

SAMPLING OF IMPORTED ATLANTIC-CAUGHT TUNA FOR  
SIZE AND SPECIES COMPOSITION IN PUERTO RICO, USA, 1976-1977

by

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SUMMARY

Import landings of Atlantic tunas were sampled for biological information in Puerto Rico, U.S.A. Results indicate that in 1976, 89% of the yellowfin tuna and 86% of the bigeye tuna sampled were less than 55 cm long. Twenty-one percent of the reported yellowfin tuna landings sampled in 1976 were actually bigeye tuna. During the first semester of 1977, similar estimates indicate that 21% of the yellowfin tuna and 93% of the bigeye tuna sampled are less than 55 cm long. Nineteen percent of the reported yellowfin tuna landings sampled in 1977 were actually bigeye tuna and 34% of the reported bigeye tuna landings sampled were actually yellowfin tuna.

RESUME

Les débarquements de thonidés atlantiques importés à Puerto-Rico ont été échantillonnés à la recherche d'information biologique. Les résultats obtenus indiquent qu'en 1976 89% de l'albacore échantillonné, et 86% du thon obèse, mesurait moins de 55 cm; 21% des débarquements échantillonnés en 1976 signalés comme étant de l'albacore était en réalité du thon obèse. Des estimations similaires effectuées pour le premier semestre de 1977 indiquaient que 21% de l'albacore échantillonné, et 93% du thon obèse, mesurait moins de 55 cm; 19% des débarquements échantillonnés en 1977 signalés comme étant de l'albacore était en réalité du thon obèse, et la situation inverse donnait un pourcentage de 34%.

RESUMEN

Con el fin de obtener información biológica, se muestrearon los desembarques de importaciones de túnidos del Atlántico en Puerto Rico, Estados Unidos. Los resultados indican que en 1976, el 89% de rabil y el 86% de patudo muestreados medían menos de 55 cms. El 21% de los desembarques dados como rabil y muestreados en 1976 era efectivamente patudo. Respecto al primer semestre de 1977; estimaciones similares indican que el 21% del rabil y el 93% del patudo medían menos de 55 cms. Un 19% de los desembarques dados como rabil y muestreados en 1977, era efectivamente patudo, mientras que un 34% dado como patudo, era rabil.

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## INTRODUCTION

Sixty-to-seventy percent of the tunas processed annually for domestic consumption in the United States are imported. These imports consist mainly of yellowfin (*Thunnus albacares*), skipjack (*Katsuwonus pelamis*), bigeye (*T. obesus*) and albacore (*T. alalunga*) tunas and are landed in California, Hawaii, American Samoa and Puerto Rico.

Most of the imported Atlantic-caught tunas enter the United States aboard refrigerated cargo vessels at Mayaguez and Ponce, Puerto Rico. The amount of imported Atlantic-caught tunas average 73,000 tons annually (Table 1). Landings have been routinely sampled by a Southwest Fisheries Center technician since March 1975.

Samples of fifty fish each are collected from storage buckets (capacity of about 1 ton) for data on fork length, weight and species composition. Results of the program for 1975 and the first semester of 1976 were presented in a previous report (Sakagawa, Coan, Holzapfel, 1977). This report presents the results for the period January 1976 through June 1977. Since dates of catches are not available and sampling may occur in a year following capture, the date of transshipment is considered the best alternative reference date and is used for dating a sample.

## SAMPLING IN 1976

During 1976, 206 samples were collected from tuna catches of Japanese, Korean, Ghanaian, Panamanian, French and Spanish flag vessels. Approximately 18% (by weight) of the total import landings were sampled for fork length (Table 2). Most of the yellowfin, skipjack and bigeye samples were from catches made in the eastern Atlantic by baitboats and most of the albacore samples were from catches made in the northern Atlantic by longliners (Table 3).

Length-frequency samples were weighted by the tonnages of the sampled landings (Sakagawa, Murphy, Coan, 1976) and pooled by quarters of the year. The length composition of the sampled landings in 1976 are shown by quarter in Figures 1-4. Yellowfin tuna landings are dominated by fish 40 to 60 cm in length and approximately 89% of the sampled yellowfin tuna are less than 55 cm in length. Bigeye tuna landings are dominated by fish 40 to 60 cm in length and approximately 86% of the sampled bigeye are less than 55 cm in length.

Mixing of yellowfin and bigeye tunas in the import landings continue to be a problem. In 1976, 107 species composition samples were taken from reported yellowfin tuna landings. These samples indicate that approximately 21% of the sampled landings of yellowfin tuna were actually bigeye tuna. This estimated mixture is almost double that reported for 1975 (11%; Sakagawa, Coan, Holzapfel, 1977).

