

OVERALL FISHING INTENSITY OF JAPANESE ATLANTIC LONGLINE FISHERY FOR BIGEYE TUNA, 1956-1972

by  
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SUMMARY

In 1972 fishing intensity of longline fishery on bigeye tuna stayed on high level in the Atlantic Ocean. The hook rate showed the same level as that in 1971 when first appreciable decline was observed since 1962. It is possible that the fishery would be approaching to the level on which further increase in effort would not result in the proportionally corresponding increase in catch.

This report is the third issue of a series of study on fishing intensity of bigeye tuna exploited by Japanese and other longline fleets in the Atlantic Ocean.

Procedure of the calculations was already described by Honma (1973). The newly added data for 1972 are those provided by ICCAT (1974) on catch in weight and by Fisheries Agency (1974) on Japanese catch in number and effort statistics. The average year in the present calculation extends from 1966 to 1972.

RESUME

En 1972, l'intensité de pêche de la pêcherie palangrière portant sur le thon obèse est demeurée à un niveau élevé dans l'Océan Atlantique. Le taux par hameçon indiquait le même niveau qu'en 1971, date à laquelle se fit sentir la première baisse sensible depuis 1962. Il est possible que la pêcherie approche du point où une augmentation ultérieure de l'effort n'entraînerait pas d'augmentation d'une importance comparable des prises.

Le présent rapport est le troisième d'une série d'études sur l'intensité de pêche portant sur le thon obèse exploité par les flottilles palangrières japonaise et autres dans l'Océan Atlantique.

La méthode de calcul a déjà été décrite par Honma (1973). Les données récemment ajoutées pour 1972 sont celles qui ont été fournies par l'ICCAT (1974) sur les prises en poids et par la Fisheries Agency (1974) sur les statistiques japonaises de capture en nombre et d'effort. L'année moyenne considérée dans les présents calculs va de 1966 à 1972.

RESUMEN

La intensidad pesquera de la pesquería de patudo con palangre, en 1972, permaneció a un nivel elevado en el Oceano Atlántico. El índice de capturas por anzuelo permaneció al mismo nivel que en 1971, año en que se apreció un sensible descenso desde 1962. Seguramente la pesquería se está aproximando a un nivel en el que un posterior aumento del esfuerzo no redundará en un aumento proporcional de la captura.

Este informe es el tercero de una serie de estudios en relación con la intensidad pesquera ejercida sobre el patudo, explotado por la flota japonesa y otras flotas palangreras en el Oceano Atlántico.

Honma (1973) ya describió el sistema de los cálculos. Los nuevos datos recientemente añadidos correspondientes a 1972 han sido facilitados por ICCAT (1974), en cuanto a capturas en peso, y por la Administración de Pesquerías de Japon (1974) en cuanto a capturas japonesas en número y esfuerzo. El promedio anual del presente cálculo corresponde al período 1966-1972.

## Catch and effort in Japanese fleet

Catch and amount of effective fishing effort in 1972 remained on a high level after the sharp rise in the previous year, 1971. Hook rate, yearly catch in number divided by yearly sum of effective effort, in 1972 was almost on the same level as that of 1971.

An estimate of "concentration index" on bigeye tuna fishing ground, yearly sum of effective effort divided by number of hooks actually used in the year, has been on increasing trend since 1962, and showed the highest rise in 1972 (Fig. 1). This trend indicates that recent Japanese longline fleet have been paying greater concerns on bigeye tuna in species preference.

## Effort of whole fleet

Detailed catch and effort statistics, Task 2 in SCRS, have not been made available on the non-Japanese longliners. Therefore, the fishing intensity of the whole longline fleet has been surmised based on the assumption that all longliners operate as shown by the Japanese statistics. This will cause some bias in the estimation of the whole longline effort.

Yield of bigeye tuna increased with expansion of fishing up to 1971. Lower hook rate in the last two years was experienced on a higher level of effort. The hook rates in 1971 and 1972 were about two thirds of the average of earlier years of 1961-1963. It seems, as was noted in the previous issue, that the declining trend of hook rate and the catch and effort relationship (Fig. 2) are indicative that the fishery would be approaching to the level of maximum sustainable yield.

