

PROPOSED TERMINOLOGY FOR SIZE GROUPS OF THE NORTH
ATLANTIC BLUEFIN TUNA (THUNNUS THYNNUS)

by

L. R. Rivas

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INTRODUCTION

Long before scientific studies started on the North Atlantic bluefin tuna, fishermen were aware that different seasons and areas of occurrence were roughly correlated with fish size. This was noticed first in the eastern Atlantic and in the Mediterranean where, in addition, fishermen gave names to various size groups. Unfortunately, however, the chosen size categories and names varied from country to country and the names were coined according to the fancy and language of the local fishermen. Even within a given country, size-group names varied according to regions and local dialects. Eventually, this vernacular nomenclature found its way into the local and national records of catch statistics and, subsequently, even into scientific studies published in the several countries involved in the bluefin tuna fishery. Finally, when the conservation and management of the fish became an international problem, this multinational nomenclature became a source of confusion. For this reason, the International Commission for the Conservation of Atlantic Tunas (ICCAT) has requested that a more uniform nomenclature, based on the now better known cycles of size groups, be proposed for discussion and approved by the various ICCAT member countries¹. In addition, it was suggested that for the sake of further clarity, the size-group names be equivalent in the three languages used in ICCAT documents (French, Spanish and English). This is strictly for biological, not statistical, purposes, since each country has its own legalistic formats for reporting catch statistics.

It should be pointed out parenthetically that the local vernacular or common names of the bluefin tuna have also been a source of confusion when translated from one language to another. This is especially true when the translated common name appears without a qualifier, such as the scientific name, a character, or a figure that would positively identify the name with the correct species. For example, the bluefin is called "kuromaguro" in Japanese, and its translation into English as black tuna, without a qualifier, could cause confusion with the blackfin tuna (*Thunnus atlanticus*), an entirely different and much smaller species. We deem it to be pertinent, therefore, to list below the common name most widely used by each of the nations principally involved in the North Atlantic bluefin tuna fishery.

COUNTRY	NAME	COUNTRY	NAME
Bahamas	Bluefin tuna	Italy	Tonno
Canada	Bluefin tuna	Japan	Kuromaguro
Denmark	Tunfisk	Morocco	Thon rouge
England	Tunny	Norway	Stoerje
France	Thon rouge	Spain	Atún rojo
Germany	Roter Thun	United States	Bluefin tuna

VERNACULAR SIZE-GROUPS

Traditionally, bluefin tuna are given different names, according to size, in the traps along the south coast of Spain (Rodríguez-Roda, 1964).

¹Proceedings of the Fifth Regular Meeting of the Commission, (Provisional) Annex 9.

Individuals heavier than 50 kg are called "atún", those weighing from 45 to 50 kg are called "atuarro", and those that weight 10 to 12 kg are called "albacora". The latter name is a source of confusion because it is also given to the albacore (*Thunnus alalunga*) in northern Spain (Bay of Biscay). Finally, the smaller bluefin caught in the Spanish traps, those weighing 5 or 6 kg, are called "cachorreta". It is puzzling that fish weighing between 12 and 45 kg and between 6 and 10 kg are not given any special name at all.

Names very similar to those used in the Spanish traps are used in the traps along the southern coast of Portugal. According to Vilela (1960), size groups by weight are named as follows: "atúns" (>90 kg), "atuarros" (50-89 kg), "albacoras" (30-49 kg), and "cachorretas" (<30 kg). It is clear that, in spite of the name similarity, these weight categories are not equivalent to those of Spain.

