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Effect of Parity and Stage of Gestation on Growth and Feed Efficiency of Gestating Sows

L. L. Thomas
Kansas State University, lorithomas@k-state.edu

R. D. Goodband
Department of Animal Science and Industry, Kansas State University, goodband@ksu.edu

M. D. Tokach
Department of Animal Science and Industry, Kansas State University, mtokach@ksu.edu

See next page for additional authors

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Cover Page Footnote

Appreciation is expressed to Thomas Livestock Company (Broken Bow, NE) for providing the animals and research facilities and to Tim Friedel, Steve Horton, and Jose Hernandez for technical assistance. Appreciation is expressed to New Standard US, Inc. (Sioux Falls, SD) for providing the scale system and to Tim Kurbis for technical assistance.

Authors

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Effect of Parity and Stage of Gestation on Growth and Feed Efficiency of Gestating Sows[1,2]

L.L. Thomas, R.D. Goodband, M.D. Tokach, J.C. Woodworth, J.M. DeRouchey, and S.S. Dritz[3]

Summary

The effects of parity and stage of gestation on female growth criteria and reproductive performance were evaluated at a commercial sow farm. A total of 712 females (Camborough, PIC, Hendersonville, TN) were group-housed and individually fed with electronic sow feeders. Gilts (parity 1) and sows were offered 4.4 and 5.0 lb of feed per day (4.7 and 5.3 Mcal NE per d), respectively. Females were moved from the breeding stall to pens on d 5 of gestation. A scale was located in the alleyway to weigh sows as they left individual feeding stations. Feed intake and BW were recorded daily throughout gestation, generating values for ADFI, ADG, and G:F for each sow. Data were divided into 3 parity groups: 1, 2, and 3+, and gestation was divided into 3 periods: d 5 to 39, 40 to 74, and 75 to 109.

From d 5 to 39, ADFI was decreased ($P < 0.05$) for parity 3+ sows compared to the other periods of gestation. Parity 2 sows, although provided the same feed allowance, had greater ($P < 0.05$) ADFI during the first period of gestation than parity 3+ sows. Parity 1 and 2 sow ADG increased ($P < 0.05$) from d 39 to 74 of gestation, then decreased ($P < 0.05$) from d 74 to 109 of gestation. Parity 3+ sow ADG increased ($P < 0.05$) in each subsequent period of gestation. Parity 1 sows had the greatest ($P < 0.05$) ADG in comparison to parity 2 and 3+ sows in each period of gestation. Regardless of parity group, G:F was poorest ($P < 0.05$) from d 5 to 39 of gestation compared with sequential periods of gestation. Parity 1 sow G:F was greater ($P < 0.05$) than parity 2 and 3+ sows for all periods of gestation. Backfat gain indicated that parity 1 sows maintained backfat (approximately 0.7 in.) while parity 2 and 3+ sows gained ($P < 0.05$) approximately 0.04 in. backfat throughout gestation. Total born was greatest ($P < 0.05$) for parity 3+ sows with parity 1 sows marginally greater ($P < 0.10$) than parity 2 sows. Although there was evidence ($P < 0.001$) for positive correlations between BW gain and total born in parities 1 ($r = 0.23$; $P = < 0.001$), 2 ($r = 0.15$; $P = 0.035$),

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[3] Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine, Kansas State University.

and 3+ (r = 0.29; $P < 0.001$), these correlations were considered weak. Overall, this study indicates that parity 1 sows have the best feed efficiency in gestation and lack strong correlations between feed intake or growth and reproductive performance.

Introduction

Our knowledge regarding the dietary energy requirements of the gestating sow currently enables us to manage feed supply during gestation on the basis of three main criteria: the sow's body condition, parity (gilts versus sows), and stage of gestation.[4,5] The impact of these factors on gestating sow nutrient requirements has been heavily researched through the years; however, research is limited in commercial production systems, specifically pertaining to the growth and feed efficiency of prolific (> 14.5 pigs born alive) gestating sows.

