THE SPANISH ALBACORE (*THUNNUS ALALUNGA*) SURFACE FISHERY ACTIVITY IN THE NORTH EASTERN ATLANTIC IN 2015

V. Ortiz de Zárate[1], B. Perez[1]

SUMMARY

The main features of the Spanish albacore (Thunnus alalunga) surface fishery in 2015 are presented. Fishing was conducted during summer and autumn seasons operating in offshore waters of the northeast Atlantic and in the Bay of Biscay. The catch of the bait boat fleet increased in 2014.On the other hand the troll fleet catch in 2015 showed some decrease in comparison with level of the troll catch in 2014.The bait boat fleet targeted albacore from July to September in the Bay of Biscay area, while albacore was targeted by the troll fleet from June to November, primarily in off shore waters of North east Atlantic. Size composition of catches obtained by the bait boats in 2015, showed a high proportion of age 1 group, followed by age 2. On the other hand, the age structure in the troll fleet showed some proportion of age 1 and a remarkable high proportion of age 2 albacore in 2015. The overall demography structure of the surface fishery, with a high proportion of age 1, could be an indicator of an abundant albacore cohort that was available to the Spanish surface fishery in 2015. Monthly spatial distribution of nominal catch rates by fleet are presented for 2015 fishing season.

RÉSUMÉ

*Les principales caractéristiques de la pêcherie espagnole de surface de germon (*Thunnus alalunga*) en 2015 sont présentées dans le présent document. La pêche avait 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 augmenté en 2014. En revanche, les prises de la flottille de ligneurs en 2015 ont présenté une légère diminution par rapport au niveau de 2014. La flottille de canneurs ciblait le germon de juillet à septembre dans la zone du golfe de Gascogne, tandis que le germon était ciblé par la flottille de ligneurs de juin à novembre majoritairement dans les eaux au large de l'Atlantique Nord-Est. La composition des tailles des captures réalisées par les canneurs en 2015 a fait apparaître une forte proportion du groupe d'âge 1, suivie du groupe d'âge 2. D'autre part, la structure démographique au sein de la flottille de ligneurs affichait une faible proportion du groupe d'âge 1 et une proportion considérablement élevée du groupe d'âge 2 dans la prise de germon de 2015. La structure démographique globale de cette pêcherie de surface, dotée d'une proportion élevée du groupe d'âge 1, pourrait être un indicateur de la cohorte abondante de germons qui était disponible pour la pêcherie de surface espagnole en 2015. La distribution spatiale mensuelle des taux de capture nominale par flottille est présentée pour la saison de pêche 2015.*

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 2015 en aguas del Atlántico nordeste y golfo de Vizcaya. La captura de los barcos de cebo vivo aumentó en 2015, mientras que la captura de flota de cacea se mantuvo en el mismo nivel de captura del año 2014. 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 la captura en número de edad 1 fue la más abundante, seguida de la edad 2. La estructura edades observada en la flota de cacea en 2015, mostró la mayor captura en los peces de edad 2 seguida de la edad 1. Las mayores capturas observadas del grupo de edad 1 en 2015, podría indicar una cohorte abundante de atún blanco que estuvo disponible en la pesquería de superficie en 2015. Se presenta la distribución geográfica mensual de las tasas de captura nominal de ambas flotas de 2015.

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[1] Instituto Español de Oceanografía. Apdo.240. 39080 Santander. Spain. victoria.zarate@st.ieo.es

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 *et al.*, 2015). Baitboat and troll vessels participate annually on the seasonal 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 2015 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 2015. The required ICCAT statistics Task II data, were elaborated from the collected information of the fishery, the catch-at-size composition of landings and the demographic structure of catches obtained by length slicing method are presented 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 2015 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) required statistics of fisheries by fleet according to 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 2015.

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 to describe the spatial evolution of fleets in 2015 fishing season in North eastern Atlantic and Bay of Biscay fishing grounds.

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 2015. Median seasonal pattern of catch for the period 2010-2014 was estimated and included for comparison to most recent temporal catch pattern observed in 2015.

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 2015.

3. Results and Discussion

According to the information collected and processed, the total albacore nominal catch (Task I data) obtained by the two surface fleets in 2015 of 11,193 t represented an increase of 21% of catch in comparison to 2014 surface fishery season. The estimated catch (Task I data), taken by the troll fleet was 5,596 t which represented a decrease of 16% in catch compared to the 2014 yield. At the contrary the bait boat catch, Task I, estimated in 2015 was 5,597 t an increase more than double the catch observed in 2014 (Ortiz de Zárate and Pérez, 2016a).

