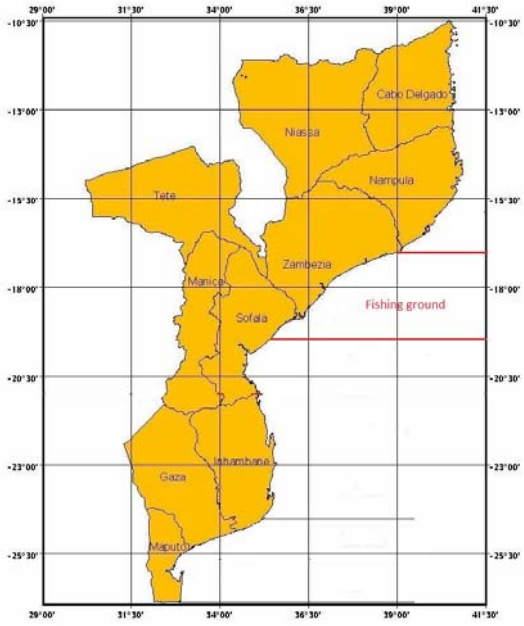


Figure1. Mozambique map showing main fishing ground.

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 an observer from the Fisheries Research Institute who was also allowed to collect data on board.

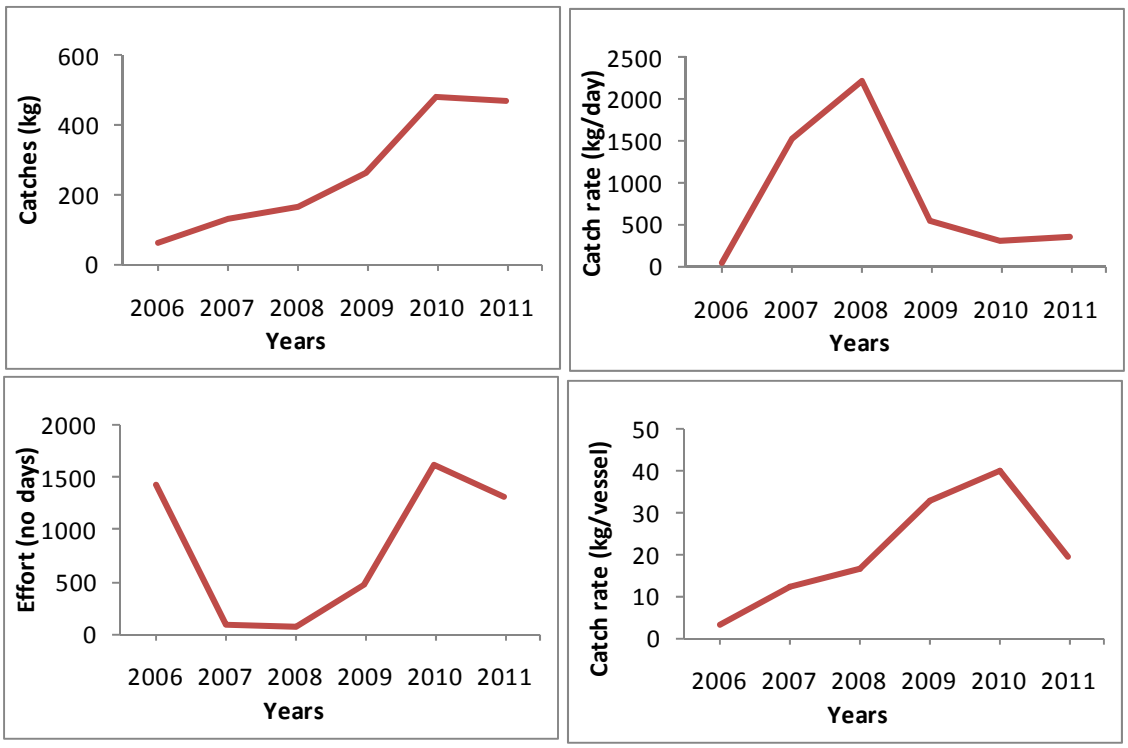
All the onboard data analyzed were collected by a single scientific observer onboard a national flagged longliner fishing in Mozambique since 2011.

