International Council for the Exploration of the Sea

C.M.1975/J:5

Pelagic Fish (Southern) Committee

REPORT OF THE BLUEFIN TUNA WORKING GROUP

Observations on the Size Composition of the Bluefin Tuna Catches from 1974

by

H Aloncle, J Hamre, J Rodriguez-Roda and K Tiews

1. Introduction

Reference is made to previous Reports of the Bluefin Tuna Working Group (Statistical News Letters, Nos. 20, 26 and 38, to Cooperative Research Reports, Ser. A, No. 23 and to No.40, as well as to Doc. C.M.1974/J:7).

The Members continued their work by correspondence and with other tuna research workers in the region. In the following,the data obtained for the fishing season 1974 are presented.

2. Material

Data on the size and age composition of Bluefin Tuna catches were received from the following countries: Canada (Tables 1- 4), France (Table 5), Norway (Tables 6-9) and USA (Tables 10-18).

Mrs C D Burnett, Dr J F Caddy reported that Canadian landings of Bluefin Tuna by all methods in the West Atlantic amounted to 768 metric tons in 1974, a substantial decrease when compared with the previous year (1 C05 metric tons). The catches by different gears varied considerably and the decline in total landings was due to major reductions in effort and catch in the purse-seine fishery off the eastern coast of the United States. This fishery only took 103 metric tons, in contrast to 635 metric tons the year before, and was well below a domestically imposed quota for 1974.

In contrast to the distant water purse-seine fishery for juveniles, the landings oflarge Bluefin from the immediate coastal waters off Canada increased substantially. The incidental catches by mackerel traps around St. Margaret's Bay, Nova Scotia,increased by nearly 120 tons to 256 metric tons, while the sports (rod and reel) fishery attained a new record of 365 metric tons, up to 70% from the previous year.

---

x) General Secretary,
ICES,
Charlottenlund Slot,
DK-2920 Charlottenlund,
Denmark.

Incidental captures by gillnets and mackerel seines accounted for the remainder (44 metric tons) of the total landings, while some additional catches, estimated at 18 metric tons, were tagged and released.

Weights were obtained for 1 921 of the approximately 2 056 large Bluefin caught in Canadian waters during 1974 and these are presented in Tables 2 and 3. Size distributions are shown in Table 2 by area and method of capture, and that for the Prince Edward Island sports fishery is further subdivided by month of landing in Table 3.

The landing of juvenile Bluefin were sampled extensively for fork length, and the data (Table 4) show that the 1974 fishery was primarily based on age groups I, II and III.

Tagging was severely restricted in 1974, with 48 large Bluefin and no juveniles marked and released. Recoveries during the year were also limited (7) but included the recapture of a large tuna, off Prince Edward Island, that had been released five years earlier off Nova Scotia.

A preliminary attempt was made in 1974 to use acoustic telemetering devices to determine the survival of large Bluefin when released after capture on rod and reel. Three fish were tagged, and despite their apparently exhausted condition, they moved off at speed on release, soon outdistancing the tracking boat, although one fish was followed for about three hours.

Dr O Bagge reported that only 1 Bluefin Tuna (= 378 kg) has been caught in September 1974 between Anholt and Læsø off the Swedish coast by Danish fishermen.

The French data were submitted by Dr H Aloncle (Table 5).

According to Mr S Myklevoll, the total Norwegian catch of Bluefin Tuna (Thunnus thynnus) in 1974 was 2 286 fish. Weight frequency distribution (per mille) by week and total is given in Table 6. The catch consists of very large Bluefin Tuna only, with individual weights ranging from 165 to 370 kilos gutted weight and a mean weight of 264 kgs, corresponding to 340 kgs live weight. Catch distribution by weeks throughout the season is given in Table 7.

Fish were more abundant this year than for quite some time. Unfortunately, difficulties with sales and lack of cold storage capacity led to several fishing stops (2-3 days each time) throughout the season. Therefore the catch of 1974 is not representative of the availability of Bluefin this year and cannot be compared with the foregoing years in this respect. The catch would no doubt have been somewhat bigger with no restrictions. The variation in weekly catches is also partly due to weather conditions.

The bulk of the catch was, like in the previous year, taken in a limited area close to the coast west of Bergen, with only a handful of fish taken at a little distance to the north and south. No fish is reported from northern Norway or the Skagerak.

Some weight/length relation data: 71 fish out of a catch of 116 were collected in the last week of the season. A condition factor (K) of 2.15 was calculated. The mean weight ($\bar{w}'$) of the sample (274 kgs) lies close to that week's mean (275 kgs). The mean length ($\bar{l}'$) of the sample is 180 cm. If we consider this length as representative for the total catch, we can estimate the increasing K by weeks through the season over the weekly mean weights (Table 8). Weekly mean

weights indicate an individual body weight gain of about 35 kgs, which seems reasonable (Figure 1).

The length frequency distribution has been calculated from the weight data, and the length frequency distribution of the 71 fish measured in the last week of the season is plotted (Table 9/Figure 2).

Vertebrae from 9 fish have been collected. Age reading is difficult in old fish, and therfore no exact age can be given at this moment (if ever). Ages from about 12 to 20 years were found, but the samples will be studied more closely later.

One American-tagged Bluefin Tuna has been recaptured this season. The release and recovery data are: Cat Bay, Bahamas, 8 June 1973; 59°52'N 5°00'E (WSW of Bergen), 12 September 1974.

Dr Rodriguez-Roda reported that in 1974 only one single madrague at La Linea ("La Atunara") was in operation, having had a total Bluefin Tuna catch of 37 fish with a mean weight of 230 kgs and a total weight of 8 510 kgs. Apart from these, 268 000 specimens of Auxis thazard (= 300 000 kgs) were caught.

