

SOME BIOLOGICAL INFORMATION ON SKIPJACK CAUGHT BY
JAPANESE LONGLINE FISHERY IN THE ATLANTIC OCEAN

by

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SUMMARY

Biological information on skipjack caught by the longline fishery in high seas was summarized in this paper. All data were prepared from the results of Japanese longline research cruises. The analysis indicated that large skipjack are very widely distributed in the Atlantic Ocean and that most of the females are in an advance stage of sexual maturity.

RESUME

Le présent document résume l'information biologique sur le listao pris en haute mer à la palangre. Les données ont toutes été élaborées à partir de résultats obtenus lors de croisières japonaises de recherche sur palangrier. L'analyse indique que le listao de grande taille est réparti sur une grande étendue dans l'Atlantique, et que la plupart des femelles se trouvaient dans un état avancé de maturité sexuelle.

RESUMEN

Presenta una síntesis de la información biológica sobre el listado capturado por palangre en alta mar. Los datos proceden de los resultados obtenidos en los cruceros científicos realizados por los palangreros japoneses. El análisis indica que los listados de talla grande están ampliamente distribuidos en el Atlántico, y que la mayor parte de las hembras se encuentra en estado avanzado de madurez sexual.

Skipjack are harvested essentially by surface fisheries in rather marginal portion of high seas. In the Atlantic Ocean, the total catch of skipjack was 113,000 tons, the record catch, in 1974. This drew the special attention of scientists studying tuna resources in the Atlantic Ocean, especially at the Standing Committee on Research and Statistics of the ICCAT annual meeting in 1975. At the meeting, recognizing the lack of biological information of the species, a working group on an intensified Atlantic-wide skipjack research program was organized to take prompt action for the review of past biological data and intensification of future research on skipjack. To comply with this program, this paper is prepared to summarize the biological data on skipjack obtained through longline fishery.

Capture of skipjack by longline fishery is inherently sporadic and negligible in amount. As Miyake (1968) and Marcille and Suzuki (1974) pointed out already, the following characteristics should be taken into account for the interpretation of the pertinent data:

- 1) Selectivity of the gear.... The size of the hook of longline gear is designed for large-sized tunas and billfishes, so that it is too large to capture skipjack. In this regard, only large-sized skipjack are vulnerable to the longline gear. The minimum size of the skipjack caught by longline gear would be around 40 cm in length (Miyake 1968). In addition, the depth of the hooks, sustained at 100-200 meters in depth, is also not suitable to catch skipjack which are usually near surface swimmers.
- 2) Record of skipjack catch.... For the longline fishery, catch of skipjack is not frequent and skipjack itself is fairly lower in economic value. On this account, most of longline fishermen do not always keep record of the skipjack catch in their logbook.
- 3) Influence of strategy of longline boats.... An objective of longliners is not to catch skipjack but to capture specific species of large-sized tunas and billfishes. The fishing strategy of longliners does not consider the catch of skipjack at all. Therefore, even if catch record of skipjack is kept, it cannot be a good index of skipjack abundance or distribution.

Considering the above nature inherent to the skipjack catch by longline fishery, results of longline research cruises in the Atlantic were selected and combined. In these cruises, all fish species including skipjack caught were recorded at reliable extent. By analyzing such data, though the amount is limited, some information on skipjack in the high sea areas of the Atlantic is presented in this study.

1. Source of data

The origin of all available data of experimental and exploratory longline cruises is listed in Table 1. Some of them were already published as cruise reports. Catch record of skipjack was kept at every fishing station and some measurements were made on board.

2. Catch distribution

Because of the limited amount of data, catch records in one degree square were compiled by quarter-of-the-year period (Fig. 1). This catch distribution does not indicate amount of catch. It is pointed out that skipjack caught by longline fishery occur in almost all Atlantic area between 40°N and 35°S in latitude and from coastal waters to central portion of high seas. To mention about the abundance and seasonal change in distribution, it is necessary to accumulate more data.

