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REPORT OF THE BLUEFIN TUNA WORKING GROUP

Observations on the Size Composition of Bluefin Tuna Catches  
from 1977

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and K Tiews

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## Introduction

Reference is made to previous reports of the Bluefin Tuna Working Group (Statistical News Letters, N<sup>o</sup> 20, 36 and 38, to Cooperative Research Reports, Ser. A., N<sup>o</sup> 23, 40 and 71 as well as document C.M. 1977/ J:3.

In 1977 Mr. J. Hamre from the Institute of Marine Research in Bergen, member of the Working Group since its beginning in 1961, decided to withdraw because of too many other obligations and was replaced by Mr. E. Bakken of the same institute. Other Working Group members are at present Dr. P. Iles (Canada), Dr. H. Aloncle (France), Prof. K. Tiews (Federal Republic of Germany) (Chairman), Mrs. O. Moura (Portugal), Dr. J. Rodriguez-Roda (Spain), Mr. R.C. Hennesmuth (USA) and Dr. James C. Tyler (USA).

The members continued their work by correspondence and with other tuna research workers in the region. The data obtained for the fishing season 1977 are presented in the following.

## Material

Data on the size and age composition of Bluefin tuna catches were received from the following countries: Canada (Tables 1-4), Denmark (Table 5), France (Table 6), Norway (Table 7), Portugal (Table 8), Spain (Tables 9-13) and USA (Tables 14 -18).

Mrs. C.D. Burnett, Mr. P.C.F. Hurley and Dr. T.D. Iles reported that the Canadian landings of bluefin tuna in 1977 for the west Atlantic yielded 972 metric tons round weight (Table 1), an increase of 26 mt or 3 % over the previous year:

- a) The purse seine fishery for juveniles off the eastern coast of the United States accounted for 298 mt, a decrease of 34 mt (10%) from 1976.
- b) The trap fishery in St. Margaret's Bay, Nova Scotia, took 368 mt of giant bluefin, an increase of 200 mt or 119 % over the previous year.
- c) The sport (rod and reel) fishery for giant bluefin declined from 342 mt in 1976 to 302 mt in 1977.

Regulations introduced in the Canadian bluefin fishery in 1974 have been maintained, subject to minor modifications in 1975 and 1976.

Weights were obtained for 1577 of the 1718 large bluefin taken in five locations along the Canadian Atlantic coast (Table 2). Mean weights range from 298.6 to 437.1 kg.

The size composition of monthly Prince Edward Island rod and reel landings is presented in Table 3. The average weight of fish increased as the season progressed, from 368.9 kg in August to 432.3 kg in October; the seasonal average was 394.4 kg, approximately the same as 1976.

The Canadian purse seine fishery for small bluefin took 298 mt. This fishery operated during July and August off the New York-New Jersey coast of the United States in 1977. The size (fork length) composition of this catch is presented in Table 4. Fork lengths range from 44.5 to 163.6 cm, with an average length of 116.2 cm. In addition, 50 otoliths were extracted for age determination and several vertebrae and gonad samples were taken.

In 1977, ten giant bluefin were tagged and released: nine from the Bay of Chaleur area (Gulf of St. Lawrence) and one east of Halifax, Nova Scotia. Five tagged bluefin were recovered in 1977; two fish were recaptured in the Gulf of Mexico from fish tagged in St. Margaret's Bay and in the Bay of Chaleur in 1976; and bluefin tagged in the Bay of Chaleur area in 1973, 1975 and 1976 were recaptured in the same general area.

The commercial impoundment program in St. Margaret's Bay was increased to 18 impoundments in 1977, and 717 giant tuna were successfully fattened for the Japanese market. In September, 290 fish were removed (average weight 393.2 kg) and in October, 427 fish were recovered (average weight 414.0 kg).

One impoundment containing 13 giant bluefin was allocated for experimental purposes in St. Margaret's Bay. Canadian and U.S. scientists worked in a co-operative program involving studies of:

internal body temperature, ambient water temperature and depth of free-swimming fish using ultrasonic telemetry; feeding behaviour; nutrition; tag retention; sex determination by hormone radio-immunoassay; aging validation; and tissue contaminant analysis.

Sampling of otoliths for age determination was continued with approximately 270 giant bluefin sampled in three different areas, in addition to the fifty juvenile bluefin sampled in the purse seine fishery. On the recommendation of the Standing Committee for Research and Statistics (ICCAT), a bluefin tuna aging workshop was held in New York in March, 1977. Scientists from several nations discussed existing aging techniques in an effort to standardize these procedures. The Proceedings of the workshop have been presented to the ICCAT Secretariat for distribution and a second workshop is planned for 1978. As a result of the 1977 workshop, an experiment involving the administration of tetracycline to impounded giant bluefin in St. Margaret's Bay, up to 2 months prior to slaughter, was initiated to validate present aging procedures. Otoliths and vertebrae from these fish are presently being analyzed.

