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Pelagic Fish (Southern) Committee

Report from the Bluefin-Tuna Working Group

Data collection from 1966

by

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I. Introduction

Following a recommendation of the Scombriform Fish Committee made during its last meeting in October 1966 in Copenhagen, the members of the Bluefin-Tuna Working Group have continued the collection of data on the development of the bluefin-tuna fisheries carried out in the North Atlantic. This has again been done by correspondence among the members of the Working Group and with other tuna researchers in the region. The work was concentrated on collecting data on the size-composition of tuna catches made in 1966. Reference is made to the previous Working Group Reports (1-3).

II. Material

Reports on the catch and the catch composition of bluefin-tuna were submitted by the following countries: France (Table 13), Italy (Table 1), Norway (Tables 2-3), Portugal (Table 4), Spain (Tables 5-9), Morocco (Tables 10-11), U.S.A. (Table 12). Denmark reported that only three tuna were caught in 1966 and also the Federal Republic of Germany could not supply any new data; their fishery ceased since 1963 because of inavailability of bluefin-tuna on its usual fishing grounds in the central parts of the North Sea.

The Italian size-composition data (Table 1) are the first ever obtained. They have been kindly submitted through the help of Dr. A. Ben-Tuvia of FAO by Dr. P. Arena and Dr. R. Sará of the Centro Sperimentale per l'Industria della Pesca e dei Prodotti del Mare in Messina and Palermo on Sicily. Dr. Arena collected length-composition data on the bluefin-tuna catches of madragues stationed at S. Gusumano (Trapani) during the fishing seasons of 1958 and 1965 and at Punta Raisi (Palermo) during the fishing season of 1966. Dr. Sará collected 82 length measurements from fish caught in the madrague at Cap Granitola during 1966. His data were combined with those of Dr. Arena in Table 1. In doing this, the tape measurements of Dr. Sará were recalculated into caliper-measurements by the formula: Caliper Length = 0.958 x Tape Length, as given by Mr. Mather.

In 1966 only 700 tons of bluefin-tuna were caught by Norwegian fishermen against 2,300 tons in 1965. According to the fishermen the abundance of fish off the Norwegian coast was extremely low. The Norwegian weight-composition data of bluefin-tuna (Table 2) were recalculated into length-composition data on the basis of a K-value of 2.11, calculated for 140 corresponding length/weight measurements.

On 28th August 1966 one fish was recaptured which had been tagged on 31st August 1961 on the Norwegian coast. The tag was returned from a fish factory in Skagen. At the time of recapture the fish measured 210 cm without head.

Dr. Vilela reports that in Table 4 submitted by him the catch of 11 fish under 10 kg was not included. The catches on the west coast of Portugal were very irregular and small and could not be statistically recorded.

Dr. Rodriguez-Roda was able to submit - apart from the usual statistics of the bluefin-tuna catches made at Barbate - also some data of other madragues (Tables 5-9). In 1966, only 1,400 tons of bluefin-tuna were caught from traps against 3,660 tons in 1965.

Dr. Aloncle forwarded catch statistics for six Moroccan madragues for 1966 as well as for 1965.

Mr. Mather III reports that, apart from the data compiled in Table 12, catches amounting to 38 tons were measured during weeks 32 and 34 with calipers at Puerto Rico. One fish was 943 mm, all the rest were from 490-579 mm with the mode of 530 mm. 1966 year's catch was extremely poor - less than 1,000 tons for six vessels.

III. Comparison of the catch-composition data collected in the different countries

1. Spanish with Norwegian catches

It was stated in Statistical News Letters No. 26 that during the research period from 1961 to 1964 a remarkable difference in the size-composition of bluefin-tuna catches made in Spain and in Norway had been observed. While the Norwegian tuna fishery was mainly on fish of the year-class 1949 respectively 1950, fish of the year-class 1952 predominated in the Spanish madrague catch. It had been concluded that during this period the North-East Atlantic tuna population had been sub-divided into two contingents of fish with different migration habits. In 1965 the size-composition showed considerable similarity (Figure 1), which was also the case for the years 1955 to 1960. The Norwegian catch consisted more or less entirely of fish of year-class 1952, and so did the Spanish catches to a large degree. This year-class had been predominating in the Spanish catch already for several years. It had found its way back to the Norwegian coast, where it had been absent from 1962 to 1964. On the other hand, the tuna of year-classes 1949 respectively 1950 had finally left the Norwegian coast, and, presumably because of overaging, the tuna fishery at all.

