

**CATCH OF BILLFISH BY THAI TUNA LONGLINERS
DURING 2014 - 2015**

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ABSTRACT

Thai tuna longliners operated in the Indian Ocean since 2007. This report was based on the data extracted from fishing logsheets by six Thai tuna longliners which declared to Department of Fisheries, Thailand. Data from their logsheets displayed important information of their fishing operation and effort. Then summarized and calculated the hook rate in Catch Per Unit Effort. During 2011-2015, fishing grounds were mainly in the Western coast of the Indian Ocean, fishing operations were recorded 2,070 fishing days. The highest total catch was in 2015 with 599.72 tonnes followed by 2014, 2012, 2011 and 2013 respectively (571.90, 470.40, 373.44 and 307.74 tonnes). The highest CPUE was found in 2014 with 13.68 fish/1,000 hooks followed by 2015 and 2012, respectively (12.38 and 10.83 fish/1,000 hooks). Billfish were caught 6,853 fishes with 295.31 tons. The average catch rate of billfish were 1.20 individual fish/1,000 hooks and 51.54 kg/1,000 hooks. The percentage of billfish to the total catch is 10.50% by number and 12.71% by weight.

In 2014, billfish were caught 2,264 fishes with 108.72 tons. The average catch rate of billfish were 2.05 individual fish/1,000 hooks and 98.49 kg/1,000 hooks. The percentage of billfish to the total catch is 15.44% by number and 19.01% by weight. The major species of billfish caught by weight were swordfish, black marlin, stripped marlin and blue marlin comprising 72.72, 16.27, 10.32 and 0.69% of the total catch, respectively.

In 2015, billfish were caught 2,250 fishes with 94.62 tons. The average catch rate of billfish were 1.26 individual fish/1,000 hooks and 52.90 kg/1,000 hooks. The percentage of billfish to the total catch is 10.16% by number and 15.78% by weight. The major species of billfish caught by weight were swordfish, black marlin, stripped marlin and indo-pacific sailfish comprising 71.77, 25.37, 2.15 and 0.71% of the total catch, respectively.

INTRODUCTION

Thailand has six Thai tuna longliners. They operated in the Indian ocean and data was collected from logsheets provided to the Department of Fisheries, Thailand. The data included information related to fishing trips and operations. The trip data was composed of dates and ports of vessel departure and return, number and weight of catch and effort (such as the number of hooks used) by species. The fishing operation included data on the time of the operation, location (latitude and longitude), the retained catch of target species and other information related to the operation. The data were provided by the Siam Tuna Fishery Company and Three Wonderful Company. Logsheets were used to estimate annual catches of the longline fleet.

Total catch of billfish, effort and catch rate were analyzed by Excel and illustrated using Surfer software.

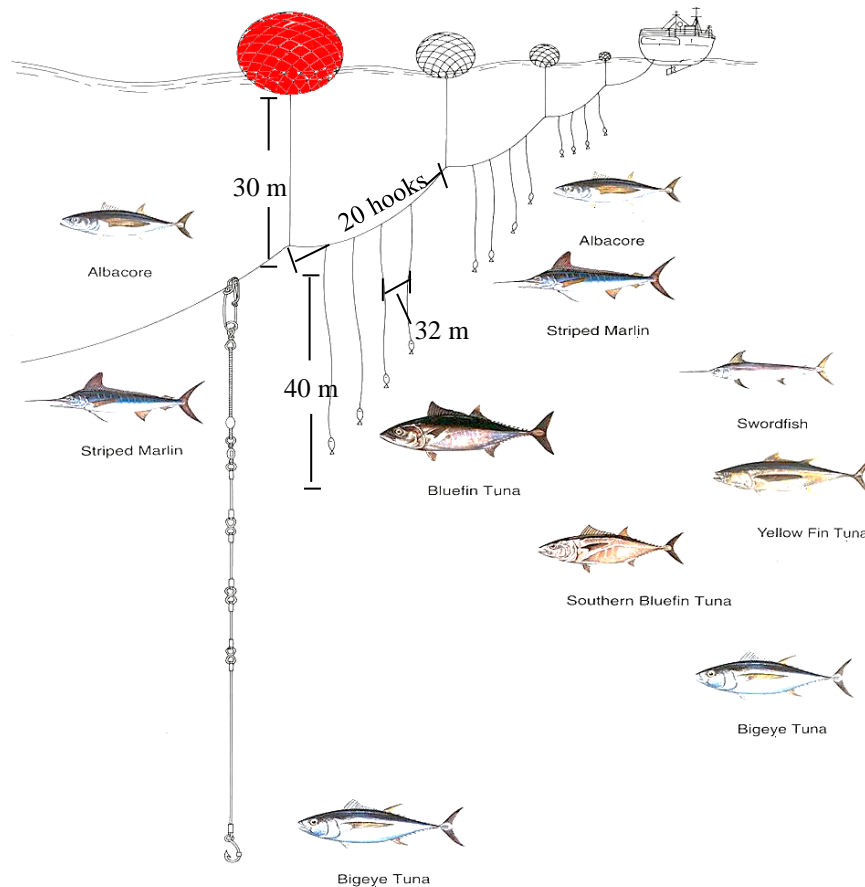


Figure 1 Structure of tuna longline arrangement

2. Fishing Ground

Thai tuna longliners operated in the Western Indian Ocean since 2007 after that were distributed around central and southern part of the Indian Ocean during 2011-2015. In 2015 Thailand have six tuna longline vessel. (Figure 2)

