

Length-Weight Relationships of Lake Kariba Fishes

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Abstract

The parameters a and b of the length-weight relationship of the form $W = aL^b$ were computed for 40 species from tables/graphs presented in E. Balon's Fishes of Lake Kariba, Africa.

Introduction

Balon (1974) presented biological and pictorial description of the fish species of Lake Kariba, with tables for conversion of length to weight. This was complemented by length-weight relationships, presented in the form of double logarithmic graphs, and/or of tables of weights and associated lengths (Fig. 1).

As presented, these relationships are not as useful as they would be in form of equations; the aim of this document is to present appropriate equations, and thus enable entry of this useful information into FishBase (Pauly and Froese 1991).

Materials and Methods

Ten length-weight data pairs were taken from Balon (1974) for each species for which such data had been tabulated. For species without tables, ten data pairs were read off from the double logarithmic graphs. Weights are in g, and standard length (SL, in cm) was used, but the

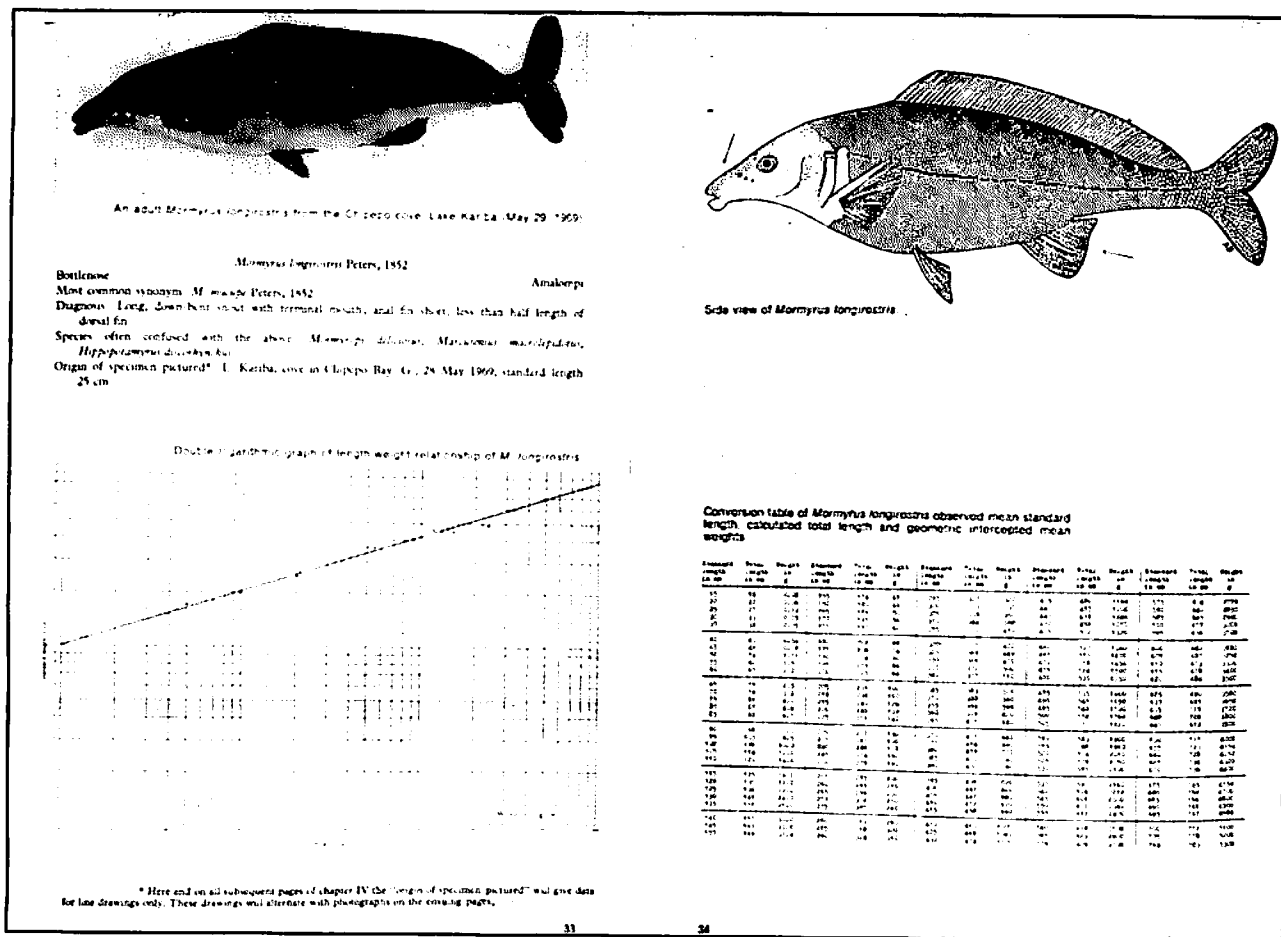


Fig. 1. Pages 33 and 34 of Balon (1974) illustrating his treatment of Kariba Lake species. Left: top, Photo of an adult *Mormyrus longirostris*; center, brief description of *M. longirostris*, bottom, double logarithmic graph of length-weight relationship of *M. longirostris*, Right: top, an artist's illustration of *M. longirostris*; bottom, table of weight and associated lengths for *M. longirostris*, extracted from graph at left.

