

ADJUSTMENT OF NON-LINEAR MODELS FOR GROWTH IN MORADA NOVA SHEEP BREED

AJUSTE DE MODELOS NÃO LINEARES PARA O CRESCIMENTO EM OVINOS DA RAÇA MORADA NOVA

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Performance evaluation of adapted animals to local conditions for economic traits is essential for the preservation of species and their genetic resources. The size of Morada Nova breed herds have decreased over time, becoming restricted to a few regions. Other races have been used with higher frequency because of their production and adaptation, and are important as a source of food and income for local communities. The objective of this research was to evaluate the application of nonlinear models to describe the growth curve of Morada Nova sheep. Records of 1604 weights of 250 lambs from Nova Odessa municipality, being 934 repeated measurements of female and 670 repeated measurements of male, obtained between 2012-2013 were used. The average birth weight observed was 2.50 ± 0.690 kg. The nonlinear models used to adjust the data were Brody $Y_t = A (1 - be^{-kt})$; Von Bertalanffy $Y_t = A (1 - be^{-kt})^3$; Richards $Y_t = A (1 - be^{-kt})^m$; Logistic $Y_t = A (1 + e^{-kt})^{-m}$ and Gompertz $Y_t = Ae^{-be^{-kt}}$. The models were fitted by Gauss-Newton using the NLIN procedure of SAS (SAS Inst., Inc., Cary, NC). The parameters that make up the functions are Y = body weight at the age t ; A = asymptotic weight that represents the average adulthood weight; K = Maturation rate, an indicator of the speed with which the animal approaches its adult size, maturity of the individual in relation to age is the fraction of mature weight attained by the individual at this age; B = Integration constant which is related to the initial weights of the animals and reflects the degree of maturation at birth ($t = 0$); m = Curve shape definition and thus determines at what proportion of the asymptotic value (A) the inflection point of the curve occurs. Only the model of Richards did not reach convergence. The quality of fit of the models was verified by the predicted mean error (PME - lower, better the fit, indicating a smaller difference between the observed and estimated weights); the predicted mean error of the models was: Bertalanffy -18.997 ± 1.97 , Brody -48.209 ± 2.09 , Gompertz -15.787 ± 1.31 , Logistic 13.623 ± 1.23 . Despite the logistic model have shown the lowest average predicted error, this model underestimated the weight for the entire curve. The use of the Gompertz model can be indicated to adjust the growth curve of the Morada Nova breed animals because model only overestimated the birth weight the birth, which can be explained by the smaller number of data in the first days of animals life of the animals.

Keywords: Gompertz, hair sheep, nonlinear models.

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