3. Size composition

Size measurement was made at the positions as indicated in Fig. 2. The data were summarized by two general areas, northern and southern hemispheres, combining all data regardless the time of capture. The size ranged from 44 cm to 92 cm in length (Fig. 3). The individuals of 40-60 cm class were mainly from eastern equatorial Atlantic. Except for 40-60 cm class in the data of northern hemisphere, there is not much difference between two general areas. Most of skipjack caught by longline fishery are older than 3+ years old and larger than those caught by surface fisheries whose major size is between 30-60 cm (1+ and 2+ years old). It should be mentioned that owing to the size selectivity of longline gear this size composition does not reflect the evidence that any smaller-sized skipjack are not distributed in oceanic region.

4. Condition of ovaries

Among individuals the sizes of which were measured, 59 females were accompanied by measurement of gonad weight. These data are plotted as gonad weight against the size in Fig. 4, being interposed by a line of gonad index of 3.0 [ovary weight (g) × 10,000 divided by cube of length (cm) = Gonad Index]. Kawasaki (1965) suggested that minimum size of skipjack at first spawning in the Pacific would be around 40-45 cm. If Atlantic skipjack follow the same size of first maturity, all specimens in Fig. 4 are large enough in size to become matured. As indicated in Fig. 4, most of skipjack female caught by longline fishery are very high in sexual maturation. Further collection of gonad data is essential to obtain information on maturing condition in time and space.

References

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- Marcille, J. and Z. Suzuki 1974: Distribution of skipjack caught by Japanese tuna longline fishery in the Indian Ocean. Far Seas Fish. Res. Lab., Bull. 10; 87-107.
- Miyake, M.P. 1968: Distribution of skipjack in the Pacific Ocean, based on records of incidental catches by Japanese longline tuna fishery. Inter-Amer. Trop. Tuna Comm., Bull. 12 (7); 511-608

Table 1. List of research cruises of Japanese longline fishery in which skipjack observation was made.

<u>Name of the vessel</u>	<u>Period</u>	<u>Remarks</u>
Shōyō-maru	Nov. 1959 - Feb. 1960	Fisheries Agency
Ditto	Oct. 1960 - Dec. 1960	Ditto
Ditto	Nov. 1965 - Jan. 1966	Ditto , Data published.
Ditto	Nov. 1966 - Feb. 1967	Ditto , Ditto
Ditto	Dec. 1967 - Jan. 1968	Ditto , Ditto
Ditto	Nov. 1968 - Jan. 1969	Ditto , Ditto
Ditto	Dec. 1969 - Jan. 1970	Ditto , Ditto
Ditto	Dec. 1970 - Feb. 1971	Ditto , Ditto
Tōkō-maru	Dec. 1956 - Jun. 1957	Fisheries Agency
Kōyō-maru	Dec. 1965 - Jan. 1966	The Shimonoseki College of Fisheries
Sagami-maru	Nov. 1956 - Nov. 1957	5 cruises, Kanagawa Pref. Fish. Exper. Station
Iwaki-maru	Dec. 1964 - Sep. 1966	5 cruises, Fukushima Pref. Fish. Exper. Station
Chiba-maru	Jan. 1966 - Oct. 1966	4 cruises, Chiba Pref. Fish. Exper. Station
Shinmiyagi-maru	Dec. 1967 - Nov. 1968	5 Cruises, Miyagi Pref. Fish. Exper. Station
37 Azuma-maru	May 1969 - Jan. 1970	Fisheries Agency
28 Azuma-maru	Jul. 1971 - Mar. 1972	Fisheries Agency
1 Kaki-maru	May 1973 - Apr. 1974	Japan Marine Fishery Resource Research Center
Ditto	Aug. 1974 - Apr. 1975	Ditto

