

STATISTICS FROM THE SPANISH ALBACORE (*THUNNUS ALALUNGA*) SURFACE FISHERY IN THE NORTH EASTERN ATLANTIC IN 2014

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SUMMARY

The main features of the Spanish albacore (Thunnus alalunga) surface fishery in 2014 are presented. Fishing is conducted during summer and autumn seasons operating in offshore waters of the northeast Atlantic and in the Bay of Biscay. The catch of the baitboat fleet has decreased from 2013. On the other hand the troll fleet catch in 2014 remained at the same level of catch in 2013. The bait boat fleet target albacore from July to September, mainly in the Bay of Biscay area, while albacore was targeted by the troll fleet from June to November, in the Bay of Biscay but mostly in off shore waters of North east Atlantic fishing grounds. Size composition of catches obtained by the baitboats in 2014, showed a high proportion of age 3 group, followed by a high proportion of age 2. The age structure in the troll fleet showed a remarkable high proportion of age 2 followed by a high proportion of age 3 albacore in 2014. The demography structure, with a high proportion of age 2 and 3 groups could be an indicator of an abundant albacore cohort in 2011 and 2012 years, that was available to the Spanish surface fishery in 2014. Monthly spatial distribution of nominal catch rates by fleet are presented for 2014 fishing season.

RÉSUMÉ

Les principales caractéristiques de la pêche espagnole de surface de germon (Thunnus alalunga) en 2014 sont présentées. La pêche a lieu pendant les mois d'été et d'automne dans les eaux situées au large de l'Atlantique Nord-Est et dans le golfe de Gascogne. Les prises de la flottille de canneurs ont diminué depuis 2013. En revanche, les prises de la flottille de ligneurs en 2014 sont demeurées au même niveau que celles de 2013. La flottille de canneurs cible le germon de juillet à septembre, essentiellement dans la zone du golfe de Gascogne, tandis que le germon a été ciblé par la flottille de ligneurs de juin à novembre dans le golfe de Gascogne, mais majoritairement dans les eaux au large des zones de pêche de l'Atlantique Nord-Est. La composition par taille des captures obtenues par les canneurs en 2014 a fait apparaître une forte proportion du groupe d'âge 3, suivie d'une forte proportion du groupe d'âge 2. La structure démographique au sein de la flottille de ligneurs a fait apparaître une proportion remarquablement élevée du groupe d'âge 2, suivie d'une forte proportion du groupe d'âge 3 dans la prise de germon de 2014. La structure démographique, dotée d'une proportion élevée des groupes d'âge 2 et 3, pourrait être un indicateur d'une abondante cohorte de germans en 2011 et 2012, qui était disponible pour la pêche de surface espagnole en 2014. La distribution spatiale mensuelle des taux de capture nominale par flottille est présentée pour la saison de pêche 2014.

RESUMEN

Se presenta un resumen de la actividad pesquera de las flotas españolas de cebo vivo y cacea dirigidas a la pesca de atún blanco (Thunnus alalunga) en los meses de verano y otoño de 2014 en aguas del Atlántico nordeste y golfo de Vizcaya. La captura de los barcos de cebo vivo disminuyó en 2014, mientras que la captura de flota de cacea se mantuvo en el mismo nivel de captura del año 2013. La flota de cebo vivo operó de julio a septiembre en el golfo de Vizcaya, mientras que la flota de cacea pescó principalmente en las aguas del Atlántico nordeste, de junio a noviembre. La composición de tallas de la captura de cebo vivo, mostró que las capturas en número de edad 3 fue la más abundante, seguida de la edad 2. La misma estructura edades se observó en la flota de cacea en 2014, siendo la captura de edad 2 la más abundante. Las mayores capturas de estos grupos de edad 2 y 3, en 2014, podrían indicar unas cohortes abundantes de atún blanco en 2011 y 2012, respectivamente. La distribución geográfica mensual de las tasas de captura nominal de ambas flotas se presenta para 2014.