The following papers were presented to ICCAT's Standing Committee on Research and Statistics in November 1977:

- 1) Butler, M.J.A.: The St. Margaret's Bay (Nova Scotia) Bluefin Research Program: A Progress Report (SCRS/77/89).
- 2) Butler, J.J.A., and D.G. Pincock: The Ultrasonic Monitoring of Impounded Bluefin Tuna in St. Margaret's Bay. (SCRS/77/92).
- 3) Butler, M.J.A., and J.M. Mason, Jr.: Behaviour Studies on Impounded Bluefin Tuna (SCRS/77/93).
- 4) Hunt, J.J. (Editor): Proceedings of the Atlantic Bluefin Tuna Aging Workshop.

Dr. Becket informed the Working Group that four of tagged bluefin recaptured in 1977, and one of those recaptured in 1976, were fish that had been released after capture by rod and reel.

This supports the value of the technique even in the colder part of the bluefin range.

Dr. Bagge submitted data on Danish and Swedish catches of 6 bluefin tuna made in the Kattegat (Table 5).

French bluefin tuna catches from the Bay of Biscay were reported by Dr. Aloncle (Table 6).

Mr. S.A. Iversen stated that except for one tuna caught 7 July (week 27) the Norwegian fishery started four weeks later in week 31. This is the usual time for starting the tuna season there. 2191 fishes, totalling 583 433 kilos were landed during the weeks 27 - 34. The main catch were landed in the two weeks 32 and 33. 65 catches were landed by 27 fishermen. The catches ranged between 1 and 219 fishes. The bulk were caught on the coast of Hordaland and Sogn and Fjordane. Three fishes were reported from Rogaland, the neighbouring district south of Hordaland.

The complete Norwegian catch is included in the Table 7. Only giant bluefin were caught. Individual weights are lacking for 16 fishes in week 32. Individual weights (guttet and without head) varied between 180 and 435 kilos, averaging 268.2 kilos, corresponding approximately to 230 - 560 kilos, mean 345 kilos live weight.

No fishing stops or other restrictions were imposed. However, the fishery ended before September due to bad weather.

No length measurements were recorded.

Dr. Monteiro submitted the landing statistics of the Portuguese bluefin tuna catches made at Azores and Madeira Islands (Table 8).

Dr. Rodriguez-Roda informed the Working Group that in 1977 three madragues were working in the south of Spain, 2 on the Atlantic coast at Barbate and Zahara de los Atunes and one on the Mediterranean coast at La Linea (Table 9).

During the months of May, June and July the weather was not very satisfactory for the madrague fishery. Nevertheless it is evident that catches of bluefin tuna are steadily decreasing in this area (total of 169 fish were measured)(Table 10). Dr. Cort says that the period from July -August 1977 was characterized by extremely bad weather which has cut down the activities of the Spanish tuna fleet in the Bay of Biscay. The improvement of weather during

September made it possible that catches reached levels above the average. The catch per unit of effort was even the highest since 1972:

<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
74.9	75.1	68.0	54.9	53.1	81.2 kg

The age composition of catches is given in Table 11.

The information on the bluefin tuna catches made by bait boats in the Canary Islands given for the first time was made by Mr. Santos-Guerra (Tables 12-13).

The US length composition data were reported by Mr. M.D. Lange of the Miami Laboratory of the National Marine Fisheries Service (Tables 14-19). The fish were measured as straight fork length in centimeters and tabulated within one week intervals across the respective fishing seasons.

Tables 20-22 were submitted by Dr. J.C. Tyler (12).

### Results

1. The bluefin tuna catches of the Spanish madrague fishery which had recovered to 490 tons in 1976 declined again to 339 tons in 1977.
2. The catches of the Norwegian fishery increased instead from 1 619 fish in 1976 to 2 191 giant tuna (= 587 tons), but were still smaller than in 1974 and 1975.
3. The French fishery in the Bay of Biscay recovered again to the level of 1975 after a drastic drop of landings in 1976 to one half due to the abnormally high water temperature until the second half of July 1976. French catches increased from 268 tons in 1976 to 487 tons in 1977. The Spanish catches per unit of effort in this area were the highest since 1972.
4. The Spanish bluefin tuna catches in the waters of the Canary Islands amounted 1 250 tons and were the largest since 1974.

