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Comparative Study of the Length-Weight Relationships of Some Fish Species along the Turkish Coasts

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Abstract

This study presents 738 length-weight relationships for 242 species found in Turkish seas. All length-weight relationships presented were collected from a total of 33 studies. These studies were all performed in Turkish coastal waters between 1997 and 2013. For all studies, the median of a value was calculated as 0.014 and the median of b value was calculated as 3.016.

Keywords: Weight-Length Relationships, Black Sea, Mediterranean Sea, Marmara Sea, Aegean Sea, Turkish marine waters.

Introduction

Length weight relationship (LWR) studies have an important role in estimating population biomass, growth rate determination, determining the stock status of fishes and in many other subjects (Pauly, 1983; Safran, 1992; Petrakis & Stergiou, 1995; Gonçalves *et al*., 1997; Stergiou & Moutopoulos, 2001; Morey *et al.,* 2003; Torcu-Koç *et al.,* 2006). These also carry a significant importance for Fishbase (Froese & Pauly, 2014). The number of these studies has been steadily increasing and this makes the functions of databases like Fishbase more comprehensible (Froese *et al*., 2011). Despite this importance, the number of comparative studies on LWR has remained quite low. No studies other than Stergiou & Moutopoulos, (2001), Froese, (2006), Torcu-Koç *et al.,* (2008), Froese *et al.,* (2011) and Froese *et al*., (2014) have been found in literature. Among these studies, Stergiou & Moutopoulos, (2001) has gathered the LWR data of fishes in Greek waters, and Torcu-Koç *et al.,* (2008) has gathered the LWR data of a limited number of lessepsian fishes in Turkish waters. Froese, (2006) and Froese *et al.,* (2014) had analysed the length-weight relationships of all fishes available on the Fishbase website using meta-analysis and Bayesian methods. Froese *et al.,* (2011), on the other hand, lists the important issues that must be considered during the preparation of length-weight relationships for publication.

Turkey is a country with four different marine systems. All four marine systems have different ecological characteristics. Even though there had been many LWR studies on those four seas, except for Torcu-Koç *et al.,* (2008) where LWR of 24 different lessepsian fish species were gathered, no wide scale and comparative study was discovered. In this study, a total of 738 LWR for 242 different fish species were examined for Turkish marine waters.

Materials and Method

All LWR in this study were gathered from a total of 33 studies performed between the years 1997-2013 in the seas of Turkey (Table 1). The studies were evaluated in four main marine regions: Black Sea, Marmara, Aegean and Mediterranean. Some of studies presented length and weight in units other than in centimeters and grams. According to Froese, (2006) this did not affect *b* value, but the intercept *a* needed to be converted with the following equation:

$a' = a10^b$ (if length was given in mm and weight in g)

Different length measurements types also affect *a* but not *b*; especially, for the same sample, *a* increases from total- to fork to standard length (Froese, 2006). For this reason studies were classified for length type and analyzed separately. The descriptive statistics of *a, b* and r^2 values estimated by LWR were given for all length type seperately. Both LWR parameters, *a* and *b*, were tested at the family level and compared per study area using one way variance analysis (ANOVA). In the cases when ANOVA results are significant, Duncan multiple comparison test was used to determine which group this difference comes from (Zar, 1999; Gündoğdu, 2014). To determine the similarities of families with regards to *a* and *b* values, hierarchical clustering based on Euclidian distance was applied and Ward's method was used (Gor-

don, 1999). The *b* value is 3 or around 3 for the majority of fishes (Tesch, 1968). *b=3* means the fish demonstrates isometric growth, and situations to the contrary are taken to be allometric growth (*b<3*: negative allometry, *b>3*: positive allometry). For determination of whether *b* value is different from 3, student t-test was applied.

Joint LWR equations on the family level for each length type were estimated with the help of the median values of the *a* and *b* parameters of each family. The correlation between *a* and *b* parameters was calculated with the help of the Pearson correlation multiplier for all species together. Froese, (2000) recommend the application of a scatter plot between *log (a)* and *b* to demonstrate the interdependency between *a* and *b* parameters.

A scatter plot between *log(a)* and *b* values was drawn for most reported species to determine the outlier values present in LWR, from, which outliers should be identified and those relationships must be considered problematic (Stergiou & Moutopoulos, 2001; Froese, 2000).

All statistical analysis was performed using the IBM SPSS v20 and R package software and the level of significance was determined as 5%.

Results

The *a, b, a´, R2,* fishing method, year of sampling, L_{min}, L_{max} location where study conducted and the season of sampling of each species , are given in Table 1, 2 and 3.The highest number of studies were performed in the Aegean Sea (n=15) and the lowest number were performed in the Black Sea (n=3) (Table 4). Table 1 shown that 236 species were studied with total length, table 2 shown that 40 species were studied with fork length and table 3 shown that 9 species were studied with disc width. The highest number of LWR studies were performed for Sparidae (13.7%, n=101) and *Mullus barbatus* (2%, n=15).

Graphs for *b* values for all length-weight relationships (for each length type separately) are shown in Figure 1 after excluding questionable records. The median values *b* was calculated as 3.05 for total length, 3.009 for fork length and 3.05 for disc width. For all LWR *b* values were not different from 3 ($p>0.05$).

Three significantly different ($p<0.05$) groups of species were formed as a result of the hierarchical clustering analysis based on the median values of *a* and *b* parameters after excluding questionable records (Fig. 2).

The LWR equation estimated from all studies was determined as,

$W=0.009L^{3.05}(n=640,r^2=0.99,$ total length)

$W=0.0165L^{3.009}(n=56,r^2=0.99,$ fork length)

$W=0.0169L^{3.05}(n=13,r^2=0.99,$ disc width)

Significant ($p<0.05$; Fig. 3) correlation value were calculated for all families as -0.417. *Log(a)-b* scatter plot for all families, it was discovered that the grouping is mostly around 3 (Fig. 3).

Some of species that have more than ten LWR and that have outliers are considered. It was determined that *M. merluccius* had two outliers and the others had one outlier each (Fig. 4).

Considering the seasons in which the studies were performed, it is noted that 25 studies were performed with samples gathered over a period of one year while the remaining 8 studies were performed only during a specific period of the year (Table 1, 2 and 3).

Discussion

In Turkish waters 512 fish species have been reported (Bilecenoğlu *et al.*, 2014). Among these species, Gobiidae (43 species), Sparidae (21 species), Blenniidae (20 species) and Labridae (20 species) families are represented by the highest numbers of species. However, the numbers of species focused on by the studies gathered by this study doesn't match Bilecenoğlu *et al.,* (2014) except for Sparidae. The main reason for this is the preference of the trawling method of fishing for the studies gathered in this study, as this prevents the sampling of the fish species living in coastal waters. Considering catching methods of studies gathered in this study, most of studies used trawl as sampling method (Table 1, 2 and 3). For example, most species belonging to the Gobiidae family live in coastal waters. Thus, it is not possible for these species to be caught by sampling performed using trawl fishing methods (Miller, 1986). When the most heavily studied species are examined, it can be seen that these species match with the ones that are most heavily fished or that are most prominent among the fishes caught using the trawl fishing methods. In fact, the target species and bycatch compositions of fisheries in all four seas are parallel to these three species (Özbilgin & Tosunoğlu, 2003; Özbilgin *et al.,* 2006; Yazıcı *et al.,* 2006; Atar & Malal, 2010; Ceylan *et al.,* 2013).

b value varies between 1.19 (*Cepola macroptalma*, from Demirel & Dalkara, 2012) and 4.15 (*Raja miraletus* from Filiz & Bilge, 2004) for all species. Also, 95% of these values vary between 2.99 and 3.028, which mean the median value of 3 accepted for all fish species is a relevant value. The study performed by Froese, (2006) on all fishes included in Fishbase demonstrates that a range close to this (2.94-3.07) is applicable for 95% of all fishes. Indeed, the t-test performed and given above shows that when all values are considered, b values aren't different from 3. This also matches the 2.5-3.5 range given by Froese, (2006) and Carlander, (1997) for the *b* value. However, there are also species with exceptional *b* values such as *C. macrophtalma* and *R. miraletus*. It is already supposed that the families that these two mentioned species belong to were placed in different clusters as a result

Table 1. Parameters of the length-weight relationship [weight (in g) and length (in cm and total length)] of marine fish species from Turkish marine waters. (M, male; F, female; C, combined); Location= Place where study conducted (AS, Aegean Sea; BS, Black Sea; MS, Marmara Sea; Medit, Mediterranean Sea); Year= year of sampling; Season = sampling season (ASC, all seasons combined; F-W, Fall-Winter; W-S, Winter-Spring); FM= fishing method (T, trawl; L, Longline; BS, beach seine; GN, gill nets; TR, trammel); a= the intercept of the relationship provided by source; a'= the original standardized intercept corresponding to cm, g (this is calculated only for length given in mm); b= the slope of the relationship; = coefficient of determination; n= the sample size; Species are listed in alphabetical order.

