

## Length-Weight Relationship for 16 Fish Species From the Eastern Black Sea, Türkiye

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### Abstract

Length-weight relationships were estimated for 16 fish species caught from the Trabzon coast (Eastern Black Sea) between January and December 2007. The b values in the LWR,  $W=aL^b$  varied between 2.736 and 3.433, with a mean of  $3.105\pm 0.084$ .

**Keywords:** length-weight relationships, Eastern Black Sea, bottom trawl.

### Introduction

Length-weight relationship (LWR) is of great importance in fishery assessments (Goncalves *et al.*, 1996). Length and weight measurements can give information on the stock composition, life span, mortality, growth and production (Bolger and Connolly, 1989; Erkoyuncu, 1995; King, 1996; Moutopoulos and Stergiou, 2000). The results obtained from this study will be useful to fisheries biologist. Two of the species had no LWR available in Fishbase (Froese and Pauly, 2008) and therefore our results may contribute to this database.

### Materials and Methods

Samples were collected from the Eastern Black Sea using bottom trawl from January 2007 to December 2007. Fish were measured to the nearest cm (total length) and weight to the nearest g.

Parameters of the length-weight relationships were calculated by method using the equation

$$\log W = \log a + b \cdot \log L,$$

where W is the total weight, L is the total length, "a" is the intercept, and "b" is the slope. Length-weight relationships are also originally used to provide information on the condition of fish and may help determine whether somatic growth is isometric ( $b=3$ ) or allometric (negative allometric:  $b<3$  or positive allometric:  $b>3$ ) (Ricker, 1973; Spiegel, 1991). The degree of association between the variables was computed by the determination coefficient,  $r^2$ . The statistical significance level of  $r^2$  and 95% confidence limits of the parameters a and b were estimated (Santos *et al.*, 2002).

### Results

A total of 4677 individuals belonging to 16 species (14 families) were used in the analysis. The most abundant species were whiting (*Merlangius merlangus euxinus*), red mullet (*Mullus barbatus ponticus*), Atlantic stargazer (*Uranoscopus scaber*), picarel (*Spicara smaris*), black scorpion fish (*Scorpaena porcus*) and greater weever (*Trachinus draco*). The number of specimens, length ranges (minimum and maximum), parameters of length-weight relationships (a and b), 95% confidence intervals of b and the coefficient of determination (r) are given in Table 1. Even though the change of b values depends primarily on the shape and fatness of the species, various factors may be responsible for the differences in parameters of the length-weight relationships among seasons and years, such as temperature, salinity, food (quantity, quality and size), sex and time of year and stage of maturity (Ricker, 1973; Pauly, 1984; Sparre, 1992).

The results obtained from this study are useful to fisheries scientist. In summary, this study updates length-weight parameters for many species encountered by bottom trawl. *Arnoglossus kessleri* and *Gobius batrachocephalus* had no length-weight relationships available in Fish base (Froese and Pauly, 2008) and hence the results contribute to our knowledge on this species.

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**Table 1.** Length-weight relationships for of 16 fish species caught from the Eastern Black Sea coast of Turkiye

Family/Species	N	$L_{\min}$ - $L_{\max}$	$W_{\min}$ - $W_{\max}$	a	b	r	S.E. (b)
Bothidae	60	4.3-9.8	1.2-8.94	0.021	2.984	0.725	0.241
<i>Arnoglossus kessleri</i>							2.501-3.467
Carangidae	267	6-15.7	1.75-44.32	0.004	3.249	0.946	0.047
<i>Trachurus trachurus</i>							3.155-3.343
Centracanthidae	528	8.3-24.2	3.51-29.4	0.009	3.008	0.856	0.053
<i>Spicara smaris</i>							2.902-3.113
Gadidae	943	6.7-29.5	2.15-241.2	0.004	3.169	0.983	0.013
<i>Merlangius merlangus euxinus</i>							3.143-3.196
Gobiidae	208	5.6-15.7	1.69-45.0	0.009	3.041	0.889	0.072
<i>Gobius niger</i>							2.898-3.184
<i>Gobius batrachocephalus</i>	184	5.5-18.0	1.71-77.0	0.024	2.736	0.913	0.114
<i>Gobius melanostomus</i>	73	9.1-35.0	8.58-381.42	0.010	3.033	0.886	0.079
							2.876-3.189
Mullidae	714	6.1-21.9	2.08-161.14	0.007	3.139	0.990	0.011
<i>Mullus barbatus ponticus</i>							3.116-3.116
Pleuronectidae	51	19.1-38.5	69.9-620.1	0.007	3.093	0.952	0.097
<i>Platichthys flesus</i>							2.896-3.289
Pomatomidae	14	11.6-22.2	12.0-131.0	0.003	3.336	0.978	0.142
<i>Pomatamus saltatrix</i>							3.026-3.646
Scorpaenidae	351	5.0-34.2	2.1-406.1	0.009	3.272	0.880	0.064
<i>Scorpaena porcus</i>							3.145-3.399
Scophthalmidae	63	10.0-61.0	14.6-4494.4	0.007	3.248	0.977	0.063
<i>Scophthalmus maximus</i>							3.121-3.374
Soleidae	100	11.3-21.7	17.29-139.85	0.016	2.755	0.960	0.056
<i>Solea nasuta</i>							2.643-2.867
Syngnathidae	163	2.7-13.7	1.11-4.68	0.004	2.949	0.563	0.203
<i>Hippocampus hippocampus</i>							2.547-3.350
Uranoscopidae	620	1.8-56.4	1.01-551.51	0.008	3.226	0.815	0.061
<i>Uranoscopus scaber</i>							3.104-3.347
Trachinidae	338	5.0-35.0	1.01-549.2	0.004	3.433	0.884	0.067
<i>Trachinus draco</i>							3.299-3.566

N: sample size, W: weight (g), L: length (cm),  
 min: minimum, max: maximum,  
 S.E: standard error,  
 b: slope

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