The length frequency and tag return data for the US Bluefin Tuna fishery in the Northwest Atlantic were submitted by Dr Grant L Beardsley from the Atlantic Bluefin Tuna Program of the Southeast Fisheries Center - Miami Laboratory.

The total of US Bluefin Tuna catch was 1 338 metric tons in 1974. He reported that there may be a significant amount of giant Bluefin being harvested by foreign trawlers in the northwest Atlantic which catch them on handline after they are chummed to the stern of the vessel during the haulback of the trawl.

Mr Frank Mather III reported that in 1974 only two traps were set in the Ibero-Moroccan Bay, i.e. at Cape Spartel and Garifa, both in Morocco, and that they did not catch a single Bluefin.

Likewise, the catches of the Mediterranean traps were disastrous, with the exception of Favignana, which maintains a respectable average. On the other hand, Japanese longliners have caught a considerable tonnage of large Bluefin in the Mediterranean and its approaches. The time-area distribution of the Japanese catches fits very well with the theory of a migration into the Mediterranean for spawning, and then the Atlantic after spawning. The Japanese longliners also fish in the Bay of Biscay for Bluefin last summer, reportedly forcing the local fleet to greatly decrease its effort in the latter part of the season.

3. Results

1. In 1974, the Spanish madrague fishery on Bluefin Tuna came practically to an end. Only one single madrague was in operation having brought a total Bluefin Tuna catch of 37 fish (= 8.5 tons) only.

2. Contrary to this, the Norwegian Bluefin Tuna catch recovered and was the largest since 1968. 2 286 fish were caught, although due to difficulties with sales and lack of cold storage capacity, the fishery had to be interrupted for several times.

3. The Bluefin Tuna catches of the Canadian commercial fishery declined mainly because of major reductions in effort in the purse-seine fishery off the eastern coast of the USA. In contrast to the distant-water purse-seine fishery for juveniles, the landings of large Bluefin fromtthe immediate coastal waters off Canada increased substantially. The total Canadian catch figure declined to 768 tons (1973 = 1 005 tons).

4. The Norwegian Bluefin Tuna catches were of the same size composition as in the previous 8 years. While in 1973 the size composition of the giant Bluefin Tuna catches on the USA coast was essentially similar to that of the Norwegian catches, it differed slightly in 1974. The mode of the length distribution curve of the US giant Tuna is at a length which is about 10 cm larger than that of the Norwegian fish (Figure 3). In order to demonstrate this, the length composition of the fish above 200 cm were separately compiled from the data given in Table 10 (Table 11). Contrary to this, the fish of the Canadian catches of large Tuna were slightly smaller than those of the Norwegian catches (Figure 4).

5. The US and Canadian purse-seine catches of juvenile Tuna were again mainly composed of three successive year classes, among which one year old fish were most abundant, the one year old fish being strongest in the catches.

I
4. References

ALONCLE, H., HAMRE, J., RODRIGUEZ-RODA, J. and K. TIEWS, 1974. Fifth Report of the Bluefin Tuna Working Group. Observations on the size composition of Bluefin Tuna catches from 1970 to 1972. Cons.int.Explor.Mer, Coop.Res.Rep., No.40:1-52.

ALONCLE, H., HAMRE, J., RODRIGUEZ-RODA, J. and TIEWS, K. 1974. Report of the Bluefin Tuna Working Group. Observations on the size composition of the Bluefin Tuna catches from 1973. Cons. ICES, C.M.1974/J:7:1-18 (mimeo).

HAMRE, J., LOZANO, F., RODRIGUEZ-RODA, J, and TIEWS, K. 1966. Second Report from the Bluefin Tuna Working Group. On the development of the Bluefin Tuna fisheries from 1950 to 1964 and further observations on size composition of Bluefin Tuna catches. Stat.News Letters, No.26, 1-34, Cons.int.Explor.Mer.

HAMRE, J., LOZANO, F., RODRIGUEZ-RODA, J. and TIEWS, K. 1968. Third Report from the Bluefin Tuna Working Group. Observations on the size composition of Bluefin Tuna catches from 1965-1966. Stat.News Letters, No.38:1-27. Cons.int.Explor.Mer.

HAMRE, J., MAURIN, C., RODRIGUEZ-RODA, J, and TIEWS, K., 1971. Report of the Bluefin Tuna Working Group. Observations on the size composition of Bluefin Tuna catches from 1967-1969. Cons.int.Explor.Mer, Coop.Res.Rep., Ser.A, No.23:1-49.

HAMRE, J. and TIEWS, K., 1964. Report from the Bluefin Tuna Working Group. On the size composition of Tuna catches from 1956-1962. Cons.int.Explor.Mer, Stat.News Letters, No.20:1-43.

Table 1. Canadian catches of Bluefin Tuna from the Atlantic Ocean, 1962-74.

(Nominal catch in metric tons, live weight)

Year	Landings			
	Traps and Longlines	Purse seines	Total commercial	Sports*
1962	137	-	137	40
1963	229	323	552	90
1964	318	579	897	99
1965	175	461	636	90
1966	211	-	211	102
1967	298	-	298	58
1968	253	-	253	180
1969	407	-	407	170
1970	275	1 161	1 436	151
1971	68	935	1 003	128
1972	36	202	238	261
1973	160	639	799	215
1974	300	103	403	365

* Prior to 1974 tagged and/or released fish are included in the Sports totals, 1974 releases estimated at 18 tons.

Table 2. Size composition (live weight per mille by 10 kg unit) of large Bluefin Tuna captured in three localities along the Canadian Atlantic coast in 1974.

