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Up-date on the Seychelles' semi-industrial and industrial longline fisheries, focusing on billfishes

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Abstract

The local pelagic long line fishery targeting swordfish started in the Seychelles in 1995 and expanded rapidly until 2001, and thereafter experiencing declines in 2002, 2003 and 2004. Over the past 6 years an increase in activity was recorded in this fishery. From only 4 vessels active in 2004, there were 9 active vessels in both 2009 and 2010. Fishing effort also increase significantly, reaching similar level (over 500,000 hooks deployed) recorded in the late 1990's. A total of 506,334 hooks were deployed in 2010 for a total catch of 295 tonnes. This represents a decline of 10% in total catch even though there was an increase of 5% in fishing effort compared to the previous year. Swordfish (Xiphias gladius) catches in weight represents 52% of the catch with other billfishes marlin and sailfish making up 2% each. The overall CPUE recorded for this fishery has been on a downward trend over the past 3 years, from 1.29Mt/1000 Hks in 2007 to 0.58 Mt/1000Hks in 2010. The annual swordfish CPUE also shows a decreasing trend from 0.58 Mt/1000hooks in 2005 to 0.37 Mt/1000hooks in 2010.

For the Seychelles industrial longline fishery, the fishing effort in terms of hooks deployed and number of fishing days has remained more or less stable for the past 4 years at around 20 million hooks deployed per year and 6000 fishing days, except for a slight drop in 2008. The total catch reported by this fleet in 2009 is estimated at 7,930 Mt obtained from a fishing effort of about 18 million hooks. Following a peak of 0.69 Mt/1000 hooks in 2005, the CPUE of the Seychelles' industrial longline fleet dropped to 0.47Mt/1000 and remained more or less constant at that level between 2006 and 2008. In 2009, the CPUE decrease slightly to 0.41Mt/1000 hooks. The CPUE for billfishes (swordfish, marlin and sailfish has remained more or less stable for the past 4 years.

1. Introduction

The Seychelles billfish report summarizes the status of Seychelles longline fisheries (semi industrial and industrial), where swordfish and tuna are the targeted species. For the semi-industrial fishery, the data have been raised to take into consideration missing logbooks and landings data have been raised to round weights. The industrial longline figures are based solely on

logbook data (i.e. the skipper's declarations) and the data have not been raised to cater for missing logbooks.

2. Semi Industrial Longline Fishery

2.1. Overview

The Seychelles semi-industrial fishery is a relatively new fishery dating back to 1995. This fishery is operated solely by Seychellois fishers employing the monofilament longline fishing technique to target swordfish (*Xiphias gladius*), yellowfin (*Thunnus albacores)* and bigeye tuna *(Thunnus obesus)*. From the onset of this fishery a monitoring and data collection program was set up by SFA to closely monitor the development of this fishery. Data collection include logbook data, landing data from fish processors and biometric data collected via port sampling programme. Mandatory statistics for this fishery are submitted to the IOTC secretariat annually.

The number of vessel in the fishery increased gradually to peak at 12 vessels in 2002. Since 2006, there are 9 registered semi industrial fishing vessels. The number of active vessel has followed a similar trend, with a peak of 12 active vessels in 2002 to only 4 in 2004. In both 2009 and 2010 there were 9 active semi industrial vessels.

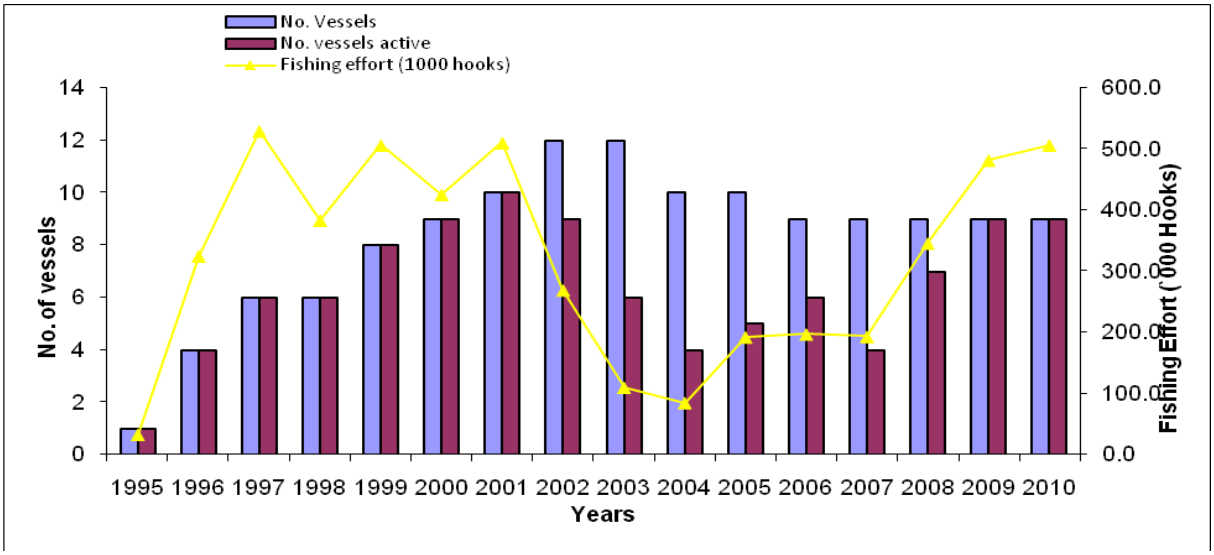


Figure 2.1. Number of vessels active and fishing effort of semi industrial fishery, 2006- 2010

Logbook coverage and landing data has improved significantly from 2006 to 2010 compared to the preceding five years (Table 2.1). Low coverage corresponded with fishing efforts directed towards

sharks and non-reporting of such activity by skippers. The number of trip sampled for biometric information has however declined significantly over the last 5 years due to skippers not informing the SFA of their entry into port plus unloading which take place at dawn (outside normal working hours).

