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Effects of Porcine Circovirus Type 2 and *Mycoplasma hyopneumoniae* Vaccination Strategy, Birth Weight, and Gender on Postweaning Performance of Growing-Finishing Pigs Reared in a Commercial Environment

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Summary

A total of 1,995 pigs were used to evaluate the effects of two porcine circovirus type 2 (PCV2) and *Mycoplasma hyopneumoniae* (*Mhyo*) vaccination strategies and birth weight on pig performance and carcass characteristics. The first vaccination strategy (BI) was a single full dose of CircoFLEX-MycoFLEX (Boehringer Ingelheim, St. Joseph, MO) at weaning. The second strategy (Intervet) was a full dose of Circumvent and MYCOSILENCER (Intervet/Schering-Plough Animal Health, Millsboro, DE) at weaning and again 22 d later. At a commercial sow farm, all pigs born alive for 22 consecutive days were identified individually at birth with a numbered ear tag. The dam, gender, and birth weight were recorded and used to randomly allot pigs at weaning (d 0) to the PCV2/*Mhyo* vaccination treatments. The pigs were weaned into 4 consecutive nursery rooms of approximately 500 pigs each on 6 occasions during a 19-d period. Pigs from each vaccination treatment were comingled in pens within rooms throughout the study. Pigs were moved to a finishing barn on d 74. Pigs were individually weighed on d 0, 22, 44, 74, and 156 to measure growth rate. Carcass data were obtained from a subsample of 420 pigs harvested on a single day (d 167). For data analysis, individual birth weight was used to assign pigs to 7 birth weight categories, each containing a similar number of observations. Therefore, data were analyzed as a 2 × 2 × 7 factorial arrangement in a completely randomized design with main effects of vaccine strategy, gender, and weight category. As birth weight category increased, ADG increased ($P < 0.01$) during each weight period and overall. Percentage of culls and light weight pigs at market also were reduced ($P < 0.01$) as weight category increased. Overall, ADG, final BW, HCW, and backfat depth of barrows were increased ($P < 0.0001$) compared with gilts, whereas the percentage of culls and pigs < 215 lb and fat-free lean were reduced ($P < 0.0001$) compared with gilts.

From d 0 to 22 and d 44 to 74, vaccine strategy did not influence ADG. However, ADG and BW were greater ($P < 0.05$) from d 22 to 44 for pigs vaccinated once with BI rather than twice with Intervet. From d 74 to 156, pigs vaccinated twice with Intervet had greater ($P < 0.05$) ADG than those vaccinated once with BI. Thus, there were no differences between the 2 vaccination strategies for overall growth performance, carcass measurements, or mortality. These results are similar to those of previous experiments that demonstrated that vaccination with Intervet reduced performance in the nursery stage but improved performance in the finisher stage. In summary, vaccination strategy,

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piglet birth weight, and gender all influence the growth of pigs during the nursery stage, finishing stage, and overall and should be considered to enhance overall performance.

Key words: birth weight, gender, growth, PCV2, vaccination

Introduction

Porcine circoviral disease (PCVD) clinical signs include one or more of the following in growing pigs: wasting, labored breathing, diarrhea, porcine dermatitis and nephropathy syndrome, secondary bacterial infections, and high mortality. Porcine circoviral disease is caused by infection with porcine circovirus type 2 (PCV2). Recent studies (Jacela et al., 2007[3]; Horlen et al., 2008[4]) have demonstrated that the subclinical manifestation of this organism in unvaccinated pigs is also associated with significant reductions in performance of growing-finishing pigs. For this reason, many swine producers are currently vaccinating growing pigs for PCV2 with one of the commercially available vaccines.

Although improvements in the health and performance of growing-finishing pigs have been observed with the implementation of PCV2 vaccination in the field, some producers have experienced increased difficulty in getting pigs started on feed after weaning. In most of these cases, pigs have been vaccinated for PCV2 and *Mycoplasma hyopneumoniae* (*Mhyo*) at weaning. Recent work at Kansas State University (K-State; Kane et al., 2008[5]) suggests that vaccination of pigs for PCV2 and *Mhyo* at the recommended ages may be followed by a transient reduction in nursery performance.

Little work has been done to determine whether this transient reduction is characteristic of all commercially available PCV2 and *Mhyo* vaccines or vaccination strategies. Jacela et al. (2007) reported that pigs vaccinated with 2 doses (d 0 and 21) of one PCV2 vaccine were heavier than unvaccinated pigs at d 113, with pigs vaccinated with 1 dose (d 7) of a second PCV2 vaccine being intermediate. They reported that the benefits to growth from PCV2 vaccination occurred primarily during the first 113 d and did not observe any transient reductions in performance after vaccination. However, the post-vaccination weighing events occurred at lengthy intervals.

