

International Council for the
Exploration of the Sea



C.M.1980/H:23
Pelagic Fish Committee

REPORT OF THE BLUEFIN TUNA WORKING GROUP

Observations on the Size Composition of Bluefin Tuna Catches from 1979

by

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INTRODUCTION

Reference is made to previous reports of the Bluefin Tuna Working Group (Statistical News Letters, Nos. 20, 36 and 38, and Cooperative Research Reports, Nos. 23, 40 and 71 as well as ICES documents C.M.1977/J:3, C.M.1978/H:34 and C.M. 1979/H:3).

The members of the Working Group continued their work by correspondence and with other tuna research workers in the region. The data obtained for the fishing season 1979 are presented in the following.

MATERIAL

Data on the size and age composition of Bluefin Tuna catches and other information were received from the following countries: Canada (Tables 1-3), Denmark, France (Table 4), Italy (Table 5), Norway (Tables 6-9), Spain (Tables 10-15) and USA (Tables 16-17).

Mrs C.D. Burnett, Mr P.C.F. Hurley and Dr T.D. Iles reported that the Canadian landings of bluefin tuna from the west Atlantic in 1979 amounted to 245 tonnes round weight (Table 1), a decrease of 426 tonnes from the previous year.

- (a) The purse seine fishery for juveniles off the eastern coast of the United States came to a complete halt this year as there were no Canadian vessels engaged in the fishery.
- (b) The trap fishery in St. Margarets Bay, Nova Scotia, yielded 30.5 tonnes of giant bluefin, a decrease of 190 tonnes.
- (c) The rod and reel catch of giant bluefin increased by 5 tonnes to 214 tonnes in 1979.

Weights were obtained for 501 of the 576 large bluefin caught in Canadian waters. The size composition and seasonal mean weights of bluefin taken in five areas along the Canadian Atlantic coast are presented in Table 2.

The monthly size composition of bluefin from the Prince Edward Island rod and reel fishery are presented in Table 3. The mean weight of fish increased as the season progressed from 320.7 kg in July to 461.9 kg in October with individual weights ranging from 252.6 kg to 544.3 kg. The seasonal mean weight remained approximately the same at 405.8 kg.

The commercial programme to impound bluefin in St. Margarets Bay, N.S., was continued but only 45 fish were impounded compared to 460 the previous year. Another 27 tuna were landed immediately upon capture in the trap nets and were not impounded. It is believed that the reduced catch was due to low water temperature early in the season and a very small mackerel run into the Bay. The seasonal mean weight for this fishery was 424.3 kg compared to 418.5 kg in 1978.

There were no bluefin tagged and released in 1979.

Tag recoveries in 1979 included:

- (i) Two bluefin caught in the Gulf of St. Lawrence which had been tagged in the Bay of Chaleur in 1975 and 1977.

- (ii) A bluefin tagged in 1977 off Ecum Secum, N.S., was recaptured by rod and reel 5 miles south of Ponce, Puerto Rico.

Bluefin tuna sampling was continued in 1979. Morphometric data were collected from 125 giant bluefin and otoliths were obtained from 105 of these.

Dr O. Bagge states that in 1979 only 1 bluefin tuna (367 kg) was caught on 11 September in the Kattegat in a herring pair trawl by Danish fishermen.

The French data were supplied by Dr Farrugio (Table 4), the Italian by Dr Li Greci (Table 5).

Mr S. Myklevoll states that the bluefin tuna season of 1979 in Norway was one of the poorest since the purse seine was introduced in this fishery.

A total of 161 giant bluefins of an estimated round weight of 60 075 kg were landed, all in the districts of Hordaland, Sogn and Fjordane. Three catch localities: Utvær, Fedje and Marsteinen are marked out on the chart in Figure 1.

All but one fish were landed by 4 tuna purse seiners, from 6 catches, while 1 fish was caught by a saithe seiner. The first fish was landed on 1 August, and the last catch was made on 8 September. Table 6 gives details of the catches.

Individual weights varied between 187 and 383 kg, gutted (less head, fins and intestines), corresponding to round weights between 241 and 492 kg. Most weight data are recorded as gutted weight, but two catches give round weight. For conversion, the equation $w = 1.285w' + 0.3$ has been used. In Table 7, weight frequency distribution of round fish is presented, and in Table 8 it is given for gutted fish. Individual weights are lacking for 6 fish.

This year's mean weight of 290 kg, gutted and 373 kg, round are the highest recorded in any season so far, and there is still no trace of younger fish.

Rough weather throughout the season hampered the fishery. On occasional days with calm sea, some sizable schools of bluefin were spotted, but they moved fast and were difficult to catch. The largest concentrations were spotted on the day of the last catch (8 September) when "Astri Ann" made her record catch of 117 fish.

The fishermen's opinion is that the number of tuna migrating to our coast this season was about the same as in the last few years. The poor catch reflects the bad weather conditions more than a reduced stock of giant bluefin in this area.

No recapture of tagged fish has been recorded this year.

In Table 9, technical data are given for some vessels that participated in the bluefin tuna fishery in 1979.

Dr J. Rodriguez-Roda reports that during 1979 catches of bluefin tuna were slightly higher in the madraques at Barbate and La Linea, but smaller at Zahara de los Atunes. Also the catches of Atlantic little tuna

(Euthynnus alleteratus). Atlantic bonito (Sarda sarda) and bullet mackerel (Auxis rochei) were greater than in 1978 (Table 10).

