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## ANALYSIS OF PIG GROWTH FROM BIRTH TO SIXTY-ONE DAYS OF AGE

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Alternative versions of common nonlinear growth functions were evaluated on 433 pigs (220 gilts and 213 barrows) from birth to 61 d of age. The objective was to identify the function which best fit the BW data and reproduce the nonlinear relationships amongst the serial BWs. Two approaches were compared. The data were fitted to (1) mixed model random effects nonlinear models (SAS NLMIXED); and (2) each pig's individual data were fit to each function. Pigs were weighed at birth, weaning (19 d of age; SD = 2.4 d), 19 d postweaning, and 42 d postweaning. The model with the best fit was:  $BW = \exp [(b_{0\_} + b_{1\_} (Age + 35) + b_{2\_} (Age + 35)^2)]$ , which was fit each individual pig's BW data. Although the function resulted in the smallest residual standard derivation (RSD) (0.336 kg), it did not predict birth weight ( $R = 0.65$ ) as precisely as it predicted weaning BW and later BW ( $R = 0.96$  to  $0.99$ ). In addition, the RSD was different at the four weigh dates and ranged from 0.04 to 0.45 kg. Birth BW had a linear-quadratic

relationship with subsequent BW. Increasing birth BW of pigs with lighter birth BW had a much greater impact on increasing subsequent BW than increasing birth BW of the heaviest pigs. In addition, BW taken at 19 and 42 d postweaning had linear-quadratic relationships with weaning BW. The linear-quadratic relationships between the actual BW were predicted by fitting the exponential function to each pig's BW data. The relationships amongst the  $b_0$ ,  $b_1$ , and  $b_2$  values of the pigs were nonlinear and complex making stochastic modeling of BW from birth to 61 d of age difficult. Pigs with the lowest birth BW, 20<sup>th</sup> percentile or lower, had lower ADG, both at the same age and BW than pigs with greater birth BW. The results indicate that increasing the BW of the lightest birth BW pigs could increase the mean and decrease the variance in BW at subsequent ages.

Key Words: Pigs, birth weight, growth, models