Other factors are known to influence the growth performance of pigs immediately postweaning, including management, genetics, health, nutrition, environment, gender, weaning age, and weaning weight. Many farms have demonstrated acceptable levels of nursery performance prior to the implementation of PCV2 vaccination. However, since the implementation of PCV2 vaccinations, some of these farms have reported an unacceptable number of pigs that appeared normal at weaning but began a progressive decline in body condition within the first 5 d postweaning. These "failure-to-thrive" pigs appeared to remain hydrated and alert with normal vital signs but did not respond to individualized environmental, nutritional, and antimicrobial interventions. They continued to progressively catabolize fat and muscle tissue to the point that euthanasia was the only remaining humane resolution. In these populations of pigs, it has

[3] Jacela et al., Swine Day 2007, Report of Progress 985, pp. 5-16.

[4] Horlen, K. P., S. S. Dritz, J. C. Nietfeld, S. C. Henry, R. A. Hesse, R. Oberst, M. Hays, J. Anderson, and R. R. R. Rowland. 2008. A field evaluation of pig mortality, performance and infection following commercial vaccination against porcine circovirus type 2. J. Am. Vet. Med. Assoc. 232:906-912.

[5] Kane et al., Swine Day 2008, Report of Progress 1001, pp. 14-20.

been difficult to identify the individual characteristics that may be associated with an increased risk for becoming a "failure-to-thrive" pig.

Therefore, our objective was to compare the effects of 2 vaccination strategies for mitigating the effects of PCV2 and *Mhyo* on postweaning performance. A second objective was to evaluate the combined effects of PCV2 vaccination strategy, birth weight, and gender on individual pig performance postweaning.

Procedures

Procedures used in this experiment were approved by the K-State Institutional Animal Care and Use Committee. The experiment was conducted at a commercial farm in Kansas with a segregated, 3-site production system (breeding/gestation/farrowing, nursery, and finisher). This experiment used 908 pigs (PIC 327 sired) born of first, second, and a few third parity females (Triumph TR24) and 1,047 pigs (PIC 327 sired) born of third parity and older sows (PIC 1050). All pigs were housed in environmentally controlled buildings with pens over totally slatted floors throughout the experiment.

During lactation, sows and their litters were housed in farrowing crates and given ad libitum access to food and water. For 22 consecutive days, all pigs born alive were identified with a small numbered button ear tag, and their weight and gender were recorded within 18 h after parturition. Afterward, litters were equalized and processed following normal farm procedures to optimize sow and piglet health and welfare. Every attempt was made to keep subsequent pig movement at a minimum; however, all necessary pig movement, fostering, removals, and mortalities were recorded. None of the pigs were given access to creep feed or additional supplements during lactation.

A total of 1,995 pigs were weaned (16.4 lb and 25 d of age) in 6 groups of approximately 330 to 340 pigs to fill four 500-head rooms over a 19-d period. Prior to each weaning event, pigs scheduled to be weaned were allotted to one of 2 vaccination strategies stratified by dam, gender, and birth weight. One vaccination strategy consisted of a single full dose of CircoFLEX-MycoFLEX (BI; Boehringer Ingelheim, St. Joseph, MO) administered intramuscularly at weaning. The other vaccination strategy consisted of 2 full doses of Circumvent and MYCOSILENCER (Intervet; Intervet/Schering-Plough Animal Health, Millsboro, DE) administered intramuscularly at weaning and again 22 d later. Both vaccination strategies were administered according to their product label. The BI vaccination consisted of a combination vaccine that provided an immunization for PCV2 and *Mhyo* with a single 2-mL injection. The Intervet vaccination required 2 separate injections each time of 2 mL of Circumvent and 1 mL of MYCOSILENCER to provide immunization for PCV2 and *Mhyo*, respectively. Prior to implementation of PCV2 vaccination for all growing pigs at weaning, pigs in this production system had exhibited severe clinical signs indicative of PCVD that had been confirmed by the histopathologic evaluation of tissues, and the presence of PCV2 was confirmed by immunohistochemistry. Subsequent to implementation, these clinical signs had abated and were not apparent in the growing pig population at the time this trial was performed.

