

SIZE AND SPECIES COMPOSITION OF ATLANTIC
TUNAS IN IMPORT LANDINGS OF PUERTO RICO, 1975-1976

by

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SUMMARY

Import landings of Atlantic tunas were sampled for biological information in Puerto Rico, U.S.A. The results for 1975 and the first semester of 1976 are presented and discussed. It is estimated that in 1975 about 73% of the total import landing of yellowfin tuna consisted of fish less than 60 cm long and about 11% of the reported yellowfin tuna landing was actually bigeye tuna. For the first semester of 1976, similar estimates also indicate a high proportion of yellowfin tuna less than 60 cm in the import landing and about 17% of the reported yellowfin tuna landing was actually bigeye tuna.

RESUME

Les débarquements de thonidés atlantiques importés à Puerto-Rico ont été échantillonnés à la recherche d'information biologique. Les résultats pour 1975 et le premier semestre de 1976 sont présentés et commentés. On estime qu'en 1975 environ 73% des débarquements totaux d'albacore importé consistaient de poisson de moins de 60 cms, et qu'à peu près 11% des débarquements signalés comme étant de l'albacore étaient en réalité du thon obèse. Pour le premier semestre de 1976, des estimations similaires indiquent également dans les débarquements d'importations une forte proportion d'albacore en-dessous de 60 cms et 17% de thon obèse déclaré comme étant de l'albacore.

RESUMEN

Los desembarcos de túnidos atlánticos importados en Puerto Rico, Estados Unidos, fueron muestreados, con el fin de obtener información biológica. El documento presenta y comenta los resultados de 1975 y del primer semestre de 1976. Se calcula que en 1975, un 73% del total de los desembarcos de rabil importado consistía en peces de menos de 60 cms y que un 11% no era rabil sino patudo. Respecto al primer semestre de 1976 cálculos similares indican asimismo la existencia de una proporción importante de rabil de talla inferior a 60 cms y de un 17% de patudo clasificado erróneamente como rabil.

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1975 SAMPLING YEAR

INTRODUCTION

The United States annually imports about 60-70% of the tuna it processes for domestic consumption. Albacore (*Thunnus alalunga*), yellowfin (*T. albacares*), bigeye (*T. obesus*) and skipjack (*Katsuwonus pelamis*) tunas are the species primarily involved. The tuna are landed in the U.S. aboard freezer vessels at ports in California, Hawaii, Oregon, and Puerto Rico.

Most of the Atlantic-caught tunas are landed in Mayaguez and Ponce, Puerto Rico. The average (1970-1975) annual import tonnage is 78,200 metric tons (Table 1).

Since March 1975 a technician of the Southwest Fisheries Center has been regularly sampling the import landings of Atlantic-caught tunas in Puerto Rico for biological information. Fifty fish samples are routinely collected to obtain data on fork length, weight and species composition. Sampling priority is on landings of tropical tunas from the surface fisheries. In 1975, a report (Sakagawa, Murphy and Coan, 1976) with preliminary results from the sampling project was presented to the Standing Committee on Research and Statistics of the International Commission for the Conservation of Atlantic Tunas (ICCAT). In this report we present data for the 1975 sampling year as well as data for the first semester of the 1976 sampling year. We also present preliminary results of an experiment, which was recently initiated, to evaluate the accuracy of using external characters in differentiating yellowfin tuna from bigeye tuna.

In 1975 preparations to sample the import landings in Puerto Rico began in March, but the first sample was not obtained until April. During the entire year samples were taken from landings representing 14,081 metric tons of tuna, or about 21% of the total landings. A total of 113 samples were collected to determine species composition of the landings and 6,802 fish were measured for fork length (Table 2). All the bigeye, yellowfin and skipjack tuna samples were of fish caught in the eastern Atlantic, and most of the albacore sampled were caught in the north Atlantic.

Length-frequency samples were weighted by a factor based on tonnage of the sampled landings (see Sakagawa, Coan, and Holzapfel, 1976) and pooled by quarters of the year according to date of transshipment to Puerto Rico. The length composition of the sampled landings by quarter and species for 1975 are shown in Figures 1-4.