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KEYWORDS

Thunnus alalunga, Troll fishery, Baitboat fishery, Catch, Size composition, Age composition, Northeast Atlantic, Bay of Biscay, Albacore

1. Introduction

Albacore (*Thunnus alalunga*) is highly migratory species. In spring and early summer, as the water temperature rises, immature albacore migrates from the central Atlantic waters towards the north-eastern Atlantic and Bay of Biscay temperate surface waters, (Aloncle et Delaporte, 1973; Bard, 1981; Ortiz de Zárate and Cort, 1998; Arrizabalaga, 2003) where forage prey are abundant (Pusineri *et al.*, 2005). The annual migratory behaviour of juvenile albacore drives the marked seasonality and area of the Spanish surface fishery that target albacore during summer and autumn months in the North eastern Atlantic and Bay of Biscay offshore waters (Arrizabalaga *et al.*, 2010; Bard and Santiago, 1999; Ortiz de Zárate and Barreiro, 2010). Bait boat and troll vessels participate on the albacore surface fishery, which represents an important resource from the socio-economical activity reported in the north-western and northern fishing ports.

Concerning the activity of both fleets: alive bait boat (BB) and trolling (TR), no major changes were observed during 2014 fishing season in relation to fleet characteristics. The number of boats involved varies among years; the annual averaged number is 450 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 90 cm fork length fish.

The aim of this paper is to present an overall description of the main features of the Spanish albacore surface fishery in 2014. The statistics elaborated from the collected information of the fishery were catch-at-size composition of landings and the demographic structure of catches obtained by length slicing method for both fleets. Moreover, a brief description of the evolution of fishing grounds based on the geographical distribution of the nominal catch rates in weight (kg) per unit of effort (in fishing days) is presented for both fleets.

2. Material and Methods

The monitoring of the Spanish bait boat and troll fleets activity in 2014 was done by means of collecting information through interviews to skippers at main fishing ports located along North western coast and the Cantabrian coast. The information, based on individual trip samples by fleet, that was collected included: number of days at sea, number of fishing days, catch in number of fish and weight (kg) and an approximate location of catch by 1°x1° degrees latitude and longitude, recording at least one position per trip.

Smaller number of trips was also sampled to obtain the length frequency of the catch by applying random sampling stratified according to commercial categories of catches landed in the main fishing markets which were monitored. The following information was recorded: date of landing, gear, number of days at sea, number of fishing days, number of lines, approximation of the fishing area in 1° x 1° degree, catch in number, catch in weight (kg) and fish length (cm). Fish were measured to the fork length (FL) and to the nearest centimetre according to commercial categories in the fishing markets.

The catch, nominal effort expressed in fishing days and length frequency data were processed by gear on monthly basis following raising procedures to estimate the Task I and Task II (biological information) statistics of ICCAT (ICCAT, 2006-2010). Thus, the monthly distribution of catch at length was estimated for the landed catches of troll and bait boat fleets in 2014.

The collected information of catches in weight and fishing effort by trip was aggregated by 1° x 1° latitude and longitude for each month and gear fleet. Then monthly nominal catch rates (CPUE) of both fleets were estimated according to the geographical locations in 1°x1° degrees and represented to describe the spatial evolution of fleets in 2014 fishing season. Likewise, the monthly percentage of catch in weight by gear was calculated to describe the temporal evolution of catches according to the fishing activity in 2014. Median seasonal pattern of catch for the period 2009-2013 was estimated and included for comparison to most recent temporal pattern.

Total age composition of catches by fleet 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 catch at length distribution by applying a knife-edge deterministic slicing to calculate the number of fish by age group caught in 2014.

3. Results and Discussion

According to the information collected and processed, the total albacore nominal catch (Task I data) obtained by the surface fleets in 2014 of 9,265 t represented same level of catch in comparison to 2013 surface fishery season. The estimated catch, Task I, taken by the troll fleet was 6,651 t in 2014 which represented an increase compared to 2013 catch of 5,864 t. At the contrary the bait boat catch, Task I, obtained in 2014 was 2,614 t, a decreased in comparison to 2013 catch of 3,425 t (Ortiz de Zárate *et al.*, 2015).