At weaning (d 0), all pigs were randomly placed in nursery pens in groups of 25 pigs. Immediately afterward, the pigs were individually weighed, assigned a body condition

score (BCS; 1 = emaciated, 2 = thin, or 3 = full-bodied), and vaccinated with their designated vaccine. This resulted in the comingling of pigs from each vaccination treatment in all pens and in all rooms throughout the study. On d 22, all pigs were weighed and again assigned a BCS. Also, pigs assigned to the Intervet vaccination strategy were administered their second dose of PCV2 and *Mhyo* vaccines. During vaccination, pigs that exhibited a "fainting" reaction immediately after administration were monitored and recorded. A "fainting" reaction was defined as any pig that was briefly unable to stand, was immobile, or exhibited involuntary muscle contractions accompanied by interrupted or irregular respiration. Pigs were weighed and assigned a BCS again on d 44 and were moved to a finishing barn at approximately 74 d postweaning, where they were weighed again. Afterward, all remaining pigs were weighed once more on d 156. Throughout the study, each pen was equipped with a dry self-feeder and cup waterer, providing ad libitum access to feed and water. Pig removals and deaths, as well as the suspected reasons, were recorded throughout the study. Carcass data were obtained from a subsample of 420 pigs from one finisher room that were harvested on a single day (d 167).

For data analysis, individual birth weight was used to assign pigs to 7 birth weight categories, such that each category contained a roughly similar number of observations. The genetic background and parity of sows were confounded, so the effects of these variables on the performance of their offspring were not evaluated in this experiment. The dam (litter of origin), nursery room, and finisher room were used as random effects in the analysis. Therefore, vaccination strategy, gender, and birth weight category were used to analyze the data as a 2 × 2 × 7 factorial arrangement in a completely randomized design using the PROC MIXED procedure of SAS (SAS Institute Inc., Cary, NC). Weaning age was used as a covariate for data analysis. Individual pig was the experimental unit for the analysis of response criteria.

Results

There were no vaccination strategy × gender × birth weight category interactions observed during the study. Therefore, the effects of vaccination strategy, gender × weight category interactions, gender, and weight category are reported.

Effects of Vaccination Strategy on Subsequent Growth

From d 0 to 22, there were no differences in growth performance between the 2 vaccination strategies (Table 1). However, pigs vaccinated with Intervet had a greater ($P < 0.0001$) risk of demonstrating a "fainting" reaction to vaccination immediately following injection. The "fainting" reactions observed were not associated with any mortality.

Following the second dose of Intervet on d 22, ADG of pigs vaccinated with BI was greater ($P < 0.0001$) from d 22 to 44 than that of pigs vaccinated with Intervet. This resulted in improved ($P < 0.0001$) ADG from d 0 to 44 and d 44 BW for pigs vaccinated with BI. There were no differences in performance from d 44 to 74, but pigs vaccinated with BI had greater ($P < 0.001$) ADG from d 0 to 74 and d 74 BW.

During the finishing period (d 74 to 156), pigs vaccinated with Intervet had greater ($P < 0.05$) ADG than those vaccinated with BI. This change in the growth response

between the 2 vaccination strategies resulted in similar overall (d 0 to 156) growth performance. There were no differences in carcass characteristics, percentage of pigs less than 215 lb, or mortality between the 2 vaccination strategies.

Birth Weight Category and Gender Interactions

During the experiment, gender × weight category interactions were observed ($P < 0.03$) for ADG from d 44 to 74, percentage of culls, and percentage of pigs weighing less than 215 lb on d 156. The ADG of barrows from d 44 to 74 was 1.43, 1.53, 1.60, 1.69, 1.72, 1.76, and 1.68 for weight categories ≤ 2.5 lb, 2.6 to 3.0 lb, 3.1 to 3.3 lb, 3.4 to 3.6 lb, 3.7 to 3.9 lb, 4.0 to 4.4 lb, and ≥ 4.5 lb, respectively. The ADG of gilts from d 44 to 74 was 1.33, 1.47, 1.51, 1.51, 1.53, 1.54, and 1.60, respectively. The interaction occurred because the rate of increase in ADG as weight category increased was not consistent for both genders. Despite the interaction, ADG was greater ($P < 0.01$) for barrows than gilts and for heavier weight categories compared with lighter categories.

