

THE BLUEFIN TUNA (*THUNNUS THYNNUS*) FISHERY IN THE BAY OF BISCAY

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SUMMARY

Curricán (troll line) and “chapa” (silver plated spoon) were the gears used in the Bay of Biscay bluefin tuna fishery up until the middle of the twentieth century, when the first experiments with baitboat were made. The introduction of this new fishing system was a very important development in the region. The fishery is mainly made up of juveniles (<30 kg), but there was a constant presence of adults (group 5+) on the trophic migration towards northern European waters in the past. From observations on board fishing vessels at the beginning of the seventies, the importance in this fishery of age 5+ fish groups is confirmed; but since then this group has practically disappeared from the fishery. The current length composition reveals the absolute dominance of juveniles.

RÉSUMÉ

La ligne traînante et la “chapa” (cuillère argentée) étaient les engins de pêche utilisés dans la pêcherie de thon rouge du Golfe de Gascogne jusqu’au milieu du XX^{ème} siècle, lorsque les premières expériences avec la canne ont été réalisées. L’introduction de ce nouveau système de pêche a constitué un développement capital dans la région. La pêcherie se compose surtout de juvéniles (<30 kg), mais les adultes (groupe 5+) étaient constamment présents dans la migration trophique vers les eaux de l’Europe du nord par le passé. D’après les observations réalisées à bord des navires de pêche au début des années 1970, l’importance de groupes de poissons d’âge 5+ a été confirmée dans cette pêcherie ; depuis lors, ce groupe a pratiquement disparu de la pêcherie. La composition par taille actuelle révèle la prédominance absolue des juvéniles.

RESUMEN

Hasta mediados del siglo XX los artes utilizados en la pesquería de atún rojo del Golfo de Vizcaya eran el curricán y la “chapa”, cuando se realizaron los primeros experimentos con cebo vivo. La introducción de este nuevo sistema de pesca supuso un desarrollo muy importante en la región. La pesquería se compone fundamentalmente de juveniles (<30 kg), pero existía una presencia constante de adultos (grupo 5+) en la migración trófica hacia aguas septentrionales europeas en el pasado. A partir de las observaciones a bordo de buques pesqueros a comienzos de los años setenta, se confirma la importancia en esta pesquería de los grupos de peces de edad 5+, pero desde entonces este grupo prácticamente ha desaparecido de la pesquería. La actual composición por tallas revela el predominio absoluto de los juveniles.

KEYWORDS

Atlantic bluefin tuna, Bay of Biscay, baitboat fishing, environmental conditions

1. The Bay of Biscay fishery

The first references to bluefin tuna fishing in the Bay of Biscay date from the sixteenth century (Merino, 1997) and indicate that it involved the use of hook gears camouflaged with a mixture of horse hairs, corn straw fibres and even feathers. This twelve centimetre tackle was all held by a tin plate, called *curricán* (troll line). The vessels that dragged these gears were sailing vessels or were rowed.

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With the introduction of steam, and later combustion engines, bluefin tuna fishing in the area underwent great transformations in the twentieth century, but the troll line and “*chapa*”² continued to be used until the arrival of baitboat fishing in 1948.

From 1949 it may be considered that the new fishing system was fully adopted, and it is from then that the historical maximums of this fishery were reached. This new fishing system, practiced first by French Basque fishermen (De la Tourrasse, 1951), led to considerable development in the area as it significantly increased the possibilities of exploitation of the bluefin tuna resource. The largest fish present in the fishery could now be caught using a rod, and in great quantities.

The fishery is mainly made up of juveniles (1-4 years old, between 4 - 35 kg; Hamre & Tiews, 1963; 1964), which are those that remain in the area throughout the fishing season, which usually runs from the end of spring (May-June) until the beginning of autumn (September-October; Cort, 1990).

The migration of shoals of juvenile tunas from wintering areas to the Bay of Biscay is associated with the latitudinal displacement of surface isotherms. Movements are in a south-north direction at the end of spring, within the area delimited by the 17° - 21° C isotherms, and north-south in autumn, within the area delimited by the 16° - 18° C isotherms (Cort, *op. cit.* 1990).

