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LENGTH-WEIGHT RELATIONSHIPS OF FISHES FROM TURKISH SEAS: A REVIEW

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ABSTRACT

The paper presents 360 length-weight relationships gathered from available literature pertaining to 90 fish species belonging to 40 families occurring throughout Turkish seas. The value of the slope b ranged from 0.409 for Thunnus thynnus *to 4.343 for* Dentex macrophthalmus*. The mean value of b was 3.088 (± SD = 0.898) and did not differ significantly from 3* (t-*test, p <0.05). The median value of b was 3.062 and 50% of b values ranged between 2.941 and 3.190.*

Key words: length-weight relationship, fishes, Turkish seas, review

RAPPORTO PESO/LUNGHEZZA DEI PESCI NEI MARI DELLA TURCHIA: UNA RASSEGNA

SINTESI

Sulla base dei dati messi a disposizione dall'attuale letteratura, l'articolo elenca 360 esempi di rapporto peso/lunghezza di pesci appartenenti a 90 specie e 40 famiglie che dimorano nei mari della Turchia. La curva (b) va dallo 0,409 della specie Thunnus thynnus *al 4,343 di quella del* Dentex macrophthalmus*. Il valore medio di b è 3,088 (± SD = 0,898) e si discosta pochissimo dal 3* (t-*test, p<0,05). La mediana del coefficente b è di 3,062, mentre il 50 % del valore di b oscilla tra 2,941 e 3,190.*

Parole chiave: rapporto peso/lunghezza, pesci, mari della Turchia, rassegna

INTRODUCTION

Recording length and weight data is a standard procedure of fish sampling programs. Such data are essential for studies of fish population dynamics. Length-weight relationships have a number of uses including: (a) the estimation of standing-crop biomass when the length-frequency distribution is known; (b) estimation of biomass from length observations because of technical difficulties (*e.g.* bobbing motion of the boat) and the amount of time required to record weight in the field; (c) the calculation of condition indexes in the analysis of ontogenetic changes; and (d) comparing the life stories and morphological variations of fish populations from different regions (Cailliet *et al.*,1986; Safran, 1992; Petrakis & Stergiou, 1995; Goncalves *et al.*, 1996; Martin-Smith, 1996; Morato *et al.*, 2001; Stergiou & Motopoulos, 2001; Filiz & Bilge, 2004).

In this review, we gathered 336 length-weight relationships from the available literature for 70 fish species from Turkish seas.

MATERIAL AND METHODS

All length-weight relationships presented here are the product of field studies conducted during 1972–2004 in Turkish seas. For the majority of the original length-weight relationship ($W=aL^b$), length was expressed in cm and weight in g (356 relationships out of 360; 98.8%), whereas for 4 (1.2%) relationships, length and weight were expressed in mm and g.

RESULTS AND DISCUSSION

Overall, 360 length-weight relationships, gathered from the literature, represent 90 species and 40 families occurring in Turkish marine waters (Tab. 1). Overall, 50 out of the 360 length-weight relationships refer to *Merluccius merluccius* (14.9%), 35 (10.4%) to *Mullus barbatus,* and 26 (7.7%) to *Pagellus erythrinus*, three of the most commercially important demersal species in Turkish seas. Regarding the number of studies, of which length-weight relationship of an individual family is recorded, Sparidae dominated the overall records (84, 25.0%), and followed by Mullidae (60, 17.9%), Merluccidae (50, 14.9%), Engraulidae (17, 5.1%) and Mugilidae (14, 4.2%). Each of the remaining 28 families was represented by less than one relationship.

The value of the slope b in the plot of log W against log W ranged from 0.409 for *Thunnus thynnus* in Aegean and Mediterranean Sea to 4.343 for *Dentex macrophthalmus* in Saros Bay. The mean value of b was 3.088 (± SD = 0.8985) and did not differ significantly from 3 (*t*-test, $p < 0.05$). The median value of b was 3.062 and 50 % of b values ranged between 2.941 and 3.19.

According to Stergiou & Moutopoulos (2001), a plot of a *versus* b for all known length-weight relationships of a species results in a linear relationship, and this relationship can be used to identify outliers. We have applied this method to all species with more than 10 length-weight relationships. This led to the detection of outliers, where the respective point deviated more than two standard deviations from the regression line. These length-weight relationships were marked as "questionable" in Table 1.

The length-weight relationship in fishes is affected by a number of factors, including season, habitat, gonad maturity, sex, diet and stomach fullness, health and preservation techniques (Dulčić & Kraljević, 1996), all of which were not accounted for in this review. As stressed by Bagenal & Tesch (1978) and Petrakis & Stergiou (1995), the use of relationships should be limited to the size range used to estimate the parameters. Extrapolation to juvenile or immature stages may be particularly unwise given the potential differences in growth patterns between adults and earlier life history stages (Bagenal & Tesch, 1978). The parameters of the length-weight relationship may vary significantly according to season, habitat and even on a daily basis *(ibid).* In fishes, size is generally more biologically relevant than age, mainly because several ecological and physiological factors are more size-dependent than age-dependent (Dulčić & Kraljević, 1996). Consequently, variability in size has important implications for diverse aspects of fisheries science and population dynamics. Length-weight relationships have several applications, namely on fish biology, physiology, ecology and fisheries assessment. In biological studies, length-weight relationships enable seasonal variations in fish growth to be followed and the calcultaion of condition indexes. In fisheries studies, length-weight relationships have many different uses, including the estimation of weight from length, the estimation of weight-at-age and the conversion of growth-in-length equations to growth-in-weight. The establishment of length-weight relationships is also fundamental for the calculation of production and biomass of a fish population, being very useful for biomass estimations based on visual census of fish populations.

This review of length-weight parameters reported here will be of considerable use in ongoing studies of the catch in Turkish commercial fisheries.

Tab. 1: Parameters of the length-weight relationship $W = aL^b$ of fish species from Turkish marine waters (length (cm), weight (g)).
Legend: Sex (M, male; F, female; C, combined; U, unidentified); Year = year of sampling; S = sampling season (AUT, Autumn; WI, Winter; SP, Spring; SU, Summer; C, All seasons); L = length (TL, Total length; FL, Fork length; SL, Standard length); a = intercept (from the literature); b = slope (of the relationship $W=aL^b$); r^2 = coefficient of correlation; N = sampling size; min and max = minimum and maximum sample lengths (cm); SD = standard deviation.
Species are listed in alphabetical order.

Tab. 1: Parametri razmerja $W = aL^b$ med dolžino in težo ribjih vrst, živečih v turških morjih (dolžina (cm), teža (g)).
Legenda: Sex = spol (M, samec; F, samica; C, oba skupaj; U, neidentificiran); Year = leto vzorčenja; S = sezona vzorčenja (AUT, jesen; WI, zima; SP, pomlad; SU, poletje; C, vse sezone); L = dolžina (TL, celotna dolžina; FL, dolžina razcepa repa; SL, standardna dolžina); a = presečišče (na podlagi virov); b = naklon (iz razmerja $W=aL^b$); r^2 = korelacijski koeficient; N = število primerkov; min in max = najmanjše in največje vzorčevalne velikosti (cm); SD = standardni odklon.
Vrste so navedene v abecednem redu.

