

between DFI and birth BW. Feed conversion (feed:gain) had linear and linear-quadratic relationships ( $P < 0.05$ ) to birth BW. Pigs with birth BW less than 1.1 kg had greater feed:gain, greater days to achieve 125 kg than pigs with birth BW greater than 1.1 kg.

**Key Words:** pig, growth, birth weight

**72 Evaluation of the impact of pig birth weight on grow-finish performance, backfat depth and loin depth.** A. Schinckel<sup>\*1</sup>, M. Einstein<sup>1</sup>, S. Jungst<sup>2</sup>, C. Booher<sup>2</sup>, and S. Newman<sup>2</sup>, <sup>1</sup>Purdue University, West Lafayette, IN, <sup>2</sup>PIC North American, Hendersonville, TN.

A trial was conducted to evaluate the impact of birth BW on the growth of backfat, loin depth and predicted carcass lean percentage. Pigs (1932 barrows and gilts, three sire lines, two dam lines, two replicates) were weighed and ultrasonically measured at approximate 28 d intervals from 74 to 158 d of age and at market BW. An exponential equation  $Y = \exp(b_0 + b_1 BW + b_2 BW^2) + a_i (\exp(b_0 + b_1 BW + b_2 BW^2))^D$  with a pig specific random effect ( $a_i$ ) was used to fit the ultrasonic data to BW. Pigs were assigned to a 113, 127, or 141 kg final BW. Fat depth and loin depth were measured with an optical probe (Fat-O-Meater, SFK Technology) between the third and fourth ribs anterior to the last rib. The relationships of the measurements and predicted percent lean to birth BW were evaluated via regression analysis. There were no significant ( $P > 0.35$ ) linear relationships between ultrasonic backfat depth and birth BW for gilts. The ultrasonic backfat depths of barrows had significant linear-quadratic ( $P < 0.10$ ) relationships with birth BW. However, birth BW only accounted for 0.2 to 0.8% of the total variance in ultrasonic backfat depth at each BW. Ultrasonic loin depths at 46.7, 64.6, 83.5, and 102.5 kg BW had ( $P < 0.05$ ) linear-quadratic-cubic relationships with birth BW. Final ultrasonic and carcass optical probe fat depths had significant ( $P < 0.10$ ) linear ( $P < 0.04$ ) or linear-quadratic ( $P < 0.10$ ) relationships with birth BW. Pigs with less than average mean birth BW had greater final backfat depths than pigs with average or greater than average birth BW. Yet, only approximately 2 to 4% of the total variance in backfat depth (adjusted for BW) was accounted for by birth BW.

**Key Words:** pig, growth, birth weight

**73 Evaluation of different mixed model nonlinear functions to describe the feed intakes of pigs of different sire and dam lines.** A. Schinckel<sup>\*1</sup>, M. Einstein<sup>1</sup>, S. Jungst<sup>2</sup>, C. Booher<sup>2</sup>, and S. Newman<sup>2</sup>, <sup>1</sup>Purdue University, West Lafayette, IN, <sup>2</sup>PIC North American, Hendersonville, TN.

Daily individual feed intakes (DFI) of 1,932 barrows and gilts from three sire and two dam lines were collected over two replicates to evaluate different functions used to parameterize DFI. Five functions relating DFI to age or BW were evaluated: linear-quadratic, exponential, generalized Michaelis-Menten (GMM), a nonlinear function  $C(1 - \exp(-Mt))$  and Bridges function  $C(1 - \exp(-\exp(Mt^A)))$  where  $t$  is age or BW. Based on AIC and RSD values, the Bridges function provided the best fit to DFI data. Two pig-specific random effects were included; one for mature DFI ( $C$ ) and one for  $M$ . Analyses were completed in which a random effect for  $A$  was predicted as a linear function of the random effect of  $C$ . The barrow and gilt data were fitted separately as their values for  $A$  were different ( $P < 0.05$ ). For DFI, there were overall significant effects ( $P < 0.05$ ) for replicate, sex and sire line by dam line interaction. Repeated measures analyses indicated significant ( $P < 0.001$ ) interactions of sire line, sex and replicate with age and BW indicating that the shapes of the DFI curves were different for the pigs of different sire lines, sexes and replicates. The research indicates that

separate DFI curves are needed for each sire line and sex and season. Daily feed:gain (F:G) values were estimated for each pig using a GMM function previously fitted to the BW data. The analyses of F:G indicated significant ( $P < 0.05$ ) effects for sire line, dam line, sex, sire line by sex and sire line by replicate.

