Ecological Life Sciences
ISSN: 1308 7258 (NWSAELS)
ID: 2019.14.4.5A0125

Status : Research Article
Received: 19.06.2019
Accepted: 10.10.2019

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DOI	http://dx.doi.org/10.12739/NWSA.2019.14.4.5A0125		
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LENGTH-WEIGHT RELATIONSHIPS AND CONDITION FACTOR OF *Umbrina cirrosa* INHABITING NORTH-EASTERN MEDITERRANEAN SEA

ABSTRACT

In this study, total length-weight relationships and condition factor of shi drum (*Umbrina cirrosa*) were examined in the North-eastern Mediterranean Sea. *Umbrina cirrosa* individuals were captured by gillnets between May 2017- April 2018 at a depth of 15 m from Mersin Bay. A total of 218 (115 male and 103 female) *U. cirrosa* were collected. Minimum-maximum length and weight of caught fishes were determined as 13.5-26.7cm and 19.12-214.04g for females and 13.8-26.8cm and 21.48-201.75g for males respectively. Total length-weight relationships of *U. cirrosa* were found as $W=0.0028*TL^{3.42}$, $R^2=0.989$, SE*b*=0.024 for combined sexes, $W=0.0029*TL^{3.414}$, $R^2=0.988$, SE*b*=0.037 for females and $W=0.0028*TL^{3.423}$, $R^2=0.998$, SE*b*=0.031 for males. 95% Confidence intervals for *b* value for combined sexes were 3.371-3.466. According to *b* values, combined sexes, females and males showed a positive allometric growth (t-test: $p<0.05$). Condition factors were 0.923±0.063 for all specimens, 0.930±0.009 for females and 0.917±0.008.

Keywords: Lenght-weight Relationship, Condition Factor, Shi drum, *Umbrina cirrosa*, Mersin Bay

1. INTRODUCTION

Shi drum, *Umbrina cirrosa* (Linnaeus, 1758) is Atlanto-Mediterranean and distributed from Bay of Biscay to Senegal. It lives in small groups or solitary in various habitats, rocky, soft and hard flat bottoms to depth of 50m [1]. *U. cirrosa* is assessed as Vulnerable (VU) globally by the International Union for Conservation of Nature (IUCN) [2]. *U. cirrosa* in the other regions of the Mediterranean were studied sufficiently on the Lenght-weight relationships (LWR) distribution, systematic, age, growth and feeding habits by some researchers during recent years. There is no more data on the LWR for *U. cirrosa* from the Northeastern Mediterranean.

2. RESEARCH SIGNIFICANCE

In this investigation, total length-weight relationships and condition factor of shi drum (*Umbrina cirrosa*) were studied for the first time in a population of the North-eastern Mediterranean Sea.

3. MATERIALS AND METHODS

Umbrina cirrosa individuals were captured by gillnets between May 2017- April 2018 at a depth of 15m from Mersin Bay, Turkey (Figure 1). Fish individuals were transported to the laboratory in Faculty of Fisheries, Firat University where they were identified, sexed. Each

How to Cite:
Başusta, N., Başusta, A., and Demiroğlu, E., (2019). Length-Weight Relationships and Condition Factor of *Umbrina cirrosa* Inhabiting North-Eastern Mediterranean Sea, Ecological Life Sciences (NWSAELS), 14(4):125-128, DOI: 10.12739/NWSA.2019.14.4.5A0125.

fish was measured for total length to the nearest 0.1cm, weight (W) was weigthed to the nearest 0.1 g and the sex was determined to the gonads. All data were subjected to statistics analysis by using the IBM SPSS Statistics ver. 22.0 for Windows (IBM Corporation and Others, 2013). Total lengths and weights of fish specimens were fitted to the length-weight equation: $W=aL^b$, by using least square methods with Statistica software [3]. In the length-weight equation *a* and *b* are intercept and the slope (=exponent) of the length-weight curve, respectively. The *b* value for *U. cirrosa* was tested by a student *t*-test at the 0.05 significance level to verify if it was significantly different from 3 [4]. All analyses for *U. cirrosa* were made for female, male and combined sexes.

