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Report from the Bluefin Tuna Working Group

Observations on the Size-Composition of Bluefin Tuna Catches from 1967

by

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I. Introduction

Reference is made to the previous reports of the Bluefin Tuna Working Group (Statistical News Letters, Nos. 20, 26 and 38). Dr. F. Lozano, upon his own request, has been replaced by Dr. C. Maurin. The members of the Working Group have continued their work by correspondance among themselves and with other tuna research workers in the region. The present report deals with the data obtained for the fishing season 1967.

II. Material

Reports on the catches and catch composition of bluefin tuna were submitted by the following countries: Denmark (Table 1), France (Table 2), Italy (Tables 3 to 4), Norway (Tables 5 to 7), Portugal (Table 8), Spain (Tables 9 to 10), Turkey (Table 11), and USA (Table 12). The Federal Republic of Germany reports that the tuna fishery could still not be continued because of inavailability of fish on the usual fishing grounds in the central parts of the North Sea.

For the first time it was possible to obtain size-composition data of Turkish bluefin tuna catches. The data were collected at the Istanbul fish market by the Institute for Hydrobiology of the Istanbul University and submitted by Dr. M. I. Artüz. The fish were caught in the sea of Marmara and in the Bosphorus. Length measurements were taken as fork length by caliper.

Mr. O. Bagge reports that the Danish catches were made east of Læsø on hook and line except 1 tuna, which has been taken in stake nets on the north coast near Skagen. The hook and line fishery has been carried out together with trawl fishery for herring. Mr. R. Letaconnoux states that Table 2 refers only to the catches distributed by the Cooperative Maritime Itsasokoa. The total French catch in the Bay of Biscay was 1,088 tons in 1967 which is lower than in 1966 (= 1,656 tons). According to Dr. R. Sara, Centro Sperimentale per l'Industria della Pesca e Prodotti del Mare, Palermo, the data given in Table 3 refer to fish, which were caught during the spawning time at the end of May and the beginning of June in one madrague. The sample is not a real random sample of the Sicilian tuna catch, because the data were obtained by different purchasers having shown different attitudes in selecting fish of the catches.

The Norwegian material given in Tables 5 to 7 is not quite complete for the southern area, because from 63 tons of tuna landed in district No.VII (Rogaland), it was not possible to get weight slips. The total Norwegian tuna catch in 1967 was approximately 1,500 tons. The Norwegian weight-composition data (Tables 5 to 6) were recalculated into length-composition data on the basis of a K-value of 2.15, calculated from a sub-sample of length/weight measurements.

Dr. Vilela reports that in 1967 only three traps have worked on the south coast of Portugal instead of five as formerly. Only a few tuna were caught on the west coast. Dr. J. Rodriguez-Roda gives in Table 9 the Spanish size-composition data from the madrague catches at Barbate by his own measurements. Bluefin tuna catches could be collected by number of fish for the whole season at Barbate, Sancti-Petri, Tarifa and La Linea (Table 10). The total Spanish tuna madrague catches in 1967 was approximately 3010 tons, distributed so: Barbate 1,836 tons; Sancti-Petri 767 tons; Tarifa 338 tons and La Linea 69 tons.

According to Mr. F. J. Mather III of Woods Hole Oceanographic Institution the US bluefin tuna catches are grouped according to date of landing (Table 12), and some samples may include fish caught in more than one week. The catch distribution by area and weeks is shown in Table 13. Mr. Mather reports that this season was much more successful than that of 1966. However, the tag return rates indicate an extremely high fishing ratio. Another alarming factor is the very poor showing of age I fish, the worst in years (Figure 1).

In Table 13 Mr. Mather has given some effort data based on number of days fished by a selected group of seiners, and their corresponding catch. These data are not complete, since they do not cover all the boats.

III. Comparison of the Catch-Composition Data collected in the Different Countries

1. Spanish with Norwegian catches

As seen in Figure 2, the size composition of the Norwegian tuna catches has remained more or less unchanged since 1964. The very slight increase in length shows that this old age-group, believed to be the 1952 year-class, is now approaching the ultimate length of bluefin tuna. The average weight is however still increasing with some 15 kg a year. Practically no recruitment of younger fish occurs.

