ACTIVITY OF THE SPANISH SURFACE LONGLINE FLEET TARGETING SWORDFISH (Xiphias gladius) IN THE INDIAN OCEAN FOR THE PERIOD 2003-2006.

B. García-Cortés¹, A. Ramos-Cartelle, J. Mejuto

ABSTRACT

This paper summarizes the annual information notified to the CTOI as part of Task II, including catch, nominal effort and nominal catch rates in 5x5 degree format for the fishing activity of the Spanish surface longline fleet targeting swordfish (<u>Xiphias gladius</u>) in the Indian Ocean during the 2003-2006 period. Several descriptive graphs and plots are presented and discussed. This information updates previous reports.

Key words: swordfish, nominal CPUE, longline, Spanish fleet.

INTRODUCTION

The surface longline fleet is part of a group of vessels which operate far from base ports and which may not call at their home ports for as long as several years. These vessels have similar structural and fishery characteristics and undertake extremely lengthy trips in terms of time at sea. They may even change oceans between trips when they are allowed to do so under their administrative situation.

The Spanish surface longline fishery targeting swordfish began to operate in certain areas of the Indian Ocean in 1993, when some of the longliners started experimental surveys in these areas. Since the beginning of the fishing activity in the Indian Ocean, the basic data for the scientific monitoring of this fleet have been collected by the Information and Sampling Network (ISN) of the Spanish Oceanography Institute (IEO) and by the Scientific Observer Program. The latter was extended to also cover the Indian Ocean in order to compile more complete information *in situ* regarding the fishing activities in those periods/areas and to obtain biological information of the individuals caught. The basic scientific information was chiefly obtained from fishery data specifically designed by the IEO for scientific purposes. These data were filled out voluntarily by the fleet.

Additionally, these vessels are required to fill out the EU requirements to be submitted to the relevant authorities. Moreover, the Spanish Fishery Administration has set up its own mechanisms to monitor each longline vessel individually through compulsory declarations concerning catch, landings and transfers within specific time frames, in addition to the mandatory implementation of VMS systems, etc.

This paper updates previously reported data (GARCÍA-CORTÉS & MEJUTO 2000; GARCÍA-CORTÉS *et al.* 2003, 2004) and includes plots and descriptions of the activity of the Spanish fleet for the recent period 2003-2006. This information was submitted to the IOTC.

¹ Instituto Español de Oceanografía. P.O. Box 130, 15080 A Coruña. Spain.

MATERIAL AND METHODS

The annual data bases created for the 2003-2006 period have been plotted and they summarize the annual activity of the Spanish surface longline fleet catching swordfish in areas of the Indian Ocean.

The basic scientific data were obtained and processed according to the recommendations of several RFOs. This has allowed us to calculate the relevant annual statistics by 5x5 degree squares, which were subsequently submitted to the IOTC. These data bases include information by 5x5 degree squares about catches, nominal effort (thousands of hooks), nominal CPUEs in number of fish and weight (kg round weight) per thousand hooks. Thus, they represent the complete activity of this fleet for scientific purposes.

When reported in weight, the individual records of each swordfish are converted into size with the size-weight relationship (TURNER 1997, cited in MIYAKE 1990). These data are supplied by the observers or the fleet itself and are obtained from a census of the size or weight of all the catch, thereby mitigating any bias, particularly in situations where minimum size regulations are in force or the random selection is done by crew members. Although the swordfish are processed on board and stored in dressed weight (DW= gutted without the head and fins), the final data are presented in round weight (RW). All the information is processed in 5x5 degree/month format (MEJUTO & GARCÍA-CORTÉS 2005) and then submitted to the IOTC. When different fishing schemes are detected among vessels or trips –e.g., commercial activity *versus* experimental activity– data are processed separately, so that each component can be weighted to its respective catch.

General information concerning the basic characteristics of the gear used by the fleet is also collected in order to interpret the data in specific scientific studies. It must be noted that a part of the fleet operating in the Indian ocean began to change their fishing gears in 2000 and replaced the 'traditional' Spanish longline for the 'American' type, which uses an average of 1,100 hooks per set –less hooks than the traditional longline, although some more than the 'Florida style' longline gear–.

The nominal CPUE by size category (CAT) was plotted for the three categories defined: CAT *l*: sizes LJ-FL <= 120 cm., *CAT 2*: sizes 125 cm<= LJ-FL<=160 cm., *CAT 3*: sizes > 160 cm LJ-FL.

Additional information on methodological bases can be found in previous papers (GARCÍA-CORTÉS & MEJUTO 2000; GARCÍA-CORTÉS *et al.* 2003, 2004).

RESULTS AND DISCUSSION

Figure 1 shows the mean nominal CPUE by year and its confidence intervals (C.I.90%) since the Spanish fishery started operating in the Indian Ocean.

A total number of 19, 24, 23 and 28 Spanish surface longline vessels carried out commercial fishing activities in the Indian Ocean in the years 2003 to 2006, respectively. In 2005 and in 2006, 10 and 11 of the total number of vessels, respectively, were also involved in experimental surveys, mostly in northern and southwestern areas of the Indian Ocean (5° N-10° S / 60° -95° E and 28°S- 42° S / 85° E- 115° E). Figures 2 and 3 show plots of landings by number of fish and by kg of round weight in the 5x5 degree format. The nominal effort in thousands of hooks set by the fleet during these years is also presented in 5x5 degree format (Figure 4).

