

REPOBLIKAN'I MADAGASIKARA

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NERITIC TUNAS CATCH SITUATION FROM THE TRIP REPORTS OF MALAGASY OBSERVERS IN 2012

THIRD WORKING PARTY ON NERITIC TUNAS

BALI, Indonesia 2 – 5 July 2013

Draft

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Abstract:

The observer program in Madagascar concerns the industrial and artisanal fishing fleets including the fleets of the three fisheries namely purse seine fishery, pelagic longliner fishery and the demersal fish longline fishery.

Specific compositions of the catches of these three fisheries were analyzed from trip reports provided by the observers. Traces of neritic tuna species are observed in the catches of these three types of fisheries with a rate relatively low (less than 1%). *Acanthocybium solandri*, *Euthynnus affinis* and *Auxis rochei* included in the purse seiner and only *Acanthocybium solandri* is reported for the pelagic longliner and demersal fish longliner.

The average size (total length) of *Acanthocybium solandri*, *Euthynnus affinis* and *Auxis rochei* sampled aboard purse seiners are 94.51, 42.02 and 45 cm respectively (for number of individuals 125, 95 and 3 respectively).

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1. Introduction

Fishing activities are among the top five holder sectors of Madagascar's economy. Efforts in the management of the fishery concerned the Government implementing the national policy and strategy supported by regional cooperation.

The system of data collection continues to progress to monitor the stock situations. The observer program has been in place since the creation of the Fisheries Monitoring Centre (Centre de Surveillance des Pêches) in 1999. Recently, national observers have benefited from capacity building through regional cooperation, especially at the IOC (Indian Ocean Commission) and through the SWIOFP (South West Indian Ocean Fisheries Project).

This document provides analysis on some results of observations of activities during the year 2012 after the capacity building. It concerns the situation of the Neritic Tuna fishing of the three fisheries affected observer program such as purse seine fishing and surface and bottom longline fishing.

Three parameters such as species compositions of each of these fisheries, fishing locations and the average size of captured individuals are selected for these analyzes.

2. Method

Trip reports provided by observers are recorded to supply the database, designed for the entire fishery. Catches of the vessel observed during the trip as well as the geographical positions of the fishery are included in each report. Some samplings are also performing on board for biometric measurement.

2.1. Species composition

From the database, trip reports in 2012 are extracted and formatted for the three fisheries to get the weight for each family or species as shown the table below:

Fishery	Family					
	FAM ₁	FAM ₂	FAM ₃	FAM ₄	...	FAM _n
LL_P	W _{1, LL_P}	W _{2, LL_P}	W _{3, LL_P}	W _{4, LL_P}	...	W _{n, LL_P}
LL_D	W _{1, LL_D}	W _{2, LL_D}	W _{3, LL_D}	W _{4, LL_D}	...	W _{n, LL_D}
PS	W _{1, PS}	W _{2, PS}	W _{3, PS}	W _{4, PS}	...	W _{n, PS}

FAMi : Family num i

LL_P : pelagic longline ; LL_D : demersal longline, PS : purse seine

$W_{i,f}$: Family num i weight for the fishery f

The specific composition is expressed in percentage for each year as shown the following operation :

Catch rate of the family i, for the fishery f = (total weight of the family i for the fishery f /sum of the total weight of all families for fishery f) x 100

$$R_{i,f} = (W_{i,f} / \sum_{i=1}^n W_{i,f}) \times 100$$

$R_{i,Y}$: Catch rate of the family i, for the fishery f

$W_{i,Y}$: total weight of the family i for the fishery f

$\sum_{i=1}^n W_{i,Y}$: sum of the total weight of all families for the fishery f

2.2. Location of the catch.

The data used in the maps of the locations of these three fisheries are extracted from the database from trip reports. These are records of geographical coordinates with the corresponding dates and vessels concerned. The following table summarizes the number of records used for these maps.