The entrance of bluefin tuna in the Bay of Biscay takes place at the end of spring to the west of the Iberian peninsula, and its final destiny is the southeastern corner of the bay where, during the summer season, an accumulation of warm waters (Koutsikopoulos & Le Cann, 1996) takes place (**Figure 2**) and a concentration of bluefin tuna prey.

The abundance of the most important preys (anchovy, sardine and mackerel) is linked to certain oceanographic conditions (Motos *et al.*, 1996; Varela, 1996) that make the Bay of Biscay a place of great richness in primary production. Bluefin tuna finds a space ideal for intense feeding, and so groups of juveniles of 1 to 3 years of age (< 30 kg) double their weight in the four months that they remain in the area (Cort, *op. cit.*).

In the interior of the bay, the tunas are found in large shoals made up of fishes of the same ages, and they search for food continually (Cort, *op. cit.*). These shoals act differently according to the nature and behaviour of their preys. These formations and the effects they produce on the sea surface give away their presence, allowing fishermen to take advantage and make their catches.

The aim of this study is to attempt to explain what happened to the groups of the largest specimens, group 5+, i.e. the fishes of over five years age and between 60-150 kg (Cort & Rodriguez-Marin, 2008), which were traditionally present in the Bay of Biscay between the middle of July and the middle of August, when they make their annual trophic migration to feeding areas in the North Sea and off coasts of Norway from the spawning areas in the Mediterranean Sea (Cort, *op. cit.*; Nøttestad & Graham, 2005).

These spawners appear to the west of the Iberian Peninsula, at the edge of the slope of the Spanish continental shelf in the direction of the southeastern corner of the Bay of Biscay, and their stay in the area is of just three weeks.

Although they could be caught using rods holding large hooks, most of them were caught one by one with reels and with the vessel stationary (**Figure 3**), such that once the shoal of tuna had been located the vessel stopped over it, and it could remain there for one or several days making catches by means of baiting until the cold storage hold was full (**Figures 4 to 6**).

In this way very important catches of large specimens were taken, as could be seen directly between 1971 and 1973. But with time this fishing method disappeared and nowadays, the few occasions when these spawners are caught (as happened in isolation in 1999 and 2006), it is done using rods and with the vessel in movement.

Fromentin (2002) quoted the importance of some cohorts (between 1947 and 1954) detected in the Atlantic fisheries of adults (Spanish Atlantic traps and Norwegian fisheries). Our data from 1956 of bluefin tuna catches in the Bay of Biscay also confirm this.

² Made up of a silver-plated spoon bearing the hook on one side and a spinner on the other. It was used manually in such a way that when the set was pulled rhythmically the shining effect attracted the fish. The size of the spoon varied between 9 and 14 cm.

The bluefin tuna length samplings in 1956, recorded thanks to the recovery of the old archives of the fishermen's associations, bear testimony to the importance that catches of group 5+ specimens had in this fishery.

The length distributions of catches of the fisheries of the Strait of Gibraltar traps (Rodríguez-Roda, 1964) and the Norwegian coast (Hamre & Tiews, 1963), and a sample of length frequencies for the Bay of Biscay fishery (Cort, 1990), all corresponding to 1956, are shown in **Figure 7**. We see how the 1950 and 1951 cohorts (fishes aged 5 and 6 years, between 135 and 170 cm) were found to be present in the three fishing areas. It is noteworthy, according to the scientific testimonies of the age, how in the Norwegian fishery the appearance of these groups of spawners came about in week 36 (the first week in September), when less than a month before these same fishes had been in the Bay of Biscay, and even earlier had crossed the Strait of Gibraltar, returning from the spawning grounds in the Mediterranean towards feeding areas out in the ocean.

But coming back to the Bay of Biscay, what is now left of a fishery with a great variety of age groups is shown in **Figure 8**: the length distribution of catches of a characteristic year, where we see that practically the entire catch is made up of juveniles of less than 30 kg, and that the groups of adults aged 5+ have disappeared from the fishery.

