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LENGTH-WEIGHT RELATIONSHIPS OF 24 FISH SPECIES FROM EDREMIT BAY AEGEAN SEA

ABSTRACT

In this study Length-weight relationships were estimated for 24 fish species from Edremit Bay (The North Aegean Sea). Samples were collected using bottom trawl with 44 mm cod end. The values of the exponent b ranged from 1.4421 (for Cepola rubescens) to 3.8111 (for Scomber scombrus) and the median value was 2.946, whereas 25-75% of the values ranged between 2.774 and 3.124.

Keywords: Length-Weight Relationships, Aegean Sea, Marine Fishes

EGE DENİZİ EDREMİT KÖRFEZİNDE 24 BALIK TÜRÜNÜN BOY-AĞIRLIK İLİŞKİSİ

ÖZET

Bu çalışmada Edremit Körfezinde (Kuzey Ege Denizi) 24 balık türüne ait boy-ağırlık ilişkileri hesaplandı. Örnekler 44mm lik göz açıklığına sahip dip trolü kullanılarak elde edildi. b değeri en düşük 1.4421 (Cepola rubescens türü için), en yüksek 3.8111 (Scomber scombrus türü için), medyan değeri 2.946 bunun %25-75'i 2.774 ve 3.124 arasında bulundu.

Anahtar Kelimeler: Boy-Ağırlık İlişkisi, Ege Denizi, Deniz Balıkları

1. INTRODUCTION (GİRİŞ)

There are some study were published related about the length-weight relationships in Turkish waters (Bilecenoğlu and Taşkavak, 2002; Can et all., 2002, Filiz et all., Çiçek et all., 2006; Karakulak et all., 2006). This study is a first study to estimate length-weight relationship for fish in the Edremit Bay (North Aegean Sea).

In this study, the parameters of length-weight relationships were estimated for 24 fish species caught in Edremit Bay (North Aegean Sea). The relationship for *Arnoglossus kessleri* were estimated first time in the World up to now.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

In this study Length-weight relationships were estimated for 24 fish species from Edremit Bay (the North Aegean Sea). The length-weight relationship was estimated first time for *Arnoglossus kessleri*. This research results are important for fish and fisheries biology subjects and fisheries management policies.

3. MATERIAL AND METHODS (MALZEME VE YÖNTEM)

Samplings were conducted on the northern coast of Edremit Bay (Figure 1) from September 1997 to September 2000. This bay occupies an area of 34.5 km from east to west, 25.5 km from north to South (Northern Aegean Sea) between 39°17′ and 39°34′N, 26°57′ and 26°34′E. Trawling was done only during daytime at depths ranging from 45 to 60 m. Duration of hauls was about 2 hours and the speed was 2 miles per hour. The trawl was equipped with a 44 mm stretched mesh size at the cod-end. Catches were immediately transported to the laboratory in a plastic box with ice. In the laboratory, firstly species identification was done according to Whitehead et all. (1984-1986a, 1986b; Froese and Pauly, 2006; Golani et al.2006). The total lengths and weights were measured to the nearest 0.5cm and 1gram recpectively for each specimen. The total lengths and weights were fitted to length-weight equations, $W = aL^b$, by using least square methods with Statistica software. In the length-weight equation a is the intercept and b is slope (=exponent) of the length-weight curve (King, 1996).

4. RESULTS AND DISCUSSION (SONUÇLAR VE TARTIŞMA)

The estimated parameters of length-weight relationship are given in Table 1. It can be seen the table, the sample size ranged from 14 for *Trisopterus luscus capelanus* to 1236 for *Citharus linguatula*. The R^2 values ranged from 0.864 for *Scyliorhinus canicula* to 0.986 for S*comber scombrus* and all regressions were highly significant ($P<0.001$). Box-whiskers plots of the exponent b were shown in Figure 2. The values of b ranged from 2.6265 for *Serranus cabrilla* 3.3486 for *Mullus barbatus* and the median value of b was 2.9456.

For all the species, the data were not representative for all months. Thus, these estimated parameters should be considered to represent only a particular season or time of year. In addition 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, time of year and stage of maturity (Bagenal and Tesch, 1978, Shepherd and Grimes, 1983, Pauly, 1984, Weatherley and Gill, 1987, Dulcic and Kraljevic, 1996). Due to the selective properties of the fishing gear, used in this study, the sample does not include juveniles or small individuals for any of the species. As pointed out by Petrakis and Stergiou (1995), the use of these relationships should be limited to the sizes used to estimate the parameters.

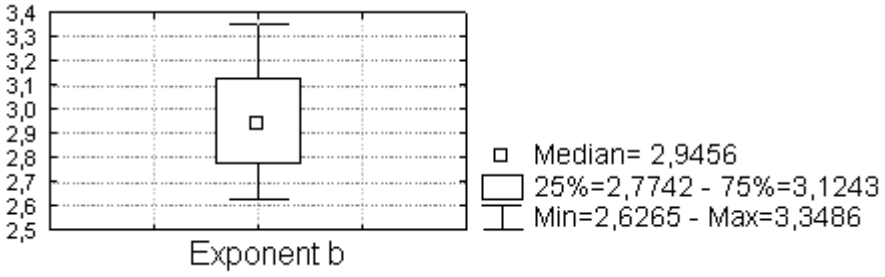

Figure 1. Box-whiskers plots of the exponent *b* of the weight-length relationships for 13 species (the box covers 75% of data values. The central box shows the median, and the vertical line represents the range of values).

(Şekil 1. Onüç tür için boy-ağırlık ilişkisinin "b" değerinin box-whiskers planı

In this study, the length-weight relationship parameters were estimated first time for *Arnoglossus kessleri*, which have not include any information even in online version of Fishbase (Froese and Pauly, 2006).

