


Length–weight relationships of four fish species from the Nujiang River, China

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Summary

Length–weight relationships (LWRs) were determined for four fish species (*Akrolioplax bicornis* [Wu, 1977], *Barbodes wynaadensis* [Day, 1873], *Glyptothorax cavia* [Hamilton, 1822] and *Placocheilus cryptonemus* [Cui & Li, 1984]) from the Nujiang River, China. Samples were collected from March 2008 to August 2016 (frequency of sampling during the study period: once per year), using various fishing gears (set nets [mesh: 1.5 cm × 2.0 cm], fish cages [0.5 cm mesh], hook, drift gill nets [mesh: 1.0 cm × 2.0 cm × 3.0 cm] and electro fishing). Two new maximum SL were recorded for *B. wynaadensis* and *P. cryptonemus*.

1 | INTRODUCTION

Length–weight relationships (LWRs) are one of tools in fishery stock assessment and management (Lei, Chen, Tao, Xiong, & Chen, 2015; Xiong et al., 2015). The Nujiang River is the second largest river in Southeast Asia, with 78 (26 endemic) fish species distributed therein (He, Xiong, Sui, Jia, & Chen, 2015). However, data on the LWRs of the ichthyofauna are scarce (He et al., 2015). In present this study, the LWRs for four fish species (*Akrolioplax bicornis* [Wu, 1977], *Barbodes wynaadensis* [Day, 1873], *Glyptothorax cavia* [Hamilton, 1822] and *Placocheilus cryptonemus* [Cui & Li, 1984]) were determined from the Nujiang River, China.

2 | MATERIALS AND METHODS

A total of 341 individuals were collected from the Liukuzhen reach (25°84' N; 98°85' E) of the Nujiang River. Samples were collected from March 2008 to August 2016 (frequency of sampling during the study period: once per year), using various fishing gears (set nets [mesh: 1.5 cm × 2.0 cm], fish cages [0.5 cm mesh], hook, drift gill nets [mesh: 1.0 cm × 2.0 cm × 3.0 cm] and electro fishing). Specimens were identified to species according to Chu and Chen (1989). For each specimen, the standard length was measured to the nearest 0.1 cm, and body weight was measured with 0.1 g accuracy. For

TABLE 1 Descriptive statistics and estimated parameters of the length–weight relationships (LWRs: $W = aL^b$) for four fish species sampled at the Nujiang River, China, March 2008–August 2016

Family	Species	N	Standard Length range (cm)	Weight range (g)	a	b	95% CI of a	95% CI of b	r ²
Cyprinidae	<i>Akrolioplax bicornis</i> (Wu, 1977)	172	8.7–12.5	14.8–32.8	0.0156	3.15	0.0127–0.0192	3.06–3.24	0.967
Cyprinidae	<i>Barbodes wynaadensis</i> (Day, 1873)	13	12.6– 31.5	66.9–936.5	0.0346	2.95	0.0149–0.0804	2.68–3.22	0.982
Cyprinidae	<i>Placocheilus cryptonemus</i> (Cui & Li, 1984)	137	5.6– 11.8	2.9–32.8	0.0137	3.12	0.0111–0.0171	3.02–3.22	0.963
Sisoridae	<i>Glyptothorax cavia</i> (Hamilton, 1822)	19	13.2–21.5	47.0–147.5	0.0376	2.75	0.0236–0.0597	2.58–2.91	0.987

N, sample size; Length of species expressed as Standard Length (SL) and Weight as whole body wet weight; LWRs, length–weight relationships; CI, confidence interval; r², coefficient of correlation. New maximum size data in bold.

each species, the length–weight relationship, $W = aL^b$, where W is the weight (g) and L is the standard length (cm), was estimated with a simple linear regression model using log-transformed data. The 95% confidence interval (CI) was determined for parameters a and b (Froese, 2006).

3 | RESULTS

The LWRs and related statistics for each of the four species studied were shown in Table 1. In present study, two new maximum SL were recorded for *B. wynaadensis* and *P. cryptonemus* (Froese & Pauly, 2016).

4 | DISCUSSION

For a comparison of b values calculated in our study with 95% confidence limits of Bayesian estimation reported in FishBase (Froese & Pauly, 2016), the fish species were divided into two groups: (i) three species with b values within the Bayesian's confidence intervals (*A. bicornis*, *B. wynaadensis* and *P. cryptonemus*); (ii) a fish species with both values of the intervals (*G. cavia*). However, this division is tentative because there was no standardized sampling protocol and samples were collected over many years. Further, for two species the sample size over several years is very small and thus these estimates should be considered as tentative. Differences in the LWR can be attributed to several factors: a number of factors such as gonad maturity, sex, diet, stomach fullness, health, age, and fishing time (seasonal and annual fluctuations) as well as the area and the fishing vessels (Zhu, Yang, Liu, & Li, 2015); however, these factors were not considered in the present study. In addition, the narrow sample size and/or the length range of *G. cavia* possibly affected the b values in the study.

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