Therefore, the objectives of this study were to document feed intake patterns in group-housed gestating sows fed via electronic sow feeders (ESF) from a commercial sow farm, and determine the effect of parity and stage of gestation on growth and feed efficiency. In addition, backfat gain and reproductive performance measurements were obtained to determine if potential correlations existed between feed intake, growth, and reproductive performance.

Methods

The Kansas State University Institutional Animal Care and Use Committee approved the protocol used in this experiment. The experiment was conducted at a commercial sow farm in central Nebraska. Females were individually housed in stalls (gilts: 1.8 × 6.9 ft and sows: 2.0 × 7.5) from d 0 to 5 of gestation, then were group-housed from d 5 to 112 of gestation. Pens for sows provided 22.0 ft^2 per sow and those for gilts provided 20.0 ft^2 per gilt. Each pen was equipped with 6 electronic feeding stations (Nedap Velos, Gronelo, Netherlands) allowing for up to 45 females per station and 28 nipple waterers to provide ad libitum access to water. Females were group-housed in dynamic groups (260 females per pen), meaning serviced sows were entering the group (approximately d 5 of gestation) as the sows due to farrow were exiting (approximately d 112 of gestation). This occurred over a 3 to 4-wk period, thereafter, the pen remained static (no movement of newly bred sows into the pen) until the sows reached d 112 of gestation and the process repeated. Each pen was equipped with a scale (7.0 ft long × 1.7 ft wide, New Standard US Inc., Sioux Falls, SD) located in the alleyway following the feeding stations and prior to returning to the pen, for individual sow weight collection every time the sow exited the feeding station.

From d 5 to 112 of gestation, females were fed a diet (Table 1) containing 0.63% standardized ileal digestible (SID) Lys according to parity and body condition (gilts and sows were offered 4.4 and 5.0 lb/d, respectively), following standard practice at this commercial farm. This would have provided daily NE intakes of 4.7 and 5.3 Mcal assuming the sow consumed all her daily feed allowance. A total of 861 females (Camborough, PIC, Hendersonville, TN; 296 gilts and 565 sows) were enrolled in the study on

[4] Kim, S. W., A. C. Weaver, Y. B. Shen, and Y. Zhao. 2013. Improving efficiency of sow productivity: nutrition and health. J Anim Sci Biotechnol. 4:26. doi: 10.1186/2049-1891-4-26.

[5] Quiniou, N. 2014. Feeding the high potential sow: implementation of some key concepts. IFIP Institut du Porc. Le Rheu cedex, France. 1:57-68.

d 5 of gestation. At d 112 of gestation, at 14:00, females were moved to the farrowing house and provided ad libitum access to a lactation diet containing 1.2% SID Lys. Both gestation and lactation diets were corn-soybean meal-based and presented in meal form.

Thomas et al.,[6] report the procedures for feed intake and BW data collection and management of this study. Feed intake data were manually extracted daily through Nedap Velos software at approximately 13:00 to ensure all females had eaten their daily allocation before system reset at 14:00. The Nedap Velos system reported 1 total intake value per day of gestation and it is assumed that the feed which was dispensed was consumed by the sow before leaving the feeding station. Sows had to walk across a scale as they moved from the feeding station back into the pen and as a result, sow BW was automatically recorded. Sows were also manually weighed at least twice during the course of the study. These weights were collected on all females near the beginning and end of gestation. These weights were then used to eliminate outlier weights in the data set based on the ADG generated from the two weights and predicted body weights based on the initial known weight and day of gestation.

The study was conducted over a 149-d period, from late May to mid-October. A total of 861 females were used in the study, of which 712 completed. Daily intake and weight values were recorded for each sow from d 5 to 112 of gestation. As a result, ADFI, BW, ADG and G:F were generated daily for each sow. These data were then divided into 3 parity groups (1, 2, and 3+) and gestation was divided into three 5-wk intervals (d 5 to 39, 40 to 74, and 75 to 109). Days 110, 111, and 112 of gestation were not included in the analysis due to the great variability of when sows were loaded into the farrowing house. When determining ADFI, BW, and ADG for each period, the average per period is reported and the median is reported for G:F. The collection of daily BW values generated small values for ADG resulting in extreme G:F values. Therefore, the median was more fit to report G:F.