The oldest fish occurring on the Spanish coast correspond with those found on the Norwegian coast. Apart from these, fish of the size corresponding to the year-class 1958 predominates again in the catches resulting in a second mode in the length-composition curve. Another mode is formed of fish belonging to year-class 1961. The fish of the year-class 1952 seem to have used 2 to 3 weeks to migrate from the Spanish to the Norwegian coast. It has had its peak of abundance on the Spanish coast in the 29th week and arrived in full strength during week 31 and 32 on the Norwegian coast (Tables 5 and 10).

2. Turkish, Spanish and Norwegian catches

In general, the catches in Turkish waters contain fish of the same size as in the other two fisheries. The maxima in the Turkish length-composition curves do, however, not tally with the Spanish and Norwegian curves. Although the size of the Turkish materials is rather small, the result is astonishingly similar to that observed when comparing the Italian catches of 1965 and 1966 with the corresponding Spanish and Norwegian data. Also in this case the age composition of Italian madrague catches was different by showing maxima where the Spanish and Norwegian curves had minima. The findings, although very preliminary, indicate that the relative strength of year-classes of bluefin tuna in the Mediterranean Sea (including its adjacent seas) and in the East Atlantic differs during the period under survey, suggesting that the bluefin tuna forms two more or less distinct stocks of fish in these areas. In view of the importance of such a conclusion for the management of the bluefin tuna stock, it is highly recommended, to collect further and greater amounts of data, in order to be able to draw definite conclusions in this direction.

3. Italian with Norwegian catches

It is unfortunately not possible to recalculate the Italian weight-composition data into length-composition data because we do not know the condition factor of the Italian fish. Therefore only the weight compositions of Italian and Norwegian catches can be compared. No conclusion can be drawn from this comparison in the direction discussed under 2., since the differences in the size composition expected are too small to be reflected by comparing uncorrected weight composition curves. In general, previous findings can be confirmed that the Italian catches consisted as the Spanish catches of more age-groups than the Norwegian catches (Tables 3 and 5).

4. U.S. with Spanish and Norwegian catches

Contrary to the previous years, fish of age-group I was absent in the US catches, which consisted as in 1966 of fish of year-classes 1965, 1964, and 1963.

Mr. Mather III reported that in 1967 another 16 fish, which were tagged on the US coast, were recaught in the Bay of Biscay. 11 of these had been released in 1966, and 5 in 1965. The period in which the latter crossed the ocean cannot be determined, but 4 of them were released in the same period and area as 2 which were recaptured in the Bay of Biscay in 1966. During 1966 and 1967 a total of 31 tuna were thus recaptured in the Bay of Biscay and had crossed the Atlantic. As already stated for the previous years the size composition of the US bluefin tuna purse-seine catches was completely different from those made on the Spanish and Norwegian coasts.

IV. Summary

1. The size composition of bluefin tuna catches made in various countries has been compared. The Norwegian tuna catches were likely composed of fish of year-class 1952 while the Spanish catches were composed of several year-classes wherein year-class 1952 predominated again, but showed a much lesser relative abundance in 1967 than in the previous years. Fish of year-class 1958 and of 1961 were other important groups of fish in the catches.

2. The age composition of Turkish hook and line catches made in 1967 was different from that of the Norwegian and Spanish catches. Another hint is thus given of the existance of a difference in the relative strength of year-classes of bluefin tuna in the East Atlantic and in the Mediterranean Sea (including adjacent seas) suggesting that bluefin tuna forms two more or less distinct stocks of fish in these areas. Further and greater amounts of data are necessary to draw definite conclusions in this direction.

3. The age composition of US bluefin tuna catches was found again completely different from that of Spanish and Norwegian catches. In 1967 fish of age-group I was entirely absent in the US catches, which is for the first time since the beginning of the fishery. In 1967, another 16 bluefin tuna, tagged in the west Atlantic, were recaught in the Bay of Biscay, bringing up the total of fish having crossed the Atlantic since 1966 to 31.