In 1966, fish of the year-class 1952 arrived again at the Norwegian coast, but in considerably smaller numbers. The picture obtained on the Spanish coast indicates that the 1952 year-class is still dominating but was considerably mixed with younger fish. No particular strong dominating year-class is observed, although some contribution seems to be made from the year-classes 1953 to 1961. These younger year-classes do not occur in the Norwegian catches.

2. Italian with Spanish and Norwegian catches

A comparison of the Italian length-composition data with those collected outside the Mediterranean Sea in the Eastern Atlantic is of the greatest interest, but must be regarded as preliminary, since only a few Italian length measurements are available:

1958	=	65
1965	=	234
1966	=	152

The best set of information is available for 1965 (Figure 1). During this year the age-composition pattern of the Italian tuna catches obviously differed from that of the East Atlantic catches. The characteristic mode formed by the fish of year-class 1952 in the Spanish as well as in the Norwegian catches is absent in the Italian length-composition curve. The Italian curve has instead a minimum which is flanked by two distinct modes, indicating another pattern in the strength of year-classes as compared to the stocks in the Atlantic. The size-composition of the younger fish is also somewhat different from that of the Eastern and Western Atlantic tuna stocks. The 1966 data indicate a similar difference in the size-composition of these stocks.

Although the present material is inadequate for conclusive evidence in this direction, these results are considered as another hint for the possibility that the bluefin-tuna of the Mediterranean Sea and the Atlantic belong to more or less separated populations. This hypothesis can be best tested by collecting further age-composition (size-composition) data. A larger number of fish must be measured to obtain a more certain picture. The hypothesis formulated does not exclude the possibility that parts of these fish stocks are mixed as is indicated by the tagging experiments made on the Spanish coast west of Gibraltar. The possibility cannot either be rejected that in certain years more or less whole year-classes may leave one area and migrate into another.

3. U.S. with Spanish and Norwegian catches

In 1966, the U.S. tuna catches were composed of fish of year-classes 1965, 1964 and 1963. Mr. Mather III, supplying these data, draws attention to the fact that the average size of the fish caught by the U.S. purse-seine fishery has steadily declined during the last years. He also reports that nine fish of the year-class 1964 and three of the year-class 1963, which were tagged on the U.S. coast in July to August 1965, were recaptured during July to October 1966 by French fishermen in the Bay of Biscay. Another three bluefin-tuna were also recaptured in the Bay of Biscay in 1966, but the length measurements of these recoveries were not available.

This was the second time that West Atlantic bluefin-tuna were recaptured in the Bay of Biscay. The first two fish, which were tagged in 1954, were recaptured in 1959. Between 1959 and 1966 there were no recaptures of tagged bluefin-tuna in the Bay of Biscay. The large number of recaptures in the Bay of Biscay in 1966 proves that the East Atlantic bluefin-tuna stock have again received a substantial recruitment of fish from the stock of the Western Atlantic. The bluefin-tuna landings in the Bay of Biscay have accordingly increased from 621 tons in 1965 to 1,624 tons in 1966. Bearing in mind that the previously observed migration of young tuna from west to east across the Atlantic coincides with the last strong year-class 1952 observed in the Spanish and Norwegian catches, it will be very interesting to see what influence this latest transatlantic migration of tuna may have in this respect. The year-classes 1963-1964 may occur in the Spanish madrague catches already next year, whereas fish of this size cannot be expected to be caught on the Norwegian coast before 1969-1970.

IV. Summary

1. The size-composition of bluefin-tuna catches made in the Norwegian and U.S. purse-seine fishery and in the Spanish and Italian madrague fishery in 1966 has been compared. The Norwegian tuna catches were again essentially composed of fish of year-class 1952, while the Spanish catches consisted of several year-classes among which year-class 1952 has ceased to play the role it had over the last years.