Data production, logbooks and on board sampling sheets were organized in spreadsheets.

3. Results and Discussion

3.1. Catch and effort

Based on data production from 2006 to 2011 graphs were produced for total catch, total effort, catch rate by day and by vessel (Figures 2, 3, 4 and 5).



Figures 2, 3 4 and 5 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 2008 and increased again in the last two years. Probably these trends are related with the fishing target or other factors which might influence. However, an observer program should be carried out to explain these results. Catch rate (kg/day) ranged from 45 to 2224. The best catch rates were in 2007 and 2008. Catch rate (kg/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 Fisheries Administration regarding catch, effort and catch rate for the national flagged longliner some graphs were produced for shark. This longliner covered fishing grounds from 17^0 00´ to $19^0$30´, as shown in the map (Fig. 1). This vessel has 32.95 m overall length and 406.47 GRT.

3.2. Catch composition

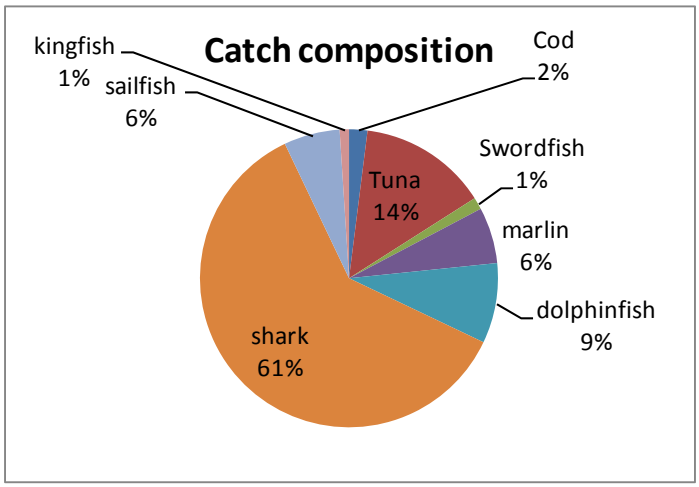
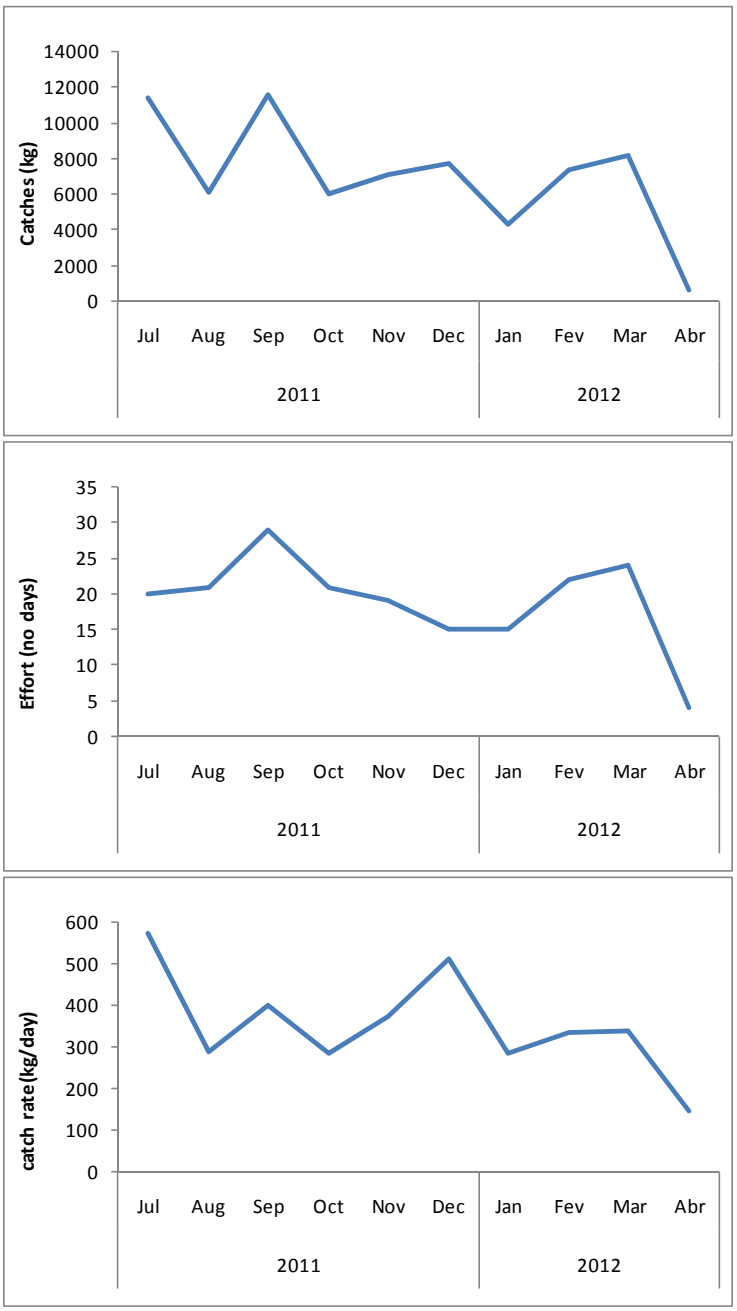