References

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Table 1. Weight distribution in ‰ (smoothed) of 38 bluefin tuna caught in the Kattegat by Danish fishermen in 1967. The weight-group refers to gutted fish (kg)

Group	‰
195	0
200	7
205	13
210	7
215	0
220	7
225	20
230	20
235	26
240	66
245	73
250	33
255	39
260	67
265	60
270	60
275	73
280	73
285	53
290	53
295	52
300	39
305	39
310	20
315	7
320	20
325	20
330	13
335	13
340	7
345	7
350	13
	1,000

Table 2. Bluefin tuna catches at St. Jean-de-Luz (France) in 1967 in kg (data given by Cocperative Maritime Itsasokoa).

Date	Total Weigth	
	Fish below 30 kg	Fish above 30 kg
11.V. - 18.V.	11,248.5	3,254
26.V. - 1.VI.	3,473	-
2.VI. - 8.VI.	32,275.5	-
9.VI. - 15.VI.	45,583.5	-
16.VI. - 22.VI.	26,819.5	-
23.VI. - 29.VI.	21,057	-
30.VI. - 6.VII	29,636	-
7.VII. - 11.VII.	13,988.5	-
12.VII. - 18.VII.	68,521	2,402
19.VII. - 27.VII.	16,299.5	-
28.VII. - 2.VIII	22,593	-
3.VIII. - 10.VIII.	29,920.5	-
11.VIII. - 17.VIII.	41,345.5	-
18.VIII. - 24.VIII.	108,927	20,534
25.VIII. - 31.VIII.	108,430.5	27,467
1.IX. - 7.IX.	48,563.5	-
8.IX. - 14.IX.	34,399.5	-
15.IX. - 21.IX.	42,847.5	-
22.IX. - 28.IX.	33,858	-
29.IX. - 5.X.	8,701	-
6.X. - 12.X.	1,787.5	-
13.X. - 19.X.	9,903	-
Total	760,178.5	53,657

Table 3. Weight distribution in ‰ (smoothed) of 558 bluefin tuna caught in Sicilian madragues during May and June 1967. The weight-group refers to ungutted fish (kg).

Group	‰	Group	‰
25	1	245	12
30	6	250	16
35	12	255	15
40	13	260	15
45	16	265	19
50	27	270	16
55	48	275	12
60	61	280	13
65	49	285	11
70	30	290	5
75	28	295	6
80	44	300	14
85	64	305	16
90	60	310	11
95	36	315	6
100	17	320	4
105	9	325	5
110	5	330	8
115	4	335	7
120	6	340	8
125	6	345	10
130	5	350	9
135	7	355	7
140	8	360	4
145	8	365	1
150	8	370	0
155	6	375	0
160	5	380	1
165	6	385	3
170	8	390	3
175	10	395	3
180	11	400	3
185	8	405	3
190	5	410	1
195	4	415	0
200	5	420	1
205	11	425	1
210	13	430	1
215	11	435	0
220	9	440	0
225	7	445	1
230	7	450	1
235	11	455	1
240	12	460	0
			1,000

Table 4. Bluefin tuna catch of Sicilian madragues in number of fish caught in 1967

Madragues stationed in:	Number
Oliveri	105 (below 80 kg each)
Trabia	650
Punta Raisi	2,800
Scopello	810 x)
Bonagia & S. Cusumano (one madrague)	2,450
Favignana & Formica (two madragues)	7,500
Capo Granitola xx)	450
Marzamemi xx)	70
	14.835

x) Note that Scopello have lost almost 20 days of the fishing season, for the delay on its setting.

xx) Madrague of the "back period".

Table 5. Size-composition (kg) of Norwegian tuna catches south of 62°N by smoothed weight frequency (per mille) in 1967.

