COMPARISON OF THE RECENT AND HISTORICAL INFORMATION ON THE SIZE COMPOSITION OF BLUEFIN TUNA (*THUNNUS THYNNUS)* IN THE ADRIATIC OBTAINED BY PURSE SEINE FISHERIES

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SUMMARY

Historical and recent size composition of bluefin tune caught in the Adriatic Sea by the purse seine were analised and compared. Among the fish being captured, the domination of juveniles was noticed in both periods analysed. Among them, two-year-old specimens of bluefin tuna were the most abundant. The findings presented in this paper confirm that the minimum size regulations under ICCAT (Rec. 08-05) are well defined for purse seine fisheries targeting bluefin tuna for subsequent farming in the Adriatic Sea.

RÉSUMÉ

La composition par taille historique et récente du thon rouge capturé dans la mer Adriatique par les senneurs a été analysée et comparée. Parmi les poissons capturés, la domination des juvéniles a été remarquée dans les deux périodes analysées. Parmi ceux-ci, les thons rouges âgés de deux ans étaient les plus abondants. Les constatations présentées dans ce document confirment que les réglementations en matière de taille minimale stipulées par l'ICCAT (Rec. 08-05) sont bien définies pour les pêcheries de senneurs qui ciblent le thon rouge aux fins de son élevage ultérieur dans la mer Adriatique.

RESUMEN

En este documento se analiza y compara la composición por tallas histórica y reciente del atún rojo capturado en el mar Adriático por los cerqueros. Entre los ejemplares capturados, se constató un predominio de los juveniles en los dos periodos considerados. Entre ellos, los ejemplares de atún rojo de dos años fueron los más abundantes. Los hallazgos presentados en este documento confirman que las regulaciones sobre talla mínima establecidas en la Rec. 08-05) están bien definidas para las pesquerías de cerco que se dirigen al atún rojo para su consiguiente cría en el mar Adriático.

KEYWORDS

Tuna fisheries, purse seining, size composition, Adriatic Sea

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1. Introduction

The main management decision currently in place for East Atlantic/Mediterranean bluefin tuna (BFTE) is a recovery plan (ICCAT Rec. 08-05) that sets as target a stock recovery to Bmsy (biomass at maximum sustained yield) levels by 2022. As of 2010 the total allowable catch is set at 12,900t and a three year management plan over 2010-2013 was established (Rec 10-04). Among the ICCAT conservation measures being introduced a drastic reduction of fishing fleet, reduction of fishing season and prohibition of the capture of specimens smaller than 30 kg were introduced. By derogation, a minimum size for bluefin tuna of 8 kg shell apply among others in the situations of bluefin tuna caught in the Adriatic Sea for farming purposes only.

2. Material and Methods

As part of the monitoring of fishing and rearing of BFT organized by the Fisheries Directorate of the Croatian Ministry of Agriculture and carried out by the Institute of Oceanography and Fisheries from Split, bluefin tunas samples were obtained in the course of Croatian purse seine fishing in the Adriatic in 2012. As the majority of these fish are destined for caging operations the data for size composition were obtained from the morts during fishing and/or transfering operations. Fish were individualy weighted (W in kg) and fork legth (FL in cm) measurements were done on 269 specimens. Age was estimated by using available length-age information (Cort and Martinez, 2010; Tičina and Kačić, 1998). Total biological sampling corespond to the 2012 fishing season (May 15 to June 15), the months in which entire anual purse seine catch is taken (**Figure 1**). Recent data on size composition were compared with historical ones obtained from 1999 to 2001 (Tičina *et al.* 2002).

3. Results and Discussion

In regard to the size composition in the age structure the two year fish (8-15 kg) prevailed. This is otherwise the most desired portion of bluefin tuna population targeted for caging. An overal interest in targeting towards two year size class is partly result of the enforcement of minimum size regulations under ICCAT regulation measures, and of the potentiality of the biomass increment over multi year farming in the floating cages. Two year fish represents 84% of the catch and has been accompanied by some larger fish of age 3 (15-23kg) and age 4 (28-35kg) respectively (**Figure 1**). No one specimen has ben weighted bellow 8 kg that confirme that ICCAT size limit is well established for Adriatic. Recent size structure of the bluefin tuna in purse seine catch in the Croatian fisheries in which overdominate small bluefin tuna showes the similar pattern to that achieved in the period 1999 to 2001 (**Figure 2**).