Total gestation feed intake was determined by calculating the sum of all intake values for each individual sow. Body weight gain for each sow was determined by calculating the difference between initial and final BW. Body weight includes the weight of the conceptus. The number of ESF feeding visits was defined as any visits that were greater than 5 minutes apart.

Backfat depth was measured at entry into pen gestation and on entering the farrowing house (approximately d 5 and 112 of gestation). Backfat depth was measured at the P2 position (last rib, 7 cm from the center line of the back) using a Lean-Meater (RENCO, Minneapolis, MN). Backfat gain during gestation was estimated by calculating the difference between values taken at d 5 and d 112 of gestation.

Reproductive performance criteria of sows were recorded using the PigCHAMP Knowledge Software (Ames, IA) and were extracted at the end of the trial. The following reproductive traits were collected in parity 1 to 5 sows: the total number of pigs

[6] Thomas, L. L.; Dritz, S. S.; Tokach, M. D.; Goodband, R. D.; DeRouchey, J. M.; and Woodworth, J. C. (2016) "Lessons Learned from Managing Electronic Sow Feeders and Sow Body Weight Data," *Kansas Agricultural Experiment Station Research Reports*: Vol. 2: Iss. 8. https://doi.org/10.4148/2378-5977.1284

born, total number of pigs born alive, number of stillborn pigs, number of mummified fetuses, number of weaned pigs, and gestation length.

Diet samples were taken from each electronic feeding station every week during feeder calibration. Weekly samples of corn, soybean meal, and dried distillers grains with solubles for gestation feed were obtained from the feed mill prior to mixing. Samples were submitted (Ward Laboratories, Inc., Kearney, NE) for analysis of DM, CP, crude fiber, ash, ether extract, Ca, and P.

Prior to data analysis, descriptive statistics in the form of means were generated using the PROC MEANS statements in SAS (Version 9.4, SAS Institute Inc., Cary, NC). Correlations between selected variables were performed using the PROC CORR statement in SAS. Extreme observations were found for female ADG, using descriptive statistics, generated from the variability between daily BW collection. Observations were deemed as outliers based on a calculated critical t-score using a Bonferroni adjustment (0.05/number of observations). This indicated that observations ± 4.97 standard deviations from the mean were considered outliers and were removed from the data set.

Female ADFI, BW, ADG, and G:F were analyzed using generalized linear mixed models whereby the linear predictor included parity group, period of gestation and all interactions as fixed effects, as well as the random effects of period nested within individual sow. As specified, models recognized the individual female as the experimental unit for this study. Female ADFI, BW, ADG, and G:F were fitted assuming a normal distribution of the response variable. Backfat and reproductive performance were analyzed similarly whereby the linear predictor included parity group as the fixed effect and individual sow as the random effect. The final models used for inference were fitted using restricted maximum likelihood estimation. Degrees of freedom were estimated using the Kenward-Rogers approach.

Estimated means and corresponding standard errors (SEM) are reported for all cell means. Pairwise comparisons were conducted on such means using either Tukey or Bonferroni adjustment to prevent inflation of Type I error due to multiple comparisons. Statistical models were fitted using the GLIMMIX procedure of SAS. Results were considered significant at $P \leq 0.05$ and marginally significant at $0.05 > P \leq 0.10$.

Results and Discussion

Chemical analysis of DM, CP, crude fiber, ether extract, Ca, P, and ash for each of the major feed ingredients and for the complete feed are presented in Table 2. Descriptive statistics for selected data are presented in Table 3. Average initial backfat depth was 0.63 in. ± 0.145 (mean ± SE) with a range of 0.31 to 1.02 in. Average final backfat depth was 0.65 mm ± 0.125 with a range of 0.28 to 1.10 mm. Average BW gain was 125.3 lb ± 31.63. The average total born was 14.9 ± 3.13 and ranged from 1 to 25. In comparison, the average total born reported for 2015 in the industry productivity analysis[7] was 13.5 ± 1.0 and the average total born reported for farms in the top 25% was 13.9 ± 0.8. The average number of pigs weaned was 13.3 ± 2.19 with a range of 0 to 17. The average number of pigs weaned reported for 2015 in the industry productivity

[7] Stalder, K. J. 2015. Pork industry productivity analysis. National Pork Board, Des Moines, IA.

analysis was 10.0 ± 1.2 and the average number of pigs weaned for farms in the top 25% was 11.0 ± 0.7.