Table 2.1. Level of coverage for the semi Industrial fishery, 2006- 2010

Year	N0. of trips	Logbook received (%)	Landing received (%)	% of trip sampled
2006	41	98	100	12
2007	40	100	100	20
2008	71	90	100	18
2009	113	96	97	18
2010	107	99	100	16

2.2. Fishing effort

A slight increase was reported in the number of trips conducted in 2010 (from 107 in 2009 to 113). In terms of fishing effort (number of hooks) deployed over the past five years, there was a slight drop between 2006 and 2007. However, from 2007 onwards the fishing effort increased significantly by 80% from 192,271 hooks in 2007 to 345,237 hooks in 2008. This coincides with the increase in the number of active semi-industrial fishing vessels. This increase in activity is partly due a revision of the fuel incentive scheme whereby vessels landing in excess of 15% shark (weight), do not qualify for fuel concessions. Consequently, more effort was diverted towards targeting swordfish and tunas. Fishing effort further increased by 40% and 5% in 2009 (481,668 hooks) and 2010 (506,334 hooks) respectively compared to the previous years (Figure 2.1).

The fishing effort deployed per set (figure 2.2) show a decreasing trend from about 850 hooks in 1996 to reach around 450 hooks during the 2000 – 2001 period. An increasing trend was then observed from 2002 to 2004 with between 600 and 700 hooks deployed per set, which coincided with the arrival of two larger vessels (LOA 23m compared to vessels averaging 10 – 16m LOA already in the fishery). Over the past 2 years, semi industrial vessels have been deploying between 500 – 600 hooks per set.

The monthly fishing effort still shows the historical slight increase in fishing effort from March to May and the drop between June and August. The higher number of hooks deployed per set for the first two month of the year is a new occurrence.

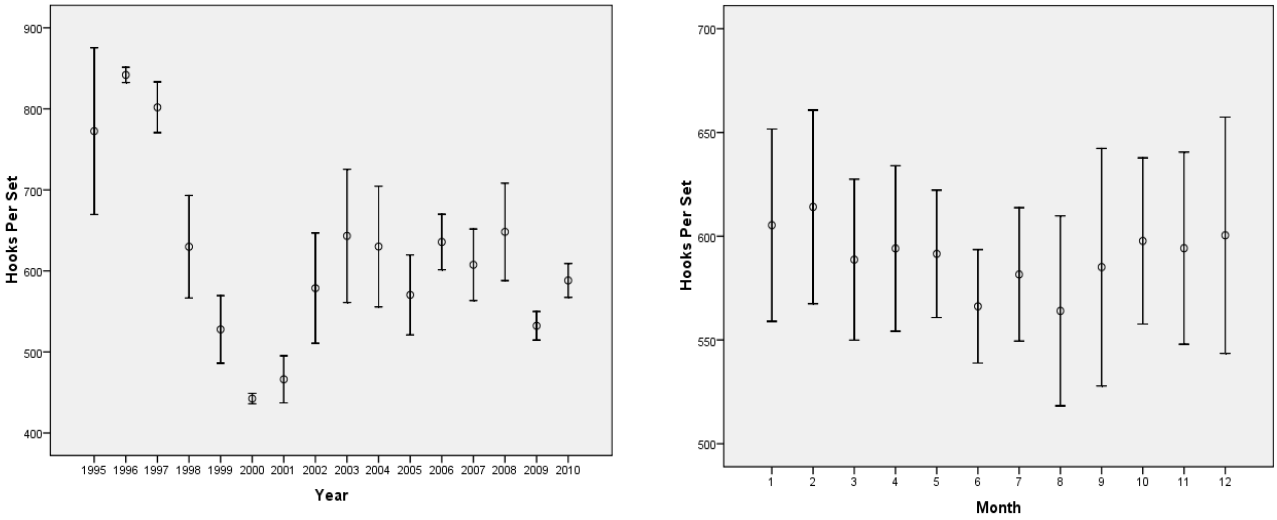


Figure 2.2. Evolution of the fishing effort (number of hooks) deployed by year (left) and by month (right)

2.3. Total Catch and Catch rates

Over the past five years the total catch reported by the semi industrial fishery fluctuated from year to year, with the highest catch of 329 Mt recorded in 2009 and the lowest of 233 Mt recorded both in 2006 and 2008. In 2010, the total reported catch of the semi industrial fleet stands at 295 Mt, representing a 10% decline from the preceding year (Table 2.2), even though the fishing effort increased by 5% in that year.

Table 2.2. Catches by species for the of semi industrial fishery, 2006- 2010

Year	SWO	YFT	BET	SFA	MAR	SHK	OTH	Total Catch ((Mt)
2006	108	40	48	3	2	31	0	233
2007	111	70	55	3	2	5	3	249
2008	98	44	59	7	3	22	1	233
2009	170	68	59	15	5	12	1	329
2010	186	58	26	5	12	6	2	295

This fishery has been experiencing a decline in Catch Per Unit Effort (Mt/1000 hook) since 2007. CPUE's ≥ 1Mt/1000 hooks (≥ 1kg/hooks) reported during 2006 and 2007 dropped down to 0.68 Mt/1000 hooks (0.68kg/hooks) in both 2008 and 2009 and further decline to 0.58 Mt/1000 hooks (0.58kg/hooks) in 2010 (figure 2.3). The 2010 recorded CPUE is the lowest annual CPUE recorded since the beginning of this fishery. The trend in monthly CPUE (figure 2.4) show the decline since August 2007.

