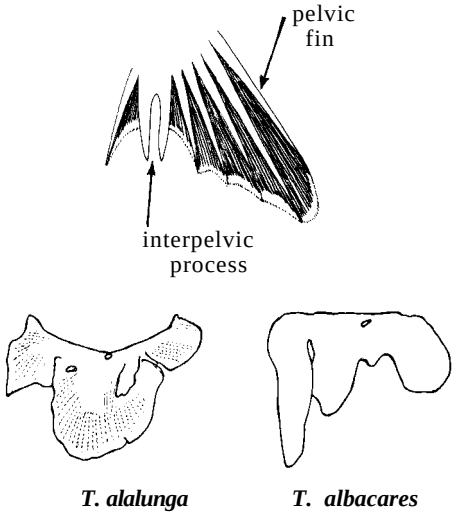
Thunnus South, 1845

SCOMBR Thun

Genus with reference : Thunnus South, 1845:620. A substitute name for Thynnus Cuvier, 1817, preoccupied, and taking the same type-species: Scomber thynnus Linnaeus, 1758, by absolute tantonomy.

Diagmstic Features : Body fusiform, elongate, and slightly compressed. Teeth small and conical, in a single series; gillrakers 19 to 43 on first arch. Two dorsal fins, separated only by a narrow interspace, the first with 11 to 14 spines, anterior spines much higher than posterior spines giving the fin a strongly concave outline; second dorsal fin with 12 to 16 rays, shorter, as high as, or higher than first dorsal fin; followed by 7 to 10 dorsal finlets; anal fin with 11 to 16 rays, about as high as second dorsal fin, followed by 7 to 10 finlets; pectoral fin of variable length depending on species and age, with 30 to 36 rays, more than in any other genus of Scombridae; interpelvic process small and bifid. Body with very small scales; corselet of larger scales developed but not very distinct. Caudal peduncle very slender, bearing on each side a strong lateral keel between 2 smaller keels. Swimbladder present in most species. Vertebrae 39. Liver in ventral view either without striations and the right lobe largest (T. albacares, T. atlanticus, T. tonggol) or with prominent striations and the central lobe largest (T. alalunga, T. maccoyii, T. obesus, T. thynnus). Colour: back metallic dark blue, lower sides and belly whitish; no dark stripes or spots on sides; finlets bright yellow, edged with black in several species.



T. alalunga *T. albacares*

Habitat and Biology : Tunas are mostly oceanic species with epipelagic to mid-water (>500 m depth) distributions depending on species and size. They do not inhabit the polar seas. They are unique among bony fish for their high metabolic rate (resulting in an extraordinary growth pattern) and in their vascular heat exchanger system (retia mirabile) permitting them to maintain body temperatures several degrees higher than the ambient water. As muscles are more powerful when warm, this guarantees steady swimming required to maintain sufficient gas exchange via the gills, which in turn is indispensable to sustain their high metabolism. As juveniles they must swim upwards of 50 km per day and are capable of remarkable bursts of speed (Magnuson, 1978). The ability to regulate body temperature increases with size and is of particular importance to albacore, yellowfin tuna, bigeye tuna, and is best developed in bluefin tuna.

Tunas are agile, opportunistic predators feeding on a great variety of suitably sized forage fishes, crustaceans and squids. Because of their size, adult tunas have few predators, mainly billfishes, sharks, and toothed whales.

Interest to Fisheries : The world catch of Thunnus species remained relatively stable around 750 000 metric tons in the period between 1975 and 1981, but exceeded 1 million metric tons in 1978 (FAO, 1983). Japan (more than 300 000 metric tons in 1981), the USA and the Republic of Korea (about 100 000 metric tons each in 1981) alone accounted for more than 60% of the world catch (FAO, 1983). Apart from being taken by big game sportsfishermen on hook and line and trolling lines, tunas are caught predominantly by industrial gear including purse seines, live bait hook-and-line, conventional longlines and deep longlines. Presently, the tuna fishing industry faces at least two major problems apart from market fluctuations:

- rising fuel costs that have already forced adoption of less energy-intensive fishing methods i.e. by reducing searching time through introduction of a variety of fish-locating and aggregating aides;
- insufficient supply of suitable bait fishes for potential surface fisheries which has induced aquaculturists to investigate the feasibility of economic mass rearing of convenient species. There have been several trials to test the utility of cultured bait, since the behaviour, growth, hardiness and shape of bait have a great bearing on its efficient use in the tuna fisheries. However, the bait fish rearing operations do not appear to be viable in any industrial context, particularly in island areas where land and labour are at a premium.

Another aspect deserving attention is the by-catch of the tuna longline fisheries, which is particularly composed of various sharks, but includes dolphin and other finfishes (Sivasubramanian, 1963). This is mostly discussed in terms of the damage inflicted to the tuna catch and not so much as an additional source of food. In the southeastern Arabian Sea and the Laccadive Sea, sharks constituted 63.8% by number and 57.8% by weight of the total catch during March to May 1981 (Silas & Pillai, 1982). Part of the by-catch is discarded, but another part is locally marketed. There is also a substantial rejection rate of tunas caught in most longline fisheries because they may be too small to sell at reasonable prices in the major high-quality, size-specific market places. Reported landings are believed to be underestimating catches by as much as 25% in numbers in some fisheries.

In general, however, all species are highly appreciated and marketed fresh, deep frozen or canned.

Literature: Gibbs & Collette (1967); Sharp & Dizon (1978).

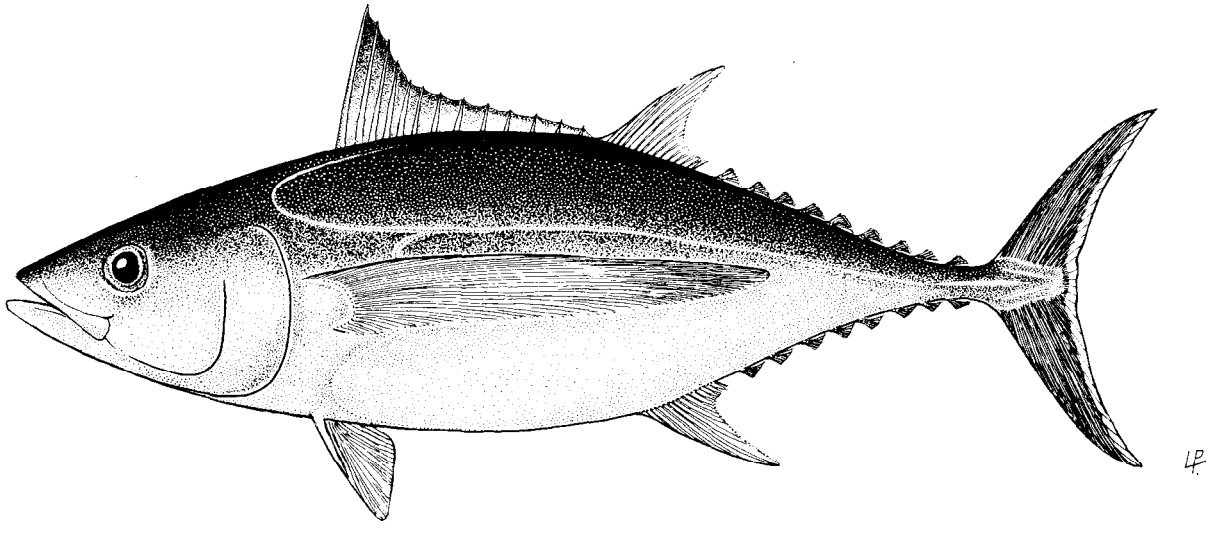
Thunnus alalunga (Bonnaterre, 1788)

SCOMBR Thun 1

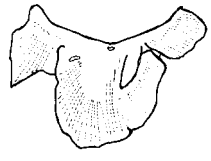
Scomber alalunga Bonnaterre, 1788, Tableau Encyclopédique et Méthodique, Ichthyologie:139 (Sardinia)

Synonymy : Scomber alatunga - Gmelin, 1789; Scomber germo Lacepède, 1800; Orcynus germon - Cuvier, 1817; Orcynus alalonga - Risso, 1826; Thynnus alalonga - Cuvier in Cuvier & Valenciennes, 1831; Thynnus pacificus Cuvier in Cuvier & Valenciennes, 1831; Orcynus alatunga - Gill, 1862; Thunnus alalonga - South, 1845; Thunnus pacificus - South, 1845; Orcynus pacificus Cooper, 1863; Orcynus germo - Lütken, 1880; Germo alalonga - Jordan, 1888; Albacora alalonga - Dresslar & Fesler, 1889; Germo alalunga - Jordan & Evermann, 1896; Thynnus alalunga - Clarke, 1900; Germo germon - Fowler, 1905; Germo germo - Jordan & Scale, 1906; Thunnus alalunga - Jordan, Tanaka, & Snyder, 1913; Thunnus germo - Kishinouye, 1923; Germo germon steadi Whitley, 1933.

FAO Names: En - Albacore; Fr - Germon; Sp - Atún blanco.

