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

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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 separately. 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-
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, Lmin, Lmax, 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:
\[ W=0.009L^{1.00} \] (n=640, r²=0.99, total length)
\[ W=0.0165L^{3.009} \] (n=640, r²=0.99, fork length)
\[ W=0.0169L^{3.05} \] (n=640, r²=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 (Bileceñoğlu 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 Bileceñoğlu 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 by-catch 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 macroptalmna, 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. macroptalmna 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  | \( r^2 \) | Source |
|--------|----------|---------|---|-----|------|----|----|----|----|---------|--------|
| ASC    | MS       | A. sphynx | 12 | C   | 2007 | BS | 2  | 7.9 | 0.00820 | 3.11 | Ozen et al. (2009) |
| ASC    | Medit    | A. djedaba** | 70 | C   | 1997-1998 | T-GN | 13 | 19.2 | 0.00075 | 0.4883 | 2.82 | 0.86 Taskavak and Bilecenoglu (2001) |
| ASC    | AS       | A. fallax | 32 | C   | 2004-2005 | GN-TR | 17.6 | 24.6 | 0.01020 | 2.93 | 0.88 Karakulak et al. (2006) |
| F-W    | BS       | A. pontica | 227 | C | 2004-2005 | T | 11.9 | 27.6 | 0.00460 | 2.93 | 0.88 Kalaycı et al. (2007) |
| F-W    | BS       | A. queketti | 11 | C | 2011 | T | 7.1 | 12.3 | 0.08690 | 3.09 | 0.97 Ozen et al. (2009) |
| Winter | Medit    | A. sphyraena | 238 | C | 2003 | T | 7.5 | 20.7 | 0.00620 | 2.93 | 0.88 Ismen et al. (2007) |
| Winter | AS       | A. sphyraena | 92 | C | 2005-2006 | T | 8 | 20.6 | 0.00426 | 2.93 | 0.88 Karakulak et al. (2007) |
| Winter | BS       | A. queketti | 48 | C | 2007 | T | 12.3 | 9.94 | 0.00002 | 0.1221 | 3.47 | 0.97 Taskavak and Bilecenoglu (2001) |
| Winter | AS       | A. queketti | 143 | C | 1998-2001 | TR-GN-T-BS | 2.7 | 7.1 | 0.00600 | 3.53 | 0.97 Ozen et al. (2009) |
| Winter | Medit    | A. queketti | 30 | C | 2007-2008 | T | 7.1 | 12.8 | 0.11350 | 2.12 | 0.69 Karakulak et al. (2006) |
| Winter | AS       | A. queketti | 7 | C | 2005-2006 | T | 20 | 25.5 | 0.01850 | 2.74 | 0.97 Ismen et al. (2007) |
| Winter | MS       | A. queketti | 44 | C | 2007 | BS | 2.9 | 9.8 | 0.02100 | 2.98 | 0.73 Ak et al. (2009) |
| Spring | AS       | A. queketti | 7 | C | 2004-2005 | GN-TR | 7.6 | 18.3 | 0.01500 | 2.75 | 0.99 Deval et al. (2014) |
| Spring | AS       | A. queketti | 32 | C | 1997-2000 | T-L | 6.5 | 26.9 | 0.00002 | 0.0203 | 3.00 | 0.99 Özkın et al. (2010) |
| Spring | AS       | A. queketti | 76 | C | 2002 | T | 6 | 8.9 | 0.01790 | 2.60 | 0.88 Bayhan et al. (2008) |
| Spring | AS       | A. queketti | 1805 | C | 2005-2006 | T | 5.5 | 24.2 | 0.00719 | 3.01 | 0.97 Bayhan et al. (2008) |
| Spring | AS       | A. queketti | 594 | C | 1999-2000 | T | 4.5 | 13.4 | 0.00970 | 2.91 | 0.96 Özaydın et al. (2007) |
| Spring | AS       | A. queketti | 796 | C | 2002 | T | 5 | 17.1 | 0.00790 | 3.01 | 0.97 Bayhan et al. (2008) |
| Spring | AS       | A. queketti | 1805 | C | 2005-2006 | T | 11.7 | 21.1 | 0.00709 | 3.05 | 0.97 Bayhan et al. (2008) |
| Spring | AS       | A. queketti | 1629 | C | 2006-2007 | T | 6.8 | 20 | 0.00680 | 3.02 | 0.96 Bay et al. (2011) |
| Season | Location | Species | N  | Sex | Year | FM  | a   | b  | Source            |
|--------|----------|---------|----|-----|------|-----|-----|----|------------------|
| ASC    | AS       | Arnoglossus laterna | 721 | C   | 1998-2001 | TR-GN-T-BS | 6.8 | 21.9 | 3.17 0.96 | Özaydın et al. (2006) |
| ASC    | AS       | Arnoglossus laterna | 328 | C   | 1997-2000 | T    | 5.5 | 20.5 | 3.49 0.97 | Türk et al. (2009) |
| ASC    | AS       | Arnoglossus laterna | 13  | C   | 2002    | T    | 1.6 | 7.9  | 2.69 0.95 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 8  | C   | 2004    | T    | 16.2| 32.4 | 3.34 0.98 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 15  | C   | 1997-2000 | T    | 85  | 11.2 | 3.12 0.96 | Özaydın et al. (2006) |
| ASC    | AS       | Arnoglossus laterna | 31  | C   | 2006-2008 | T    | 4.1 | 7.9  | 2.71 0.95 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 8  | C   | 2004    | T    | 16.2| 32.4 | 3.34 0.98 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 15  | C   | 1997-2000 | T    | 29  | 1.1  | 0.0011 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 31  | C   | 2006-2008 | T    | 4.1 | 7.9  | 2.71 0.95 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 8  | C   | 2004    | T    | 16.2| 32.4 | 3.34 0.98 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 15  | C   | 1997-2000 | T    | 29  | 1.1  | 0.0011 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 31  | C   | 2006-2008 | T    | 4.1 | 7.9  | 2.71 0.95 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 8  | C   | 2004    | T    | 16.2| 32.4 | 3.34 0.98 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 15  | C   | 1997-2000 | T    | 29  | 1.1  | 0.0011 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 31  | C   | 2006-2008 | T    | 4.1 | 7.9  | 2.71 0.95 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 8  | C   | 2004    | T    | 16.2| 32.4 | 3.34 0.98 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 15  | C   | 1997-2000 | T    | 29  | 1.1  | 0.0011 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 31  | C   | 2006-2008 | T    | 4.1 | 7.9  | 2.71 0.95 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 8  | C   | 2004    | T    | 16.2| 32.4 | 3.34 0.98 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 15  | C   | 1997-2000 | T    | 29  | 1.1  | 0.0011 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 31  | C   | 2006-2008 | T    | 4.1 | 7.9  | 2.71 0.95 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 8  | C   | 2004    | T    | 16.2| 32.4 | 3.34 0.98 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 15  | C   | 1997-2000 | T    | 29  | 1.1  | 0.0011 | Boylan et al. (2008) |
| ASC    | AS       | Arnoglossus laterna | 31  | C   | 2006-2008 | T    | 4.1 | 7.9  | 2.71 0.95 | Boylan et al. (2008) |

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 | Ilkay 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       | Buglossidium luteum | 208 | C  | 2003 | T  | 9  | 21.6 | 0.00650 | 2.74 | 0.78 | Filiz and Bilge (2004)        |
| ASC    | AS       | Buglossidium luteum | 332 | C  | 2005-2006 | T  | 8.5 | 27.5 | 0.00347 | 3.02 | 0.91 | Ismen et al. (2007)           |
| 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 | Ilkay 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)           |
| ASC    | AS       | Caelorinchus caelorhincus | 123 | C  | 2005 | T  | 7  | 11.4 | 0.01500 | 2.82 | 0.89 | Ozaydın et al. (2007)         |
| ASC    | MS       | Caelorinchus caelorhincus | 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)           |
| ASC    | AS       | Caelorinchus caelorhincus | 123 | C  | 2005 | T  | 7  | 11.4 | 0.01500 | 2.82 | 0.89 | Ozaydın et al. (2007)         |
| ASC    | MS       | Caelorinchus caelorhincus | 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)           |
| ASC    | AS       | Caelorinchus caelorhincus | 123 | C  | 2005 | T  | 7  | 11.4 | 0.01500 | 2.82 | 0.89 | Ozaydın et al. (2007)         |
| ASC    | MS       | Caelorinchus caelorhincus | 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)           |
| ASC    | AS       | Caelorinchus caelorhincus | 123 | C  | 2005 | T  | 7  | 11.4 | 0.01500 | 2.82 | 0.89 | Ozayıd (2007) and Taskavak (2010) |
| Season Location | Species | N | Sex | Year | FM | Source |
|-----------------|---------|---|-----|------|----|--------|
| ASC AS | 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 | 15.3 | 0.00071 | 1.0821 | 3.18 | 1.00 | Keskin and Gaygusuz (2010) |
| ASC AS | Chromis chromis | 141 | C | 2004-2005 | GN-TR | 8.7 | 14 | 0.00270 | 2.70 | 0.98 | Sangun et al. (2007) |
| ASC AS | Citharus linguatula* | 1236 | C | 1997-2000 | T | 69 | 237 | 0.00002 | 3.26 | 0.98 | Türk et al. (2008) |
| ASC AS | Clinitrachus argentatus** | 99 | C | 2007 | BS | 2.6 | 7.9 | 0.00602 | 3.09 | 0.97 | Ozen et al. (2009) |
| Winter Medit | Cynoglossus sinusarabici | 53 | C | 2007-2008 | T | 17.1 | 12.48 | 0.02390 | 2.52 | 0.98 | Erguden et al. (2009) |