Species identification samples were taken to check the accuracy of external characteristics to differentiate bigeye tuna from yellowfin tuna. A total of 4,280 tuna were identified first by external characteristics and then positively by examination of the livers. Results indicated (Table 4) that identification by external characters is very accurate for a trained technician and that most errors occur with small fish. More than 90% of the fish found to be misidentified were less than 55 cm long.

Broken and/or seriously smashed yellowfin and bigeye tunas are routinely rejected for sampling for length-frequency. It was hypothesized that the proportion of yellowfin tuna or bigeye tuna was the same for broken and unbroken fish, and thus the length-frequency sample was representative. During the second quarter of 1976, a special experiment was executed to test this hypothesis. A series of four samples were taken one from each bucket of small-to-medium yellowfin and bigeye tuna in which a larger-than-usual number of broken fish were observed. For each sample, 25 broken and 25 unbroken fish were taken at random. The broken and unbroken fish were identified by external characters, and the unbroken were measured for fork length and weight. All the fish were then thawed to the point where they could be cut in the anterior visceral region to expose the liver which allowed a definite identification of species. Results of the experiment were inconclusive due to the small amount of samples taken. The experiment is continuing.

## SAMPLING IN 1977

Data are available for the first semester of 1977 only. As of June, 8% (by weight) of the total 1977 import landings for January to June were sampled for fork length (Table 2). Most of the yellowfin, bigeye and skipjack samples were from catches made in the eastern Atlantic by baitboats and all of the albacore samples were from catches made in the northern Atlantic by longliners (Table 3).

Length-frequency samples were weighted and the quarterly length frequencies for yellowfin, skipjack, bigeye and albacore tunas were compiled (Figures 5-8). Results indicate that the modal length for yellowfin and bigeye tunas have increased slightly over estimates for 1976. Twenty-nine percent of the sampled yellowfin tuna are below 55 cm in length and 93% of the sampled bigeye tuna are below 55 cm in length.

Eighteen species composition samples were taken during the first semester of 1977. Results indicate that 19% or 534 tons of the reported yellowfin tuna landings sampled were actually bigeye tuna (Table 2). Canneries reported some bigeye tonnages for the period. Eight species composition samples from these tonnages indicate that 34% of the sampled landings were actually yellowfin tuna.

## SUMMARY AND REMARKS

Results of sampling of import landings in Puerto Rico during 1976 and the first semester of 1977 indicate:

- 1) During 1976, 89% of the Atlantic-caught yellowfin tuna imported to Puerto Rico were undersized (<55 cm) fish. During the first semester of 1977, 29% of the imported yellowfin tuna were undersized. It thus appears that the percentage of undersized yellowfin tuna in the import landings for 1977 will be considerably below that for 1976 if the current trend continues.

The amount of bigeye tuna less than 55 cm in 1977 was 93% compared to 86% in 1976.

- 2) Bigeye tuna frequently occurs in import landings of yellowfin tuna. In 1976, an estimated 21% of the sampled landings of yellowfin tuna were actually bigeye tuna; during the first half of 1977 an estimated 19% were actually bigeye tuna.
- 3) Canneries have made an attempt to segregate import landings of bigeye tuna from yellowfin tuna in the last semester of 1976 and the first semester of 1977. A preliminary analysis of eight species composition samples revealed that 34% of the sampled reported bigeye tuna tonnages are actually yellowfin tuna. These reported tonnages should be monitored closely since most of the bigeye tuna landed in 1977 have been small fish.
- 4) The use of external characteristics of yellowfin and bigeye tunas to differentiate the species proved satisfactory. There is no difficulty in using this method on large fish. Small fish (<55 cm) presented some difficulty but the probability of error appears to be small.
- 5) A special experiment to determine the amount of bias introduced into the length-frequency sample by rejecting broken yellowfin and bigeye tunas proved inconclusive due to the small number of samples. The experiment will be continued thru 1977.

## LITERATURE CITED

- 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-1976) (1): 67-71.
- Sakagawa, G.T., A.L. Coan, and E.P. Holzapfel. 1977. Size and species composition of Atlantic tunas in Import landings of Puerto Rico, 1975-1976. ICCAT Collective Vol. Sci. Pap., 6(SCRS-1976) (1): 99-102.

Table 4. 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		% error
	Positively identified	Misidentified	
1976			
<u>Yellowfin tuna</u>			
29-85	3,539	32	0.9
86-151	18	0	0
152-166	0	0	0
<u>Bigeye tuna</u>			
36-85	616	19	3.0
86-151	0	0	0
152-166	0	0	0
First Semester 1977			
<u>Yellowfin tuna</u>			
44-85	215	9	4.0
86-151	5	0	0
152-166	0	0	0
<u>Bigeye tuna</u>			
41-85	348	8	2.2
86-151	0	0	0
152-166	0	0	0