

Preliminary result of the CAPPES (CAPturabilité des grands PELagiques exploités à la palangre dérivante dans la Zone Economique Exclusive des Seychelles) research program

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1.0 INTRODUCTION

The monofilament longline fishery for swordfish and tuna introduced locally in 1995 had become well established over the years. However faced with constraints related to reduce catch rate and an exportation ban of swordfish on European Market, the SFA in collaboration with Reunion Island (France), supported by France through the participation of two research institutes, IRD and l'IFREMER, organized a workshop from the 2nd to the 5th of February 2004, with the principal objectives of evaluating longline fishery activities in the Southwest Indian Ocean and propose regional scientific and technical program to address the various constraints. As far as Seychelles is concern the major problem raised by the local fishers were, reduced catch rate (swordfish mainly), importation ban on swordfish on the European market due to its heavy metal content in that did not meet EU regulated level, and availability and cost of bait. The economic efficiency of a longline fishery is driven by two important factors - fuel and bait, especially when fisheries depend on imported bait. The price and availability of bait will determine the economic efficiency and the seasonality of fishing activities. For each fishing operation, local semi-industrial vessels targeting swordfish and tuna set on average between 800 to 1200 hooks usually baited with imported squids or mackerels.

The outcome of the workshop was various action plans (short-term and long term). For Seychelles the short-term plan was centred on increasing the catchability and versatility of the fishing gear and address the problem of importation ban on swordfish.

A research project "CAPPES" (CAPturabilité des grands PELagiques exploités à la palangre dérivante dans la Zone Economique Exclusive des Seychelles) was set up as part of the development of the local monofilament longline fishery.

This project has for objective to diversify the longline fishery to permit the local fishers to target tuna (yellowfin and swordfish) rather than swordfish and to test the efficiency of various type of bait. This will be attained via the;

1. Study the behaviour of the fishing gear under different setting scenarios (boat speed, line shooter speed, current speed and direction, e.t.c..).
2. Study the habitat of the targeted species to identify the environmental parameters that determine the distribution and movement of those species.

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3. Study the efficiency of various bait types (mackerels, saury, squids and bonitos)

2.0 Methodology

Longline are deployed with various instrument to record various information. TDR's are fixed at the nadir point of the basket mainline to allow calculation of the maximum fishing depth attained by the gear (Figure 1).

Hooks are also equipped with hook timers to record the time of each capture.

Other environmental parameters are collected using a sea bird XBT Profiler that record temperature, depth, and oxygen concentration.

The first trip was conducted in September 2004. To date four-trips have been conducted by the SFA research vessels (RV LMITIE) with the participation of two other operators (MV Pisces of Oceana fisheries and MV Albacore of B & E enterprise).

3.0 Preliminary Results

1. The local fishers now have the technical know-how on how to deploy their fishing gear in order to target the different vertical strata depending on the targeted species, (swordfish vs tuna). By using different vessel or shooter speed during the setting operation, and depending on other environmental parameters such as current speed and direction, the line can be set to a targeted depth.
During the research cruises we observed that the catch rate of Bigeye tuna and yellowfin tuna increases with depth down to about 375m. However the catch rate of yellowfin tuna is higher than that of bigeye tuna. No catch was recorded beyond 375 metres.
2. During the bait efficiency test, 56 swordfish were caught representing a gross catch weight of about 2.1 MT. Individual length (EFL = eye-fork length) ranged from 63 cm to 189 cm (average length = 119 cm). The observation of the distribution of both sizes and weight of swordfish caught according to the type of bait shows some interesting results. With squid and saury as bait, the average size of swordfish caught is about 95 cm (EFL) while it reaches 138 cm for swordfish caught with bonitos. This shows that the bait has a selectivity effect, saury and squid catching smaller fish than bonito.
3. With regards to the catch rate (CPUE = catch per unit effort), the number of hooks deployed during this particular trip is low to have conclusive result. However, we have a trend showing that CPUE in number (number of swordfish per hook) is higher for squid and saury than for bonitos but an opposite result is observed for CPUE in weight (weight of fish per hook). The swordfish average weight captured with bonitos was 45 kg compared to 17 kg for those caught with squid and saury. Furthermore bycatch of non commercial species were not recorded on bonitos.

4.0 Conclusion

The result of this research is very interesting. The local fishers have expressed their satisfaction given the fact that they now have the technical know how on deploying their gear

in order to target different vertical strata, depending on the species being targeted. Before that they usually set shallow longline to target swordfish and tuna were taken as by catch.