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 | 0.00160 | 3.00 | 999.00 | 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 | 3.12 | 0.99 | Ismen et al. (2007) |
| ASC    | Medit    | Dasyatis pastinaca | 14 | C   | 1999-2000 | T | 40 | 74.2 | 0.00850 | 3.04 | 0.97 | Ozaydin et al. (2007) |
| ASC    | Medit    | Dasyatis pastinaca | 16 | C   | 2005 | T | 44.2 | 138 | 0.00230 | 3.25 | 0.99 | Ozaydin et al. (2007) |
| ASC    | AS       | Dasyatis pastinaca | 334 | C | 1999-2003 | T | 23.4 | 100.9 | 0.00200 | 3.24 | 0.96 | Yeldan and Avsar (2007) |
| ASC    | Medit    | Delenostoeus quadrirarmatus | 883 | C | 2005-2006 | T | 16.3 | 40.2 | 0.00010 | 3.24 | 0.97 | Yildiz 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 | 0.00610 | 2.50 | 0.99 | 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 | 3.55 | 0.99 | Yigit and Ismen (2009) |
| Fall   | Medit    | Dentex gibbosus | 34 | C   | 2000 | L | 17.6 | 47.3 | 0.03410 | 3.71 | 0.95 | Ilkyaz et al. (2008) |
| ASC    | AS       | Dentex macrophthalmus | 249 | C | 2005-2006 | T | 8.7 | 19.9 | 0.02100 | 2.89 | 0.99 | Ceyhan et al. (2009) |
| F-W    | AS       | Dentex maroccanus | 8 | C   | 2006 | TR-L | 18.9 | 34 | 0.00880 | 3.18 | 0.99 | Ismen et al. (2007) |
| ASC    | AS       | Diplodus annularis* | 81 | C   | 2009-2011 | T | 10 | 16.7 | 0.00400 | 1.72 | 3.43 | Demir et al. (2012) |
| F-W    | Medit    | Diplodus annularis* | 887 | C | 1999-2000 | T | 7.9 | 16.7 | 0.00014 | 1.6669 | 3.17 | 0.99 | Keskin and Gaygusuz (2010) |
| ASC    | AS       | Diplodus annularis** | 89 | C | 2000-2001 | TR-L | 9.6 | 13.3 | 0.00001 | 0.0024 | 2.48  | 0.96 | Taskavak and Bilecenoglu (2001) |
| ASC    | Medit    | Diplodus annularis | 33 | C   | 2006 | TR-L | 21.3 | 16 | 0.00610 | 3.04 | 0.98 | Ceyhan et al. (2009) |
| 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    | 25.3 | 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)|
| ASC AS          | Diplodus vulgaris| 118 | C   | 2005-2006 | T     | 6.6     | 8.6  | 0.00380 | 3.53 0.98                   | Ilkyaz et al. (2008)|
| ASC AS          | Diplodus vulgaris| 179 | C   | 2005-2006 | T     | 14.9    | 100  | 0.00083 | 3.35 1.00                   | Ismen et al. (2007)|
| Spring AS       | Diplodus vulgaris| 8   | C   | 2003      | T     | 17.9    | 22.2 | 0.0070  | 3.40 0.99                   | Filiz and Bilge (2004)|
| ASC AS          | Diplodus vulgaris| 39  | C   | 2005-2006 | T     | 7.3     | 12.2 | 0.00010 | 3.41 0.97                   | Ilkyaz et al. (2008)|
| Spring 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                   | Kalayci 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. (2008)|
| ASC AS          | Engraulis encrasicolus| 28  | C   | 1997-2000 | T     | 85      | 134  | 0.00021 | 2.77 0.66                   | Türker et al. (2008)|
| ASC Medit       | Euphacterias myrus| 125 | C   | 2002-2003 | L     | 18.6    | 56.6 | 0.01780 | 2.86 0.94                   | Akyol et al. (2007)|
| F-W MS          | Epinephelus aeneus| 36  | C   | 2006      | TR-L  | 21.6    | 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| 53  | C   | 2000      | L     | 14.2    | 55.4 | 0.08850 | 2.39 0.93                   | Can et al. (2002)  |
| ASC AS          | Epinephelus aeneus| 59  | C   | 2002-2003 | L     | 14.6    | 45   | 0.02660 | 2.74 0.97                   | Akyol et al. (2007)|
| ASC AS          | Epinephelus spinax| 11  | U   | 2005-2009 | T     | 10.6    | 45   | 0.00230 | 3.23 0.95                   | Ismen et al. (2009)|
| ASC AS          | Epinephelus 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    | 134.6| 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)  |
| 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 | Ilkyaz 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 | 0.01200 | 2.50 | 0.98 | Erguden et al. (2009) |
| ASC AS | Galcidulus argenteus | 331 | C | 2005-2006 | T | 6.7 | 13.5 | 0.01414 | 2.85 | 0.83 | Ismen et al. (2007) |
| ASC AS | Galcidulus 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 | 0.00680 | 0.6958 | 3.01 | 1.00 | Keskin and Gaygusuz (2010) |
| F-W MS | Gadus callarias mediterraneus | 56 | C | 2006-2007 | T | 8.2 | 14.3 | 0.00300 | 3.05 | 0.93 | Koc et al. (2011) |
| ASC AS | Galeus melastomus | 93 | C | 2005-2006 | T | 12 | 31.7 | 0.00238 | 3.03 | 0.92 | Ismen et al. (2007) |
| ASC AS | Galeus melastomus | 303 | U | 2005-2009 | T | 11.3 | 31.7 | 0.01414 | 2.85 | 0.83 | Ismen et al. (2009) |
| ASC MS | Gobius argenteus | 23 | C | 2005 | T | 11.2 | 20.3 | 0.00390 | 3.33 | 0.99 | Ozaydın et al. (2007) |
| ASC MS | Gobius niger | 73 | C | 2007 | T | 9.1 | 35 | 0.01000 | 3.03 | 0.89 | Filiz and Bilge (2004) |
| ASC BS | Gobius geniporus | 20 | C | 2005 | T | 10.1 | 25.6 | 0.00700 | 3.05 | 0.93 | Demirel and Dalkara (2012) |
| ASC BS | Gobius melanostomus | 184 | C | 2005-2006 | T | 5.5 | 18 | 0.02400 | 2.74 | 0.91 | Ak et al. (2009) |
| ASC BS | Gobius melanostomus | 127 | C | 2005-2006 | T | 6.5 | 18 | 0.02400 | 2.74 | 0.91 | Ak et al. (2009) |
| ASC BS | Gobius niger | 208 | C | 2005-2006 | T | 5.6 | 18 | 0.02400 | 2.74 | 0.91 | Ak et al. (2009) |
| ASC BS | Gobius niger | 14 C | 2005-2006 | T | 5.5 | 18 | 0.02400 | 2.74 | 0.91 | Ak et al. (2009) |
| ASC MS | Gobius niger | 272 | C | 2007 BS | T | 2.7 | 11.8 | 0.00400 | 2.95 | 0.56 | Ak et al. (2009) |
| ASC BS | Gymnothorax cretensis** | 13 | C | 2000-2001 | BS | 6.6 | 9.7 | 0.00120 | 0.2433 | 3.13 | 0.95 | Keskin and Gaygusuz (2010) |
| ASC BS | Gymnura altavela | 17 | C | 2005 | T | 37.6 | 95 | 0.04490 | 2.84 | 0.99 | Ozaydın et al. (2007) |
| ASC MS | Gymnura altavela | 9 | C | 2003 | T | 37.5 | 95 | 0.04490 | 2.84 | 0.99 | Ozaydın et al. (2007) |
| ASC MS | Gymnura altavela | 107 | C | 1999-2003 | T | 30.2 | 83.5 | 0.00900 | 3.23 | 0.99 | Yildiz 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) |
| ASC MS | Helicolenus dactylopterus | 178 | C | 2003 | T | 5.5 | 13.5 | 0.00790 | 3.28 | 0.92 | Filiz and Bilge (2004) |
| ASC AS | Hexanchus griseus | 18 | C | 2005-2009 | T | 68.6 | 105 | 0.00470 | 3.15 | 0.97 | Ismen et al. (2009) |
| ASC AS | Hexanchus griseus | 14 C | 2005-2006 | T | 68.6 | 105 | 0.00470 | 3.15 | 0.97 | Ismen et al. (2009) |
| ASC MS | Hexanchus griseus | 14 | C | 2005-2006 | T | 80 | 114 | 0.00600 | 3.28 | 0.92 | Ismen et al. (2009) |
| ASC BS | Hexanchus griseus | 5 | C | 2005-2006 | T | 80 | 114 | 0.00600 | 3.28 | 0.92 | Ismen et al. (2009) |
| ASC BS | 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) |
| ASC BS | Hippocampus hippocampus | 163 | C | 2007 | T | 2.7 | 13.7 | 0.00400 | 2.95 | 0.56 | Ak et al. (2009) |

Table 1. (Continued)
| Season | Location | Species | N | Sex | Year          | FM | a   | a'   | b   | Source                          |
|--------|----------|---------|---|-----|---------------|----|-----|------|-----|---------------------------------|
| ASC    | AS       | Hippocampus hippocampus | 29 | C   | 2000-2002     | TR | 80  | 0.00100 | 3.14 | 0.76 Gürkan and Taskavak (2007) |
| Spring | AS       | Hoplostethus mediterraneus | 137 | C    | 2003          | T  | 8   | 0.01490 | 2.95 | 0.98 Filiz and Bilge (2004)    |
| ASC    | AS       | Hoplostethus mediterraneus | 599 | C    | 2005-2006     | T  | 4.5 | 0.0890 | 3.16 | 0.99 Ismen et al. (2007)       |
| ASC    | Medit    | Hymenocampus italicus | 76 | C    | 2009-2011  | T  | 8.2 | 0.00770 | 2.45 | 0.77 Devet et al. (2014)       |
| Fall   | AS       | Hymenocampus italicus | 91 | C    | 2011         | T  | 7.4 | 0.00340 | 2.89 | 0.86 Yaprıcı et al. (2015)     |
| ASC    | MS       | Labrus viridis | 72 | C    | 2007          | BS | 3   | 0.01272 | 2.99 | 0.99 Ozen et al. (2009)        |
| ASC    | Medit    | Lagocephalus lagocephalus | 27 | C    | 2001-2003  | T-L | 12.3 | 0.00660 | 3.30 | 0.95 Sangun et al. (2007)      |
| Winter | Medit    | Lagocephalus spadiceus | 89 | C    | 2007-2008  | T   | 26.9 | 0.02040 | 2.90 | 0.94 Erguden et al. (2009)     |
| ASC    | Medit    | Lagocephalus spadiceus** | 19 | C    | 1997-1998  | T-GN | 15.9 | 0.00902 | 2.95 | 0.97 Taskavak and Bilecenoglu (2001) |
| Winter | Medit    | Lagocephalus suezensis | 86 | C    | 2007-2008  | T   | 16.7 | 0.02360 | 2.75 | 0.96 Erguden et al. (2009)     |
| Winter | ASC      | Leiodus klunzingeri | 212 | C   | 1999-2000  | T   | 2.1  | 0.00900 | 3.16 | 0.96 Ciçek et al. (2006)       |
| ASC    | ASC      | Leiodus klunzingeri | 632 | C   | 2001-2003  | T-L | 1.9  | 0.00750 | 3.22 | 0.97 Sangun et al. (2007)      |
| ASC    | Medit    | Leiodus klunzingeri** | 156 | C   | 1997-1998  | T-GN | 4.9  | 0.00600 | 0.0065 | 3.27 | 0.96 Taskavak and Bilecenoglu (2001) |
| Winter | Medit    | Leiodus klunzingeri** | 358 | C   | 2007-2008  | T   | 10.9 | 0.00260 | 3.71 | 0.92 Erguden et al. (2009)     |
| ASC    | MS       | Lepadogaster lepadogaster | 4 | C    | 2007          | BS | 4.1  | 0.00415 | 3.60 | 0.99 Ozen et al. (2009)        |
| ASC    | AS       | Lepadogaster caudatus | 13 | C    | 2005-2006  | T   | 36.3 | 0.00047 | 3.05 | 0.99 Ismen et al. (2007)       |
| Spring | AS       | Lepadogaster caudatus | 40 | C    | 2003          | T   | 21.9 | 0.00040 | 3.11 | 0.99 Filiz and Bilge (2004)    |
| ASC    | ASC      | Lepidostomus boscii | 2242 | C   | 2006-2008 | T   | 10.9 | 0.00390 | 3.25 | 0.99 Ozekinci et al. (2009)    |
| ASC    | ASC      | Lepidostomus boscii | 521 | C   | 2005-2006 | T   | 10.2 | 0.00316 | 3.29 | 0.99 Ismen et al. (2007)       |
| ASC    | ASC      | Lepidostomus whitfieldianus | 12 | C   | 2006-2008 | T   | 20.2 | 0.00726 | 2.33 | 0.91 Ozekinci et al. (2009)    |
| MS     | ASC      | Lepidostomus whitfieldianus | 143 | C  | 2009-2011 | T   | 5.9  | 0.03300 | 2.63 | 0.84 Demirel and Dalkara (2012) |
| ASC    | ASC      | Lepidostomus cavillone | 1428 | C   | 2005-2006 | T   | 12.7 | 0.00880 | 3.15 | 0.98 Ilkay et al. (2008)       |
| ASC    | AS       | Lepidostomus cavillone | 855 | C   | 2005-2006 | T   | 7   | 0.00442 | 3.41 | 0.90 Ismen et al. (2007)       |
| ASC    | AS       | Lepidostomus cavillone | 377 | C   | 1997-2000 | T   | 75   | 0.00011 | 2.98 | 0.89 Türker et al. (2008)      |
| Spring | AS       | Leaneurigobius friesi | 17 | C   | 2003          | T   | 6.2  | 0.03920 | 2.13 | 0.72 Filiz and Bilge (2004)    |
| F-W    | MS       | Leaneurigobius friesi | 580 | C   | 2006-2007 | T   | 4.2  | 0.01600 | 2.53 | 0.85 Bok et al. (2011)         |
| ASC    | AS       | Leaneurigobius friesi | 149 | C   | 2005-2006 | T   | 6.8  | 0.00890 | 2.86 | 0.99 Ilkay et al. (2008)       |
| ASC    | AS       | Leaneurigobius friesi | 631 | C   | 2005          | T   | 4   | 0.00790 | 3.01 | 0.95 Ozaydin et al. (2007)     |
| Fall   | AS       | Lesueurigobius suerii | 13 | C   | 2011          | T   | 3.9  | 0.00960 | 2.93 | 0.91 Yaprıcı et al. (2015)     |
| ASC    | Medit    | Lesueurigobius suerii | 6 | C  | 2009-2011 | T   | 44.5 | 0.03900 | 3.08 | 0.98 Devet et al. (2014)       |
| F-W    | MS       | Lithognathus mormyrus* | 141 | C | 2006         | GN-TR | 23.7 | 0.00240 | 3.50 | 0.97 Ceyhan et al. (2009)      |
| ASC    | MS       | Lithognathus mormyrus** | 41 | C | 2000-2001 | L-BS | 2.6  | 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 | 0.01920 | 2.83 | 0.99 Gokce et al. (2010)       |