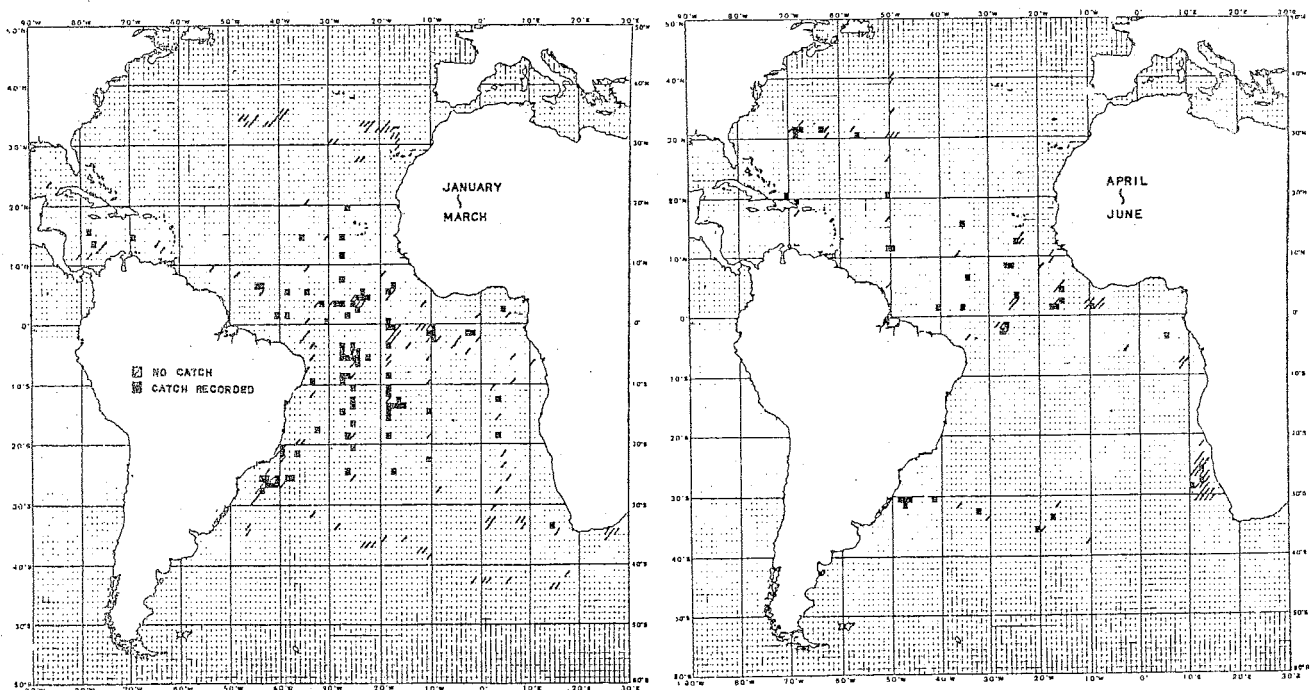


Fig. 1. Catch distribution of skipjack caught by Japanese longline research cruises.

