

THE TREND OF MEAN LENGTH OF ATLANTIC SWORDFISH FROM 1975 TO 1990 CAUGHT BY
THE
JAPANESE LONGLINE FISHERY

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SUMMARY

The historical changes in the mean length of Atlantic swordfish (*Xiphias gladius*) caught by the Japanese longline fishery from 1975 to 1990 were analyzed. Results show that the size became smaller in almost all areas during this period. However, these changes occurred mainly during the earlier period and there was no clear trend in the later period.

RESUME

Les changements historiques de la longueur moyenne de l'espadon de l'Atlantique (*Xiphias gladius*) capturé par la pêcherie palangrière japonaise de 1975 à 1990 ont été analysés. Il est indiqué que la taille devient plus faible dans la plupart des zones de cette période. Mais ces changements se sont surtout produits au début de la période et il n'existait pas de tendance claire dans la période postérieure.

RESUMEN

Se analiza el cambio histórico del promedio de talla del pez espada del Atlántico (*Xiphias gladius*) capturado por la pesquería de palangre de Japón desde 1975 a 1990. Se indica que en este período, la talla disminuyó en casi todas las áreas. Estos cambios, no obstante, tuvieron lugar principalmente en el período inicial, y no hubo una tendencia clara en el más reciente.

Introduction

Japanese longline vessels targeted yellowfin tuna and albacore in the tropical waters at the beginning of their operations in the Atlantic Ocean. Then fishing ground was shifted with the change of the target species to bigeye and bluefin tunas. Swordfish has been caught incidentally in these operations. The size of swordfish caught by many countries has become smaller since the fisheries started (ICCAT 1992). In this report, the size data obtained from Japanese swordfish catch were examined to clarify the historical change of the size.

Material and Method

The size data used in this report were collected from the catch

of the Japanese commercial longliners, and compiled at National Research Institute of Far Seas Fisheries. The size composition data were recorded by 5cm interval of Eye-Fork-Length (EFL) with information on sampling date and place (5 degrees latitude x 10 degrees longitude). The numbers of swordfish caught and sampled for measurement from 1975 to 1990 are listed in Table 1. In this report, the Atlantic Ocean was divided into 10 degrees latitude x 30 degrees longitude areas on the basis of ICCAT area (Fig. 1). Then the size data were compiled by the area and year. The only seven areas were selected from these areas for the further analysis, because there were not sufficient samples in the other areas.

Result and Discussion

1) Historical change of mean length in each area

In almost all of the areas except for Area 1, there were clear downward trends in mean length of swordfish (Fig. 2). This downward trends were clear in the period from 1975 to 1982 in the almost area. After the period, the clear trend did not observed, though there were some fluctuations in mean length. In contrast with these areas, there was an upward trend in mean length in Area 1, the coastal waters of the United States.

2) Difference in mean length among the areas

In the western North Atlantic the average values of mean lengths in the period from 1975 to 1990 are similar between Area 1 and Area 2 (154cm in Area 1 versus 152cm in Area 2), though the historical

trends are different between them. In the earlier period from 1975 to 1982, the mean length in Area 2 was larger than in Area 1, while in the later period from 1983 to 1990 in Area 1 was larger than in Area 2. The mean length in Area 3, western tropical Atlantic, was smaller than those in Area 1 and Area 2. Area 4, 5, 6 and 7 correspond to the waters between off Cape Verde and Angola of Africa. The averages of mean lengths from 1975 to 1990 are varied from 153cm to 165cm among these areas and become larger remarkably from north to south (Table 2).

3) Comparison of mean length among the countries

Hoey and Mejuto (1991) reported swordfish size composition from Spanish and United States longline fisheries in the North Atlantic between 1986 and 1988. For the comparison with Hoey and Mejuto (1991), mean lengths in EFL were converted to Lower-Jaw-Fork-Length (LJFL) using the formula,

$$LJFL = 7.821534 + 1.0897 * EFL \quad (\text{Ray and Garces 1979})$$

The results are shown in Table 3. Area 1 in this report corresponds with the Area NEUS in Hoey et al (1991). In this area, the mean length of Japanese catch are clearly larger than those of U.S. and the differences attained to 31-52cm. In Area 2 corresponds roughly with Area NWAZ, NEAZ and AZOR, the differences among the countries attained to 9-37cm. Area 4 and Area 5 correspond with Area CACV, the difference attained to 13-39cm. In all cases, swordfish caught by Japanese longliners is significantly larger than U.S. and Spanish, though there were differences in the number of sample and the areas. The difference of the size among the countries may be caused by the difference in fishing gear, fishing ground and fishing strategy among the countries.

Reference

- ANON., 1992. Report for biennial period, 1990-91 part II (1992),
ICCAT:1-294
- Hoey, J. and J. Mejuto. 1991. Swordfish size composition data from
Spanish and United States North Atlantic longline fisheries.
ICCAT, CVSP, vol. XXXV(2):415-428.
- Rey, J. C. and A. Garces. 1979. Nuevos datos sobre la pesqueria
Espanola de pez espada, *Xiphias gladius*, biologica y
morfometria. ICCAT, CVSP, vol. VIII(2):504-509.

Table 1. Catch in number of
Atlantic swordfish by
Japanese longline fishery
and number of fish sampled.