(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 | 0.0180 | 3.01 | 0.98 Ilkyaz 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 aurata** | 75 | C   | 2000-2001 | L-BS | 2.3 | 18.6 | 0.00922 | 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 Ilkyaz et al. (2008) |
| ASC MS  | Lophius piscatorius | 30 | C   | 2005-2006 | T  | 9.3  | 18.2 | 0.02200 | 2.85 | 0.81 Demirel and Dalkara (2012) |
| F-W MS  | Lophius piscatorius | 40 | C   | 2006-2007 | T  | 36   | 54   | 0.00014 | 2.49 | 0.88 Bok et al. (2011) |
| Winter Medit | Leiognathus klunzingeri | 358 | C | 2007-2008 | T  | 10.7 | 29.2 | 0.00260 | 3.71 | 0.92 Erguden et al. (2009) |
| ASC MS  | Lepadogaster lepadogaster | 4 | C   | 2007-2006 | BS | 4.1  | 5.1  | 0.00415 | 3.60 | 0.99 Ozen et al. (2009) |
| Spring AS  | Lepidopus caudatus | 13 | C   | 2005-2006 | T  | 36.3 | 80   | 0.00470 | 3.05 | 0.99 Ismen et al. (2007) |
| ASC MS  | Lepidopus caudatus | 143 | C   | 2009-2011 | T  | 5.9  | 14.2 | 0.03009 | 2.63 | 0.84 Demirel and Dalkara (2012) |
| ASC AS  | Lepidopus caudatus | 1428 | C | 2006-2007 | T  | 12.7 | 33   | 0.00880 | 3.15 | 0.98 Ilkyaz et al. (2008) |
| ASC MS  | Lepidopus caudatus | 855 | C   | 2005-2006 | T  | 7    | 12.8 | 0.00442 | 3.41 | 0.90 Ismen et al. (2007) |
| Spring AS  | Lepidopus caudatus | 521 | C   | 2005-2006 | T  | 10.2 | 39.5 | 0.00316 | 3.29 | 0.99 Ismen et al. (2007) |
| ASC AS  | Lepidopus caudatus | 12 | C   | 2006-2008 | T  | 20.2 | 35.7 | 0.07260 | 2.33 | 0.91 Ozekinci et al. (2009) |
| Autumn AS  | Lepidopus caudatus | 171 | C   | 2003-2004 | T  | 10.1 | 23.7 | 0.00970 | 3.02 | 0.95 Çin and Bilge (2015) |
| Spring AS  | Lepidopus caudatus | 377 | C   | 1997-2000 | T  | 75   | 141  | 0.00011 | 2.98 | 0.89 Tüker et al. (2008) |
| Spring AS  | Lepidopus caudatus | 17 | C   | 2003-2004 | T  | 6.9  | 14.2 | 0.00490 | 3.08 | 0.99 Ismen et al. (2007) |
| F-W MS  | Lepidopus caudatus | 580 | C   | 2006-2007 | T  | 4.2  | 10.7 | 0.01600 | 2.53 | 0.85 Bok et al. (2013) |
| Fall AS  | Lepidopus caudatus | 149 | C   | 2005-2006 | T  | 6.8  | 20.5 | 0.00890 | 2.89 | 0.96 Ilkyaz et al. (2008) |
| F-W MS  | Lepidopus caudatus | 631 | C   | 2005-2006 | T  | 4    | 9.1  | 0.00790 | 3.01 | 0.95 Ozaydin et al. (2007) |
| F-W AS  | Lepidopus caudatus | 117 | C   | 2010-2011 | T  | 5.9  | 14.2 | 0.00490 | 3.08 | 0.99 Ismen et al. (2007) |
| F-W MS  | Lepidopus caudatus | 117 | C   | 2010-2011 | T  | 5.9  | 14.2 | 0.00490 | 3.08 | 0.99 Ismen et al. (2007) |
| F-W AS  | Lepidopus caudatus | 141 | C   | 2006-2007 | T  | 23.7 | 14.5 | 0.00240 | 3.50 | 0.97 Ceyhan et al. (2009) |

