

## SIZE AND SPECIES COMPOSITIONS OF ATLANTIC TUNAS FROM IMPORTS LANDED IN PUERTO RICO DURING 1982

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## SUMMARY

United States imports of foreign-caught Atlantic tunas transshipped to Puerto Rico are sampled for size and species composition by personnel of the Southwest Fisheries Center, under a program that began in 1974. Fork length measurements were made on a total of 10,071 fish in 1982: 6,404 yellowfin tuna, 2,323 skipjack tuna, 1,094 bigeye tuna, 100 albacore tuna, 100 little tunny, and 50 blackfin tuna. Length-frequency information derived from these measurements is presented for the first four of these species. Sampling results indicate that 68% by number of the yellowfin tuna and 56% by number of the bigeye tuna in the 1982 Atlantic imports to Puerto Rico were less than 55 cm fork length, the International Commission for the Conservation of Atlantic Tunas' minimum size regulation for these species.

## RESUME

Les importations américaines de thonidés de l'Atlantique capturés hors du territoire et transbordés à Puerto Rico sont échantillonnées, à la recherche d'une composition en âge et taille par le personnel du "Southeast Fisheries Center" dans le cadre d'un programme mis en route en 1974. Des mensurations en longueur fourche ont été faites en 1982 sur 10.071 poissons:

6.404 albacores, 2.323 listaos, 1.094 thons obèses, 100 germons, 100 thonines et 50 thons à nageoires noires. L'information sur les fréquences de taille fournie par ces mensurations est présentée pour les quatre premières espèces mentionnées. Les résultats de l'échantillonnage indiquent que 68% du nombre d'albacores et 56% de celui de thon obèse dans les importations atlantiques à Puerto Rico mesuraient moins de 55 cm de longueur fourche, ce qui correspond à la taille limite fixée pour ces espèces par l'ICCAT.

## RESUMEN

En el marco de un programa iniciado en 1974, el personal del Southwest Fisheries Center efectúa muestreo de talla y composición por especies de los túnidos atlánticos capturados por barcos extranjeros e importados por Estados Unidos a Puerto Rico. En 1982 se midió la longitud-horquilla de un total de 10.071 peces: 6.404 rabiles, 2.323 listados, 1.094 patudos, 100 atunes blancos, 100 bacoretas y 50 atunes aleta negra. Se presenta la información obtenida sobre frecuencias de talla de las cuatro primeras especies mencionadas. Los resultados del muestreo indican que el 68% (en números) del rabil y el 56% (en números) del patudo atlántico importado a Puerto Rico en 1982, era inferior a 55 cm, talla mínima establecida en las regulaciones de la Comisión Internacional para la Conservación del Atún Atlántico.

## INTRODUCTION

Most of the Atlantic-caught tuna imported by the United States is transshipped to Mayaguez and Ponce, Puerto Rico. From 1970 to 1982, these imports averaged 86,067 mt annually, or 26% of the total Atlantic tuna catch. While albacore, bigeye, skipjack and yellowfin tunas are the primary species, limited quantities of blackfin, little tunny and bullet tuna (*Auxis* sp.) are also included. The bigeye and yellowfin tuna species are not separated during unloading and are normally recorded as yellowfin tuna.

The Southwest Fisheries Center (SWFC) of the National Marine Fisheries Service established a monitoring program in Puerto Rico in 1974 for length and species composition of imported tunas. This paper presents results obtained from the program in 1982. Procedures used in this sampling program, and the methods for estimating length and species compositions for the total import landings from the samples, have previously been described (Herrick 1981, Sakagawa et al. 1976).

Minimum size regulations (3.2 kg or 55.0 cm fork length, with a 15% undersize allowance per catcher vessel per landing), were adopted for Atlantic yellowfin and bigeye tunas (in 1973 and 1979, respectively) by the International Commission for the Conservation of Atlantic Tunas (ICCAT). In this regard, the size/species composition sampling results obtained in Puerto Rico are representative of surface-caught yellowfin, skipjack, and bigeye tuna that are exported to the United States<sup>1</sup>, and are not necessarily representative of the actual size/species compositions of catches at their original port of landing. Therefore, the Puerto Rican import sampling program is not specifically designed nor intended to monitor the effectiveness of these size regulations.