2. Conclusions

The abundance of the most important preys make the Bay of Biscay an ideal place for the concentration of bluefin tuna since the end of spring (May- June) until the beginning of autumn (September-October). The fishery is mainly made up of juveniles (1-4 years old, between 4-35 kg), which are those that remain in the area throughout the fishing season. However, in the past, adult fishes were traditionally present in the Bay of Biscay between the middle of July and the middle of August, when they made their annual trophic migration to feeding areas in the North Sea and off coasts of Norway from the spawning areas in the Mediterranean Sea. At present, the groups of adults have disappeared from the fishery.

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Figure 1. Baitboat fishing vessels in the Bay of Biscay.

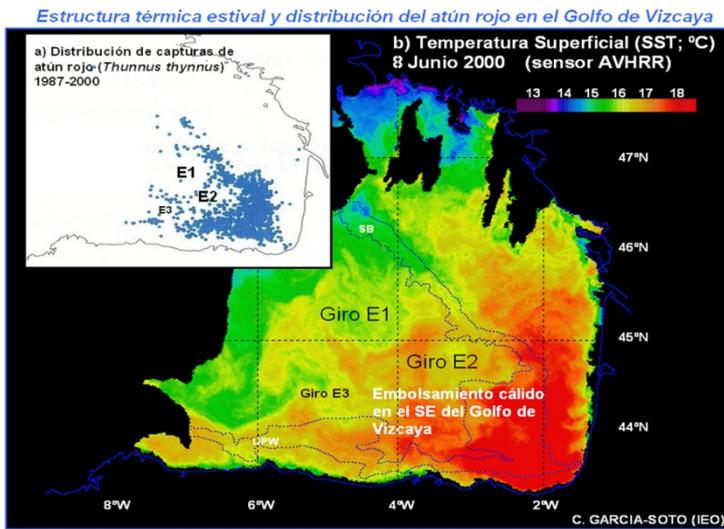


Figure 2. Accumulation of warm waters (Garcia-Soto, 2005) and concentration of bluefin (Rodriguez-Marin *et al.*, 2003).



Figure 3. Preparing a reel for tuna fishing (Photograph taken in 1972).



Figure 4.



Figure 5.



Figure 6.

Figures 4 to 6. Bluefin tuna fishing with reels and live bait in the Bay of Biscay (Photographs taken in 1973).

