IOTC-2016-WPTT18-12
Received: 20 October 2016

An Overview of the tropical tuna catches by Mauritian Semi-Industrial Longliners

A. Sheik Mamode, T. Sooklall and M. Curpen-Mahadoo

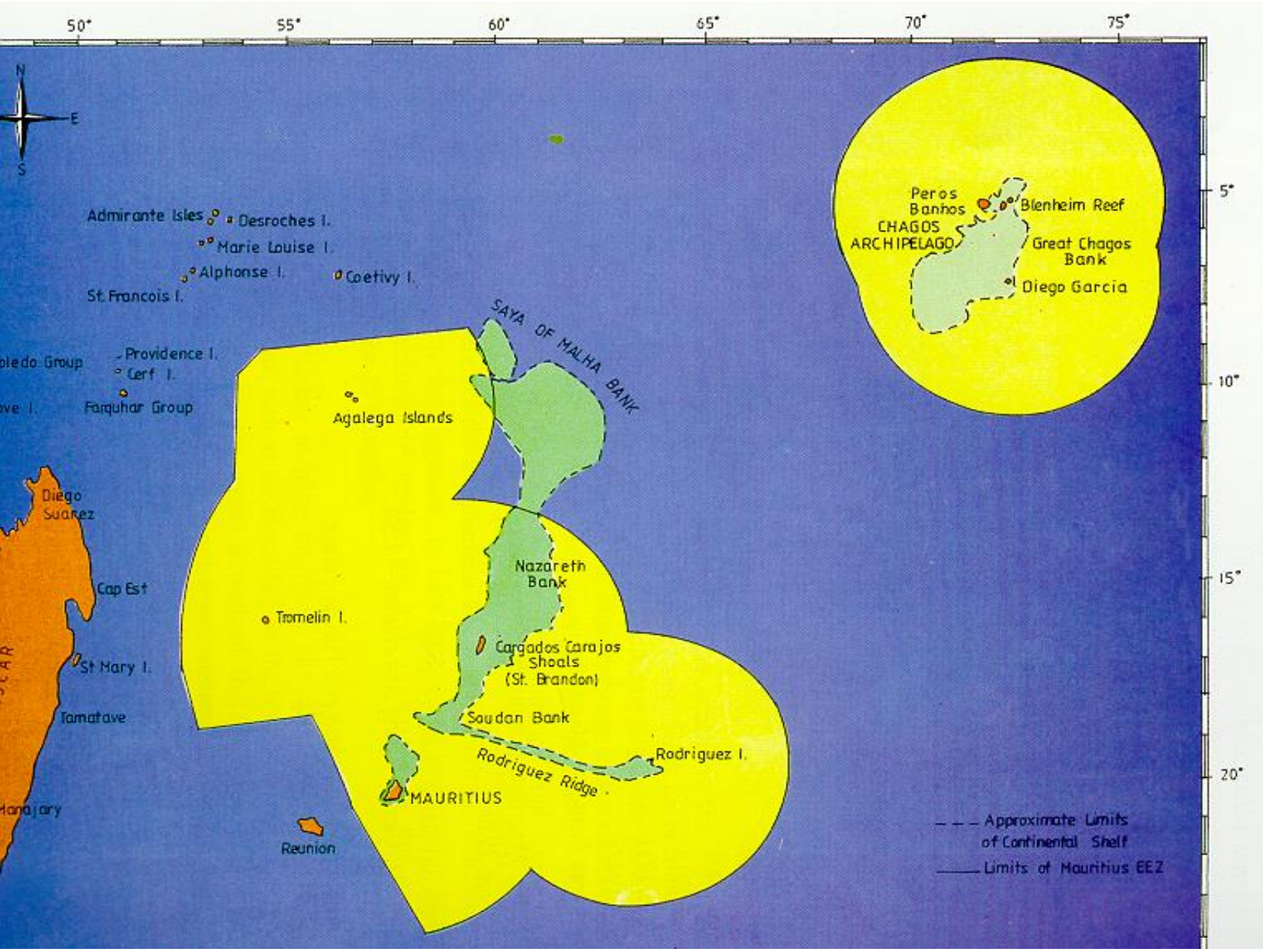
Albion Fisheries Research Centre - Mauritius

