

Information on the catch of shortfin mako (*Isurus oxyrinchus*) caught by Japanese longline fishery in the Indian Ocean after 2018.

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Summary

The fishing effort and catch of shortfin mako by Japanese longline fleet in the Indian Ocean after the previous stock assessment in 2020 were summarized, and the activity and the fate information of this species were also detailed based on the data from logbook and observer program for Japanese longline fishery in the Indian Ocean. Between 2018 and 2022, retained catch decreased rapidly from 2018 to 2020, and kept low level afterward. It was suggested that the decrease of catch was caused by the regulation on this species rather than the decrease of stock. The observer deployment was interrupted since 2020 due to the pandemic of COVID-19 and the chance of observation on this species decreased significantly after the pandemic. As a result, the amount of data available for the estimation of abundance index became quite few and Japan cannot provide the update of abundance index for the stock assessment of shortfin mako in the Indian Ocean. In addition, the decreased catch (i.e., reported catch) of this stock should be carefully interpreted, because the reported catch is affected by various factors such as a regulation. Continuation of data collection from observer program would provide information useful to monitor the trend of this population.

Introduction

In 2020, stock assessment of shortfin mako (*Isurus oxyrinchus*) in the Indian Ocean was conducted using several types of stock assessment models, such as CMSY and JABBA (IOTC 2020). Estimates from the base case for JABBA suggested that the shortfin mako in the Indian Ocean is experiencing overfishing but is not overfished. But the management recommendation based on the stock assessment results was not provided due to several fundamental issues such as model misspecification and high uncertainty in the nominal catch.

For the stock assessment, Japan provided the standardized annual CPUE and catch estimates of this population from 1993 to 2018, based on filtered logbook data (Kai and Semba 2019). The catch was estimated by multiplying the standardized CPUE with fishing effort and the estimated annual catches increased in the beginning of 1990s and reached at peak in 1996 (5,217 ton) due to the increase in the fishing effort as well as the high catch rates of SMA. The catch largely fluctuated between 2,358 ton (1998) and 5,082 ton (1999) until 1999, followed by rapid decrease of catch to 28 ton in 2018, probably due to the decrease of fishing effort and low CPUE (Kai and Semba 2019).

This document paper briefly reports the annual catch trend of this stock, caught by Japanese longline fleet with the information obtained from Japanese observer program in this area since 2018.

Materials and methods

Number of hooks deployed, retained catch number, and nominal CPUE for the retained catch in the Indian Ocean

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were calculated by year, based on logbook data of Japanese longline fishery between 2018 and 2022. The activity of Japanese observer program in the Indian Ocean and the fate of shortfin mako recorded in this program was also summarized for the same period. Due to the pandemic of COVID-19 since 2019, the deployment of observer on board for longline fleet in distant water was stopped or dramatically decreased and the amount of available data was limited.

Results and Discussion

Annual number of hooks deployed, retained catch number and the nominal CPUE (for retained catch) were shown in Table1 and Figure 1. Fishing effort in 2018 was about 22 million hooks and it decreased to 20 million hooks in 2019, while it increased again to the similar level as 2018 afterward. On the contrary, both retained catch and corresponding nominal CPUE rapidly decreased from 2018 to 2020, which remained at low level afterward.

Observer data is one of the useful sources to evaluate the abundance trend, because it reports not only retained catch but also released individuals. Since 2018, observed hook number in the Indian Ocean was between 1.7 and 2.0 million, but the activity almost “stopped” in the Indian Ocean after 2020 due to the spread of COVID-19 (Table 2). Observed number of shortfin mako was above 100 in 2018 and 2019, but 5 individual was reported in 2020, which should be recognized as incomplete record because the observation in this year was partial, and deployment of observer was interrupted.

The absolute retained and released number of shortfin mako and the proportion by fate was summarized by year in Table3. In 2018, the number of retained shark was two-fold of released shark, but the ratio was almost even in 2019 and all sharks were released in 2020. According to the fishing industry related to the distant water longline fishery, live release of shortfin mako has been promoted since around then, in reaction to the international trade of this species was regulated by CITES (coming into force: 26th November 2019).

At present, the retained number of shortfin mako declined after 2018, which may be caused by the change of treatment of this species, rather than the change of abundance, considering the stable or increasing trend of abundance index before 2018 (Kai and Semba 2019) and stable trend of fishing effort for Japanese fleet (Semba 2023). As of 2024, the deployment of observer on distant water longline fishery is recovering to the similar level of 2019. Further data collection of catch and biological information of this species is necessary for the stock assessment via observer program as long as the release of this species continues in the commercial fishery.

Conclusion

Since 2018, the quality of both logbook and observer data, in relation to the shortfin mako caught by Japanese longline fishery in the Indian Ocean, changed due to the COVID-19 and regulation on this species. As a result, the amount of data available for the estimation of its abundance index became quite few and **Japan cannot provide the update of abundance index for the stock assessment of shortfin mako in the Indian Ocean at present.** In addition, **the decreased catch (i.e., reported catch) of this stock should be carefully interpreted, because the reported catch is affected by various factors such as a regulation.** Continuation of data collection from observer program would provide information useful to monitor the abundance trend of this population.

Reference

IOTC 2020. Report of the 16th Session of the IOTC Working Party on Ecosystems and Bycatch.

Kai, M., and Semba, Y. 2019. Estimation of annual catch rates and catches for shortfin mako (*Isurus oxyrinchus*) caught by Japanese longline fishery operated in the Indian Ocean from 1993 to 2018. IOTC-2019-WPEB15-21.