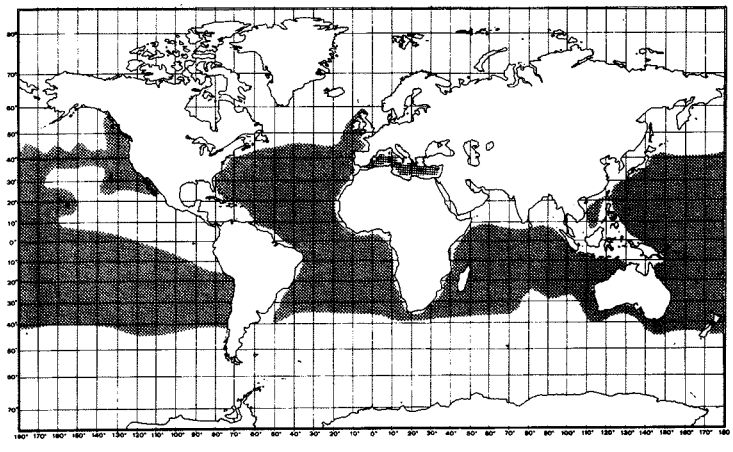


Diagnostic Features : A large species, deepest at a more posterior point than in other tunas (at, or only slightly anterior to, second dorsal fin rather than near middle of first dorsal fin base). Gillrakers 25 to 31 on first arch. Second dorsal fin clearly lower than first dorsal; pectoral fins remarkably long, usually 30% of fork length or longer in 50 cm or longer fish, reaching well beyond origin of second dorsal fin (usually up to second dorsal finlet). Fish smaller than 50 cm will have proportionately smaller pectorals than other tunas, i.e. T. obesus. Ventral surface of liver striated (vascular network). Swim-bladder present, but poorly developed and not evident in fish smaller than about 50 cm fork length. Vertebrae 18 precaudal plus 21 caudal. Colour: a faint lateral iridescent blue band runs along sides in live fish; first dorsal fin deep yellow, second dorsal and anal fins light yellow, anal finlets dark; posterior margin of caudal fin white.



liver

Geographical Distribution : Cosmopolitan in tropical and temperate waters of all oceans including the Mediterranean Sea, extending north to 45 to 50°N and south to 30 to 40°S but not at the surface between l0°N and 10°S.



Habitat and Biology : An epi- and mesopelagic, oceanic secies, abundant in surface waters of 15.6° to 19.4°C; deeper swimming, large albacore are found in waters of 13.5° to 25.2°C; temperatures as low as 9.5°C may be tolerated for short periods. In the Atlantic, the larger size classes (80 to 125 cm) are associated with cooler water bodies, while smaller individuals tend to occur in warmer strata. According to data presently available, the opposite occurs in the northeastern Pacific. Albacore tend to concentrate along thermal discontinuities (oceanic fronts such as the Transition Zone in the north Pacific and the Kuroshio Front east of Japan) where large catches are made. The Transition Zones are preferred to cooler upwelling waters which are richer in forage organisms but poorer in oxygen content. Minimun oxygen requirements are probably similar to those of yellowfin tuna, that is about 2 ml/l. Albacore migrate within water masses rather than across temperature and oxygen boundaries.

Throughout its range, the albacore migrates over great distances and appears to form separate groups at different stages of its life cycle. Several diverging, sometimes contradictory models have been suggested to portray these migrations. At least two stocks (northern and southern) are believed to exist in both the Atlantic and the Pacific Oceans, each with distinct spawning areas and seasons and with little or no interchange across the warm equatorial waters.

The depth distribution in the Pacific ranges from the surface down to at least 380 m and is governed by the vertical thermal structures and oxygen contents of the water masses. In the Atlantic, for the same environmental determinants, albacore are believed to occur as deep as 600 m. Like other tunas, albacore form schools with fewer fish, hence more compact units when composed of larger fish. They may also form mixed. schools with skipjack tuna, yellowfin tuna and bluefin tuna. Schools may be associated with floatiny objects, including sargassum weeds.

Although fecundity does increase with size generally, there is no close relationship between fork length and ovary-weight and hence, number of eggs; a 20 kg female may produce between 2 and 3 million eggs per season, which are released at least in two batches. The sex ratio in catches is about 1:1 for immature specimens, but males predominate among mature fishes, which is possibly due to both differential mortality of sexes, and differential growth rate after maturity.

Size : Maximum fork length is 127 cm. The all-tackle angling record is a 40 kg fish with a fork length of 123 cm taken in the Canary Islands in 1977. In the Pacific surface fishery (pole-and-line, and troll fishery), smaller sizes (modes between 55 to 80 cm fork length) predominate, while longline fisheries take bigger fish (modes about 95 to 115 cm); in the Indian Ocean, common sizes range from 40 to 100 cm fork length (Silas & Pillai, 1982), while males up to 109 cm and females up to 106 cm are not exceptional in the Atlantic. In the Pacific, maturity may be attained at about 90 cm fork length in females and at about 97 cm in males; in the Atlantic it is reached at about 94 cm in both sexes.

Interest to Fisheries : There are important fisheries for T. alalunga in the Atlantic and Pacific Oceans. Catches have been reported from 15 FAO Fishing Areas by 15 countries in the period from 1974 to 1981. Along with increasing effort in the major fisheries, the world catch has been gradually declining from a peak of about 245 000 metric tons in 1974 to a low of about 181 000 metric tons in 1981 (FAO, 1981, 1983). More than half of the catch in the last years was taken in the Pacific, particularly in Fishing Areas 61, 77 and 81. The landings in Area 61 were almost exclusively made by Japanese vessels. More than 10 000 metric tons were reported in 1981 from two other fishing areas, namely Areas 27 (predominantly by Spain, while the French catch collapsed to less than one tenth of its previous level) and 47 (FAO, 1983).

Albacore fisheries involve 4 basic types of fishing operations: longlining, live-bait fishing, trolling, and purse seining. Surface methods (trolling, purse-seining, live-bait) tend to take smaller fish than longlining. In recent years, boats and gear have been improved by introduction of longer vessels (trollers up to 22 m length), more modern boatbuilding materials (fiberglass, aluminium, etc.), larger ice storage or brine freezing capacities, better navigational aids and fish locating devices, and larger bait-holding capacities that increase the autonomy of the vessels.

The most important albacore fisheries are the following:

In the Pacific there are 5 major fisheries which are operational at various times of the year:

- The Japanese live-bait fishery originates south of Japan and then develops offshore into the area of the Kuroshio Front. It extends from March through July, with a peak in June.

- The Japanese longline fishery operates across the North Pacific throughout the year, although the best catches are obtained from December to February.

- The US surface fishery from off Baja California to Canada attains its peak in August and September; fishing activities extend from June to December in the northern part of this area and from May to January in the southern part; 90% of catches are taken in waters of 15.6° to 19.4° C; catches of this fishery are believed to include fishes as young as one year of age, with only few mature adults.

- Longline operations in the South Pacific between 10° and 40° S from Samoan and Japanese bases extend throughout the year with the peak season from August to February.

- The New Zealand surface fishery, mostly in waters from 18.5° to 21.3° C, extends from January to April, with best catches usually in February.

- Albacore is also caught as a by-catch in the Hawaiian longline fishery for yellowfin and bigeye tuna.

In the Indian Ocean, the fishery is barely developed, but areas of potentially successful exploitation, as derived from an assessment of favourable hydrographical conditions, are given in Sharp (1979). Up to the mid-sixties, catches in this area were taken exclusively by Japanese vessels, while in the late seventies, vessels from Taiwan, Province of China, were the most abundant, followed by boats from the Republic of Korea and Japan.

In the Atlantic, there are at least 3 fisheries for albacore:

- A trolling fishery dating back to the last century which has undergone mechanization of boats and gear and introduced on-board processing of fish. It is operated primarily by Spanish and French vessels in the Bay of Biscay and the West European Basin.

- A more recent pole-and-line fishery initiated after World War II by French and Spanish bait-boats in the Bay of Biscay and off northern Portugal; this activity is restricted to the summer months. A recent offshoot of this fishery, dating from 1970, is the seasonal pole-and-line activity in fall off Morocco by Azores- and Maideira-based Spanish and Portuguese vessels.

- Seasonal summer and winter longline fisheries operating in different offshore areas in the northern and southern hemispheres. These fisheries were operated almost exclusively by long-distance fleets from Japan up to 1970, but since that time vessels from the Republic of Korea and Taiwan Island are also participating. On a smaller scale, countries like Brazil, Cuba and Venezuela have entered this fishery.

Local Names : ANGOLA: Avoador; ARGENTINA: Albacora; BRAZIL: Albacora branca; CANADA: Albacore, Germon atlantique; CHILE: Atún de aleta larga; COLOMBIA: Albacora; CUBA: Albacora; DOMINICAN REPUBLIC: Albacora; ECUADOR: Atún; EGYPT: Tunna; FRANCE: Germon; GERMANY FR: Weisser Thun; GREECE: Tonnos macropteros; ISRAEL: Garmon; ITALY: Alaionga; JAPAN: Binnaga, Tonbo; KENYA: Jodari (Swahili); KOREA REP: Nal-gae-da-raeng-i; MALTA: Ala-longa; MARTINIQUE: Germon; MEXICO: Albacora; MONACO: Ara-lunga; MOROCCO: Germon, Thone; NEW ZEALAND: Albacore tuna; PACIFIC ISLANDS TRUST TERRITORIES: Aáhi taria; PANAMA: Albacora; PERU: Albacora, Alalunga, Atún de aleta larga; POLAND: Germon; PORTUGAL: Albacora, Voador; PUERTO RICO: Albacora ROMANIA: Ton cu inotatoare lungi; SENEGAL: Bonette; SOMALIA: Jodari (Swahili); SOUTH AFRICA: Albacore, Albakoor, Langvin tuna, Longfin tunny; SPAIN: Albacora, Atún blanco; SWEDEN: Albakore; TAIWAN, PROVINCE OF CHINA: Chang chi we; TANZANIA: Jodari (Swahili); TUNISIA: Ghzel; TURKEY: Yazili orkinos; UK: Albacore; URUGUAY: Albacora; USA: Albacore; Hawaii: Ahipahala; USSR: Albakor, Belokrylyj tunets, BeIyj tunets, Dlinnoperyj tunets; VENEZULEA: Albacora; VIET NAM: Cá ngir vây dài; YUGOSLAVIA: Silac.

