SCRS/1994/090

GREEK SWORDFISH FISHERY

Col.Vol.Sci.Pap. ICCAT, 44 (1) : 287-288 (1995)

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SUMMARY

Fisheries and biological data for swordfish collected from 1991 to 1993 in the Aegean Sea were analyzed in order to examine the exploitation pattern of the stock in the area. Differences among the annual length distributions of the catches were found to be highly significant and the average length of the harvested animals showed declining trends. Results demonstrated that the main component of the swordfish catches was comprised of juveniles and this is in agreement with findings from other Mediterranean areas. The existence of a growth over-fishing situation has been suggested, demanding the application of immediate management measures.

RESUME

Les données biologiques et les données relatives à la pêche à l'espadon recueillies entre 1991 et 1993 dans la mer Egée ont été analysées pour examiner le schéma d'exploitation du stock dans cette zone. Les différences entre les distributions annuelles de longueur semblaient particulièrement élevées et la longueur moyenne des poissons pêchés tend à diminuer. Les résultats ont démontré que la majeure partie des prises d'espadons étaient composées de juvéniles, ce qui correspond aux résultats relatifs aux autres zones de la Méditerranée. L'existence d'une situation de surpêche a été évoquée et exige la mise en place immédiate de mesures de gestion.

RESUMEN

Se analizaron los datos de pesquería y biológicos referentes al pez espada, recogidos de 1991 a 1993 en el Mar Egeo, con el fin de examinar el tipo de explotación del stock en la zona. Se observó que las diferencias entre las distribuciones anuales de tallas de las capturas eran muy significativas y la talla media de los peces capturados presentaba tendencias al descenso. Los resultados demostraban que la mayor parte de las capturas de pez espada se componía de juveniles, dato que concuerda con los que se tienen de otras zonas mediterráneas. Se ha sugerido la existencia de una situación de sobrepesca que va en aumento y que exige la aplicación de medidas inmediatas de ordenación.

Introduction

Among all fisheries for large pelagic species existing in the Greek seas the one for swordfish is the most important and still expanding especially in the central and southern part of the Aegean sea. Consequently, swordfish compose the main bulk of large scombroid catches and over the last decade the annual Greek swordfish production fluctuated from 1000 to 2000 metric tons. According to ICCAT records, this production places Greece among the three most important swordfish producers in the Mediterranean.

Fishing for swordfish is carried out using surface drifting long-lines through February to September while is prohibited from October to January. However, the high season is from May to September, when usually more than 70% of the total annual catch (in weight) occurs.

The most important fleets involved in the fishery are based in the ports of Chania and Kalymnos. Chania is located in the island of Crete while Kalymnos in the Dodecanisian islands complex at the southeastern area of the Aegean sea. Production of these fleets compose as much as 70-80% of the total Aegean production. Several small boats are also operating in the central Aegean sea, fishing on an opportunistic basis, mainly during the summer months. In the Ionian sea fishing is carried out mostly in coastal areas and the annual production is about half of that of the Aegean.

The total number of boats involved in the swordfish fishery varies a great deal from year to year and even within the same year, since not a special license is required for a professional boat to take part in the fishery. As a consequence, fishermen choose the most gainful occupation and leave the fishery when other coastal fisheries are becoming more profitable. However, it is estimated that during the last three years up to 60-70 boats are involved in the swordfish fishery on a constant basis.

The aim of the present work is to analyze biological and fisheries data collected in the Aegean sea from 1991 to 1993 in order to examine the swordfish exploitation pattern in the area.

Materials and methods

Observers recorded all swordfish landings at the fishing ports of Chania and Kalymnos from 1991 to 1993 while the total Greek production was estimated by interviewing, on a regular basis, fishermen and trades based at the most important landing sites.

Measurements of lower jaw fork length (LJFL) to the nearest cm were taken for 5927 animals landed at the ports of Kalymnos and Chania from February to September in 1991, 1992, and 1993. Since landings on these ports compose more than 80% of the total Aegean catch, the measurements were considered to be representative of the length composition of the total swordfish catch in the area.

