

CROATIAN BLUEFIN TUNA CATCHES IN THE ADRIATIC DURING 1999 THROUGH 2001 BY YEAR/MONTH/SIZE STRUCTURE

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SUMMARY

The weight compositions of bluefin tuna (Thunnus thynnus L.) catches from the Adriatic Sea during the period 1999 through 2001 by Croatian side are presented in this paper. Catch at weight composition was converted into catch at length using length-weight relationship calculated from published data for the Adriatic Sea. In addition, age composition estimates of these catches were done using age-length key obtained by spine reading. The assessment indicates a strong decline of the older ages groups from spring to summer months. Analyses of the catches made on the monthly bases show that majority of older age classes, that represent the most favourable catches, were fished in the month of April; 45% of the fish sized 21-50 kg and 58% of the fish sized 51-100 kg. However, in the months of July and August large quantity of smaller bluefin tuna were caught. These findings put reservations on the effects of existing measures to protect juveniles in the Adriatic Sea in which purse seining is prohibited for the month of May.

RÉSUMÉ

Le présent document fait état de la composition en poids des captures de thon rouge (Thunnus thynnus L.) dans la mer Adriatique du côté croate pendant la période 1999-2001. La prise à un poids donné a été convertie en prise par taille au moyen d'une relation longueur-poids calculée d'après des données publiées sur l'Adriatique. De plus, la structure démographique de ces prises a été estimée par une clé âge-taille obtenue par la lecture des épines. L'évaluation signale une forte baisse des âges les plus avancés pendant les mois de printemps-été. L'analyse des captures mensuelles montre que la plupart des âges les plus avancés, qui constituent la capture la plus favorable, étaient pêchés pendant le mois d'avril; 45% des poissons pesaient de 21 à 50 kg, et 58% de 51 à 100 kg. Toutefois, en juillet et août, de grandes quantités de petits thons rouges étaient capturées. Ces résultats imposent une réserve aux effets des mesures en vigueur de protection des juvéniles de l'Adriatique où la pêche à la senne est interdite pendant le mois de mai.

RESUMEN

En este documento se presentan la composición en peso de las capturas de atún rojo (Thunnus thynnus L.) del mar Adriático durante el periodo de 1999 a 2001 y en la zona croata. La composición de las capturas en peso se convirtió en captura por clases de talla utilizando la relación peso-talla calculada a partir de los datos publicados para el mar Adriático. Además, se realizaron las estimaciones de composición por edad de estas capturas utilizando una clave talla-edad obtenida mediante la observación de las aletas. La evaluación indica la existencia de un fuerte descenso de los grupos de edades más avanzadas en los meses de primavera a verano. Los análisis de las capturas realizados mensualmente muestran que la mayor parte de las capturas de clases de edades avanzadas, que representan las capturas más favorables, se realizaron durante el mes de abril: el 45% de los peces se situaba en 21-50 kg y el 58% en 51-100 kg. Sin embargo, en los meses de julio y agosto se capturaron grandes cantidades de atún rojo más pequeño. Estos hallazgos ponen en tela de juicio los efectos de las medidas existentes para proteger a los juveniles en el mar Adriático que prohíben pescar con cerco en el mes de mayo.

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KEYWORDS

Size composition, purse seining, fishery statistics, bluefin tuna, Adriatic Sea

1. INTRODUCTION

Off shore purse-seine fishing activities concerning the bluefin tuna are very important part of the fisheries within Adriatic Sea. In the Croatian fishery, purse seine is a principal fishing gear used for fishing of bluefin tunas. According to SINOVIĆ (1998) the Croatian fishermen exploit about 2.3 % of the eastern Atlantic stock of the bluefin tuna. Bluefin tuna fishing activities in the Adriatic Sea are described in detail by TIŠINA (1993; 1994; 1997; 1999). Based on the data reported by ALEGRIA (1984), TIŠINA (1994) and Tišina's unpublished data, SINOVIĆ (1998) and SINOVIĆ *et al.* (1999) described the weight structure of the tuna population in the Adriatic Sea. The age structure of this part of bluefin tuna population was described by TIŠINA and KAIĆ (1998).