<sup>1</sup>Given limited sampling resources in Puerto Rico, priority length-species composition sampling coverage is given to surface-caught mixed yellowfin/bigeye and skipjack tuna imports.

## RESULTS OF THE 1982 PUERTO RICAN SAMPLING PROGRAM

During 1982, 161 length-frequency samples (79 yellowfin, 46 skipjack, 31 bigeye, 2 albacore, 1 blackfin and 2 little tunny) were taken from transshipments of Atlantic tunas to Puerto Rico. The majority of yellowfin and skipjack tuna samples were from the eastern Atlantic with the remainder from the western Atlantic; all of the bigeye tuna samples were from the eastern Atlantic, and all of the albacore tuna samples were from the southern Atlantic. Fork length measurements were made on 10,071 fish: 6,404 were yellowfin tuna, 2,323 skipjack tuna, 1,094 bigeye tuna, 100 albacore tuna, 100 little tunny, and 50 blackfin tuna. 12,321 mt of shipments were sampled, or 11.4% the total tonnage of U. S. Atlantic tuna imports (Tables 2-5).

Because imported yellowfin and bigeye tunas are unloaded together as "yellowfin", it is necessary to sample these landings to determine their species composition. In 1982, 84 species composition samples of 100 fish each indicated that 22% by weight of these mixed landings were bigeye tuna. Applying this result to the total of 11,037 mt of mixed yellowfin/bigeye tuna imports (Table 1) yields corrected totals of 8,587 mt and 2,428 mt for yellowfin and bigeye tunas, respectively. In addition, the species composition sampling indicates that 0.2%, or 22 mt of skipjack tuna and other species were included in 1982 "yellowfin" transshipments.

### Yellowfin Tuna

Purse-seine-caught yellowfin tuna imported from the eastern Atlantic in 1982 ranged in size from 34 to 178 cm, although only 1% of the fish were greater than 110 cm. The large majority of fish were between 40 and 60 cm. The average fork length was 53 cm, which is very similar to the average length for 1981 and 1982 (Table 2, Figure 1).

Baitboat-caught yellowfin tuna imported from the eastern Atlantic in 1982 ranged in size from 35 to 127 cm and were more evenly distributed over their size range than purse-seine-caught yellowfin tuna. The average fork length was 65 cm, an increase of nearly 19 cm over that recorded in 1981.

Yellowfin tuna caught by baitboats in the western Atlantic and imported into Puerto Rico in 1982 ranged from 36 to 98 cm. The average fork length was 66 cm, a decrease from the average fork lengths of 96 and 98 cm, respectively, estimated from sampling in 1980 and 1981 (Table 2).

Sampling results indicated the percentage of yellowfin tuna less than 55 cm fork length was 72% for imported eastern Atlantic purse-seine-caught fish in 1982, a slight decrease from 78% during 1981. The percentage less than 55 cm fork length for imported eastern Atlantic baitboat-caught fish decreased dramatically to 27% from 1981's 92%. Seven percent of the western Atlantic baitboat-caught yellowfin tuna were estimated to be less than 55 cm fork length, up from 0% in 1981 (Table 2, Figure 4b).

#### Skipjack Tuna

The average fork lengths of skipjack tuna as determined by sampling of imports to Puerto Rico have been remarkably constant since 1976. Purse-seine-caught skipjack tuna are slightly larger than baitboat-caught skipjack tuna in the eastern Atlantic, with average fork lengths of 47 and 43 cm, respectively. Western Atlantic skipjack tuna continue to be considerably larger than those from the eastern Atlantic, with an average fork length of 57 cm (Table 3, Figure 2).

#### Bigeye Tuna

Average fork lengths of eastern Atlantic bigeye tuna, as determined by sampling of imports to Puerto Rico in 1982, increased by approximately 10 cm for purse-seine-caught fish and decreased by approximately 10 cm for baitboat-caught fish compared to the 1981 averages. Purse-seine-caught bigeye tuna extended over a much larger size range (39-184 cm) than baitboat caught bigeye tuna (43-83 cm), although the average fork lengths were quite close (59 and 56 cm, respectively) (Table 4, Figure 3b).