Abstract

This paper provides an overview of the tropical tuna fisheries as recorded by Mauritius, for the national semi-industrial vessels that were licensed to fish in the Mauritius EEZ The semi-industrial longliners consist of vessels less than 24m that operate inside the EEZ (Exclusive Economic Zone) of Mauritius. These vessels target swordfish but tropical tunas are also obtained during the fishing operations. The range of areas that are covered by the fishing operation of the semi industrial longliners extended from latitudes 09°S-20°S and longitudes 55°E -62°E. A total of 5 longliners were in operation in 2015 with a total catch of 102.9 tonnes out of which 27.4 % consisted of yellowfin tuna and 12.91% was bigeye. The annual trend for the period of 2012-2015 shows that the levels of yellowfin tuna were higher compared to bigeye tuna except for the year 2013 where bigeye catches were higher with a percentage difference of 34.5%. The fork lengths of a total of 1558 yellowfin tuna were measured during unloading of the catch at port. The lengths of total number of yellowfin sampled during the 2012-2015 period ranged from 63 -174 cm, with an average fork length of 119.1 cm. The percentage of mature fish varied between 91-97% in the catch of yellowfin sampled. A total of 1159 bigeye tuna were sampled during the four year period and the fork length distribution tuna was in the range 75-177cm with an average fork length of 118.0 cm

1. Introduction

Due to its ideal geographical position, conducive port infrastructures and dry-docking facilities Mauritius is a regional hub for maritime traffic. Tuna fishing longliners regularly call at the Port Louis harbour with an approximate of over 600 calls yearly for unloading and transhipment of tuna. A small number of purse seiners also call at Port Louis for different activities such as unloading, dry docking and repairs. Tuna fishing in the waters of Mauritius are mainly practiced by foreign longliners and purse-seiners operating against payment of a licence fee. A number of foreign fishing vessels are authorized to fish in the EEZ of Mauritius under Fishing Agreements. The Mauritian vessels targeting tuna and tuna like species are mainly purse seiners and longliners. A few artisanal pirogues are involved in fishing on anchored FADs around the island. . In 2015 the tuna fleet consisted of two purse seiners of 2667 GT, 5 purse seiners 678 GT and 5 semi-industrial longliners of less than 24M in length. The purse seiners operated mainly on the high seas and in third party waters with occasional incursions inside the EEZ. The catch of these purse seiners consisted mainly of yellowfin tuna (Thunnus albacares), skipjack tuna (Katsuwonus pelamis) and bigeye tuna (Thunnus obesus). On the other hand the local semi-industrial longliners operated only within the EEZ of Mauritius targeting mainly swordfish (Xiphias gladius). They also land tuna species. This paper discusses mainly the tropical tuna catch of these local semi-industrial longliners for the last four years.



The EEZ of Mauritius

2. The semi-industrial fleet.

The semi industrial fleet comprises of boat less than 24 metres in length with overall length in the range 13.50-22.80 meters that carry out short fishingl trips with a duration of 5-10 days. These boats have onboard engines and their gross tonnage is in the range 32-97.4 tonnes. The fish holding capacity of the semi industrial longliners varies in the range of 5-25 tonnes. Table 1 summarises the vessels characteristics of the semi industrial fleet for the period 2012-2015.

Year	Gear	Number of vessels	Number of fishing days	GT	LOA (m)
2012	Surface longline	5	238	38.4-90.4	13.50-22.80
2013	Surface longline	3	196	38.4-90.4	13.50-22.80
2014	Surface longline	3	131	38.4-90.4	13.50-22.80
2015	Surface longline	5	191	32-97.4	13.50-22.80

Table1: Semi-industrial longline fleet

3. Catch composition of the Semi industrial Longliners

Swordfish forms the major part of the catch the semi industrial longline fleet as it is the target species of the fishery. From 2012 to 2015, on average, swordfish accounted for 43% out of the total catches followed by tuna species such as yellowfin tuna (22%), bigeye tuna (15%) and albacore tuna (11%). The by-catch in this fishery consists mainly of billfishes (marlins and sailfish) -about 4% of the total catch and shark (short fin mako) make up about 1% of the catch. The main species of marlin included mostly blue marlin followed by striped marlin.