Size class (kg)	P.E.I.		Nfld.	Nova Scotia		Total smoothed
	Incidental					
	Gear	Sport	Sport	Commercial	Sport	
70		2				
80		-				
90		-				
100		-				
110		-		1		
120		-		-		
130		-		-		
140		-		1		
150		-		-		
160		-		-		
170		-		1		
180		-		1		
190		-		4		1
200		-		5		2
210		2		4		5
220		3		24		12
230	8	12	33	34		21
240	8	10	67	55		29
250	8	16	33	61		36
260	-	24	67	72		45
270	33	31	133	83	40	55
280	8	44	133	90	40	65
290	49	55	133	99	40	71
300	49	71	33	81	40	71
310	33	63	67	62	80	72
320	49	89	200	97	80	83
330	140	101	100	56	80	85
340	49	93		69	-	74
350	57	74		33	200	58
360	107	59		27	200	47
370	49	53		18	-	39
380	107	50		10	40	35
390	66	55		5	40	30
400	66	31		4	40	22
410	16	22		1	-	14
420	41	16		-	40	10
430	25	13		1	-	8
440	16	4		1	-	4
450	8	1			-	2
460	-	3			-	2
470	8	1			40	2
Total	1 000	1 000	1 000	1 000	1 000	1 000
Number	122	903	30	841	25	1 921
Average Weight (kg)	357	338	294	297	351	

Size class 70 kg = 70.0 - 79.9.

Table 3. Size composition of large Bluefin Tuna caught by rod and reel off Prince Edward Island during four consecutive months of the 1974 season (live weight per mille by 10 kg unit).

	JULY		AUGUST		SEPTEMBER		OCTOBER	
	No. of fish	‰	No. of fish	‰	No. of fish	‰	No. of fish	‰
70					2	8		
80					-	-		
.					-	-		
.					-	-		
.								
200					-	-		
210	2	7			-	-		
220	1	4	1	4	1	4		
230	9	31	-	-	2	8		
240	8	28	1	4	-	-		
250	10	35	3	10	1	4		
260	16	56	5	17	1	4		
270	12	42	13	46	3	12		
280	19	66	18	63	3	12		
290	23	80	16	56	9	35	2	27
300	33	115	23	81	8	31	-	-
310	14	49	24	84	17	66	2	27
320	32	112	24	84	19	74	5	67
330	34	119	28	98	25	97	4	53
340	19	66	34	119	25	97	6	80
350	15	52	27	95	18	70	7	93
360	10	35	20	70	16	62	7	93
370	5	18	18	63	24	93	1	13
380	7	24	8	28	20	78	10	133
390	5	18	9	32	27	105	9	120
400	1	4	6	21	13	50	8	107
410	3	10	2	7	10	39	5	67
420	4	14	3	10	3	12	4	53
430	2	7	1	4	6	23	3	40
440	-	-	-	-	3	12	1	13
450	-	-	1	4	-	-	-	-
460	1	4			1	4	1	13
470	1	4						
	1 000		1 000		1 000		1 000	
Total No. of Fish	286		285		257		75	
Average Weight (kg)	315		331		358		372	

Size class 70 kg = 70.0 - 79.9

Table 4. Size composition of small Bluefin Tuna taken off the U.S. coast by Canadian purse-seine vessels in 1974.

Size Class (cm)	Number of Fish	‰
45	11	6
50	638	345
55	102	55
60	2	1
65	3	2
70	199	107
75	299	162
80	40	22
85	144	78
90	277	150
95	53	29
100	4	2
105	-	-
110	-	-
115	-	-
120	1	1
125	-	-
130	1	1
135	6	3
140	11	6
145	16	8
150	7	4
155	3	2
160	4	2
165	4	2
170	9	5
175	6	3
180	4	2
185	2	1
190	2	1
Total	1 848	1 000

Size category 45 = 45.0 - 49.9 (fork length caliper)

Table 5. French Bluefin Tuna catches in 1974 from St. Jean-de-Luz (France) in kg.

Date	Total Weight	
	Fish below 30 kg	Fish above 30 kg
6 Jun. - 12 Jun. 1974	1 437	
13 Jun. - 19 Jun.	18 556	
20 Jun. - 26 Jun.	70 786	
27 Jun. - 3 Jul.	65 253	
4 Jul. - 10 Jul.	52 450	
11 Jul. - 17 Jul.	28 674	
18 Jul. - 24 Jul.	79 513	
25 Jul. - 31 Jul.	36 599	18 206
1 Aug. - 7 Aug.	22 274	6 840
8 Aug. - 14 Aug.	9 903	
15 Aug. - 21 Aug.	35 099	
22 Aug. - 28 Aug.	54 808	
29 Aug. - 4 Sep.	872	
5 Sep. - 11 Sep.	15 989	
12 Sep. - 18 Sep.	19 923	
19 Sep. - 25 Sep.	7 169	
26 Sep. - 2 Oct.	2 063	
Total	496 322	25 046

Table 6. Size composition (kg) of Norwegian Bluefin Tuna catches south of 62°N by smoothed weight frequency (‰) in 1974.