The percentage of culls and pigs weighing less than 215 lb for barrows was 7.62%, 7.97%, 4.70%, 3.61%, 4.40%, 1.65%, and 3.25% for weight categories ≤ 2.5 lb, 2.6 to 3.0 lb, 3.1 to 3.3 lb, 3.4 to 3.6 lb, 3.7 to 3.9 lb, 4.0 to 4.4 lb, and ≥ 4.5 lb, respectively. Percentage of culls and pigs weighing less than 215 lb for gilts was 27.50%, 13.62%, 4.52%, 10.97%, 2.05%, 3.21%, and 0.96%, respectively. The interaction occurred because the percentage of culls and pigs less than 215 lb was significantly greater in lighter weight categories for gilts, but the percentage of culls and pigs less than 215 lb was similar for barrows and gilts in heavier weight categories. In spite of the interaction, the percentage of culls and pigs weighing less than 215 lb was less ($P < 0.001$) for barrows and pigs of heavier weight categories.

The Effects of Birth Weight Category on Subsequent Growth

As expected, birth weight increased ($P < 0.0001$) as weight category increased. Also, preweaning ADG, weaning weight, and BCS at weaning were improved ($P < 0.0001$) for pigs as weight category increased (Table 2).

After weaning, pigs in increasing weight categories had improved ($P < 0.0001$) ADG and final BW for all periods (d 0 to 22, d 22 to 44, d 0 to 44, d 44 to 74, d 0 to 74, d 74 to 156, and d 0 to 156). Postweaning mortality was not affected by weight category. Pigs of heavier weight categories also had greater ($P < 0.0001$) HCW compared with lighter weight category pigs. However, there were no differences in the backfat depth, loin depth, and fat-free lean of pigs subsampled from the different weight categories in this experiment.

The Effects of Gender on Subsequent Growth

From d 0 to 22, ADG, d 22 BW, and d 22 BCS were greater ($P < 0.01$) for gilts than for barrows (Table 3). Although there were no differences in ADG from d 22 to 44 or d 44 BW, there was a tendency for ($P < 0.06$) gilts to have greater ADG from d 0 to 44.

However, for d 44 to 74 and the entire nursery period (d 0 to 74), ADG and d 74 BW were improved ($P < 0.001$) for barrows. The ADG of barrows was also greater ($P < 0.0001$) during the finishing period (d 74 to 156) than that of gilts.

Overall (d 0 to 156), ADG, final BW, HCW, and backfat depth of barrows were increased ($P < 0.0001$), whereas the percentage fat-free lean was reduced ($P < 0.0001$) compared with gilts. Postweaning mortality of barrows and gilts was not significantly different.

Discussion

Although there was not an unvaccinated control group in the current experiment, the differences observed between the 2 vaccination strategies are similar to previous nursery experiments (Kane et al., 2008; Potter et al., 2009[6]; Shelton et al., 2009[7]). Pigs vaccinated in the current experiment with Intervet on d 0 and 22 experienced a transient reduction in growth after administration of the second dose. Kane et al. (2008) reported a transient reduction in growth after a single dose of Circumvent, but the pigs in their experiment were primarily maternal-line (PIC 1050) barrows, considerably lighter at weaning, and vaccinated with Respisure 1 (Pfizer Animal Health, New York, NY) at the same time. Potter et al. (2009) observed similar differences in the growth of pigs vaccinated with 2 doses of Circumvent and 1 dose of CircoFLEX as in the current experiment. It is unclear whether the growth of pigs vaccinated with BI in the current experiment was affected by vaccination, but Potter et al. (2009) did not observe any differences in nursery growth between pigs vaccinated with CircoFLEX and the controls.

In spite of the negative effect of the Intervet vaccination strategy on nursery performance, the growth of these pigs in the finisher was better than that of pigs vaccinated using the BI strategy. As a result, overall performance was not different between the 2 vaccination strategies. Although clinical PCVD was not noted in any of the growing pig groups, this suggests that the Intervet strategy may have provided more effective immunity during the finisher phase, which led to better growth performance. The end result was the same, but the similar efficacy of the two vaccination strategies is worthy of further investigation.

These data demonstrate the importance of increasing birth weight for improving the lifetime growth performance of pigs (Figures 1 and 2). Although identifying differences in preweaning mortality between birth weight categories was not undertaken for this report, it is apparent that management strategies to increase the birth weight and growth performance of the lightest 30% of pigs born may be beneficial.

The overall differences in growth and carcass characteristics between barrows and gilts were typical and not unexpected. These data reinforce the potential need for differing management strategies to optimize the performance of barrows and gilts within a population (e.g., split-sex feeding, different pig flows, different feeders, etc.). Although there were no differences in postweaning mortality, the slower overall growth rate of gilts resulted in twice as many gilts being culled for weight than barrows. This was particularly problematic for the gilts in this study that had a birth weight ≤ 2.5 lb. These gilts were nearly 4 times more likely to be culled because of poor growth rate than barrows of similar birth weight.