## References

- Fisheries Agency of Japan 1974. "Annual report of effort and catch statistics by area on Japanese tuna longline fishery, 1972". 279p.
- Honma, M. 1973. "Overall fishing intensity and catch by length class of yellowfin tuna in Japanese Atlantic longline fishery, 1956-1971". Col. Vol. Sci. Pap. vol. 1, 59-77.
- International Commission for the Conservation of Atlantic Tunas 1974. "Statistical Bulletin". Vol. 4.

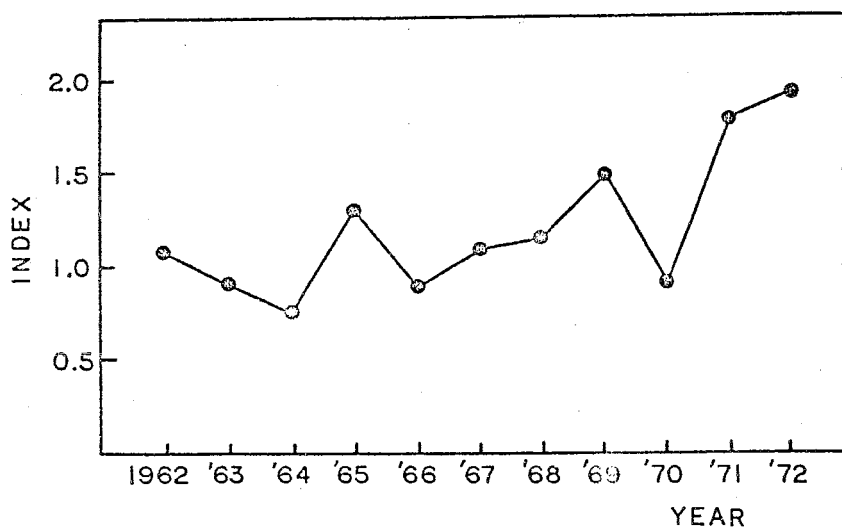


Fig. 1. Concentration index of Japanese longline fishery on bigeye tuna in the Atlantic Ocean, 1962-1972.