2. The age-composition of Italian madrague catches made in 1965 and 1966 was different from that of the Norwegian and Spanish catches. Although these data are still preliminary, they indicate the existence of a difference in the relative strengths of year-classes of bluefin tuna in the Mediterranean Sea and in the East Atlantic, suggesting that the bluefin-tuna forms two more or less distinct stocks of fish in these areas. However, further and greater amounts of data are necessary to draw definite conclusions in this direction

3. The age-composition of U.S. bluefin-tuna catches completely differed from that of Italian and Spanish madrague and Norwegian purse-seine catches. However, during 1965/66 substantial numbers of bluefin-tuna of year-classes 1964 and 1963 have immigrated from the U.S. Atlantic coast into the East Atlantic, as recaptures of 15 tagged bluefin-tuna, obtained in 1966 in the Bay of Biscay indicate. On the basis of the experiences gained during the last years it is believed that these immigrants may increase the European Atlantic tuna catches during the years to come.

References

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Table 1. Length distribution (fork length) in % (smoothed) for Italian bluefin-tuna catches at Sicilian madragues made in 1958 (by tape, following body curvature), 1965 and 1966 (by caliper).

5 cm groups	1958 %	1965 %	1966 %
115 - 119	-	-	2
120 - 124	-	-	12
125 - 129	-	4	28
130 - 134	-	15	34
135 - 139	15	27	28
140 - 144	69	38	26
145 - 149	122	51	29
150 - 154	127	56	28
155 - 159	111	54	30
160 - 164	100	46	36
165 - 169	70	34	36
170 - 174	28	19	23
175 - 179	4	9	8
180 - 184	0	3	7
185 - 189	0	4	12
190 - 194	0	18	24
195 - 199	0	32	53
200 - 204	4	34	70
205 - 209	8	33	62
210 - 214	16	42	64
215 - 219	12	50	67
220 - 224	12	43	56
225 - 229	28	33	58
230 - 234	47	28	64
235 - 239	50	32	61
240 - 244	43	41	49
245 - 249	39	46	23
250 - 254	35	71	5
255 - 259	31	73	3
260 - 264	21	44	2
265 - 269	8	16	-
270 - 274	-	4	-
n =	65	234	152

Table 2. Size-composition of Norwegian tuna catches south of 62°N by smoothed weight frequency (%) in 1966 (kg). Total catch about 700 tons.

Group W'	mean W (kg)	Week numbers								Total	
		31	32	33	34	35	36	37	39		
112	144	-	1	-	-	-	-	-	-	-	-
117	151	-	2	-	1	-	-	-	-	-	1
122	157	-	1	-	-	-	-	-	-	-	-
127	163	-	-	-	-	-	-	2	-	-	-
132	170	-	-	-	1	-	-	4	-	-	1
137	176	-	-	-	1	-	-	2	-	-	x
142	183	-	-	-	1	-	1	-	-	-	x
147	189	-	-	-	2	2	2	-	2	-	1
152	196	-	-	2	3	4	2	-	5	-	3
157	202	-	-	4	4	6	2	2	2	-	4
162	208	-	1	7	9	7	4	5	-	-	6
167	215	-	4	11	14	11	7	9	5	-	10
172	221	-	9	23	20	17	10	10	9	-	15
177	228	-	13	36	31	23	19	13	5	-	23
182	234	25	15	38	37	33	28	21	5	-	30
187	241	75	21	38	38	42	30	26	14	-	35
192	247	100	38	42	52	50	36	29	18	-	43
197	253	100	50	55	69	61	49	52	20	-	57
202	260	100	55	73	73	69	56	76	35	-	66
207	266	125	67	80	76	76	62	65	63	-	71
212	273	150	75	79	78	86	77	48	76	-	78
217	279	125	74	77	76	84	78	47	63	-	77
222	286	100	79	65	75	74	71	47	56	-	71
227	292	75	85	65	68	62	69	58	67	-	68
232	298	25	79	71	56	60	65	74	71	-	64
237	305	-	63	59	47	58	58	75	67	-	57
242	311	-	50	47	40	49	55	58	52	-	49
247	318	-	46	40	38	36	50	48	33	-	41
252	324	-	41	30	29	24	40	47	40	-	32
257	331	-	34	21	17	17	30	47	53	-	24
262	337	-	23	14	12	14	20	41	44	-	18
267	343	-	16	7	10	11	16	25	35	-	13
272	350	-	17	2	7	8	18	21	35	-	12
277	356	-	14	-	5	6	14	20	29	-	9
282	363	-	9	2	4	3	6	8	16	-	5
287	369	-	5	3	2	1	3	4	9	-	3
292	376	-	1	2	-	2	3	2	7	-	2
297	382	-	1	2	1	2	3	-	9	-	2
302	388	-	3	1	1	1	3	-	15	-	2
307	395	-	4	-	1	-	3	-	11	-	2
312	401	-	3	1	-	-	1	-	2	-	1
317	408	-	1	2	-	-	1	-	-	-	1
322	414	-	-	1	-	-	2	-	2	-	1
327	420	-	-	-	-	-	1	-	7	-	x
332	427	-	-	-	-	-	1	2	7	-	x
337	433	-	-	-	-	-	2	5	2	-	1
342	440	-	-	-	-	-	1	5	-	-	x
347	446	-	-	-	-	-	-	2	2	-	-
352	453	-	-	-	-	1	-	-	5	-	1
357	459	-	-	-	1	-	-	-	2	-	x
Total		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
n =		10	258	332	678	980	767	153	114		3292