In France, the vernacular nomenclature is usually not "formally" applied to size groups as in Portugal and Spain. Rather, adjectival terms such as "petit" (small), "moyen" (medium), or "gros" (large) are loosely applied according to the relative size of fish occurring in a given area at a given time. For example, when a day's haul is landed at Nice from a purse-seiner and the fish range from 10 to 30 kg, those weighing 30 kg would be called large, those weighing 20 kg medium, and those weighing 10 kg small. On the other hand, in a day's haul at St-Jean-de-Luz (Bay of Biscay), comprising fish from 30 to 50 kg, the 30 kg fish would be called small, the 40 kg fish medium, and the 50 kg fish large. In Fuenterrabia, on the Spanish side of the Bay of Biscay, the vernacular nomenclature of size groups is more stable. At the auction shed, the fish are always divided into five groups regardless of the sizes represented on any given day (Cort and Cendrero, 1975). These size groups are purely arbitrary and were determined by mutual accord among the fishermen, auctioneers, and buyers. The size groups considered are the "pequeños" (small, <10 kg), "medianos" (medium, 10-25 kg), "grandes" (large, 25-50 kg), "mayores" (larger, 50-100 kg), and "mucho mayores" (much larger, >100 kg but usually not reaching 200). Again, this classification and nomenclature do not agree with the size groups and names used in the Spanish and Portuguese traps.

In Canada and in the United States size groups of bluefin tuna have also been named, more or less arbitrarily, by anglers and commercial fishermen, but without regard to fixed weight or length categories. For example, the term "school tuna" may be interpreted by some fishermen as fish weighing anywhere from about 3 to 40 kg whereas other fishermen include fish weighing up to about 115 kg. In the Gulf of Mexico, the Florida Straits, and the Caribbean, bluefin tuna, except for the very small young-of-the-year, are always very large and weigh about 140 kg or more. These large fish are called "giants" and are more or less unanimously recognized as such throughout the southern and northern fisheries. In the Gulf of Maine, however, fish that weigh less than 140 kg but more than 115 may also be called giants although bluefin of that size are not known to participate in the southern spawning migration.

BIOLOGICAL AND STATISTICAL SIZE-GROUPS

Observations of the differences in the distributional and migratory patterns of bluefin tuna of various size ranges led some scientists to categorize bluefin tuna statistics into size groups to facilitate their studies of the biology and fisheries of the species. Moreover, some governmental or regional statistics have been tabulated in terms of size groups. As noted above, some of the vernacular size group terminologies have been incorporated into statistical and biological studies. The Portuguese governmental statistics for the trap fishery were published in terms of the four vernacular size groups (Republica Portuguesa, Estatisticas das pescas maritimas no continente e ilhas adjacentes no ano de _____. [published annually] Direcçao das Pescarias, Lisboa). Portuguese scientists have used these terms in recapitulating and discussing the trap catches of bluefin tuna. On the other hand, the general Spanish statistics were presented in terms of "atunes" and "atuarros" only, with the other two size groups being used only in the catch data for certain traps (Lozano Cabo, 1958). The vernacular names used in the Bay of Biscay are not important in the governmental statistics or in the literature, but the statistics of French landings of bluefin tuna at St.-Jean-de-Luz (Cooperative Maritime Itsasokoa) (see Reports of the ICES bluefin tuna working groups) are presented in terms of fish weighing less than 30 kg. and fish weighing more than 30 kg. Most of the latter group fall within the various "medium" size ranges discussed in the following paragraphs.

Schuck and Mather, in an informal presentation at the Bermuda Oceanic Fisheries Conference in May, 1951, showed that the temporal and areal distribution of bluefin tuna in the western North Atlantic varied with size of fish. They presented preliminary distribution charts for small (less than 70 pound [31.7 kg]) medium (70-270 pound [31.7-122.4 kg]) and large or giant (over 270 pound [122.4 kg]) bluefin. They also noted that age 0 (less than 5 pound [2.3 kg]) bluefin were rare in the area, and that little was known about their distribution. In a 1958 manuscript, Mather and Schuck discussed the distribution and migrations of bluefin tuna in terms of four size and age groups; very small (less than 5 pounds [2.3 kg], less than 1 year old), small (5-69 pounds, [2.3-31.3 kg], 1-4 years old), medium (70-269 pounds [31.7-122.0 kg], 5-9 years old) and large or giant (270 pounds [122.4 kg] and over, 9 years old and over). Mather (1962; 1964) and Mather, Mason and Jones (1974) used similar size age groups, adding the corresponding approximate lengths in the 1974 publication.

