

**INVESTIGATIONS ON THE PURSE-SEINE FISHING OF BONITOS,
SARDA SARDA (BLOCH, 1793), IN TURKISH WATERS IN 1995**

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SUMMARY

Bonito is an economically important species in the Turkish fishery. Bonitos which are naturally present in the Mediterranean and in the Aegean Sea migrate in the early spring to the Sea of Marmara and in autumn to the Black Sea; they migrate through the Sea of Marmara back to the Mediterranean Sea.

In Turkish waters bonito are caught in the Black Sea, in the Marmara Sea and in the northern Aegean Sea.

Bonito are also caught along the coastline of the Black Sea from Igneada to Hopa, particularly off Igneada, Karaburun, Sile, Kefken, Karadeniz, Ereğlisi, Sinop, Cide, Gümenez, Persembe, Samsun, Trabzon, Ordu, Rize and in the Bosphorus.

Important fishing grounds for bonito in the Sea of Marmara are the waters around the island of Marmara and around the Prince Islands, by Bandırma, and Çanakkale.

The bonito fishery begins in September and ends in December. The fishermen catch this commercially important fish occasionally during the entire year.

In this preliminary investigation, bonito caught by purse seine from September 1 to December 31, 1995, landed at the Istanbul Fish Market, Kumpalı, were sized and weighed.

Questionnaires to determine the fishing effort and the catch per unit effort (CPUE) were carried out on 15 purse seiners.

RÉSUMÉ

La bonite à dos rayé est une espèce importante pour la pêche turque. Les bonites, qui sont naturellement présentes dans la Méditerranée et la Mer Egée, migrent au début du printemps dans la Mer de Marmara et en automne dans la Mer Noire, puis repartent dans la Méditerranée, en passant par la Mer de Marmara.

Dans les eaux turques, les bonites sont capturées dans la Mer Noire, la Mer de Marmara et le Nord de la Mer Egée.

Les bonites sont également capturées le long des côtes de la Mer Noire, entre Igneada et Hopa, en particulier au large d'Igneada, Karaburun, Sile, Kefken, Karadeniz Ereğlisi, Sinop Cide, Gümenez, Persembe, Samsun, Trabzon, Ordu, Rize et dans le Bosphore.

Dans la Mer de Marmara, les zones importantes de pêche à la bonite sont l'île de Marmara, les îles Prince, Bandırma et Çanakkale.

La pêche à la bonite a lieu entre septembre et décembre. Toutefois, certains pêcheurs capturent toute l'année ce poisson important d'un point de vue commercial.

Dans le cadre de cette recherche provisoire, les bonites qui ont été capturées par les senneurs entre le 1^{er} septembre et le 31 décembre 1995 et débarquées au marché d'Istanbul - Kumkapi, ont été mesurées et pesées.

Des enquêtes visant à définir l'effort de pêche et la CPUE ont été menées à bord de 15 senneurs.

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RESUMEN

El bonito es un espécimen económicamente importante en la pesquería de Turquía. Los bonitos, que están presentes de forma natural en el Mar Mediterráneo y en el Mar Egeo, migran a comienzos de la primavera al Mar de Mármara, y en el otoño al Mar Negro; migran a través del Mar de Mármara de regreso al Mar Mediterráneo.

En aguas de Turquía, los bonitos son capturados en el Mar Negro, Mar de Mármara y al norte del Mar Egeo. También se capturan bonitos a lo largo de la costa del Mar Negro, desde Igneada a Hopa, particularmente frente a Igneada, Karaburun, Sile, Kefken, Karadeniz Ereğlisi, Sinop-Cide, Gümenez, Persembe, Samsun, Trabzon, Ordu, Rize, y en el Bósforo.

Hay importantes caladeros de bonito en el Mar de Mármara; se trata de aguas que rodean a la Isla de Mármara y Prince Islands, en Bandırma y Çanakkale.

La pesquería de bonito empieza en septiembre y finaliza en diciembre. Los pescadores capturan este pez, comercialmente importante, ocasionalmente durante todo el año.