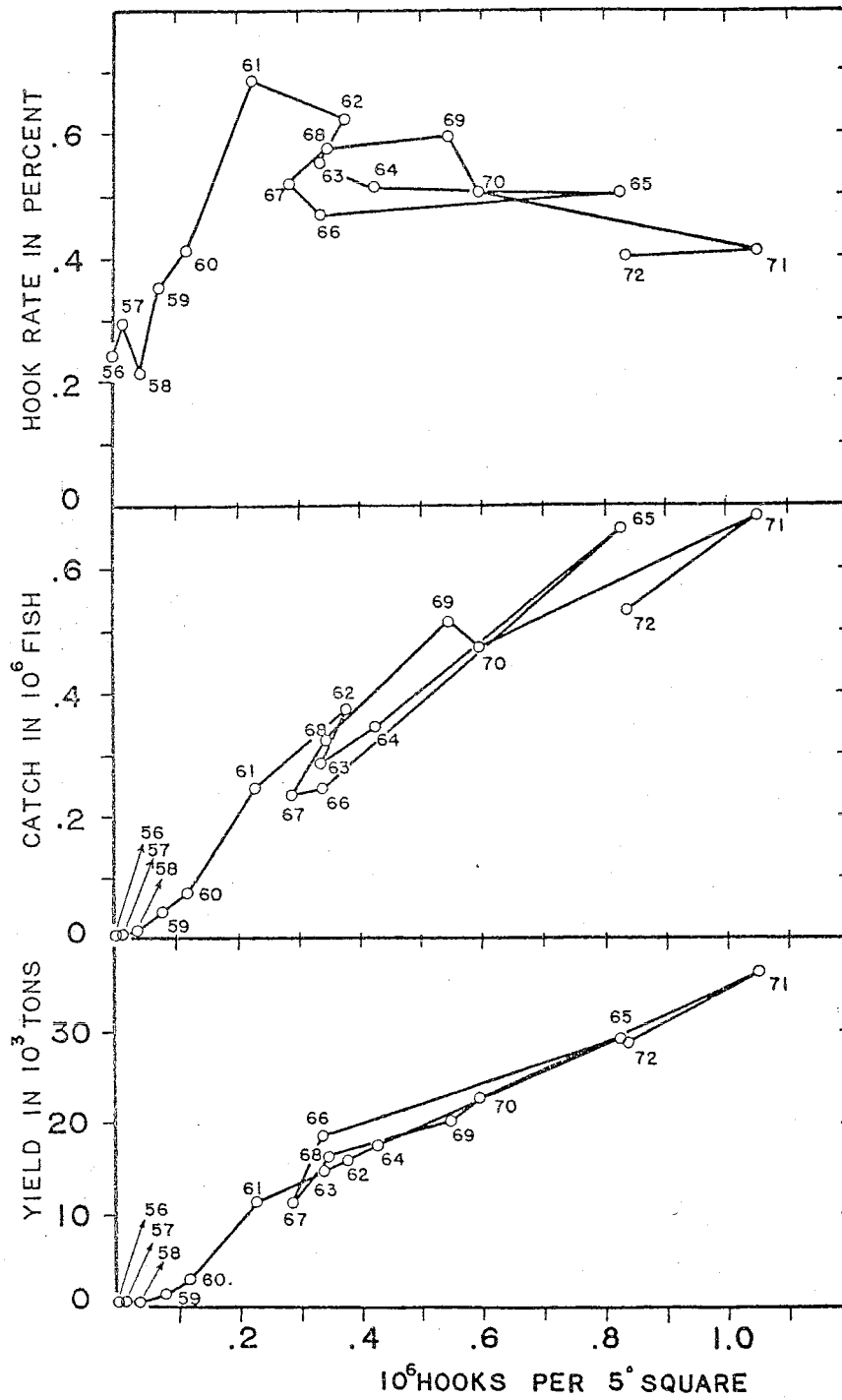


Fig. 2. Density in hook rate, catch in number, and yield in weight of bigeye tuna, against overall fishing intensity in the whole Atlantic longline fishery, 1956-1972.

Table 1. Extent of fishing ground in 5<sup>o</sup> square unit based on "average years from 1966 through 1972", amount of effective effort in thousand hooks (X) and overall fishing intensity in thousand hooks per 5<sup>o</sup> square (f) of Japanese longline fishery for bigeye tuna in the Atlantic Ocean, 1956-1972.

Month	Area	1956		1957		1958		1959		1960	
		X	f	X	f	X	f	X	f	X	f
Total	1,914.44	82	0.5	2,912	17.9	6,894	42.3	12,674	78.4	17,075	106.4
1	165.78	-	-	-	-	588	3.5	907	5.5	687	4.1
2	160.72	-	-	12	0.1	172	1.1	415	2.6	739	4.6
3	131.58	-	-	9	0.1	203	1.5	271	2.1	575	4.4
4	150.53	-	-	62	0.4	176	1.2	556	3.7	1,025	6.9
5	163.38	-	-	221	1.4	424	2.6	905	5.5	1,158	7.1
6	169.12	9	0.0	216	1.3	935	5.5	1,270	7.5	2,205	13.0
7	154.38	3	0.0	382	2.5	625	4.0	1,662	10.8	2,234	14.5
8	157.05	18	0.1	240	1.5	218	1.4	1,298	8.3	1,831	11.7
9	165.01	19	0.1	414	2.5	823	5.0	1,184	7.2	2,023	12.3
10	173.87	25	0.1	457	2.6	1,043	6.0	1,890	10.9	1,331	7.7
11	158.21	2	0.0	294	1.9	661	4.2	1,640	10.4	1,902	12.0
12	164.81	6	0.0	605	3.7	1,028	6.2	675	4.1	1,366	8.3

