

Outburst of FAD fishing following quota implementation: The case of Indian Ocean yellowfin

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Summary

Recent assessments of the Indian Ocean yellowfin tuna indicate that the stock has been overfished and subject to overfishing since 2014. As part of the rebuilding plan initiated in 2017, the Indian Ocean Tuna Commission (IOTC) has implemented an annual quota on high seas fisheries to reduce the catch of yellowfin to levels compatible with a stock recovery by 2024. The IOTC also set a limit of 350 for the number of buoys monitored by a purse seiner at any time as well as on the number of support vessels managing the network of fish aggregating devices (FADs). To comply with catch limit, the Seychelles purse seine fleet has sharply reduced the seasonal targeting of free-swimming schools of large yellowfin which contributed to 35% of the yellowfin purse seine catch during 2007-2016. This has disrupted the typical spatio-temporal patterns of the fishery while the advent of echo-sounder buoys enhanced the spatial expansion of the fleet in areas where seabirds are rare or absent. The Seychelles purse seine fishery is now an almost-exclusive FAD fishery, characterized by high daily catch rates and a catch composed of 2/3 skipjack and about 30% of yellowfin which are mainly juveniles. Similar changes in fishing practices are expected for all purse seine fleets of the Indian Ocean. Overall, the implementation of the yellowfin quota has resulted in strong changes in purse seine fishing patterns and an expected increase in overall levels of bycatch due to the sharp increase in sets on floating objects.

Introduction

The Indian Ocean stock of yellowfin has been assessed as overfished and subject to overfishing since 2014. The rebuilding plan developed by the Indian Ocean Tuna Commission (IOTC) has implemented a reduction of the purse seine catch by 15% from reference levels and called for a progressive reduction in the number of auxiliary vessels supporting the purse seiners' activities (Res. 16/01, 17/01 and 18/01). In parallel, the IOTC resolutions 13/08, 15/08, 17/08 and 18/08 called for national management plans for improving the collection and reporting of data on activities related to fish aggregating devices (FADs) and set some limits on the numbers of instrumented buoys available to each purse seiner in order to reduce their effort and the overcapacity of the Indian Ocean yellowfin fisheries.

During 2015-2018, the Seychelles purse seine fishery was composed of 13 foreign-owned purse seiners assisted by several support vessels mainly devoted to the maintenance of the array of FADs (Assan et al., 2015). The annual yellowfin catch of 33,211 metric tons (t) authorized for the Seychelles fleet from 2017 has been evenly divided between the purse seiners, each of them obtaining an individual quota of 2,555 t. To closely monitor the yellowfin catch, the Seychelles Fishing Authority (SFA) developed in collaboration with the fishing companies a system of weekly collection of the logbooks and preliminary estimation of catch composition from past port samples. In addition, the companies developed a system of monitoring and control of the numbers of buoys followed by each purse seiner to ensure compliance with IOTC Conservation and Management Measures. The objective of the present study was to assess the recent changes in fishing practices and catch composition derived from port samples in the Seychelles purse seine fishery following the implementation of the total allowable catch of yellowfin.

Materials and Methods

All fisheries logbooks and sales notes from Seychelles purse seiners and support vessels are collated from the companies and managed with a relational database at SFA. Several controls are performed, including the verification of fishing sets positions against VMS available since the early 2000s. Samples of the catch have been collected at unloading in Port Victoria following a methodology in use since the mid-1990s (Pallarés and Hallier, 1997). Samples from Seychelles and EU flagged purse seiners are shared between national scientific institutes to derive an average species composition for each school association (i.e. free-swimming school and floating object; FOB) in large areas of the western Indian Ocean. Here, mean weights in the catch were

computed for each species as the annual average of weights (derived from length measurements) across samples.

