A NOTE ON JAPANESE LONGLINE SIZE DATA FOR YELLOWFIN TUNA FOR THE YEARS 1955-1964

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SUMMARY

The Japanese tuna longline fishery in the Atlantic Ocean was initiated in 1955 in the tropical Atlantic Ocean mainly aiming at yellowfin tuna. Recently, the Japanese longline size data for yellowfin tuna measured by research and commercial boats in the early historical years, 1955-1964, were made available. Changes in the length composition from the beginning to the latest year of the fishery were briefly examined for two selected areas.

RESUME

La pêche palangrière japonaise dans l'Atlantique a débuté en 1955 dans l'Atlantique tropical; elle visait surtout l'albacore. Les données palangrières japonaises de taille pour l'albacore mesuré sur des navires de recherche et des bateaux commerciaux pendant la période historique 1955-64 ont récemment été mises à disposition. Les modifications de la composition de taille du début à la dernière année de la pêcherie sont brièvement passés en revue pour deux zones retenues.

RESUMEN

La pesquería palangrera japonesa de túnidos en el Atlántico se inició en 1955, en la zona tropical, dirigida principalmente al rabil. En fechas recientes, se han facilitado los datos de talla del palangre japonés, de peces que han sido medidos en barcos científicos y comerciales durante los primeros años, 1955-1964. Se examinan brevemente los cambios en la composición por talla, en dos zonas seleccionadas, desde el primer año hasta el más reciente.

Introduction

The Japanese longline fishery started the fishing from the areas off Brazil in 1956, mainly targeting yellowfin tuna, and expanded its operations to eastward to the areas off Africa along the equator in the latter half of the 1950s. Since then, the fishing ground has further expanded to the higher latitudes both in the south and north to about 20° in 1960 and to about 40° in 1964. Length data of yellowfin taken by the Japanese longline fleet have been input to the ICCAT data base for the years in and after 1965, when the fishery covered major areas of yellowfin distribution, being compiled by month of the year and lat. 10° x long. 20° areas. The size data sampled in the early period from 1955 to 1964 were compiled according to the same time-area stratum with the data after 1964. These data were measured on board of the research and commercial boats.

Adding these early data to a time series of the historical data, changes of sample length composition of yellowfin from the beginning of the fishery to the present time were briefly analyzed for two areas selected from the major distribution areas of yellowfin.

I. Newly compiled data

Table 1 shows periods of the sampling and numbers of yellowfin tuna measured with which the present compilation were made. Although commercial longline fishery by the Japanese fleet started from 1956, exploratory fishing by research vessel began from the end of 1955 and all the measurements from 1955 to 1960 were obtained from the research vessels. The data from December 1955 to June 1956 were from the Carribean and those for 1957 were from the tropical areas between 10° N and 10° S. Most of the 1960 sample came from tropical areas but small number of yellowfin was measured in the areas as high latitude as 30° N. The sampling was poor from 1959 to 1962 with no data available for 1958 and 1961.

The data from 1962 to 1964 were made available by the commercial longline boats. The sample took place in the areas between 0° and 30° S and

20° E to 40° W in 1962, between 20° N to 20° S and 20° E to 40° W in 1963 and between 30° N to 30° S and 20° E to 80° W in 1964. Most of yellowfin were measured in the tropical areas and off Africa.

II. Changes in the length composition

The Japanese longline fishery in the Atlantic Ocean operated in the tropical areas along the equator in the latter half of the 1950s, within about 20° latitudes both in the south and the north in 1960 and within about 40° latitudes in 1964 (Fig. 1). The major distribution of yellowfin tuna, as shown in Fig. 1., lies in the tropical areas between 20° N and 10° S along the South Equatorial Current.

The historical time series, from the beginning of longline fishery to the present time, of the sample length data is available for the Area 1 (10° N - 10° S, 0° W - 20° W) and Area 2 (10° N - 20° N, 60° W - 100° W) (Fig. 2).

The length composition of yellowfin tuna used in this report were those by month of the year and Lat. 10° x Long. 20° areas, measured on board of the Japanese longline boats and in various unloading ports in Japan during period from 1955 to 1985.

III. Results and discussion

Yellowfin larger than 120 cm form a major component of the longline catch both in Areas 1 and 2. Comparison of the length composition between the two areas since 1967 indicates most of fish range from 120 cm to 140 cm in both areas, with a significant numbers from 140 cm to 160 cm classes in Area 1 and and from 100 cm to 120 cm in Area 2. Annual length composition of yellowfin tuna in Area 1 shows modes in the length class larger than 140 cm during 1956-1957 period and after 1959, a major component between 140 cm and 160 cm with the modes in 120 cm-130 cm and 140-150 cm classes showing no consistent trend of changes. However, the modes became unclear since 1975.

