Weight-Length Relationships for Selected Fish Species of the Small-Scale Fisheries off the South Coast of İskenderun Bay

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Abstract: In this study a series of weight-length relationships are presented for 13 fish species caught between September and December 2000 off the south coast of İskenderun Bay. The samples were collected with longlines. The values of the exponent b in the weight-length relationship, $W = aL^b$, ranged from 2.391 to 3.675 and the median value was 2.714.

Key Words: İskenderun Bay, Weight-length relationships, Longline, Fish species

İskenderun Körfezi'nin Güney Kıyısında Küçük Çaplı Avcılık Yoluyla Yakalanan Bazı Balıklarda Boy-Ağırlık İlişkisi

Özet: Bu çalışmada İskenderun Körfezinin güney kıyılarında Eylül-Aralık 2000 tarihleri arasında yakalanan 13 balık türüne ait boy-ağırlık ilişkisi verilmiştir. Örnekler paraketa ile toplanmıştır. Boy-ağırlık ilişkisindeki ($W = aL^b$) b katsayısı 2,391 ile 3,675 arasında değişmiş ve medyan değeri 2,714 olarak bulunmuştur.

Anahtar Sözcükler: İskenderun Körfezi, Boy-ağırlık ilişkisi, Paraketa, Balık türleri

Knowledge of the relationship between the length and weight of a fish species in a given geographic region is useful for at least four reasons:

A) For the estimation of standing-crop biomass when the length-frequency distribution is known (1,2).

B) Conversion of growth-in-length equations to growth-in-weight for the prediction of weight at age and use in stock assessment models (2).

C) For the calculation of condition indices (1,3).

D) For the life history and morphological compression of populations from different regions (1,4)

In this study we report on the weight-length relationships for 13 species from the south coast of İskenderun Bay caught using longlines.

Sampling took place on the south coast of İskenderun Bay (Fig. 1) from September to December 2000 with longlines of three hook sizes (14, 10 and 8), about 15,000 hooks, in depths from 12 to 65 m. Catches were immediately transported to the laboratory where total weights and lengths were recorded to the nearest gram and to 0.5 cm. All weights (g) and total lengths were fitted to length-weight equations, $W = axL^b$, by using least square methods with Statistica software. In the length-weight equation a and b are the intercept and slope (= exponent) of the length-weight curve, respectively (5).

The estimated parameters of the weight-length relationship along with sample descriptive statistics (number of fish, mean length, standard error of mean length, minimum and maximum length), the coefficient of determination (R^2) and type of growth (based on confidence limits of b) are given in the Table. The sample size ranged from 12.10 cm for *Symphodus tinca* to 67.50 cm for *Epinephelus aeneus*. The R^2 values ranged from 0.85 for *Diplodus sargus* to 0.997 for *Symphodus tinca* and all regressions were highly significant (P < 0.001). The values of *b* ranged from 2.391 for *Epinephelus costae* to 3.675 for *Symphodus tinca* and the median value of *b* was 2.714 (Fig. 2). Five species (*Sargocenron rubrum, Dentex gibbosus, Diplodus sargus,*
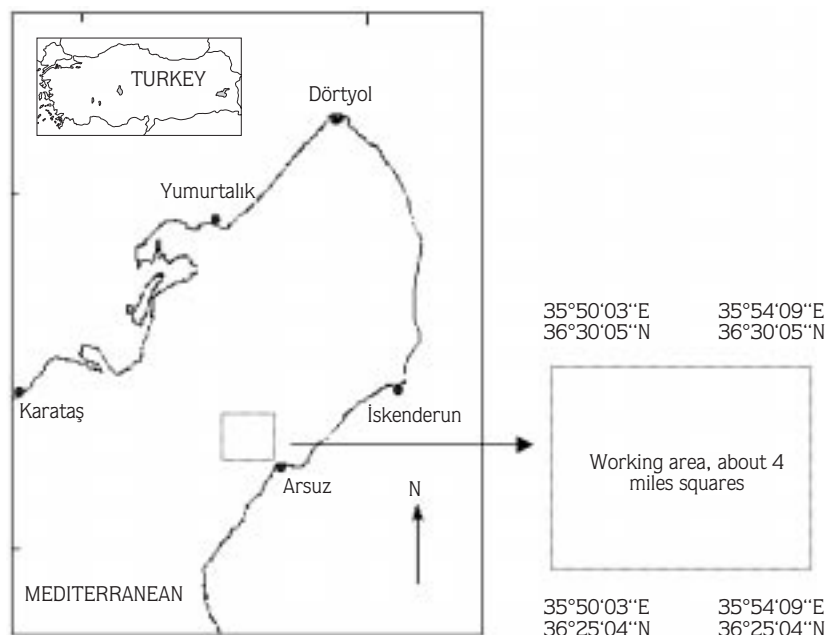
Figure 1. Map showing location of longlining area.

Diplodus vulgaris and *Pagrus coeruleostictus*) showed isometric growth, seven species (*Saurida undosquamis, Epinephelus aeneus, Dentex dentex, Sparus aurata, Oblada melanura, Pomadasys incisus* and *Epinephelus costae*) showed negative allometric growth and only one species (*Symphodus tinca*) showed positive allometric growth.