The monthly spatial distribution of nominal catch rates for the bait boat fleet in 2015 fishing season are represented in **Figure 1.a**. As shown, all the fishing activity took place in Bay of Biscay area from July to September, with minor catches in October. The geographical distribution of bait boat catches during 2015 was similar to the distribution of fishing effort in 2012 and 2013, when catches concentrated mainly in the Bay of Biscay area closer to the coast line (Ortiz de Zárate *et al.,* 2015).

Likewise the monthly nominal catch rates observed for troll fleet in 2015 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 during July, August and September in 2015. The decrease of the fishing effort by troll fleet in the Bay of Biscay has been documented since 2009 (Ortiz de Zárate and Pérez, 2016b).

The monthly evolution of the nominal catches taken in 2015 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. The cumulative catch of 50% was taken during July and August, with a peak in September, representing the remaining 50% of the total catch taken. The high catch in September represented a level of catch well above the median of 24% estimated for the period 2010-2014.

Similarly, monthly evolution of the troll fleet nominal catches is shown in **Figure 2.b**. In 2015, the overall fishing pattern was similar to the median seasonal pattern observed for the period 2010-2014. In the case of the troll fleet, the fishing season was more balanced, spreading the catch from June to October even an extension of activity to November. Substantial catches were obtained at the beginning of the summer fishing season in June followed by   the largest proportion of catch obtained in July.

The length distribution of catch was obtained from a sample size of 74,129 fish measured, representing a sampling coverage in number of fish of 1 % for bait boat and 6.9 % for troll fleets respectively. The total annual distribution of catch at size distribution (Task II data) is shown in **Figure 3,** for the bait boat and troll fleets operating in 2015. Three main modes can be clearly identified in the length distribution of catches taken by troll vessels by visual inspection in 2015. Meanwhile, in the case of the bait boat catch at size distribution it is also possible to identify three modes, with a remarkable mode of young albacore, not as clear as in the case of troll fleet. The total catch at size distribution by fleet shown similar length profiles, although the abundance shown an uneven pattern, probably 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 2015 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 bait boat fleet (77%). The estimated proportions of age 2 was larger in troll fleet (55 %) and represented the 26 % in the aggregated catch of both fleets.

Finally, both fleets aggregated catch contributed to the higher overall proportion of the age 1 albacore in 2015 fishing season, representing 57% in number of fish, followed by the 26% of age 2 in the aggregated catch of both fleets.

The proportion of age 3 was present in both fleets at similar level of catch in number of fish, representing 15% for both fleets aggregated. The age 4 group, was very scarce in the composition of catch, represented a minor contribution of 2% in the total albacore caught by the two fleets. The abundance of age 1 (**Figure 4)** in the commercial catch taken by the surface fleets in 2015 might be considered as an indicator of a probable strong albacore cohort which could be evident in the consecutive fishing years in North 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; Ortiz de Zárate and Pérez, 2016) and the fishing distribution observed in 2015 described the inter annual variability of the fishing activity in the Bay of Biscay and North East Atlantic fishing grounds by fleet. This fact merit 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).

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'Ocean Atlantique. De la dynamique de population à la stratégie démographique. *Thèse Doctorat ès Sciences Naturelles, Universitè 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, 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. 2016a. Statistics from the Spanish albacore (*Thunnus alalunga*) surface fishery in the North eastern Atlantic in 2014. Col. Vol. Sci. Pap. ICCAT, 72(8): 2023-2030.