Table 3. Length distribution in % (smoothed) for Norwegian bluefin-tuna catches made in 1966 (recalculated from weight distribution data on the basis of a K-value of 2.11).

5 cm groups	%
190 - 194	1
195 - 199	-
200 - 204	1
205 - 209	2
210 - 214	9
215 - 219	28
220 - 224	70
225 - 229	118
230 - 234	177
235 - 239	224
240 - 244	157
245 - 249	122
250 - 254	61
255 - 259	21
260 - 264	8
265 - 269	5
270 - 274	1
275 - 279	1
Total	1006

Table 4. Bluefin-tuna catches from the south coast of Portugal by madragues in 1966, specified by weight groups (kg).

Weeks		Number of fish				Total
Nos.	Date	Atúns > 90 kg	Atuarros 50-89 kg	Albacoras 30-49 kg	Cacherretas < 30 kg	
21.	16/22 May	19	4	-	-	23
22.	23/29 "	5	4	2	-	11
23.	30/ 5 June	230	31	9	4	274
24.	6/12 "	125	49	4	-	178
25.	13/19 "	54	9	3	-	66
26.	20/26 "	10	-	2	-	12
27.	27/ 3 July	7	7	-	-	14
28.	4/10 "	49	9	2	-	60
29.	11/17 "	130	9	2	-	141
30.	18/24 "	121	51	1	44	217
31.	25/31 "	77	31	6	1,647	1,761
32.	1/ 7 August	17	1	1	-	19
33.	8/14 "	64	14	2	-	80
34.	15/21 "	7	1	-	-	8
35.	22/28 "	8	-	-	-	8
Total		923	220	34	1,695	2,872

Table 5. Weekly size-composition in % (smoothed of Spanish madrague catches at Sancti-Petri and Barbate in 1966 (D = pre spawning fish, R = post-spawning fish) (Rodriguez-Roda, 1967).