The monthly spatial distribution of nominal catch rates for the bait boat fleet in 2014 fishing season are represented in **Figure 1.a**. As shown, most of the catches were obtained in the offshore waters of North eastern Atlantic from July to September, with minor catches in the Bay of Biscay area. The geographical distribution of bait boat catches in 2014 was different than previous fishing seasons of 2012 and 2013, when catches concentrated mainly in the Bay of Biscay area closer to the coast line. Likewise the monthly nominal catch rates for troll fleet in 2014 fishing season are included in **Figure 1.b**. The troll fleet operated in the offshore waters of the North eastern Atlantic from June to November. Very scarce number of trips were observed in The Bay of Biscay area in August and September of 2014. The decrease of the fishing effort by troll fleet in the Bay of Biscay has been documented since 2009 (SCRS/2015/025).

The monthly evolution of the nominal catches taken in 2014 fishing season by the bait boat fleet is shown in **Figure 2.a**. The bait boat fleet completed 100% of the total catch between July and September, however a cumulative catch of 85% was taken during July and August, with a peak in August, when catch represented 52% of total 2014 fishing, well above the median of 29% for the period 2009 -2013. Similarly, monthly evolution of the troll fleet nominal catches is shown in **Figure 2.b**. In 2014, the overall fishing pattern was distinct from the median seasonal pattern observed for the period 2009-2013. In the case of the troll fleet, the fishing season was more balanced, spreading the catch from July to October, the largest proportion of catch corresponded to July and the overall pattern followed the median trend estimated for the period 2009-2013.

The length distribution of catch was obtained from a sample size of 63,885 fish measured, representing a sampling coverage in number of fish of 2.2 % for bait boat and 5.7 % for troll fleets respectively. The total seasonal catch at size distribution (Task II data) is shown in **Figure 3**, for the bait boat and troll fleets operating in 2014. Three main modes can be clearly identified in the length distribution of catches taken by troll vessels by visual inspection in 2014. Meanwhile, in the case of the bait boat catch at size distribution it is also possible to identify two modes, although not as clearly as in the case of troll fleet. The total catch at size distribution by fleet shown some distinct profiles, that correspond to the different selectivity patterns associated to the two gears targeting albacore in different spatial and temporal strata.

The age composition of catch for the bait boat and troll fleets obtained by length slicing of the catch at size, ranged from age 1 to age 4 group in 2014 catches (**Figure 4**). However, the age composition varied in the proportion at age obtained annually by the two fleet accordingly to their diverse catchability as shown in **Figure 1.a** and **Figure 1.b**. Thus, age 1 albacore was targeted more by troll fleet (15%). The estimated proportions of age 2 was large in both bait boat (41 %) and troll vessels (60%) in 2014, both fleets aggregated contributed to the higher overall proportion of the age 2 albacore in 2014 fishing season, representing 55% in number of fish.

Remarkable high proportion of age 3 was present in the bait boat catch (50%), in comparison to the observed proportion of age 3 catch in precedent years 2012 (16%) and 2013 (17%) as described by Ortiz de Zárate, *et al.* (2015). This high percentage of age 3 was also detected in troll fleet yield. The age 4 group, very scarce in the composition of catch, represented the 3% of total albacore caught by the bait boat and troll fleet. The abundance of age 2 and 3 (**Figure 4**) in the commercial catch taken by the surface fleets in 2014 might be considered as an indicator of a probable strong albacore cohorts in the consecutive years 2011 and 2012 in North Atlantic stock, therefore being caught in the surface fishery in the North Eastern Atlantic stock.

The inter annual changes observed in the surface fishery concerning the temporal and spatial distribution of albacore targeted by the surface fishery in previous years (Ortiz de Zárate *et al.*, 2015) and the last 2014 year described the decrease of bait boat activity and troll fleet to a minor degree in the Bay of Biscay. This fact merits to be studied in relation to climatic and oceanographic variables that influence the migration and habitat distribution of albacore (Dufour *et al.*, 2010; Lavín *et al.*, 2007) in the northeast Atlantic waters and Bay of Biscay off shore waters. Further comprehensive studies will be useful to elucidate the behaviour of albacore confronted to environmental variables (Arrizabalaga *et al.*, 2014).

