

Short Communication

Length-weight relationships of seven fish species from the Karun River system, southwestern Iran

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Abstract: Length-weight relationships (LWR) for seven species from the Karun River system in Iran were provided. These species include *Alburnus doriae*, *Alburnus sellal*, *Barbus karunensis*, *Capoeta coadi*, *Squalius berak*, *Turcinoemacheilus saadii* and *Rhinogobius lindbergi*. Fishes were collected in November and December 2018 and LWR is based on total length and weight of 2867 specimens calculated by equation $W = aL^b$. The b value ranged from 2.92 to 3.25 and r^2 from 0.94 to 0.99. The length and weight range is presented for each species collected in the Karun River Basin.

Keywords: Cyprinidae, Gobiidae, LWR, Nemacheilidae

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Introduction

Length-weight relationships (LWR) are useful in fisheries and ecological researches, since it can be used to estimate biomass, condition factor, and growth patterns of fish species and populations (Jafari et al. 2016; Salvador et al. 2018). It also allows the conversion of length into weight (Gubiani et al. 2009; Asadollah et al. 2017; Keivany et al. 2017a). LWRs are well-documented for many fishes in Iran (e.g., Keivany et al. 2017a, b, c; Zamani-Faradonbe et al. 2018), however, this information is not available in Fishbase (Froese & Pauly 2019) for *Capoeta coadi* Alwan, Zareian & Esmaili, 2016, *Alburnus sellal* Heckel, 1843, *A. doriae* De Filippi, 1865, *Turcinoemacheilus saadii* Esmaili, Sayyadzadeh, Özulug, Geiger & Freyhof, 2014, *Barbus karunensis* Khaefi, Esmaili, Geiger & Eagderi, 2017, *Squalius berak* Heckel, 1843 and *Rhinogobius lindbergi* Berg, 1933 from the Karun River system. Thus, the objective of the present study

is to provide baseline data on LWRs of these common species in the Karun River system.

Materials and Methods

A total of 2867 specimens belonging to the seven above-mentioned species were collected between November to December 2018 in eight tributaries of the Karun River. A dip net with a 5mm stretched mesh size and a backpack electrofishing device (Samus 1000) was used. The specimens were anesthetized in 1% clove oil, fixed in 10% neutralized formalin and were taken to the Laboratory of the Isfahan University of Technology for further examination. Total length (TL) and total weight (W) were measured to the nearest 0.1mm, and 0.01g, respectively. The length-weight relationship equation $W = aL^b$ was used, where W is the total body weight (g), L is the total body length (cm), a is the intercept and b is the slope (Froese 2006). Statistical analyses were performed in Excel 2016 at the 95%

Table 1. Descriptive statistics and LWR parameters for seven fish species from Karun River system in Iran.

Families/Species	N	TL (cm)	BW (g)	a	CL 95% (a)	b	95% CL (b)	r ²
		Min-Max	Min-Max					
Cyprinidae								
<i>Alburnus doriae</i>	0145	4.0-16.3	0.70-56.50	0.007	0.004-0.009	3.11	3.09-3.13	0.95
<i>Alburnus sellal</i>	1435	1.2-16.8	0.36-47.23	0.009	0.007-0.010	2.95	2.93-3.97	0.97
<i>Barbus karunensis</i>	0025	9.0-17.0	6.04-41.19	0.010	0.008-0.012	2.97	2.92-3.02	0.98
<i>Capoeta coadi</i>	1084	2.6-26.8	0.15-207.96	0.014	0.012-0.015	2.92	2.90-2.92	0.99
<i>Squalius berak</i>	0090	4.8-21.0	0.97-165.09	0.006	0.005-0.007	3.25	3.23-3.27	0.99
Nemacheilidae								
<i>Turcinoemacheilus</i>	32	3.0-06.5	0.18-1.78	0.005	0.004-0.007	3.05	3.01-3.09	0.97
Gobiidae								
<i>Rhinogobius lindbergi</i>	56	2.7-05.7	0.22-1.85	0.011	0.007-0.012	2.93	2.92-3.14	0.94

confidence level.

Results and Discussin

Alburnus sellal was the most abundant species (1435 specimens), followed by *C. coadi*, *A. doriae*, *S. berak*, *R. lindbergi*, *T. saadii* and *B. karunensis*. The values of b, intercept a and their determination coefficient (r²) are presented in Table 1. The LWRs of these fish species were $W = 0.007L^{3.11}$ (r² = 0.95) for *A. doriae*, $W = 0.009L^{2.95}$ (r² = 0.97) for *A. sellal*, $W = 0.010L^{2.97}$ (r² = 0.98) for *B. karunensis*, $W = 0.014L^{2.92}$ (r² = 0.99) for *C. coadi*, $W = 0.006L^{3.25}$ (r² = 0.99) for *S. berak*, $W = 0.005L^{3.05}$ (r² = 0.97) for *T. saadii*, and $W = 0.011L^{2.93}$ (r² = 0.94) for *R. lindbergi*, respectively. The values of b in the length–weight relationship equations were determined as 3.11 for *A. doriae*; 2.95 for *A. sellal*, 2.97 for *B. karunensis*, 2.92 for *C. coadi*, 3.25 for *S. berak*, 3.05 for *T. saadii* and 2.93 for *R. lindbergi*.

Relationship between length and weight (LWR) is an important index in fisheries management (Mouludi-Saleh & Keivany 2018). Coefficient of determination values (r²) was >0.94 for the LWRs of the studied species, ranging from 0.94 in *R. lindbergi* to 0.99 in *C. coadi*. The b-values for *S. berak* and *A. sellal* was previously reported as 3.14-3.69 (Mouludi-Saleh & Keivany 2018; Eagderi et al. 2020) and 2.98-3.21 (Keivany et al. 2016a), respectively, also Eagderi et al. (2020) estimated it as

3.04 for *A. doriae* and Alavi et al. (2018) as 2.90 for *C. coadi*. The b-value for all the species was within the expected range of 2-4 (Tesch 1971; Froese 2006). However, these may vary due to food availability, sexual maturity and preservation techniques (Keivany et al. 2015, 2016a, b) none of which were considered in this study. Our estimates are based on individuals preserved in formalin, thus a correction factor may be needed to convert these to the relationships of live specimens. Therefore, future studies should try to obtain on-site length and weight data from fresh (unpreserved) specimens. This study provides estimates on LWR of seven fish species in southwestern Iran and could be useful for fishery biologists and managers.

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مقاله کوتاه

رابطه طول-وزن هفت گونه ماهی در حوضه رودخانه کارون در جنوب غربی ایران

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چکیده: رابطه طول و وزن هفت گونه از رودخانه کارون در ایران ارائه می‌شود. این گونه‌ها شامل *Alburnus doriae*، *Alburnus sellal*، *Barbus karunensis*،

Capoeta coadi، *Squalius berak*، *Turcinoemacheilus saadii* و *Rhinogobius lindberg* می‌باشند. ماهی‌ها در آبان و آذر ۱۳۹۷ صید و رابطه طول و وزن

آن‌ها بر اساس طول کل و وزن کل ۲۸۶۷ نمونه و با استفاده از معادله $W = aL^b$ محاسبه گردید. دامنه مقدار b بین ۲/۹۲ و ۳/۲۵ و a^2 بین ۰/۹۴ و ۰/۹۹ بود. دامنه

اندازه طولی و وزنی ماهی‌های صید شده در حوضه رودخانه کارون نیز ارائه شده است.

کلمات کلیدی: رابطه طول و وزن، کپورماهیان، گاوماهیان، لوچ‌ماهیان.