

LENGTH-WEIGHT RELATIONSHIP OF ELEVEN FISH SPECIES OF THE AMAZONIAN FLOODPLAIN LAKES

RELACIÓN LONGITUD-PESO EN ONCE ESPECIES DE PECES DE LOS LAGOS DE PLANOS INUNDABLES AMAZÓNICOS

RELAÇÃO COMPRIMENTO-PESO DE ONZE ESPÉCIES DE PEIXES DE LAGOS DE VÁRZEA DA AMAZÔNIA

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Key words:

Condition factor,
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Amazonian.

Abstract

This study estimated the length-weight relationship of eleven Amazonian fish species, which were caught in eight floodplain lakes, in the years 2004, 2005 and 2006. The parameters of the length-weight relationship were estimated by non-linear estimation, employing the Levenberg-Marquardt algorithm. It was found that only one species (*Mylossoma duriventre*) showed isometric growth.

Palabras clave:

Factor de condición,
Crecimiento,
Peces,
Lagos de plano inundable,
Amazonas.

Resumen

Este estudio determinó la relación longitud-peso de once especies de peces de la Amazonia, capturados en lagos de várzea, en los años 2004, 2005 y 2006. Los parámetros de relación longitud-peso fueron obtenidos por estimación no lineal, usando el algoritmo de Levenberg-Marquardt. Fue observado que apenas una especie (*Mylossoma duriventre*) exhibió crecimiento isométrico.

Palavras-chaves:

Fator de condição,
Crescimento,
Peixes
Lagos de várzea,
Amazônia.

Resumo

Este estudo determinou a relação comprimento-peso de onze espécies de peixes da Amazônia, capturados em lagos de várzea, nos anos de 2004, 2005 e 2006. Os parâmetros da relação comprimento-peso foram obtidos por estimação não-linear, usando o algoritmo de Levenberg-Marquardt. Foi observado que apenas uma espécie (*Mylossoma duriventre*) exibiu crescimento isométrico.

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Introduction

The Amazon basin is home to one of the most diverse freshwater fish fauna of the world (REIS *et al.*, 2003). Strongly influenced by the flood pulse, which promotes dramatic and cyclical changes in the environment, the floodplains are the most productive areas in this basin (JUNK *et al.*, 1989) and are important habitats for several species of commercial importance for the Amazonian fisheries (PETRERE JR, 1989; BATISTA e PETRERE JR, 2007).

Besides their importance, there are substantial gaps of biological information for some of these species. Aiming to contribute to fill this gaps and to build a base for fishing management, the objective of this study was to estimate the length-weight relationship and identify growth patterns, isometric or allometric, for 11 fish species of the Amazonian floodplain lakes.

Material and methods

The samples were collected between the years of 2004 and 2006 in eight floodplain lakes along the middle and lower stretches of the Solimões River. Fish were collected with eight monofilament gillnets of different mesh sizes: 30, 40, 50, 60, 70, 80, 90 and 100mm between opposite knots. Nets were size standardized in 20 m long x 2 m deep. In general, collected fish were identified, measured (standard length, cm) and weighed (total body mass, g) immediately after catch. Fish that the identification was dubious were taken to the Laboratory of Fishing Ecology at the Federal University of Amazonas (UFAM) aiming to confirm its identification.

The parameters of the weight-length relationship were determined by non-linear estimation, employing the Levenberg-Marquardt algorithm (MYERS, 1990). All statistical procedures were performed using the software Statistica 9.0 (STATSOFT, 2009).

Results

Were weighed and measured a total of 8,343 individuals of eleven species, belonging to five families (Table 1).

The Table 2 shows the values of *a* and *b*, their confidence intervals and the r^2 , obtained through the weight-length relationship. Only one specie (*Mylossoma duriventre*) presented isometric growth ($b=3$). The remaining species showed values that demonstrates negative allometric growth.

Table 1. Number of individuals belonging to the eleven studied families, indicating the maximum and minimum length (Lmax and Lmin, respectively).

Family	Species	N	Lmax	Lmin
Loricariidae	<i>Pterygoplichthys pardalis</i>	888	9	53
Prochilodontidae	<i>Prochilodus nigricans</i>	334	7.5	43
Curimatidae	<i>Potamorhina altamazonica</i>	928	9.5	24
Curimariidae	<i>Potamorhina latior</i>	562	8	21.5
Curimatidae	<i>Psectrogaster rutiloides</i>	717	3.5	18
Serrasalminidae	<i>Colossoma macropomum</i>	255	10	36
Serrasalminidae	<i>Mylossoma duriventre</i>	254	5.5	22
Serrasalminidae	<i>Serrasalmus spilopleura</i>	557	5	20
Serrasalminidae	<i>Serrasalmus elongatus</i>	252	6	28
Serrasalminidae	<i>Pygocentrus nattereri</i>	3420	5	28
Osteoglossidae	<i>Osteoglossum bicirrhosum</i>	176	10.4	70.5

Table 2. Parameters of the length-weight relationships estimated for 11 Amazonian floodplain fish species, indicating their confidence interval and the R^2 .

Species	A	Lower limit a	Upper limit a	b	Lower limit b	Upper limit b	R ²
<i>Pterygoplichthys pardalis</i>	0.8668	0.6611	1.0726	1.8165	1.7435	1.8895	0.898
<i>Prochilodus nigricans</i>	0.2115	0.1458	0.2773	2.3510	2.2555	2.4466	0.944
<i>Potamorhina altamazonica</i>	0.0312	0.0241	0.0383	2.8984	2.8211	2.9757	0.940
<i>Potamorhina latior</i>	0.0248	0.0186	0.0309	2.8888	2.8010	2.9766	0.952
<i>Psectrogaster rutiloides</i>	0.0729	0.0562	0.0898	2.6037	2.5162	2.6912	0.923
<i>Colossoma macropomum</i>	0.0716	0.0525	0.0908	2.7710	2.6873	2.8547	0.921
<i>Mylossoma duriventre</i>	0.0429	0.0311	0.0549	3.0040	2.9046	3.1034	0.960
<i>Serrasalmus spilopleura</i>	0.0698	0.0534	0.0861	2.8018	2.6982	2.8751	0.930
<i>Serrasalmus elongatus</i>	0.0533	0.0285	0.0781	2.7191	2.5259	2.8572	0.870
<i>Pygocentrus nattereri</i>	0.1100	0.0995	0.1206	2.6800	2.6470	2.7130	0.952
<i>Osteoglossum bicirrhosum</i>	0.0381	0.0126	0.0637	2.5600	2.3923	2.7313	0.937

Discussion

Among the 11 species analyzed, we found that only *Mylossoma duriventre* showed isometric growth. In other words, its weight increases proportionately with the length. The allometric coefficient estimated for the others species showed that they follow a negative allometric growth.

The estimated values of the parameter 'a', condition factor, were higher than estimates obtained by ISAAC E RUFFINO (1995) for *O. bicirrhosum*, *P. nigricans*, *M. duriventre*, *P. nattereri* e *L. pardalis* (now *Pterygoplichthys pardalis*) caught at the lower Amazon stretch. An opposite pattern was observed for *C. macropomum*. By the other hand, the estimates of the condition factor were higher than values obtained by CATARINO *et al.* (2014) for *P. nigricans* caught in a floodplain lake of the lower stretch of the Solimões River.

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