Ortiz De Zárate, V., B. Perez. 2016b. 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, 72(8): 2016-2022.
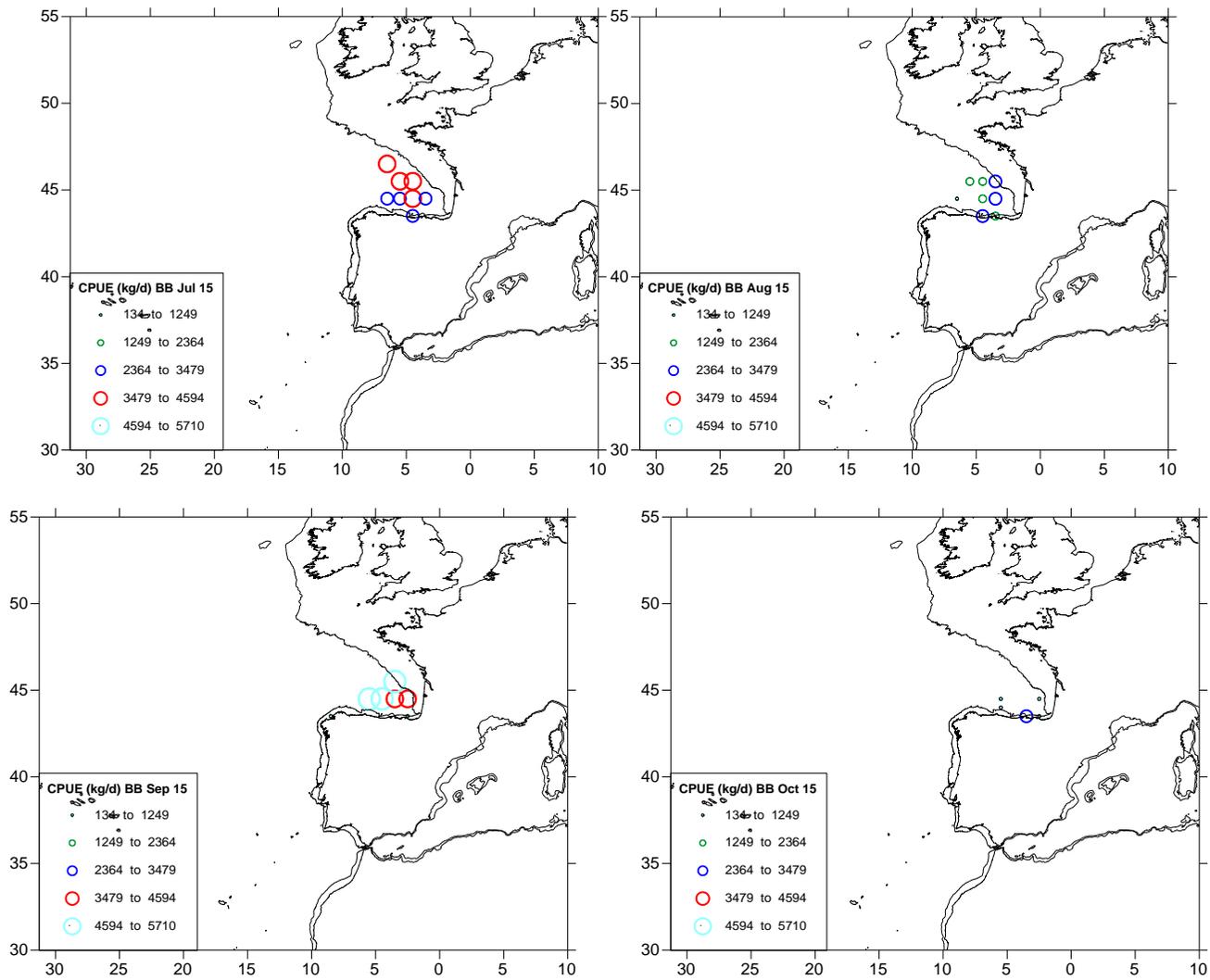
Figure 1.a. Spanish bait boat nominal CPUE distribution in 2015 fishing season derived from interviews to skippers.
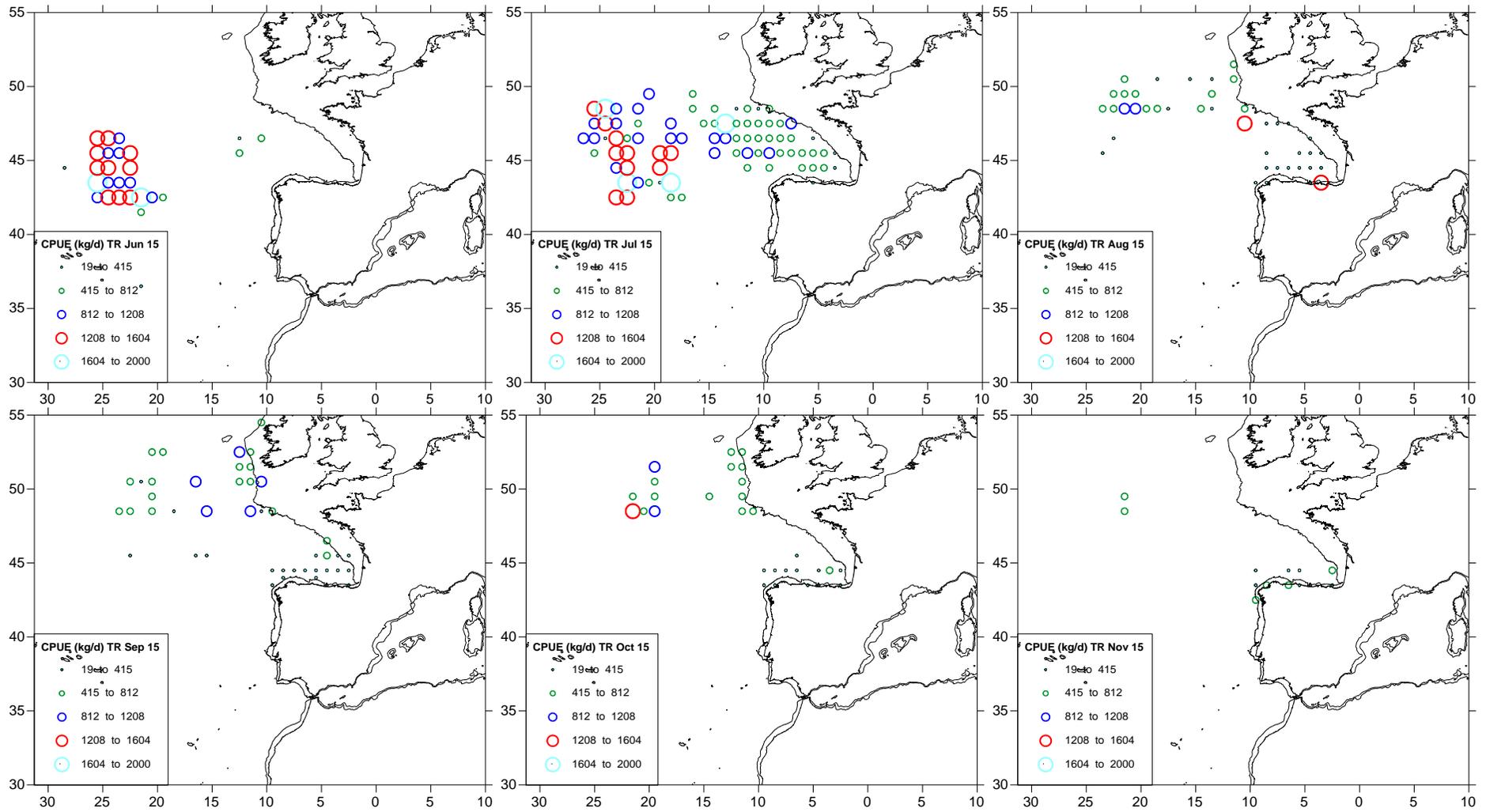