Group w'	Means w	Week Numbers 30	31	32	33	34	35	36	37	38	39	Total
72	93									1		
77	99									1		x
82	105									1		
92	119										1	
97	125										2	x
102	131										1	
117	150		1									
122	157		1			1						x
127	163		1	1								x
132	170			1								x
137	176			2					1			x
142	183		1	2					2		1	x
147	189		3	2		1			1	1	2	1
152	195		5	3		1		1		1	2	2
157	202	14	6	4	1	3		2		2	1	3
162	208	28	8	8	2	4		2	1	3		5
167	215	14	16	11	3	4	2	2	2	4	1	7
172	221	14	24	12	7	6	5	3	2	5	3	9
177	227	42	30	16	14	10	5	5	2	4	3	12
182	234	56	41	26	20	17	9	5	5	6	3	19
187	240	98	55	39	17	23	11	6	8	9	5	26
192	247	139	61	45	20	25	14	10	10	12	7	30
197	253	111	58	54	44	30	20	16	13	16	14	36
202	260	70	62	67	69	39	23	23	16	17	21	45
207	266	28	74	73	76	49	32	27	28	18	24	53
212	272	14	78	75	77	59	36	25	42	24	33	58
217	279	42	74	77	81	60	40	27	49	36	45	61
222	285	42	71	74	85	60	76	37	50	42	52	63
227	292	28	64	70	89	65	98	51	45	41	51	64
232	298	28	55	68	85	72	80	61	42	45	47	65
237	305	28	47	61	68	73	62	64	42	58	49	62
242	311	56	36	51	49	69	65	65	54	63	55	57
247	317	84	30	40	42	64	74	72	69	52	60	52
252	324	56	30	30	40	54	58	75	60	48	60	46
257	330	14	26	25	32	45	45	65	51	58	53	40
262	337		19	21	25	39	56	51	61	61	51	36
267	343		12	14	21	33	54	46	70	57	46	31
272	350		6	10	13	27	36	41	63	49	38	25
277	356		3	7	10	21	23	32	49	42	41	20
282	362		3	6	8	16	20	31	36	42	47	17
287	369		3	5	4	10	20	33	24	42	41	14
292	375		3	3	1	7	14	27	19	40	33	11
297	382		1	1	1	5	9	24	22	32	21	9
302	388			1	1	4	7	23	20	20	19	7
307	395				1	3	2	15	14	13	10	5
312	401				1	3		8	9	11	8	4
317	408			1		2		5	4	10	8	2
322	414					1		5	1	8	5	1
327	420							5	1	5	5	1
332	427							4	2	1	6	1
337	433						2	4	3		6	1
342	440						5	2	2	1	3	x
347	446						2	1	1	3	4	x
352	453							1		2	6	1
357	459							1	-	1	3	x
362	465							1				
	n	18	508	1,721	490	1,824	112	435	286	475	383	6,652

Table 6. Size-composition (kg) of Norwegian tuna catches north of 63°N by smoothed weight frequency (per mille) in 1967

Group w'	Means w	Week Numbers 30	31	33	Total
147	189		4		3
152	195		13		8
157	202		13		8
162	208	7	4		5
167	215	15	13		13
172	221	7	25		18
177	227		13		8
182	234		8		5
187	240	7	21	42	18
192	247	22	38	84	35
197	253	36	54	42	47
202	260	57	50		50
207	266	72	38		47
212	272	57	34		40
217	279	50	42		42
222	285	108	54	83	74
227	292	165	54	167	99
232	298	129	50	83	79
237	305	64	75		67
242	311	29	104		72
247	317	29	87	42	65
252	324	43	54	84	52
257	330	43	37	42	40
262	337	43	33	42	38
267	343	22	29	84	30
272	350		21	42	15
277	356		17		10
282	362		13	42	10
287	369		4	84	8
292	375			42	3
	n	35	60	6	101

Table 7. Calculated length data - length frequency distribution in per mille for Norwegian tuna catches in 1967 (K = 2.15)

Length Groups cm	Southern area	Northern area
205-209	3	11
210-214	9	16
215-219	22	33
220-224	50	26
225-229	102	122
230-234	144	114
235-239	187	214
240-244	171	215
245-249	135	152
250-254	93	79
255-259	52	26
260-264	24	1
265-269	7	-
270-274	2	-
275-279	1	-

