

**NOTES ABOUT THE STRUCTURE OF THE FISHED STOCK OF SWORDFISH
FROM THE LIGURIAN SEA**

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SUMMARY

Size/frequency distributions and the LJFL/weight relationship of swordfish of the Ligurian Sea are given, with some discussion on the incidence of gonad and stomach content weights on the evaluation of the round weight.

RESUME

Les distributions de fréquences/taille et la relation poids/LMF de l'espadon de la Mer Ligurienne sont données avec quelques discussions sur l'incidence des poids de gonades et de contenus stomacaux sur l'évaluation du poids vif.

RESUMEN

Se dan las distribuciones de frecuencias de talla y la relación LFJL/peso, del pez espada del mar de Liguria, junto con discusión acerca de la incidencia del peso de las gónadas y del contenido estomacal en la evaluación del peso vivo.

Introduction

Since August 1990 we have been taking records of size/weight and biological sampling of swordfish from the Ligurian Sea as part of the programme "Valutazione degli stocks di grandi scombroidi e dell'incidenza su di essi dell'attività di pesca del Mar Ligure" of the Ministero della Marina Mercantile of Italy.

In response to the need expressed at the ICCAT - CGPM working session in Hersonissos (Crete, September 1992) to have as many records as possible of biological parameters from different Mediterranean localities, we would here like to present some data from our area.

1) Size/frequencies distributions

1.a) LJFL - frequency

Fishing for swordfish is carried out in both the Eastern and Western Ligurian Riviera, but it is most developed in the latter zone, with a peak in Imperia. The Ligurian fleet uses both longlines and drift nets, but the latter are limited, at present, by the fishing act DM 18/7/1990 to a maximum of 17. Other limits to drift net activity are set down by DM 18/7/1990; 25/5/1991; 12/8/1992, which states that no fishing can take place in a large area of the Ligurian Sea in order to respect sites where there is a high concentration of Cetaceans and that the maximum permissible net length is 2.5 km. In 1990 all driftnet activity was suspended from August onwards (DM 30/7/1990); in 1991 it was

allowed to start again providing the above-mentioned limits were respected.

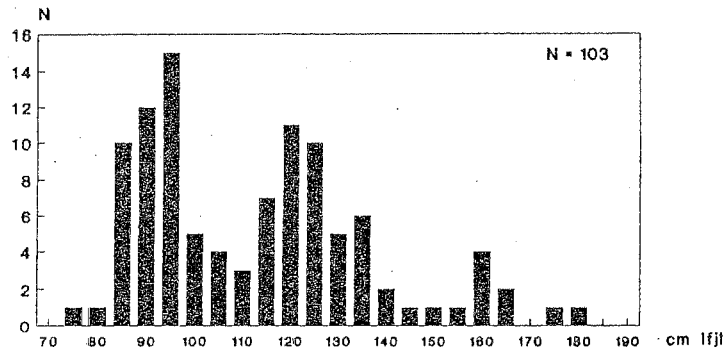


Fig. 1 - Swordfish length/frequency distribution. Western Ligurian Riviera. August 1990. Long lines.

Length/frequency distributions were recorded both on board and at the moment of landing (Figs. 1 and 2). In a total of 833 individuals registered in Sanremo and Imperia the size range was 75 -185 cm L_{WFL}, with a dominance of ~ 90 and ~ 120 cm sizes. The second distribution (Fig. 2) pools measurement carried out from August to October.

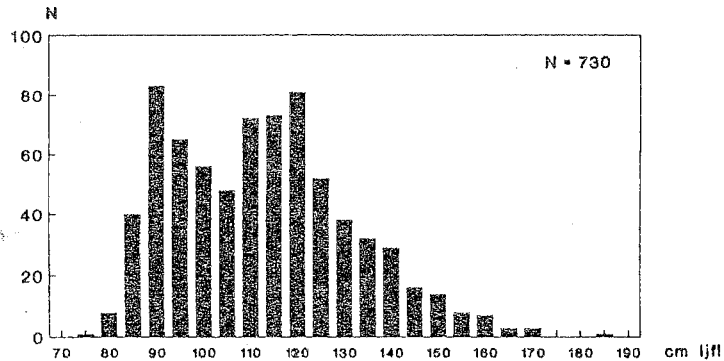


Fig. 2 - Swordfish length/frequency distribution. Western Ligurian Riviera. 1990 Fishery season. Long lines.