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| Keskin and Gaygusuz (2010)                    |
| ASC    | Medit    | *Liza corinna*          | 15    | C   | 1997-1998| T-GN   | 16.7  | 18.7  | 0.00002| Taskavak and Bilecenoglu (2001)               |
| ASC    | MS       | *Liza saliens*          | 57    | C   | 2000-2001| L-BS   | 2.3   | 18.6  | 0.00092| Keskin and Gaygusuz (2010)                    |
| ASC    | AS       | Lophius badegaussa      | 29    | C   | 2005-2006| T      | 7     | 45.4  | 0.0160 | İlkeş et al. (2008)                          |
| ASC    | MS       | Lophius piscatorius     | 15    | C   | 2009-2011| T      | 9.3   | 18.2  | 0.02200| Demirel and Dalkara (2012)                   |
| ASC    | AS       | Lophius piscatorius     | 15    | C   | 2005    | T      | 22.3  | 6.7   | 0.01990| Ozyaydn et al. (2007)                        |
| ASC    | AS       | Lophius piscatorius     | 94    | C   | 1998-2001| TR-GN-T-BS | 8    | 48    | 0.01460| Ismen et al. (2007)                          |
| ASC    | AS       | Lophius piscatorius     | 445   | C   | 2005-2006| T      | 11.2  | 9.3   | 0.01239| Ismen et al. (2007)                          |
| ASC    | AS       | Lophius piscatorius     | 30    | C   | 2005-2006| T      | 6.1   | 9.6   | 0.01010| İlkeş et al. (2008)                          |
| F-W    | MS       | Lophius piscatorius     | 40    | C   | 2006-2007| T      | 36    | 54    | 0.00010| Bok et al. (2011)                           |
| ASC    | AS       | Lophius piscatorius*    | 23    | C   | 1997-2000| T      | 101   | 440   | 0.00002| Tüker et al. (2008)                         |
| Spring | AS       | Macroramphosus scolopax| 43    | C   | 2003    | T      | 7.1   | 11.4  | 0.00790| Filiz and Bilge (2004)                       |
| ASC    | Medit    | Macroramphosus scolopax| 124   | C   | 1999-2000| T      | 3.7   | 9.2   | 0.00590| Çiçek et al. (2006)                          |
| ASC    | MS       | Merlangius merlangus euxinus| 234  | C   | 2009-2011| T      | 10.6  | 24.5  | 0.01200| Demirel and Dalkara (2012)                   |
| ASC    | AS       | Merlangius merlangus euxinus| 23   | C   | 2005-2006| T      | 12.5  | 19.1  | 0.01020| Ismen et al. (2007)                          |
| ASC    | AS       | Merlangius merlangus euxinus| 100  | C   | 1998-2001| TR-GN-T-BS | 16   | 31    | 0.00920| Ozyaydn and Taskavak (2006)                  |
| F-W    | BS       | Merlangius merlangus euxinus| 904  | C   | 2004-2005| T      | 7.7   | 22.7  | 0.00670| Kalayçi et al. (2007)                        |
| F-W    | WS       | Merlangius merlangus euxinus| 166  | C   | 2006-2007| T      | 7.6   | 24.2  | 0.00470| Bok et al. (2011)                           |
| ASC    | BS       | Merlangius merlangus euxinus| 943  | C   | 2007    | T      | 6.7   | 29.5  | 0.00400| Ak et al. (2009)                             |
| F-W    | AS       | Merluccius merluccius   | 21    | C   | 2006    | TR-L   | 28.1  | 21.5  | 0.01990| Ceyhan et al. (2009)                         |
| ASC    | AS       | Merluccius merluccius*  | 2711  | C   | 2005    | T      | 2.7   | 48.8  | 0.98140| Ozaydın et al. (2007)                       |
| ASC    | Medit    | Merluccius merluccius   | 297   | C   | 2001-2003| T-L    | 13.2  | 31    | 0.03370| Sangan et al. (2007)                        |
| ASC    | MS       | Merluccius merluccius   | 715   | C   | 2009-2011| T      | 9.3   | 52    | 0.01000| Demirel and Dalkara (2012)                   |
| ASC    | MS       | Merluccius merluccius   | 31    | C   | 2012-2013| T      | 16    | 28.7  | 0.00960| Özerol (2014)                                |
| ASC    | MS       | Merluccius merluccius*  | 501   | C   | 1998-2001| TR-GN-T-BS | 12.3 | 47    | 0.00500| Ozyaydn and Taskavak (2006)                  |
| ASC    | AS       | Merluccius merluccius   | 22    | C   | 2004-2005| GN-TR  | 19.7  | 41.1  | 0.00490| Karakulak et al. (2006)                      |
| ASC    | Medit    | Merluccius merluccius   | 567   | C   | 1999-2000| T      | 3.1   | 29.9  | 0.00460| Çiçek et al. (2006)                          |
| ASC    | AS       | Merluccius merluccius   | 2041  | C   | 2005-2006| T      | 7.9   | 66    | 0.00439| Ismen et al. (2007)                          |
| ASC    | AS       | Merluccius merluccius   | 1499  | C   | 2005-2006| T      | 6.9   | 9.6   | 0.00390| İlkeş et al. (2008)                          |
| F-W    | MS       | Merluccius merluccius   | 319   | C   | 2006-2007| T      | 8.9   | 44.8  | 0.00260| Bok et al. (2011)                           |
| ASC    | AS       | Merluccius merluccius*  | 166   | C   | 1997-2000| T      | 158   | 372   | 0.00007| Tüker et al. (2008)                         |
| W-S    | BS       | Mesogobius batrachocephalus| 37   | C   | 2009-2011| T      | 7.2   | 13.3  | 0.02030| Demirhan and Can (2007)                      |
| ASC    | AS       | Microchirus ocellatus   | 8     | C   | 2006-2008| T      | 10.3  | 13.7  | 0.03260| Ozekinci et al. (2009)                       |
| ASC    | AS       | Microchirus ocellatus   | 6     | C   | 2005-2006| T      | 5.5   | 19.8  | 0.00790| İlkeş et al. (2008)                          |
| ASC    | AS       | Microchirus variegatus  | 29    | C   | 2006-2008| T      | 10.1  | 15.5  | 0.01620| Ozekinci et al. (2009)                       |
| ASC    | AS       | Microchirus variegatus  | 10    | C   | 2004-2005| GN-TR  | 10.1  | 14.6  | 0.01370| Karakulak et al. (2006)                      |
| Season | Location | Species                   | N  | Sex | Year      | FM  | a    | b     | Source                          |
|--------|----------|---------------------------|----|-----|-----------|-----|------|-------|--------------------------------|
| ASC    | AS       | *Microchirus variegatus*   | 36 | C   | 2005-2006 | T   | 4.4  | 0.00440 | 3.31  | 0.96 | İlkyaz et al. (2008)           |
| ASC    | AS       | *Microchirus variegatus*   | 36 | C   | 2002      | T   | 7.3  | 0.00300 | 3.42  | 0.99 | Bayhan et al. (2008)           |
| ASC    | AS       | *Microstomias postassou*   | 540| C   | 2005-2006 | T   | 13.7 | 0.00350 | 3.20  | 0.99 | İsmen et al. (2007)            |
| ASC    | AS       | *Melva macroura*          | 192| C   | 2005-2006 | T   | 27.7 | 0.00050 | 3.42  | 0.98 | İsmen et al. (2007)            |
| ASC    | AS       | *Monocirrus hexipus*      | 15 | C   | 2006-2008 | T   | 9.7  | 0.05650 | 2.43  | 0.94 | Özekici et al. (2009)          |
| ASC    | AS       | *Mullus barbatius*        | 45 | C   | 1997-2000 | T   | 10   | 0.06100 | 3.35  | 0.99 | Türkö et al. (2008)            |
| F-W    | Medit    | *Mullus barbatius*        | 8  | C   | 2008-2009 | GN-TR | 11  | 0.01840 | 2.84  | 0.99 | Gökkız et al. (2010)           |
| ASC    | AS       | *Mullus barbatius*        | 94 | C   | 2009-2011 | T   | 9.6  | 0.01150 | 3.00  | 0.86 | Demirel and Dalkara (2012)     |
| F-W    | BS       | *Mullus barbatius*        | 176| C   | 2004-2005 | T   | 6.6  | 0.01110 | 2.96  | 0.98 | Kalaycı et al. (2007)          |
| ASC    | AS       | *Mullus barbatius*        | 3386| C | 2005-2006 | T   | 6    | 0.00762 | 3.09  | 0.96 | İsmen et al. (2007)            |
| ASC    | AS       | *Mullus barbatius*        | 2021| C  | 1999-2000 | T   | 3.8  | 0.00760 | 3.13  | 0.98 | Çiçek et al. (2006)            |
| ASC    | Medit    | *Mullus barbatius*        | 1565| C  | 2012-2013 | T   | 8.7  | 0.00710 | 3.17  | 0.99 | Özvarol (2014)                 |
| ASC    | BS       | *Mullus barbatius*        | 714 | C  | 2007      | T   | 6.1  | 0.00700 | 3.14  | 0.99 | Ak et al. (2009)               |
| ASC    | AS       | *Mullus barbatius*        | 1879| C  | 2005-2006 | T   | 5.8  | 0.00600 | 3.22  | 0.98 | İlkyaz et al. (2008)           |
| W-S    | BS       | *Mullus barbatius*        | 432 | C  | 2009-2011 | T   | 6.8  | 0.00510 | 3.24  | 0.97 | Demirhan and Can (2007)        |
| F-W    | MS       | *Mullus barbatius*        | 99  | C  | 2006-2007 | T   | 10   | 0.00490 | 3.33  | 0.92 | Bok et al. (2011)              |
| ASC    | AS       | *Mullus barbatius*        | 76  | C  | 2004-2005 | GN-TR | 12.5| 0.00490 | 3.27  | 0.94 | Karakulak et al. (2006)        |
| ASC    | Medit    | *Mullus barbatius*        | 451 | C  | 2001-2003 | T-L  | 8.2  | 0.00320 | 3.06  | 0.94 | Sangun et al. (2007)           |
| F-W    | AS       | *Mullus surmuletus*       | 120 | C  | 2006      | TR-L | 17.2| 0.01720 | 2.98  | 0.98 | Ceyhan et al. (2009)           |
| ASC    | MS       | *Mullus surmuletus*       | 17  | C  | 2000-2001 | L-BS | 4.7  | 0.00045 | 1.0920 | 3.39 | 0.99 | Keskin and Gaygusuz (2010)     |
| F-W    | MS       | *Mullus surmuletus*       | 145 | C  | 2006-2007 | T   | 11   | 0.02400 | 2.72  | 0.89 | Bok et al. (2011)              |
| ASC    | Medit    | *Mullus surmuletus*       | 354 | C  | 2009-2011 | T   | 8.5  | 0.00600 | 3.18  | 0.93 | Demirel and Dalkara (2012)     |
| ASC    | AS       | *Mullus surmuletus*       | 59  | C  | 2005-2006 | T   | 11.2 | 0.00580 | 3.27  | 0.98 | İlkyaz et al. (2008)           |
| ASC    | Medit    | *Mullus surmuletus*       | 45  | C  | 2012-2013 | T   | 13.7 | 0.00290 | 3.47  | 0.95 | Özvarol (2014)                 |
| ASC    | AS       | *Mustelus asterias*       | 7   | C  | 2005-2009 | T   | 53.7 | 0.00060 | 3.40  | 1.00 | İsmen et al. (2009)            |
| ASC    | AS       | *Mustelus mustelus*       | 17  | C  | 2005      | T   | 51.4 | 0.00440 | 2.91  | 0.98 | Özaydın et al. (2007)          |
| ASC    | AS       | *Mustelus mustelus*       | 70  | C  | 2005-2009 | T   | 46.8 | 0.00340 | 2.98  | 0.99 | İsmen et al. (2009)            |
| ASC    | AS       | *Mustelus mustelus*       | 148 | C  | 2005-2006 | T   | 5.8  | 0.00270 | 3.05  | 0.98 | İlkyaz et al. (2008)           |
| ASC    | AS       | *Mustelus mustelus*       | 26  | C  | 2005-2006 | T   | 58.9 | 0.00131 | 3.19  | 0.99 | İsmen et al. (2007)            |
| Spring | AS       | *Myliobatis aquila*       | 14  | C  | 2003      | T   | 47.5 | 0.00080 | 3.34  | 0.93 | Filiz and Bilge (2004)         |
| Spring | AS       | *Myliobatis aquila*       | 14  | C  | 2003      | T   | 47.5 | 0.00080 | 3.34  | 0.93 | Filiz and Bilge (2004)         |
| ASC    | AS       | *Myliobatis aquila*       | 66  | C  | 2005-2007 | T   | 29.5 | 0.00027 | 3.56  | 0.92 | Yığın and İsmen (2009)         |
| 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 | Erguden et al. (2009)                       |
|        | ASC      | Nemipterus randalli      | 143| C   | 2012-2013    | T   | 9.5    | 22     | 0.01200 | Özvarol (2014)                             |
| W-S    | BS       | Neogobius melanostomus   | 99 | C   | 2009-2011    | T   | 8.6    | 19.1   | 0.00470 | Demirhan and Can (2007)                     |
| ASC    | MS       | Nerophis ophidion**      | 177| C   | 2000-2001    | L-BS| 9.7    | 21.2   | 0.000200| Keskin and Gaygusuz (2010)                 |
| ASC    | AS       | Nerophis ophidion        | 11 | C   | 1998-2001    | TR-GN-T-BS| 10.3 | 18.2   | 0.00090 | Ozyayin and Taskavak (2006)                |
| ASC    | AS       | Nerophis ophidion        | 86 | C   | 2000-2002    | TR   | 78     | 214    | 0.00000 | Gürkan and Taskavak (2007)                |
| ASC    | Medit    | Neottamoma melanarun     | 75 | C   | 2009-2011    | T   | 25.1   | 79.8   | 0.00020 | Erguden et al. (2009)                      |
| ASC    | Medit    | Nezumia aequalis         | 72 | C   | 2009-2011    | T   | 8.4    | 20.3   | 0.00420 | Özvarol (2014)                             |
| ASC    | Medit    | Ophidion barbatum        | 9  | C   | 2004-2005    | GN-TR| 9.1   | 19.8   | 0.00340 | Karakulak et al. (2006)                    |
| ASC    | Medit    | Ophidion barbatum        | 316| C   | 2004-2005    | GN-TR| 9.1   | 19.8   | 0.00340 | Karakulak et al. (2006)                    |
| ASC    | Medit    | Ophidion barbatum        | 44 | C   | 2005-2006    | T   | 9.5    | 20.2   | 0.00175 | Ismen et al. (2007)                        |
| ASC    | Medit    | Ophidion barbatum        | 41 | C   | 2001-2003    | T-L  | 12.1   | 30.1   | 0.00150 | Sangun et al. (2007)                       |
| ASC    | Medit    | Ophiinus serpens         | 41 | C   | 1997-1998    | T-GN | 6.1    | 12.2   | 0.000001| Taskavak and Bilecenoglu (2001)            |
| Winter | Medit    | Oxyurichthys petersii**  | 175| C   | 2007-2008    | T   | 19.2   | 13.3   | 0.00640 | Erguden et al. (2009)                      |
| ASC    | Medit    | Oxyurichthys petersii*   | 83 | C   | 2001-2003    | T-L  | 11     | 17     | 0.01186 | Sangun et al. (2007)                       |
| ASC    | Medit    | Pagellus acare           | 334| C   | 2005-2006    | T   | 16.4   | 51.6   | 0.01040 | Ilkyaz et al. (2008)                       |
| ASC    | Medit    | Pagellus acare           | 901| C   | 1999-2000    | T   | 3.6    | 15.3   | 0.00750 | Çiçek et al. (2006)                        |
| ASC    | Medit    | Pagellus bogaraveo       | 77 | C   | 2005-2006    | T   | 10.1   | 19.8   | 0.01560 | Ilkyaz et al. (2008)                       |
| ASC    | Medit    | Pagellus bogaraveo       | 2355| C  | 2005-2006    | T   | 6.5    | 25.1   | 0.00747 | Ismen et al. (2007)                        |
| F-W    | AS       | Pagellus erythrinus      | 125| C   | 2006        | TR-L| 30.9   | 18.6   | 0.00620 | Ceyhan et al. (2009)                       |
| F-W    | Medit    | Pagellus erythrinus      | 87 | C   | 2012-2013    | T   | 11.6   | 21.5   | 0.05110 | Özvarol (2014)                             |
| ASC    | Medit    | Pagellus erythrinus      | 43 | C   | 2008-2009    | GN-TR| 13.3  | 20.2   | 0.04120 | Gökçe et al. (2010)                       |
| ASC    | Medit    | Pagellus erythrinus      | 365| C   | 2002-2003    | L   | 12     | 30     | 0.01760 | Akyol et al. (2007)                        |
| ASC    | Medit    | Pagellus erythrinus      | 1787| C  | 1999-2000    | T   | 1.4    | 18.6   | 0.01520 | Çiçek et al. (2006)                        |
| ASC    | Medit    | Pagellus erythrinus      | 222| C   | 2001-2003    | T-L  | 7.9    | 31.58  | 0.01450 | Sangun et al. (2007)                       |
| ASC    | Medit    | Pagellus erythrinus      | 1014| C  | 2005-2006    | T   | 12.1   | 42.3   | 0.01340 | Ilkyaz et al. (2008)                       |