5. The overall Canadian catches continued to increase and reached 972 tons, which was the largest catch since 1974. Also the US catches amounting to 1 945 tons were slightly higher than in 1976 and the second largest since 1974.
6. The Norwegian Bluefin Tuna catches were of the known size composition (Fig. 1). It tallied neither with the Canadian catch of giant tuna, which were considerable larger as in 1976, nor with the catches made in the Canary Islands which consisted largely of smaller fish. The Spanish madrague catch shows a recruit of some 12 year old fish, while the older component of the catch tallies with the length composition of the US catch of giant tuna (Fig. 2). As has to be expected the size composition of the US and Canadian purse seine catches tally widely.
7. The US and Canadian purse seine catches were dominated by 4 year olds. This year class dominated the catches already in 1974, 1975 and 1976. The second largest group was that of 2 year olds.
8. In the live bait fishery in the Bay of Biscay the strongest year class was again that of 2 year olds which was also the case in 1975 and 1976. This indicates strongly that the fluctuation pattern in the strength of the recruit year classes did not tally in the eastern and western Atlantic during these years.



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Table 1. Canadian Catches of Bluefin Tuna from Atlantic Ocean,  
1962-77

Landings (Nominal Catch in Metric Tons, Round Weight)

<u>Year</u>	<u>Traps**</u>	<u>Purse seine</u>	<u>Rod &amp; reel*</u>	<u>Total</u>
1962	137	-	40	177
1963	229	323	90	642
1964	318	579	99	996
1965	175	461	90	726
1966	211	-	102	313
1967	298	-	58	356
1968	253	-	180	433
1969	407	-	170	577
1970	275	1161	151	1587
1971	68	935	128	1131
1972	36	202	261	499
1973	160	639	215	1014
1974	300	103	365	768
1975	141	295	193	629
1976	172	332	342	846
1977	372	298	302	972

\*Note: Prior to 1974 tagged and/or released fish are included in the rod and reel totals.

\*\*Note: From 1962-74 the catch includes a small proportion of incidental longline catches.

Table 2. Size composition (round weight per mille by 10 kg unit) of large Bluefin Tuna captured in five localities along the Canadian Atlantic Coast in 1976

Size class (kg)	P.E.I.		Nfld.		N. B.		Que.		Trap n	N S.		Total n	°/oo smooth.
	Rod and reel n	and reel n	Rod and reel n	and reel n	Rod and reel n	and reel n	Rod and reel n	and reel n					
180	-		-		-		-		1	-		1	
190	-		-		-		-		-	-		-	
200	1		-		-		-		-	-		-	
210	-		-		-		-		-	-		1	
220	1		-		-		-		-	-		-	
230	-		-		-		-		-	-		1	1
240	-		1		-		-		2	-		2	3
250	1		-		1		-		9	-		10	5
260	-		-		-		-		6	-		8	6
270	1		-		-		-		11	-		11	7
280	3		-		-		-		14	-		15	10
290	4		1		-		-		18	-		21	13
300	9		1		-		-		16	-		21	16
310	10		1		2		-		22	-		32	19
320	12		1		3		1		24	-		38	25
330	15				5		-		32	-		48	36
340	21				5		1		40	-		60	37
350	27				9		1		39	-		66	41
360	25				13		2		44	-		81	48
370	25				14		1		57	1		98	58
380	34				25		2		58	1		99	66
390	39				22		2		64	1		126	78
400	33				22		4		54	-		117	81
410	41				19		3		64	1		124	75
420	33				11		1		52	-		115	71
430	30				12		1		57	-		102	62
440	25				10		1		37	1		81	56
450	14				1		1		52	-		88	49
460	15				4		-		33	1		50	33
470	5				-		1		31	-		50	29
480	7				1				29	-		35	24
490	6				2				23	-		31	19
500	2				-				13	-		21	13
510	-				1				5	2		9	7
520	-				1				5	1		7	5
530	1								4			5	4
540									1			2	2
									1			1	1

(ctd)

Continuation table 2.

Totals	440	5	183	22	918	9	1577	1000
Mean weight (kg)	394.4	298.6	396.7	397.7	388.1	437.1		
Size class 80 kg = 80.0 - 89.9								

Table 3. Size composition of large Bluefin caught by rod and reel off Prince Edward Island during four consecutive months of the 1977 season (number of fish and round weight per mille by 10 kg unit).

Size class (kg)	July		August		September		October	
	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%
200					1	5		
210					-	-		
220			1	8	-	-		
230			-	-	-	-		
240			-	-	-	-		
250			1	8	-	-		
260			-	-	-	-		
270			-	-	1	5		
280			2	15	-	-	1	10
290			2	15	2	10	-	-
300			6	45	3	15	-	-
310			7	53	3	15	-	-
320			4	30	8	39	-	-
330			7	53	8	39	-	-
340			13	99	7	34	1	10
350			11	83	14	68	2	20
360			9	68	13	63	3	29
370	1	1000	9	68	12	58	3	29
380			16	121	16	78	2	20
390			12	91	22	107	5	49
400			9	68	18	88	6	59
410			8	61	22	107	11	108
420			8	61	12	58	13	127
430			2	15	15	73	13	127
440			1	8	16	78	8	78
450			2	15	3	15	9	88
460			2	15	4	20	9	88
470					2	10	3	30
480					2	10	5	49
490					1	5	5	49
500							2	20
510							-	-
520							-	-
530							1	10
<u>Totals</u>	1	1000	132	1000	205	1000	102	1000
<u>Mean weight (kg)</u>	370.0		368.9		392.2		432.2	

Size class 200 kg = 200.0-209.9

Table 4. Size (fork length) composition of small Bluefin taken off the U.S. coast by Canadian purse-seine vessels in 1977.