En esta investigación preliminar, los bonitos capturados con cerco desde el 1 de septiembre al 31 de diciembre de 1995, desembarcados en el Fish Market de Istanbul- Kumkapi, fueron tallados y pesados. Se han preparado cuestionarios para determinar el esfuerzo de pesca y la captura por unidad de esfuerzo (CPUE) de 15 cerqueros.

INTRODUCTION

Sarda sarda (Bloch, 1793), which has a vital importance in the fishing economy of Turkey, is the most caught specimen of the family of Scombridae.

Few studies on bonito fishing in Turkish Waters are present. Devedjian (1926), Slastenenko (1955-56), and Akşiray (1987) studied the Scombridae family and other fishes living in our seas.

In addition to this, Demir (1961) published investigations on, "The eggs of Bonito (*Sarda sarda* Bloch)"; Demir (1963) "The Biology of *Sarda sarda*", Nümann (1955) "Marking (Tagging) of *Sarda sarda* in Turkish Waters"; and Nümann (1955) "*Sarda sarda* in the Black Sea, the Sea of Marmara, the Bosphorus and Çanakkale Strait (Dardanelles) .

Bonitos in the Aegean Sea and in the Mediterranean pass to the Sea of Marmara and to the Black Sea for reproduction in the spring. They migrate back to the Sea of Marmara and to the Mediterranean in autumn (Devedjian, 1926; Slastenenko, 1955-1956; Nümann, 1955).

Bonitos are being fished in the Black Sea and in the Sea of Marmara in the North Aegean Sea. They are caught in the Black Sea by İğneada toward Hopa, especially in the waters of İğneada, Karaburun, Şile, Kefken, Karadeniz Ereğlisi, Sinop, Trabzon, Ordu, Rize, and in the Bosphorus and in the Sea Marmara near the Prince Islands by Selimpaşa, Marmara Island, and Bandırma and in the North Aegean near Çanakkale (Figure 1).

In this preliminary study, our objectives were to determine the sizes of bonitos and to investigate the correlation between the length and the weight by calculating the length - weight distribution for bonitos fished in the Black Sea and to find out the data concerning the CPUE.

MATERIALS AND METHODS

The fish caught in the Black Sea by purse seiners landed at the Istanbul Fish Market in September and December in 1995, were studied.

A total of 493 bonitos were used. The length of fish were measured as (FL cm) and their weight determined as (W g).

15 fishing boats fishing in the Black Sea were interviewed and data on their fishing effort was collected.

LENGTH FREQUENCY

In this study that most of the fish (332 individuals) were found to be in the size interval of 35-39 cm which comprised 65.31% of fishes measured, followed by the 30-34 cm size interval with 29.2%. Fishes of 155-59 cm size interval were the least abundant (Figure 2).

The smallest bonito was 31 cm, the largest one being 66 cm.

Average length of all fishes measured was 36.036 ± 0.191 cm (average length \pm standard error).

WEIGHT FREQUENCY

It was found that bonitos (202 of 493 individuals) of 600-699 g were the most abundant in catches with 41.78%. The minimum bonito weight was 380 g and the maximum weight was 4848 g (Figure 3).

The average weight of all fishes was 727.811 ± 22.109 g (average weight \pm standard error).

LENGTH - WEIGHT RELATIONSHIP

The relationship between the length and weight was shown in Figure 4. According to this figure the regression is as follows:

$$y = - 2.18989 + 3.228 \cdot x$$

the correlation coefficient was determined as

$$r = 0.97026 \quad r^2 = 0.9414$$

The correlation coefficient was determined by correlation r . r value of the length and weight was determined to be between 0.5 and 1.0. A positive and powerful correlation between the length-weight was found.

BONITO FISHING

Fishing starts in September and ends in December.

Bonito fishing is being made by dalian, purse seiners, fishing nets, trammel nets, drift nets, beach seines and hand lines (Demir, 1963; Akşiray, 1987).

