DESCRIPTION OF THE SPANISH BLUEFIN (THUNNUS THYNNUS) TRAP FISHERY

by

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1. HISTORY OF THE FISHERY

Trap fishing for bluefin tuna in Spain was introduced by the Phoenicians some three thousand years ago. Those traps were of three types, which were modified through the years and perfected to the present level. From 1294 and during a few centuries, the traps of the Spanish South Atlantic and some of those of the Mediterranean near the Strait of Gibraltar were monopolized by some nobles (the Counts of Niebla and the Dukes of Medina Sidonia) as a reward for wartime endeavors. Later they were auctioned off in public to any private companies. From 1929 until 1971 inclusive, bluefin tuna fishing using traps from "La Línea de la Concepción" (Mediterranean) to Ayamonte (Atlantic) was dominated by the "Consorcio Nacional Almadrabero, S.A." company. Presently, three traps located in Barbate, Zahara de Atunes and La Línea, are exploited by two private companies. Another trap in Ceuta is also owned by a private company.

2. FISHING SEASONS AND GROUNDS (INCLUDING THE MAJOR LANDING PORTS)

The trap fishing season is from May to September, inclusive. The traps are those of Barbate and Zahara de los Atunes on the South Atlantic coast of Spain, and that of La Línea (on the Mediterranean coast at the entrance to the Strait of Gibraltar). In Ceuta (northern Africa) there are one or two traps, according to the year.

3. DESCRIPTION OF THE GEAR AND THE FISHING VESSELS; NUMBER OF GEAR, FISHING VESSELS, CREWMEN AND FISHING BOATS BY SIZE

The three traps mentioned earlier operate each annual fishing season in the South of Spain. The one in Barbate, situated 3,700 m from the coast, is comprised of a series of anchored vertical nets which form a square with its different chambers, and fence net (raberas). A detailed description of the Barbate trap can be found in Rodríguez-Roda (1964). The squares, which are set where the water depth is 30 m, are comprised of four compartments: open chamber, enclosed belly, pre-cod end and cod end. The cod end is the only one with a net in mid-water in which the tuna are actually caught and which are then transferred to the trap vessels. Between the chamber and the enclosed belly there is a mouth-like opening for the entry of the tuna. Fish are guided by the on-land and in-water fence nets to the chamber and eventually to the aforementioned "mouth".

Among the various vessels, large and small, used in trap fishing, some are used for forming the square or "copo", but others are used in actually taking the fish out of the trap, and still others are used for transporting the catches to land.

Original report in Spanish.

4. RELATION WITH OTHER FISHERIES AND OTHER SPECIES (EXCLUSIVE FISHERY, MULTI-SPECIES FISHERY AND INCIDENTAL FISHES, ETC.)

In addition to bluefin, the following species are also caught: Atlantic little tuna (Euthynnus alletteratus), Atlantic bonito (Sarda sarda), frigate tuna (Auxis thazard), swordfish (Xiphias gladius) and Atlantic white marlin (Tetrapturus albidus).

Catches of Atlantic little tuna, Atlantic bonito and frigate tuna are more abundant, while those of swordfish and Atlantic white marlin are small.

5. TYPE AND ORIGIN OF BAIT USED (IF USED)

No bait of any kind is used.

6. FISHING GROUNDS

6.1 General description of a typical fishing operation

The tuna enter through the mouth of the trap and go first to the chamber or to the enclosed belly ("bouche"). The final objective is that the fish go either on their own or by force to the cod end ("copo"), which is where they are finally caught alive or dead.

The trap goes into operation between 6 and 7 a.m. When the bluefin or small fish (Atlantic little tuna, Atlantic bonito and frigate tuna) are in the cod end, the work of raising the net from the depth of the cod end begins so that the tuna rise to the surface and can be caught. Once they are caught, the fish are transported to special vessels which then take the catch to the port for landing and distribution.

6.2 Effects of weather and hydrographical conditons

In a recent 1978 paper I discussed the effects of weather and hydrographical conditions. For catching pre-spawning bluefin ("derecho") west and southwest winds are most favorable; for post-spawning bluefin tuna ("revés"), east winds are more favorable.

The turbidity or transparency of the water favor bluefin fishing since bluefin prefer clear waters.

The ideal temperatures are those between 16 and 21°C. The sea conditions influence bluefin fishing only in that such conditions determine whether or not fishing can take place on high seas. Large wave coefficients before or after a full moon also have some influence. Finally, the cetacean called a "killer whale" (Orcinus orca) can, because of its voracious nature, impede the entry of bluefin tuna to the trap.