The test on bait efficiency gave very interesting results. The fact that the small tuna were very efficient on billfish (especially swordfish) can provide a source of cheaper and locally available bait for longlining operation. Several thousand of tonnes of these small tuna's or bonitos caught by purse seiners are discarded every year. They can provide an alternative to imported bait. Our first trial showed that the sizes of swordfish caught on tuna are relatively larger than those taken on squids or mackerel. Small tuna were also very efficient at catching other billfishes such as marlin and sailfish

This is a positive for the stock in terms of sustainable exploitation, as the bait is more selective towards larger individuals. By catch of non-commercial species such as skates, rays, lancet fish are greatly reduced.

The results are only preliminary, and further research cruises is required for more conclusive results. There are plans for at least one research trip per month. The primary objective of the research will remain as targeting tuna. Even if the exportation of swordfish to the European market have resume after EU member voted to raise the permissible level of cadmium in swordfish giving the operators the technical know-how for targeting tuna will be vital in season when swordfish catch rate is very low (August – May).

SFA in collaboration with IRD will also develop software that will assist local operators on targeting the various species. It will allow them to obtain the different setting parameters required to target different vertical strata depending on the target species.

Instrumented longline

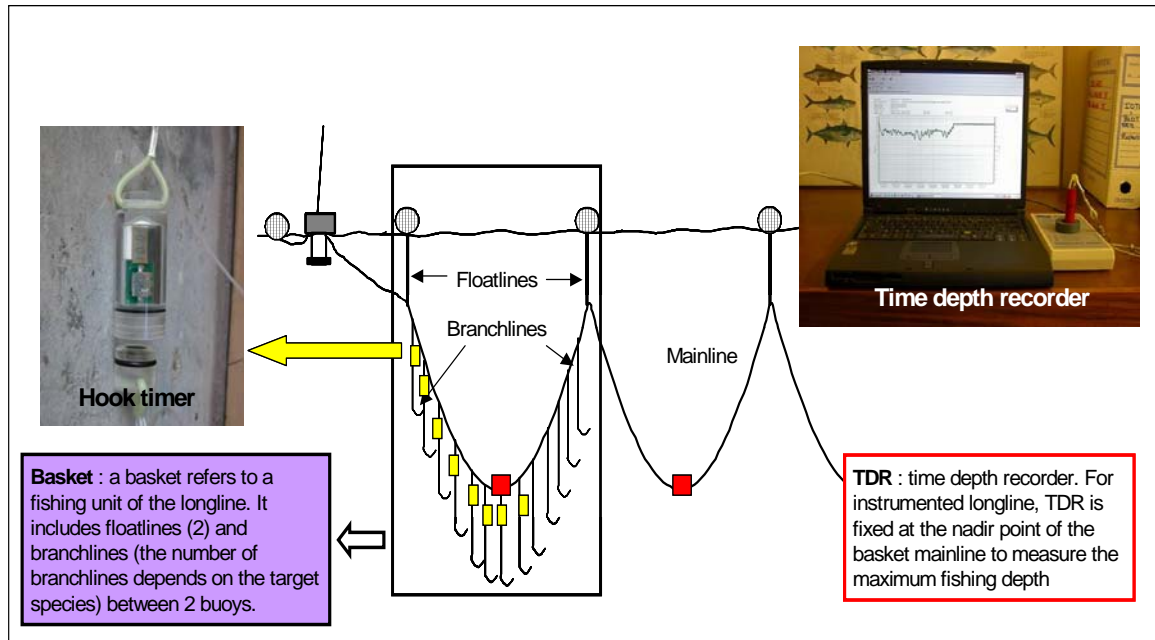


Figure 1. An Instrumented longline.

