

INFORMATION ON THE SWORDFISH FISHERY IN THE PORTUGUESE CONTINENTAL EEZ

M. Azevedo

Instituto Nacional de Investigação das Pescas, Algés - Praia, 1400 Lisboa, Portugal

SUMMARY

This paper presents some results concerning the swordfish (Xiphias gladius) surface longline fishery in Portuguese continental waters. The total catch rates of this fishery indicate a value of around 320 kg per thousand hooks.

The swordfish length-weight (guttled) relationship estimated from 1987 commercial catches may be expressed in the formula:

$$W(\text{kg}) = 0.0000037 * L(\text{cm})^{**3.210966}$$

The length distribution analysis indicates that the recruitment to the fishery occurs in the third quarter of the year. The fishery is mainly composed of swordfish around 150 cm in length. The length distribution in the 1987 catches shows a decrease in the classes over 200 cm length, compared to 1986 catches; however, the annual mean weight in the catch is similar.

RESUME

Le présent document présente quelques résultats concernant la pêche palangrière de surface d'espadon (Xiphias gladius) dans les eaux du Portugal continental. Le taux global de capture de cette pêcherie est environ 320 kg/1.000 hameçons.

Le rapport longueur-poids (éviscéré) de l'espadon estimé à partir des prises commerciales de 1987 peut être exprimé comme suit:

$$W(\text{kg}) = 0.0000037 * L(\text{cm})^{**3.210966}$$

L'analyse de la distribution de tailles indique que le recrutement dans la pêcherie se produit pendant le troisième trimestre de l'année. La pêcherie se compose en majorité d'espadons d'environ 150 cm de longueur. La distribution de taille des prises de 1987 montre une baisse des classes de plus de 200 cm de longueur par rapport aux prises de 1986; le poids moyen annuel de la prise est cependant similaire.

RESUMEN

El documento presenta resultados referentes a la pesquería palangrera de superficie de pez espada (Xiphias gladius) en aguas del continente portugués. Las tasas de captura total de esta pesquería están alrededor de 320 kg por 1000 anzuelos.

La relación talla-peso del pez espada (eviscerado), estimada en base a las capturas comerciales del año 1987, puede expresarse como sigue: $W(\text{kg}) = 0.0000037 * L(\text{cm})^{**3.210966}$.

El análisis de distribución de talla indica que el reclutamiento a la pesquería tiene lugar en el tercer trimestre del año. La pesquería se compone principalmente de pez espada de unos 150 cm. En comparación con las observaciones de 1986, la distribución por tallas de las capturas de 1987 presenta una disminución de las clases de más de 200 cm, sin embargo, el peso medio anual de la captura es similar.

1. INTRODUCTION

In this paper, an overview of the recent Portuguese Continental fishery targeting swordfish with surface longline and operating within the Continental Exclusive Economic Zone, is presented. It includes information on fishing method, area and season and fleet components.

During April to October 1987 three Swordfish fishing experiments were carried out on board commercial vessels using longline. These experiments were performed with the aim of estimating the cpue and the mean weight in the catch, in traditional and non traditional swordfish fishing areas and seasons.

A sampling program, carried out on board commercial vessels and at landing ports during 1986 and 1987, provided information on swordfish length and weight distribution, sex composition and stomach contents.

The swordfish length-weight relationship presented for 1987 is based on 464 fish sampled. The monthly commercial length distribution of catches is analysed.

2. THE FISHERY

2.1. Fishing Method and Operation

The fishing method used is the drift surface longline. A section of the standard gear is presented in FIGURE 1.

The mainline can be of three kinds: twisted polyethylene (PE Ø 3.0mm), twisted polypropylene (PP Ø 3.0mm) or nylon.

The hooks are of two kinds: straight barble hook with plate or with eye.

The mainline is suspended from the surface by float lines of around 10 meters long of twisted polyethylene (PE Ø 6.0mm). The number of sinkers (usually of 1 kg weight) and buoys used depend on the fishing depth.

The longline is set at dusk and the common baits used are the spanish mackerel (Scomber japonicus) and mackerel (Scomber scomber) of 20 to 25 cm length and squids.

The hauling operation starts at dawn and may take 4 to 8 hours depending on the number of hooks set, weather conditions and number of fish caught (mainly sharks).

The number of hooks per haul ranges from 1000 to 2000, for a longline of 25 to 50 Km long.

The duration of each trip can be one day, for the fleet operating

near the coast, or 10 to 15 days for the others.