Figure 1. The study area, Northeastern Mediterranean sea

4. RESULTS AND DISCUSSION

A total of 218 fish samples were captured during the study period. Total length and weight of caught fishes were decided as 13.5-26.7cm and 19.12-214.04g for females and 13.8-26.8cm and 21.48-201.75g for males, respectively. Length-weight relationships of *U. cirrosa* were found as $W=0.0028*L^{3.4198}$, $R^2=0.9896$, SEb=0.037 for combined sexes, $W=0.0029*L^{3.4142}$, $R^2=0.9882$, SEb=0.037 for females and $W=0.0028*L^{3.423}$, $R^2=0.9908$, SEb=0.031 for males (Figure 2, Figure 3, and Figure 4). 95% Confidence limits of b were found as 3.371-3.466, t-test $P<0.05$. According to *b* values, all individuals, females and males showed a positive allometric growth ($b>3$) (t-test: $p<0.05$). The correlation coefficient (R) was found 0.994 for all individuals. it can be said that this relationship is positive and very strong.

According to the regression analysis, fish size has significant correlation with fish weight ($R=0.995$, $R^2=0.9896$, $F_{1, 216}=20339, 758$; $P<0.001$) and we can say that 99% increase in fish weight was due to length increase for all individuals and also it is possible to say that fish-size could be used in high accuracy to predict fish weight. Condition factors were calculated 0.923±0.063 for all individuals, 0.930±0.009 for females and 0.917±0.008 for males.