The average length was smaller than in the previous year (202 cm in 1979, 230 cm in 1978). For the years 1963-73 and for ages 5-14 years (146-263 cm), $M = 0.18$ and $F = 0.51$ were calculated.

Dr S. Guerra submitted the data for the Canary Islands (Table 12) and reported that a total catch of 658 tonnes was obtained, which is only half of the catch of the previous year.

Dr J.L. Cort furnished Table 13 and informed the Group that between the 12th and 16th September the Spanish Institute of Oceanography (I.E.O) organised a tagging cruise onboard a bait fishing boat.

One-hundred-and-one bluefin tuna (10 year class 1 fish and 91 year class 2 fish) were tagged.

Dr J.C. Rey reported that the catches of giant bluefin tuna off the Moroccan Atlantic coast between Cape Juby (28°N) and Cape Mazagán (34°N) landed at Algeciras Port amounted to 998 tonnes (4 880 fish). They were caught by hook and line (Tables 14 and 15).

The U.S. data were given by Dr Richards and are preliminary (Tables 16 and 17).

RESULTS

1. The bluefin tuna catches of the Spanish madrague fishery continued to be successful amounting to 611 tonnes in 1979. They were similar to those in 1978 (634 tonnes), when they were then the highest since 1970.
2. The catches of the Norwegian purse seine fishery instead continued to decrease, a total of 161 giant fish of an estimated round weight of 60 tonnes only was caught. The fishermen's opinion is, however, that the number of tuna migrating to the Norwegian coast was similar to that of the last years, but that rough weather through the season has hampered the fishery.
3. The Spanish bluefin tuna fishery in the Bay of Biscay was only half as large in 1979 as in 1978. Only 50 528 fish were caught instead of 119 538.
4. Also, the Spanish catch in the waters of the Canary Islands was less than half that of the previous year (1979 - 658 tonnes, 1978 - 1 548 tonnes), while off the coast of Morocco it was double (1979 - 998 tonnes, 1978 - 450 tonnes).
5. The Canadian catches were the lowest since 1962 amounting to 245 tonnes only. The purse seine fishery for juveniles off the eastern coast of the USA came to a complete halt in 1979, as there were no Canadian vessels engaged in the fishery. The US catches amounting to some 2 300 tonnes were more or less stable over the last 3 years.
6. The Norwegian fish were longer than in all previous years and tallied in size composition to a larger degree with the Canadian catches of giant tuna than during 1976-78, when the Canadian fish was larger.

The Norwegian fish tallied even more with the US hand gear catches of giant fish, as was also the case in the previous 2 years. The giant fish caught off the Canary Islands were again smaller, but had the same size composition as the fish of the Spanish madrague catches (Figure 2).

7. In the US purse seine catches of small fish, three year classes can be identified (2, 3 and 4 year olds) (Figure 3). Small fish caught by US sport fishing off the Mid-Atlantic coast were mainly 1 and 2 year olds (Table 16). This and similar observations in the past seem to indicate that the west Atlantic bluefin tuna stock is recruiting with relatively small fluctuations in the strength of year classes, although fluctuations do exist.
8. One-four years' old fish were found to have been of nearly equal abundance in the Spanish catches in the Bay of Biscay in 1979 (Table 13) which was not the case in previous years.
9. In the French purse seine catches of bluefin tuna in the Mediterranean, 3-year old fish dominated (Table 4).
10. Bluefin tuna catches off the Atlantic coast of Morocco consisted mainly of old fish of year classes 8-15 (Table 15). They were thus of similar age composition as the Spanish madrague catches (Figure 3) and the catches made off the Canary Islands.

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Table 1. Canadian catches of bluefin tuna from the Atlantic Ocean, 1962-79.

Landings (nominal catch in tonnes, round weight)				
Year	Traps ^{*)}	Purse Seine	Rod and reel ^{***)}	Total
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	1 161	151	1 587
1971	68	935	128	1 131
1972	36	202	261	499
1973	160	639	215	1 014
1974	300	103	365	768
1975	141	295	193	629
1976	172	332	342	846
1977	372	298	302	972
1978	221	241	209	671
1979	31	-	214	245

*) From 1962-74, the catch includes a small proportion of incidental longline catches.

***) Prior to 1974, tagged and/or released fish are included in the rod and reel totals.

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 1979.

Class kg	Prince Edward Island		Newfoundland		New Brunswick		Quebec		Nova Scotia				Total	
	Rod & reel		Rod & reel		Rod & reel		Rod & reel		Rod & reel		Trap		n	% smoothed
	n	%	n	%	n	%	n	%	n	%	n	%		
250	2	6											2	1
260	-													4
270	3	10											3	5
280	3	10					1	50					4	9
290	5	16					-	-			1	14	6	12
300	5	16			1	18	-	-			-	-	6	14
310	7	22			1	18	-	-			3	42	11	23
320	11	35			2	36	2	100			3	42	18	30
330	7	22			5	91	-	-			-	-	12	34
340	17	54			3	55	-	-	1	28	4	55	25	42
350	13	41			1	18	1	50	-	-	4	55	19	44
360	21	66			3	55	-	-	-	-	1	14	25	49
370	21	66			3	55	1	50	-	28	3	42	29	56
380	16	51			4	72	2	100	-	-	6	83	28	59
390	20	63			8	145	3	150	-	-	2	28	33	59
400	18	57			3	55	1	50	-	-	2	28	24	54
410	17	54			5	91	-	-	-	-	5	69	27	54
420	21	66	1	1 000	3	55	2	100	-	-	3	42	30	60
430	20	63			3	55	2	100	2	55	4	55	31	56
440	15	47			4	72	1	50	1	28	-	-	21	49
450	9	28			3	55	2	100	5	139	7	97	26	43
460	5	16			1	18	1	50	2	55	3	42	12	28
470	15	47			1	18	1	50	1	28	4	55	22	39
480	13	41			-	-	-	-	2	55	7	97	22	43
490	12	38			-	-	-	-	3	83	3	42	18	37
500	9	28			-	-	-	-	4	111	2	28	15	28
510	1	3			-	-	-	-	5	139	2	28	8	21
520	7	22			-	-	-	-	3	83	-	-	10	17
530	2	6			-	-	-	-	2	55	1	14	5	12
540	2	6			-	-	-	-	1	14	1	14	3	7
550					1	18			1	28	-	-	2	4
560									-	-	-	-	-	1
570									1	28	-	-	1	1
580									-	-	-	-	-	1
590									-	-	-	-	-	1
600									1	28	1	14	2	1
610									1	28			1	1
Total	317	1 000	1	1 000	55	1 000	20	1 000	36	999	72	1 000	501	1 000
Mean weight (kg)	405.8		420.0		395.7		403.5		493.1		424.3			

