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Short Communication

Length–weight relationship for three estuarine fish species from the Chilika Lagoon, India

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We investigated the length–weight relationships (LWRs) for *Sillago vincenti* McKay, 1980, *Triacanthus nieuhofii* Bleeker, 1852 and *Terapon puta* Cuvier, 1829 from the Chilika lagoon in India. Sampling was conducted in central sector of the Chilika from April to November of 2017. Specimens were caught in mono-filament gill nets of mesh size 28-36 mm and fixed set nets of mesh size 16-24 mm. From LWR estimation, the determined intercept (*a* value) and slope (*b* value) were found to be 0.007 and 3.039 for *Sillago vincenti*, 0.010 and 2.997 for *Triacanthus nieuhofii* and 0.008 and 3.156 for *Terapon puta*. The relationships between length and weight in all three species were highly correlated (p <0.05).

[Keywords: Chilika, India, Length–weight relationship]

Introduction

In open water fish conservation and management, information on body weight of fish is foremost for regulation of catch and estimation of biomass[1]. Similarly, evaluation of fish biomass, yield and standing stock of a population, requires both length and weight data. But, during field data collection, measurement of fish size (length) is more convenient than taking body weight when data requirement is huge. Measurement of both length and weight data of each specimen from an unsorted catch is practically time consuming as well as cost expensive[2]. Database on length weight relationship (LWR) has significant role in fish biology, for any type of fish i.e., commercial, non-commercial, food fish, thrashed fish or pray fish. Such database is very useful for biomass estimation because, each species has a unique shape in general all over the globe.

Chilika lagoon is recognized for it's diverse aquatic ecosystem of the tropics where fisheries have foremost importance in research, management and ultimately to serve livelihood to millions of fishers. Despite some studies on length-weight relationship from Chilika[2-7], many commonly occurring fish species has yet to be studied. Here, we report first information on LWR for *Sillago vincenti* McKay, 1980 and *Triacanthus nieuhofii* Bleeker, 1852 and species specific updated LWR for *Terapon puta* Cuvier, 1829 from Chilika.

Materials and methods

Chilika lagoon (19°28'-19°54' N; 85°05'-85°38' E) is a designated Ramsar site, located in east coast of India. Samplings were conducted in Chilika on seasonal basis from April to November of 2017 using mono-filament gill nets having mesh size 28-36 mm and fixed set nets of mesh size 16-24 mm. Soon after collection, fishes were packed in ice-box and brought to research laboratory for further study. Species were identified following standard literatures[8,9]. Total length (TL) and body weight (W) were measured to the nearest 0.1 cm using a digital caliper and 0.01 g using an electronic balance, respectively.

The length-weight relationship $W = aL^b$ were estimated by the least squares method through the transformed equation, $\log W = \log a + b^* \log L$ where, W is total body weight (g), L is total length (cm), a is intercept and b is slope of the linear regression[10]. Normalization of the data sets was carried out by removing extreme outliers using log-log plot of L and W pairs[10]. Statistical significance i.e., 95 % confidence limits (Cl) of a, b and r^2 were determined[10]. The whole statistical analysis was performed using MS-Excel 2010 for Windows.

Results and Discussion

Total, 432 fresh fish specimens of three species belonging to 3 different families were measured. The sample size (N), length and weight ranges, estimates of LWR (a, b and r^2) are summarized in Table 1. The

Table 1 — Estimated parameters of length–weight relationships of fishes sampled during April-November 2017 from the Chilika lagoon, India

Species	N	TL range (mm)	W range (g)	*a* (95% Cl of a)	*b* (95% Cl of b)	r^2
Sillago vincenti McKay, 1980	49	4.5-24.1	0.61-116.15	0.007 (0.006-0.008)	3.039 (2.995-3.124)	0.991
Triacanthus nieuhofii Bleeker, 1852	187	7.2-23.2	3.94-137.42	0.010 (0.009-0.012)	2.997 (2.931-3.064)	0.977
Terapon puta Cuvier, 1829	196	4.3-14.9	0.91-39.55	0.008 (0.007-0.009)	3.156 (3.095-3.218)	0.981

estimated values '*a*' ranged from 0.007 (*Sillago vincenti*) to 0.010 (*Triacanthus nieuhofii*) whereas *b* values were found within 2.997 (*T. nieuhofii*) to 3.156 (*Terapon puta*). All relations were statistically significant ($p < 0.05$).

The values of *b* for all three examined species were found within the expected limits[10,11]. Here, the confidence limits observed were also found within the recommended range and at par with Bayesian confidence limits[1]. Importantly, the current study reports first LWR information for *Sillago vincenti* and *Triacanthus nieuhofii*. But, the LWR information shown in FishBase for *Terapon puta* is not species specific as the sample size and the fish size used for the estimation is very poor. Therefore, current LWR estimation for *Terapon puta* may considered as updated and species specific. The presented results will be considered as basic biological parameters that would be useful partly for conservation and management of the examined species.

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