1.b) Gilled - gutted weight/frequency

The weight/frequencies distributions of the above-mentioned fish are:

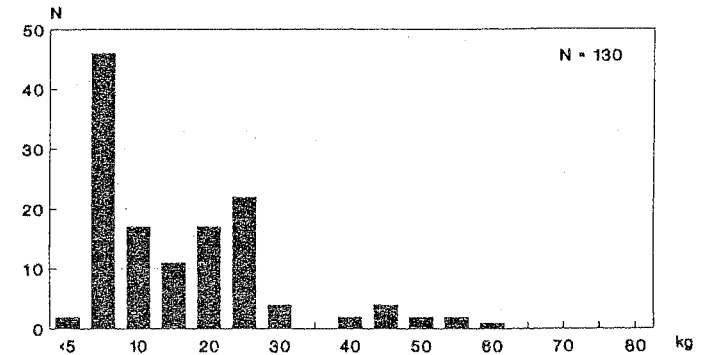


Fig. 3 - Swordfish gilled and gutted weight/frequency distribution. Sanremo. August 1990.

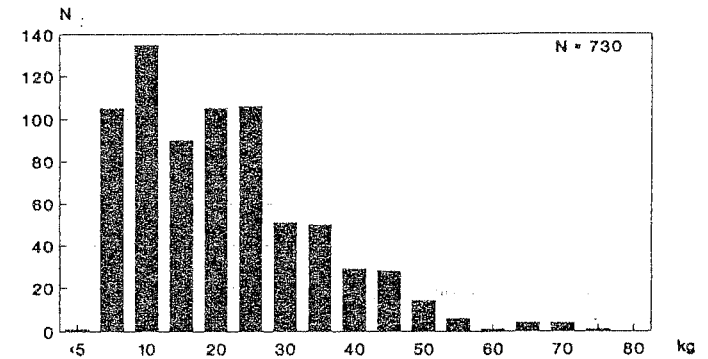


Fig. 4 - Swordfish gutted weight/frequency distribution. Imperia. 1990 Fishery season. Long lines.

It must be noted that the longliners of Imperia usually clean fish for the market simply by gutting it, while the Sanremo

long liners prepare a gilled and gutted fish. The fish caught by driftnet are usually gilled and gutted and fetch a lower price on the market than those caught by long liners. It should be pointed out that long liners are sometimes allowed to keep gills on fish in situ, in view of the fact that the fish captured by line have a better appearance and may also be used for display on the fishmonger's slab or in restaurants.

2) Length/weight relationship

2.a) From the fish sampled in Sanremo the following GG weight/LJFL has been observed.

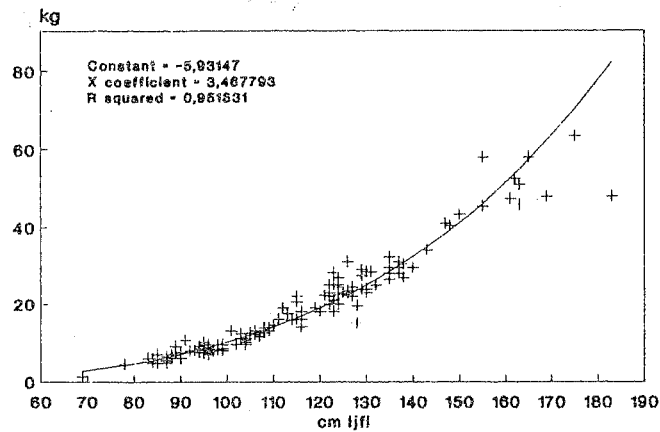


Fig. 5 - Swordfish length/weight relationship. Western Ligurian Riviera. 1990. Long lines.