Length-groups	Week Nos.	Sancti-Petri					Barbate					Total
		D 21	D 22	D 23	D 24	D 25	R 28	R 29	R 30	R 31	R 32	
100 - 104.5	-	-	-	-	-	13	-	-	-	-	-	-
105 - 109.5	-	-	-	-	-	25	-	-	-	-	-	1
110 - 114.5	5	-	-	-	-	13	-	-	-	-	-	1
115 - 119.5	14	1	-	-	-	-	-	-	-	-	-	1
120 - 124.5	19	2	1	-	-	-	-	-	-	-	-	2
125 - 129.5	14	1	3	-	-	-	-	-	-	-	-	2
130 - 134.5	10	3	5	12	-	-	-	-	-	-	-	3
135 - 139.5	24	9	16	24	-	8	-	3	44	13	-	10
140 - 144.5	38	13	31	24	-	16	-	11	103	26	-	18
145 - 149.5	33	10	31	36	-	8	-	18	74	17	-	17
150 - 154.5	43	8	25	48	-	3	-	16	30	9	-	14
155 - 159.5	52	16	24	48	-	5	-	17	44	9	-	16
160 - 164.5	33	30	25	36	-	8	-	28	74	9	-	22
165 - 169.5	29	36	42	12	-	18	-	40	89	9	-	29
170 - 174.5	43	36	63	24	25	44	-	55	118	13	-	40
175 - 179.5	38	39	59	83	50	59	2	60	147	13	-	44
180 - 184.5	38	39	53	107	63	46	5	59	88	4	-	41
185 - 189.5	52	36	67	60	100	46	6	70	15	-	-	45
190 - 194.5	57	44	75	48	113	69	9	76	-	9	-	47
195 - 199.5	52	53	63	84	113	79	12	67	15	17	-	53
200 - 204.5	33	49	46	60	100	66	10	50	30	13	-	43
205 - 209.5	14	44	34	24	38	54	9	45	30	26	-	35
210 - 214.5	10	51	36	48	25	49	24	58	44	55	-	42
215 - 219.5	14	77	46	72	50	49	79	59	44	60	-	60
220 - 224.5	24	100	49	48	38	64	133	52	15	81	-	74
225 - 229.5	47	90	49	12	38	82	161	51	-	148	-	82
230 - 234.5	75	75	52	12	38	71	182	51	-	157	-	83
235 - 239.5	71	57	48	36	50	49	164	48	-	110	-	71
240 - 244.5	52	38	32	36	75	44	109	34	-	94	-	51
245 - 249.5	33	25	15	12	38	41	62	20	-	68	-	31
250 - 254.5	24	14	7	-	-	23	28	12	-	30	-	15
255 - 259.5	5	6	4	-	-	5	9	5	-	13	-	6
260 - 264.5	-	1	1	-	-	-	3	-	-	4	-	1
265 - 269.5	-	-	-	-	-	-	2	-	-	-	-	-
n =		53	267	254	21	20	98	179	206	17	59	1,174

Table 6. Spanish bluefin-tuna catches at Barbate by weeks and number of fish in 1966 (D = pre-spawning fish, R = post-spawning fish) (Rodriguez-Roda, 1967).

Week Nos.	Time	Number of fish	Spawning condition
19	1. V. - 7. V.	61	D
20	8. V. - 14. V.	216	D
21	15. V. - 21. V.	380	D
22	22. V. - 28. V.	1,001	D
23	29. V. - 4. VI.	633	D
24	5. VI. - 11. VI.	236	D
25	12. VI. - 18. VI.	95	D
26	19. VI. - 25. VI.	16	D
27	26. VI. - 2. VII.	104	D & R
28	3. VII. - 9. VII.	111	R
29	10. VII. - 16. VII.	756	R
30	17. VII. - 23. VII.	257	R
31	24. VII. - 30. VII.	17	R
32	31. VII. - 6. VIII.	172	R
33	7. VIII. - 13. VIII.	185	R
34	14. VIII. - 20. VIII.	65	R
35	21. VIII. - 27. VIII.	109	R
36	28. VIII. - 3. IX.	1	R
		4,415	

Table 7. Spanish bluefin-tuna catches at La Línea by weeks and number of fish in 1966 (R = post-spawning fish) (Rodríguez-Roda, 1967).

Week Nos.	Time	Number of fish	Spawning condition
28	3. VII. - 9. VII.	88	R
29	10. VII. - 16. VII.	143	R
32	31. VII. - 6. VIII.	7	R
33	7. VIII. - 13. VIII.	9	R
34	14. VIII. - 20. VIII.	12	R
35	21. VIII. - 27. VIII.	20	R
37	4. IX. - 10. IX.	15	R
		294	

Table 8. Spanish bluefin-tuna catches at St. Petri by weeks and number of fish in 1966 (D = spawning fish) (Rodríguez-Roda, 1967).

Week Nos.	Time	Number of fish	Spawning condition
20	8. V. - 14. V.	57	D
21	15. V. - 21. V.	111	D
22	22. V. - 28. V.	1,602	D
23	29. V. - 4. VI.	1,382	D
24	5. VI. - 11. VI.	185	D
25	12. VI. - 18. VI.	21	D
26	19. VI. - 25. VI.	-	-
27	26. VI. - 2. VII.	11	D
		3,369	

Table 9. Spanish bluefin-tuna catches at Tarifa by weeks and number of fish in 1966 (D = pre-spawning fish) (Rodríguez-Roda, 1967).