The percentages (by number) of imported bigeye tuna less than 55 cm fork length for eastern Atlantic purse seine and baitboat-caught fish were 56% and

48%, respectively, as estimated by sampling. The corresponding percentages for 1981 were 90% for purse-seine-caught bigeye tuna and 30% for baitboat-caught bigeye tuna (Table 4, Figure 4a).

#### Albacore Tuna

Two size frequency samples of imported southern Atlantic longline-caught albacore tuna were taken. Average fork length was 81.33 cm, and sizes ranged from 60-100 cm (Table 5, Figure 3a).

#### DISCUSSION

Large percentages of fish less than 55 cm fork length continue to occur in imports of Atlantic yellowfin and bigeye tuna. Sampling results obtained in 1982 revealed that 68% by number of the imported Atlantic yellowfin tuna were less than 55 cm fork length, and 56% by number of the imported Atlantic bigeye tuna were less than 55 cm fork length (Tables 2 and 4). The proportion of fish less than 55 cm fork length contained in the imports of yellowfin and bigeye tuna has been quite variable from 1977 to 1982, as shown in Figure 4.

While skipjack tuna from the eastern Atlantic transshipped to Puerto Rico represent all sizes of the surface catch, the same may not be true for the combined yellowfin/bigeye catch from either purse seiners or baitboats, because selected sizes of fish are often transshipped to different countries or are canned in the country unloading the catcher vessel. The large percentage of undersize fish in the Puerto Rico sample is, therefore, probably not indicative of the percentage actually unloaded by the catcher vessels.

LITERATURE CITED

- Herrick, Samuel F. 1982. Size and species compositions of Atlantic tunas from imports landed in Puerto Rico during 1980. Collective Vol. Sci. Pap. Inter. Comm. Conserv. Atl. Tunas, Madrid (SCRS-1981) 17(1):53-67.
- Sakagawa, Gary T., A. L. Coan and E. P. Holzappel. 1976. Length composition of yellowfin, skipjack, and bigeye tunas caught in the eastern tropical Atlantic by American purse seiners. N.O.A.A. Technical Report NMFS-702.

Table 1. Import landings (metric tons) of Atlantic-caught tunas in Puerto Rico for 1970-1982.<sup>1</sup>

	Albacore	Skipjack	Yellowfin/ Bigeye <sup>2</sup>	Total Imports	Total Atlantic catch
1970	34,322	7,970	5,414	47,706	228,781
1971	26,258	13,709	9,832	49,799	280,163
1972	48,249	41,758	23,736	113,770	291,164
1973	45,654	32,934	20,106	98,694	291,609
1974	25,627	49,315	17,349	92,291	354,364
1975	22,815	32,087	12,286	67,188	301,633
1976	17,159	33,153	10,816	61,128	316,915
1977	34,072	39,428	7,290	80,790	365,569
1978	43,157	53,204	9,363	105,724	356,457
1979	34,913	46,586	7,070	88,569	333,722
1980	27,146	45,566	8,377	81,089	352,571
1981	32,447	68,738	22,519	123,704	379,951
1982	37,015	60,360	11,037	108,414	411,006 <sup>3</sup>

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

<sup>2</sup>Bigeye tuna included with yellowfin tuna in landing weights.

<sup>3</sup>Preliminary.

Table 2. Summary of imported Atlantic yellowfin tuna sampling results for 1976 to 1982.