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Alosa sp.	Black Sea	C	1988–94	C	TL	0.0081	3.103	0.921*	65	–	–	–	–	Erkoyuncu *et al.* (1994)
Arnoglossus laterna	İzmir Bay	C	1996–97	C	TL	0.00932	2.897	0.940	643	12.1	6.0	15.3	–	Mater & Bayhan (2000)
Argentina sphyraena	Sigacik trawl area	C	2003	C	TL	0.0062	2.93	0.93	238	–	7.5	20.7	–	Filiz & Bilge (2004)
Atherina hepsetus	Eceabat Dardanelles	C	1997–99	C	FL	0.01287	2.890	0.999	564	–	5.8	13.0	–	Altun (2000)
Belone belone	Black Sea	C	1988–94	C	TL	0.0005	3.203	0.940*	65	–	–	–	–	Erkoyuncu *et al.* (1994)
Belone belone euxini	Black Sea	C	1995–96	C	TL	0.00055	3.177	0.940*	643	37.55	31.2	52.2	0.17	Samsun (1995)
Capros aper	Yeşilova Bay	F	1992	SU	TL	0.0000294	2.912	0.883*	170	86.35	–	–	0.7	Kaya & Ozaydın (1996)
Capros aper	Yeşilova Bay	M	1992	SU	TL	0.0000204	2.915	0.883*	165	84.72	–	–	0.6	Kaya & Ozaydın (1996)
Capros aper	Sigacik trawl area	C	2003	WI, SU	TL	0.0232	2.83	0.98	455	–	2.9	10.1	–	Filiz & Bilge (2004)
Cepola rubescens	İzmir Bay	F	1996–97	C	TL	0.32388	1.269	0.792	131	34.43	11.5	45.6	6.76	Kaya *et al.* (2001)
Caelorinchus caelorinchus	Sigacik trawl area	C	2003	C	TL	0.0065	2.74	0.78	208	–	4.0	21.6	–	Filiz & Bilge (2004)
Cepola rubescens	İzmir Bay	M	1996–97	C	TL	0.2154	1.384	0.810	144	29.17	19.8	47.1	6.26	Kaya *et al.* (2001)
Chelidonichthyes lucerna	İskenderun Bay	F	1999–00	C	TL	0.0095	2.990	0.960*	199	–	8.0	30.3	–	Ismen *et al.* (2004)
Chelidonichthyes lucerna	İskenderun Bay	M	1999–00	C	TL	0.0089	3.010	0.980*	143	–	8.3	21.2	–	Ismen *et al.* (2004)
Chelon labrosus	Güllük Lagoon	C	1993–94	C	TL	0.0075539	3.067	0.962*	45	26.4	20.0	35.0	3.5	Hossucu (2001)
Chlorophthalmus agassizi	Sigacik trawl area	C	2003	C	TL	0.0027	3.37	0.98	378	–	7.7	17.5	–	Filiz & Bilge (2004)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Chimaera monstrosa	Sigacik trawl area	C	2003	C	TL	0.0028	2.82	0.98	17	–	13.1	75.3	–	Filiz & Bilge (2004)
Conger conger	Sigacik trawl area	C	2003	C	TL	0.0005	3.24	0.96	22	–	32.2	65.4	–	Filiz & Bilge (2004)
Dasyatis pastinaca	İskenderun Bay	F	1999–00	C	TL	0.00091	3.440	0.940	110	–	20.5	88.0	–	Ismen (2003)
Dasyatis pastinaca	İskenderun Bay	M	1999–00	C	TL	0.00237	3.170	0.950	146	–	20.0	73.0	–	Ismen (2003)
Dasyatis pastinaca	İskenderun Bay	C	1999–00	C	TL	0.00144	3.310	0.940	256	–	20.0	88.0	–	Ismen (2003)
Dasyatis pastinaca	Sigacik trawl area	C	2003	WI, SU	TL	0.0149	2.81	0.85	29	–	37.3	74.2	–	Filiz & Bilge (2004)
Dentex dentex	İskenderun Bay	C	2000	AUT	TL	0.0861	2.495	0.921	16	42.41	31.40	51.0	6.35	Can *et al.* (2000)
Dentex gibbosus	İskenderun Bay	C	2000	AUT	TL	0.0341	2.714	0.857	34	27.29	17.68	47.3	6.83	Can *et al.* (2000)
Dentex macrophthalmus	Saros Bay	C	1991	SU	TL	0.01760	3.071	0.864*	20	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	İzmir Bay	C	1991	SU	TL	0.02248	2.966	0.889*	20	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Güllük Bay	C	1991	SU	TL	0.00782	3.292	0.974*	20	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Gökova Bay	C	1991	SU	TL	0.02404	2.932	0.874*	60	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Saros Bay	C	1992	WI	TL	0.01974	3.027	0.988*	12	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Saros Bay	C	1992	SP	TL	0.00002	4.343	0.980*	58	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Gökova Bay	C	1992	SP	TL	0.01280	3.107	0.970*	40	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Gökova Bay	C	1993	SP	TL	0.01731	3.084	0986*	46	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	İzmir Bay	C	1993	AUT	TL	0.02968	2.859	0.975*	9	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Güllük Bay	C	1993	AUT	TL	0.02946	2.812	0.974*	10	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Gökova Bay	C	1993	AUT	TL	0.02117	2.977	0.978*	82	–	–	–	–	Benli *et al.* (2000)
Dentex macrophthalmus	Aegean Sea	F	1991–93	C	FL	0.01308	3.171	0.955*	285	14.10	8.2	22.0	0.18	Ozaydın (1997)
Dentex macrophthalmus	Aegean Sea	M	1991–93	C	FL	0.00921	3.282	0.941*	203	14.65	8.2	22.0	0.37	Ozaydın (1997)
Dentex macrophthalmus	Aegean Sea	C	1991–93	C	FL	0.01191	3.198	0.941*	507	14.23	7.8	22.0	0.20	Ozaydın (1997)
Dentex macrophthalmus	Marmara, Aegean and Mediterra-nean Sea	C	1991–93	WI	FL	0.0000099	3.143	0.962*	87	–	10.7	19.5	–	Anonymus (1993)
Diplodus annularis	Edremit Bay	F	1997–98	C	FL	0.0367	2.797	0.865*	322	10.33	7.3	13.8	0.57	Koc *et al.* (2002)
Diplodus annularis	Edremit Bay	M	1997–98	C	FL	0.0455	2.696	0.846*	330	10.18	8.0	14.0	0.55	Koc *et al.* (2002)
Diplodus annularis	İzmir Bay	C	1997–99	C	FL	0.014	3.190	–	160	–	7.8	15.6	–	Kınacıgil & Akyol (2001)
Diplodus annularis	İzmir Bay	F	1997–99	C	FL	0.018	3.090	–	72	–	–	–	–	Kınacıgil & Akyol (2001)
Diplodus annularis	İzmir Bay	M	1997–99	C	FL	0.012	3.260	–	68	–	–	–	–	Kınacıgil & Akyol (2001)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Diplodus annularis	Çandarlı Bay	C	1992	WI	TL	0.04792	2.643	0.886*	24	–	–	–	–	Benli *et al.* (2000)
Diplodus annularis	Güllük Bay	C	1992	WI	TL	0.02056	3.016	0.957*	20	–	–	–	–	Benli *et al.* (2000)
Diplodus annularis	Güllük Bay	C	1993	SP	TL	0.02791	2.926	0.945*	20	–	–	–	–	Benli *et al.* (2000)
Diplodus annularis	Çandarlı Bay	C	1993	AUT	TL	0.01509	3.187	0.927*	36	–	–	–	–	Benli *et al.* (2000)
Diplodus annularis	İzmir Bay	C	1993	AUT	TL	0.01449	3.196	0.931*	32	–	–	–	–	Benli *et al.* (2000)
Diplodus annularis	Gökova Bay	C	1993	AUT	TL	0.09692	2.473	0.893*	18	–	–	–	–	Benli *et al.* (2000)
Diplodus annularis	Gülbahçe Bay	C	1996–1997	C	FL	0.021	3.023	0.961	205		6.5	15.0	–	Tosunoglu *et al.* (1997)
Diplodus annularis	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0000050	3.299	0.929*	214	–	8.7	17.3	–	Anonymus (1993)
Diplodus annularis	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0000248	2.959	0.895*	381	–	8.4	15.4	–	Anonymus (1993)
Diplodus annularis	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000327	2.905	0.918*	193	–	8.2	19.3	–	Anonymus (1993)
Diplodus annularis	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000102	3.150	0.976*	104	–	9.1	16.6	–	Anonymus (1993)
Diplodus sargus	İskenderun Bay	C	2000	AUT	TL	0.0342	2.807	0.850	33	19.29	14.90	26.7	2.94	Can *et al.* (2000)
Diplodus vulgaris	Saros Bay	C	1992	WI	TL	0.02840	2.929	0.943*	20	–	–	–	–	Benli *et al.* (2000)
Diplodus vulgaris	İzmir Bay	C	1993	AUT	TL	0.02413	2.983	0.952*	35	–	–	–	–	Benli *et al.* (2000)