| ASC    | Medit    | Pagellus erythrinus      | 169 | C  | 2004-2005    | GN-TR| 9.9   | 29.8   | 0.01240 | Karakulak et al. (2006)                   |
| ASC    | Medit    | Pagellus erythrinus      | 2480| C  | 2005-2006    | T   | 7.2    | 27     | 0.01050 | Ismen et al. (2007)                        |
| ASC    | Medit    | Pagellus erythrinus      | 181 | C  | 1997-2000    | T   | 78     | 228    | 0.00110 | Türker et al. (2008)                       |
| Fall   | Medit    | Pognas caeruleostictus   | 311| C   | 2000        | L   | 12.5   | 38.8   | 0.006710| Can et al. (2002)                         |
| ASC    | Medit    | Pognas caeruleostictus   | 664| C   | 2001-2003    | T-L  | 5.5    | 20.4   | 0.01250 | Sangun et al. (2007)                       |
| ASC    | Medit    | Pognas caeruleostictus   | 10 | C   | 2005-2006    | T   | 6.5    | 23.7   | 0.00280 | Ilkyaz et al. (2008)                       |
| ASC    | Medit    | Pognas pugnus           | 127| C   | 2012-2013    | T   | 9.5    | 19     | 0.01860 | Özvarol (2014)                             |
| 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     | Ilkyar et al. (2008)                   |
| ASC MS  | Parablennius tentacularis** | 10 C 2000-2001 L-BS | 3.5  | 10  | 0.00072     | 0.9601 | 3.13     | Keskin and Gaygusuz (2010)            |
| ASC Medit | Pelates quadrilineatus** | 76 C 1997-1998 T-GN | 7.9  | 12.1 | 0.00001     | 0.0134 | 2.96     | Taskavak and Bilecenoglu (2001)        |
| ASC Medit | Pomphitis vancuvalensis** | 46 C 1997-1998 T-GN | 7.7  | 15.5 | 0.00001     | 0.0120 | 3.03     | Taskavak and Bilecenoglu (2001)        |
| Spring AS | Perissedon cataphractum | 11 C 2003 T | 8.1  | 21.2 | 0.00480     | 2.97  | 0.99     | Filiz and Bilge (2004)                 |
| Spring AS | Physic hennoides | 359 C 2005-2006 T | 16   | 42.5 | 0.00209     | 3.38  | 0.97     | Ismen et al. (2007)                   |
| Spring AS | Physic hennoides | 12 C 2003 T | 12.3 | 15   | 0.00170     | 3.55  | 0.89     | Filiz and Bilge (2004)                 |
| ASC BS  | Platichthys flesus** | 51 C 2007 T | 19.1 | 44.5 | 0.00520     | 2.96  | 0.97     | Taskavak and Bilecenoglu (2001)        |
| ASC BS  | Pomatoschistus bathi** | 19 C 2000-2001 L-BS | 2.8  | 6.3  | 0.00520     | 0.9141 | 3.25     | Keskin and Gaygusuz (2010)            |
| ASC MS  | Pomatoschistus marmoratus | 16 C 2007 BS | 5.5  | 6.7  | 0.00363     | 3.19  | 0.97     | Ozen et al. (2009)                    |
| ASC MS  | Pomatoschistus minutus | 12 C 2007 BS | 4.2  | 5.6  | 0.00599     | 3.12  | 0.98     | Ozen et al. (2009)                    |
| ASC Medit | Pomatoschistus pic tus | 30 C 2006-2007 T | 22.2 | 61.2 | 0.00130     | 3.39  | 0.97     | Yeldan and Avsar (2007)               |
| F-W MS  | Pomatoschistus saltatrix | 30 C 2006-2007 T | 22.2 | 61.2 | 0.00130     | 3.39  | 0.97     | Yeldan and Avsar (2007)               |
| F-W BS  | Pomatoschistus saltatrix | 170 C 2009-2011 T | 9.6  | 65   | 0.11300     | 2.42  | 0.77     | Demiray and Dalkara (2012)            |
| ASC BS  | Pomatoschistus saltatrix | 112 C 2005-2006 T | 6   | 60   | 0.01300     | 3.12  | 1.00     | Ismen et al. (2007)                   |
| ASC Medit | Pomatoschistus saltatrix | 77 C 1999-2003 T | 29.3 | 64.6 | 0.00370     | 3.08  | 0.98     | Yeldan and Avsar (2007)               |
| W-S BS  | Pomatoschistus saltatrix | 27 C 2009-2011 T | 10.7 | 95.2 | 0.00190     | 3.24  | 0.99     | Demiray and Dalkara (2012)            |
| ASC BS  | Pomatoschistus saltatrix | 226 C 2005-2007 T | 10  | 88   | 0.00163     | 3.32  | 0.99     | Yiggin and Ismen (2009)               |
| Spring AS | Pomatoschistus saltatrix | 37 C 2003 T | 20.5 | 99   | 0.00160     | 3.30  | 0.94     | Filiz and Bilge (2004)                |
| ASC AS  | Pomatoschistus saltatrix | 31 C 1999-2000 T | 20.5 | 17.7 | 0.00160     | 3.29  | 0.93     | Filiz and Mater (2002)                |
| F-W MS  | Pomatoschistus saltatrix | 24 C 2006-2007 T | 12.2 | 79   | 0.00061     | 2.87  | 0.89     | Bok et al. (2011)                     |
| ASC AS  | Pomatoschistus mirakletus | 30 C 2005-2006 T | 6.5  | 30.5 | 0.00891     | 3.22  | 0.97     | Ismen et al. (2007)                   |
| ASC AS  | Pomatoschistus mirakletus | 12 C 2005 T | 39  | 53.5 | 0.00630     | 2.95  | 0.97     | Ozaydin et al. (2007)                 |
| ASC AS  | Pomatoschistus mirakletus | 52 C 2005-2007 T | 10.5 | 53.5 | 0.00173     | 3.27  | 0.95     | Yiggin and Ismen (2009)               |
| Spring AS | Pomatoschistus mirakletus | 13 C 2005 T | 30  | 50.5 | 0.00010     | 4.15  | 0.93     | Filiz and Bilge (2004)                |
| ASC AS  | Pomatoschistus mirakletus | 13 C 1999-2000 T | 30  | 56.5 | 0.00010     | 4.02  | 0.93     | Filiz and Mater (2002)                |
| 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 | 7.4 | 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 | 3.22 | 0.94 | Basusta et al. (2012) |
| ASC Medit | Rhinobatos rhinobatos | 262 | M | 2010-2012 | L-T-GN | 35 | 125 | 0.00110 | 3.39 | 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 | 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 | BS | 4.6 | 6.8 | 0.00051 | 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 AS | Sarda salpa | 80 | C | 2002-2003 | L | 19.6 | 33.1 | 0.00460 | 3.11 | 0.94 | Akyol et al. (2007) |
| ASC AS | Saurida undosquamis | 100 | C | 1997-2000 | T | 158 | 217 | 0.00000 | 3.81 | 0.99 | Türker et al. (2008) |
| ASC AS | Saurida undosquamis | 79 | C | 2008-2009 | GN-TR | 12.8 | 36.4 | 0.01050 | 2.80 | 0.97 | Gokce et al. (2010) |
| Winter Medit | Saurida undosquamis | 304 | C | 2007-2008 | T | 34 | 99.2 | 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 | Akşin 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 | Sancar 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 | BS | 2.9 | 12 | 0.0069 | 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 | Sancar 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 | Özvarol et al. (2009) |
| 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) |
| F-W BS          | Scopthalmus maximus | 144 | C  | 2002-2011 | T  | 5.6 | 42.1 | 0.02300 | 3.25 | 0.98 | Deval et al. (2014) |
| ASC AS          | Scorpaena notata | 113 | C  | 2005 | T  | 5.8 | 20.2 | 0.03201 | 2.75 | 0.96 | Iseri et al. (2007) |
| ASC AS          | Scorpaena notata | 855 | C  | 2005 | T  | 8.4 | 17 | 0.02170 | 3.06 | 0.96 | Özaydın et al. (2006) |
| ASC BS          | Scorpaena notata | 58 | C  | 2007 | T  | 8.1 | 15.1 | 0.01650 | 3.02 | 0.88 | Karakulak et al. (2006) |
| F-W MS          | Scorpaena notata | 357 | C  | 2004-2005 | L-BS | 7.5 | 18.7 | 0.01670 | 3.06 | 0.96 | Özaydın and Taskavak (2006) |
| ASC AS          | Scorpaena porcus | 114 | C  | 2009-2011 | T  | 5.6 | 42.1 | 0.02300 | 2.88 | 1.00 | Deval et al. (2014) |
| ASC MS          | Scorpaena porcus* ** | 45 | C  | 2000-2001 | L-BS | 10 | 22 | 0.00158 | 1.93 | 0.98 | Keskin and Gaygusuz (2010) |
| ASC AS          | Scorpaena scrofa | 12 | C  | 2005 | T  | 10.5 | 28.3 | 0.04480 | 2.69 | 0.98 | Özaydın et al. (2006) |
| ASC AS          | Scorpaena scrofa | 129 | U  | 2005-2009 | T  | 16.5 | 61.6 | 0.00012 | 0.99 | 0.99 | Özaydın et al. (2009) |
| ASC AS          | Scorpaena scrofa | 1501 | C  | 2005-2006 | T  | 9.6 | 62 | 0.00169 | 3.01 | 0.97 | Özaydın et al. (2007) |
| ASC AS          | Scorpaena scrofa | 153 | C  | 2004-2005 | GN-TR | 12.3 | 30.1 | 0.01400 | 3.02 | 0.88 | Karakulak et al. (2006) |
| ASC AS          | Scorpaena scrofa | 12 | U  | 2005-2006 | T  | 7.5 | 16.3 | 0.00002 | 0.99 | 0.99 | Özaydın et al. (2009) |
| ASC AS          | Scorpaena scrofa | 198 | C  | 1999-2000 | TR-GN-T-BS | 20.6 | 51.5 | 0.00000 | 3.25 | 0.98 | Özaydın and Taskavak (2006) |
| ASC BS          | Scorpaena scrofa | 755 | U  | 2005-2009 | T  | 16.5 | 61.6 | 0.00000 | 3.37 | 0.98 | Özaydın et al. (2009) |
| F-W MS          | Scorpaena scrofa | 15 | C  | 2005-2006 | GN-TR | 10.5 | 28.3 | 0.04480 | 2.69 | 0.98 | Özaydın et al. (2007) |
| ASC AS          | Syphirhodon carcharias | 113 | C  | 1999-2000 | T  | 17.5 | 52.5 | 0.00109 | 2.98 | 0.96 | Karakulak et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 744 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 1998-2000 | GN-TR | 19.9 | 51.9 | 0.00120 | 3.00 | 0.68 | Karakulak et al. (2006) |
| ASC MS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Özaydın et al. (2006) |
| ASC AS          | Syphirhodon carcharias | 914 | C  | 2005-2006 | T  | 11.9 | 21.8 | 0.00120 | 2.99 | 0.94 | Öz| 0.68 | 0.94 | Özaydın et al. (2006) |
| Season | Location | Species          | N   | Sex | Year     | FM | a     | a'   | b     | Source                      |
|--------|----------|------------------|-----|-----|----------|----|-------|------|-------|-----------------------------|
| ASC    | AS       | Serranus cabrilla| 974 | C   | 2005     | T  | 7.4   | 26   | 0.0110 | Özyaydın 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  | 0.00910 | 3.19 0.98 Bok et al. (2011) |
| ASC    | AS       | Serranus hepatus | 379 | C   | 2009-2011 | T  | 6.5   | 13.7 | 0.03600 | 2.62 0.75 Demirel and Dalkara (2012) |
| ASC    | AS       | 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 Özaydın 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 Özaydın and Taskavak (2006) |
| F-W    | MS       | 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 | 3.06 0.95 Ismen et al. (2007) |
| ASC    | Medit    | Serranus hepatus | 573 | C   | 2001-2003 | T-L | 4.8   | 13   | 0.01450 | 3.04 0.95 Sangun et al. (2007) |
| ASC    | AS       | Serranus scabba | 313 | C   | 2005    | T  | 8.3   | 23.5 | 0.00970 | 3.14 0.99 Özaydın et al. (2007) |
| ASC    | AS       | Serranus scabba | 311 | C   | 2004-2005 | GN-TR | 10.2 | 21.3 | 0.00650 | 3.24 0.97 Karakulak et al. (2006) |
| ASC    | Medit    | Serranus scabba | 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 Çeyhan et al. (2009) |
| Winter | Medit    | Siganus luridus | 21  | C   | 2007-2008 | T  | 16.3  | 14.19| 0.01360 | 2.92 0.95 Ergüden et al. (2009) |
| Winter | Medit    | Siganus rivulatus** | 56 | C   | 2006     | TR-L | 16.2 | 11.7 | 0.00980 | 3.04 0.88 Çeyhan et al. (2009) |
| Winter | Medit    | Siganus rivulatus | 122 | C   | 2007-2008 | T  | 18    | 15.61| 0.01700 | 2.82 0.89 Ergüden et al. (2009) |
| Winter | Medit    | Siganus rivulatus | 5   | C   | 2008-2009 | GN-TR | 8    | 19.9 | 0.01270 | 2.92 0.99 Gökek et al. (2010) |
| Winter | 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    | Siganus rivulatus** | 23 | C   | 2007-2008 | T  | 20.5  | 14.52| 0.00550 | 3.06 0.96 Ergüden et al. (2009) |
| Winter | Medit    | Siganus rivulatus** | 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) |
| F-W    | BS       | Solea nasuta**  | 5   | C   | 2000-2001 | L-BS | 5.7   | 17.6 | 0.0050 | 0.8394 3.23 1.00 Keskin and Gaygusuz (2010) |
| F-W    | BS       | Solea nasuta**  | 100 | C   | 2007     | T  | 11.3  | 21.7 | 0.01600 | 2.76 0.96 Ak et al. (2009) |
| Winter | Medit    | Solea nasuta**  | 13  | C   | 2008-2009 | GN-TR | 11.2 | 24.4 | 0.04900 | 2.35 0.98 Gökek et al. (2010) |
| ASC    | AS       | Solea nasuta**  | 44  | C   | 2002     | T  | 9.2   | 15.5 | 0.02320 | 2.73 0.74 Bayhan et al. (2008) |
| ASC    | AS       | Solea nasuta**  | 130 | C   | 2006-2008 | T  | 10    | 32   | 0.01920 | 2.73 0.96 Özçakıcı et al. (2009) |
| ASC    | AS       | Solea nasuta**  | 53  | C   | 2009-2011 | T  | 20    | 33.2 | 0.00660 | 3.06 0.85 Kömürel and Dalkara (2012) |
| ASC    | AS       | Solea nasuta**  | 55  | C   | 2006-2007 | T  | 6.9   | 16   | 0.00430 | 3.17 0.93 Özvarol (2014)    |
| ASC    | AS       | Solea nasuta**  | 79  | C   | 2005-2006 | T  | 14.7  | 39.2 | 0.00375 | 3.25 0.97 Ismen et al. (2007) |
| ASC    | AS       | Solea nasuta**  | 72  | C   | 2005-2006 | T  | 4.5   | 8.4  | 0.00300 | 3.27 0.97 İlyaz et al. (2008) |
| 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 | Özaydın 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   | Mediterr  | 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) |
| AS     | Medit    | Sparus aurata   | 141| C   | 2002-2003 | L          | 14.5 | 32.6 | 0.01220 | 3.03 0.97 | Akkol et al. (2007) |
| AS     | Medit    | 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 | Ergüden et al. (2009) |
| ASC    | Medit    | Sparus aurata   | 440| C   | 2012-2013 | T          | 9    | 17.3 | 0.02600 | 2.66 0.82 | Özvarol (2014) |
| F-W    | AS       | Sparus aurata   | 17 | C   | 2008-2009 | GN-TR     | 13.3 | 17.9 | 0.01210 | 3.03 0.96 | Demirel and Dalkara (2012) |
| ASC    | AS       | Sparus aurata   | 1081| C | 2005-2006 | T          | 15.2 | 59.3 | 0.01210 | 3.09 0.96 | Yang et al. (2008) |
| ASC    | MS       | Sparus aurata   | 175| C   | 2009-2011 | T          | 10.4 | 17.9 | 0.00984 | 3.01 0.96 | Yang et al. (2008) |
| ASC    | Medit    | Sparus aurata   | 1381| C | 1999-2000 | T          | 4.2  | 17.9 | 0.00984 | 3.01 0.96 | Yang et al. (2008) |
| ASC    | Medit    | Sparus aurata   | 298| C   | 2001-2003 | T          | 8.7  | 17.1 | 0.00984 | 3.01 0.96 | Yang et al. (2008) |
| ASC    | Medit    | Sparus aurata   | 830| C   | 2004-2005 | GN-TR     | 11  | 22   | 0.00220 | 3.51 0.92 | Yang et al. (2008) |
| ASC    | Medit    | Sparus aurata   | 176| C   | 2001-2003 | T-L        | 7.5  | 16.9 | 0.02800 | 2.95 0.92 | Yang et al. (2008) |
| ASC    | Medit    | Sparus aurata   | 360| C   | 1999-2000 | T          | 4.9  | 14.9 | 0.01950 | 2.67 0.95 | Yang et al. (2008) |
| ASC    | Medit    | Sparus aurata   | 130| C   | 2004-2005 | GN-TR     | 11.5 | 18.7 | 0.01380 | 2.88 0.95 | Yang et al. (2008) |
| ASC    | AS       | Sparus aurata   | 1449| C | 2005-2006 | T          | 8.2  | 18.6 | 0.01800 | 2.92 0.95 | Yang et al. (2008) |
| ASC    | BS       | Sparus aurata   | 528| C   | 2007  | T          | 8.3  | 24.2 | 0.00990 | 3.01 0.86 | Yang et al. (2008) |
| F-W    | MS       | Sparus aurata   | 403| C   | 2006-2007 | T          | 5.9  | 17.7 | 0.00890 | 3.08 0.86 | Yang et al. (2008) |
| F-W    | BS       | Sparus aurata   | 42 | C   | 2005-2006 | T          | 12  | 51.4 | 0.00770 | 3.07 0.97 | Yang et al. (2008) |
| ASC    | BS       | Sparus aurata   | 83 | C   | 2004-2005 | T          | 11.2 | 20   | 0.00630 | 3.15 0.96 | Yang et al. (2008) |