From d 5 to 39 of gestation, ADFI was decreased ($P < 0.05$) for parity 3+ sows compared to the other periods of gestation (Table 4). There was no evidence for differences ($P > 0.05$) in ADFI following d 39 of gestation for parity 3+ sows. There was no evidence for differences ($P > 0.05$) in ADFI for parity 1 or 2 sows from d 5 to 109 of gestation; however, numerically, ADFI was decreased from d 5 to 39 of gestation compared with later gestation. Parity 2 sows, although provided the same feed allowance, had greater ADFI during the first period ($P < 0.05$) than parity 3+ sows. It is unknown why parity 2 sows consumed more feed in comparison to parity 3+ sows. Regardless of period, ADFI for parity 1 sows was lower ($P < 0.05$) compared to parity 2 and 3+ sows, which is attributed to the assigned feeding strategies. On average, females visited the feeding stations 3 times per day.

Regardless of parity, BW increased ($P < 0.05$) during each period of gestation (Table 4). Parity 3+ sows had the greatest BW ($P < 0.05$) compared to parity 1 or 2 sows, regardless of period. By the final period of gestation, parity 1 sows were 8 lb heavier ($P < 0.05$) than parity 2 sows.

For parity 1 and 2, sow ADG increased ($P < 0.05$) from d 39 to 74 of gestation then decreased ($P < 0.05$) from d 74 to 109 of gestation (Table 4). Parity 3+ sow ADG increased ($P < 0.05$) during each period of gestation. Parity 1 and 3+ sow G:F increased ($P < 0.05$) following d 39 of gestation with no evidence for differences ($P > 0.05$) following d 74 of gestation. Parity 2 sow G:F increased ($P < 0.05$) from d 39 to 74 of gestation and decreased ($P < 0.05$) from d 74 to 109 of gestation. Fetus development is slow during the first third of pregnancy, and about 2/3 of fetal growth or energy deposition in the uterus occurs during the last 1/3 of pregnancy.[8] Therefore, we would expect to see an increase in ADG and improvement in G:F attributed to the increase in fetal growth in the later stages of gestation as the metabolic focus of the sow shifts from the recovery of sow body tissue following weaning to the synthesis of fetal tissue in late gestation. Parity 1 or 2 sows do not appear to show this increase in ADG or G:F. Parity 3+ sows show an increase in ADG but no changes in G:F following d 39 of gestation.

Parity 1 sow ADG and G:F was greater ($P < 0.05$) than parity 2 and 3+ in all periods of gestation (Table 4). Parity 2 sow ADG was greater ($P < 0.05$) than parity 3+ from d 5 to 39 of gestation; however, parity 3+ sow ADG was greater ($P < 0.05$) from d 75 to 109. Parity 3+ sow G:F was greater ($P < 0.05$) than parity 2 sow from d 75 to 109 of gestation. The differences in ADG and G:F among parities may be attributed to the differences in the composition (lean and fat) of gain. Dourmad et al.[9] suggested that for a given energy supply, higher protein retention is generally measured in parity 1

[8] Dourmad, J. Y., M. Etienne, A. Valancogne, S. Dubois, J. van Milgen, and J. Noblet. 2008. InraPorc: A model and decision support tool for the nutrition of sows. Anim. Feed Sci. Technol. 143:372-386. doi:10.1016/j.anifeedsci.2007.05.019.

[9] Dourmad, J.Y., J. Noblet, M.C. Pere, and M. Etienne. 1999. Mating, pregnancy and prenatal growth. In: I. Kyriazakis, editor, Quantitative biology of the pig. CABI Publishing, Wallingford, UK. p. 129-152.

sows than in older sows. This is partly explained by parity 1 sows having a lower energy requirement for maintenance because of their body weight.