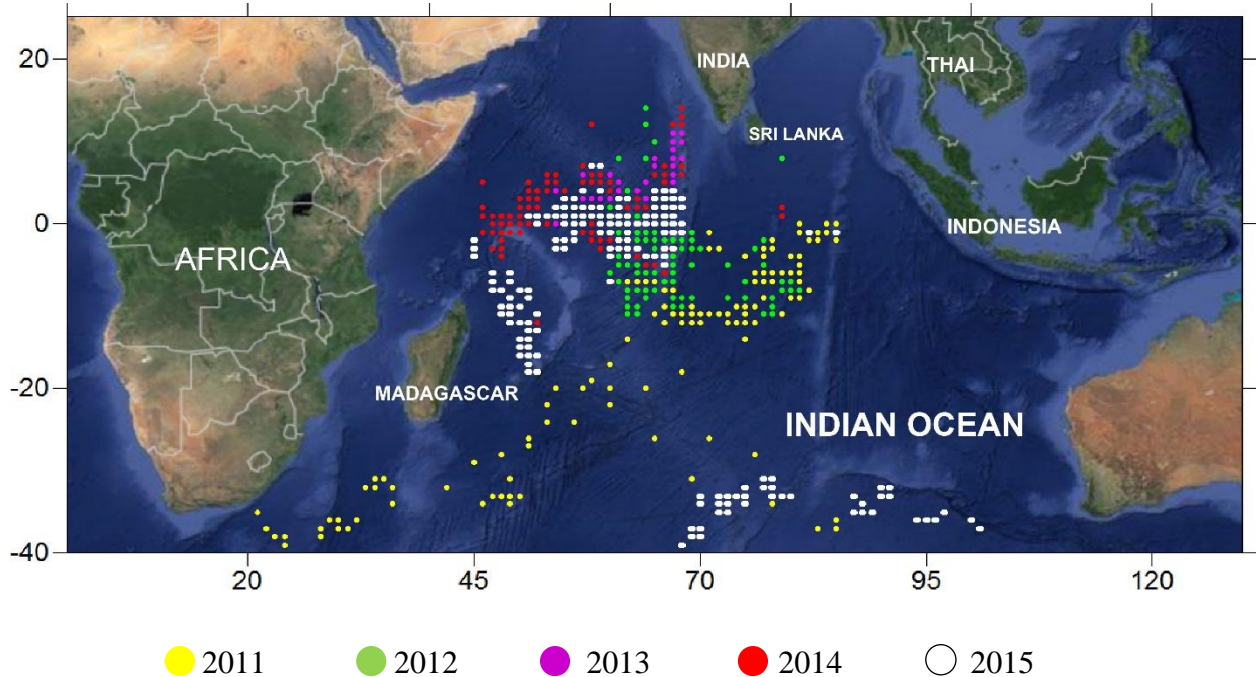


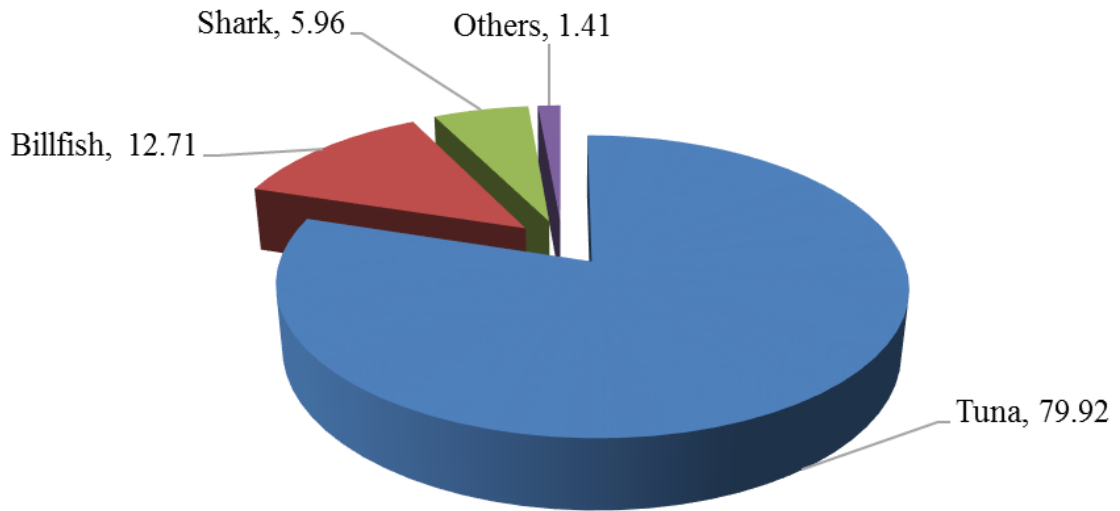
Figure 2 Fishing ground of Thai tuna longliners during 2011-2015

3. Fishing efforts, catches, percentage compositions and CPUEs between 2011-2015

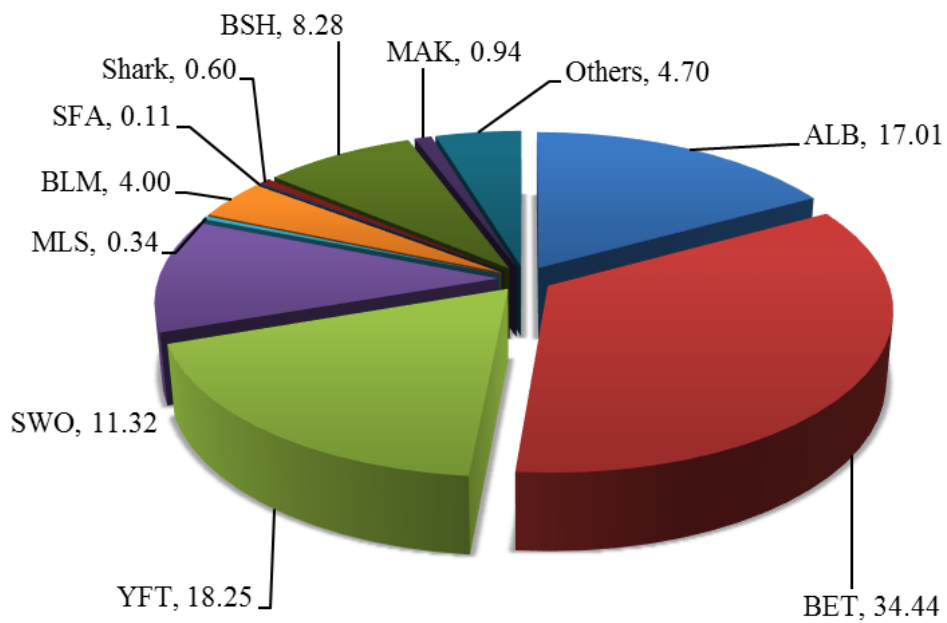
Fishing efforts during 2011-2015 were shown in table 1. The fishing operations were recorded 2,070 fishing days. In 2015, The highest fishing effort 1,788,800 hooks (563 fishing days).

