Catch Trends of Billfishes by Malaysian Tuna Longliners in the Indian Ocean, 2013 - 2017

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Abstract

Malaysian tuna longline vessels were fishing in waters off Madagascar and southwards since the 3rd quarter of 2011. The primary target of these vessels was Albacore and all catches were landed in Mauritius. From 2013 to 2017, catches of billfish (comprised of marlins and swordfish) by Malaysian tuna longliners ranged from 0.68 to 47.22 tonnes with the average 10.35 ± 9.03 tonnes. In 2017, landing of marlin was four times over from 2013, showing an increase about 40% compare to 2013, meanwhile for swordfish, 15% greater than 2013 landing. This showed the demand of these fishes will make them as an attractive by-catch due to its high value, although billfishes are not the primary target of tuna longliners.

Keywords: Marlin, Swordfish, tuna longliner. Indian Ocean, Billfish

Introduction

Malaysian longline vessels had started to operate in Indian Ocean since 2003 by using tuna longline. To date, 19 Malaysian tuna longline vessels were license whereby 13 of it were registered and operate in the east of Indian Ocean and another 6 tuna longline vessels registered and operate in southwest Indian Ocean. The main species been caught such as Albacore, Yellowfin tuna, big eye tuna; meanwhile billfishes such as black marlin and sailfish were also caught in small amounts (IOTC, 2015).

The vessels that normally operating in southwest Indian Ocean will undertake a long fishing trips and all their catches were transported back to the fishing port by large fishing vessels. Port Louis in Mauritius was used by Malaysian vessels for transshipment to export all the catches to buyer countries. The vessels that unloaded at the Port Louis Mauritius used to operate in fishing areas in the western Indian Ocean particularly during October to February (IOTC, 2016).

Billfish that include sailfish and marlin from family, Xiphiidae and swordfish from family Isotiophoridae. These two families comprise with three genera with eight identified species (Collete *et al*., 2006) and well known as pelagic fish in open ocean (Fierstine, 1997). The geographical distributions of billfish are broad, ranging from latitudes 50ºN to 50ºS with temperature ranging 15ºC to 30ºC (Bernard *et al*., 2013). The distribution of billfish tallies with their migration pattern and prey distribution because their diet consist mostly of migratory species (Vaske Jr *et al*., 2011) due to their characteristic as pelagic fish. Billfish mostly prey on herrings, sardines, shads, smaller mackerels and tuna.

The world demand for billfish are mostly on temperate and tropical countries, such as Japan, because the good quality of flesh can be used to prepare sashimi (Nakamura, 1985). Meanwhile, in tropical and subtropical region, billfish fishing is common in recreational and leisure fishing by sport fishing enthusiasts (Alio, 2012). Long-line fishing if billfish is the frequently used method to catch billfish although they are also occasionally caught as by-catch by trawlers and seiners (Venizelos *et al*., 2001).

However, the research and management of billfishes is often receiving attention than other highly migratory species worldwide (Kerstetter and Schratwieser, 2018) even it has been reported that the landing of these species was increasing annualy particularly in Indian Ocean (Lan *et al.*, 2015). It also been reported by Lan *et al*., 2015 that the total catch of swordfish as tally as fishing effort, indicated that more than 75% of swordfish were caught in the northwest and southwest of the Indian Ocean due to environmental variables differences.

Material and methods

The billfish catch data and fishing locations presented in this paper were obtained from logbooks weekly submitted via email to the Department of Fisheries Malaysia (DoFM). The data reporting is mandatory under Malaysia Fisheries Regulations as the part of the requirement for licensing Malaysian-flagged tuna fishing vessels.

A hundred (100) hooks were expressed for fishing effort analysis. Normally, Malaysia tuna longline fishing vessels operation using 3000 hooks for each shooting and took it one day to complete one haul. However, there are no observer on board for Malaysia tuna vessels and Malaysia currently in the process of developing national observer scheme.

Fishing operation

To date, 19 Malaysian tuna longliner were license whereby 13 of it were registered and operate in the east of Indian Ocean and another 6 tuna longline vessels registered and operate in southwest Indian Ocean. This longliners were fishing in waters off Madagascar and southwards since the 3rd quarter of 2011. The primary target of these vessels was Albacore and all catches were landed in Mauritius.