Other by-catch species comprises of dolphin fish, oilfish and wahoo which make up a small proportion (4%) of the total species composition as shown in **figure 1.**

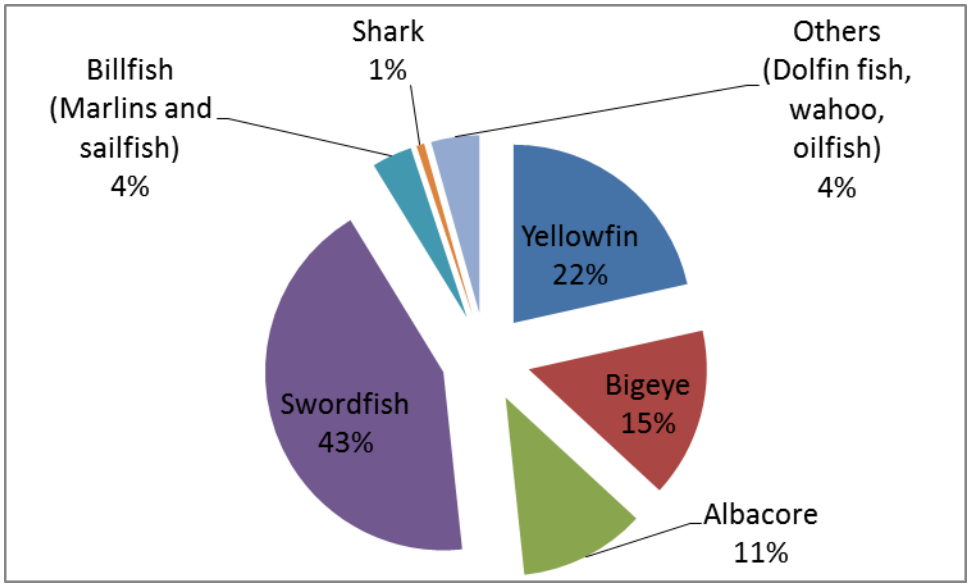


Figure 1: Average catch composition of the Mauritian semi industrial longliners during a period of 2012 – 2015

4. Annual catches of tropical tuna species the semi-industrial longliners

The tropical tuna species caught by the semi-industrial longline fleet comprises mainly of yellowfin and bigeye tuna. In 2015 the annual catches for yellowfin was the highest with a catch of 28.27 tons landed by the five fishing vessels and the lowest catch recorded was in 2012 with 5.60 tonnes. The catch levels for yellowfin tuna has remained constant (11.27 tonnes) for the years 2013 and 2014.

The highest bigeye catch were observed in the year 2013 with around 17.19 tonnes as compared to 2012 with the lowest catch (3 tonnes) of bigeye recorded so far. **Figure 2** shows the predominance of the yellowfin catch over bigeye catch except for the year 2013 where bigeye catches was higher with a percentage difference of 34.45%. This explains the large sample size (n= 603) of bigeye measured in 2013 as shown in Figure 9.

The low catches in yellowfin and bigeye in 2012 is mainly attributed to a low fishing effort with a CPUE of 0.2 kg/hook (**Figure 3).**

Figure 2:**Annual catches of yellowfin tuna and bigeye tuna from the Mauritius flagged semi industrial longline fleet**