Summary statistics, as well as the cumulative percentage frequency distribution were calculated for each annual sample while differences among the samples were tested for significance on the 0.05 level by means of a Kruskal-Wallis one way analysis of variance by ranks (Siegel & Castellan, 1989).

Statistical analysis was performed using the computer package Systat (Wilkinson, 1988).

Results and Discussion

Fishery production reached a maximum of 1700 metric tons in 1991 while dropped about 20% the subsequent years (Table 1). Catches were reported in gilled-and-gutted weight, bill on, fins on. The conversion factor 1.12 suggested during the 2nd GFCM/ICCAT Expert Consultation on Stocks of Large Pelagic Fishes in the Mediterranean (Anonymous, 1993) could be employed for transformation to round live weight.

The mean LJFL of the harvested animals showed a declining trend and dropped from 128.42cm in 1991 to 107.06 in 1993 (Table 2). A high percentage of the fish had a LJFL less than 120cm and this phenomenon was stronger in 1993 when animals of that size composed as much as 80% of the catch (Fig. 1). Results of the Kruskal-Wallis test indicated that differences among annual distributions were highly significant (KW test statistic = 636.84, P<<0.001).

As swordfish life-cycle lasts more than ten years and findings of growth studies (Berkeley & Houde, 1983; Tsimenides & Tserpes, 1989) suggest that an animal of 120cm is less than three years old, it can be concluded that the main bulk of swordfish catches in the Aegean sea is composed of juveniles. The same has also been reported for other central and western Mediterranean areas (Di Natale 1990, 1991, Rey et. al. 1987). Although this phenomenon could be attributed to an increase of the juvenile stock size, as it has been suggested for the Atlantic (Anonymous, 1991), the available data are not enough to support such a hypothesis for the Mediterranean. However, even if it is the case, it is unlikely that the juvenile stock size will continue to increase, since recruitment in pelagic fish stocks tends to show rising or falling trends (Cushing, 1981).

Conclusively, present data together with previous work in other Mediterranean areas suggest that there is a growth overfishing problem for the Mediterranean swordfish stock and immediate management measures are needed to avoid a possible future collapse of the fishery.

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Table 1. Greek swordfish catches; weight gilled and gutted, fins on, bill on.

YEAR	CATCH (metric tons)		
	Total	Aegean sea	Ionian sea
1991	1700	1100	600
1992	1300	860	440
1993	1400	900	500

Table 2. Summary statistics of the total annual samples.

SUMMARY STATISTICS	YEAR		
	1991	1992	1993
Mean	128.42	119.19	107.06
Standard Error	0.71	0.68	0.48
Median	123.00	117.00	108.00
Minimum	52.00	41.00	51.00
Maximum	239.00	243.00	227.00
Sample size	1770	1791	2366

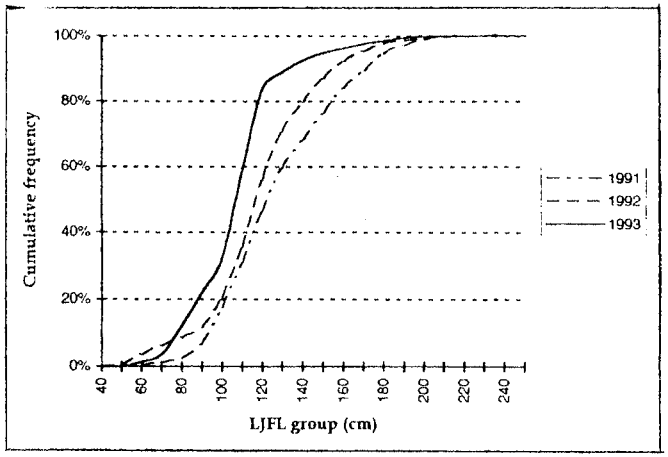

Figure 1. Percentage cumulative frequency distribution of the annual samples. Numbers on X axis indicate the lower limit of the corresponding length group.