Figure 1.b. Spanish troll nominal CPUE distribution in 2015 fishing season derived from interviews to skippers.
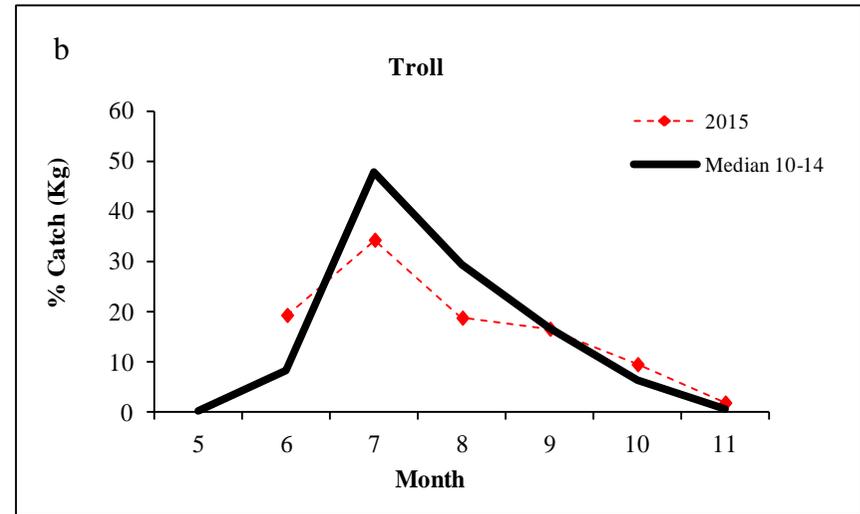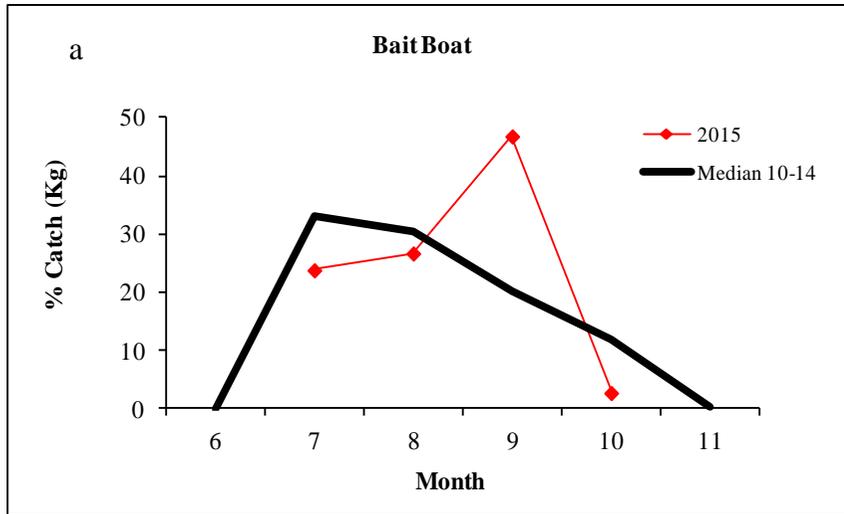
Figure 2. Seasonality of Spanish albacore catch by (a) bait boat fleet and (b) troll fleet in 2015 and median catch for 2010-2014.
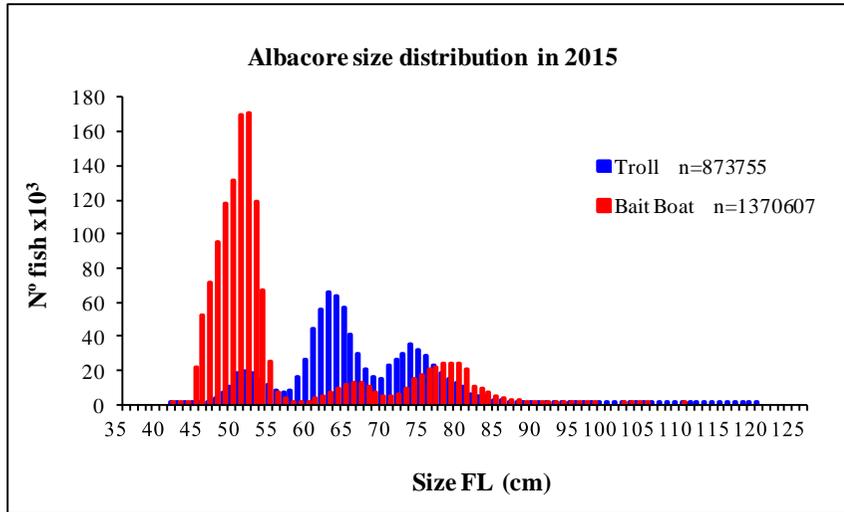