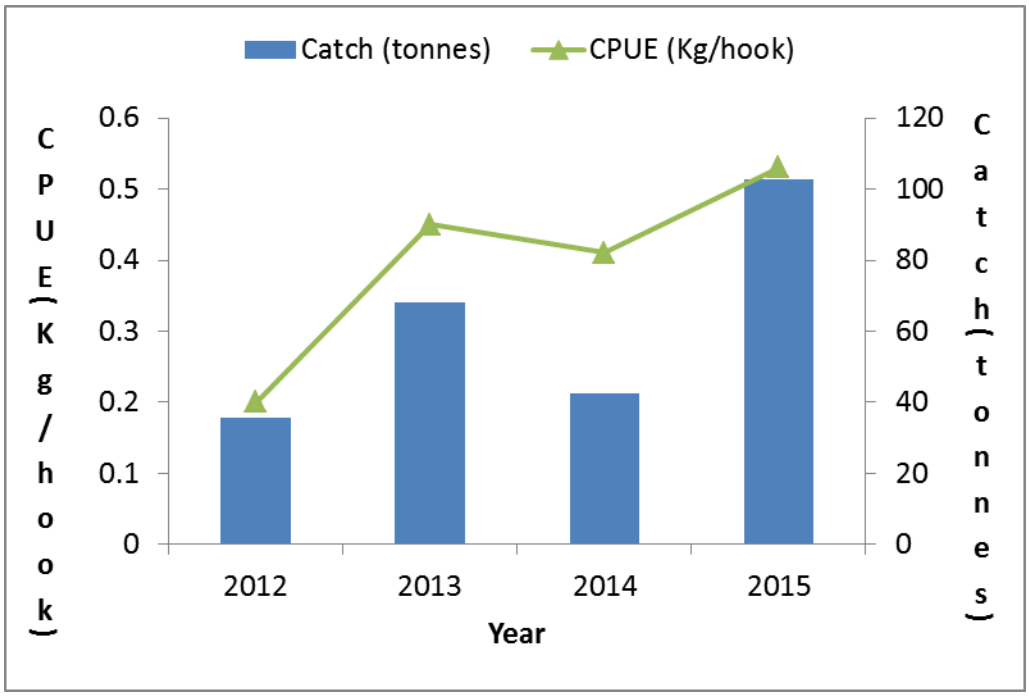


Figure 3: Catch per unit effort for the Mauritius flagged semi industrial longliners

5. Spatial distribution

The fishing operations were carried out inside the Mauritius EEZ within latitudes 15°S-20°S and longitudes 55°E -61°E for the year 2015. The fishing zones of the vessels for the 4 year period were spread between latitude 9°-20° S and longitudes 55°-62° E as shown in Figure 4 and 5 .

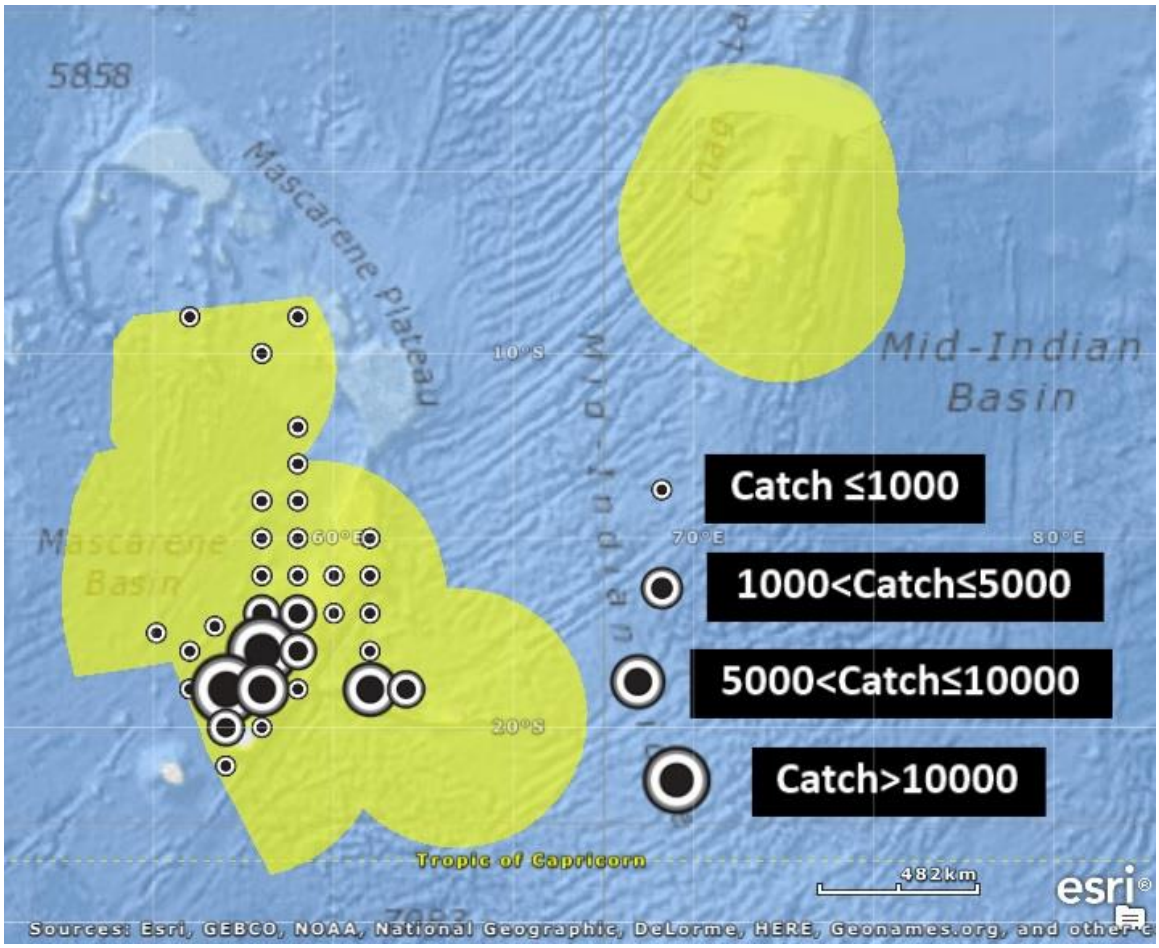


Figure 4: Spacial distribution of Yellowfin tuna (catches in the legend are in kg)