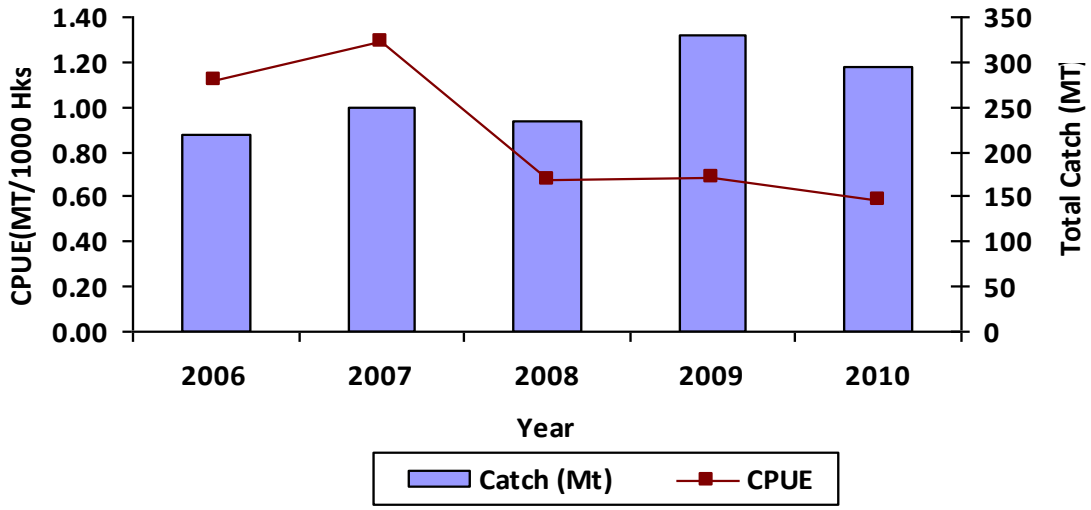


Figure 2.3. Catch and catch rate of semi industrial fishery, 2006- 2010

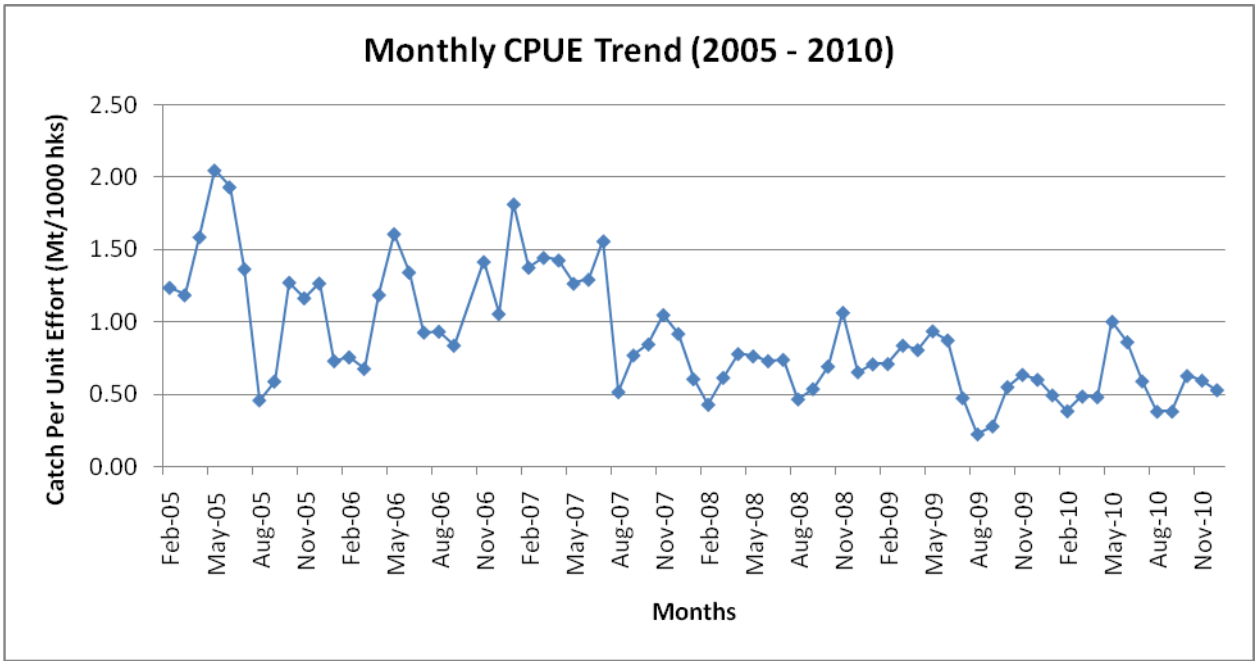


Figure 2.4. Monthly CPUE trend from 2005- 2010

2.4. Species composition

The average species composition of the total catch reported over the last 10 years is shown in figure 2.3. Swordfish, the targeted species dominated the catch making 52% of the total catch, followed by tuna (yellowfin and bigeye) with 33%. Other billfishes, marlin and sailfish each make on average 2% of the total catch. The proportion of shark in the catch has been on decline over the past 3 years. However it should be pointed out that under-reporting (particularly of sharks) has always been a problem in this fishery.