Size class 250 kg = 250.0 - 259.9

Table 3. Size composition of large bluefin tuna caught by rod and reel off Prince Edward Island during four consecutive months of the 1979 season (number of fish and round weights per mille by 10 kg unit).

Size class kg	July		August		September		October	
	n	%	n	%	n	%	n	%
250			2	13				
260			-	-				
270			3	20				
280			3	20				
290			3	20	1	9		
300	1	333	2	13	2	18		
310	-	-	7	46	-	-		
320	1	333	8	53	2	18		
330	1	333	6	39	-	-		
340			12	79	4	35	1	21
350			9	59	4	35	-	-
360			16	105	4	35	1	21
370			17	112	3	26	1	21
380			14	92	1	9	1	21
390			14	92	5	44	1	21
400			9	59	6	53	3	64
410			6	39	8	70	3	64
420			8	53	11	96	2	43
430			7	46	10	88	3	64
440			2	13	12	105	1	21
450			-	-	5	44	4	85
460			-	-	3	26	2	43
470			2	13	10	88	3	64
480			2	13	7	61	4	85
490					7	61	5	106
500					3	26	6	128
510					-	-	1	21
520					6	53	1	21
530							2	43
540							2	43
Total	3	999	152	999	114	1 000	47	1 000
Mean weight (kg)	320.7		370.5		432.9		461.9	

Size class 250 kg = 250.0 - 259.9

Table 4. Bluefin tuna (*Thunnus thynnus*) catches in 1979 from French purse seiners in the Mediterranean by age groups (sample = 1 002 556.9 kg). Total catch for bluefin tuna in the French Mediterranean in 1979 = 1 578 000 kg (1 527 000 by purse seiners and 51 000 by gillnets).

Age group	April		May		June		August		September		October		November		December		Total	
	n	kg	n	kg	n	kg	n	kg	n	kg	n	kg	n	kg	n	kg	n	kg
0													46	44	28	117	74	161
1							27	179			2080	18415	314	2505			2421	21099.4
2					316	3504					2228	33908	6823	104470.5	5035	88550	13402	230432.5
3	1613	47656	568	17953			15	358	915	27538	3068	82665	8689	205307	8182	191267	23050	572744
4			276	12400							673	25993	56	2062	2444	85526	3449	125981
5	66	3548	17	971							15	734					98	5253
6	2	136															2	136
7			3	253					20	2069							23	2322
8			91	10540			53	6736	16	1953	2	255					162	19484
9			1	150			26	3616	43	6110							70	9876
10 and above			1	161			44	7203			25	6137	5	1567			75	15068
Total	1681	51340	957	42428	316	3504	165	18092	994	37670	8091	168107	14933	315955	15689	365460	42826	1002556.9

Table 5. Bluefin tuna (Thunnus thynnus) catches from Sicilian tuna traps and by Italian purse seiners along the Sicilian coast or in the south Tyrranean and Ionian Seas in tonnes.

Years	<u>Bluefin tunas fished by:</u>			
	Sicilian tuna-traps	Purse seiners	Other fishing gear	<u>Total</u>
1972	821,4	1 020	-	1 832,4
1973	317,2	1 225	-	1 542,2
1974	706,2	6 000	-	6 706,2
1975	713,8	6 270	-	6 983,8
1976	643,8	9 010	12	9 655,8
1977	505,8	5 084	34	5 623,8
1978	210,0	4 450	110	4 770,0
1979	194,6	6 000 ¹⁾	1)	6 194,6 ¹⁾

1) Most of production; further data are expected				

Table 6. Norwegian bluefin tuna (Thunnus thynnus L.) catches in 1979.

Date	Vessel	N	Catch w'	w	Position
1.8.	SF-30-A PLAREX	1	278		N of Utvær
24.8.	SF-44-A ASTRI ANN	12	3 383		N of Utvær
24.8.	R-20-TV TOFTØYSUND	4		1 436	W of Fedje
24.8.	SF-30-A PLAREX	9	2 506		N of Utvær
25.8.	H-115-B NYSTRAND	17		5 900	Marsteinen
8.9.	SF-44-A ASTRI ANN	117	34 573		N of Utvær
?	VESTØY	1	298		(Sogn & Fj.)
1979	Total	161	41 038	7 336	

NYSTRAND's catch (25.8.) is also given as 11 fish, round = 3 840 kg + 6 fish, gutted = 1 584 kg.