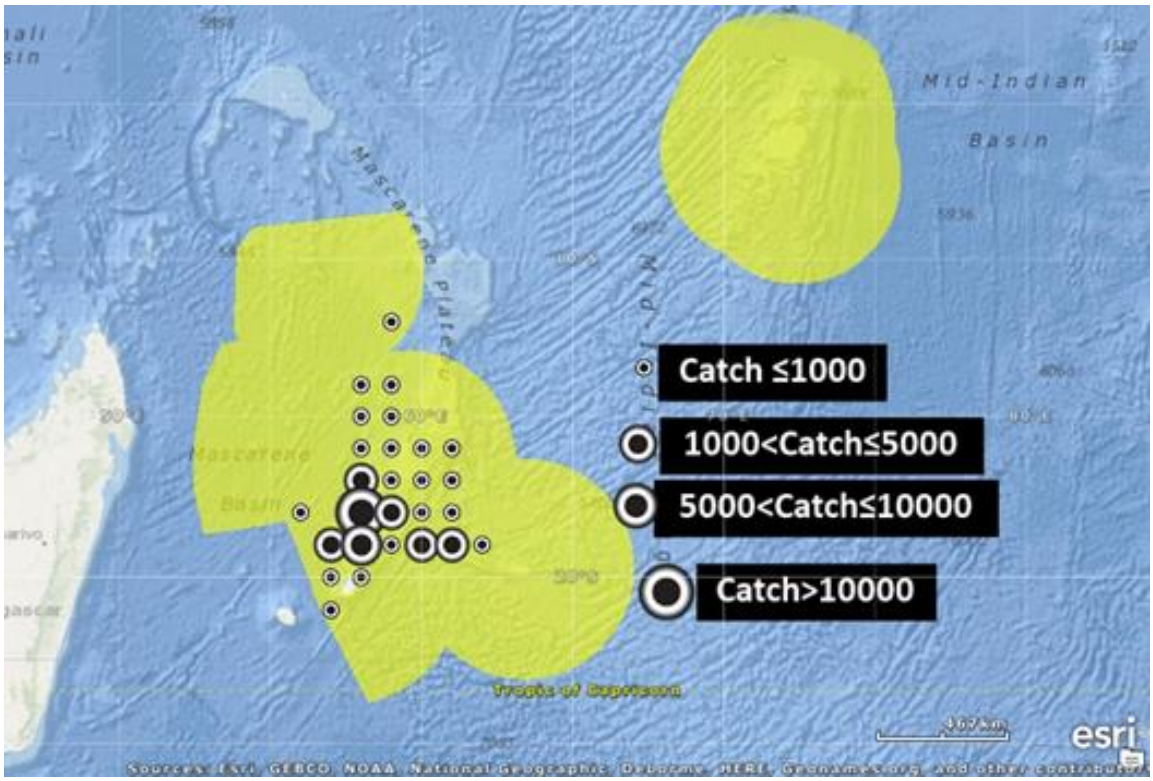


Figure 5: Spacial distribution of Bigeye tuna (catches in the legend are in kg)

6. Seasonal Patterns for local longliners fishing in the Mauritius EEZ

The average monthly catch of local longliners for the last four years is shown in fig. 6. It is observed that there is a peak in yellowfin in August and bigeye peaks in the month of May. Catch rates are lowest during the winter months of June-July for both species.

Catches of yellowfin tuna are higher as compared to bigeye tuna except for the months May and October.