**Key Words:** feed intakes, pigs, nonlinear function

**74 Number of functional underline sections affects weaned piglet body weight and quality.** C. L. Yoder<sup>\*1</sup>, J. S. Fix<sup>1</sup>, J. W. Holl<sup>2</sup>, W. O. Herring<sup>2</sup>, J. M. Bender<sup>2</sup>, and M. T. See<sup>1</sup>, <sup>1</sup>North Carolina State University, Raleigh, <sup>2</sup>Smithfield Premium Genetics Group, Rose Hill, NC.

At farrowing and weaning, commercial Large White  $\times$  Landrace sow ( $n = 376$ ) underline sections were evaluated for mammary gland and teat functionality to determine the effect on preweaning piglet performance. Underline sections were classified as functional if mammary glands filled the palm of the hand and teats had no visual injury or defect. Underlines were evaluated within 24 h of farrowing (FFU) and 3 d prior to weaning (WFU). Loss of functional underline sections (LFU) from farrowing to weaning was calculated for each sow. Pigs were cross fostered (CF) (12%) within 24 h of farrowing. Two d prior to weaning ( $18.7 \pm 0.03$  d of age), pigs ( $n = 3950$ ) were weighed and assigned a visual quality score (QS) (3 = healthy pig; 2 = slightly small (3.2-4.1 kg BW) and/or slightly unthrifty; 1 small ( $< 3.2$  kg BW) and/or unthrifty). Model for FFU, WFU and LFU included, fixed effect of farrowing date ( $n = 29$  d) and covariate of parity ( $2.98 \pm 0.10$ ). WFU model included covariate of lactation length (LL). LFU model included fixed effect for wean wk ( $n = 4$ ). Models to evaluate effects of WFU and LFU on individual piglet weaning weight (IWW) included, fixed effects of sex, CF status and farrow date; covariates of parity, total pigs weaned, linear and quadratic effects of birth weight and LL; interactions of CF  $\times$  LL and birth weight  $\times$  LL. Descriptive statistics (min, max, mean): FFU (8, 17, 12.7), WFU (3, 15, 9.0) and LFU (0, 9, 3.8). Parity was inversely related to FFU ( $P < 0.10$ ) and WFU ( $P < 0.05$ ). Regression estimates of parity on FFU and parity on WFU were  $-0.07 \pm 0.041$  and  $-0.39 \pm 0.05$ , respectively. Every 1 d increase in LL resulted in an estimated decrease of  $0.28 \pm 0.13$  WFU. Direct relationships between WFU and IWW and between WFU and QS were identified ( $P < 0.01$ ). IWW increased  $49.3 \pm 9.55$  g per WFU increase. As WFU increased the odds of pigs being lower QS decreased (odds ratio: 0.869;  $P < 0.01$ ). One unit increase ( $P < 0.01$ ) in LFU of nurse sows resulted in piglets being an estimated  $53.48 \pm 8.5$  g lighter at weaning. Older parity sows had fewer FFU and WFU. Longer LL resulted in fewer WFU. Fewer WFU and greater LFU resulted in lighter pigs at weaning.

**Key Words:** functional teats, piglet growth, pigs

**75 Economic impact of removing pigs prior to marketing on remaining pig growth performance.** J. Y. Jacela<sup>\*</sup>, S. S. Dritz, M. D. Tokach, J. M. DeRouchey, R. D. Goodband, and J. L. Nelssen, Kansas State University, Manhattan.

A total of 1,126 pigs (BW = 109 kg; 25 pigs/pen) were used in a 15-d study to evaluate the economic impact of removing the heaviest pigs (topping) prior to marketing the whole finishing group and determine its effect on growth performance of the remaining pigs. Pens were blocked by average BW within sex and randomly assigned to 1 of 3 treatments with 15 pens/ treatment. Treatments were topping 0, 2, or 4 pigs per pen. After topping, pens were weighed again (d 0) to determine average pig weight. Pens were  $3.05 \times 5.48$  m and floor space/pig were 0.67, 0.73, and 0.80 m<sup>2</sup> for pens with 0, 2, and 4 pigs topped/pen, respectively. Pen