RECORDS	FISHERIES		
	LL_P	LL_D	PS
Number of vessels	5	4	3
Number of fishing days observed	42	24	97
Number of positions recorded	28	95	91

2.3. Average size

Biometric measurements were also performed for some sample onboard. For Neritic Tuna species, this information is available for purse seine and the three species namely *Acanthocybium solandri*, *Euthynnus affinis* et *Auxis rochei*. The average size and average weight are obtained from the following formula

$$TL_{av} = \frac{\sum_i^n TL_i}{n}$$

TL_{av} : Average Total length; TL_i : Individual Total Length

$$W_{av} = \frac{\sum_i^n W_i}{n}$$

W_{av} : Average Weight ; W_i : Individual Weight

3. Results

3.1. Species composition

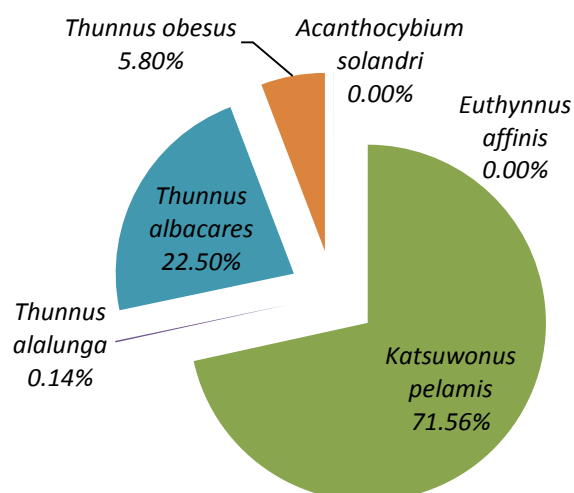
The following tables and graphs show the catch rate per family or per species of these three fisheries (seine, surface longline and bottom longline) expressed in weight.

Table 1 : Species composition of the purse seiner catches

Family	Catch rate
Balistidae	0,00%
Carangidae	0,01%
Carcharhinidae	0,00%
Cheloniidae	0,00%
Coryphaenidae	0,02%
Haemulidae	0,00%
Kyphosidae	0,00%
Labrisomidae	8,89%
Lobotidae	0,00%
Penaeidae	0,46%
Scombridae	89,54%
Scorpaenidae	0,00%
Sphyraenidae	0,00%
Strombidae	1,08%
Veneridae	0,00%

Family of Scombridae occupies 89.54% of the purse seine catches. This family includes species of Tropical and Neritic Tuna. The following graph shows the catch rate of each species of tuna in the family of Scombridae:

Graph 1 : Catch rates of each species of the family of Scombridae in the purse seine catches



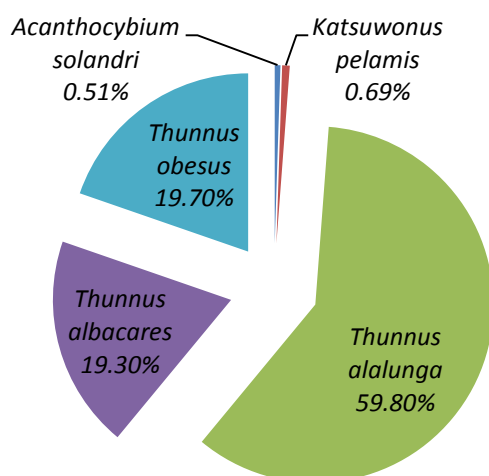
This graph shows that the Tropical Tuna species including *Katsuwonis pelamis*, *Thunnus albacares* and *Thunnus obesus* predominate in terms of catch rates. However, traces of Neritic Tunas are present in these catches. *Acanthocybium solandri*, *Euthynnus affinis* and *Auxis rochei* are present with a rate relatively low (less than 1%).

