Species Synopsis No. 26
FAO Fisheries Biology Synopsis No. 69 FIb/S69
(Distribution restricted) SAST - Tuna

SYNOPSIS OF BIOLOGICAL DATA ON YELLOWFIN TUNA
Thunnus albacares (Bonnaterre) 1788 (WESTERN ATLANTIC)

Exposé synoptique sur la biologie du thon à nageoires jaunes
Thunnus albacares (Bonnaterre) 1788 (Atlantique Ouest)

Sinopsis sobre la biología del atún de aleta amarilla
Thunnus albacares (Bonnaterre) 1788 (Atlántico Occidental)

Prepared by
C. P. IDYLL and DONALD DE SYLVA
Institute of Marine Science
University of Miami
Miami, Florida, U. S. A.

FISHERIES DIVISION, BIOLOGY BRANCH
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1963

1 IDENTITY

1.1 Taxonomy

1.1.1 Definition

Phylum Vertebrata
Subphylum Craniata
Superclass Gnathostomata
Series Pisces
Subclass Actinopterygii
Order Perciformes
Suborder Scombroidei
Family Scombridae
Genus Thunnus
Species Thunnus albacares (Bonnaterre), 1788

1.1.2 Description

Genus Thunnus

"Body oblong, robust, with very slender caudal peduncle. Head conical. Mouth wide, with one series of small, conical teeth in the jaws and bands of minute multiform or sand-like teeth on the vomer and palatines. Scales present, those of the pectoral region forming an obscure corselet. First dorsal of 12 to 15 spines which grow gradually shorter backward, the interval between last spine and second dorsal slight; second dorsal and anal short and rather high, each with 8 or 10 finlets; ventrals moderate; pectorals moderate, inserted rather below the level of the eye. Vertebrae normal, 39 to 41 in number, the lower foramina small." (Jordan and Evermann, 1896:869-70).

Thunnus albacares (Bonnaterre) 1788

"Dorsal spines 14. Dorsal finlets 8 to 11; anal finlets 8 to 10. Gill rakers 20 to 22 on lower limb of first arch. Posterior part of maxillary not entirely concealed by preorbital. Scales covering entire body. Corselet indistinct. Pectoral fin reaching to vertical from origin of second dorsal fin or somewhat beyond, but not to vertical from origin of anal fin." (Rivas, 1951) 221).

Proportional measurements as given in Table I, taken from Bullis and Mather (1956).

Meristics on yellowfin in Table II are taken from Bullis and Mather (1956).

Table I

Measurements (in percentage of fork length) of yellowfin tunas from the northwestern Caribbean

Measurements					
Fork length in mm.	1006	1281	1523	1550	1699
Snout to first dorsal	.286	.268	.250	.269	.279
Snout to second dorsal	.509	.495	.480	.492	.485
Snout to anal	.567	.549	.545	.540	.536
Snout to ventral	.295	.280	.305	.282	.284
Head	.260	.250	.252	.255	.258
Maximum depth	.241	.244	.259	.258	.269
Maximum width	.183	.193	.199	.201	.191
Largest first dorsal spine	.109	.115	.123	.135	.122
Base first dorsal	.232	.230	.223	.224	.219
Length second dorsal	.199	.290	.390	.386	.290
Base second dorsal	.093	.095	.088	.101	.093
Length anal	.210	.314	.411	.465	mut.
Base anal	.075	.080	.086	.088	.084
Pectoral	.293	.258	.246	.258	.220
Ventral	.117	.102	.110	.115	.103
Caudal spread	.350	.379	.378	.414	.433
Longest dorsal finlet	.033	.036	-	.039	.037
Ventral insert to vent	.283	.271	.260	.266	.268
Least depth caudal peduncle	.024	.025	.023	.026	.024
Maximum width at caudal keels	.093	.101	.093	.098	.093
Snout	.088	.091	.087	.092	.092
Maxillary	.101	.096	.095	.099	.098
Interorbital	.093	.094	.102	.101	.103
Diameter orbit	.036	.032	.032	.031	.029
Longest gill raker	.033	.030	.039	-	-

