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Length-Weight Relationship and Condition Factor of Spiny Gurnard (*Lepidotrigla dieuzeidei* Blanc and Hureau, 1973) Inhabiting Northeast Mediterranean Sea

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Abstract: The aim of this study was to determine length-weight relationships and to give the maximum length spiny gurnard (*Lepidotrigla dieuzeidei* Blanc and Hureau, 1973) inhabiting Northeast Mediterranean Sea. A total of 1910 spiny gurnard, (*Lepidotrigla dieuzeidei* Blanc Hureau, 1973) were obtained from the fishermen on September 2012 to October 2012 in the Northeast Mediterranean Sea. Total length of samples ranged between 7.2-20.4 cm (female), 7.1-17.9 cm (male) and weight 2.28-63.08 g (female), 1.90-47.12 g (male) for *L. dieuzeidei*, respectively. The length-weight relationships of *L. dieuzeidei* were found as $W = 0.0034\ TL^{3.35}$ ($R^2 = 0.83$) for all specimens, $W = 0.003TL^{3.41}$ ($R^2 = 0.84$) for females and $W = 0.004TL^{3.28}$ ($R^2 = 0.81$) for male, respectively. The types of growth for both sexes were positive allometric growth for spiny gurnard. The condition factor values varied between 0.8017±0.0057 (female), 0.8076±0.0061 (male) in *L. dieuzeidei* b-value has been identified as 3.3052, 3.2176, 3.2664, male, female and for all individuals in *L. dieuzeidei*, respectively. The difference of length-weight relationship between *L. dieuzeidei* was statistically insignificant ($p>0.05$). This study presented the first reference on LWRs and condition factor for spiny gurnard from NE Mediterranean coast of Turkey.

Key words: *Lepidotrigla dieuzeidei*, spiny gurnard, Northeast Mediterranean, length-weight relationship, condition factor

INTRODUCTION

The spiny gurnard (*Lepidotrigla dieuzeidei*) inhabits muddy substrate at depths of 50-250 m and feeds on benthic invertebrates, chiefly amphipod crustaceans. It is Atlanto-Mediterranean species, distributed along the Mediterranean from Gibraltar to Mauritania (Golani *et al*., 2006). Although, there are some knowledges about age, growth and reproduction, systematic on *Chelidonichthys lucerna* and other triglid fishes but no information on the length weight relationship of the spiny gurnard in the Eastern Mediterranean Sea (Ismen *et al*., 2004). To the best knowledge of the researchers, this study is to determine sex ratio, the Length-Weight Relationships (LWRs), relative condition factor of *Lepidotrigla dieuzeidei* from the Northeastern Mediterranean Sea.

MATERIALS AND METHODS

Fish samples were caught by bottom trawl at 80-100 m in Iskenderun Bay, northeastern Mediterranean during September 2012 to October 2012. The trawler was equipped with 44 mm stretched mesh size nets at the cod-end. Trawling lasted 3 h and the trawling speed was 2.5 knots. The specimens were identified according to Golani *et al*. (2006). Total length was measured to the nearest 1 mm and the weight of each specimen was determined with a digital scale nearest to the 0.01 g.

The sex ratio was given as Males:Females (M:F) calculated using the formula: total number of male/total number of females (Oliveira *et al*., 2012). Length-Weight Relationship (LWR) for female, male and all individuals have been identified separately. All total lengths and weights were fitted to the length-weight equation:

$$W = aL^b$$

By using least square methods with Statistica Software. Student t-test was used to determine whether the difference between length and weight are significant. In the length-weight equation a and b are intercept and the slope (= exponent) of the length-weight curve, respectively (King, 1995; Can *et al*., 2002; Basusta and Cicek, 2006; Basusta *et al*., 2012; Turker-Cakir *et al*., 2008;

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Koc *et al*., 2008). The b-value for this species was tested by a t-test at the 0.05 significance level to verify if it was significantly different from 3. LWRs for spiny gurnard were calculated separately according to the sex (Erguden *et al*., 2011).

RESULTS AND DISCUSSION

A total of 1882 individuals of *L. dieuzeidei* were collected during the study (Table 1). A total lengths of females and males ranged from 7.2-20.4 cm and from 7.1-17.9 cm, respectively. The estimated parameters of the length-weight relationships and length characteristics (number of fish (n), size range and weight range), the coefficient of determination (R^2) and type of growth are given in Table 1. The sex ratio for this species was approximately 1.2:1.