Size Class (cm)	No. of Fish	% smoothed
40	1	1
45	-	-
50	-	-
55	1	1
60	5	7
65	4	5
70	8	11
75	68	93
80	76	104
85	21	29
90	2	3
95	10	14
100	17	23
105	19	26
110	29	40
115	34	46
120	76	104
125	98	134
130	99	135
135	53	72
140	67	92
145	35	48
150	5	7
155	3	4
160	1	1
<hr/>		
Total:	732	1000

Size category 40=40.0 - 44.9 (fork length caliper)

Table 5. Weight distribution of Bluefin Tuna landed in Denmark in 1977.  
The weight group refers to gutted fish with gills (kg)

Weight group kg	n
270 - 274	1
...	
290 - 294	1
...	
340 - 344	1
...	
350 - 354	1
360 - 364	1
390 - 394	1
Total	6



Table 6. French Bluefin Tuna catches in 1977 from the Golfe de Gascogne (France) in kg

Date	<u>Total weight</u>	
	Fish below 30 kg	Fish above 30 kg
09.06. - 15.06.1977	127	-
16.06. - 22.06.1977	<b>57 610</b>	-
23.06. - 29.06.1977	31 253	-
30.06. - 1.07.1977	56 653	-
7.07. - 13.07.1977	46 755	-
14.07. - 20.07.1977	50 713	-
21.07. - 27.07.1977	60 931	-
28.07. - 03.08.1977	110	-
04.08. - 10.08.1977	14 311	-
11.08. - 17.08.1977	11 577	-
18.08. - 24.08.1977	302	-
25.08. - 31.08.1977	2 816	-
01.09. - 07.09.1977	32 896	-
08.09. - 14.09.1977	7 325	-
15.09. - 21.09.1977	27 864	-
22.09. - 28.09.1977	57 353	-
29.09. - 05.10.1977	20 210	-
06.10. - 12.10.1977	7 988	-
	486 794	-

Table 7. Size composition (kg) of Norwegian Bluefin Tuna catches by smoothed weight frequency (%) in 1977.

Group	means	Week No.					Total
		w'	w	27	31	32	
182	234				1		1
187	240				2		1
192	247				2		2
197	253		3		3		3
202	260		7		6		5
207	266		3		8		6
212	272		14		11		10
217	279		30		17		15
222	285		33		25		23
227	292	250	43		29		29
232	298	500	43		32		32
237	305	250	43		44		39
242	311		59		58		52
247	317		66		62		59
252	324		72		61		61
257	330		69		62		62
262	337		59		64		61
267	343		72		68		63
272	350		92		74		70
277	356		89		68		67
282	362		59		52		55
287	369		33		41		46
292	375		33		39		44
297	382		33		38		42
302	388		20		32		36
307	395		13		26		29
312	401		10		18		22
317	408		3		13		16
322	414				9		11
327	420				8		9
332	427				8		8
337	433				6		6
342	440				2		3
347	446				1		2
352	453				2		2
357	459				2		2
362	465				2		2
367	472				1		1
372	478				1		1
377	485				1		1
382	491						
387	498						
392	504						
397	510				1		1
402	517				1		1
407	523						
412	530						
417	536						
422	543						
427	549						
432	555						
437	562						
					1		
n		1	76	1227	864	7	2175
$\frac{w'}{w'}$		232	19732	326644	234886	1939	583433
$\frac{w'}{w'}$		232.0	259.6	266.2	271.9	277.0	268.2
N				1243			2191
$\frac{w'}{w'}$				330543			587332
$\frac{w'}{w'}$				265.9			268.1

Table 8. Portuguese Bluefin Tuna landings at Azores and Madeira Islands in 1977 in kg

Month	Azores Island	Madeira Islands	Total
January	-	1 600	1 600
February	-	600	600
March	-	-	-
April	-	-	-
May	-	-	-
June	-	33 900	33 900
July	31 666	-	31 666
August	2 723	-	2 723
September	84 483	-	84 483
October	-	-	-
<b>Total</b>	<b>118 872</b>	<b>36 100</b>	<b>154 972</b>

Table 9. Bluefin Tuna catch from three madragues in Southern Spain (Barbate, Zahara de los Atunes and La Linea) in 1977:

	Number of fish	kg
<u>Barbate</u>		
Big bluefin tuna	1 245	263 300
Little bluefin tuna	<u>23</u>	<u>230</u>
	1 268	263 530
<u>Zahara de los Atunes</u>		
Bluefin tuna	<u>358</u>	<u>75 717</u>
<u>La Linea</u>		
Bluefin tuna	<u>0</u>	<u>0</u>
<b>Total</b>	<b>1 626</b>	<b>339 247</b>

Table 10. Size composition of Spanish madrague catches of Bluefin Tuna (Thunnus thynnus L.) at Barbate in 1977.