Table 7. Weight frequency distribution of Norwegian bluefin tuna catches 1979, round weight.

Week No	31	34	34	34	34	36	?		
Date	1.8	24.8	24.8	24.8	25.8	8.9	?		
w in kg	Number of fish							Total	%
240 - 244	.	.	.	1	.	.	.	1	0.65
275 - 279	1	.	1	0.65
280 - 284	1	.	1	0.65
285 - 289	1	3	.	4	2.58
290 - 294	.	.	1	.	.	1	.	2	1.29
295 - 299	.	1	1	0.65
300 - 304
305 - 309
310 - 314	1	5	.	6	3.87
315 - 319	4	.	4	2.58
320 - 324	.	1	.	1	2	2	.	6	3.87
325 - 329	.	1	.	.	.	4	.	5	3.23
330 - 334	.	1	.	1	1	3	.	6	3.87
335 - 339	1	.	1	0.65
340 - 344	3	.	3	1.94
345 - 349	.	1	.	.	.	1	.	2	1.29
350 - 354	6	.	6	3.87
355 - 359	1	1	.	.	2	5	.	9	5.81
360 - 364	.	1	.	1	.	4	.	6	3.87
365 - 369	.	.	2	.	.	3	.	5	3.23
370 - 374	.	2	.	1	.	5	.	8	5.16
375 - 379	1	4	.	5	3.23
380 - 384	4	1	5	3.23
385 - 389	.	.	.	2	.	14	.	16	10.32
390 - 394	2	.	.	2	1.29
395 - 399	.	1	.	1	.	3	.	5	3.23
400 - 404	1	.	1	0.65
405 - 409	4	.	4	2.58
410 - 414	.	.	1	.	1	9	.	11	7.10
415 - 419	1	.	1	0.65
420 - 424	.	1	.	1	.	2	.	4	2.58
425 - 429	6	.	6	3.87
430 - 434	3	.	3	1.94
435 - 439	2	.	2	1.29
440 - 444	1	.	1	0.65
445 - 449	2	.	2	1.29
450 - 454	.	1	.	.	.	2	.	3	1.94
455 - 459	2	.	2	1.29
460 - 464	1	.	1	0.65
465 - 469	1	.	1	0.65
470 - 474	2	.	2	1.29
490 - 494	1	.	1	0.65
n	1	12	4	9	11	117	1	155	100
N	1	12	4	9	17	117	1	161	
w	358	4351	1436	3225	5900	44422	383	60075	
w	358	363	359	358	347	380	383	373	

Table 8. Weight frequency distribution of Norwegian bluefin tuna catches 1979, gutted weight.

Week No	31	34	34	34	34	36	?		
Date	1.8	24.8	24.8	24.8	25.8	8.9	?		
w' in kg	Number of fish							Total	%
185 - 189	.	.	.	1	.	.	.	1	0.65
215 - 219	1	.	1	0.65
220 - 224	1	1	.	1	1.29
225 - 229	.	1	1	.	.	4	.	6	3.87
230 - 234
235 - 239
240 - 244	1	5	.	6	3.87
245 - 249	2	4	.	6	3.87
250 - 254	.	1	.	1	.	3	.	5	3.23
255 - 259	.	2	.	1	1	3	.	7	4.52
260 - 264	4	.	4	2.58
265 - 269	.	1	.	.	.	3	.	4	2.58
270 - 274	7	.	7	4.52
275 - 279	1	1	.	.	2	6	.	10	6.45
280 - 284	.	1	2	1	.	4	.	8	5.16
285 - 289	.	2	.	1	.	4	.	7	4.52
290 - 294	1	8	.	9	5.81
295 - 299	.	.	.	1	.	6	1	8	5.16
300 - 304	.	.	.	1	2	12	.	15	9.68
305 - 309	.	1	.	.	.	1	.	2	1.29
310 - 314	.	.	.	1	.	3	.	4	2.58
315 - 319	1	4	.	5	3.23
320 - 324	.	.	1	.	.	10	.	11	7.10
325 - 329	.	1	.	1	.	1	.	3	1.94
330 - 334	7	.	7	4.52
335 - 339	3	.	3	1.94
340 - 344	3	.	3	1.94
345 - 349	2	.	2	1.29
350 - 354	.	1	.	.	.	2	.	3	1.94
355 - 359	2	.	2	1.29
360 - 364	1	.	1	0.65
365 - 369	3	.	3	1.94
370 - 374
375 - 379
380 - 384	1	.	1	0.65
n	1	12	4	9	11	117	1	155	100
N	1	12	4	9	17	117	1	161	
$\frac{w'}{w'}$	278	3383	1117	2506	4571	34573	298	46726	
$\frac{w'}{w'}$	278	282	279	278	269	295	298	290	

Table 9. Technical data for some vessels participating in the Norwegian bluefin tuna fishery in 1979.

Vessel :	PLAREX	NYSTRAND	ASTRI ANN	TOFTØYSUND
Length :	15.7 m	20.3 m	21.5 m	28.1 m
Width :	5.1 m	5.6 m	5.6 m	7.0 m
Depth :	3.0 m	2.3 m	2.6 m	3.4 m
Gross t.:	36.0 t	50.0 t	49.0 t	150.0 t
Net t. :	10.0 t	14.0 t	13.0 t	56.0 t
Material:	Wood	Wood	Wood	Steel
Built :	1962	1957	1950	1977
Motor :	GM Caterpillar		Callesen	Alpha
HP :	242	245	345	660
Built :	1971	1965	1962	1976

Source: Register over merkepliktige norske fiskefarkoster 1978.
Fiskeridirektøren-A/S Lunde & Co.s Forlag, 1978.