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	MS	*Aidablennius sphynx*	12	C	2007	BS	2	7.9	0.00820		3.11	0.99	Ozen et al. (2009)
ASC	Medit	*Alepes djedaba***	70	C	1997-1998	T-GN	13	19.2	0.00075	0.4883	2.82	0.86	Taskavak and Bilecenoglu (2001)
ASC	AS	*Alosa fallax*	32	C	2004-2005	GN-TR	17.6	24.6	0.01020		2.93	0.88	Karakulak et al. (2006)
F-W	BS	*Alosa pontica*	227	C	2004-2005	T	11.9	27.6	0.00460		3.12	0.94	Kalaycı et al. (2007)
ASC	AS	*Anthias anthias*	16	C	2005-2006	T	6.5	26.9	0.02500		3.02	0.98	İlkyaz et al. (2008)
ASC	AS	*Aphanius fasciatus*	143	C	1998-2001	TR-GN-T-BS	2.7	7.1	0.00600		3.53	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Apogon imberbis*	12	C	2004-2005	GN-TR	9.7	12.8	0.11350		2.12	0.69	Karakulak et al. (2006)
Winter	Medit	*Apogon nigripinnis*	30	C	2007-2008	T	7.1	5.53	0.04840		2.49	0.98	Erguden et al. (2009)
ASC	Medit	*Apogon nigripinnis***	22	C	1997-1998	T-GN	4.1	8.5	0.00002	0.0203	3.00	0.99	Taskavak and Bilecenoglu (2001)
Fall	AS	*Apogon queketti*	11	C	2011	T	7.1	12.3	0.08690		3.06	0.92	Yapıcı et al. (2015)
Winter	Medit	*Apogon queketti*	48	C	2007-2008	T	12.3	9.94	0.01570		3.06	0.95	Erguden et al. (2009)
Spring	AS	*Argentina sphyraena*	238	C	2003	T	7.5	20.7	0.00620		2.93	0.93	Filiz and Bilge (2004)
ASC	AS	*Argentina sphyraena*	92	C	2005-2006	T	8	20.6	0.00426		3.08	0.98	Ismen et al. (2007)
ASC	Medit	*Argyropelecus hemigymnus*	27	C	2009-2011	T	2.6	5.1	0.00420		3.59	0.87	Deval et al. (2014)
ASC	AS	*Arnoglossus imperialis*	36	C	2006-2008	T	7.6	15.2	0.00390		3.30	0.94	Ozekinci et al. (2009)
ASC	MS	*Arnoglossus kessleri*.***	24	C	2000-2001	L-BS	4.2	8.7	0.00004	0.1221	3.47	0.97	Keskin and Gaygusuz (2010)
ASC	BS	*Arnoglossus kessleri*	60	C	2007	T	4.3	9.8	0.02100		2.98	0.73	Ak et al. (2009)
ASC	AS	*Arnoglossus kessleri*	7	C	2005-2006	T	20	25.5	0.01850		2.74	0.96	İlkyaz et al. (2008)
ASC	AS	*Arnoglossus kessleri*	76	C	2002	T	6	8.9	0.01790		2.60	0.88	Bayhan et al. (2008)
ASC	MS	*Arnoglossus kessleri*	44	C	2007	BS	2.9	9.8	0.00673		3.15	0.97	Ozen et al. (2009)
ASC	AS	*Arnoglossus kessleri**	32	C	1997-2000	T	52	95	0.00004		3.12	0.94	Türker et al. (2008)
ASC	MS	*Arnoglossus laterna*.***	7	C	2000-2001	L-BS	5.2	12.3	0.00207	0.9682	2.67	0.98	Keskin and Gaygusuz (2010)
ASC	AS	*Arnoglossus laterna*	8	C	2004-2005	GN-TR	7.6	18.3	0.01500		2.75	0.99	Karakulak et al. (2006)
ASC	MS	*Arnoglossus laterna**	328	C	2009-2011	T	6	19.5	0.01300		2.79	0.87	Demirel and Dalkara (2012)
ASC	Medit	*Arnoglossus laterna*	291	C	2001-2003	T-L	4.5	13.4	0.01220		2.84	0.95	Sangun et al. (2007)
ASC	AS	*Arnoglossus laterna*	1078	C	2005	T	4.5	14.9	0.00970		2.91	0.96	Ozaydın et al. (2007)
ASC	Medit	*Arnoglossus laterna*	594	C	1999-2000	T	2.2	11.8	0.00800		3.01	0.97	Çiçek et al. (2006)
ASC	AS	*Arnoglossus laterna*	796	C	2002	T	5.6	17.1	0.00730		3.01	0.97	Bayhan et al. (2008)
ASC	AS	*Arnoglossus laterna*	1805	C	2005-2006	T	5.5	24.2	0.00719		3.01	0.98	Ismen et al. (2007)
ASC	AS	*Arnoglossus laterna*	1629	C	2005-2006	T	11.7	24.1	0.00710		3.05	0.97	İlkyaz et al. (2008)
F-W	MS	*Arnoglossus laterna*	58	C	2006-2007	T	6.8	20	0.00680		3.02	0.96	Bok et al. (2011)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Arnoglossus laterna*	721	C	1998-2001	TR-GN-T-BS	6.8	21.9	0.00520		3.17	0.96	Ozaydın and Taskavak (2006)
ASC	AS	*Arnoglossus laterna*	57	C	2006-2008	T	8.8	20.2	0.0046		3.18	0.98	Ozekinci et al. (2009)
ASC	AS	*Arnoglossus laterna*	328	C	1997-2000	T	55	205	0.0002		3.24	0.97	Türker et al. (2008)
ASC	AS	*Arnoglossus rueppelli*	13	C	2006-2008	T	7.5	16.2	0.0081		2.92	0.95	Ozekinci et al. (2009)
ASC	AS	*Arnoglossus thori*	6	C	2002	T	19.6	29.5	0.0442		2.16	0.95	Bayhan et al. (2008)
ASC	AS	*Arnoglossus thori*	20	C	2005	T	6.1	7.9	0.0288		2.48	0.98	Ozaydın et al. (2007)
ASC	AS	*Arnoglossus thori*	8	C	2004-2005	GN-TR	8.5	11.2	0.0068		3.12	0.96	Karakulak et al. (2006)
ASC	AS	*Arnoglossus thori*	371	C	2005-2006	T	29	51.3	0.0054		3.26	0.96	İlkyaz et al. (2008)
ASC	AS	*Arnoglossus thori*	15	C	2006-2008	T	8	13.1	0.0026		3.56	0.96	Ozekinci et al. (2009)
ASC	AS	*Arnoglossus thori**	170	C	1997-2000	T	65	225	0.0001		2.95	0.93	Türker et al. (2008)
ASC	MS	*Atherina boyeri***	606	C	2000-2001	L-BS	2.5	11.2	0.0005	0.7383	3.22	0.97	Keskin and Gaygusuz (2010)
F-W	MS	*Atherina boyeri*	14	C	2006-2007	T	7.6	11.7	0.0015		3.49	0.99	Bok et al. (2011)
ASC	MS	*Atherna hepsetus***	65	C	2000-2001	L-BS	2.7	14.8	0.0004	0.6371	3.24	0.98	Keskin and Gaygusuz (2010)
Fall	AS	*Aulopus filamentosus*	11	C	2011	T	23.7	32.8	0.0065		3.10	0.99	Yapıcı et al. (2015)
ASC	Medit	*Balistes capriscus*	123	C	2001-2003	T-L	5.9	40.9	0.0678		2.43	0.89	Sangun et al. (2007)
ASC	MS	*Belone belone***	10	C	2000-2001	L-BS	3.4	12	0.0003	0.0651	2.28	0.95	Keskin and Gaygusuz (2010)
ASC	AS	*Belone belone*	416	C	1998-2001	TR-GN-T-BS	26	60.5	0.0003		3.37	0.93	Ozaydın and Taskavak (2006)
ASC	Medit	*Blennius ocellaris*	31	C	2001-2003	T-L	6.8	17.2	0.0411		2.61	0.95	Sangun et al. (2007)
F-W	MS	*Blennius ocellaris*	15	C	2006-2007	T	11.2	13.7	0.0381		2.56	0.97	Bok et al. (2011)
ASC	AS	*Blennius ocellaris*	23	C	2005	T	9.2	14.3	0.0183		2.91	0.97	Ozaydın et al. (2007)
ASC	Medit	*Blennius ocellaris*	43	C	1999-2000	T	4.1	9.6	0.0172		2.89	0.97	Çiçek et al. (2006)
ASC	AS	*Blennius ocellaris*	36	C	2005-2006	T	7	14.2	0.0169		2.93	0.93	Ismen et al. (2007)
ASC	AS	*Blennius ocellaris*	204	C	2005-2006	T	23.9	45.1	0.0167		2.97	0.98	İlkyaz et al. (2008)
F-W	AS	*Boops boops*	32	C	2006	TR-L	21.4	16.5	0.0085		3.09	0.95	Ceyhan et al. (2009)
ASC	Medit	*Boops boops**	124	C	2012-2013	T	10	20.2	0.0139		2.82	0.88	Özvarol (2014)
ASC	Medit	*Boops boops*	391	C	1999-2000	T	7.5	21.4	0.00800		3.05	0.95	Çiçek et al. (2006)
ASC	Medit	*Boops boops*	172	C	2001-2003	T-L	11.2	21.1	0.00720		3.08	0.93	Sangun et al. (2007)
ASC	AS	*Boops boops*	39	C	2005	T	11.3	16.7	0.00570		3.35	0.96	Ozaydın et al. (2007)
ASC	AS	*Boops boops*	378	C	2005-2006	T	24.5	37.4	0.00500		3.24	0.97	İlkyaz et al. (2008)
ASC	AS	*Boops boops*	518	C	2004-2005	GN-TR	10.2	32.1	0.00480		3.26	0.95	Karakulak et al. (2006)
ASC	AS	*Boops boops*	189	C	2005-2006	T	10.5	22	0.00450		3.24	0.96	Ismen et al. (2007)
ASC	AS	*Boops boops**	1231	C	1997-2000	T	94	221	0.00011		2.92	0.87	Türker et al. (2008)
ASC	Medit	*Bothus podas*	90	C	2001-2003	T-L	6.2	15.7	0.00960		3.00	0.92	Sangun et al. (2007)
ASC	Medit	*Bothus podas*	1498	C	1999-2000	T	4.2	17.3	0.00900		3.10	0.98	Çiçek et al. (2006)
ASC	AS	*Bothus podas*	17	C	2005	T	11	18.7	0.00400		3.39	0.98	Ozaydın et al. (2007)
ASC	Medit	*Bregmaceros atlanticus*	16	C	2001-2003	T-L	5.95	7.6	0.00320		3.29	0.83	Sangun et al. (2007)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Buglossidium luteum*	28	C	2002	T	7.3	9.6	0.02400		2.57	0.79	Bayhan et al. (2008)
F-W	MS	*Buglossidium luteum*	27	C	2006-2007	T	9.5	20	0.01950		2.62	0.97	Bok et al. (2011)
ASC	AS	*Buglossidium luteum*	123	C	2005	T	7	11.4	0.01500		2.82	0.89	Ozaydın et al. (2007)
ASC	AS	*Buglossidium luteum*	862	C	2005-2006	T	16.1	35.2	0.00910		3.06	0.96	İlkyaz et al. (2008)
ASC	MS	*Buglossidium luteum*	55	C	2009-2011	T	8.4	15.1	0.00500		3.02	0.90	Demirel and Dalkara (2012)
Spring	AS	*Caelorinchus caelorhincus*	208	C	2003	T	9	21.6	0.00650		2.74	0.78	Filiz and Bilge (2004)
ASC	AS	*Caelorinchus caelorhincus*	332	C	2005-2006	T	8.5	27.5	0.00347		3.02	0.91	Ismen et al. (2007)
Fall	AS	*Callanthias ruber*	44	C	2011	T	5.7	13.5	0.02430		2.48	0.99	Yapıcı et al. (2015)
Winter	Medit	*Callionymus filamentosus*	43	C	2007-2008	T	10.7	9.15	0.03230		2.51	0.93	Erguden et al. (2009)
ASC	Medit	*Callionymus filamentosus***	92	C	1997-1998	T-GN	5.8	10.2	0.00003	0.0181	2.84	0.96	Taskavak and Bilecenoglu (2001)
ASC	MS	*Callionymus lyra*	99	C	2009-2011	T	6.5	22.5	0.02100		2.55	0.92	Demirel and Dalkara (2012)
F-W	MS	*Callionymus lyra*	87	C	2006-2007	T	6.4	22.6	0.00870		2.83	0.97	Bok et al. (2011)
ASC	AS	*Callionymus maculatus*	49	C	2005-2006	T	8.7	16.6	0.00660		3.13	0.98	İlkyaz et al. (2008)
ASC	MS	*Callionymus pusillus*	20	C	2007	BS	3.8	10.7	0.03137		2.00	0.98	Ozen et al. (2009)
ASC	MS	*Callionymus risso***	13	C	2000-2001	L-BS	3.2	7	0.00137	0.6946	2.71	0.94	Keskin and Gaygusuz (2010)
ASC	MS	*Callionymus risso*	42	C	2007	BS	2.4	6.4	0.01407		2.71	0.97	Ozen et al. (2009)
F-W	MS	*Callionymus risso*	15	C	2006-2007	T	11.6	18.2	0.00790		2.93	1.00	Bok et al. (2011)
Spring	AS	*Capros aper*	455	C	2003	T	2.9	10.1	0.02320		2.83	0.98	Filiz and Bilge (2004)
ASC	AS	*Capros aper*	35	C	2005-2006	T	4.4	9.1	0.01445		3.08	0.96	Ismen et al. (2007)
F-W	Medit	*Caranx crysos*	21	C	2008-2009	GN-TR	13.4	24	0.01000		3.00	0.94	Gokce et al. (2010)
ASC	Medit	*Centracanthus cirrus*	102	C	1999-2000	T	8.7	13.7	0.00810		3.04	0.95	Çiçek et al. (2006)
ASC	MS	*Cepola macrophthalma*	20	C	2009-2011	T	18.5	43.1	0.33900		1.19	0.85	Demirel and Dalkara (2012)
F-W	MS	*Cepola macrophthalma*	17	C	2006-2007	T	20.8	46.7	0.09340		1.51	0.84	Bok et al. (2011)
ASC	AS	*Cepola macrophthalma*	881	C	2005	T	16.2	50.9	0.07410		1.67	0.91	Ozaydın et al. (2007)
ASC	AS	*Cepola macrophthalma*	635	C	2005-2006	T	8.3	13.6	0.07160		1.65	0.97	İlkyaz et al. (2008)
ASC	AS	*Cepola macrophthalma*	136	C	2005-2006	T	19.1	49.6	0.03461		1.85	0.92	Ismen et al. (2007)
ASC	AS	*Cepola macrophthalma*	254	C	1998-2001	TR-GN-T-BS	12.2	50.6	0.02030		1.97	0.98	Ozaydın and Taskavak (2006)
ASC	AS	*Cepola rubescens*	356	C	1997-2000	T	3	43.7	0.13790		1.44	0.88	Türker et al. (2008)
ASC	MS	*Chalaroderma ocellata*	21	C	2009-2011	T	9.8	14.7	0.01800		2.86	0.90	Demirel and Dalkara (2012)
Fall	AS	*Champsodon nudivittis*	111	C	2011	T	6.2	12.7	0.00490		3.15	0.97	Yapıcı et al. (2015)
ASC	AS	*Chelidonichthys gurnardu*	304	C	1997-2000	T	94	224	0.00006		3.08	0.95	Türker et al. (2008)
ASC	Medit	*Chelidonichthys lastoviza*	28	C	2012-2013	T	10.1	20	0.02720		2.64	0.97	Özvarol (2014)
ASC	AS	*Chelidonichthys lastoviza*	88	C	2005-2006	T	11.5	21.2	0.01056		3.00	0.92	Ismen et al. (2007)
ASC	Medit	*Chelidonichthys lastoviza*	75	C	2001-2003	T-L	6.5	19.3	0.00850		3.08	0.99	Sangun et al. (2007)
ASC	AS	*Chelidonichthys lastoviza*	67	C	2005-2006	T	24.7	51.2	0.00800		3.13	0.97	İlkyaz et al. (2008)
ASC	AS	*Chelidonichthys lastoviza*	7	C	2004-2005	GN-TR	15.2	19.5	0.00430		3.33	0.85	Karakulak et al. (2006)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Chelidonichthys lastoviza**	128	C	1997-2000	T	75	780	0.00011		3.04	0.96	Türker et al. (2008)
ASC	MS	*Chelidonichthys lucerna**.**	17	C	2000-2001	L-BS	6.3	15.1	0.00113	0.8935	2.90	0.98	Keskin and Gaygusuz (2010)
ASC	Medit	*Chelidonichthys lucerna*	474	C	2001-2003	T-L	6.7	24.5	0.01660		2.74	0.95	Sangun et al. (2007)
ASC	Medit	*Chelidonichthys lucerna*	137	C	1999-2000	T	2.2	30.3	0.01350		2.85	0.99	Çiçek et al. (2006)
F-W	Medit	*Chelidonichthys lucerna*	3	C	2008-2009	GN-TR	9.5	23.5	0.01060		2.92	0.99	Gokce et al. (2010)
F-W	MS	*Chelidonichthys lucerna*	90	C	2006-2007	T	8	64	0.01000		2.98	0.98	Bok et al. (2011)
ASC	AS	*Chelidonichthys lucerna*	829	C	2005-2006	T	12.5	76	0.00960		2.93	0.98	Ismen et al. (2007)
ASC	MS	*Chelidonichthys lucerna*	352	C	2009-2011	T	10.5	56	0.00900		3.00	0.98	Demirel and Dalkara (2012)
ASC	AS	*Chelidonichthys lucerna*	121	C	2005-2006	T	24.1	78.2	0.00430		3.24	0.99	İlkyaz et al. (2008)
ASC	MS	*Chelon labrosus***	6	C	2000-2001	L-BS	3.6	15.3	0.00071	1.0821	3.18	1.00	Keskin and Gaygusuz (2010)
Spring	AS	*Chimaera monstrosa*	17	C	2003	T	13.1	75.3	0.00280		2.82	0.98	Filiz and Bilge (2004)
Spring	AS	*Chlorophthalmus agassizi*	378	C	2003	T	7.7	17.5	0.00270		3.37	0.98	Filiz and Bilge (2004)
ASC	AS	*Chromis chromis*	141	C	2004-2005	GN-TR	8.7	14	0.02750		2.70	0.79	Karakulak et al. (2006)
ASC	AS	*Citharus linguatula*	409	C	1998-2001	TR-GN-T-BS	8.4	22.7	0.05400		2.31	0.92	Ozaydın and Taskavak (2006)
ASC	MS	*Citharus linguatula*	108	C	2009-2011	T	7.3	22.5	0.02900		2.83	0.92	Demirel and Dalkara (2012)
ASC	Medit	*Citharus linguatula*	44	C	2012-2013	T	8	19.2	0.01330		2.78	0.92	Özvarol (2014)
ASC	Medit	*Citharus linguatula*	338	C	2001-2003	T-L	6.5	21.3	0.01140		2.82	0.98	Sangun et al. (2007)
ASC	AS	*Citharus linguatula*	1755	C	2006-2008	T	8.2	23.5	0.00610		3.07	0.97	Ozekinci et al. (2009)
ASC	Medit	*Citharus linguatula*	922	C	1999-2000	T	3.5	21	0.00580		3.08	0.98	Çiçek et al. (2006)
ASC	AS	*Citharus linguatula*	1513	C	2005-2006	T	8.9	23.8	0.00540		3.13	0.99	İlkyaz et al. (2008)
ASC	AS	*Citharus linguatula*	1724	C	2005	T	8.2	24.5	0.00530		3.12	0.96	Ozaydın et al. (2007)
ASC	AS	*Citharus linguatula*	716	C	2002	T	8.2	22.8	0.00480		3.14	0.99	Bayhan et al. (2008)
ASC	AS	*Citharus linguatula*	8	C	2004-2005	GN-TR	15.1	18.9	0.00090		3.73	0.95	Karakulak et al. (2006)
ASC	AS	*Citharus linguatula**	1236	C	1997-2000	T	69	237	0.00002		3.26	0.98	Türker et al. (2008)
ASC	MS	*Clinitrachus argentatus*	99	C	2007	BS	2.6	7.9	0.00602		3.09	0.97	Ozen et al. (2009)
Spring	AS	*Conger conger*	22	C	2003	T	32.2	65.4	0.00050		3.24	0.96	Filiz and Bilge (2004)
ASC	AS	*Conger conger*	25	C	2005-2006	T	40.1	64.5	0.00039		3.32	0.95	Ismen et al. (2007)
ASC	AS	*Conger conger*	10	C	2005	T	37.2	49.5	0.00030		3.40	0.98	Ozaydın et al. (2007)
ASC	AS	*Conger conger*	8	C	2004-2005	GN-TR	20.9	62.5	0.00020		3.49	0.97	Karakulak et al. (2006)
ASC	AS	*Conger conger*	20	C	2005-2006	T	4.9	12.3	0.00010		3.60	0.99	İlkyaz et al. (2008)
ASC	AS	*Coris julis*	35	C	2004-2005	GN-TR	13.4	18.2	0.00820		3.05	0.81	Karakulak et al. (2006)
ASC	AS	*Coris julis*	183	C	2005	T	6.1	13.6	0.00680		3.11	0.98	Ozaydın et al. (2007)
ASC	AS	*Coris julis*	16	C	2005-2006	T	16.4	22.1	0.00399		3.16	0.97	Ismen et al. (2007)
ASC	Medit	*Cynoglossus sinusarabici*	96	C	2001-2003	T-L	8.2	18.2	0.03080		2.41	0.91	Sangun et al. (2007)
Winter	Medit	*Cynoglossus sinusarabici*	53	C	2007-2008	T	17.1	12.48	0.02390		2.52	0.98	Erguden et al. (2009)
ASC	Medit	*Cynoglossus sinusarabici*	235	C	1999-2000	T	4.5	15.5	0.00720		2.96	0.96	Çiçek et al. (2006)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	Medit	*Cynoglossus sinusarabici***	32	C	1997-1998	T-GN	9.6	13.3	0.00001	0.0024	2.48	0.96	Taskavak and Bilecenoglu (2001)
ASC	Medit	*Dasyatis centroura*	4	C	2009-2011	T	141.1	220	0.00300		3.00	999.00	Deval et al. (2014)
ASC	AS	*Dasyatis pastinaca*	12	C	2004-2005	GN-TR	29.2	37.8	0.11680		2.12	0.64	Karakulak et al. (2006)
Spring	AS	*Dasyatis pastinaca*	29	C	2003	T	37.3	74.2	0.01490		2.81	0.85	Filiz and Bilge (2004)
ASC	AS	*Dasyatis pastinaca*	48	C	2005-2006	T	20.5	66	0.01259		3.30	0.99	Ismen et al. (2007)
ASC	AS	*Dasyatis pastinaca*	14	C	1999-2000	T	40	74.2	0.00850		2.94	0.97	Filiz and Mater (2002)
ASC	AS	*Dasyatis pastinaca*	16	C	2005	T	44.2	138	0.00230		3.25	0.99	Ozaydın et al. (2007)
ASC	Medit	*Dasyatis pastinaca*	334	C	1999-2003	T	23.4	100.9	0.00200		3.24	0.97	Yeldan and Avsar (2007)
ASC	AS	*Dasyatis pastinaca*	71	C	2005-2007	T	37.5	114	0.00074		3.55	0.96	Yığın and Ismen (2009)
ASC	AS	*Deltentosteus quadrimaculatus*	883	C	2005-2006	T	16.3	40.2	0.00400		3.41	0.95	İlkyaz et al. (2008)
F-W	AS	*Dentex dentex*	39	C	2006	TR-L	23.5	15	0.01050		3.06	0.98	Ceyhan et al. (2009)
Fall	Medit	*Dentex dentex*	16	C	2000	L	31.4	51	0.08610		2.50	0.92	Can et al. (2002)
ASC	AS	*Dentex dentex*	22	C	2004-2005	GN-TR	16.8	61.5	0.01070		3.03	0.95	Karakulak et al. (2006)
F-W	Medit	*Dentex dentex*	5	C	2008-2009	GN-TR	15.9	18.4	0.00310		3.53	0.99	Gokce et al. (2010)
Fall	Medit	*Dentex gibbosus*	34	C	2000	L	17.68	47.3	0.03410		2.71	0.85	Can et al. (2002)
ASC	AS	*Dentex macrophthalmus*	249	C	2005-2006	T	8.7	19.9	0.02100		2.89	0.99	İlkyaz et al. (2008)
F-W	AS	*Dentex maroccanus*	8	C	2006	TR-L	18	14.8	0.11860		2.29	0.90	Ceyhan et al. (2009)
ASC	AS	*Dentex maroccanus*	146	C	2005-2006	T	14.2	26.5	0.02827		2.72	0.93	Ismen et al. (2007)
ASC	AS	*Dentex maroccanus*	9	C	2004-2005	GN-TR	18.9	34	0.00880		3.18	1.00	Karakulak et al. (2006)
ASC	Medit	*Diaphus metopoclampus*	7	C	2009-2011	T	6.6	10.6	0.01360		2.95	0.98	Deval et al. (2014)
F-W	AS	*Dicentrarchus labrax*	28	C	2006	TR-L	36.9	24.5	0.03590		2.68	0.96	Ceyhan et al. (2009)
F-W	AS	*Diplodus annularis*	159	C	2006	TR-L	14.8	9.5	0.01440		3.06	0.97	Ceyhan et al. (2009)
ASC	MS	*Diplodus annularis*, **	7	C	2000-2001	L-BS	3.6	16.9	0.00134	1.7278	3.11	1.00	Keskin and Gaygusuz (2010)
ASC	Medit	*Diplodus annularis*	154	C	2001-2003	T-L	10.3	15	0.03700		2.68	0.90	Sangun et al. (2007)
F-W	MS	*Diplodus annularis*	15	C	2006-2007	T	7	16.7	0.02200		2.96	0.99	Bok et al. (2011)
ASC	AS	*Diplodus annularis*	159	C	2002-2003	L	9.5	16	0.01790		2.99	0.97	Akyol et al. (2007)
F-W	Medit	*Diplodus annularis*	33	C	2008-2009	GN-TR	12.2	15	0.01730		2.97	0.91	Gokce et al. (2010)
ASC	AS	*Diplodus annularis*	108	C	2005-2006	T	8.8	15.6	0.01602		3.02	0.89	Ismen et al. (2007)
