

LENGTH-WEIGHT RELATIONSHIPS OF 18 FISH SPECIES FROM THE PERSIAN GULF

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DUŽINSKO-MASENI ODNOS 18 VRSTA RIBA IZ PERSIJSKOG ZALIVA

Apstrakt

Dužinsko-maseni odnos (LWR) je opisan kod osamnaest vrsta riba ulovljenih duž obala Hormoz moreuza u Persijskom zalivu, Iran. Izlovljeno je ukupno 2328 jedinki od jeseni 2013. do zime 2014. godine sa strašinom za lov gambora i obalnom klopkom. LWR je izračunat korišćenjem stepene jednačine $W = a \cdot L^b$. Vrednosti parametra b su bile bliške vrednosti 3 kod malabarskog crvenog pagara (*Lutjanus malabaricus*), tigrozube kavale (*Otolithes ruber*), srebrnastog silaga (*Sillago sihama*), salaha (*Equulites lineolatus*), glatkozubog konja (*Leiognathus equulus*) i konjića (*Secutor ruconius*), vrednosti parametra b značajno veće od 3 su zabeležene kod prugastog konjića (*Aurigequula fasciata*) i indijskog iverka (*Psettodes erumei*), a vrednosti parametra b značajno manje od 3 su zabeležene kod vrste pagar žutoperajar (*Acanthopagrus latus*), srpa (*Drepane longimana*), indijskog arbuna (*Lethrinus lentjan*), skakavice (*Liza klunzingeri*), indijskog pagra (*Lutjanus johnii*), plotice (*Parastromateus niger*), kopljastog gruntera (*Pomadasyss kaakan*), zmijičnjaka (*Trichiurus lepturus*), šarenog konjića (*Nuchequula gerreoides*) i vrste *Photopectoralis bindus*. Do sada nisu postojale u bazi FishBase LWR kod četiri istraživane vrste u ovom radu, a takođe je zabeležena i nova maksimalna dužina za vrstu pagar žutoperajar. Rezultati dobijeni u ovom radu mogu biti od pomoći biolozima i upravljačima koji se bave ribarstvom u Persijskom zalivu.

Ključne reči: dužinsko-maseni odnos, model rasta, Persijski zaliv

Keywords: Length-weight relationship, growth pattern, Persian Gulf

INTRODUCTION

Length-weight (LW) relationship parameters have basic uses in fish stocks assessment and fisheries management (Froese, 2006). For the Persian Gulf, the numbers of such studies are very limited and mostly related to recent years (Raеisi et al., 2014; Aghajanpour et al., 2015; Daliri et al., 2015). This paper provides the first published reference of length-weight relationships for Yellowfin seabream (*Acanthopagrus latus*), Concertina fish (*Drepane longimana*), Klunzinger's mullet (*Liza klunzingeri*) and Ornate ponyfish (*Equulites lineolatus*) and also is the first report for other 14 fish species from Persian Gulf.

MATERIAL AND METHODS

Fish specimens were captured from the northern coast of the Persian Gulf in the Strait of Hormuz. In total, 2328 specimens were collected between autumn 2013 and winter 2014 by shrimp beam trawl and intertidal fishing weirs.

All specimens were identified to the species level according to Fischer and Bianchi (1984),

Carpenter et al. (1997) and rechecked against the FishBase (Froese and Pauly, 2015). Total lengths (TL), were measured to the nearest 0.1 mm with a digital caliper. Weights (W) were measured to the nearest 1 g with an electronic balance. For visual inspection of outliers, log-log plots of length and weight values were performed and only extreme outliers attributed to data error were omitted from analysis (Froese, 2006). The LWR was calculated by applying the power regression equation $W = a \cdot L^b$, where W is the total weight (g), L is the total length (cm), *a*, the intercept and *b* the slope of log-transformed linear regression (Bagenal, 1978).