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References

- Aloncle, H. et F. Delaporte. 1973. Populations, croissance et migrations du germon (*Thunnus alalunga*) dans le nord-est Atlantique essai de synthèse. *Rev. Trav. Inst. Pêches marit.*, 37(1): 97-115.
- Arrizabalaga, H. 2003, Estructura poblacional del atún blanco (*Thunnus alalunga* Bonn. 1788): una aproximación multidisciplinar. PhD, Universidad de Vigo, 161 pp.
- Arrizabalaga, H., F. Dufour, L. Kell, G. Merino, L. Ibaibarriaga, G. Chust, X. Irigoien, J. Santiago, H. Murua, I. Fraile, M. Chifflet, N. Goikoetxea, Y. Sagarminaga, O. Aumont, L. Bopp, M. Herrera, J. M. Fromentin, S. Bonhomeau. 2014. Global habitat preferences of commercially valuable tuna. *Deep-Sea Research II*. <http://dx.doi.org/10.1016/j.dsr2.2014.07.001>
- Arrizabalaga, H. and J. Santiago. 2003. Assessment sensitivity to different north Atlantic albacore catch at age estimates. *ICCAT, Col. Doc. Cient.*, Vol. 55 (1): 272-279.
- Arrizabalaga, H., J. Santiago, Y. Sagarminaga, I. Artetxe. 2010. Daily CPUE database for Basque albacore trollers and bait boats Collect. Vol. Sci. Pap. ICCAT, 65(4): 1291-1297
- Bard, F.X. 1981. Le thon germon (*Thunnus alalunga*) de l'Océan Atlantique. De la dynamique de population à la stratégie démographique. Thèse Doctorat ès Sciences Naturelles, Université de Paris VI, 330 p.
- Bard, F.X and J. Santiago. 1999. Review of albacore (*T. alalunga*) historical surface fisheries data (1920-1975) for possible relationships with north Atlantic oscillation. *SCRS/98/106. ICCAT, Col. Doc. Cient.* Vol. 49 (4): 311-323.
- Dufour, F., H. Arrizabalaga, X. Irigoien, J. Santiago. 2010. Climate impacts on albacore and bluefin tunas migrations phenology and spatial distribution. *Progress in Oceanography*, 86, 283-290.
- ICCAT. 2006- 2009. *ICCAT Manual. International Commission for the Conservation of Atlantic Tuna. In: ICCAT Publications* [on-line]. Updated 2009. [Cited 01/27/]. ISBN (Electronic Edition): 978-92-990055-0-7
- Lavin, A., Moreno-Ventas, X., Ortiz de Zárate, V., Abaunza, P., and Cabanas, J. M. 2007. Environmental variability in the North Atlantic and Iberian waters and its influence on horse mackerel (*Trachurus trachurus*) and albacore (*Thunnus alalunga*) dynamics – *ICES Journal of Marine Science*, 64.
- Ortiz de Zárate, V. and J. L. Cort. 1998. Albacore (*Thunnus alalunga*, Bonnaterre) stock structure in the Atlantic Ocean, as inferred from distribution and migration patterns. *ICCAT, Col. Vol. Sci. Pap.* 50 (1): 251-260.
- Ortiz de Zárate, V. and S. Barreiro. 2010. Statistics from the Spanish albacore (*Thunnus alalunga*) surface fishery in the North eastern Atlantic in 2008. *Collect. Vol. Sci. Pap. ICCAT*, 65(4): 1437-1445.
- Ortiz de Zárate, V., B. Perez, M. Ruiz. 2013. Statistics from the Spanish albacore (*Thunnus alalunga*) surface fishery in the North eastern Atlantic in 2011. *Collect. Vol. Sci. Pap. ICCAT*, 69(5): 2163-2171.
- Ortiz de Zárate, V, B. Perez, M. Ruiz. 2015. Statistics from the Spanish albacore (*Thunnus alalunga*) surface fishery in the North eastern Atlantic, years: 2012-2013. *Col. Vol. Sci. Pap. ICCAT*, 71(5): 2379-2389.
- Ortiz de Zárate, V., B. Perez. 2016 (*in press*) *SCRS/2015/025* Evolution of spatial distribution of fishing ground for the Spanish albacore (*Thunnus alalunga*) troll fleet in the north eastern Atlantic, years: 2000 to 2013. *Col. Vol. Sci. Pap. ICCAT*.