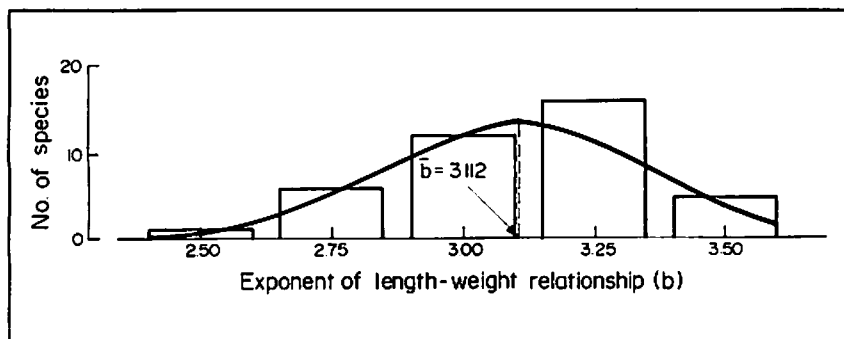


Fig. 2. Frequency distribution of 40 values of the exponent (b) for the length-weight relationships of fishes from Lake Kariba, Africa, with superimposed normal distribution ($\bar{b}=3.112$, $s.d.=0.375$).

Table 1. Parameters (a , b) of the length-weight relationship of 40 species of freshwater fishes from Lake Kariba, Africa [(computed from data in Balon (1974))]; the parameter (a) relates standard length in cm, to wet weight, in g.

Species ^a	TL/SL	a	b	Species ^a	TL/SL	a	b
MORMYRIDAE				SCHILBEIDAE			
<i>Mormyrops deliciosus</i>	1.080	0.0104	2.957	<i>Schilbe mystus</i>	1.190	0.0196	2.842
<i>Hippopotamyrus discorhynchus</i>	1.186	0.0141	3.074	<i>Eutropius depressirostris</i>	1.173	0.0176	2.892
<i>Marcusenius macrolepidotus</i>	1.148	0.00961	3.188	CLARIIDAE			
<i>Mormyrus longirostris</i>	1.127	0.00617	3.211	<i>Heterobranchus longifilis</i>	1.166	0.00985	3.074
ANGUILLIDAE				<i>Clarias gariepinus</i>	1.150	0.0105	3.013
<i>Anguilla nebulosa labiata</i>	1.016	0.000235	3.517	MALAPTERURIDAE			
CLUPEIDAE				<i>Malapterurus electricus</i>	1.137	0.0285	2.937
<i>Limnothrissa miodon</i>	1.182	0.0192	2.681	MOCHOKIDAE			
CYPRINIDAE				<i>Synodontis zambezensis</i>	1.289	0.0278	2.967
<i>Barbus poecheii</i>	1.170	0.0125	3.310	<i>Synodontis nebulosus</i>	1.206	0.0211	3.022
<i>Barbus paludinosus</i>	1.214	0.0121	3.319	CYPRINODONTIDAE			
<i>Barbus unitaeniatus</i>	1.290	0.0332	2.721	<i>Aplocheilichthys johnstonii</i>	1.261	0.0139	3.202
<i>Barbus lineomaculatus</i>	1.229	0.0158	3.170	CICHLIDAE			
<i>Barbus fasciolatus</i>	1.331	0.0352	2.712	<i>Tilapia andersonii</i>	1.276	0.0276	3.300
<i>Labeo cylindricus</i>	1.246	0.0144	3.235	<i>Tilapia mossambica mortimeri</i>	1.284	0.0390	3.060
<i>Labeo lunatus</i>	1.258	0.0100	3.271	<i>Tilapia rendalli</i>	1.252	0.0331	3.189
<i>Labeo congoro</i>	1.259	0.0299	3.008	<i>Sargochromis giardi</i>	1.246	0.0276	3.152
<i>Labeo altivelis</i>	1.291	0.0283	2.976	<i>Sargochromis codringtoni</i>	1.246	0.0276	3.152
<i>Barilius zambezensis</i>	1.249	0.0241	2.548	<i>Serranochromis macrocephalus</i>	1.245	0.00433	3.440
DISTICHODONTIDAE				<i>Serranochromis robustus jallae</i>	1.221	0.00433	3.440
<i>Distichodus mossambicus</i>	1.276	0.00694	3.415	<i>Haplochromis carlottae</i>	1.184	0.0384	3.068
<i>Distichodus schenga</i>	1.275	0.0136	3.252	<i>Haplochromis darlingi</i>	1.252	0.0376	2.850
ALESTIIDAE				<i>Pseudocrenilabrus philander</i>	1.235	0.0352	2.869
<i>Hydrocynus vittatus</i>	1.247	0.0106	3.202				
<i>Alestes lateralis</i>	1.223	0.0139	3.213				
<i>Brachyalestes imberi imberi</i>	1.242	0.0100	3.321				
<i>Micralestes acutidens</i>	1.171	0.00802	3.592				

^aSpecies names are reproduced as in Balon (1974), without considering recent revisions, esp. for the cichlids.

relation between total length (TL) and SL was also estimated from the illustrations. Base 10 logarithms were taken and the parameters a and b were estimated using LOTUS 1-2-3's linear regression routine. Near perfect correlations were obtained in all cases; thus correlation coefficient, standard error of estimates, etc. need not be reported.

Results and Discussion

The value of the TL/SL ratio ranges from 1.016 to 1.331 with an average of 1.218 (Table 1). The estimates of the parameter b tend to be normally distributed (Fig. 2), as previously shown by Carlander (1969) and Cinco (1982). The mean value of $\bar{b} = 3.112$ is, however, significantly higher than the mean value of 3 reported by these authors (t -test, $df = 39$, $\alpha = 0.01$).



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