SYNOPSIS OF BIOLOGICAL DATA ON ALBACORE Thunnus alalunga
(Gmelin) 1788 (WESTERN ATLANTIC)

Exposé synoptique sur la biologie du germon Thunnus alalunga
(Gmelin) 1788 (Atlantique Ouest)

Sinopsis sobre la biología de la albacora Thunnus alalunga
(Gmelin) 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 Chordata
Subphylum Craniata
Superclass Gnathostomata
Series Pisces
Class Teleostomi
Subclass Actinopterygii
Order Perciformes
Suborder Scombroidei
Family Scombridae
Genus Thunnus
Species Thunnus alalunga

1.1.2 Description

- Genus Thunnus South 1845

"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 alalunga (Gmelin) 1788

"Body rather slender, head and eyes comparatively large, caudal portion short. Scales rather large, about 210 in the lateral line. Pectorals sabre shaped, very long, reaching to the first anal finlet. Lower margin of these fins is a little concave at the proximal part. Height of the second dorsal is equal to or a little shorter than that of the first dorsal.

"The roof of the abdominal cavity is remarkably convex. So the cavity is very narrow and the flesh very rich in amount. Three lobes of the liver are connected with each other by very narrow portions, and the lateral lobes are divided into many lobules at the margin, as well as the inner side. On the outer side of the liver we find very fine parallel venules, covering nearly the whole surface of the liver. On the inner side of the liver bulibous and more or less conical masses of vascular plexus of both arterioles and venules are found.

"Venules to the cutaneous vein are arranged in two alternate rows, and are more numerous than the arterioles. These venules pour to the inner side of the vein. Arterioles from the cutaneous artery are arranged in one row, and on the inner side of the artery. Venules are very minute and numerous, forming thick sheets in the lateral muscle, before pouring into the cutaneous vein. These venules form numerous small bundles by uniting just at the root. Each of the numerous branches from the cutaneous artery is minutely divided as soon as it emerges from the main blood-vessels, and running along the venules supplies fresh blood to the dark red portion of the lateral muscle. The cutaneous artery originates just behind the pharyngeal muscle in the levels of the fifth vertebra and runs obliquely backward.

"Air-bladder present, rounded at the anterior end, and its wall is rather thin. It is narrow, but long, running the whole length of the abdominal cavity. Kidneys of both sides are united to form a flat, ring-shaped body round the pharyngeal muscles. The ring-shaped kidneys are slightly prolonged backward. Ureters of both sides meet in a nearly straight line, thick at the junction. In this thick junction, we find a short longitudinal septum from the anterior wall. Posterior to this septum the ureters are joined to a median tube.

"Skull rather narrow. Vertebrae nearly uniform. Parapophyses well developed. Parapophyses of the ninth vertebra are almost horizontal as in the preceding vertebrae; but in the tenth vertebra the haemal arch is formed and is turned forward leaving only a little space between the centrum and the arch. In each of the following precaudal vertebrae the haemal spine is formed, and it is remarkable that it is nearly uniformly elongated. These precaudal haemal spines are remarkably longer than in other tunnies. The head of the second and third ribs is very thick, and the distal portion of these ribs is broad, thin, and gradually narrow. The part between the head and the broad distal portion is very narrow to admit the passage of the cutaneous blood-vessels."
"The colour is blackish blue in the dorsal part, with a greenish lustre near the tail. Sides and belly are silvery. In young specimens, ca. 60 cm in length, we find some five or six dark, irregularly longitudinal bands, running near the ventral median line. These bands are more distinct at the caudal region, and are more or less united in the form of irregular net-work. First dorsal nearly colourless, except the dusky border. Pectorals black, ventrals and the second dorsal are dusky, but the anal is nearly colourless. The dorsal finlets are dusky, washed with yellow, while the ventral finlets are more or less dusky. Iris silvery, tinted with light blue." (Kishinouye, 1923:434-436).

1.2 Nomenclature

1.2.1 Valid scientific name

*Thunnus alalunga* (Gmelin) 1788

1.2.2 Synonyms

*Ala-lunga* Cetti, 1777  
*Ala-lunga* Gmelin, 1788  
*Scomber alatunga* Gmelin, 1788  
*Scomber germo* Lacpède, 1802  
*Scomber sermon* Lacpède, 1802  
*Thynnus pacificus* Cuvier andValenciennes, 1831  
*Orcynus germo* Lütken, 1880  
*Germo alalunga* Jordan and Evermann, 1896:871  
*Germo germo* Jordan and Evermann, 1926  
*Thunnus (L) alaluna* Fraser-Brunner, 1950

1.2.3 Standard common names, vernacular names

**Standard Common Names**

- **U.S.A., Canada** Albacore
- **Cuba, Dominican Republic, Mexico** Albacora
- **Brazil** Albacora blanco cachorra
- **Martinique** Germon

**Other Common Names and Vernacular Names**

- **U.S.A., Canada** Long-finned albacore, longfin tuna

These names are taken from Rosa (1950).