Length group cm.	% smoothed
155 - 159.9	1.5
160 - 164.9	4.4
165 - 169.9	11.8
170 - 174.9	20.7
175 - 179.9	22.2
180 - 184.9	25.2
185 - 189.9	29.6
190 - 194.9	28.1
195 - 199.9	31.1
200 - 204.9	53.3
205 - 209.9	79.9
210 - 214.9	88.8
215 - 219.9	94.7
220 - 224.9	105.0
225 - 229.9	93.2
230 - 234.9	57.7
235 - 239.9	41.4
240 - 244.9	47.3
245 - 249.9	50.3
250 - 254.9	41.4
255 - 259.9	28.1
260 - 264.9	22.2
265 - 269.9	13.3
270 - 274.9	4.4
275 - 279.9	3.0
280 - 284.9	1.5
N = 169	1000.1

Table 11. Demographic structure of Spanish Bluefin catch and total number of fish caught in the Bay of Biscay

Age group	Number of fish
I	4 934
II	46 712
III	10 393
IV	5 371
V	346
VI	219
VII	94
-----	
Total	68 069

Table 12. Spanish catches of Bluefin Tuna in the Canary Islands, 1974 - 1977

Year	Catch in metric tons and round weight
1974	546
1975	978
1976	832
1977	1250

Table 13. Size composition of Bluefin Tuna caught by baitboats in the Canary Islands during the 1977 season.

Size class (kg)	% smoothed
100	8
...	
180	8
190	12
200	24
210	20
220	12
230	24
240	50
250	66
260	78
270	87
280	85
290	92
300	83
310	60
320	59
330	60
340	60
350	48
360	28
370	16
380	10
390	8
400	2
Number of fish	
= 124	1000

Table 14. Sample length frequency by week of giant Atlantic Bluefin Tuna caught by rod and reel in the Bahamas in 1977 (sample = 15 fish).

Length cm	Week				$\Sigma_1^4$	°/oo smoothed
	5/15- 5/21	5/22- 5/28	5/29- 6/4	6/5- 6/11		
215-219						16
220-224	1				1	33
225-229						83
230-234	1	2		1	4	149
235-239	1				1	116
240-244		1			1	106
245-249	2	1			3	133
250-254		1			1	116
255-259	2				2	83
260-264						66
265-269	1	1			2	66
270-274						33
$\Sigma_{215}^{274}$	8	6		1	15	1000

Table 15. Sample length-frequency by week of small Atlantic Bluefin Tuna caught by sport fishing off the U.S. Mid-Atlantic coast in 1977. Total catch 56 MT, total samples 196 fish.

Length cm	Week														T o t a l	o / o smooth			
	29.5.- 4.6.	5.6.- 11.6.	12.6.- 18.6.	19.6.- 25.6.	26.6.- 2.7.	3.7.- 9.7.	10.7.- 16.7.	17.7.- 23.7.	24.7.- 30.7.	31.7.- 6.8.	7.8.- 13.8.	14.8.- 20.8.	21.8.- 27.8.	28.8.- 3.9.			4.9.- 10.9.	11.9.- 17.9.	18.9.- 24.9.
18																			
20																			
22						2								1				0	4
24																		3	8
26																		0	4
28														2	2			2	9
30														2	3			5	10
32														1				0	5
34																		1	4
36															1			1	5
38																		1	4
40						1												0	4
42																		2	5
44																		0	3
46																		0	2
48															1			1	4
50															1			1	4
52																		0	1
54																		0	1
56						1							1					1	5
58						3		1										2	15
60						1		14										7	39
62								15										15	73
64								4										20	84
66																		8	54
68									1						1			6	32
70																		5	26
72	1																	4	19
74	6																	1	19
76	2																	9	29
78															1			4	35
80	1																	9	37
						5							1					7	37

(ctd.)