Hook rates of yellowfin and nominal number of hooks in Area 1 showed a very low level since 1975 and a remarkable increase from 1980, respectively (Fig. 3). The low level of hook rates is due probably to rapid increase of yellowfin catch by purse seine fishery (Suzuki 1987) and partly due to development of deep longline operation since the 1980s. These changes in the yellowfin fishery might have related with the appearence of the vague modes since 1975.

In Area 2, the length composition ranged from 100 cm to 160 cm during 1955-1956 and from 120 cm to 160 cm during 1957-1967, respectively. In the years 1970-1976, the length compositions of yellowfin tuna larger than 120 cm decreased and those of smaller than 100 cm increased in comparison to the previous years, and most of yellowfin were within 100-140 cm range. Since 1977, the catch of the smaller fish less than 100 cm were reduced and the mode of composition was in the length class of 120 cm-130 cm. Most of yellowfin were within the range from 120 cm to 140 cm since 1959. In this area, although numbers of hooks used from 1972 to 1978 did not change so significantly, the hook rates of yellowfin tuna showed a slight declining tendency.

In both areas, the hook rates decreased significantly at the beginning phase of the fishery. In Area 2, the fish larger than 140 cm decreased from 1955 to 1959. As most of those larger fish were caught at the beginning of fishery in a large amount, it was considered that hook rates decreased due to the exploitation of the large fish. However, in Area 1, the relation between the decrease of larger fish catch and that of hook rates was not so clear as in Area 2.

Although more detailed analysis based on smaller time area stratum and based on catch by size required, there is a significant difference in the CPUE trend between the two Areas.

References

Honma M. and K. Hisada 1971: Structure of yellowfin tuna population in the Atlantic Ocean. Bull. Far Seas Fish. Res. Lab. (4): 93-124.

Suzuki Z. 1987: A study of interaction on yellowfin between longline and purse seine fisheries in the eastern Atlantic Ocean. ICCAT, CVSP 26(1), p. 15-26.

Table 1. Number of yellowfin tuna measured by the Japanese research and commercial longline boats in the Atlantic Ocean, 1955-1964.

Year	Month of measurement	Fish measured
1955	Dec.	86
1956	Feb.- June & Nov., Dec.	4,511
1957	Jan.- July & Sep.- Dec.	10,487
1959	Nov., Dec.	357
1960	Oct.- Dec.	290
1962	Nov.	359
1963	Feb. & May- Dec.	5,327
1964	Feb.- Dec.	3,208

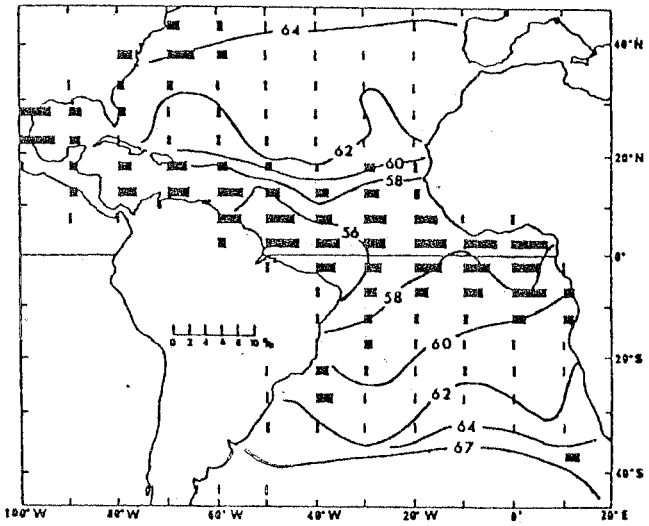

Fig. 1. Average relative abundance of yellowfin tuna during period 1961-1965 and the expansion of the Japanese longline fishery. Numbers in the Figure indicate the last two digits of the year showing expansion of the longline fishing ground. (Modified from Honma and Hisada, 1971)