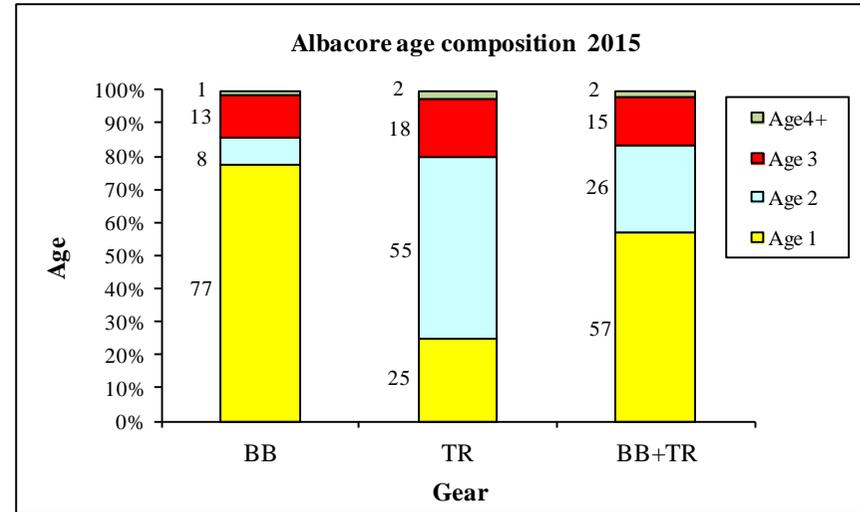**Figure 3.** Albacore catch at size caught by bait boat and troll fleets in 2015.

Figure 4. Age composition of Spanish albacore surface fishery in 2015.

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