Table 2: Species composition of the surface longliner catches

Family	Catch rate
Alepisauridae	0,06%
Alopiidae	1,56%
Carcharhinidae	13,39%
Cheloniidae	0,05%
Coryphaenidae	9,40%
Gempylidae	0,96%
Istiophoridae	5,89%
Labrisomidae	0,35%
Lamnidae	0,74%
Molidae	0,40%
Scombridae	58,41%
Sphyraenidae	0,29%
Xiphiidae	8,50%

For surface longliners, the Scombridae predominates with a catch rate of 58.41% followed by other pelagic species such as Carcharinidae, Coryphaenidae, Xiphiidae et Istiophoridae. The following graph shows the catch rate of each species of tuna in the family Scombridae :

Graph 2 : Catch rates of each species of the family of Scombridae in the surface longliner catches



Acanthocybium solandri represents Neritic Tuna in the catch of the surface longline with a rate relatively low (0.51%).

Table 3: Species composition of the bottom longliner catches

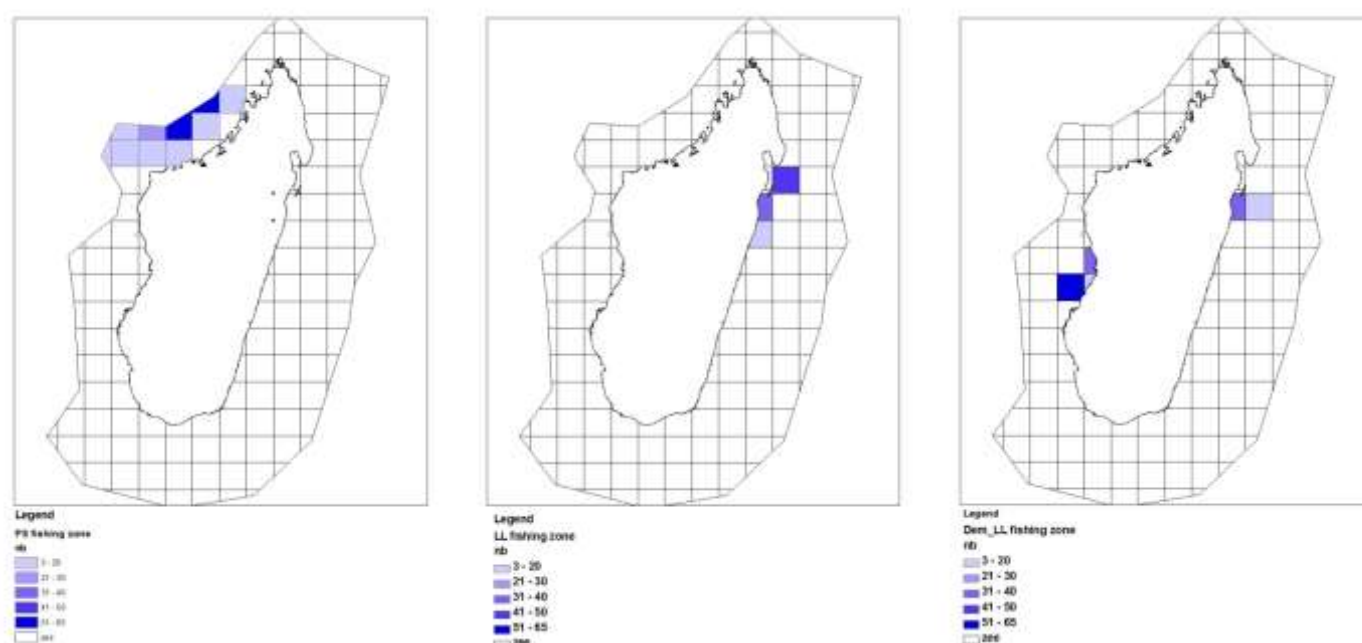
Family	Catch rate
Ariidae	0,56%
Aristaeidae	0,28%
Balitoridae	0,09%
Carangidae	1,69%
Carcharhinidae	1,60%
Characidae	0,28%
Dasyatidae	0,09%
Haemulidae	0,66%
Lethrinidae	21,00%
Lutjanidae	54,52%
Rhinobatidae	0,09%
Sciaenidae	0,09%
Scombridae	0,19%
Serranidae	18,27%
Sparidae	0,28%
Stegostomatidae	0,09%
Tetraodontidae	0,19%

Trace of the Scombridae (catch rate of 0.19%) is observed in the bottom longliner. This family is represented only by *Acanthocybium solandri*.