	1976	1977	1978	1979	1980	1981	1982
	Average length (cm)						
Purse seine, E. Atl.	42.82	52.92	64.95	42.73	51.81	54.47	52.79
Purse seine, W. Atl.	-	-	-	-	47.58	58.49	-
Baitboat, E. Atl.	46.83	61.14	53.75	50.36	55.41	46.85	65.44
Baitboat, W. Atl.	-	-	-	-	95.85	98.14	66.10
Average	46.28	60.24	57.35	48.48	51.85	53.25	53.62
	Size range (cm)						
Purse seine, E. Atl.	37-128	45-98	35-142	34-49	36-174	34-167	34-178
Purse seine, W. Atl.	-	-	-	-	27-89	37-138	-
Baitboat, E. Atl.	29-137	39-129	35-147	33-130	35-135	33-133	35-127
Baitboat, W. Atl.	-	-	-	-	51-126	62-132	36-98
Overall range	29-137	39-129	35-147	33-130	27-174	33-167	34-178
	Number sampled						
Purse seine, E. Atl.	75	131	455	41	927	1865	3102
Purse seine, W. Atl.	-	-	-	-	100	199	-
Baitboat, E. Atl.	4877	2148	2932	4330	2671	1687	1563
Baitboat, W. Atl.	-	-	-	-	41	167	677
Total	4952	2279	3387	4371	3739	3918	5342
	Tonnage sampled (mt)						
Purse seine, E. Atl.	278	47	1781	223	1597	3343	2485
Purse seine, W. Atl.	-	-	-	-	173	186	-
Baitboat, E. Atl.	2372	542	1665	1182	308	492	85
Baitboat, W. Atl.	-	-	-	-	14	105	226
Total	2650	589	3446	1405	2092	4126	2797
	Percentage less than 55 cm, by number						
Purse seine, E. Atl.	100	75	30	100	72	78	71
Purse seine, W. Atl.	-	-	-	-	88	37	-
Baitboat, E. Atl.	88	16	61	73	53	92	27
Baitboat, W. Atl.	-	-	-	-	2	0	7
Total	90	22	51	72	72	79	68
	Percentage less than 55 cm, by weight						
Purse seine, E. Atl.	97	51	8	100	50	30	48
Purse seine, W. Atl.	-	-	-	-	67	22	-
Baitboat, E. Atl.	74	8	39	54	31	81	11
Baitboat, W. Atl.	-	-	-	-	0	0	3
Total	77	12	23	61	49	35	46

Table 3. Summary of imported Atlantic skipjack tuna sampling results for 1976 to 1982.

	1976	1977	1978	1979	1980	1981	1982
	Average length (cm)						
Purse seine, E. Atl.	45.95	47.66	45.86	46.88	47.46	47.12	46.69
Purse seine, W. Atl.	-	-	-	-	-	58.59	-
Baitboat, E. Atl.	44.09	45.10	44.36	45.58	44.77	45.11	43.34
Baitboat, W. Atl.	-	-	-	-	59.40	58.86	57.11
Average	44.80	46.04	45.16	46.35	48.08	48.97	47.85
	Size range (cm)						
Purse seine, E. Atl.	36-69	34-69	34-70	34-68	32-69	36-70	33-63
Purse seine, W. Atl.	-	-	-	-	-	43-81	-
Baitboat, E. Atl.	30-80	25-68	30-64	35-66	33-73	35-76	35-61
Baitboat, W. Atl.	-	-	-	-	47-75	43-82	41-73
Overall range	30-80	25-69	30-70	34-68	32-75	35-82	33-73
	Number sampled						
Purse seine, E. Atl.	1163	604	1220	861	857	953	854
Purse seine, W. Atl.	-	-	-	-	-	100	-
Baitboat, E. Atl.	2784	1867	1569	1469	1119	551	660
Baitboat, W. Atl.	-	-	-	-	250	296	606
Total	3947	2471	2789	2330	2226	1900	2120
	Tonnage sampled (mt)						
Purse seine, E. Atl.	3742	3004	8160	5517	5512	8748	4862
Purse seine, W. Atl.	-	-	-	-	-	672	-
Baitboat, E. Atl.	5294	4318	6220	3455	2181	2971	35
Baitboat, W. Atl.	-	-	-	-	2167	2294	1597
Total	9036	7322	14380	8972	9860	14685	6812

Table 4. Summary of imported Atlantic bigeye tuna sampling results for 1976 to 1982.