Annual catches in 2011-2015 were estimated 373.44, 470.40, 307.74, 571.90 and 599.72 tonnes, respectively. The major species caught during 5 years were tuna group, billfish group, shark group and other species group which 1,856.64, 295.31, 138.55 and 32.71 tonnes. The average percentage composition by weight of tuna group, billfish group, shark group and other species group which 79.92%, 12.71%, 5.96% and 1.41%, respectively. (Figure 3A) The CPUE have ranged between 9.13 and 13.28 fish/1,000 hooks, and the average CPUE was 11.39 fish/1,000 hooks. The lowest CPUE was in 2011, and the highest CPUE was in 2014. (Table 1)

In 2015, species composition by weight were bigeye tuna (*Thunnus obesus*), yellowfin tuna (*T. albacares*), albacore tuna (*T. alalunga*), swordfish, blue shark, black marlin, mako shark, unidentified shark, striped marlin, Indo-Pacific sailfish and other species which 34.44%, 18.25%, 17.01%, 11.32%, 8.28%, 4.00%, 0.94%, 0.60%, 0.34%, 0.11% and 4.70%, respectively. (Figure 3B)



(A) Catch composition by weight during 2011-2015



(B) Species composition by weight in 2015

Figure 3 Catch composition by weight

Table 1 Fishing effort, annual catches and CPUEs of Thai tuna longliners

Year	Fishing days	Total Number of Hooks	Total Number of fish	Total Number of billfish	Catch weight (Tonnes)						CPUE (fish/1,000 hooks)	CPUE of Billfish (fish/1,000 hooks)	
					ALB	BET	YFT	Sharks	Billfish	Other species			Total
2011	372	1,049,400	9,583	291	11.44	248.48	92.12	5.41	15.99	0.00	373.44	9.13	0.28
2012	388	1,083,600	11,732	736	2.73	342.18	81.92	18.53	25.05	0.00	470.41	10.83	0.68
2013	363	704,400	7,157	1,312	1.38	207.78	41.88	5.78	50.93	0.00	307.74	10.16	1.86
2014	384	1,103,900	14,663	2,264	13.91	270.87	123.91	49.95	108.72	4.54	571.91	13.28	2.05
2015	563	1,788,800	22,148	2,250	102.02	206.56	109.45	58.88	94.62	28.17	599.70	12.38	1.26
Total	2,070	5,730,100	65,283	6,853	131.47	1,275.88	449.28	138.544	295.31	32.71	2,323.20	11.39	1.20

4. Billfish

During 2011-2015, the fishing grounds of billfish were mostly around central and southern part of the Indian Ocean (Figure 4). Billfish were caught 6,853 fishes with 295.31 tonnes. The CPUE of billfish were 1.20 fish/1,000 hooks and 51.53 kg/1,000 hooks. The percentage of billfish was 10.50% by number and 12.71% by weight.

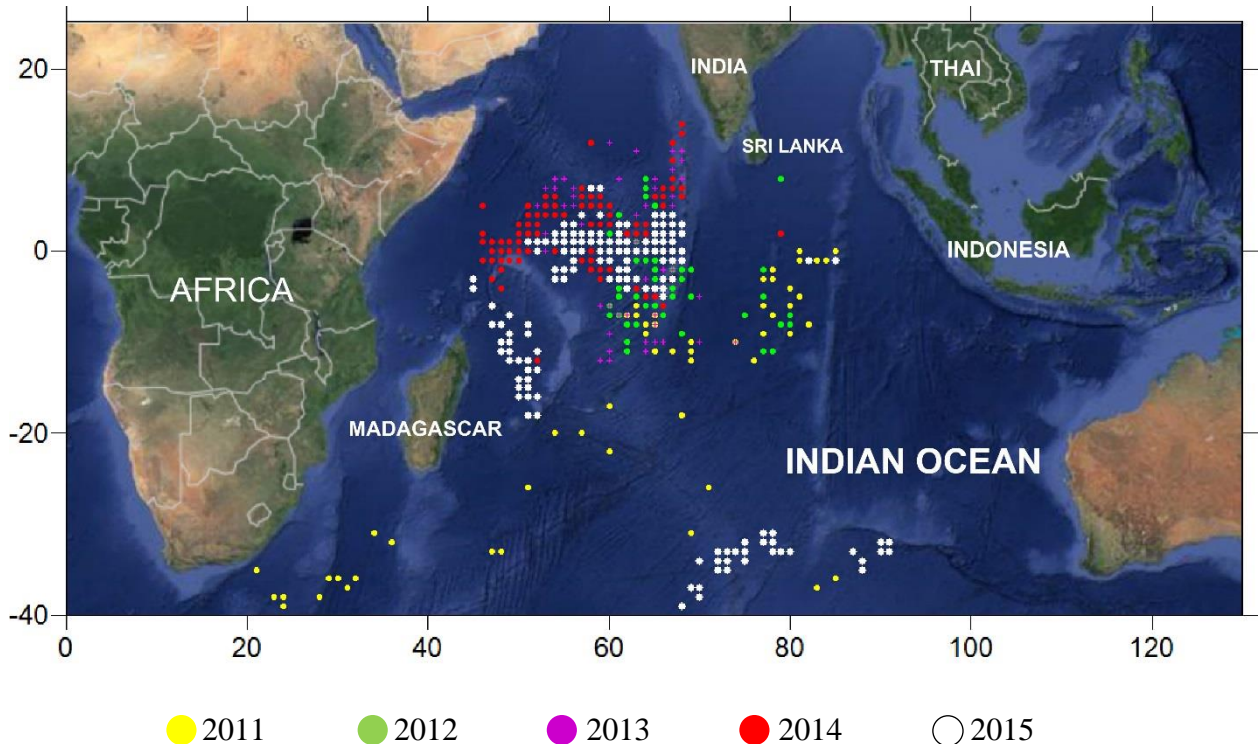
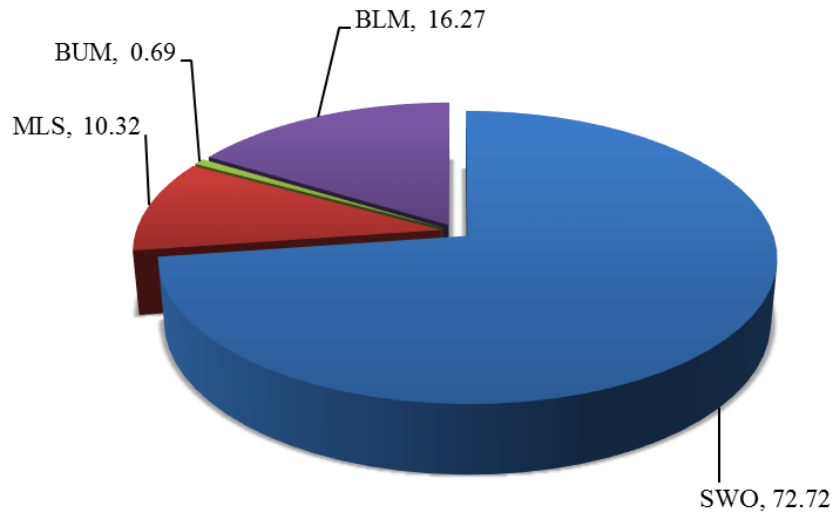