All the Malaysian vessels operate tuna longlines off the eastern coast of Madagascar, Lat S 10º to S 25º from January to March and from October to December, for each of the three years they were deployed. For the other month, these vessels operate off southern Madagascar until Lat S 35º. Based on the vessels deployment, longlining activities were carried out at the southern-most fishing area of Lat S 35º during the month of May each year. In 2017, the operation of tuna longline vessels has been expand to Lat N 10º to N 25º.

A total of 3,000 hooks were used for each fishing operation by each tuna longliner. Immersion time is was between 8 to 10 hours for each operation. Generally, fishing effort was reduced in March and September since 2012. However, fishing effort appears to be more stable from 2014 onwards.

Annual Landings and Catch Composition of Billfish

Billfishes are not the target species for Malaysian tuna longliners. The billfishes were considered as by-catch which include black marlin, striped marlin, swordfish and other low

value species. The other bycatch species were grouped into mix fishes. The average catch composition from Malaysian longliners as shown in Figure 1 with the targets species was Albacore since 2012 whereby this species was dominated the catch with 70% or 772.12 mt of the total catch, followed by yellowfin tuna (9%), mix fishes (8%), swordfish (5%), marlin (3%), and bigeye tuna (5%). The marlin and swordfish are the common billfishes that commonly caught by tuna long-liners as bycatch species. The annual landings of these species from 2013 to 2017 as in Figure 2.