1/ Since the albacore is rare in the western Atlantic, these names probably also are used for the yellowfin tuna (*Thunnus albacares*) and blackfin tuna (*T. atlanticus*).

1.3 General variability

1.3.1 Subspecific fragmentation (races, varieties, hybrids)

Meristic counts, shown below, are given by Bullis and Mather (1956) for four specimens:

<table>
<thead>
<tr>
<th>Counts of <em>Thunnus alalunga</em> from the northwestern Caribbean.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First dorsal spines</td>
</tr>
<tr>
<td>Second dorsal spines and rays</td>
</tr>
<tr>
<td>Dorsal finlets</td>
</tr>
<tr>
<td>Anal spines and rays</td>
</tr>
<tr>
<td>Anal finlets</td>
</tr>
<tr>
<td>Pectoral fin</td>
</tr>
<tr>
<td>Upper gill rakers</td>
</tr>
<tr>
<td>Lower gill rakers</td>
</tr>
</tbody>
</table>

Proportional measurements on these fishes are as follows:

<table>
<thead>
<tr>
<th>Measurements (in percentage of fork length) of <em>Thunnus alalunga</em> from the northwestern Caribbean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fork length in mm.</td>
</tr>
<tr>
<td>Snout to first dorsal</td>
</tr>
<tr>
<td>Snout to second dorsal</td>
</tr>
<tr>
<td>Snout to anal</td>
</tr>
<tr>
<td>Snout to ventral</td>
</tr>
<tr>
<td>Head</td>
</tr>
<tr>
<td>Maximum depth</td>
</tr>
<tr>
<td>Maximum width</td>
</tr>
<tr>
<td>Largest first dorsal spine</td>
</tr>
<tr>
<td>Base first dorsal</td>
</tr>
<tr>
<td>Length second dorsal</td>
</tr>
<tr>
<td>Base second dorsal</td>
</tr>
<tr>
<td>Length anal</td>
</tr>
<tr>
<td>Base anal</td>
</tr>
<tr>
<td>Pectoral</td>
</tr>
<tr>
<td>Ventral</td>
</tr>
<tr>
<td>Caudal spread</td>
</tr>
<tr>
<td>Longest dorsal finlet</td>
</tr>
<tr>
<td>Ventral insert to vent</td>
</tr>
<tr>
<td>Least depth caudal peduncle</td>
</tr>
<tr>
<td>Max. width at caudal keels</td>
</tr>
<tr>
<td>Snout</td>
</tr>
</tbody>
</table>

751
DISTRIBUTION

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

In the western Atlantic Thunnus alalunga has been caught from waters off the middle Atlantic States of the United States as far south as the coast of Brazil. Rivas (1951) said that up to that time there were "no authentic records of Thunnus alalunga from the western North Atlantic" and reports of the occurrence of this species there were "not supported by actual specimens and almost certainly are based on the ever confused T. atlanticus." Since then, however, a number of authentic records have been made which definitely establish the presence of T. alalunga in the western Atlantic (Bullis & Mather, 1956; Mowbray, 1956; Mather & Gibbs, 1957). It has not yet been reported from the Gulf of Mexico.

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

There is no information available on areas occupied by eggs, larvae and other juvenile stages.

Areas occupied by adults

Thunnus alalunga has been caught in the western Atlantic in the following areas: Off the coast of New Jersey at 39° 45' N, 73° 00' W (Mather & Gibbs, 1957), this specimen was 81 cm in fork length. It was caught by trolling on September 12, 1956. Off Bermuda, Mowbray (1956) caught it on experimental longlines. An earlier record of an albacore reported by Goode & Bean (1879) from off Nova Scotia at about 44° N, 58° 30' W about Banquereau, is questionably identified. Bullis & Mather (1956) report the capture of 11 specimens "at seven stations in the area south of and between western Hispaniola and eastern Cuba and north and east of Jamaica". Their lengths ranged from 95 to 105 cm. A commercial fisherman using longlines "had been catching albacore --- south of Ponce, Puerto Rico and in the vicinity of St. Croix ---. Thus this valuable species appears to have been fairly abundant and widely distributed in the northern Caribbean ---". Rosa (1950) says T. alalunga in the western Atlantic occurs on the " --- coast of the United States, rarely found north of Florida but straggles as far as Cape Cod on the coast of Massachusetts along the Gulf Stream, Bahama Islands --- Caribbean Sea, Cuba, Leeward, Windward, Tobago and Trinidad Islands --- coast of Brazil", but some of these areas and identifications may be questionable. The northernmost substantiated record is given by Mather & Gibbs (1957:243).