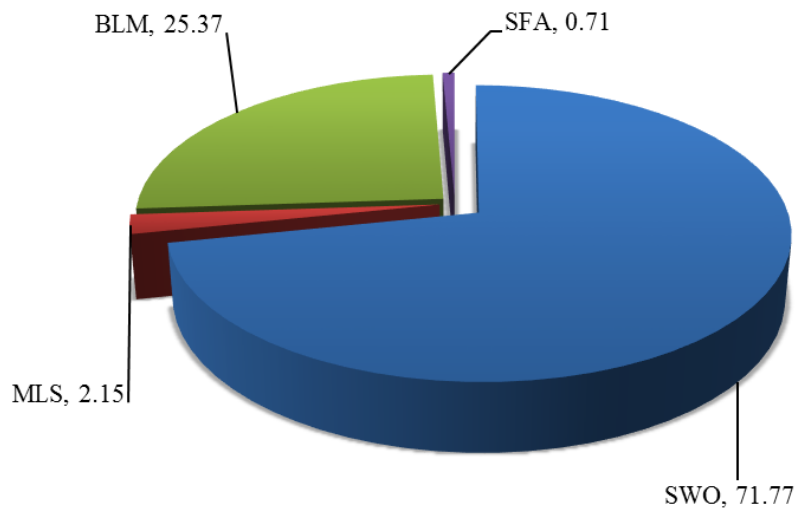
Figure 4 Fishing ground of Billfish during 2011-2015

In 2014 Thailand initiate to collect the data caught of billfish by species, billfish were caught 2,264 fishes with 108.72 tons. The major species of billfish caught by weight were swordfish, black marlin, stripped marlin, and blue marlin were 72.72%, 16.27%, 10.32% and 0.69% of the total catch, respectively. (Figure 5A) The average catch rate of billfish was 2.05 fish/1,000 hooks and 98.49 kg/1,000 hooks. The highest catch rate was found in March while the lowest catch rate was in December.

In 2015, Swordfish and Stripped marlin can be caught in central and southern of the Indian Ocean while Black marlin and Indo-Pacific Sailfish only caught in central of the Indian Ocean (Figure 6). Billfish were caught 2,250 fishes with 94.62 tonnes. Species composition of billfish by weight were swordfish, stripped marlin, black marlin, and Indo-Pacific sailfish which 71.77%, 25.37%, 2.15% and 0.71%, respectively. (Figure 5B) The average catch rate of billfish was 1.26 fish/1,000 hooks and 52.90 kg/1,000 hooks. The highest catch was found in May while the lowest catch rate was in July.