Continued table 15

Length cm	Week										Total	°/oo smoothed							
	29.5.- 4.6.	5.6.- 11.6.	12.6.- 18.6.	19.6.- 25.6.	26.6.- 2.7.	3.7.- 9.7.	10.7.- 16.7.	17.7.- 23.7.	24.7.- 30.7.	31.7.- 6.8.			7.8.- 13.8.	14.8.- 20.8.	21.8.- 27.8.	28.8.- 3.9.	4.9.- 10.9.	11.9.- 17.9.	18.9.- 24.9.
82						2												6	30
84						1												4	29
86																		8	34
88																		6	32
90																		5	25
92																		3	14
94																		0	6
96				2														2	6
98						1												1	13
100		1		2														5	14
102																		0	9
104						1												2	13
106	1			1		4												6	25
108						2												5	23
110						1												2	13
112																		1	5
114																		0	3
116																		1	8
118				1		2												4	13
120						1												1	8
122																		0	5
124				1														3	13
126				1		1												4	15
128																		1	5
130						2												2	10
132						1												2	9
134																		2	9
136																		1	8
138																		0	6
---																		0	3
150																		0	1
152																		1	3
154																		0	1

(ctd)

Continued table 15

Length cm	Week												Total	°/oo smoothed						
	29.5.- 4.6.	5.6.- 11.6.	12.6.- 18.6.	19.6.- 25.6.	26.6.- 2.7.	3.7.- 9.7.	10.7.- 16.7.	17.7.- 23.7.	24.7.- 30.7.	31.7.- 6.8.	7.8.- 13.8.	14.8.- 20.8.			21.8.- 27.8.	28.8.- 3.9.	4.9.- 10.9.	11.9.- 17.9.	18.9.- 24.9.	
156																		0	1	
158				1															1	3
160																			0	1
162																			0	0
164																			0	0
166																			1	3
168																			0	1
170																			0	0
Sx	11	1	8	4	6	42	46		5	4	4	3	6	34	14	4	3	195	1000	

Table 16. Sample length-frequency by week of giant Atlantic Bluefin Tuna caught by hand-gear off the NE coast of the US in 1977 (total catch 634 MT, total sample = 1 062 fish).

Length cm	Week												$\Sigma^{11}$ 1	9 100 smoothed
	6/19- 6/25	6/26- 7/2	7/3- 7/9	7/10- 7/16	7/17- 7/23	7/24- 7/30	7/31- 8/6	8/7- 8/13	8/14- 8/20	8/21- 8/27	8/30- 9/3	9/4- 9/10		
170-174		1											1	
175-179														
180-184														
185-189														
190-194						1							1	
195-199														
200-204				1									1	
205-209														
210-214				1					1				2	1
215-219					1								1	2
220-224				1		1			2				4	3
225-229			1	2	1	1							5	8
230-234			2	1		4	3	4	2	1			17	15
235-239		1	1	2	2	2	2	4	7	3			22	24
240-244		2		12	2	6	2	4	4	5	1	1	39	48
245-249	2	2	4	12	13	16	6	23	10	13	1		102	86
250-254	3	1	1	8	11	25	14	24	15	14	3	2	121	121
255-259		5	6	20	17	34	11	17	24	20	10	5	169	154
260-264		6	2	31	17	25	17	33	23	20	13	6	193	168
265-269		2	2	30	12	20	11	22	23	17	19	6	164	147
270-274			2	12	4	12	10	16	10	16	9	4	95	103
275-279		1	1	10	9	11	7	8	6	8	14	6	81	67
280-284			1	4	2	2	4	3	5	2	4	1	28	35
285-289				1		3		1	5	2	1		13	13
290-294							1						1	4
295-299											2		2	1
$\Sigma^{299}$ 170	5	21	23	148	91	163	88	157	136	122	77	31	1062	1000

Table 17. Sample length-frequency by week of small Atlantic Bluefin Tuna caught by U.S. purse-seine fleet in 1977 (total catch = 972MT, total sampled 1682 fish)

Length cm	12.6.- 18.6.	19.6.- 25.6.	26.6.- 2.7.	Total	°/oo smoothed
54	1			1	1
56	1	1		2	1
58	1			1	1
60				0	0
--					
66	1			1	0
68				0	0
70	1			1	4
72	9	8	4	21	16
74	35	12	21	68	51
76	100	44	39	183	87
78	83	53	25	161	80
80	17	12	9	38	35
82	4	3		7	8
84				0	1
86				0	0
--					
92		2		2	1
94		3		3	1
96	1	1		2	3
98	2	7	1	10	8
100	7	22		29	15
102	5	25	1	31	18
104	13	19	1	33	17
106	4	13		17	12
108	3	7		10	6
110		2		2	4
112	6	5		11	6
114	7	9		16	12
116	15	24		39	31
118	51	62		113	71
120	84	128	1	213	111
122	100	105		205	125
124	104	110	2	216	109
126	52	47	1	100	68
128	28	13		41	30
130	15	6		21	14
132	8	4		12	7
134	3		1	4	3
136				0	1
138	1			1	0
140				0	0
142	1	1		2	1
144		1		1	1
146		1		1	1
148		1	2	3	1
150		1		1	1
152		3	1	4	2
154	1	5		6	3
156		1		1	2
158		4	1	5	3
160		5	1	6	4
162	2	7	1	10	5
164		5	2	7	5
166	1	6	1	8	4
168	1	3		4	4
170	2	4		6	3
172				0	1
174	1	1		2	1
Sx	771	796	115	1682	1000