Group Means		Week Numbers							
w'[1]	w[2]	30	31	32	33	34	35	37	Total
167	215	125	-	1	1	-	-	-	-
172	221	250	-	3	1	-	-	-	1
177	228	125	-	4	1	-	-	-	x
182	234	-	-	6	1	-	-	1	1
187	241	-	-	8	3	5	1	2	2
192	247	-	-	5	8	9	1	1	3
197	253	-	5	12	14	13	2	1	6
202	260	-	10	25	16	18	4	1	9
207	266	-	5	27	21	9	7	3	11
212	273	-	5	29	28	-	13	7	16
217	279	-	19	36	31	13	19	9	20
222	286	-	33	35	33	27	24	12	23
227	292	-	43	41	45	27	31	17	30
232	298	-	53	57	57	27	38	24	40
237	305	-	58	64	58	35	47	29	45
242	311	-	48	68	63	75	59	36	53
247	318	-	72	72	77	92	66	45	63
252	324	-	115	66	79	57	67	50	65
257	331	-	82	62	70	35	66	58	63
262	337	-	39	53	65	35	70	68	65
267	343	-	39	47	62	31	73	70	65
272	350	-	43	49	55	40	69	69	62
277	356	-	58	42	44	75	60	68	57
282	363	125	53	36	36	105	52	66	53
287	369	250	29	34	30	101	47	59	47
292	376	125	29	31	25	66	41	54	41
297	382	-	48	23	23	35	34	53	37
302	388	-	44	16	17	27	29	46	30
307	395	-	15	15	10	22	24	36	23
312	401	-	-	13	8	13	17	27	17
317	408	-	10	9	8	9	13	24	15
322	414	-	24	8	7	5	9	23	13
327	420	-	19	6	4	-	7	16	9
332	427	-	5	2	3	-	7	10	7
337	433	-	-	-	3	-	5	7	4
342	440	-	-	-	2	-	2	5	3
347	446	-	-	-	1	-	2	4	2
352	453	-	-	-	-	-	1	2	1
357	459	-	-	-	-	-	-	2	x
362	465	-	-	-	-	-	-	2	1
367	472	-	-	-	-	-	-	1	x
n		2	52	240	533	57	647	755	2 286
W'		457	13597	60325	134919	15049	171083	207514	602944
w'		228.5	261.5	251.4	253.1	264.0	264.4	274.9	263.8

1) = w' = weight of gutted fish without head

2) = w = weight of ungutted fish (w = w' x 1.285)

Table 7. Norwegian catch distribution by weeks, variation in catch size and mean catch.

Week No.	No. of catches	Total	No. of fish Variation	Mean catch
30	1	2	2	22
31	3	52	1-36	17.3
32	10	240	1-42	24
33	11	533	9-97	48.5
34	3	57	11-33	19
35	21	647	4-85	30.8
36	0	0	-	-
37	10	755	29-159	75.5
Total	59	2 286	1-159	38.7

Table 8. Calculated condition factor (K) for Norwegian Bluefin Tuna catches.

Week No.	w'	l'	K
30	228.5	180	1.80
31	261.5	180	2.06
32	251.4	180	1.97
33	253.1	180	1.98
34	264.0	180	2.07
35	264.4	180	2.07
37	274.9	180	2.15
Mean	263.8	180	2.07

Table 9. Calculated length frequency distribution (per mille) for Norwegian Bluefin Tuna catches from weight data and length frequency distribution of 71 fish measured.

Length Group L in cm	Smoothed weight frequency (per mille)	
	Calculated by K = 2.07	71 fish measured
217	1	
222	3	
227	9	
232	22	7
237	51	42
242	103	99
247	160	183
252	189	226
257	178	166
262	140	116
267	87	91
272	41	53
277	14	18
282	3	
287	1	

Table 10. Monthly size composition of U.S. Bluefin Tuna catches in ‰ (smoothed) (fork length by caliper) for 1974.

Fork Length	July	August	September	October	Total
41 - 45	8	-	-	-	3
46 - 50	104	23	1	-	47
51 - 55	197	66	124	-	137
56 - 60	110	64	320	-	168
61 - 65	11	21	273	-	102
66 - 70	15	1	77	-	32
71 - 75	79	20	2	-	42
76 - 80	126	66	13	-	77
81 - 85	81	84	26	-	67
86 - 90	67	79	22	-	53
91 - 95	96	95	17	10	64
96 - 100	67	104	34	-	65
101 - 105	19	70	39	-	39
106 - 110	2	15	17	10	13
111 - 115	-	11	2	-	4
116 - 120	-	26	-	-	7
121 - 125	-	50	1	-	13
126 - 130	-	53	2	-	14
131 - 135	-	33	1	10	9
136 - 140	-	22	-	-	6
141 - 145	-	47	-	-	6
146 - 150	-	21	-	10	5
151 - 155	-	12	-	10	3
156 - 160	-	4	-	-	1
161 - 165	-	2	-	-	1
166 - 170	-	1	-	-	-
171 - 175	-	1	-	-	-
176 - 180	-	-	-	-	-
181 - 185	-	-	-	10	-
186 - 190	-	-	-	10	-
191 - 195	-	-	-	-	-
196 - 200	-	-	-	-	-
201 - 205	-	-	-	-	-
206 - 210	-	-	-	10	-
211 - 215	-	-	-	10	-
216 - 220	-	-	-	10	-
221 - 225	-	-	-	10	-
226 - 230	1	-	1	10	1
231 - 235	1	-	1	-	1
236 - 240	2	1	1	10	1
241 - 245	3	2	1	10	2
246 - 250	3	1	1	40	2
251 - 255	3	1	4	80	3
256 - 260	3	1	5	130	4
261 - 265	2	1	5	150	3
266 - 270	1	1	4	165	2
271 - 275	1	1	3	145	2
276 - 280	-	-	2	83	1
281 - 285	-	-	1	40	-
286 - 290	-	-	-	20	-
291 - 295	-	-	-	10	-
296 - 300	-	-	-	-	-
301 - 305	-	-	-	-	-
n	26 027	16 836	22 233	114	65 210

Table 11. Monthly size composition of U.S. Bluefin Tuna catches above 200 cm (comp. Table 10) in ‰ (smoothed) (fork length by caliper) for 1974.