ASC	AS	*Diplodus annularis*	1443	C	2005-2006	T	11.9	17.1	0.01230		3.13	0.96	İlkyaz et al. (2008)
ASC	Medit	*Diplodus annularis*	89	C	1999-2000	T	7.9	16.7	0.01130		3.15	0.96	Çiçek et al. (2006)
ASC	AS	*Diplodus annularis*	372	C	2004-2005	GN-TR	7.7	17.7	0.00680		3.32	0.98	Karakulak et al. (2006)
ASC	MS	*Diplodus annularis**	81	C	2009-2011	T	10	16.7	0.00400		3.43	0.74	Demirel and Dalkara (2012)
ASC	AS	*Diplodus annularis**	887	C	1997-2000	T	73	138	0.00051		2.82	0.87	Türker et al. (2008)
ASC	MS	*Diplodus puntazzo***	18	C	2000-2001	L-BS	2.6	7.6	0.00114	1.6669	3.17	0.99	Keskin and Gaygusuz (2010)
ASC	AS	*Diplodus puntazzo*	7	C	2004-2005	GN-TR	15.2	25.2	0.00440		2.66	0.98	Karakulak et al. (2006)
F-W	AS	*Diplodus sargus*	33	C	2006	TR-L	21.3	16	0.00610		3.04	0.98	Ceyhan et al. (2009)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
F-W	Medit	*Diplodus sargus*	26	C	2008-2009	GN-TR	11.6	18.1	0.06080		2.50	0.93	Gokce et al. (2010)
Fall	Medit	*Diplodus sargus*	33	C	2000	L	14.9	26.7	0.03420		2.81	0.85	Can et al. (2002)
ASC	Medit	*Diplodus sargus*	36	C	2001-2003	T-L	11.2	25.3	0.01080		3.17	0.99	Sangun et al. (2007)
F-W	AS	*Diplodus vulgaris*	69	C	2006	TR-L	19.2	9.6	0.00690		3.21	0.99	Ceyhan et al. (2009)
ASC	AS	*Diplodus vulgaris*	93	C	2004-2005	GN-TR	9	25	0.08580		2.43	0.65	Karakulak et al. (2006)
ASC	AS	*Diplodus vulgaris*	69	C	2002-2003	L	9.6	26.5	0.01450		3.03	0.99	Akyol et al. (2007)
Fall	Medit	*Diplodus vulgaris*	105	C	2000	L	13.2	27	0.01310		3.12	0.93	Can et al. (2002)
ASC	AS	*Diplodus vulgaris*	23	C	2005-2006	T	10.2	19.1	0.00925		3.14	0.94	Ismen et al. (2007)
F-W	Medit	*Diplodus vulgaris*	22	C	2008-2009	GN-TR	11.7	17.9	0.00890		3.19	0.99	Gokce et al. (2010)
ASC	AS	*Diplodus vulgaris*	242	C	2005-2006	T	6.6	8.6	0.00380		3.53	0.98	İlkyaz et al. (2008)
ASC	AS	*Dipturus oxyrinchus*	118	C	2005-2006	T	10	63.2	0.00423		3.29	1.00	Ismen et al. (2007)
ASC	AS	*Dipturus oxyrinchus*	179	C	2005-2007	T	14.9	100	0.00083		3.35	1.00	Yığın and Ismen (2009)
Spring	AS	*Dipturus oxyrinchus*	8	C	2003	T	17.9	62.2	0.00070		3.40	0.99	Filiz and Bilge (2004)
ASC	Medit	*Dussumieria acuta***	27	C	1997-1998	T-GN	14	16.9	0.00001	0.0062	3.03	0.88	Taskavak and Bilecenoglu (2001)
Winter	Medit	*Dussumieria elopsoides*	59	C	2007-2008	T	16.4	12.42	0.00550		3.12	0.99	Erguden et al. (2009)
ASC	Medit	*Echelus myrus*	14	C	2001-2003	T-L	30.9	67.5	0.01310		2.28	0.98	Sangun et al. (2007)
ASC	Medit	*Echelus myrus*	310	C	1999-2000	T	4.4	49.5	0.00410		2.66	0.97	Çiçek et al. (2006)
ASC	AS	*Echelus myrus*	39	C	2005-2006	T	7.3	12.2	0.00010		3.41	0.97	İlkyaz et al. (2008)
ASC	MS	*Echiichthys vipera*	24	C	2007	BS	1.7	14.3	0.01664		2.71	0.99	Ozen et al. (2009)
F-W	BS	*Engraulis encrasicolus*	575	C	2004-2005	T	8	14.7	0.01740		2.60	0.85	Kalaycı et al. (2007)
ASC	Medit	*Engraulis encrasicolus*	392	C	2001-2003	T-L	7	17	0.01560		2.66	0.96	Sangun et al. (2007)
ASC	AS	*Engraulis encrasicolus*	212	C	2005-2006	T	8.1	14.8	0.00529		2.97	0.87	Ismen et al. (2007)
ASC	Medit	*Engraulis encrasicolus*	630	C	1999-2000	T	4.3	13.7	0.00370		3.18	0.96	Çiçek et al. (2006)
ASC	AS	*Engraulis encrasicolus*	28	C	1997-2000	T	85	134	0.00021		2.77	0.66	Türker et al. (2008)
ASC	Medit	*Ephinephelus marginatus*	48	C	2001-2003	T-L	13.1	29.4	0.01160		3.07	0.91	Sangun et al. (2007)
F-W	AS	*Epinephelus aeneus*	36	C	2006	TR-L	21	16	0.00940		3.27	0.95	Ceyhan et al. (2009)
ASC	AS	*Epinephelus aeneus*	125	C	2002-2003	L	18.6	56.6	0.01780		2.86	0.94	Akyol et al. (2007)
Fall	Medit	*Epinephelus aeneus*	89	C	2000	L	17.4	67.5	0.01520		2.90	0.97	Can et al. (2002)
ASC	Medit	*Epinephelus aeneus*	24	C	2001-2003	T-L	16	42.2	0.01200		2.99	0.99	Sangun et al. (2007)
F-W	AS	*Epinephelus costae*	365	C	2006	TR-L	18.9	12	0.01020		3.21	0.94	Ceyhan et al. (2009)
Fall	Medit	*Epinephelus costae*	53	C	2000	L	14.2	55.4	0.08850		2.39	0.93	Can et al. (2002)
ASC	AS	*Epinephelus costae*	59	C	2002-2003	L	14.6	45	0.02660		2.74	0.97	Akyol et al. (2007)
ASC	AS	*Etmopterus spinax*	11	U	2005-2009	T	10.6	45	0.00230		3.23	0.95	Ismen et al. (2009)
ASC	AS	*Etmopterus spinax*	24	C	2005-2006	T	10.6	45	0.00172		3.27	0.92	Ismen et al. (2007)
Winter	Medit	*Etrumeus teres*	61	C	2007-2008	T	16.7	13.46	0.00780		2.99	0.97	Erguden et al. (2009)
F-W	MS	*Eutrigla gurnardus*	67	C	2006-2007	T	9.6	22.8	0.01050		2.96	0.96	Bok et al. (2011)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Eutrigla gurnardus*	7	C	2005-2006	T	9.9	42	0.01040		2.88	1.00	İlkyaz et al. (2008)
ASC	MS	*Eutrigla gurnardus*	633	C	2009-2011	T	10.1	25.6	0.00700		3.05	0.93	Demirel and Dalkara (2012)
ASC	AS	*Eutrigla gurnardus*	23	C	2005	T	11.2	20.3	0.00390		3.33	0.99	Ozaydın et al. (2007)
ASC	AS	*Eutrigla gurnardus*	251	C	2005-2006	T	10.9	21.2	0.00250		3.42	0.92	Ismen et al. (2007)
Winter	Medit	*Fistularia commersonii*	12	C	2007-2008	T	65	60	0.01120		2.50	0.98	Erguden et al. (2009)
ASC	AS	*Gadiculus argenteus*	331	C	2005-2006	T	6.7	13.5	0.01414		2.85	0.83	Ismen et al. (2007)
Spring	AS	*Gadiculus argenteus*	110	C	2003	T	6.4	10.5	0.00560		3.24	0.89	Filiz and Bilge (2004)
ASC	MS	*Gaidropsarus mediterraneus***	8	C	2000-2001	L-BS	4.2	20.7	0.00068	0.6958	3.01	1.00	Keskin and Gaygusuz (2010)
F-W	MS	*Gaidropsarus mediterraneus*	56	C	2006-2007	T	8.2	14.3	0.00300		3.18	0.79	Bok et al. (2011)
ASC	AS	*Galeus melastomus*	93	C	2005-2006	T	12	31.7	0.00238		3.03	0.98	Ismen et al. (2007)
ASC	AS	*Galeus melastomus*	303	U	2005-2009	T	11.3	31.7	0.00160		3.18	0.95	Ismen et al. (2009)
Fall	AS	*Gnathophis mystax*	466	C	2011	T	17.3	39.7	0.00150		2.92	0.97	Yapıcı et al. (2015)
ASC	BS	*Gobius batrachocephalus*	184	C	2007	T	5.5	18	0.02400		2.74	0.91	Ak et al. (2009)
ASC	MS	*Gobius geniporus*	20	C	2007	BS	4.1	15.3	0.00646		3.21	0.99	Ozen et al. (2009)
ASC	BS	*Gobius melanostomuss*	73	C	2007	T	9.1	35	0.01000		3.03	0.89	Ak et al. (2009)
F-W	BS	*Gobius niger*	227	C	2004-2005	T	8	25.3	0.01660		2.87	0.96	Kalaycı et al. (2007)
F-W	MS	*Gobius niger*	286	C	2006-2007	T	6.9	15	0.01150		2.98	0.88	Bok et al. (2011)
W-S	BS	*Gobius niger*	113	C	2009-2011	T	7.6	13.2	0.01130		3.00	0.91	Demirhan and Can (2007)
ASC	BS	*Gobius niger*	208	C	2007	T	5.6	15.7	0.00900		3.04	0.89	Ak et al. (2009)
ASC	MS	*Gobius niger*	83	C	2009-2011	T	8	14.3	0.00800		3.13	0.93	Demirel and Dalkara (2012)
ASC	AS	*Gobius niger*	447	C	2005	T	7.7	16.5	0.00750		3.15	0.97	Ozaydın et al. (2007)
ASC	AS	*Gobius niger*	618	C	2005-2006	T	15.3	36.6	0.00650		3.21	0.97	İlkyaz et al. (2008)
ASC	Medit	*Gobius niger*	272	C	1999-2000	T	2.1	12.2	0.00470		3.39	0.95	Çiçek et al. (2006)
ASC	MS	*Gobius paganellus*	161	C	2007	BS	2.7	11.8	0.01130		3.03	0.97	Ozen et al. (2009)
ASC	MS	*Gymnammodytes cicerellus***	13	C	2000-2001	L-BS	6.6	9.7	0.00012	0.2433	3.31	0.85	Keskin and Gaygusuz (2010)
ASC	AS	*Gymnura altavela*	17	C	2005	T	37.6	95	0.04490		2.84	0.99	Ozaydın et al. (2007)
Spring	AS	*Gymnura altavela*	9	C	2003	T	37.5	72	0.02680		2.96	0.98	Filiz and Bilge (2004)
ASC	Medit	*Gymnura altavela*	107	C	1999-2003	T	30.2	83.5	0.00900		3.23	0.98	Yeldan and Avsar (2007)
ASC	AS	*Helicolenus dactylopterus*	96	C	2005-2006	T	7.6	20.5	0.01628		3.04	0.97	Ismen et al. (2007)
Spring	AS	*Helicolenus dactylopterus*	178	C	2003	T	5.5	13.5	0.00790		3.28	0.92	Filiz and Bilge (2004)
ASC	AS	*Heptranchias perlo*	18	C	2005-2009	T	68.6	105	0.00470		2.90	0.96	Ismen et al. (2009)
ASC	AS	*Heptranchias perlo*	14	C	2005-2006	T	68.6	105	0.00424		2.93	0.96	Ismen et al. (2007)
ASC	AS	*Hexanchus griseus*	7	F	2005-2009	T	80	170	0.00020		3.61	0.98	Ismen et al. (2009)
ASC	AS	*Hexanchus griseus*	5	C	2005-2006	T	80	114	0.00008		3.82	0.91	Ismen et al. (2007)
ASC	AS	*Hippocampus guttulatus*	200	C	2000-2002	TR	100	165	0.01000		2.47	0.64	Gürkan and Taskavak (2007)
ASC	BS	*Hippocampus hippocampus*	163	C	2007	T	2.7	13.7	0.00400		2.95	0.56	Ak et al. (2009)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Hippocampus hippocampus*	29	C	2000-2002	TR	80	140	0.00100		3.14	0.76	Gürkan and Taskavak (2007)
Spring	AS	*Hoplostethus mediterraneus mediterraneus*	137	C	2003	T	8	18	0.01490		2.95	0.98	Filiz and Bilge (2004)
ASC	AS	*Hoplostethus mediterraneus mediterraneus*	599	C	2005-2006	T	4.5	24.6	0.00890		3.16	0.99	Ismen et al. (2007)
ASC	Medit	*Hymenocephalus italicus*	76	C	2009-2011	T	8.2	15.5	0.00770		2.45	0.77	Deval et al. (2014)
Fall	AS	*Hymenocephalus italicus*	91	C	2011	T	7.4	14.9	0.00340		2.89	0.86	Yapıcı et al. (2015)
ASC	MS	*Labrus viridis*	72	C	2007	BS	3	12.6	0.01272		2.99	0.99	Ozen et al. (2009)
ASC	Medit	*Lagocephalus lagocephalus*	27	C	2001-2003	T-L	12.3	22.5	0.00660		3.30	0.85	Sangun et al. (2007)
Winter	Medit	*Lagocephalus spadiceus*	89	C	2007-2008	T	26.9	15.94	0.02040		2.90	0.94	Erguden et al. (2009)
ASC	Medit	*Lagocephalus spadiceus***	19	C	1997-1998	T-GN	15.9	19.9	0.00002	0.0186	2.95	0.97	Taskavak and Bilecenoglu (2001)
Winter	Medit	*Lagocephalus suezensis*	86	C	2007-2008	T	16.7	12.9	0.02360		2.75	0.96	Erguden et al. (2009)
Fall	AS	*Lagocephalus suezensis*	15	C	2011	T	11.5	14.1	0.01890		2.75	0.94	Yapıcı et al. (2015)
ASC	Medit	*Leiognathus klunzingeri*	2212	C	1999-2000	T	2.1	10.7	0.00900		3.16	0.96	Çiçek et al. (2006)
ASC	Medit	*Leiognathus klunzingeri*	632	C	2001-2003	T-L	1.9	10	0.00750		3.22	0.97	Sangun et al. (2007)
ASC	Medit	*Leiognathus klunzingeri***	156	C	1997-1998	T-GN	4.9	10.4	0.00000	0.0065	3.27	0.96	Taskavak and Bilecenoglu (2001)
Winter	Medit	*Leiognathus klunzingeri*	358	C	2007-2008	T	10.9	7.29	0.00260		3.71	0.92	Erguden et al. (2009)
ASC	MS	*Lepadogaster lepadogaster*	4	C	2007	BS	4.1	5.1	0.00415		3.60	0.99	Ozen et al. (2009)
ASC	AS	*Lepidopus caudatus*	13	C	2005-2006	T	36.3	80	0.00047		3.05	0.99	Ismen et al. (2007)
Spring	AS	*Lepidopus caudatus*	40	C	2003	T	21.9	81.5	0.00040		3.11	0.99	Filiz and Bilge (2004)
ASC	AS	*Lepidorhombus boscii*	2242	C	2006-2008	T	10.9	40.8	0.00390		3.25	0.99	Ozekinci et al. (2009)
ASC	AS	*Lepidorhombus boscii*	521	C	2005-2006	T	10.2	39.5	0.00316		3.29	0.99	Ismen et al. (2007)
ASC	AS	*Lepidorhombus whiffiagonis*	12	C	2006-2008	T	20.2	35.7	0.07260		2.33	0.91	Ozekinci et al. (2009)
ASC	MS	*Lepidotrigla cavillone*	143	C	2009-2011	T	5.9	14.2	0.03300		2.63	0.84	Demirel and Dalkara (2012)
ASC	AS	*Lepidotrigla cavillone*	1428	C	2005-2006	T	12.7	33	0.00880		3.15	0.98	İlkyaz et al. (2008)
ASC	AS	*Lepidotrigla cavillone*	855	C	2005-2006	T	7	12.8	0.00442		3.41	0.90	Ismen et al. (2007)
ASC	AS	*Lepidotrigla cavillone*	377	C	1997-2000	T	75	141	0.00011		2.98	0.89	Türker et al. (2008)
Spring	AS	*Lesueurigobius friesii*	17	C	2003	T	6.2	8.1	0.03920		2.13	0.72	Filiz and Bilge (2004)
F-W	MS	*Lesueurigobius friesii*	580	C	2006-2007	T	4.2	10.7	0.01600		2.53	0.85	Bok et al. (2011)
ASC	AS	*Lesueurigobius friesii*	149	C	2005-2006	T	6.8	20.5	0.00890		2.89	0.96	İlkyaz et al. (2008)
ASC	AS	*Lesueurigobius friesii*	631	C	2005	T	4	9.1	0.00790		3.01	0.95	Ozaydın et al. (2007)
Fall	AS	*Lesueurigobius suerii*	13	C	2011	T	3.9	4.4	0.00960		2.93	0.91	Yapıcı et al. (2015)
ASC	Medit	*Leucoraja circularis*	6	C	2009-2011	T	44.5	82	0.00390		3.08	0.98	Deval et al. (2014)
F-W	AS	*Lithognathus mormyrus*	141	C	2006	TR-L	23.7	14.5	0.00240		3.50	0.97	Ceyhan et al. (2009)
ASC	MS	*Lithognathus mormyrus*, **	41	C	2000-2001	L-BS	2.6	8.5	0.00097	1.2072	3.10	0.99	Keskin and Gaygusuz (2010)
F-W	Medit	*Lithognathus mormyrus*	6	C	2008-2009	GN-TR	16.4	23	0.01920		2.83	0.99	Gokce et al. (2010)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Lithognathus mormyrus*	55	C	2005-2006	T	9.2	30.5	0.01180		3.01	0.98	İlkyaz et al. (2008)
ASC	AS	*Lithognathus mormyrus*	36	C	2002-2003	L	16	27.8	0.00980		3.04	0.95	Akyol et al. (2007)
ASC	Medit	*Lithognathus mormyrus*	39	C	1999-2000	T	12.6	19.4	0.00920		3.09	0.95	Çiçek et al. (2006)
ASC	MS	*Liza aurata***	446	C	2000-2001	L-BS	2.3	17.4	0.00088	0.9151	3.02	0.96	Keskin and Gaygusuz (2010)
ASC	Medit	*Liza carinata***	15	C	1997-1998	T-GN	16.7	18.7	0.00002	0.0162	2.86	0.94	Taskavak and Bilecenoglu (2001)
ASC	MS	*Liza saliens***	57	C	2000-2001	L-BS	2.3	18.6	0.00092	0.9371	3.01	0.99	Keskin and Gaygusuz (2010)
ASC	AS	*Lophius budegassa*	29	C	2005-2006	T	7	45.4	0.01160		3.08	0.99	İlkyaz et al. (2008)
ASC	MS	*Lophius piscatorius*	15	C	2009-2011	T	9.3	18.2	0.02200		2.85	0.81	Demirel and Dalkara (2012)
ASC	AS	*Lophius piscatorius*	15	C	2005	T	22.3	67	0.01990		2.97	0.99	Ozaydın et al. (2007)
ASC	AS	*Lophius piscatorius*	94	C	1998-2001	TR-GN-T-BS	8	48	0.01460		2.93	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Lophius piscatorius*	445	C	2005-2006	T	11.2	83	0.01239		3.03	0.98	Ismen et al. (2007)
ASC	AS	*Lophius piscatorius*	30	C	2005-2006	T	6.1	9.6	0.01010		3.11	0.99	İlkyaz et al. (2008)
F-W	MS	*Lophius piscatorius*	40	C	2006-2007	T	36	54	0.00010		2.49	0.88	Bok et al. (2011)
Winter	Medit	*Leiognathus klunzingeri*	358	C	2007-2008	T	10.9	7.29	0.00260		3.71	0.92	Erguden et al. (2009)
ASC	MS	*Lepadogaster lepadogaster*	4	C	2007	BS	4.1	5.1	0.00415		3.60	0.99	Ozen et al. (2009)
ASC	AS	*Lepidopus caudatus*	13	C	2005-2006	T	36.3	80	0.00047		3.05	0.99	Ismen et al. (2007)
Spring	AS	*Lepidopus caudatus*	40	C	2003	T	21.9	81.5	0.00040		3.11	0.99	Filiz and Bilge (2004)
ASC	AS	*Lepidorhombus boscii*	2242	C	2006-2008	T	10.9	40.8	0.00390		3.25	0.99	Ozekinci et al. (2009)
ASC	AS	*Lepidorhombus boscii*	521	C	2005-2006	T	10.2	39.5	0.00316		3.29	0.99	Ismen et al. (2007)
ASC	AS	*Lepidorhombus whiffiagonis*	12	C	2006-2008	T	20.2	35.7	0.07260		2.33	0.91	Ozekinci et al. (2009)
ASC	MS	*Lepidotrigla cavillone*	143	C	2009-2011	T	5.9	14.2	0.03300		2.63	0.84	Demirel and Dalkara (2012)
ASC	AS	*Lepidotrigla cavillone*	1428	C	2005-2006	T	12.7	33	0.00880		3.15	0.98	İlkyaz et al. (2008)
ASC	AS	*Lepidotrigla cavillone*	855	C	2005-2006	T	7	12.8	0.00442		3.41	0.90	Ismen et al. (2007)
ASC	AS	*Lepidotrigla cavillone*	377	C	1997-2000	T	75	141	0.00011		2.98	0.89	Türker et al. (2008)
Spring	AS	*Lesueurigobius friesii*	17	C	2003	T	6.2	8.1	0.03920		2.13	0.72	Filiz and Bilge (2004)
F-W	MS	*Lesueurigobius friesii*	580	C	2006-2007	T	4.2	10.7	0.01600		2.53	0.85	Bok et al. (2011)
ASC	AS	*Lesueurigobius friesii*	149	C	2005-2006	T	6.8	20.5	0.00890		2.89	0.96	İlkyaz et al. (2008)
ASC	AS	*Lesueurigobius friesii*	631	C	2005	T	4	9.1	0.00790		3.01	0.95	Ozaydın et al. (2007)
Fall	AS	*Lesueurigobius suerii*	13	C	2011	T	3.9	4.4	0.00960		2.93	0.91	Yapıcı et al. (2015)
ASC	Medit	*Leucoraja circularis*	6	C	2009-2011	T	44.5	82	0.00390		3.08	0.98	Deval et al. (2014)
F-W	AS	*Lithognathus mormyrus*	141	C	2006	TR-L	23.7	14.5	0.00240		3.50	0.97	Ceyhan et al. (2009)
ASC	MS	*Lithognathus mormyrus**, **	41	C	2000-2001	L-BS	2.6	8.5	0.00097	1.2072	3.10	0.99	Keskin and Gaygusuz (2010)
F-W	Medit	*Lithognathus mormyrus*	6	C	2008-2009	GN-TR	16.4	23	0.01920		2.83	0.99	Gokce et al. (2010)
ASC	AS	*Lithognathus mormyrus*	55	C	2005-2006	T	9.2	30.5	0.01180		3.01	0.98	İlkyaz et al. (2008)
ASC	AS	*Lithognathus mormyrus*	36	C	2002-2003	L	16	27.8	0.00980		3.04	0.95	Akyol et al. (2007)
ASC	Medit	*Lithognathus mormyrus*	39	C	1999-2000	T	12.6	19.4	0.00920		3.09	0.95	Çiçek et al. (2006)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	MS	*Liza aurata***	446	C	2000-2001	L-BS	2.3	17.4	0.00088	0.9151	3.02	0.96	Keskin and Gaygusuz (2010)
ASC	Medit	*Liza carinata***	15	C	1997-1998	T-GN	16.7	18.7	0.00002	0.0162	2.86	0.94	Taskavak and Bilecenoglu (2001)
ASC	MS	*Liza saliens***	57	C	2000-2001	L-BS	2.3	18.6	0.00092	0.9371	3.01	0.99	Keskin and Gaygusuz (2010)
ASC	AS	*Lophius budegassa*	29	C	2005-2006	T	7	45.4	0.01160		3.08	0.99	İlkyaz et al. (2008)
ASC	MS	*Lophius piscatorius*	15	C	2009-2011	T	9.3	18.2	0.02200		2.85	0.81	Demirel and Dalkara (2012)
ASC	AS	*Lophius piscatorius*	15	C	2005	T	22.3	67	0.01990		2.97	0.99	Ozaydın et al. (2007)
ASC	AS	*Lophius piscatorius*	94	C	1998-2001	TR-GN-T-BS	8	48	0.01460		2.93	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Lophius piscatorius*	445	C	2005-2006	T	11.2	83	0.01239		3.03	0.98	Ismen et al. (2007)
ASC	AS	*Lophius piscatorius*	30	C	2005-2006	T	6.1	9.6	0.01010		3.11	0.99	İlkyaz et al. (2008)
F-W	MS	*Lophius piscatorius*	40	C	2006-2007	T	36	54	0.00010		2.49	0.88	Bok et al. (2011)
ASC	AS	*Lophius piscatorius**	23	C	1997-2000	T	101	440	0.00002		2.94	0.97	Türker et al. (2008)
Spring	AS	*Macroramphosus scolopax*	43	C	2003	T	7.1	11.4	0.00790		2.86	0.87	Filiz and Bilge (2004)
ASC	Medit	*Macroramphosus scolopax*	124	C	1999-2000	T	3.7	9.2	0.00590		3.01	0.97	Çiçek et al. (2006)
ASC	MS	*Merlangius merlangus euxinus*	234	C	2009-2011	T	10.6	24.5	0.01200		2.84	0.93	Demirel and Dalkara (2012)
ASC	AS	*Merlangius merlangus euxinus*	23	C	2005-2006	T	12.5	19.1	0.01020		2.99	0.89	Ismen et al. (2007)
ASC	AS	*Merlangius merlangus euxinus*	100	C	1998-2001	TR-GN-T-BS	16	31.7	0.00920		2.94	0.96	Ozaydın and Taskavak (2006)