Table 18. Sample length-frequency by week of small Atlantic Bluefin Tuna caught and or tagged by U.S. purse-seine fleet in 1977 (total catch 86MT, total sampled= 2388 fish)

Length cm	Week				Total	°/oo smoothed
	26.6.- -2.7.	3.7.- 9.7.	10.7.- 16.7.	17.7.- 23.7.		
50		1			1	0
52					0	1
54		6		3	9	6
56		39	2	2	43	17
58		62	2	8	72	23
60		30	7	1	38	16
62		4	2		6	5
64					0	1
66					0	1
68		1	1		2	1
70		1			1	1
72	1	6		1	8	5
74	1	22		1	24	32
76	31	145	3	5	184	104
78	76	494	17	14	601	210
80	49	478	114	29	670	246
82	20	306	127	18	471	180
84		75	85	1	161	84
86	1	8	9	2	20	27
88		4		1	5	3
90					0	1
92			1		1	0
--						
102	2	2			4	2
104	1	1			2	2
106	6	2			8	2
108		2	1		3	3
110	1	5			6	3
112	1	2			3	2
114					0	1
116			2		2	1
118	1				1	1
120	4			3	7	3
122	5	3		2	10	4
124	5	3		5	13	5
126	3	3		2	8	4
128	2	2			4	2
130					0	1
Sx	210	1707	373	98	2388	1000

Table 19 Sample length-frequency by week of giant Atlantic bluefin Tuna caught by U. S. purse-seine fleet in 1977 (total catch = 168MT, total sampled = 388 fish).

Length cm	Week				$\Sigma_1^4$	c/oo smoothed
	8/28- 9/3	9/4- 9/10	9/11- 9/17	9/18- 9/24		
180-184						1
185-189		1			1	2
190-194		1			1	4
195-199		2			2	6
200-204		3			3	9
205-209		2			4	9
210-214				2	1	8
215-219		1		1	2	14
220-224		5		9	14	32
225-229		9		5	14	64
230-234		17		28	45	104
235-239		7		30	37	128
240-244		11		43	54	149
245-249		8		49	57	145
250-254		4		25	29	112
255-259	1	4		32	37	89
260-264		5		12	17	63
265-269		2		12	14	36
270-274				4	4	17
275-279				1	1	5
280-284		1			1	2
285-289						1
290-294						
295-299						
300-304						
$\Sigma_{180}^{304}$	1	83		254	338	1000

Table 20. US-Bluefin Tuna catches 1974 - 1977

Year	Purse Seine, Giant and School Tuna	Hand Gear for Giant Tuna	Sport Fishing for School Tuna	Totals (MT)
1974	852	683	322	1 857
1975	1 986	715	122	2 823
1976	1 234	604	29	1 867
1977	1 255*	634	56	1 945*

\* Includes estimated October catches of small (6MT) and medium (23MT) purse seine tuna in special scientific quotes

Table 21. Dates, catches and approximate age composition of 1976 US Bluefin Tuna Fisheries

Fishery	Dates		Catch by number of fish	Catch by round weight (MT)	Approximate age composition by number
	open	close			
Small fish, purse seine					
Regular Season	10 June	29 June	63 729	845 MT	{ 12 % age 2 88 % age 3
Tagging Season	8 July	18 July	21 007	224 MT	{ 32 % age 1 47 % age 2 21 % age 3
Small fish, sport	1 Jan.	31 Dec.	2 970	29 MT	{ 47 % age 1 34 % age 2 16 % age 3 3 % ages 4-5
Large fish, purse seine	1 Sept.	21 Sept.	519	165 MT	age 7-9+
Large fish, hand gear	18 May	16 Sept.	1 872	604 MT	age 7-9+
				----- 1 867 MT	



Table 22. Dates, catches and approximate age composition of the 1977 U.S. Bluefin Tuna Fisheries

Fishery	Dates		Catch by number of fish	Catch by round weight (MT)	Approximate age composition by number
	open	close			
Small fish, purse seine					
Regular season	15 June	20 June	31 600	972 MT	{ 25 % age 2 70 % age 4 5 % ages 1,3,5
Tagging Season	1 July	15 July	7 615	86 MT	{ 7 % age 1 91 % age 2 2 % ages 3-4
	? Oct.	? Oct.	530*	6 MT*	
Small fish, sport	1 Jan.	24 Sept. <sup>1)</sup>	4 932	56 MT	{ 15 % age 1 69 % age 2 12 % age 3 4 % ages 4-5
Large fish, purse seine	3 Sept.	18 Sept.	556	168 MT	age 7-9+
Large fish, hand gear					
Northern Area	1 Jan.	5 Sept.	1 946	634 MT	age 7-9 +
Southern Area	1 Jan.	9 Sept.			
	16 Sept.	still open			
Medium fish, purse seine (special quota)	? Oct.	? Oct.	250 *	23 MT*	age 5-8
				1 945 MT	

\* Estimated

1) Last data included for catch in this table; season closes 31 Dec.

