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Technical contribution

Length–weight relationships of six freshwater fish species from the semiarid region of Brazil

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Summary

Evaluated were the length–weight relationships of six freshwater fish species caught in the Santa Cruz Reservoir in the semiarid region of Brazil: one Characidae, one Prochilodontidae, one Anostomidae, two Loricariidae and one Cichlidae, providing the first references of length–weight relationships and new maximum lengths for these species.

Introduction

The artisanal fisheries in Brazilian semiarid reservoirs constitute an important economic activity that provides essential earnings as well as food for the low-income population (Paiva et al., 1994). Despite the importance of fishing in this region, biological data about many fish species caught in these man-made ecosystems are scarce or absent. In this context, this study provides new information about the length–weight relationship (LWR) of six fish species caught in the Santa Cruz Reservoir. The resulting data will be useful for the management of the fish species in these important ecosystems.

Materials and methods

This study was conducted in the Santa Cruz Reservoir (05°45′56″S; 37°48′00″W), which is located in the hydrographic basin of Apodi-Mossoró in northeastern Brazil. The reservoir was built in 2002, occupies an area of 34.13 km^2, and has a maximum capacity of ~600 million m^3 of water. Sampling was carried out quarterly from February 2010 to November 2012 using gillnets. Eight different locations within the reservoir were sampled at each time point. Captured fish were transported to the laboratory for identification to the lowest taxonomic level according to Rosa et al. (2003). The scientific names and family were confirmed using the FishBase. Total length (cm) and overall body weight (g) were recorded. Samples of the analyzed specimens were deposited in the Ichthyological Collection of the Federal University of Paraíba (Catalog Number UFPB 8933-8997). Parameters of the length–weight relationships ($W = a\ TL^b$) were estimated by linear regression after logarithmic transformation of the data ($\log W = \log a + b \log TL$), where W is weight, TL is total length, a is the intercept, and b is the regression slope (Le Cren, 1951; Froese, 2006). The plot of

Table 1
Descriptive statistics and estimates of length–weight relationship parameters ($Wt = a\ Ls^b$) for six freshwater fish species, Santa Cruz Reservoir in the semiarid region of Brazil. N = sample size; Min. = minimum; Max. = maximum; a = intercept; b = slope; CI = confidence interval; r^2 = determination coefficient. Bold = new maximum species length

	N	Length Min–Max	Weight Min–Max	*a*	CI *a*	*b*	CI *b*	r^2
Characiformes								
Characidae								
Triportheus signatus	993	6.5–**19.5**	5.1–128.6	0.0230	0.0212–0.0274	2.878	2.832–2.924	0.937
Prochilodontidae								
Prochilodus brevis	63	5.8–**28.2**	4.6–540.0	0.0380	0.0256–0.0563	2.869	2.735–3.003	0.967
Anostomidae								
Leporinus taeniatus	10	11.0–**19.0**	27.1–169.5	0.008173	0.002603–0.0256	3.400	2.978–3.822	0.975
Siluriformes								
Loricariidae								
Hypostomus cf. *papariae*	787	5.9–**27.2**	5.1–330.4	0.0437	0.0379–0.0504	2.820	2.771–2.870	0.942
Loricariichthys derbyi	38	10.3–**24.9**	9.0–161.0	0.00292	0.00227–0.00375	3.410	3.323–3.498	0.994
Perciformes								
Cichlidae								
Crenicichla menesezi	78	8.1–**18.9**	9.0–152.7	0.0174	0.0108–0.0278	3.070	2.882–3.257	0.933

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log a and log b was used to detect and exclude outliers (Vega-Cendejas et al., 2012).

Results and discussion

We analyzed 1969 specimens belonging to six species from three orders and five families to estimate LWR. Coefficients of determination (r^2) ranged from 0.933 to 0.994 and b values ranged between 2.820 and 3.410 (Table 1). Parameter b was within the expected 2.5 and 3.5 (Froese, 2006), thus we consider our result to be an adequate estimation of the LWR.

According to the information in FishBase (Froese and Pauly, 2013), LWR references for the six species are reported here for the first time. New maximum total lengths are also presented for the six species.

In conclusion, the results presented herein provide new information on the biology of fish species from the Brazilian semiarid region. These data may provide useful insight for fisheries management and contribute to the conservation of fish species in semiarid regions, especially those such as in the Santa Cruz Reservoir where the fishing activity is very intense.

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