Table II

Counts of yellowfin tuna from the northwestern Caribbean

Counts					
First dorsal spines	14	14	14	14	14
Second dorsal spines and rays	14	14	14	15	14
Dorsal finlets	9	9	9	8	9
Anal spines and rays	13	14	14	14	14
Anal finlets	9	9	8	8	9
Pectoral	36	35	36	36	35
Upper gill rakers	10	9	8		9
Lower gill rakers	22	20	21		20

"The colour is nearly black at the back, sides greyish with oblique transverse lines and series of dots of silvery white in alternation. Iris greenish yellow; first dorsal greyish tinged with yellow; tips of the second dorsal and dorsal finlets bright yellow; pectorals black on the inner side, greyish or sometimes yellowing on the outerside; ventrals greyish, tinged with yellow; anal and anal finlets bright yellow." (Kishinouye, 1923:447).

1.2 Nomenclature

1.2.1 Valid scientific name

Thunnus albacares (Bonnaterre) 1788

1.2.2 Synonyms

Albacores or Thynni Sloane, 1707

Scomber albacares Bonnaterre, 1788

Scomber sloanei Cuvier and Valenciennes, 1831

Thynnus albacora Lowe, 1839

Thynnus macropterus Temminck and Schlegel, 1844

Orcynus subulatus Poey, 1875

Thunnus allisoni Mowbray, 1920

Neothunnus macropterus, Kishinouye, 1923

Neothunnus catalinae Jordan and Evermann, 1926

Neothunnus itosibi Jordan and Evermann, 1926

Semathunnus guildi Fowler, 1933

Thunnus nicolsoni Whitley, 1936

Neothunnus argentivittatus (nec Cuvier and Valenciennes) Beebe and Tee-Van, 1936

Thunnus albacora Tortonese, 1939

Neothunnus albacora, Nichols and La Monte, 1941

Neothunnus allisoni, Nichols and La Monte, 1941

Thunnus macropterus, Hildebrand, 1946

Thunnus (Neothunnus) albacora, Fraser-Brunner, 1950

Germo itosibi, Smith, 1950

Thunnus albacares, Ginsburg, 1953

Thunnus subulatus, Ginsburg, 1953

Thunnus catalinae, Ginsburg, 1953

Neothunnus albacares, Mather and Day, 1954

Neothunnus albacora macropterus, Schultz, 1960

(According to Mather, 1962, Thynnus argentivittatus Cuvier and Valenciennes, 1831, should be added to this synonymy)

1.2.3 Standard common names, vernacular names

Table III

Common and vernacular names

Country	Standard Common Names	Vernacular Names
British Guiana	Yellowfin tuna	Yellowfin albacore Albacore
British West Indies	Yellowfin tuna	Yellowfin albacore, Albacore, Bonito, Thon jaune, Thon France
Cuba	Atun	Albacora
U. S. A.	Yellowfin tuna	Allison tuna, Albacore

1.3 General variability

1.3.1 Subspecific fragmentation (races, varieties, hybrids)

The taxonomic status of this species is still under study. The name albacares should be applied to the Western Atlantic species, but Eastern Atlantic, Indian Ocean and Pacific Ocean taxa have not been conclusively identified as being conspecific with the Western Atlantic form. Studies by Rivas (1961) tentatively indicate that the name argentivittatus should be used for the Indian Ocean yellowfin tuna. Mather (1962) suggested that argentivattatus of Rivas (1961)

should actually belong in the synonymy of Thunnus tonggol Bleeker. Collette and Gibbs (1962) conclude that "there is only a single pantropical species (of yellowfin tuna) with a continuous distribution."