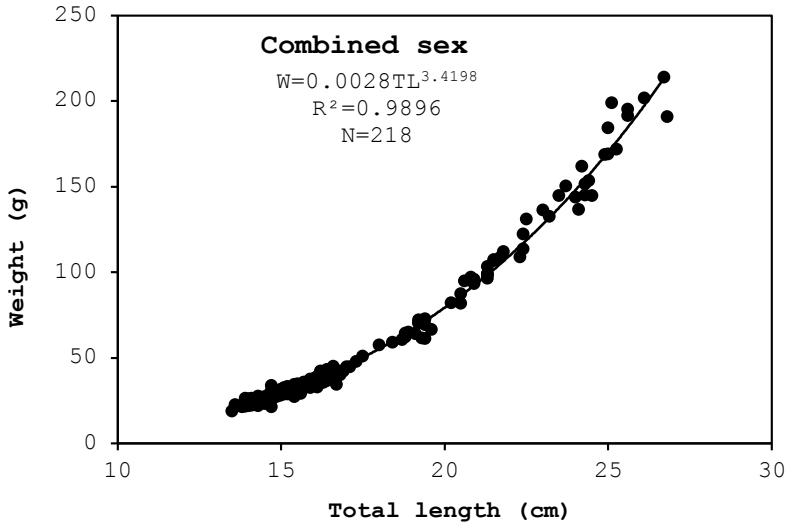

Figure 2. Total length-weight relationship of *Umbrina cirrosa*, combined sexes

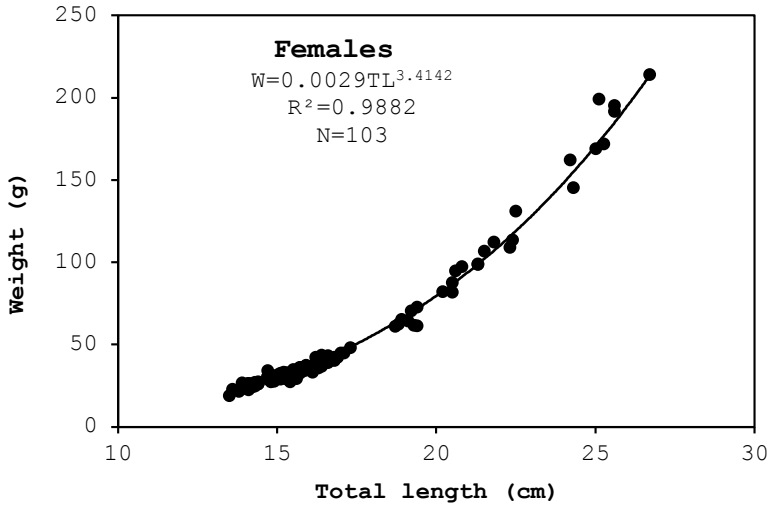

Figure 3. Total length-weight relationship of *Umbrina cirrosa* for females

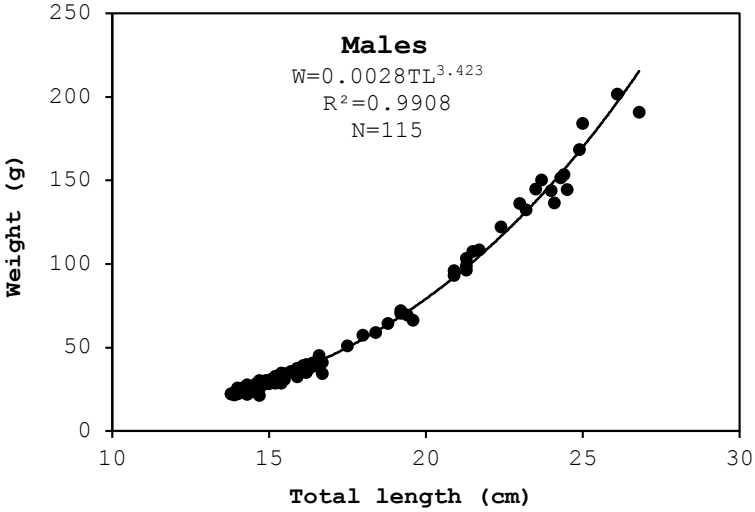

Figure 4. Total length-weight relationship of *Umbrina cirrosa* for males

5. CONCLUSION

According to regions calculated *b* values for this species were found 3.29 for Saros Bay (North Aegean Sea) by Ismen et al. [5], 3.06 for Northern Adriatic by Dulcic and Glamuzina [6], These values are very close in our study. Other *b* value was reported 3.53 for Portugal South Coasts by Borges et al. [7]. Reported this value is different from our study (Table 1). This difference may be caused by the lower sample size. In this study, the data did not represent a total year, thus, these estimated parameters should be considered to represent only for 2017-2018 fishing Season.

Table 1. Total length-weight relationship values for *Umbrina cirrosa* from different regions

Region	Sexes	N	$L_{MIN-MAX}$ (cm)	$W_{MIN-MAX}$(g)	a	b	r^2	Researchers
Saros Bay. Turkey	Σ	118	10.0-63.2	9.00-4056	0.00423	3.2909	0.998	Ismen et al. 2007 [5]
Northern Adriatic	Σ	44	33.1-47.0	-	0.01150	3.060	0.977	Dulcic and Glamuzina, 2006 [6]
Portugal South coasts	Σ	8	30.2-55.4	88.0-702.7	0.00048	3.539	0.99	Borges et al. 2003 [7]
North Eastern Mediter. Turkey	Σ	218	13.5-26.8	19.12-214.04	0.0028	3.4198	0.9896	In this study
	♀	103	13.5-26.7	19.12-214.04	0.0029	3.4142	0.9882	
	♂	115	13.8-26.8	21.48-201.75	0.0028	3.4230	0.9908	

NOTICE

This work was supported by Scientific Research Projects Coordination Unit of Fırat University. Project Number: SUF.17.06. This work is presented as Abstract at 3-6 July 2018, the 4th International Symposium on Euroasian Biodiversity in Kiev, Ukraine.

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