Week Nos.	Time	Number of fish	Spawning condition
20	8. V. - 14. V.	372	D
21	15. V. - 21. V.	9	D
22	22. V. - 28. V.	115	D
23	29. V. - 4. VI.	52	D
24	5. VI. - 11. VI.	237	D
25	12. VI. - 18. VI.	138	D
		923	

Table 10. Weekly bluefin-tuna catches of six Moroccan madragues in 1965.

Week Nos.	No. of fish	Weight of ungutted fish (kg)	Average weight of fish (kg)
19.	2	765	382
20.	387	77,782	201
21.	2,283	399,029	175
22.	3,528	626,438	176
23.	1,783	319,867	179
24.	1,249	217,615	174
25.	342	47,890	140
26.	54	9,352	173
30.	139	18,002	130
31.	245	29,251	119
32.	715	99,915	140
33.	135	11,465	85
34.	10	1,614	161
35.	5	302	60
36.	392	5,784	15
37.	195	4,019	21
38.	9	1,230	137
40.	34	482	15
41.	5	11	2
43.	18	238	13
Total	11,530	1,871,051	125

Table 11. Weekly bluefin-tuna catches of six Moroccan madragues in 1966.

Week Nos.	No. of fish	Weight of ungutted fish (kg)	Average weight of fish (kg)
20.	1,040	218,948	210
21.	1,278	250,600	196
22.	2,043	368,409	180
23.	974	134,027	138
24.	2,488	408,395	164
25.	1,517	257,784	170
26.	182	31,026	170
27.	1	146	146
31.	22	2,127	97
32.	43	6,158	143
34.	1	70	70
35.	26	2,005	77
36.	9	450	50
37.	6	370	62
Total	9,630	1,680,515	134

Table 12. Weekly size-composition of U.S. bluefin-tuna purse-seine catches in % (smoothed) for 1966. Length was measured to the nearest inch from the mouth (upper jaw) to fork of tail by tape following curvature of body.

Length in cm	Weeks													Total			
	28 3.-9.	29 10.-16.	30 17.-23.	31 24.-30.VII.	32 31.-6.	33 7.-13.	34 14.-20.	35 21.-27.VIII.	36 28.-3.	37 4.-10.IX.	Total						
46			1		0											0	
49			4		5											2	
51		250	16	2	49											16	
53		500	47	12	167											59	
56		250	79	26	269											133	
58			74	33	228											186	
61			47	24	108											166	
64			22	9	34											95	
66			10	6	8											38	
69			18	25	1											17	
71			42	79	1											23	
74			89	177	1											44	
76			137	253	1											61	
79			131	211	3											52	
81			83	102	5											29	
84			40	32	3											13	
86			17	8	3											7	
89			9	1	3											5	
91			6		4											5	
94			8		7											5	
97			16		16											7	
99			25		24											10	
102			26		23											10	
104			24		18											8	
107			17		10											6	
109			8		4											2	
112			3		3											1	
114			1		2											0	
117					0												
Total	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3734
n =	194	3	734	198	692	117	105	931	484	276							

Table 13. Bluefin-tuna catches at Saint-Jean-de-Luz
(France, Bay of Biscay) in 1966 in kg.

Date	T o t a l w e i g h t	
	Fish below 30 kg	Fish from 30-70 kg
27. V. - 2. VI.	90,149.5	-
3. VI. - 9. VI.	147,819.5	-
10. VI. - 16. VI.	112,657.0	-
17. VI. - 23. VI.	139,460.5	-
24. VI. - 30. VI.	123,527.0	-
1. VII. - 7. VII.	130,048.5	-
8. VII. - 13. VII.	53,535.5	-
15. VII. - 21. VII.	61,779.5	19,713
22. VII. - 28. VII.	98,846.0	23,679
29. VII. - 4. VIII.	96,876.0	22,789
5. VIII. - 11. VIII.	102,176.0	9,423
12. VIII. - 18. VIII.	148,904.5	12,318
19. VIII. - 25. VIII.	84,358.0	-
26. VIII. - 1. IX.	13,094.5	-
2. IX. - 8. IX.	29,830.0	-
9. IX. - 15. IX.	81,929.5	-
16. IX. - 22. IX.	16,468.0	-
23. IX. - 29. IX.	3,762.0	-
7. X. - 13. X.	0,926.0	-
20. X. - 27. X.	0,235.0	-
	1,536,382.5	87,922