	1976	1977	1978	1979	1980	1981	1982
	Average length (cm)						
Purse seine, E. Atl.	-	57.29	60.01	-	48.86	49.12	58.99
Baitboat, E. Atl.	49.57	56.78	52.08	51.79	56.52	66.16	55.93
Average	49.57	56.84	54.45	51.79	51.10	58.55	58.92
	Size range (cm)						
Purse seine, E. Atl.	-	35-112	42-120	-	39-88	32-68	39-184
Baitboat, E. Atl.	39-97	41-113	35-160	36-112	37-95	39-107	43-83
Overall range	39-97	35-113	35-160	36-112	37-95	32-107	39-184
	Number sampled						
Purse seine, E. Atl.	-	110	173	-	241	259	753
Baitboat, E. Atl.	227	982	1949	2163	1029	321	234
Total	227	1092	2122	2163	1270	580	987
	Tonnage sampled (mt)						
Purse seine, E. Atl.	-	30	493	-	236	255	735
Baitboat, Atl.	77	230	747	489	167	98	10
Total	77	260	1240	489	403	353	745
	Percentage less than 55 cm, by number						
Purse seine, E. Atl.	-	72	26	-	81	90	56
Baitboat, E. Atl.	86	54	72	76	59	30	48
Total	86	56	58	76	75	83	56
	Percentage less than 55 cm, by weight						
Purse seine, E. Atl.	-	30	11	-	61	83	20
Baitboat, E. Atl.	74	29	49	51	30	11	35
Total	74	29	29	51	48	63	20

Table 5. Summary of imported Atlantic albacore tuna sampling results for 1976 to 1982.

	1976	1977	1978	1979	1980	1981	1982
	Average length, (cm)						
Longline, N. Atl.	85.71	101.2	-	-	-	-	-
Longline, S. Atl.	83.17	85.4	86.28	91.64	93.72	-	-
Purse seine, E. Atl.	-	-	-	-	-	98.96	81.33
Average	84.08	89.8	86.28	91.64	93.72	98.96	81.33
	Size range, (cm)						
Longline, N. Atl.	69-112	90-112	-	-	-	-	-
Longline, S. Atl.	54-105	54-111	62-114	60-114	57-113	-	60-100
Purse seine, E. Atl.	-	-	-	-	-	93-106	-
Overall Range	54-112	54-112	62-114	60-114	57-113	93-106	60-100
	Number sampled						
Longline, N. Atl.	200	50	-	-	-	-	-
Longline, S. Atl.	250	150	350	220	509	-	100
Purse seine, E. Atl.	-	-	-	-	-	50	-
Total	450	200	350	220	509	50	100
	Tonnage sampled (mt)						
Longline, N. Atl.	1021	257	-	-	-	-	-
Longline, S. Atl.	1679	398	1682	1124	2660	-	536
Purse seine, E. Atl.	-	-	-	-	-	137	-
Total	2700	655	1682	1124	2660	137	536

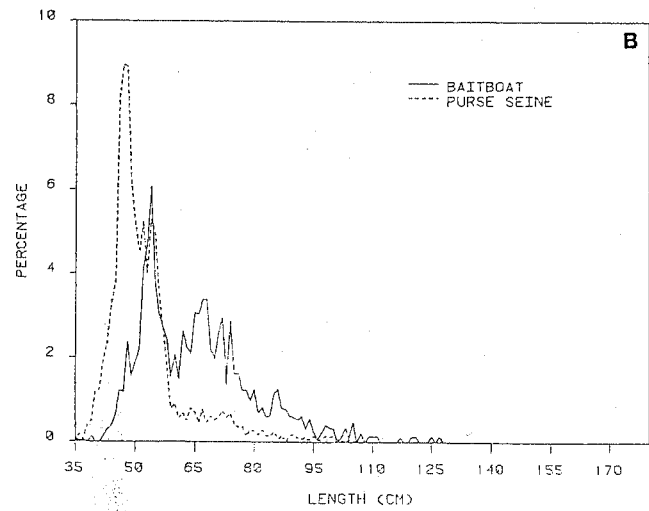
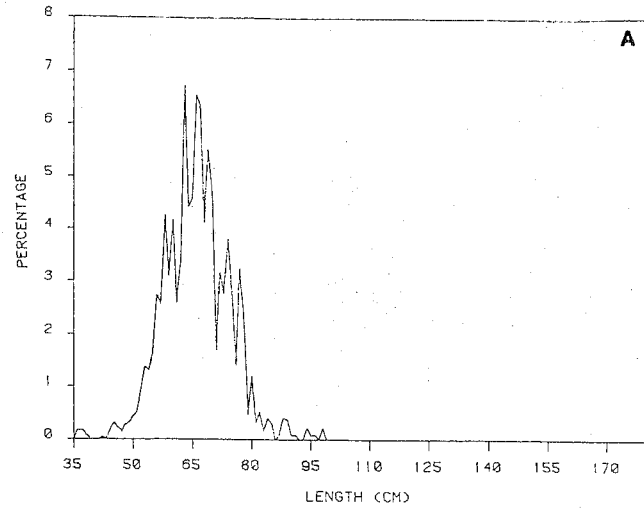


