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Short communication

Length–weight relationships for six endemic freshwater fishes from Hutovo Blato wetland (Bosnia and Herzegovina)

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Introduction

Estimates of length–weight relationships (LWR) and maximum size are necessary for stock assessment and management (Pauly, 1983; Froese, 2006).

In this study, new length–weight relationship parameters and maximum sizes are reported for six endemic freshwater fish species collected from the Natural Park Hutovo Blato wetland (Bosnia and Herzegovina), applying the recommendations given by Froese (2006).

Material and methods

The study was carried out in the Hutovo Blato, a small Mediterranean-type wetland of the Neretva River basin (Adriatic watershed) in southern Bosnia and Herzegovina. Fishes were sampled with driftnets (mesh size 20–72 mm, length 30 m, height between 1 and 2 m) in area lakes, streams and springs on a monthly basis in 2007. Sampling stations were selected randomly (2–4 stations) in all waterbodies. Specimens were identified and measured to the nearest 0.1 cm total length (TL) and weighed to the nearest 0.01 g total weight (TW).

Length-to-weight relationships (LWR) were calculated from $\log W = \log a + b \log L$, where W is the weight of the fish in grams, L the total length of the fish, a the intercept, and b the slope. Parameters a and b of the LWR were estimated by linear regression analysis on log-transformed data. The obtained coefficients were analysed with ANOVA.

Scientific names for each species were checked against Kottelat and Freyhof (2007) and FishBase (Froese and Pauly, 2008).

Results and discussion

In this survey, 848 individuals of six fish species belonging to three families were examined. The species, sample size, size range (cm, TL), length–weight parameters a and b, and the correlation coefficient (r^2) are given in Table 1. Overall, the values of parameter b, which varies between 2 and 4 (Tesch, 1971), remained within the expected range of 2.5–3.5 (Froese, 2006), with values varying from 2.80 for *Cobitis narentana* to 3.31 for *Rutilus basak* and *Scardinius plotizza*. All regressions were highly significant ($P < 0.001$).

Four fish species which had no length–weight relationships were found and new maximum lengths were established for five species.

With the lowest b-value, *C. narentana* showed negative allometric growth, which is well known and due to adaptation and its burrowing lifestyle (Zanella et al., 2003). Observed values of the length–weight relationship for *Squalius svallize* from Croatian freshwaters (Treer et al., 2008) are not valid, as observed specimens were caught from the River Krka (Prpa et al., 2007). Bogutskaya and Zupančič (1999) noted that *S. svallize* is widely distributed in the Neretva basin up to Jablaničko Lake, Rama and Buna rivers, the waters of Hutovo Blato, and in the Trebišnjica basin including Bilećko Lake and subterranean waters of the Popovo polje. Bogutskaya and Zupančič (1999) also noted that specimens reported from the rivers Cetina and Krka (Croatia) as *Leuciscus svallize* are certainly not *S. svallize*. This also applies to the values reported for Lake Kremasta (Greece) by Economou et al. (1991).

We trust our results will be useful in the management and conservation of these rare species.

Table 1
Length–weight relationships for six endemic freshwater fish species, Hutovo Blato wetland (Bosna and Herzegovina)

Family	Species	*n*	Minimum TL (cm)	Maximum TL (cm)	*a*	*b*	95% CI of *b*	r^2
Salmonidae	*Salmo dentex*	36	21.7	**88.0**	0.0084	3.07	2.92–3.22	0.9875
Cyprinidae	*Chondrostoma knerii*	424	11.7	**29.4**	0.0035	3.27	3.16–3.38	0.9360
	Rutilus basak	537	6.0	**23.3**	**0.0053**	**3.31**	3.19–3.43	0.8971
	Scardinius plotizza	95	9.9	**39.0**	**0.0051**	**3.31**	3.20–3.42	0.9888
	Squalius svallize	47	6.5	**27.7**	**0.0074**	**3.22**	2.97–3.48	0.9926
Cobitidae	*Cobitis narentana*	133	5.5	10.2	**0.0042**	**2.80**	2.81–3.49	0.8912

n, number of specimens; *a*, *b*, parameters of length–weight relationship; r^2, coefficient of correlation; CI, confidence limit. First length–weight relationships and new maximum sizes marked in bold.

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