3.2. Fishing zone of the three types of fishery

The three maps below show the locations each of these three fisheries in the EEZ of Madagascar during the observation period in 2012.

Figure 1 : Location of the fishing zone of purse seine, surface longline and bottom longline



map. a : Purse seine

map. b : surface longline

map. c : bottom longline

These three maps show that each fishery prefer a particular fishing zone. Purse seiners who are foreign vessels operating in the North West part of the Malagasy EEZ during the period from February to June of the year (map. a). The fishing zone of surface longline focus in the Northeastern part (map. b). Bottom longline vessels are present in the Northern and Eastern part of the South of the middle West of the Malagasy EEZ.

3.3. Average size

The biometric measurements were taken on board for the 223 individuals sampled from the purse seine. Total length and weight were measured. The following table shows the average total length, maximum and minimum and average weight, maximum and minimum for each of the three species of Neritic Tuna aboard the purse seiners.

Table 4 : Average total length and average weight of three species of neritic tuna : *Acanthocybium solandri*, *Euthynnus affinis* et *Auxis rochei*

	<i>Acanthocybium solandri</i>	<i>Euthynnus affinis</i>	<i>Auxis rochei</i>
N=223	125	95	3
Average Total Length	94,51	42,04	45,00
Max Length	124,50	47,50	47,00
Min Length	63,00	37,00	43,00
Average Weight	6,08	1,58	1,33
Max Weight	8,15	1,85	1,50
Min Weight	1,20	1,40	1,00

Average total lengths *Acanthocybium solandri*, *Euthynnus affinis* and *Auxis rochei* are 94.51 cm, 42.04 cm and 45 cm respectively. The average weights are 6.08 kg, , 1.85 kg and 1.33 kg respectively.

4. Discussion

Analyses of species composition of catches for each of these three fisheries show that some species of Neritic Tunas are present in their catches. *Acanthocybium solandri*, *Euthynnus affinis* and *Auxis rochei* included in the purse seine, while *Acanthocybium solandri* is the only present for catch surface longliners and bottom longliners. However, the catch rate in Neritic Tuna is relatively low. This low catch rate could be explained by the target for each of these fisheries. In fact, purse seiners and surface longliners target tropical tunas and bottom longliners target demersal fish species. Neritic Tuna are caught as bycatches. In addition, negligence the part of observers is seen at records in data collection sheets for Neritic Tuna compared to tropical tunas. Thus, some records of the number and weight of Neritic Tunas are forgotten and make the catch rates lower Neritic Tuna.

The purse seine fishing correspond to the preferred zones of *Katsuwonis pelamis* during their migration in Malagasy waters. For national surface longliners fishing zone focus in the North

East and national bottom longliners are present in the North East and South of Middle West part. These fishing zones correspond to shore bases of company fleets owner.

It should be noted that the traditional fishermen using small boats usually unpowered catch also Neritic Tunas including *Acantocybium solandri* and *Scomberomorus commerson* but unfortunately, the statistic production of this fishery is still unknown. This fishery supplies local markets in Tuna. Brief neritic tuna are caught in Malagasy waters and they are present around of coastal waters.

Sampling made aboard purse seiners were used to calculate the average size of fish caught by this fishery. Sizes observed are well below the maximum size of each of these species. The maximum sizes for *Acanthocybium solandri* and *Euthynnus affinis* are 250 cm and 100 cm respectively, while the average size of fish caught are 94.51 and 42.02 cm respectively.

5. Conclusion

Neritic tuna are caught by some fisheries in Malagasy waters. Through the observer program, trip reports shows that the three fisheries as purse seine, surface longline and bottom longline catch as bycatches Neritic Tuna species. *Acantocybium solandri*, *Euthynnus affinis* and *Auxis rochei* are Neritic tuna species that are caught in these fisheries with a rate relatively low.

The presence of neritic tunas in almost every local market of fishery products supplied by traditional fishing shows that neritic tunas are present almost around the Malagasy coast. Fishing areas on the maps presented above correspond to three fishing zones observed according to their target fisheries.