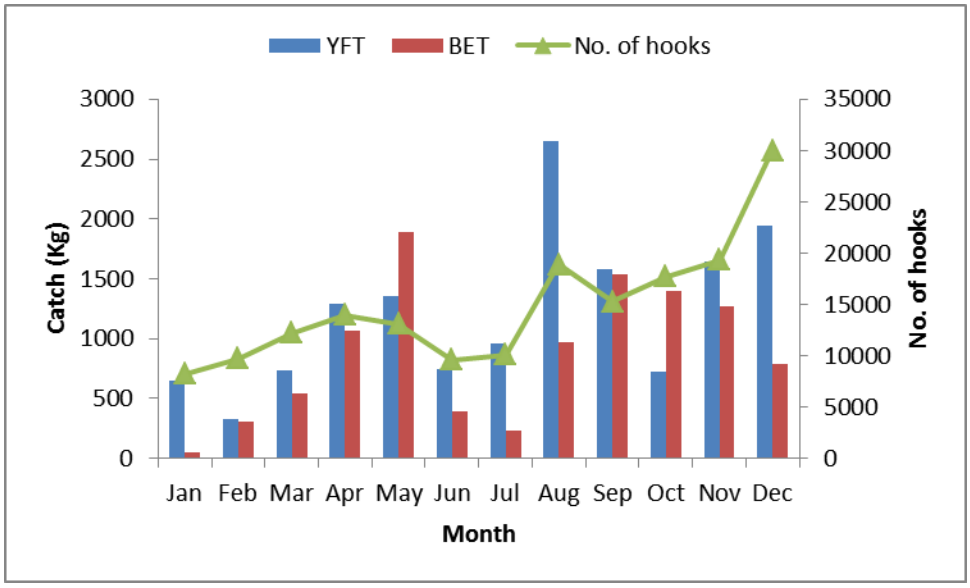


Figure 6: Average monthly catches of yellowfin tuna and bigeye tuna and effort for the period 2012-2015

7. Mean weight of yellowfin tuna.

The weight of 1558 yellowfin tuna was measured during the period 2012-2015. The mean weight depicted in figure 7 is the gilled/gutted weight as the yellowfin tuna is already gilled and gutted onboard the vessel during the fishing campaign. The mean weight of the yellowfin varied between 18kg and 32kg. It can be seen from figure 7 that the average weight of yellowfin is decreasing as from February to reach its lowest level (18kg) in June. The figure below gives an indication of the presence of large yellowfin in the catch obtained during the summer season.

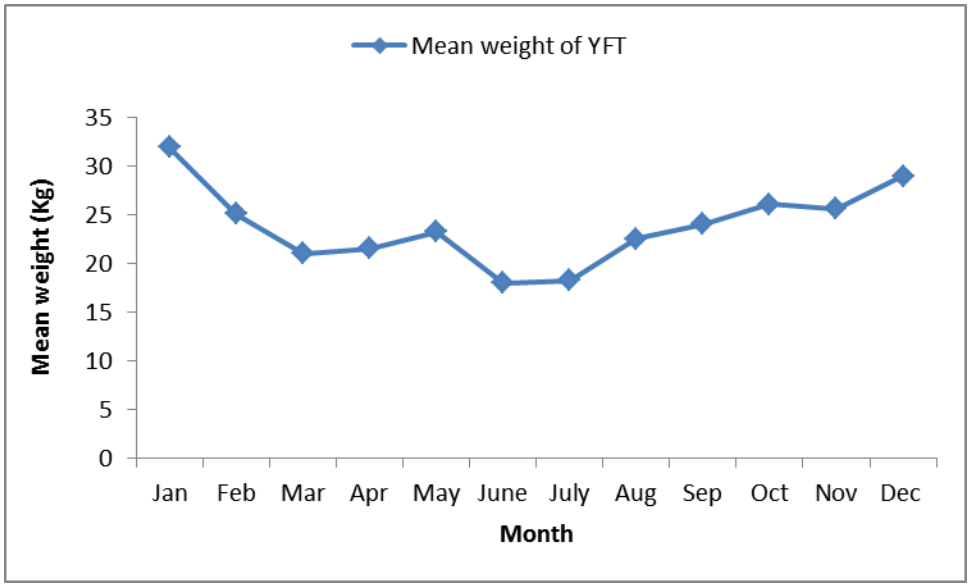


Figure 7: Mean weight of yellowfin tuna sampled for the period 2012-2015

8. Size composition

(i) Yellowfin tuna.

A total of 1558 yellowfin tuna was sampled for length using a caliper at the port during unloading. Figure 8 shows the length frequency distribution of fork length for yellowfin sampled from the semi industrial longliners for the period 2012-2015. In this 4 year period, fork length of yellowfin tuna ranged in size from 63 -174 cm, with an average fork length of 119.1 cm.