According to the current ICCAT recommendations, concerning the necessity to reduce the catches of juvenile bluefin tuna in the eastern Atlantic and the Mediterranean Sea, fishing of the fish weighting less than 3.2 kg have been forbidden. Furthermore, only 15% in the number of the fish up to 6.4 kg accidentally caught could be comprised in the entire annual catch of the bluefin tuna. In compliance with ICCAT recommendations concerning the closure of purse seine fishing of tunas during the period from 1st to 31st May in the Adriatic Sea, in order to protect juveniles, has been entered into force on June 21st 1999. Due to fact that in practice it resulted just in relocation of fishing effort (from and into the Adriatic Sea), the aim of this paper was to evaluate effectiveness of this recommendation concerning the protection of juvenile bluefin tuna in the Adriatic Sea.

2. MATERIAL AND METHODS

All data analysed in this paper originated from new National Fisheries Information System of the Republic of Croatia. Since 1999, the Croatian fishermen are forced by law to submit data about catches of bluefin tuna within next 24 hours. The data submitted to National Fisheries Information System contains: time, date and geographic position of the catch, name of the vessel and its owner, captain's name, type of the fishing gear used, estimated quantities of catch in weight and number, as well as the name of the person that submitted these data. The data cover the period from January 1999 to August 2001.

Data about quantities of catch in weight and number were used to calculate the average weight of the captured specimens. The catches were sorted, according to average weight of bluefin tuna specimens, into six weight categories as follow: <5 kg, 5-10 kg, 11-20 kg, 21-50 kg, 51-100 kg and >100 kg respectively. Due to fact that schooling by size/age behaviour of the young bluefin tuna was observed, we supposed that the reported catches consisted of fish of similar size. Furthermore, using length-age keys, we converted the weight categories into age classes.

3. RESULTS AND DISCUSSION

The Croatian bluefin tuna catches in the Adriatic during 1999 through 2001 by year and size in weight structure are shown in the Table 1 and shown on the Figures 1-4. It can be noticed a significant increase in amount of bluefin tuna specimens within second weight category (5-10 kg), from 1999 (30%) to 2000. and during 2001 year (>80%). At the same time, amount of bigger specimens of bluefin tuna in the catches decreased, particularly specimens into 3rd (11-20 kg) and 4th (21-50) weight categories.

After converting the weights into lengths, using length-weight relation: $W_{(kg)} = 3.44 \times FL_{(cm)}^{2.87}$ (TIÈINA, 1994), it was found that 1st category contained the specimens mostly up to 62 cm, 2nd category contained specimens mostly up to 80 cm, 3rd category contained specimens mostly up to 102 cm, 4th category contained specimens mostly up to 140 cm, 5th category contained specimens mostly up to 178 cm and 6th category contained specimens over 178 cm in the fork length.

According to length-age key that have been done by reading of fin spines cross sections on the 150 specimens caught in the Adriatic Sea (TIÈINA and KAËIÆ, 1998), all specimens in the 1st category belong to 0+ or 1⁰ age groups. Furthermore, the specimens of bluefin tuna weighted 5-10 kg belong mostly to the 1⁰, 1⁺ and 2⁰ age groups. The specimens of bluefin tuna weighted 11-20 kg belong mostly to the 2⁰, 2+ and 3⁰ age groups. The specimens weighted from 21 to 50 kg belong to different age groups ranged from 3⁰ to 5⁺. Furthermore, according to the length-age key given by COMPEAN-JIMENEZ and BARD (1980; 1983), concerning the bluefin tuna from the eastern Atlantic, the specimens from 5th category are mostly up to nine years old (age group 8⁺).

When analysing more in detail the 2nd weight group (5-10 kg) in the 2000 and 2001, it was found that specimens ranged 5-7 kg in round weight, comprised 30.0% and 48.3% of the total number of specimens within this group. Regarding to the whole annual catch of bluefin tuna in the 2000 and 2001 year, the amount in number of these specimens were 24.3% and 39.3% respectively.

