

Length-Weight Relationships for 6 Fish Species from Khuzestan (North of Persian Gulf), Iran

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Abstract: Length-weight relationships of 6 species from 5 families were estimated in the north Persian Gulf. Sampling was operated monthly using 24mm mesh size bottom trawl in depths of 3-20 m from January to December 2007. Total number of 4199 individuals of were used for calculations. Isometric growth was found in *leiognathus bindus*, *Liza subviridis*, *Ilisha compressa* and *Cynoglossus arel*. The values of the slope b in the Length-weight relationship for *Pennahia macrophthalmus* and *Johnius belangerii* was calculated 3.37 and 3.27 respectively. The study presents valuable data for fisheries scientists.

Key words: Length-weight relationship % Fish % Persian Gulf % Khuzestan % Iran

INTRODUCTION

The North Persian Gulf (Khuzestan Province, Iran) considered one of the most important nursery grounds for both commercial and noncommercial fish species in the region [1,2]. High diversity of juvenile and adult fish was caught during previous studies besides high primary production of Khuzestan coastal waters confirm the importance of this area [3, 4].

Length-weight relationships provide useful data for stock assessment and population dynamics studies such as growth estimation, length and age structures [5] and allow scientists to compare different populations of the same species in different environments in morphological aspects [6]. Fisheries scientists use length-weight relationships for population health state monitoring [7].

Despite the significance of length-weight relationships utility in fisheries studies and importance of the North Persian Gulf in fishing of Iran, length-weight relations was not calculated for most species in the region.

The aim of this study was to establish length-weight relationships for 6 most common species caught during one year sampling in the Khuzestan province located in the northern Persian Gulf.

MATERIALS AND METHODS

Study Area: Khuzestan inshore waters is located in the North of Persian Gulf which lies between latitudes

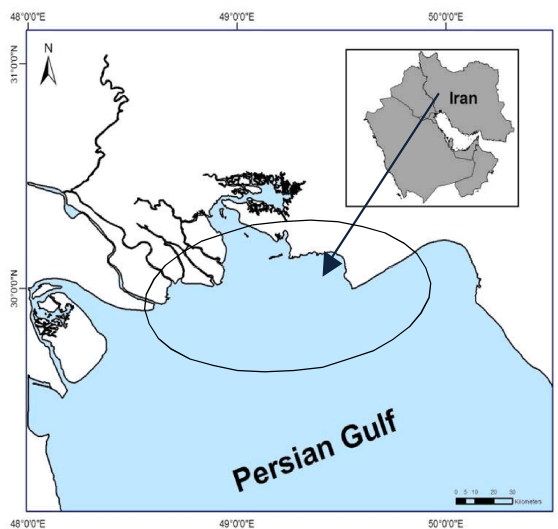


Fig. 1: Khuzestan inshore waters (North of Persian Gulf)

29°53'-30°05' and longitudes 48°44'-49°43' receives high water and sediment input from the rivers of region mainly Arvandrud (Fig. 1). The climate of the region is subtropical. Rains occur mainly from November to May and substrate of this shallow area consists of muddy and sandy sediments.

Sampling Design: 10 hauls were operated monthly during one year sampling from January to December 2007. Sampling was carried out using an experimental trawl with 24mm mesh size in cod end based on random sampling to

Table 1: length-weight relationships of 6 species from north Persian Gulf, N: the sample size, min, max, mean total length, a: the intercept of relationship, b: the slope of relationship, SE: Standard Error, r: coefficient of correlation, t value (difference of b from 3)

species	N	Min	Max	Mean	a	b	SE(b)	r	t value
<i>Leiognathus bindus</i>	316	4.7	12	7.6	0.011	3.096	0.029	0.973	0.10*
<i>Liza subviridis</i>	225	7.2	16.5	11.5	0.017	2.819	0.034	0.968	1.91*
<i>Ilisha compressa</i>	828	6.7	24.1	8.5	0.016	2.69	0.03	0.909	1.46*
<i>Cynoglossus arel</i>	627	8.6	26.6	16.7	0.002	3.289	0.027	0.979	1.26*
<i>Pennahia macrophthalmus</i>	1096	4.6	19	10.8	0.004	3.378	0.02	0.963	2.06ns
<i>Johnius belangerii</i>	1107	4.5	20.2	11.3	0.005	3.274	0.018	0.968	2.08ns

*: significant at $p=0.05$; ns: non significant at: $p=0.05$

cover an area of about 5500 km² between 3-20m depth. Specimens were identified to species level. Total length (TL) and weight (W) were measured to millimeter and tenths gram respectively.

Length-weight relations is usually expressed by $w = aL^b$ equation [8] where W is weight (g), L is total length (cm), a is Regression constant (intercept) and b is the Regression slope (fish growth rate) [9]. The parameters a and b were estimated by the least-square method from logarithmically transformed data and the correlation (r^2), that is the degree of association between the length and weight was computed from the linear regression analysis. The parameters of the relationships were calculated using SPSS software. In order to verify if calculated b was significantly different from 3, the t-test was employed using the statistic: $t_s = (b-3)/S_b$, where S_b is the standard error of the slope [10].

When the b value in length-weight relationship was statistically equal to or did not show significant deviation from 3, the growth was considered isometric, whereas the positive or negative allometric growth occurred when the b value was significantly different from 3 [8].

RESULTS

4199 individuals belonging to 6 species from 5 families were used for the analysis. Depending on the species the smallest total length which measured during the study was between 4.5-8.6 and maximum total lengths values were measured between 12-26.6. The coefficient of determination (r^2) was between 0.90 for *Ilisha compressa* and 0.97 for *Cynoglossus arel* and *leiognathus bindus*. The sample size, maximum and minimum total length along with length-weight parameters and correlations are given in table 1. According to which isometric growth was found in *leiognathus bindus*, *Liza subviridis*, *Ilisha compressa* and *Cynoglossus arel*. Positive allometry was found in two other species with allometric coefficients of 3.37 and 3.27 for *Pennahia macrophthalmus* and *Johnius belangerii* respectively.

DISCUSSION

Length-weight relationship parameters of the fish are affected by a series of factors including water temperature, food availability and reproductive activities and so they would be vary among different environments [11,12]. No previous length-weight relationships was available for these 6 species in the study area. Then the results of the study are useful inputs for fisheries scientists stock assessment models and useful for Spatio-temporal comparison in the future.

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