Month	1961		1962		1963		1964		1965		1966	
	X	f	X	f	X	f	X	f	X	f	X	f
Total	35,369	221.4	59,468	372.2	52,451	330.5	66,665	418.4	127,863	811.0	49,243	314.8
1	1,530	9.2	1,436	8.7	1,644	9.9	1,616	9.7	8,235	49.7	4,508	27.2
2	1,686	10.5	4,540	28.2	4,844	30.1	4,117	25.6	8,168	50.8	9,295	57.8
3	1,129	8.6	3,348	25.4	3,655	27.8	4,837	36.8	11,793	89.6	7,050	53.6
4	1,324	8.8	3,567	23.7	6,005	39.9	4,740	31.5	11,759	78.1	4,372	29.0
5	2,528	15.5	8,060	49.3	8,131	49.8	4,086	25.0	9,001	55.1	3,900	23.9
6	3,291	19.5	3,985	23.6	1,204	7.1	1,684	10.0	8,507	50.3	2,904	17.2
7	6,448	41.8	6,141	39.8	2,300	14.9	3,646	23.6	17,316	112.2	3,072	19.9
8	6,636	42.3	8,143	51.8	7,702	49.0	10,530	67.0	15,958	101.6	3,727	23.7
9	1,206	7.3	6,622	40.2	6,712	40.7	9,647	58.5	12,003	72.7	3,684	22.3
10	3,788	21.8	7,234	41.6	5,789	33.3	9,516	54.7	11,744	67.5	3,543	20.4
11	4,226	26.7	4,461	28.2	3,423	21.6	6,566	41.5	8,520	53.9	1,856	11.7
12	4,576	9.6	1,933	11.7	1,043	6.3	5,680	34.5	4,859	29.5	1,330	8.1

Month	1967		1968		1969		1970		1971		1972	
	X	f	X	f	X	f	X	f	X	f	X	f
Total	34,784	217.3	35,377	220.6	44,199	278.7	37,400	235.8	96,218	605.2	85,482	540.9
1	2,341	14.1	2,506	15.1	1,139	6.9	2,352	14.2	4,892	29.5	10,291	62.1
2	5,557	34.6	2,039	12.7	2,136	13.3	3,529	22.0	6,437	40.1	15,028	93.5
3	2,057	15.6	2,219	16.9	2,462	18.7	3,179	24.2	7,368	56.0	9,061	68.9
4	2,330	15.5	1,548	10.3	4,912	32.6	3,212	21.3	11,609	77.1	7,731	51.4
5	1,960	12.0	2,668	16.3	6,027	36.9	2,404	14.7	10,383	63.6	5,146	31.5
6	1,352	8.0	3,489	20.6	3,926	23.2	2,383	14.1	7,165	42.4	3,025	17.9
7	2,339	15.2	4,294	27.8	5,613	36.4	3,594	23.3	8,603	55.7	2,956	19.1
8	1,803	11.5	4,446	28.3	6,612	42.1	2,650	16.9	5,388	34.3	5,170	32.9
9	3,168	19.2	5,229	31.7	5,341	32.4	4,046	24.5	7,927	48.0	5,423	32.9
10	4,681	26.9	4,958	28.5	2,574	14.8	4,010	23.1	13,198	75.9	8,324	47.9
11	4,372	27.6	1,448	9.1	1,895	12.0	3,753	23.7	8,676	54.8	7,972	50.4
12	2,822	17.1	532	3.2	1,561	9.5	2,287	13.9	4,574	27.8	5,356	32.5

Table 2. Historical catch and effort statistics of Japanese longline fishery and those estimated for the whole longline fishery in the Atlantic Ocean, 1956-1972.