When the same data were analysed by month (Table 2), it was found that majority of tunas above 20 kg in round weight, that represent the most favourable catches, were fished in the month of April; 45% of the fish sized 21-50 kg and 58% of the fish sized 51-100 kg respectively. It can be supposed that these bigger tunas are present in the Adriatic during May also, when purse seine fishing on bluefin tunas is prohibited. On the other side, during the months of July and August large quantity of smaller bluefin tuna were caught.

In earlier data on size composition of bluefin tuna catch obtained by Croatian fishermen in the period from 1967 to 1981 (ALEGRIA, 1984) and in the period from 1982 to 1992 (TIÈINA, 1994), amounts of 12% and 15% of these small specimens were reported. So, it seems that the ICCAT recommendation concerned the prohibition of purse seine fishing in the Adriatic Sea during the period from 1 to 31 May instead of period from 16 July to 15 August (that is adopted for the other parts of Mediterranean Sea), did not gained its purpose in order to protect juveniles. However, in practice it resulted just in relocation of fishing effort (from and into the Adriatic Sea), thus decreasing the effectiveness of earlier recommendation, in order to protect juvenile bluefin tunas within Mediterranean Sea fishing area.

4. CONCLUSION

Based on the given results on bluefin tuna catch size composition during the period from 1999 through 2001, can be concluded that an increased proportion in the number of small bluefin tunas in the Adriatic Sea have been fished. Also, as a consequence of different periods when the purse seine fishing is prohibited within Mediterranean Sea, a relocation of fishing effort from and into the Adriatic Sea was noticed. It is known that fishing entity, which has a purse seine bluefin tuna fishery, should prohibit any transfer of its fleet to either of two areas (Adriatic Sea and the other parts of Mediterranean Sea) during the respective closed season, but is obvious that it does not work. So, these findings suggest that "Recommendation by ICCAT on changes of closed season for the bluefin tuna purse seine fishery in the Mediterranean Sea" (Ref. 98-6 BFT) should be changed, in order to establish the closed season for the bluefin purse seine fishery during the same period over the entire Mediterranean Sea fishing area.

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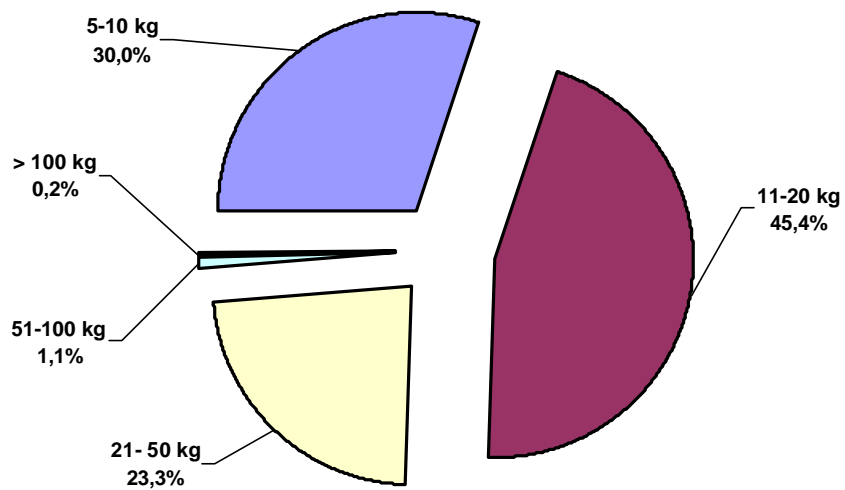


Figure 1. Weight structure of BFT catch (Croatia, 1999.)