Sampling areas in the Seychelles EEZ

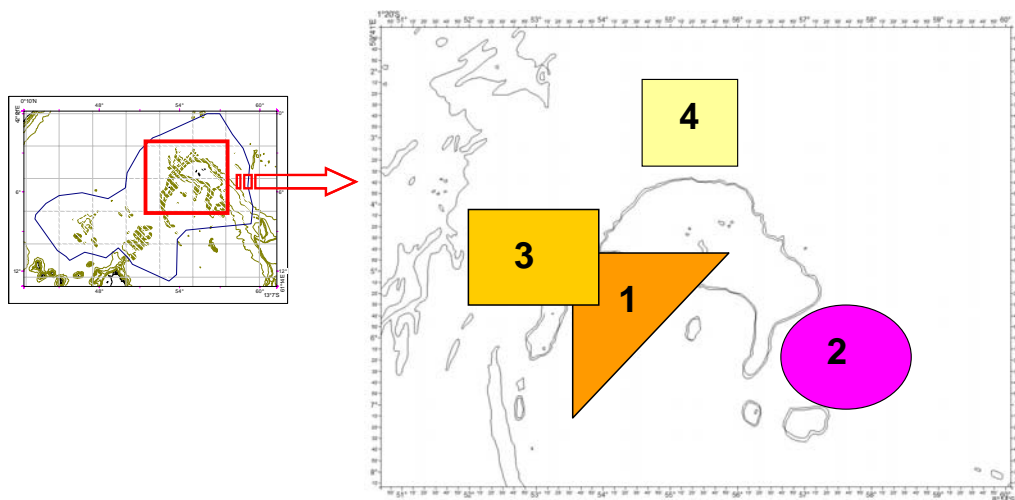


Figure 2. The area studied during the 4 research trips.

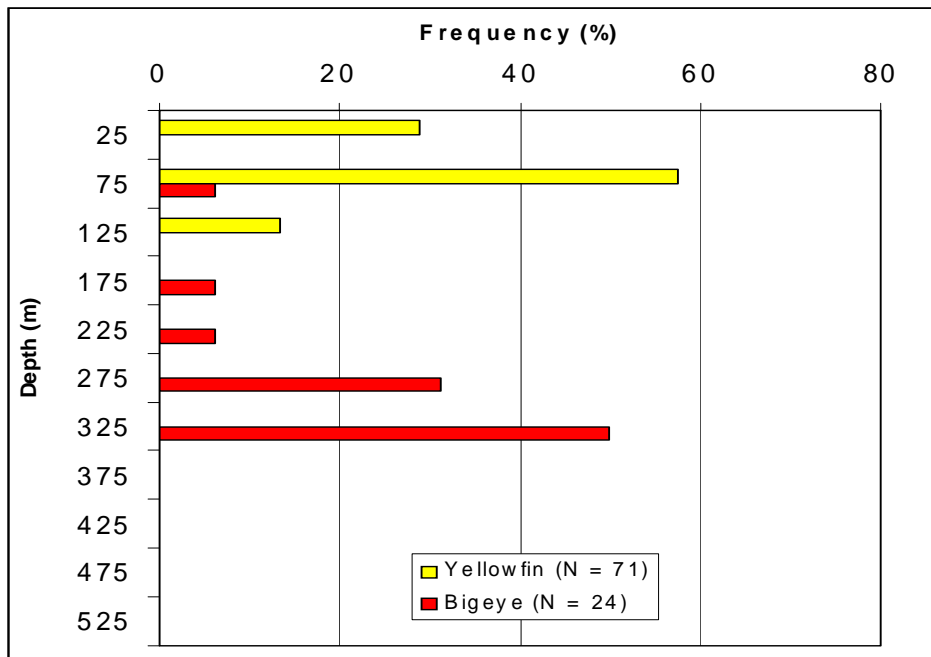


Figure 3. Catches of yellowfin and bigeye tuna at various depths.



Figure 4. Bonito and Saury used for the bait efficiency tests.

