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## PRESENT STATE OF TUNA FISHERY WITH TRAP IN SOUTH SPAIN

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### Abstract

The total production in 1973 of the two South Spain traps was of 2 383 tuna with 467 988 Kg. The yield by weight and day in the sea and trap was 1 119.6 Kg. and 234 tons for trap. The yield by number was 5.7 tuna by day and trap, and 1 191.5 Kg. by trap. That is to say 6 % for the weight and 4 % for the number more than in 1972.

In the figure 1 we give the catches and fluctuations for the trap of Barbate during 45 years.

In the tables I and III and figure 2 we give the relation between length, weight and age of tuna. In these figures we see that the predominate age on the fishery is the 9 years old.

In previous publications of ICCAT (vol. 1/SCRS-1972) and ICES (C.M. 1973/J: 4, Pelagic Fish (Southern) Committee of Report of the Bluefin Tuna Working Group), we gave data about the production and yield in the period 1962 to 1972 for the tunas, Thunnus thynnus (L.), catches by the traps of South Spain. In the mentions ones we indicated the brusck descend of yield for unit effort in last years, over all from 1971. From 1963 it can be considered that the production is not normal into foreknow fluctuations (RODRIGUEZ-RODA, 1966), since that the superior levels of these fluctuations hardly reach the inferior -

middle level calculated, fig. 1. For to make clear this point, we can put our attention in the principal trap (Barbate), in which the number of tunas catches annually in the period 1929 to 1964 it was included between 10 000 and 25 000 numbers reached for last time in 1962. There is to pointing that the middle size of tunas catches in creased during the years 1965 to 1967, this to explain that the des cend in weight it's not observed so much more from 1971, fig. 1.

Because of economic difficulties incited by the descend in the tuna catches with traps in the South Spain, the company that worked till now this fishing, finished in 1972, passing the traps to other smaller economically firms. This repercussed in the number of traps in working, descending from 4 in 1966 (Barbate, Sancti-Petri, Tarifa and La Línea) to 2 in 1972 and 1973 (Barbate and La Línea), to both sides of Gibraltar Strait.

In the year 1973, the total production of tunas in the two traps was 467 988 Kgs. (399 453 Kgs. for Barbate and 68 535 Kgs. for La Línea) and 2 383 tunas (1 952 tunas for Barbate and 431 ones for La Línea). Considering that the number of days in the sea for the two traps was 209, the yield in weight for day in the sea and traps was 1 119.6 Kgs. and 234 tons for trap and respect to number of tunas the yields were 5.7 tunas for day in the sea and trap and 1 191.5 tunas for trap. Comparing this data with the given ones in previous publications, it was observed in 1973 an important increase in the yield for unit effort, nearly of 6 % for the weight and the 4 % for the number of caught exemplars.

In the figure 1, are given the annual catches for the juvenile tunas recruited by the Barbate trap. These tunas called by the fishermen "Atuarros" have a weight of 45 to 50 Kgs., a middle size of 130 to 135 cm. and an age about 4 years old. It is appreciated very well in the mentioned figure the influence in the fishery of these little tunas 4 or 5 years later. So we see that the great quantity of "Atuarros" existing in the years 1940, 1950 and 1952 influenced clearly in the catches of the big tunas in the years 1944, 1953 and 1957, respectively, considering that the middle age of the population that is caught is of 8 to 9 years old.

We have prepared the Table I with the following equations (RODRIGUEZ-RODA, 1964) that connect the size with the age (von BERTALANFFY'S equation) and the size with the weight:

$$l_t = 335.84 \left[ 1 - e^{-0.09 (t + 0.89)} \right]$$

$$P = 19 \times 10^{-6} \times L^3$$

In the Tables I and III and figure 2 we can see that for the period 1963 to 1973, the predominant tunas were of 9 to 11 years old. In the mentioned figure we can observed perfectly, for every year, the modal classes corresponding to a same annual class or tunas age from 13 or 14 years old. Into these ideas we have pointed, in the possible, and in black the annual classes evolution till their disappearance.