There is not much considerable variability in the distributions from year to year. The fork length of the yellowfin tuna measured in 2012 was in the range 82-171cm with a mode at 119 cm. 96% of the distribution was greater than 100 cm and thus can be considered as matured based on the work of Zhu et al (2008) which estimated size of yellowfin tuna at first maturity to be 100 cm in the Western Indian Ocean. The 2013 distribution varied between 82-168 cm consisting of two prominent modes with peaks at 115 cm and 118 cm. In 2014 the fish sampled ranged from 76-168 cm with 91% of the fish measuring more than 100 cm. The distribution showed three modes with peaks at 115cm, 118 cm and 123 cm. The percentage of matured yellowfin reached 97%. The sample size for 2015 was highest with a total of 732 fish and the distribution was in the range of 63-174cm. There was one mode was at 115 cm and 93% of the distribution consisted of matured yellowfin.

.

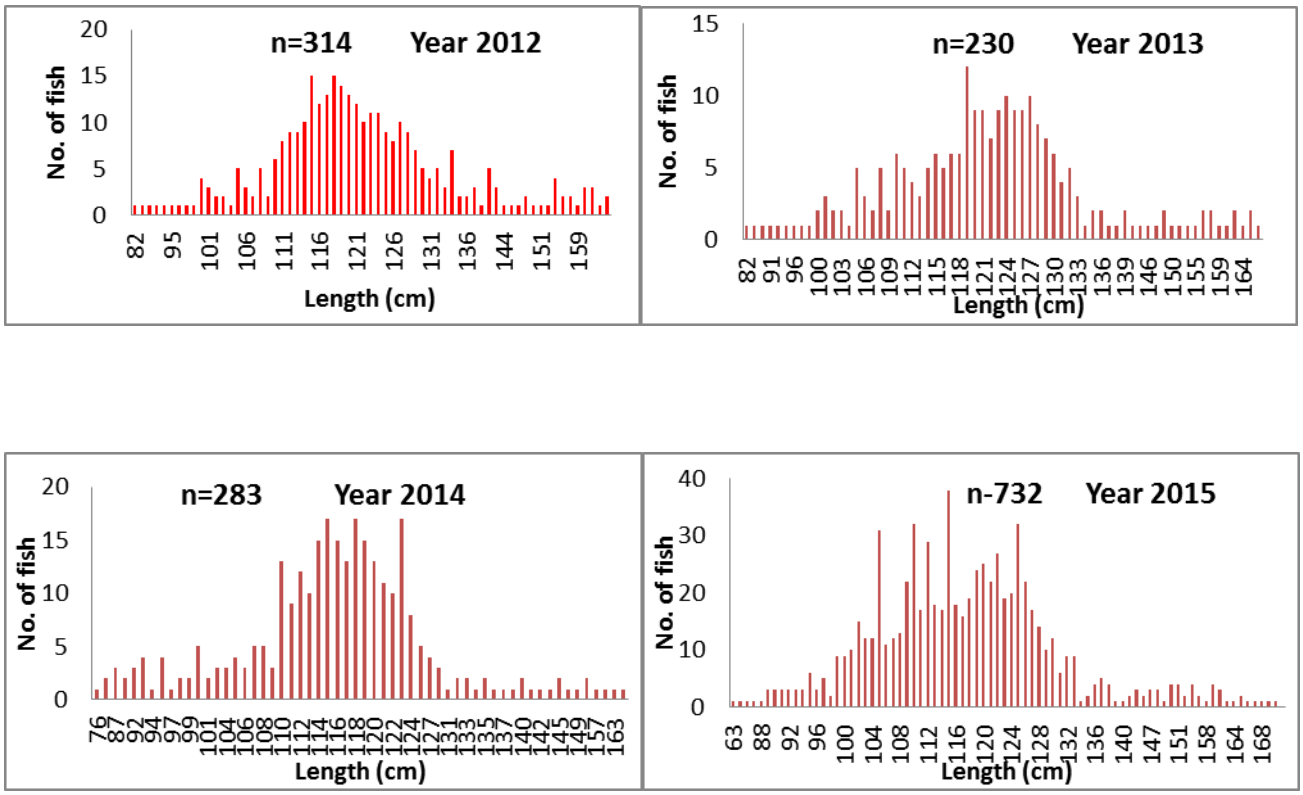


Figure 8: Length frequency distribution for yellowfin tuna for the year 2012- 2015

(ii) Bigeye tuna

The fork lengths of the bigeye tuna landed from the semi industrial longliners were measured and a total of 1159 fish were measured during the four year period. Figure 9 show the length frequency distribution of fork length, by year, for bigeye tuna sampled from semi industrial vessels in the 2012–2015 period. In this 4 year period, fork length of bigeye tuna ranged in size from 75 -177 cm, with an average fork length of 118.04 cm.