Fork Length	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Total
195-199	-	-	4	1	-	-	1
200-204	16	-	8	4	-	-	3
205-209	31	-	8	7	2	-	5
210-214	32	2	9	10	7	15	7
215-219	47	5	9	11	12	44	10
220-224	47	12	9	9	14	44	12
225-229	47	29	16	10	9	15	18
230-234	94	57	34	15	2	-	31
235-239	125	98	80	20	-	15	54
240-244	109	144	126	29	9	30	81
245-249	125	159	123	59	35	59	99
250-254	156	148	119	103	70	103	117
255-259	93	137	145	141	117	118	137
260-264	31	110	137	171	172	118	143
265-269	31	64	96	167	198	103	123
270-274	16	25	50	120	159	73	80
275-279	-	7	18	72	91	73	44
280-284	-	2	7	36	49	102	23
285-289	-	1	2	11	29	73	8
290-294	-	-	-	2	12	15	2
295-299	-	-	-	1	6	-	1
300-304	-	-	-	1	5	-	1
305-309	-	-	-	-	2	-	-
n	16	465	234	639	107	17	1 478

Table 12. 1974 recaptures of Giant (120 kg) Bluefin Tuna. Released by cooperators of the Woods Hole Oceanographic Institution's Game Fish Tagging Program (WHOI) and the National Marine Fisheries Service's Marine Research Tagging Program (NMFS)

RELEASE			RECAPTURE		
Date	Area	Gear	Date	Area	Gear
8 Jun. 1973	Bahamas	Rod & Reel	3 Jul.1974	New England	Handline(WHOI)
22 Jul.1974	New England	Free tagged	26 Jul.1974	New England	Rod & Reel(WHOI)
18 Aug.1970	Newfld.	Rod & Reel	22 Jul.1974	Nova Scotia	Harpooned(WHOI)
14 Aug.1970	Newfld.	Rod & Reel	15 Jul.1974	New England	Handline(WHOI)
22 Jul.1974	New England	Rod & Reel	30 Jul.1974[x]	New England	Rod & Reel(WHOI)
27 Jul.1973	New England	Rod & Reel	4 Aug.1974	New England	Rod & Reel(NMFS)
8 Jun.1973	Bahamas	Rod & Reel	12 Sep.1974	Norway	Seine (WHOI)
22 Jul.1974	New England	Free tagged	8 Sep.1974	New England	Rod & Reel(WHOI)

x) Tag shed, but fish identified by taggers on basis of deformed fin and an open wound on lateral line where they had noted the tag had been placed. This recapture may be considered as highly probable, if not certain.

Table 13. Woods Hole Oceanographic Institution - Cooperative Game Fish Tagging Program. - Releases and returns for giant (over 120 kg) Bluefin Tuna tagged in Newfoundland waters, by year of release, months at large, and area[x] of recapture.

Year	Releases	Returns						Total
		Months at large						
		0-5.9	6.0-17.9	18.0-29.9	30.0-41.9	42.0-53.9	?	
1962	6	0	0	0	0	0		0
1963	3	0	0	0	0	0		0
1964	41	0	0	0	0	0		0
1965	47	0	0	0	0	0		0
1966	49	0	0	0	0	0		0
1967	6	0	0	0	0	0		0
1968	193	1 L	0	0	1 L	0		2 L
1969	166	0	0	0	0	0		0
1970	79	1 L	0	0	0	1 M, 1N		3 LMN
1971	32	0	0	1 M	0	-		1 M
1972	38	0	1 G	0	-	-		1
1973	0	0	0	-	-	-		0
1974	0	0	-	-	-	-		0
Unknown	1						1L	1 L

x) Areas: L = Local; M = Massachusetts; N = Nova Scotia; G = Grand Banks.

Table 14. Woods Hole Oceanographic Institution - Cooperative Game Fish Tagging Program. - Releases and returns for Giant Bluefin Tuna (over 120 kg) tagged off the Bahamas by year of release, months at large, and area[xx] of recapture.

Year	Releases	Returns					Total
		Months at large					
		0-5.9	6.0-17.9	18.0-29.9	30.0-41.9	42.0-53.9	
1954	21	0	0	0	0	0	0
1955	14	0	0	0	0	0	0
1956	41	0	0	0	0	0	0
1957	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0
1959	25	0	0	0	0	0	0
1960	13	0	0	2 N	0	0	2 N
1961	34	2 N	0	0	0	0	2 N
1962	45	1 N	0	0	0	0	1 N
1963	147	0	0	1 B	0	0	1 B
1964	41	0	0	0	0	0	0
1965	55	0	0	0	0	0	0
1966	105	0	0	0	0	1 A	1 A
1967	82	1 N	0	0	0	0	1 N
1968	57	0	0	0	0	0	0
1969	47	0	0	0	0	1 B	1 B
1970	182	1 A	0	0	0	0	1 A
1971	49	0	0	1 A	0	-	1 A
1972	32	0	1 N	0	-	-	1 N
1973	47	0	1 A, 1 N	-	-	-	2 AN
1974	31	0	-	-	-	-	-

xx) Areas: A = Northeastern North America; B = Brazil and Argentina; N = Norway.

Table 15. Releases and returns for giant (over 122 kg) Bluefin Tuna tagged in New England coastal waters, by years of release and recapture. Returns expressed in numbers (numerators) and percent of releases (denominators), were all from New England waters.