Tuna growth in his juvenile years is very intense, so in length than in weight, therefore if the fishery was controled, their evolution would be favourably.

Table II is a summary of data of middle size (Fork length) and middle weight in the first year of tuna life according to previous publication (RODRIGUEZ-RODA, 1964), considering that the spawning season of tuna is verified between last of June and first days of July.

Because of the high fecundity of the tuna: 12 000 000 to 15 000 000 of eggs, for a tuna of 210 cm. of fork length and 194 Kg. of weight, (RODRIGUEZ-RODA, 1967), it is not difficult recovery his fishery if it is forbidden at less the juvenile tuna catches, till the size of 105-115 cm., which is the smallest length of spawning (RODRIGUEZ-RODA, 1964).

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T A B L E I

Age in years.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Fork leng. cm.	56	82	105	127	146	164	181	196	210	222	234	244	254	263
Weight Kg.	3.2	10.3	22.0	38.6	59.5	84.4	114.2	143.3	175.0	209.0	242.8	277.7	310.2	344.1

T A B L E II

	18 Septiembre	28 Septiembre	15 Noviembre	25 Junio
Size, cm.	29	31.7	41.9	55.3
Weight, gr.	424	555	1.700	3.360

TABLE III

Annual distribution of length frequency in percentage of tuna, Thunnus thynnus, catches by the trap in Barbate (Gulf of Cádiz).-

Class Intervals, cm.	Y E A R S										
	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
50- 54.9							1.0				
55- 59.9							1.0				
60- 64.9							-				
65- 69.9							-				
70- 74.9							4.0				
75- 79.9							3.0				
80- 84.9							0.3				
85- 89.9							0.1				
90- 94.9											
95- 99.9											
100-104.9											
105-109.9			0.3	0.1						1.2	
110-114.9			0.3	-						1.2	
115-119.9			-	0.1						-	
120-124.9			0.3	0.2	0.1					-	
125-129.9	0.5	0.3	0.5	0.2	-	0.1				0.6	
130-134.9	0.5	-	0.3	0.1	-	-		0.1		-	
135-139.9	-	0.6	-	0.6	0.5	-		0.1		-	
140-144.9	0.3	1.0	0.3	2.5	0.4	0.3	0.1	0.1		-	
145-149.9	-	-	0.8	1.5	0.5	0.1	0.1	-	0.2	0.6	0.6
150-154.9	1.6	1.0	1.8	1.2	1.2	0.4	0.3	0.2	-	0.6	0.6
155-159.9	1.1	0.3	1.1	1.5	2.2	1.4	0.5	0.6	-	1.2	-
160-164.9	0.3	1.0	1.6	2.3	3.0	1.5	0.6	0.6	-	1.2	-
165-169.9	-	0.6	2.1	2.4	2.7	1.5	0.2	1.3	0.4	1.8	0.6
170-174.9	1.1	0.3	2.6	4.4	1.2	1.4	1.3	1.3	0.4	0.6	0.6
175-179.9	0.3	1.0	0.8	4.8	1.2	1.8	1.5	1.6	0.4	3.6	1.2
180-184.9	1.3	1.3	0.8	3.6	2.9	3.5	3.2	1.7	0.6	1.2	3.1
185-189.9	1.3	1.3	0.8	4.5	3.4	2.0	4.8	4.9	0.9	2.4	3.1
190-194.9	2.1	1.6	1.1	5.3	4.3	3.2	5.9	6.4	3.8	2.4	3.1
195-199.9	5.0	2.6	1.6	5.8	6.1	3.5	5.3	10.0	2.8	3.0	5.0
200-204.9	13.4	4.8	2.1	4.2	7.7	5.2	3.8	11.7	6.0	1.8	4.4
205-209.9	16.6	9.9	2.1	2.8	8.6	8.7	4.6	10.9	4.9	3.6	9.3
210-214.9	16.8	14.4	5.0	4.0	6.4	10.2	6.6	8.8	7.5	7.2	10.6
215-219.9	14.5	15.4	5.5	6.0	4.1	12.0	5.3	6.3	5.8	9.6	9.3
220-224.9	8.2	14.4	13.5	8.0	4.1	9.3	8.3	5.8	6.2	7.8	9.3