2.b) Factors affecting the length/weight relationships

Gilled and gutted weight should be related to round weight in a simple way. However, both or one of them could be influenced by the following biological characteristics.

2.b1) Condition factor

We have prepared separate length-weight regressions for the months of August, September and October i.e. with the materials

available by means of the professional fishing activities. We could not find significant differences among such relationships. We are therefore of the opinion that, if differences in condition exist among swordfish in the Ligurian Sea, these can only be shown by additional "ad hoc" sampling in the winter-spring period.

2.b2) Feeding conditions

The stomach content of 41 fishes was weighed as wet weight. In the fish caught by liners, it ranged from 0 to 6% of the fish g.g. weight.

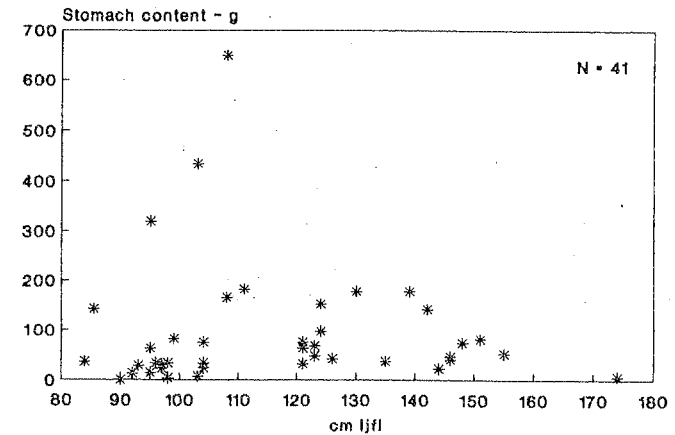


Fig. 6 - Stomach content weights in fish caught by longlines

2.b3) Sexual conditions

It is well known that particularly the female gonads in swordfish reach a large size and that this can lead to a large difference between round and gutted weight. However, we assume that this aspect is of little importance in our area for the following reasons:

- In a sample of 107 fish (75-180 cm ljfl) from the Ligurian Riviera observed on board, the sex ratio was 67:40 in favour of males.
- In a sample of 73 weighed gonads of fish of the 75-175 cm ljfl range (Fig. 7), the male gonads (N= 45) had a maximum weight

of 120 g and only in one case did the female gonad (N= 28) weigh more than 130 g.

In other words we found only one mature female (cm 160 ljl); together the two ovaries weighed 6 Kg, about 10 % of the g.g. weight.

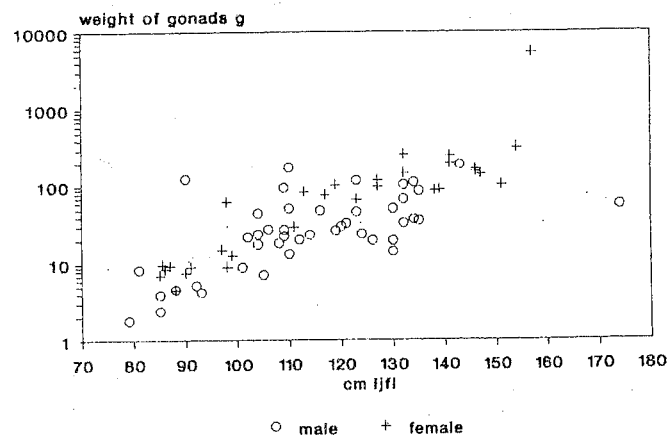


Fig. 7 - Swordfish of the Ligurian Sea: gonad weight in relation to size

3. Age structure of the fished stock

A study of ages of the sampled fish is in progress; it is based both on counts of fin rays zones and on the examination of otoliths. However, we are of the opinion that the size-frequency distributions (figs. 1 and 2) are indicative of the prevalence of only a few early age groups. On the basis of literature data (Radtke and Hurley 1983; Miyake and Rey 1989; Cavallaro et al. 1990; Megalofonou et al. 1990), their ages seem to be 1 - 3.

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