Figure 1. Estimated length composition of yellowfin tuna transshipments from (A) western Atlantic baitboat catches, and (B) eastern Atlantic purse seine and baitboat catches.

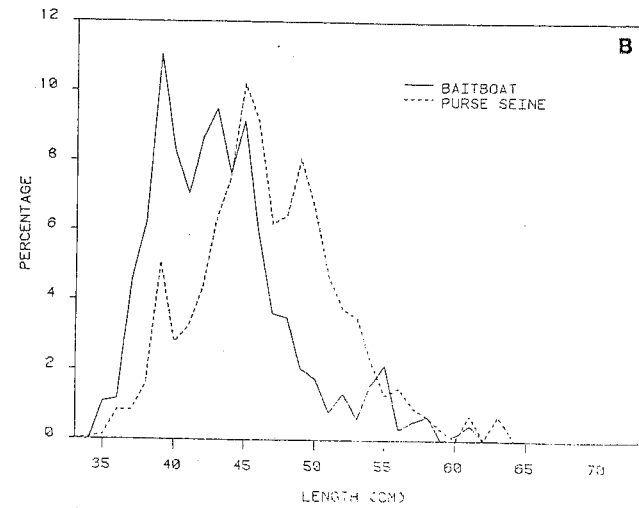
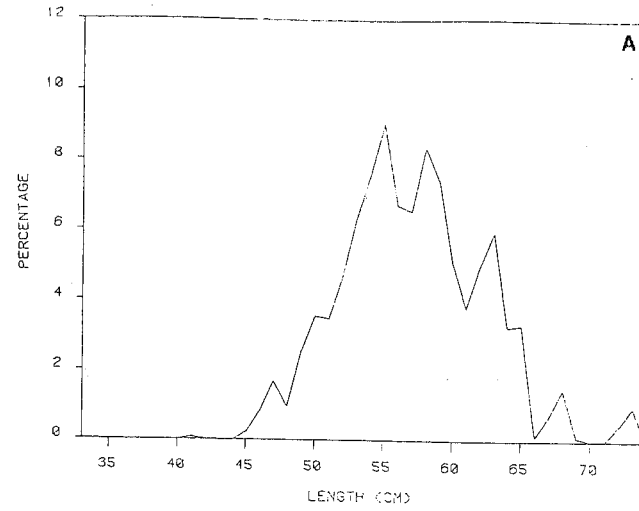


Figure 2. Estimated length composition of skipjack tuna transshipments from (A) western Atlantic baitboat catches, and (B) eastern Atlantic baitboat and purse seine catches.