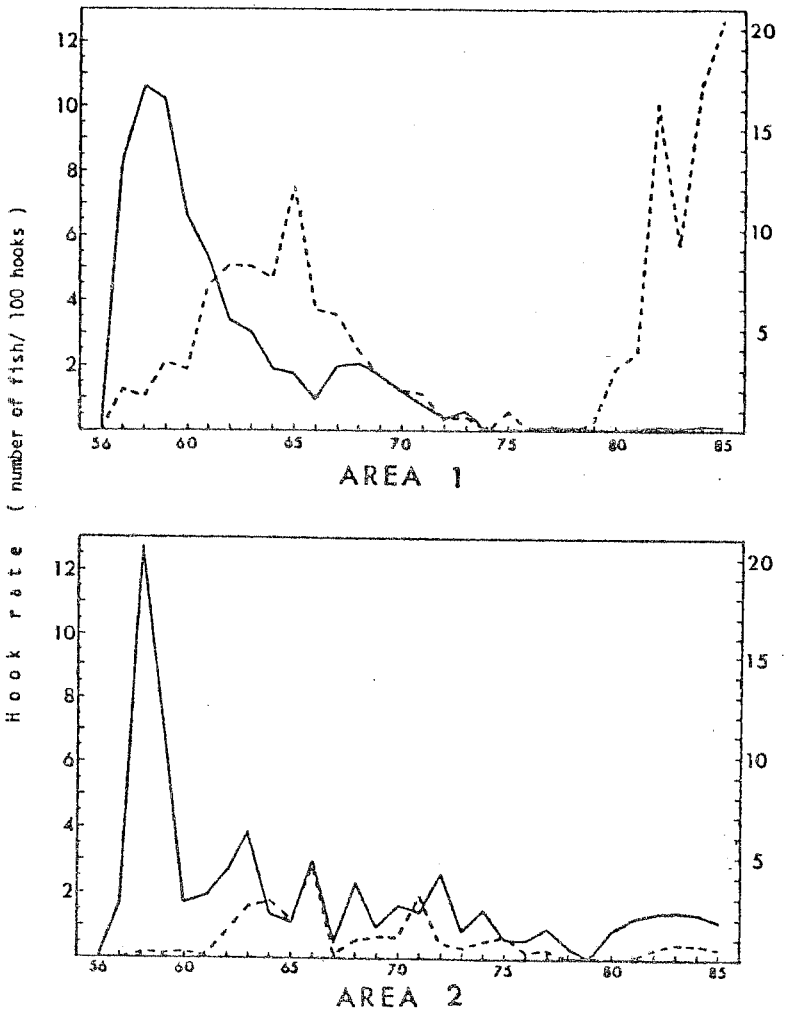

Fig. 3. Annual trend of hook rates for yellowfin tuna (catch per 100 hooks, solid line) and nominal number of hooks (broken line) for the Japanese longline fishery in Area 1 and Area 2, 1956-1985.

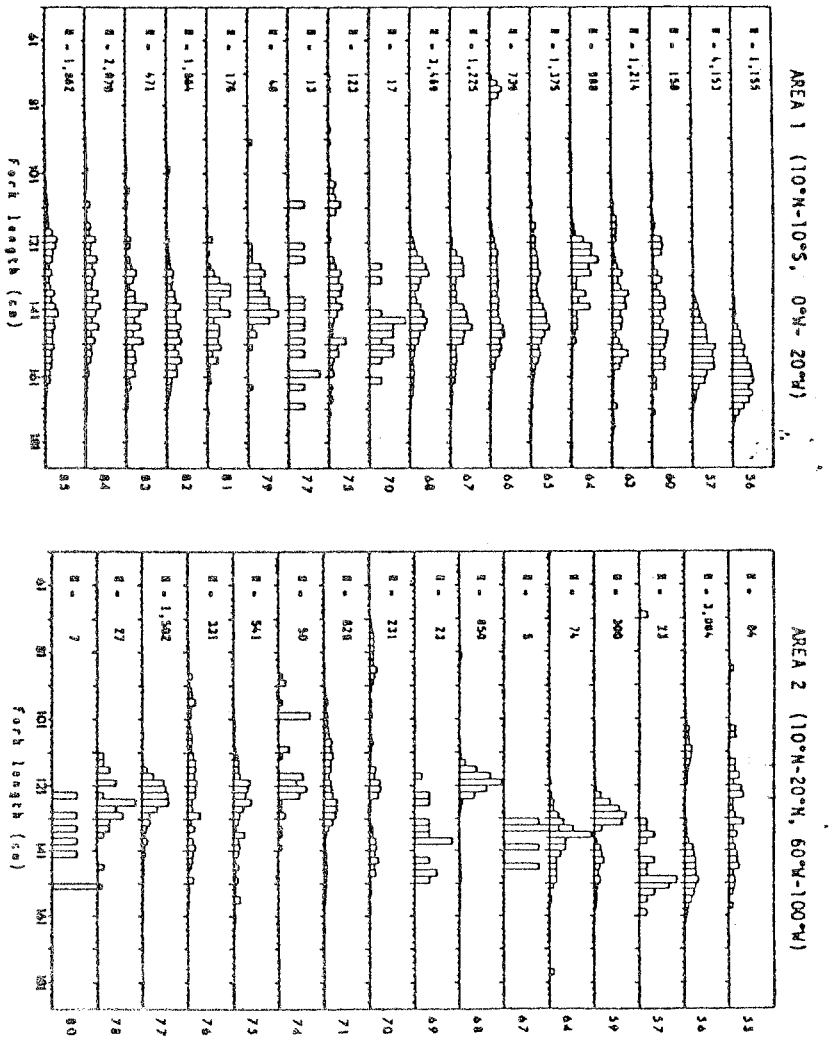

Fig. 2. Annual percentage frequency of length composition for yellowfin tuna by 2 cm, taken by the Japanese research and commercial longline boats in Area 1 and Area 2, 1955-1985. Number of sample and year are shown in the left and the right sides of the Figure, respectively.