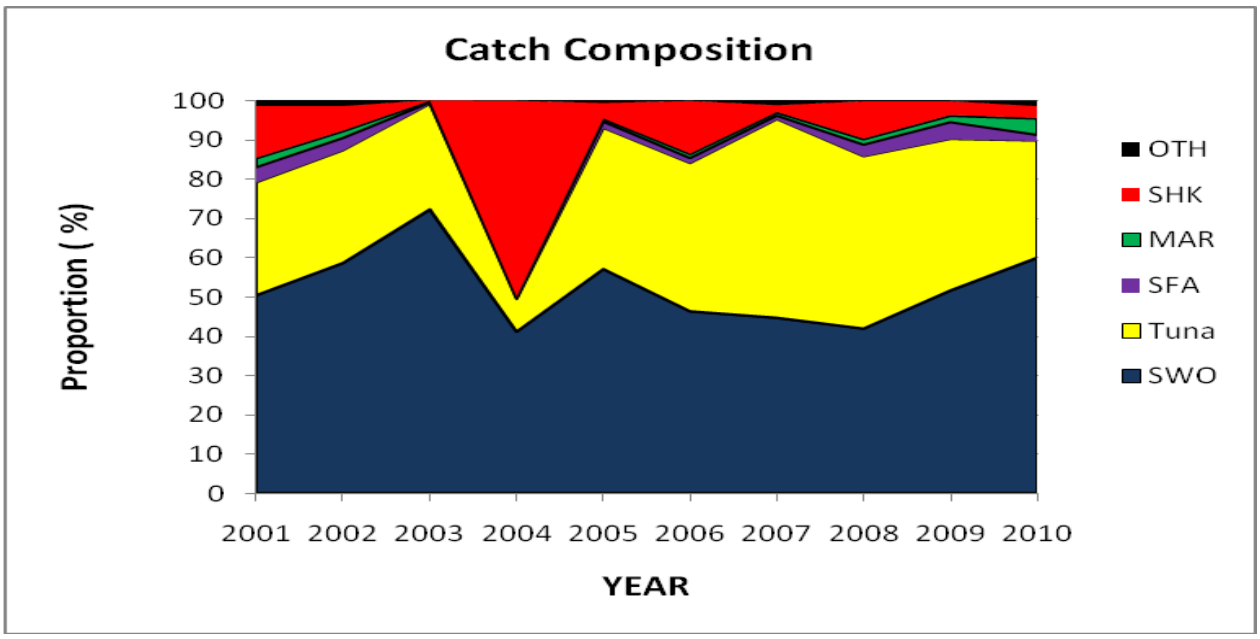
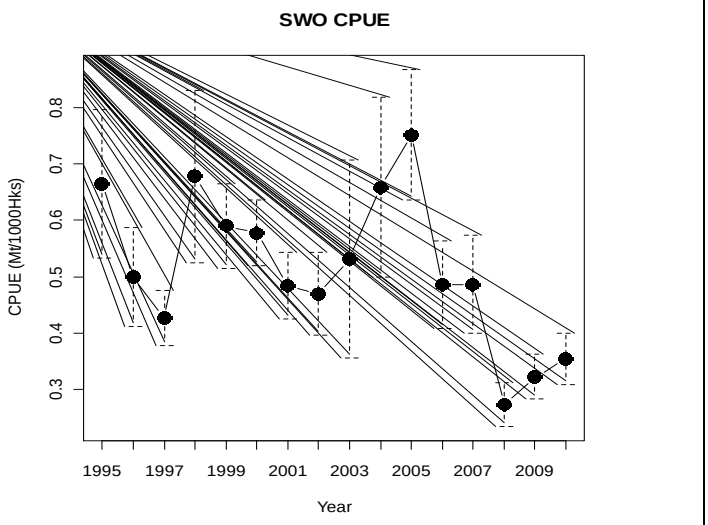


Figure 2.5. Average Species composition of semi Industrial catches for the 2001- 2010 period.

The overall annual CPUE trend which was on the increase between 2004 and 2007 has since declined steadily (figure 2.3). Similarly, the CPUE for swordfish is also showing a decline, from 0.76 Mt/1000 hooks in 2005 to 0.35 Mt/1000 hooks in 2010 (figure 2.6 left).

For the other billfishes, sailfish recorded a sharp drop in CPUE in 2010 from 0.027 Mt/1000 hooks to only 0.010 Mt/1000 hooks, while marlin (all species combined) CPUE has been on an increase since 2008. The reported CPUE for tuna (yellowfin and bigeye combined) declined from a peak of 0.62Mt/1000hooks in 2007 to 0.16 Mt/1000 hooks in 2010 (figure 2.7 right). The CPUE for shark has been more or less stable over recent years after the sharp spike (increase) in 2004.



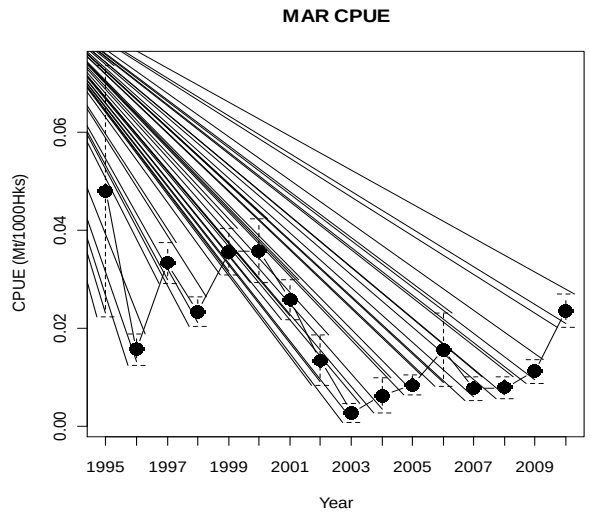
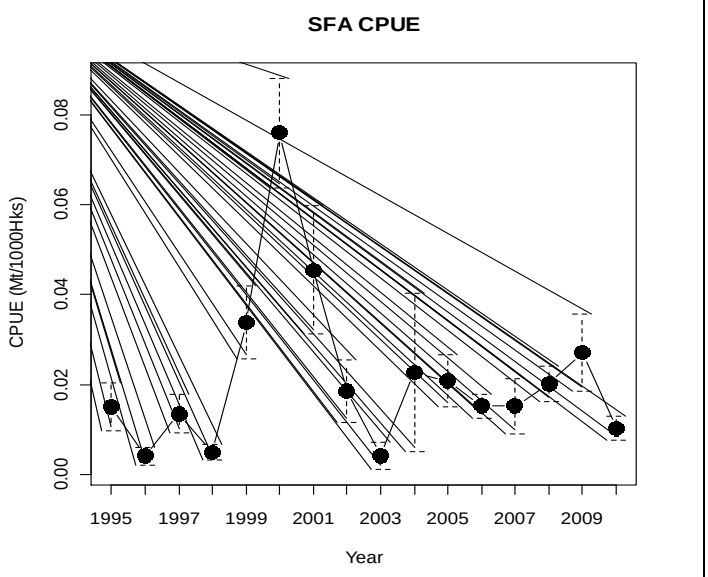


Figure 2.6.CPUE trends by species, swordfish (left) and marlin (right).



