

## Length-weight relationship of *Hoplias aff. malabaricus* (Bloch, 1794) in a subtropical wetland

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*Hoplias aff. malabaricus* (Bloch, 1794) is a predatory fish from the Erythrinidae family, widely distributed, occurring in river basins of South America (Oyakawa and Mattox, 2009). This species has a vital role in ecosystems as top predator besides having an important economic value for fisheries (Chaves et al., 2009). Nevertheless, few studies are conducted on bioecological characteristics such as length-weight, which can provide information on morphometric variation in different populations, determining whether somatic growth is allometric or isometric (e.g. Froese, 2006). Moreover, these relationships are useful for fisheries in order to calculate weight and biomass when only length measurements are available as well as for making comparisons of stocks in different regions (Froese, 2006). Thus, the present study aims to determine the length-weight of specimens of *H. aff. malabaricus* collected in the Lagoa do Peixe National Park and to compare two methods of analysis (model linear and nonlinear).

The sampling of specimens was performed monthly in a wetland area (31°06'S, 50°51' W), between April 2008 and May 2009 in the Lagoa do Peixe National Park (LPNP), with the special authorization provided by SISBIO (N°: 482920/2007-6). We measured the length and weight of 110 specimens for the determination of the length/weight. This ratio was determined by the equation  $W_T = a * L_T^b$ , where  $W_T$  the total weight of fishes (g),  $a$  the coefficient related to body shape,  $L_T$  the total length (mm) and  $b$  exponent that is related to the isometric or allometric growth of fishes. To adjust the model, we used PAST 3.0 statistical software to estimate the parameters  $a$  and  $b$  through a least square regression  $\log(W_T) = \log(A) + B * \log(L_T)$  and Statistica 7.0 to compute a direct non-linear regression, and to perform the Levenberg-Marquard iteration algorithm in order to compare the two methods.

*Hoplias aff. malabaricus* showed an average total length ( $L_T$ ) of 177.3±79.3 mm and average total weight of ( $W_T$ ) 127±162.83 g. The parameters estimated by linear regression were:  $a = -5,175 [-5.291; -5.063]$ ,  $b = 3.104 [3.053; 3.155]$ , with  $W_T = 0.0000668 * L_T^{3.104}$ . The direct

nonlinear regression showed the following results:  $W_T = 0,0000344 * L_T^{3.23}$ . In this study, *H. aff. malabaricus* has a positive allometric growth. We recommend using the nonlinear model whenever is possible, because is often more practical and robust than the linear model, which changes the relationship of the variables. The  $b$  values (higher than three) indicate a nearly positive allometric growth pattern that is the fish have grown more in width or height than in length (Isa et al., 2010). Our findings are in agreement with Barbieri (1989), which found  $b = 3.18$  for this species on a study conducted with 404 specimens in a reservoir on a more tropical environment (Monjolinho Reservoir, São Carlos/SP). On the other hand, Chaves et al. (2009), studying the population structure of *H. aff. malabaricus* ( $n = 67$ ) in northern Brazil, recorded a value of  $b = 2.25$ . Differences among parameters values could be due to several factors, such as difference in the samples sizes, the range sizes of specimens, genetic differences among groups and local environmental conditions (Froese, 2006). The results obtained by Chaves et al. (2009) represent only a particular period of the year, which reflect a limited environmental condition and, thus, may affect the parameter values obtained in the length-weight relationship. The performance of growth observed shows a good conservation status of the species, important for the balance of community of fishes, as well as a better understanding of the relationships within the ecosystem and conservation.

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