Table 8. Bluefin tuna caught from the south coast of Portugal madragues in 1967, specified by weight-group (kg)

Months	Number of fish					Total
	> 90	50-89	30-49	10-29	<10	
	Atún	Atuarros	Albacoras	Cachorretas	Cachorretitas	
May	197	82	-	-	-	279
June	116	28	1	3	14	162
July	886	122	3	-	1	1,012
August	167	31	-	-	-	198
Total	1,366	263	4	3	15	1,651

Table 9. Weekly size - composition in ‰ (smoothed) of Spanish madrague catches at Barbate in 1967. (D = pre-spawning fish; R = post-spawning fish) (Rodriguez-Roda, 1968)

Length-group \ Week No.	D 19	D 20	D 22	D 23	D 24	R 28	R 29	R 30	Total
115 - 119,5							1		0
120 - 124,5							2		1
125 - 129,5							1		0
130 - 134,5		6		2			0		1
135 - 139,5		13	5	5	11		0		4
140 - 144,5	1	13	9	6	21		0	2	5
145 - 149,5	3	19	5	8	21		0	5	7
150 - 154,5	5	39	5	11	32	8	1	6	13
155 - 159,5	8	59	23	17	52	19	6	6	22
160 - 164,5	8	60	37	29	63	19	13	19	27
165 - 169,5	4	42	27	37	52	15	11	32	24
170 - 174,5	3	24	18	29	32	15	7	22	16
175 - 179,5	6	16	18	19	21	30	12	34	16
180 - 184,5	7	11	23	27	63	69	24	65	26
185 - 189,5	8	13	32	48	105	89	37	68	35
190 - 194,5	13	24	50	58	84	85	54	76	45
195 - 199,5	31	32	73	67	104	104	70	101	61
200 - 204,5	48	42	105	104	146	123	75	102	75
205 - 209,5	53	52	132	123	114	104	77	83	78
210 - 214,5	50	41	105	84	62	70	75	63	64
215 - 219,5	42	25	73	47	21	58	62	55	47
220 - 224,5	48	26	64	39		58	50	49	43
225 - 229,5	79	45	36	31		39	66	44	53
230 - 234,5	97	72	27	30		23	93	44	67
235 - 239,5	114	90	37	29		27	98	36	75
240 - 244,5	140	91	32	34		27	75	29	74
245 - 249,5	120	73	27	51		15	44	26	59
250 - 254,5	68	46	23	44		4	25	19	37
255 - 259,5	33	20	14	19			13	10	17
260 - 264,5	11	6	5	5			6	2	6
265 - 269,5	1	4					3		2
270 - 274,5		1					1		1
n =	228	279	55	161	24	65	315	154	1,281

Table 10. Spanish bluefin tuna catches (by number of fish) at Barbate, Sancti-Petri, Tarifa and La Linea by weeks in 1967 (D = pre-spawning; R = post-spawning fish) (Rodriguez-Roda, 1968).

Week No.	Time	Number of fish and spawning condition			
		Barbate	Sancti-Petri	Tarifa	La Linea
18	30.IV. - 6.V.	220 D	289 D	21 D	
19	7.V. - 13.V.	1,251 D	143 D	331 D	
20	14.V. - 20.V.	2,545 D	1,958 D	769 D	
21	21.V. - 27.V.	1,619 D	711 D	30 D	
22	28.V. - 3.VI.	650 D	440 D	372 D	
23	4.VI. - 10.VI.	427 D	377 D	314 D	
24	11.VI. - 17.VI.	162 D	224 D	19 D	
25	18.VI. - 24.VI.	64 D	222 D	30 D	
26	25.VI. - 1.VII	9 D & R	44 D		
27	2.VII. - 8.VII.	26 R			12 R
28	9.VII. -15.VII.	192 R			108 R
29	16.VII. - 22.VII.	1,490 R			303 R
30	23.VII. - 29.VII.	447 R			48 R
31	30.VII. - 5.VIII.	412 R			7 R
32	6.VIII.- 12.VIII.	8 R			-
33	13.VIII.- 19.VIII.	118 R			-
34	20.VIII.- 26.VIII.				2 R
35	27.VIII.- 2.IX.				2 R
36	3.IX. - 9.IX.				
37	10.IX. - 16.IX.				
38	17.IX. - 23.IX.				
		9,640	4,408	1,886	482

Total = 16,416

Table 11. Size composition in ‰ (smoothed) (fork length by caliper) of Turkish bluefin tuna catches in 1967 (landed at the Istanbul fish market).