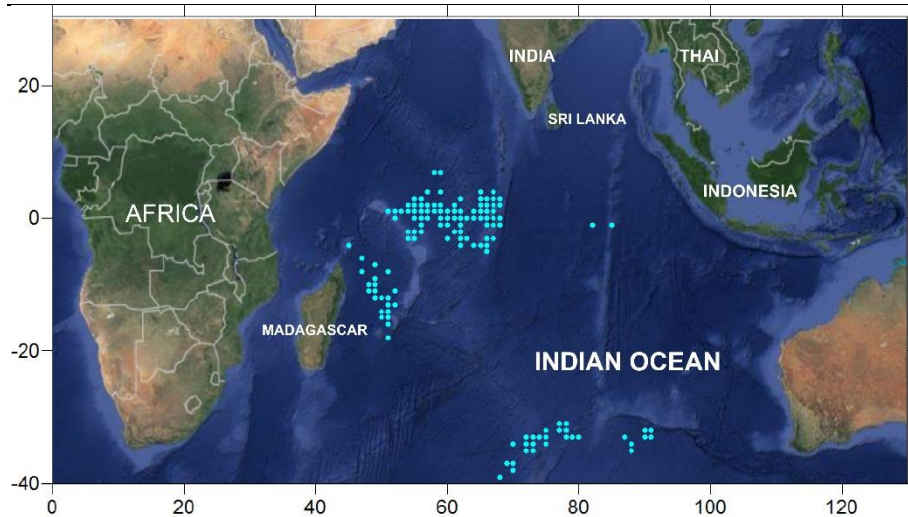


(A) Catch composition by weight in 2014

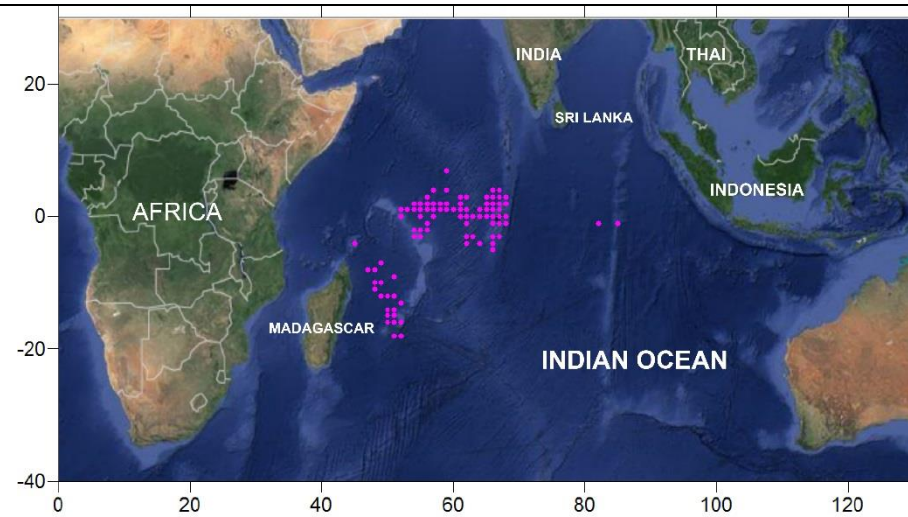


(B) Catch composition by weight in 2015

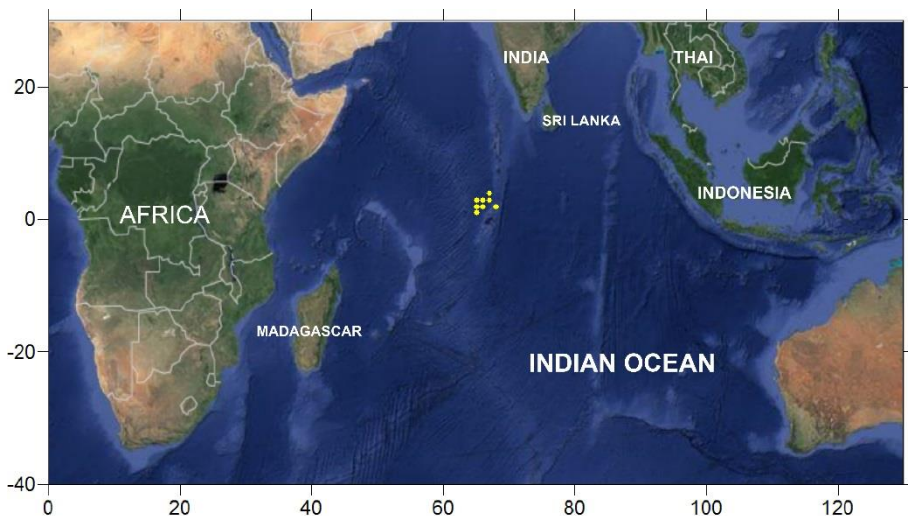
Figure 5 Catch composition of billfish by weight in 2014 and 2015



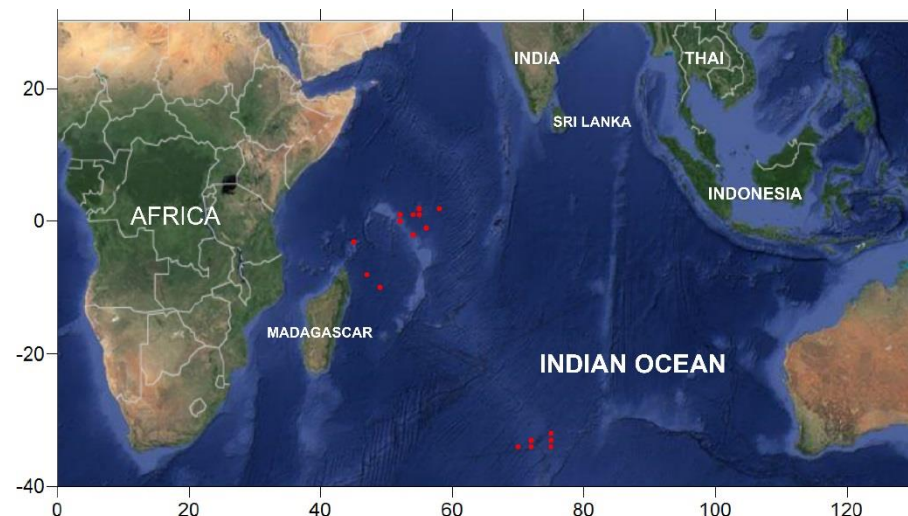
(A) Swordfish



(B) Black marlin



(C) Indo-Pacific Sailfish



(D) Stripped marlin

Figure 6 Fishing ground of billfish in 2015

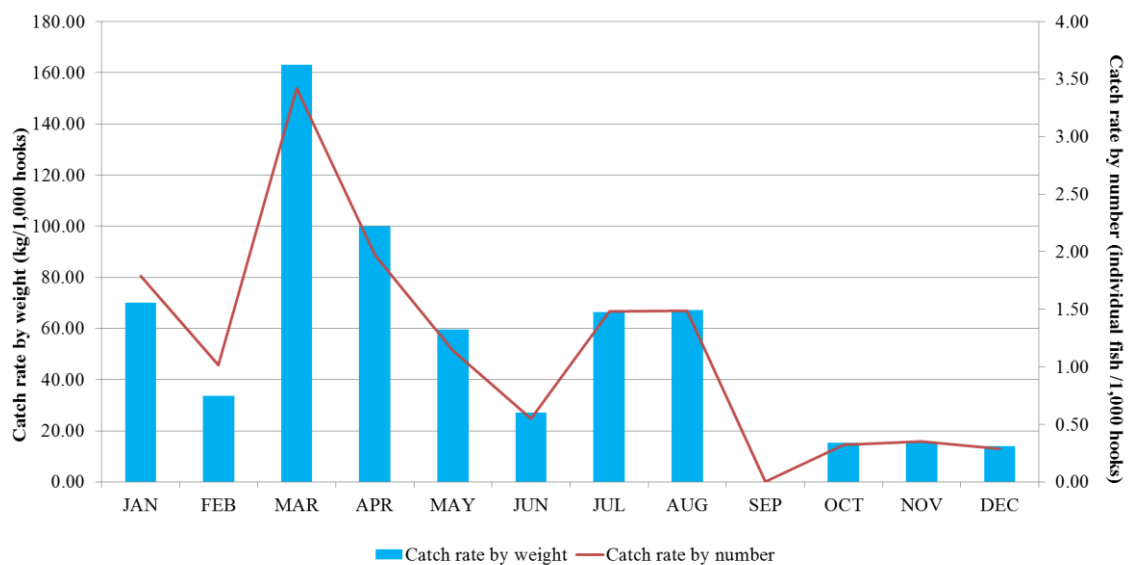
5. Variation of catch rate by species

In 2014, The total catch of swordfish was 1,666 fishes with 79.06 tonnes. The highest catch rate was found in March (3.42 fish/1,000 hooks with 163.11 kg/1,000 hooks) while the lowest catch rate was found in December (0.29 fish/1,000 hooks with 13.86 kg/1,000 hooks). (Figure 7A) The average CPUE of swordfish was 1.51 fish/1,000 hooks with 71.62 kg/1,000 hooks.

