Short Communication

Length-weight relationship for four fish species from the Oman Sea, Iran

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Abstract: The present study reports length-weight relationship (LWR) of four fish species viz. *Pennahia macrophtalmus, Epinephelus bleekeri, Acropoma joponicum* and *Trichiurus lepturus* from the Oman Sea, Iran. A total of 880 specimens were collected from December 2016 to August 2017 by trawling. The LWR parameter *b* for the studied species was 2.68 to 3.07.

Introduction

The length-weight relationship of fishes is used to estimate the weight of a specimen from its length and vice versa, evaluation of fish stocks, estimating biomass, ontogenetic changes, growth rate studies and understanding the life cycle (Froese, 2006; Sarkar et al., 2008; Kumolu-Johnson and Ndimele 2010). Such information is scarce for fish species of the Oman Sea, hence feels its necessity for fisheries management (Oscoz et al., 2005).

This contribution presents the parameters of LWRs for four species viz. *Pennahia macrophtalmus,* (Acanthuriformes: Sciaenidae), *Epinephelus bleekeri* (Perciformes: Serranidae), *Acropoma joponicum* (Perciformes: Acropomatidae) and *Trichiurus lepturus* (Scombriformes: Trichiuridae) from the Oman Sea.

Materials and Methods

The sampling was carried out on a monthly basis. A total of 880 specimens of four species, including 219 *P. macrophtalmus,* 81 *E. bleekeri,* 241 *A. joponicum* and 339 *T. lepturus* were collected in the depths of 168-276 m by trawling (30 mm mesh size) from the Oman Sea during December 2016 to August 2017. The collected fishes were preserved in the buffered 10% formalin at the field and transported to the

Fisheries Laboratory of University of Tehran. The total length (TL) and total weigh of each individual were measured using dial calipers and digital scale to the nearest 0.1 mm and 0.1 g, respectively.

The length-weight relationship was estimated by $W=aL^b$, and the logarithmic length-weight equation as follows: $Log(w) = Log(a)+blog(L)$. Where W is the whole-body weight (g); L = the total length (mm), a = the intercept and b = the slope. Prior to regression analyses, log-log plots of the length-weight pairs were performed to identify outliers (Froese et al., 2011; Radkhah and Eagderi 2015). Outliers perceive in the log-log plots of all species were evacuated from the regression. All statistical analyses were performed in Excel 2016.

Results

The specimens were ranged from 64.1-870.2 mm in total length and 48.1-5400 g in total weight. The number of samples, minimum and maximum of total length (mm), minimum and maximum of weight (g), length-weight relationships parameters (*a*, 95%CI-*a*, *b* and 95%CI-*b*) and the coefficient of determination (r^2) of four studied species, including *macrophtalmus, E. bleekeri, A. joponicum* and *T. lepturus* are presented in Table 1. LWR ranged 2.68 for *A. joponicum* to 3.07 for *E. bleekeri*. All

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Table 1. Descriptive statistics and estimated parameters of length-weight relationships for four species from Oman Sea, Iran.

species	Total length (mm)		Weight (g)		Regression parameters				
	n	min	max	min	max	a	b	r^2	95% CL of b	95% CL of a
P. macrophtalmus (Bleeker,1549)	219	166.3	438.2	48.1	1004.1	0.0005	2.72	0.85	2.32-3.07	0.0001-0.0009
E. bleekeri (Vaillant,1878)	81	240.2	870.2	203.0	5400.3	0.0001	3.07	0.95	2.47-3.10	0.0001-0.0005
A. joponicum (Gunther,1859)	241	64.1	271.3	5.3	65.5	0.0008	2.68	0.88	2.57-3.13	0.0005-0.0009
T. lepturus (Linnaeus,1758)	339	191.6	545.6	100.0	1601.0	0.0006	2.71	0.75	2.64-3.24	0.0003-0.0009

n, number of individuals; a, intercept; b, slope; CI, confidence intervals; r^2, coefficient of determination.

relationships were highly significant ($P<0.05$) with r^2 values greater than 0.75 in four species ($r^2 = 0.75$-0.95).

Discussion

The values of the b in LWRs falls between 2.5 and 3.5 (Froese, 2006) or 2-4 (Tesch, 1971). The value of *b* for *P. macrophtalmus* (2.72), *E. bleekeri* (3.07), *A. joponicum* (2.68) and *Trichiurus lepturus* (2.71) are in the expected range (Tesch, 1971; Froese, 2006; Zamani-Faradonbe et al., 2015a, b). This study provided some basic information that will be useful for their fishery management and fish population dynamic studies.

Acknowledgments

References

Froese R. (2006). Cube law, condition factor and weight-length relationships: history, meta-analysis and recommendations. Journal of Applied Ichthyology, 22: 241-253.

Froese R., Tsikliras A.C., Stergiou K.I. (2011). Editorial note on weight–length relations of fishes. Acta Ichthyologica Et Piscatoria, 41(4): 261-263.

Kumolu-Johnson C.A., Ndimele P.E. (2010). Length-weight relationships and condition factors of twenty-one fish species in Ologe Lagoon, Lagos, Nigeria. Asian Journal of Agricultural Science, 2: 174-179.

Oscoz J., Campos F., Escala M.C. (2005). Weight–length relationships of some fish species of the Iberian Peninsula. Journal of Applied Ichthyology, 21: 73-74.

Radkhah A., Eagderi S. (2015). Length-weight and length-length relationships and condition factor of six cyprinid fish species of Zarrineh River (Urmia Lake basin, Iran).

Iranian Journal of Ichthyology, 2(1): 61-64.

Sarkar U.K., Negi R.S., Deepak P.K., Lakra W.S., Paul S.K. (2008). Biological parameters of the endangered fish *Chitala chitala* (Osteoglossiformes: Notopteridae) from some Indian rivers. Fisheries Research, 90(1-3): 170-177.

Tesch F.W. (1971). Age and growth. In: W.E. Ricker (Ed.). Methods for assessment of fish production in fresh waters. Blackwell Scientific Publications, Oxford. pp. 98-130.

Zamani Faradonbeh M., Eagderi S., Ghojoghi F. (2015a). Length-weight relationship and condition factor of seven fish species of Totkabon River (southern Caspian Sea basin), Guilan, Iran. International Journal of Aquatic Biology, 3(3): 172-176.

Zamani Faradonbe M., Eagderi S., Naserabad S.S. (2015b). Length-weight relationships and condition factor of three fish species from Taleghan River (Alborz Province, Iran). Journal of Advance Botany and Zoology, 2: 1-3.