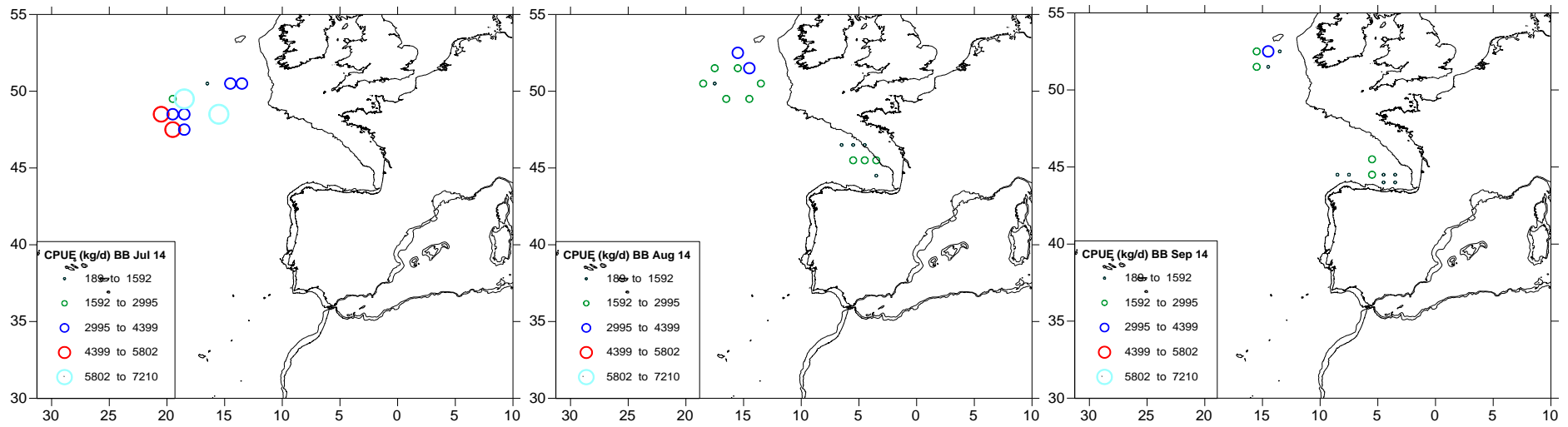


Figure 1.a. Spanish baitboat nominal CPUE distribution in 2014 fishing season derived from interviews to skippers.