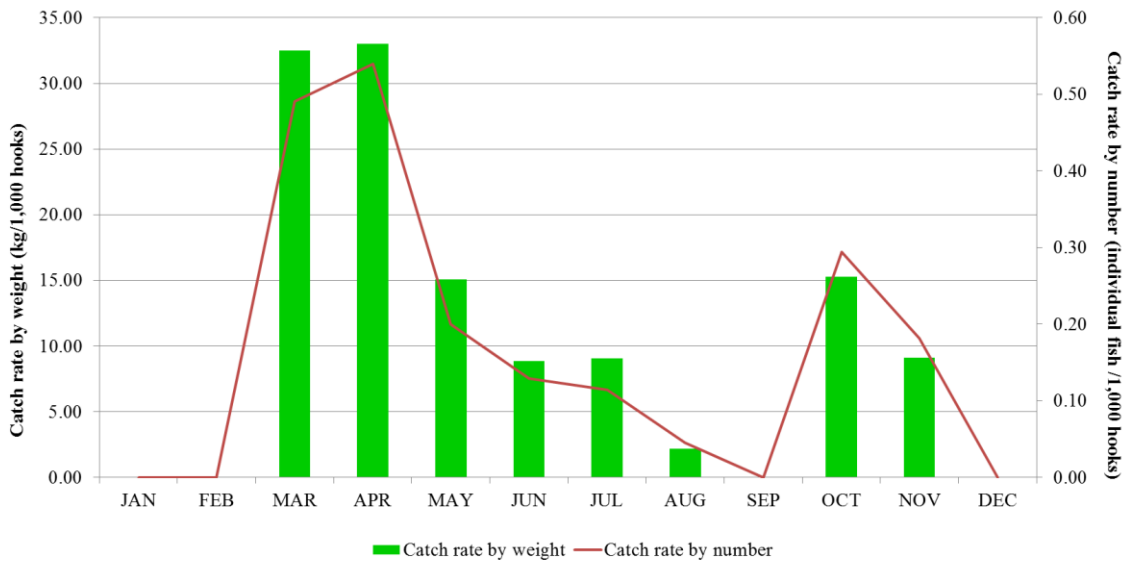
The total catch of black marlin was 273 fishes with 17.69 tonnes. The highest catch rate was found in April (0.54 fish/1,000 hooks with 33.03 kg/1,000 hooks) while the lowest catch rate was found in August (0.05 fish/1,000 hooks with 2.20 kg/1,000 hooks). (Figure 7B) The average CPUE of black marlin was 0.25 fish/1,000 hooks and 16.03 kg/1,000 hooks.

The total catch of blue marlin was 8 fishes with 0.75 tonnes. The highest catch rate was found in July (0.04 fish/1,000 hooks with 3.23 kg/1,000 hooks) while the lowest catch rate was found in May (0.01 fish/1,000 hooks with 0.89 kg/1,000 hooks). (Figure 7C) The average CPUE of blue marlin was 0.01 fish/1,000 hooks and 0.68 kg/1,000 hooks.

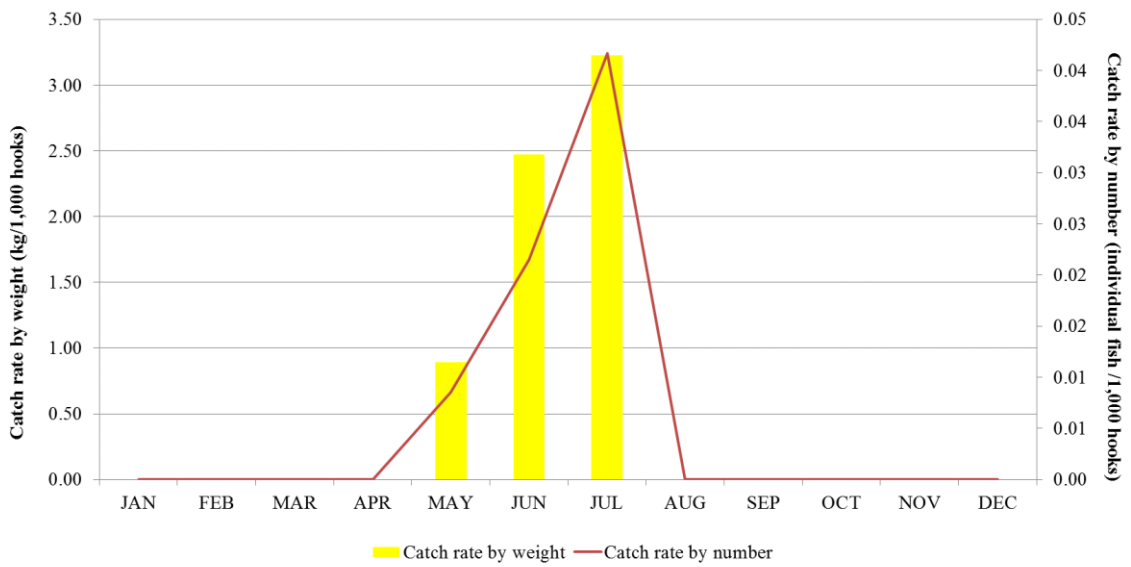
The total catch of striped marlin was 317 fishes with 11.21 tonnes. The highest catch rate was found in March (0.95 fish/1,000 hooks with 37.26 kg/1,000 hooks) while the lowest catch rate was found in November (0.03 fish/1,000 hooks with 1.27 kg/1,000 hooks). (Figure 7D) The average CPUE of striped marlin was 0.29 fish/1,000 hooks and 10.16 kg/1,000 hooks.