Diplodus vulgaris	İskenderun Bay	C	2000	AUT	TL	0.0131	3.124	0.933	105	16.66	13.20	27.0	2.36	Can *et al.* (2000)
Diplodus vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000334	2.929	0.943*	20	–	12.1	17.5	–	Anonymus (1993)
Diplodus vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.000365	2.908	0.992*	20	–	10.5	18.9	–	Anonymus (1993)
Diplodus vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0000680	2.795	0.984*	11	–	8.8	16.7	–	Anonymus (1993)
Diplodus vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000016	3.538	0.960*	18	–	13.0	18.0	–	Anonymus (1993)
Dipturus oxyrinnchus	Sigacik trawl area	C	2003	WI, SU	TL	0.0007	3.40	0.99	8	–	17.9	62.2	–	Filiz & Bilge (2004)
Engraulis encrasicolus	Eastern Black Sea	C	2001–02	WI	SL	0.032	2.507	0.895	50	10.48	9.45	11.7	0.066	Aka (2003)
Engraulis encrasicolus	Mid Black Sea	C	2001–02	WI	SL	0.0214	2.673	0.913	50	10.04	8.75	11.35	0.088	Aka (2003)
Engraulis encrasicolus	Western Black Sea	C	2001–02	WI	SL	0.0111	2.979	0.865	50	10.28	9.35	11.05	0.061	Aka (2003)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Engraulis encrasicolus	Marmara Sea	C	2001–02	WI	SL	0.0094	2.999	0.942	50	11.34	10.5	12.1	0.060	Aka (2003)
Engraulis encrasicolus	İzmir Bay	C	2001–02	WI	SL	0.0102	2.937	0.852	50	10.34	9.5	11.2	0.049	Aka (2003)
Engraulis encrasicolus	Edremit Bay	C	2001–02	WI	SL	0.009	2.991	0.866	50	10.14	9.15	11.45	0.062	Aka (2003)
Engraulis encrasicolus	Eastern Black Sea	F	1997–98	–	TL	0.0054	3.040	0.891	907	11.71	8.8	13.8	3.42	Gözler & Ciloglu (1998)
Engraulis encrasicolus	Eastern Black Sea	M	1997–98	–	TL	0.0049	3.071	0.640	339	11.68	8.8	13.8	1.74	Gözler & Ciloglu (1998)
Engraulis encrasicolus	Eastern Black Sea	C	1997–98	–	TL	0.0057	3.015	0.855	1664	11.22	7.0	13.8	4.43	Gözler & Ciloglu (1998)
Engraulis encrasicolus	Eastern Black Sea	C	1996–97	–	TL	0.00569	3.117	–	–	–	6.2	13.5	–	Kayalı (1998)
Engraulis encrasicolus	Eastern Black sea	C	1993–94	–	TL	0.0051	3.048	–	–	10.43	–	–	–	Düzgünes *et al.* (1995)
Engraulis encrasicolus	Black Sea	C	1988–94	C	TL	0.0053	3.038	0.941*	43	–	–	–	–	Erkoyuncu *et al.* (1994)
Engraulis encrasicolus	Black Sea	C	–	–	–	0.0047	3.100	–	–	–	–	–	–	Ozdamar *et al.* (1991a)
Engraulis encrasicolus	Black Sea	C	–	–	–	0.023	3.412	–	–	–	–	–	–	Ozdamar *et al.* (1991b)
Engraulis encrasicolus	Black Sea	C	–	–	–	0.0025	3.388	–	–	–	–	–	–	Karacam & Düzgünes (1990)
Engraulis encrasicolus	Black Sea	C	1987–88	–	TL	–2.5941	3.386	–	956	9.34	6.66	15.25	–	Düzgünes & Karacam (1989)
Engraulis encrasicolus	Black Sea	C	1988–89	C	TL	0.00643	2.974	–	1172	–	75	130	–	Unsal (1989)**
Epinephelus costae	İskenderun Bay	C	2000	AUT	TL	0.0885	2.391	0.930	53	29.76	14.20	55.4	8.78	Can *et al.* (2000)
Gadus euxinus	Eastern Black Sea	C	–	–	–	0.0272	2.573	–	–	–	–	–	–	Düzgünes & Karacam (1990)
Gadus merlangus euxinus	Black Sea	C	1995–96	C	TL	0.0039	3.238	0.931	1302	14.53	9.0	24.0	0.07	Samsun & Erkoyuncu (1998)
Gadus merlangus euxinus	Black Sea	C	1988–94	C	TL	0.0034	3.299	0.922*	54	–	–	–	–	Erkoyuncu *et al.* (1994)
Gadus merlangus euxinus	Mid Black Sea	C	–	C	–	00043	3.195	–	–	–	–	–	—	Samsun *et al.* (1993)
Gadiculus argenteus argenteus	Sigacik trawl area	C	2003	C	TL	0.0056	3.24	0.89	110	–	6.4	10.5	–	Filiz & Bilge (2004)
Gymnura alatvela	Sigacik trawl area	C	2003	C	TL	0.0268	2.96	0.98	9	–	37.5	72.0	–	Filiz & Bilge (2004)
Helicolenus dactylopterus	Sigacik trawl area	C	2003	C	TL	0.0079	3.28	0.92	178	–	5.5	13.5	–	Filiz & Bilge (2004)
Hoplostethus mediterraneus	Sigacik trawl area	C	2003	C	TL	0.0149	2.95	0.98	137	–	8.0	18.0	–	Filiz & Bilge (2004)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Lesueurigobius friessi	Sigacik trawl area	C	2003	C	TL	0.0392	2.13	0.72	17	–	6.2	8.1	–	Filiz & Bilge (2004)
Lepidopus caudatus	Sigacik trawl area	C	2003	C	TL	0.0004	3.11	0.99	40	–	21.9	81.5	–	Filiz & Bilge (2004)
Liza ramada	Güllük Lagoon	C	1993–94	C	TL	0.0066894	3.052	0.946*	86	23.5	17.0	33.8	2.8	Hossucu (2001)
Liza saliens	Güllük Lagoon	C	1993–94	C	TL	0.008859	2.997	0.965*	38	25.3	18.3	39.0	3.7	Hossucu (2001)
Liza saliens	İzmir Bay	U	1997–98	C	FL	0.0082	3.090	0.990	15	–	8.4	19.6	3.29	Akyol (1999)
Liza saliens	İzmir Bay	F	1997–98	C	FL	0.0088	3.080	0.953	294	–	13.4	33.1	–	Akyol (1999)
Liza saliens	İzmir Bay	M	1997–98	C	FL	0.0079	3.120	0.986	121	–	13.2	28.7	–	Akyol (1999)
Liza saliens	İzmir Bay	C	1997–98	C	FL	0.0078	3.120	0.985	430	–	8.4	33.1	–	Akyol (1999)
Macroramphosus scolopax	Sigacik trawl area	C	2003	C	TL	0.0079	3.28	0.92	43	–	7.1	11.4	–	Filiz & Bilge (2004)
Merlangius merlangus euxinus	Black Sea	F	1990–93	C	–	0.0040	3.250	0.980*	4176	–	–	–	–	Işmen (2002)
Merlangius merlangus euxinus	Black Sea	M	1990–93	C	–	0.0044	3.220	0.980*	3181	–	–	–	–	Işmen (2002)
Merlangius merlangus euxinus	Eastern Black Sea	F	1997	C	–	0.004856	3.151	–	1349	–	–	–	–	Sahin & Akbulut (1997)
Merlangius merlangus euxinus	Eastern Black Sea	M	1997	C	–	0.005450	3.110	–	864	–	–	–	–	Sahin & Akbulut (1997)
Merlangius merlangus euxinus	Eastern Black Sea	C	1990	C	–	0.0070	3.007	–	–	–	–	–	–	Uysal (1990)
Merluccius merluccius	Saros Bay	C	1991	SU	TL	0.00669	3.013	0.736*	275	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1991	SU	TL	0.00933	2.617	0.64*	78	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1991	SU	TL	0.01038	2.862	0.674*	53	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1991	SU	TL	0.00732	2.977	0.681*	203	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1992	WI	TL	0.00382	3.221	0.960*	74	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1992	WI	TL	0.00507	3.097	0.986*	156	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1992	WI	TL	0.00383	3.188	0.995*	35	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1992	WI	TL	0.00573	3.025	0.997*	21	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1992	SP	TL	0.00297	3.164	0.960*	170	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1992	SP	TL	0.00572	3.029	0.941*	73	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1992	SP	TL	0.00670	3.101	0.980*	9	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1992	SP	TL	0.00570	3.050	0.960*	68	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1993	SP	TL	0.00297	3.075	0.970*	60	–	–	–	–	Benli *et al.