Literature : Postel (1963b); Yoshida & Otsu (1963); Fischer, ed. (1973, Species Identification Sheets, Mediterranean and Black Sea) Fischer & Whitehead, eds (1974, Species Identification Sheets, Eastern Indian Ocean/Western Central Pacific); Le Gall (1974); Collette (1978, Species Identification Sheets, Western Central Atlantic; 1981, Species Identification Sheets, Eastern Central Atlantic); Dotson (1980, describes methods and gear for northeast Pacific fleets); Foreman (1980, summarizes i.e. growth parameter estimates); Bard (1981, Ph.D.thesis); Le Gall (1981, bibliography).

Remarks : Note that the vernacular name "albacora" is used for swordfish (Xiphias gladius) in Chile, while it is commonly used for T. alalunga in other Spanish speaking countries,while in the eastern Atlantic "albacore" is used by francophones for the yellowfin tuna (T. albacares).

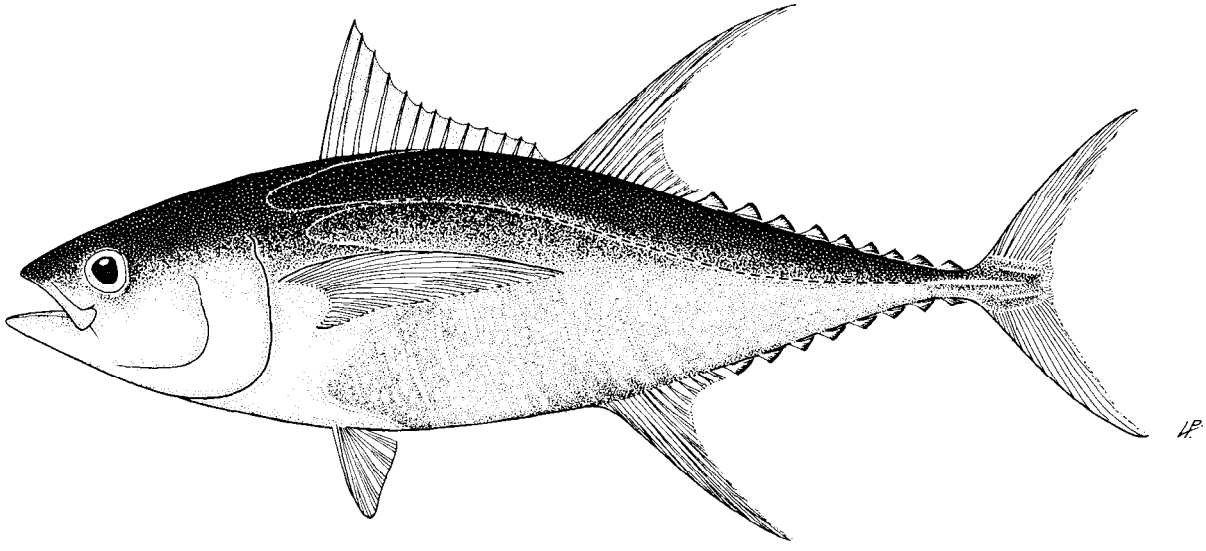
Thunnus albacares (Bonnaterre, 1788)

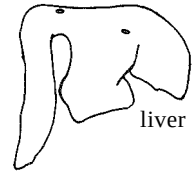
SCOMBR Thun 3

Scomber albacares Bonnaterre, 1788, Tableau Encyclopedique et Methodique, Ichthyologie:140 (Jamaica).

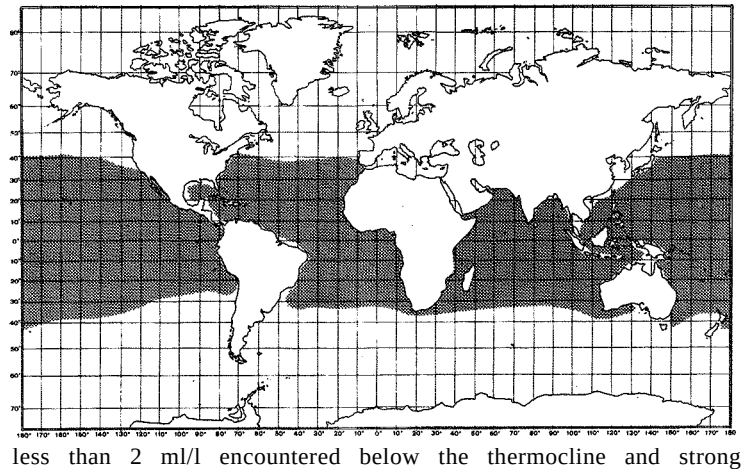
Synonymy : Scomber albacorus Lacepède, 1800; Thynnus argentivittatus Cuvier in Cuvier & Valenciennes, 1831; Scomber sloanei Cuvier in Cuvier & Valenciennes, 1831;. Thynnus albacora Lowe, 1839; Thynnus macropterus Temminck & Schlegel, 1844; Thunnus argentivittatus - South, 1845; Orcynus subulatus Poey, 1875; Orcynus albacora - Poey, 1875; Orcynus macropterus - Kitahara, 1897; Germo macropterus - Jordan & Snyder, 1901; Thunnus macropterus - Jordan, Tanaka & Snyder, 1913; Thunnus allisoni Mowbray, 1920; Germo argentivittatus - Nichols & Murphy, 1922; Germo allisoni - Nichols, 1923; Neothunnus macropterus - Kishinouye, 1923; Neothunnus catalinae - Jordan & Evermann, 1926; Neothunnus albacora - Jordan & Evermann, 1926; Neothunnus itosibi - Jordan & Evermann, 1926; Neothunnus albacores - Jordan & Evermann, 1926; Neothunnus allisoni - Jordan & Evermann, 1926; Kishinoella zacalles Jordan & Evermann, 1926; Semathunnus guildi Fowler, 1933; Semathunnus itosibi - Fowler, 1933; Neothunnus argentivittatus - Beebe & Tee-Van, 1936; Germo albacora - Fowler, 1936; Thunnus albacora - Tortonese, 1939; Germo itosibi - Smith, 1949; Neothunnus albacora brevipinna Bellón & Bardán de Béllon, 1949; Neothunnus albacora longipinna Bellón & Bardán de Bellón, 1949; Neothunnus macropterus macropterus - Bellón & Bardán de Bellón, 1949; Neothunnus macropterus itosibi - Bellón & Bardán de Bellón, 1949; Neothunnus brevipinna - Postel, 1950; Thunnus zacalles - Fraser-Brunner, 1950; Thunnus albacares - Ginsburg, 1953; Thunnus catalinae - Ginsburg, 1953; Neotunnus albacares - Mather, 1954; Thunnus albacores - Le Danois, 1954; Neothunnus albacora macropterus - Schultz, 1960; Thunnus albacares macropterus - Jones & Silas, 1963a; Thunnus itosibi - Jones & Silas, 1963a.

FAO Names : En - Yellowfin tuna; Fr - Albacore; Sp - Rabil.





Diagnostic Features : A large species, deepest near middle of first dorsal fin base. Gillrakers 26 to 34 on first arch. Some large specimens have very long second dorsal and anal fins, which can become well over 20% of fork length; pectoral fins moderately long, usually reaching beyond second dorsal fin origin but not beyond end of its base, usually 22 to 31% of fork length. No striations on ventral surface of liver. Swimbladder present. Vertebrae 18 precaudal plus 21 caudal. Colour: back metallic dark blue changing through yellow to silver on belly; belly frequently crossed by about 20 broken, nearlv vertical lines: dorsal and anal fins, and dorsal and anal finlets, bright yellow, the finlets with a narrow black border.



Geographical Distribution : Worldwide in tropical and subtropical seas, but absent from the Mediterranean Sea.

Habitat and Biology : Epipelagic, oceanic, above and below the thermocline. The thermal' boundaries of occurrence are roughly 18° and 31°C. Vertical distribution appears to be influenced by the thermal structure of the water column, as is shown by the close correlation between the vulnerability of the fish to purse seine capture, the depth of the mixed layer, and the strength of the temperature gradient within the thermocline. Yellowfin tuna are essentially confined to the upper 100 m of the water column in areas with marked oxyclines, since oxygen concentrations less than 2 ml/l encountered below the thermocline and strong thermocline gradients tend to exclude their presence in waters below the discontinuity layer. Larval distribution in equatorial waters is transoceanic the year round, but there are seasonal changes in larval density in subtropical waters. It is believed that the larvae occur exclusively in the warm water sphere, that is, above the thermocline.

Schooling occurs more commonly in near-surface waters, primarily by size, either in monospecific or multispecies groups. In some areas, i.e. eastern Pacific, larger fish (greater than 85 cm fork length) frequently school with porpoises. Association with floating debris and other objects is also observed.

Although the distribution of yellowfin tuna in the Pacific is nearly continuous, lack of evidence for long-ranging east-west or north-south migrations of adults suggests that there may not be much exchange between the yellowfin tuna from the eastern and the central Pacific, nor between those from the western and the central Pacific. This hints at the existence of subpopulations.

Spawning occurs throughout the year in the core areas of distribution, but peaks are always observed in the northern and southern summer months respectively. Joseph (1968) gives a relationship between size and fecundity of yellowfin tuna in the eastern Pacific.

Size : Maximum fork length is over 200 cm. The all-tackle angling record was a 176.4 kg fish of 208 cm fork length taken off the west coast of Mexico in 1977. Common to 150 cm fork length.

Off the Philippines and Central America, the smallest mature fish were found within the size group from 50 to 60 cm fork length at an age of roughly 12 to 15 months (Davidoff, 1963), but between 70 and 100 cm fork length the percentage of mature individuals is much higher. All fish over 120 cm attain sexual maturity.