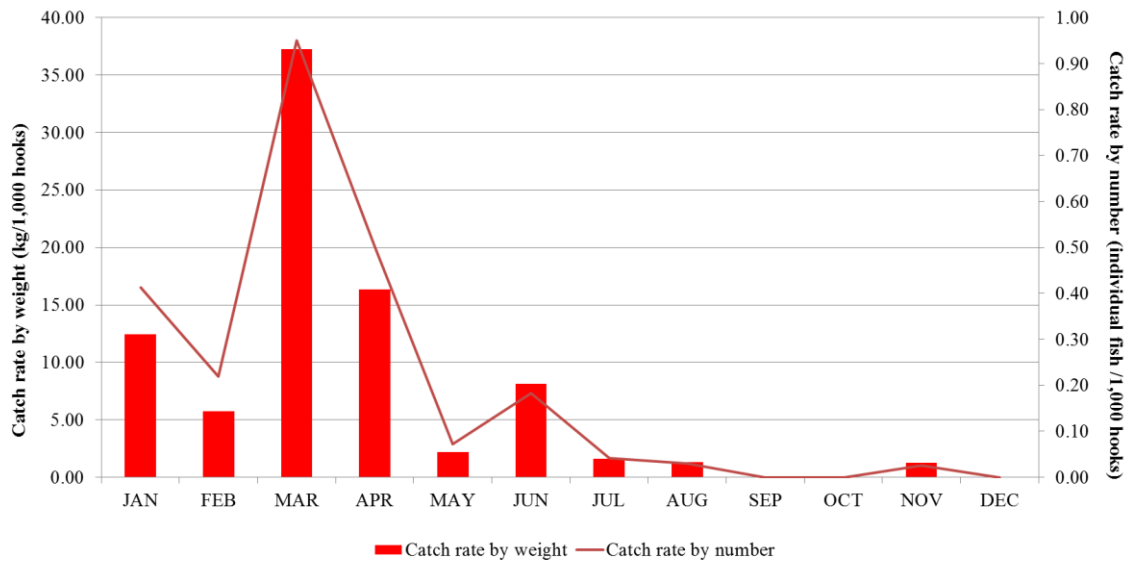
(A) Swordfish



(B) Black marlin



(C) Blue marlin



(D) Stripped marlin

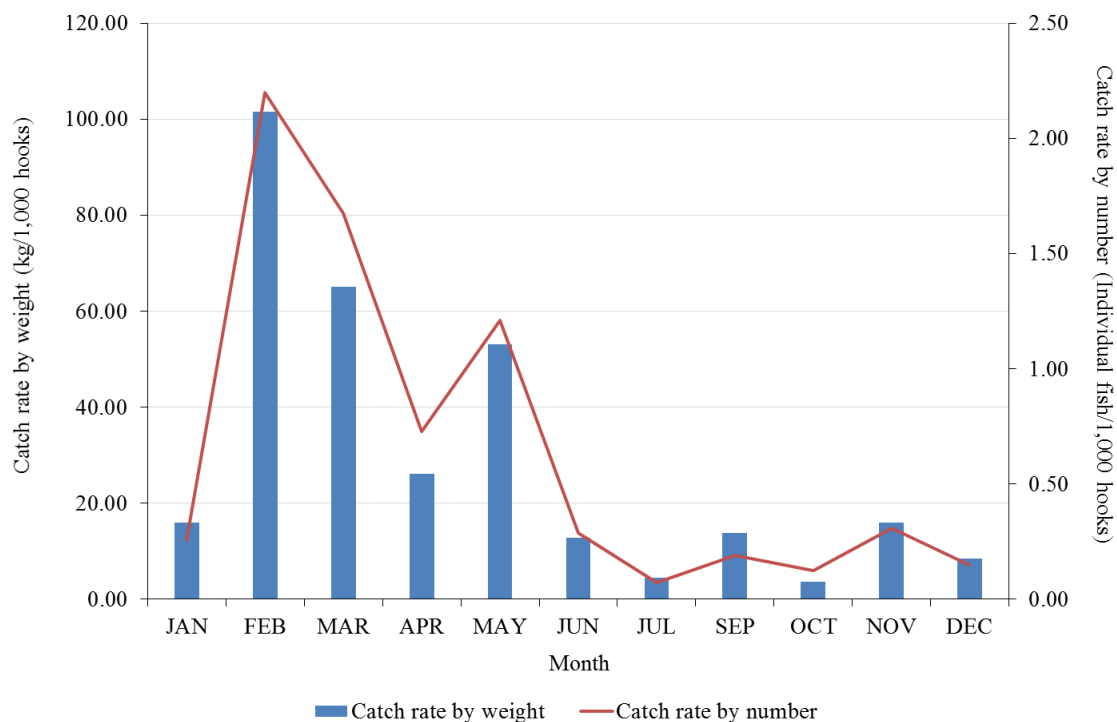
Figure 7 CPUEs of Billfish in 2014

In 2015, The total catch of swordfish was 1,587 fishes with 67.90 tonnes. The highest catch rate was found in February (2.20 fish/1,000 hooks with 101.58 kg/1,000 hooks) while the lowest catch rate was found in October (0.12 fish/1,000 hooks with 3.63 kg/1,000 hooks). (Figure 8A) The average CPUE of swordfish was 0.89 fish/1,000 hooks and 31.96 kg/1,000 hooks.

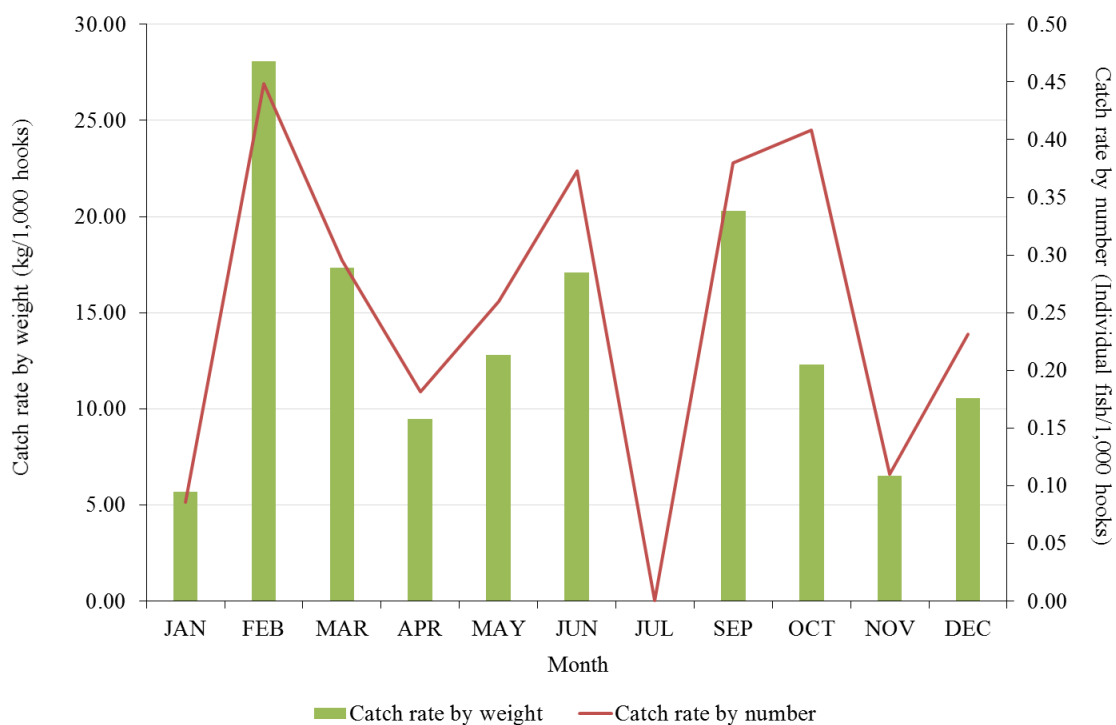
The total catch of black marlin was 489 fishes with 25.00 tonnes. The highest catch rate was found in February (0.45 fish/1,000 hooks with 28.09 kg/1,000 hooks) while the lowest catch rate was found in January (0.09 fish/1,000 hooks with 5.67 kg/1,000 hooks). (Figure 8B) The average CPUE of blue marlin was 0.27 fish/1,000 hooks and 13.98 kg/1,000 hooks.

The Indo-pacific sailfish was found only in March which 28 fishes with 0.67 tonnes. The catch rate of Indo-pacific sailfish was 0.02 fish/1,000 hooks and 0.38 kg/1,000 hooks. (Figure 8C)

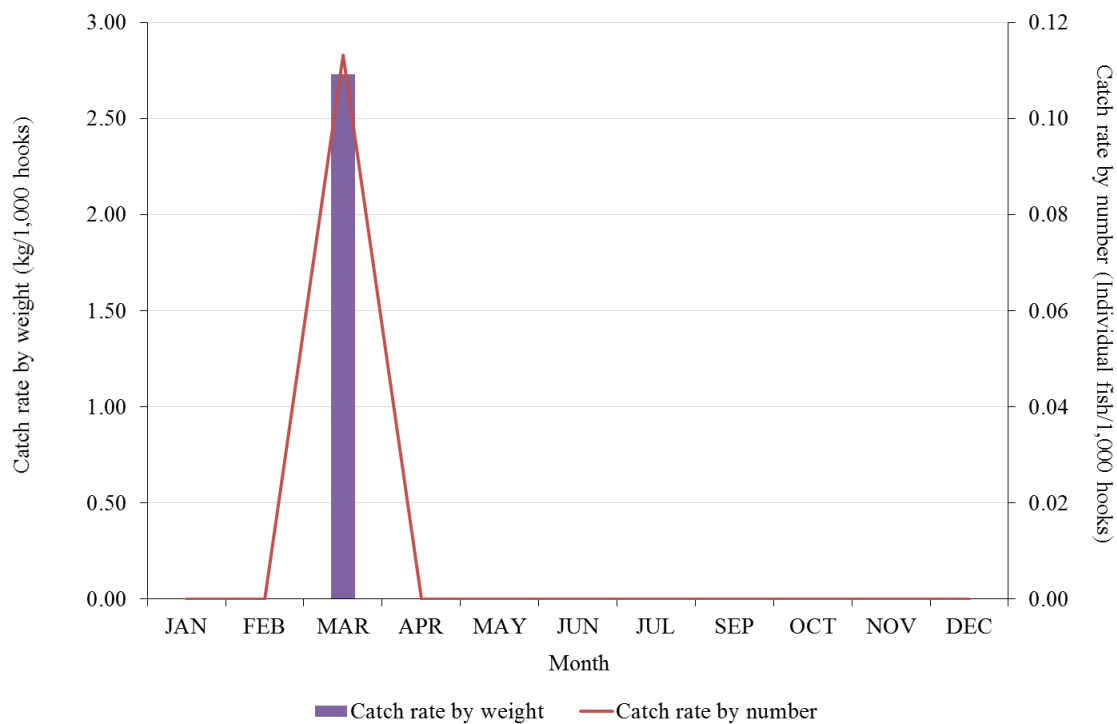
The total catch of stripped marlin was 40 fishes with 2.03 tonnes. The highest catch rate was found in May (0.07 fish/1,000 hooks with 3.63 kg/1,000 hooks) while the lowest catch rate was found in April (0.01 fish/1,000 hooks with 0.28 kg/1,000 hooks). (Figure 8D). The average CPUE of stripped marlin was 0.02 fish/1,000 hooks and 1.14 kg/1,000 hooks.



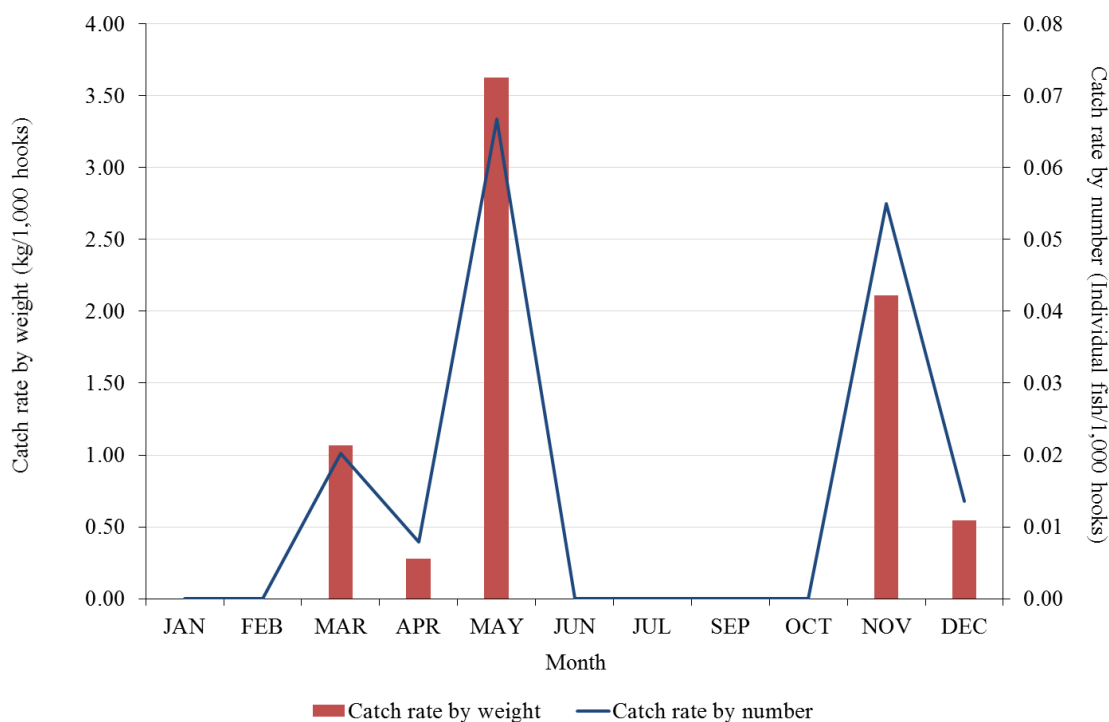
(A) Swordfish



(B) Black marlin



(C) Indo-Pacific Sailfish



(D) Stripped marlin

Figure 8 CPUEs of Billfish in 2015