F-W	BS	*Merlangius merlangus euxinus*	904	C	2004-2005	T	7.7	22.7	0.00670		3.02	0.96	Kalaycı et al. (2007)
F-W	MS	*Merlangius merlangus euxinus*	166	C	2006-2007	T	7.6	24.2	0.00470		3.15	0.94	Bok et al. (2011)
ASC	BS	*Merlangius merlangus euxinus*	943	C	2007	T	6.7	29.5	0.00400		3.17	0.98	Ak et al. (2009)
F-W	AS	*Merluccius merluccius*	21	C	2006	TR-L	28.1	21.5	0.01990		2.96	0.94	Ceyhan et al. (2009)
ASC	AS	*Merluccius merluccius**	2711	C	2005	T	2.7	48.8	0.98140		3.19	0.98	Ozaydın et al. (2007)
ASC	Medit	*Merluccius merluccius*	29	C	2001-2003	T-L	13.2	31	0.03370		2.35	0.93	Sangun et al. (2007)
ASC	MS	*Merluccius merluccius*	715	C	2009-2011	T	9.3	52	0.01000		2.89	0.94	Demirel and Dalkara (2012)
ASC	Medit	*Merluccius merluccius*	31	C	2012-2013	T	16	28.7	0.00960		2.90	0.95	Özvarol (2014)
ASC	AS	*Merluccius merluccius*	501	C	1998-2001	TR-GN-T-BS	12.3	47	0.00500		3.15	0.98	Ozaydın and Taskavak (2006)
ASC	AS	*Merluccius merluccius*	22	C	2004-2005	GN-TR	19.7	41.1	0.00490		3.10	0.98	Karakulak et al. (2006)
ASC	Medit	*Merluccius merluccius*	567	C	1999-2000	T	3.1	29.9	0.00460		3.15	0.98	Çiçek et al. (2006)
ASC	AS	*Merluccius merluccius*	2041	C	2005-2006	T	7.9	66	0.00439		3.15	0.98	Ismen et al. (2007)
ASC	AS	*Merluccius merluccius*	1499	C	2005-2006	T	6.9	9.6	0.00390		3.20	0.98	İlkyaz et al. (2008)
F-W	MS	*Merluccius merluccius*	319	C	2006-2007	T	8.9	44.8	0.00260		3.37	0.99	Bok et al. (2011)
ASC	AS	*Merluccius merluccius**	166	C	1997-2000	T	158	372	0.00007		3.01	0.97	Türker et al. (2008)
W-S	BS	*Mesogobius batrachocephalus*	37	C	2009-2011	T	7.2	13.3	0.02030		2.75	0.93	Demirhan and Can (2007)
ASC	AS	*Microchirus ocellatus*	8	C	2006-2008	T	10.3	13.7	0.03260		2.73	0.97	Ozekinci et al. (2009)
ASC	AS	*Microchirus ocellatus*	6	C	2005-2006	T	5.5	19.8	0.00790		3.25	0.99	İlkyaz et al. (2008)
ASC	AS	*Microchirus variegatus*	29	C	2006-2008	T	10.1	15.5	0.01620		2.87	0.91	Ozekinci et al. (2009)
ASC	AS	*Microchirus variegatus*	10	C	2004-2005	GN-TR	10.1	14.6	0.01370		3.03	0.92	Karakulak et al. (2006)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Microchirus variegatus*	36	C	2005-2006	T	4.4	12.5	0.00440		3.31	0.96	İlkyaz et al. (2008)
ASC	AS	*Microchirus variegatus*	36	C	2002	T	7.3	9.6	0.00300		3.42	0.99	Bayhan et al. (2008)
ASC	AS	*Micromesistius poutassou*	549	C	2005-2006	T	13.7	42.5	0.00350		3.20	0.99	Ismen et al. (2007)
ASC	AS	*Molva macrophthalma*	192	C	2005-2006	T	27.7	63	0.00050		3.42	0.98	Ismen et al. (2007)
ASC	AS	*Monochirus hispidus*	15	C	2006-2008	T	9.7	13.7	0.05650		2.43	0.94	Ozekinci et al. (2009)
ASC	AS	*Mullus barbatus**	45	C	1997-2000	T	10	18.5	0.06100		3.35	0.98	Türker et al. (2008)
F-W	Medit	*Mullus barbatus*	8	C	2008-2009	GN-TR	11	20.4	0.01840		2.84	0.99	Gokce et al. (2010)
ASC	MS	*Mullus barbatus*	94	C	2009-2011	T	9.6	22.7	0.01500		3.00	0.86	Demirel and Dalkara (2012)
F-W	BS	*Mullus barbatus*	176	C	2004-2005	T	6.6	18.4	0.01110		2.96	0.98	Kalaycı et al. (2007)
ASC	AS	*Mullus barbatus*	3386	C	2005-2006	T	6	24.7	0.00762		3.09	0.96	Ismen et al. (2007)
ASC	Medit	*Mullus barbatus*	2021	C	1999-2000	T	3.8	21.5	0.00760		3.13	0.98	Çiçek et al. (2006)
ASC	Medit	*Mullus barbatus*	1565	C	2012-2013	T	8.7	21.5	0.00710		3.17	0.89	Özvarol (2014)
ASC	BS	*Mullus barbatus*	714	C	2007	T	6.1	21.9	0.00700		3.14	0.99	Ak et al. (2009)
ASC	AS	*Mullus barbatus*	1879	C	2005-2006	T	5.8	16.5	0.00600		3.22	0.98	İlkyaz et al. (2008)
W-S	BS	*Mullus barbatus*	432	C	2009-2011	T	6.8	14.6	0.00510		3.24	0.97	Demirhan and Can (2007)
F-W	MS	*Mullus barbatus*	99	C	2006-2007	T	10	15.7	0.00490		3.33	0.92	Bok et al. (2011)
ASC	AS	*Mullus barbatus*	76	C	2004-2005	GN-TR	12.5	22.3	0.00490		3.27	0.94	Karakulak et al. (2006)
ASC	Medit	*Mullus barbatus*	451	C	2001-2003	T-L	8.2	22	0.00320		3.06	0.94	Sangun et al. (2007)
F-W	AS	*Mullus surmuletus*	120	C	2006	TR-L	17.2	13.1	0.01720		2.98	0.98	Ceyhan et al. (2009)
ASC	MS	*Mullus surmuletus*, **	17	C	2000-2001	L-BS	4.7	9.4	0.00045	1.0920	3.39	0.99	Keskin and Gaygusuz (2010)
F-W	MS	*Mullus surmuletus*	142	C	2006-2007	T	11	18	0.02400		2.72	0.89	Bok et al. (2011)
ASC	Medit	*Mullus surmuletus*	145	C	1999-2000	T	5.5	22.2	0.00820		3.11	0.98	Çiçek et al. (2006)
ASC	AS	*Mullus surmuletus*	601	C	2004-2005	GN-TR	10.9	29.9	0.00680		3.19	0.98	Karakulak et al. (2006)
ASC	MS	*Mullus surmuletus*	354	C	2009-2011	T	8.5	23	0.00600		3.18	0.93	Demirel and Dalkara (2012)
ASC	AS	*Mullus surmuletus*	59	C	2005-2006	T	11.2	23.8	0.00580		3.27	0.98	İlkyaz et al. (2008)
ASC	Medit	*Mullus surmuletus**	45	C	2012-2013	T	13.7	24.5	0.00290		3.47	0.95	Özvarol (2014)
ASC	AS	*Mustelus asterias*	7	C	2005-2009	T	53.7	154	0.00060		3.40	1.00	Ismen et al. (2009)
ASC	AS	*Mustelus mustelus*	17	C	2005	T	51.4	95.5	0.00440		2.91	0.98	Ozaydın et al. (2007)
ASC	AS	*Mustelus mustelus*	70	C	2005-2009	T	46.8	152.2	0.00340		2.98	0.99	Ismen et al. (2009)
ASC	AS	*Mustelus mustelus*	148	C	2005-2006	T	5.8	11.6	0.00270		3.05	0.98	İlkyaz et al. (2008)
ASC	AS	*Mustelus mustelus*	26	C	2005-2006	T	58.9	152.2	0.00131		3.19	0.99	Ismen et al. (2007)
Spring	AS	*Mustelus mustelus*	35	C	2003	T	38.3	97.5	0.00110		3.25	0.97	Filiz and Bilge (2004)
ASC	AS	*Mustelus mustelus*	24	C	1999-2000	T	38.3	97.5	0.00080		3.33	0.97	Filiz and Mater (2002)
ASC	AS	*Myliobatis aquila*	14	C	2005-2006	T	23.5	100	0.01252		3.02	0.97	Ismen et al. (2007)
Spring	AS	*Myliobatis aquila*	14	C	2003	T	47.5	76.5	0.00080		3.34	0.93	Filiz and Bilge (2004)
ASC	AS	*Myliobatis aquila*	66	C	2005-2007	T	29.5	121	0.00027		3.56	0.92	Yığın and Ismen (2009)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
Winter	Medit	*Nemipterus randalli*	10	C	2007-2008	T	15.3	10.05	0.01300		2.69	0.98	Erguden et al. (2009)
ASC	Medit	*Nemipterus randalli*	143	C	2012-2013	T	9.5	22	0.01200		2.98	0.94	Özvarol (2014)
W-S	BS	*Neogobius melanostomus*	99	C	2009-2011	T	8.6	19.1	0.00470		3.39	0.95	Demirhan and Can (2007)
ASC	MS	*Nerophis ophidion***	177	C	2000-2001	L-BS	9.7	21.2	0.00020	0.1122	2.75	0.82	Keskin and Gaygusuz (2010)
ASC	AS	*Nerophis ophidion*	11	C	1998-2001	TR-GN-T-BS	10.3	18.2	0.00090		2.13	0.82	Ozaydın and Taskavak (2006)
ASC	AS	*Nerophis ophidion*	86	C	2000-2002	TR	78	214	0.00000		2.42	0.74	Gürkan and Taskavak (2007)
ASC	Medit	*Nettastoma melanurum*	75	C	2009-2011	T	25.1	79.8	0.00020		3.18	0.94	Deval et al. (2014)
ASC	Medit	*Nezumia aequalis*	72	C	2009-2011	T	8.4	20.3	0.00420		2.80	0.83	Deval et al. (2014)
Fall	Medit	*Oblada melanura*	22	C	2000	L	15.6	27	0.03220		2.70	0.96	Can et al. (2002)
ASC	AS	*Oblada melanura*	316	C	2004-2005	GN-TR	9.1	19.8	0.00340		3.46	0.92	Karakulak et al. (2006)
ASC	MS	*Oedalechilus labeo***	41	C	2000-2001	L-BS	2.5	13.2	0.00115	0.7829	2.83	0.97	Keskin and Gaygusuz (2010)
ASC	AS	*Ophidion barbatum*	9	C	2004-2005	GN-TR	19.7	25.4	0.07620		2.08	0.80	Karakulak et al. (2006)
ASC	MS	*Ophidion barbatum*	15	C	2007	BS	7.3	17.7	0.00291		3.24	0.98	Ozen et al. (2009)
ASC	AS	*Ophidion barbatum*	44	C	2005-2006	T	9.5	20.2	0.00175		3.32	0.97	Ismen et al. (2007)
ASC	Medit	*Ophisurus serpens*	41	C	2001-2003	T-L	12.1	50.1	0.00150		2.96	0.99	Sangun et al. (2007)
ASC	Medit	*Oxyurichthys petersii***	112	C	1997-1998	T-GN	6.1	12.2	0.00001	0.0101	3.06	0.98	Taskavak and Bilecenoglu (2001)
Winter	Medit	*Oxyurichthys petersii*	175	C	2007-2008	T	19.2	13.3	0.00640		2.86	0.89	Erguden et al. (2009)
ASC	Medit	*Pagellus acarne*	83	C	2001-2003	T-L	11	17	0.01860		2.84	0.91	Sangun et al. (2007)
ASC	AS	*Pagellus acarne*	334	C	2005-2006	T	16.4	51.6	0.01040		3.06	0.93	İlkyaz et al. (2008)
ASC	Medit	*Pagellus acarne*	901	C	1999-2000	T	3.6	15.3	0.00750		3.15	0.95	Çiçek et al. (2006)
ASC	AS	*Pagellus bogaraveo*	77	C	2005-2006	T	10.1	19.8	0.01560		2.93	0.95	İlkyaz et al. (2008)
ASC	AS	*Pagellus bogaraveo*	2355	C	2005-2006	T	6.5	25.1	0.00747		3.20	0.96	Ismen et al. (2007)
F-W	AS	*Pagellus erythrinus*	125	C	2006	TR-L	30.9	18.6	0.00620		3.04	0.94	Ceyhan et al. (2009)
ASC	Medit	*Pagellus erythrinus*	87	C	2012-2013	T	11.6	21.5	0.05110		2.51	0.95	Özvarol (2014)
F-W	Medit	*Pagellus erythrinus*	43	C	2008-2009	GN-TR	13.3	20.2	0.04120		2.58	0.95	Gokce et al. (2010)
ASC	AS	*Pagellus erythrinus*	365	C	2002-2003	L	12	30	0.01760		2.89	0.94	Akyol et al. (2007)
ASC	Medit	*Pagellus erythrinus*	1787	C	1999-2000	T	1.4	18.6	0.01520		2.84	0.97	Çiçek et al. (2006)
ASC	Medit	*Pagellus erythrinus*	222	C	2001-2003	T-L	7.9	31.58	0.01450		2.91	0.94	Sangun et al. (2007)
ASC	AS	*Pagellus erythrinus*	1014	C	2005-2006	T	12.1	42.3	0.01340		2.98	0.98	İlkyaz et al. (2008)
ASC	AS	*Pagellus erythrinus*	169	C	2004-2005	GN-TR	9.9	29.8	0.01240		3.01	0.94	Karakulak et al. (2006)
ASC	AS	*Pagellus erythrinus*	2480	C	2005-2006	T	7.2	27	0.01050		3.06	0.98	Ismen et al. (2007)
ASC	AS	*Pagellus erythrinus**	181	C	1997-2000	T	78	228	0.00110		2.66	0.92	Türker et al. (2008)
Fall	Medit	*Pagrus caeruleostictus*	311	C	2000	L	12.5	38.8	0.06710		2.52	0.90	Can et al. (2002)
ASC	Medit	*Pagrus caeruleostictus*	684	C	2001-2003	T-L	5.5	20.4	0.01250		3.00	0.97	Sangun et al. (2007)
ASC	AS	*Pagrus caeruleostictus*	10	C	2005-2006	T	6.5	23.7	0.00280		3.48	0.98	İlkyaz et al. (2008)
ASC	Medit	*Pagrus pagrus*	127	C	2012-2013	T	9.5	19	0.01860		2.92	0.94	Özvarol (2014)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Pagrus pagrus*	18	C	2005-2006	T	27.7	83	0.01710		2.97	1.00	İlkyaz et al. (2008)
ASC	MS	*Parablennius sanguinolentus***	10	C	2000-2001	L-BS	3.1	14.7	0.00082	1.1990	3.17	0.99	Keskin and Gaygusuz (2010)
ASC	MS	*Parablennius tentacularis***	64	C	2000-2001	L-BS	3.5	10	0.00072	0.9601	3.13	0.97	Keskin and Gaygusuz (2010)
ASC	Medit	*Pelates quadrilineatus***	76	C	1997-1998	T-GN	7.9	12.1	0.00001	0.0134	2.96	0.97	Taskavak and Bilecenoglu (2001)
ASC	Medit	*Pempheris vanicolensis***	46	C	1997-1998	T-GN	7.7	15.5	0.00001	0.0120	3.03	0.95	Taskavak and Bilecenoglu (2001)
Spring	AS	*Peristedion cataphractum*	11	C	2003	T	8.1	21.2	0.00480		2.97	0.99	Filiz and Bilge (2004)
ASC	AS	*Phycis blennoides*	359	C	2005-2006	T	16	42.5	0.00209		3.38	0.97	Ismen et al. (2007)
Spring	AS	*Phycis blennoides*	12	C	2003	T	12.3	15	0.00170		3.55	0.89	Filiz and Bilge (2004)
ASC	AS	*Phycis phycis*	59	C	2004-2005	GN-TR	13.7	44.5	0.00520		3.19	0.99	Karakulak et al. (2006)
ASC	BS	*Platichthys flesus*	51	C	2007	T	19.1	38.5	0.00700		3.09	0.95	Ak et al. (2009)
Fall	Medit	*Pomadasys incisus*	106	C	2000	L	13.4	21.2	0.04650		2.60	0.91	Can et al. (2002)
ASC	Medit	*Pomadasys incisus*	23	C	2001-2003	T-L	11.9	19	0.01990		2.83	0.97	Sangun et al. (2007)
ASC	MS	*Pomatomus saltatrix*	17	C	2009-2011	T	14.5	18.5	0.38700		2.77	0.85	Demirel and Dalkara (2012)
F-W	MS	*Pomatomus saltatrix*	290	C	2006-2007	T	10.6	24	0.03250		2.53	0.86	Bok et al. (2011)
F-W	BS	*Pomatomus saltatrix*	143	C	2004-2005	T	13.2	21.7	0.01300		2.86	0.92	Kalaycı et al. (2007)
ASC	BS	*Pomatomus saltatrix*	14	C	2007	T	11.6	22.2	0.00300		3.34	0.98	Ak et al. (2009)
ASC	MS	*Pomatoschistus bathi***	19	C	2000-2001	L-BS	2.8	6.3	0.00052	0.9141	3.25	0.98	Keskin and Gaygusuz (2010)
ASC	MS	*Pomatoschistus marmoratus*	71	C	2009-2011	T	3.7	9	0.00400		2.52	0.72	Demirel and Dalkara (2012)
ASC	MS	*Pomatoschistus minutus*	16	C	2007	BS	5.5	6.7	0.00363		3.19	0.97	Ozen et al. (2009)
ASC	MS	*Pomatoschistus pictus*	12	C	2007	BS	4.2	5.6	0.00599		3.12	0.98	Ozen et al. (2009)
ASC	Medit	*Raja asterias*	113	C	1999-2003	T	22.2	61.2	0.00130		3.39	0.97	Yeldan and Avsar (2007)
F-W	MS	*Raja asterias*	30	C	2006-2007	T	43	79	0.00000		3.24	0.97	Bok et al. (2011)
ASC	MS	*Raja clavata**	170	C	2009-2011	T	9.6	65	0.11300		2.42	0.77	Demirel and Dalkara (2012)
ASC	AS	*Raja clavata*	112	C	2005-2006	T	6	60	0.01300		3.12	1.00	Ismen et al. (2007)
ASC	Medit	*Raja clavata*	77	C	1999-2003	T	29.3	64.6	0.00370		3.08	0.98	Yeldan and Avsar (2007)
W-S	BS	*Raja clavata*	27	C	2009-2011	T	10.7	95.2	0.00190		3.24	0.99	Demirhan and Can (2007)
ASC	AS	*Raja clavata*	226	C	2005-2007	T	10	88	0.00163		3.32	0.99	Yığın and Ismen (2009)
Spring	AS	*Raja clavata*	37	C	2003	T	20.5	99	0.00160		3.30	0.94	Filiz and Bilge (2004)
ASC	AS	*Raja clavata*	31	C	1999-2000	T	20.5	17.75	0.00160		3.29	0.93	Filiz and Mater (2002)
F-W	MS	*Raja clavata**	24	C	2006-2007	T	12.2	70	0.00001		2.87	0.89	Bok et al. (2011)
ASC	AS	*Raja miraletus*	30	C	2005-2006	T	6.5	30.5	0.00891		3.22	0.97	Ismen et al. (2007)
ASC	AS	*Raja miraletus*	12	C	2005	T	39	53.5	0.00630		2.95	0.97	Ozaydın et al. (2007)
ASC	AS	*Raja miraletus*	52	C	2005-2007	T	10.5	53.5	0.00173		3.27	0.95	Yığın and Ismen (2009)
Spring	AS	*Raja miraletus*	13	C	2003	T	30	50.5	0.00010		4.15	0.93	Filiz and Bilge (2004)
ASC	AS	*Raja miraletus*	13	C	1999-2000	T	30	56.5	0.00010		4.02	0.93	Filiz and Mater (2002)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Raja radula*	49	C	2005-2006	T	12.5	39	0.01131		3.25	0.98	Ismen et al. (2007)
ASC	AS	*Raja radula*	25	C	2004-2005	GN-TR	17.4	70	0.00300		3.22	0.94	Karakulak et al. (2006)
ASC	AS	*Raja radula*	204	C	2005-2007	T	17	61	0.00205		3.32	0.97	Yığın and Ismen (2009)
ASC	Medit	*Raja radula*	295	C	1999-2003	T	21.1	68.1	0.00120		3.36	0.99	Yeldan and Avsar (2007)
ASC	Medit	*Rhinobatos cemiculus*	262	M	2010-2011	L-T-GN	32	149	0.00265		3.02	0.86	Basusta et al. (2012)
ASC	Medit	*Rhinobatos rhinobatos*	20	M	2010-2012	L-T-GN	35	125	0.00110		3.19	0.96	Basusta et al. (2012)
ASC	AS	*Rostroraja alba*	11	C	2005	T	25.2	53.4	0.00900		3.48	0.99	Ozaydın et al. (2007)
ASC	AS	*Rostroraja alba*	43	C	2005-2006	T	9.5	93	0.00662		3.20	0.99	Ismen et al. (2007)
Fall	AS	*Rostroraja alba*	12	C	2011	T	26.1	52	0.00210		3.21	0.99	Yapıcı et al. (2015)
ASC	AS	*Rostroraja alba*	126	C	2005-2007	T	14	159	0.00194		3.27	0.98	Yığın and Ismen (2009)
ASC	MS	*Salaria pavo*	14	C	2007	BS	3.7	12.2	0.01653		2.62	0.98	Ozen et al. (2009)
ASC	MS	*Sardina pilchardus***	38	C	2000-2001	L-BS	4.7	6.7	0.00015	0.8262	3.74	0.86	Keskin and Gaygusuz (2010)
ASC	AS	*Sardina pilchardus*	87	C	1997-2000	T	80	142	0.00031		2.77	0.68	Türker et al. (2008)
ASC	MS	*Sardinella aurita***	24	C	2000-2001	L-BS	4.6	6.8	0.00031	0.8518	3.44	0.81	Keskin and Gaygusuz (2010)
F-W	MS	*Sardinella aurita*	16	C	2006-2007	T	9.9	16.8	0.03330		2.27	0.88	Bok et al. (2011)
ASC	AS	*Sardinella aurita*	50	C	2004-2005	GN-TR	16.4	26.2	0.00620		3.08	0.91	Karakulak et al. (2006)
ASC	Medit	*Sargocentron rubrum***	38	C	1997-1998	T-GN	12	16.7	0.00002	0.0180	3.02	0.94	Taskavak and Bilecenoglu (2001)
Fall	Medit	*Sargocentron rubrum*	57	C	2000	L	12.9	21.4	0.00910		3.27	0.86	Can et al. (2002)
ASC	AS	*Sarpa salpa*	80	C	2004-2005	GN-TR	11.1	31.2	0.00870		3.13	0.98	Karakulak et al. (2006)
F-W	AS	*Saurida undosquamis*	80	C	2006	TR-L	26.1	19.6	0.00420		3.37	0.95	Ceyhan et al. (2009)
Fall	Medit	*Saurida undosquamis*	100	C	2000	L	17.4	33.1	0.01170		2.80	0.90	Can et al. (2002)
F-W	Medit	*Saurida undosquamis*	79	C	2008-2009	GN-TR	12.8	36.4	0.01050		2.80	0.94	Gokce et al. (2010)
Winter	Medit	*Saurida undosquamis*	304	C	2007-2008	T	34	19.92	0.00630		2.97	0.99	Erguden et al. (2009)
ASC	AS	*Saurida undosquamis*	80	C	2002-2003	L	19.6	33.1	0.00460		3.11	0.95	Akyol et al. (2007)
ASC	Medit	*Saurida undosquamis*	1801	C	1999-2000	T	5	33	0.00390		3.17	0.97	Çiçek et al. (2006)
ASC	Medit	*Saurida undosquamis*	416	C	2001-2003	T-L	10.6	26.1	0.00390		3.15	0.96	Sangun et al. (2007)
ASC	Medit	*Saurida undosquamis*	211	C	2012-2013	T	11.5	35.5	0.00370		3.19	0.97	Özvarol (2014)
ASC	MS	*Sciaena umbra***	12	C	2000-2001	L-BS	2.9	12	0.00069	0.9951	3.16	0.98	Keskin and Gaygusuz (2010)
ASC	AS	*Sciaena umbra*	24	C	2004-2005	GN-TR	13.9	29.8	0.00550		3.23	0.98	Karakulak et al. (2006)
ASC	AS	*Scomber japonicus*	25	C	2004-2005	GN-TR	18.1	31.2	0.00640		3.11	0.98	Karakulak et al. (2006)
ASC	Medit	*Scomber japonicus*	11	C	2001-2003	T-L	17.1	22	0.00560		3.11	0.95	Sangun et al. (2007)
ASC	AS	*Scomber japonicus*	45	C	2005-2006	T	12.2	22	0.00164		3.52	0.97	Ismen et al. (2007)
ASC	AS	*Scomber scombrus*	100	C	2005-2006	T	13.6	24	0.00286		3.30	0.96	Ismen et al. (2007)
ASC	AS	*Scomber scombrus*	54	C	2004-2005	GN-TR	22	31.1	0.00250		3.38	0.85	Karakulak et al. (2006)
ASC	AS	*Scomber scombrus*	52	C	1997-2000	T	158	217	0.00000		3.81	0.99	Türker et al. (2008)
ASC	AS	*Scophthalmus rhombus*	10	C	2006-2008	T	32	48.9	0.00290		3.42	0.98	Ozekinci et al. (2009)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	BS	*Scopthalmus maximus*	63	C	2007	T	10	61	0.00700		3.25	0.98	Ak et al. (2009)
ASC	Medit	*Scorpaena elongata*	114	C	2009-2011	T	5.6	42.1	0.02300		2.88	1.00	Deval et al. (2014)
ASC	AS	*Scorpaena notata*	113	C	2005-2006	T	5.8	20.2	0.03291		2.75	0.96	Ismen et al. (2007)
ASC	AS	*Scorpaena notata*	565	C	2005	T	8.4	17	0.02130		2.96	0.96	Ozaydın et al. (2007)
ASC	AS	*Scorpaena notata*	357	C	2005-2006	T	7.5	18.7	0.01670		3.06	0.96	İlkyaz et al. (2008)