Initial backfat depth was greatest ($P < 0.05$) for parity 1 sows, followed by parity 3+ and 2 sows (Table 5). There was no evidence for a difference in final backfat depth between parity 2 and 3+ sows; however, backfat depth of parity 1 sows were nearly 0.10 in. greater ($P < 0.05$). Backfat gain indicates that parity 1 sows maintained backfat while parity 2 and 3+ sows gained ($P < 0.05$) backfat. Based on these observations we estimate parity 1 sows lose 0.15 in. of backfat during lactation. During the following gestation, the sows (now parity 2) gain 0.05 in. of backfat during gestation. During the next lactation period, the sows maintain backfat into the following gestation period (now parity 3 sow).

Total born was greatest ($P <0.05$) for parity 3+ sows, with parity 1 sows marginally greater ($P < 0.10$) than parity 2 sows (Table 5). Number of pigs born alive was greatest ($P < 0.05$) for parity 3+ sows compared to the other parity groups, but there was no evidence for differences between parity 1 and 2 sows. There was no evidence for differences in stillborn pigs among the parity groups. The number of mummified fetuses were greater ($P < 0.10$) in parity 1 sows in comparison to parity 2 and 3+ sows. There was no evidence for differences in the number of pigs weaned among the parity groups.

There was evidence for a negative correlation (r = -0.15; $P = 0.020$) between total feed intake and stillbirths in parity 1 sows (Table 6) and backfat gain was positively correlated (r = 0.14; $P = 0.026$) to the number of mummified fetuses. There was evidence for a negative correlation (r = -0.17; $P = 0.018$) between backfat gain and stillborn pigs in parity 2 sows. In parity 3+ sows, there was evidence for a negative correlation between backfat gain and total number of pigs born (r = -0.26; $P < 0.001$) indicating as females gained more backfat, total number of pigs born decreased. There was a positive correlation (r = 0.13; $P = 0.037$) between BW gain and the number of mummified fetuses in parity 3+ sows. There was evidence for a positive correlation in parity 1 (r = 0.23; $P < 0.001$), 2 (r = 0.15; $P = 0.035$), and 3+ (r = 0.29; $P < 0.001$) sows between BW gain and total born. This is expected, as total number of pigs born increases, the weight associated with products of conceptus increases, leading to increased BW gain. It is important to note that although these correlations are significant, they are considered weak indicating that other factors may have a larger influence. Nonetheless, this does support that body BW and backfat gain do influence subsequent litter size.

When comparing total intake consumed throughout the course of gestation to backfat gain and BW gain, we observed a large range in backfat gain and BW gain among females fed the same amount of feed. We expect that as females consume more feed, backfat and BW will increase. There was evidence for a positive correlation (r = 0.24; $P < 0.001$) between backfat gain and total intake in parity 3+ sows. There was also evidence for a positive correlation between BW gain and total intake in parity 1 (r = 0.37; $P < 0.001$) and parity 3+ (r = 0.15; $P = 0.015$) sows. Again, these correlations are significant but weak.

From the existing data, it is apparent that ADFI, ADG, and G:F differ based on parity and period of gestation. The significant correlations observed between feed intake, BW

gain, and backfat depth with litter size are considered weak but indicate an influence of these factors on litter size. Overall, this study improves our knowledge on feeding the pregnant sow and how to properly meet her nutrient requirements in gestation based on differences in parity and period of gestation.

Table 1. Diet composition (as fed basis)[1]

Ingredient	%
Corn	54.75
Soybean meal	11.85
DDGS, 8.5% oil[2]	30.00
Monocalcium phosphate	0.65
Limestone	1.65
Salt	0.50
Liquid Lys, 50%	0.15
Choline chloride, 60%	0.11
Vitamin and trace mineral premix	0.38
Total	100
Calculated analysis	
Standardized ileal digestible (SID) AA, %	
Lys	0.63
Ile:Lys	93
Leu:Lys	258
Met:Lys	46
Met and Cys:Lys	88
Thr:Lys	82
Trp:Lys	23
Val:Lys	112
ME, kcal/lb	1,463
NE, kcal/lb	1,062
CP, %	18.5
Ca, %	0.83
P, %	0.59
Available P, %	0.47
Standardized Total Tract Dig. (STTD) P, %	0.47
Ca:P	1.42

[1] Diet was fed from d 5 to 112 of gestation.