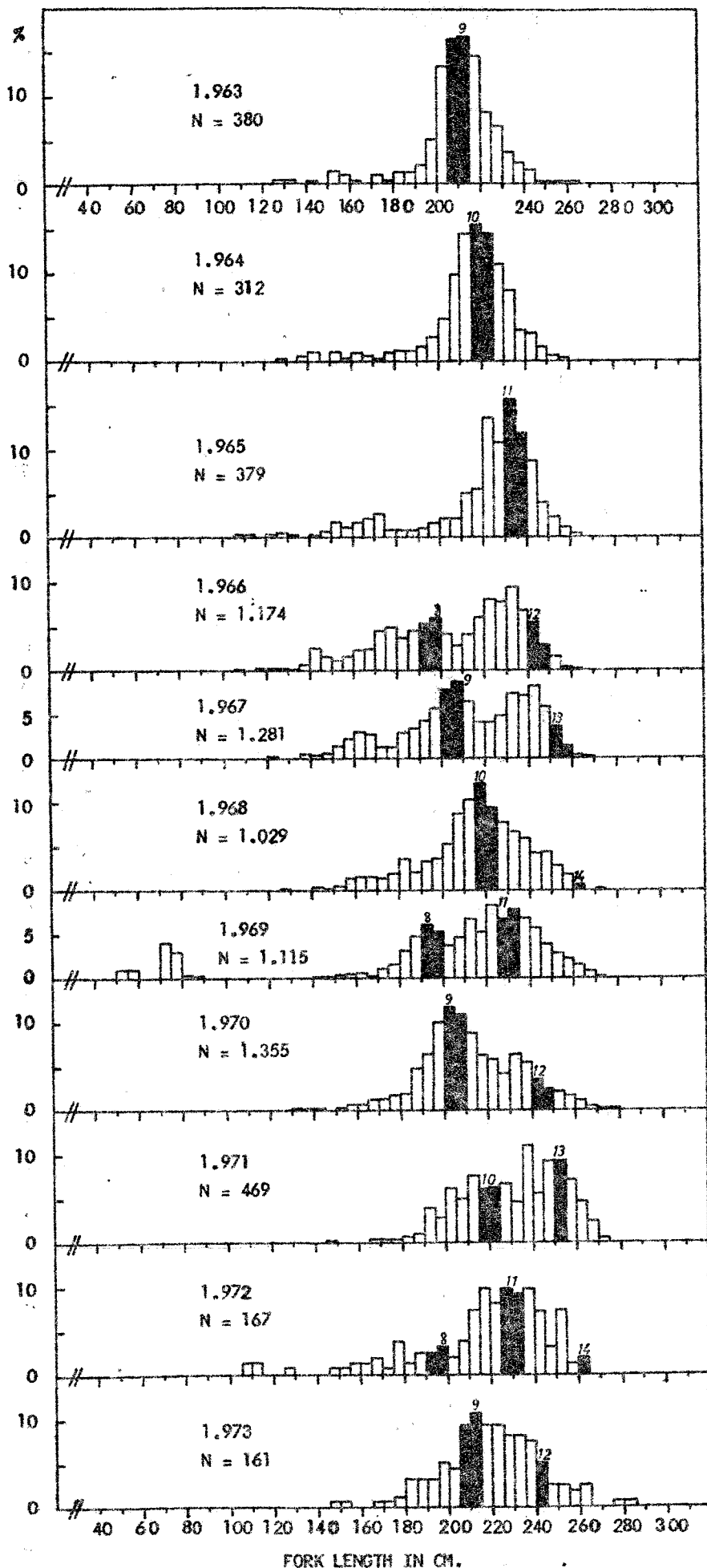


Fig.2.- Size composition and evolution of tuna fishery of Bahate trap (South Atlantic coast of Spain) from the years 1963 to 1973.