Length cm	January	February	March	April	May-December	Total
~~85~~					14	2
90					34	6
95					27	5
100					7	2
140		7			-	2
145		13			-	2
150		7			7	2
155		7			14	4
160		20			7	6
165	6	20			14	7
170	12	13			20	8
175	6	13			41	10
180	6	13	15	4	54	16
185	30	26	30	9	47	26
190	59	39	15	4	47	30
195	70	63	7	4	68	40
200	71	82	22	22	69	51
205	77	57	37	39	41	50
210	83	51	59	35	48	53
215	83	51	66	48	68	62
220	78	39	66	90	48	66
225	60	45	81	90	34	64
230	54	51	66	69	47	58
235	54	45	44	98	47	61
240	49	39	74	120	34	67
245	59	63	118	95	34	77
250	53	76	111	78	41	76
255	24	57	66	60	34	50
260	12	50	44	35	27	31
265	6	26	37	31	20	22
270	-	-	15	31	7	12
275	-	7	7	17		7
280	6	13	13	4		7
285	12	7	7	-		5
290	6			4		3
295	-			9		3
300	-			4		3
305	-					2
310	6					2
315	12					3
320	6					-
	1,000	1,000	1,000	1,000	1,000	1,000
n =	42	39	34	58	37	210

Table 12. Weekly size composition of US bluefin tuna purse-seine catches in ‰ (smoothed) (fork length by caliper) off New Jersey and Long Island for 1967.

Length cm	Weeks							Total
	27 - 28	28 - 29	29	33	34	35	36	
50				1			2	
55				14	5	3	46	12
60	19	4		29	11	7	116	32
65	142	36	21	33	19	13	120	45
70	310	71	146	96	85	57	130	102
75	287	58	354	249	187	190	220	204
80	138	34	354	285	183	261	220	207
85	63	30	125	139	87	146	99	98
90	34	68		36	59	63	20	49
95	7	175		38	90	93	12	69
100		245		39	87	88	11	76
105		200		26	47	43	4	46
110		73		1	19	13		15
115		6		4	21	3		9
120				10	37	8		16
125				8	39	9		17
130				2	19	3		7
135					4			1
140					1			
	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
n =	67	128	12	260	526	219	254	1,466

Table 13. Catch (in short tons, above line) and effort (in days fished, below line) in the north-western Atlantic bluefin tuna purse-seine fishery for 1967 season, by weeks and statistical areas (Figure 1).

Week	VA, C, D & near 39°00'N, 74°00'W	VB	IVC	IVD	IVE, F	IIIC, D & near 40°30'N,67°45'W	In and south of VE amd F	T o t a l
26 (July 1)			0/1	0/1				0/2
27 (July 2-8)		195.9/9						195.9/9
28 (July 9-15)		17.0/6						17.0/6
29 (July 16-22)	161.4/4	318.1/1.3						479.5/17
30 (July 23-29)	8.3/1	128.9/14						137.2/15
31 (July 30-Aug.5)		0/5	129.4/10	0/1	0/1			129.4/17
32 (Aug.6-12)	0/1	0/2	220.7/6				0/1	220.7/10
33 (Aug.13-19)		173.2/11	536.9/29				0/1	710.1/38
34 (Aug.20-26)		172.6/5	425.3/20					579.9/25
35 (Aug.27-Sept.2)	0/5	0/5	28.5/20		0/5	7.8/2		36.3/37
36 (Sept.3-9)			0/1	31.9/4	0/4			31.9/9
T o t a l	169.7/11	1,005.7/70	1,340.8/84	31.9/6	0/10	7.8/2	0/2	2,555.9/185