[2] Distillers dried grains with solubles.

Table 2. Chemical analysis of major feed ingredients and complete feed (as-fed-basis)[1]

	Corn	SBM	DDGS	Complete feed
Proximate analysis, %				
DM	87.93	89.40	90.53	89.33
CP	7.60	47.58	28.76	19.36
Crude fiber	1.88	3.27	8.24	3.81
Ca	0.03	0.45	0.03	0.90
P	0.27	0.68	0.87	0.63
Ether extract	3.28	0.91	8.59	4.35
Ash	1.21	6.31	5.42	5.18

[1] Diet samples (21 total samples) were taken from each electronic feeding station weekly and ingredients samples (16 total samples) were obtained from the feedmill as ingredients were added to the mixer.

Table 3. Descriptive statistics for data included in the study[1]

Item	Mean	SD	Minimum	Maximum
Initial backfat, in.	0.63	0.145	0.31	1.02
Final backfat, in.	0.65	0.125	0.28	1.10
Backfat gain,[2] in.	0.02	0.129	-0.35	0.43
Total intake,[3] lb	503.9	38.8	400	683
Initial BW, lb	363.7	50.68	236	516
Final BW, lb	489.0	46.31	360	649
BW gain,[4] lb	125.3	31.63	18	256
Parity	2.3	1.31	1	5
Total born	14.9	3.13	1	25
Born alive	14.2	3.06	1	23
Stillbirths	0.37	0.68	0	9
Mummies	0.30	0.59	0	4
Pigs weaned	13.3	2.19	0	17
Gestation length, d	115.3	0.99	112	117

[1] Values from a total of 712 females (Camborough, PIC, Hendersonville, TN) were used.
[2] Backfat gain = final backfat – initial backfat.
[3] Total intake = sum of daily intake values throughout the course of gestation for each individual sow.
[4] BW gain = final BW – initial BW.

Table 4. Growth and feed efficiency of gestating sows housed under commercial conditions as influenced by parity and gestation period[1,2]

	Day of gestation			
	5 to 39	40 to 74	75 to 109	Probability, *P* <
ADFI,[3] lb				
Parity 1	4.29[x] ± 0.012	4.32[x] ± 0.012	4.33[x] ± 0.012	<0.001
Parity 2	4.94[z] ± 0.014	4.97[y] ± 0.014	4.96[y] ± 0.014	<0.001
Parity 3+	4.88[ay] ± 0.012	5.01[by] ± 0.012	5.00[by] ± 0.012	<0.001
BW,[4] lb				
Parity 1	342.2[ax] ± 2.09	391.8[bx] ± 2.09	446.3[cx] ± 2.09	<0.001
Parity 2	365.9[ay] ± 2.40	399.8[by] ± 2.40	438.1[cy] ± 2.40	<0.001
Parity 3+	419.9[az] ± 1.98	452.9[bz] ± 1.98	492.9[cz] ± 1.98	<0.001
ADG,[5] lb				
Parity 1	1.17[ay] ± 0.024	1.66[bx] ± 0.024	1.42[cx] ± 0.024	<0.001
Parity 2	0.86[ax] ± 0.028	1.23[by] ± 0.028	0.89[ay] ± 0.028	<0.001
Parity 3+	0.65[az] ± 0.023	1.17[by] ± 0.023	1.35[cx] ± 0.023	<0.001
G:F[6]				
Parity 1	0.29[ay] ± 0.005	0.33[bz] ± 0.005	0.34[by] ±0.005	<0.001
Parity 2	0.19[ax] ± 0.006	0.22[bx] ± 0.006	0.20[ax] ± 0.006	<0.001
Parity 3+	0.20[ax] ± 0.005	0.22[bx] ± 0.005	0.22[bz] ± 0.005	<0.001

[1] A total of 712 females (PIC 1050) were used in a 108-d trial with 249, 188, and 275 females in parity groups 1, 2, and 3+.

[2] Values within response criteria with different superscripts within a row[abc] or column[xyz] differ, $P < 0.05$.

