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Additional Information

# Length-Weight relationships of two endemic fish species in the Júcar River Basin, Iberian Peninsula

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## Summary

This study provides length-weight relationship (LWRs) information for two fish species (family Cyprinidae) in two headwater streams of the Júcar River Basin (Eastern Iberian Peninsula). Both species are endemic to the Iberian Peninsula and have no previous LWR estimates.

## Introduction

The purpose of this study is to estimate LWRs for two endemic fish of the Iberian Peninsula, captured and released in the headwaters of the Júcar River Basin (Eastern Spain) and which are classified by IUCN as vulnerable: *Achondrostoma arcasii* and *Squalius valentinus*. These species did not have LWRs in FishBase.org.

## Materials and methods

This study was carried out in the Valencia Region (Eastern Iberian Peninsula), within the Júcar River Basin, specifically, in the Villahermosa and Palancia Rivers (40°03'-40°11'N; 1°17'-0°24'W). Villahermosa is a small tributary of the Mijares River. The climate is typically Mediterranean, with rainfall concentrated at the end of winter and the beginning of spring, and with low flow in the summer months (see Alcaraz-Hernández et al., 2011). The field work was conducted during the months of July and August, between 2003 and 2006. In the present piece of research, LWRs are estimated for two fish species *Achondrostoma arcasii* and *Squalius valentinus*. Both species are endemic to the Iberian Peninsula and are classified as vulnerable in the IUCN red list. In the study site, only one species of the genus *Achondrostoma* and one of *Squalius* are present.

Standard electrofishing gear was used to catch the fish. Each sampling unit was enclosed with nets and the removal method was applied (with a minimum of three passes). The extracted individuals were placed in oxygenated water allowing their recuperation before being measured. The captured individuals were released alive after the entire process in a place near the sampling section.

Fork lengths (cm) and weights (g) of all fish extracted were measured. The sex could not be determined, therefore LWRs were estimated for both sexes together. Parameters *a* and *b* of LWRs were estimated by linear regression analysis on log-transformed data. The data check for outliers was made upon a plot of log *L* versus log *W*, following the recommendations of Froese (2006). Values of fish weight below two grams were removed from the analysis.

## Results

The estimated parameters of the LWRs of the *Achondrostoma arcasii* and *Squalius valentinus* with sample descriptive statistics are given in Table 1. *Squalius valentinus* has a new record maximum length for FishBase (highlighted in bold, table 1).

## Discussion

This article provides relevant information for the management and conservation of two endemic species in a vulnerable situation due to habitat loss, water pollution, river regulation and invasive fish species in this river basin (Elvira and Almodóvar, 2001; Clavero and García-Berthou, 2005; Garcia-Berthou et al., 2005; Doadrio et al., 2011).

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Table 1

Length-weight relationship (LWRs) of two fish species inhabiting the headwaters in two rivers of the Júcar River Basin (Eastern Iberian Peninsula).

Species	<i>N</i>	Min	Max	<i>a</i> ( $\pm$ 95% CL)	<i>b</i> ( $\pm$ 95% CL)	<i>r</i> <sup>2</sup>
<i>Achondrostoma arcasii</i>	422	4.9	12.3	0.025 $\pm$ 0.005	2.77 $\pm$ 0.10	0.866
<i>Squalius valentinus</i>	512	4.6	<b>17.5</b>	0.019 $\pm$ 0.002	2.90 $\pm$ 0.06	0.945

*N*, sample size; Min and Max, minimum and maximum length (cm); *a* and *b* parameters of relationship  $\pm$  95% confidence Level; *r*<sup>2</sup>, coefficient of determination. Number in bold indicate the maximum length recorded.