



Application of nonlinear mixed models to describe growth patterns and sexual dimorphism in capybaras (*Hydrochoerus hydrochaeris*).

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In this paper a von Bertalanffy functions was fitted to describe long-term changes in body mass of capybaras (*Hydrochoerus hydrochaeris*). A multilevel nonlinear mixed effects model was employed because it allowed for estimation of all growth profiles simultaneously, and different sources of variation (i.e., sex, individuals, and litter effects) were incorporated directly into the parameters. Furthermore, variance in-homogeneity and within-individuals correlation were introduced to the functions. Inclusion of a variance of power function and a continuous autoregressive process of first order rendered a substantially improved fit to data. The sample consisted of 673 weight data obtained from 33 females and 37 males. Significant variance components were recorded for both individuals and litters. Also significant differences were observed in growth patterns between sexes. Males showed asymptotic weights and age at the inflection point significantly higher than females, while the constant growth rate was lower. These differences could be interpreted in terms of mating system of this species since males have chances to mate only when they reach a large enough size to compete with other males. For females, however, the possibility of mating does not depend on aggressive confrontations, so if they reach sexual maturity earlier, they may extend the period when they are sexually active.

Keywords: capybaras; body mass; nlme.