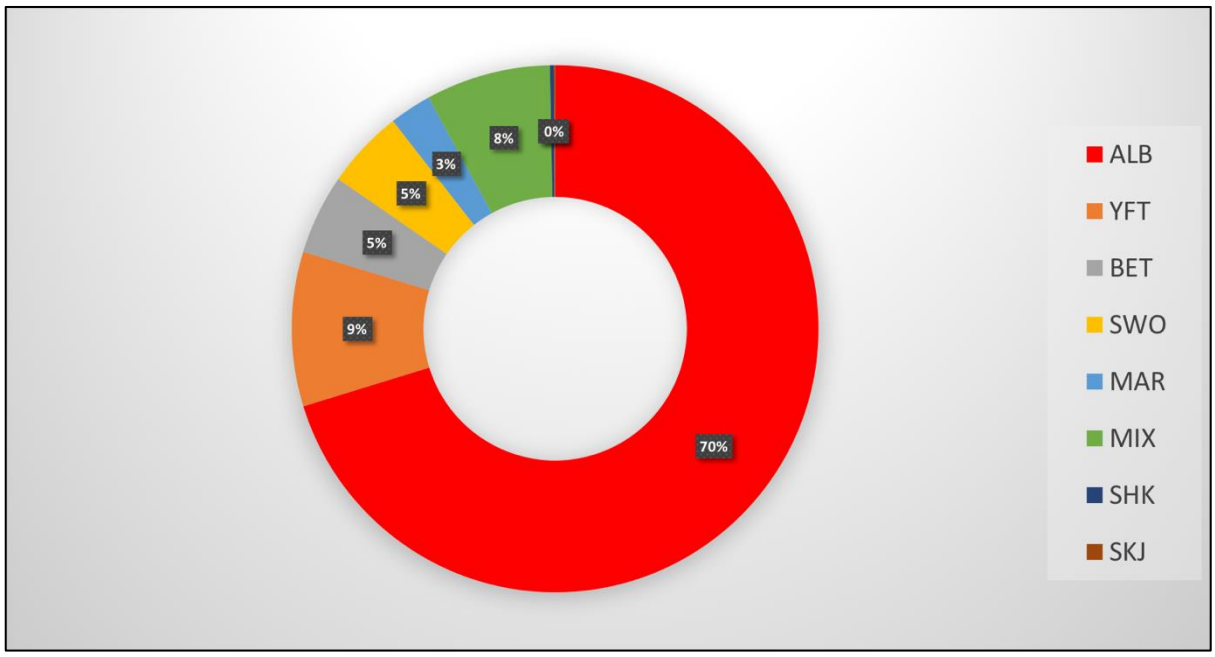

Figure 1: Average total catch composition from 2013 to 2017

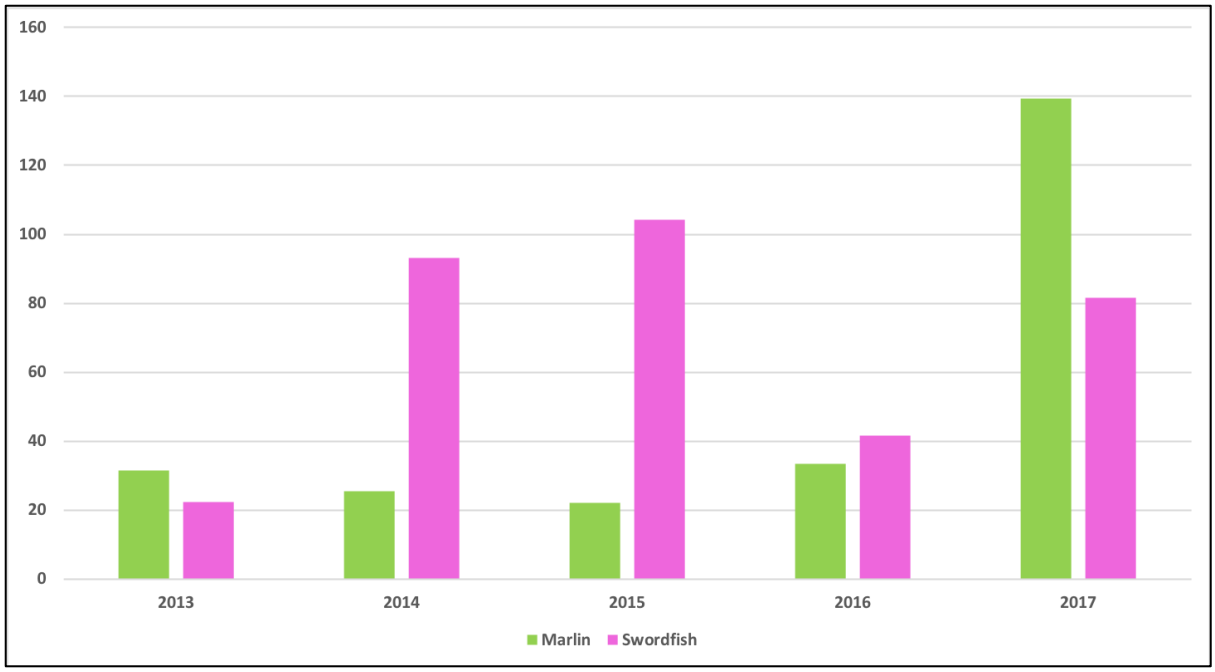

Figure 2: Total annual landings of marlins and swordfish by Malaysian tuna longline from 2013 to 2017

Monthly Catches and of Billfish and Fishing Effort

Figure 3 shows the monthly catches of billfish and fishing efforts by Malaysian tuna longliners in the Indian Ocean. From 2013 to 2017, catches of billfish by Malaysian tuna longliners ranged from 0.68 to 47.22 tonnes with the average 10.35 $\pm$ 9.03 tonnes. Overall, it appears that there are two peaks of fishing activities, namely from October to January and May to August. This fishing seasons coincide with the highest catches of billfish in that period. The highest peak was during the middle of the year (May to August). Low fishing effort was recorded early of the year normally due to a long holiday. In overall, the catch of marlin are typically high from November to February and then it declined in the middle of the year. Meanwhile, for swordfish, the catch is high at the end of 2014 but the same situation does not reflected from 2015 onwards as the catch was higher during mid-year. However, the catch of swordfish seems to be increasing at the early of 2017 before declining during mid of the year.