	No. of catch	No. of sample
1975	32,110	3,552
1976	15,180	1,817
1977	14,467	2,250
1978	15,387	1,111
1979	16,493	998
1980	37,567	2,517
1981	39,220	2,525
1982	65,949	3,562
1983	32,071	1,756
1984	63,288	4,074
1985	73,319	5,809
1986	44,365	2,416
1987	38,370	1,802
1988	69,253	5,039
1989	88,573	6,762
1990	100,916	3,822

Table 2. Average value of mean
lengths of Atlantic
swordfish by Japanese
longline fisheries in EFL
(cm) from 1975 to 1990 by
area.

Area	average
1	154
2	152
3	151
4	153
5	156
6	162
7	165

Table 3. Comparison of mean length in LJFL (cm) of Atlantic
swordfish among the nations. Japanese value is converted from
EFL to LJFL.

	AREA	1986	1987	1988
JAPAN	1	188	169	177
US & SPAIN	NEUS	136	138	134
JAPAN	2	181	163	157
US & SPAIN	NWAZ	158	150	144
US & SPAIN	NEAZ	152	154	148
US & SPAIN	AZOR	144	142	138
JAPAN	4	160	174	184
JAPAN	5	165	179	179
JAPAN	6	183	180	178
US & SPAIN	CACV	147	142	139

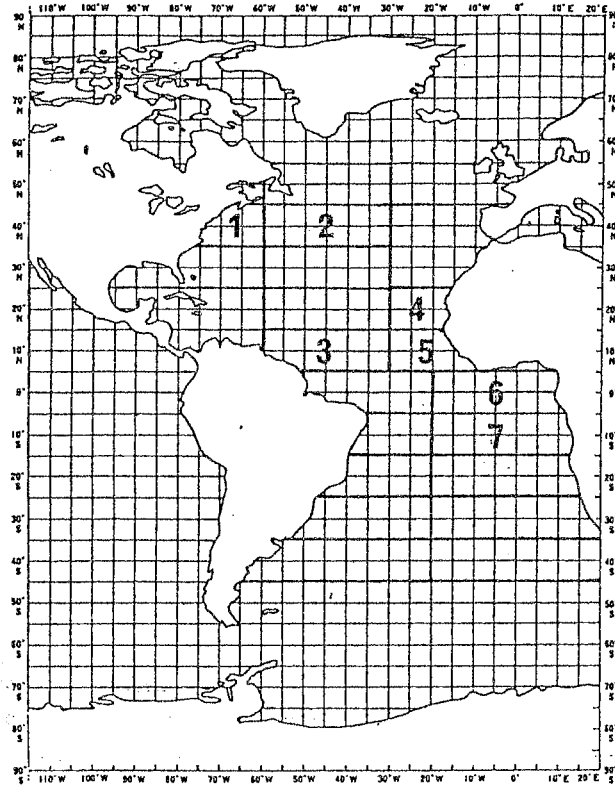


Fig. 1. Area used in the present report. Areas not given number are not available, because of insufficient samples.

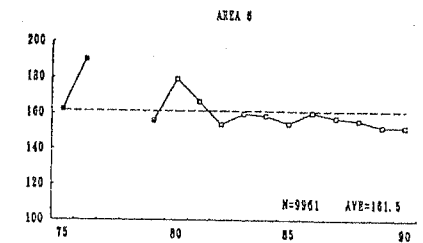
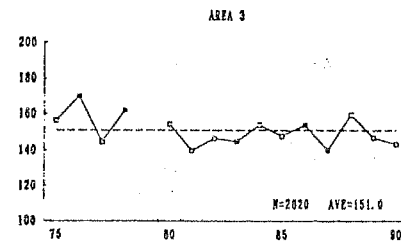
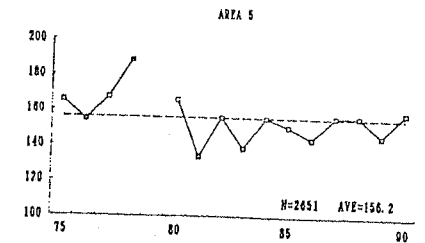
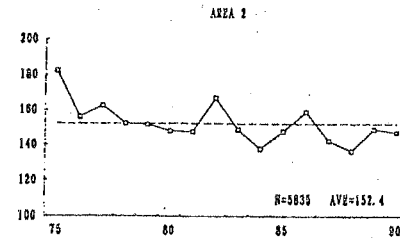
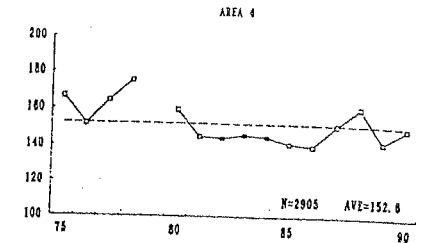
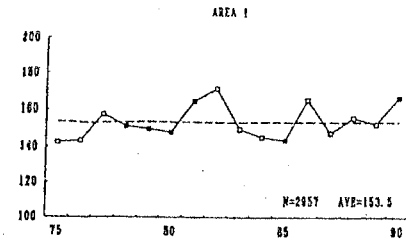


Fig. 2. Historical change of mean length of Atlantic swordfish in EFL (cm) from 1975 to 1990. The broken line denotes average value of mean length over the period. The solid square indicates the year when number of fish measured is less than 100.

