

**COOPERATIVE RESEARCH REPORT**

Series A, No. 23

**FOURTH REPORT OF THE BLUEFIN TUNA WORKING GROUP**

**Observations on the size composition  
of Bluefin Tuna catches from 1967 to 1969**

by

J. Hamre, C. Maurin, J. Rodriguez-Roda and K. Tiews

ISBN 978-87-7482-524-1

ISSN 2707-7144

<https://doi.org/10.17895/ices.pub.5525>

International Council for the Exploration of the Sea  
Charlottenlund Slot, DK-2920 Charlottenlund  
Denmark

*March 1971*



## Contents

	<u>Page</u>
Introduction .....	1
Material .....	1
Bluefin Tuna catches .....	5
Comparison of the catch composition data collected in different countries .....	6
Spanish catches compared with Norwegian ones .....	6
Turkish, Italian, Spanish and Norwegian catches .....	7
US catches compared with Spanish, Norwegian, Turkish, Italian and French catches .....	7
Summary .....	8
References .....	9
Tables 1 - 38 .....	11
Figures 1 and 2 .....	48



### Introduction

Reference is made to the previous reports of the Bluefin Tuna Working Group (Statistical News Letters, Nos. 20, 26 and 38). Following recommendations of the Pelagic Fish (Southern) Committee in 1967, 1968 and 1969, the members of the Bluefin Tuna Working Group have continued to collect data on the development of the Bluefin Tuna fisheries in the North Atlantic and adjacent seas. The work was carried out by correspondence between members and with other tuna scientists in the region. It has been concentrated on collecting data on the size composition of tuna catches made in 1967 to 1969.

During the reporting period Dr. C. MAURIN has replaced Dr. F. LOZANO CABO, who wished to be replaced.

### Material

On the occasion of the First Session of the International Commission for the Conservation of Atlantic Tunas, FAO has published a Bulletin of Fisheries Statistics (No.19) on the catch statistics of Atlantic tuna fisheries, which includes a table on the catches of Bluefin Tuna in the Atlantic Ocean and adjacent seas by major fishing areas and by countries. This is reproduced as Table 1 of the present report. The 1968 figure for Canada has been corrected upon information received from Dr. S. N. TIBBO of the Fisheries Research Board of Canada.

Reports on catches and catch composition of Bluefin Tuna were submitted by the following countries: Denmark (Table 2), France (Tables 3-7), Italy (Tables 8-13), Norway (Tables 14-22), Portugal (Tables 23-25), Spain (Tables 26-31), Turkey (Tables 32-34), and USA (Tables 35-38). The Federal Republic of Germany reported that the tuna fishery, which ceased in 1962, could still not be resumed because of unavailability of fish on the former fishing grounds in the central parts of the North Sea.

For the first time it has been possible to obtain size composition data of Turkish Bluefin Tuna catches. In 1967 such data were collected at the Istanbul fish market by the Institute of Hydrobiology of the Istanbul University and submitted by Dr. M. J. ARTUZ. The fish were caught in the Sea of Marmara and in the Bosphorus. Length measurements are fork length measured by caliper. The scientist reports for 1968 that tuna landings at the Istanbul fish market were so scarce during June, August, September and December that no data could be collected. No data were obtained for 1969.

Dr. O. BAGGE reports for 1967 that the Danish catches were made east of Læsø on hook and line, except one tuna which has been taken in a stake net on the north coast near Skagen. The hook and line fisheries have been carried out together with trawl fishery for herring. In 1968, the Danish catches were made between 17 August and 23 October in Kattegat east of Læsø on hook and line or in midwater trawls as by-catch in connection with herring trawling, except for the one fish, which was caught in a stake net south of Skagen harbour on 26 July. The 1969 fish were caught by midwater herring trawls, 14 by Danish fishermen and the others by Swedish fishermen.

Mr. R. LETACONNOUX states that Table 3 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, thus lower than in 1966 (= 1 656 tons). In 1968 the catch decreased to 426 tons. In this year Dr. C. MAURIN supplied for the first time length composition data of French Bluefin Tuna catches made in the Mediterranean Sea (Table 5). Mr. DUCLERC from the Laboratoire de Sète (ISTPM) reports that a total of 1 500 tons of Bluefin Tuna was caught from July 1969 to January 1970 by the French purse-seine fishery in the Mediterranean. Most of the catches were made during October and November (Table 7).

According to Dr. R. SARA, Centro Sperimentale per l'Industria della Pesca e Prodotti del Mare, Palermo, the data given in Table 8 refer to fish which were caught during the spawning time at the end of May

and the beginning of June in one madragge. The presented sample is not a real random sample of the Sicilian tuna catches, because the data were obtained by different purchasers with different attitudes in selecting fish from the catches. According to Dr. ARENA and Dr. LI GRECI the fish treated in Table 10 are from 6 subsamples, taken between 1 June and 31 July 1968, from tuna traps stationed at Punta Raisi, San Cusumano, Favignana and Capo Grani-tola. The data given in Table 11 were submitted by Dr. SARA from catches made in the madragues stationed at Favignana, San Cusumano and Formica. The Italian data for 1968 were kindly submitted through the Working Group of Scombroid Fishes of the GFCM. The data in Table 12, submitted by Dr. LI GRECI, are from tuna caught during May to June 1969 in the madragues stationed at Punta Raisi and at San Cusumano (Bonagia), and those in Table 13, collected by Dr. R. SARA, refer to tuna catches made in madragues at Scopello, Favignana and Formica.

The Norwegian material given in Tables 14-16 is not quite complete for the southern area, because it was not possible to get weight slips from 63 tons of tuna landed in district No.VII (Rogaland). The total Norwegian tuna catch in 1967 was approximately 1 500 tons. The Norwegian weight composition data (Tables 14-15) were recalculated into length composition data on the basis of a K-value of 2.15, calculated from a subsample of length/weight measurements. In 1968, the Norwegian tuna catch decreased to about 500 tons, and in 1969 it increased again to approximately 700 tons. Since no length/weight measurements were made in 1969, the 1968 condition factor of  $K = 2.16$  was used to transform the collected weight data into length data.

Dr. H. VILLELA reports that in 1967 only 3 traps were operated on the south coast of Portugal instead of 5 in earlier years. They gave a total catch of 1 651 fish. Only a few tuna were caught on the west coast. In 1968 only 39 tuna were caught by traps, but 26 199 tuna were caught from mid-September to mid-October in the same year by hook and line on the west coast of Portugal. These were small fish of about 5 kg each.

Dr. J. RODRIGUEZ-RODA gives in Table 26 the Spanish size composition data from the madrague catches at Barbate based upon his own measurements. Bluefin Tuna catches could be recorded by numbers of fish for the whole season of 1967 at Barbate, Sancti-Petri, Tarifa and La Linea (Table 27). The total Spanish tuna madrague catches in 1967 were approximately 3 010 tons, distributed as follows: Barbate 1 863 tons; Sancti-Petri 767 tons; Tarifa 338 tons; and La Linea 69 tons. In 1968 the Spanish Bluefin Tuna catches were extremely poor (1 138 tons). The madragues of La Linea did not catch any tuna, and the madrague of St.-Petri was replaced by the madrague of Conil in view of the poor catches made in 1967 at St.-Petri. In 1969 the Spanish madrague catches were again slightly better than in 1968, amounting to 1 634 tons.

According to Mr. F. J. MATHER III of Woods Hole Oceanographic Institution the US Bluefin Tuna catches were grouped according to date of landing in Table 35, and some samples may include fish caught in more than 1 week. The catch distribution by area and week is shown in Table 36. Mr. MATHER reports that the 1967 season was much more successful than that of 1966. However, the tag return rates indicate an extremely high fishing rate. Another alarming factor is the very poor appearance of age I fish, the worst for years (Figure 1). In Table 36 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 boats. Mr. MATHER states that in 1968 the total Bluefin Tuna catches were about 670 short tons of small fish taken between Maryland and Cape Cod, and 150 short tons of giant tuna made north of Cape Cod (Cape Cod Bay). Bluefin Tuna catches were thus much lower in 1968 than in 1967, when 2 556 tons were caught.

In 1969, US purse-seine catches of relatively small Bluefin Tuna increased again to 1 728 short tons. There was no fishing of giant tuna in Cape Cod Bay this year, because the two small seiners, which had been based there, were sold to fishermen in other areas.



Mr. MATHER III reported that in 1967 another 16 fish which were tagged on the US coast, were re-caught in the Bay of Biscay. Eleven of these had been released in 1966, and five 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 32 tuna were thus recaptured in the Bay of Biscay after having crossed the Atlantic.

Mr. MATHER reports further that another Bluefin Tuna caught in the Bay of Biscay had been received in 1969. This fish was released off New Jersey on 7 July, 1967 and recaptured by a French fisherman on 3 July, 1969. One fish released the day before in the same locality was recaptured in the Bay of Biscay in October 1968. These are the only transatlantic migrations of small Bluefin Tuna released since 1967 which have been recorded. Although the number of releases has declined since then, there appears to have been a definite high point of transatlantic migrations in the years 1965 to 1966. In total 34 tagged Bluefin Tuna have crossed the Atlantic since 1966.

#### Bluefin Tuna catches

As indicated in Table 1, the total Atlantic Bluefin Tuna catch has steadily declined since 1962. In 1968 it was 22 400 tons or less than half the catch in 1962. While catches in the northwest Atlantic declined to less than one third, the most marked decline occurred in the northeast Atlantic, where catches went down from 23 900 tons in 1962 to 4 400 tons in 1968. The main reduction in catch is observed in the Norwegian, Spanish and Portuguese fisheries. The Bluefin Tuna catches in the Mediterranean and the Black Sea have remained at the same level as in previous years. This is another indication that the Mediterranean has a more or less independent Bluefin Tuna population.

Comparison of the catch composition data collected  
in different countries

Spanish catches compared with Norwegian ones

The size composition of the Norwegian Bluefin Tuna catches has remained more or less unchanged over the last 5 years (Figure 2). The majority of the fish caught belonged to the rich year class 1952. The fact that the size has not increased over the last years is explained by the assumption that the ultimate length of the fish has been reached. It is, however, reasonable to believe that a certain recruitment of younger fish to the Norwegian tuna stock has also taken place during the last years. A similar phenomenon has been reported by TIEWS (1964) for the last years of the German tuna fishery in the North Sea which terminated in 1962.

In 1967, the oldest fishes occurring on the Spanish coast corresponded with those found on the Norwegian coast. Apart from these, fish of a size corresponding to the year class 1958 dominated again in the catches, resulting in a second mode of the length composition curve. Another mode was formed of fish belonging to year class 1961. The fishes of the year class 1952 seemed to have used two to three weeks to migrate from the Spanish to the Norwegian coast. It had its peak abundance on the Spanish coast in the 29th week and arrived in full strength during week 31 and 32 on the Norwegian coast (Tables 14-26).

In 1968, the composition of the Spanish catches changed. Old fish of year class 1952 became much fewer, and the dominating year class was that of 1958. Other, younger year classes were less predominant than in 1967.

In 1969, fish of a length corresponding to the year class 1958 dominated again in the Spanish catches. A second mode of the length composition curve can presumably be attributed to fish of the year class 1961 which was detected in the 1967 catches as a distinct mode. Some small tuna (below 90 cm) were also caught in

the Spanish madragues in 1969, probably belonging to the year classes 1968 and 1967.

#### Turkish, Italian, Spanish and Norwegian catches

In general, the catches in Turkish waters contain fish of the same size as in the other fisheries. The maxima in the Turkish length composition curve did, however, not tally with the Spanish and Norwegian curves in 1967 and 1968. Although the Turkish material 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 (HAMRE et al., 1968). In this case the age composition of Italian madrague catches was also different by showing maxima where the Spanish and Norwegian curves had minima. In 1968, two of the modes in the right part of the Italian curves corresponded well with modes in the Turkish curve, while the two first ones did not tally. One should remember, however, that relatively few data are available.

These results seem to indicate that the relative strength of year classes of Bluefin Tuna in the Mediterranean Sea (including its adjacent seas) and in the East Atlantic have differed during the years from 1965 to 1968, suggesting that the Bluefin Tuna forms two more or less distinct stocks of fish in these areas.

However, in 1969 the two larger modes of the Italian curve have corresponded well with those of the Spanish curves, but the data are too scarce to be conclusive. In view of the importance of such a conclusion for the management for the Bluefin Tuna stock, it is strongly recommended to collect further and greater amounts of data in order to be able to reach more definite conclusions concerning this problem.

#### US catches compared with Spanish, Norwegian, Turkish, Italian and French ones

The US purse-seine catches were composed of smaller fish than the catches of Spain, Norway, Turkey and Italy.

In 1967, contrary to the previous years, fish of age group I were absent in the US catch, which consisted as in 1966 of fish of the year classes 1965, 1964 and 1963.

In 1968, fish of age group I were scarce in the landings. It was noted, however, that fishes of the 1966 year class, which did not show up in 1967, occurred in considerable quantities in 1968.

The French tuna catches from the Mediterranean with a similar age composition as the US catches, were composed of smaller fish than the catches of Spain, Norway, Turkey and Italy.

In 1969, for the third time fish of age group I were absent in the US purse-seine catches. The catches were composed of the year classes 1967 and 1966, as well as 1965. Mr. MATHER states that the average size of fish of age group II was definitely larger in recent years than earlier. In 1969 the size composition of the French catches from the Mediterranean did not seem to tally with any of the others. The smallest fish may have belonged to the year classes 1967 or 1966.

#### Summary

1. There is an alarmingly high rate of decline in Atlantic Bluefin Tuna catches from 1962 to 1968. The decline was largest in the northeast Atlantic, where catches went down from 23 900 tons in 1962 to 4 400 tons in 1968. Only the Mediterranean catches remained more or less unchanged, indicating that the Mediterranean Bluefin Tuna population constitutes a more or less independent stock.
2. The size composition of Bluefin Tuna catches made in various countries have been compared. The Norwegian tuna catches from 1967 to 1969 were mainly composed of fish of the year class 1952, while the Spanish catches consisted of several year classes, of which the year class 1952 predominated

only in 1967, but with a much lesser relative abundance in that year than in the previous years. In the following years younger year classes predominated in the Spanish catches.

3. The age composition of Turkish hook and line catches made in 1967 and 1968 was different from that of the Norwegian and Spanish catches. This was also the case with the Italian madrague catches in 1968. This is another indication 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 in these areas. Further and more numerous data are needed in order to draw definite conclusions in this respect.
4. The age compositions of US Bluefin Tuna catches were again completely different from that of Spanish, Norwegian and Italian catches. Contrary to what has been the case in earlier years, fish of age group I were practically absent in the US catches in all three years under observation. This has happened for the first time since the beginning of the fishery. In 1967 another 16 Bluefin Tuna, in 1968 1 Bluefin Tuna and in 1969 also 1 Bluefin Tuna, tagged in the western Atlantic, were re-caught in the Bay of Biscay. This brings the total of tagged fish having crossed the Atlantic since 1966 up to 34.

#### References

- |     |      |   |
|-----|------|---|
| FAO | 1969 | "Report of the Working Party on Mediterranean Scombroid resources".<br>FAO/GFCM 10/69/11:10 pp. |
| FAO | 1968 | "Atlantic tuna fisheries: catch statistics". Bull.Fish.Statistics,<br><u>19</u> :30 pp.         |

- Hamre, J. 1964 "Report from the Bluefin Tuna  
and Tiews, K. Working Group. On the Size  
Composition of Tuna Catches  
from 1956-62". Stat.News  
Letters, 20:1-43. Cons.perm.  
int.Explor.Mer.
- Hamre, J., 1966 "Second Report from the Bluefin  
Lozano, F., Tuna Working Group. On the  
Rodriguez-Roda, J. Development of the Bluefin Tuna  
and Tiews, K. Fisheries from 1950-64 and further  
observations on size composition of  
Bluefin Tuna catches". Stat.News  
Letters, 26:1-34, Cons.perm.int.  
Explor.Mer.
- Hamre, J., 1968 Third Report from the Bluefin  
Lozano, F., Tuna Working Group. Observations  
Rodriguez-Roda, J. on the Size Composition of Blue-  
and Tiews, K. fin Tuna Catches from 1965-66".  
Stat.News Letters, 38:1-27.  
Cons.int.Explor.Mer.
- Rodriguez-Roda, J. 1970 "El atún, Thunnus thynnus (L.)  
del sur de España en la campana  
almadrabera del año 1969 y su  
relación con la temperatura y  
transparencia del agua del mar".  
Investigación Pesquera, 34(2).
- Tiews, K. 1964 "Der Thunbestand (Thunnus thynnus  
(L.)) in der Nordsee, seine  
Wanderungen, seine transatlan-  
tischen Beziehungen und seine  
Nutzung durch die deutsche  
Fischerei". Arch.Fischwiss.,  
14(3):105-48.

Table 1. Bluefin Tuna catches in the Atlantic Ocean and adjacent seas, by major fishing areas and by countries.

Nominal catch (live weight), thousand metric tons.

Fishing area, Country	1962	1963	1964	1965	1966	1967	1968
<b>GRAND TOTAL</b>	50.6	44.8	42.6	36.7	26.8	29.8	22.4
<u>Northwest Atlantic</u>	<u>3.4</u>	<u>4.7</u>	<u>2.7</u>	<u>2.2</u>	<u>1.4</u>	<u>2.3</u>	<u>0.9</u>
Canada	0.2	0.7	1.5	0.7	0.2	0.3	0.3
Japan	-	0.0	0.1	0.3	0.1	0.0	...
Norway	-	-	0.1	0.0	-	...	...
United States	3.2	4.0	1.0	1.2	1.1	2.0	0.6
<u>Northeast Atlantic</u>	<u>23.9</u>	<u>11.5</u>	<u>8.2</u>	<u>9.9</u>	<u>7.9</u>	<u>5.7</u>	<u>4.4</u>
Denmark	0.2	0.0	0.1	0.0	0.0	0.0	0.0
France	1.5	1.0	0.8	1.2	2.2	1.2	0.7
Germany, Fed. Rep.	0.2	0.0	0.0	0.0	0.0	-	0.0
Japan	-	-	0.0	0.0	0.0	0.0	...
Norway	8.2	0.2	1.4	2.5	1.0	1.9	0.7
Portugal	5.8	6.7	1.0	... <sup>a)</sup>	0.4	0.2	...
Spain	8.0	3.6	4.9	6.2	4.3	2.4	2.8
Sweden	0.0	0.0	0.0	...	...	0.0	...
<u>Mediterranean and Black Sea</u>	<u>3.4</u>	<u>4.4</u>	<u>5.0</u>	<u>4.1</u>	<u>4.4</u>	<u>8.4</u>	<u>6.4</u>
Algeria	...	0.0	0.0	0.0	0.1	0.2	0.1
France	0.2	0.4	1.2	0.5	1.2	1.2	1.2
Greece	...	...	0.6	0.7	0.5	0.6	...
Italy	2.1	2.4	2.5	2.1	1.7	4.0	3.3
Malta	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Morocco	0.0	0.0	0.0	-	-	-	-
Spain	0.3	0.6	0.3	0.5	0.5	0.5	0.6
Turkey	0.2	0.1	0.0	0.1	0.1	1.5	0.3
Yugoslavia	0.1	0.3	0.3	0.1	0.2	0.3	0.2
<u>Western central Atlantic</u>	<u>0.0</u>	<u>0.9</u>	<u>4.5</u>	<u>6.7</u>	<u>2.9</u>	<u>2.8</u>	<u>1.6</u>
China (Taiwan)	-	-	-	-	-	0.0	0.0
Cuba <sup>b)</sup>	-	...	...	0.1	0.5	2.4	1.2
Grenada	0.0	0.0	0.0	0.0	0.0	0.0	...
Japan <sup>c)</sup>	0.0	0.4	2.6	5.7	2.4	0.4	...
United States	-	0.5	1.9	0.9	0.0	-	-
Venezuela <sup>d)</sup>	...	...	...	...	...	...	...

a) Quantities caught in northeast Atlantic included with eastern central Atlantic.

b) 1963-64, "Bluefin Tuna" included with "Yellowfin Tuna".

c) 1966-67, includes quantities of "Young tuna".

d) "Bluefin Tuna" included with "Yellowfin Tuna".

(cont.)

Table 1 (ctd.)

Fishing area, Country	1962	1963	1964	1965	1966	1967	1968
<u>Eastern central Atlantic</u>	<u>13.3</u>	<u>14.3</u>	<u>10.8</u>	<u>9.2</u>	<u>8.3</u>	<u>9.4</u>	<u>7.5</u>
Angola	...	...	...	0.0	...	...	...
China (Taiwan)	-	-	-	...	0.0	0.0	0.0
Equatorial Guinea	0.1	...	...	...	...	...	...
Ghana <sup>e)</sup>	...	...	...	...	0.2	0.5	1.1
Japan	4.2	1.9	0.4	0.2	0.0	0.1	...
Morocco	1.6	3.9	4.4	...	3.5	3.5	1.1
Portugal	2.5	2.0	2.6	2.1 <sup>a)</sup>	2.2	2.0	...
Spain	4.9	6.5	3.4	2.9	2.4	3.3	3.2
<u>Southwest Atlantic</u>	<u>2.0</u>	<u>6.0</u>	<u>5.9</u>	<u>2.1</u>	<u>0.3</u>	<u>0.1</u>	<u>0.2</u>
Argentina	-	0.3	0.2	0.1	0.1	0.1	0.0
Brasil f)	...	...	...	...	...	...	...
China (Taiwan)	-	-	-	-	...	...	0.0
Cuba	...	...	...	...	...	0.0	0.2
Japan	2.0	5.7	5.7	2.0	0.2	0.0	...
<u>Southeast Atlantic</u>	<u>4.6</u>	<u>3.0</u>	<u>5.5</u>	<u>2.5</u>	<u>1.6</u>	<u>1.1</u>	<u>1.4</u>
Angola	2.4	2.6	4.2	2.3	1.6	1.1	1.3
China (Taiwan)	-	-	-	-	-	0.0	0.1
Japan	0.2	0.0	0.0	0.2	0.0	0.0	...
Spain	2.0	0.4	1.3	-	-	-	-

a) Quantities caught in northeast Atlantic included with eastern central Atlantic.

e) 1962-65, catches are not included in this table.

f) "Bluefin Tuna" included with "Albacore".



Table 2. Weight distribution in ‰ (smoothed) of Bluefin Tuna caught in Kattegat by Danish fishermen in 1967-69. The weight group refers to gutted fish, with gills (kg).

Weight group (kg)	1967	1968	1969
195	0	10	0
200	7	19	0
205	13	10	0
210	7	0	0
215	0	0	0
220	7	0	0
225	20	0	0
230	20	0	0
235	26	0	0
240	66	10	0
245	73	29	0
250	33	29	0
255	39	10	29
260	67	19	59
265	60	58	30
270	60	58	15
275	73	38	30
280	73	58	15
285	53	58	29
290	53	38	74
295	52	38	59
300	39	19	15
305	39	19	0
310	20	48	0
315	7	48	15
320	20	38	73
325	20	38	103
330	13	38	58
335	13	58	29
340	7	77	15
345	7	48	0
350	13	10	15
355	0	0	44
360	0	0	59
365	0	10	59
370	0	19	59
375	0	10	42
380	0	0	15
385	0	10	15
390	0	19	29
395	0	9	15
Numbers caught	38	26	17
	1 000	1 000	1 000

Table 3. Bluefin Tuna catches at St. Jean-de-Luz (France) in 1967 in kg (data given by Cooperative Maritime Itsasokoa).

Date	Total weight	
	Fish below 30 kg	Fish above 30 kg
11 May - 18 May	11 248.5	3 254
26 May - 1 Jun.	3 473	-
2 Jun. - 8 Jun.	32 275.5	-
9 Jun. - 15 Jun.	45 583.5	-
16 Jun. - 22 Jun.	26 819.5	-
23 Jun. - 29 Jun.	21 057	-
30 Jun. - 6 Jul.	29 636	-
7 Jul. - 11 Jul.	13 988.5	-
12 Jul. - 18 Jul.	68 521	2 402
19 Jul. - 27 Jul.	16 299.5	-
28 Jul. - 2 Aug.	22 593	-
3 Aug. - 10 Aug.	29 920.5	-
11 Aug. - 17 Aug.	41 345.5	-
18 Aug. - 24 Aug.	108 927	20 534
25 Aug. - 31 Aug.	108 430.5	27 467
1 Sep. - 7 Sep.	48 563.5	-
8 Sep. - 14 Sep.	34 399.5	-
15 Sep. - 21 Sep.	42 847.5	-
22 Sep. - 28 Sep.	33 858	-
29 Sep. - 5 Oct.	8 701	-
6 Oct. - 12 Oct.	1 787.5	-
13 Oct. - 19 Oct.	9 903	-
T o t a l	760 178.5	53 657

Table 4. Bluefin Tuna catches at St. Jean-de-Luz (France) in 1968 in kg (data given by Cooperative Maritime Itsasokoa).

Date	Total weight	
	Fish below 30 kg	Fish above 30 kg
9 May - 16 May	5 163	-
21 Jun. - 26 Jun.	11 031	-
28 Jun. - 4 Jul.	15 178.5	-
5 Jul. - 11 Jul.	31 856	-
12 Jul. - 18 Jul.	2 595	-
19 Jul. - 25 Jul.	19 898.5	5 488
26 Jul. - 1 Aug.	51 188.5	13 243
2 Aug. - 8 Aug.	35 098.5	5 041
9 Aug. - 16 Aug.	14 538.5	5 768
17 Aug. - 22 Aug.	34 576.5	4 782
23 Aug. - 29 Aug.	22 503	-
7 Sep. - 12 Sep.	9 638.5	-
13 Sep. - 19 Sep.	5 449.5	-
4 Oct. - 10 Oct.	63 044.5	-
11 Oct. - 17 Oct.	10 192.5	-
18 Oct. - 24 Oct.	25 644.5	-
Total	357.596.5	34 322

Table 5. Size composition in % (smoothed) (fork length by caliper) of French Bluefin Tuna catches from the Mediterranean landed at Sète in April and November 1968 and at Nice from August to October 1968.

Month Length (cm)	April	Aug.-Oct.	November	Sx
55	-	1	-	1
60	-	8	-	4
65	-	13	-	6
70	-	6	-	3
75	-	2	-	2
80	-	30	5	19
85	-	168	67	120
90	-	274	237	250
95	-	151	320	215
100	-	24	167	83
105	-	61	33	48
110	47	115	35	80
115	204	83	61	80
120	266	30	52	46
125	124	13	20	20
130	31	7	3	6
135	62	3	-	4
140	109	2	-	5
145	93	1	-	3
150	46	0	-	2
155	18	1	-	1
160	-	2	-	1
165	-	1	-	0
170	-	0	-	0
175	-	1	-	0
180	-	2	-	1
185	-	1	-	0
	1 000	1 000	1 000	1 000
n =	16	266	197	479

Table 6. Bluefin Tuna catches at St. Jean-de-Luz (France) in 1969 in kg (data given by Cooperative Maritime Itsasokoa).

Date	Total weight	
	Fish below 30 kg	Fish above 30 kg
22 May - 28 May	9 706	1 082
29 May - 5 Jun.	4 654	-
6 Jun. - 12 Jun.	19 478.5	-
13 Jun. - 19 Jun.	48 752	-
20 Jun. - 26 Jun.	11 334	-
27 Jun. - 3 Jul.	32 466.5	-
4 Jul. - 10 Jul.	24 656	-
11 Jul. - 17 Jul.	18 463	-
18 Jul. - 24 Jul.	16 708.5	21 762
25 Jul. - 31 Jul.	14 821.5	-
1 Aug. - 7 Aug.	83 562	-
8 Aug. - 12 Aug.	19 964.5	21 964
13 Aug. - 21 Aug.	37 142	25 955
22 Aug. - 28 Aug.	9 861.5	-
29 Aug. - 4 Sep.	2 150.5	-
5 Sep. - 11 Sep.	19 614	12 113
12 Sep. - 18 Sep.	15 034	-
19 Sep. - 25 Sep.	2 892	-
26 Sep. - 2 Oct.	4 121	6 405
3 Oct. - 9 Oct.	1 782	1 732
10 Oct. - 16 Oct.	4 962	3 227
17 Oct. - 23 Oct.	4 056	8 469
24 Oct. - 30 Oct.	3 145.5	9 117
1 Nov. - 6 Nov.	4 255	8 312
7 Nov. - 13 Nov.	387.5	-
T o t a l	413 969.5	120 138

Table 7. Size composition in ‰ (smoothed) (fork length by caliper) of French Bluefin Tuna catches from the Mediterranean landed at Sète in July, September and October 1969.

Length (cm)	‰
65	1
70	2
75	3
80	27
85	153
90	273
95	196
100	63
105	23
110	19
115	18
120	23
125	36
130	37
135	26
140	15
145	15
150	13
155	7
160	3
165	3
170	5
175	6
180	5
185	5
190	6
195	5
200	3
205	2
210	1
215	1
220	2
225	1
230	0
235	1
240	1
	1 000
	n = 903

Table 8. 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).

Weight group (kg)	‰	Weight group (kg)	‰
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 9. 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 <sup>x)</sup>
Bonagia and San Cusumano (one madrague)	2 450
Favignana and Formica (two madragues)	7 500
Capo Granitola <sup>xx)</sup>	450
Marzamemi <sup>xx)</sup>	70
	14 835

x) Note that Scopello have lost almost 20 days  
of the fishing season, caused by delay in  
setting the madrague.

xx) Madrague of the "back period".



Table 10. Length distribution (fork length) in ‰ (smoothed) for Italian Bluefin Tuna catches in Sicilian madragues in 1968 (by caliper).

Length interval (LF in cm)	Pre-spawners taken May-June at Punta Raisi, San Cusumano and Favignana (in ‰)	Post-spawners taken 31 July at Capo Grani- tola (in ‰)	Total
110	1	-	1
115	4	-	4
120	11	-	10
125	15	-	14
130	16	-	15
135	24	-	22
140	30	-	28
145	24	-	23
150	21	-	19
155	31	-	28
160	51	-	47
165	72	-	67
170	84	-	78
175	71	-	66
180	44	-	42
185	26	-	24
190	13	-	13
195	8	-	8
200	11	-	10
205	16	11	15
210	24	57	26
215	33	125	39
220	38	148	44
225	42	136	48
230	45	125	51
235	43	68	46
240	43	23	42
245	47	80	49
250	48	125	53
255	38	68	40
260	18	23	19
265	6	11	6
270	2	-	2
275	1	-	1
	1 001	1 000	1 000
n =	338	22	360

Condition factor (K) 2.10

1.79

$$K = \frac{W \times 10^5}{L^3} \text{ where } W \text{ is weight in kg, and } L \text{ is length in cm.}$$

Table 11. Weight distribution in ‰ (smoothed) of 898 Bluefin Tuna caught in Sicilian madragues during May and June 1968.  
The weight group refers to ungutted fish (kg).

Weight group (kg)	‰	Weight group (kg)	‰
20	2	220	22
25	7	225	21
30	12	230	18
35	14	235	17
40	13	240	15
45	13	245	14
50	19	250	13
55	20	255	12
60	15	260	11
65	15	265	12
70	17	270	16
75	15	275	19
80	15	280	18
85	15	285	15
90	16	290	13
95	24	295	16
100	30	300	22
105	30	305	21
110	26	310	17
115	20	315	12
120	17	320	10
125	13	325	10
130	7	330	10
135	5	335	11
140	6	340	11
145	7	345	10
150	6	350	10
155	4	355	8
160	4	360	4
165	5	365	4
170	7	370	4
175	11	375	3
180	14	380	4
185	13	385	2
190	13	390	2
195	17	395	1
200	22	400	1
205	20	405	2
210	18	410	2
215	19	415	1
			1 000

Table 12. Length distribution (fork length) in % (smoothed) for Italian Bluefin Tuna catches in Sicilian madragues in 1969 (by caliper).

Length Interval (LF in cm)	Total
105	2
110	4
115	2
120	2
125	4
130	4
135	13
140	26
145	33
150	40
155	44
160	33
165	15
170	13
175	27
180	53
185	75
190	75
195	58
200	27
205	9
210	24
215	51
220	67
225	78
230	78
235	67
240	45
245	20
250	9
255	2
	1 000
n =	113

Table 13. Weight distribution in % (smoothed) of 528 Bluefin Tuna caught in Sicilian madragues during May and June 1969. The weight group refers to ungutted fish (kg).

Weight group (kg)	%	Weight group (kg)	%
20	0	245	17
25	0	250	18
30	0	255	17
35	1	260	17
40	6	265	19
45	9	270	19
50	11	275	17
55	14	280	14
60	15	285	18
65	16	290	19
70	19	295	18
75	16	300	16
80	11	305	19
85	11	310	23
90	12	315	23
95	12	320	17
100	11	325	14
105	15	330	17
110	19	335	18
115	21	340	15
120	24	345	12
125	23	350	13
130	16	355	17
135	11	360	17
140	9	365	11
145	8	370	9
150	7	375	13
155	6	380	17
160	5	385	15
165	4	390	11
170	4	395	6
175	5	400	3
180	6	405	2
185	5	410	6
190	5	415	8
195	4	420	4
200	3	425	2
205	7	430	3
210	12	435	2
215	10	440	1
220	9	-	-
225	14	495	1
230	17	500	2
235	17	505	3
240	16	510	1
			1 000

Table 14. Size composition (kg) of Norwegian tuna catches south of 62°N by smoothed weight frequency (per mille) in 1967.

Group means		Week numbers										Total
W <sup>1</sup> 1)	W <sup>2</sup> 2)	30	31	32	33	34	35	36	37	38	39	
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

1) W<sup>1</sup> = observed weight of gutted fish without head.

2) W<sup>2</sup> = calculated live weight (W<sup>1</sup> · 1.085)

Table 15. Size composition (kg) of Norwegian tuna catches north of 63°N by smoothed weight frequency (per mille) in 1967.

Group means		Week numbers			T o t a l
W <sup>1</sup>	W	30	31	33	
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 16. 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 17. Size composition of Norwegian tuna catches south of 62°N by smoothed weight frequency (per mille) in 1968 (kg).

Group means		Week numbers						T o t a l
W <sup>1</sup>	W	31	32	34	35	36	37	
142	183	31	-	-	-	-	-	-
147	189	63	-	-	-	-	-	1
152	196	31	-	-	-	-	-	-
157	202	-	1	-	1	-	-	x
162	208	-	3	2	1	-	-	1
167	215	-	7	5	1	-	1	3
172	221	-	14	6	4	1	2	5
177	228	-	24	9	7	2	1	8
182	234	16	35	20	10	3	3	13
187	241	63	44	32	13	7	5	19
192	247	110	52	29	14	10	9	22
197	253	94	57	23	19	14	18	26
202	260	63	63	27	29	21	22	33
207	266	125	72	33	38	22	25	39
212	273	156	86	44	43	23	27	45
217	279	78	88	56	46	32	22	49
222	286	32	75	62	53	42	20	51
227	292	16	64	63	59	49	30	54
232	298	16	64	63	59	52	40	56
237	305	32	64	53	61	54	47	57
242	311	16	47	46	71	64	58	60
247	318	-	37	70	75	72	64	64
252	324	16	32	85	69	69	56	61
257	331	32	24	65	63	68	55	55
262	337	16	17	52	56	67	62	51
267	343	-	13	41	45	62	63	45
272	350	-	10	32	36	54	60	38
277	356	-	5	34	30	43	54	32
282	363	-	4	21	23	37	49	26
287	369	-	2	9	17	34	46	21
292	376	-	1	9	13	28	40	18
297	382	-	-	8	13	22	37	15
302	388	-	-	5	10	14	31	11
307	395	-	-	2	7	7	18	7
312	401	-	-	-	7	7	9	6
317	408	-	-	-	3	8	9	5
322	414	-	-	-	2	5	7	3
327	420	-	-	-	3	2	3	2
332	427	-	-	-	2	-	3	1
337	433	-	-	-	1	1	5	1
342	440	-	-	-	-	2	3	1
347	446	-	-	-	-	2	-	x
352	453	-	-	-	1	2	1	1
357	459	-	-	-	-	1	2	x
362	465	-	-	-	-	1	1	-
367	472	-	-	-	-	1	-	x
372	478	-	-	-	-	1	-	-
n =		16	441	165	791	528	300	2 240

Table 18. Size composition of Norwegian tuna catches north of 63°N by smoothed weight frequency (per mille) in 1968 (kg).

Group means		Week number
W <sup>†</sup>	W	
187	241	32
192	247	14
197	253	28
202	260	28
207	266	42
212	273	56
217	279	42
222	286	42
227	292	14
232	298	28
237	305	56
242	311	42
247	318	42
252	324	14
257	331	28
262	337	56
267	343	42
272	350	56
277	356	84
282	363	56
287	369	42
292	376	56
297	382	28
302	388	28
307	395	56
n =		28



Table 19. Calculated length data. Length frequency distribution in per mille for Norwegian tuna catches in 1968 ( $K = 2.16$ ).

Length groups (cm)	Southern area	Northern area
205-209	1	-
210-214	2	-
215-219	13	-
220-224	38	20
225-229	70	84
230-234	120	114
235-239	147	107
240-244	177	115
245-249	174	109
250-254	133	199
255-259	78	148
260-264	35	112
265-269	14	-
270-274	3	-
275-279	1	-

Table 20. Size composition of Norwegian tuna catches south of 62°N by smoothed weight frequency (per mille) in 1969 (kg).

Group means		Week numbers				T o t a l
W <sup>i</sup>	W	31	32	33	34	
152	196	1	-	-	2	-
157	202	1	1	-	5	1
162	208	2	1	1	2	1
167	215	2	1	2	-	2
172	221	3	4	1	2	2
177	228	6	4	2	7	4
182	234	8	11	5	11	8
187	241	14	22	11	13	16
192	247	29	27	22	15	24
197	253	45	31	33	20	34
202	260	54	42	39	28	43
207	266	59	45	43	41	48
212	273	62	48	54	54	54
217	279	66	62	67	56	67
222	286	77	75	70	48	72
227	292	74	78	66	47	71
232	298	67	75	68	50	70
237	305	69	73	67	54	69
242	311	65	69	57	76	64
247	318	58	60	55	95	60
252	324	53	51	52	80	56
257	331	43	45	55	47	48
262	337	37	39	50	39	42
267	343	28	33	46	43	37
272	350	18	31	37	39	31
277	356	17	28	28	32	25
282	363	13	19	18	24	18
287	369	7	12	14	13	12
292	376	7	9	14	15	10
297	382	7	5	8	19	7
302	388	4	1	4	11	4
307	395	2	1	2	5	2
312	401	2	1	1	5	2
317	408	1	1	2	5	1
322	414	1	-	1	2	1
327	420	-	-	-	-	-
332	427	-	-	1	-	-
337	433	-	-	1	-	1
342	440	-	-	1	-	-
n =		471	697	645	116	1 929

Table 21. Size composition of Norwegian tuna catches north of 63°N by smoothed weight frequency (per mille) in 1969 (kg).

Group means		Week number
W <sup>r</sup>	W	33
187	241	33
192	247	67
197	253	33
202	260	-
207	266	17
212	273	50
217	279	50
222	286	34
227	292	50
232	298	67
237	305	50
242	311	17
247	318	67
252	324	150
257	331	117
262	337	50
267	343	34
272	350	50
277	356	50
282	363	17
n =		15

Table 22. Calculated length data. Length frequency distribution (per mille) for Norwegian tuna catches in 1969 (K = 2.16).

Length groups (cm)	Southern area	Northern area
210-214	3	-
215-219	6	-
220-224	29	45
225-229	88	88
230-234	151	97
235-239	198	131
240-244	199	134
245-249	157	327
250-254	108	144
255-259	50	37
260-264	14	-
265-269	3	-
270-274	1	-

Table 23. Bluefin Tuna caught by madragues at the south coast of Portugal in 1967, by weight groups (kg).

Months	Number of fish					T o t a l
	>90 Atún	50-89 Atuarros	30-49 Albacoras	10-29 Cachorretas	<10 Cachorretitas	
May	197	82	-	-	-	279
Jun.	116	28	1	3	14	162
Jul.	886	122	3	-	1	1 012
Aug.	167	31	-	-	-	198
Total	1 366	263	4	3	15	1 651

Table 24. Bluefin Tuna caught by madragues at the south coast of Portugal in 1968, by weight groups (kg).

Months	Atún >90		Atuarros 50-89		Albacoras 30-49		Cachorretas <30		T o t a l	
	N	kg	N	kg	N	kg	N	kg	N	kg
May	1	123	1	70	1	30	0	0	3	223
Jun.	104	17 469	6	322	0	0	0	0	110	17 991
Jul.	259	46 749	25	2 151	0	0	1	5	285	48 905
Aug.	1	146	0	0	0	0	0	0	1	146
Sep.	0	0	0	0	0	0	0	0	0	0
Total	365	64 487	32	2 543	1	30	1	5	399	67 065

Table 25. Bluefin Tuna caught by madragues at the south coast of Portugal in 1969, by weight groups (kg).

Months	Atún >90		Atuarros 50-89		Albacoras 30-49		Cachorretas <30		T o t a l	
	N	kg	N	kg	N	kg	N	kg	N	kg
Jun.	9	1 057	1	70	0	0	1	—*)	11	1 127
Jul.	982	181 716	11	779	0	0	58	—	1 051	182 495
Aug.	732	138 277	20	1 367	4	112	2 057	—	2 813	139 756
Total	1 723	321 050	32	2 216	4	112	2 116	—	3 875	323 378

\*) The weight of the greatest part of the Cachorretas caught was between 3 and 6 kg.

Table 26. Weekly size composition in % (smoothed) of Spanish madrague catches at Barbate in 1967. (RODRIGUEZ-RODA, 1968).  
(D = pre-spawning fish; R = post-spawning fish).

Length group	Week number								Total
	19	20	22	23	24	28	29	30	
	D	D	D	D	D	R	R	R	
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 27. Spanish Bluefin Tuna catches (by number of fish) at Barbate, Sancti-Petri, Tarifa and La Linea by weeks in 1967 (RODRIGUEZ-RODA, 1968).

(D = pre-spawning; R = post-spawning fish)

Week number	Time	Number of fish and spawning condition			
		Barbate	Sancti-Petri	Tarifa	La Linea
18	30 Apr. - 6 May	220 D	289 D	21 D	-
19	7 May - 13 May	1 251 D	143 D	331 D	-
20	14 May - 20 May	2 545 D	1 958 D	769 D	-
21	21 May - 27 May	1 619 D	711 D	30 D	-
22	28 May - 3 Jun.	650 D	440 D	372 D	-
23	4 Jun. - 10 Jun.	427 D	377 D	314 D	-
24	11 Jun. - 17 Jun.	162 D	224 D	19 D	-
25	18 Jun. - 24 Jun.	64 D	222 D	30 D	-
26	25 Jun. - 1 Jul.	9 D & R	44 D		
27	2 Jul. - 8 Jul.	26 R	-	-	12 R
28	9 Jul. - 15 Jul.	192 R	-	-	108 R
29	16 Jul. - 22 Jul.	1 490 R	-	-	303 R
30	23 Jul. - 29 Jul.	447 R	-	-	48 R
31	30 Jul. - 5 Aug.	412 R	-	-	7 R
32	6 Aug. - 12 Aug.	8 R	-	-	-
33	13 Aug. - 19 Aug.	118 R	-	-	-
34	20 Aug. - 26 Aug.	-	-	-	2 R
35	27 Aug. - 2 Sep.	-	-	-	2 R
36	3 Sep. - 9 Sep.	-	-	-	-
37	10 Sep. - 16 Sep.	-	-	-	-
38	17 Sep. - 23 Sep.	-	-	-	-
		9 640	4 408	1 886	482

T o t a l = 16 416

=====

Table 28. Spanish Bluefin Tuna catches (by number of fish) at Barbate, Conil and Tarifa by weeks in 1968. (RODRIGUEZ-RODA, 1969).

(D = pre-spawning; R = post-spawning fish)

Week number	Time	Number of fish and spawning condition		
		Barbate	Conil	Tarifa
18	28 Apr. - 4 May	1 D	-	-
19	5 May - 11 May	131 D	199 D	2 D
20	12 May - 18 May	11 D	-	-
21	19 May - 25 May	1 631 D	135 D	21 D
22	26 May - 1 Jun.	431 D	75 D	44 D
23	2 Jun. - 8 Jun.	1 000 D	579 D	-
24	9 Jun. - 15 Jun.	82 D	116 D	275 D
25	16 Jun. - 22 Jun.	80 D	75 D	124 D
26	23 Jun. - 29 Jun.	-	1 D	-
27	30 Jun. - 6 Jul.	1 D	-	-
28	7 Jul. - 13 Jul.	1 R	-	-
29	14 Jul. - 20 Jul.	38 R	-	-
30	21 Jul. - 27 Jul.	412 R	-	-
31	28 Jul. - 3 Aug.	357 R	-	-
32	4 Aug. - 10 Aug.	4 R	-	-
		4 180	1 180	466

T o t a l = 5 826 = 1 138 003 kg

=====



Table 29. Weekly size composition in % (smoothed) of Spanish madrague catches at Barbate in 1968. (RODRIGUEZ-RODA, 1969).

(D = pre-spawning; R = post-spawning fish)

Length group	Week number								T o t a l
	19	20	21	22	23	25	30	31	
	D	D	D	D	D	D	R	R	
120-124.9	-	-	-	-	1	-	-	-	0
125-129.9	-	-	-	-	2	-	-	-	1
130-134.9	-	-	-	-	1	-	-	-	0
135-139.9	-	-	-	-	3	-	-	-	1
140-144.9	-	-	-	-	7	-	-	-	2
145-149.9	-	-	2	-	7	-	-	-	2
150-154.9	-	-	6	4	15	4	-	-	6
155-159.9	-	-	7	9	33	8	2	-	12
160-164.9	-	125	10	4	39	4	5	2	15
165-169.9	3	250	14	9	32	4	5	2	15
170-174.9	8	125	18	26	26	12	3	2	15
175-179.9	18	125	26	34	36	20	5	0	21
180-184.9	26	250	28	34	47	33	9	0	27
185-189.9	16	125	26	26	43	45	21	4	27
190-194.9	5	-	26	30	46	45	31	13	30
195-199.9	8	-	31	56	61	49	39	19	39
200-204.9	21	-	49	82	77	86	71	15	57
205-209.9	39	-	77	130	89	127	116	28	82
210-214.9	58	-	102	151	96	144	125	86	103
215-219.9	94	-	112	116	96	135	104	130	109
220-224.9	112	-	106	82	78	90	90	114	96
225-229.9	86	-	94	69	57	49	86	98	78
230-234.9	71	-	77	60	31	33	94	105	67
235-239.9	91	-	53	30	17	16	84	111	56
240-244.9	117	-	30	17	18	16	49	103	46
245-249.9	102	-	30	21	16	33	31	78	39
250-254.9	65	-	37	9	13	33	21	44	29
255-259.9	42	-	25	-	9	12	9	28	18
260-264.9	18	-	10	-	3	-	5	17	8
265-269.9	3	-	3	-	-	-	2	4	2
270-274.9	-	-	2	-	-	-	-	-	1
275-279.9	-	-	1	-	-	-	-	-	0
n =	96	2	231	58	275	61	170	136	1 029

Table 30. Spanish Bluefin Tuna catches (by number of fish) at Barbate, Sancti-Petri, Tarifa and La Linea by weeks in 1969. (RODRIGUEZ-RODA, 1970).

(D = pre-spawning; R = post-spawning fish)

Week number	Time	Number of fish and spawning condition				T o t a l
		Barbate	Sancti-Petri	Tarifa	La Linea	
18	27 Apr. - 3 May	217 D	135 D	190 D	-	542 D
19	4 May - 10 May	3 D	39 D	3 D	-	45 D
20	11 May - 17 May	251 D	487 D	2 D	-	740 D
21	18 May - 24 May	295 D	212 D	3 D	-	510 D
22	25 May - 31 May	2 256 D	606 D	296 D	-	3 158 D
23	1 Jun. - 7 Jun.	208 D	48 D	2 D	-	258 D
24	8 Jun. - 14 Jun.	346 D	154 D	88 D	-	588 D
25	15 Jun. - 21 Jun.	10 D	89 D	-	-	99 D
26	22 Jun. - 28 Jun.	66 D	3 D	139 D	-	208 D
27	29 Jun. - 5 Jul.	8 D	212 D	-	-	220 D
28	6 Jul. - 12 Jul.	11 R	-	-	-	11 R
29	13 Jul. - 19 Jul.	326 R	-	-	95 R	421 R
30	20 Jul. - 26 Jul.	773 R	-	-	17 R	790 R
31	27 Jul. - 2 Aug.	560 R	-	-	34 R	594 R
32	3 Aug. - 9 Aug.	180 R	-	-	11 R	191 R
33	10 Aug. - 16 Aug.	8 R	-	-	18 R	26 R
34	17 Aug. - 23 Aug.	53 R	-	-	12 R	65 R
35	24 Aug. - 30 Aug.	14 R	-	-	-	14 R
		5 585	1 985	723	187	8 480

Total = 8 480 = 1 633 510 kg.

Table 31. Weekly size composition in % (smoothed) of Spanish madrague catches at Barbate in 1969.  
(RODRIGUEZ-RODA, 1970).

(D = pre-spawning; R = post-spawning fish)

Length group	Week number									T o t a l
	20	21	22	24	26	29	30	31	32	
45 - 49.9	-	-	-	-	-	-	16	-	-	2
50 - 54.9	-	-	-	-	-	-	49	-	-	7
55 - 59.9	-	-	-	-	-	-	49	-	-	7
60 - 64.9	-	-	-	-	-	-	16	-	-	2
65 - 69.9	-	-	-	-	-	-	66	-	-	10
70 - 74.9	-	-	-	-	-	-	181	-	-	28
75 - 79.9	-	-	-	-	-	-	168	-	-	26
80 - 84.9	-	-	-	-	-	-	59	-	-	9
85 - 89.9	-	-	-	-	-	-	7	-	-	1
90 - 94.9	-	-	-	-	-	-	2	-	-	0
135 - 139.9	-	-	-	-	4	-	-	-	-	0
140 - 144.9	-	6	-	-	7	-	-	-	-	1
145 - 149.9	-	24	-	2	4	-	-	-	-	1
150 - 154.9	-	55	-	7	-	-	-	-	-	3
155 - 159.9	-	91	-	11	-	-	-	-	-	4
160 - 164.9	-	98	-	12	-	-	-	-	-	5
165 - 169.9	-	73	1	14	8	3	-	5	2	6
170 - 174.9	-	67	5	33	23	8	-	11	7	11
175 - 179.9	-	67	14	54	60	11	4	16	16	19
180 - 184.9	1	43	31	63	125	22	10	30	39	32
185 - 189.9	7	24	56	63	155	44	10	57	71	47
190 - 194.9	21	30	73	54	136	50	12	80	89	55
195 - 199.9	19	43	67	40	98	42	16	77	85	51
200 - 204.9	21	55	54	40	57	53	19	55	66	44
205 - 209.9	36	55	63	65	42	78	25	36	55	49
210 - 214.9	56	43	69	84	42	108	32	36	51	58
215 - 219.9	71	30	57	72	57	161	34	66	42	64
220 - 224.9	89	30	53	70	76	169	32	86	57	71
225 - 229.9	109	37	72	82	53	106	40	61	74	74
230 - 234.9	125	37	88	68	30	58	44	52	78	73
235 - 239.9	126	43	80	47	19	42	29	61	87	68
240 - 244.9	92	37	72	37	4	28	19	59	80	55
245 - 249.9	56	12	58	28	-	14	18	66	55	40
250 - 254.9	55	-	33	26	-	3	10	66	28	30
255 - 259.9	56	-	19	21	-	-	12	43	11	22
260 - 264.9	41	-	16	7	-	-	15	18	5	15
265 - 269.9	14	-	14	-	-	-	6	9	2	8
270 - 274.9	5	-	5	-	-	-	-	7	-	2
275 - 279.9	-	-	-	-	-	-	-	2	-	0
n =	188	41	202	107	66	90	170	110	141	1 115

Table 32. Size composition in % (smoothed) (fork length by caliper) of Turkish Bluefin Tuna catches in 1967 (landed at the Istanbul fish market).

Length cm	Months					T o t a l
	Jan.	Feb.	Mar.	Apr.	May-Dec.	
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 33. Size composition in % (smoothed) (fork length by caliper) of Turkish Bluefin Tuna catches in 1968 (landed at the Istanbul fish market).

Length cm	Months					T o t a l
	Jan.	Feb.	Mar.	Apr.	May-Dec.	
105	-	-	-	-	5	1
110	-	-	-	-	20	4
115	-	-	-	-	41	9
120	-	-	-	-	41	9
125	-	-	-	-	20	4
130	4	-	-	-	10	3
135	8	-	-	-	10	4
140	4	-	-	-	15	4
145	-	-	-	-	20	4
150	-	-	-	6	30	7
155	-	-	-	12	52	13
160	-	6	-	12	61	16
165	-	11	-	17	61	19
170	-	6	15	17	52	17
175	-	-	30	6	46	15
180	4	6	15	-	57	16
185	13	28	7	-	46	19
190	13	50	29	-	26	23
195	12	44	44	12	15	24
200	21	33	37	29	5	24
205	25	33	37	29	5	25
210	25	33	52	35	15	30
215	21	33	52	70	30	39
220	34	28	51	104	52	52
225	54	39	73	110	52	64
230	50	67	73	87	26	59
235	54	61	51	76	15	51
240	62	39	52	81	26	52
245	67	61	66	70	26	58
250	92	94	66	47	20	65
255	96	78	44	35	15	57
260	67	50	22	47	10	41
265	58	38	30	41	10	37
270	75	39	51	23	10	41
275	62	39	44	23	10	37
280	33	34	30	11	10	24
285	21	33	22	-	15	18
290	13	17	7	-	15	11
295	8	-	-	-	5	3
300	4	-	-	-	-	1
	1 000	1 000	1 000	1 000	1 000	1 000
n =	60	45	34	43	49	231

Table 34. Weight composition in % (smoothed) (gutted fish with head and gills) of Turkish Bluefin Tuna catches in 1968 (landed at the Istanbul fish market).

Weight kg	Months					T o t a l
	Jan.	Feb.	Mar.	Apr.	May-Dec.	
15	-	-	-	-	11	2
20	-	-	-	-	37	8
25	-	-	-	-	52	12
30	-	-	-	-	37	8
35	-	-	-	-	11	2
40	-	-	-	-	5	1
45	-	-	8	-	11	4
50	-	-	15	6	5	5
55	-	-	8	12	11	6
60	-	-	-	6	42	11
65	-	-	-	6	63	15
70	-	-	-	6	63	18
75	-	-	-	18	63	17
80	-	-	-	18	47	9
85	-	-	8	6	26	7
90	5	12	23	-	26	13
95	10	23	23	-	37	18
100	5	17	8	-	32	13
105	-	12	-	-	16	6
110	-	12	-	-	10	5
115	-	17	-	-	16	7
120	-	35	8	-	21	13
125	5	41	30	-	10	17
130	10	30	46	12	-	18
135	10	30	30	25	-	17
140	10	24	15	12	-	12
145	10	6	15	-	-	6
150	10	-	15	-	21	10
155	10	-	15	6	52	18
160	10	-	15	31	42	20
165	5	6	23	43	10	17
170	-	17	23	24	5	13
175	5	17	15	43	10	18
180	21	12	23	85	5	28
185	37	23	38	79	5	35
190	31	29	46	49	10	32
195	10	23	38	37	5	21
200	5	23	30	37	-	17
205	21	12	23	31	-	16
210	26	6	15	18	5	14
215	21	12	15	6	10	13
220	26	12	15	6	5	13
225	21	12	23	25	10	18
230	21	17	30	43	21	26
235	42	40	23	43	21	34
240	36	52	15	17	21	31

(cont. ....)

Table 34.(cont.)

Weight kg	Months					T o t a l
	Jan.	Feb.	Mar.	Apr.	May-Dec.	
245	26	35	15	6	10	19
250	31	29	15	-	-	15
255	26	34	30	18	-	21
260	32	23	38	37	-	25
265	37	12	23	18	5	19
270	32	12	15	-	10	14
275	37	6	15	18	10	18
280	42	12	15	43	10	24
285	42	34	15	43	10	29
290	37	34	23	31	10	27
295	21	17	23	12	5	15
300	10	17	7	-	-	7
305	21	23	7	6	-	12
310	26	23	23	12	-	16
315	16	17	23	6	-	12
320	10	6	7	-	-	5
325	5	6	7	-	-	4
330	-	17	15	-	-	6
335	5	17	7	-	-	6
340	16	12	-	-	-	6
345	26	12	-	-	5	9
350	26	6	-	-	10	9
355	16	-	-	-	5	5
360	16	-	-	-	-	4
365	16	-	-	-	-	4
370	5	6	-	-	-	2
375	-	12	-	-	-	2
380	-	6	-	-	-	1
	1 000	1 000	1 000	1 000	1 000	1 000
n =	48	43	33	41	48	213

Table 35. Weekly size composition of US Bluefin Tuna purse-seine catches in % (smoothed) (fork length by caliper) off New Jersey and Long Island in 1967.

Length cm	Week number							T o t a l
	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 36. Catch (in short tons, above line) and effort (in days fished, below line) in the northwestern Atlantic Bluefin Tuna purse-seine fishery for the 1967 season, by weeks and statistical areas (Figure 1).

Week number and dates	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 and F	T o t a l
26 (1 Jul.)			$\frac{0}{1}$	$\frac{0}{1}$				$\frac{0}{2}$
27 (2-8 Jul.)		$\frac{195.9}{9}$						$\frac{195.9}{9}$
28 (9-15 Jul.)		$\frac{17.0}{6}$						$\frac{17.0}{6}$
29 (16-22 Jul.)	$\frac{161.4}{4}$	$\frac{318.1}{13}$						$\frac{479.5}{17}$
30 (23-29 Jul.)	$\frac{8.3}{1}$	$\frac{128.9}{14}$						$\frac{137.2}{15}$
31 (30 Jul.- 5 Aug.)		$\frac{0}{5}$	$\frac{129.4}{10}$	$\frac{0}{1}$	$\frac{0}{1}$			$\frac{129.4}{17}$
32 (6-12 Aug.)	$\frac{0}{1}$	$\frac{0}{2}$	$\frac{220.7}{6}$				$\frac{0}{1}$	$\frac{220.7}{10}$
33 (13-19 Aug.)		$\frac{173.2}{11}$	$\frac{536.9}{29}$				$\frac{0}{1}$	$\frac{710.1}{41}$
34 (20-26 Aug.)		$\frac{172.6}{5}$	$\frac{425.3}{20}$					$\frac{597.9}{25}$
35 (27 Aug.- 2 Sep.)	$\frac{0}{5}$	$\frac{0}{5}$	$\frac{28.5}{20}$		$\frac{0}{5}$	$\frac{7.8}{2}$		$\frac{36.3}{37}$
36 (3-9 Sep.)			$\frac{0}{1}$	$\frac{31.9}{4}$	$\frac{0}{4}$			$\frac{31.9}{9}$
T o t a l	$\frac{169.7}{11}$	$\frac{1\ 005.7}{70}$	$\frac{1\ 340.8}{87}$	$\frac{31.9}{6}$	$\frac{0}{10}$	$\frac{7.8}{2}$	$\frac{0}{2}$	$\frac{2\ 555.9}{188}$

Table 37. Weekly size composition of US Bluefin Tuna purse-seine catches in ‰ (smoothed) (fork length by caliper) between New Jersey and Cape Cod for 1968 (total catch = 670 short tons; about 150 tons of giant Bluefin Tuna seined in Cod Bay are not represented in the random sample).

Length cm	Week of year				T o t a l
	29	30	31	33-34	
45	-	1	1	-	1
50	-	4	4	11	4
55	-	6	5	28	9
60	-	2	2	25	7
65	10	8	0	9	6
70	92	63	33	11	52
75	234	146	178	81	164
80	233	151	284	225	225
85	94	87	172	256	149
90	59	79	60	128	79
95	120	141	88	61	104
100	108	159	105	83	113
105	35	96	52	64	60
110	3	35	8	18	15
115	4	14	2	-	5
120	4	7	4	-	4
125	3	1	2	-	2
130	1	-	-	-	1
	1 000	1 000	1 000	1 000	1 000
n =	265	222	248	211	946

Table 38. Weekly size composition of US Bluefin Tuna purse-seine catches in % (smoothed) (fork length by caliper) between New Jersey and Cape Cod for 1969 (total catch = 1 728 short tons).

Length cm	Week of year					T o t a l
	27	28	29	33	35	
50	-	-	1	3	-	1
55	-	-	5	10	1	4
60	-	3	11	12	2	6
65	-	40	15	6	1	12
70	-	147	95	39	14	59
75	-	192	211	99	98	136
80	-	87	167	93	168	132
85	-	5	44	31	117	54
90	31	0	1	3	15	17
95	125	30	16	15	2	14
100	281	133	86	75	33	74
105	344	186	153	167	128	155
110	187	92	119	178	181	150
115	32	23	46	73	107	70
120	-	28	14	18	15	22
125	-	23	5	36	18	20
130	-	9	3	56	24	23
135	-	2	4	35	17	15
140	-	-	4	16	15	10
145	-	-	1	19	24	13
150	-	-	-	13	20	10
155	-	-	-	3	-	3
	1 000	1 000	1 000	1 000	1 000	1 000
n =	8	143	187	170	302	810

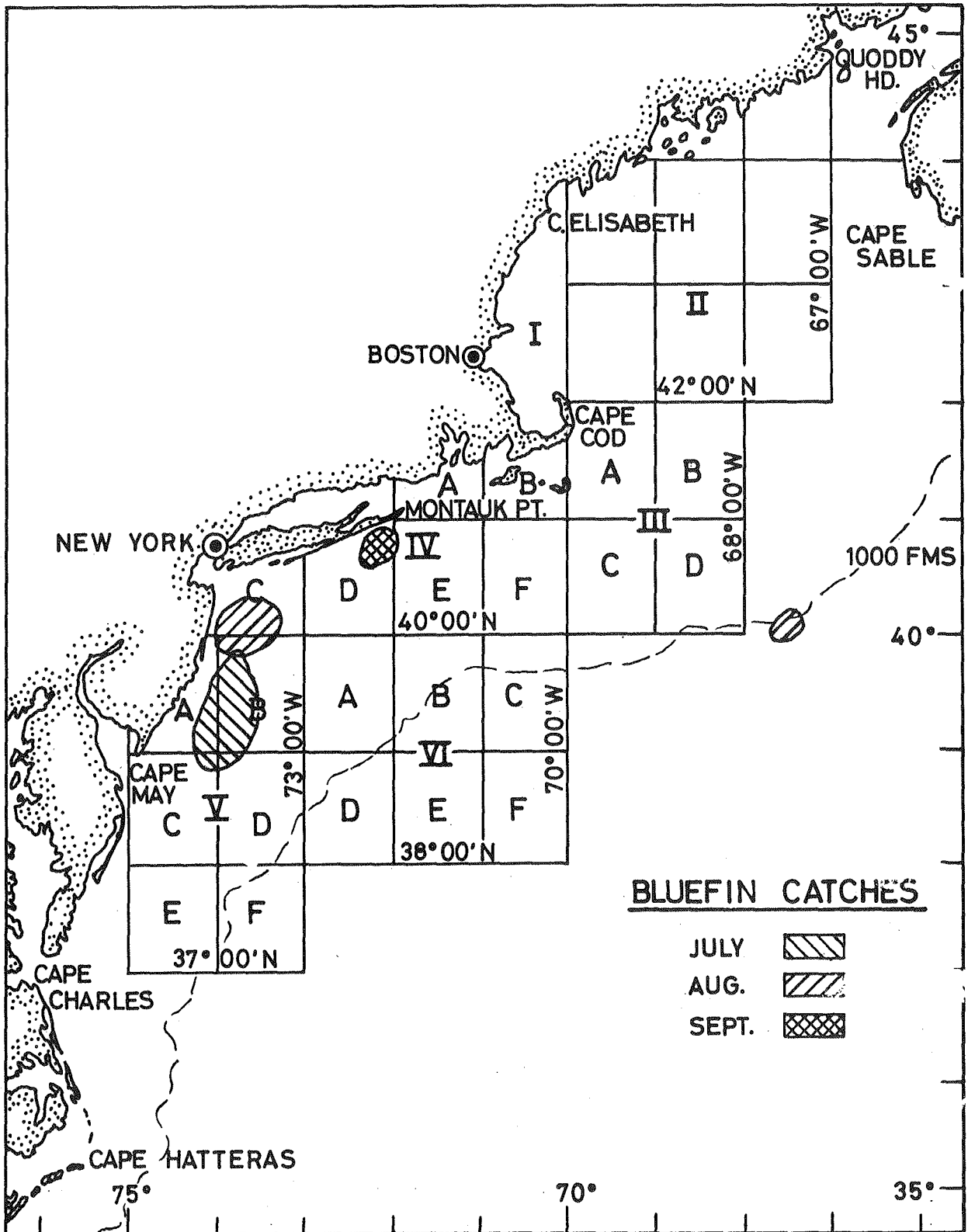


Figure 1. Map showing fishing grounds of US Bluefin Tuna fisheries.

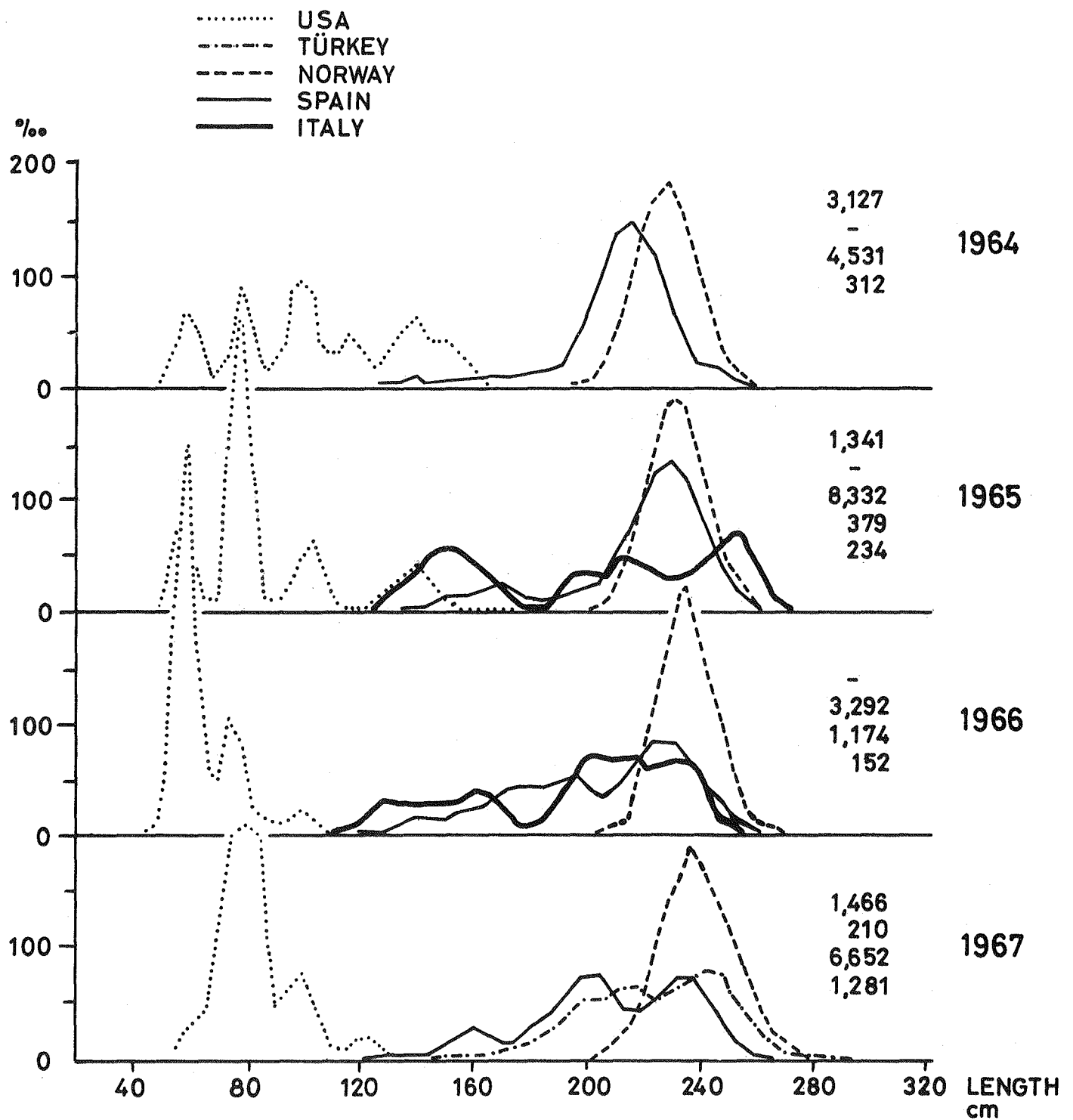


Figure 2. Size composition of Bluefin Tuna catches made in USA, Turkey, Norway, Spain and Italy.