| ASC    | BS       | Sparus aurata   | 139| C   | 1997-2000 | T          | 105  | 157  | 0.00051 | 3.86 0.92 | Yang et al. (2008) |
| ASC    | AS       | Spondyliosoma cantharus** | 46 | C   | 2004-2005 | GN-TR     | 8.2  | 28.7 | 0.01920 | 2.87 0.89 | Yang et al. (2008) |
| ASC    | AS       | Spondyliosoma cantharus** | 45 | C   | 2005-2006 | T          | 9.6  | 22.7 | 0.00902 | 3.18 0.98 | Yang et al. (2008) |
| ASC    | MS       | Sprattus sprattus** | 52 | C   | 2000-2001 | L-BS       | 3.8  | 5.5  | 0.0023  | 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 | Yang et al. (2008) |
| ASC    | AS       | Sprattus sprattus** | 565| C   | 2005-2009 | T          | 17.1 | 115  | 0.00370 | 3.05 0.97 | Yang et al. (2008) |
| ASC    | MS       | Sprattus sprattus** | 32 | C   | 2003   | T          | 27   | 70.5 | 0.00310 | 3.11 0.98 | Yang et al. (2008) |
| ASC    | MS       | Sprattus sprattus** | 32 | C   | 1999-2000 | T          | 27   | 70.5 | 0.00310 | 3.11 0.98 | Yang et al. (2008) |
| F-W    | MS       | Sprattus sprattus** | 8  | C   | 2006-2007 | T          | 41   | 52   | 0.00003 | 2.62 0.96 | Yang et al. (2008) |
| ASC    | AS       | Squalus acanthias | 299| C   | 2005-2006 | T          | 21.5 | 117.5| 0.00345 | 3.06 0.98 | Yang et al. (2008) |
| 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 | Squalus blainvillei | 18 | C | 2006-2007 | T | 38 | 56 | 0.00004 | 2.48 | 0.96 | Bok et al. (2011) |
| ASC | Stegolepis diadema | 52 | C | 2001-2003 | T-L | 7.3 | 14.2 | 0.02760 | 2.83 | 0.98 | Sangun et al. (2007) |
| Winter | Stegolepis diadema | 56 | C | 2007-2008 | T | 13.5 | 11.62 | 0.01460 | 3.08 | 0.98 | Erguden et al. (2009) |
| ASC Medit | Stegolepis diadema | 207 | C | 1997-1998 | T-GN | 7.1 | 13 | 0.00001 | 0.0104 | 3.19 | 0.92 | Taskavak and Bilecenoglu (2001) |
| ASC | Symphodus boa | 52 | C | 2009-2011 | T | 10 | 25.9 | 0.00050 | 3.36 | 0.94 | Deval et al. (2014) |
| ASC | Symphodus cinereus* | 20 | C | 2005 | T | 4 | 7 | 0.01140 | 3.07 | 0.96 | Ozaydın et al. (2007) |
| ASC | Symphodus cinereus* | 8 | C | 2005-2006 | T | 9 | 45.5 | 0.00050 | 3.26 | 0.99 | Ilkyaz et al. (2008) |
| ASC | Symphodus dederkini | 15 | C | 2005 | T | 5.5 | 9.6 | 0.00093 | 1.4044 | 3.18 | 0.99 | Keskin and Gaygusuz (2010) |
| ASC | Symphodus mediterraneus | 39 | C | 2004-2005 | GN-TR | 9.8 | 14.2 | 0.00009 | 1.2263 | 3.08 | 0.98 | Keskin and Gaygusuz (2010) |
| ASC | Symphodus mediterraneus | 39 | C | 2005 | T | 4.9 | 20.2 | 0.00050 | 3.08 | 0.98 | Ozaydın et al. (2007) |
| ASC MS | Symphodus ocellatus* | 575 | C | 2000-2001 | L-BS | 1.8 | 10.7 | 0.00010 | 1.2263 | 3.08 | 0.98 | Keskin and Gaygusuz (2010) |
| ASC | Symphodus ocellatus* | 216 | C | 2005 | T | 4.7 | 9.2 | 0.00650 | 3.22 | 0.96 | Ozaydın et al. (2007) |
| ASC | 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 | Symphodus roissali* | 8 | C | 2005-2006 | T | 9 | 45.5 | 0.00050 | 3.26 | 0.99 | Ilkyaz et al. (2008) |
| ASC | Symphodus rossicus | 19 | C | 2004-2005 | GN-TR | 9.6 | 12.7 | 0.00093 | 1.4044 | 3.18 | 0.99 | Keskin and Gaygusuz (2010) |
| ASC | Symphodus rossicus | 36 | C | 2005 | T | 7.1 | 9.6 | 0.00093 | 1.4044 | 3.18 | 0.99 | Keskin and Gaygusuz (2010) |
| ASC MS | Symphodus tinca* | 41 | C | 2000-2001 | L-BS | 2.1 | 15.5 | 0.00011 | 1.3910 | 3.10 | 0.99 | Keskin and Gaygusuz (2010) |
| ASC | Symphodus tinca* | 89 | C | 2005 | T | 6.7 | 23 | 0.00130 | 3.08 | 0.98 | Ozaydın et al. (2007) |
| ASC | Symphodus tinca* | 248 | C | 2004-2005 | GN-TR | 10 | 26.8 | 0.00050 | 3.05 | 0.97 | Keskin and Gaygusuz (2010) |
| Fall Medit | Symphurus nigrisculus | 10 | C | 2000 | L | 12.1 | 17.2 | 0.00010 | 0.3034 | 3.18 | 0.99 | Can et al. (2002) |
| ASC MS | Symphurus nigrisculus | 182 | C | 2005-2006 | T | 7.7 | 12.7 | 0.00880 | 2.98 | 0.96 | Ilkyaz et al. (2008) |
| ASC | Symphurus nigrisculus | 7 | C | 2006-2008 | T | 9.8 | 10.9 | 0.00750 | 3.15 | 0.91 | Ozekinci et al. (2009) |
| Fall | Symphurus nigrisculus | 10 | C | 2000 | L | 12.1 | 17.2 | 0.00010 | 0.3034 | 3.18 | 0.99 | Can et al. (2002) |
| ASC | Syngnathus abaster* | 298 | C | 2000-2001 | L-BS | 2.1 | 12.6 | 0.00020 | 3.034 | 3.18 | 0.90 | Keskin and Gaygusuz (2010) |
| ASC | 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 | 0.00050 | 3.12 | 0.95 | Bok et al. (2011) |
| ASC | 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 | Syngnathus acus | 570 | C | 2000-2002 | TR | 33 | 256 | 0.00000 | 3.54 | 0.95 | Gürkan and Taskavak (2007) |
| ASC | 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 | 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 | Ciçek et al. (2006) |
| 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 | 0.00920 | 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   | 0.05330 | 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 | 0.02520 | 2.98  | 0.99   | Ilkyaz 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       | Torpedo marmorata | 95 | C   | 2005-2006 | T  | 8.2  | 28.2 | 0.00520 | 3.10  | 0.97   | Ilkyaz et al. (2008) |
| ASC Medit | Torpedo marmorata | 54 | C   | 2001-2003 | T-L | 9   | 20   | 0.00520 | 3.09  | 0.99   | Sangun et al. (2007) |
| ASC    | AS       | Torpedo marmorata | 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 | AS       | 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 | 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 | AS       | Trachurus mediterraneus* | 446 | C | 2005-2006 | T  | 7.5  | 20.9 | 0.00318 | 3.37  | 0.96   | Ismen et al. (2007) |
| ASC MS | AS       | Trachurus mediterraneus* | 76 | C | 1997-2000 | T  | 73  | 225  | 0.00941 | 3.10  | 0.97   | Türker et al. (2008) |
| ASC MS | AS       | Trachurus trachurus* | 156 | C | 2009-2011 | T  | 11.2 | 21   | 0.02700 | 2.95  | 0.77   | Demirel and Dalkara (2012) |
| ASC AS | AS       | Trachurus trachurus* | 264 | C | 2004-2005 | GN-TR | 10.5 | 24.3 | 0.01150 | 2.90  | 0.92   | Karakulak et al. (2006) |
| F-W BS | BS       | Trachurus trachurus | 747 | C | 2004-2005 | T  | 7.3  | 18.3 | 0.00860 | 2.98  | 0.96   | Kalayci et al. (2007) |
| F-W MS | BS       | Trachurus trachurus | 307 | C | 2006-2007 | T  | 8   | 16.4 | 0.00560 | 3.13  | 0.92   | Bok et al. (2011) |
| ASC AS | AS       | Trachurus trachurus | 159 | C | 2005-2006 | T  | 13.7 | 24.5 | 0.00470 | 3.20  | 0.98   | Ilkyaz et al. (2008) |
| ASC AS | AS       | Trachurus trachurus | 1205 | C | 2005-2006 | T  | 7.5  | 33   | 0.00467 | 3.20  | 0.97   | Ismen et al. (2007) |
| ASC BS | BS       | Trachurus trachurus | 267 | C | 2007 | T  | 6   | 15.7 | 0.00400 | 3.25  | 0.95   | Ak et al. (2009) |
| ASC AS | AS       | Trachurus trachurus* | 174 | C | 1997-2000 | T  | 78  | 243  | 0.00021 | 2.88  | 0.94   | Türker et al. (2008) |
| ASC Medit | Trichurus lepturus | 84 | C | 2001-2003 | T-L | 20.5 | 58.8 | 0.00850 | 2.33  | 0.73   | Sangun et al. (2007) |
| ASC AS | AS       | Trigla lyra | 26 | C | 2005-2006 | T  | 25.6 | 125.1 | 0.00070 | 2.74  | 0.98   | Ilkyaz et al. (2008) |
| ASC MS | AS       | Trigla lyra | 27 | C | 2009-2011 | T  | 16.5 | 32.3 | 0.01200 | 2.83  | 0.93   | Demirel and Dalkara (2012) |
| ASC AS | 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 | MS       | Trigla lyra | 96 | C | 2006-2007 | T  | 4.5  | 51   | 0.00620 | 3.05  | 0.99   | Bok et al. (2011) |
| 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 | Demirel and Dalkara (2012)                 |
| ASC    | MS       | Tripterygon delasi    | 7  | C   | 2007      | BS  | 2.8   | 5.6  | 0.00605 | Ozen et al. (2009)                         |
| ASC    | MS       | Tripterygon tripteronus | 8  | C   | 2007      | BS  | 2.9   | 6.2  | 0.00593 | Ozen et al. (2009)                         |
| Fall   | AS       | Trisopterus capelanus  | 695 | C   | 2011      | T   | 8.5   | 22.2 | 0.00710 | Yaprıcı et al. (2015)                      |
| ASC    | AS       | Trisopterus minutus   | 980 | C   | 2005-2006 | T   | 23.5  | 54.5 | 0.00650 | Ilkyaz et al. (2008)                       |
| ASC    | AS       | Trisopterus lucas capelanus | 14 | C   | 1997-2000 | T   | 13.1  | 200  | 0.00004 | Türkler et al. (2008)                      |
| ASC    | AS       | Trisopterus minutus   | 780 | C   | 2005      | T   | 8.4   | 22.6 | 0.00710 | Özyaydın et al. (2007)                     |
| ASC    | AS       | Trisopterus minutus   | 158 | C   | 1998-2001 | T   | 12.1  | 19.9 | 0.00670 | Özyaydın and Taskavak (2006)               |
| ASC    | AS       | Upeneus moluccensis** | 265 | C   | 1997-1998 | T-GN | 10.2  | 17   | 0.00001 | Taskavak and Bilecenoglu (2001)            |
| F-W    | Medit    | Upeneus moluccensis   | 975 | C   | 1999-2000 | T   | 4.9   | 19   | 0.00550 | Çiček et al. (2006)                        |
| ASC    | Medit    | Upeneus moluccensis   | 93  | C   | 2012-2013 | T   | 9.5   | 19.2 | 0.00530 | Özvaroılı (2014)                           |
| Winter | Medit    | Upeneus moluccensis   | 297 | C   | 2007-2008 | T   | 17.7  | 11.98| 0.00340 | Erguden et al. (2009)                      |
| Winter | Medit    | Upeneus moluccensis   | 651 | C   | 2001-2003 | T-L  | 7     | 18   | 0.00240 | Sangun et al. (2007)                       |
| Winter | Medit    | Upeneus pori          | 210 | C   | 2007-2008 | T   | 17    | 11.63| 0.01570 | Erguden et al. (2009)                      |
| ASC    | Medit    | Upeneus pori          | 1225| C   | 1999-2000| T   | 5.1   | 15.5 | 0.00870 | Çiček et al. (2006)                        |
| ASC    | Medit    | Upeneus pori**        | 102 | C   | 1997-1998 | T-GN | 9.1   | 14.7 | 0.00000 | Taskavak and Bilecenoglu (2001)            |
| ASC    | AS       | Uranoscopus scaber     | 62  | C   | 2004-2005 | GN-TR| 10.8  | 30.6 | 0.01560 | Karakulak et al. (2006)                    |
| ASC    | MS       | Uranoscopus scaber     | 49  | C   | 2009-2011 | T   | 8     | 25.1 | 0.01500 | Demirel and Dalkara (2012)                 |
| W-S    | BS       | Uranoscopus scaber     | 69  | C   | 2009-2011 | T   | 5.3   | 21.8 | 0.01500 | Demirhan and Can (2007)                    |
| F-W    | MS       | Uranoscopus scaber     | 82  | C   | 2006-2007 | T   | 10.7  | 24.6 | 0.01090 | Bok et al. (2011)                          |
| ASC    | Medit    | Uranoscopus scaber     | 92  | C   | 2001-2003 | T-L  | 5.2   | 24.7 | 0.01030 | Sangun et al. (2007)                       |
| ASC    | AS       | Uranoscopus scaber     | 157 | C   | 2005      | T   | 10.1  | 29.1 | 0.01000 | Özyaydın et al. (2007)                     |
| ASC    | AS       | Uranoscopus scaber     | 219 | C   | 2005-2006 | T   | 12.2  | 20.2 | 0.00970 | Ilkyaz et al. (2008)                       |
| ASC    | AS       | Uranoscopus scaber     | 71  | C   | 2005-2006 | T   | 12.5  | 27.4 | 0.00804 | Ismen et al. (2007)                        |
| ASC    | BS       | Uranoscopus scaber     | 620 | C   | 2007      | T   | 1.8   | 56.4 | 0.00800 | Ak et al. (2009)                           |
| ASC    | MS       | Zebras zebra           | 5   | C   | 2007      | BS  | 2.6   | 3.8  | 0.00973 | Ozen et al. (2009)                         |
| ASC    | Medit    | Zeus faber             | 261 | C   | 1999-2000 | T   | 2.1   | 20.8 | 0.03270 | Çiček et al. (2006)                        |
| ASC    | AS       | Zeus faber             | 83  | C   | 2005-2006 | T   | 10.1  | 15.1 | 0.01770 | Ilkyaz et al. (2008)                       |
| ASC    | AS       | Zeus faber             | 242 | C   | 2005-2006 | T   | 5.5   | 57.5 | 0.01477 | Ismen et al. (2007)                        |
| ASC    | AS       | Zeus faber             | 22  | C   | 2005      | T   | 10.4  | 44.5 | 0.01330 | Özydın et al. (2007)                       |
| ASC    | AS       | Zosterisessor ophiocephalus | 168| C   | 1998-2001| TR-GN-T-BS | 9.3   | 20.5 | 0.00440 | Özydın et al. 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 3.03 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 3.252 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 macrophthalus | 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   | 2517| C | 2005       | T            | 5.1   | 16.1  | 0.019 3.046 0.93 Ozaydın et al. (2007) |
| 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 encrasicholus | 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 and Taskavak (2006) |
| 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 asarata       | 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 2.999 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 2.868 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)
| Season | Location | Species               | N  | Sex | Year   | SM a | b      | Source                          |
|--------|----------|-----------------------|----|-----|--------|------|--------|---------------------------------|
|        | ASC      | Pagellus bogaraveo    | 51 | C   | 2005   | 8.8  | 17.9   | Ozaydın et al. (2007)           |
|        | ASC      | Pagellus erythrinus   | 226| C   | 1998-2001 | 9    | 28.2   | Ozaydın and Taskavak (2006)     |
|        | F-W      | Pagellus erythrinus   | 226| C   | 1998-2001 | 9.2  | 28.2   | Ozaydın and Taskavak (2006)     |
|        | ASC      | Pagrus pagrus         | 12 | C   | 2006   | 10.3 | 15.7   | Ozaydın et al. (2007)           |
|        | ASC      | Sardenella aurita     | 677| C   | 1998-2001 | 10.3 | 24.1   | Ozaydın and Taskavak (2006)     |
|        | ASC      | Sarpa salpa           | 77 | C   | 1998-2001 | 19.9 | 29.9   | Ozaydın et al. (2007)           |
|        | ASC      | Sphyraena chrysotaenia| 57 | C   | 2006   | 18   | 28.6   | Ozaydın et al. (2007)           |
|        | ASC      | Sphyraena sphyraena   | 78 | C   | 2006   | 21   | 31.2   | Ozaydın et al. (2007)           |
|        | ASC      | Spicara flexuosa      | 765| C   | 1998-2001 | 8.3  | 18.3   | Ozaydın et al. (2007)           |
|        | ASC      | Spicara maena         | 194| C   | 1998-2001 | 8.7  | 19.7   | Ozaydın et al. (2007)           |
|        | ASC      | Spicara smaris        | 163| C   | 1998-2001 | 8.3  | 18.3   | Ozaydın et al. (2007)           |
|        | ASC      | Trachurus mediterraneus| 45 | C   | 1988-2001 | 8.3  | 18.3   | Ozaydın et al. (2007)           |
|        | ASC      | Upeneus moluccensis   | 51 | C   | 2006   | 8.4  | 17.4   | Ozaydın et al. (2007)           |