6.3 Duration of a net raising, number of liftings in a fishing season

Net raising can take from one to two hours, according to the number of tunas caught. The number of net raisings is in relation to the quantity of tunas or small fish in the net. During a day there are an average of three liftings.

6.4 Conservation measures and storage of the fish during a raising operation

Tuna are handled during the same day they are caught. They are quartered immediately or at least within a few hours of their having been caught. They are also preserved in huge refrigerators in cases when the catch is abundant. By the day after catch, tuna are usually canned in oil or other preservation process.

7. THE CATCHES

7.1 Total catch, average catch per net raising, average catch per boat per year, etc.

In one of my 1978 papers I have given the catches over the period 1962 to 1977. From the 13,225 bluefin caught in the Barbate trap in 1962 with a total weight of 2,189 MT, the catch in the same trap dropped in 1979 to 1,963 bluefin with a total weight of 308 MT.

In 1962, four traps were set in the South of Spain (Barbate, Sancti-Petri, Tarifa and La Línea), with a total catch of 30,180 bluefin tunas, or 4,776 MT. In 1978, the Barbate, Zahara de los Atunes and La Línea traps were in operation. (However, this last trap only caught three bluefin.) At any rate, the total catch of the three traps amounted to 2,976 bluefin, with a total weight of 634 MT. The average daily catch of the Barbate trap went from 188 bluefin in 1962 to 10 in 1977, i.e. from 19.5 MT to 2 MT, respectively.

The catches of the other traps are considerably less.

7.2 Tendency of the catches

In papers I prepared in 1965, 1966 and 1978, I noted that with data for 36 years, there are maximum and minimum catches every six or seven years. The minimum catches correspond to the years 1978, 1984 and 1990, while maximum catches will occur in 1981 and 1987.

8. FISHING EFFORT

8.1 Types of fishing effort calculated and their reliability as an effort measure

The two units of effort used in my 1976 paper were:

a) Total number of trap days (trap units multiplied by days at sea);
b) Number of traps set.

Given the characteristics and the function of the traps, it is believed that the number of traps and the number of days in which they are set per season represent the most ideal effort units for the calculations.

8.2 Tendency of fishing effort

The catch-per-unit-of-effort per trap and day at sea of the combination of traps went from 40.9 bluefin in 1962 to 4.4 bluefin in 1977. With respect to weight, it went from 6,500 kg to 912 kg during the same period.

The yield per trap during the same period went from 9,564 bluefin to 813 bluefin, with a corresponding weight of 1,521 and 170 kgs, respectively.

We can say that there has been a strong decreasing tendency in the catch-per-unit-of-effort in the last 16 years.

9. SIZE AND MATURITY OF THE FISH CAUGHT (ADULT OR IMMATURE, SPAWNING STATE OR FISH IN FEEDING STATE)

In my paper of 1977, size frequency curves are given for the years 1963 to 1976. The curves show a dominant size of between 240 and 250 cm fork length (= zoological) for the latest years, since the dominant size in 1963 was 210 cm. The bluefin taken in the last years are larger in size than those taken in previous years. In the Barbate and Zahara de los Atunes traps, the majority of the bluefin caught from 1976 to 1978 ranged between 150-280 cm. Bluefin tuna measuring 60 to 120 cm fork length were caught only in the years 1969, 1972 and 1975.

A paper I did in 1964 included a sexual maturity scale in which Phase V is the spawning phase. During the months of May and June the adult bluefin arrive with their gonads in a premature state (Phase II), or in a maturing state (Phase III) and very few are in a pre-spawning state (Phase IV).

During the months of July and August the gonads are all in a post-spawning stage (Phase VI).

In a research paper of 1967, I pointed out that the first stage of sexual maturity in the females appears at 97.5 cm, that of the males at 105 cm, with an average weight of 22 kg. This corresponds to three-year-old fish.

Everything that has been said before is also true for pre-spawning bluefin ("derecho") as well as for post-spawning ("revés") bluefin. The former scarcely eat, while the latter avidly follow

pelagic fish or crabs (called in the vernacular "Pataliao" (Polybius henslowi) which are abundant in the waters of the Gulf of Cadiz.

10. FORMS OF FISH PRODUCTS, CONSUMPTION AND AVERAGE PRICE OF THE FISH, ETC.

Until a few years ago, the bluefin caught by the traps were consumed as canned in oil or in tomato, etc. Very few bluefin were or are sold fresh to local markets.

In the last few years, the Japanese have been buying the major part of the pre-spawning bluefin taken by traps. The fish are cut, the head, tail, viscus mass and the vertebral column are removed and the fish are frozen on-board the vessels.

The average price for fresh bluefin is about 200 pesetas/kg. The Japanese later sell the bluefin in Japan for about 1,000 pesetas/kg or more.

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