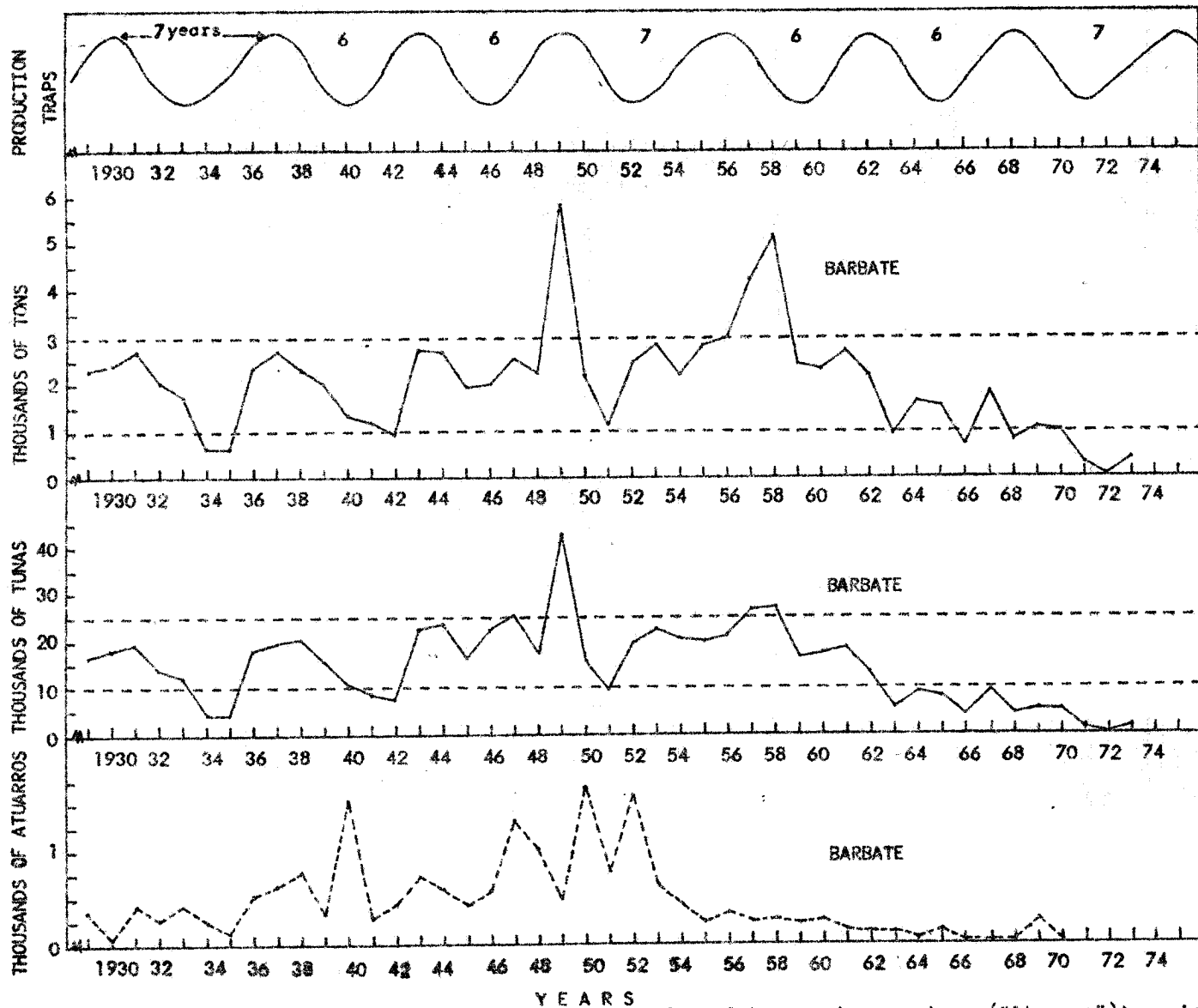


Fig.1.- Periodical fluctuations and annual production of tuna and young tuna ("Atuarro") in weight and number from trap of Barbate (South Atlantic coast of Spain).