ASC	AS	*Scorpaena notata*	108	C	2004-2005	GN-TR	8.1	15.1	0.01650		3.02	0.88	Karakulak et al. (2006)
ASC	AS	*Scorpaena notata*	52	C	1998-2001	TR-GN-T-BS	7.9	24.3	0.01400		3.09	0.97	Ozaydın and Taskavak (2006)
ASC	MS	*Scorpaena porcus**, **	45	C	2000-2001	L-BS	4.9	19	0.00158	1.9349	3.09	0.98	Keskin and Gaygusuz (2010)
ASC	AS	*Scorpaena porcus*	10	C	2005-2006	T	10	22	0.02555		2.88	0.99	Ismen et al. (2007)
ASC	AS	*Scorpaena porcus*	9	C	2005-2006	T	31.2	85.5	0.02150		2.96	0.97	İlkyaz et al. (2008)
ASC	AS	*Scorpaena porcus*	255	C	2004-2005	GN-TR	8	27.3	0.02150		2.92	0.93	Karakulak et al. (2006)
ASC	AS	*Scorpaena porcus*	50	C	1998-2001	TR-GN-T-BS	14.1	25.6	0.02010		3.00	0.96	Ozaydın and Taskavak (2006)
F-W	BS	*Scorpaena porcus*	136	C	2004-2005	T	8.5	29.2	0.01730		3.03	0.98	Kalaycı et al. (2007)
ASC	AS	*Scorpaena porcus*	86	C	2005	T	8.6	27.2	0.01590		3.07	0.99	Ozaydın et al. (2007)
W-S	BS	*Scorpaena porcus*	470	C	2009-2011	T	4.6	17.5	0.01240		3.19	0.94	Demirhan and Can (2007)
ASC	BS	*Scorpaena porcus*	351	C	2007	T	5	34.2	0.00900		3.27	0.88	Ak et al. (2009)
F-W	MS	*Scorpaena porcus*	15	C	2006-2007	T	17.3	21.4	0.00670		3.34	0.94	Bok et al. (2011)
ASC	AS	*Scorpaena scrofa*	12	C	2005	T	10.5	28.3	0.04480		2.69	0.98	Ozaydın et al. (2007)
ASC	AS	*Scorpaena scrofa*	129	C	1998-2001	TR-GN-T-BS	8.2	30.1	0.02910		2.80	0.99	Ozaydın and Taskavak (2006)
ASC	AS	*Scorpaena scrofa*	15	C	2004-2005	GN-TR	12.3	39.1	0.01800		3.01	0.99	Karakulak et al. (2006)
ASC	MS	*Scyliorhinus canicula*	189	C	2009-2011	T	20	50	0.00400		2.87	0.87	Demirel and Dalkara (2012)
ASC	AS	*Scyliorhinus canicula*	1888	U	2005-2009	T	9.6	91.3	0.00170		3.17	0.98	Ismen et al. (2009)
ASC	AS	*Scyliorhinus canicula*	1501	C	2005-2006	T	9.6	62	0.00169		3.17	0.99	Ismen et al. (2007)
ASC	AS	*Scyliorhinus canicula*	113	C	1999-2000	T	17.5	52.5	0.00160		3.18	0.98	Filiz and Mater (2002)
Spring	AS	*Scyliorhinus canicula*	637	C	2003	T	10.5	50.9	0.00120		3.26	0.99	Filiz and Bilge (2004)
ASC	AS	*Scyliorhinus canicula*	744	C	2005-2006	T	12.2	19.1	0.00120		3.29	0.96	İlkyaz et al. (2008)
ASC	AS	*Scyliorhinus canicula*	187	C	2005	T	28.6	51.5	0.00060		3.44	0.95	Ozaydın et al. (2007)
ASC	AS	*Scyliorhinus canicula**	112	C	1997-2000	T	246	786	0.00002		3.10	0.86	Türker et al. (2008)
ASC	AS	*Scyliorhinus stellaris*	34	C	2005	T	14.5	71	0.00650		2.82	0.98	Ozaydın et al. (2007)
ASC	AS	*Scyliorhinus stellaris*	11	C	2005-2006	T	7	16.3	0.00200		3.23	1.00	İlkyaz et al. (2008)
ASC	AS	*Scyliorhinus stellaris*	12	U	2005-2009	T	16.5	61.6	0.00090		3.37	1.00	Ismen et al. (2009)
ASC	Medit	*Serranus cabrilla*	126	C	2001-2003	T-L	7.1	18.9	0.06620		3.22	0.98	Sangun et al. (2007)
ASC	Medit	*Serranus cabrilla*	41	C	1999-2000	T	5.5	8.9	0.01310		2.90	0.91	Çiçek et al. (2006)
ASC	AS	*Serranus cabrilla*	714	C	2005-2006	T	47.1	88.3	0.01240		2.96	0.98	İlkyaz et al. (2008)
ASC	AS	*Serranus cabrilla*	200	C	1998-2001	TR-GN-T-BS	11.9	21.8	0.01220		2.99	0.94	Ozaydın and Taskavak (2006)
ASC	AS	*Serranus cabrilla*	91	C	2004-2005	GN-TR	11.9	19.8	0.01120		3.00	0.68	Karakulak et al. (2006)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Serranus cabrilla*	974	C	2005	T	7.4	26	0.01110		2.99	0.98	Ozaydın et al. (2007)
F-W	MS	*Serranus cabrilla*	15	C	2006-2007	T	6.9	11.7	0.00910		3.19	0.98	Bok et al. (2011)
ASC	Medit	*Serranus cabrilla*	52	C	2012-2013	T	9	18.5	0.00910		3.05	0.96	Özvarol (2014)
ASC	AS	*Serranus cabrilla*	34	C	2005-2006	T	11	27.5	0.00861		3.06	0.95	Ismen et al. (2007)
ASC	AS	*Serranus cabrilla*	602	C	1997-2000	T	87	234	0.00071		2.63	0.87	Türker et al. (2008)
ASC	MS	*Serranus hepatus**, **	5	C	2000-2001	L-BS	2	6.8	0.00153	1.5230	3.00	1.00	Keskin and Gaygusuz (2010)
ASC	AS	*Serranus hepatus*	78	C	1997-2000	T	78	114	0.04100		2.80	0.79	Türker et al. (2008)
ASC	MS	*Serranus hepatus*	379	C	2009-2011	T	6.5	13.7	0.03600		2.62	0.75	Demirel and Dalkara (2012)
F-W	MS	*Serranus hepatus*	111	C	2006-2007	T	5.9	11.8	0.03190		2.71	0.87	Bok et al. (2011)
ASC	Medit	*Serranus hepatus*	100	C	2012-2013	T	5.8	13.9	0.02880		2.73	0.73	Özvarol (2014)
ASC	AS	*Serranus hepatus*	2543	C	2005	T	6.7	11.6	0.02410		2.79	0.95	Ozaydın et al. (2007)
ASC	AS	*Serranus hepatus*	143	C	1998-2001	TR-GN-T-BS	5.7	11.1	0.01620		3.00	0.98	Ozaydın and Taskavak (2006)
ASC	Medit	*Serranus hepatus*	584	C	1999-2000	T	2.4	10.5	0.01610		3.03	0.97	Çiçek et al. (2006)
ASC	AS	*Serranus hepatus*	1285	C	2005-2006	T	6.2	15.2	0.01490		3.04	0.95	İlkyaz et al. (2008)
ASC	Medit	*Serranus hepatus*	573	C	2001-2003	T-L	4.8	13	0.01430		3.04	0.95	Sangun et al. (2007)
ASC	AS	*Serranus scriba*	313	C	2005	T	8.3	23.5	0.00970		3.14	0.99	Ozaydın et al. (2007)
ASC	AS	*Serranus scriba*	311	C	2004-2005	GN-TR	10.2	21.3	0.00650		3.24	0.97	Karakulak et al. (2006)
ASC	Medit	*Serranus scriba*	8	C	2001-2003	T-L	13.6	17	0.00440		3.41	0.95	Sangun et al. (2007)
F-W	AS	*Siganus luridus*	22	C	2006	TR-L	16.5	13.2	0.01450		3.03	0.96	Ceyhan et al. (2009)
Winter	Medit	*Siganus luridus*	21	C	2007-2008	T	16.3	14.19	0.01360		2.92	0.95	Erguden et al. (2009)
F-W	AS	*Siganus rivulatus*	56	C	2006	TR-L	16.2	11.7	0.00980		3.04	0.88	Ceyhan et al. (2009)
Winter	Medit	*Siganus rivulatus*	122	C	2007-2008	T	18	15.61	0.01700		2.82	0.89	Erguden et al. (2009)
F-W	Medit	*Siganus rivulatus*	5	C	2008-2009	GN-TR	8	19.9	0.01270		2.92	0.99	Gokce et al. (2010)
ASC	Medit	*Siganus rivulatus***	355	C	1997-1998	T-GN	10.7	24.1	0.00000	0.0075	3.20	0.98	Taskavak and Bilecenoglu (2001)
Winter	Medit	*Sillago sihama*	23	C	2007-2008	T	20.5	14.52	0.00530		3.06	0.96	Erguden et al. (2009)
ASC	Medit	*Sillago sihama***	108	C	1997-1998	T-GN	9.4	20.3	0.00000	0.0032	3.36	0.93	Taskavak and Bilecenoglu (2001)
F-W	MS	*Solea kleinii*	20	C	2006-2007	T	4.6	25.9	0.03140		2.50	0.98	Bok et al. (2011)
ASC	MS	*Solea nasuta***	5	C	2000-2001	L-BS	5.7	17.6	0.00050	0.8394	3.23	1.00	Keskin and Gaygusuz (2010)
ASC	BS	*Solea nasuta*	100	C	2007	T	11.3	21.7	0.01600		2.76	0.96	Ak et al. (2009)
F-W	Medit	*Solea solea*	13	C	2008-2009	GN-TR	11.2	24.4	0.04900		2.35	0.98	Gokce et al. (2010)
ASC	AS	*Solea solea*	44	C	2002	T	9.2	15.5	0.02320		2.73	0.74	Bayhan et al. (2008)
ASC	AS	*Solea solea*	130	C	2006-2008	T	10	32	0.01920		2.73	0.96	Ozekinci et al. (2009)
ASC	MS	*Solea solea*	53	C	2009-2011	T	20	33.2	0.00600		3.06	853.00	Demirel and Dalkara (2012)
F-W	MS	*Solea solea*	55	C	2006-2007	T	6.9	16	0.00430		3.17	0.93	Bok et al. (2011)
ASC	AS	*Solea solea*	79	C	2005-2006	T	14.7	39.2	0.00375		3.25	0.97	Ismen et al. (2007)
ASC	AS	*Solea solea*	72	C	2005-2006	T	4.5	8.4	0.00300		3.27	0.97	İlkyaz et al. (2008)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Solea solea*	74	C	1998-2001	TR-GN-T-BS	20.4	37	0.00220		3.39	0.96	Ozaydın and Taskavak (2006)
ASC	AS	*Solea solea*	110	C	2005	T	19.7	31.9	0.00210		3.20	0.95	Ozaydın et al. (2007)
F-W	AS	*Sparus aurata*	59	C	2006	TR-L	26.7	14.6	0.01760		2.89	0.97	Ceyhan et al. (2009)
Fall	Medit	*Sparus aurata*	21	C	2000	L	16.9	32	0.04060		2.68	0.97	Can et al. (2002)
ASC	Medit	*Sparus aurata*	298	C	2001-2003	T-L	10.3	31.8	0.02200		2.84	0.90	Sangun et al. (2007)
ASC	Medit	*Sparus aurata*	13	C	1999-2000	T	15.5	27.9	0.01450		2.99	0.97	Çiçek et al. (2006)
ASC	AS	*Sparus aurata*	141	C	2002-2003	L	14.5	32.6	0.01220		3.03	0.97	Akyol et al. (2007)
ASC	AS	*Sparus aurata*	123	C	2005-2006	T	14.6	26.4	0.01000		3.09	0.98	İlkyaz et al. (2008)
ASC	Medit	*Sphyraena chrysotaenia***	54	C	1997-1998	T-GN	12.6	23.1	0.00003	0.0124	2.63	0.96	Taskavak and Bilecenoglu (2001)
Winter	Medit	*Sphyraena chrysotaenia*	67	C	2007-2008	T	32.2	28.93	0.00110		3.41	0.90	Erguden et al. (2009)
ASC	Medit	*Spicara flexuosa*	440	C	2012-2013	T	9	17.3	0.02600		2.66	0.82	Özvarol (2014)
F-W	Medit	*Spicara maena*	17	C	2008-2009	GN-TR	13.3	17.9	0.02150		2.80	0.91	Gokce et al. (2010)
ASC	AS	*Spicara maena*	1081	C	2005-2006	T	15.2	59.3	0.01210		2.97	0.96	İlkyaz et al. (2008)
ASC	MS	*Spicara maena*	175	C	2009-2011	T	10.4	18	0.01000		3.03	0.85	Demirel and Dalkara (2012)
ASC	AS	*Spicara maena*	353	C	2005-2006	T	8.8	17.8	0.00984		3.01	0.96	Ismen et al. (2007)
ASC	Medit	*Spicara maena*	1381	C	1999-2000	T	4.2	17.8	0.00810		3.12	0.98	Çiçek et al. (2006)
ASC	Medit	*Spicara maena*	298	C	2001-2003	T-L	8.7	17.1	0.00800		3.09	0.91	Sangun et al. (2007)
ASC	AS	*Spicara maena*	830	C	2004-2005	GN-TR	11	22	0.00280		3.51	0.92	Karakulak et al. (2006)
ASC	Medit	*Spicara smaris*	176	C	2001-2003	T-L	7.5	16.9	0.02880		2.59	0.92	Sangun et al. (2007)
ASC	Medit	*Spicara smaris*	360	C	1999-2000	T	4.9	14.9	0.01950		2.67	0.95	Çiçek et al. (2006)
ASC	AS	*Spicara smaris*	130	C	2004-2005	GN-TR	11.5	18.7	0.01380		2.88	0.73	Karakulak et al. (2006)
ASC	AS	*Spicara smaris*	1449	C	2005-2006	T	8.2	18.6	0.01180		2.92	0.95	Ismen et al. (2007)
ASC	BS	*Spicara smaris*	528	C	2007	T	8.3	24.2	0.00900		3.01	0.86	Ak et al. (2009)
F-W	MS	*Spicara smaris*	403	C	2006-2007	T	5.9	17.7	0.00890		3.08	0.86	Bok et al. (2011)
ASC	AS	*Spicara smaris*	42	C	2005-2006	T	12	51.4	0.00770		3.07	0.97	İlkyaz et al. (2008)
F-W	BS	*Spicara smaris*	83	C	2004-2005	T	11.2	20	0.00630		3.15	0.96	Kalaycı et al. (2007)
ASC	AS	*Spicara smaris**	139	C	1997-2000	T	105	157	0.00031		2.86	0.92	Türker et al. (2008)
ASC	AS	*Spondyliosoma cantharus*	46	C	2004-2005	GN-TR	8.2	28.7	0.01920		2.87	0.89	Karakulak et al. (2006)
ASC	AS	*Spondyliosoma cantharus*	45	C	2005-2006	T	9.6	22.7	0.00902		3.18	0.98	Ismen et al. (2007)
ASC	MS	*Sprattus sprattus***	52	C	2000-2001	L-BS	3.8	5.5	0.00023	0.7758	3.53	0.80	Keskin and Gaygusuz (2010)
F-W	BS	*Sprattus sprattus*	5087	C	2004-2005	T	5.6	12.6	0.00790		2.87	0.88	Kalaycı et al. (2007)
ASC	AS	*Squalus acanthias*	565	C	2005-2009	T	17.1	115	0.00370		3.05	0.97	Ismen et al. (2009)
Spring	AS	*Squalus acanthias*	32	C	2003	T	27	70.5	0.00310		3.11	0.98	Filiz and Bilge (2004)
ASC	AS	*Squalus acanthias*	32	C	1999-2000	T	27	70.5	0.00310		3.11	0.98	Filiz and Mater (2002)
F-W	MS	*Squalus acanthias*	8	C	2006-2007	T	41	52	0.00003		2.62	0.96	Bok et al. (2011)
ASC	AS	*Squalus blainvillei*	299	C	2005-2006	T	21.5	117.5	0.00345		3.06	0.98	Ismen et al. (2007)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Squalus blainvillei*	27	C	2005-2009	T	30.5	121.6	0.00300		3.07	0.99	Ismen et al. (2009)
F-W	MS	*Squalus blainvillei*	18	C	2006-2007	T	38	56	0.00004		2.48	0.96	Bok et al. (2011)
ASC	Medit	*Stephanolepis diaspros*	52	C	2001-2003	T-L	7.3	14.2	0.02760		2.83	0.98	Sangun et al. (2007)
Winter	Medit	*Stephanolepis diaspros*	56	C	2007-2008	T	13.5	11.62	0.01460		3.08	0.98	Erguden et al. (2009)
ASC	Medit	*Stephanolepis diaspros***	207	C	1997-1998	T-GN	7.1	13	0.00001	0.0104	3.19	0.92	Taskavak and Bilecenoglu (2001)
ASC	Medit	*Stomias boa*	52	C	2009-2011	T	10	25.9	0.00050		3.36	0.94	Deval et al. (2014)
ASC	MS	*Symphodus cinereus***	173	C	2000-2001	L-BS	2.3	11.3	0.00093	1.4044	3.18	0.99	Keskin and Gaygusuz (2010)
ASC	AS	*Symphodus cinereus*	20	C	2005	T	4	7	0.01140		3.07	0.96	Ozaydın et al. (2007)
ASC	AS	*Symphodus cinereus*	8	C	2005-2006	T	9	45.5	0.00780		3.26	0.99	İlkyaz et al. (2008)
ASC	AS	*Symphodus doderleini*	15	C	2005	T	5.5	9.6	0.01100		3.12	0.96	Ozaydın et al. (2007)
ASC	AS	*Symphodus mediterraneus*	39	C	2004-2005	GN-TR	9.8	16.4	0.01730		2.90	0.94	Karakulak et al. (2006)
ASC	AS	*Symphodus mediterraneus*	39	C	2005	T	4.9	20.2	0.01270		3.08	0.98	Ozaydın et al. (2007)
ASC	MS	*Symphodus ocellatus***	575	C	2000-2001	L-BS	1.8	10.7	0.00102	1.2263	3.08	0.98	Keskin and Gaygusuz (2010)
ASC	AS	*Symphodus ocellatus*	216	C	2005	T	4.7	9.2	0.00850		3.22	0.96	Ozaydın et al. (2007)
ASC	MS	*Symphodus roissali***	22	C	2000-2001	L-BS	2.4	14.1	0.00069	1.6782	3.39	0.99	Keskin and Gaygusuz (2010)
ASC	AS	*Symphodus rostratus*	19	C	2004-2005	GN-TR	9.6	12.7	0.01770		2.84	0.84	Karakulak et al. (2006)
ASC	AS	*Symphodus rostratus*	36	C	2005	T	7.1	10.9	0.00490		3.46	0.98	Ozaydın et al. (2007)
ASC	MS	*Symphodus tinca***	41	C	2000-2001	L-BS	2.1	15.5	0.00111	1.3910	3.10	0.99	Keskin and Gaygusuz (2010)
ASC	AS	*Symphodus tinca*	89	C	2005	T	6.7	23	0.01830		2.91	0.98	Ozaydın et al. (2007)
ASC	AS	*Symphodus tinca*	248	C	2004-2005	GN-TR	10	26.8	0.01090		3.05	0.97	Karakulak et al. (2006)
Fall	Medit	*Symphodus tinca*	10	C	2000	L	12.1	17.2	0.00210		3.68	0.99	Can et al. (2002)
ASC	AS	*Symphurus nigrescens*	182	C	2005-2006	T	7.7	12.7	0.00880		2.98	0.96	İlkyaz et al. (2008)
ASC	AS	*Symphurus nigrescens*	7	C	2006-2008	T	9.8	10.9	0.00750		3.15	0.91	Ozekinci et al. (2009)
Fall	AS	*Symphurus nigrescens*	10	C	2011	T	7.8	10.6	0.00270		3.50	0.96	Yapıcı et al. (2015)
ASC	Medit	*Synchiropus phaeton*	65	C	2009-2011	T	4.8	13.3	0.01910		2.35	0.97	Deval et al. (2014)
ASC	MS	*Syngnathus abaster***	298	C	2000-2001	L-BS	2.1	12.6	0.00020	0.3034	3.18	0.90	Keskin and Gaygusuz (2010)
ASC	MS	*Syngnathus acus***	15	C	2000-2001	L-BS	10.3	37.8	0.00040	0.4689	3.07	0.96	Keskin and Gaygusuz (2010)
F-W	MS	*Syngnathus acus*	17	C	2006-2007	T	21.3	28.4	0.00030		3.12	0.93	Bok et al. (2011)
ASC	AS	*Syngnathus acus*	202	C	1998-2001	TR-GN-T-BS	6.1	20.7	0.00010		3.63	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Syngnathus acus*	570	C	2000-2002	TR	33	256	0.00000		3.54	0.95	Gürkan and Taskavak (2007)
ASC	MS	*Syngnathus typhle***	375	C	2000-2001	L-BS	6.2	31.6	0.00020	0.3141	3.20	0.97	Keskin and Gaygusuz (2010)
ASC	AS	*Syngnathus typhle*	125	C	2000-2002	TR	40	258	0.00000		3.00	0.96	Gürkan and Taskavak (2007)
ASC	Medit	*Synodus saurus*	161	C	1999-2000	T	10.7	31	0.00730		3.02	0.96	Çiçek et al. (2006)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	AS	*Synognathus typhle*	14	C	1998-2001	TR-GN-T-BS	7.5	20.3	0.00020		3.22	0.94	Ozaydın and Taskavak (2006)
ASC	AS	*Torpedo marmorata*	20	C	2005-2006	T	13.2	28.6	0.05920		2.64	0.99	Ismen et al. (2007)
ASC	AS	*Torpedo marmorata*	12	C	2005	T	10.3	37	0.05350		2.64	0.98	Ozaydın et al. (2007)
ASC	AS	*Torpedo marmorata*	20	C	1999-2000	T	9.6	25	0.04880		2.69	0.96	Filiz and Mater (2002)
Spring	AS	*Torpedo marmorata*	37	C	2003	T	9.2	34	0.02730		2.91	0.98	Filiz and Bilge (2004)
ASC	AS	*Torpedo marmorata*	35	C	2005-2006	T	8.1	14.1	0.02320		2.98	0.99	İlkyaz et al. (2008)
ASC	AS	*Torpedo marmorata*	22	C	2004-2005	GN-TR	16.4	38.9	0.01390		3.10	0.95	Karakulak et al. (2006)
ASC	Medit	*Torpedo nobiliana*	92	M	2010-2013	L-T-GN	12	35	0.01500		3.06	0.85	Basusta et al. (2012)
ASC	AS	*Trachinus draco*	32	C	2004-2005	GN-TR	4.4	35.2	0.02430		2.58	0.92	Karakulak et al. (2006)
ASC	AS	*Trachinus draco*	95	C	2005-2006	T	8.2	28.2	0.00520		3.10	0.97	İlkyaz et al. (2008)
ASC	Medit	*Trachinus draco*	54	C	2001-2003	T-L	9	20	0.00520		3.09	0.99	Sangun et al. (2007)
ASC	BS	*Trachinus draco*	338	C	2007	T	5	35	0.00400		3.43	0.88	Ak et al. (2009)
ASC	AS	*Trachinus draco*	45	C	2005	T	17.2	34.1	0.00400		3.18	0.96	Ozaydın et al. (2007)
ASC	AS	*Trachinus draco*	1025	C	2005-2006	T	15	37	0.00366		3.20	0.97	Ismen et al. (2007)
ASC	MS	*Trachurus mediterraneus*	496	C	2009-2011	T	7.5	18.5	0.01800		2.73	0.84	Demirel and Dalkara (2012)
ASC	Medit	*Trachurus mediterraneus*	373	C	2001-2003	T-L	7	19.1	0.01280		2.81	0.88	Sangun et al. (2007)
ASC	Medit	*Trachurus mediterraneus*	718	C	1999-2000	T	2.6	16	0.01080		2.86	0.98	Çiçek et al. (2006)
ASC	AS	*Trachurus mediterraneus*	31	C	2004-2005	GN-TR	14.2	26.6	0.00470		3.17	0.95	Karakulak et al. (2006)
ASC	AS	*Trachurus mediterraneus*	446	C	2005-2006	T	7.5	20.9	0.00318		3.37	0.96	Ismen et al. (2007)
ASC	AS	*Trachurus mediterraneus**	76	C	1997-2000	T	73	225	0.00041		3.10	0.97	Türker et al. (2008)
ASC	MS	*Trachurus trachurus**	156	C	2009-2011	T	11.2	21	0.02700		2.95	0.77	Demirel and Dalkara (2012)
ASC	AS	*Trachurus trachurus*	264	C	2004-2005	GN-TR	10.5	24.3	0.01130		2.90	0.92	Karakulak et al. (2006)
F-W	BS	*Trachurus trachurus*	747	C	2004-2005	T	7.3	18.3	0.00860		2.98	0.96	Kalaycı et al. (2007)
F-W	MS	*Trachurus trachurus*	307	C	2006-2007	T	8	16.4	0.00560		3.13	0.92	Bok et al. (2011)
ASC	AS	*Trachurus trachurus*	159	C	2005-2006	T	13.7	24.5	0.00470		3.20	0.98	İlkyaz et al. (2008)
ASC	AS	*Trachurus trachurus*	1205	C	2005-2006	T	7.5	33	0.00467		3.20	0.97	Ismen et al. (2007)
ASC	BS	*Trachurus trachurus*	267	C	2007	T	6	15.7	0.00400		3.25	0.95	Ak et al. (2009)
ASC	AS	*Trachurus trachurus**	174	C	1997-2000	T	78	243	0.00021		2.88	0.94	Türker et al. (2008)
ASC	Medit	*Trichiurus lepturus*	84	C	2001-2003	T-L	20.5	58.8	0.00830		2.33	0.73	Sangun et al. (2007)
ASC	AS	*Trigla lyra*	26	C	2005-2006	T	25.6	125.1	0.01700		2.74	0.98	İlkyaz et al. (2008)
ASC	MS	*Trigla lyra*	27	C	2009-2011	T	16.5	32.3	0.01200		2.83	0.93	Demirel and Dalkara (2012)
ASC	AS	*Trigla lyra*	531	C	2005-2006	T	18.6	47.1	0.00915		2.94	0.97	Ismen et al. (2007)
F-W	MS	*Trigla lyra*	96	C	2006-2007	T	4.5	51	0.00620		3.05	0.99	Bok et al. (2011)