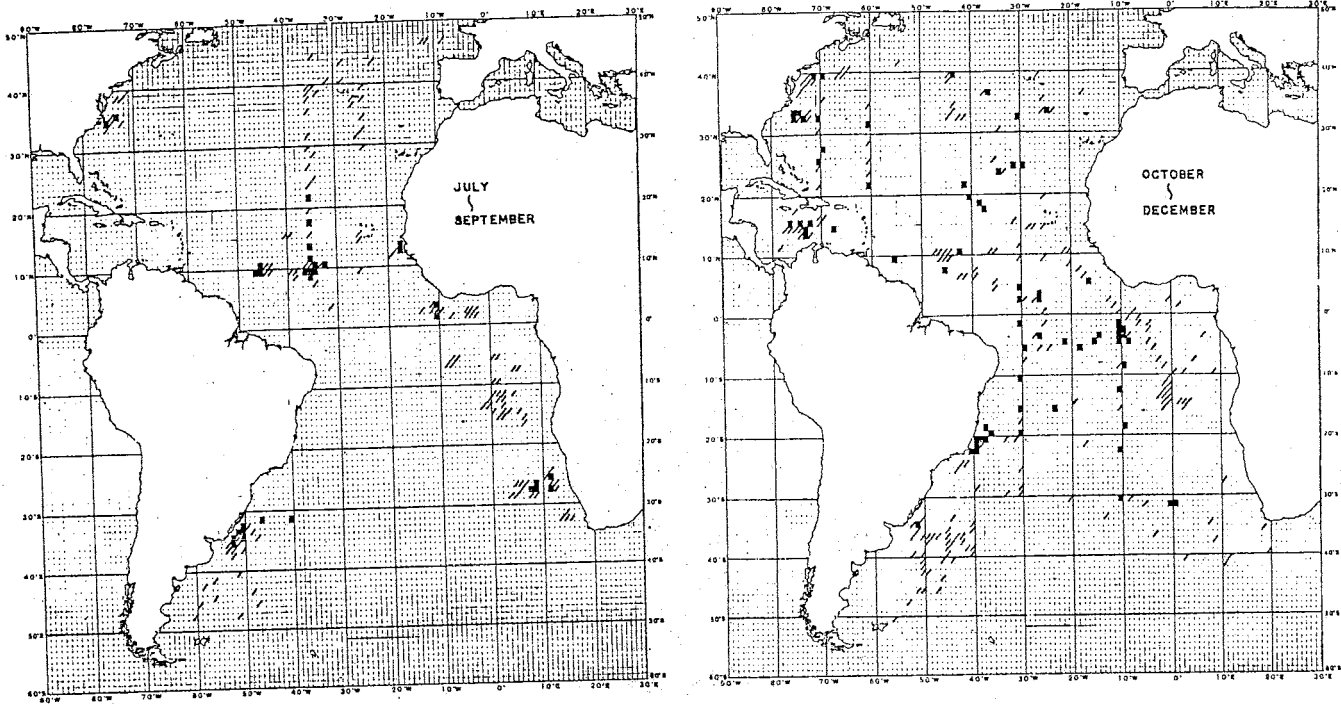


Fig. 1. Continued

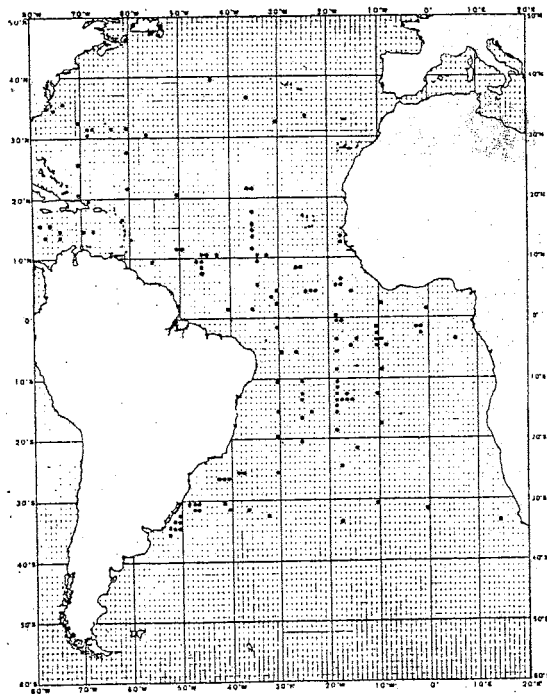


Fig. 2. Locations where skipjack size measurement was conducted by Japanese longline research cruises.

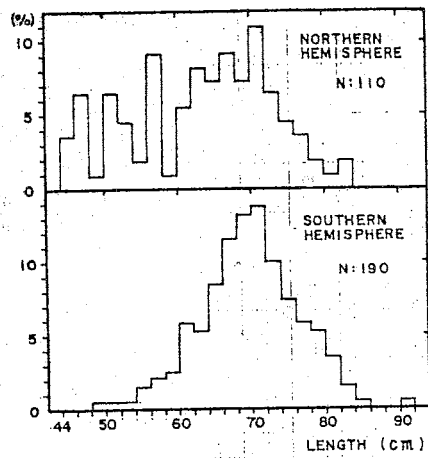


Fig. 3. Size composition of skipjack caught by Japanese longline research cruises in the Atlantic Ocean.

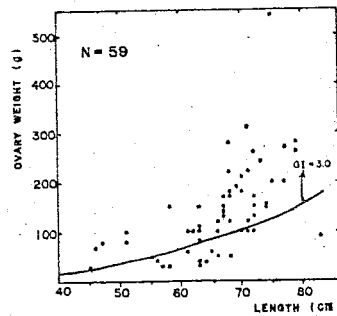


Fig. 4. Scatter diagram showing the relationship between ovary weight and length of skipjack caught by Japanese longline research cruises in the Atlantic Ocean.