

CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

## USE OF THE GOMPERTZ MODEL TO DESCRIBE THE GROWTH OF COBB BROILERS

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The constant evolution and competitiveness in the poultry industry has led to the need for studies that analyze the growth of poultry for meat production, since its biological origin. Nonlinear functions have been used to describe body growth through sequential measures and have been shown to be suitable for describing growth curves of individuals of the most different species. Thus, the objective of this study was verifying the Gompertz nonlinear model to interpret the growth of the Cobb broiler line. The Gompertz model was defined as:  $Y = Ae^{Be^{-kt}}$ , where  $Y$  is the body weight at an age ( $t$ );  $t$  = animal age;  $A$  = mature weight;  $B$  = a constant related to the animal initial weight and  $k$  = growth rate. The parameters of the model were estimated by the Marquardt method using the NLIN statistical procedure of SAS, applying the convergence criteria of  $10^{-8}$ . The experiment was conducted in Pinheirão farm, located at the municipality of Piraí do Sul – PR, using 70 male and female Cobb broilers, daily weighted from 1 to 49 days of age. The facility consisted of a 10 m<sup>2</sup> shed, with gas heating, which was turned-on overnight, aiming to maintain the shed temperature as recommended for each age, according to the Cobb Management Manual. The light program was divided into; 1-day animals: 24 light hours, 2-5 days: 23 light hours, 6-21 days: 16 light hours and finally, from 22-49 days: 18 hours of light. To determine the quality of the broilers growth curve, the results of the mean square error (MSE) and the coefficient of determination ( $R^2$ ) were considered. The animals presented average weight at the first day of life of 47.07 g and 2247.34 g with 49 days of age. The estimation of the parameter  $A$  was 4604.6, indicating a good interpretation of the model for the mature weight of broilers. The estimation of parameters  $B$  and  $k$  were 50.36 and 0.04, respectively. The MSE was 24045.5 and the  $R^2$  was 0.9832. Therefore, it can be considered that the Gompertz model showed a good fit to the Cobb broiler performance, since it resulted in low value of MSE and a high value of  $R^2$ , performing an important mathematical interpretation of the growth of Cobb broilers raised in Brazil.

**Keywords:** body weight, growth, nonlinear functions, parameters, poultry

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