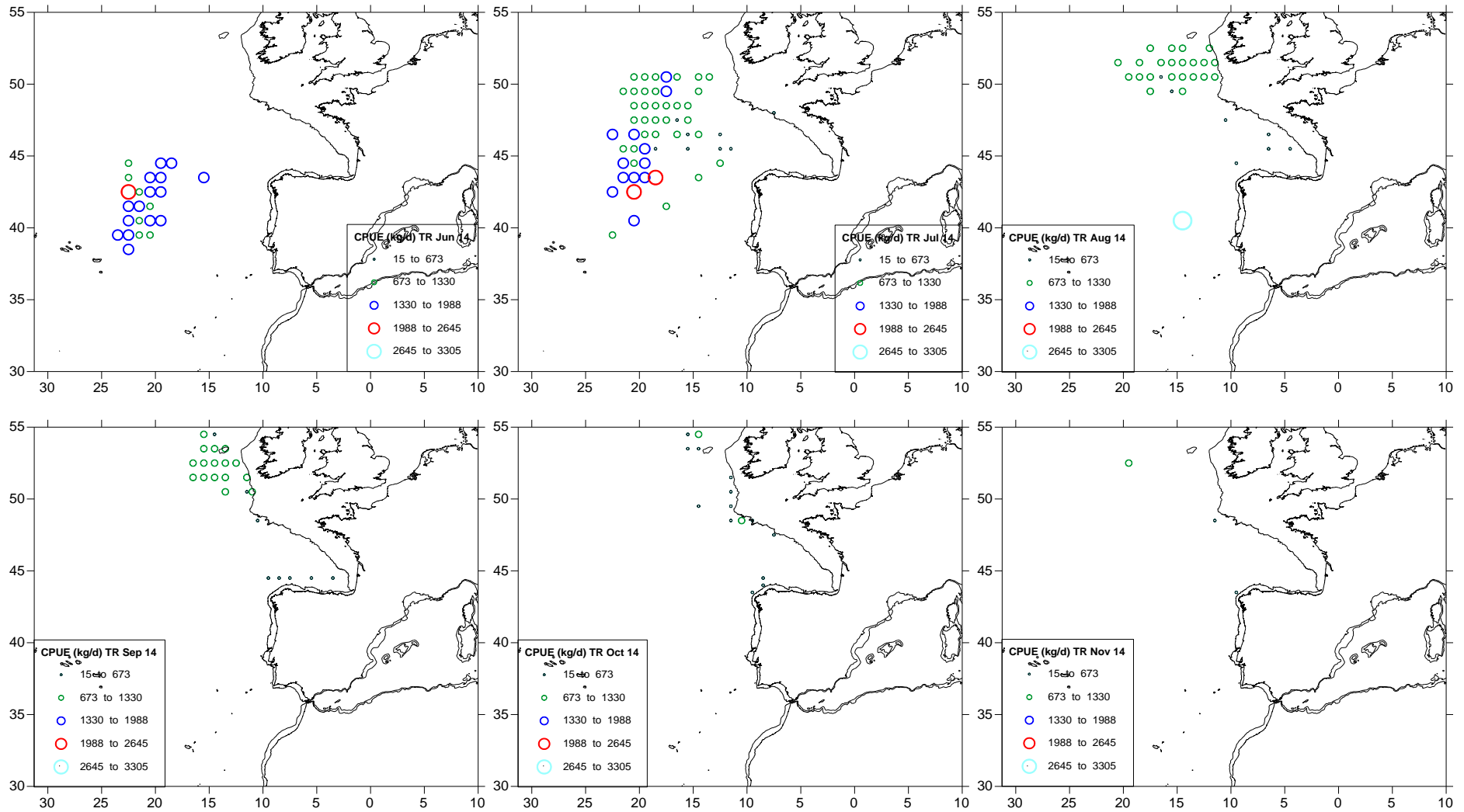


Figure 1.b. Spanish troll nominal CPUE distribution in 2014 fishing season derived from interviews to skippers.

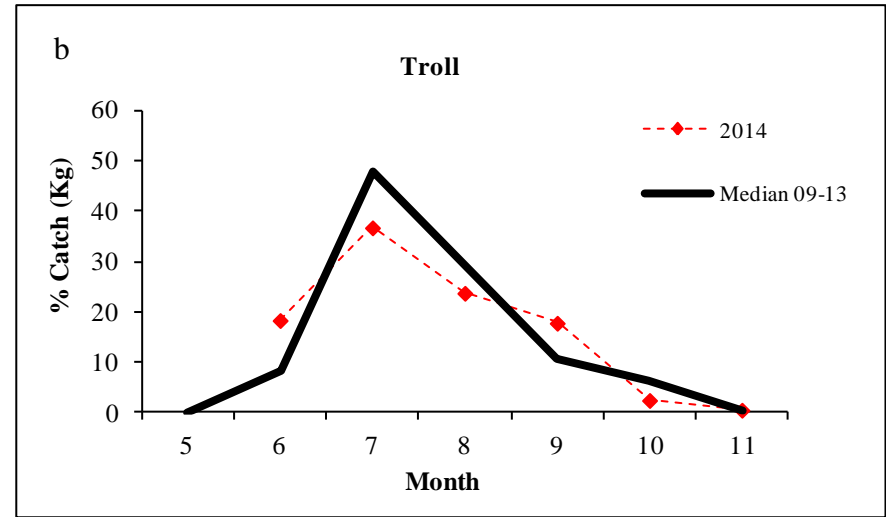
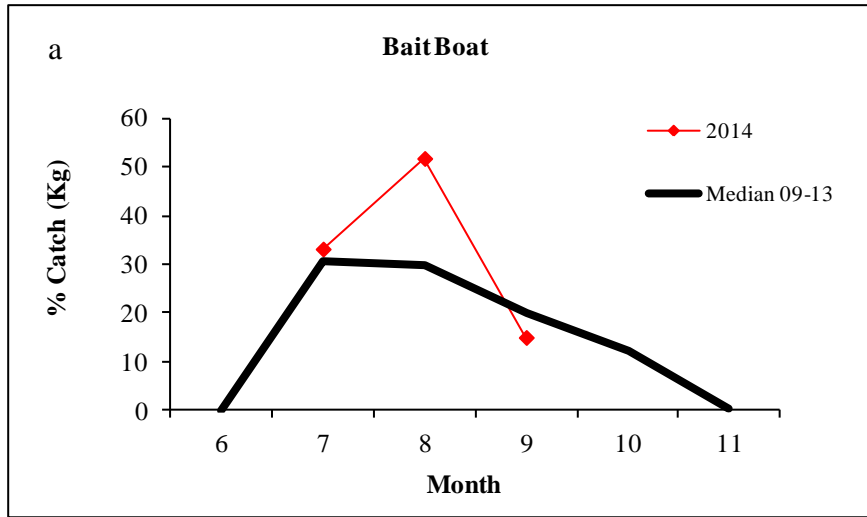


