



-RESEARCH ARTICLE-

Length-Weight Relationship of Brown Comber, *Serranus hepatus*, Linnaeus, 1758 from Iskenderun Bay, Northeastern Mediterranean, Turkey

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Abstract

This study describes the length-weight relationship (LWR) for *Serranus hepatus* from Iskenderun Bay, Northeastern Mediterranean, Turkey. A total of 202 individuals were caught from Iskenderun Bay, during the 2015-2016 fishing season. The total length ranged from 5.7-9.5 cm and body weight 2.23-12.19 g. Length-weight relationship was found as the $W = 0.0172L^{2.9664}$ ($R^2=0.84$, $F_{1,200}=21.221$, $P < 0.001$) and $SE_b = 0.091$ (t-test: 32.706 p < 0.01). The types of growth were found isometric growth for all individuals of *S. hepatus*.

Keywords:

Length-weight relationship, Brown comber, *Serranus hepatus*, Iskenderun Bay, Turkey.

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Introduction

Brown comber, *Serranus hepatus* Linnaeus, 1758 inhabits on sandy or muddy grounds often above seagrass meadow at depths of 30-100 m. It feeds on invertebrates and small fishes. *S. hepatus* is Atlanto-Mediterranean and distributes from Portugal to Senegal (Golani et al., 2006). There is no information on the length-weight relationships (LWR) of this species in Iskenderun Bay, North-eastern Mediterranean Sea. However, brown comber in the other areas of the Mediterranean were studied satisfactorily on the LWRs by some researchers during recent years (Gonçalves et al., 1997; Abdallah, 2002; Borges et al., 2003; Bilecenoğlu, 2009; Çiçek et al., 2006; Dulcic and Glamuzina, 2006; Dulcic et al., 2007; Sangun et al., 2007; Gürkan and Bayhan, 2010; Özgen, 2012; Soykan et al., 2013; Yapıcı et al., 2012; Özvarol, 2014; Akalın et al., 2015; Erdoğan and Torcu-Koç, 2016). In this study, length-weight relationships (LWR) of *S. hepatus* were examined for the first time in a population of Iskenderun Bay.

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Material and Methods

Serranus hepatus specimens were caught as by-catch by commercial trawling from depths of 50 and 90 m of Iskenderun Bay, eastern Mediterranean Turkish coasts, during the 2015-2016 fishing season (Figure 1). The trawler was equipped with 44 mm stretched mesh size nets at the cod-end. Trawling lasted 3 hours and the trawling speed was 2.5 knots. The samples were transferred to the ecophysiology laboratory where it was identified. Total lengths (TL) were measured to the nearest 1 mm and the weight of each specimen was determined with a digital scale nearest to the 0.01 g. Total lengths and weights were fitted to the length-weight equation: $W=aL^b$, by using least square methods with Statistica software.

In the length-weight equation a and b are intercept and the slope (=exponent) of the length-weight curve, respectively (King, 1995). The b value for this species was tested by a t -test at the 0.05 significance level to verify if it was significantly different from 3. The significance of linear regression was assessed by Analysis of Variance (ANOVA).