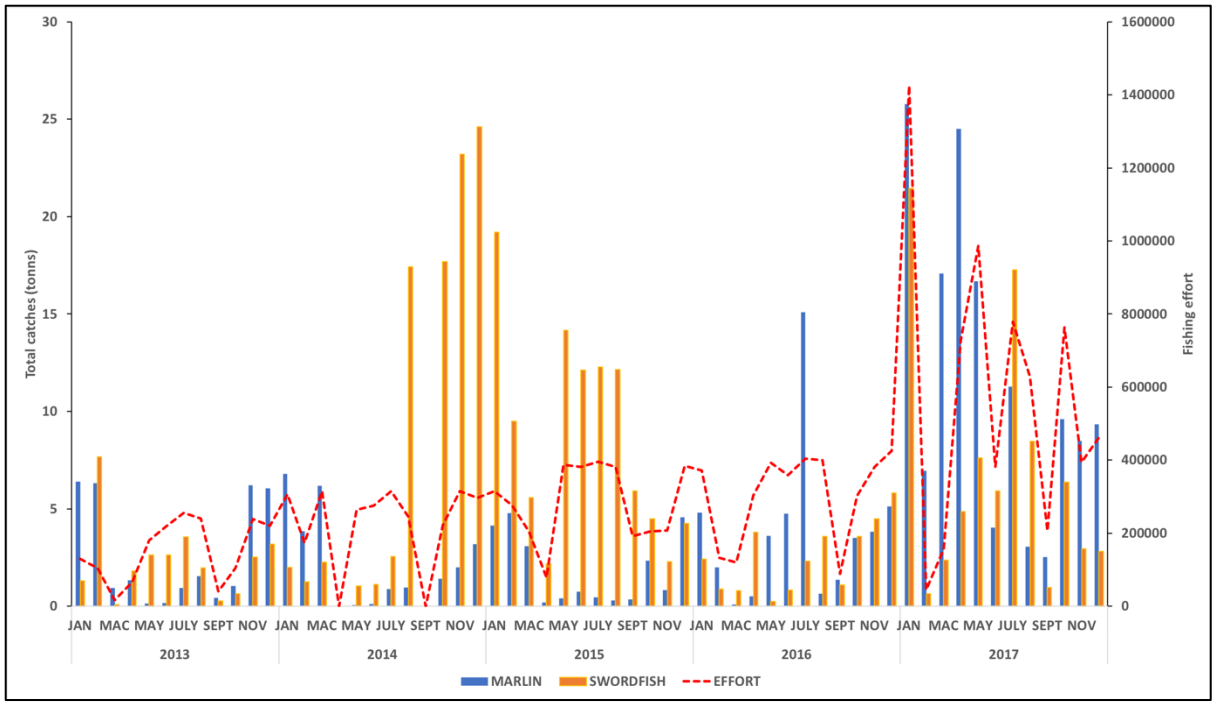

Figure 3: Monthly catches of marlin and swordfish by Malaysian tuna longline vessels in 2013 to 2017.

The mean monthly catches of billfishes by Malaysian tuna longliners according to Northeast and Southeast Indian Ocean from 2013 to 2017 followed by the fishing effort as appeared in the Figure 4. Malaysian tuna longliners had started to operated in Northeast Indian Ocean (Quadrant IOTC code: 1) since 2016 and this had contributed to the landing and fishing effort data. By referring to the Figure 4, the difference in peaks between fishing effort and landing can be expected since the longliners were not targeting for billfishes. Although it is not a targeting catch, their landing patterns do indicate their availability in the fishing areas.