* (2000)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Merluccius merluccius	Çandarlı Bay	C	1993	SP	TL	0.00561	3.069	0.991*	35	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1993	SP	TL	0.00665	3.037	0.903*	37	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Güllük Bay	C	1993	SP	TL	0.00291	3.257	0.943*	17	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1993	SP	TL	0.00618	3.049	0.983*	51	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1993	AUT	TL	0.00642	3.028	0.997*	76	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1993	AUT	TL	0.00312	3.266	0.989*	68	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1993	AUT	TL	0.00432	3.175	0.986*	58	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Güllük Bay	C	1993	AUT	TL	0.00731	3.017	0.993*	20	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1993	AUT	TL	0.00396	3.173	0.977*	26	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1991	SU	TL	0.00669	3.013	0.736*	275	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1991	SU	TL	0.00933	2.617	0.640*	78	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1991	SU	TL	0.01038	2.862	0.674*	53	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1991	SU	TL	0.00732	2.977	0.681*	203	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1992	WI	TL	0.00382	3.221	0.960*	74	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1992	WI	TL	0.00507	3.097	0.986*	156	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1992	WI	TL	0.00383	3.188	0.995*	35	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1992	WI	TL	0.00573	3.025	0.997*	21	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1992	SP	TL	0.00297	3.167	0.960*	170	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1992	SP	TL	0.00572	3.029	0.941*	73	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1992	SP	TL	0.00670	3.014	0.980*	9	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1992	SP	TL	0.00570	3.050	0.960*	68	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1993	SP	TL	0.00572	3.075	0.970*	60	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1993	SP	TL	0.00561	3.069	0.991*	35	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1993	SP	TL	0.00665	3.037	0.903*	37	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Güllük Bay	C	1993	SP	TL	0.00291	3.257	0.943*	17	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1993	SP	TL	0.00618	3.049	0.983*	51	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Saros Bay	C	1993	AUT	TL	0.00642	3.028	0.977*	76	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Çandarlı Bay	C	1993	AUT	TL	0.00312	3.266	0.989*	68	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	İzmir Bay	C	1993	AUT	TL	0.00432	3.175	0.983*	58	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Güllük Bay	C	1993	AUT	TL	0.00731	3.017	0.993*	20	–	–	–	–	Benli *et al.* (2000)
Merluccius merluccius	Gökova Bay	C	1993	AUT	TL	0.00396	3.173	0.977*	26	–	–	–	–	Benli *et al.* (2000)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Merluccius merluccius	Aegean Sea	C	1994–95	C	TL	0.0045	3.194	0.974*	336	–	13.6	43.5	–	Uckun *et al.* (2000)
Merluccius merluccius	Edremit Bay	C	1996–97	–	TL	0.0095	2.928	0.960*	165	–	15.8	37.2	–	Torcu *et al.* (1997)
Merluccius merluccius	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0000048	3.065	0.984*	1164	–	10.5	69.5	–	Anonymus (1993)
Merluccius merluccius	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000037	3.117	0.990*	1114	–	7.8	73.5	–	Anonymus (1993)
Merluccius merluccius	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000043	3.090	0.988*	614	–	14.2	79.0	–	Anonymus (1993)
Merluccius merluccius	İzmir Bay	C	1989	AUT	FL	0.00246	2.960	–	74	26.10	20.50	36.14	–	Kara & Gurbet (1990)
Mugil cephalus	Güllük Lagoon	C	1993–94	C	TL	0.008198	3.048	0.976*	132	31.0	17.6	46.2	6.6	Hossucu (2001)
Mugil cephalus	İzmir Bay	U	1997–98	C	FL	0.0149	2.950	0.998	29	–	10.2	45.3	–	Akyol (1999)
Mugil cephalus	İzmir Bay	F	1997–98	C	FL	0.0075	3.160	0.989	98	–	25.7	54.5	–	Akyol (1999)
Mugil cephalus	İzmir Bay	M	1997–98	C	FL	0.0109	3.040	0.965	77	–	28.2	55.5	–	Akyol (1999)
Mugil cephalus	İzmir Bay	C	1997–98	C	FL	0.0101	3.070	0.991	204	–	10.2	55.5	–	Akyol (1999)
Mugil so–iuy	Eastern Black Sea	C	1995	C	TL	0.010	2.980	0.970*	174	–	22.5	68.9	–	Basçınar & Okumus (1997)
Mugil sp.	Black Sea	C	1988–94	C	TL	0.0068	3.077	0.980*	75	–	–	–	–	Erkoyuncu *et al.* (1994)
Mullus barbatus	İzmir Bay	C	1997	WI	FL	0.0071	3.290	–	221		10.3	19.1	–	Kınacıgil *et al.* (2001)
Mullus barbatus	Saroz Bay	C	1991	SU	TL	0.01493	2.968	0.965*	222	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Çandarlı Bay	C	1991	SU	TL	0.00775	3.234	0.918*	40	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	İzmir Bay	C	1991	SU	TL	0.01540	2.988	0.905*	118	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Güllük Bay	C	1991	SU	TL	0.02774	2.768	0.704*	122	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Gökova Bay	C	1991	SU	TL	0.01578	2.998	0.857*	60	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Saroz Bay	C	1992	WI	TL	0.00942	3.188	0.977*	80	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Çandarlı Bay	C	1992	WI	TL	0.001261	3.067	0.973*	166	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	İzmir Bay	C	1992	WI	TL	0.00871	3.204	0.980*	39	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Güllük Bay	C	1992	WI	TL	0.01442	3.051	0.980*	53	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Gökova Bay	C	1992	WI	TL	0.00824	3.219	0.967*	40	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Saroz Bay	C	1992	SP	TL	0.00321	3.309	0.922*	170	–	–	–	–	Benli *et al.* (2000)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Mullus barbatus	Çandarlı Bay	C	1992	SP	TL	0.00328	3.313	0.960*	100	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	İzmir Bay	C	1992	SP	TL	0.00346	3.305	0.980*	120	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Güllük Bay	C	1992	SP	TL	0.00110	3.051	0.941*	60	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Gökova Bay	C	1992	SP	TL	0.04830	2.801	0.884*	11	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Saroz Bay	C	1993	SP	TL	0.01421	3.029	0.990*	38	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	İzmir Bay	C	1993	SP	TL	0.01382	3.038	0.938*	91	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Güllük Bay	C	1993	SP	TL	0.01205	3.115	0.981*	40	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Gökova Bay	C	1993	SP	TL	0.00736	3.314	0.960*	68	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Saroz Bay	C	1993	AUT	TL	0.03087	2.738	0.899*	48	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Çandarlı Bay	C	1993	AUT	TL	0.02738	2.824	0.963*	40	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	İzmir Bay	C	1993	AUT	TL	0.01723	2.984	0.902*	115	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	Gökova Bay	C	1993	AUT	TL	0.00767	3.292	0.950*	99	–	–	–	–	Benli *et al.* (2000)