Releases		Returns, by year of recapture									
Year	Number	1966	1967	1968	1969	1970	1971	1972	1973	1974[a]	Total
1966	2	0	0	0	0	0	0	0	0	-	0
1967	0	-	0	0	0	0	0	0	0	-	0
1968	6	-	-	0	0	1/16.7	0	0	0	-	1/16.7
1969	1	-	-	-	0	0	0	0	0	-	0
1970	4	-	-	-	-	0	0	0	0	-	0
1971	10	-	-	-	-	-	0	0	1/10.0	-	1/10.0
1972	17	-	-	-	-	-	-	1/5.9	1/5.9	-	2/11.8
1973[b]	15	-	-	-	-	-	-	-	5/33.3	1/6.7	6/40.0
1974[c]	10	-	-	-	-	-	-	-	-	2/20.0[d]	2/20.0
Total						1		1	7	3	12

Footnotes:

a) Incomplete.

b) Includes 6 releases of, and 4 1973 returns from, fish tagged while swimming free.

c) Includes 4 releases of, and 2 returns from, fish tagged while swimming free.

d) Another fish, tagged in 1974 after capture by rod and reel, has very probably also been recaptured after shedding the tag. It was identified by the crew which had probably tagged it on the basis of a deformed pectoral fin, and a wound on the lateral line where the tagging data card indicated that the tag had been placed. This probable recapture occurred 8 days after the release.

Table 16. Releases and returns for Giant (over 122 kg) Bluefin Tuna, Thunnus thynnus, tagged in New England coastal waters, by cooperators with the Woods Hole Oceanographic Institution and National Marine Fisheries Service fish tagging programs.

Year released	Releases[x)]	Returns by Months at Large			Total	%
		0-5.9	6-17.9	18-29.9		
1966	2	-	-	-	-	
1967	0	-	-	-	-	
1968	6	-	-	1	1	16.7
1969	1	-	-	-	-	
1970	4	-	-	-	-	
1971	10	-	-	1	1	10.0
1972	17	1	1	-	2	11.8
1973	15[a]	5	-	-	6[a]	40.0
1974	10[b]	2	-	-	2[b]	20.0

x) Fish were caught for tagging by rod and reel except as noted.

a) Includes 6 releases of, and 4 1973 returns from, fish tagged while swimming free.

b) Includes 4 releases of, and 2 1974 returns from, fish tagged while swimming free.

Table 17. Woods Hole Oceanographic Institution, Cooperative Game Fish Tagging Program. - Releases of young Bluefin Tuna in coastal waters between Cape Hatteras and Cape Cod, by year and method of capture for tagging, and return rates from these, based on all data received up to 1 February, 1974.

Year	Purse Seine		Rod and Reel	
	Releases	Return rate, %	Releases	Return rate, %
1954	0	0	169	1.8
1955	0	0	215	0
...				
1957	0	0	34	2.9
1958	0	0	38	0
1959	0	0	25	0
1960	0	0	15	6.7
1961	21	0	129	5.4
1962	25	0	52	7.7
1963	0	0	29	31.0
1964	455	28.2	10	30.0
1965	1 629	15.0	43	39.5
1966	3 772[x]	29.0	187	44.9
1967	614	29.5	14	21.4
1968	219	47.5	41	26.8
1969	92	17.4	244	38.1
1970	32	25.0	426	41.5
1971	311[x]	20.6	31	48.5
1972	127[x]	30.7	66	39.4
1973	264	18.5	86	11.6
1974	1 424[x]	4.4	277	2.9

x) Includes jig releases.

Table 18. Woods Hole Oceanographic Institution, Cooperative Game Fish Tagging Program. - Numbers of local returns from small Bluefin Tuna released in coastal waters between Cape Hatteras, North Carolina, and Cape Cod, Massachusetts, and percent of returns by method of recapture.

Year	N	Method of recapture	
		Commercial	Sport
1954	1	100.0	0
1955	0	0	0
1956	0	0	0
1957	1	0	100.0
1958	0	0	0
1959	0	0	0
1960	1	100.0	0
1961	7	100.0	0
1962	4	100.0	0
1963	9	100.0	0
1964	131	96.2	3.8
1965	243	88.5	11.5
1966	1 163	84.9	15.1
1967	184	91.3	8.7
1968	115	87.0	13.0
1969	109	95.4	4.6
1970	185	99.5	0.5
1971	79	93.7	6.3
1972	65	90.8	9.2
1973	59	96.6	3.4
1974	71	69.0	31.0