In previous years, the activity of this fleet was restricted to areas to the west of 95° E. However, the experimental surveys conducted by 8 vessels during 2003 and 2004 caused an eastwards

expansion reaching 115° E. In year 2005, 7 more vessels were involved in another experimental survey with a northwards expansion (5° N-10° S and 60°-95° E).

The swordfish individuals landed in the period 2003-2006 amounted to 73,921, 86,773, 102,233 and 108,403, respectively. The total round weight in tons was 4,290, 4,713, 5,079 and 5,155 and the individuals sampled for size were 34,669, 31,871, 19,443 and 32,888. This represents an average sampling rate of about 32.0% of the fish caught over this period.

Figures 5 and 6 show plots of nominal CPUEs in number and round weight, respectively. These data refer to the catch of the Spanish fleet using the "American" longline gear (only one vessel used the traditional Spanish longline in 2006). The overall nominal CPUE in number of fish was about 17 individuals for the years 2003 and 2004, 19 for the year 2005 and 17 for 2006. The overall nominal CPUE in weight for these years was 966, 920, 964 and 787 kg round weight, respectively.

The catch rates (CPUE) in number of fishes per size category are shown in figures 7, 8 and 9. The values by area for the three size categories are very low for CAT1 in 2003 and 2004, but in 2005 and 2006, the expansion of the fishing areas northwards suggests that the smallest individuals are probably concentrated in the northern areas. The groups CAT2 and CAT3 seem to be similar in all the areas except in the southern regions covered during the experimental survey in 2005 and 2006, where yields were very low for both categories. This shows that south of 35°S there is not a good distribution area for any swordfish size category. The CAT3 CPUE obtained during 2005 and 2006 in recently prospected areas of the north presents very low values compared with the high values for CAT1.

ACKNOWLEDGEMENTS

We would like to thank all the Scientific Observers, the skippers and sailors who have collaborated with us, as well as all the staff of the IEO projects SWOATL and SHKLL: A. Carroceda, F. González, I. González, J. Lorenzo, M. Marín, M. Quintáns and J.L. Torres.

LITERATURE

GARCÍA-CORTÉS, B., J. Mejuto (2000). A general overview on the activity of the Spanish surface longline fleet targeting swordfish (*Xiphias gladius*) in the Indian Ocean for the period 1993-1998. IOTC-2000-WPB-01. IOTC Proceedings no.3 (2000): 140-153.

GARCÍA-CORTÉS, B., J. Mejuto, A. Ramos- Cartelle (2003). A description of the activity of the Spanish surface longline fleet targeting swordfish (*Xiphias gladius*) in the Indian Ocean with special reference to the year 2001. IOTC-2003-WPB-03. IOTC Proceedings no.6 (2003):280-286.

GARCÍA-CORTÉS, B., J. Mejuto, A. Ramos- Cartelle (2004). A general overview of the activity of the Spanish surface longline fleet targeting swordfish (*Xiphias gladius*) in the Indian Ocean during the year 2002. IOTC-2004-WPB-05. IOTC Proceedings year 2004.

MEJUTO, J., B. García-Cortés (2005). Documentación sobre la preparación de datos científicos de la pesquería española de pez espada (*Xiphias gladius*) en las regiones del Pacífico, con especial referencia a los años más recientes 2002 y 2003. Data and Standard Review Meeting of IATTC. La Jolla California, April 29-30, 2005.

MIYAKE, P.M. (1990). Manual de operaciones para la estadística y el muestreo de túnidos y especies afines en el océano Atlántico. ICCAT. Tercera edición.



Figure 1. Mean nominal CPUE (kg of swordfish round weight per thousand hooks) of the Spanish surface longline fleet obtained in the Indian ocean as a whole during the 1993-2006 period (data not available for year 1997).



Figure 2. Number of swordfish landed by the Spanish surface longline fleet by year during the 2003-2006 period in the Indian Ocean.



Figure 3. Swordfish landings in kg of round weight carried out by the Spanish surface longline fleet by year during the 2003-2006 period in the Indian Ocean.



Figure 4. Nominal fishing effort in thousands of hooks set by the Spanish surface longline fleet by year during the 2003-2006 period in the Indian Ocean.



Figure 5. Nominal CPUE in number of swordfish landed per thousand hooks set by the Spanish surface longline fleet by year during the 2003-2006 period in the Indian Ocean.



Figure 6. Nominal CPUE in kg of round weight of swordfish landed per thousand hooks set by the Spanish surface longline fleet by year during the 2003-2006 period in the Indian Ocean.



Figure 7 . Nominal CPUE in number of swordfish by size class (cm, LJFL): CAT1 < 125 cm; by year during 2003-2006 period in the Indian Ocean.



Figure 8. Nominal CPUE in number of swordfish by size class (cm, LJFL): CAT2 15-160 cm; by year during 2003-2006 period in the Indian Ocean



Figure 9. Nominal CPUE in number of swordfish by size class (cm, LJFL): CAT3 > 160 cm; by year during 2003-2006 period in the Indian Ocean.