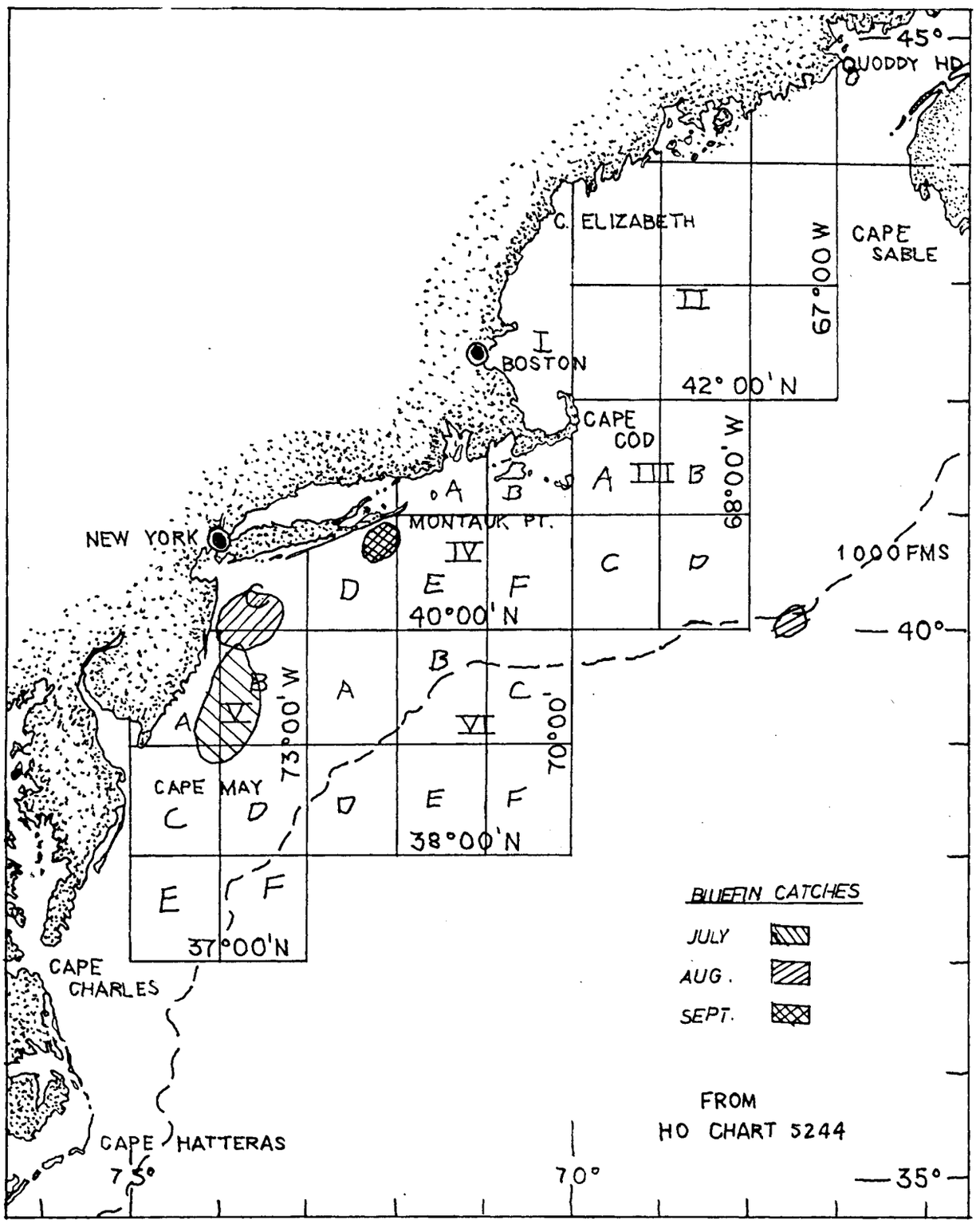

Figure 1. Map showing fishing grounds of US bluefin tuna fishery.