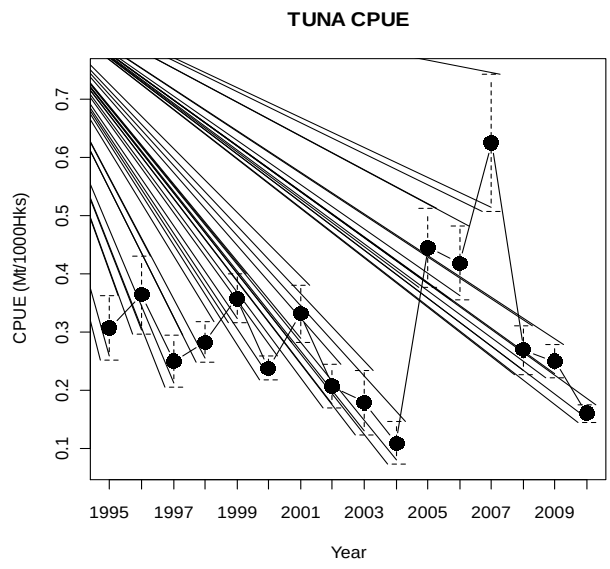
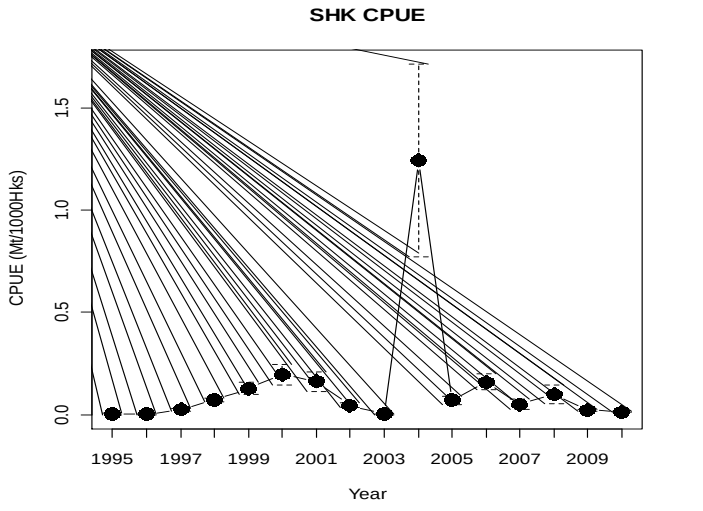


Figure 2.7. CPUE trends by species, sailfish (left) and tuna (right).



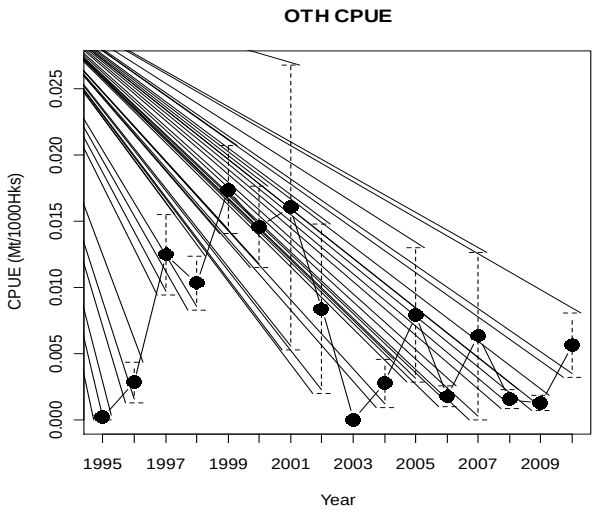
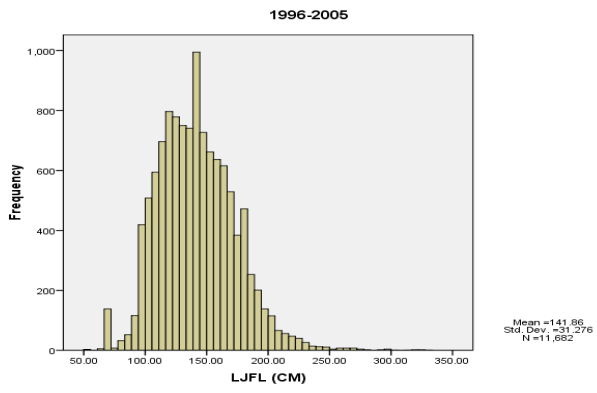
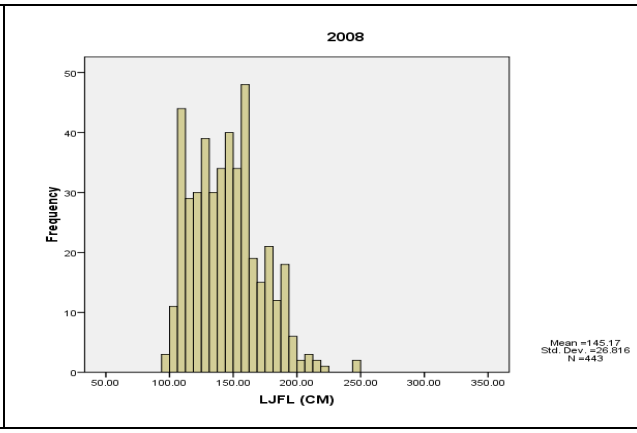


Figure 2.8. CPUE trends by species, sharks (left) and Other species (right).

2.3. Length Frequency

The monitoring of size frequencies through port sampling has been in place since the beginning of this fishery. Analysis of size frequency were realised from Pectoral Anal Length (PAL), which were then converted to LJFL (Lower Jaw Fork Length) using conversion factors obtained from **Poisson *et al*.** (1998). Size class are in centimetres. Swordfish size frequency distributions from 1996 – 2005 combined and for the last 5 years are presented in figure 2.9. No significant annual difference can be noticed in the size frequency distribution with the mean length fluctuating between 144 to 155 cm. As mentioned previously the number of trips sampled has decrease in 2010. As a consequence the number of swordfish sampled has dropped from 1296 to 753 individuals.