Table 2. (Continued)
Table 3. Parameters of the length-weight relationship (weight \((\text{in g})\) and length \((\text{in cm and disk width})\) of marine fish species from Turkish marine waters. Sex: (M, male; F, female; C, \(\text{ASC}, \text{all seasons combined}; \text{F-W}, \text{fall-winter}; \text{W-S}, \text{winter-spring}\); FM= fishing method \((T, \text{trawl}; L, \text{Longline}; B, \text{beach seine}; GN, \text{gill nets}; TR, \text{trammel})\); \(a\) and \(b\), the intercept of the regression line (log-log scale) and the slope of the relationship; \(r^2\), the coefficient of determination; \(n\), the sample size; Species are listed in alphabetical order.

| Species            | Sex | Location | Year       | N  | SM | Season | Intercept \((a)\) | Slope \((b)\) | Source                                    |
|--------------------|-----|----------|------------|----|----|--------|------------------|---------------|-------------------------------------------|
| Dasyatis pastinaca | M   | ASC      | 2010-2011  | 417| M  | L-T-GN | 0.0419          | 3.3169        | Basusta et al., (2012)                     |
| Ilkyaz et al., (2008) |
| Gymnura altavela   | C   | ASC      | 2005-2006  | 31 | C  | T      | 0.0102           | 3.374          | Ilkyaz et al., (2008)                      |
| Ilkyaz et al., (2008) |
| Myliobatis aquila  | C   | ASC      | 2005-2006  | 39 | C  | T      | 0.0058           | 3.374          | Ilkyaz et al., (2008)                      |
| Ilkyaz et al., (2008) |
| Pteromylaeus bovinus| M  | ASC      | 2010-2011  | 22 | M  | L-T-GN | 0.0194           | 2.9034         | Basusta et al., (2012)                     |
| Raja clavata       | C   | ASC      | 2005-2006  | 24 | C  | T      | 0.0335           | 2.892          | Ilkyaz et al., (2008)                      |
| Ilkyaz et al., (2008) |
| Raja miraletus     | M   | ASC      | 2010-2011  | 22 | M  | L-T-GN | 0.0021           | 3.263          | Basusta et al., (2012)                     |
| Ilkyaz et al., (2008) |
| Raja polystigma    | C   | ASC      | 2005-2006  | 18 | C  | T      | 0.0218           | 3.052          | Ilkyaz et al., (2008)                      |
| Rostroraja alba    | C   | ASC      | 2005-2006  | 5  | C  | T      | 0.0083           | 3.131          | Ilkyaz et al., (2008)                      |