Age structure analysis of bluefin tuna population in the Adriatic Sea has been done by several authors (Scaccini, 1965; Morović, 1971; Alegria-Hernandez, 1984; Tičina and Kačić 1998). Fish born in May/June after one year of age (A=0+) with FL less than 60 cm, and in weight till 3.5kg (Tičina and Kačić, 1998) were usually observed in the channel areas of eastern Adriatic, but nowdays not being fished because of ICCAT minimum size regulations. The similar situation is with yearly fish (A=1 and A=1+) with FL from 60 to 75 cm that corresponds with the weight from 4 up to 8 kg. We found the two-year size class (A=2 and A=2+) above 8 kg that corresponds with the FL between 75 and 85 cm. Three years fish (A=3 and A=3+) weighted between 16 and 23 kg and FL 95 to 105 cm, while four year fish (A=4 and A=4+) weighted betweem 28 and 35 kg with fork length between 110 and 120 cm.

The fact that the purse seine fleet targeting bluefin tuna to reach its quota to be mainly placed into floating cages for further breeding, prevents us from knowing what would happened if it had continued fishing after the spawning season (July and on). In the big game fishing performed from the end of July through August and September, specimens having 40 to more than 100 kg in weight were caught (unpublished data). Tičina *et al.* (2002) has also recorded a change in the mean weight during the year (**Figure 2**).

Less is known about migratory paterns of the subadults and adults within Mediterranean and the Adriatic. Improving current understanding of both feeding and sexual migrations should be an important area for future research. Although age composition may be influenced by the fishing strategies that have emerged since implementation of the multi-annual recovery plan for bluefin tuna in the eastern Atlantic and Mediterranean it is thrue that the purse seine catch composed mainly of juveniles has hystoricaly prevailed in Adriatic bluefin tuna fisheries. Higher abundance or higher concentration of small bluefin tuna in the central Adriatic could also be explained with the fact according to which this area is a feeding ground for bluefin tuna juveniles, while higher

presence of adults in the second half of the year might be connected to a specific sexual migrating pattern of bluefin tuna.

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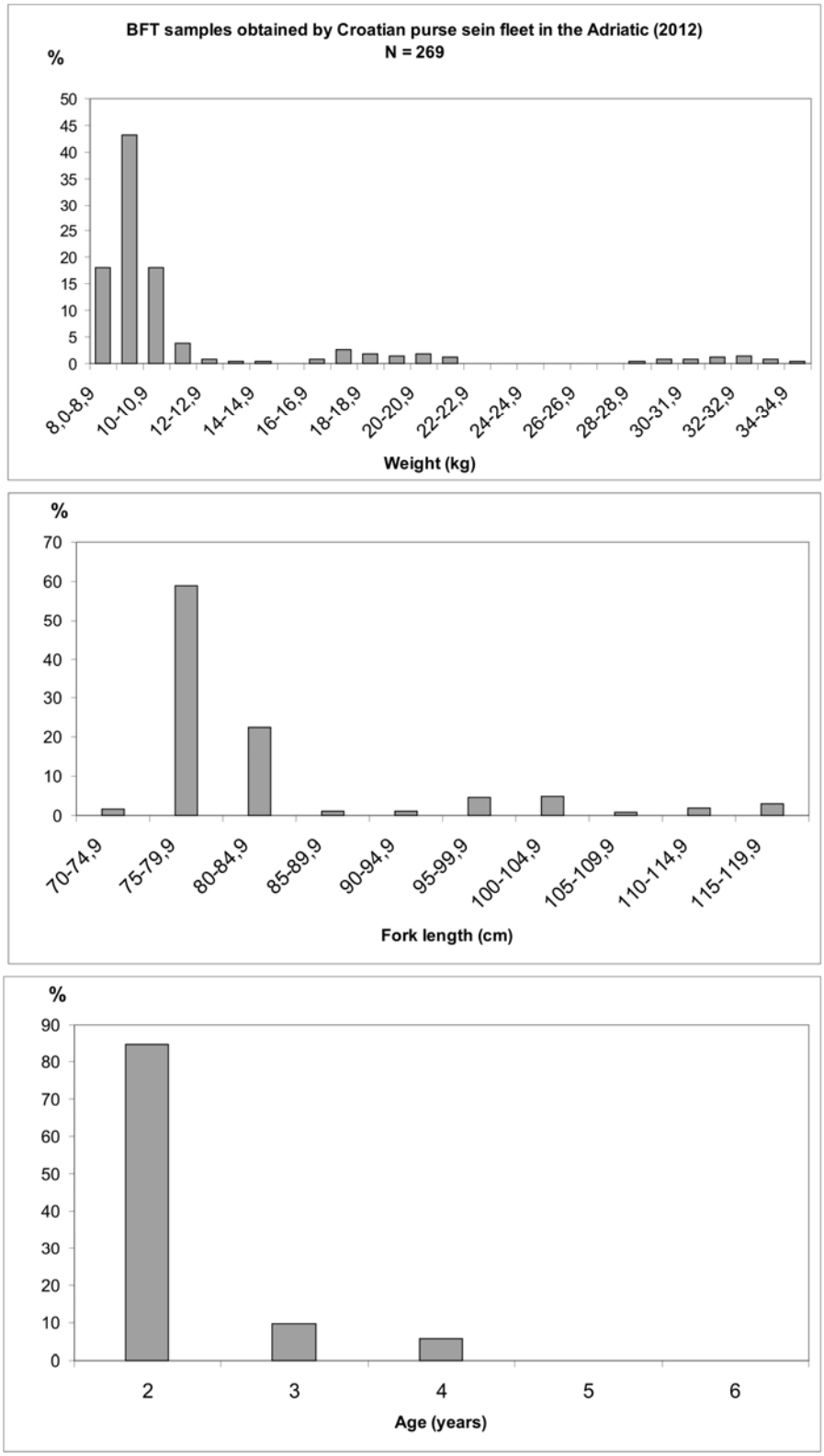

