

BLUEFIN TUNA CATCHES PRODUCED BY DIFFERENT FISHING GEARS

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SUMMARY

The main goal of an investigation is to discover average size fish of the bluefin tuna population in the Adriatic Sea and possible size differences between the catches taken by purse seine net, longline and hand line. The sample for the research was comprised of 9,270 bluefin tuna specimens caught in 1997 in the Adriatic Sea, with a total weight of 404,987 kg. The same has been divided into different weight categories to discover fluctuation of the bluefin tuna population targeted by different fishing gears. To estimate the average size of fish in population, the number of purse seine attempts has also been used. The number of the fishermen's attempts to make a catch is necessary for observation since they were leaving each catch with undersized fish, but at the same time it is valuable information to estimate the average size of fish.

An examination and quick analysis of the data are showing significant differences between purse, longline and hand line catches. The average weight of bluefin tuna caught was 43.6 kg, but the estimation of the average population size is much less.

RÉSUMÉ

Le principal objectif de la recherche est de déterminer la magnitude moyenne du stock de thon rouge dans la Mer Adriatique, et les éventuelles différences de taille entre les prises des sennes, des palangres et des lignes à main. Les échantillons destinés à la recherche se composaient de 9.270 thons rouges capturés pendant l'année 1997 dans l'Adriatique, d'un poids total de 404.987 kg. L'échantillon a été divisé en différentes catégories de poids pour définir la fluctuation du stock de thon rouge lorsqu'il est visé par différents engins. L'estimation de la taille moyenne du poisson dans le stock a aussi utilisé le nombre de tentatives de pêche à la senne. Il est nécessaire d'observer le nombre de ces tentatives du fait que les pêcheurs abandonnent les prises de poissons sous-taille, mais ceci est aussi une information utile pour estimer la taille moyenne du poisson.

L'examen et l'analyse résumée des données montrent des différences significatives entre les prises des sennes, des palangres et des lignes à main. Le poids moyen du thon rouge capturé était de 43,6 kg, mais la taille moyenne estimée du stock est bien inférieure.

RESUMEN

El principal objetivo de investigación es averiguar la talla media de los atunes rojos en el Adriático y las posibles diferencias de tallas en las capturas del cerco, palangre y línea de mano. La muestra a investigar se componía de 9.270 atunes rojos pescados en 1997 en el Adriático, con un peso total de 404.987 kg. La muestra se clasificó en diferentes categorías de peso para estudiar la fluctuación de la población de atún rojo que es objetivo de diferentes artes de pesca. Para la estimación de la talla media de los peces en la población se ha usado también el número de lances del cerco. Esta cifra es necesaria en la observación, debido a que descartaban la captura con peces pequeños, pero al propio tiempo es una información útil para estimar la talla media de los peces.

Un breve examen y análisis de los datos muestra importantes diferencias entre las capturas del cerco, palangre y caña. El peso medio de los atunes rojos capturados era de 43,6 kg, si bien la estimación de la talla media en la población es muy inferior.

MATERIAL AND METHODS

As a material we used cargo list of tuna farmers which sell bluefin tuna on the Japanese or other markets with each specimens and its weight. Also, the other trader's lists, which were composed in the cooperation with Fisheries Directorate, are used in this investigation. Data that was provided by tuna farmers are exclusively based on tune purse seine catches and they are presenting final weight of fish. It means this is weight from the farm exit and it is composed of the wild and farmed growth. So the final weight has to be corrected (reduced) for the farm growth if we want to observe nature weight. This reduction has to be around 20 percent and it was done through the presentation or data analysis. All of those data are presented in the Table 1. which consist average weight of the caught bluefin tunas by different fishing gears (purse seine, long line and hand)

When we made a survey to discover all bluefin tuna catches over the 1997, we also asked fishermen who fishing with the purse seine net that they have to report their successful or unsuccessful attempts so that we would be able to estimate average size of the fish in the population which is appearing in the Adriatic Sea. The results of that small survey are presented in the Table 2. and obviously they are talking that fishermen done more unsuccessful than successful trays. We have to notice that undersized fish (bluefin tuna smaller than 70 cm) does not cause all unsuccessful attempts because the major part of the unsuccessful attempts are fishermen's failures. Despite of it we can be sure that about 25% of the all so-called unsuccessful attempts actually present catches of the undersized bluefin tuna left by fishermen. Those data are based on the total Croatian purse seine catches during 1997 and from that point of view are hardly comparable with another sample of the "only" 400 MT.