Mullus barbatus	İskenderun Bay	C	1992–93	C	FL	–1.77494	3.026	0.956*	348	–	7.5	15.12	–	Türeli & Erdem (1997)
Mullus barbatus	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0000033	3.320	0.960*	533	–	8.5	22.4	–	Anonymus (1993)
Mullus barbatus	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000091	3.106	0.970*	636	–	9.0	20.5	–	Anonymus (1993)
Mullus barbatus	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.00000201	2.941	0.955*	1084	–	8.5	21.0	–	Anonymus (1993)
Mullus barbatus	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000078	3.143	0.968*	1090	–	8.8	22.3	–	Anonymus (1993)
Mullus barbatus	Mid Black sea	C	–	–	–	0.0054	3.209	–	–	–	–	–	–	Anonymus (1991a)
Mullus barbatus	İzmir Bay	C	1989	AUT	FL	0.00542	3.344	–	231	13.30	10.83	19.50 –	–	Kara & Gurbet (1990)
Mullus barbatus	Aliağa–Çandarlı Bay	C	1989	AUT	FL	0.13243	2.310	–	199	14.68	11.20	19.12	–	Kara & Gurbet (1990)
Mullus barbatus	Edremit Bay	C	1989	AUT	FL	0.011782	2.960	–	196	15.34	11.50	18.75	–	Kara & Gurbet (1990)
Mullus barbatus	Gülbahçe Bay (İzmir)	C	1973	C	FL	0.0165	2.923	0.960*	6054	–	7.6	22.0	–	Togulga (1977)
Mullus barbatus	Edremit Bay	C	1970	SU	FL	0.022	–	–	204	–	10.0	19.0	–	Kınıkaslan (1972)
Mullus barbatus ponticus	Eastern Black Sea	F	1997	C	–	0.0052653	3.217	–	–	–	–	–	–	Sahin & Akbulut (1997)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Mullus barbatus ponticus	Eastern Black Sea	M	1997	C	–	0.0053736	3.220	–	–	–	–	–	–	Sahin & Akbulut (1997)
Mullus barbatus ponticus	Black Sea	C	1988–89	C	TL	0.006855	3.156	–	2116	12.0	6.9	25.3	0.004	Samsun & Erkoyuncu (1992)
Mullus surmuletus	Saros Bay	C	1991	SU	TL	0.0078	3.089	0.950*	57	–	–	–	–	Benli *et al.* (2000)
Mullus surmuletus	Gökova Bay	C	1991	SU	TL	0.02168	2.920	0.926*	20	–	–	–	–	Benli *et al.* (2000)
Mullus surmuletus	Saros Bay	C	1992	WI	TL	0.03224	2.819	0.830*	6	–	–	–	–	Benli *et al.* (2000)
Mullus surmuletus	Güllük Bay	C	1992	WI	TL	0.00984	3.242	0.913*	20	–	–	–	–	Benli *et al.* (2000)
Mullus surmuletus	Çandarlı Bay	C	1992	SP	TL	0.00510	3.221	0.810*	27	–	–	–	–	Benli *et al.* (2000)
Mullus surmuletus	İzmir Bay	C	1992	SP	TL	0.00580	3.194	0.980	28	–	–	–	–	Benli *et al.* (2000)
Mullus surmuletus	İzmir Bay	C	1993	AUT	TL	0.01177	3.131	0.958	37	–	–	–	–	Benli *et al.* (2000)
Mullus surmuletus	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0000087	3.122	0.947*	170	–	11.5	32.1	–	Anonymus (1993)
Mullus surmuletus	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0000488	2.784	0.929*	131	–	114.0	205.0	–	Anonymus (1993)
Mullus surmuletus	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000103	3.104	0.990*	67	–	97.0	238.0	–	Anonymus (1993)
Mullus surmuletus	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000209	2.971	0.968*	30	–	100.0	253.0	–	Anonymus (1993)
Mustelus mustelus	Sigacik trawl area	C	2003	WI, SU	TL	0.0011	3.25	0.99	35	–	38.3	97.5	–	Filiz & Bilge (2004)
Myliobatis aquila	Sigacik trawl area	C	2003	WI, SU	TL	0.0008	3.34	0.93	14	–	47.5	76.5	–	Filiz & Bilge (2004)
Oblada melanura	İskenderun Bay	C	2000	AUT	TL	0.0322	2.697	0.964	22	20.45	15.60	27.0	3.32	Can *et al.* (2000)
Pagellus sp.	İzmir Bay	C	1989	AUT	FL	0.01592	3.008	–	111	14.59	8.66	21.43	–	Kara & Gurbet (1990)
Pagellus sp.	Edremit Bay	C	1989	AUT	FL	0.14723	2.289	–	74	16.75	13.71	22.0	–	Kara & Gurbet (1990)
Pagellus acerna	Aegean Sea	F	1991–93	C	FL	0.00527	3.447	0.850*	85	14.74	14.7	21.0	0.34	Ozaydin (1997)
Pagellus acerna	Aegean Sea	M	1991–93	C	FL	0.01087	3.172	0.927*	139	13.68	10.5	17.8	0.22	Ozaydin (1997)
Pagellus acerna	Aegean Sea	C	1991–93	C	FL	0.01420	3.075	0.962*	302	13.27	7.8	21.0	0.24	Ozaydin (1997)
Pagellus acerna	Gülbahçe Bay	C	1996–97	C	FL	0.082	3.288	0.935	107	–	9.8	14.8	–	Tosunoglu *et al.* (1997)
Pagellus acerna	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000876	2.646	0.806*	40	–	8.0	15.0	–	Anonymus (1993)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Pagellus bogaraveo	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0000018	3.472	0.951*	73	–	9.0	20.0	–	Anonymus (1993)
Pagellus bogaraveo	Marmara, Aegean and	C	1991–93	SU	FL	0.0000083	3.150	0.978*	5	–	11.0	15.0	–	Anonymus (1993)
Pagellus bogaraveo	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000709	2.709	0.792*	20	–	11.0	14.0	–	Anonymus (1993)
Pagellus bogaraveo	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000061	3.214	0.968*	81	–	9.0	19.0	–	Anonymus (1993)
Pagrus coeruleostictus	İskenderun Bay	C	2000	AUT	TL	0.0671	2.521	0.908	311	18.52	12.50	38.8	2.93	Can *et al.* (2000)
Pagellus erythinus	Saros Bay	C	1991	SU	TL	0.01299	2.972	0.832*	124	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Çandarlı Bay	C	1991	SU	TL	0.01190	3.156	0.959*	20	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	İzmir Bay	C	1991	SU	TL	0.04097	2.889	0.857*	60	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Güllük Bay	C	1991	SU	TL	0.01816	2.968	0.908*	40	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Gökova Bay	C	1991	SU	TL	0.0255	2.932	0.822*	40	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Saros Bay	C	1992	WI	TL	0.03184	2.773	0.896*	20	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Çandarlı	C	1992	WI	TL	0.01459	3.079	0.978*	29	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Gökova Bay	C	1992	WI	TL	0.01356	3.101	0.945*	20	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Saros Bay	C	1992	SP	TL	0.00109	3.537	0.941*	46	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Çandarlı Bay	C	1992	SP	TL	0.01619	3.011	0.960*	40	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	İzmir Bay	C	1992	SP	TL	0.06402	2.752	0.960*	56	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Güllük Bay	C	1992	SP	TL	0.02065	2.527	0.689*	42	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Gökova Bay	C	1992	SP	TL	0.04277	2.838	0.960*	7	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Saros Bay	C	1993	SP	TL	0.01249	3.140	0.988*	16	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	İzmir Bay	C	1993	SP	TL	0.01498	3.077	0.988*	57	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Güllük Bay	C	1993	SP	TL	0.06999	2.539	0.975*	17	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Gökova Bay	C	1993	SP	TL	0.01754	2.993	0.956*	17	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Saros Bay	C	1993	AUT	TL	0.00606	3.391	0.984*	17	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Çandarlı Bay	C	1993	AUT	TL	0.06999	2.539	0.975*	17	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	İzmir Bay	C	1993	AUT	TL	0.01699	3.001	0.944*	57	–	–	–	–	Benli *et al.* (2000)