RESULTS AND DISCUSSION

Sample size, range of total length and weight and the value of parameters *a* and *b* with 95% confidence limit are given in Table 1. In the present study the range of exponent *b* was 2.67-3.36 and within the expected range of 2.5-3.5. Minimum and maximum values of parameter *a* were 0.0031 for Eel-like Largehead hairtail (*Trichiurus lepturus*) fish specimens and 0.0495 for short and deep body Concertina (*Drepane longimana*) fish specimens, respectively (Froese, 2006). The length-weight relationship in fish is affected by a number of factors such as habitat, population, gonad maturity, sex, health, sample size, preservation techniques (Tesch, 1971; Alavi-Yeganeh, et al, 2011), which were not considered in the present study. The new maximum TL record for *Acanthopagrus latus* appears to be 38.6 cm (Table 1). These results will be useful for fishery research, management and conservation in the Persian Gulf.

Table 1 - Length-weight relationships in 12 commercial fish species from the Strait of Hormuz in the Persian Gulf.

Family	Species	Length range (TL, cm)	Weight range (g)	n	Regression parameters				
					a	a CI 95%	b	b CI 95%	r ²
Sparidae	<i>Acanthopagrus latus</i>	16.4 - 38.6 ^c	89 - 1288	74	0.0279	0.0199 - 0.0392	2.883	2.782 - 2.983	0.99
Drepaneidae	<i>Drepane longimana</i>	19.8 - 47.3	258 - 2866	91	0.0495	0.0378 - 0.0649	2.895	2.783 - 2.936	0.99
Lethrinidae	<i>Lethrinus lentjan</i>	20.3 - 40.9	142 - 982	66	0.0270	0.0164 - 0.0437	2.837	2.696 - 2.978	0.98
Mugilidae	<i>Liza klunzingeri</i>	10.8 - 19.9	13 - 74	383	0.0205	0.0149 - 0.0282	2.762	2.645 - 2.880	0.95
	<i>Lutjanus johnii</i>	32.2 - 45.4	479 - 1340	42	0.0390	0.0162 - 0.0944	2.733	2.488 - 2.977	0.96
Lutjanidae	<i>Lutjanus malabaricus</i>	23.8 - 73	231 - 6490	82	0.0206	0.0159 - 0.0267	2.931	2.895 - 3.002	0.99
Sciaenidae	<i>Otolithes ruber</i>	21 - 51.6	65 - 1433	102	0.0116	0.0094 - 0.0142	2.970	2.912 - 3.027	0.99
Carangidae	<i>Parastromateus niger</i>	17.8 - 48	109 - 2213	89	0.0263	0.0205 - 0.0338	2.899	2.828 - 2.970	0.99
Haemulidae	<i>Pomadasys kaakan</i>	28.3 - 59.9	322 - 2787	80	0.0207	0.0155 - 0.0277	2.903	2.825 - 2.981	0.99
Psettodidae	<i>Psettodes erumei</i>	20.2 - 63.8	80 - 3558	107	0.0038	0.0026 - 0.0054	3.360	3.259 - 3.461	0.99
Sillaginidae	<i>Sillago sihama</i>	12.4 - 23.7	14 - 96	95	0.0084	0.0060 - 0.0119	2.949	2.831 - 3.068	0.98
Trichiuridae	<i>Trichiurus lepturus</i>	50.5 - 104.5	120 - 937	163	0.0031	0.0016 - 0.0059	2.670	2.520 - 2.821	0.95
	<i>Equulites lineolatus</i>	5.0-11.3	1-10.	139	0.0060	0.004-0.009	3.144	2.943-3.353	0.931
	<i>Aurigequula fasciata</i>	5.8-13.1	3-37	221	0.0101	0.008-0.012	3.249	3.161-3.336	0.980
Leiognathidae	<i>Secutor ruconius</i>	4.3-6.1	1-4	69	0.0231	0.017-0.032	2.833	2.642-3.024	0.964
	<i>Photoptoralis bindus</i>	4.4-10.8	1-19	239	0.0175	0.016-0.019	2.934	2.889-2.980	0.993
	<i>Leiognathus equulus</i>	9.4-22.1	14-237	22	0.0102	0.007-0.015	3.216	2.912-3.519	0.997
	<i>Nuchequula gerreoides</i>	6.9-11.4	4-18	169	0.0230	0.018-0.029	2.794	2.676-2.912	0.964

n, sample size; a, intercept of log-log relationship; b, slope of relationship; CI95%, confidence intervals; r², coefficient of determination; c De-
notes species with a maximum length greater than previously recorded.

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