Interest to Fisheries : There are important yellowfin tuna fisheries throughout tropical and subtropical seas. Recent catch statistics for this species include reports from 14 fishing areas by 35 countries. The most important catches (well over 100 000 metric tons) are recorded from Fishing Areas 71, 77 and 34 (slightly less than 10 000 metric tons). Japan and the USA were the two countries with the largest catch (about 100 000 metric tons each per year). Landings were relatively stable over the period from 1975 to 1981, varying only between about 496 000 and 545 000 metric tons.The world catch for 1981 totalled 526 340 metric tons (FAO, 1983). The above level of production could be maintained due to an increase in fishing effort, but reduction in catches per unit effort suggests decreasing abundance of some stocks.

Near-surface schooling yellowfin tuna are captured primarily with purse seines and by pole-and-line fishing, while trolling and gillnetting are of much lesser importance. The 1979 eastern Pacific surface fleet numbered 259 purse seiners, 45 bait boats, and 17 other vessels flying 16 flags.The carrying capacity of this fleet amounted to 169 149 metric tons. Purse seining is increasing in the western Pacific, initially taking mainly skipjack and bluefin tuna. In 1982, the yellowfin tuna catch by US purse seiners in this area probably exceeded that of skipjack tuna, and the total purse seine catch of yellowfin by all vessels may have been higher than that of bluefin tuna.

Pole-and-line fishing is still one of the major surface fishing techniques for yellowfin tuna in the Pacific, even though this method is declining in overall importance throughout the world.

The most important fishing method for deep swimming yellowfin tuna is longlining, primarily by vessels from Japan, the Republic of Korea and Taiwan Island. Although these fisheries operate virtually throughout the geographical range of the species, the largest catches are made in the equatorial waters of the Pacific.

For the purpose of assessing maximum sustainable yield of yellowfin stocks, the Inter-American Tropical Tuna Commission has established a Yellowfin Regulatory Area (CYRA) and some experimental fishing areas in the eastern Pacific. The fishery has been under regulation since 1966. However, since 1979, the I-ATTC has been unable to administer effectively any conservation measures due to lack of agreement on a quota system in the CYRA among its member countries. Overfishing was suspected a couple of years ago, but the 1982 catch was so low that this is no longer the case.

In the Indian Ocean, yellowfin tuna were taken exclusively by Japanese vessels up to the early sixties, but thereafter, boats from the Republic of Korea and Taiwan, Province of China, started operating in this area and acounted for more than 50% of the total catch by the late seventies. Nevertheless, Indian Ocean yellowfin tuna fisheries are not yet fully developed. Based on hydrographical data, Sharp (1979) has suggested the existence of certain areas of potential exploitation.

Local Names : ARGENTINA: Aleta amarilla; AUSTRALIA: Yellowfinned albacore; BRAZIL: Albacora de lage; CUBA: Atún de aleta amarilla; FRANCE: Thon à nageoires jaunes; GERMANY FR: Gelbflossenthun; GREECE: Tonnos macropteros; INDIA: Howalla, Kelawalla (Sinhalese); ITALY: Tonno albacora; JAPAN: Hatsu, Kihada, Kimeji (young), Kiwada; MALTA: Tonn; MARTINIQUE: Albacore, Z'aile jaune; NETHERLANDS: Geelvintonijn; NORWAY: Albakor; PACIFIC ISLANDS TRUST TERRITORIES: Palau: Tkuu; PHILIPPINES: Albacora, Badla-an, Buyo, Tambakol; POLAND: Albakora: PORTUGAL: Atum albacora, Atum rabil, Peixinho da ilho; ROMANIA: Albacora, Ton galben; SENEGAL: Albacore; Doullou-doullou (Ouoloff); Thon à nageoires jaunes; Wakhandor (Lebou); SOUTH AFRICA: Geelvin-tuna, Yellowfin tuna; SPAIN: Rabil; SWEDEN: Albacora; UK: Yellowfin tuna; URUGUAY: Aleta amarilla; USA: Yellowfin tuna; Hawaii: 'Ahi, Kahauli, Kanana, Maha'o, Palaha; USSR: Albacor, Tikhookeanskij zheltoperyj tunets, Zheltoperyj tunets, Zheltokhvostyj tunets; VENEZUELA: Atùn aleta amarilla; VIET NAM: Cá bò Vang; JUGOSLAVIA: Tuna zutoperka.

Literature : Mimura et al. (1963, Indian Ocean); Schaefer, Broadhead & Orange (1963, Pacific); Vilela & Frade (1963, eastern Atlantic); Fischer & Whitehead, eds (1974, Species Identification Sheets, Eastern Indian Ocean/Western Central Pacific); Collette (1978, Species Identification Sheets, Western Central Atlantic; 1981, Species Identification Sheets, Eastern Central Atlantic); Sharp (1978, describes the relation between vulnerability to surface gear, schooling, and environmental processes); Cole (1980, Pacific, summarizes i.e. growth parameter estimates).

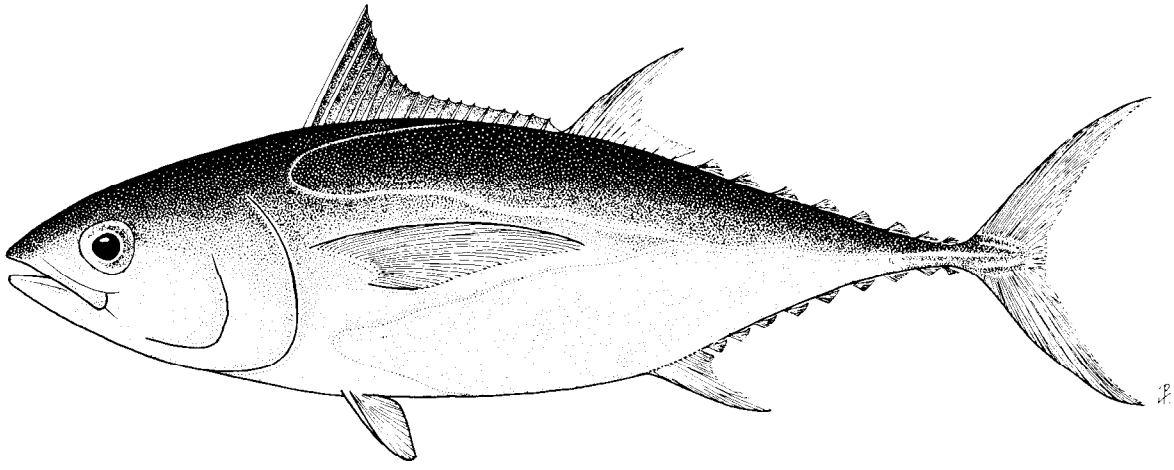
Thunnus atlanticus (Lesson, 1830)

SCOMBR Thun 7

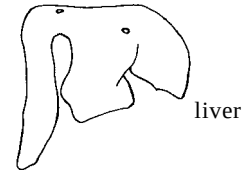
Thynnus atlanticus Lesson, 1830, Voyage sur la corvette "La Coquille" Zoologie, 10:165-166 (Trinidade Island off Brazil).

Synonymy : Thynnus coretta Cuvier in Cuvier & Valenciennes,1831; Thynnus balteatus Cuvier in Cuvier & Valenciennes, 1831; Thunnus balteatus - South, 1845; Thunnus coretta - South, 1845; Orcynus balteatus - Poey, 1868; Parathunnus rosengarteni Fowler, 1934; Parathunnus ambiguus Mowbray, 1935; Parathunnus altanticus Beebe & Hollister, 1935; Thunnus atlanticus - Rivas, 1951.

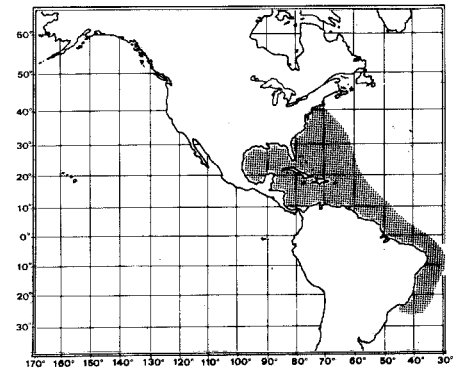
FAO Names : En - Blackfin tuna; Fr - Thon à nageoires noires; Sp - Atún aleta negra.



Diagnostic Features : A small species of tuna, deepest near middle of first dorsal fin base. Gillrakers few, 19 to 25 on first arch. Pectoral fins moderate in length, usually 22 to 31% of fork length. Ventral surface of liver not striated, right lobe longer than centre and left lobes. Small swimbladder present. Vertebrae 19 precaudal plus 20 caudal. Colour: back metallic dark blue, lower sides uniformly silvery grey or with pale streaks and spots at least partly in vertical rows, belly milky white; first dorsal fin dusky, second dorsal and anal fins dusky with a silvery lustre; finlets dusky with a trace of yellow.



Geographical Distribution : Restricted to the western Atlantic Ocean, from off Martha's Vineyard, Massachusetts south to Trinidade Island and Rio de Janeiro, Brazil.



Habitat and Biology : An epipelagic, oceanic species occurring in waters of at least 20°C. Blackfin tuna frequently form large mixed schools with skipjack. Its spawning grounds are believed to be located well offshore. Around Florida the spawning season extends from April to November with a peak in May, while in the Gulf of Mexico it apparently lasts from June to September. No fecundity estimate is available. Males predominate in catches of adult fish.

Surface and deepsea fishes, squids, amphipods, shrimps, crabs, and stomatopods and decapod larvae form the food basis of blackfin tuna. It competes for food with skipjack tuna and is occasionally even preyed upon by this species. Other predators include Atlantic blue marlin (Makaira nigricans) and common dolphinfish (Coryphaena hippurus).