These size groups were originally selected empirically from distributional data. Subsequent studies indicate that the transition from the "small" to the "medium" group corresponds roughly to the attainment of sexual maturity. The transition from the "medium" to the "giant" group corresponds, in the western Atlantic at least, to a great extension of the migratory pattern.

In the Ninth Session Report of the General Fisheries Council for the Mediterranean (GFCM), published in 1968, a group of experts recommended that the bluefin tuna be divided into three size categories corresponding to "...very distinct biological stages of the fish." The recommended size categories were: (1) from birth to first sexual maturity (3 or 4 years;

average weight 25 to 30 kg), (2) from first sexual maturity to 7 or 8 years (from about 25-30 to 80 kg), and (3) individuals older than eight years or weighing more than 80 kg. No names were proposed for these categories.

The "distinct biological stage" at 7 or 8 years and weights of more than 80 kg. was not defined, but Sara (1973) suggested that it might be related to the full development of the swim bladder. He also maintained that the change in migratory pattern which bluefin tuna in the eastern Atlantic underwent at this size and these ages was a greatly increased tendency to participate in cyclical migrations to Mediterranean spawning areas in May and June and from them in July and August.

More recently Rivas (MS) studied various parameters of the annual life history cycles and found them to differ according to size. He selected four size groups and named them as follows: (1) giant (age 9+), 190+ cm, 136+ kg.; (2) medium (ages 6-8), 150-190 cm, 66-135 kg.; (3) small (ages 1-5), 50-150 cm, 3-66 kg.; (4) zero (age 0), 3 kg.

Shingu and Hisada (1976; 1977) and Shingu, Hisada, Kume and Honma (1975) discussed the oceanic distribution of Atlantic bluefin tuna on the basis of age-groups similar to the size-age groups set up by Mather and his colleagues. Shingu and his colleagues classified bluefin 5-8 or 5-9 years old as "medium" with the younger fish being "small" or "smaller" and older ones being "large".

Size and age ranges of several of these stratifications are diagrammed in Figure 1 and the critical separations between the "small" and "medium" groups and the "medium" and "large" groups are listed in Table 1 to facilitate comparisons between them. The figure and table show considerable similarities between the group stratifications arrived at, more or less independently, in different areas and by different individuals. It is obvious, however, that a standard terminology and uniform size limits are urgently needed for the designation of size groups. In the following section, we are submitting definitions of a proposed size group stratification for the comments and suggestions of all concerned.

PROPOSED SIZE-GROUPS

The purpose of the size-group concept, as we see it, is to facilitate the consideration of large masses of catch data in respect to distributional and migratory cycles. Therefore, the following three factors were considered in defining the size groups to be recommended for future use:

1. The sizes at which distinct changes in distributional patterns occur, and related changes, if any, in the physiological development of the fish.
2. The form in which the largest amount of size data is presently available, and may most readily be collected in the future.
3. The size-groups which have been most extensively used in the past.

The first of these three items is, of course, the primary concern. Since, however, the margin between size groups (except the young of the year) is always obscured by considerable overlaps in the sizes following a given distributional pattern some consideration may be given to the other two items.

Since most of the available size data for bluefin tuna are in terms of weight, we have selected whole or live weight in kilograms as the basic unit for size group separations. Approximate length in centimeters and approximate ages in years are listed as secondary-criteria. Age must be used with caution, especially in the larger size ranges, since there are considerable variations in contemporary size for age determinations (Berry et al., 1977).

Reference to Figure 1 and Table 1 shows that, in a remarkable number of cases, separations between size-age groups occur at or near a weight of 30 kg. and an age of four years. The weight of 30 kg. corresponds roughly to the size at the beginning of the fifth year of life and would actually set the division between the ages of three and four years. Distributional data suggest that in recent years, however, four year old fish have tended to aggregate with younger bluefin rather than with older ones. We therefore propose an upper limit of 44 kg. for the small size group, which would include most four-year-olds in that group. This limit is a year above the estimated age of first maturity for eastern Atlantic bluefin (Rodríguez-Roda, 1964), but falls within the ranges of estimated ages of first maturity in the western Atlantic (Mather et al., MS; Baglin, MS and personal communication).