The sizes of yellowfin tuna are particularly worthy of comment. The dominant group is 1-year olds (approximately 40-60 cm long) and about 73% of the sampled landings (by weight) consist of fish less than 60 cm (Figure 1).

Import landings of yellowfin and bigeye tunas in the U.S. are normally not separated by species but mixed and reported as yellowfin tuna. Skipjack tuna landings, on the other hand, are normally sorted to remove other tuna species that might be mixed with the skipjack tuna. This sorting, is not always thorough and landings of other species are sometimes recorded as skipjack tuna. Albacore is the one species that is normally not mislabeled. To determine the actual species composition of the import landings in Puerto Rico, the landings were sampled for species composition. Fifty-four samples were collected in 1975 from landings reported as skipjack tuna and 59 samples, from landings reported as yellowfin tuna. Attempts were made to collect a species composition sample with each length-frequency sample.

Twenty-four samples from skipjack tuna landings contained only skipjack tuna and 30 samples contained other species mixed with skipjack tuna. In the mixed samples, little tunny (*Euthynnus alletteratus*) was found in one sample, bigeye tuna in one sample, frigate and bullet mackerels (*Auxis thazard* and *A. rochei*) in six samples, and yellowfin tuna in 26 samples. Skipjack tuna, however, was the dominant species in the mixed samples and nearly always constituted 99% (by weight) or more of the fish in the mixed samples. From these results we concluded that landings of species other than skipjack tuna in the skipjack tuna landings are small; therefore, beginning with the 1976 sampling season, routine collection of species composition samples from skipjack tuna landings was suspended.

Virtually all of the species composition samples from yellowfin tuna landings were mixed; only three samples contained pure yellowfin tuna. In the mixed samples, little tunny was found in 12 samples, frigate and bullet mackerels in 14 samples, skipjack tuna in 39 samples and bigeye tuna in 40 samples. Only bigeye tuna, however, were found in large enough quantities to be significant, i.e., greater than 0.5% by weight of the sample. In the mixed samples containing bigeye tuna, between 1 and 16% of the sample consisted of bigeye tuna. We estimated that between April and December 1975 about 11% by weight of the reported total yellowfin tuna landing was actually bigeye tuna. If we assume this rate holds for the entire year, the reported yellowfin tuna import landing of 12,286 metric tons (Table 1) in fact consists of 10,935 metric tons of yellowfin tuna and an estimated 1,351 metric tons of bigeye tuna.

1976 SAMPLING YEAR

The 1976 sampling season has not yet ended and data are still being collected. In this report, data for only the first semester of 1976 are therefore presented.

Samples were collected from landings totaling 2,533 metric tons during the first semester of 1976. As in 1975, sampling priority was on the tropical tuna landings of the surface fisheries. More than 1,800 fish were measured for length of which 91% was yellowfin and skipjack tunas (Table 2). Species composition samples, a total of 22, were also collected from yellowfin tuna landings only.

Length composition of the sampled landings by species and quarter are shown in Figures 5-8. Noteworthy features of the results are the dominant 1-year-old yellowfin tuna in the landings (Figure 5) and the occurrence of only small bigeye tuna, less than 65 cm long (Figure 7).

All of the species composition samples were mixed samples, i.e., yellowfin tuna plus one or more other tuna species. Frigate and bullet mackerels were found in five samples, little tunny in six samples, skipjack tuna in 11 samples and bigeye tuna in 22 samples. Only bigeye tuna, however, occurred in significant quantities.

The amount of bigeye tuna in each of the sampled tonnages was calculated and an overall percentage of bigeye tuna in the total tonnage estimated for the semester. The bigeye tuna estimate is 17% (or 1,228 metric tons) of the reported yellowfin tuna landing of 7,221 metric tons (Table 1).