Preliminary studies suggest that blackfin tuna may become older than 5 years.

Size : Maximum fork length is 100 cm; common to 72 cm and 6 to 7 kg of weight (approximately 5 years of age). The all-tackle angling record is a 19.05 kg fish with a fork length of 100 cm taken in Bermuda in 1978.

Interest to Fisheries : The largest fishery for the species operates off the southeastern coast of Cuba and uses live-bait and pole. This is a mixed fishery directed also at Katsuwonus pelamis, but the catches are not separated. Blackfin tuna are also caught off Haiti and casually throughout the Lesser Antilles with various gear. In the important sports fisheries for the species in Florida and the Bahamas, trolling is the major method. In the period from 1975 to 1980 the world catch of this species ranged between 781 and 300 metric tons but peaked at 845 metric tons in 1981 (FAO, 1983).

Local Names : CUBA: Albacora; GUADELOUPE: Giromón, Thon noir; HAITI: Bonite, Deep-bodied tunny; JAPAN: Mini maguro, Monte maguro, Taiseiyo maguro; MARTINIQUE: Bonite noir, Petit thon; PORTUGAL: Albacorinha; SPAIN: Atún aleta negra; ST. LUCIA: Thon nuit; USA: Blackfin tuna; USSR: Atlanticheskyj tunets, Chernij tunets; VENEZULEA: Atún aleta negra.

Literature : De Sylva (1955); Idyll & De Sylva (1963); Nomura & Cruz (1967, Brazil, gives length and weight data); Beardsley & Simmons (1971, bibliography); Collette (1978, Species Identification Sheets, Western Central Atlantic).

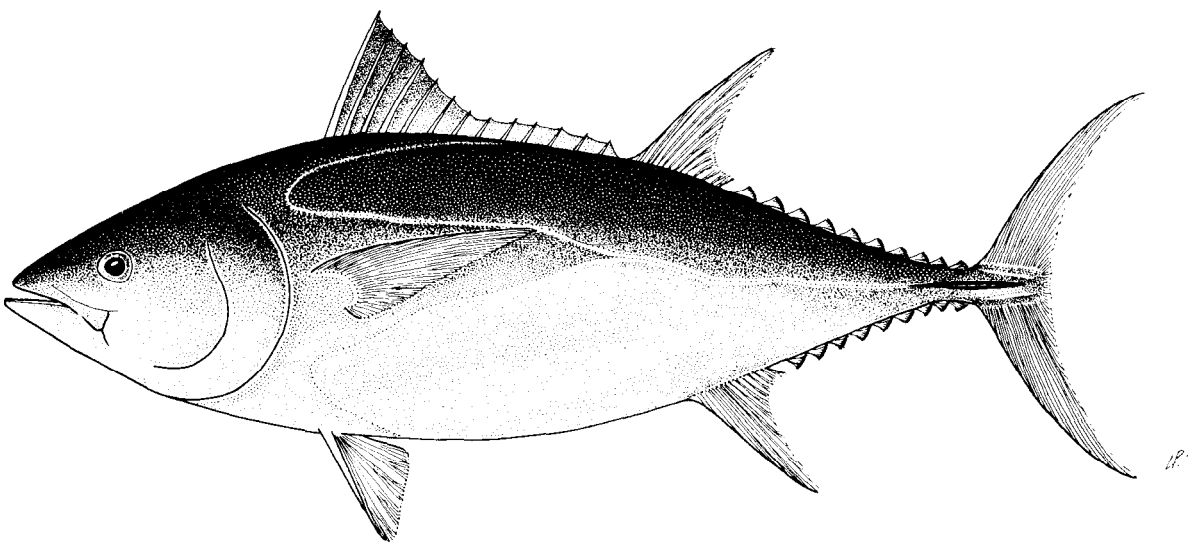
Thunnus maccoyii (Castelnau, 1872)

SCOMBR Thun 4

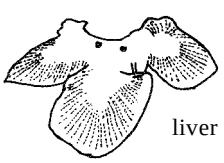
Thunnus maccoyii Castelnau, 1872, Proc.Zool.Acclim.Soc.Victoria, 1:104-105 (Melbourne, Australia).

Synonymy : Thunnus phillipsi Jordan & Evermann, 1926; Thunnus maccoyii - Jordan & Evermann, 1926; Thunnus thynnus maccoyii - Serventy, 1956.

FAO Names: En - Southern bluefin tuna; Fr - Thon rouge du sud; Sp - Atún del sur.



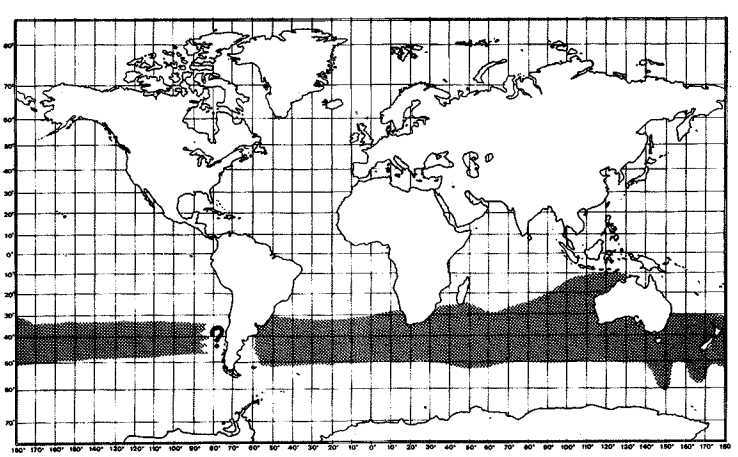
Diagnostic Features : A very large species, deepest near middle of first dorsal fin base. Gillrakers 31 to 40 on first arch. Pectoral fins very short, less than 80% of head length (or between 20.2 and 23% of fork length), never reaching the interspace between the dorsal fins. Ventral surface of liver striated. Swimbladder present. Vertebrae 18 precaudal plus 21 caudal. Colour: lower sides and belly silvery white with colourless transverse lines alternated with rows of colourless dots (the latter dominate in older fish), visible only in fresh specimens; first dorsal fin yellow or bluish; anal fin and finlets dusky yellow edged with black; median caudal keel yellow in adults.



liver

T. maccoyii

Geographical Distribution : Probably found throughout the Southern Ocean south of 30° S.



Habitat and Biology : Epipelagic, oceanic in cold temperate; waters, confined to temperatures between 5º and 20ºC for much of its life span; spawning fish and larvae, however, are encountered in waters with surface temperatures between 20° and 30° C.

In adults, seasonal migrations are observed between the warm water western and northwestern Australian spawning grounds (maximum catches are recorded at temperatures between 23° and 26° C) and coldwater feeding grounds off Tasmania and New Zealand (at temperatures of 13º to 15°C). The spawning season extends throughout the southern summer from about September/October to March. Fecundity of a 158 cm long female with gonads weighing about 1.7 kg each was estimated at about 14 to 15 million eggs.

The food spectrum, covering a wide variety of fishes (cold and warm water species from different depth strata), crustaceans, molluscs, salps and other groups, reveals the southern bluefin tuna as an opportunist. It is in turn preyed upon by sharks, dolphins, seals and billfishes.

Longevity is believed to be at least 12 years, older specimens being rarely encountered. One 3-year old individual was tagged off Albany, Australia, and recaptured off South Australia after 15 years and 4 months, suggesting that this species may attain an age of 20 years.

Size : Maximum fork length is 225 cm (Yukinawa, 1970). In the Indian Ocean, common sizes range between 160 to 200 cm fork length (Silas & Pillai, 1982). The all-tackle angling record is a 158 kg fish with a fork length of 203 cm taken off Whakatane, New Zealand in 1981. Length-weight correlations vary, particularly in adult fish in relation to physiological condition. A 180 cm long southern bluefin tuna may have a gutted weight of roughly 102 to 134 kg. Length at first maturity is estimated by circumstancial evidente at 130 cm, equivalent to about 40 kg of weight.

Interest to Fisheries : Southern bluefin tuna is an important commercial species, especially off Australia. Between 1975 and 1981 the world catch varied between a maximum of 43 223 metric tons (in 1976) and a minimum of 32 415 metric tons (in 1978). Japan and Australia landed the bulk of the catches (34 755 out of a total of 34 970 metric tons in 1981) (FAO, 1983). The major surface fishing grounds are found off New South Wales (peak catches in November and December) and in South Australian coastal waters (peak season February through April). Initially, in the fifties and early sixties, trolling was the dominant fishing technique but it was subsequently replaced by live-bait-and-pole fishing. Recently a specialized fishery for sashimi-quality has been developed by New Zealand fishermen.

The main longline fishing grounds extend from 10° to 170°W with concentrations off Tasmania, New Zealand and South Africa. They shift seasonally associated with changes in hydrographical conditions. With the introduction of monthly sea surface temperature charts as an aid in fish locating, fishing operations increased their efficiency. On the Tasmanian and New Zealand grounds the fishing season peaks from June through September, and off Cape Town, from May to August, as expressed by maximum hook rates. Adult fish (over 130 cm fork length) are predominantly caught off New Zealand, Tasmania and on the Western Australian (spawning) longline fishing grounds.

This species is prized for the sashimi markets of Japan, and individual fish have brought more than US$ 10 000 on the auction in Tokyo. Market prices change dramatically with the fat contents i.e. quality of the meat. Fat prespawning southern bluefin tuna fetch high prices while spent individuals meet low appreciation.

A management scheme for the conservation of the stock is in operation. It involves an increase in the age at first capture through a voluntary scheme of closed seasons in areas where juveniles and up ta 5-year-old fish aggregate; likewise, the Australian government has imposed restrictions on the number of boats allowed to operate within its waters.