The upper limits of the various "medium", or equivalent, groups are more scattered, ranging from 80 to 158 kg and from seven to nine years of age. In general, the sizes and ages for the eastern Atlantic-Mediterranean area are smaller than those for the western Atlantic, suggesting possible differences in size-specific distribution between these regions.

The separation between the young-of-the-year (zero) and the small groups presents no problems, since there is general agreement that bluefin weigh about 3 kg at the end of their first year of life.

We therefore submit the following size-group terminology and limits for the consideration of the SCRS. All weights and lengths are approximate (see below).

CATEGORY	WEIGHT (kg)	FORK LENGTH (cm)	AGE IN YEARS
Zero	<3	<50	<1
Small	3 - 44	52 - 129	1 through 4
Medium	45 - 130	130 - 180	5 through 8
Giant	>130	>180	>8

It must be realized that all of the above lengths and weights are of necessity approximations of average conditions. This is because the size at age varies by year class due to changes in growth rates, and also varies by time of year due to within-year growth. Also there are differences in size considerations on each side of the Atlantic. None of these factors is sufficiently well quantified at present to allow for greater precision than given above.

The proposed size-category names in English are given below with their proposed French and Spanish equivalents which are direct translations from the English. Except for small, all these names have the same etymology.

ENGLISH	FRENCH	SPANISH
Zero(s)	Zéro(s)	Cero(s)
Small(s)	Petit(s)	Pequeño(s)
Medium(s)	Moyen(s)	Mediano(s)
Giant(s)	Géant(s)	Gigante(s)

The Spanish and Portuguese name "cachorreta(s)" includes the zeros and most of the small category and, furthermore, its meaning would be distorted if translated into English or French. The word "cachorro" means pup in English and "petit chien" (small dog) in French and "cachorreta" is a diminutive form applied to an animal, in this case a fish, other than a dog. The name "albacora" would include some of the smalls and mediums and, besides, it would be a misnomer as indicated earlier. The name "atuarro" cannot be translated into English or French and the word "atún" simply means "tuna" in English and "thon" in French.

As to the nomenclature used for size-groups in Fuenterrabía, the name "grandes" means big, or large, in English and "gros" (big or large) in French and could perhaps be used instead of "giant" as proposed by us. We believe, however, that the name giant has a more precise meaning and, besides, it has been widely used for many years in the western Atlantic. The word "mayores" actually means "older" in English and "plus vieux" or "plus âgé" in French, but as applied in Spanish to a given size-group of fish its connotation changes to "larger" in English and "plus gros" in French. This Spanish name, therefore, would lose its meaning if translated into French or English and, in French, it would translate into two words. We believe that the short, single-word names proposed above are more practical because they are all direct translation equivalents. In addition, these adjectival names should not be used as qualifiers but rather, as substantives (nouns). Therefore, when referring to any of the four proposed size categories, only the single-word name should be used, in singular or plural, without appending the word "fish", "size", "category", "groups", etc. For example: "the catch consisted mostly of smalls, with very few mediums represented; no zeros and only one giant were seen."

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Table 1. Limits of medium (or equivalent) size or age groups for bluefin tuna, from various sources.

Source or area	Lower limit		Upper limit	
	Weight (kg)	Age (yrs.)	Weight (kg)	Age (yrs.)
GFCM ¹	25 - 30	3 - 4	80	7 - 8
Portugal ²	30		90	
Bay of Biscay ³	30			
Rivas Ms	66	6 - 8	136	9+
Mather (<u>et al</u>)	30 - 32	4 - 5	120 - 122	8 - 9
Shingu <u>et al</u>		4 - 5		8 - 9

¹General Fisheries Council for the Mediterranean.

²Albacoras (30-50 kg) and atuarros (50-90 kg) are considered as collectively equivalent to the medium group.

³Statistics of the Cooperative Maritime Itsasokoa, St. Jean-de-Luz.