Table 10. Bluefin tuna catches and others from three madragues in southern Spain in number of specimen (N) and weight (Kg) in 1979.

Location	Barbate (Atlantic Ocean)	Zahara de los Atunes (Atlantic Ocean)	La Línea (Mediterranean Sea)	Total
Madragues' name	"Ensenada de Barbate"	"Cabo Plata"	"La Atunara"	
<u>Thunnus thynnus</u>	N = 2 030 Kg = 412 803	N = 850 Kg = 174 250	N = 118 Kg = 23 600	N = 2 998 Kg = 610 653
<u>Euthynnus alle- teratus</u>	N = 33 373 Kg = 116 805	N = 4 240 Kg = 14 840	N = 0 Kg = 0	N = 37 613 Kg = 131 645
<u>Sarda sarda</u>	N = 52 324 Kg = 62 789	N = 39 160 Kg = 99 133	N = 1 000 Kg = 2 350	N = 92 484 Kg = 164 272
<u>Auxis rochei</u>	N = 7 896 Kg = 8 330	N = 45 690 Kg = 48 203	N = 332 000 Kg = 350 260	N = 385 586 Kg = 406 793

Table 11. Size composition of Spanish madrague catches of bluefin tuna (Thunnus thynnus (L.)) at Barbate in 1979.

Length group cm	No. of fish	% smoothed
125-129.9		0.9
130-134.9	1	3.6
135-139.9	2	7.2
140-144.9	3	9.0
145-149.9	2	8.1
150-154.9	2	13.5
155-159.9	9	20.7
160-164.9	3	21.6
165-169.9	9	24.4
170-174.9	6	24.4
175-179.9	6	25.3
180-184.9	10	42.4
185-189.9	21	57.7
190-194.9	12	59.5
195-199.9	21	70.4
200-204.9	24	82.1
205-209.9	22	76.7
210-214.9	17	68.6
215-219.9	20	60.5
220-224.9	10	51.4
225-229.9	17	46.0
230-234.9	7	42.4
235-239.9	16	40.6
240-244.9	6	33.4
245-249.9	9	29.8
250-254.9	9	29.8
255-259.9	6	22.6
260-264.9	4	14.4
265-269.9	2	8.1
270-274.9	1	3.6
275-279.9		0.9
Total	277	999.6

Table 12. Size composition (number of fish and round weight) of bluefin tuna caught by baitboats in the Canary Islands during the 1979 season.

Size class (kg)	No. of fish	% smoothed
30.0 - 39.9	1	2
.....		
60.0 - 69.9	1	2
.....		
100.0 - 109.9	1	2
110		2
120	1	4
130	4	8
140	2	5
150	3	8
160	4	12
170	6	17
180	8	25
190	13	32
200	11	38
210	18	48
220	21	58
230	21	67
240	31	80
250	30	87
260	32	89
270	31	87
280	27	79
290	27	74
300	24	64
310	15	43
320	7	22
330	2	11
340	3	10
350	5	11
360	2	7
370		1
380		1
390	1	2
400	1	2
Total	353	1 000

Table 13. Total bluefin tuna catch (*Thunnus thynnus*) of the Spanish fleet in the Bay of Biscay, 1979 (= 1.085 tonnes) by age groups.

Age group	Number of fish	%
1	13 179	26.1
2	9 941	19.7
3	12 258	24.2
4	11 563	22.9
5	2 630	5.2
6	832	1.6
7	112	0.2
8	13	0.1
n =	50 528	100.0

Table 14. Bluefin tuna (*Thunnus thynnus*) landings in Algeciras (south Spain) from catches made at the Moroccan Atlantic Coast in 1979 in tonnes.

Month	Total weight	%
January	9	0.9
August	6	0.6
September	120	12.0
October	216	21.6
November	242	24.3
December	405	40.5
Total	998	100.0

Table 15. Age distribution of bluefin tuna (*Thunnus thynnus*) landed at Algeciras Port (south Spain) during the period January - December 1979^{*)}.

Year class	Number of fish						Total	%
	Jan	Aug	Sep	Oct	Nov	Dec		
6			27		8	14	49	1.01
7		7	18	25	21	86	157	3.24
8		1	14	81	101	223	420	8.65
9		1	30	118	224	244	635	13.08
10		5	48	211	279	244	787	16.22
11	5	1	37	120	149	230	542	11.17
12	11		28	62	102	198	401	8.26
13	9	3	67	122	119	267	587	12.10
14	3	4	110	151	118	246	632	13.02
15	2	1	90	95	79	132	399	8.22
16	2	6	42	38	31	42	161	3.32
17	1		12	16	10	18	57	1.17
18			1	2	2	13	18	0.37
19			1		2	1	4	0.08
20				1		2	3	0.06
21								
22					1		1	0.02
Total	33	29	525	1 042	1 264	1 960	4 853	99.99

*) The conversion table used in this study for age determination was that of Mather and Shuck (1960).

Table 16. Total catch size frequencies of all U.S. 1979 bluefin tuna fisheries (2 300 tonnes) calculated from samples (preliminary 10 January 1980) - length frequency.