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, Cluster-2=0.007, Cluster-3=0.071.
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.

References

Ak, O., Kutlu, S., Aydın, I., 2009. Length-weight relationship for 16 fish species from the Eastern Black Sea, Turkey. Turkish Journal of Fisheries and Aquatic Science, 9, 125-126.

Akyol, O., Kınaeggil, H., Şevik, R., 2007. Longline fishery and length-weight relationships for selected fish species in Gökova Bay Aegean Sea, Turkey. International Journal of Natural and Engineering Sciences, 1, 1-4.

Arbuckle, J. L., 2013. IBM® SPSS® Amos™ 20 User’s Guide. Chicago, IL: IBM.

Atar, H., Malal, S. 2010. Determination of bycatch and discard catch rates on trawl fishing in Mersin-Anamur fishing ground. Journal of Food, Agriculture Environment, 81, 348-352.

Başusta, A., Başusta, N., Sulikowski, J., Driggers, W., Demirhan, S., Çiçek, E., 2012. Length–weight relationships for nine species of batoids from the Iskenderun Bay, Turkey. Journal of Applied Ichthyology, 28 (5), 850-851.

Bayhan, B., Sever, T. M., Taşkavak, E., 2008. Length-weight relationships of seven flatfishes Pisces: Pleuronectiformes from Aegean Sea. Turkish Journal of Fisheries and Aquatic Science, 8, 377-389.

Bilecenoglu, M., Kaya, M., Cinangir, B., Çiçek, E., 2014. An updated checklist of the marine fishes of Turkey. Turkish Journal of Zoology, 38, 901-929. doi: 10.3906/zoo-1405-60
Özbilgin, H., Tosunoğlu, Z. 2003. Comparison of the selectivities of double and single codends. *Fisheries Research*, 63 (1), 143-147.

Özbilgin, Y., Tosunoğlu, Z., Özbilgin, H., 2006. By-catch in a 40 mm PE demersal trawl codend. *Turkish Journal of Veterinary and Animal Sciences*, 30, 179-185.

Özekinci, U., Cengiz, Ö., İsmen, A., Altınagac, U., Ayaz, A., 2009. Length-weight relationships of thirteen flatfishes Pisces: Pleuronectiformes from Saroz Bay North Aegean Sea, Turkey. *Journal of Animal and Veterinary Advances*, 8 (9), 1800-1801.

Özvarol, Y., 2014. Length-weight relationships of 14 fish species from the Gulf of Antalya northeastern Mediterranean Sea, Turkey. *Turkish Journal of Zoology*, 38 (3), 342-346.

Pauly, D. 1983. Some simple methods for the assessment of tropical fish stocks. FAO Fisheries Technical Paper, Rome, 52 pp.

Petrakis, G., Stergiou, K., 1995. Weight-length relationships for 33 fish species in Greek waters. *Fisheries Research*, 21 (3), 465-469.

Safran, P., 1992. Theoretical analysis of the weight-length relationship in fish juveniles. *Marine Biology*, 112 (4), 545-551.

Sangun, L., Akamca, E., Akar, M., 2007. Weight-length relationships for 39 fish species from the north-eastern Mediterranean coast of Turkey. *Turkish Journal of Fisheries and Aquatic Sciences*, 7 (1), 37-40.

Stergiou, K., 1993. Abundance-depth relationship, condition factor and adaptive value of zooplanktophagy for red bandfish, *Cepola macrophthalmus*. *Journal of Fish Biology*, 42 (5), 645-660.

Sangun, L., Akamca, E., Akar, M., 2007. Weight-length relationships for 39 fish species from the north-eastern Mediterranean coast of Turkey. *Turkish Journal of Fisheries and Aquatic Sciences*, 7 (1), 37-40.

Stergiou, K., Economidis, P., Sinis, A. 1992. Age, growth and mortality of red bandfish, *Cepola macrophthalmus L.*, in the western Aegean Sea Greece. *Journal of Fish Biology*, 40 (3), 395-418.

Stergiou, K., Moutoupoulos, D., 2001. A review of length-weight relationships of fishes from Greek marine waters. *Naga, the ICLARM quarterly*, 24 (1-2), 23-39.

Taskavak, E., Bilecenoglu, M., 2001. Length-weight relationships for 18 Lessepsian Red Sea immigrant fish species from the eastern Mediterranean coast of Turkey. *Journal of the Marine Biological Association of the United Kingdom*, 81(5), 895-896.

Team, R. D. C., 2013. *R Foundation for statistical computing*. Vienna, Austria.

Tesch, F., 1968. Age and growth. p. 93-123. In: *Methods for assessment of fish production in fresh waters* Ricker W. (Eds). Blackwell Scientific Publications, Oxford.

Torcu-Koc, H., Erdogan, Z., Tezer, T., 2006. A review of length-weight relationships of fishes from freshwaters of Turkey. *Journal of Applied Ichthyology*, 22 (4), 264-270.

Torcu-Koc, H., Çakır, D., Başusta, N., 2008. A review of length-weight relationships of lessepsian fishes from Turkish seas. *e-Journal of New World Sciences Academy Natural And Applied Sciences*, 31, 145-150.

Turker-Cakir, D., Torcu-Koc, H., Basusta, A., Basusta, N., 2008. Length-weight relationships of 24 fish species from Edremit Bay Aegean Sea. *e-Journal of New World Scientific Academy National Applied Science*, 3, 47-51.

Wootton, R. J., 1990. *Ecology of teleost fishes*. Springer, 404 pp.

Yapıcı, S., Karachle, P., Filiz, H., 2015. First length-weight relationships of 11 fish species in the Aegean Sea. *Journal of Applied Ichthyology*, 31(2), 398-402.

Yazıcı, M., İsmen, A., Altınagaç, U., Ayaz, A., 2006. Marmara Denizi’nde Karides Algarnasının Av Kompozisyonu ve Hedeflenmemeyi Av Üzerine Bir Çalışma. *E.Ü. Su Ürünleri Dergisi*, 233-4, 269-275.

Yeldan, H., Avsar, D., 2007. Length–weight relationship for five elasmobranch species from the Cilician Basin shelf waters northeastern Mediterranean. *Journal of Applied Ichthyology*, 23 (6), 713-714.

Yığın, C., İsmen, A., 2009. Length–weight relationships for seven rays from Saros Bay North Aegean Sea. *Journal of Applied Ichthyology*, 25 (S1), 106-108.

Zar, J.H., 1999. *Biostatistical analysis*. Pearson Publishing, Cloth, 929 pp.