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Information Paper submitted by Japan

Japan Japanese Flying Squid Stock Assessment

Abstract

Japan is sharing four domestic stock assessments - blue mackerel (IP03), chub mackerel (IP04), Japanese flying squid (IP05), and Japanese sardine (IP06) for information sharing purpose.





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Japanese flying squid (Winter-spawning stock)

Japanese flying squid is widely distributed around Japan, and this stock is hatched in the East China Sea in winter, migrates northward to the Pacific Ocean, and then migrates southward to the Sea of Japan in autumn and winter. A fishing year (April to March of the following year) is applied to the stock assessment on this stock.



Figure 1 Distribution

This stock is distributed in the Pacific Ocean, the Sea of Okhotsk, the Sea of Japan, and the East China Sea, but the main fishing grounds in Japan are formed in the Pacific Ocean. Spawning grounds are mainly formed in the East China Sea in winter.



Figure 2 Trends in catch

Catch remained at a low level in the 1980s and began to increase since the 1989 fishing season, reaching approximately 400 thousand tons in the 1996 fishing season. Thereafter, the catch remained relatively stable, but has declined significantly since the 2016 fishing season, with a catch of 14,356 tons in the 2022 fishing season with the following composition: Japan, 12,497 tons; South Korea; 1,480 tons; Russia, 379 tons; and China, no catch.



Figure 3: Stock biomass and spawning stock biomass

The stock biomass had generally remained between 500 thousand and 1,000 thousand tons since the 1990 fishing season, but began to decline significantly since the 2015 fishing season, and was estimated to be 135 thousand tons in the 2024 fishing season. The spawning stock biomass (SSB) has been flat for the last five years (2019-2023 fishing seasons) and was 42 thousand tons in the 2023 fishing season. The biomass and SSB for the 2024 fishing season are provisional.





A Beverton-Holt type stock-recruitment relationship (blue thick line) was applied to spawning stock biomass for the 1979-2022 fishing season and recruitment for the 1980-2023 fishing season (biomass of survivors which go through the fishing season corresponds to spawning stock biomass, and recruitment is the number of fish in the following year). The blue dotted line in the figure is the range estimated to contain 90% of the observed SSB and recruitment.

Table 1 Reference points, estimated values and catch

The target reference point (TRP) was estimated at 255 thousand tons, and the limit reference point (LRP) at 145 thousand tons. The fishing ban level was estimated at 16 thousand tons. The 2023 SSB and the maximum sustainable yield were estimated at 42 thousand tons and 144 thousand tons, respectively. The total catch in 2023 was 14 thousand tons.

TRP	LRP	Ban level	SSB in 2023	MSY	Total catch in 2023
255 thousand t	145 thousand t	16 thousand t	42 thousand t	144 thousand t	14 thousand t



Figure 5: Kobe plot

SSB has been below SSB realizing MSY (SSBmsy) since the 2013 fishing season. Fishing mortality (F) was above Fmsy, corresponding to fishing mortality sustaining SSBmsy, in many years since the 1980 fishing season. In the 2023 fishing season, SSB was below LRP but above the ban level, and F was below Fmsy.