Pagellus erythinus	Aegean Sea	F	1991–93	C	FL	0.02370	2.907	0.978*	512	15.36	11.1	24.5	0.18	Ozaydin (1997)
Pagellus erythinus	Aegean Sea	M	1991–93	C	FL	0.2722	2.865	0.956*	163	18.27	8.8	25.6	0.41	Ozaydin (1997)
Pagellus erythinus	Aegean Sea	C	1991–93	C	FL	0.02423	2.985	0.972*	692	16.04	8.8	25.6	0.20	Ozaydin (1997)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Pagellus erythinus	Gülbahçe Bay	C	1996–97	C	FL	0.018	3.012	0.976	204	–	8.0	24.0	–	Tosunoğlu *et al.* (1997)
Pagellus erythinus	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000287	2.917	0.966*	387	–	7.0	25.0	–	Anonymus (1993)
Pagellus erythinus	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000122	3.080	0.966*	117		11.0	24.0		Anonymus (1993)
Peristedion cataphractum	Sigacil trawl area	C	2003	C	TL	0.0048	2.97	0.99	11	–	8.1	21.2	–	Filiz & Bilge (2004)
Pleuronactes platessa	Black Sea	C	1988–94	C	TL	0.0078	3.109	0.960*	48	–	–	–	–	Erkoyuncu *et al.* (1994)
Phycis blennoides	Sigacik trawl area	C	2003	C	TL	0.0017	3.55	0.89	12	–	12.3	15.0	–	Filiz & Bilge (2004)
Pomadasys incisus	İskenderun Bay	C	2000	AUT	TL	0.0465	2.604	0.910	106	16.12	13.40	21.2	1.75	Can *et al.* (2000)
Pomatomus saltatrix	Black Sea	C	1988–94	C	TL	0.0388	2.558	0.846*	19	–	–	–	–	Erkoyuncu *et al.* (1994)
Pomatomus saltator	İzmir Bay	C	1987	AUT –WI	TL	0.02017	2.955	–	400	–	15.0	40.5	–	Alpbaz & Kınacıgil (1988)
Raja clavata	Sinop	C	–	–	–	0.0026	3.200	0.990	54	–	27.3	83.2	–	Erdem *et* al. (2001)
Raja clavata	Sigacik trawl area	C	2003	WI, SU	TL	0.0016	3.30	0.94	37	–	20.5	99.0	–	Filiz & Bilge (2004)
Raja miraletus	Sigacik trawl area	C	2003	WI, SU	TL	0.0001	4.15	0.93	13	–	30.0	50.5	–	Filiz & Bilge (2004)
Raja sp.	Black Sea	C	1988–94	C	TL	0.0090	2.920	0.922*	40	–	–	–	–	Erkoyuncu *et al.* (1994)
Sarda sarda	Black Sea	C	1995–96	AUT –WI	TL	0.0058	3.176	0.980*	4104	34.42	20.0	40.0	2.21	Samsun (1997)
Sarda sarda	Black Sea	C	1988–94	C	TL	0.0297	2.679	0.865*	14	–	–	–	–	Erkoyuncu *et al.* (1994)
Sardina pilchardus	İzmir Bay	F	1996–97	C	TL	0.0053	3.275	0.872*	187	–	9.3	13.0	–	Karakayıs & Togulga (2000)
Sardina pilchardus	İzmir Bay	M	1996–97	C	TL	0.0081	3.108	0.781*	75	–	–	–	–	Karakayıs & Togulga (2000)
Sardina pilchardus	İzmir Bay	C	1996–97	C	TL	0.0062	3.214	0.855*	262	–	9.3	14.6	–	Karakayıs & Togulga (2000)
Sardina pilchardus	İzmir Bay	F	1997–98	C	FL	0.0042	3.382	0.850	216	–	9.6	14.7	–	Mater & Bayhan (1999)
Sardina pilchardus	İzmir Bay	M	1997–98	C	FL	0.0025	3.600	0.870	148	–	9.8	14.9	–	Mater & Bayhan (1999)
Sardina pilchardus	İzmir Bay	C	1997–98	C	FL	0.0045	3.359	0.830	364	–	9.6	14.9	–	Mater & Bayhan (1999)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Saurida undosquamis	İskenderun	F	1999–00	C	TL	0.088	3.190	0.980	368	–	9.0	35.0	–	Ismen (2002)
Saurida undosquamis	İskenderun	M	1999–00	C	TL	0.120	2.950	0.960	234	–	5.0	32.0	–	Ismen (2002)
Saurida undosquamis	Fethiye Bay	C	1993	C	FL	–1.3279	3.295	0.828*	430	–	17.3	30.8	–	Mater & Torcu (1997)
Saurida undosquamis	Mersin Bay	C	1993	C	FL	–0.9596	2.616	0.656*	100	–	13.5	32.2	–	Mater & Torcu (1997)
Saurida undosquamis	İskenderun Bay	C	1992–93	C	FL	–2.06171	3.022	0.998*	333	–	8.3	21.92	–	Türeli & Erdem (1997)
Scomberomorus commerson	Güllük and Gökova Bay	C	1994	C	TL	0.1567	2.223	0.885*	70	–	52.0	87.0	–	Buhan *et al.* (1997)
Scophthalmus maeaticus	Black Sea	C	–	C	–	0.0047	3.418	–	–	–	40.0	–	–	Erdem (2001)
Scophthalmus maximus	Eastern Black Sea	F	1990–91	C	TL	0.0099	3.140	0.980	86	–	196	630	–	Avsar (1999)**
Scophthalmus maximus	Eastern Black Sea	M	1990–91	C	TL	0.0112	3.110	0.980	63	–	181	595	–	Avsar (1999)**
Scophthalmus maximus	Eastern Black Sea	C	1990–91	C	TL	0.0085	3.180	0.980	194	–	181	630	–	Avsar (1999)**
Scorpaena porcus	Sinop	C	1996–97	–	TL	0.054	2.590	–	633	17.26	11.49	23.63	0.083	Koca (2002)
Scorpaena sp.	Black Sea	C	1988–94	C	TL	0.0180	3.080	0.980*	31	–	–	–	–	Erkoyuncu *et al.* (1994)
Scyliorhinus canicula	Northern Aegean Sea	F	1991–96	SP	TL	0.001	3.453	0.991	95	–	–	51.7	–	Cihangir *et al.* (1997)
Scyliorhinus canicula	Northern Aegean Sea	M	1991–96	SP	TL	0.005	2.004	0.989	121	–	–	54.6	–	Cihangir *et al.* (1997)
Scyliorhinus canicula	Northern Aegean Sea	C	1991–96	SU–AUT	TL	0.001	3.205	0.919	370	–	–	54.6		Cihangir *et al.* (1997)
Scyliorhinus canicula	Siagacik trwal area	C	2003	WI, SU	TL	0.0012	3.26	0.99	637	–	10.5	50.9	–	Filiz & Bilge (2004)
Serranus cabrilla	Edremit Bay	C	1997–98	C	FL	0.0311	2.670	0.880	595	14.43	8.6	22.3	1.573	Torcu *et al.* (2004
Serranus cabrilla	Marmara, Aegean and Mediterra-nean Sea	C	1991–93	SP	FL	0.0000225	2.879	0.937*	100	–	94.0	200.0	–	Anonymus (1993)
Serranus cabrilla	Marmara, Aegean and Mediterra-nean Sea	C	1991–93	SU	FL	0.0000081	3.059	0.929*	193	–	94.0	255.0	–	Anonymus (1993)
Serranus cabrilla	Marmara, Aegean and Mediterra-nean Sea	C	1991–93	AUT	FL	0.0000066	3.121	0.966*	176	–	10.4	20.3	–	Anonymus (1993)
Serranus cabrilla	Marmara, Aegean and Mediterra-nean Sea	C	1991–93	WI	FL	0.00001	3.043	0.980*	75	–	11.6	17.5	–	Anonymus (1993)
Serranus scriba	Marmara, Aegean and Mediterra-nean Sea	C	1991–93	SU	FL	0.0000252	2.878	0.719	20	–	8.0	24.0	–	Anonymus (1993)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Siganus rivulatus	Antalya Bay	F	1996–98	C	TL	0.0064	3.221	0.903*	292	15.12	7.0	21.5	0.32	Bilecenoglu & Kaya (2002)
Siganus rivulatus	Antalya Bay	M	1996–98	C	TL	0.007945	3.135	0.903*	229	16.09	7.1	20.6	0.34	Bilecenoglu & Kaya (2002)
Siganus rivulatus	Antalya Bay	C	1996–98	C	TL	0.007137	3.179	0.903*	521	–	7.0	21.5	–	Bilecenoglu & Kaya (2002)
Solea solea	İskenderun Bay	F	2000–01	C	TL	0.0093	3.077	0.960	530	–	20.5	28.2	–	Türkmen (2003)
Solea solea	İskenderun Bay	M	2000–01	C	TL	0.0117	2.998	0.973	553	–	8.8	25.0	–	Türkmen (2003)
Solea sp.	Black Sea	C	1988–94	C	TL	0.0019	3.580	0.941*	19	–	–	–	–	Erkoyuncu *et al.* (1994)
Solea solea	İzmir Bay	C	1989–90	C	TL	0.00514	3.135	0.815	335	26.2	11.0	34.5	0.6	Hossucu (1992)