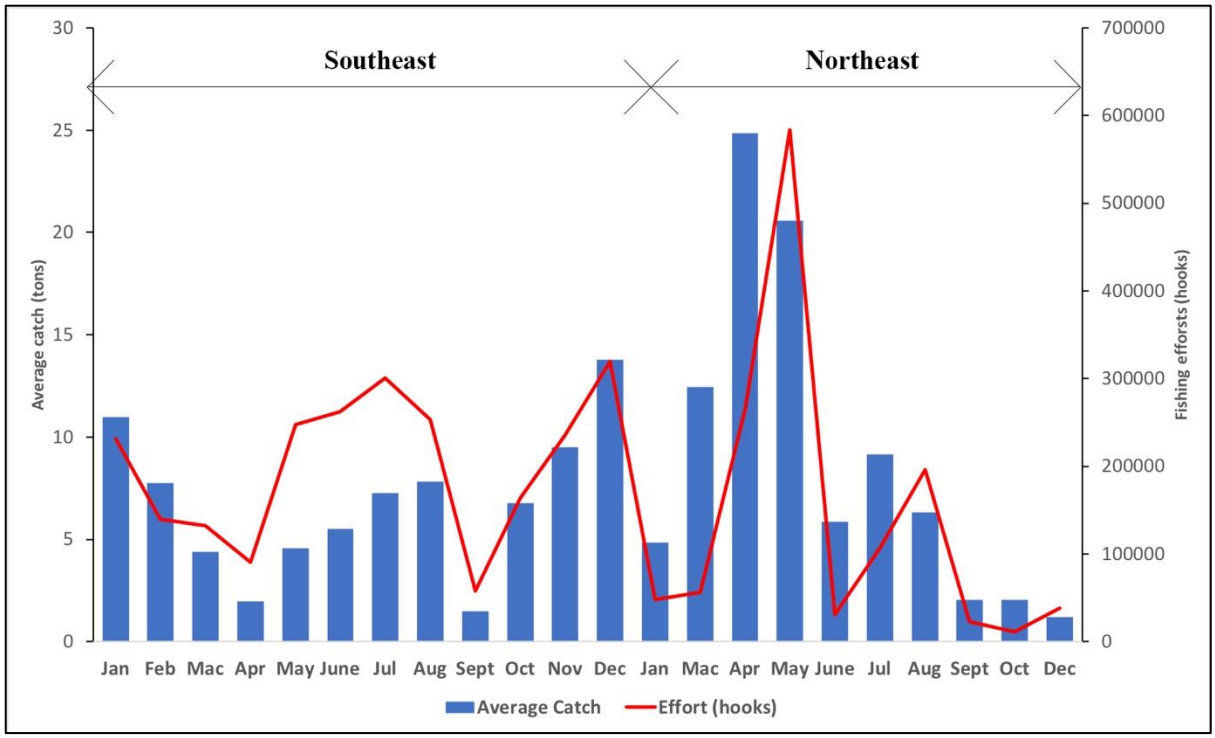

Figure 4: mean monthly catches of billfishes by Malaysian tuna longliners according to Northeast and Southeast Indian Ocean from 2013 to 2017
(Southeast: Quadrant IOTC Code: 1; Northeast: Quadrant IOTC Code: 2)

Discussion

In 2017, landing of marlin was four times over from 2013, showing an increase about 40% compare to 2013, meanwhile for swordfish, 15% greater than 2013 landing. The increasing of landing data towards the end of 2017 was also because of the area of fishing operation was also covered the Northeast Indian Ocean. Due to the value is relatively high, the demand of these fishes will make them as an attractive by-catch, although billfishes are not the primary target of tuna longliners.

According to monthly catches, the highest peak periods of billfish landings was around October to January and May to August which may indicate the peak availability of these fishes in some parts of the southern Indian Ocean and may coincide with migration pattern. The monthly fishing efforts also increased during this period indicated that the fishing fleet intensify the fishing operations.

It is important for better understand of their biology, growth, life cycle, location preferences, interaction with environmental parameters and also genetic relationship in the Indian Ocean through information gathering of more data including oceanographic parameters. Therefore, it is recommended to increase the number of billfish caught to obtaining further information on these species. By less of less than 10 years series of data is still not enough to for detailed analysis to be carried out. More detail data should be available for meaningful to describe the variation or pattern of the landing and fishing effort throughout of the year.

Conclusion

The landing of billfishes by Malaysian tuna longliners in the Indian Ocean had showed it trend from 2013 t0 2017 even though this species was not the primary target species by the fishing vessel in the particular area. This indicate their availability of billfishes in the fishing areas and due to its high value, the demand of these fishes will make them as an attractive by-catch. Therefore, it is recommended to update the landing data so that more comprehensive and conclusive research finding can be done in the future.

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