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THE SPANISH ALBACORE (*THUNNUS ALALUNGA*) SURFACE FISHERY IN THE NORTHEASTERN ATLANTIC IN 2005

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SUMMARY

*The main features of the Spanish albacore (*Thunnus alalunga*) surface fishery operating during summer and autumn months of 2005 in the northeast Atlantic and Bay of Biscay waters north of 40ºN parallel are presented in this document. The baitboat fleet increased its yield 30%; likewise the troll fleet showed an increased catch of 36% respectively to the 2004 yield. Both fleets increased their nominal fishing effort about 16% in 2005. The size composition of the catches in 2005 obtained by both fleets showed a high proportion of age 2 derived by both methods used to age catches: length slicing and age-length keys, which is in agreement with the high proportion of age 1 present in 2004. However, in the case of age 3, the observed proportion of the catch at age differs contingent on either method applied to age the catch in the case of the troll fleet.*

RESUMEN

Este documento presenta un resumen sobre la actividad pesquera de las flotas de superficie españolas: cebo vivo y cacea dirigidas a la pesca de atún blanco (Thunnus alalunga) *que desarrollaron su actividad en los meses de verano y otoño de 2005 en aguas del Atlántico nordeste y golfo de Vizcaya al norte del paralelo 40 º N. La evolución de las capturas y esfuerzo realizado por los barcos de cebo vivo y cacea, mostró un aumento del 30% y 36% respectivamente frente a las capturas del año 2004. El esfuerzo nominal en días de pesca aumentó prácticamente un 16% en ambas flotas. En 2005, la composición de tallas de la captura, mostró un nivel elevado de capturas de edad 2 obtenido con los dos métodos empleados: corte de tallas determinista ("filo de cuchillo") y claves talla edad, que corresponde a un nivel elevado de capturas de edad 1 observado en el año 2004 en ambas flotas. Sin embargo la proporción de capturas de edad 3 observada difiere dependiendo del método empleado en la obtención de la composición de edades de las capturas de la flota de cacea.*

RÉSUMÉ

*Ce document présente un résumé sur les activités de pêche des flottilles de surface espagnoles (canne et ligne traînante) ayant ciblé le germon (*Thunnus alalunga*) pendant les mois d'été et d'automne de 2005 dans les eaux de l'Atlantique Nord-Est et du Golfe de Gascogne, au nord du parallèle 40ºN. L'évolution des prises et de l'effort déployé par les canneurs et les ligneurs a présenté un accroissement de 30% et 36%, respectivement, par rapport aux prises de 2004. L'effort nominal en jours de pêche a pratiquement augmenté de 16% pour ces deux flottilles. En 2005, la composition par tailles des captures a montré une forte proportion de prises d'âge 2, obtenue à l'aide de deux méthodes, le découpage des tailles et les clefs âge-taille, qui correspond à une forte proportion d'âge 1 observée en 2004 dans les deux flottilles. Toutefois, la proportion observée de prises d'âge 3 est différente selon la méthode appliquée pour obtenir la composition des âges des prises de la flottille de ligneurs.*

KEYWORDS

Thunnus alalunga, *troll fishery, baitboat fishery, catch, size composition, age composition, northeast Atlantic*

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1. Introduction

The albacore fishery in the north of Spain is an important economical activity for the Spanish artisanal surface fleet based in the north-western Atlantic and Bay of Biscay fishing ports. The highly seasonal migratory behaviour of immature albacore into the north-eastern Atlantic temperate surface waters (Aloncle et Delaporte, 1973; Bard, 1981; Cort *et al*. 1992; Ortiz de Zárate and Cort, 1998) drives the marked seasonality of this fishery that take place during summer and autumn months (Bard and Santiago, 1999).

No major changes had been observed during 2005 fishing season as concerns the activities of both fleets: alive bait boat (BB) and trolling (TR). The number of boats involved varies among years; the annual average is 550 vessels (80% troll and 20% bait boat). The troll vessels are of lesser tonnage (mean of 50 GRT) than those of bait boat (mean 120 GRT). The catch composition by age is mainly made up of immature albacore 1 to 4 age groups (corresponding to 50 to 85 cm fish length).

The aim of this paper is to present an overall description of the characteristics of the Spanish albacore surface fishery in 2005. The evolution in catch and nominal fishing effort (in fishing days) as well as the catch-at-size composition of landings and demographic structure of catches obtained by two methods: length slicing and age length keys derived from spine readings (Ortiz de Zárate *et al.,* SCRS/2006/107 *in press*) are presented for both fisheries.