Year	JAPANESE FLEET				WHOLE FLEET		
	Hook rate Catch in number per 100 hooks	Catch in number of fish in 1,000	Yield in 1,000 tons	Intensity per 5° square (1,000 hooks)	Catch in number of fish in 1,000	Yield in 1,000 tons	Intensity per 5° square (1,000 hooks)
1956	0.244	0.2	..	0.5	0.2	..	0.5
1957	0.299	8.7	0.5	17.9	8.7	0.5	17.9
1958	0.215	14.8	0.5	42.3	14.8	0.5	42.3
1959	0.353	44.8	1.5	78.4	44.8	1.5	78.4
1960	0.413	70.6	2.9	106.4	73.0	3.0	110.1
1961	0.688	243.3	11.0	221.4	247.7	11.2	225.4
1962	0.623	370.7	15.7	372.2	375.4	15.9	376.9
1963	0.544	285.3	14.5	330.5	289.2	14.7	335.1
1964	0.516	343.7	17.3	418.4	347.7	17.5	423.2
1965	0.508	649.8	28.5	811.0	661.2	29.0	825.2
1966	0.471	232.1	17.6	314.8	247.9	18.8	336.3
1967	0.520	180.9	8.5	217.3	236.2	11.1	283.8
1968	0.578	204.6	10.3	220.6	323.8	16.3	349.1
1969	0.596	263.6	10.3	278.7	519.5	20.3	549.3
1970	0.506	189.2	9.0	235.8	475.1	22.6	592.1
1971	0.411	395.0	20.8	605.2	685.6	36.1	1050.4
1972	0.405	346.5	18.5	540.9	535.7	28.6	836.2

Table 3. Estimated amount of catch of bigeye tuna in the Atlantic Ocean, 1961-1973, in 1,000 tons.

Country	Gear	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973 <sup>*1</sup>
Grand total <sup>*2</sup>		11.2	16.0	17.6	20.5	29.1	18.8	11.6	17.3	23.6	25.3	44.3	32.5	(37.5)
Total by gear	Longline	11.2	15.9	14.7	17.5	29.0	18.8	11.1	16.3	20.3	22.6	36.1	28.6	(30.3)
	Surface	..	0.0	2.9	3.0	0.1	0.0	0.5	1.0	3.3	2.7	8.2	3.9	(7.2)
Argentina	Longline	0.2	0.2	0.2	0.2	0.4	0.2	0.1	0.3	0.2	0.1	0.0	0.0	0.0
Brazil	Longline	..	..	..	..	..	..	..	..	..	..	0.0	0.0	0.1
China(Taiwan)	Longline	-	0.0	0.0	0.0	-	0.5	1.9	4.6	7.2	5.3	4.7	2.3	3.1
Cuba	Longline	..	..	..	..	0.1	0.3	0.3	0.9	1.0	4.1	3.2	2.0	..
France <sup>*3</sup>	Surface	..	..	2.7	2.8	-	..	..	..	1.6	1.2	0.5	0.3	2.5
Japan	Subtotal <sup>*2</sup>	11.0	15.7	14.5	17.3	28.7	17.6	9.0	11.3	10.7	9.1	21.0	18.8	19.5
	Longline	11.0	15.7	14.5	17.3	28.5	17.6	8.5	10.3	10.3	9.0	20.8	18.5	19.3
	Surface	-	0.0	0.0	0.0	0.1	0.0	0.5	1.0	0.5	0.1	0.2	0.3	0.2
Korea	Longline	-	-	..	..	..	0.2	0.3	0.2	1.6	4.1	7.4	5.7	5.5
Panama	Longline	..	..	..	..	..	..	..	..	..	..	..	0.1	2.3
South Africa	Surface	0	0	0.2	0.2	..	..	..	..	..	..	..	-	-
Spain	Surface	..	..	..	..	..	..	..	..	1.1	1.2	7.0	3.1	4.4
United States	Surface	-	-	..	..	..	..	..	..	0.1	0.2	0.5	0.2	0.1
Venezuela	Longline	..	..	..	..	..	..	..	0.0	0.0	0.0	0.0	-	..

Notes: 1) Source of data: 1963-1973 from ICCAT Statistical Bulletin, Vol. 4 (1974) and 1961-1962 from Hisada 1972.

2) ..: no data available, -: none, 0.0 or 0: magnitude known to be more than zero but less than half the unit or final digit used.

\*1 Includes provisional figures.

\*2 Minor discrepancy is due to the rounding of numbers.

\*3 Catches of Ivory Coast and Senegal have been included with French Catch, in order to protect the privacy of private enterprises of the former two.