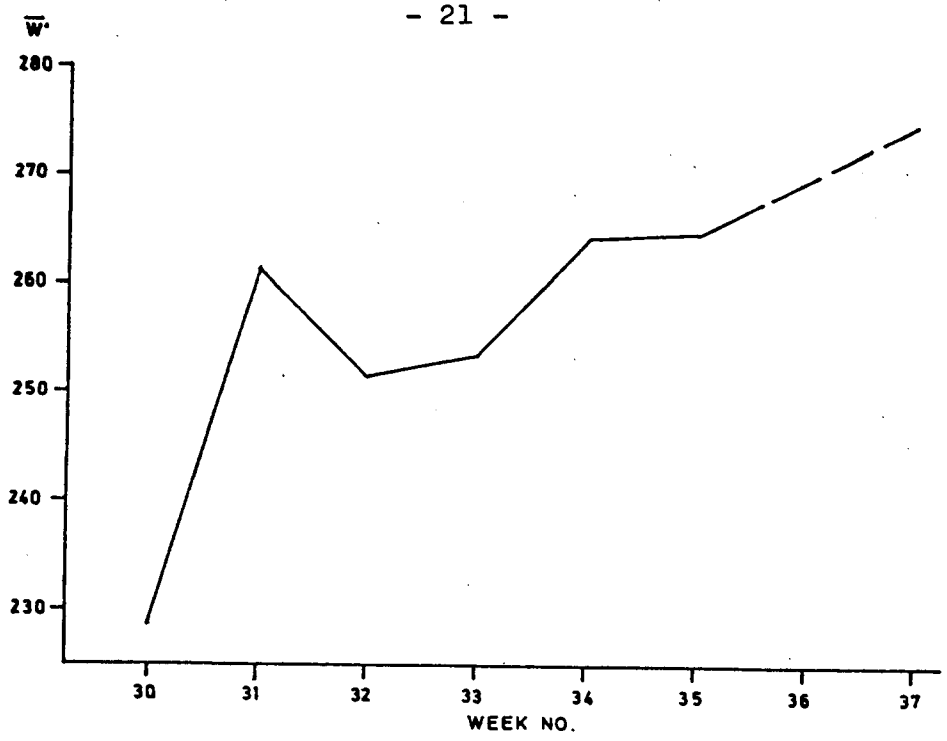

Figure 1. Body weight increase by weeks.

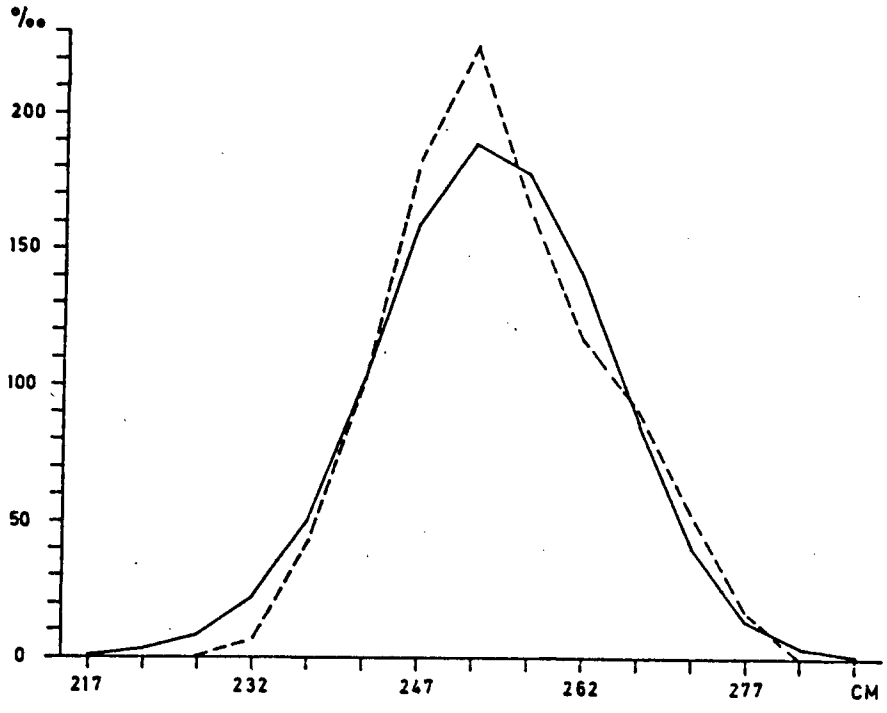

Figure 2. Calculated length frequency distribution from weight data, and length frequency distribution of 71 fish measured (broken line).