2. Material and methods

The monitoring of this surface fishery was carried out by collecting information through interviews of landings and fishing effort of each fleet at main fishing ports located along north western coast and the Bay of Biscay. The fish length data collection is based on a stratified random sampling by commercial category of catches landed in the main fishing markets. From each trip sampled the following information is recorded: date of landing, gear, number of fishing days, number of skippers, number of lines, fishing area, catch in number, catch in weight (k) and fish length. Fish were measured to the fork length (FL) and to the nearest centimetre according to commercial categories in the fishing markets.

Thus catch, nominal effort (fishing days) and length distribution were processed by gear on monthly basis following statistical procedures to estimate Task I and Task II (biological information) statistics of ICCAT (Miyake, 1990).

Mean weight and length by month was calculated for troll and bait boat catches in 2005 and compared against the monthly parameters: length and weight averaged from catches of each fleet for three previous years (2002-2004). A t-test for two tailed hypothesis was applied to test for difference between 2005 monthly mean weight and size and previous three years average (2002-2004) parameters considering the samples with unequal variances resolved by the Welsh's approximate t (Zar, 1984).

Age composition of catches was derived by using the mean length at age obtained for North Atlantic albacore stock based on the von Bertalanffy model estimated by Bard (1981), then the values obtained for the quarter 3 (July, August and September) (see **Table 2** in Arrizabalaga and Santiago, 2003) were used to split the annual catch at size distribution by applying a knife-edge deterministic slicing to calculate the number of fish by age group. In addition proportions of catch at age for troll and bait boat fleets were estimated by applying age length keys derived (ALK's) from directed spine section readings (Ortiz de Zárate *et al.,* SCRS/2006/107).

3. Results and discussion

The fishing area remains similar to previous fishing seasons on broad terms (**Figure 1)**. The troll vessels operated in a larger area from the coastal waters in the Bay of Biscay to the most western (25ºW) and northern waters (52ºN) while the bait boats were localised mainly in the Bay of Biscay waters as had been for the latest years (Santiago, 1996; Ortiz de Zárate and Rodríguez-Cabello, 2001). However on smaller scale in the case of the troll fleet, fewer fishing trips were located to the west of 15º compared with year 2003 and both fleets extended their respective activities above parallel 45º N, reaching further northern areas up to 52ºN in contrast with year 2003 (see Figure 1 in Ortiz de Zárate *et al*. 2005). In 2004 the number of bait boat trips was larger in the Bay of Biscay fishing area compare with 2005 when most of the fishing operations were located along the Spanish coast (below the parallel 45º).

The overall nominal catch in 2005 amounted to 19,490 t, representing an increase of 33% compared with 2004 catch (14,624 t). In fact, the troll fleet catch (10,165 t) was raised by 36% and the bait boat catch (9,325 t) by 30% respectively. A total of 79,222 fish were measured, representing a sampling coverage of 3.5% for bait boat and 2% for troll fleets respectively.

Albacore catch by the Spanish surface fishery in the Bay of Biscay has levelled off the average catch of the historical series from 1975 to 2004 time period (**Figure 2a**) following the increasing trend that begun in 2002. Particularly for the troll catch the 2005 level is higher than the average catch in the time period described. As overall, the nominal fishing effort also shows an increase in both fleets in comparison with year 2004, although not so significant (17%) as for the catch. In general the nominal fishing effort trend remains at lower level than average since 1992 (**Figure 2b**). The fishing season in 2005 for the bait boat fleet in the Bay of Biscay and troll fleet in the North eastern Atlantic (**Figure 3**) was enhanced by favourable climatic conditions at the beginning of autumn months resulting in larger catches caught in comparison with previous year (see Figure 3 in Ortiz de Zárate, *et al*. 2005).

The catch at size distribution from 2005 is shown in **Figure 4** for both bait boat and troll fleets. Three main modes are clearly identified in the length distribution of catches by visual inspection. The demographic structure of catch for the bait boat and troll fleets obtained by length slicing is shown in **Table 1**. Shaded numbers show the cohorts taken in the fishery by each gear corresponding to different exploitation pattern which varies between years and within fleets. Proportions of ages 1 and 2 are similar in both fleets for previous 2004 but quite different for ages 1 and 2 in 2005.