The length weight relations were separately estimated for females and males are presented Fig. 1-3. The exponent b demonstrated a positive allometric growth. The difference between length and weight was found significantly ($p>0.05$). The length-weight relationships of *L. dieuzeidei* were found as $W = 0.0042TL^{3.2664}$ ($R^2 = 0.863$) for all specimens, $W = 0.0038TL^{3.3052}$ ($R^2 = 0.874$) for females and $W = 0.0047TL^{3.2176}$ ($R^2 = 0.850$) for male, respectively.

The largest value of b parameter was 3.41 for females while the lowest value was 3.28 for males of this species. Similar values were observed by Merella *et al*. (1997) in Spain, Olim and Borges (2006) in the South coast of Portugal and Vallisneri in the Adriatic Sea.

The condition factor (K) values varied between 0.8044±0.0041 (all specimens), 0.8017±0.0057 (female), 0.8076±0.0061 (male) in *L. dieuzeidei*. The K-value is low to Olim and Borges (2006). According to King (1995) this result is related gonadal development.

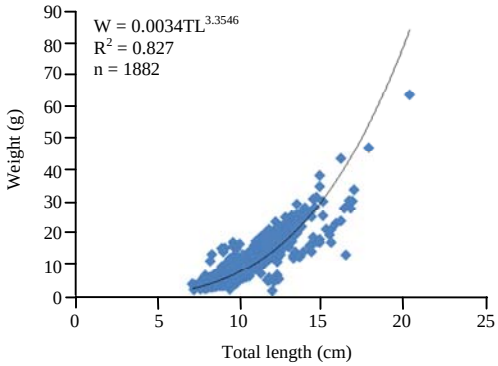

Fig. 1: Length-weight relationships of *Lepidotrigla dieuzeidei* for all individuals

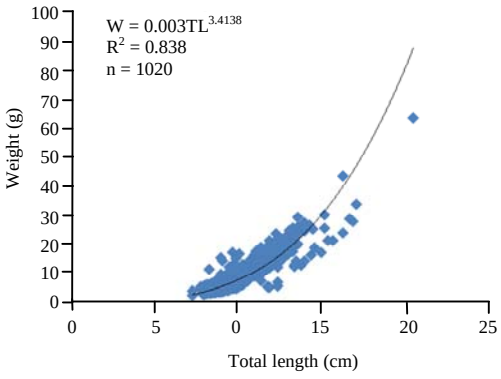

Fig. 2: Length-weight relationships of *Lepidotrigla dieuzeidei* for female

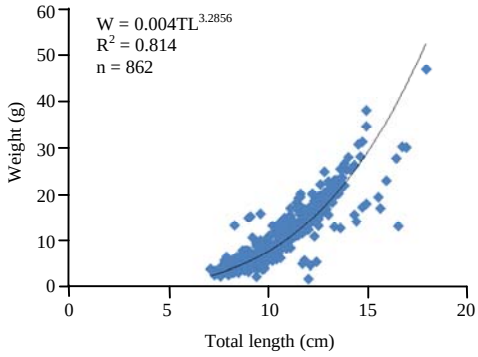

Fig. 3: Length-weight relationships of *Lepidotrigla dieuzeidei* for male

Table 1: Length-weight relationship of *Lepidotrigla dieuzeidei*, North-Eastern Mediterranean, Turkey. Sample size, Total Length (TL), Weight (W) and equation parameters for a and b and R^2 values (n = sample size; a, intercept of the regression; b, slope or regression coefficient; R^2 coefficient of determination)

Sex	n	Total length range (cm)	Weight range (g)	a	b	R^2	References
F	1020	7.2-20.4	2.28-63.08	0.0030	3.41	0.84	In this study
M	862	7.1-17.9	1.90-47.12	0.0040	3.28	0.81	In this study
AI	1882	7.1-20.4	1.90-63.08	0.0034	3.35	0.83	In this study
F	91	7.4-13.7	4.3-33.000	0.0054	3.27	0.95	Vallisneri *et al*. (2010)
M	52	8.1-12.5	5.3-24.000	0.0060	3.31	0.96	Vallisneri *et al*. (2010)
F	115	6.9-16.2	3.2-51.000	0.0110	3.04	0.87	Olim and Borges (2006)
M	130	6.8-15.8	3.2-43.900	0.0090	3.11	0.96	Olim and Borges (2006)
AI	255	6.9-16.2	3.2-51.000	0.0090	3.11	0.95	Olim and Borges (2006)
AI	13	9.0-15.1	-	0.0078	3.12	0.99	Merella *et al*. (1997)

F = Female; M = Male; Al = All individual

CONCLUSION

The present study provides basic information on length-weight, relative condition factor and sex ratio for the spiny gurnard that will be useful for fishery management and ecological research from Northeastern Mediterranean Sea.

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