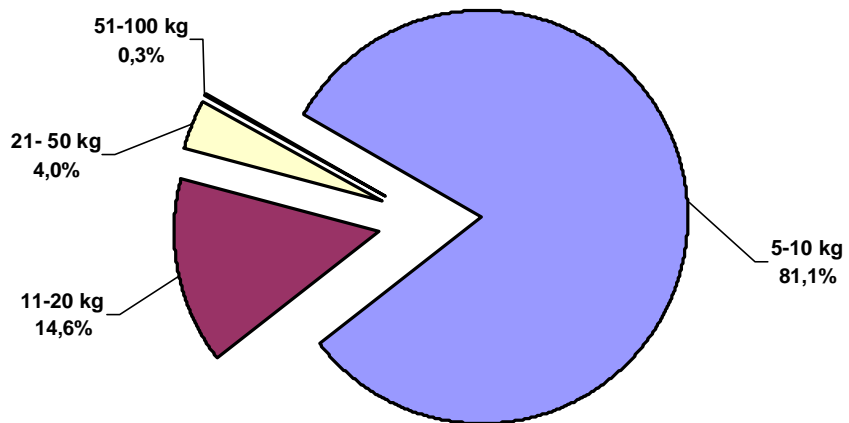


Figure 2. Weight structure of BFT catch (Croatia, 2000.)

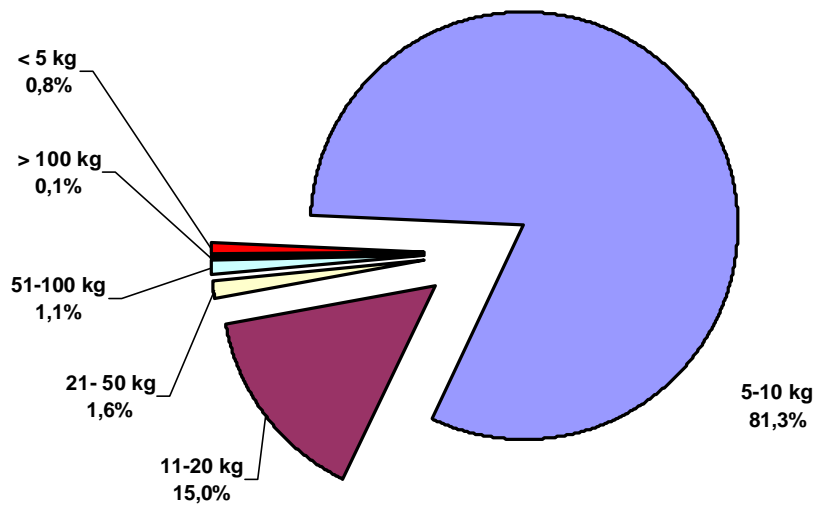


Figure 3. Weight structure of BFT catch (Croatia, 2001.*)

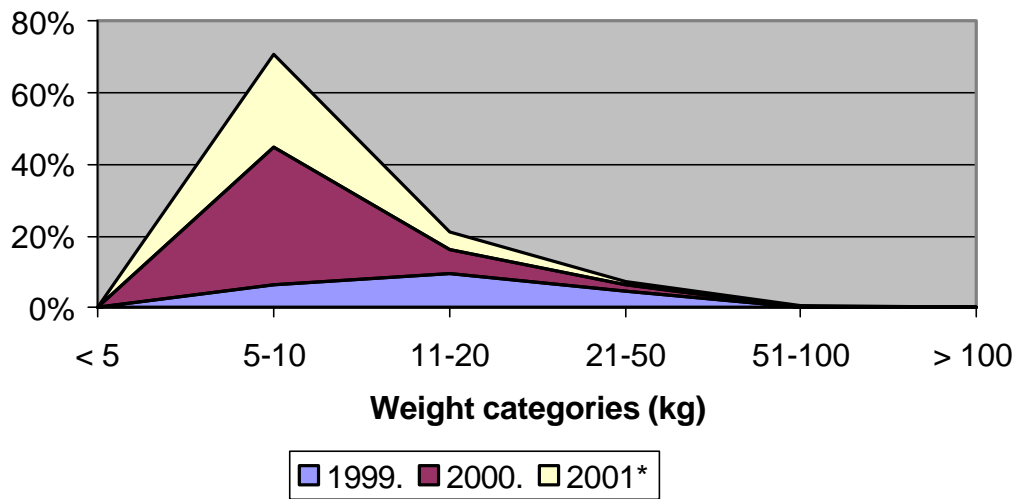


Figure 4. Weight structure of BFT catch (Croatia, 1999-2001*)