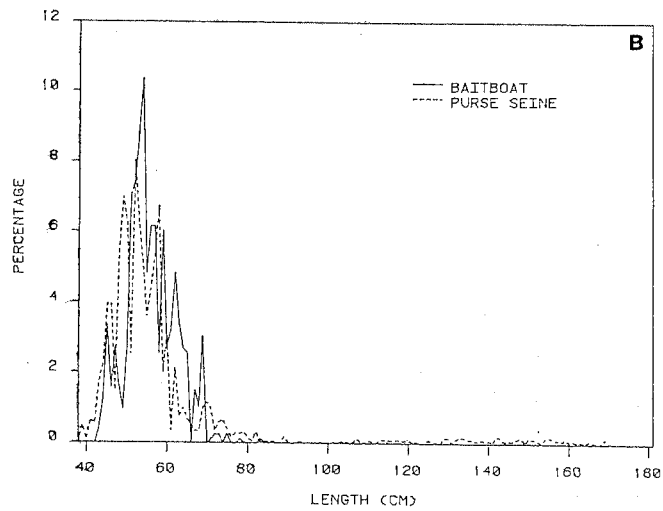
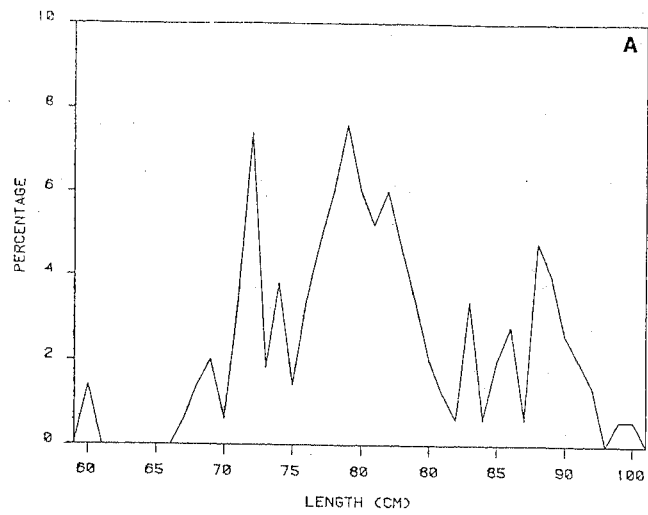


Figure 3. Estimated length composition of transshipments from (A) southern Atlantic longline albacore tuna catches, and (B) eastern Atlantic baitboat and purse seine bigeye tuna catches.

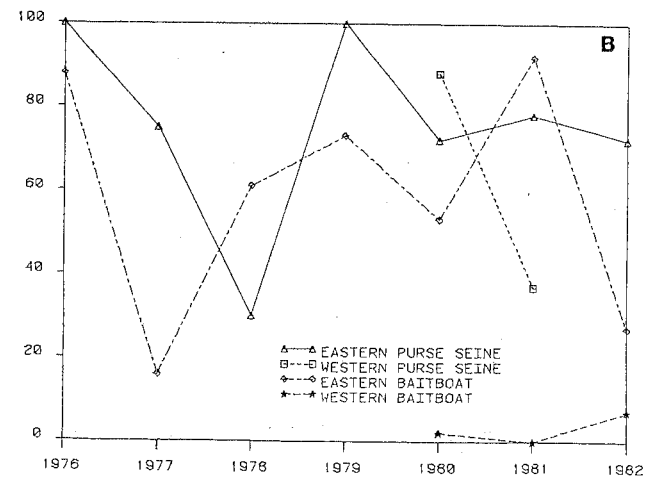
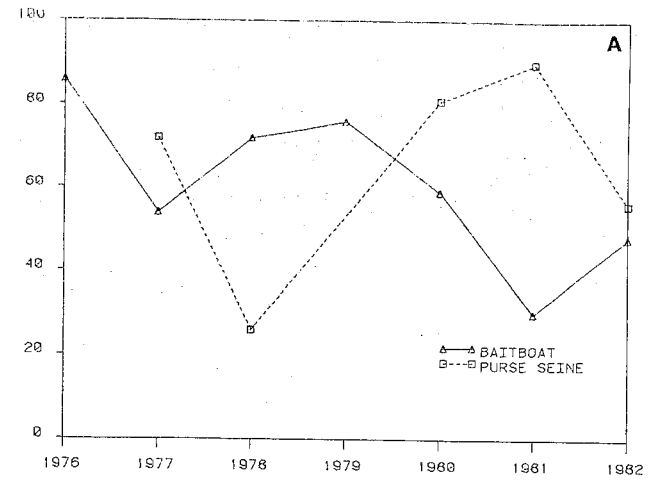


Figure 4. Percentage (by number) of fish less than 55 cm, by gear, for (A) eastern Atlantic bigeye tuna transshipments and (B) eastern and western Atlantic yellowfin tuna transshipments.