Fishery	Small fish purse seine		Medium fish purse seine		Giant fish ¹⁾ purse seine		Small fish sport	
	Length (cm) ⁵⁾	n	% smoothed	n	% smoothed	n	% smoothed	n
35-39							2	1
40-44							0	0
45-49							0	0
50-54			1				13	19
55-59	2	2					157	96
60-64	1	1					548	154
65-69	0	3					148	98
70-74	8	27					40	48
75-79	76	64	0	1			209	118
80-84	56	57	1	2			618	188
85-89	5	24	0	3			263	128
90-94	17	45	2	8			33	38
95-99	114	114	5	20			40	20
100-104	135	127	15	35			70	23
105-109	36	69	4	23			34	16
110-114	20	32	1	8			9	5
115-119	32	54	2	14			0	1
120-124	93	107	12	63			0	1
125-129	136	138	47	122			6	2
130-134	75	90	28	129			3	1
135-139	17	32	40	109			1	1
140-144	0	5	13	65			0	0
145-149	0	1	5	31			1	0
150-154	3	2	10	42			1	0
155-159	2	3	22	76			1	1
160-164	2	1	30	87			3	1
165-169	0	1	15	67			6	3
170-174	0	0	17	50			8	7
175-179			7	29			23	8
180-184			1	8			17	7
185-189			0	1			5	3
190-194			0	0			1	1
195-199							1	1
200-204					0	4	1	1
205-209					3	11	1	1
210-214					2	10	1	1
215-219					0	4	1	1
220-224					1	3	0	1
225-229					0	6	1	1
230-234					3	16	0	1
235-239					6	48	1	1
240-244					22	106	0	1
245-249					31	156	0	0
250-254					35	180	1	1
255-259					37	166	0	0
260-264					18	120	0	0
265-269					19	81	0	0
270-274					6	48	0	0
275-279					6	25	1	0
280-284					1	10	0	0
285-289					0	3		
290-294					1	2		
295-299					0	1		
Sx =	830	1 000	277	1 000	191	1 000	2 269	1 000
Month caught:	June open season		July ²⁾ special		Aug-Sep		Jun-Nov	
Catch in round weight (tonnes)	1 021		20		301		86 ³⁾	
Total catch (no. of fish) ⁶⁾	40 000 ⁴⁾		556		1 081		7 825 ³⁾	

- 1) Additional purse seine landings not sampled include approximately 150 medium fish (17 tonnes) incidental and 200 giant fish (66 tonnes) taken as bonus for tagging.
- 2) Taken during tagging of medium bluefin tuna.
- 3) Estimated from Atlantic bluefin tuna sport fish survey.
- 4) Estimated from average weight of sampled fish.
- 5) Straight fork length (cm) measurement.
- 6) Totals: may differ from total catch in number due to rounding errors.

Table 17. Total catch size frequencies for all U.S. 1979 bluefin tuna fisheries - weight frequencies. Giant fish, handgear¹⁾.

Weight ²⁾ kg	n	% smoothed	Weight kg	n	% smoothed
135-139	3	1	330-334	43	25
140-144	3	1	335-339	43	23
145-149	0	1	340-344	78	32
150-154	2	1	345-349	40	29
155-159	4	2	350-354	51	25
160-164	5	2	355-359	42	30
165-169	2	2	360-364	82	31
170-174	4	2	365-369	21	23
175-179	5	2	370-374	48	20
180-184	3	2	375-379	34	22
185-189	6	3	380-384	44	25
190-194	7	4	385-389	62	30
195-199	8	5	390-394	51	27
200-204	11	5	395-399	39	21
205-209	4	6	400-404	23	16
210-214	20	6	405-409	39	18
215-219	2	6	410-414	29	15
220-224	23	9	415-419	11	12
225-229	19	10	420-424	35	12
230-234	18	11	425-429	7	12
235-239	22	12	430-434	39	12
240-244	27	15	435-439	0	9
245-249	38	17	440-444	24	7
250-254	21	14	445-449	6	6
255-259	28	18	450-454	12	5
260-264	55	20	455-459	8	5
265-269	11	19	460-464	10	4
270-274	63	23	465-469	2	2
275-279	32	21	470-474	2	2
280-284	31	18	475-479	7	3
285-289	39	24	480-484	6	3
290-294	69	27	485-489	2	2
295-299	27	23	490-494	4	1
300-304	48	23	495-499	0	1
305-309	46	25	500-504	1	0
310-314	44	23	505-509	2	0
315-319	34	23	510-514	0	0
320-324	61	29	515-519	2	0
325-329	58	30	520-524	0	0
Sx =				1 852	1 000

1) Estimated from incomplete preliminary data.

2) Round weight measurements grouped in 5 kg intervals.