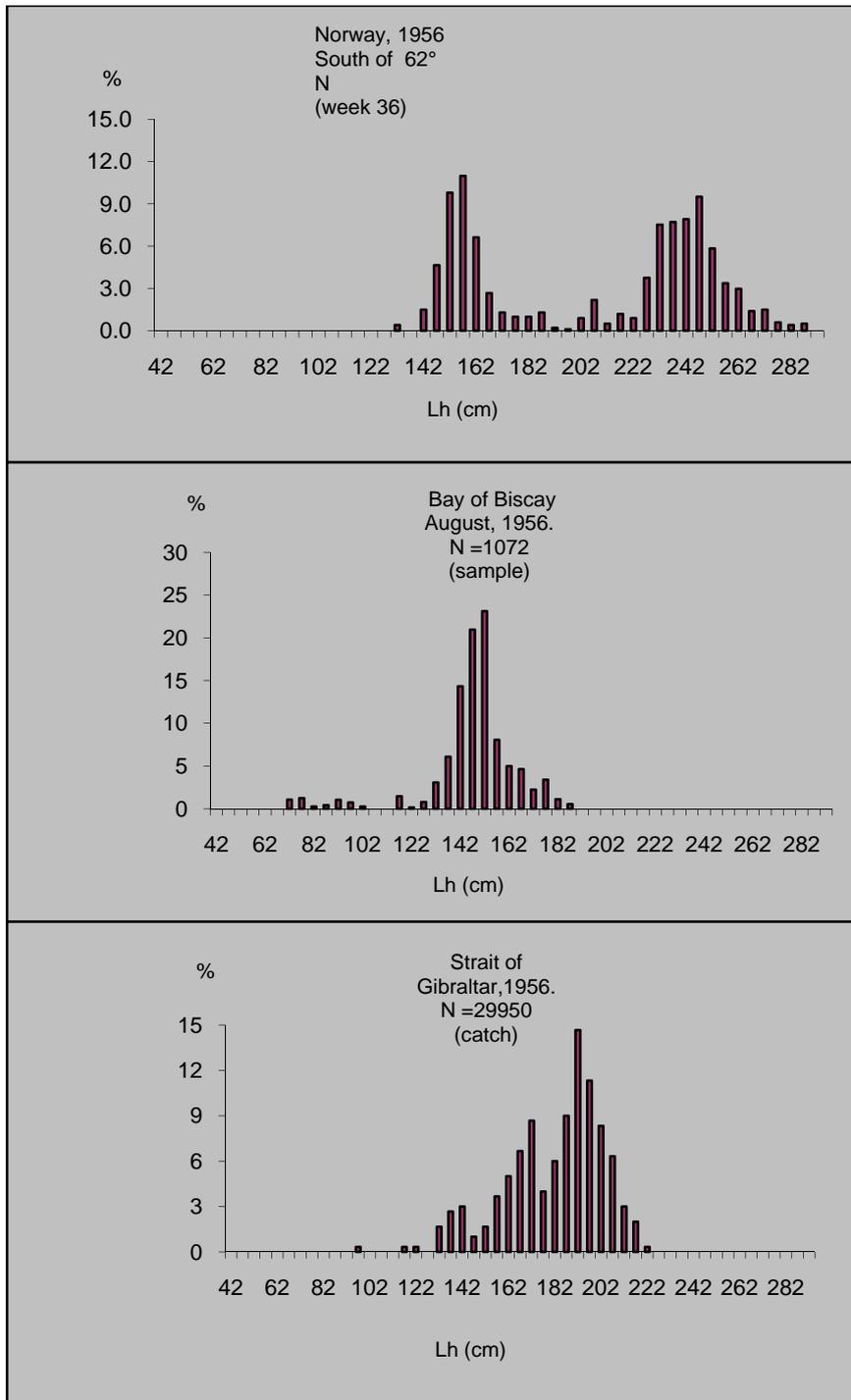


Figure 7. Distributions of length frequencies of three spawning bluefin tuna fisheries in the northeastern Atlantic (1956).

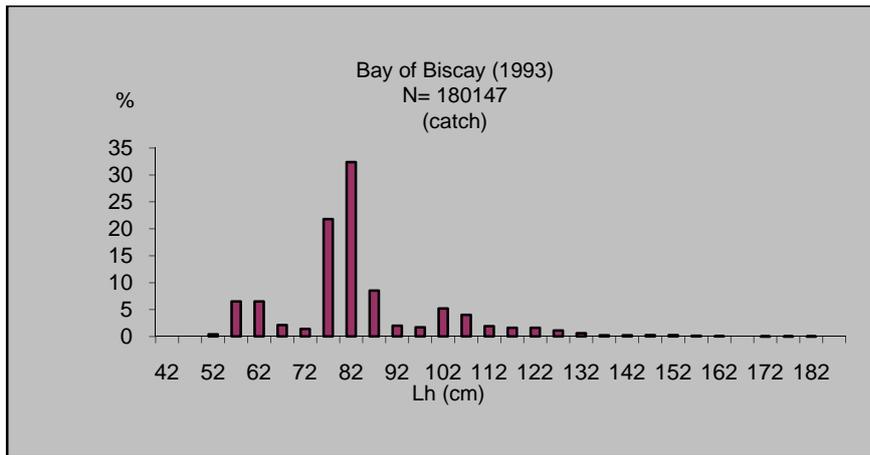


Figure 8. Distribution of length frequencies of bluefin tuna in the Bay of Biscay.