The total bonito catch of Turkey is shown in table 1.

Table 1: Catch of Bonitos (ton/year).

Years	Ton
1980	14292
1981	23174
1982	23397
1983	29034
1984	7220
1985	12281
1986	10756
1987	16973
1988	17613
1989	4667
1990	14387
1991	19151
1992	8654
1993	19000
1994	9460

The lowest value of CPUE is 2 kg (13.11.1995), the highest value is 1519.3 kg (21.10.1995). The monthly average value is shown on Table 2.

Table 2: Data related to fishing effort, CPUE of 15 purse-seiners catching bonitos in the Black Sea.

1995	September	October	November	December
Sampled / Total boats	15/ 376	15/ 376	8/ -	4/ -
Sampled fishing days	12.73	12.2	2.33	1.25
Number of bonito	67402	121338	7686	142
Effort in days	28	29	29	25
CPUE in kg	224.61	439.26	235	18.5

RESULT

In this study, the relationship between the length and weight of bonitos, which are caught in the Black sea was investigated. The length-weight frequency distribution, and the average value of length and weight was determined.

During the study, bonitos of 35-39 cm were the most abundant in catches (65.31%) with the longest individual of 66 cm and shortest individual of 31 cm, and the average value was determined to be 36.036 ± 0.191 cm.

Bonitos of 600-699 g were the most abundant in catches with 41.78%, and the minimum weight being 380 g, the maximum weight was 4848 g, the average weight of all fishes was found to be 727.811 ± 22.109 g (average weight \pm standard error).

The weight-length relationship of bonitos were well correlated. The correlation coefficient was determined as $r = 0.97026$. A strong and a positive correlation was found between the weight and length.

According to the CPUE data, the bonito fishing is mostly being made in September, October, and November.

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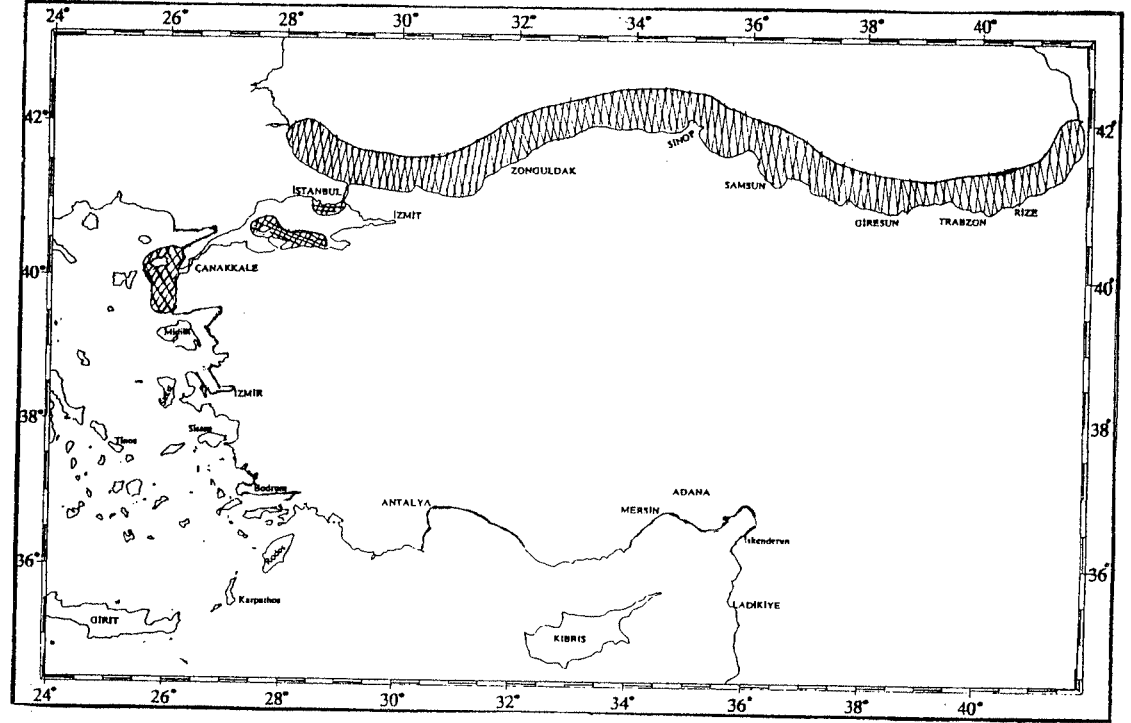