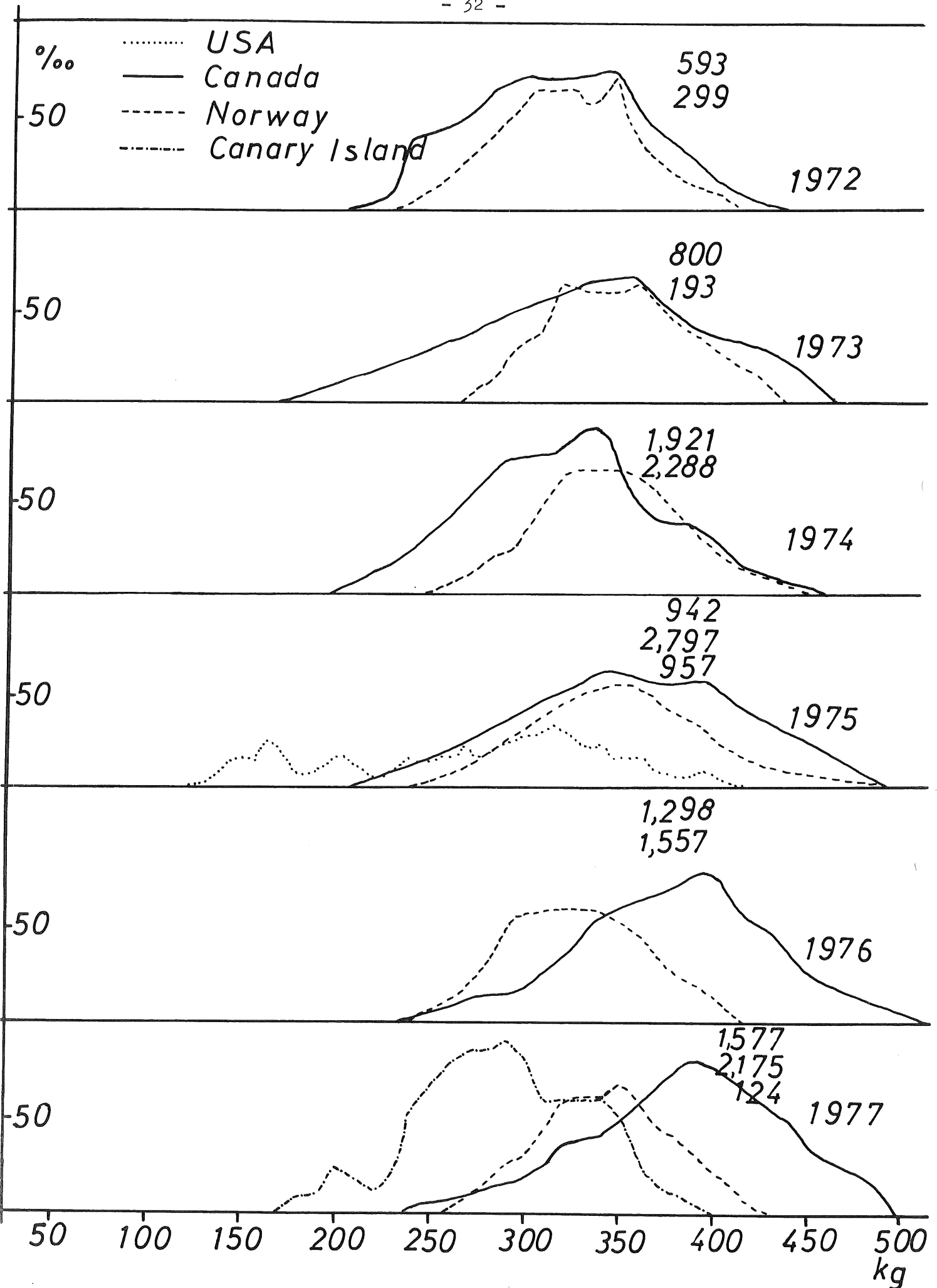


Figure 1. Weight composition of Bluefin Tuna catches made in USA, Canada, Norway and Canary Island (Spain)