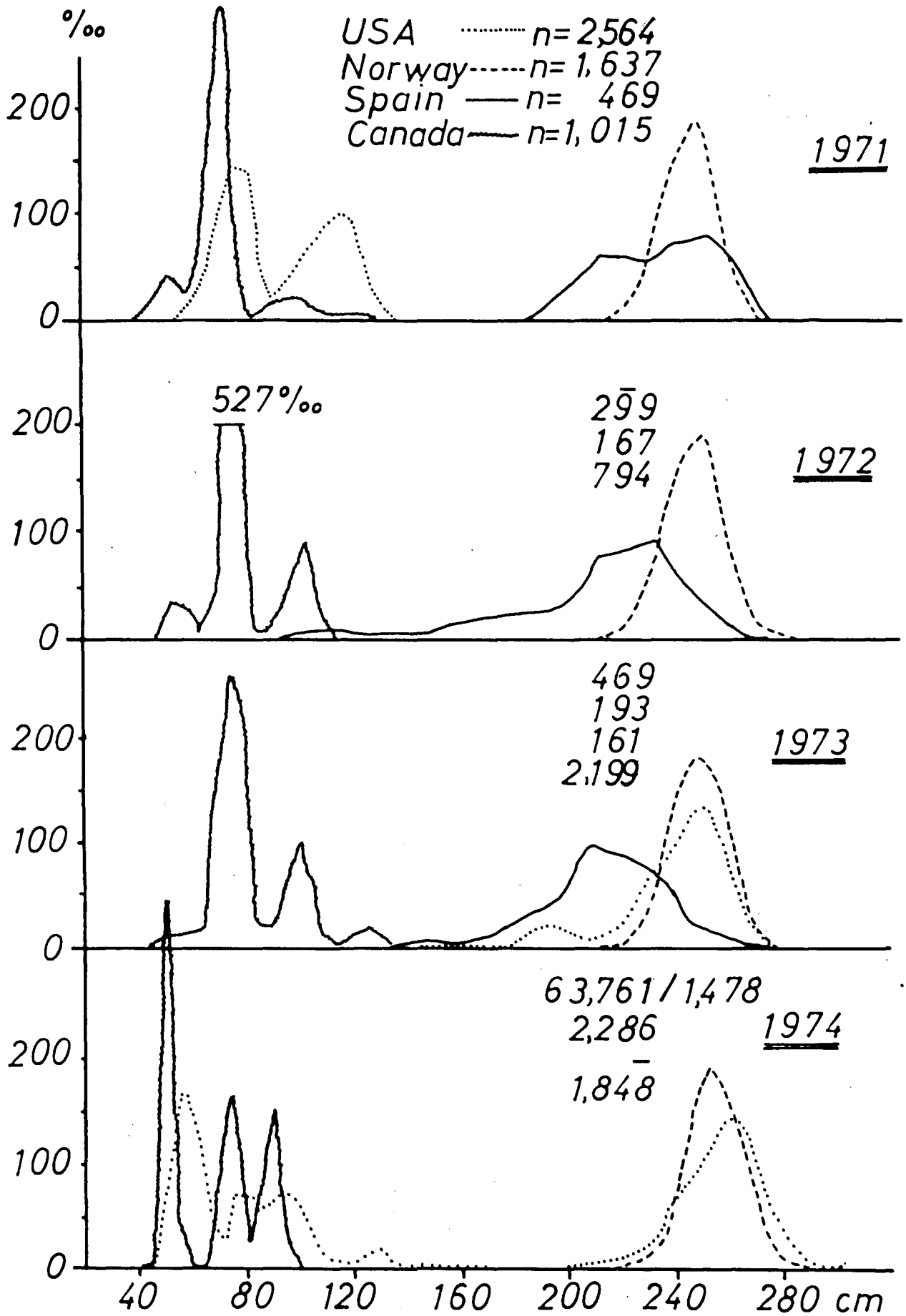

Figure 3. Size composition of Bluefin Tuna catches made in USA, Norway, Spain and Canada.

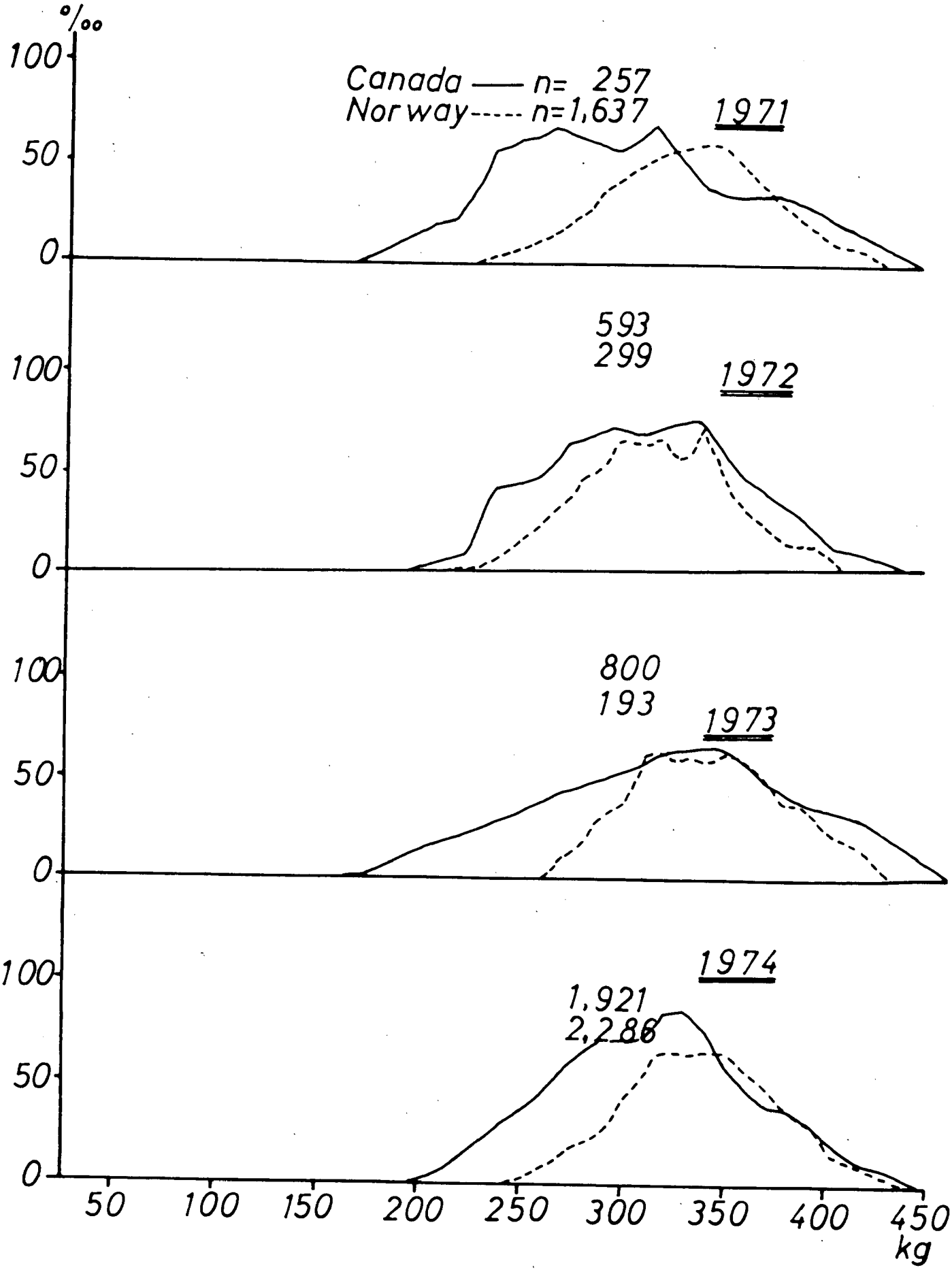

Figure 4. Weight composition of Bluefin Tuna catches made in Canada and Norway.