

Length-weight and length-length relationships of eight fish species from river Ganga, India

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Summary

Present study provides length-weight relationships (LWRs) and length-length relationships (LLRs) of eight fish species from river Ganga, India. Specimens were sampled from gill nets (mesh, 22–120 mm), cast nets (mesh, 12–14 mm), and seine nets (mesh, 12 mm) on quarterly basis from September 2016 to September 2017 within the river stretch from Buxar (25°33'43.90"N and 83°56'3.10"E) to Freserganj (21°35'40.58"N and 88°15'28.92"E). The *b* value ranged from 2.86 (*Otolithoides pama*) to 3.08 (*Polynemus paradiseus*), whereas *a* value ranged from 0.004 (*P. paradiseus*) to 0.016 (*Rita rita*). Both relationships (LWRs and LLRs) were found to be highly correlated ($p < .001$). This study provides first report on LWR for *Amblyceps mangois* and *Osteobrama cotia*, whereas new maximum length recorded for *Macragnathus pancalus*. Furthermore, the estimate of *R. rita* should be considered as tentative because of the limited size range in the study.

1 | INTRODUCTION

In fisheries biology, estimation of length-weight relationships (LWRs) and length-length relationships (LLRs) are important parameters commonly used to convert length measures into weight and vice-versa. Because, in field condition, weight measurements are less accurate and time consuming as compared to length measurements (Karna, 2017). LWR is also partly an important parameter for fish stock and population assessments (Chu, Hou, Tsong-Ueng, & Wang, 2012; Ruiz-Campos, Gonzalez-Acosta, & Cruz-Aguero, 2006). Recently, numerous attempts are made to study LWRs as well as LLRs of indigenous freshwater fish species from Indian waters (Baitha et al., 2017; Borah et al., 2017; Koushlesh et al., 2017; Nath et al., 2017; Sandhya et al., 2016). However, there is a lack of studies on LWRs for fishes of the River Ganga (largest river in India and fifth longest in the world), hence, this study contributes such estimates for eight species.

2 | MATERIALS AND METHODS

Under a systematic quarterly fisheries survey in the lower stretch of river Ganga from Buxar (25°33'43.90"N and 83°56'3.10"E),

Patna (25°36'51.66"N and 85°12'7.02"E), Bhagalpur (25°15'28.336"N and 86°58'53.890"E), Farakka (24°47'38.478"N and 87°55'26.413"E), Rajnagar (23°50'10.64"N and 88°13'55.60"E), Balagarh (23°07'44.05"N and 88°27'58.04"E), Godakhali (22°23'57.37"N and 88°08'03.47"E), Diamond Harbour (22°09'53.85"N and 88°12'19.21"E) and Freserganj (21°35'40.58"N and 88°15'28.92"E), fresh fish specimens were sampled from gill nets (mesh 22–120 mm), cast nets (12–14 mm) and seine nets (12 mm) from September 2016 to September 2017. Fishes were identified following standard literatures of Talwar and Jhingran (1991), Jayaram (1999). Total length (TL), standard length (SL) and fork length (FL) were measured to the nearest 1 mm with a digital caliper and weighed (W) to the nearest 0.01 g on an electronic balance. The parameters for the equation $W = aL^b$ (Ricker, 1973) were estimated by linear regression analysis, after a logarithmic transformation of the variables (weight and length data). Extreme outliers were removed before linear regression analysis. The statistical significance, 95% confidence intervals (CI) of the parameters *a*, *b* and coefficient of determination (r^2) were also estimated. The LLRs between TL, FL and SL were also established using linear regression analysis of $TL = a + b \times FL$ and $TL = a + b \times SL$.