Figure 1: The main catching grounds of bonitos in Turkish Waters

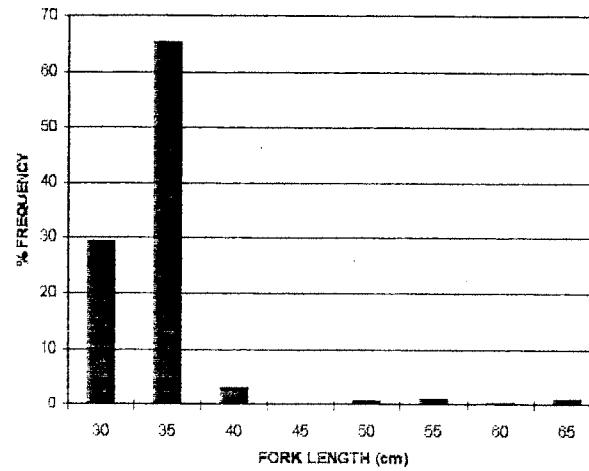


Figure 2: The fork length composition of bonitos caught by purse-seiners in Turkish Waters in 1995

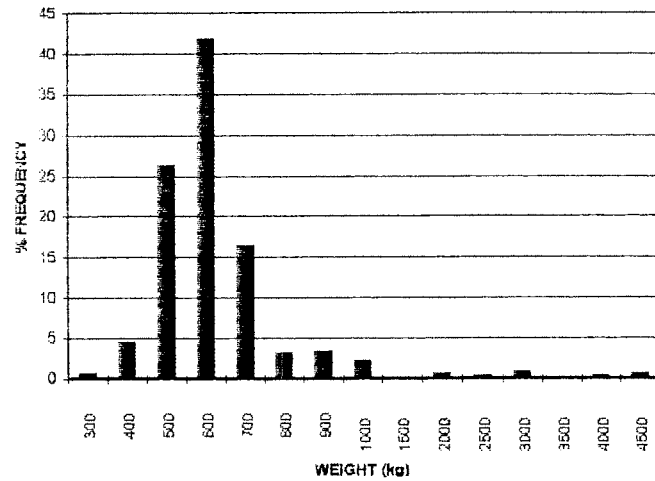


Figure 3: The weight composition of bonitos caught by purse-seiners in Turkish Waters in 1995

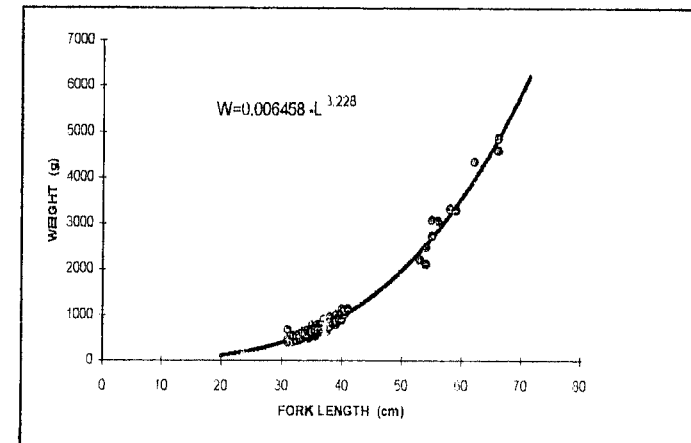


Figure 4: The length-weight relationship bonitos caught by purse-seiners in Turkish Waters in 1995