2 DISTRIBUTION

2.1 Delimitation of the total area of distribution and ecological characterization of this area

Thunnus albacares is regarded as a pantropical species. In the western Atlantic it has been reported as far north as 37° 21' N (Mather and Gibbs, 1957:242). Mather and Gibbs say ". . . records . . . seem to indicate a fairly regular occurrence of yellowfins during the fall (August to November) not far off the continental shelf south of New England. Perhaps longline fishes would establish the presence of a relatively regular seasonal population at greater depths than are normally fished." It is known from Bermuda and the Bahamas. Yellowfin tuna from 15 to 50 pounds are occasionally taken by anglers between southern Florida and the western Bahamas. To the south, the yellowfin tuna has been reported as far as British Guiana (Rosa, 1950). It is "widely distributed in the Gulf of Mexico beyond the 500-fathom curve (Springer, 1957:13), having been first seen there in 1954 by the M/V Oregon of the United States Fish & Wildlife Service. In the Caribbean Sea it has been reported from Cuba, Haiti, St. Lucia, Barbados, Tobago-Trinidad, Martinique and Jamaica.

2.2 Differential distribution

2.2.1 Areas occupied by eggs, larvae and other junior stages; annual variations in these patterns, and seasonal variations for stages persisting over two or more seasons. Areas occupied by adult stages: seasonal and annual variations of these

- larval stages

Three specimens of juvenile tunas from the Western Gulf of Mexico were provisionally identified as yellowfins by Klawe and Shimada (1959). These were 26, 31 and 36 mm in length. These were captured in June. Other specimens smaller than 25 mm were identified as Thunnus but were not assigned to species.

3 BIONOMICS AND LIFE HISTORY

3.1 Reproduction

3.1.1 Sexuality (hermaphroditism, heterosexuality, intersexuality)

Thunnus albacares is heterosexual. There are no external characters known by which to distinguish the sexes.

3.1.2 Maturity (age and size)

Twenty-nine fish caught by the M/V Oregon in May and June, 1954, were in spawning condition. These fish averaged 149 pounds.

3.1.3 Mating (monogamous, polygamous, promiscuous)

Polygamous.

3.1.4 Fertilization (internal, external)

External.

3.1.6 Spawning

From the capture of small larvae in June (Klawe and Shimada, 1959) it is inferred that spawning in the Gulf of Mexico by yellowfin tunas takes place in that month. It is not known whether it takes place at other times of the year or not.

3.3 Adult history

3.3.6 Greatest size

Rivas (1951) states that in the western Atlantic yellowfin tuna reach a length of over 1500 mm (59 inches) and a height of more than 159 pounds. Catches by the United States Fish & Wildlife Service vessel M/V Oregon on longline gear averaged "close to 100 pounds." (Springer, 1957:16).

3.4 Nutrition and growth

3.4.2 Food (type, volume)

Beebe (1936) found squid, the larvae of stomatopods and crabs, and squirrelfish larvae to be predominant in yellowfin tuna from St. Lucia in the Caribbean.

3.5 Behavior

3.5.1 Migration and local movements

Observations on exploratory fishing vessels of the United States Fish & Wildlife Service suggest that the tunas move seasonally or irregularly (Springer, 1955). Catches by the M/V Oregon and by a limited amount of commercial fishing suggest that yellowfins move from the southern part of the Gulf of Mexico into the northern part in about June. Catches were better in the northern part of the Gulf from July to December. There are yellowfins in the southern part of the Gulf all year, judging by fairly level catches at all seasons. Catches in the central Gulf move lower than either to the north or south (Wathne, 1959).

3.5.2

In the Gulf of Mexico yellowfin tuna appear infrequently at the surface, and only when the sea is calm. This led Springer (1955) to suggest that purse seining and live bait fishing for this species in the Gulf held little promise. In the Gulf of Mexico the yellowfin, like all other species of tunas except the little tuna Euthynnus, are not found near shore, but usually 75 miles or more offshore. In the Caribbean they are often found closer to the islands.

4 POPULATION (STOCK)

4.1 Structure

4.1.3 Size composition

In July, 1954, in the western Gulf of Mexico the M/V Oregon caught 112 yellowfin tuna on Japanese longline gear; these averaged 99 pounds in weight. In April a fish weighing 190 pounds was caught, and in mid-May to mid-June, 29 yellowfins caught weighed an average of 149 pounds.