(continued)

Table 1. (Continued)

Season	Location	Species	N	Sex	Year	FM			*a*	*a'*	*b*		Source
ASC	MS	*Trigloporus lastoviza*	44	C	2009-2011	T	5.5	18	0.04900		2.57	0.97	Demirel and Dalkara (2012)
ASC	MS	*Tripterygion delaisi*	7	C	2007	BS	2.8	5.6	0.00605		3.07	0.99	Ozen et al. (2009)
ASC	MS	*Tripterygion tripteronotus*	8	C	2007	BS	2.9	6.2	0.00593		3.16	0.98	Ozen et al. (2009)
Fall	AS	*Trisopterus capelanus*	695	C	2011	T	8.5	22.2	0.00710		3.17	0.98	Yapıcı et al. (2015)
ASC	AS	*Trisopterus minutus*	980	C	2005-2006	T	23.5	54.5	0.00650		3.18	0.98	İlkyaz et al. (2008)
ASC	AS	*Trisopterus luscus capelanus*	14	C	1997-2000	T	131	200	0.00004		3.19	0.87	Türker et al. (2008)
ASC	AS	*Trisopterus minutus*	780	C	2005	T	8.4	22.6	0.00710		3.17	0.98	Ozaydın et al. (2007)
ASC	AS	*Trisopterus minutus*	158	C	1998-2001	TR-GN-T-BS	12.1	19.9	0.00670		3.18	0.94	Ozaydın and Taskavak (2006)
ASC	AS	*Trisopterus minutus*	229	C	2005-2006	T	10.2	20.6	0.00563		3.20	0.95	Ismen et al. (2007)
ASC	Medit	*Upeneus moluccensis***	265	C	1997-1998	T-GN	10.2	17	0.00001	0.0142	3.02	0.97	Taskavak and Bilecenoglu (2001)
F-W	Medit	*Upeneus moluccensis*	5	C	2008-2009	GN-TR	12.2	19.5	0.00590		3.24	0.99	Gokce et al. (2010)
ASC	Medit	*Upeneus moluccensis*	975	C	1999-2000	T	4.9	19	0.00550		3.26	0.99	Çiçek et al. (2006)
ASC	Medit	*Upeneus moluccensis*	93	C	2012-2013	T	9.5	19.2	0.00530		3.23	0.81	Özvarol (2014)
Winter	Medit	*Upeneus moluccensis*	297	C	2007-2008	T	17.7	11.98	0.00340		3.44	0.95	Erguden et al. (2009)
ASC	Medit	*Upeneus moluccensis*	651	C	2001-2003	T-L	7	18	0.00240		3.56	0.98	Sangun et al. (2007)
Winter	Medit	*Upeneus pori*	210	C	2007-2008	T	17	11.63	0.01570		2.82	0.96	Erguden et al. (2009)
ASC	Medit	*Upeneus pori*	1225	C	1999-2000	T	5.1	15.5	0.00870		3.05	0.96	Çiçek et al. (2006)
ASC	Medit	*Upeneus pori***	102	C	1997-1998	T-GN	9.1	14.7	0.00000	0.0050	3.26	0.98	Taskavak and Bilecenoglu (2001)
ASC	AS	*Uranoscopus scaber*	62	C	2004-2005	GN-TR	10.8	30.6	0.01560		3.00	0.89	Karakulak et al. (2006)
ASC	MS	*Uranoscopus scaber*	49	C	2009-2011	T	8	25.1	0.01500		3.06	0.94	Demirel and Dalkara (2012)
W-S	BS	*Uranoscopus scaber*	69	C	2009-2011	T	5,3	21,8	0,01500		3,05	0,98	Demirhan and Can (2007)
F-W	MS	*Uranoscopus scaber*	82	C	2006-2007	T	10,7	24,6	0,01090		3,15	0,97	Bok et al. (2011)
ASC	Medit	*Uranoscopus scaber*	92	C	2001-2003	T-L	5,2	24,7	0,01030		3,15	0,99	Sangun et al. (2007)
ASC	AS	*Uranoscopus scaber*	157	C	2005	T	10,1	29,1	0,01000		3,19	0,98	Ozaydın et al. (2007)
ASC	AS	*Uranoscopus scaber*	219	C	2005-2006	T	12,2	20,2	0,00970		3,21	0,99	İlkyaz et al. (2008)
ASC	AS	*Uranoscopus scaber*	71	C	2005-2006	T	12,5	27,4	0,00804		3,25	0,95	Ismen et al. (2007)
ASC	BS	*Uranoscopus scaber*	620	C	2007	T	1,8	56,4	0,00800		3,23	0,82	Ak et al. (2009)
ASC	MS	*Zebrus zebrus*	5	C	2007	BS	2,6	3,8	0,00973		2,94	0,98	Ozen et al. (2009)
ASC	Medit	*Zeus faber*	261	C	1999-2000	T	2,1	20,8	0,03270		2,71	0,98	Çiçek et al. (2006)
ASC	AS	*Zeus faber*	83	C	2005-2006	T	10,1	15,1	0,01770		2,95	0,99	İlkyaz et al. (2008)
ASC	AS	*Zeus faber*	242	C	2005-2006	T	5,5	57,5	0,01477		2,99	0,99	Ismen et al. (2007)
ASC	AS	*Zeus faber*	22	C	2005	T	10,4	44,5	0,01330		3,05	1,00	Ozaydın et al. (2007)
ASC	AS	*Zosterisessor ophiocephalus*	168	C	1998-2001	TR-GN-T-BS	9,3	20,5	0,00440		3,31	0,98	Ozaydın and Taskavak (2006)