2.2. Fishing Area and Season

The main fishing area is the mainland EEZ (FIGURE 1), defined from Cabo Mondego (Lat: 40°N) to the south limit of the EEZ (Lat: 35°N).

This is a fishery in the process of expansion. In 1986 the fleet operated in a fishing area between latitude 38°N and latitude 40°N. In 1987 the longline fleet started the exploitation of the southern zone, including the Banco Gorringe (FIGURE 1).

This fleet operates from January to December with the maximum catch recorded in the period from August to October.

2.3. Fleet Components

The swordfish surface longline fleet is composed of 20 boats, distributed as follow: 12 boats between 20 and 40 GRT, 6 boats between 50 and 90 GRT and 2 boats between 150 and 200 GRT.

Swordfish is also a by-catch of other fleets fishing with gillnets and purse seines. The gillnet fleet is composed of small boats operating near the coast. The purse seine fleet, comprising boats of higher tonnage, operates both near the shore and offshore.

2.4. Catch, Effort and cpue

In 1987 the swordfish catches attained 520 t compared with 359 t in 1986.

Surface longlines account for 97% of the total catch in 1986 and 99.8% in 1987.

The by-catches of this fishery are sharks, tunas, marlins and spearfish. The common species are: Mako shark (Isurus oxyrinchus), Blue shark (Prionace glauca), Thresher shark (Alopias vulpinus), bigeye (Thunnus obesus) and albacore (Thunnus alalunga), Atlantic blue marlin (Makaira nigricans) and spearfish (Tetrapturus pfluegeri).

Longline fishery effort data is not available for the period 1986-1987. It is planned to start collecting this information in 1989.

Cpue was estimated, based on the 1987 swordfish fishing experiments. Longline cpue, expressed in total catch (Kg live) per 1000 hooks, was around 320 Kg. Considering only the swordfish catches, cpue decrease to 200 Kg.

Although these catch rates are comparable to the Spanish longline fishery operating in the NE Atlantic (Rey *et al.*, 1987), the catch rates of the Spanish and USA fleets in east of the Grand Banks are higher (Hoey *et al.*, 1987).

3. ESTIMATION OF THE LENGTH-WEIGHT RELATIONSHIP

The length-weight relationship estimated was based on 464 fish obtained from the sampling of the 1987 commercial catches in the continental waters.

The swordfish weight is expressed in Kg gutted and the length, in cm, was measured from the lower jaw to the fork of the caudal fin (LJFL).

The estimation of the parameters was made by applying a regression analysis after logarithmic transformation of the data.

The results were as follow:

number of observations 464
 intercept a -12.50768
 std. dev. of intercept .1934951
 confidence interval of intercept (-12.88693 , -12.12843)
 slope b 3.210966
 std. dev. of slope 3.852534E-02
 confidence interval of slope (3.135456 , 3.286475)
 correlation coeff. r .968
 confidence interval of r (.962 , .9735)

The resulting length-weight relationship may be expressed in the form:

$$W(\text{Kg}) = 0.0000037 L(\text{cm})^{3.210966}$$

4. ANALYSIS OF MONTHLY COMMERCIAL CATCH LENGTH DISTRIBUTIONS

Swordfish length (LJFL) distributions are presented per month and total for 1986 (FIGURE 3) and 1987 (FIGURE 4).

In 1986, the length of the 522 swordfish measured ranged from 20 to 265 cm. In 1987, 722 fish were measured ranging between 70 and 265 cm.

Examining the monthly modes of 1986-1987 it is suggested that:

- the recruitment to the fishery starts in the third quarter of the year

- there is a decrease in the frequencies of the larger classes (over 200 cm length) in 1987

- in 1986, the highest frequencies appear around the length range 120-180 cm and in 1987 near the length class 150 cm.

5. ANALYSIS OF MONTHLY MEAN WEIGHT IN THE CATCH

The mean weight in the catch during 1986-1987, by month and total, is presented in the following text table:

	MONTH											
	05	06	07	08	09	10	11	12	TOTAL			
1986	90	64	64	46	55	40	31	23	49			
1987	62	51	55	53	33	32	37	-	44			

Unit: Kg gutted

Examining the monthly mean weight it is observed that there is a decrease in the last quarter of the year of about 26% and 52% of the highest value obtained in 1986 and 1987, respectively.

The annual mean weight shows no significant change between 1986 and 1987.

6. SEX COMPOSITION

In 1987, sex composition was scarcely sampled. Only 104 fish were analysed by sex.

The length range (LJFL) of the fish sampled from April to October have been from 96 to 220 cm. From 104 swordfish sampled, 55 were females (53%).