For this species, the data were not representative for all months. Thus, these estimated parameters should be considered to represent only a particular season or time

Table. Descriptive statistics, estimated parameters and type of growth of the weight-length relationship for 13 species caught off the south coast of İskenderun Bay.

Species	Length characteristics					Parameters of the relationship					Type of growth*
	N	Mean	Min	Max	SD	a	b	SE(b)*	CL(b)*	R²	(b = 3, P = 0.05)
Saurida undosquamis (Richardson, 1848)	100	26.41	17.40	33.1	3.89	0.0117	2.7971	0.0105	2.616-2.977	0.90	-(A)
Sargocenron rubrum (Forsskal, 1775)	57	15.17	12.90	21.4	1.34	0.0091	3.267	0.0140	2.919-3.615	0.86	I
Diplodus sargus (L., 1758)	33	19.29	14.90	26.7	2.94	0.0342	2.8079	0.2088	2.381-3.233	0.85	I
Dentex gibbosus (Rafinesque, 1810)	34	27.29	17.68	47.3	6.83	0.0341	2.714	0.195	2.316-3.111	0.857	I
Epinephelus aeneus (Geoffrov Saint-Halaire, 1817)	89	34.26	17.40	67.5	10.97	0.0152	2.90	0.0488	2.803-2.990	0.975	-(A)
Dentex dentex (L., 1758)	16	42.41	31.40	51	6.35	0.0861	2.495	0.1950	2.077-2.913	0.921	-(A)
Symphodus tinca (L., 1758)	10	14.41	12.10	17.2	1.75	0.0021	3.675	0.068	3.518-3.833	0.997	+(A)
Sparus aurata (L., 1758)	21	23.26	16.90	32	4.46	0.0406	2.679	0.104	2.460-2.898	0.971	-(A)
Oblada melanura (L., 1758)	22	20.45	15.60	27	3.32	0.0322	2.697	0.115	2.457-2.937	0.964	-(A)
Diplodus vulgaris (Geoffrov Saint-Halaire, 1817)	105	16.66	13.20	27	2.36	0.0131	3.124	0.082	2.960-3.287	0.933	I
Pomadasys incisus (Bowdich, 1825)	106	16.12	13.40	21.2	1.75	0.0465	2.604	0.080	2.445-2.763	0.910	-(A)
Pagrus coeruleostictus (Valenciennes, 1830)	311	18.52	12.50	38.8	2.93	0.0671	2.521	0.221	2.042-3.001	0.908	I
Epinephelus costae (Staindachner, 1878)	53	29.76	14.20	55.4	8.78	0.0885	2.391	0.089	2.211-2.571	0.93	-(A)

*SE(*b*): Standard errors of *b*; CL(*b*): Confidence limits of *b* N; number of fish; I: Isometric; -(A): Negative allometric and +(A): Positive allometric growth
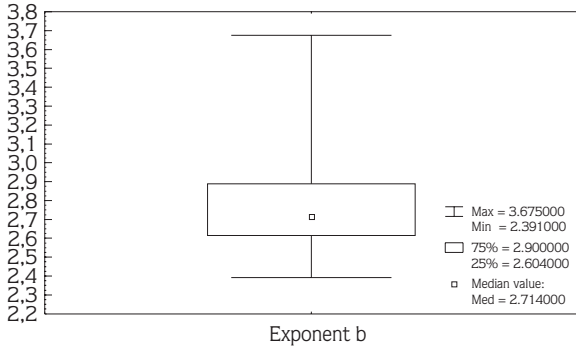
Figure 2. Box-whiskers plots of the exponent b of the weight-length relationships (W = aL^b) for 13 species caught in the study area. The box covers 75% of data values: The central box shows the median, and the vertical line represents the range of values.

of year. According to Bagenal and Tesch (6) the parameters of *b* generally do not vary significantly throughout the year, unlike parameter *a* which may vary seasonally, daily and between habitats.

Due to the selective properties of the equipment, used in this study, such as longline, our samples do not include juveniles or small individuals for any of the species. As pointed out by Petrakis and Stergiou (1), the use of these relationships should be limited to the sizes used to estimate the parameters. It is also noted it was particularly dangerous to extrapolate to juvenile or immature stages (2,6).

References

1. Petrakis, G., Stergiou, K.I.: Weight-length relationships for 33 fish species in Greek waters. Fish. Res., 1995; 21: 465-469.

2. Gonçalves, J.M.S., Bentes, L., Lino, P.G., Riberio J., Canario, A.V.M., Erzini, K.: Weight-length relationships for selected fish species of the small-scale demersal fisheries of the south and south-west coast of Portugal. Fish. Res., 1997; 30: 253-256.

3. Avşar, D.: Balıkçılık Biyolojisi ve Populasyon Dinamiği. Baki Kitap Evi Yayınları, Adana, 1998.

4. Erkoyuncu, İ.: Balıkçılık Biyolojisi ve Populasyon Dinamiği. Ondokuz Mayıs Üniv. Yayınları, Sinop, 1995.

5. King, M.: Fisheries Biology Assessment and Management. Fishing News Books, USA, 1996.

6. Bagenal, T.B., Tesch, F.W.: Age and Growth, In Methods for Assessment of Fish Production in Freshwaters. Blackwell Scientific Publications, 1978.