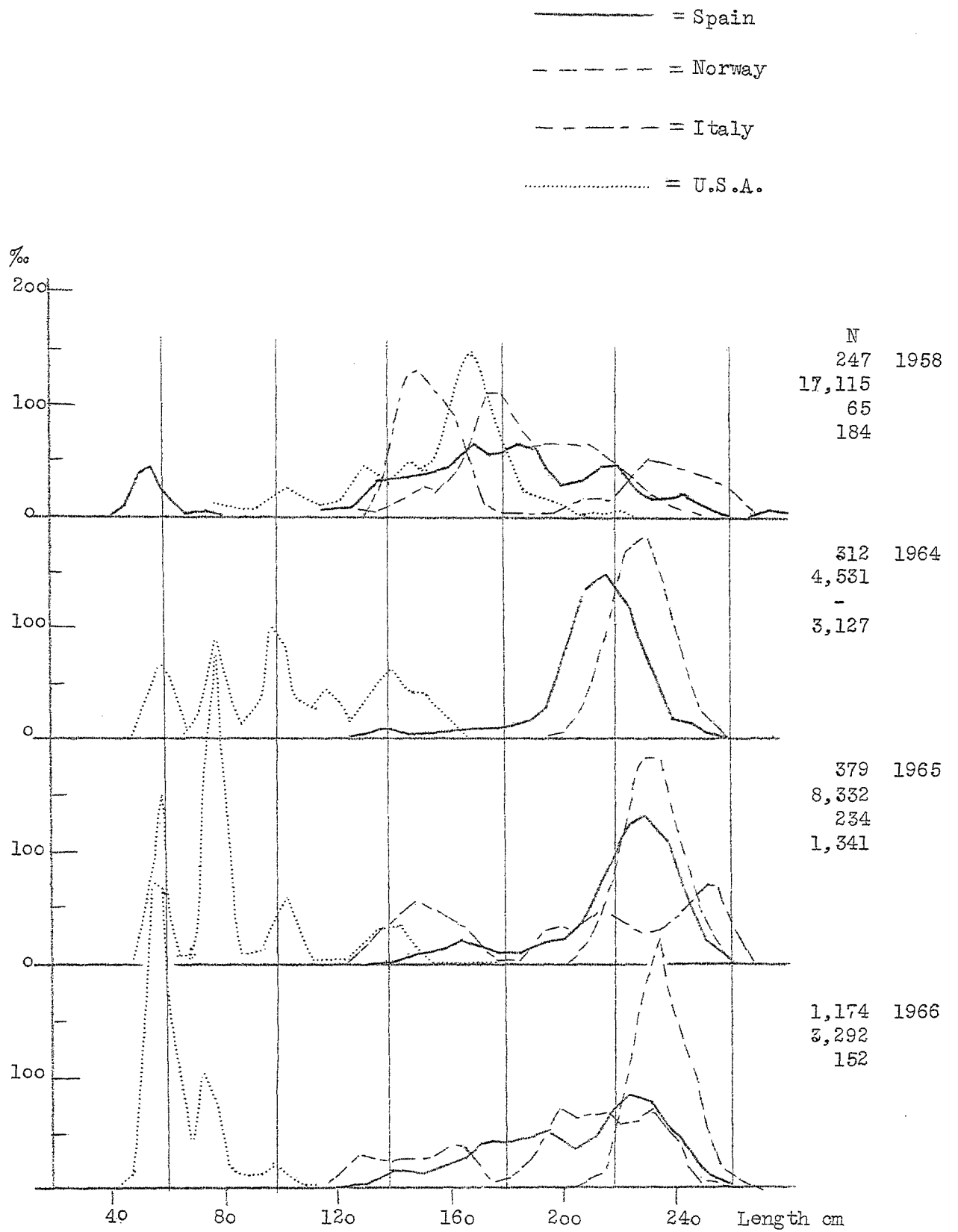


Figure 1. Size composition of West Norwegian, Spanish, Italian and U.S. bluefin-tuna catches by areas in the years 1958, 1964 to 1966 (length is given as fork length by calipers)