Table 2. Parameters of the length-weight relationship [weight (in g) and length (in cm and fork length)] of marine fish species from Turkish marine waters. Sex: (M, male; F, female; C, combined); Location= Place where study conducted (AS, Aegean Sea; BS, Black Sea; MS, Marmara Sea; Medit, Mediterranean Sea) Year= year of sampling; Season = sampling season (ASC, all seasons combined; F-W, Fall-Winter; W-S, Winter-Spring); FM= fishing method (T, trawl; L, Longline; BS, beach seine; GN, gill nets; TR, trammel); a= the intercept of the relationship provided by source;b= the slope of the relationship; = coefficient of determination; n= the sample size; Species are listed in alphabetical order.

Season	Location	Species	N	Sex	Year	SM			*a*	*b*		Source
ASC	AS	*Atherina boyeri*	138	C	1998-2001	TR-GN-T-BS	4.8	9.8	0.0048	3.165	0.98	Ozaydın and Taskavak (2006)
ASC	AS	*Boops boops*	1197	C	1998-2001	TR-GN-T-BS	10.7	23.5	0.0127	3.033	0.92	Ozaydın and Taskavak (2006)
ASC	AS	*Chelidonichthys lastoviza*	366	C	2005	T	8.2	19.8	0.0124	3.008	0.974	Ozaydın et al. (2007)
ASC	AS	*Chelidonichthys lucerna*	85	C	2005	T	16.2	41.1	0.0057	3.019	0.977	Ozaydın et al. (2007)
ASC	AS	*Chelon labrosus*	94	C	1998-2001	TR-GN-T-BS	13.5	24.9	0.0533	2.523	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Chromis chromis*	27	C	2005	T	8.2	11.2	0.0144	3.066	0.953	Ozaydın et al. (2007)
ASC	AS	*Dentex dentex*	17	C	2005	T	17.8	29.7	0.0164	3.032	0.985	Ozaydın et al. (2007)
ASC	AS	*Dentex macrophthalmus*	51	C	1998-2001	TR-GN-T-BS	9.9	19.5	0.0178	3.051	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Diplodus annularis*	929	C	1998-2001	TR-GN-T-BS	7.9	16.8	0.0245	2.973	0.94	Ozaydın and Taskavak (2006)
ASC	AS	*Diplodus annularis*	2517	C	2005	T	5.1	16.1	0.019	3.046	0.93	Ozaydın et al. (2007)
ASC	AS	*Diplodus puntazzo*	27	C	2005	T	8.6	21.4	0.0423	2.775	0.996	Ozaydın et al. (2007)
ASC	AS	*Diplodus vulgaris*	63	C	1998-2001	TR-GN-T-BS	8	15.4	0.0184	3.094	0.98	Ozaydın and Taskavak (2006)
ASC	AS	*Diplodus vulgaris*	1615	C	2005	T	5.5	23.1	0.0344	2.841	0.95	Ozaydın et al. (2007)
ASC	AS	*Engraulis encrasicolus*	513	C	1998-2001	TR-GN-T-BS	10.5	14.9	0.0116	2.84	0.94	Ozaydın and Taskavak (2006)
ASC	AS	*Gobius niger*	727	C	1998-2001	TR-GN-T-BS	6	15.6	0.0134	2.914	0.94	Ozaydın and Taskavak (2006)
ASC	AS	*Lepidotrigla cavillone*	31	C	1998-2001	TR-GN-T-BS	8	21.1	0.0101	3.143	0.95	Ozaydın and Taskavak (2006)
ASC	AS	*Lepidotrigla cavillone*	1517	C	2005	T	3.8	15.3	0.0117	3.051	0.95	Ozaydın et al. (2007)
ASC	AS	*Lithognathus mormyrus*	35	C	1998-2001	TR-GN-T-BS	15.5	22	0.0094	3.181	0.96	Ozaydın and Taskavak (2006)
ASC	AS	*Liza aurata*	81	C	1998-2001	TR-GN-T-BS	15.7	27.8	0.0113	3.016	0.93	Ozaydın and Taskavak (2006)
ASC	AS	*Liza saliens*	329	C	1998-2001	TR-GN-T-BS	15.8	35	0.012	2.99	0.95	Ozaydın and Taskavak (2006)
ASC	AS	*Mullus barbatus*	479	C	1998-2001	TR-GN-T-BS	7.5	20	0.0102	3.176	0.96	Ozaydın and Taskavak (2006)
ASC	AS	*Mullus barbatus*	1910	C	2005	T	5.4	21.2	0.0089	3.233	0.981	Ozaydın et al. (2007)
ASC	AS	*Mullus surmuletus*	51	C	1998-2001	TR-GN-T-BS	8.4	17	0.0167	3.011	0.96	Ozaydın and Taskavak (2006)
ASC	AS	*Mullus surmuletus*	117	C	2005	T	7.4	21.9	0.0106	3.202	0.99	Ozaydın et al. (2007)
F-W	AS	*Pagellus acarne*	46	C	2006	TR-L	14.1	12.1	0.0088	3.112	0.952	Ceyhan et al. (2009)
ASC	AS	*Pagellus acarne*	335	C	1998-2001	TR-GN-T-BS	8.6	14.5	0.0942	2.086	0.95	Ozaydın and Taskavak (2006)
ASC	AS	*Pagellus acarne*	303	C	2005	T	9.4	17.5	0.0302	2.782	0.963	Ozaydın et al. (2007)

(continued)

Table 2. (Continued)