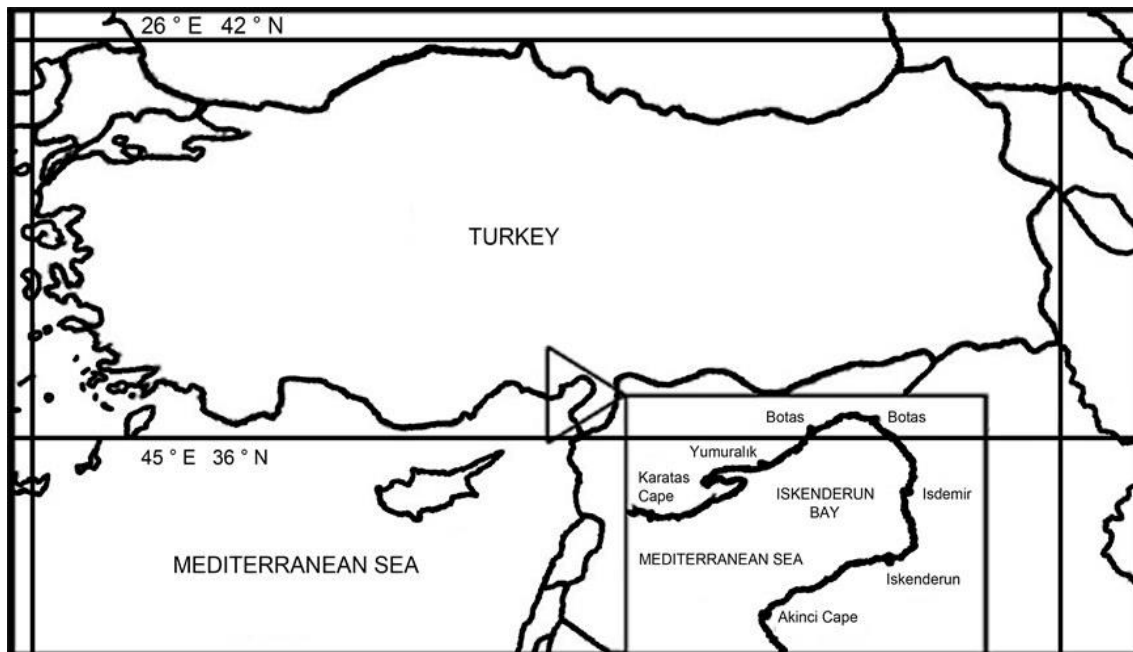


Figure 1. Sampling Area, Iskenderun Bay, North-Eastern Mediterranean Sea.

Results

A total of 202 specimens were used for this study. All individuals ranged between 5.7-9.5 cm TL and 2.23-12.19 g. All analyses of this species were made for combined sexes due to being synchronous hermaphrodite.

The length-weight relationship was estimated for combined sexes were: $W = 0.0172 * L^{2.9664}$ ($R^2 = 0.84$), $SE_b = 0.091$ (Figure 2) and 95 % Confidence Intervals of $b = 2.92748 - 3.07252$, t -test $P < 0.05$. According to these values, the type of growth for all sexes was isometric growth ($b = 3$). Regression analysis is shown that fish length has significant correlation with weight ($R = 0.92$, $R^2 = 0.84$, $F_{1,200} = 1069.70$, $P < 0.001$) and it is possible to say that 84% increase in weight was due to length increase.

Moreover, when the t-test results were analyzed for the significance of regression coefficients (t-test = 32.706, $P < 0.01$), it was found that fish-length data could be used in high accuracy to predict fish weight.