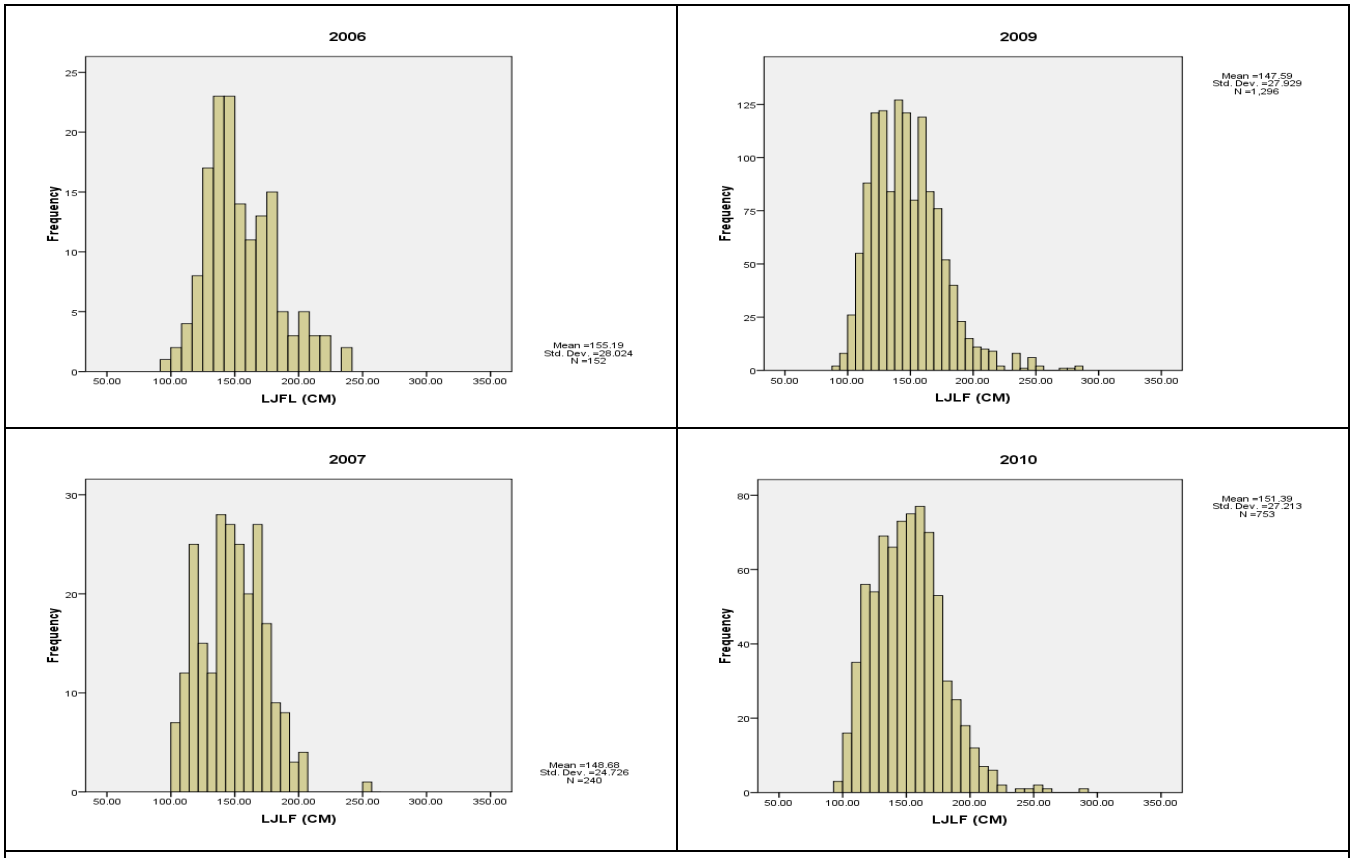


Figure 2.9. Swordfish size frequency distributions (LJFL) in cm) for fish sampled at landing sites in Victoria.

3. Industrial Longline Fishery

3.1 Logbook Coverage

Seychelles started registering large scale industrial longline vessel in 1997. Currently most of the vessels are of Taiwanese origin. Those vessels are under obligation to submit a logbook to the Seychelles' Authority for all of their fishing activities throughout the validity of their registration period. This report covers statistics only up to 2009 because logbook returns for 2010 is still relatively low (only 50% to date). Catch declaration recorded as processed weight on logbooks has been converted to round weight using IOTC's conversion factors. The the statistics presented here have not been extrapolated to take into account missing logbooks.

There are currently 26 Seychelles registered and licensed industrial longline vessels in operation in the Indian Ocean (table 3.1). It should be pointed out that there are vessels that are registered and not necessarily licensed. Given that a licensed is only necessary to operate inside of the Seychelles EEZ.

Table 3.1. Number of Seychelles registered and licensed industrial longline vessel for the past 5 years.

Year	No. of Fishing Vessels
2005	25
2006	25
2007	27
2008	28
2009	27

Those large scale industrial longliners do not use Port Victoria for unloading/ transhipment and consequently logbook return has always been problematic. The Seychelles Fishing Authority has stepped up efforts over recent years to improve the returns of logbooks from this fleet. Logbook returns has greatly increased over recent years from 71% in 2004 to an average of 92% for the past 5 years, (table 3.2).

Table 3.2 Percentage of logbook returned from Seychelles registered industrial longliners.

Year	% Log Book Returned
2005	96
2006	94
2007	82
2008	93
2009	93

3.2. Vessel active

Overall the number of industrial longliners active per year has been relatively stable over the past 5 years averaging 26 vessels active per year. It must be noted that a vessel may be registered in Seychelles and operate in the Western Indian Ocean but may not be licensed, as licences are only required if the vessel wishes to operate inside the Seychelles EEZ.

Table 3.3. Number of Seychelles registered and licensed industrial longliners active from 2005 and 2009.

Year	Vessels Active
2005	25
2006	25
2007	27
2008	25
2009	26

3.3. Fishing Effort

The fishing effort, both in terms of fishing days and number of hooks set show an increasing trend from 2000 to 2005 (corresponding to an increase in logbook returned to SFA) and has since remained more or less stable around 20 million hooks deployed per year and 6000 fishing days. There was however a slight drop in 2008 (figure 3.1).