[3] Average daily feed intake is reported as the mean for each period.

[4] Female BW is reported as the mean for each period and includes the weight of the sow and products of conceptus.

[5] Female ADG is reported as the mean for each period.

[6] G:F is reported as the median for each period.

Table 5. Influence of parity group on backfat depth, weight, and reproductive performance[1,2]

	Parity group			
	1	2	3+	Probability, $P <$
Sow backfat, in.				
Initial	0.72[a] ± 0.008	0.56[c] ± 0.010	0.60[b] ± 0.008	<0.001
Final	0.71[a] ± 0.008	0.61[b] ± 0.009	0.62[b] ± 0.007	<0.001
Gain	-0.001[b] ± 0.0082	0.056[ax] ± 0.0094	0.021[aby] ± 0.0078	<0.001
Sow weight, lb				
Initial	322.7[c] ± 2.17	352.4[b] ± 2.49	408.6[a] ± 2.06	<0.001
Final	474.0[b] ± 2.41	461.1[c] ± 2.78	521.8[a] ± 2.30	<0.001
Weight gain	151.3[a] ± 1.60	108.8[b] ± 1.84	113.2[b] ± 1.52	<0.001
Total born	14.8[bx] ± 0.196	14.2[by] ± 0.226	15.5[a] ± 0.187	<0.001
Born alive	14.0[b] ± 0.192	13.6[b] ± 0.220	14.9[a] ± 0.182	<0.001
Stillbirths	0.4 ± 0.044	0.3 ± 0.051	0.4 ± 0.042	0.451
Mummies	0.4[y] ± 0.037	0.3[x] ± 0.042	0.3[x] ± 0.035	0.047
Pigs weaned	13.4 ± 0.139	13.4 ± 0.160	13.2 ± 0.132	0.582

[1] A total of 712 females (PIC 1050) were used in a 108-d trial with 249, 188, and 275 females in parity groups 1, 2, and 3+, respectively.

[2] Values with different superscripts within a row[abc] $P < 0.05$ and values with different superscripts within a row[xyz] $P < 0.10$.

Table 6. Association between reproductive performance and total feed intake, backfat gain and BW gain, grouped by parity[1]

Parity 1		Total born	Born alive	Stillbirths	Mummies	Pigs weaned
Total intake,[2] lb	R	0.01	0.04	-0.15	0.02	0.11
	Probability, *P* <	0.815	0.484	0.020	0.808	0.081
Backfat gain,[3] in.	R	-0.03	-0.07	0.02	0.14	0.01
	Probability, *P* <	0.640	0.291	0.709	0.026	0.917
BW gain,[4] lb	R	0.23	0.21	0.09	0.01	0.03
	Probability, *P* <	<0.001	0.001	0.151	0.830	0.621
Parity 2						
Total intake,[2] lb	R	-0.03	-0.03	0.00	0.03	0.07
	Probability, *P* <	0.700	0.650	0.980	0.679	0.351
Backfat gain,[3] in.	R	0.02	0.06	-0.17	-0.09	-0.04
	Probability, *P* <	0.830	0.400	0.018	0.2070	0.5558
BW gain,[4] lb	R	0.15	0.15	0.01	-0.01	0.06
	Probability, *P* <	0.035	0.038	0.900	0.874	0.438
Parity 3+						
Total intake,[2] lb	R	-0.11	-0.10	-0.04	-0.06	0.06
	Probability, *P* <	0.062	0.098	0.467	0.343	0.354
Backfat gain,[3] in.	R	-0.26	-0.25	-0.05	-0.05	0.03
	Probability, *P* <	<0.001	<0.001	0.419	0.397	0.599
BW gain,[4] lb	R	0.29	0.29	-0.03	0.13	-0.04
	Probability, *P* <	<0.001	<0.001	0.604	0.037	0.528

[1] A total of 712 females (PIC 1050) were used in a 108-d trial with 249, 188, and 275 females in parity groups 1, 2, and 3+, respectively.
[2] Total intake = sum of daily intake values throughout the course of gestation for each individual sow.
[3] Backfat gain = final backfat – initial backfat.
[4] BW gain = final BW – initial BW.