Local Names : AUSTRALIA: Southern bluefin tuna, Southern tunny; CHILE: Atún; JAPAN: Bachi maguro, Indo (Goshu) maguro, Minami maguro; NEW ZEALAND: Bluefin tuna, Tunny; SOUTH AFRICA: Southern bluefin tuna, Suidelike blouvin-tuna; USSR: Avstralijskaya tunets.

Literatre : Serventy (1956); Robins (1963); Fischer & Whitehead, eds (1974, Species Identification Sheets, Eastern Indian Ocean/Western Central Pacific); Olson (1980, summarizes i.e. growth parameter estimates); Shingu (1981, reports i.e. population parameters).

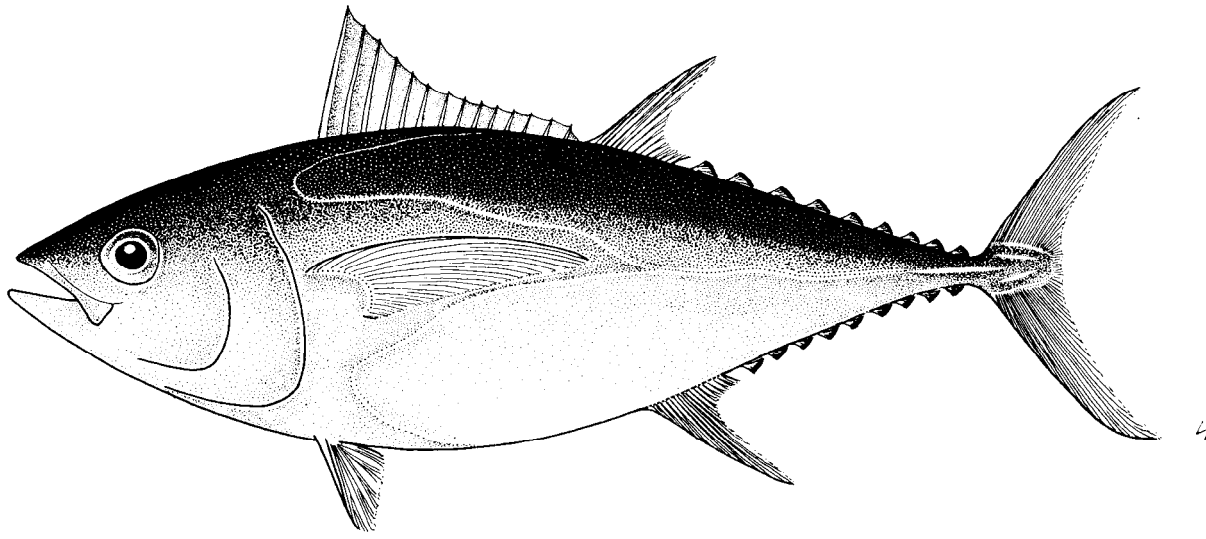
Thunnus obesus (Lowe, 1839)

SCOMBR Thun 5

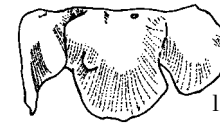
Thynnus obesus Lowe, 1839, Proc.Zool.Soc.London, 7:78 (Madeira).

Synonymy : Thynnus sibi Temminck & Schlegel, 1844; Orcynus sibi - Kitahara, 1897; Germo sibi - Jordan & Snyder, 1901; Thunnus sibi - Jordan & Snyder, 1901; Thunnus mebachi Kishinouye, 1915; Parathunnus mebachi - Kishinouye, 1923; Pathunnus sibi - Jordan & Hubbs, 1925; Parathunnus obesus - Jordan & Evermann, 1926; Germo obesus - Fowler, 1936; Thunnus obesus - Fraser-Brunner, 1950; Neothunnus obesus - Postel, 1950; Parathunnus obesus mebachi - Jones & Silas, 1961; Thunnus obesus sibi - Jones & Silas, 1963a; Thunnus obesus mebachi - Jones & Silas, 1964.

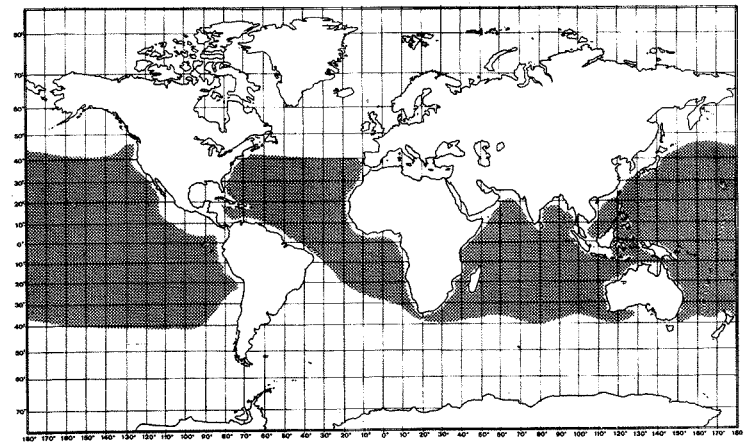
FAO Names : En - Bigeye tuna; Fr - Thon obèse; Sp - Patudo.



Diagnostic Features : A large species, deepest near middle of first dorsal fin base. Gillrakers 23 to 31 on first arch. Pectoral fins moderately long (22 to 31% of fork length) in large individuals (over 110 cm fork length), but very long (as long as in T. alalunga) in smaller individuals (though in fish shorter than 40 cm they may be very short). In fish longer than 30cm, ventral surface of liver striated. Swimbladder present. Vertebrae 18 precaudal plus 21 caudal. Colour: lower sides and belly whitish; a lateral iridescent blue band runs along sides in live specimens; first dorsal fin deep yellow, second dorsal and anal fins light yellow, finlets bright yellow edged with black.


liver

Geographical Distribution : Worldwide in tropical and subtropical waters of the Atlantic, Indian and Pacific oceans, but absent from the Mediterranean.



Habitat and Biology : Epipelagic and mesopelagic in oceanic waters, occurring from the surface to about 250 m depth. Temperature and thermocline depth seem to be the main environmental factors governing the vertical and horizontal distribution of bigeye tuna. Water temperatures in which the species has been found range from 13º to 29° C, but the optimum range lies between 17° and 22° C. This coincides with the temperature range of the permanent thermocline. In fact, in the tropical western and central Pacific, major concentrations of T. obesus are associated with the thermocline rather than with the surface phytoplankton maximum. For this reason, variation in occurrence of the species is closely related to seasonal and climatic changes in surface temperature and thermocline.

Juveniles and small adults of bigeye tuna school at the surface in mono-species groups or together with yellowfin tuna and/or skipjack. Schools may be associated with floating objects.

In the eastern Pacific some spawning is recorded between 10°N and l0° S throughout the year, with a peak from April through September in the northern hemisphere and between January and March in the southern hemisphere. Kume (1967) found a correlation between the occurrence of sexually inactive bigeye tuna and a decrease of surface temperature below 23° or 24° C. Mature fish spawn at least twice a year; the number of eggs per spawning has been estimated at 2.9 million to 6.3 million.

The food spectrum of bigeye tuna covers a variety of fish species, cephalopods and crustaceans, thus not diverging significantly from that of other similar-sized tunas. Feeding occurs in daytime as well as at night. The main predators are large billfish and toothed whales.

Size : Maximum fork length over 200 cm; common to 180 cm (corresponding to an age of at least 3 years). The all-tackle angling record for the Pacific is a 197.3 kg fish from off Cabo Blanco, Peru in 1957. This fish was 236 cm long but it was not specified whether this pertained to fork length or total length. For the Atlantic, the all-tackle angling record is a 170.3 kg fish with a fork length of 206 cm taken off Ocean City, Maryland, USA in 1977. Maturity seems to be attained at 100 to 130 cm fork length in the eastern Pacific and in the Indian Ocean, and at about 130 cm in the central Pacific.

Interest to Fisheries : Catch statistics are reported by 17 countries for 14 fishing areas. Yearly catches of more than 10 000 metric tons are taken in Fishing Areas 34, 51, 61, 71, and 77 with more than two thirds of the total taken in the Pacific up to 1980. Among the countries reporting bigeye tuna catches Japan ranks first, followed by the Republic of Korea with much lower landings. The world catch increased from about 164 000 metric tons in 1974 to 201 000 metric tons in 1980 reaching a peak of 214 000 metric tons in 1977 (FAO, 1981). For 1981 a decrease to about 167 000 metric tons was estimated (FAO, 1983). In the Indian Ocean, the bigeye tuna fishery was dominated by Japanese fleets up to the end of the sixties, but subsequently operations of vessels from the Republic of Korea became more important, and have accounted for more than 60% of the catch in the late seventies.

The most important fishing gear, at least in the Pacific, are longlines, which comprise some 400 'baskets' (consisting of 5 branch lines, each with a baited hook) extending over up to 130 km. Species commonly used as bait include (frozen) Pacific saury (Cololabis saira), chub mackerel (Scomber japonicus), jack mackerel (Trachurus) and squid. Day- and night-time operations are common throughout the year, but there are seasonal variations in apparent abundance reflected in changes of fishing effort. In the seventies, deep longlines employing between 10 and 15 branch lines per basket were introduced. This new type of gear is theoretically capable of fishing down to 300 m depth, as compared to the usual 170 m reached by traditional longline gear. Catch rates increased for about 3 years and then declined to previous levels again, suggesting that only a portion of the bigeye resources are exploited.

Bigeye tuna is exploited in increasing quantities as associated catch of the spring and summer pole-and-line fishery in the northwestern Pacific, and of the purse seine fishery in the eastern Pacific, both directed primarily at skipjack and yellowfin tuna. In Japan, its meat is highly priced and processed into sashimi in substitution for bluefin tuna.