Results and Discussion

In 2017 and 2018, several Seychelles purse seiners reached their individual quota before the end of the year and were stopped with their support vessels. This resulted in a reduction by about 20% of the days at sea and 7% of the fishing sets of the fleet between 2015-2016 and 2017-2018. Meanwhile, the fishery spatially expanded and the percentage of sets on FADs increased from 74% in 2015 to 94% in 2018 (Figure 1). The annual catch increased from about 100,000 t during 2015-2016 to >120,000 t during 2017-2018. The increase in catch is explained by the highest catch rates observed in the history of the fishery (>50 t per searching day in 2017-2018) which are due to both increase in the number of associated schools found at sea (i.e. >1.1 sets on FADs per searching day) and high average catch per set (>44 t per successful set). The distribution of set weights shows a steady increase in large sets during 2015-2018 (e.g., 10% of the sets >100 t in 2018) and a reduction in small sets, e.g. ~30% of the sets <20 t in 2018 vs. ~40% in previous years. This might be linked to a more stringent selection of larger schools enhanced by buoys echo-sounders along with environmental conditions that favored large tuna aggregations in 2017-2018.

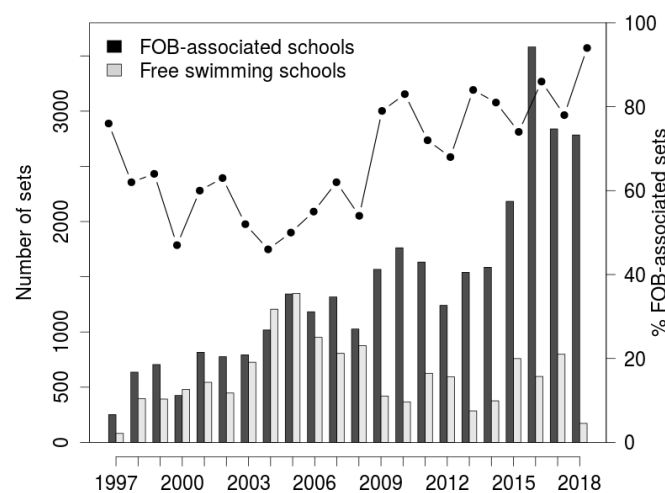


FIGURE 1. Annual number of fishing sets made by the Seychelles purse seine fishing fleet on schools associated with floating objects (FOBs) and free-swimming schools during 1997-2018. Line with solid circles indicates the percentage of sets made on FOBs.

In 2018, 97% of the Seychelles purse seine catch was taken on FOB-associated schools. Skipjack now represents 2/3 of the total catch while yellowfin contributes to less than 30%. While about 35% of the yellowfin was caught in free schools composed of large, mature fish of average weight of ~45 kg over the decade prior to the quota implementation (2007-2016), about 95% of the yellowfin caught in 2018 came from associated schools which are predominated by juvenile fish of average weight <10 kg. The increased contribution of FAD-fishing during 2000-2017 resulted in a substantial decline in the mean weight of yellowfin in the purse seine catch from about 30 kg in the early 2000s to about 10 kg in 2018.

Since 2014 which corresponds to the first year when the stock of yellowfin was assessed as overfished, the number of small yellowfin caught by the Seychelles purse seine fishery has more than doubled. Similar changes in fishing patterns are expected for all purse seine fleets operating within the Indian Ocean. Despite the absence of accurate estimates of natural mortality rates for Indian Ocean yellowfin, the increasing contribution of small yellowfin to the total catch might affect the catch rates of longline fisheries and exacerbate the level of growth overfishing of the stock. The major increase in the numbers of sets on FOBs might also result in increased overall levels of bycatch that are now mostly retained onboard. Data collected as part of the Seychelles national observer program co-financed by the industry will be analyzed to assess the extent of the current levels of bycatch in the fishery. In addition, all fishing companies have now agreed to share buoy data with the SFA. These data will be crucial to better understand buoy use and FAD dynamics so as to mitigate some adverse effects of FAD fishing and support the recovery of the yellowfin stock without affecting the

economic model of the purse seine fishing companies.

References

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