Figure 6. Catch composition of the national flagged longliner.

The catch composition was comprised by shark (61%) followed by tuna (14%), dolphinfish (9%), marlin (6%), sailfish (6%) and the remained percentage by other species. *Prionace glauca made up 16*% of sharks catch, while *Isurus oxyrinchus* accounted for 11%, followed by *Carcharhinus sorrah* (10%), *Squalus asper* (8%), *Carcharhinus leucas* (8%) and other species.

Shark catches ranged from 600 to 11600 kg (Figure 7). Catch rate (kg/day) varied from 147 to 570 (Figure 9). It looks like the best catches and catch rates were in July and September, but more data needs to be collected in the future in order to get consistent information. Most of the fishing was undertaken around 19^0 and the best catches were between 17^0 and 19^0. Same fishing area was used by Chinese longliners in 2010.



Figures 7,8 and 9 Catch, effort, catch rate by day for shark caught by national flagged longliner.

Nineteen species were observed during this observer trip, including 3 tuna species, 4 billfish species, 9 shark species, and 3 other species (Table 2). The dominant shark species were *Prionace glauca* , *Isurus oxyrinchus Carcharhinus sorrah,* , *Squalus asper* and *Carcharhinus leucas.*

3.3. Depredation

Most of the damaged species were swordfish and bigeye and predator species was shark.

3.4. Incidental catches of seabirds, turtles and marine mammals

During the trip 3 seagulls and 2 kites were caught on the longline. Regarding incidental catches of turtles one specimen of *Lepidochelys olivacea* with 34 cm was captured.

4. Recommendations

- Observer program should be carried out in foreign fleet in order to collect information regarding logbooks, on species composition and biological characteristics in the EEZ.
- Observer program should continue on national flagged vessel.

5. References

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Palha de Sousa, B. 2009 Relatório sobre pesca experimental com rede de emalhar.

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Anon, 2010. Master Plan (2010-2019) of the Ministry of Fisheries. Ministry of Fisheries, Maputo, 43p.

Table 2 List of observed species in the national flagged longliner observer trip during 2012.

Category	Scientific name	Common name
Sharks	*Carcharhinus sorrah*	
	Carcharhinus leucas	
	Sphyrna zygaena	
	Hexanchus criseus	
	Hexanchus vitatus	
	Galeocerdo cuvier	
	Squalus asper	
	Prionace glauca	Blue shark
	Lepidocybium flavobrunneum	Escolar
	Isurus oxyrinchus	*Shortfin mako*
	Makaira indica	Black marlin
Billfish	*Istiophorus platypterus*	Sailfish
	Tetrapturus audax	Striped marlin
	Xiphias gladius	Swordfish
	Coryphaena hippurus	Dolphinfish
	Rachycentron canadum	Cobia
Tuna	*Thunnus obesus*	Bigeye
	Thunnus alalunga	Albacore
	Thunnus albacares	Yellowfin