Local Names : ARGENTINA: Ojos grandes, Patudo; BRAZIL: Albacora bandolim; CHILE: Atún de ojo grande; COLOMBIA: Atún; CUBA: Ojigrande; ECUADOR: Albacora, Atún ojo grande; FRANCE: Patudo, Thon aux grands yeux, Thon obese, Thon ventru; GERMANY FR: Grossaugenthun; JAPAN: Bachi, Daruma, Darumeji, Mebachi, Mebuto; MARTINIQUE: Patudo, Thon obese; NETHERLANDS: Storje, Grootoogtonijn; PACIFIC ISLANDS TRUST TERRITORIES: Aáhi o'opa, Aáhi tatumu; PERU: Atún ojo grande, Patudo; POLAND: Opastun; PORTUGAL: Albacora-ôlho-grande, Atum patudo; SENEGAL: Thon obese; SOUTH AFRICA: Bigeye tuna, Grootoog-tuna; SPAIN: Patudo; UK: Bigeye tuna; USA: Bigeye tuna; USSR: Bolsheglazyj tunets; VENEZUELA: Atún ojo gordo; YUGOSLAVIA: Zutoperajni tunj.

Literature : Mimura et al. (1936a, Indian Ocean); Alverson & Peterson (1963, Pacific); Fischer & Whitehead, eds (1974, Species Identification Sheets, Eastern Indian Ocean/Western Central Pacific); Collette (1978, Species Identification Sheets, Western Central Atlantic; 1981, Species Identification Sheets, Eastern Central Atlantic); Calkins (1980, Pacific).

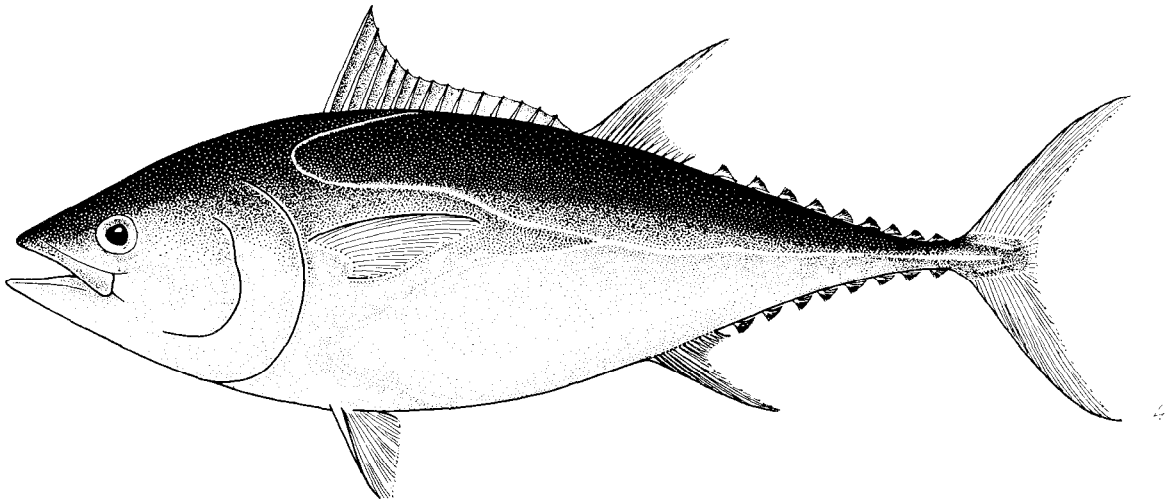
Thunnus thynnus (Linnaeus, 1758)

SCOMBR Thun 2

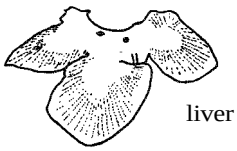
Scomber thynnus Linnaeus, 1758, Systema Naturae, ed. X:297-298.

Synonymy : Thynnus thynnus - Cuvier, 1817; Thynnus mediterraneus Risso, 1826; Thynnus vulgaris Cuvier in Cuvier & Valenciennes, 1831; Thynnus orientalis Temminck & Schlegel, 1844; Thunnus vulgaris - South, 1845; Thynnus secundo-dorsalis Storer, 1855; Orcynus thynnus - Poey, 1875; Orcynus secondidorsalis - Poey, 1875; Orcynus schlegelii Steindachner in Steindachner & Döderlein, 1884; Albacora thynnus - Jordan, 1888; Thunnus thynnus - Jordan & Evermann, 1896; Thunnus schlegelii - Jordan & Snyder, 1900; Thunnus orientalis - Jordan & Snyder, 1900; Thunnus secundodorsalis - Jordan & Evermann, 1926; Thunnus saliens Jordan & Evermann, 1926; Thunnus thynnus thynnus Serventy, 1956; Thunnus thynnus coretta - Serventy, 1956; Thunnus thynnus orientalis - Serventy, 1956; Thunnus thynnus saliens - Serventy, 1956.

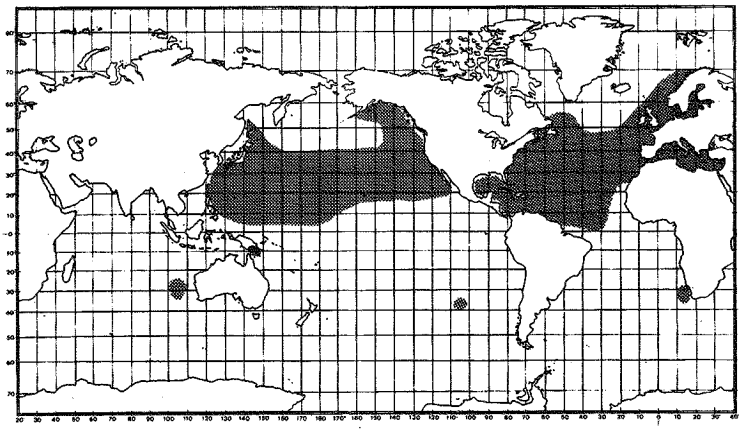
FAO Names : En - Northern bluefin tuna; Fr - Thon rouge; Sp - Atún.



Diagnostic Features : A very large species, deepest near middle of first dorsal fin base. Gillrakers 34 to 43 on first arch. Second dorsal fin higher than first dorsal; pectoral fins very short, less than 80% of head length (16.8 to 21.% of fork length), never reaching the interspace between the dorsal fins. Ventral surface of liver striated. Swimbladder present. Vertebrae 18 precaudal plus 21 caudal. Colour: lower sides and belly silvery white with colourless transverse lines alternated with rows of colourless dots (the latter dominate in older fish), visible only in fresh specimens; first dorsal fin yellow or bluish; the second reddish-brown; anal fin and finlets dusky yellow edged with black; median caudal keel black in adults.


liver

Geographical Distribution : There are at least 2 subspecies, one in the Atlantic and one in the Pacific. The Atlantic subspecies is found from Labrador and Newfoundland South into the Gulf of Mexico and the Caribbean Sea and is also known off Venezuela and Brazil in the western Atlantic; in the eastern Atlantic it occurs from the Lofoten Islands off Norway South to the Canary Islands and the Mediterranean Sea. There is also a population off South Africa. The Pacific subspecies is known from the Gulf of Alaska to southern California and Baja California in the eastern Pacific; in the western Pacific, it occurs from Sakhalin Island in the southern Sea of Okhotsk South to the northern Philippines.



Habitat and Biology : Epipelagic, usually oceanic but seasonally coming close to shore. Northern bluefin tuna tolerate a wide range of temperatures.Up to a size of 40 to 80 kg, they school by size, sometimes together with albacore, yellowfin, bigeye, skipjack, frigate tuna,eastern Pacific bonito and/or yellowtail amberjack (Seriola lalandi).

In the northeastern Pacific, T. thynnus tend to migrate northward along the coast of Baja California and California from June to September. Off the Pacific coast of Japan they migrate northward in summer and southward during winter. Large fish may enter the Sea of Japan from the South in early summer and move as far north as the Okhotsk Sea; most leave the Sea of Japan through Tsugara Strait, north of Honshu.

Onset of maturity is at about 4 or 5 years, and large adults (age l0+) are known to spawn in the Gulf of Mexico and in the Mediterranean Sea. In the Pacific, spawning occurs northeast of the Philippines. In recent surveys, larvae have been discovered east of the Kuroshio, in the transitional fronts. Females weighing between 270 to 300 kg may produce as many as 10 million eggs per spawning season.

Variations in the food spectrum are attributed primarily to behavioural differences in feeding. 'Vigorous pursuit' would be required to prey on small schooling fishes (anchovies, sauries, hakes) or on squids, while 'modified filter-feeding' is used to feed on red crabs and other less agile organisms.

In turn, northern bluefin tuna are preyed upon by killer whales (Orcinus orca), pilot whales and blackfish. However, the rather large size of adults drastically reduces the number of potencial predator species.

Size : Maximum fork length over 300 cm; common to 200 cm. The all-tackle angling record is a 679 kg fish of 384 cm fork length taken off Aulds Cove, Nova Scotia in 1979. The biggest fish in the various North Atlantic fisheries range between 540 and 560 kg in recent years. In the warmer waters off the Canary Islands, the biggest fish in commercial catches range between 350 and 400 kg.

Interest to Fisheries : Catch statistics were reported by 25 countries for 9 fishing areas, Fishing Area 61 alone accounting for almost half the total. The country taking the largest catches of northern bluefin tuna is Japan (28 628 metric tons in 1981), and it operates in almost all fishing areas with its long-distance fleets. World catches of T. thynnus have remained more or less stable oscillating around 36 000 metric tons between 1975 and 1988, while in 1981 they increased to 46 000 metric tons (FAO, 1983). T. thynnus is caught with different types of gear, such as purse seines, longlines, trolling lines, trap nets and others. Some of the oldest fisheries documented are Mediterranean trap fisheries. Off Sicily, northern bluefin tuna are traditionally caught in the 'tonnare', or by harpooning from the 'antenna' vessels. Traps similar to the 'tonnare' are also used off southern Spain and Morocco. The species also formed the basis of ancient specialized fisheries off the eastern USA and Canada, and is presently avidly sought by big game fishermen on hook-and-line. It is marketed fresh or deep frozen in Japan; the belly portion fetches particularly high prices when containing much fat.