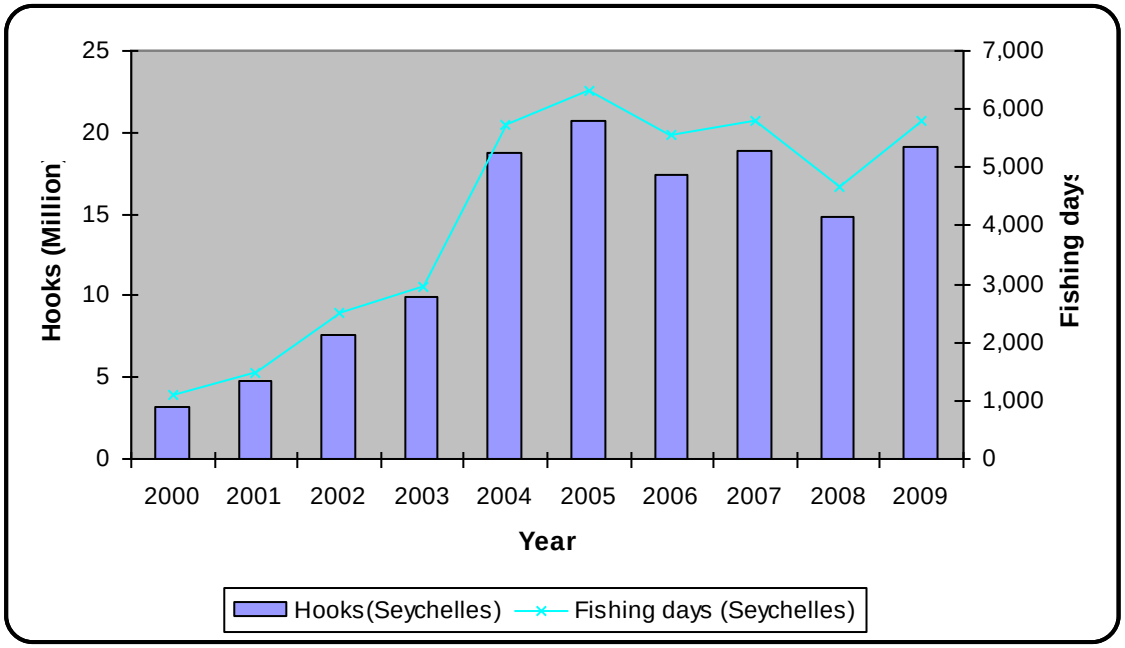


Figure 3.1. Fishing effort reported by the Seychelles' industrial longline fleet (number of hooks and fishing days*)*

3.5. Catch

The total catch reported by the Seychelles industrial longline fleet increased from 6,795 Mt in 2008 to 7,930 Mt in 2009, coinciding with an increase of 27% in fishing effort. Table 3.4 shows a significant decrease in catches of yellowfin tuna since 2005. A drop of more than 90% was recorded from 2005 to 2009. On the other hand catches of species declared as other species has increase significantly, particularly in 2007 and 2009. Catches of swordfish show a steady decline, while that for marlin has been more or less stable over the past 5 years.

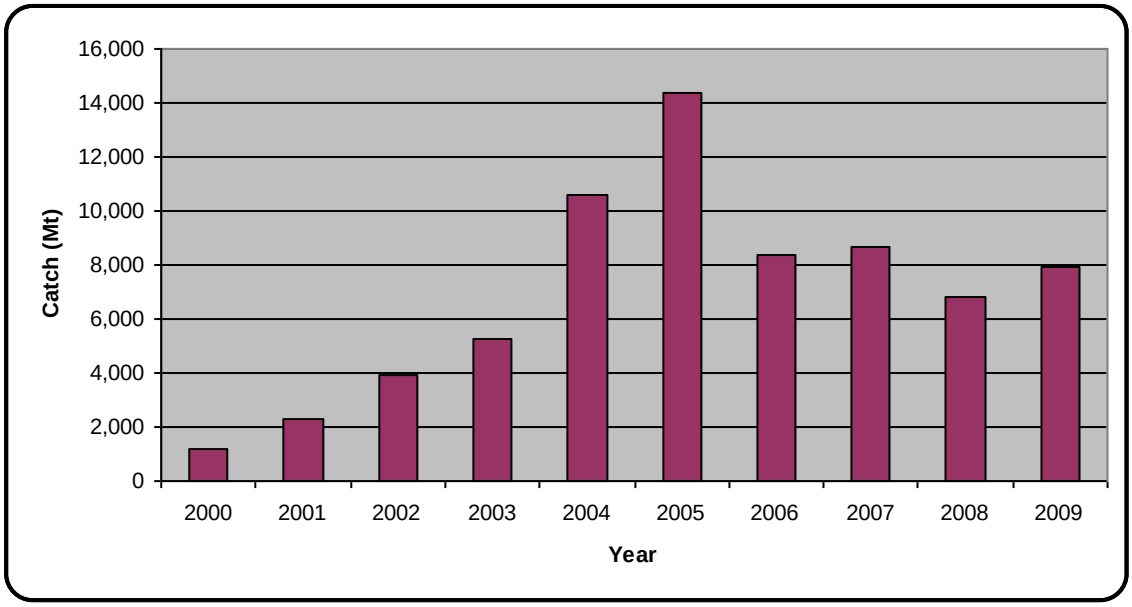


Figure 3.3. Seychelles registered industrial longline fleet total catch (Mt), year 2000 to 2009.

Table 3.4. Catch by species reported by the longline fleet from 2005 to 2009.

TOTAL CATCH (MT) BY SPECIES (SEYCHELLES)								
YEAR	YFT	BET	SWO	ALB	MAR	SFA	OTH	TOTAL
2005	7,366	5,374	982	139	209	2	276	14,347
2006	2,763	3,834	722	92	150	0	813	8,374
2007	1,775	4,511	690	303	134	0	1,228	8,642
2008	580	4,009	559	765	205	-	677	6,795
2009	462	4,051	569	319	156	13	2,360	7,930

3.6. Catch Rate

Following a peak of 0.69 Mt/1000 hooks in 2005, the CPUE of the Seychelles' fleet has remained more or less constant at around (0.47Mt/1000 hooks) between 2006 and 2008 (table 3.5 and figure 3.4). In 2009 , the CPUE decrease slightly to 0.41Mt/1000 hooks. Species-wise, bigeye tuna catch rate for the Seychelles fleet has been much higher than for yellowfin tuna throughout the 5 year period except in 2005 when the catch rate for the later was at a record of 0.36 Mt/1000 hooks. The catch rate for billfishes (swordfish, marlin and sailfish has remained more or less stable for the past 4 years. However significant increase in the catch rate of other species was recorded in 2009.