2.3 Behavioristic and ecological determinants of the general limits of distribution

Studies on the Pacific albacore reviewed by Yoshida and Otsu (1962) show that temperature and other factors are important in determining its distribution. Its occurrence in cool waters of the Pacific (58° - 68° F), and its apparent presence in only deeper strata of the western Atlantic, suggest that the Atlantic form prefers cool water. Mather (1962b) reported albacore taken in water below 60° F in the western Atlantic.
5 EXPLOITATION

Springer (1957) reports that commercial longline vessels landed albacore at Ponce, Puerto Rico early in 1955, along with other species of tunas. Quantities and other particulars are not given. Since that report these vessels have ceased fishing in the Caribbean, their operations in 1955 being experimental. Mowbray (1956) lists albacore as a potential commercial species in Bermuda. It is caught by anglers there.

The only commercial fisheries of consequence in the western Atlantic for albacore are by Japanese vessels off the coasts of Brazil and in the Caribbean Sea, including waters off the Dominican Republic and Venezuela (Anon, 1957). Areas in the northern Caribbean were abandoned, and fishing activity has been concentrated off Brazil and Venezuela.

5.1 Fishing equipment

5.1.1 Fishing gear

The gear used by the Japanese for albacore in the western Atlantic is the longline. This is the same as described by Shimada (1951).

5.2 Fishing areas

During Japanese exploratory fishing operations in 1957 yellowfin and albacore were the principal species caught. The best grounds for yellowfins were located north of 4° S, and for albacore, south of this boundary. Fair catches of albacore were made as far south as 22° S.

The Atlantic grounds opened up in 1957 extended in a narrow belt along the Equator from Africa to South America and are not extensive. Albacore were reported to be abundant offshore between Cabo Frio (60 miles east of Rio de Janeiro) and Santos (Anon, 1959b).

Albacore were reported caught in greatest numbers in waters off the northeastern Brazilian coast, south of the Equator, in an area including the Rocos Reefs and Fernando de Noronha Islands. In other areas off Brazil yellowfins have dominated catches with albacore ranking second (Pinto, 1961).

In 1958 Japanese longline vessels tried tuna fishing in the Caribbean, with poor results (Anon, 1959a). However, Japanese longline vessels are reported to be fishing out of Venezuelan ports, in areas about 150 miles north of Venezuela. Catches include yellowfin and albacore.

5.3 Fishing seasons

In 1958 Japanese longline catches of albacore in the Brazil Current were best in winter and poorest in summer (Nagai & Nakagome, 1958). In that year the catches per 100 hooks of longline gear in December were 9.28, and in February 9.12. Catches in the North Equatorial Current were much lower than those in the Brazil Current in winter, the catch rate in the former area being 1.82 fish per 100 hooks. In spring the South Equatorial Current area showed a catch rate of 1.5 - 2.6. The Brazil Current catch rate in spring was 2.47 fish per 100 hooks.

In 1959 Japanese vessels in the period from June to January were fishing in an area starting about 200 miles north of the Amazon, and seaward several hundred miles. This narrow fishing ground was believed to be supported by upwelling.

From February to June fishing took place south of Fernando de Noronha, between Cabo São Roque and the São Francisco River (Anon, 1959d).

5.4 Fishing operations and results

5.4.1 Effort and intensity

The numbers of boats operating in the Japanese longline fishery off Brazil were 1959, 9; 1960, 35; 1961, 52. In December 1961, of the 52 Japanese tuna vessels fishing in the Atlantic, 40 were operating in the albacore grounds off South America; this was 14 fewer than in 1960.

In the spring of 1959, 3 Japanese firms were operating 9 lonliners off Brazil.

5.4.3 Catches

When Japanese boats first fished off Brazil in the spring of 1957 catches of tuna were about 15 tons a day; late in 1957 this had fallen to 7 - 9 tons and in
early 1959 to 5 - 7 tons. These catches were about 80% yellowfin, the rest being made up of big-eye tuna, albacore, and bluefin.

Catches were already showing marked signs of decline in early 1959 (Anon, 1959c).

Albacore and other tunas caught off Brazil were landed in various Caribbean countries as well as in Brazil. These countries included Puerto Rico, Cuba, Haiti, Trinidad and Panama (Anon, 1959c, 1959e).

In 1958 Japanese albacore landings at countries in the western Atlantic were as follows (Anon, 1959e):

<table>
<thead>
<tr>
<th>Country</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>1,119</td>
</tr>
<tr>
<td>Cuba</td>
<td>91</td>
</tr>
<tr>
<td>Trinidad</td>
<td>24</td>
</tr>
<tr>
<td>Panama</td>
<td>394</td>
</tr>
<tr>
<td>Haiti</td>
<td>219</td>
</tr>
<tr>
<td>Argentina</td>
<td>28</td>
</tr>
</tbody>
</table>

Substantial drops in catches of tunas in the western Atlantic were reported late in 1959 by Japanese boats. These catches consisted mostly of yellowfin, but included some albacore. In 1957 an average daily catch of 4,000 kan (16.6 metric tons) was reported per vessel. In 1958 this dropped to half, and in 1959 it fell still further (Anon, 1960a).