In late 1982, the International Commission for the Conservation of Atlantic Tunas (ICCAT) increased the 1983 catch limit for the western Atlantic to 2 660 metric tons. This quota is subsequently divided among the contracting parties (Canada, Japan and USA). Concern about the continued low leve1 of abundance of small northern bluefin tuna resulted in an ICCAT decision to limit the catch of fish smaller than 120 cm to 15% by weight of the total catch in the western Atlantic. In these waters, the fisheries are also controlled through number of licences, limitation of fishing season, minimum size and maximum-catch-per-boat-and-day-regulations. The sportfishing boats are also obliged to report a descriptive log of their operations on a weekly basis, and use prescribed gear.

Local Names : ANGOLA: Atum, Rabilha; ARGENTINA: Atún aleta azul, Atún rojo; BRAZIL: Atum; BULGARIA: Ton; CHILE: Atún cimarrón, Atún de aleta azul; CHINA: Cá chan, Thu; COLOMBIA: Atún, Atún de aleta azul; CUBA: Atún aleta azul; DENMARK: Thunfisk; DOMINICAN REPUBLIC: Atún; EGYPT: Tunna; FINLAND: Tonnikala; FRANCE: Thon rouge; GERMANY FR: Roter Thun; GREECE: Tónnos; ICELAND: Túnfiskur; ISRAEL: Tunna kehula; ITALY: Tonno; JAPAN: Honmaguro, Kuro maguro, Kuromeji, Yokowa (young); MALTA: Tonn; MARTINIQUE: Thon rouge; MEXICO: Atún de aleta azul; MOROCCO: Thone; MONACO: Tono; NETHERLANDS: Tonijn; NORWAY: Makrellshørje, Sjorje, Thunfisk; PERU: Atún de aleta azul; POLAND: Ton; PORTUGAL: Atum; ROMANIA: Ton, Ton rosu; SOUTH ARICA: Blouvin-tuna, Bluefin tuna; SPAIN: Atún; SWEDEN: Makrilstörje, Röd tonfisk, Tonfisk; TUNISIA: Toun ahmar; TURKEY: Orkinos; UK: Bluefin tuna, Tunny; URUGUAY: Aleta azul, Atún rojo; USA: Bluefin tuna; USSR: Solsheglazyj tunets, Krasnyj tunets, Sineperyj tunets, Sinij tunets, Vostochnyj tunets, Zoludoj tunets; VENEZUELA: Atún aleta azul; YUGOSLAVIA: Tun.

Literature : Bell (1963, eastern Pacific); Tiews (1963, Atlantic); Yamanaka et al. (1963, Pacific); Fischer, ed. (1973, Species Identification Sheets, Mediterranean and Black Sea); Collette (1978, Species Identification Sheets, Western Central Atlantic;1981, Species Identification Sheets, Eastern Central Atlantic); Bayliff (1980a, Pacific, summarizes i.e. growth parameters); Farrugio (1980, gives growth data on Mediterranean bluefin tuna); Aloncle et al. (1981).

Remarks : Two subspecies were recognized by Gibbs & Collette (1967): T. thynnus thynnus (Linnaeus) in the North Atlantic and T. thynnus orientalis Temminck & Schlegel in the North Pacific.

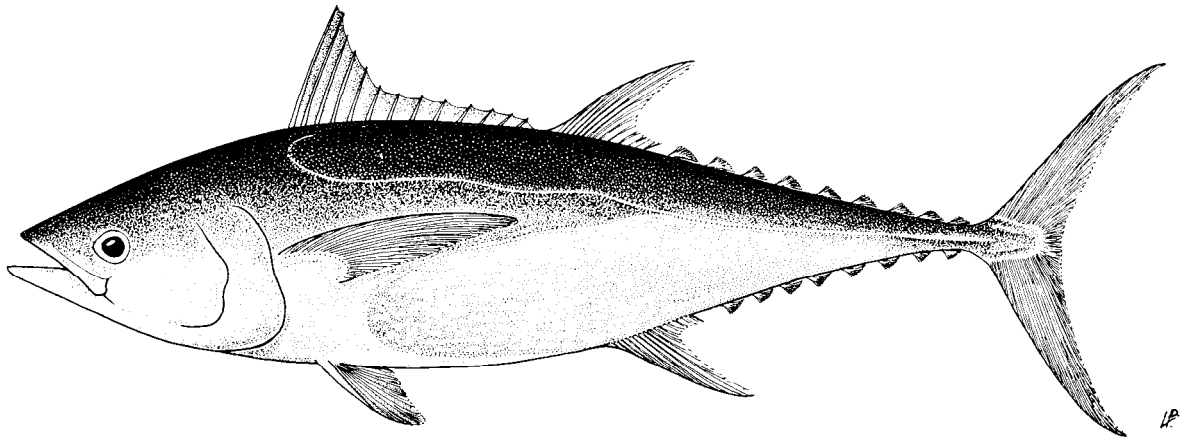
Thunnus tonggol (Bleeker, 1851)

SCOMBR Thun 6

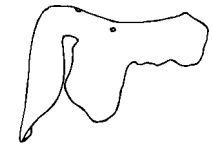
Thynnus tonggol Bleeker, 1851a, Natur.Tidschr.Ned.Ind., 1:356-357 (Batavia Sea).

Synonymy : Thunnus rarus Kishinouye, 1915; Neothunnus rarus - Kishinouye, 1923; Kishinoella rara - Jordan & Hubbs, 1925; Neothunnus tonggol - Jordan & Evermann, 1926; Thunnus nicholsoni Whitley, 1936; Thunnus tonggol - Tortonese, 1939; Kishinoella tonggol - Serventy, 1941.

FAO Names : En - Longtail tuna; Fr - Thon mignon; Sp - Atún tongol.

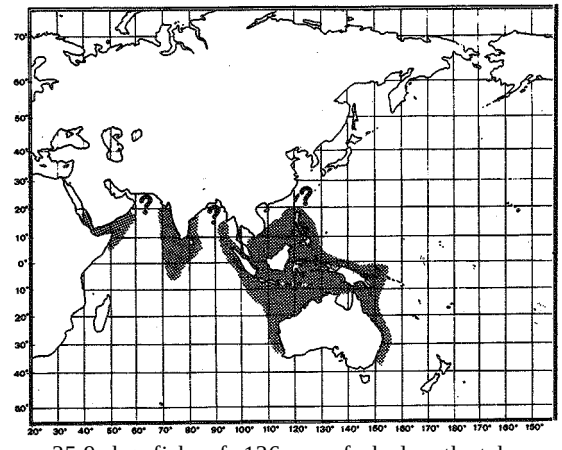


Diagnostic Features : A small species, deepest near middle of first dorsal fin base. Gillrakers few, 19 to 27 on first arch. Second dorsal fin higher than first dorsal; pectoral fins short to moderately long, 22 to 31% of fork length in smaller specimens (under 60 cm fork length) and 16 to 22% in larger individuals; ventral surface of liver not striated. Swimbladder absent or rudimentary. Vertebrae 18 precaudal plus 21 caudal. Colour:lower sides and belly silvery white with colourless elongate oval spots arranged in horizontally oriented rows; dorsal, pectoral and pelvic fins blackish, tip of second dorsal and anal fins washed with yellow; anal fin silvery; dorsal and anal finlets yellow with greyish margins; caudal fin blackish, with streaks of yellowish green.



liver

Geographical Distribution : Indo-West Pacific Ocean from Japan South through the Philippines to Papua New Guinea, New Britain, the northern three quarters of Australia (Twofold Bay, New South Wales to Freemantle, Western Australia) west through the East Indies to both coasts of India, southern Arabian Peninsula, the Red Sea and the Somalia coast.



Habitat and Biology : An epipelagic, predominantly neritic species avoiding very turbid waters and areas with reduced salinity such as estuaries. Longtail tuna may form schools of varying size. Being an opportunistic feeder, its diet includes many species of crustaceans, cephalopods and fishes, at varying percentages.

Size : Maximum fork length is about 130 cm. In the Indian Ocean, common fork lengths range between 40 and 70 cm (Silas & Pillai, 1982). The all-tackle angling record is a 35.9 kg fish of 136 cm fork length taken at Montagne Island, New South Wales, Australia, in 1982.

Interest to Fisheries : This species is known to be fished off Japan (but is very rare), the Philippines, Australia, Papua New Guinea, Indonesia, and India, but catch statistics were only reported for Australia and Papua New Guinea, ranging between only 9 and 59 metric tons per year in the period from 1975 to 1980. In 1981, catches of 350 metric tons were for the first time reported by the United Arab Emirates bringing the total to 368 metric tons in this year (FAO, 1983). This is doubtlessly a still gross underestimate of the actual landings of this species. Fishing gear comprise trolls, drift nets, and longlines.

Local Names : AUSTRALIA: Northern bluefin tuna; JAPAN: Koshinaga; USSR: Dlinnokhvostyj tunets.

Literature : Serventy (1956a, Australia); Jones (1963, Indian Ocean); Fischer & Whitehead, eds (1974, Species Identification Sheets, Eastern Indian Ocean/Western Central Pacific).

Remarks : Juveniles of this species, bluefin tuna, yellowfin tuna and bigeye tuna are very similar. Some of the records from Japanese waters may therefore be ascribed to misidentification.