Statistical analysis of the differences among catches done by different fishing gears will not be done because all of those data are from the "second hand" so the final analysis may produce wrong conclusions.

DISCUSSION

The first objective of the investigation is to discover average weight of the specimens in the bluefin tuna population, which is appearing in the Adriatic Sea.

If we are taking into consideration average weights done by different fishing gears from the Table 1., we must reduced average weight of the fish caught by purse seiners because all of those have average farmed increase of the 20 %, based on final weight. The average weight of the bluefin tunas caught by purse seiners is 34.25 kg instead of 43.25 kg. So corrected average weight is almost equalized with the average weight of the long liners catches (31.25) but yet bigger than long liners catches. The differences between two of those weights are mostly caused by the fact that fishermen are leaving undersized fish caught by purse seine net what is not possible with the long line or hooks catches because they are death. Finally it is so obvious from the Chart 2., Chart 3., and Chart 4. which presenting size structure of the different catches.

If we want to observe all population we have to include failure catches (catches had composed by undersized fish, latter liberated) and their average weights and complete influence on the population structure. As we can see from the Table 2. Croatian purse seine fishermen produced 474 unsuccessful attempts and the average catch rep each attempt was 3791 kg. From their reports we are able to conclude that they have about 25 % of all of those unsuccessful was catches with undersized fish latter left (average size of fish was 5 kg) and all others attempts were their failures. So we can conclude that they caught and liberated about 447338 kg or 89467 pieces of undersized fish. If we add these quantities on the total reported purse seine catches (Table 2.), we are getting the total targeted population was weighting 1535377.77 kg. As we don't know average size of fish for all annual catch but we know the same thing for very large sample (34.25 kg), we are able to estimate the average size of fish in the population targeted by purse seiners. In such situation we are getting two different groups, first one with total weight of 1088039.77 kg and 31767 pieces and the second one with 447338 kg or 89467 pieces.

Finally it is not too complicate to conclude that the all the targeted population has the average size of the bluefin tuna examples about 12.66 kg. This number has to be corrected for the long line and hooks catches and their average weights but as you can see from the Table 1. The average sizes of the fish caught by long liners are smaller than fish from the purse seine net. At the same time the average size of the fish caught by hooks is larger than fish caught from the purse seine nets. So we are able to finalize especially if we know that these gears (long line and hooks) participate lees than 2 % in the total annual catch that average weight of the bluefin tunas which appearing in the Adriatic Sea is between 12 and 13 kilograms.

The estimation is done despite of fact that the examination can be strongly influenced by bluefin tunas age zero (less than 1.8 kg and small enough to pass through the purse seine net). At the same time another scientific data clearly talks that such a small bluefin tuna examples never appeared in the Adriatic Sea. We have to be cautious during the estimation of the average weight of the bluefin tunas which appearing in the Adriatic Sea.

CONCLUSIONS

After presentation of data we can be sure for the next conclusions:

-the average weight of the bluefin tuna in the population that was appearing in the Adriatic Sea during 1997 is between 12 and 13 kilograms.

-different fishing gears (purse seine net, long line) are targeting and catching same old (weight) fish so it is necessary to provide similar or same managing measures for the protection and conservation of this population or the all bluefin tuna stock.

-undersized but caught by purse seine net, bluefin tuna can be and must be saved, for what fortunately in Croatian case exists and commercial reasons (those fish is not for the retail market or tuna farms).

-for the next period differences between caught and farmed bluefin tuna must be observed and scientifically confirmed from managing and scientific reasons because estimation of 20% of the farmed growth is pretty rough.

APPENDIX

Tables:

Table 1.: Number of the caught bluefin tuna categorized by weight groups and different fishing gears

CATEGORIES (Kg)	PURSE SEINE		LONG LINE		HAND		TOTAL	
	PIECES	TOTAL WEIGHT (Kg)	PIECES	TOTAL WEIGHT (Kg)	PIECES	TOTAL WEIGHT (Kg)	PIECES	TOTAL WEIGHT (Kg)
0-3,5	5	17	0	0	0	0	5	17
3,5-8,5	12	66	2	19	5	41	19	126
8,5-16	228	3439	13	196	3	38	244	3673
16-26	779	16493	25	534	1	25	805	17052
26-29	285	8052	17	491	0	0	302	8543
29-36	1693	60190	17	560	1	31	1711	60781
36-45	2921	121868	17	692	9	379	2947	122939
45-60	2224	118523	5	271	20	1087	2249	119881
60-	892	62364	4	362	92	9249	988	71975
TOTAL	9039	391012	100	3125	131	10850	9270	404987
AVERAGE WEIGHT	43.25		31.25		82.82		43.68	

Table 2.: List of the purse seine vessels that had reported their own catches and trays to make a catch during 1997.