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Table 1. Annual effort, retained catch number, and nominal CPUE of shortfin mako caught by Japanese longline fleet in the Indian Ocean between 2018 and 2022.

Year	Hook number	Retained catch (number)	CPUE
2018	22,207,349	1,420	0.064
2019	19,950,030	819	0.041
2020	21,648,621	80	0.004
2021	22,227,264	124	0.006
2022	20,504,206	104	0.005

Table 2. Summary of activity and reported number of shortfin mako recorded by Japanese observer program conducted in the Indian Ocean between 2018 and 2022.

* Number of set in 2019 was obtained from the cruise deployed in 2019 as a continuation.

Year	Number of vessel (deployed)	Number of set (observed)	Hook number (observed)	Catch number (observed)
2018	16	676	1,717,350	131
2019	20	805	2,039,504	166
2020	0	154*	421,758	5
2021	0	0	NA	NA
2022	0	0	NA	NA

Table 3. Annual absolute number of retained and released shortfin mako (a) and the proportion (b) calculated from the Japanese observer data.

a) absolute number

	2018	2019	2020	2021	2022
retained	100	85	0	NA	NA
released	30	81	5	NA	NA

b) proportion (%)

	2018	2019	2020	2021	2022
retained	77	51	0	NA	NA
released	23	49	100	NA	NA

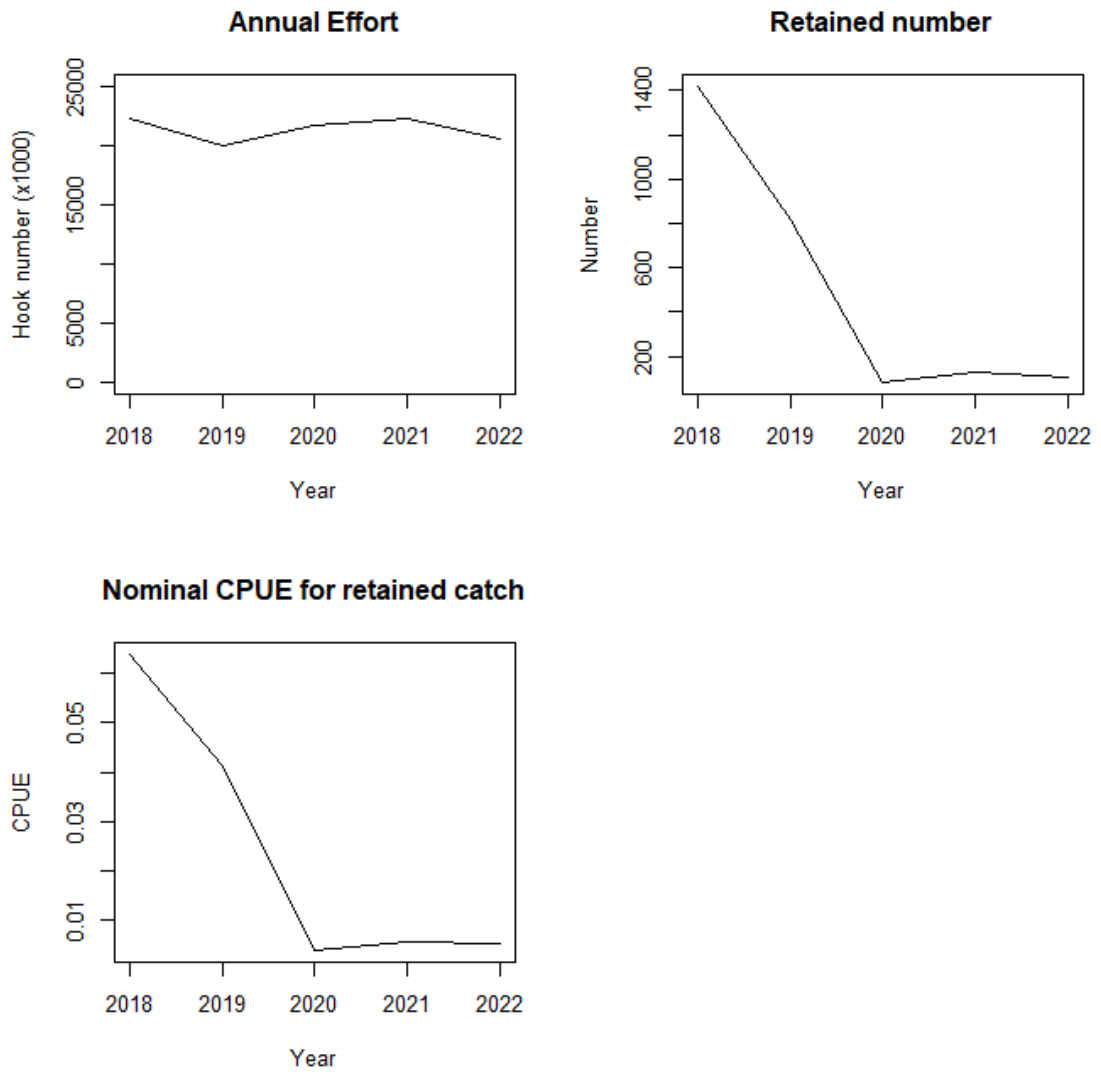


Figure 1. Annual changes in hook number deployed (top left), number of retained catch (top right), and nominal CPUE for the retained catch (below left) of the shortfin mako caught in the Indian Ocean, based on the logbook data of Japanese longline fishery between 2018 and 2022.