Figure 1. Weight (above), length (middle) and age distribution (below) of bluefin tuna in the Adriatic waters caught by Croatian purse seine fleet in 2012.

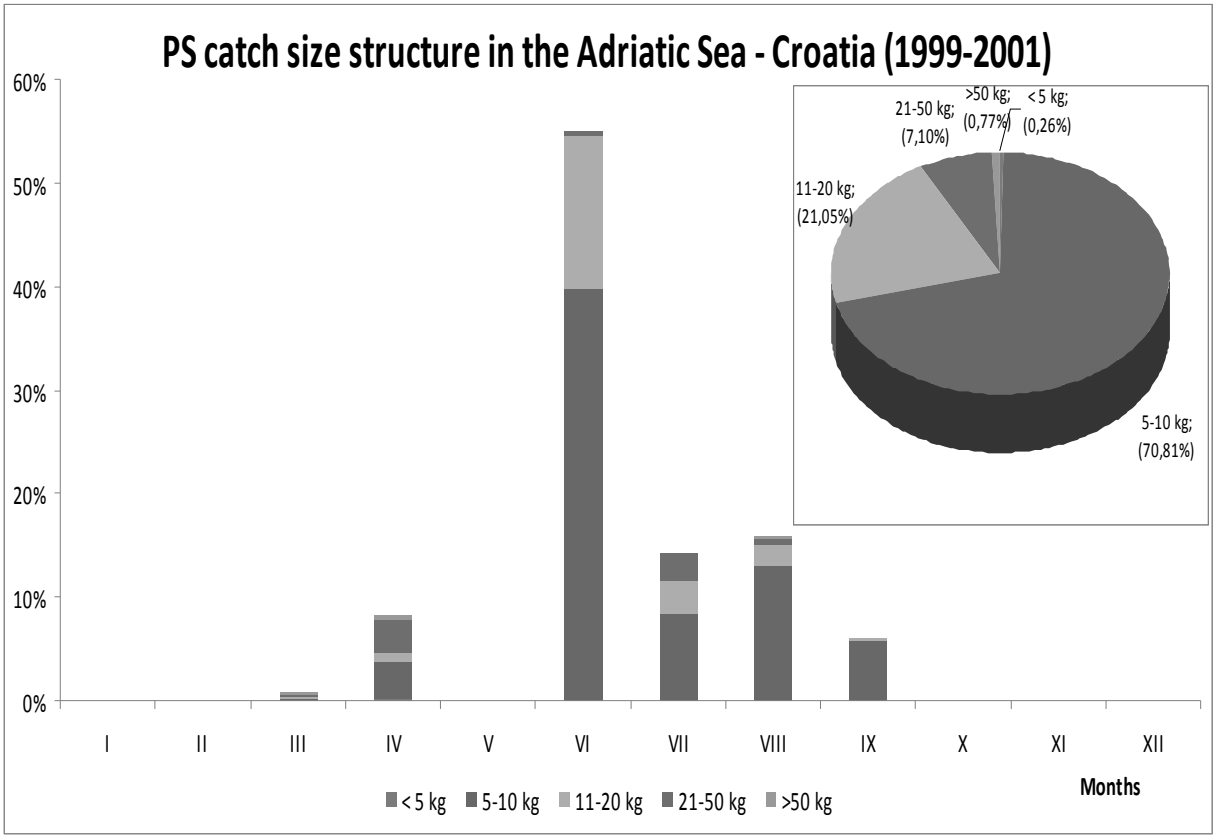

Figure 2. Purse seine catch size structure in the Adriatic by months over 1999-2001 (modified from Tičina *et al.* 2002).