Solea solea	İzmir Bay	C	1989	AUT	FL	0.00054	3.640	–	9	23.61	22.50	25.83	–	Kara & Gurbet (1990)
Solea solea	Aliağa–Çandarlı Bay	C	1989	AUT	FL	0.00182	3.458	–	11	25.31	20.50	30.10	–	Kara & Gurbet (1990)
Solea solea	Edremit Bay	C	1989	AUT	FL	0.20137	1.951	–	14	26.21	21.50	31.00	–	Kara & Gurbet (1990)
Solea vulgaris	Yumurtalık	C	1992–93	C	TL	–2.52566	3.250	0.992*	603	–	12.1	34.5	–	Altun *et al.* (1997)
Solea vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0000003	3.562	0.951*	8	–	23.8	34.2	–	Anonymus (1993)
Solea vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0000026	3.183	0.937*	66	–	13.9	27.4	–	Anonymus (1993)
Solea vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0001367	2.479	0.740*	23	–	19.2	33.5	–	Anonymus (1993)
Solea vulgaris	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000098	2.958	0.960*	11	–	–	–	–	Anonymus (1993)
Sparus aurata	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.000025	2.941	0.960*	24	–	15.5	24.1	–	Anonymus (1993)
Sparus aurata	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0000693	2.743	0.984*	9	–	15.3	22.2	–	Anonymus (1993)
Sparus aurata	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.000017	3.470	0.982*	31	–	14.2	22.3	–	Anonymus (1993)
Sparus aurata	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000149	3.023	0.878*	14	–	16.0	19.6	–	Anonymus (1993)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Sphyraena chrysotaenia	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000053	3.049	0.895*	6	–	21.0	25.2	–	Anonymus (1993)
Sphyraena chrysotaenia	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.000049	3.056	0.964*	22	–	14.0	25.6	–	Anonymus (1993)
Sphyraena sphyraena	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0001309	2.428	0.925*	9	–	24.0	34.0	–	Anonymus (1993)
Sphyraena sphyraena	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0002720	2.290	0.927*	13	–	22.0	35.0	–	Anonymus (1993)
Spicara flexuosa	İzmir Bay	F	1998–99	C	FL	0.1156	2.163	0.689*	240	–	9.20	14.90	–	Mater *et al.* (2001)
Spicara flexuosa	İzmir Bay	M	1998–99	C	FL	0.0452	2.566	0.740*	172	–	11.30	15.50	–	Mater *et al.* (2001)
Spicara flexuosa	İzmir Bay	C	1998–99	C	FL	0.0411	2.594	0.846*	412	–	9.20	15.50	–	Mater *et al.* (2001)
Spicara smaris	Eastern Black Sea	F	1989	C	TL	0.0510	3.229	0.958*	280	–	11.1	22.5	–	Sahin & Genc (1999)
Spicara smaris	Eastern Black Sea	M	1989	C	TL	0.0650	3.126	0.880*	176	–	11.3	22.0	–	Sahin & Genc (1999)
Spicara smaris	Eastern Black Sea	C	1991–92	C	TL	0.005	3.260	–	–	–	–	–	–	Ismen (1995)
Spicara smaris	Black Sea	C	1988–94	C	TL	0.0061	3.215	0.941*	25	–	–	–	–	Erkoyunucu *et al.* (1994)
Spicara smaris	Mid Black Sea	C	–	–	–	0.0051	3.217	–	–	–	–	–	–	Anonymus (1991c)
Sprattus sprattus phallericus	Eastern Black Sea	F	1991	SP–SU	TL	0.00214	3.456	0.999*	214	–	8.45	14.09		Sahin (1999)
Sprattus sprattus phallericus	Eastern Black Sea	M	1991	SP–SU	TL	0.00204	3.474	0.994*	158	–	8.27	12.5	–	Sahin (1999)
Sprattus sprattus phallericus	Eastern Black Sea	C	1991	SP–SU	TL	0.00211	3.461	0.997*	372	–	8.35	13.20	–	Sahin (1999)
Squalus acanthias	Black Sea	F	1969–73	–	TL	0.0041	3.004	0.996	1840	85	30.0	140.0	–	Kutaygil & Bilecik (1998)
Squalus acanthias	Black Sea	M	1969–73	C	TL	0.0053	2.929	0.999	1780	75	30.0	120.0	–	Kutaygil & Bilecik (1998)
Squalus acanthias	Eastern Black Sea	C	1994–95	C	TL	0.0013	3.254	0.81*	159	–	35.5	141.5	–	Karacam *et al.* (1996)
Squalus acanthias	Sigacik trawl area	C	2003	WI, SU	TL	0.0031	3.11	0.98	32	–	27.0	70.5	–	Filiz & Bigle (2004)
Symphodus tinca	İskenderun Bay	C	2000	AUT	TL	0.0021	3.675	0.997	10	14.41	12.10	17.2	1.75	Can *et al.* (2000)
Thunnus thynnus	Aegean and Mediterranean Sea	C	1996–98	C	TL	0.0000181	2.988	0.994*	3577	118.40	59.0	275.0	37.0	Karakulak & Oray (2001)
Thunnus thynnus	Aegean and Mediterranean Sea	C	1992–94	C	FL <120	–21.780	0.409	0.931	145	–	–	–	–	Karakulak & Oray (1994)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Thunnus thynnus	Aegean and Mediterranean Sea	C	1992–94	C	FL >120	–186.521	1.633	0.780	1494	–	–	–	–	Karakulak & Oray (1994)
Torpedo marmorata	Siagacik trawl area	C	2003	WI, SU	TL	0.0273	2.91	0.98	27	–	9.2	34.0	–	Filiz & Bilge (2004)
Trachurus mediterraneus	Eastern Black Sea	C	1996–97	–	TL	0.0108	2.980	–	–	–	6.3	17.8	–	Kayalı (1998)
Trachurus mediterraneus	Mid Black sea	C	–	–	–	0.0089	2.950	–	–	–	–	–	–	Anonymus (1991b)
Trachurus mediterraneus	Black Sea	C	–	–	–	0.3612	1.160	–	–	–	–	–	–	Düzgünes & Karaçam (1991)
Trachurus mediterraneus ponticus	Black Sea	C	–	–	FL	0.004834	3.218	–	601	–	6.5	17.5	–	Sahin *et al.* (1997)
Trachurus trachurus	Mid Black Sea	C	1995–96	C	TL	0.00759	3.05	–	720	14.13	9.4	16.8	0.07	Yücel & Erkoyuncu (2000)
Trachurus trachurus	Black Sea	C	1988–94	C	TL	0.0290	2.485	0.960	77	–	–	–	–	Erkoyuncu *et al.* (1994)
Trachurus trachurus	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0000288	3.832	0.976*	259	–	9.0	29.6	–	Anonymus (1993)
Trachurus trachurus	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000071	3.072	0.955*	496	–	8.1	38.5	–	Anonymus (1993)
Trachurus trachurus	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000139	3.964	0.974*	311	–	10.7	27.1	–	Anonymus (1993)
Trigla lucerna	Yumurtalık	C	1992–93	–	TL	–2.18077	3.088	0.966*	348	–	14.4	26.9	–	Altun *et al.* (1997)
Trigla lucerna	Black Sea	C	–	–	–	0.0085	3.032	–	–	–	–	–	–	Erdem *et al.* (1994)
Trigla lucerna	Black Sea	C	1988–94	C	TL	0.0070	3.089	0.980*	55	–	–	–	–	Erkoyuncu *et al.* (1994)
Trisopterus minutus	Çandarlı Bay	C	1993	SP	TL	0.0979	3.017	0.951*	35	–	–	–	–	Benli *et al.* (2000)
Trisopterus minutus	Çandarlı Bay	C	1993	AUT	TL	0.00709	3.144	0.910*	117	–	–	–	–	Benli *et al.* (2000)
Upeneus moluccensis	Gökova Bay	C	1993	AUT	TL	0.00606	3.351	0.962*	39	–	–	–	–	Benli *et al.* (2000)
Upeneus moluccensis	Mediterranean Sea	F	1991–92	C	FL	0.01051	3.150	0.945*	535	13.69	8.6	17.8	1.635	Kaya *et al.* (1999)
Upeneus moluccensis	Mediterranean Sea	M	1991–92	C	FL	0.00607	3.352	0.922*	176	11.16	8.5	16.1	1.378	Kaya *et al.* (1999)
Upeneus moluccensis	Fethiye Bay	C	1990–93	–	FL	–1.2889	3.386	0.828*	536	–	9.0	17.0	–	Torcu & Mater (1997)
Upeneus moluccensis	Mersin Bay	C	1990–93	–	FL	–1.0554	2.903	0.723*	500	–	8.9	16.0	–	Torcu & Mater (1997)
Upeneus moluccensis	Marmara, Aegean and Mediterranean Sea	C	1991–93	SP	FL	0.0000043	3.257	0.976*	152	–	81.0	167.0	–	Anonymus (1993)