NAME OF THE VESSEL	NUMBER OF THE SUCCESSFUL ATTEMPTS	CATCHES (Kg)	NUMBER OF THE UNSUCCESSFUL ATTEMPTS
m/b "Kali"	40	103131	90
m/b "Marinero I"	8	9974	10
m/b "Knežak"	4	8986	6
m/b "Marinero II"	20	144512	30
m/b "Tuljan"	25	102246	0
m/b "Lubin"	20	102096	0
m/b "Nemirna", "Proizd I"	20	201465	25
m/b "Hrvatski uspjeh"	0	0	5
m/b "Molo"	4	27070	18
m/b "Centar B"	4	19890	15
m/b "Napredak"	16	110633.96	30
m/b "Hidra"	21	130000.25	109
m/b "Skuša"	9	27258.56	53
m/b "Preko"	96	100777	83
TOTAL	287	1088039.77	474
Average catch per successful attempt		3791 kg	

Chart 2.:

SIZE STRUCTURE OF THE PURSE SEINE CATCH

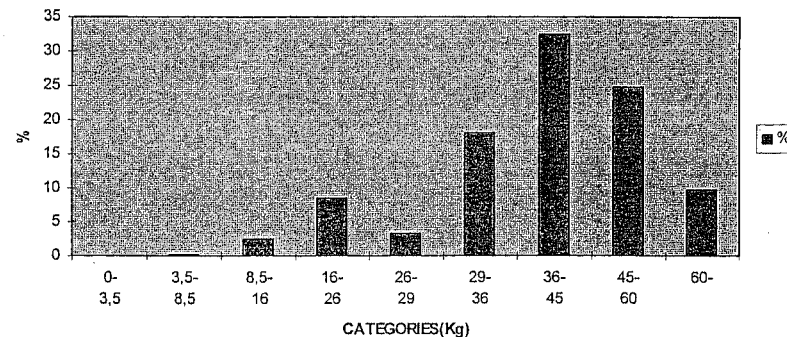


Chart 3.:

SIZE STRUCTURE OF THE LONG LINE CATCH

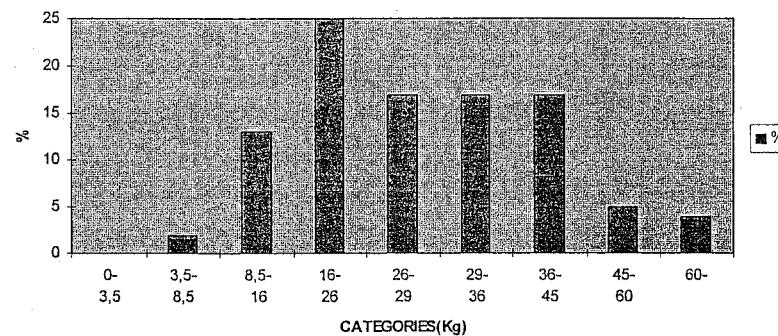
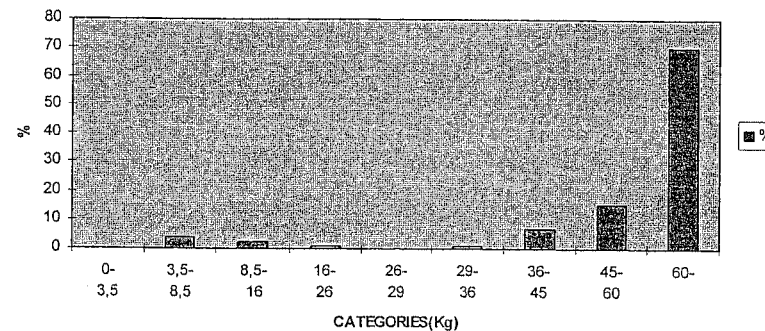


Chart 4.:

SIZE STRUCTURE OF THE HAND CATCH



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Charts:

