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SEVENTH REPORT OF THE BLUEFIN TUNA WORKING GROUP

Observations on the Size Composition of Bluefin Tuna Catches from 1976 to 1978

by

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INTRODUCTION

Previous reports of the Bluefin Tuna Working Group were published in Statistical News Letters, Nos. 20, 26 and 38, and Cooperative Research Reports, Nos. 23, 40 and 71. Following recommendations of the Pelagic Fish Committee in 1976, 1977 and 1978, the members of the Working Group continued the collection of data on the development of the bluefin tuna fisheries in the North Atlantic and adjacent seas. The work was again carried out by correspondence between members and with other tuna scientists in the region and it has again been concentrated on the collection of data on the size composition of tuna catches taken in 1976-1978.

MATERIAL

The development of bluefin tuna catches in the Atlantic is shown in Table 1. It is based on statistics collected by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

Reports on catches and catch composition of bluefin tuna were submitted by the following countries: Canada (Tables 2-11), Denmark (Tables 12-14), France (Tables 15-23), Norway (Tables 24-26), Portugal (Table 27), Spain (Tables 28-41), Turkey (Tables 42-44), and USA (Tables 45-63).

The Federal Republic of Germany could still not resume its tuna fishery because of unavailability of fish on the former fishing grounds in the central parts of the North Sea since 1963.

Mrs C.D. Burnett, Dr M.J.A. Butler and Dr T.D. Iles reported that Canadian landings of bluefin tuna in the western Atlantic in 1976 yielded 846 tonnes round weight by all methods (Table 8), an increase of 217 tonnes, or 34% over the previous year:

a) The purse seine fishery for small fish off the New Jersey coast caught 332 tonnes, an increase of 12% over 1975 (295 tonnes).

b) The trap fishery in St Margaret's Bay (Nova Scotia) yielded 168 tonnes of giant bluefin, an increase of 14% over 1975 (144 tonnes); 4 tonnes were landed from a mackerel trap fishery east of Halifax, N.S.

c) The rod and reel catch of giants increased from 193 tonnes in 1975 to 342 tonnes in 1976, a 78% increase, but this was 6% less than the peak 1974 landing (365 tonnes).

Regulations which were introduced in 1974 for the various Canadian bluefin fisheries were continued, with minor additions and modifications, throughout the 1975 and 1976 seasons. These should be viewed within the context of ICCAT Regulations.

Weights were obtained for 1298 of the 1338 large bluefin caught in Canadian waters (Table 2). Fork and flank length measurements were obtained from approximately 60% of the catch.

Monthly landings from the Prince Edward Island rod and reel fishery are presented in Table 3. The average weight of fish in the fishery increased as the season progressed from 370.1 kg in August to 435.7 kg in October; the seasonal average was 395.3 kg, as compared with 386.1 kg in 1975.

The Canadian purse seine fishery for small bluefin operated during July and August off the New York/New Jersey coast of the United States. The size (fork length) composition of the 332 tonnes catch is presented in Table 4. The fork lengths range from 51.5 to 112.8 cm with an average length of 86.8 cm.

In 1976, 11 giant bluefin were tagged and released from the trap fishery (mackerel) in St Margaret's Bay, Nova Scotia. A further 17 giants, caught by rod and reel, were tagged and released from the Bay of Chaleur area (Gulf of St Lawrence). Recoveries in 1976 included:

(1) Two bluefin caught in the Gulf of St Lawrence, which had been tagged in St Margaret's Bay, Nova Scotia, in 1971 and 1976, respectively.

(2) A bluefin tagged in the Bay of Chaleur in 1975 was recaptured off North Cape, Prince Edward Island.

(3) A bluefin released in St Margaret's Bay in 1975 was recovered this year from the same general area.

The commercial programme to impound bluefin in St Margaret's Bay was continued in 1976. A total of 9 impoundments were established and 292 giants were successfully fattened over a 2-3 month period for the Japanese "Sashimi" market. The impounded bluefin were fed trash fish once or twice a day at an approximate rate of 5% body weight per day. In September, 110 fish were removed (average weight 372.2 kg), 178 in October (average weight 400.7 kg) and 4 in early November (average weight 416.6 kg). At that time, the water temperature decreased to between 6° and 7°C and the remaining 10 to 15 bluefin died.

The otolith sampling programme for age determinations was continued this year and involved approximately 500 giant bluefin and 191 juveniles.

Seasons and amended regulations for the 1976 East Coast bluefin tuna fishery were announced in March by the Minister of State for Fisheries, Remoe LeBlanc.

Changes to be introduced this year include a new 10-week season off Newfoundland and an additional season along the Atlantic coast of Nova Scotia.

New regulations set a minimum size limit of 300 pounds for the large tuna fishery. This limit has been imposed to provide some degree of protection for tuna of intermediate age.

At the request of the majority of fishermen, night fishing for tuna will be prohibited on the grounds of safety. In addition, tuna fishing by rod and reel will be restricted to operations from registered tuna vessels (i.e., fishing from a wharf will not be allowed). The catch limit remains the same as last year, namely two fish per boat per day.

The 1976 seasons are as follows:

a) Prince Edward Island (Alberton to Tracadie) - 10 July to 17 September inclusive.

b) Prince Edward Island (all other areas) - 10 August for 10 weeks.

c) New Brunswick and Quebec - 10 August for 10 weeks.

d) Outer Nova Scotia - 1 August for 10 weeks.

e) Nova Scotia (Gulf portions) - 1 September for 10 weeks.

f) Newfoundland (Atlantic coast) - 15 July for 10 weeks.

g) Newfoundland (Gulf portion) - 1 August for 10 weeks.

Mr LeBlanc said that in future licenses would only be transferred to bona fide fishermen. There were no plans at present to change the number of licenses issued for tuna fishing in the Gulf of St Lawrence (192).

The Minister stressed the importance of acquiring accurate data on the tuna fishery. To this end, each licensee must maintain a log descriptive of his fishing operations and catch and submit it weekly to the Fisheries and Marine Service's Statistics Branch.

Other regulations introduced as part of the 1975 tuna policy will continue in force for 1976. These are:

No fishing for bluefin will be permitted in the Gulf of St Lawrence, except by rod and reel. Fishing lines may not exceed 130 lbs breaking strength, and the length of the double line is limited to 30 feet.

All vessels engaged in taking or attempting to take bluefin tuna must be registered with the Fisheries and Marine Service as tuna sport fishing vessels. Only persons issued operator's licenses in 1975 may register their vessels for the tuna sport fishery in 1976. Vessel registrations must be renewed each year. The fee for registration being $20 and for an operator's license $5 (unchanged from 1975). Licenses and registrations must be applied for between 20 March and 16 May each year.

Transfer of fish between tuna fishing boats will not be permitted.

All plants handling tuna for export must be registered and meet standards established by the Fisheries Inspection Act.

Infringement of these regulations could result in suspension of a license to participate in the bluefin fishery.

Mrs C.D. Burnett, Mr P.C.F. Hurley and Dr T.D. Iles reported that the Canadian landings of bluefin tuna in 1977 for the west Atlantic yielded 972 tonnes round weight (Table 8), an increase of 26 tonnes or 3% over the previous year:

a) The purse seine fishery for juveniles off the eastern coast of the United States accounted for 298 tonnes, a decrease of 34 tonnes (10%) from 1976.

b) The trap fishery in St Margaret's Bay, Nova Scotia, took 372 tonnes of giant bluefin, an increase of 200 tonnes or 119% over the previous year.

c) The sport (rod and reel) fishery for giant bluefin declined from 342 tonnes in 1976 to 302 tonnes in 1977.

Regulations introduced in the Canadian bluefin fishery in 1974 have been maintained, subject to minor modifications in 1975 and 1976.

Weights were obtained for 1577 of the 1718 large bluefin taken in five locations along the Canadian Atlantic coast (Table 5). Mean weights ranged from 298.6 to 437.1 kg.

The size composition of monthly Prince Edward Island rod and reel landings is presented in Table 6. The average weight of fish increased as the season progressed, from 368.9 kg in August to 432.3 kg in October; the seasonal average was 394.4 kg, approximately the same as in 1976.

The Canadian purse seine fishery for small bluefin took 298 tonnes. This fishery operated during July and August off the New York/New Jersey coast of the United States in 1977. The size (fork length) composition of this catch is presented in Table 7. Fork lengths range from 44.5 to 163.6 cm, with an average length of 116.2 cm. In addition, 50 otoliths were extracted for age determination and several vertebrae and gonad samples were taken.

In 1977, 10 giant bluefin were tagged and released: 9 from the Bay of Chaleur area (Gulf of St Lawrence) and one east of Halifax, Nova Scotia. Five tagged bluefin were recovered in 1977; two fish were recaptured in the Gulf of Mexico from fish tagged in St Margaret's Bay and in the Bay of Chaleur in 1976; and bluefins tagged in the Bay of Chaleur area in 1973, 1975 and 1976 were recaptured in the same general area.

The commercial impoundment program in St Margaret's Bay was increased to 18 impoundments in 1977, and 717 giant tuna were successfully fattened for the Japanese market. In September, 290 fish were removed (average weight 393.2 kg), and in October 427 fish were recovered (average weight 414.0 kg).

One impoundment containing 13 giant bluefin was allocated for experimental purposes in St Margaret's Bay. Canadian and U.S. scientists worked in a cooperative programme involving studies of: internal body temperature, ambient water temperature and depth of free-swimming fish, using ultrasonic telemetry; feeding behaviour; nutrition; tag retention; sex determination by hormone radio-immunoassay; aging validation; and tissue contaminant analysis.

Sampling of otoliths for age determination was continued with approximately 270 giant bluefin sampled in three different areas, in addition to the fifty juvenile bluefin sampled in the purse seine fishery. On the recommendation of the Standing Committee for Research and Statistics of ICCAT, a bluefin tuna aging workshop was held in New York in March, 1977. Scientists from several nations discussed existing aging techniques in an effort to standardize these procedures. The proceedings of the workshop have been presented to the ICCAT Secretariat for distribution and a second workshop is planned for 1978. As a result of the 1977 workshop, an experiment involving the administration of tetracycline to impounded giant bluefin in St Margaret's Bay, up to 2 months prior to slaughter, was initiated to

validate present aging procedures. Otoliths and vertebrae from these fish are presently being analysed.

Dr Becket informed the Working Group that four of the tagged bluefin recaptured in 1977 and one of those recaptured in 1976 were fish that had been released after capture by rod and reel. This supports the value of the technique even in the colder part of the bluefin range.

Mrs C.D. Burnett, Mr P.C.F. Hurley and Dr T.D. Iles reported that the Canadian landings of bluefin tuna from the west Atlantic in 1978 amounted to 671 tonnes round weight (Table 8), a substantial decrease from the previous year (301 tonnes or 31%):

a) The purse seine fishery for juveniles off the eastern coast of the United States accounted for 241 tonnes, a decrease of 57 tonnes or 19% from 1977, and a decrease of 27% from 1976.

b) The incidental capture of giant bluefin in mackerel traps in St Margaret's Bay, Nova Scotia, also decreased from 372 tonnes in 1977 to 221 tonnes in 1978.

c) The sport (rod and reel) fishery for giant bluefin declined from 302 tonnes in 1977 to 209 tonnes this year, a decrease of 93 tonnes. The most significant change occurred in the Bay of Chaleur area of New Brunswick where the 1978 landings decreased 83%.

The size composition of bluefin taken in five areas along the Canadian Atlantic coast is presented in Table 9. Seasonal mean weights increased from 1977 in all areas but Newfoundland. Mean weights range from 293.7 to 459.0 kg.

The size composition of the Prince Edward Island rod and reel fishery is presented in Table 10. The mean weight of fish increased as the season progressed, from 315.5 to 468.2 kg, ranging in size from 174.6 to 560.1 kg. Although the seasonal mean weight for this area showed no increase in 1977, a significant increase from 394.4 kg in 1977 to 406.4 kg in 1978 was observed.

Catches of small bluefin from the purse seine fishery in July and August off the mid-Atlantic coast of the United States were sampled for size (length) composition. Fork lengths ranged from 55.3 to 186.8 cm with an average length of 111.9 cm. Size composition is presented in Table 11. No Canadian vessels operated in the Gulf of Guinea in 1978.

The commercial impoundment programme was continued in St Margaret's Bay, Nova Scotia, and maintained at 18 impoundments in 1978. Of 553 bluefin impounded, 460 were successfully held for one to four months for fattening. The remainder escaped or died during the season. Another 70 tuna were landed immediately upon capture in traps and were not impounded. Mean weight of the latter was 327.9 kg compared to 431.2 kg mean weight of the impounded tuna, demonstrating the rationale behind this programme.

One impoundment containing 10 bluefin was allocated for experimental purposes. Canadian and American scientists conducted cooperative investigations of: monitoring behavioural and physiological parameters by means of ultrasonic telemetry, aging validation, tag retention, tissue contamination, nutrition, parasitology, and electrophoretic studies.

Six bluefin were tagged and released in Canadian waters in 1978. Five were released from traps in St Margaret's Bay, and one from a rod and reel capture east of Halifax, Nova Scotia.

Four tagged bluefin were recovered in 1978. Three had been tagged and released from traps in St Margaret's Bay, Nova Scotia, in 1975 and 1976; two of these were recaptured by rod and reel in the Prince Edward Island area and the third was taken by a Japanese longline in the Gulf of Mexico. The fourth recapture had been released in the Bay of Chaleur area and was recaptured in the same general area in 1978.

Sampling was continued at the major bluefin landing ports in Canada in 1978. In addition to morphometric data, 300 otoliths were collected from giant bluefin and 50 from juveniles for age determination studies.

Dr O. Bagge submitted the Danish data (Tables 12-14).

Dr H. Aloncle explained that in 1976 the French catches did not reflect the exact situation of the bluefin tuna density in the Gulf of Gascogne (Table 15).

The year had been a very hot one. The temperature of the surface waters had largely exceeded 20°C on the surface and the fishermen complained of the excessive hydrological conditions which had disturbed the fishing conditions in the Gulf.

This fishery remains very artisanal on the French Atlantic coast where catches are always made with living bait.

The activity has, however, developed on the French Mediterranean coast where the fishery is carried out with purse seine under participation of a plane which informed the purse seine fishermen of the position of the shoals.

The statistics of French bluefin tuna catches for 1977 were submitted by Dr H. Aloncle (Table 16). French bluefin tuna catches made by purse seine in the Mediterranean in 1978 are given in Table 17.

The French bluefin tuna catches made by live bait fishing in the Bay of Biscay in 1978 were reported by Dr F.X. Bard (Table 18). Both Dr Bard and Dr Cort from Spain also submitted Tables 19-23 evaluating the bluefin tuna fishery in the Bay of Biscay carried out by France and Spain over the past years (Figure 1). The 1978 statistics on the age composition of catch represents an estimate and is based on counts and sortings of 14 300 bluefin tuna according to commercial weight classes and carried out by the captains of fishing boats and fish dealers.

Drs Bard and Cort state that the bluefin tuna fishery in the Bay of Biscay has been continuously monitored since 1972. Catches, fishing effort and estimates of age composition of catches were recorded. The following conclusions can be drawn:

> There is a decrease of fishing effort by one half since 1975; there is a continuous increase of the mean occurrence of the younger age groups; since 1976 also fish of medium age (4-7 years) returned in the catches; there is evidence of the existence of a strong year class 1974.

The experts concluded further that if one considers that the bluefin tuna stock of the eastern Atlantic recruits to a large degree in the Bay of Biscay at an age of 2 years after it has escaped the fishery of Morocco, the stock situation of bluefin tuna in the eastern Atlantic can be considered as rather good, as reflected by the recent development of the fishery in the Bay of Biscay.

Mr S. Myklevoll reported that the first Norwegian catch of bluefin tuna in 1976 was landed on 8 July, opening the season 2-3 weeks earlier than expected, in week 28 as compared to weeks 30-31 for the last ten years (Table 24).

One-thousand-six-hundred-and-nineteen fish, totalling 413 110 kg, were landed during the period 8 July to 28 August (weeks 28-35). A single fish was caught on 1 October. The catches were concentrated in the first three and the last three weeks, with only two fish landed during weeks 31-32.

No fishing stops or other restrictions were imposed, but periods of bad weather hampered the fishery. Eighty catches were laned by 28 fishermen. The catches ranged between 1 and 10 fish. The bulk were caught on the coast of Hordaland and Sogn & Fjordane, while 2 fish were reported from Møre & Romsdal and 2 fish from Rogaland, the neighbouring districts to the north and south.

The complete Norwegian catch is included in Table 24; individual weights are lacking for 62 fish in week 29. Only giant bluefin were caught. Individual weights (gutted and without head) varied between 130 and 400 kg, averaging 255.2 kg. This corresponds approximately to 165-520, mean 330 kg live weight. A mean weight increment of about 35 kg from week 28 to week 35 was observed. No length measurements were recorded.

One American tuna tag was returned. The fish had been tagged at Cat Cay, Bahamas, on 8 June 1969 and was recaptured north of Bergen on 24 August 1976.

Mr S.A. Iversen stated that except for one tuna caught on 7 July (week 27) the Norwegian fishery started four weeks later in 1977 (week 31). This is the usual time for the start of the tuna season there (Table 25). 2191 fish, totalling 583 433 kg, were landed during weeks 27-34. The main catch was landed in the two weeks 32 and 33. Sixty-five catches were landed by 27 fishermen. The catches ranged between 1 and 219 fish. The bulk were caught on the coast of Hordaland and Sogn & Fjordane. Three fish were reported from Rogaland, the neighbouring district south of Hordaland.

The complete Norwegian catch is included in Table 25. Only giant bluefin were caught. Individual weights are lacking for 16 fish in week 32. Individual weights (gutted and without head) varied between 180 and 435 kg, averaging 268.2 kg, corresponding approximately to 230-560 kg, mean 345 kg live weight.

No fishing stops or other restrictions were imposed. However, the fishery ended before September due to bad weather. No length measurements were recorded.

Mr Iversen furnished the Norwegian data for 1978 (Table 26) and stated that except for two tunas caught in week 28, the fishery started two weeks later. This is more or less the usual time for starting the tuna season there.

Six-hundred-and-fifty-one fish, totalling 168 092 kg, were landed during weeks 28-33. The main catch was landed in the two weeks of 31 and 32. Thirty-eight catches, ranging between 1 and 117 fish, were landed by 25 vessels. The bulk was caught on Vikingbank and the coast of Hordaland and Sogn & Fjordane.

The complete Norwegian catch is included in Table 26. Only giant bluefin were caught. Individual weights are lacking for 117 fish in week 32. Individual weights (gutted and without heads) varied between 130 and 380, averaging 258.2 kg, corresponding approximately to 330 kg live weight.

The poor catch this year was mainly due to bad weather during the season and that the tunas seemed to be farther from the coast than usual. Catches and observations from the Vikingbank confirm this. No length measurements were recorded.

Dr R. Monteiro submitted the landing statistics of the Portuguese bluefin tuna catches made at Azores and Madeira Islands (Table 27).

According to Dr J. Rodriguez-Roda, only two madragues were working in 1976 in southern Spain, one at Barbate and a new one at Zahara de los Atunes, 8 km from Barbate towards the Straits of Gibraltar.

In 1976, the catches were a little better than in 1975. The mean age of tuna for Barbate was 11.4 years at a mean length of 237.6 cm (Tables 28 and 29).

Mr Cort informed the Working Group that the bluefin tuna fishing season in 1976 in the Bay of Biscay began later than usual owing to high temperatures, which reached 24.9°C and lasted until the second half of July; the result was that the fish were not taking the bait. In August, the catches were very good, being 67.3% of the total. The season ended during the first week of October.

Another noteworthy point was the presence of fish in a state of advanced sexual maturity (Cort et al, 1976). These observations took place at the end of June and the beginning of July, precisely when the temperatures were higher in the Bay. The result of the microscopic study of the ovules and ovocytes of the fish appeared to confirm that they were in stage IV (pre-spawning).

Studies to be made during coming seasons may prove the possible existence of spawning grounds for certain groups of fish in the Bay of Biscay.

In Table 30 (Bard and Cort, 1976), information is given on the demographic structure of the bluefin surface fishery in the Bay of Biscay from 1972 to 1976 for the fishing fleets of Fuenterrabia (Spain) and St Jean de Luz (France), whose catches were up to more than 95% of the total catch made in the entire Bay throughout the season.

The trends in recent years show a decrease for the c.p.u.e. in kg, but an increase for the c.p.u.e. in number of fish because boats have been seeking the small fish in recent years (Table 31).

Dr Rodriguez-Roda informed the Working Group that in 1977 three madragues were working in the south of Spain, 2 on the Atlantic coast at Barbate and Zahara de los Atunes and one on the Mediterranean coast at La Linea (Table 32).

During the months of May, June and July, the weather was not very satisfactory for the madrague fishery. Nevertheless, it is evident that catches of bluefin tuna are steadily decreasing in this area (a total of 169 fish were measured) (Table 33). Dr Cort reported that the period from July to August 1977 was characterized by extremely bad weather which cut down the activities of the Spanish tuna fleet in the Bay of Biscay. The improvement in weather during September made possible average catches. The catch per unit of effort was even the highest since 1972:

1972	1973	1974	1975	1976	1977
74.9	75.1	68.0	54.9	53.1	81.2 kg

The age composition of catches is given in Table 34.

Information on the bluefin tuna catches made by bait boats in the Canary Islands, given for the first time, was made available by Mr Santos-Guerra (Tables 35-36).

Dr Rodriguez-Roda informed the Working Group that the 1978 Spanish madrague fishery on bluefin tuna was better than in 1977. A total of 2976 bluefin tuna was caught in 1978 against 1626 in 1977 (Tables 37-38).

Dr Cort who supplied Table 39 reported that the bluefin tuna fishing season in 1978 in the Bay of Biscay began in the second half of June and lasted until the end of October. In contrast to previous years, the weather was very good, resulting in good catches of 1400 tonnes. He pointed out the great abundance of 1-year-old bluefin tuna which was uncommon in previous years. The Spanish Institute of Oceanography organised a tagging cruise in August 1978 aboard a trolling boat. Three-hundred-and-eight fish were tagged from which 170 were bluefin tuna and 138 albacores.

The size composition data of Spanish bluefin tuna catches in the waters of the Canary Islands for 1978 were supplied by Dr Santos-Guerra. A total of 1548 tonnes was caught (Table 40).

Dr J.C. Rey compiled the age composition data of bluefin tuna catches made off the Atlantic coast of Morocco (Table 41). The fish were caught between Cape Juby (28°N) and Cape Mazagán (34°N) from September to December 1978. They were landed at Algeciras in Spain. The fishing fleet is composed of small and medium fishing boats (25-80 gross tonnes) fishing with hooks. Catches of bluefin tuna are occasional. Some 450 tonnes were caught.

The Turkish data for 1976 in Table 42 were presented by Dr Gazi Sun, and for 1977 and 1978 by Professor Demio. They were collected at the Istabul Fish Market and at a madrague stationed at Beykoz (Bosphorus) only (Tables 43 and 44).

Dr W.W. Parks of the Southeast Fisheries Center reported that in 1976 the United States commercial fisheries landed 1838 tonnes of bluefin tuna. In addition, there was a small sport catch of 29 tonnes and probably consisting of ages 0, 1, 2 and 3 bluefin (Table 57).

Table 45 lists the total US commercial bluefin catch by age (estimated by length frequency) and gear in numbers and in weight. The table indicates that the 1973 (age 0) year class, at age 3 in 1976, contributed 80% of the catch in numbers or 51% of the catch by weight. The table further indicates

that the catch in numbers was distributed by 3% hand-gear and 97% purse seine, and by weight 34% hand-gear and 66% purse seine.

Table 46 lists estimated 1976 hand-gear catches by age and week. The table indicates that significant hand-gear catches occurred between weeks 28 and 38 (4 July to 18 September) with the maximum weekly catch (25% of the total hand-gear catch by weight) occurring in week 34. The modal age in the catch in most weeks was 13 years; there did not appear to be a shift in the age distribution of the catch as the season progressed.

Table 47 lists estimated 1976 purse seine catches by age and week. The table indicates that the purse seine season was divided into two periods. In the first period (weeks 26-30; 27 June to 24 July) bluefin aged 2-3 were caught; in the second (weeks 37, 38; 5-18 September) age 9+ fish were taken. The largest weekly catch by weight occurred in the first week.

In the first period, age 3 bluefin dominated the catches in all weeks (90% of the total period - one catch by weight). In the second period, age 14 fish predominated (26%). Overall, age 3 bluefin, 1973 year class fish, comprised 77% of the purse seine catch by weight.

Tables 48 and 49 list sample length frequency by week for the 1976 US bluefin catch.

For 1977, the US length composition data were reported by Mr M.D. Lange of the Miami Laboratory of the National Marine Fisheries Service (Tables 50-55). The fish were measured as straight fork length in centimeters and tabulated with one week intervals across the respective fishing seasons.

Tables 56-58 were submitted by Dr J.C. Tyler.

The US data for 1978 were compiled by Mr M.I. Farber (Tables 60-63). They are computer printouts for the actual size samples by month for each fishery as well as each total catch (actual or estimated) by weight and number. The fisheries included are: purse seine - small fish; purse seine - giant fish; sport fishing - small fish; and hand-gear - giant fish. Length and weight frequencies are tabulated for each of these, except for hand-gear where only a weight frequency is available.

SUMMARY OF CONCLUSIONS

Bluefin Tuna Catches

The western Atlantic catches increased considerably during the period under survey due to the considerable increase of catches of Japanese longliners (Table 1). The catches of the Canadian and US purse seine fisheries of small fish were slightly larger than during the preceding three years (1973-75) but less than half of those at the beginning of the 1970's. The catch of giant fish by traps and hook and line was more or less unchanged.

The eastern Atlantic overall catches were slightly smaller than in 1973-75, but larger than in 1970-72 due to a considerable Japanese longline fishery. Catches of younger fish in the Bay of Biscay by France and Spain declined during the period under survey, while Spanish and Moroccan madrague catches recovered again. The Norwegian purse seine catches declined to nearly half of the catches made in the preceding period.

The Mediterranean catch continued to increase due to the development of the purse seine fishery especially in Italy and France. The Italian madrague fishery yielded stable catches.

The total North Atlantic catches, including the Mediterranean, were the highest ones since 1967.

Comparison of the Catch Composition Data Collected in Different Countries

Norwegian, Canadian, US, Canary Islands, and Spanish catches of giant bluefin tuna

The Norwegian bluefin tuna catches were of similar size composition as in previous years and remained more or less unchanged over the last 14 years. The size composition did not tally with that of the Canadian catches of giant tuna as it did in 1973-75; Canadian fish were considerably larger. Norwegian catches in 1978 were, however, very similar to those made by the US handline as well as rod and reel fishery. Also, they did not correspond with the catches of giant tuna caught off the Canary Islands, which were smaller. The Spanish madrague catches were also composed of smaller fish (Figure 2).

Catches of giant bluefin tuna off southern Spain, Morocco and Canary Islands

Bluefin tuna catches off the Atlantic coast of Morocco consisted mainly of old fish of year classes 12 and 13 (Table 41). They were thus of similar age composition as the Spanish madrague catches, and also seemed to correspond largely with the catches made off the Canary Islands.

US, Canadian, French and Spanish catches of smaller fish

In the US and Canadian purse seine catches, the same year classes dominated. In 1978, the year classes 1973 and 1975, then 5 and 3 years old, dominated (Figure 3). The year class 1973 had already formed a pronounced peak in the length composition in 1974. Small fish caught by US sport fishing off the mid-Atlantic coast were mainly 1-year-old fish (Figure 3).

In 1978, in the live bait bluefin tuna fishery in the Bay of Biscay the 1-year-old fish dominated in both the French and Spanish fishery. The 1974 year class was found to be stronger than year classes 1973 and 1975. This may allow the conclusion that the fluctuation pattern in the strength of recruit year classes of bluefin tuna did not tally in the eastern and western Atlantic during the period under survey.

In the French purse seine catches of bluefin tuna in the Mediterranean, 1-year-old fish dominated as they did in the catches made in the Bay of Biscay (Table 17).

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Table 1. Bluefin tuna catches (in thousand tonnes) in the Atlantic and Mediterranean (Source: ICCAT Report for biennial period, 1978-79, Part I (1978), Madrid, Spain, 1979)[11].

Fishery		1978[1]	1977	1976	1975	1974	1973	1972	1971	1970
WESTERN ATLANTIC										
Sub-total		4 663	5 858	5 213	4 977	3 529	3 371	2 626	5 842	5 001
Canada	Large	392	644	514	350	664	367	228	206	426
	Small (PS)	241	298	332	291	103	635	260	935	1 161
USA	Large	763	802	769	715	731	199	516	518	829
	Small (PS)	913	1 058	1 069	1 986	804	970	1 622	2 651	2 498
	Sport (sml)	54	56	29	122	322	103	-	-	-
Japan[3]	LL	2 300	3 000	2 500	1 513	905	1 097	0	1 532	87
EASTERN N. ATLANTIC										
Sub-total		5 249	6 016	4 863	9 794	5 711	3 628	3 935	4 088	4 861
France	Surf	598	592	267	778	550	532	900	800	800
Morocco	PS	296	595	331	2 624	590	512	531	30	406
	Trap	637	222	0	0	7	1	122	63	286
Norway	PS	168[4]	583	413	900	800	100	100	600	400
Portugal	BB	-	155[4]	218[4]	321	1	21	1	1	-
Spain	BB-Can	800	1 250	832[5]	932	546	906	-	800[5]	-
	BB-NE	550	720[6]	612[6]	891	1 009[6]	1 008[6]	1 469[6]	1 194[6]	1 469
	Trap	600	339[7]	490[7]	448[7]	13	504	250	600	1 500
Japan[3]	LL	1 500	1 500	1 700	2 900	2 195	44	562	-	-
MEDITERRANEAN										
Sub-total		8 747	13 189	15 982	11 135	13 407	5 792	5 765	5 199	3 337
France	PS	1 000	3 180	3 800[8]	1 600[8]	1 800[8]	1 400[8]	1 100[8]	2 200[8]	1 100
Italy	Trap	500	698	650	713	1 000	317	667	746	677
	PS	6 000	8 000[9]	9 010	6 270	6 000	2 200	2 300	-	-
	Uncl	-	34	12	500	500	500	500	500	500
Japan	LL	200	600	1 000	1 260	2 195	246	112	-	-
Libya		-	288	-	-	500	400	300	600	500
Malta		47	47	25	37	21	1	1	1	1
Morocco	Trap	-	-	222	-	14	1	36	37	-
	BB	-	-	332	264	590	-	1	42	-
Spain	Uncl	-	68[10]	100[10]	103[10]	192[10]	274[10]	124[10]	129[10]	69[10]
Tunisia		-	-	220	167	245	227	400	496	266
Yugoslavia		1 000	932	562	155	317	224	200	326	90
Algeria	Trap	-	40	49	66	33	1	1	100	1
Turkey		-	-	-	-	-	1	23	22	133
TOTAL N. ATLANTIC										
Sub-total		3	54	66	55	192	238	114	3 158[2]	109
Korea		3	3	10	23	56	66	30	3 039	-
Taiwan		-	51	56	32	136	172	84	119	109
TOTAL		18 662	25 117	26 075	25 961	24 287	13 029	12 400	18 287[2]	13 308

1) Provisional estimates.
2) May include southern bluefin.
3) Japanese longline catches split between East and West Atlantic by Z. Suzuki.
4) From ICES Bluefin Tuna Working Group, 1978, 1977.
5) From A. Santos.
6) From J.L. Cort.
7) From ICES Bluefin Tuna Working Group, 1978, 1977, 1976.
8) From H. Farrugio.
9) From G. Piccinetti.
10) From J.C. Rey.
11) Plus catch data of Norway, 1978.

Table 2. Size composition (round weight per mille by 10 kg intervals) of large bluefin tuna captured in five localities along the Canadian Atlantic coast in 1976 (‰ smoothed).

Size class kg	P.E.I. Rod & Reel		Nfld. Rod & Reel		N.B. Rod & Reel		Quebec Rod & Reel		N.S. Trap		Total	
	n	‰	n	‰	n	‰	n	‰	n	‰	n	‰
80	1	2	-	-	-	-	-	-	2	4	2	0
...	0	0	-	-	-	-	-	-	-	-	-	-
190	0	0	-	-	-	-	-	-	0	0	1	0
200	0	0	-	-	-	-	-	-	1	2	1	0
210	0	0	-	-	-	-	-	-	0	0	0	0
220	0	0	-	-	-	-	-	-	0	0	0	0
230	0	0	-	-	-	-	-	-	2	4	2	1
240	0	0	-	-	-	-	-	-	3	7	3	2
250	0	0	0	0	-	-	-	-	5	11	5	5
260	2	3	1	167	-	-	-	-	9	20	12	8
270	2	3	2	332	0	0	-	-	8	18	12	12
280	6	9	0	0	1	6	0	0	21	46	28	16
290	7	11	0	0	1	6	1	46	5	11	14	15
300	8	12	1	167	0	0	0	0	9	20	18	16
310	16	25	0	0	0	0	0	0	16	35	32	25
320	17	26	0	0	3	18	0	0	25	55	45	34
330	22	34	0	0	7	42	1	46	22	48	52	46
340	44	68	1	167	7	42	1	46	34	75	87	57
350	38	58	0	0	11	67	1	46	18	40	68	62
360	44	68	0	0	13	79	0	0	43	95	100	65
370	32	49	1	167	10	61	2	91	27	59	72	67
380	55	85	0	0	10	67	1	46	34	75	101	73
390	47	72	-	-	15	91	1	45	39	86	102	81
400	75	115	-	-	16	97	1	45	24	53	116	81
410	40	61	-	-	16	97	5	227	22	48	83	67
420	36	55	-	-	11	67	1	45	19	42	67	57
430	34	52	-	-	16	97	3	136	23	51	76	52
440	26	40	-	-	12	73	0	0	11	24	49	41
450	30	46	-	-	2	12	0	0	6	13	38	31
460	20	31	-	-	3	18	3	136	7	15	33	25
470	13	20	-	-	3	18	1	45	7	15	24	19
480	10	15	-	-	1	6	0	0	6	13	16	14
490	7	11	-	-	1	6	-	-	6	13	14	10
500	7	11	-	-	2	12	-	-	0	0	9	7
510	5	8	-	-	1	6	-	-	1	2	7	7
520	5	8	-	-	0	0	-	-	1	2	6	3
530	1	2	-	-	0	0	-	-	0	0	1	1
540	0	0	-	-	2	12	-	-	-	-	2	0
Total	650	1 000	6	1 000	165	1 000	22	1 000	455	1 000	1 298	1 000
Mean weight (kg)	395.3		304.7		401.8		407.4		331.7			

Size class 80 kg = 80.0 - 89.9 kg.
Nfld = Newfoundland
N.S. = Nova Scotia
P.E.I. = Prince Edward Island
N.B. = New Brunswick

Table 3. Size composition of large bluefin caught by rod and reel off Prince Edward Island during three consecutive months of the 1976 season (number of fish and round weight per mille by 10 kg intervals).

Size class (kg)	August		September		October	
	No. of fish	‰	No. of fish	‰	No. of fish	‰
190	-	-	1	5	-	-
200	-	-	-	-	-	-
210	-	-	-	-	-	-
220	-	-	-	-	-	-
230	-	-	-	-	-	-
240	-	-	-	-	-	-
250	-	-	-	-	-	-
260	1	4	1	5	-	-
270	1	4	1	5	-	-
280	3	11	3	14	-	-
290	6	23	1	5	-	-
300	7	27	1	5	-	-
310	14	53	1	5	1	6
320	10	38	7	32	-	-
330	14	53	6	27	2	12
340	23	88	16	73	5	29
350	24	92	10	46	4	24
360	22	84	17	78	5	29
370	22	84	6	27	4	24
380	30	115	20	92	5	29
390	24	92	18	82	5	29
400	21	80	39	179	15	88
410	14	53	17	78	9	53
420	12	46	7	32	17	100
430	6	23	11	50	17	100
440	4	15	9	41	13	77
450	3	11	8	37	19	112
460	1	4	7	32	12	71
470	-	-	5	23	8	47
480	-	-	2	9	8	47
490	-	-	-	-	7	41
500	-	-	2	9	5	29
510	-	-	2	9	3	18
520	-	-	-	-	5	29
530	-	-	-	-	1	6
Total	262	1 000	218	1 000	170	1 000
Mean weight (kg)	370.1		394.2		435.7	

Size class 190 kg = 190.0 - 199.9

Table 4. Size (fish length) composition of small bluefin tuna taken off the US coast by Canadian purse-seine vessels in 1976.

Size class (cm)	No. of fish	‰
50	23	16
55	102	72
60	4	3
65	-	-
70	28	20
75	338	240
80	116	82
85	25	18
90	196	139
95	466	331
100	104	74
105	6	4
110	1	1
Total	1 409	1 000

Size category 50 = 50.0 - 54.9 (fork length caliper).

Table 5. Size composition (round weight per mille by 10 kg intervals) of large bluefin tuna captured in five localities along the Canadian Atlantic coast in 1977.

Size class (kg)	P.E.I.	Nfld.	N.B.	Quebec	N.S.		Total	‰
	Rod & Reel n	Rod & Reel n	Rod & Reel n	Rod & Reel n	Trap n	Rod & Reel n	n	Smoothed
180	-	-	-	-	1	-	1	-
190	-	-	-	-	-	-	-	-
200	1	-	-	-	-	-	1	-
210	-	-	-	-	-	-	-	-
220	1	-	-	-	-	-	1	1
230	-	-	-	-	2	-	2	3
240	-	1	-	-	9	-	10	5
250	1	-	1	-	6	-	8	6
260	-	-	-	-	11	-	11	7
270	1	-	-	-	14	-	15	10
280	3	-	-	-	18	-	21	13
290	4	1	-	-	16	-	21	16
300	9	1	-	-	22	-	32	19
310	10	1	2	1	24	-	38	25
320	12	1	3	-	32	-	48	36
330	15	-	5	-	40	-	60	37
340	21	-	5	1	39	-	66	41
350	27	-	9	1	44	-	81	48
360	25	-	13	2	57	1	98	58
370	25	-	14	1	58	1	99	66
380	34	-	25	2	64	1	126	78
390	39	-	22	2	54	-	117	81
400	33	-	22	4	64	1	124	75
410	41	-	19	3	52	-	115	71
420	33	-	11	1	57	-	102	62
430	30	-	12	1	37	1	81	56
440	25	-	10	1	52	-	88	49
450	14	-	1	1	33	1	50	33
460	15	-	4	-	31	-	50	29
470	5	-	-	1	29	-	35	24
480	7	-	1	-	23	-	31	19
490	6	-	2	-	13	-	21	13
500	2	-	-	-	5	2	9	7
510	-	-	1	-	5	1	7	5
520	-	-	1	-	4	-	5	4
530	1	-	-	-	1	-	2	2
540	-	-	-	-	1	-	1	1
Total	440	5	183	22	918	9	1 577	1 000
Mean weight (kg)	394.4	298.6	396.7	397.7	388.1	437.1		

Size class 80kg = 80.0 - 89.9 kg.

P.E.I. = Prince Edward Island
Nfld. = Newfoundland
N.B. = New Brunswick
N.S. = Nova Scotia

Table 6. Size composition of large bluefin tuna caught by rod and reel off Prince Edward Island during four consecutive months of the 1977 season (number of fish and round weight per mille by 10 kg intervals).

Size class (kg)	July		August		September		October	
	No. of fish	‰	No. of fish	‰	No. of fish	‰	No. of fish	‰
200	-	-	-	-	1	5	-	-
210	-	-	-	-	-	-	-	-
220	-	-	1	8	-	-	-	-
230	-	-	-	-	-	-	-	-
240	-	-	-	-	-	-	-	-
250	-	-	1	8	-	-	-	-
260	-	-	-	-	-	-	-	-
270	-	-	-	-	1	5	-	-
280	-	-	2	15	-	-	1	10
290	-	-	2	15	2	10	-	-
300	-	-	6	45	3	15	-	-
310	-	-	7	53	3	15	-	-
320	-	-	4	30	8	39	-	-
330	-	-	7	53	8	39	-	-
340	-	-	13	99	7	34	1	10
350	-	-	11	83	14	68	2	20
360	-	-	9	68	13	63	3	29
370	1	1 000	9	68	12	58	3	29
380	-	-	16	121	16	78	2	20
390	-	-	12	91	22	107	5	49
400	-	-	9	68	18	88	6	59
410	-	-	8	61	22	107	11	108
420	-	-	8	61	12	58	13	127
430	-	-	2	15	15	73	13	127
440	-	-	1	8	16	78	8	78
450	-	-	2	15	3	15	9	88
460	-	-	2	15	4	20	9	88
470	-	-	-	-	2	10	3	30
480	-	-	-	-	2	10	5	49
490	-	-	-	-	1	5	5	49
500	-	-	-	-	-	-	2	20
510	-	-	-	-	-	-	-	-
520	-	-	-	-	-	-	-	-
530	-	-	-	-	-	-	1	10
Total	1	1 000	132	1 000	205	1 000	102	1 000
Mean weight (kg)	370.0		368.9		392.2		432.2	

Size class 200 kg = 200.0 - 209.9 kg.

Table 7. Size (fork length) composition of small bluefin tuna taken off the US coast by Canadian purse-seine vessels in 1977.

Size class (cm)	No. of fish	‰ Smoothed
40	1	1
45	-	-
50	-	-
55	1	1
60	5	7
65	4	5
70	8	11
75	68	93
80	76	104
85	21	29
90	2	3
95	10	14
100	17	23
105	19	26
110	29	40
115	34	46
120	76	104
125	98	134
130	99	135
135	53	72
140	67	92
145	35	48
150	5	7
155	3	4
160	1	1
Total	732	1 000

Size category 40 = 40.0 - 44.9 (fork length caliper).

Table 8. Canadian catches of bluefin tuna from the Atlantic Ocean, 1962-78. Landings (nominal catch in tonnes, round weight).

Year	Traps**)	Purse Seine	Rod & Reel*)	Total
1962	137	-	40	177
1963	229	323	90	642
1964	318	579	99	996
1965	175	461	90	726
1966	211	-	102	313
1967	298	-	58	356
1968	253	-	180	433
1969	407	-	170	577
1970	275	1 161	151	1 587
1971	68	935	128	1 131
1972	36	202	261	499
1973	160	639	215	1 014
1974	300	103	365	768
1975	141	295	193	629
1976	172	332	342	846
1977	372	298	302	972
1978	221	241	209	671

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

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

Table 9. Size composition (round weight per mille by 10 kg unit) of large bluefin tuna captured in five localities along the Canadian Atlantic coast in 1978.

Size class (kg)	P.E.I.	Nfld.	N.B.	Quebec	N.S.	Trap	Total	‰ Smoothed
	Rod & Reel	Rod & Reel	Rod & Reel	Rod & Reel	Rod & Reel			
60	-	-	-	-	-	1	1	2
70	-	-	-	-	-	4	4	2
80	-	-	-	-	-	0	0	1
..	-	-	-	-	-	..	..	..
120	-	-	-	-	-	1	1	1
130	-	-	-	-	-	2	2	1
140	-	-	-	-	-	0	0	1
150	-	-	-	-	-	0	0	0
160	-	-	-	-	-	1	1	1
170	1	-	-	-	-	0	1	1
180	0	-	-	-	-	1	1	1
190	1	-	-	-	-	1	2	1
200	0	-	-	-	-	1	1	1
210	0	-	-	-	-	0	0	0
220	0	-	-	-	-	0	0	0
230	0	-	-	-	-	1	1	0
240	0	-	-	-	-	0	0	1
250	2	-	-	-	-	2	4	2
260	0	-	-	-	-	0	0	3
270	2	-	-	-	-	4	6	5
280	3	-	1	-	-	3	7	7
290	3	2	0	-	-	4	9	8
300	3	-	0	-	-	4	7	8
310	6	-	0	-	-	4	10	10
320	8	-	0	-	-	6	14	14
330	9	-	0	-	-	7	16	21
340	24	-	1	1	-	10	36	32
350	24	-	0	1	1	16	42	43
360	26	-	0	0	0	31	57	50
370	26	-	4	0	2	17	49	54
380	38	-	4	1	0	27	70	62
390	32	-	2	1	0	35	70	69
400	32	-	2	2	0	43	79	68
410	24	-	5	1	0	24	54	64
420	29	-	1	2	1	42	75	66
430	28	-	3	0	2	35	68	62
440	21	-	2	1	0	20	44	48
450	16	-	2	0	1	22	41	44
460	20	-	2	0	1	31	54	49
470	12	-	1	1	1	37	52	46
480	6	-	1	0	5	18	30	36
490	13	-	2	-	0	23	38	29
500	5	-	2	-	0	9	16	24

(Cont'd.)

Table 9 (Continued)

Size class (kg)	P.E.I. Rod & Reel	Nfld. Rod & Reel	N.B. Rod & Reel	Quebec Rod & Reel	N.S. Rod & Reel	Trap	Total	‰ Smoothed
510	11	-	-	-	1	20	32	22
520	2	-	-	-	1	7	10	16
530	6	-	-	-	1	8	15	11
540	3	-	-	-	-	4	7	7
550	-	-	-	-	-	1	1	3
560	1	-	-	-	-	2	3	2
570	-	-	-	-	-	0	0	1
580	-	-	-	-	-	0	0	0
590	-	-	-	-	-	1	1	-
n =	437	2	35	11	17	530	1 032	1 000
Mean weight (kg)	406.4	293.7	421.0	406.6	459.0	417.6		

Size class 60 kg = 60.0 - 69.9 kg

Table 10. Size composition of large bluefin caught by rod and reel off Prince Edward Island during four consecutive months of the 1978 season (number of fish and round weights per mille by 10 kg intervals).

Size class (kg)	July		August		September		October	
	No.	‰	No.	‰	No.	‰	No.	‰
170	-	-	-	-	1	5	-	-
180	-	-	-	-	-	-	-	-
190	-	-	-	-	1	5	-	-
200	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-
240	-	-	-	-	-	-	-	-
250	-	-	2	13	-	-	-	-
260	-	-	-	-	-	-	-	-
270	-	-	2	13	-	-	-	-
280	-	-	1	6	2	9	-	-
290	1	500	3	20	-	-	-	-
300	-	-	-	-	2	9	1	16
310	-	-	3	20	3	13	-	-
320	-	-	5	33	3	13	-	-
330	1	500	6	39	3	13	-	-
340	-	-	15	98	9	41	-	-
350	-	-	15	98	9	41	-	-
360	-	-	15	98	11	51	-	-
370	-	-	11	72	15	68	-	-
380	-	-	21	137	14	63	3	49
390	-	-	13	85	15	68	2	33
400	-	-	11	72	19	86	2	33
410	-	-	9	59	14	63	1	16
420	-	-	6	39	17	77	6	98
430	-	-	3	20	23	104	2	33
440	-	-	6	39	14	63	1	16
450	-	-	3	20	7	32	6	98
460	-	-	-	-	13	59	7	116
470	-	-	1	6	8	36	3	49
480	-	-	-	-	2	9	4	66
490	-	-	2	13	4	18	7	116
500	-	-	-	-	4	18	1	16
510	-	-	-	-	5	23	6	98
520	-	-	-	-	-	-	2	33
530	-	-	-	-	3	13	3	49
540	-	-	-	-	-	-	3	49
550	-	-	-	-	-	-	-	-
560	-	-	-	-	-	-	1	16
Total	2	1 000	153	1 000	221	1 000	61	1 000
Mean wt. (kg)	315.5		376.6		410.8		468.2	

Size class 170 kg = 170.0 - 179.9 kg

Table 11. Size (fork length) composition of small bluefin taken off the US coast by Canadian purse seine vessels in 1978.

Size class (cm)	No. of fish	‰ Smoothed
55	7	14
60	62	32
65	39	27
70	2	11
75	13	16
80	58	37
85	64	44
90	42	33
95	25	46
100	151	123
105	319	191
110	210	147
115	27	51
120	2	8
125	9	8
130	15	13
135	27	19
140	30	25
145	43	37
150	79	49
155	54	40
160	21	19
165	4	6
170	1	1
175	1	1
180	1	1
185	1	1
Total	1 307	1 000

Size category 55 = 55.0 - 59.9 (fork length caliper)

Table 12. Weight distribution of bluefin tuna landed in Denmark in 1976. The weight groups refer to gutted fish with gills (kg).

Weight group (kg)	n
320 - 324	1
...	
330 - 334	2
335 - 339	1
...	
345 - 349	1
...	
355 - 359	1
360 - 364	1
365 - 369	1
370 - 374	1
375 - 379	1
380 - 384	1
...	
395 - 400	2
...	
410 - 414	1
...	
430 - 434	1
...	
450 - 454	1
Total	16

All the tuna are caught by Swedish and Danish mid-water trawlers in the Kattegat.

Table 13. Weight distribution of bluefin tuna landed in Denmark in 1977. The weight groups refer to gutted fish with gills (kg).

Weight group (kg)	n
270 - 274	1
...	
290 - 294	1
...	
340 - 344	1
...	
350 - 354	1
...	
360 - 364	1
...	
390 - 394	1
Total	6

Table 14. Weight distribution of bluefin tuna landed in Denmark in 1978. The weight groups refer to gutted fish with gills (kg).

Weight group (kg)	n
325 - 329	1
...	
340 - 344	1
345 - 349	2
...	
355 - 359	1
...	
365 - 369	1
...	
375 - 379	1
...	
400 - 405	1
...	
415 - 419	1
Total	9

Table 15. French bluefin tuna catches in 1976 from the Golfe de Gascogne (France) in kg.

Date	Total weight	
	Fish below 30 kg	Fish above 30 kg
3 Jun - 9 Jun	8 750	-
10 Jun - 16 Jun	34 281.5	-
17 Jun - 23 Jun	3 050	-
24 Jun - 30 Jun	2 684	-
1 Jul - 7 Jul	672.5	-
14 Jul - 21 Jul	6 485	-
22 Jul - 28 Jul	1 190	-
29 Jul - 4 Aug	1 223	-
5 Aug - 11 Aug	34 840	-
12 Aug - 18 Aug	69 725	-
19 Aug - 25 Aug	47 152	-
26 Aug - 1 Sep	30 757	-
2 Sep - 8 Sep	8 887	-
9 Sep - 15 Sep	6 056	-
16 Sep - 22 Sep	5 976	-
23 Sep - 29 Sep	2 045	-
1 Oct - 6 Oct	4 263	-
Total	268 037.0	-

Table 16. French bluefin tuna catches in 1977 from the Golfe de Gascogne (France) in kg.

Date	Total weight	
	Fish below 30 kg	Fish above 30 kg
9 Jun - 15 Jun	127	-
16 Jun - 22 Jun	57 610	-
23 Jun - 29 Jun	31 253	-
30 Jun - 1 Jul	56 653	-
7 Jul - 13 Jul	46 755	-
14 Jul - 20 Jul	50 713	-
21 Jul - 27 Jul	60 931	-
28 Jul - 3 Aug	110	-
4 Aug - 10 Aug	14 311	-
11 Aug - 17 Aug	11 577	-
18 Aug - 24 Aug	302	-
25 Aug - 31 Aug	2 816	-
1 Sep - 7 Sep	32 896	-
8 Sep - 14 Sep	7 325	-
15 Sep - 21 Sep	27 864	-
22 Sep - 28 Sep	57 353	-
29 Sep - 5 Oct	20 210	-
6 Oct - 12 Oct	7 988	-
Total	486 794	-

Table 17. French bluefin tuna purse seine catches in 1978 from the Mediterranean by age groups.

Age group	April		May		October		November		Total	
	n	kg	n	kg	n	kg	n	kg	n	kg
1	2	17	-	-	14 931	113 932	2 410	20 426	17 343	134 375
2	2 559	41 827	-	-	1 430	21 189	6 982	113 519	10 971	176 535
3	68	1 327	-	-	80	1 512	9 717	231 124	9 865	233 963
4	-	-	-	-	-	-	300	11 302	300	11 302
5	-	-	-	-	-	-	175	9 174	175	9 174
6	10	820	-	-	-	-	-	-	10	820
7	222	20 470	-	-	-	-	-	-	222	20 470
8	61	7 513	-	-	-	-	1	118	62	7 631
9	26	4 179	19	3 163	-	-	-	-	45	7 342
10 and above	206	37 051	58	10 593	-	-	-	-	264	47 644
Total	3 154	113 204	77	13 756	16 441	136 633	19 585	385 663	39 257	649 256

Table 18. French bluefin tuna catches from the Bay of Biscay in 1978.

Catch: 723 159 kg

Fishing effort

Number days on sea: 814 x 1.2 = 977

Number of men days: 8 206 x 1.2 = 9 847

Age composition of catch

Age groups	1	2	3	4	5	6
n	35 000	32 300	3 170	4 100	770	62

Table 19. French and Spanish bluefin tuna catches in 1978 from the Bay of Biscay in tonnes*).

Year	Bermeo	Guetaria	Fontarrabia	St Jean de Luz	Total
1940	37	-	-	194	231
1941	7	-	-	144	151
1942	7	-	-	50	57
1943	32	-	263	-	295
1944	6	-	447	-	453
1945	12	-	539	298	849
1946	30	-	628	247	906
1947	10	-	515	76	601
1948	35	-	536	484	1 055
1949	81	-	1 107	1 990	3 178
1950	55	-	941	1 869	2 865
1951	318	-	768	2 893	3 979
1952	144	-	1 280	2 362	3 786
1953	11	-	1 181	2 364	3 556
1954	24	-	955	3 451	4 430
1955	411	-	1 006	3 031	4 448
1956	143	-	1 195	1 453	2 791
1957	97	-	1 507	1 550	3 154
1958	591	-	935	1 303	2 829
1959	67	-	954	2 031	3 052
1960	96	54	549	553	1 252
1961	32	61	514	907	1 514
1962	266	85	306	965	1 622
1963	115	124	520	543	1 302
1964	200	63	476	400	1 139
1965	270	185	581	621	1 657
1966	228	526	555	1 624	2 933
1967	91	209	360	860	1 069
1968	102	162	367	566	1 197
1969	274	137	810	534	1 755
1970	119	39	1 311	732	2 201
1971	151	30	1 421	680	2 282
1972	0	36	1 194	740	1 970
1973	0	156	1 469	540	2 165
1974	0	17	1 008	522	1 547
1975	0	38	891	692	1 621
1976	0	25	587	267	879
1977*)	0	34	720	593	1 347
1978*)	0	?	650	598	-

*) Until 10 September 1978

Table 20. Fishing effort of the French and Spanish bluefin tuna fishing fleet in the Bay of Biscay 1972-78.

Year	Number of fishing boat days at sea*)	Number of fishermen days
1972	3 009	28 735
1973	3 389	32 556
1974	2 258	23 535
1975	3 034	30 931
1976	1 489	15 524
1977	1 778	18 034
1978*)	1 570	16 950

*) Until 10 September 1978

Table 21. Relationship of fishing efficiency of fishing boats equipped with sonar and without sonar. (Catch made with use of sonar/Catch made without sonar.)

1977	1.142	1.479	0.785	0.999	1.128	1.561	1.577	0.915
1978	1.298	0.537	0.868	1.813	0.985	1.51	1.37	

Mean : 1.196

Standard deviation : 0.357

N : 15

Table 22. Age composition of bluefin tuna catches in the Bay of Biscay 1972-78*).

Age group	1	2	3	4	5	6	7	8-10
1972	200	30 200	15 000	3 200	6 260	6 240	6 240	1 750
1973	1 100	91 900	11 000	2 200	2 400	5 000	3 000	2 000
1974	1 250	35 000	48 800	6 100	1 000	900	150	0
1975	13 000	85 700	9 410	5 900	950	480	0	0
1976	850	46 000	9 650	1 640	1 190	685	51	0
1977	7 790	76 100	16 780	5 740	350	222	94	0
1978*)	14 200	50 350	8 670	12 540	2 340	560	47	36

*) Until 10 September 1978

Table 23. Catch per unit effort of age group 2 bluefin tuna in the Bay of Biscay 1972-78.

Year class	Number of fish per days at sea
70	10.40
71	27.12
72	15.50
73	28.24
74	30.88
75	42.79
76	32.07

Table 24. Size composition (kilos) of Norwegian bluefin tuna catches by smoothed weight frequency (‰) in 1976 (w' = weight of gutted fish without head, w = weight of ungutted fish).

Group means		Week No.									Total
w'	w	28	29[1]	30	31	32	33	34	35	40	
127	163	-	-	-	-	-	1	-	-	-	-
132	170	-	-	-	-	-	2	-	-	-	1
137	176	-	-	-	-	-	1	-	-	-	-
142	183	-	-	-	-	-	-	-	-	-	-
147	189	-	-	-	-	-	-	-	-	-	-
152	195	-	-	-	-	-	-	1	1	-	-
157	202	-	-	-	-	-	-	2	2	-	1
162	208	-	-	-	-	-	-	2	1	-	1
167	215	3	1	-	-	-	-	2	-	-	1
172	221	6	2	-	-	-	-	1	-	-	1
177	227	6	1	-	-	-	-	2	-	-	1
182	234	6	3	-	-	-	1	2	1	-	2
187	240	6	8	8	-	-	2	3	2	-	4
192	247	6	11	12	-	-	2	3	2	-	5
197	253	6	18	29	250	-	5	3	3	-	8
202	260	14	28	41	500	-	9	5	5	-	12
207	266	27	33	37	250	-	9	13	6	-	17
212	272	57	39	37	-	-	11	22	8	-	24
217	279	68	47	70	-	-	15	25	15	-	30
222	285	65	65	86	-	-	28	28	21	-	38
227	292	76	86	74	-	-	55	36	24	-	50
232	298	100	94	53	-	-	67	44	25	-	58
237	305	90	89	49	-	-	51	48	37	-	57
242	311	73	84	58	-	-	41	52	54	-	58
247	317	90	88	54	-	-	45	61	54	-	64
252	324	93	71	62	-	-	50	64	49	-	62
257	330	65	51	70	-	250	57	68	48	-	60
262	337	46	41	66	-	500	74	71	51	-	61
267	343	36	33	57	-	250	83	65	61	250	59
272	350	25	32	33	-	-	73	62	64	500	55
277	356	19	27	12	-	-	64	63	62	250	51
282	362	11	13	12	-	-	65	58	63	-	46
287	369	3	7	17	-	-	51	47	57	-	38
292	375	-	8	17	-	-	33	37	58	-	31
297	382	-	9	17	-	-	30	28	58	-	28
302	388	-	8	8	-	-	24	26	46	-	24
307	395	-	4	-	-	-	19	20	37	-	18
312	401	-	1	4	-	-	17	14	28	-	13
317	408	-	-	8	-	-	11	10	16	-	8
322	414	-	1	4	-	-	4	7	12	-	6
327	420	-	2	-	-	-	1	4	14	-	5
332	427	-	1	-	-	-	-	2	10	-	3
337	433	-	-	-	-	-	-	2	3	-	1
342	440	-	-	-	-	-	-	1	1	-	1
347	446	-	-	-	-	-	-	-	2	-	1
352	453	-	-	-	-	-	-	-	2	-	1
357	459	-	-	-	-	-	-	1	2	-	1
362	465	-	-	-	-	-	-	1	1	-	1
367	472	-	-	-	-	-	-	1	-	-	-
372	478	-	-	-	-	-	-	-	-	-	-
377	485	-	-	-	-	-	-	-	-	-	-
382	491	-	-	-	-	-	-	-	-	-	-
387	498	-	-	-	-	-	-	-	-	-	-
392	504	-	-	-	-	-	-	-	-	-	-
397	510	-	-	-	-	-	-	1	-	-	-
402	517	-	-	-	-	-	-	1	-	-	1
407	523	-	-	-	-	-	-	1	-	-	-
n		92	303	61	1	1	235	587	276	1	1 557
w'		21 763	72 476	14 679	200	260	61 202	152 797	74 662	273	398 312
$\bar{w}'$		236.6	239.2	240.6	200.0	260.0	260.4	260.3	270.5	273.0	255.8
N		-	365	-	-	-	-	-	-	-	1 619
w'		-	87 274	-	-	-	-	-	-	-	413 110
$\bar{w}'$		-	239.1	-	-	-	-	-	-	-	255.2

1) Individual weights lacking for 62 fish in week 29.

Table 25. Size composition (kg) of Norwegian bluefin tuna catches by smoothed weight frequency (‰) in 1977 (w' = weight of gutted fish without head, w = weight of ungutted fish).

Group means		Week No.					Total
w'	w	27	31	32[1]	33	34	
182	234	-	-	1	-	-	1
187	240	-	-	2	1	-	1
192	247	-	-	2	2	-	2
197	253	-	3	3	3	-	3
202	260	-	7	6	4	-	5
207	266	-	3	8	4	-	6
212	272	-	14	11	7	-	10
217	279	-	30	17	12	-	15
222	285	-	33	25	20	-	23
227	292	250	43	29	29	-	29
232	298	500	43	32	30	36	32
237	305	250	43	44	32	107	39
242	311	-	59	58	43	107	52
247	317	-	66	62	54	36	59
252	324	-	72	61	60	36	61
257	330	-	69	62	61	72	62
262	337	-	59	64	59	36	61
267	343	-	72	68	57	-	63
272	350	-	92	74	63	-	70
277	356	-	89	68	65	36	67
282	362	-	59	52	59	72	55
287	369	-	33	41	54	72	46
292	375	-	33	39	51	72	44
297	382	-	33	38	47	36	42
302	388	-	20	32	42	36	36
307	395	-	13	26	35	72	29
312	401	-	10	18	28	36	22
317	408	-	3	13	21	36	16
322	414	-	-	9	14	72	11
327	420	-	-	8	10	36	9
332	427	-	-	8	10	-	8
337	433	-	-	6	8	-	6
342	440	-	-	2	4	-	3
347	446	-	-	1	3	-	2
352	453	-	-	2	2	-	2
357	459	-	-	2	1	-	2
362	465	-	-	2	1	-	2
367	472	-	-	1	1	-	1
372	478	-	-	1	-	-	1
377	485	-	-	-	-	-	-
382	491	-	-	-	1	-	-
387	498	-	-	-	1	-	-
392	504	-	-	1	1	-	1
397	510	-	-	1	1	-	-
402	517	-	-	-	-	-	-
407	523	-	-	-	-	-	-
412	530	-	-	-	-	-	-
417	536	-	-	-	-	-	-
422	543	-	-	-	-	-	-
427	549	-	-	-	-	-	-
432	555	-	-	-	-	-	-
437	562	-	-	-	1	-	-
n		1	76	1 227	864	7	2 175
w'		232	19 732	326 644	234 886	1 939	583 433
$\bar{w}'$		232.0	259.6	266.2	271.9	277.0	268.2
N		-	-	1 243	-	-	2 191
w'		-	-	330 543	-	-	587 332
$\bar{w}'$		-	-	265.9	-	-	268.1

1) Individual weights lacking for 16 fish in week 32.

Table 26. Size composition (kg) of Norwegian bluefin tuna catches by weight frequency (‰) in 1978 (w' = weight of gutted fish without head, w = weight of ungutted fish).

Group means		Week No.					Total	Total smoothed
w'	w	28	30	31	32 [1]	33		
132	172	-	-	-	-	4	2	-
137	178	-	-	-	-	-	-	-
142	183	-	-	-	-	-	-	-
147	190	-	-	-	-	-	-	-
152	197	-	-	-	36	-	2	-
157	204	-	-	-	-	-	-	-
162	211	-	-	-	-	-	-	-
167	217	-	-	-	-	-	-	-
172	223	-	-	-	-	-	-	-
177	228	-	-	-	-	-	-	-
182	234	-	-	5	-	-	2	2
187	240	-	-	-	-	-	-	2
192	247	-	-	-	-	11	6	4
197	253	-	-	5	-	-	2	8
202	260	-	-	36	71	11	24	14
207	266	-	-	9	-	4	6	13
212	272	-	-	14	71	11	15	15
217	279	-	77	23	36	26	26	25
222	285	-	-	36	-	37	34	34
227	292	500	77	73	36	18	45	43
232	298	-	77	64	-	33	45	46
237	305	500	77	64	-	41	51	50
242	311	-	77	91	107	22	56	58
247	317	-	230	73	71	52	66	68
252	324	-	77	91	107	70	81	73
257	330	-	-	64	143	55	62	66
262	337	-	-	68	71	59	62	58
267	343	-	-	27	36	66	47	56
272	350	-	154	36	71	85	66	54
277	356	-	-	41	-	41	37	44
282	362	-	-	32	36	48	39	44
287	369	-	77	50	36	48	49	43
292	375	-	77	23	36	41	34	36
297	382	-	-	23	-	37	28	32
302	388	-	-	9	36	63	37	29
307	395	-	-	18	-	18	17	23
312	401	-	-	14	-	30	21	18
317	408	-	-	5	-	18	11	14
322	414	-	-	-	-	18	9	9
327	420	-	-	-	-	15	7	6
332	427	-	-	5	-	4	4	4
337	433	-	-	-	-	-		2
342	440	-	-	5	-	4	4	3
347	446	-	-	-	-	4	2	2
352	453	-	-	-	-	-	-	1
357	459	-	-	-	-	-	-	-
362	465	-	-	-	-	-	-	-
367	472	-	-	-	-	-	-	-
372	478	-	-	-	-	4	2	-
377	485	-	-	-	-	-	-	-
382	491	-	-	-	-	4	2	-
387	498	-	-	-	-	-	-	-
n		2	13	220	28	271	534	1 000
w'		464	3 275	55 569	6 931	72 627	138 866	-
$\bar{w}'$		232	251.9	259.6	247.5	268.0	260.1	-
N		-	-	-	145	-	651	-
w'		-	-	-	36 157	-	168 092	-
$\bar{w}'$		-	-	-	249.4	-	258.2	-

1) Individual weights lacking for 117 fish in week 32.

Table 27. Portuguese bluefin tuna landings at Azores and Madeira Islands in 1977 in kg.

Month	Azores Island	Madeira Islands	Total
Jan	-	1 600	1 600
Feb	-	600	600
Mar	-	-	-
Apr	-	-	-
May	-	-	-
Jun	-	33 900	33 900
Jul	31 666	-	31 666
Aug	2 723	-	2 723
Sep	84 483	-	84 483
Oct	-	-	-
Total	118 872	36 100	154 972

Table 28. Size composition in ‰ (smoothed) of Spanish madrague catches of bluefin tuna at Barbate in 1976.

Length group cm	‰ smoothed
170 - 174.9	1.7
175 - 179.9	3.3
180 - 184.9	1.7
185 - 189.9	1.7
190 - 194.9	3.3
195 - 199.9	3.3
200 - 204.9	18.1
205 - 209.9	39.5
210 - 214.9	47.7
215 - 219.9	60.9
220 - 224.9	85.5
225 - 229.9	93.7
230 - 234.9	88.8
235 - 239.9	95.4
240 - 244.9	95.4
245 - 249.9	90.5
250 - 254.9	82.2
255 - 259.9	60.9
260 - 264.9	49.4
265 - 269.9	41.1
270 - 274.9	21.4
275 - 279.9	6.6
280 - 284.9	3.3
285 - 289.9	3.3
290 - 294.9	1.7
N = 152	1 000

Table 29. Catch from two madragues in southern Spain (Barbate and Zahara near Barbate) in 1976.

Barbate	1 680 tuna = 417 495 kg; mean weight = 248.5 kg
Zahara de los Atunes	439 tuna = 72 740 kg; mean weight = 231.4 kg
Total	2 119 tuna = 490 235 kg; mean weight = 231.4 kg

Table 30. Demographic structure of the life bait fishery on bluefin tuna in the Golfe de Gascogne.

Year	Age group								Effort	Man days
	I	II	III	IV	V	VI	VII	VIII-X	Days at sea	at sea
1972	0	30 200	15 000	3 200	6 260	6 240	6 240	1 750	3 009	28 735
1973	0	91 900	11 000	2 200	2 400	5 000	3 000	2 000	3 389	32 556
1974	0	35 000	48 800	6 100	1 000	900	150	0	2 258	23 535
1975	13 000	85 700	9 407	5 900	950	480	0	0	3 034	30 931
1976	845	45 987	9 654	1 643	1 188	685	51	0	1 489	15 524

Table 31. The catch, effort and catch per unit of effort for the Spanish and French fishery in the period 1972-1976 (Bay of Biscay).

	1972	1973	1974	1975	1976
Catch (tonnes)	2 094	2 001	1 558	1 669	856
Catch (n. fish)	68 890	117 500	91 950	115 437	60 053
E (.) *	28 735	32 556	23 535	30 931	15 524
C.p.u.e. (kg)	72.9	61.5	66.2	54	55.1
C.p.u.e. (n. fish)	2.4	3.6	3.9	3.7	3.7

* E (.) = days at sea x number of men

Table 32. Bluefin tuna catch from three madragues in southern Spain (Barbate, Zahara de los Atunes and La Linea) in 1977.

	Number of fish	Kg.
Barbate		
Big bluefin tuna	1 245	263 300
Small bluefin tuna	23	230
Total	1 268	263 530
Zahara de los Atunes		
Bluefin tuna	358	75 717
La Linea		
Bluefin tuna	0	0
Grand Total	1 626	339 247

Table 33. Size composition of Spanish madrague catches of bluefin tuna at Barbate in 1977.

Length group (cm)	‰ Smoothed
155 - 159.9	1.5
160 - 164.9	4.4
165 - 169.9	11.8
170 - 174.9	20.7
175 - 179.9	22.2
180 - 184.9	25.2
185 - 189.9	29.6
190 - 194.9	28.1
195 - 199.9	31.1
200 - 204.9	53.3
205 - 209.9	79.9
210 - 214.9	88.8
215 - 219.9	94.7
220 - 224.9	105.0
225 - 229.9	93.2
230 - 234.9	57.7
235 - 239.9	41.4
240 - 244.9	47.3
245 - 249.9	50.3
250 - 254.9	41.4
255 - 259.9	28.1
260 - 264.9	22.2
265 - 269.9	13.3
270 - 274.9	4.4
275 - 279.9	3.0
280 - 284.9	1.5
N = 169	1 000.1

Table 34. Demographic structure of Spanish bluefin tuna catch and total number of fish caught in the Bay of Biscay.

Age group	Number of fish
I	4 934
II	46 712
III	10 393
IV	5 371
V	346
VI	219
VII	94
Total	68 069

Table 35. Spanish catches of bluefin tuna in the Canary Islands, 1974-77.

Year	Catch in tonnes (round weight)
1974	546
1975	978
1976	832
1977	1 250

Table 36. Size composition of bluefin tuna caught by baitboats in the Canary Islands during the 1977 season.

Size class (kg)	‰ Smoothed
100	8
...	...
180	8
190	12
200	24
210	20
220	12
230	24
240	50
250	66
260	78
270	87
280	85
290	92
300	83
310	60
320	59
330	60
340	60
350	48
360	28
370	16
380	10
390	8
400	2
No. of fish: 124	1 000

Table 37. Bluefin tuna and other catches from three madragues in southern Spain in 1978.
Catches in number of specimen (n) and weight (kg) from the south Spain madragues in 1978.

Location in front of the city of	Madragues' name	Thunnus thynnus	Euthynnus alleteratus	Sarda sarda	Auxis thazard	Xiphias gladius
Barbate (Atlantic Sea)	"Ensenada de Barbate"	n = 1 963 kg = 417 440	n = 9 733 kg = 38 932	n = 30 198 kg = 45 297	n = 4 559 kg = 4 559	n = 37 kg = 1 850
Zahara de los atunes (Atlantic Sea)	"Cabo plata"	n = 1 010 kg = 216 140	n = 1 100 kg = 4 400	n = 13 700 kg = 20 550	n = 19 700 kg = 19 700	
La Linea (Mediter-ranean Sea)	"La Atunara"	n = 3 kg = 480			n = 300 000 kg = 300 000	
Total		n = 2 976 kg = 634 060	n = 10 833 kg = 43 332	n = 43 898 kg = 65 847	n = 324 259 kg = 324 259	n = 37 kg = 1 850

Table 38. Size composition of Spanish madrague catches of bluefin tuna at Barbate in 1978.

Length group (cm)	‰ Smoothed
150 - 154.9	1.2
155 - 159.9	2.4
160 - 164.9	1.2
165 - 169.9	4.8
170 - 174.9	14.4
175 - 179.9	25.2
180 - 184.9	32.5
185 - 189.9	33.7
190 - 194.9	37.3
195 - 199.9	34.9
200 - 204.9	26.4
205 - 209.9	24.0
210 - 214.9	27.6
215 - 219.9	45.7
220 - 224.9	75.7
225 - 229.9	96.2
230 - 234.9	99.8
235 - 239.9	92.6
240 - 244.9	85.4
245 - 249.9	74.6
250 - 254.9	54.1
255 - 259.9	38.5
260 - 264.9	30.1
265 - 269.9	22.9
270 - 274.9	12.0
275 - 279.9	4.8
280 - 284.9	2.4
n = 208	1 000.4

Table 39. Age composition of Spanish bluefin tuna catches in the Bay of Biscay in 1978.

Year class	Number of fish	in %
1	66 650	55.7
2	33 464	28.0
3	5 713	4.8
4	10 123	8.5
5	2 532	2.1
6	931	0.8
7	73	0.06
8	18	0.01
9	34	0.03
n	119 538	100.00

Table 40. Size composition (number of fish and round weight) of bluefin tuna caught by bait boats in the Canary Islands in 1978.

Size class (kg)	No. of fish	‰ Smoothed
115 - 119.9	1	1
120 - 124.9	2	3
125 - 129.9	1	3
130 - 134.9	2	3
135 - 139.9	-	2
140 - 144.9	-	3
145 - 149.9	5	6
150 - 154.9	1	6
155 - 159.9	3	8
160 - 164.9	6	11
165 - 169.9	4	9
170 - 174.9	2	7
175 - 179.9	3	8
180 - 184.9	6	13
185 - 189.9	7	18
190 - 194.9	12	22
195 - 199.9	8	21
200 - 204.9	10	24
205 - 209.9	14	29
210 - 214.9	13	29
215 - 219.9	12	29
220 - 224.9	14	34
225 - 229.9	20	40
230 - 234.9	16	40
235 - 239.9	18	42
240 - 244.9	21	42
245 - 249.9	14	39
250 - 254.9	19	39
255 - 259.9	16	43
260 - 264.9	25	53
265 - 269.9	28	56
270 - 274.9	17	41
275 - 279.9	10	32
280 - 284.9	19	34
285 - 289.9	12	34
290 - 294.9	18	34
295 - 299.9	12	32
300 - 304.9	15	32
305 - 309.9	14	26
310 - 314.9	4	14
315 - 319.9	2	6
320 - 324.9	3	6
325 - 329.9	2	5
330 - 334.9	1	3
335 - 339.9	1	4
340 - 344.9	4	6
345 - 349.9	1	4
350 - 354.9	1	2
355 - 359.9	1	2
Total	440	1 000

Table 41. Age composition of Spanish bluefin tuna catches made off the Atlantic coast of Morocco in 1978.

Year class	Number of fish	%
5	6	0.3
6	6	0.3
7	26	1.3
8	56	2.8
9	126	6.4
10	150	7.6
11	226	11.4
12	420	21.2
13	480	24.3
14	340	17.2
15	108	5.5
16	22	1.1
17	8	0.4
18	2	0.1
Total	1 976	100.0

Table 42. Catch of bluefin tuna in Istanbul, Turkish area, in 1976.

Weight group (kg)	n
150-154	1
...	
160-164	1
...	
170-174	1
175-179	1
180-184	1
185-189	4
190-194	2
...	
200-204	1
205-209	1
210-214	3
215-219	2
220-224	2
225-229	5
230-234	1
235-239	1
240-244	2
...	
250-254	3
255-259	1
260-264	3
265-269	2
270-274	3
275-279	2
280-284	2
285-289	1
290-294	2
295-299	3
300-305	2
...	
315-319	1
...	
330-334	1
...	
340-344	1
...	
350-354	2
...	
375-379	1
...	
385-389	1
Total	60

Table 43. Catch of bluefin tuna in Istanbul, Turkish area, in 1977.

Month	Istanbul fish market	Beykoz trap (Bosphorus)
	Total weight in kg	Total weight in kg
Jan	565	-
Feb	427	-
Mar	1 794	-
Apr	9 850	-
May	-	-
Jun	-	-
Jul)		9 971
Aug)		
Sep	310	-
Oct	-	-
Nov	3 248	-
Dec	7 095	-
Total	23 289	9 971

Table 44. Turkish bluefin tuna catches made in the Istanbul area in 1978 and landed at Istanbul fish market.

Month	Istanbul fish market
	Total weight in kg
Jan	7 250
Feb	5 429
Mar	9 808
Apr	5 886
May	10 472
Jun	6 123
Jul	-
Aug	1 295
Sep	200
Oct	556
Total	47 019

Table 45. Estimated 1976 US bluefin tuna catch by age and gear.

Age	Hand-gear catch		Purse seine catch		Total catch			
	No.	Weight (tonnes)	No.	Weight (tonnes)	No.	%	Weight (tonnes)	%
1	-	-	*	-	-		-	-
2	-	-	10 323	97.9	10 323	16.4	97.9	5.6
3	-	-	50 327	883.0	50 327	79.9	883.0	50.9
4	-	-	-	-	-	0.0	-	0.0
5	3	0.2	-	-	3	0.005	0.2	0.01
6	33	5.0	-	-	33	0.05	5.0	0.3
7	44	6.6	-	-	44	0.07	6.6	0.4
8	138	25.2	-	-	138	0.2	25.2	1.4
9	66	16.3	11	1.8	77	0.1	18.1	1.0
10	198	50.9	42	7.9	240	0.4	58.8	3.4
11	118	33.4	40	9.0	158	0.2	42.4	2.4
12	495	160.1	31	8.1	526	0.8	168.2	9.7
13	600	235.4	116	33.9	716	1.1	269.3	15.5
14	129	55.9	125	42.8	254	0.4	98.7	5.7
15	-	-	73	27.6	73	0.1	27.6	1.6
16+	-	-	81	34.8	81	0.1	34.8	2.0
Total	1 824	-	61 169	-	62 993	-	-	-
%	2.9	-	97.1	-	-	-	-	-
Weight	-	589.0	-	1 146.8	-	-	1 735.8	-
%	-	33.9	-	66.1	-	-	-	-

*There was a small catch (probably around 1% of the total catch by weight) of 1-year-old fish.

Table 46. Estimated catch of bluefin tuna by age and week and by weight and number of fish, 1976 US hand-gear fishery.

Weight (tonnes)

Age / Week	28*)	29	30	31	32	33	34	35	36	37	38	Total
5	0.2	-	-	-	-	-	-	-	-	-	-	0.2
6	0.9	1.1	0.3	-	-	-	-	-	-	1.7	1.0	5.0
7	-	1.1	0.3	1.5	0.7	0.6	-	-	-	1.5	0.9	6.6
8	-	2.4	1.2	0.6	1.6	2.2	8.1	2.9	0.3	3.7	2.2	25.2
9	0.6	-	-	-	1.7	3.7	-	-	-	6.4	3.9	16.3
10	4.6	2.1	1.1	1.6	8.6	-	21.3	7.7	0.7	2.0	1.2	50.9
11	4.9	4.1	1.3	4.6	2.5	8.8	-	-	-	4.5	2.7	33.4
12	5.5	6.2	16.1	17.1	25.5	19.9	44.3	16.0	1.5	5.0	3.0	160.1
13	7.3	20.7	15.3	23.5	22.9	30.7	54.5	19.6	1.8	24.5	14.6	235.4
14	2.4	3.7	4.3	5.6	5.5	4.0	19.9	7.2	0.7	1.6	1.0	55.9
15	-	-	-	-	-	-	-	-	-	-	-	-
16+	-	-	-	-	-	-	-	-	-	-	-	-
Total	26.4	41.4	39.9	54.5	69.0	69.9	148.1	53.4	5.0	50.9	30.5	589.0

Number of fish

Age / Week	28	29	30	31	32	33	34	35	36	37	38	Total
5	3	-	-	-	-	-	-	-	-	-	-	3
6	8	11	2	-	-	-	-	-	-	3	9	33
7	-	8	2	11	4	4	-	-	-	9	6	44
8	3	13	8	4	9	13	45	17	1	17	11	138
9	20	-	-	-	9	17	-	-	-	23	14	66
10	11	8	5	7	35	-	82	30	2	6	3	198
11	32	26	5	18	9	31	-	-	-	11	7	118
12	11	5	52	56	78	62	137	50	5	11	7	495
13	6	52	44	66	61	84	146	54	6	49	27	600
14	-	8	11	14	13	9	45	17	1	3	2	129
15	-	-	-	-	-	-	-	-	-	-	-	-
16+	-	-	-	-	-	-	-	-	-	-	-	-
Total	94	131	129	176	218	220	455	168	15	132	86	1 824

*) Week 28 = 4 - 10 July.

Table 47. Estimated catch of bluefin tuna by age and week and by weight and number of fish, 1976 US purse seine fishery.

Weight (tonnes)

Age / Week	26	27	28	30	37	38	Total
1	59.5	3.0	17.1	18.3	-	-	97.9
2	316.6	180.3	186.7	199.4	-	-	883.0
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	0.2	1.6	1.8
10	-	-	-	-	0.7	7.2	7.9
11	-	-	-	-	0.2	8.8	9.0
12	-	-	-	-	0.6	7.5	8.1
13	-	-	-	-	2.9	31.0	33.9
14	-	-	-	-	3.0	39.8	42.8
15	-	-	-	-	2.2	25.4	27.6
16+	-	-	-	-	1.2	32.8	34.8
Total	376.1	183.3	203.8	217.7	11.0	154.1	1 146.8

Number of fish

Age / Week	26	27	28	30	37	38	Total
1	-	-	-	-	-	-	-
2	6 251	294	1 827	1 951	-	-	10 323
3	17 384	9 845	11 168	11 930	-	-	50 327
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	2	9	11
10	-	-	-	-	3	39	42
11	-	-	-	-	1	39	40
12	-	-	-	-	2	29	31
13	-	-	-	-	9	107	116
14	-	-	-	-	9	116	125
15	-	-	-	-	5	68	73
16+	-	-	-	-	3	78	81
Total	23 635	10 139	12 995	13 881	34	485	61 169

Table 48. Sample length frequency, 1976 US purse seine bluefin tuna catch (number of fish).

Length (cm)	Week					Total No. of fish	‰ Smoothed
	26	27	28	37	38		
66	-	-	-	-	-	-	-
68	1	-	-	-	-	1	1
70	2	-	4	-	-	6	3
72	6	-	2	-	-	8	10
74	29	2	9	-	-	40	26
76	49	4	11	-	-	64	36
78	28	5	7	-	-	40	28
80	11	4	4	-	-	19	15
82	5	-	4	-	-	9	7
84	2	1	1	-	-	4	3
86	-	-	1	-	-	1	4
88	2	-	17	-	-	19	19
90	12	12	49	-	-	73	57
92	45	64	59	-	-	168	118
94	86	129	65	-	-	280	184
96	123	188	30	-	-	341	193
98	73	101	11	-	-	185	132
100	23	34	5	-	-	62	56
102	5	11	-	-	-	16	17
104	2	3	-	-	-	5	4
106	-	1	-	-	-	1	2
108	-	2	-	-	-	2	1

180	-	-	-	1	-	1	1
185	-	-	-	-	1	1	1
190	-	-	-	-	1	1	1
195	-	-	-	-	1	1	1
200	-	-	-	1	4	5	3
205	-	-	-	4	3	7	5
210	-	-	-	3	4	7	6
215	-	-	-	8	6	14	7
220	-	-	-	3	3	6	7
225	-	-	-	2	10	12	8
230	-	-	-	4	12	16	9
235	-	-	-	-	3	3	6
240	-	-	-	-	11	11	6
245	-	-	-	-	9	9	7
250	-	-	-	-	10	10	6
255	-	-	-	-	5	5	4
260	-	-	-	-	6	6	3
265	-	-	-	-	1	1	2
270	-	-	-	-	2	2	1
n =	504	561	279	26	92	1 462	1 000

66 = 66-67 cm.

Table 49. Sample length frequency, 1976 US hand-gear bluefin tuna catch.

Length (cm)	July		August		September		Total	
	n	‰ sm.*	n	‰ sm.	n	‰ sm.	n	‰ sm.
140	2	2	-	-	-	-	2	1
145	0	1	-	-	-	-	1	1
150	1	2	-	-	-	-	1	2
155	-	1	-	-	-	9	5	5
160	3	7	-	-	2	23	5	5
165	2	7	-	-	1	18	3	5
170	1	7	-	-	0	9	1	5
175	4	12	-	-	1	9	5	5
180	2	12	-	-	0	14	2	6
185	3	9	0	1	2	23	5	6
190	1	9	2	6	1	27	4	9
195	4	13	4	10	2	31	10	13
200	6	17	3	11	2	36	11	15
205	3	12	5	11	2	31	10	13
210	2	8	2	11	1	32	5	12
215	2	9	6	13	3	41	11	14
220	4	12	3	11	2	46	9	15
225	4	18	2	10	3	36	9	16
230	8	24	6	20	0	23	14	20
235	4	25	11	30	2	27	17	23
240	13	33	12	40	2	50	27	38
245	8	46	17	47	5	77	30	49
250	23	69	15	62	5	68	43	66
255	24	99	33	106	0	41	57	97
260	43	133	57	139	4	55	104	128
265	40	127	35	129	4	82	79	126
270	24	102	42	114	6	82	72	107
275	29	95	30	95	2	59	61	88
280	15	53	21	63	3	37	39	58
285	7	29	9	38	0	14	16	32
290	4	13	11	24	0	0	15	18
	286	1 000	326	1 000	55	1 000	667	1 000

*sm. = smoothed.

Table 50. Sample length frequency by week of giant Atlantic bluefin tuna caught by rod and reel in the Bahamas in 1977 (sample = 15 fish).

Length (cm)	Week				Total	‰ Smoothed
	20	21	22	23		
215 - 219	-	-	-	-	-	16
220 - 224	1	-	-	-	1	33
225 - 229	-	-	-	-	-	83
230 - 234	1	2	-	1	4	149
235 - 239	1	-	-	-	1	116
240 - 244	-	1	-	-	1	106
245 - 249	2	1	-	-	3	133
250 - 254	-	1	-	-	1	116
255 - 259	2	-	-	-	2	83
260 - 264	-	-	-	-	-	66
265 - 269	1	1	-	-	2	66
270 - 274	-	-	-	-	-	33
Total	8	6	-	1	15	1 000

Table 51. Sample length frequency by week of small Atlantic bluefin tuna caught by sport fishing off the US Mid-Atlantic coast in 1977 (total catch 56 tonnes, total sample 196 fish).

Length (cm)	Week																	Total	‰ Smoothed
	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38		
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4
20	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	3	8
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2	9
28	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	5	10
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5
32	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	4
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	5
36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	4
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4
40	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	2	5
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	4
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	4
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
54	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	5
56	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	2	15
58	-	-	-	-	-	3	4	-	-	-	-	-	-	-	-	-	-	7	39
60	-	-	-	-	-	1	14	-	-	-	-	-	-	-	-	-	-	15	73
62	-	-	-	-	-	-	15	-	-	-	-	1	-	4	-	-	-	20	84
64	-	-	-	-	-	-	4	-	-	-	-	1	1	2	-	-	-	8	54
66	-	-	-	-	-	-	-	-	-	-	-	1	-	4	1	-	-	6	32
68	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	2	5	26
70	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	4	19
72	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	19
74	6	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1	-	9	29
76	2	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	4	35
78	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-	9	37
80	1	-	-	-	-	5	-	-	-	-	-	-	1	-	-	-	-	7	37
82	-	-	-	-	-	2	-	-	1	1	1	-	1	-	-	-	-	6	30
84	-	-	-	-	-	1	1	-	1	1	-	-	-	-	-	-	-	4	29
86	-	-	-	-	-	-	1	-	2	1	-	-	-	3	1	-	-	8	34
88	-	-	-	-	-	-	-	-	-	-	1	-	2	2	-	-	1	6	32
90	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1	-	-	5	25
92	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	3	14
94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6
96	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	6
98	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	13
100	-	1	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	5	14
102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9
104	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	2	13
106	1	-	1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	6	25
108	-	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	5	23
110	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	2	13
112	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	5
114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3
116	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	8
118	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	1	-	4	13
120	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	8
122	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5
124	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	3	13
126	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	4	15
128	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	5
130	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	10
132	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	2	9
134	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	8
136	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	2	6
138	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3
...																			
150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
152	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	3
154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
156	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
158	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3
160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
162	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
164	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
166	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	3
168	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1
170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Total	11	1	8	4	6	42	46	-	5	4	4	3	6	34	14	4	3	195	1 000

Table 52. Sample length frequency by week of giant Atlantic bluefin tuna caught by hand-gear off the northeast coast of the US in 1977 (total catch 634 tonnes, total sample = 1 062 fish).

Length (cm)	Week												Total	‰ Smoothed
	25	26	27	28	29	30	31	32	33	34	35	36		
170 - 174	-	1	-	-	-	-	-	-	-	-	-	-	1	-
175 - 179	-	-	-	-	-	-	-	-	-	-	-	-	-	-
180 - 184	-	-	-	-	-	-	-	-	-	-	-	-	-	-
185 - 189	-	-	-	-	-	-	-	-	-	-	-	-	-	-
190 - 194	-	-	-	-	-	1	-	-	-	-	-	-	1	-
195 - 199	-	-	-	-	-	-	-	-	-	-	-	-	-	-
200 - 204	-	-	-	1	-	-	-	-	-	-	-	-	1	-
205 - 209	-	-	-	-	-	-	-	-	-	-	-	-	-	-
210 - 214	-	-	-	1	-	-	-	-	-	1	-	-	2	1
215 - 219	-	-	-	-	1	-	-	-	-	-	-	-	1	2
220 - 224	-	-	-	1	-	1	-	-	2	-	-	-	4	3
225 - 229	-	-	1	2	1	1	-	-	-	-	-	-	5	8
230 - 234	-	-	2	1	-	4	3	4	2	1	-	-	17	15
235 - 239	-	1	1	2	2	2	2	2	7	3	-	-	22	24
240 - 244	-	2	-	12	2	6	2	4	4	5	1	1	39	48
245 - 249	2	2	4	12	13	16	6	23	10	13	1	-	102	86
250 - 254	3	1	1	8	11	25	14	24	15	14	3	2	121	121
255 - 259	-	5	6	20	17	34	11	17	24	20	10	5	169	154
260 - 264	-	6	2	31	17	25	17	33	23	20	13	6	193	168
265 - 269	-	2	2	30	12	20	11	22	23	17	19	6	164	147
270 - 274	-	-	2	12	4	12	10	16	10	16	9	4	95	103
275 - 279	-	1	1	10	9	11	7	8	6	8	14	6	81	67
280 - 284	-	-	1	4	2	2	4	3	5	2	4	1	28	35
285 - 289	-	-	-	1	-	3	-	1	5	2	1	-	13	13
290 - 294	-	-	-	-	-	-	1	-	-	-	-	-	1	4
295 - 299	-	-	-	-	-	-	-	-	-	-	2	-	2	1
Total	5	21	23	148	91	163	88	157	136	122	77	31	1 062	1 000

Table 53. Sample length frequency by week of small Atlantic bluefin tuna caught by US purse seine fleet in 1977 (total catch 972 tonnes) total sample 1682 fish).

Length (cm)	Week			Total	‰ Smoothed
	24	25	26		
54	1	-	-	1	1
56	1	1	-	2	1
58	1	-	-	1	1
60	-	-	-	0	0
--					
66	1	-	-	1	0
68	-	-	-	0	0
70	1	-	-	1	4
72	9	8	4	21	16
74	35	12	21	68	51
76	100	44	39	183	87
78	83	53	25	161	80
80	17	12	9	38	35
82	4	3	-	7	8
84	-	-	-	0	1
86	-	-	-	0	0
--					
92	-	2	-	2	1
94	-	3	-	3	1
96	1	1	-	2	3
98	2	7	1	10	8
100	7	22	-	29	15
102	5	25	1	31	18
104	13	19	1	33	17
106	4	13	-	17	12
108	3	7	-	10	6
110	-	2	-	2	4
112	6	5	-	11	6
114	7	9	-	16	12
116	15	24	-	39	31
118	51	62	-	113	71
120	84	128	1	213	111
122	100	105	-	205	125
124	104	110	2	216	109
126	52	47	1	100	68
128	28	13	-	41	30
130	15	6	-	21	14
132	8	4	-	12	7
134	3	-	1	4	3
136	-	-	-	0	1
138	1	-	-	1	0
140	-	-	-	0	0
142	1	1	-	2	1
144	-	1	-	1	1
146	-	1	-	1	1
148	-	1	2	3	1
150	-	1	-	1	1
152	-	3	1	4	2
154	1	5	-	6	3
156	-	1	-	1	2
158	-	4	1	5	3
160	-	5	1	6	4
162	2	7	1	10	5
164	-	5	2	7	5
166	1	6	1	8	4
168	1	3	-	4	4
170	2	4	-	6	3
172	-	-	-	0	1
174	1	1	-	2	1
Total	771	796	115	1 682	1 000

Table 54. Sample length frequency by week of small Atlantic bluefin tuna caught and/or tagged by US purse-seine fleet in 1977 (total catch 86 tonnes, total sample 2388 fish).

Length (cm)	Week				Total	‰ Smoothed
	26	27	28	29		
50	-	1	-	-	1	0
52	-	-	-	-	0	1
54	-	6	-	3	9	6
56	-	39	2	2	43	17
58	-	62	2	8	72	23
60	-	30	7	1	38	16
62	-	4	2	-	6	5
64	-	-	-	-	0	1
66	-	-	-	-	0	1
68	-	1	1	-	2	1
70	-	1	-	-	1	1
72	1	6	-	1	8	5
74	1	22	-	1	24	32
76	31	145	3	5	184	104
78	76	494	17	14	601	210
80	49	478	114	29	670	246
82	20	306	127	18	471	180
84	-	75	85	1	161	84
86	1	8	9	2	20	27
88	-	4	-	1	5	3
90	-	-	-	-	0	1
92	-	-	1	-	1	0
--						
102	2	2	-	-	4	2
104	1	1	-	-	2	2
106	6	2	-	-	8	2
108	-	2	1	-	3	3
110	1	5	-	-	6	3
112	1	2	-	-	3	2
114	-	-	-	-	0	1
116	-	-	2	-	2	1
118	1	-	-	-	1	1
120	4	-	-	3	7	3
122	5	3	-	2	10	4
124	5	3	-	5	13	5
126	3	3	-	2	8	4
128	2	2	-	-	4	2
130	-	-	-	-	0	1
Total	210	1 707	373	98	2 388	1 000

Table 55. Sample length frequency by week of giant Atlantic bluefin tuna caught by US purse-seine fleet in 1977 (total catch 168 tonnes, total sample 388 fish).

Length (cm)	Week				Total	‰ Smoothed
	35	36	37	38		
180 - 184	-	-	-	-	-	1
185 - 189	-	1	-	-	1	2
190 - 194	-	1	-	-	1	4
195 - 199	-	2	-	-	2	6
200 - 204	-	3	-	-	3	9
205 - 209	-	2	-	2	4	9
210 - 214	-	-	-	1	1	8
215 - 219	-	1	-	1	2	14
220 - 224	-	5	-	9	14	32
225 - 229	-	9	-	5	14	64
230 - 234	-	17	-	28	45	104
235 - 239	-	7	-	30	37	128
240 - 244	-	11	-	43	54	149
245 - 249	-	8	-	49	57	145
250 - 254	-	4	-	25	29	112
255 - 259	1	4	-	32	37	89
260 - 264	-	5	-	12	17	63
265 - 269	-	2	-	12	14	36
270 - 274	-	-	-	4	4	17
275 - 279	-	-	-	1	1	5
280 - 284	-	1	-	-	1	2
285 - 289	-	-	-	-	-	1
290 - 294	-	-	-	-	-	-
Total	1	83	-	254	338	1 000

Table 56. US bluefin tuna catches 1974-77.

Year	Purse seine, Giant & school tuna	Hand gear for giant tuna	Sport fishing for school tuna	Total (tonnes)
1974	852	683	322	1 857
1975	1 986	715	122	2 823
1976	1 234	604	29	1 867
1977	1 255*)	634	56	1 945*)

*) Includes estimated October catches of small (6 tonnes) and medium (23 tonnes) purse seine tuna in special scientific quotas.

Table 57. Dates, catches and approximate age composition of 1976 US bluefin tuna fisheries.

Fishery	Dates		Catch by number of fish	Catch by round weight (tonnes)	Approximate age composition by number
	Open	Close			
Small fish, purse seine					
Regular season	10 Jun	29 Jun	63 729	845	12% age 2 88% age 3
Tagging season	8 Jul	18 Jul	21 007	224	32% age 1 47% age 2 21% age 3
Small fish, sport	1 Jan	31 Dec	2 970	29	47% age 1 34% age 2 16% age 3 3% ages 4-5
Large fish, purse seine	1 Sep	21 Sep	519	165	Ages 7-9+
Large fish, hand-gear	18 May	16 Sep	1 872	604	Ages 7-9+
Total	-	-	-	1 867	-

Table 58. Dates, catches and approximate age composition of the 1977 US bluefin tuna fisheries.

Fishery	Dates		Catch by number of fish	Catch by round weight (tonnes)	Approximate age composition by number
	Open	Close			
Small fish, purse seine					
Regular season	15 Jun	20 Jun	31 600	972	25% age 2 70% age 4 5% ages 1,3,5
Tagging season	1 Jul	15 Jul	7 615	86	7% age 1 91% age 2 2% ages 3-4
	? Oct	? Oct	530*)	6*)	
Small fish, sport	1 Jan	24 Sep[1)]	4 932	56	15% age 1 69% age 2 12% age 3 4% ages 4-5
Large fish, purse seine	3 Sep	18 Sep	556	168	Ages 7-9+
Large fish, hand gear					
Northern Area	1 Jan	5 Sep	1 946	634	Ages 7-9+
Southern Area	1 Jan 16 Sep	9 Sep Still open			
Medium fish, purse seine (special quota)	? Oct	? Oct	250*)	23*)	Ages 5-8
Total	-	-	-	1 945	-

*) Estimated. [1)] Last data included for catch in this table; season closes 31 December.

Table 59 US Atlantic bluefin tuna samples. Size frequencies - fish caught by purse seiners in 1978.

cm	Jun	Aug	Sep	Oct	Total	‰ Smoothed
50 - 54	-	1	-	-	1	2
55 - 59	-	8	-	-	8	8
60 - 64	1	36	-	-	37	14
65 - 69	3	15	-	-	18	14
70 - 74	25	-	-	-	25	18
75 - 79	45	11	-	-	56	29
80 - 84	18	45	-	-	63	31
85 - 89	21	16	-	-	37	35
90 - 94	109	1	-	-	110	72
95 - 99	244	-	-	-	244	123
100 - 104	255	-	-	-	255	130
105 - 109	145	-	-	-	145	81
110 - 114	17	-	-	-	17	28
115 - 119	12	-	-	-	12	11
120 - 124	36	-	-	-	36	24
125 - 129	84	-	-	-	84	45
130 - 134	109	-	-	-	109	56
135 - 139	85	-	2	-	87	48
140 - 144	70	-	0	-	70	46
145 - 149	93	-	1	-	94	50
150 - 154	63	-	12	-	75	38
155 - 159	16	-	4	-	20	19
160 - 164	6	-	7	2	15	8
165 - 169	0	-	2	1	3	3
170 - 174	0	-	0	1	1	1
175 - 179	0	-	0	1	1	1
180 - 184	1	-	0	5	6	3
185 - 189	-	-	0	8	8	5
190 - 194	-	-	0	13	13	7
195 - 199	-	-	0	13	13	7
200 - 204	-	-	0	9	9	5
205 - 209	-	-	0	5	5	4
210 - 214	-	-	0	8	8	3
215 - 219	-	-	1	1	2	2
220 - 224	-	-	0	1	1	1
225 - 229	-	-	1	0	1	1
230 - 234	-	-	1	0	1	2
235 - 239	-	-	4	3	7	3
240 - 244	-	-	5	0	5	3
245 - 249	-	-	2	0	2	3
250 - 254	-	-	10	4	14	5
255 - 259	-	-	4	2	6	5
260 - 264	-	-	5	3	8	3
265 - 269	-	-	2	0	2	2
...	-	-	-	-	-	-
285 - 289	-	-	1	-	1	-
n =	1 458	133	64	80	1 735	1 000

June:

Small fish open season
Total catch = 852.3 t
Estimated = 24 560 fish
Sampled = 1 458 fish

August:

Small fish tagging season
Total catch = 60.2 t
Estimated = 7 130 fish
Sampled = 133 fish

September - October:

Fish open season
Total catch = 76.7 t
326 fish
Sampled = 144 fish

78 sample catch by gear 5 = purse seine

Average:

Jun = 113.52
Aug = 73.53
Sep = 208.83
Oct = 203.44

Total = 118.11

Table 60. US Atlantic bluefin tuna sample. Weight frequencies - fish caught by purse seiners in 1978.

Weight (kg)	Jun	Aug	Sep	Oct	Total	‰ Smoothed
0 - 4	-	5	-	-	5	21
5 - 9	16	60	-	-	76	64
10 - 14	34	68	-	-	102	82
15 - 19	50	-	-	-	50	104
20 - 24	221	-	-	-	221	124
25 - 29	9	-	-	-	9	60
30 - 34	5	-	-	-	5	11
35 - 39	25	-	-	-	25	24
40 - 44	40	-	-	-	40	37
45 - 49	47	-	-	-	47	40
50 - 54	27	-	-	-	27	32
55 - 59	24	-	-	4	28	29
60 - 64	29	-	-	3	32	33
65 - 69	39	-	-	2	41	32
70 - 74	15	-	-	2	17	23
75 - 79	10	-	-	7	17	13
81 - 84	0	-	-	2	2	6
85 - 89	0	-	-	2	2	3
90 - 94	0	-	-	7	7	4
...	..	-	-	..	..	..
100 - 104	1	-	-	3	4	2
...	..	-	-	..	..	..
115 - 119	-	-	-	1	1	2
120 - 124	-	-	-	5	5	3
125 - 129	-	-	-	0	0	0
130 - 134	-	-	-	1	1	2
135 - 139	-	-	-	7	7	4
140 - 144	-	-	-	1	1	8
145 - 149	-	-	-	13	13	10
150 - 154	-	-	-	4	4	10
155 - 159	-	-	1	17	18	10
160 - 164	-	-	0	1	1	6
165 - 169	-	-	0	3	3	4
170 - 174	-	-	1	6	7	5
175 - 179	-	-	1	0	1	5
180 - 184	-	-	2	8	10	6
185 - 189	-	-	1	1	2	4
190 - 194	-	-	0	3	3	3
195 - 199	-	-	1	2	3	3
200 - 204	-	-	2	3	5	3
205 - 209	-	-	1	-	1	3
210 - 214	-	-	2	1	3	2
215 - 219	-	-	1	1	2	2
220 - 224	-	-	0	0	0	0
225 - 229	-	-	1	1	2	2
...	-	-	..	..	..	..
240 - 244	-	-	1	1	2	2
245 - 249	-	-	2	-	2	2
250 - 254	-	-	1	0	1	2
255 - 259	-	-	1	1	2	2
260 - 264	-	-	3	0	3	2
265 - 269	-	-	0	1	1	2

June:

Small fish open season
Total catch = 852.3 t
Estimated = 24 560 fish
Sampled = 592 fish

August:

Small fish tagging season
Total catch = 60.2 t
Estimated = 7 130 fish
Sampled = 133 fish

September - October:

Giant fish open season
Total catch = 76.7 t
326 fish
Sampled = 288 fish

/Cont'd.

Table 60 (Continued)

Weight (kg)	Jun	Aug	Sep	Oct	Total	‰ Smoothed
270 - 274	-	-	2	1	3	3
275 - 279	-	-	4	0	4	3
280 - 284	-	-	2	0	2	3
285 - 289	-	-	5	0	5	5
290 - 294	-	-	7	0	7	6
295 - 299	-	-	4	0	4	4
300 - 304	-	-	1	0	1	3
305 - 309	-	-	5	0	5	4
310 - 314	-	-	4	0	4	6
315 - 319	-	-	11	1	12	8
320 - 324	-	-	5	0	5	7
325 - 329	-	-	5	2	7	5
330 - 334	-	-	1	0	1	4
335 - 339	-	-	7	0	7	7
340 - 344	-	-	13	1	14	9
345 - 349	-	-	1	0	1	5
350 - 354	-	-	6	0	6	5
355 - 359	-	-	5	0	5	6
360 - 364	-	-	9	1	10	8
365 - 369	-	-	5	1	6	7
370 - 374	-	-	5	2	7	6
375 - 379	-	-	2	1	3	4
380 - 384	-	-	1	0	1	3
385 - 389	-	-	4	2	6	4
390 - 394	-	-	0	0	0	3
395 - 399	-	-	4	2	6	3
400 - 404	-	-	0	0	0	2
405 - 409	-	-	6	2	8	3
410 - 414	-	-	0	0	0	2
415 - 419	-	-	2	1	3	2
420 - 424	-	-	0	0	0	0
425 - 429	-	-	1	0	1	0
430 - 434	-	-	4	1	5	2
435 - 439	-	-	0	0	0	1
440 - 444	-	-	0	1	1	0
...	-	-	..	..	..	..
475 - 479	-	-	1	0	1	0
...	-	-	..	..	..	..
485 - 489	-	-	1	0	1	0
n =	592	133	155	133	1 013	1 000

Month	Weight	Average
Jun	20 540	34.70
Aug	1 123	8.44
Sep	50 453	325.50
Oct	23 104	173.71
Total	95 220	94.00

Table 61. US Atlantic bluefin tuna sample. Size frequencies - small fish caught by sport fishing off the Mid-Atlantic in 1978.

Total catch = 68.0 t estimated
6 350 fish estimated
Sampled = 1 478 fish

cm	Jun	Jul	Aug	Sep	Total	‰ Smoothed
20 - 24	-	4	-	-	4	2
25 - 29	-	1	-	-	1	2
30 - 34	-	0	1	4	5	3
35 - 39	-	3	2	2	7	3
40 - 44	-	0	0	0	0	2
45 - 49	-	1	0	0	1	5
50 - 54	10	15	0	0	25	21
55 - 59	13	56	2	0	71	58
60 - 64	4	124	63	1	192	98
65 - 69	19	28	65	12	124	118
70 - 74	164	78	12	2	256	169
75 - 79	197	157	7	1	362	211
80 - 84	98	134	30	2	264	164
85 - 89	6	55	14	2	77	74
90 - 94	4	10	4	0	18	23
95 - 99	12	9	0	0	21	14
100 - 104	9	14	0	0	23	15
105 - 109	8	13	1	0	22	12
110 - 114	1	2	-	0	3	5
115 - 119	0	1	-	1	2	1
n =	545	705	201	27	1 478	1 000

Month	Average
Jun	76.69
Jul	74.20
Aug	69.89
Sep	64.56
Total	74.36

Table 62. US Atlantic bluefin tuna sample. Weight frequencies - small fish caught by sport fishing off the Mid-Atlantic coast in 1978.

Total catch = 68.0 t estimated
6 350 fish estimated
Sampled = 2 216 fish

Weight (kg)	Jun	Jul	Aug	Sep	Total	‰ Smoothed
0 - 3	-	-	-	-	-	28
1 - 4	18	160	56	2	236	162
5 - 9	253	370	302	40	965	332
10 - 14	248	330	158	45	781	294
15 - 19	21	20	26	12	79	115
20 - 24	28	32	14	5	79	28
25 - 29	3	5	2	2	12	12
30 - 34	1	1	0	0	2	3
35 - 39	6	1	0	0	7	2
40 - 44	1	2	0	1	4	3
45 - 49	3	1	1	3	8	3
50 - 54	0	2	0	1	3	3
55 - 59	2	3	2	2	9	3
60 - 64	0	1	1	2	4	3
65 - 69	1	5	1	1	8	3
70 - 74	0	2	0	1	3	2
75 - 79	-	-	2	1	3	1
80 - 84	-	-	0	0	0	1
85 - 89	-	-	1	1	2	1
90 - 94	-	-	2	1	3	1
95 - 99	-	-	0	0	0	0
100 - 104	-	-	0	1	1	0
...	-	-	..	..	..	..
115 - 119	-	-	2	0	2	-
120 - 124	-	-	0	0	0	-
125 - 129	-	-	2	1	3	-
130 - 134	-	-	1	1	2	-
n =	585	935	573	123	2 216	1 000

Month	Weight	Average
Jun	6 509	11.13
Jul	9 001	9.63
Aug	5 928	10.35
Sep	2 328	18.93
Total	23 766	10.72

Table 63. US Atlantic bluefin tuna sample. Weight frequencies - giant fish caught by handline, harpoon, or rod and reel in 1978.

Total catch = 795.4 t estimated
2 321 fish
Sampled = 2 248 fish

Note: Sampled one fish (403 kg) found dead in January, not in table.

Weight (kg)	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	‰ Smoothed
135 - 139	-	-	-	1	2	4	-	7	3
140 - 144	-	-	-	0	1	0	-	1	3
145 - 149	-	-	-	0	4	8	-	12	3
150 - 154	-	-	-	0	0	2	-	2	2
155 - 159	-	-	-	0	1	5	-	6	2
160 - 164	-	-	-	1	1	2	-	4	2
165 - 169	-	-	-	0	1	0	-	1	1
170 - 174	-	-	-	0	1	3	-	4	2
175 - 179	-	-	-	0	1	0	-	1	1
180 - 184	-	-	-	0	2	1	-	4	1
185 - 189	-	-	-	0	1	1	-	2	1
190 - 194	-	-	-	0	1	1	-	2	1
195 - 199	-	-	-	0	0	3	-	3	1
200 - 204	-	-	1	1	0	0	-	2	1
205 - 209	-	-	0	0	0	0	-	0	1
210 - 214	-	-	0	0	1	0	-	1	1
215 - 219	-	1	1	0	1	0	-	3	1
220 - 224	-	0	0	0	0	1	-	1	2
225 - 229	-	0	0	1	6	1	-	8	3
230 - 234	-	1	1	1	1	1	-	5	2
235 - 239	-	0	0	2	1	0	-	3	2
240 - 244	-	1	1	2	3	1	-	8	3
245 - 249	-	0	1	3	6	0	-	10	4
250 - 254	-	0	0	2	7	0	-	9	4
255 - 259	-	0	0	1	3	1	1	6	5
260 - 264	-	0	1	7	10	1	1	20	8
265 - 269	-	0	1	11	8	4	0	24	11
270 - 274	-	0	1	10	18	5	0	34	14
275 - 279	-	0	1	9	14	5	0	29	16
280 - 284	-	0	3	15	29	2	0	49	19
285 - 289	1	0	2	14	17	4	1	39	22
290 - 294	0	1	6	22	40	5	0	74	26
295 - 299	1	0	0	12	27	1	1	42	22
300 - 304	-	0	1	10	23	7	0	41	21
305 - 309	-	0	1	18	33	8	1	61	26
310 - 314	-	0	2	20	34	11	1	68	32
315 - 319	-	0	2	25	52	15	2	96	37
320 - 324	-	0	0	20	46	10	0	76	38
325 - 329	-	0	1	14	67	10	0	92	37
330 - 334	-	0	0	15	42	17	0	74	34
335 - 339	-	0	1	15	42	6	0	64	39
340 - 344	-	1	0	35	90	24	0	150	48

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Table 63 (Continued)

Weight (kg)	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	‰ Smoothed
345 - 349	-	-	0	18	34	17	0	69	42
350 - 354	-	-	2	13	62	16	0	93	37
355 - 359	-	-	1	23	42	11	0	77	40
360 - 364	-	-	0	25	58	25	1	109	42
365 - 369	-	-	0	14	49	15	0	78	39
370 - 374	-	-	2	9	56	17	1	85	35
375 - 379	-	-	1	10	40	9	1	61	30
380 - 384	-	-	0	9	43	7	0	59	29
385 - 389	-	-	0	10	50	21	1	82	30
390 - 394	-	-	1	8	37	6	0	52	27
395 - 399	-	-	0	10	36	9	0	55	22
400 - 404	-	-	0	11	20	7	0	38	20
405 - 409	-	-	1	4	30	12	0	47	17
410 - 414	-	-	-	4	16	4	0	24	15
415 - 419	-	-	-	4	26	12	0	42	14
420 - 424	-	-	-	1	14	6	0	21	11
425 - 429	-	-	-	1	12	7	0	20	9
430 - 434	-	-	-	2	14	7	0	23	9
435 - 439	-	-	-	1	6	9	1	17	8
440 - 444	-	-	-	1	7	3	-	11	5
445 - 449	-	-	-	0	3	3	-	6	4
450 - 454	-	-	-	2	10	2	-	14	4
455 - 459	-	-	-	0	4	1	-	5	3
460 - 464	-	-	-	0	3	1	-	4	2
465 - 469	-	-	-	0	4	2	-	6	2
470 - 474	-	-	-	0	2	0	-	2	1
475 - 479	-	-	-	0	1	1	-	2	1
480 - 484	-	-	-	0	2	0	-	2	1
485 - 489	-	-	-	0	0	1	-	1	-
490 - 494	-	-	-	0	0	0	-	0	-
495 - 499	-	-	-	0	1	1	-	2	-
500 - 504	-	-	-	1	0	-	-	1	-
505 - 509	-	-	-	-	1	-	-	1	-
n =	2	5	36	468	1 321	402	13	2 247	1 000

Month	Weight	Average
Apr	585	292.50
May	1 324	264.80
Jun	10 912	303.11
Jul	155 480	332.22
Aug	458 542	347.12
Sep	138 824	345.33
Oct	4 289	329.92
Total	769 956	342.66

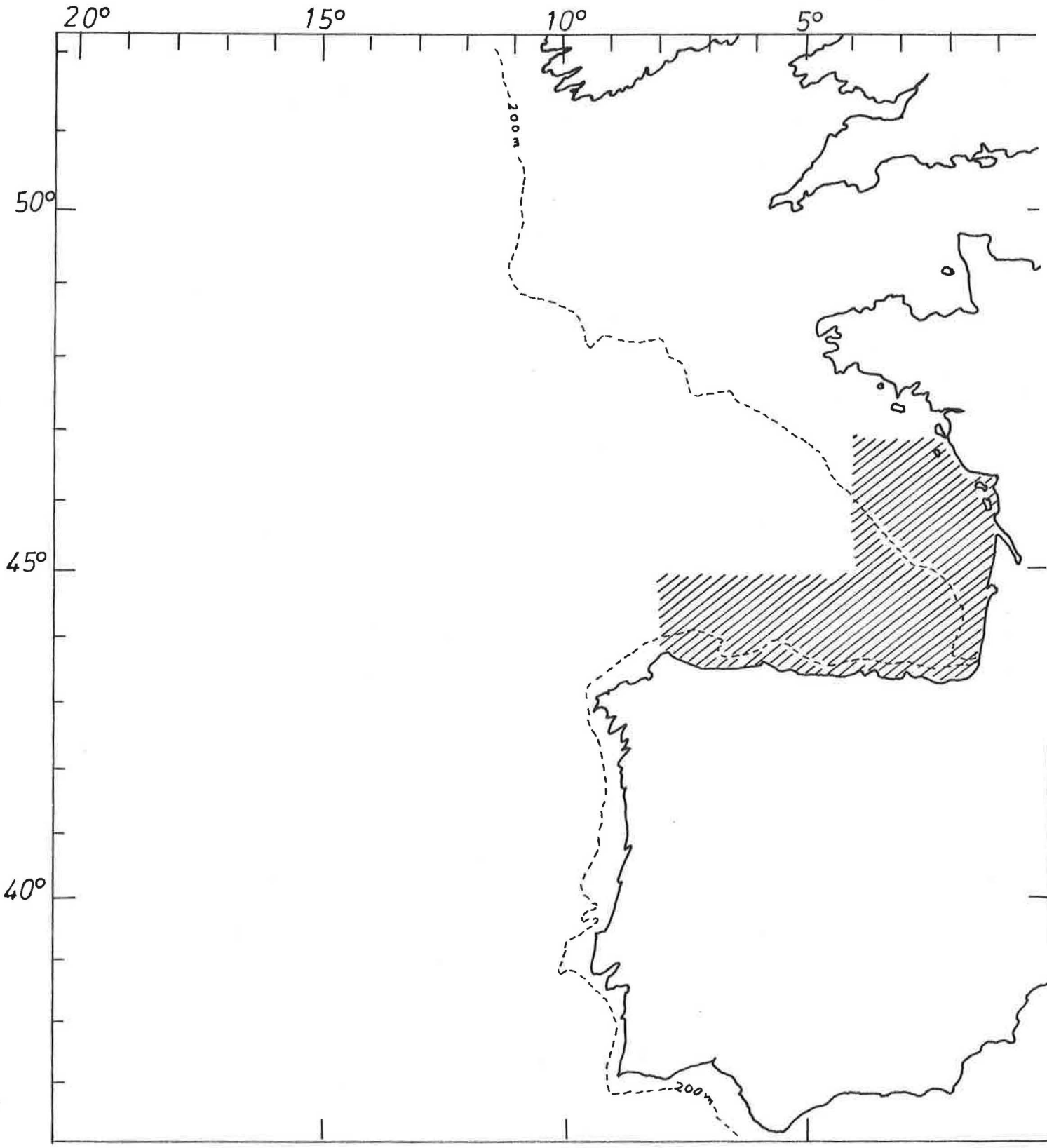

Figure 1. Fishing area of bluefin tuna in the Bay of Biscay.

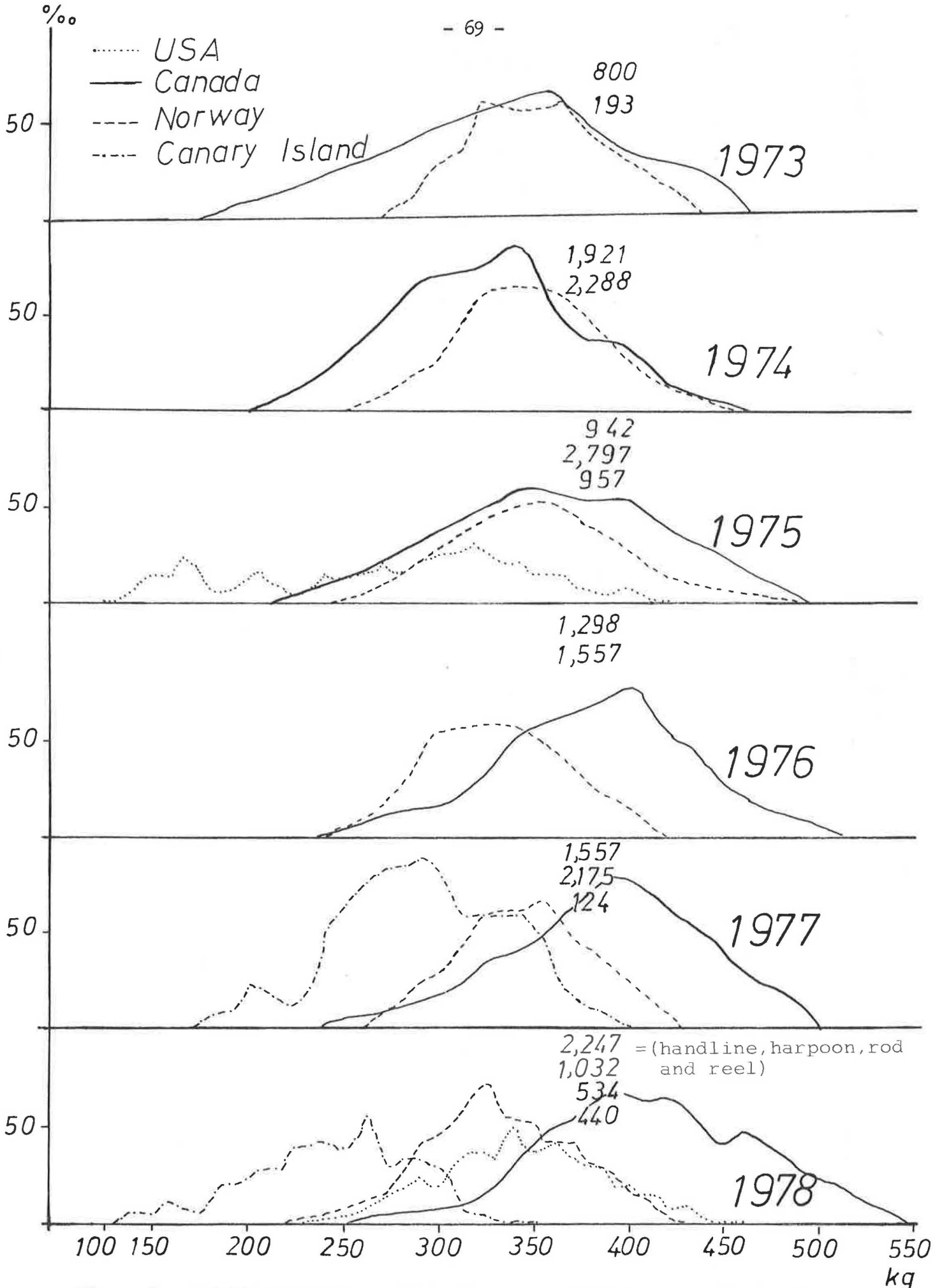

Figure 2. Weight composition of bluefin tuna catches made in US, Canada, Norway and Canary Islands (Spain).

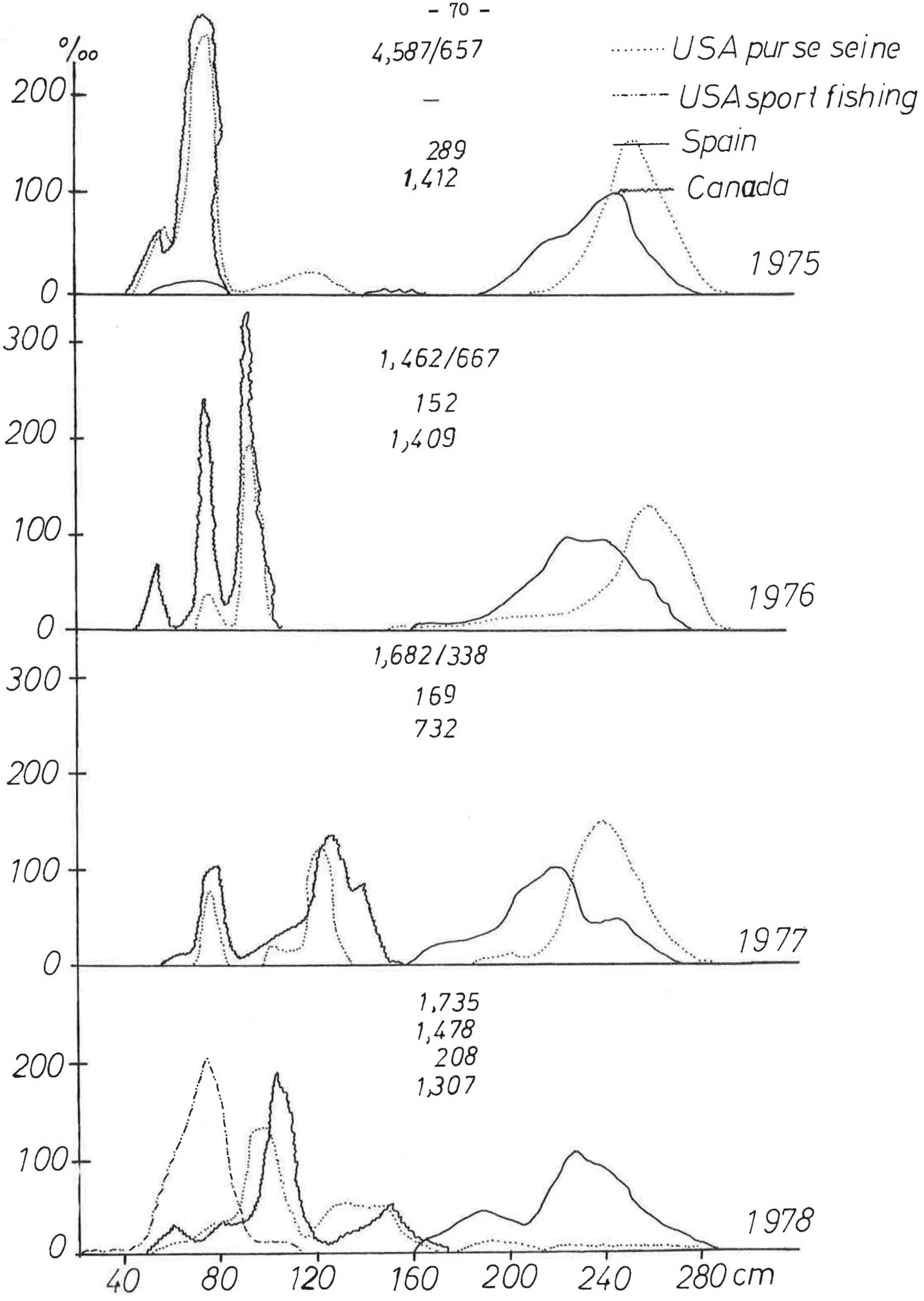

Figure 3. Size composition of bluefin tuna catches made in US, Spain and Canada.

Indication of spine colours

Reports of the Advisory Committee on Fishery Management	Red
Reports of the Advisory Committee on Marine Pollution	Yellow
Fish Assessment Reports	Grey
Pollution Studies	Green
Others	Black

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