Table 1. Length-weight relationships for 24 fishes from the Edremit Bay
(Tablo 1. Edremit Körfezindeki 24 balık türü için boy-ağırlık ilişkisi

Species	Weigth characteristics					Length characteristics				Parameters of the relationship				
	N	Mean	Min	Max	SD	Mean	Min	Max	SD	a	b	SE of b	CI(95%)	R^2
Scyliorhinus canicula (Linnaeus, 1758)	112	570.17	63.67	2424	488.43	496.14	246	786	96.448	2.10^{-6}	3.0999	187.348	17.8621	0.864
Sardina pilchardus (Walbaum,1792)	87	15.966	6.49	34.22	5.8389	115.36	80	142	11.042	3.10^{-5}	2.7664	3.34525	2.31988	0.6768
Engraulis encrasicolus (Linnaeus, 1758)	28	7.0546	3.33	15.95	3.2831	98.678	85	134	11.779	2.10^{-5}	2.7742	2.15172	4.36292	0.6611
Trisopterus luscus capelanus, (Linnaeus, 1758)	14	41.706	23.42	105.29	23.340	149.71	131	200	21.691	$4. 10^{-6}$	3.1948	8.98306	11.3621	0.8687
Merluccius merluccius (Linnaeus, 1758)	166	119.41	27.77	350.95	69.113	240.50	158	372	46.926	$7. 10^{-6}$	3.0081	16.5434	7.13856	0.9662
Lophius piscatorius Linnaeus, 1758	23	201.23	11.73	912.26	186.96	230.73	101	440	66.933	$2. 10^{-6}$	2.9379	58.8760	27.3544	0.9697
Chelidonichthys gurnardus, Linnaeus, 1758	304	26.419	7.5	78	11.428	139.03	94	224	19.189	$6. 10^{-6}$	3.0824	2.99320	2.15706	0.9511
Chelidonichthys lastoviza (Brünnich, 1768)	128	41.118	11.39	116.14	17.033	267.54	75	780	134.46	$1. 10^{-5}$	3.0419	17.0550	23.2941	0.9596
Lepidotrigla cavillone, (Lacepede, 1801)	377	15.168	4.9	40.09	5.3683	104.43	75	141	11.976	$1. 10^{-5}$	2.9828	1.86271	1.20895	0.8927
Serranus cabrilla, (Linnaeus, 1758)	602	46.329	10.54	163.66	20.519	158.41	87	234	23.455	$7. 10^{-5}$	2.6265	9.15637	1.87366	0.8738
Serranus hepatus, (Linnaeus, 1758)	78	139.15	71	215	33.531	95.641	78	114	7.4659	4.10^{-3}	2.8015	15.4590	1.65685	0.7917
Trachurus mediterraneus (Steindachner, 1868)	76	27.338	4.21	109.5	21.203	129.56	73	225	31.279	$7. 10^{-6}$	3.0992	5.53036	7.03238	0.9717
Trachurus trachurus, (Linnaeus, 1758)	174	47.143	6.1	181.6	38.462	149.16	78	243	39.189	$2. 10^{-5}$	2.8767	13.0046	5.82296	0.9379
Boops boops, (Linnaeus, 1758)	1231	40.903	9.28	111.6	10.926	159.93	94	221	13.242	$1. 10^{-5}$	2.9248	4.03841	0.73973	0.8703
Diplodus annuris, (Linnaeus, 1758)	887	25.284	8.66	72.13	7.4785	103.11	73	138	9.5335	$5. 10^{-5}$	2.82	2.95376	0.62739	0.8724
Pagellus erytrinus, (Linnaeus, 1758)	181	56.148	18.11	159.1	22.394	142.77	78	228	18.778	$1. 10^{-4}$	2.6595	7.05171	2.73564	0.9203
Spicara smaris, (Linnaeus, 1758)	139	28.053	15	44.2	7.0368	133.49	105	157	11.528	$3. 10^{-5}$	2.8551	3.36116	1.91639	0.9243
Mullus barbatus Linnaeus, 1758	45	34.905	13.62	91.34	19.424	12.909	10	18,5	1.8818	$6. 10^{-3}$	3.3486	4.43903	0.54982	0.9795
Cepola rubescens Linnaeus, 1758	356	17.567	4.55	34.93	5.6564	28.429	12.3	43.7	6.2104	0.1379	1.4421	2.05688	0.64512	0.8801
Scomber scombrus, Linnaeus, 1758	52	56.462	33	101.72	22.443	183.67	158	217	17.921	$1. 10^{-7}$	3.8111	4.39556	4.87091	0.986
Citharus linguatula, (Linnaeus, 1758)	1236	27.646	2.12	90.18	19.522	150.96	69	237	36.532	$2. 10^{-6}$	3.2574	5.57422	2.03666	0.9825
Arnoglossus kessleri, Schmidt, 1915	32	3.4493	0.8	5.85	1.1400	81.75	52	95	9.0554	$4. 10^{-6}$	3.1243	0.41992	3.13747	0.9448
Arnoglossus laterna, (Walbaum, 1792)	328	43.317	8.4	392.41	59.276	82.408	55	205	22.530	$2. 10^{-5}$	3.242	18.5264	2.43823	0.9677
Arnoglossus thori Kyle, 1913	170	25.227	1.59	83.87	13.428	145.99	65	225	26.554	$1. 10^{-5}$	2.9456	5.24926	3.99170	0.933

N: Sample size; Mean: Mean value of length (cm) or weight (g); Min: Minimum value of length or weight; Max: Maximum value of length or weight; SD: Standard deviation; SE: Standard error; a: Intercept of the relationship; b: the slope of the relationship; R^2: Correlation coefficient; C.I.: Confidence intervals (95%); Species are listed in taxonomical order.

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