Season	Location	Species	N	Sex	Year	SM			*a*	*b*		Source
ASC	AS	*Pagellus bogaraveo*	51	C	2005	T	8.8	17.9	0.0179	2.985	0.981	Ozaydın et al. (2007)
ASC	AS	*Pagellus erythrinus*	226	C	1998-2001	TR-GN-T-BS	9	25.2	0.0122	3.034	0.99	Ozaydın and Taskavak (2006)
ASC	AS	*Pagellus erythrinus*	495	C	2005	T	5.9	19.5	0.0178	2.855	0.972	Ozaydın et al. (2007)
ASC	AS	*Pagrus pagrus*	12	C	2005	T	10.3	15.7	0.0266	2.736	0.96	Ozaydın et al. (2007)
ASC	AS	*Sardina pilchardus*	388	C	1998-2001	TR-GN-T-BS	9.2	14	0.0046	3.109	0.89	Ozaydın and Taskavak (2006)
ASC	AS	*Sardinella aurita*	677	C	1998-2001	TR-GN-T-BS	13	24.2	0.0088	3.112	0.9	Ozaydın and Taskavak (2006)
F-W	AS	*Sarpa salpa*	77	C	2006	TR-L	18.2	14	0.0942	2.086	0.929	Ceyhan et al. (2009)
ASC	AS	*Sarpa salpa*	93	C	1998-2001	TR-GN-T-BS	13.9	27.5	0.0302	2.782	0.99	Ozaydın and Taskavak (2006)
F-W	AS	*Scomber japonicus*	16	C	2006	TR-L	26.7	20.5	0.0179	2.985	0.996	Ceyhan et al. (2009)
ASC	AS	*Scomber japonicus*	129	C	1998-2001	TR-GN-T-BS	12.5	26	0.0122	3.034	0.98	Ozaydın and Taskavak (2006)
ASC	AS	*Scomber scombrus*	50	C	1998-2001	TR-GN-T-BS	19	28.5	0.0178	2.855	0.91	Ozaydın and Taskavak (2006)
F-W	AS	*Seriola dumerili*	14	C	2006	TR-L	24.1	22	0.0266	2.736	0.964	Ceyhan et al. (2009)
ASC	AS	*Sparus aurata*	72	C	1998-2001	TR-GN-T-BS	15.3	28	0.0046	3.109	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Sparus aurata*	10	C	2005	T	18	26.1	0.0088	3.112	0.989	Ozaydın et al. (2007)
F-W	AS	*Sphyraena chrysotaenia*	57	C	2006	TR-L	21.9	19.2	0.0942	2.086	0.936	Ceyhan et al. (2009)
F-W	AS	*Sphyraena sphyraena*	78	C	2006	TR-L	27.1	21	0.0302	2.782	0.712	Ceyhan et al. (2009)
ASC	AS	*Spicara flexuosa*	765	C	1998-2001	TR-GN-T-BS	8.3	18	0.0179	2.985	0.9	Ozaydın and Taskavak (2006)
ASC	AS	*Spicara maena*	194	C	1998-2001	TR-GN-T-BS	8.7	19.5	0.0122	3.034	0.99	Ozaydın and Taskavak (2006)
ASC	AS	*Spicara maena*	494	C	2005	T	9	18.1	0.0178	2.855	0.98	Ozaydın et al. (2007)
ASC	AS	*Spicara smaris*	163	C	1998-2001	TR-GN-T-BS	8.3	16.8	0.0266	2.736	0.96	Ozaydın and Taskavak (2006)
ASC	AS	*Spicara smaris*	27	C	2005	T	10	15.1	0.0046	3.109	0.963	Ozaydın et al. (2007)
ASC	AS	*Spondyliosoma cantharus*	66	C	2005	T	8.4	18.5	0.0088	3.112	0.991	Ozaydın et al. (2007)
F-W	AS	*Trachurus mediterraneus*	45	C	2006	TR-L	22.7	16.5	0.0942	2.086	0.963	Ceyhan et al. (2009)
ASC	AS	*Trachurus mediterraneus*	549	C	1998-2001	TR-GN-T-BS	9.3	22.6	0.0302	2.782	0.98	Ozaydın and Taskavak (2006)
ASC	AS	*Trachurus mediterraneus*	12	C	2005	T	6.8	16.3	0.0179	2.985	0.993	Ozaydın et al. (2007)
ASC	AS	*Trachurus trachurus*	575	C	1998-2001	TR-GN-T-BS	10.3	25.6	0.0122	3.034	0.97	Ozaydın and Taskavak (2006)
ASC	AS	*Trachurus trachurus*	501	C	2005	T	6.1	16.9	0.0178	2.855	0.946	Ozaydın et al. (2007)
ASC	AS	*Trigla lucerna*	470	C	1998-2001	TR-GN-T-BS	12.7	34.4	0.0266	2.736	0.98	Ozaydın and Taskavak (2006)
F-W	AS	*Upeneus moluccensis*	51	C	2006	TR-L	12.7	10	0.0046	3.109	0.929	Ceyhan et al. (2009)

Table 3. Parameters of the length-weight relationship [weight (in g) and length (in cm and disk width)] of marine fish species from Turkish marine waters. Sex: (M, male; F, female; C, combined); Location= Place where study conducted (AS, Aegean Sea; BS, Black Sea; MS, Marmara Sea; Medit, Mediterranean Sea) Year= year of sampling; Season = sampling season (ASC, all seasons combined; F-W, Fall-Winter; W-S, Winter-Spring); FM= fishing method (T, trawl; L, Longline; BS, beach seine; GN, gill nets; TR, trammel); a= the intercept of the relationship provided by source;b= the slope of the relationship; = coefficient of determination; n= the sample size; Species are listed in alphabetical order.

Season	Location	Species	N	Sex	Year	SM			*a*	*b*		Source
ASC	Medit	*Dasyatis pastinaca*	417	M	2010-2011	L-T-GN	15	64	0.0419	3.3169	0.84	Basusta et al. (2012)
ASC	AS	*Dasyatis pastinaca*	31	C	2005-2006	T	20.8	36	0.0102	3.37	0.984	İlkyaz et al. (2008)
ASC	Medit	*Gymnura altavela*	104	M	2010-2011	L-T-GN	30	127	0.017	2.7948	0.73	Basusta et al. (2012)
ASC	AS	*Gymnura altavela*	9	C	2005-2006	T	11.2	24.1	0.0025	3.27	0.97	İlkyaz et al. (2008)
ASC	AS	*Myliobatis aquila*	39	C	2005-2006	T	4.6	8.6	0.0058	3.28	0.986	İlkyaz et al. (2008)
ASC	Medit	*Pteromylaeus bovinus*	22	M	2010-2011	L-T-GN	32	86	0.0194	2.9034	0.9	Basusta et al. (2012)
ASC	Medit	*Raja clavata*	75	M	2010-2011	L-T-GN	25	70	0.023	2.6421	0.76	Basusta et al. (2012)
ASC	AS	*Raja clavata*	24	C	2005-2006	T	19	43.2	0.0335	2.89	0.956	İlkyaz et al. (2008)
ASC	Medit	*Raja miraletus*	22	M	2010-2011	L-T-GN	24	54	0.0021	3.262	0.95	Basusta et al. (2012)
ASC	AS	*Raja miraletus*	10	C	2005-2006	T	5	9.2	0.0346	2.82	0.977	İlkyaz et al. (2008)
ASC	AS	*Raja polystigma*	18	C	2005-2006	T	6.7	21.3	0.0218	3.05	0.982	İlkyaz et al. (2008)
ASC	Medit	*Rhinoptera marginata*	17	M	2010-2011	L-T-GN	13	92	0.01	2.1347	0.75	Basusta et al. (2012)
ASC	AS	*Rostroraja alba*	5	C	2005-2006	T	7.8	18.3	0.0083	3.13	0.99	İlkyaz et al. (2008)

of the clustering analysis performed. As a result, the number of factors affecting the differences in *b* value is quite high. The feeding and the habitat of the fishes are only two among these many factors. Along with this, differences between geographic regions, sample size and similar factors may also cause this value to change (Tesch, 1968; Wootton, 1990). Indeed, the difference shown in Table 4 makes the effect of geographic region differences on the *b* parameter clear.

The *a* parameter indicates the point the logarithmic form of the LWR intercepts the axis. Thus the *a* value is directly related to the growth rate of the fish (Froese, 2006). In this sense, it can be seen that *a* increases as the *b* value decreases, thus having an inverse relationship (Fig. 3). When all LWR are considered, it can be seen that 95% of *a* values fall between the range of 0.0123-0.0187. The distribution roughly matches the log-normal distribution, but it is strongly inclined towards the left hand side. Also, the number of species with a very low *a* value is quite high (Table 1, 2 and 3). Froese, (2000), Stergiou & Moutopoulos, (2001) and Froese, (2006) have stated that if there are multiple studies for a species, if a scatter plot of *log*(*a*) and *b* values acquired from the studies on said species, the detection of outliers becomes possible. Based on this, four species (*A. laterna, M. merluccius, C. linguatula* and *R. clavata*), that have six or more studies on them each were examined this way (Fig. 4). The circled outliers indicate the problematic studies for that species. These outliers also cause a drop in Froese, (2006) states that a more solid regression analysis performed after removing outlier observations would be strong enough to explain the variance 99%.

It can be seen in Figure 3 that when a scatter diagram for *log*(*a*) and *b* is drawn most estimates are distributed at and around 3. This makes it possible to say that most of the species present in Turkish waters show an isometric growth. This conclusion is supported when the four families with the highest distribution stated for Turkey's fish fauna in Bilecenoğlu *et al.,* (2014). Again Fishbase records support this statement.

Another reason for the variance in estimates and outlier observations is the seasonal effects. It is not possible to sample all size classes of a species in studies performed at a certain part of the year. According to Froese *et al.,* (2011), a good LWR study can be possible only by year-long sampling, allowing all size classes to be sampled, and making it possible to make better estimates.

As a result, this study offers a collected list of the LWR parameters for most species prevalent in Turkey's seas. In addition, it will serve as an effective resource in demonstrating the factors that impact both parameters in general.

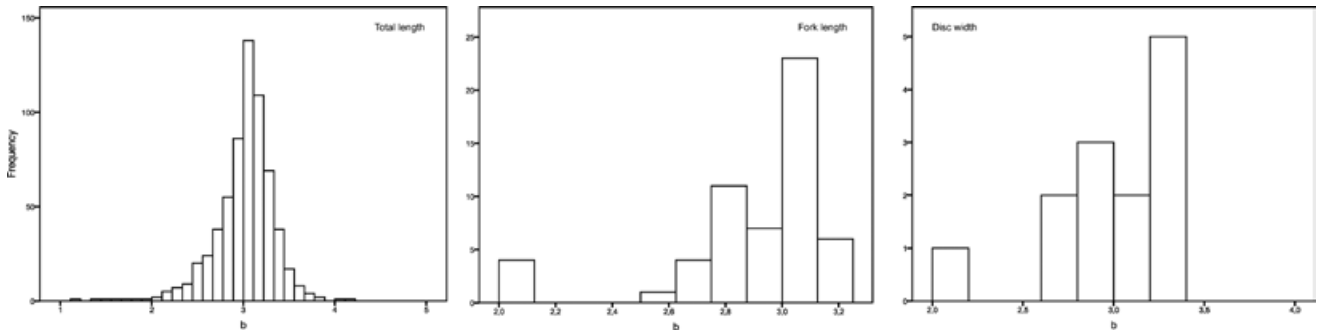

Fig. 1: Frequency distribution of exponent b based on 709 records for 242 species.

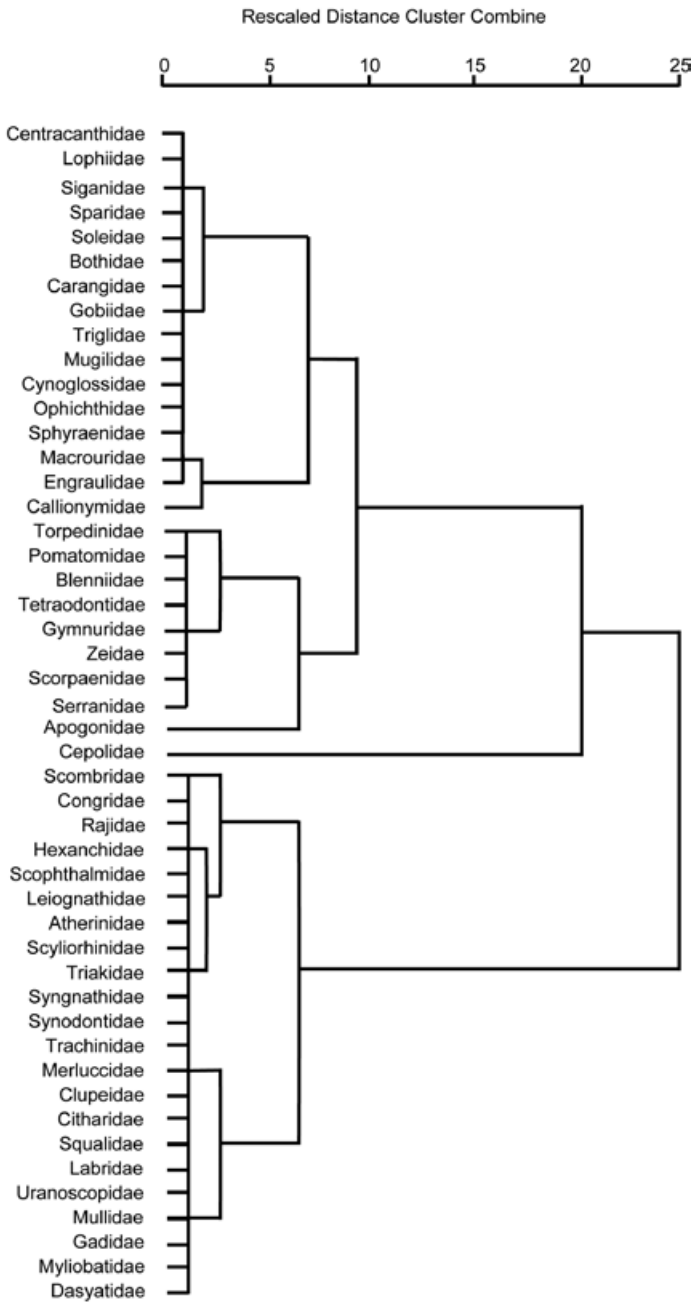

Fig. 2: Similarity dendogram for LWR parameters based on families. The average and medians of a and b values of the clusters determined by hierarchical clustering; (the letters above indicate differences and questionable records were excluded) Cluster-1=0.016[a], Cluster-2= 0.007[b], Cluster-3=0.071[c].

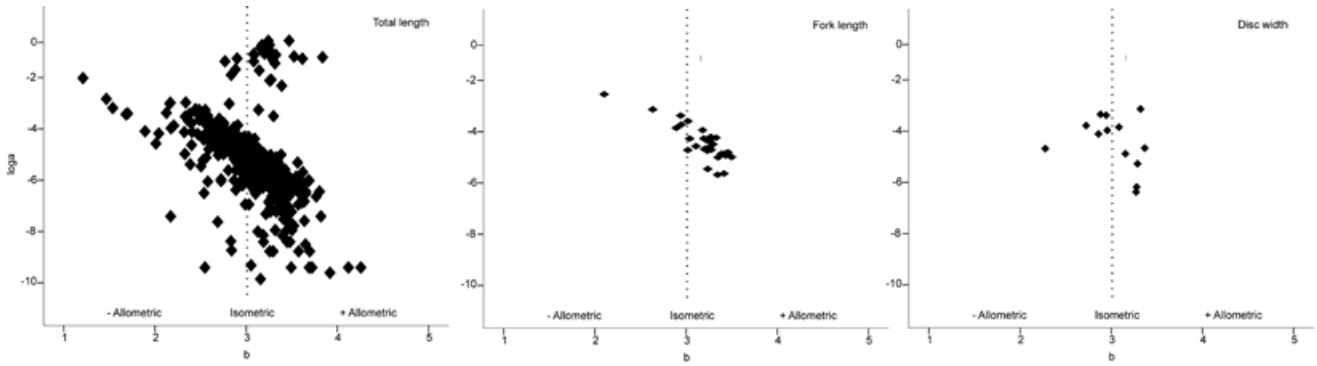

Fig. 3: Scatter plot of mean log a over mean b for 242 fish species. Areas of negative allometric, isometric and positive allometric change in body weight relative to body length are indicated.

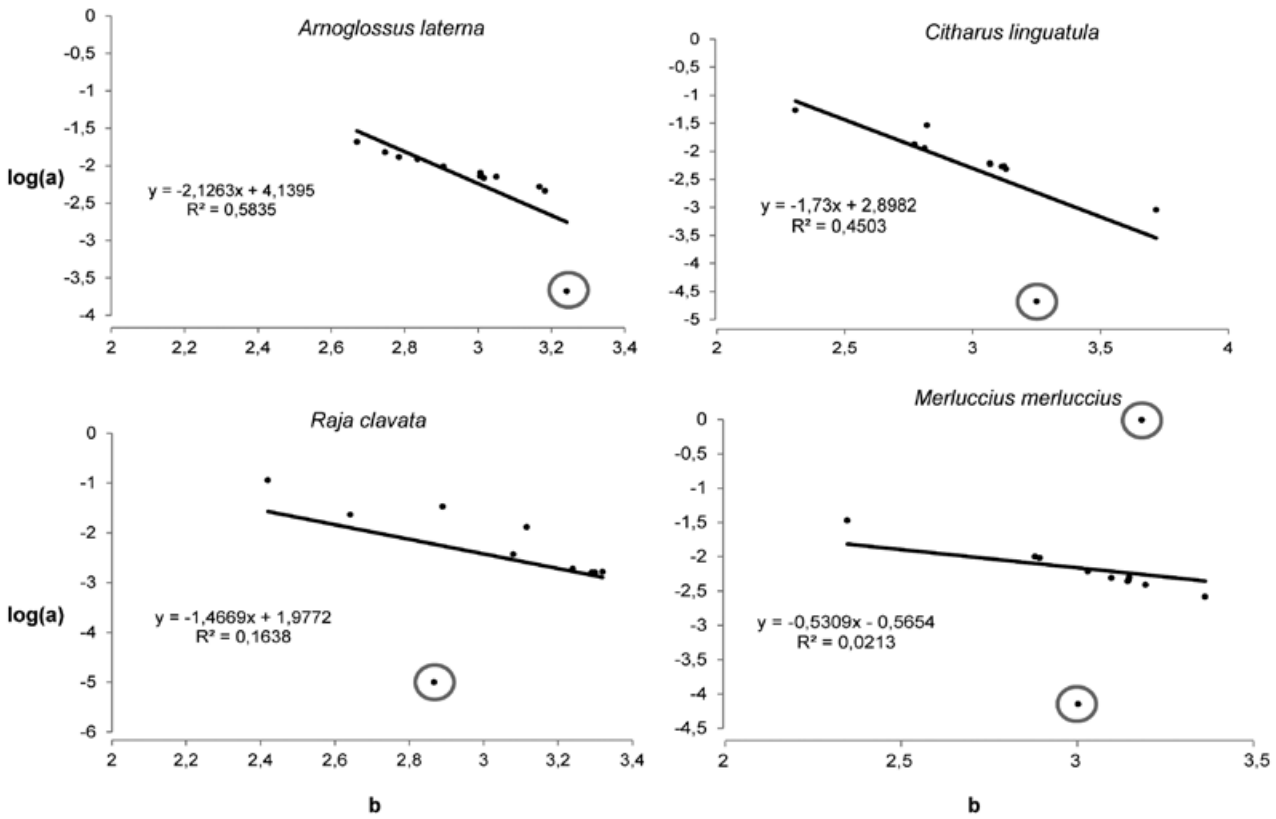

Fig. 4: The *log(a)* vs *b* graph of 4 species with more than 10 studies. The circled points are the outliers.

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