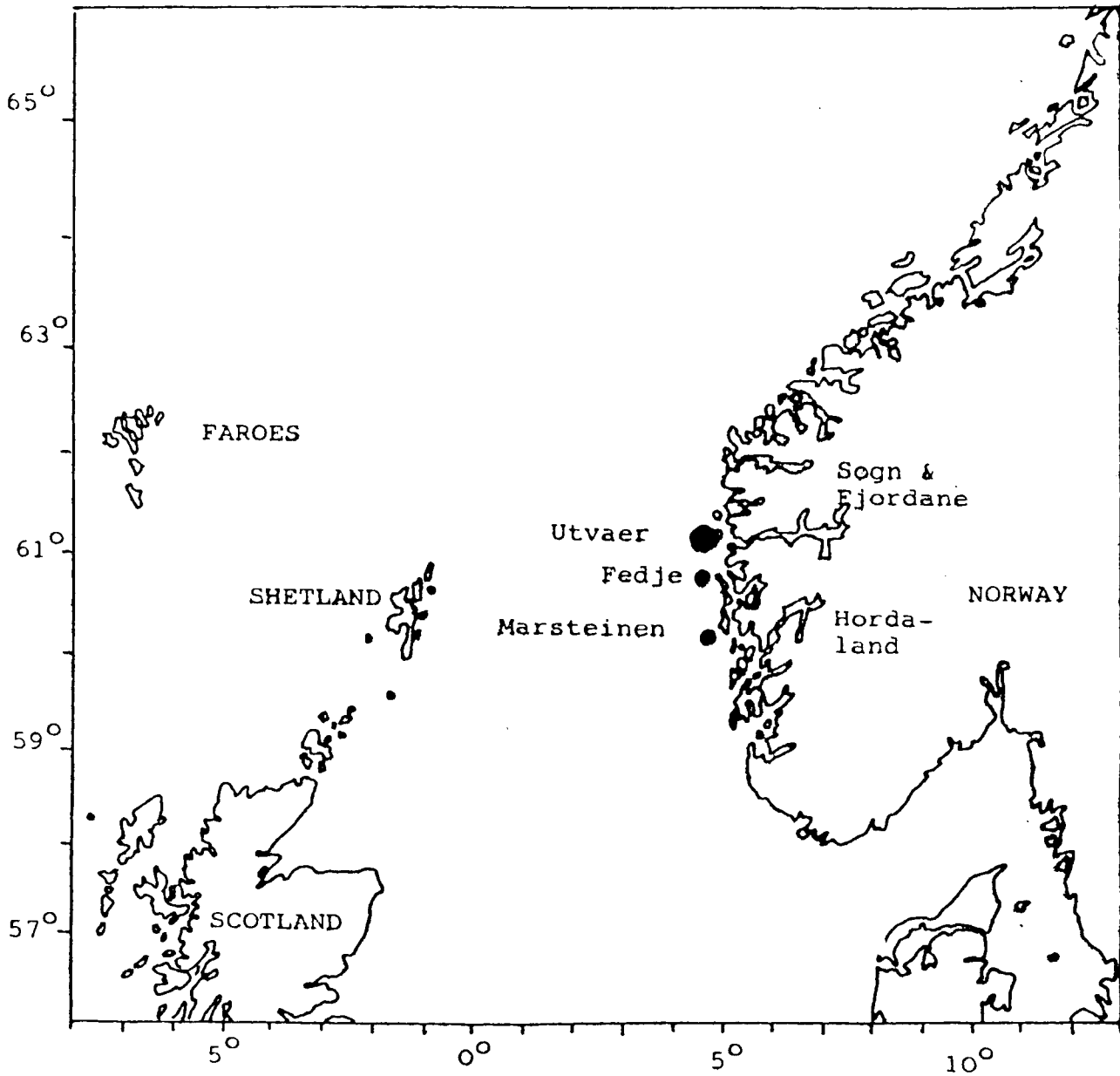


Figure 1. Localities of bluefin tuna catches on the west coast of Norway, August-September 1979.