For the year 2012, fish sampled ranged in size from 82-173 cm with two modes at 115 cm and 120 cm and an average fork length of 116.27cm. Around 65 % of the fish were in the 100-125 cm range. The FL distribution for 2013 was in the range 80-166 cm with one dominant mode at 130 cm. The sizes of the fish sampled in 2014 were between 77 cm and 154cm showing a mode at 111 cm. The length frequency distribution for 2015 was in the range 75-177cm with one mode peaking at 115 cm.

The mean fork lengths for the 2014 and 2015 distributions were not much different with a value of 113.52 cm and 114.86 cm respectively. The highest mean fork length was recorded for the year 2013 with a value of 120.83cm.

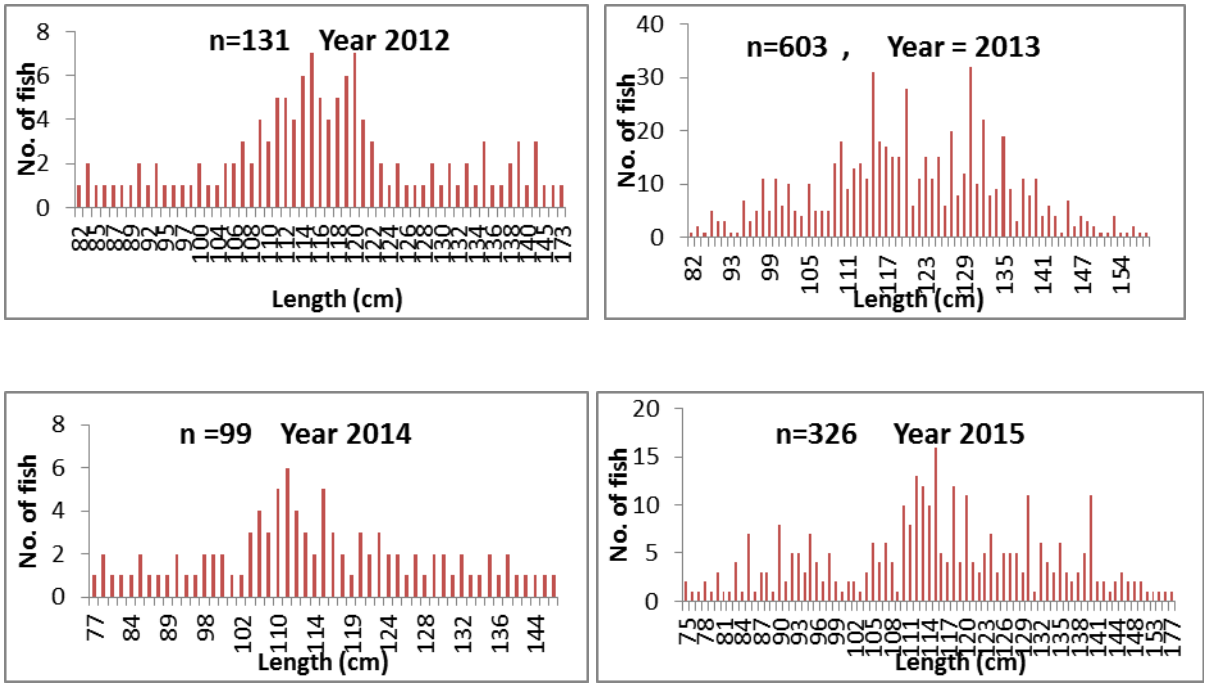


Figure 9: Length frequency distribution for bigeye tuna for the year 2012- 2015

Reference

Zhu G, Xu L, Zhou Y, Song L (2008) Reproductive biology of yellowfin tuna T albacares on the west-central Indian Ocean. Journal of Ocean University of China(English Edition) 7:327-332