On the contrary when examine the age composition obtained for both bait boat and troll catches by applying the ALKs derived from spine readings (**Table 2**) shows unlike proportions by age group for both baitboat and troll catch exploitation pattern. The most remarkable large differences appear for age group 3 and 4, which are estimated in large proportion when using these derived ALKs. Accordingly the high proportion of age 3 in troll catch in 2005 would be supported by the remarkably high catch in number of juveniles of age 2 (> 61 cm) caught during 2004 by both fleets and therefore was well represented in the catch in both the Atlantic and the Bay of Biscay areas (**Figure 1**). Moreover the high proportion of age 4 observed in the bait boat catches during 2005 fishing season would be supported by the higher mean length observed on the monthly evolution (**Figure 5a**) compared to the mean of previous years (2002-2004) for this fleet, as well to a minor degree in troll fleet is identified the increase in mean length in October in 2005. This difference is also clear when looking at the mean weight in 2005 for both fleets (**Figure 5b**), notably through all fishing season and in the case of baitboats, exceptionally in October.

Significant statistical differences (t-student, $p<0.05$) were detected between fork length and weight means from all months in 2005 bait boat fishery against previous years tested (2002-2004). Differences on bait boat suggest that a higher catch of older fish caught in 2005 is plausible. Age composition of caught albacore could be explained likely by the derived catch at age data from spine reading examination (ALKs).

Regarding albacore troll fishery, only statistical differences were detected in October ($p<0.05$). Differences on mean weight and mean length observed in 2005 for troll data (**Figure 5a** and **Figure 5b**) could be explained by the higher proportion of ages 3 and 4 observed in the age composition derived by the ALKs method (**Table 2**) and were targeted in October 2005 at the end of fishing season.

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Table 1. Age composition of Spanish albacore surface fishery in 2005. Length slicing.

Length	Baitboat					Troll			
Age	2005	2004	2003	2002	Age	2005	2004	2003	2002
1	16.8	31.0	73.3	56.2	1	43.3	42.6	59.7	54.5
2	26.5	47.1	15.1	5.0	2	48.6	46.8	30.0	34.9
3	47.7	18.5	7.0	22.2	3	7.3	8.9	7.2	7.4
4	8.3	3.0	3.6	13.1	4	0.5	1.3	1.5	2.2
5	0.5	0.1	0.7	2.6	5	0.1	0.2	0.8	0.5
6+	0.1	0.2	0.4	0.9	6+	0.0	0.2	0.8	0.4

Table 2. Age composition of Spanish albacore surface fishery in 2005. Age length keys (spines).

ALK	Baitboat				Troll		
Age	2005	2004	2003	Age	2005	2004	2003
1	13,8	20,5	70,0	1	32,9	21,3	47,4
2	20,8	51,5	17,4	2	49,2	59,5	38,6
3	46,4	19,6	6,1	3	16,0	15,6	9,4
4	17,2	6,9	4,4	4	1,6	2,8	2,6
5	1,6	1,2	1,3	5	0,2	0,6	0,7
6+	0,3	0,2	0,5	6+	0,1	0,2	0,8

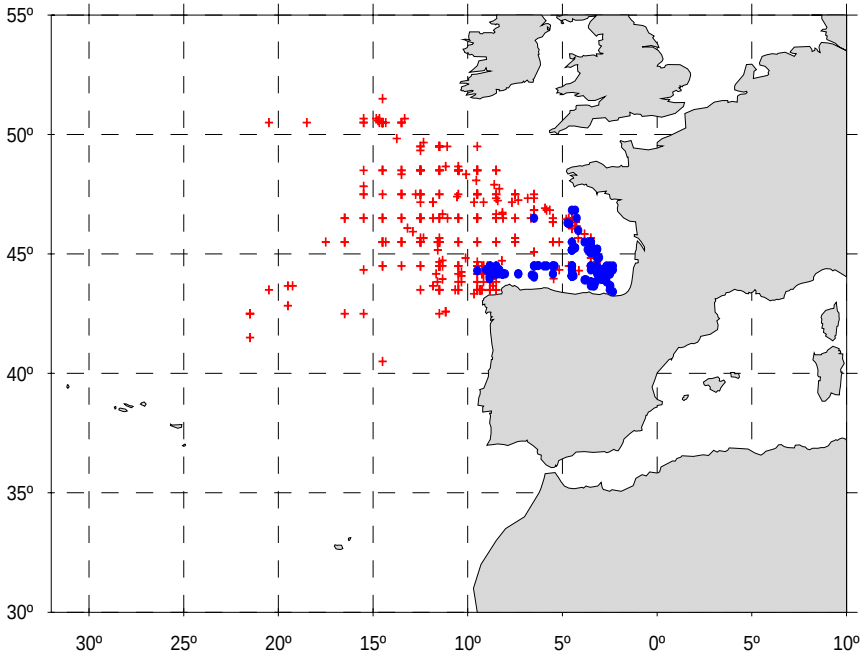

Figure 1. Albacore fishing area of Spanish surface fishery in 2005.