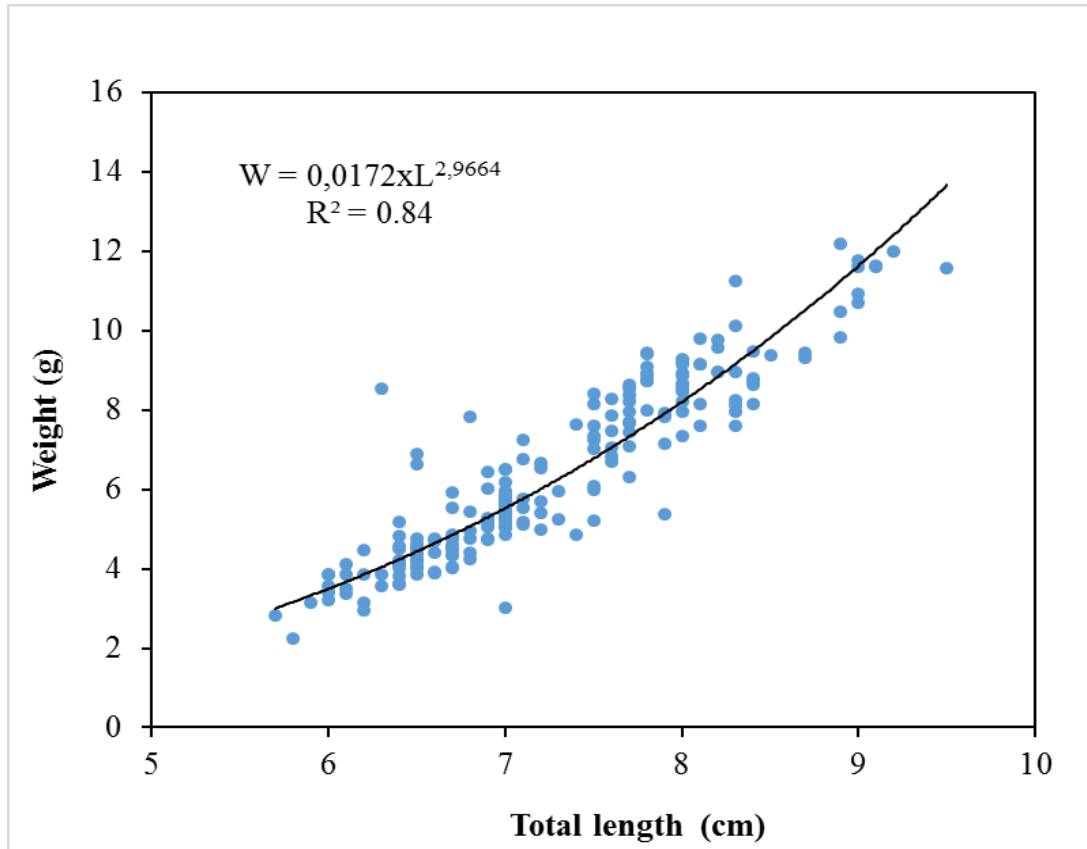


Figure 2. Length weight relationship for *S. hepatus* in Iskenderun Bay.

Discussion

There are some studies proving knowledge about b values of *S. hepatus* for some areas in the Mediterranean Sea and Atlantic Ocean (Table 1). The maximum observed total length of *S. hepatus* was found 23.0 cm in Northeastern Mediterranean by Sangün et al. (2007). The minimum observed total length of brown comber (2.4 cm) was recorded in Babadillimanı Bight, Mersin by Çiçek et al. (2006). The maximum b value was estimated for this species in Babadillimanı Bight, Mersin by Çiçek et al. (2006) and in Çandarlı Bay, Izmir by Akalın et al. (2015) (Table 1). These differences depend on sample size, fishing equipments and fishing season, reproduction season, length measurements (fork standart and total lengths) etc. These calculated parameters should be considered to represent only 2015-2016 fishing season. LWRs are important in fish population dynamics, notably to raise length-frequency samples to total catch, or to estimate fish biomass (Froese, 1998). This LWR data will be useful for researchers and fishery management plans in future.

Table 1. Total length-weight relationship values for *S. hepatus* from different locations.

| Location | n | Lmin- maks (cm) | b | r ² | Source |
|--------------------------------|------|-----------------------|--------|----------------|---------------------------------|
| Iskenderun Bay | 202 | 5.7-9.5 | 2.966 | 0.84 | In this study |
| Alexandria, Egypt | 603 | 3.1-12.5 | 2.998 | - | Abdallah, 2002 |
| Babadillimanı, Mersin | 584 | 2.4–10.5 | 3.29 | 0.98 | Çiçek et al., 2006 |
| Northeastern Mediterranean | 573 | 4.8-23.0 | 3.044 | 0.95 | Sangün et al., 2007 |
| Antalya Bay | 100 | 5.8-13.9 | 2.732 | 0.94 | Özvarol, 2014 |
| Izmir Bay | 1499 | 3.9-12.3 | 3.11 | - | Soykan et al., 2013 |
| Izmir Bay | 603 | 5.2-11.7 | 2.998 | 0.97 | Bilecenoğlu, 2009 |
| Izmir Bay | 2827 | 6.3-11.7 | 2.76 | 0.87 | Özgen, 2012 |
| Çandarlı Bay | 762 | 5.6-15.0 | 3.162 | 0.92 | Akalın et al., 2015 |
| Uzunada, Eastern Aegean Sea | 5222 | 6.5-11.7 | 2.89 | 0.85 | Yapıcı et al., 2012 |
| Bandırma Bay | 162 | 6.5–11.1 | 2.84 | 0.75 | Erdoğan and Torcu- Koç.,2016 |
| Edremit Bay | 78 | 7.8-11.4 | 2.8015 | 0.79 | Çakır et al., 2008 |
| Adriatic Sea | 87 | 5.4-18.9 | 3.123 | - | Dulcic and Glamuzina, 2006 |
| Adriatic Sea | 1218 | 5.8-13.2 | 3.19 | - | Dulcic et al., 2007 |
| South Portugal Coasts | 69 | 8.5-13.8 | 2.77 | - | Gonçalves et al., 1997 |
| Algarve Coasts | 21 | 6.7-13.1 | 2.977 | - | Borges et al., 2009 |

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