Table 3.5. Catch per Unit Effort reported by industrial longline fleet over the past 5 years.

CPUE (MT/1000 HOOKS) (SEYCHELLES)								
YEAR	YFT	BET	SWO	ALB	MAR	SFA	OTH	TOTAL
2005	0.36	0.26	0.05	0.01	0.01	0.00	0.01	0.69
2006	0.16	0.22	0.04	0.01	0.01	0.00	0.05	0.48
2007	0.09	0.24	0.04	0.02	0.01	0.00	0.07	0.46
2008	0.04	0.27	0.04	0.05	0.01	0.00	0.05	0.46
2009	0.02	0.21	0.03	0.02	0.01	0.00	0.12	0.41

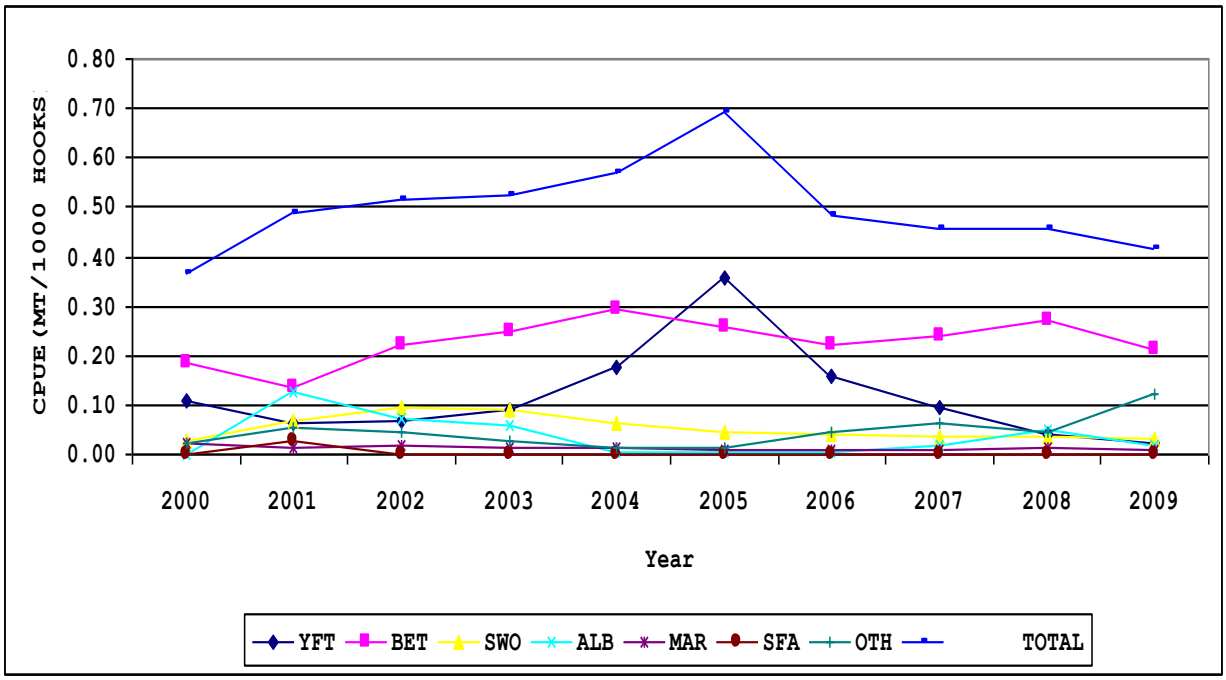


Figure 3.4. CPUE trends by species reported by the Seychelles' fleet over the past 9 years.

3.7. Species Composition

Since 2006, bigeye tuna has been the dominant species in the catches of the Seychelles industrial longline fleet, accounting for over 50% of the total catch. This was also the case in 2009 whereby bigeye tuna accounted for 51% of the total catch, the Other species category was in second place with 27%.

For billfishes the proportion of swordfish and marlin in the catches each decreased by 1% in 2009 compared to 2008, (figure 3.5).

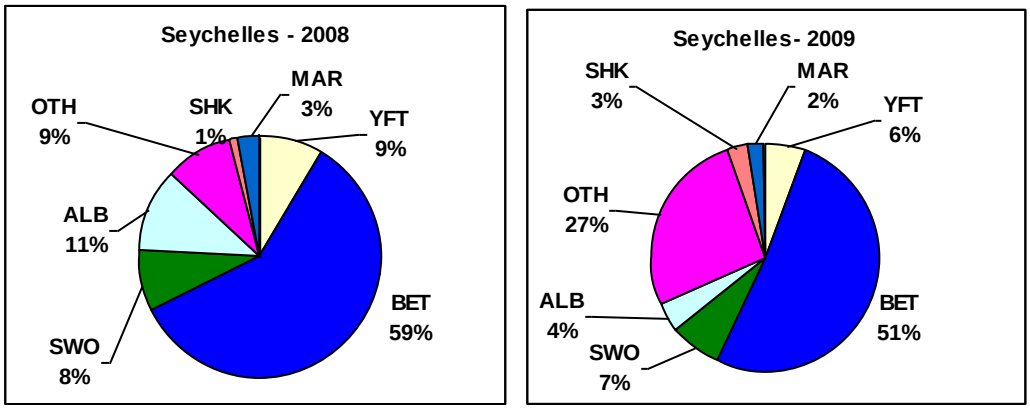


Figure 3.5. Species composition of longline's catches for 2008 and 2009.

References

Poisson, F., D. Guyomard., F.Rene. 1998. Collection of Statistical and biological information on the Reunion Island Swordfish fishery. IOTC Proceeding, No. 1.