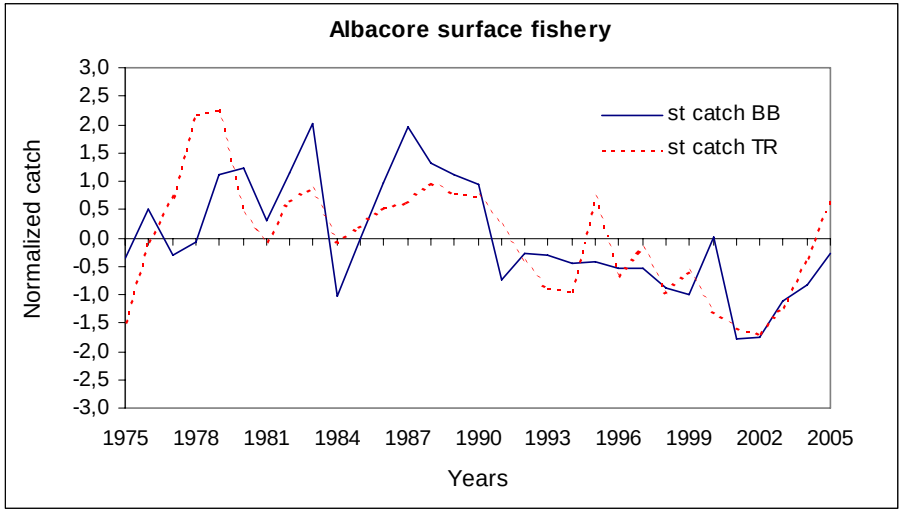

Figure 2a. Normalized albacore catch (t) of Spanish fishery in North eastern Atlantic: 1975-2005.

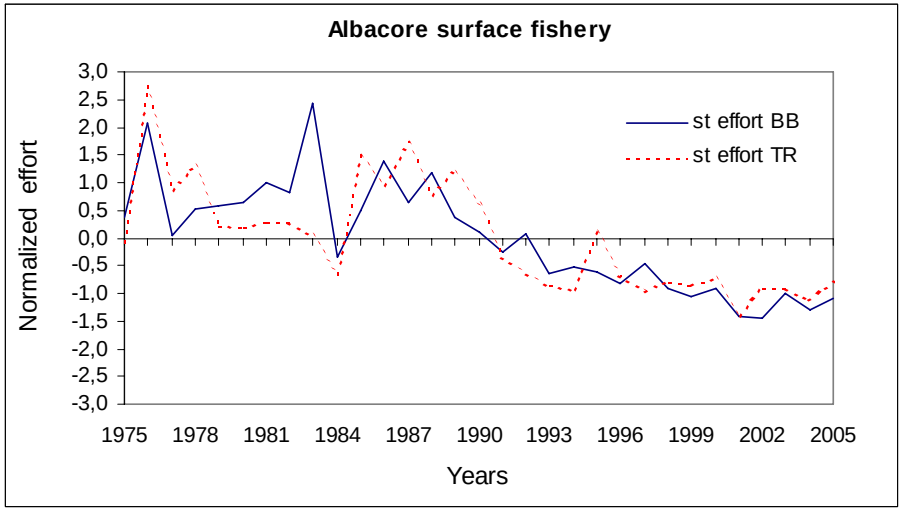

Figure 2b. Normalized albacore fishing effort of Spanish fishery in North eastern Atlantic: 1975-2005.

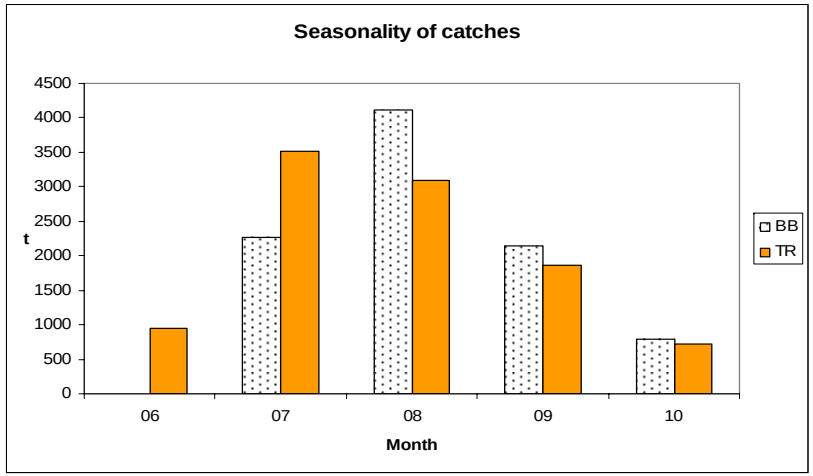

Figure 3. Seasonality of the catches taken by Spanish albacore baitboat and troll fleets in 2005.