7. STOMACH CONTENTS

During the 1987 fishing experiments it has been possible to observe the stomach contents of swordfish.

The species identified in the stomachs sampled were spanish mackerel, mackerel, blue whiting (*Micromesistius poutassou*), squids and shrimps which are included in the swordfish diet. Spanish mackerel and squids were presented with higher frequency in the the fish analysed.

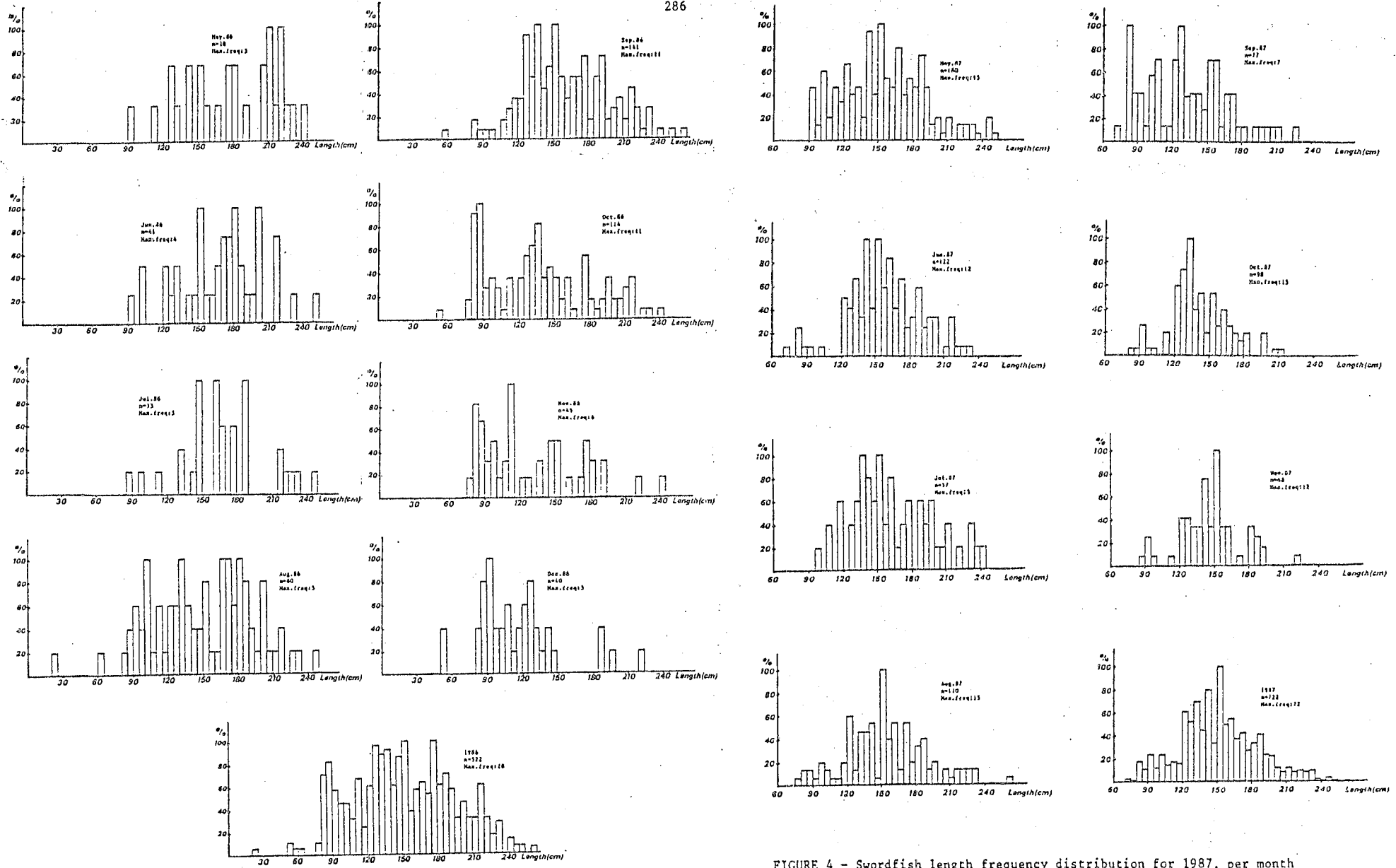


FIGURE 3 - Swordfish length frequency distribution for 1986, per month and total. (Max. frequency=100%)

FIGURE 4 - Swordfish length frequency distribution for 1987, per month and total (Max. frequency=100%).