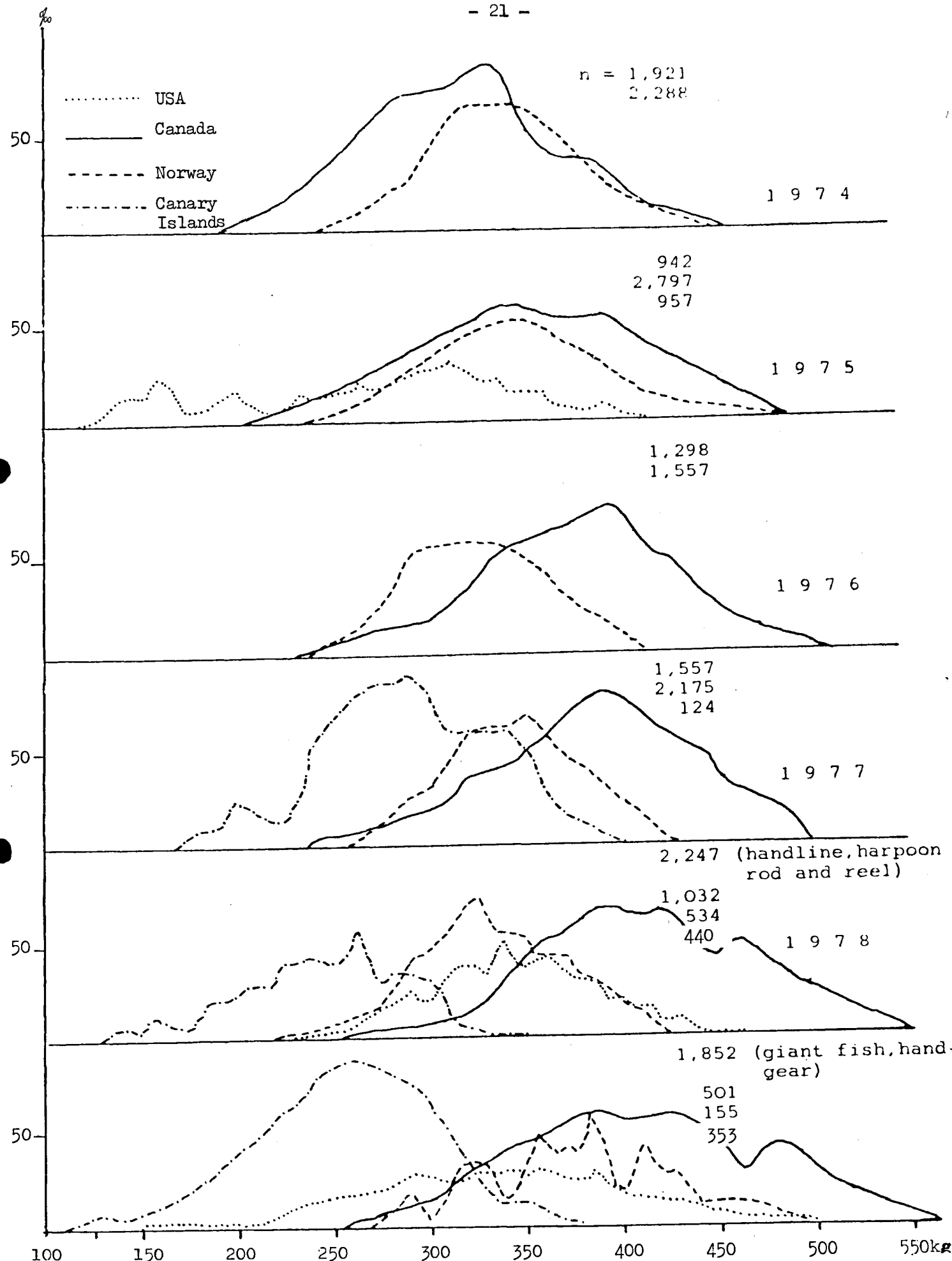


Figure 2. Weight composition of bluefin tuna catches made in USA, Canada, Norway and Canary Islands (Spain).

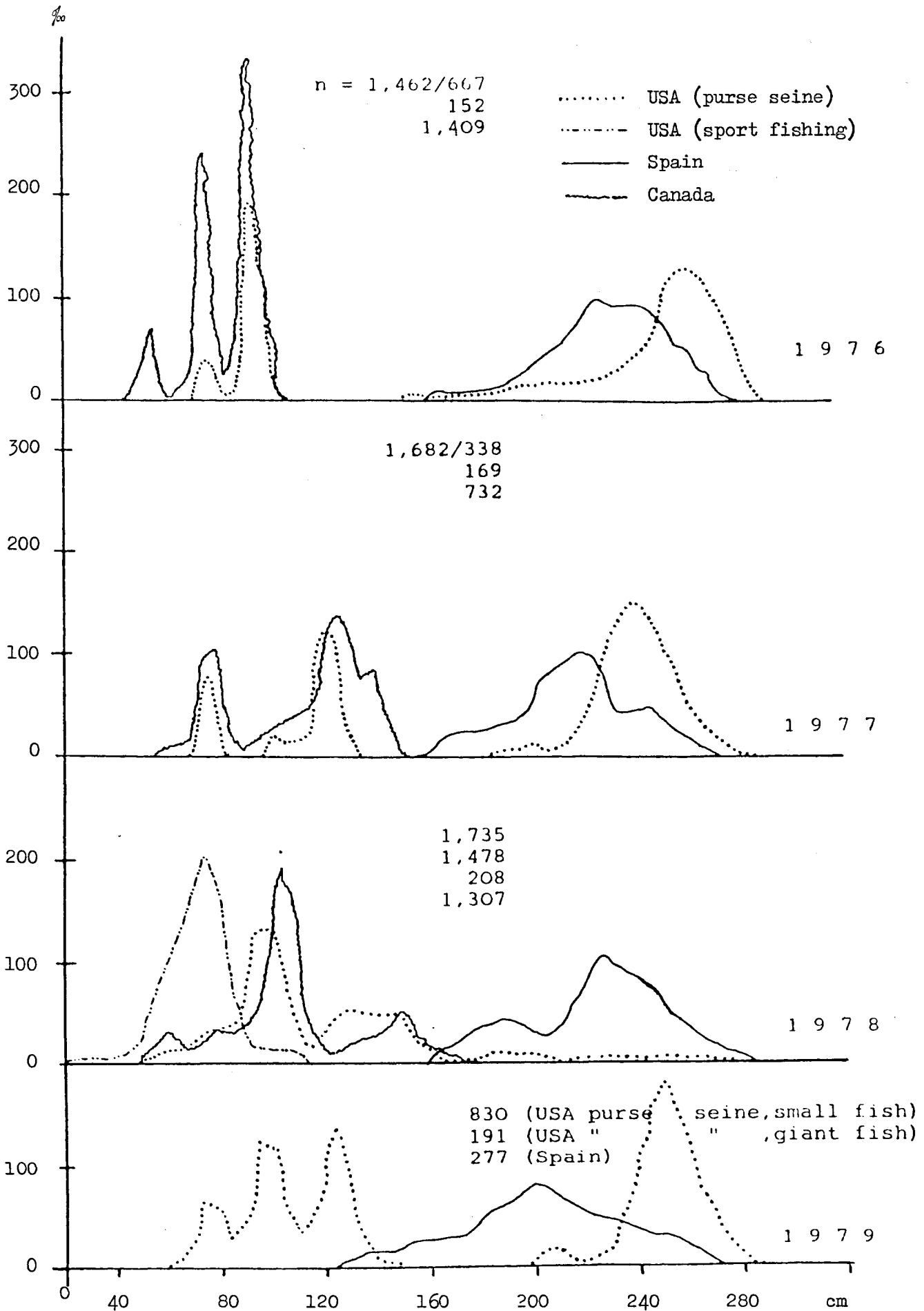


Figure 3. Size composition of bluefin tuna catches made in USA, Spain and Canada.