Species	Area	Sex	Year	S	L	a	b	r^2	N	mean	min	max	SD	Source
Upeneus moluccensis	Marmara, Aegean and Mediterranean Sea	C	1991–93	SU	FL	0.0000036	3.300	0.947*	300	–	93.0	176.0	–	Anonymus (1993)
Upeneus moluccensis	Marmara, Aegean and Mediterranean Sea	C	1991–93	AUT	FL	0.0000257	2.896	0.956*	207	–	86.0	178.0	–	Anonymus (1993)
Upeneus moluccensis	Marmara, Aegean and Mediterranean Sea	C	1991–93	WI	FL	0.0000027	3.353	0.941*	120	–	93.0	173.0	–	Anonymus (1993)
Upeneus pori	Babadillimanı bight	F	1999–00	C	TL	0.0073	3.120	0.963	461	–	6.5	15.5	–	Cicek *et al.* (2002)
Upeneus pori	Babadillimanı bight	M	1999–00	C	TL	0.0103	2.976	0.949	534	–	6.3	14.7	–	Cicek *et al.* (2002)
Zosterisessor ophiocephalus	Izmir Bay	C	1999–00	C	TL	0.0086	3.060	0.950	1066	–	8.0	23.3	–	Akyol (2003)

* r converted into r^2

** length–weight relationship corresponding to mm, g

RAZMERJA MED DOLŽINO IN TEŽO RIB, ŽIVEČIH V TURŠKIH MORJIH: PREGLED

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POVZETEK

Članek navaja 360 razmerij med dolžino in težo rib, in sicer glede na podatke, ki so bili zbrani iz obstoječe literature in zadevajo 90 vrst iz 40 družin, živečih v turških morjih. Naklon krivulje (b) se je gibal med 0,409 pri vrsti Thunnus thynnus *in 4,343 pri vrsti* Dentex macrophthalmus. *Povprečna vrednost b je bila 3,088 (± SD = 0,898) in se ni bistveno razlikovala od 3* (t-*test, p <0,05). Mediana koeficienta b je bila 3,062 in 50% vrednosti b se je gibalo med 2,941 in 3,190.*

Ključne besede: razmerje med dolžino in težo, ribe, turška morja, pregled

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