External characters, such as body shape, size of eye, length of pectoral, dorsal and anal fins, and body color patterns, are routinely used to differentiate yellowfin tuna from bigeye tuna in the landings in Puerto Rico. These characters, however, are not as pronounced in small

fish than in large fish. Often a specimen of positive identification is used to judge the species identification of other specimens in the lot. And routinely, fish of questionable identification are dissected and the liver examined for positive identification (Miyake and Hayasi, 1972). In order to evaluate the accuracy of relying on external characters only to differentiate yellowfin tuna from bigeye tuna, we initiated an experiment at the ending of the semester in which the species of each fish of a sample was first determined from external characters and then positively identified by examination of the liver. Preliminary results of the experiment (Table 3) indicate that the accuracy of using external characters for species identification is high and errors occur primarily in differentiating small (<85 cm) fish.

SUMMARY AND REMARKS

Results so far obtained from sampling of import landings in Puerto Rico indicate:

- (1) Considerable amount of small yellowfin tuna are being caught in the Atlantic Ocean. In 1975, for example, an estimated 73% of the import landings of Atlantic yellowfin tuna in Puerto Rico was fish less than 60 cm long.
- (2) Inclusion of other species of tuna in the skipjack tuna landings was confirmed, but the amount of mislabeled fish is very small.
- (3) Bigeye tuna frequently occurs in significant amounts in the import landings of yellowfin tuna. In 1975, an estimated 11% of the Atlantic yellowfin tuna landed as imports in Puerto Rico was actually bigeye tuna. In the first semester of 1976, an estimated 17% was actually bigeye tuna.
- (4) Preliminary results indicate that the use of external characters and positively identified specimens for comparison is a satisfactory procedure for differentiating yellowfin tuna from bigeye tuna in import landings in Puerto Rico. Errors in identification of species with use of this procedure are primarily for fish <85 cm long and the errors appear to be small.

LITERATURE CITED

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- Sakagawa, G.T., T.C. Murphy, and A.L. Coan. 1976. Report on the sampling of imports of Atlantic-caught tunas in Puerto Rico, U.S.A. ICCAT Collective Vol. Sci. Pap., 5(SCRS-1975) (1): 67-71.

Table 1. Import landings (metric tons) of Atlantic-caught tunas in Puerto Rico for 1970-1976¹

Year	Species			Total
	Albacore	Skipjack	Yellowfin ²	
1970	34,322	7,970	5,414	47,706
1971	26,258	13,709	9,832	49,799
1972	48,249	41,785	23,736	113,770
1973	45,654	32,934	20,106	98,694
1974	25,627	49,315	17,349	92,291
1975	22,815	32,087	12,286	67,188
1976 ³	17,159	7,121	7,221	31,501

¹Tonnage is based on actual weights, not adjusted to round weight. Large fish and particularly albacore are frequently landed gilled and gutted.

²Bigeye tuna included with yellowfin tuna in landing weights.

³Landings are for the first semester only.

Table 3. Results of experiment to determine accuracy of external characters to differentiate yellowfin tuna from bigeye tuna. Positive identification was made by examination of the liver.

Length group (cm)	Number of fish		
	Positively identified	Misidentified	% error
<u>Yellowfin tuna</u>			
33-85	462	2	0.4
86-151	11	0	0
152-166	3	0	0
<u>Bigeye tuna</u>			
39-85	93	3	3.0
86-151	0	0	0
152-166	0	0	0

Table 2. Tonnage and number of fish sampled by species, and gear in 1975 and the first semester of 1976.

Year	Gear	Quarter	Albacore		Bigeye		Skipjack		Yellowfin	
			Tonnage	No.	Tonnage	No.	Tonnage	No.	Tonnage	No.
1975	Longline	2	2067	293						
		3	2415	250						
		4	220	150						
	Pole and line and purse seine	2			129	105	1604	801	936	1640
3						1162	450	650	651	
4				92	40	3710	1071	1096	1351	
Total			4702	693	221	145	6476	2322	2682	3642
1976	Longline	2	850	100						
	Pole and line and purse seine	1			13	30	240	151	44	288
2				47	43	1061	450	278	765	
Total			850	100	60	73	1301	601	322	1053