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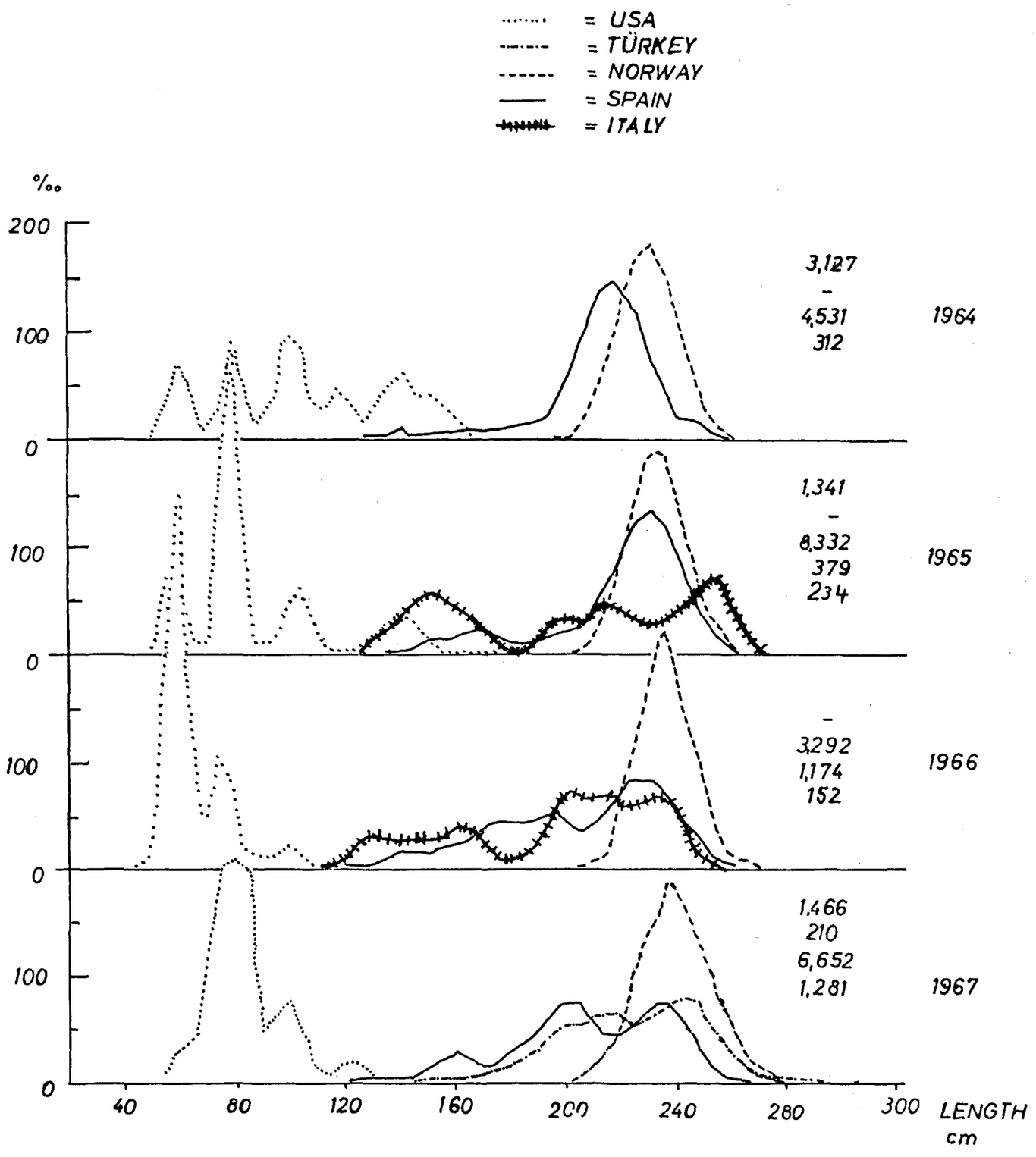

Figure 2. Size composition of bluefin tuna catches made in USA, Turkey, Norway, Spain and Italy.

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