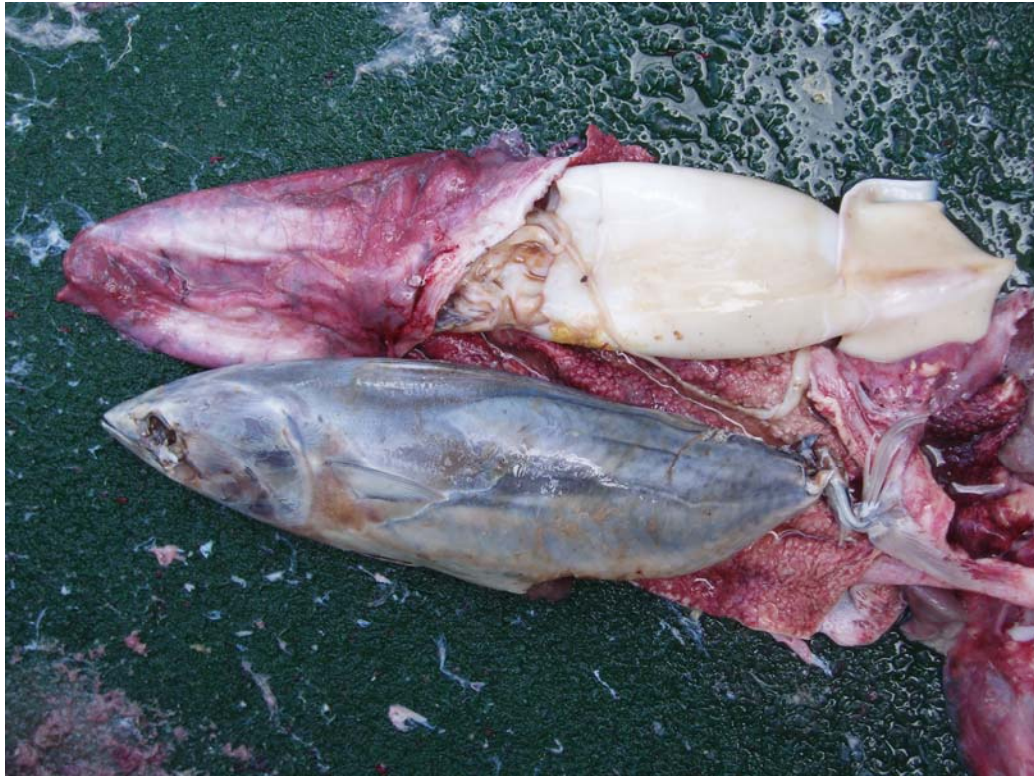


Figure 5. Comparison between the size of prey (squid) found in the stomach of a swordfish and the bonito bait being tested.



Figure 6. A large swordfish taken on bonitos

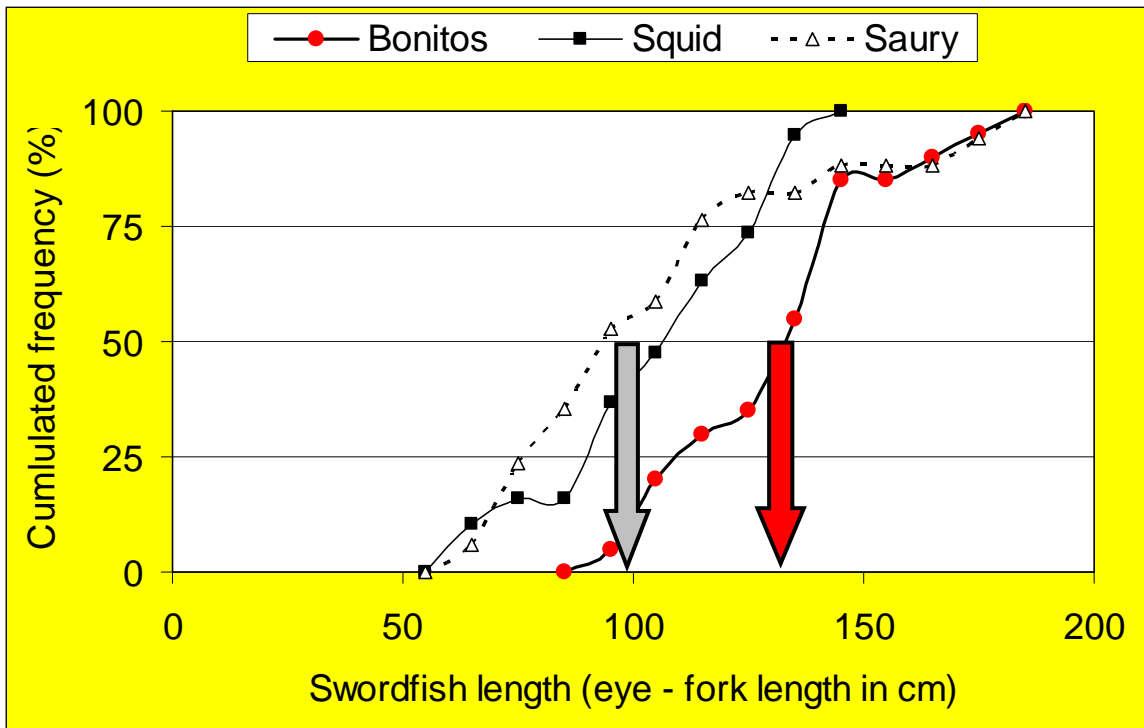


Figure 7. Size distribution of swordfish taken on various bait type.