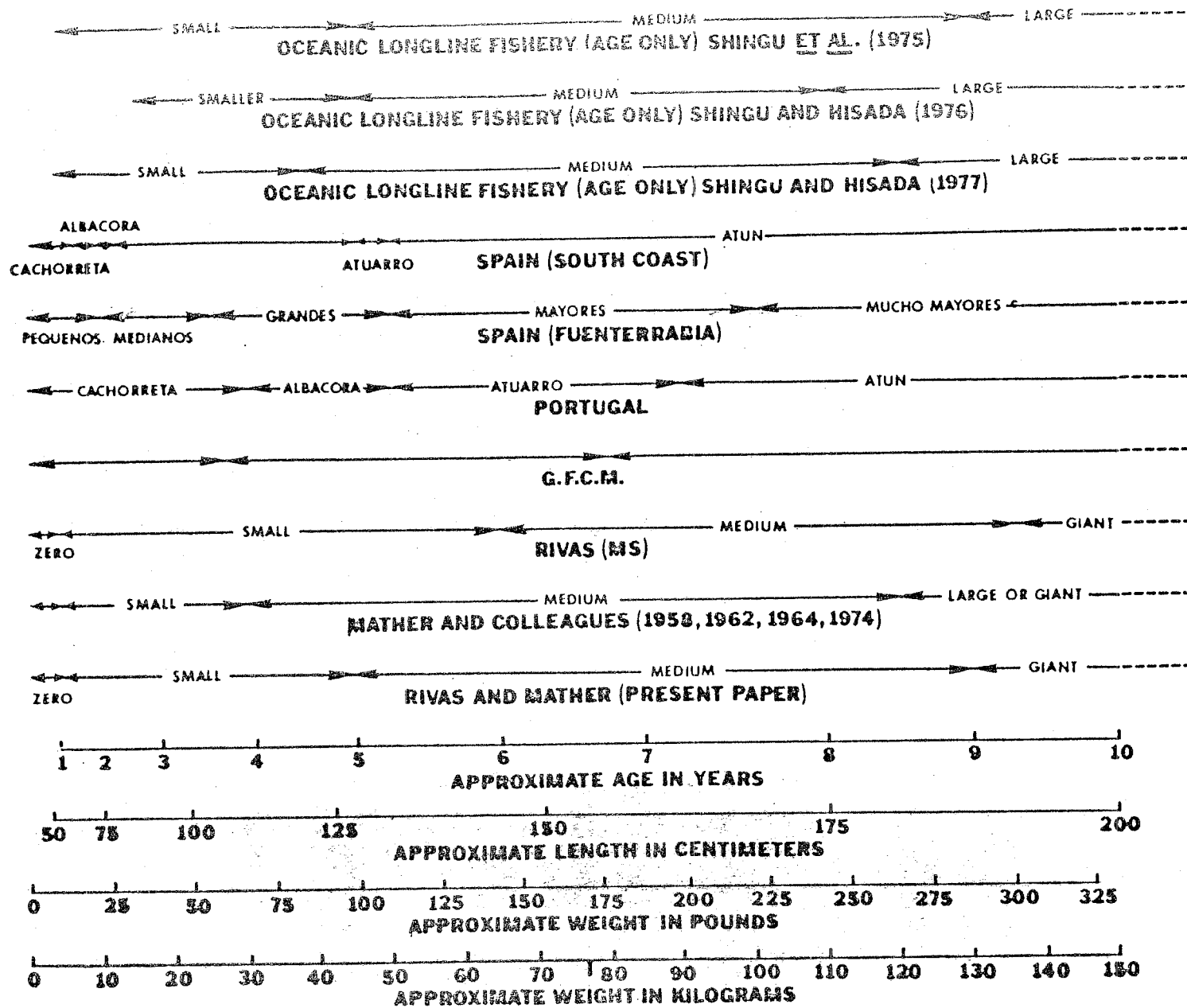


Figure 1. Comparison of size and/or age groups of bluefin tuna used by various authors and/or various fisheries.