Figure 2. Seasonality of Spanish albacore catch by (a) bait boat fleet and (b) troll fleet in 2014 and median catch for 2009-2013.

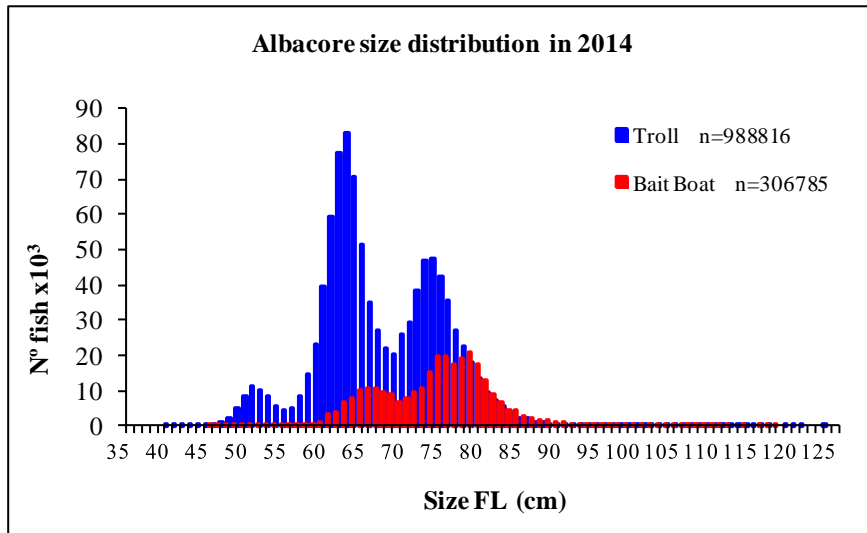


Figure 3. Catch at size albacore distribution caught by surface fleets in 2014.

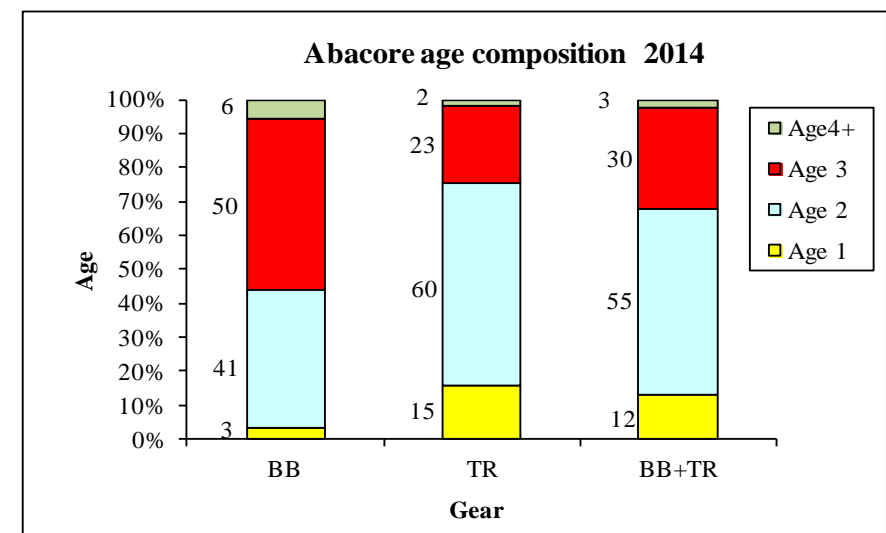


Figure 4. Age composition of Spanish albacore surface fishery in 2014.