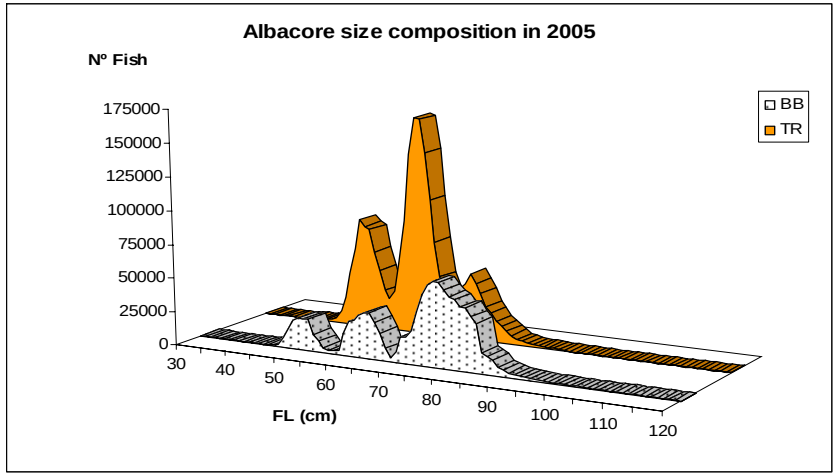

Figure 4. Catch length composition of Spanish albacore baitboat and troll fishery in 2005.

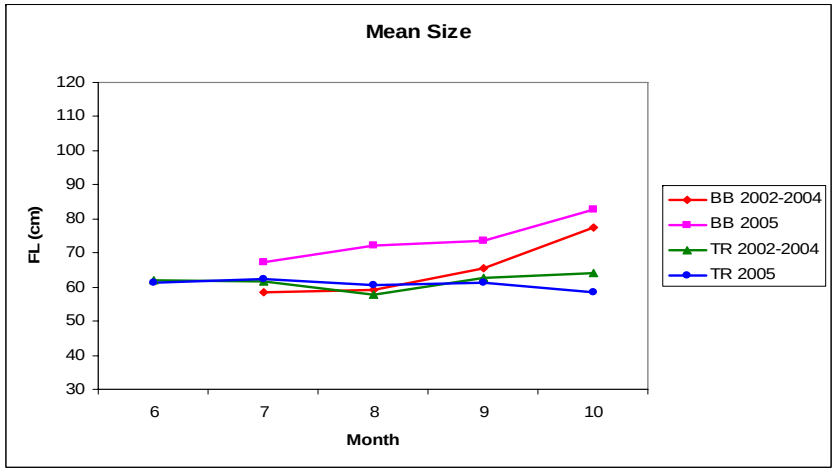

Figure 5a. Monthly distribution of albacore mean size observed in baitboat and troll catches.

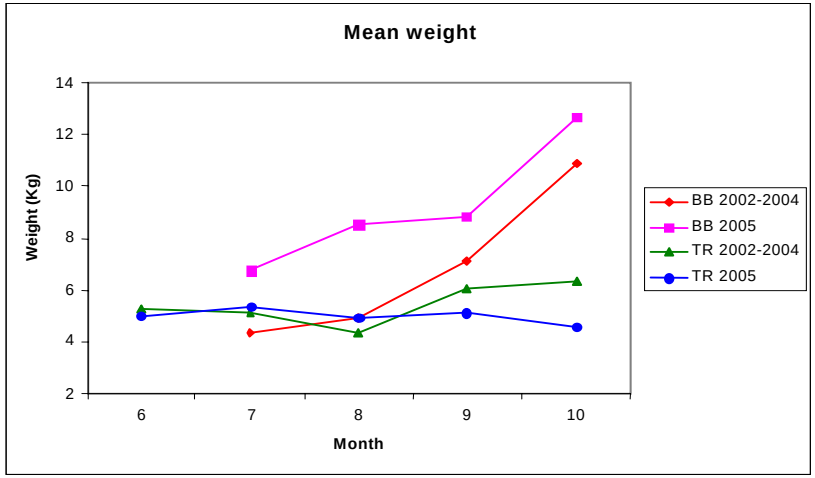

Figure 5b. Monthly distribution of albacore mean weight size observed in baitboat and troll catches.