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[6] Potter et al., Swine Day 2009, Report of Progress 1020, pp. 21-27.

[7] Shelton et al., Swine Day 2009, Report of Progress 1020, pp. 28-XX.

In conclusion, vaccinating pigs for PCV2 and *Mhyo* with different vaccination strategies resulted in differences in growth rate in the nursery and finishing phases but equal performance overall. These data also illustrate the biological differences in growth among pigs of differing birth weights and between barrows and gilts. A greater understanding of these differences, and the implementation of management strategies to mitigate their effects, may result in significant improvements in overall performance.

Table 1. Effect of PCV2 and *Mhyo* vaccine strategy on growth and carcass characteristics of pigs[1]

	PCV2 and *Mhyo* vaccination strategy[2]			
Growth performance	BI	Intervet	SEM	Probability, *P* <
Pigs, no.	1,006	989		
Preweaning ADG, lb[3]	0.52	0.52	0.01	---[4]
Initial birth wt, lb	3.51	3.50	0.01	---
Weaning age, d	25.10	25.05	0.44	---
ADG, lb				
d 0 to d 22	0.74	0.74	0.03	---
d 22 to 44	1.43	1.36	0.07	0.0001
d 0 to d 44	1.09	1.05	0.02	0.0001
d 44 to 74	1.58	1.56	0.04	---
d 0 to d 74	1.28	1.25	0.02	0.001
d 74 to 156	1.89	1.92	0.03	0.05
d 0 to 156	1.61	1.61	0.02	---
Pig weight, lb				
Weaning (d 0)	16.54	16.49	0.15	---
d 22	32.69	32.54	2.68	---
d 44	63.71	61.97	3.55	0.0001
d 74	111.06	108.73	3.33	0.001
d 156	268.21	267.88	5.79	---
Body condition score[5]				
d 0	2.86	2.86	0.02	---
d 22	2.98	2.99	0.01	---
d 44	3.00	3.00	0.01	---
"Fainting" reaction, %	0.00	1.58	0.29	0.0001
Cull and < 215 lb BW, %	6.80	6.80	1.50	---
Postweaning mortality, %	1.67	1.46	0.41	---
Carcass characteristics[6]				
Pigs, no.	213	205		
Final BW (181 d of age), lb	267.7	270.3	2.88	---
HCW (192 d of age), lb	206.8	208.9	1.97	---
Backfat depth, mm	17.46	18.13	0.38	---
Loin depth, mm	56.78	57.66	0.53	---
Fat-free lean, %	52.22	51.91	0.24	---

[1] A total of 1,995 pigs were used to evaluate the effects of PCV2 and *Mhyo* vaccine strategy on pig performance and carcass characteristics.
[2] PCV2 and *Mhyo* vaccine strategies tested were: BI, a single full dose of CircoFLEX-MycoFLEX at d 0, and Intervet, a full dose of Circumvent and MYCOSILENCER at d 0 and 22.
[3] Results are reported as least squares means.
[4] Probability, *P* > 0.10.
[5] 1 = emaciated, 2 = thin, or 3 = full-bodied.
[6] Carcass data were obtained from a subsample of 420 pigs harvested in a single day (d 167 postweaning).

Table 2. Effect of pig birth weight on subsequent growth and carcass characteristics[1]

	Birth weight category, lb							
Growth performance	≤ 2.5	2.6 - 3.0	3.1 - 3.3	3.4 - 3.6	3.7 - 3.9	4.0 - 4.4	≥ 4.5	SEM
Pigs, no.	283	325	287	314	270	275	239	
Preweaning ADG, lb[2]	0.40[a]	0.49[b]	0.50[b]	0.52[c]	0.54[c]	0.58[d]	0.60[d]	0.01
Initial birth wt, lb	2.18[a]	2.82[b]	3.21[c]	3.50[d]	3.80[e]	4.18[f]	4.83[g]	0.01
ADG, lb								
d 0 to d 22	0.59[a]	0.67[b]	0.73[bc]	0.75[cd]	0.78[d]	0.82[e]	0.86[f]	0.03
d 22 to 44	1.17[a]	1.30[b]	1.37[c]	1.41[d]	1.47[e]	1.48[e]	1.56[f]	0.07
d 0 to d 44	0.88[a]	0.98[b]	1.05[c]	1.08[d]	1.12[e]	1.15[e]	1.21[f]	0.02
d 44 to 74	1.39[a]	1.51[b]	1.56[bc]	1.60[cd]	1.62[d]	1.65[d]	1.64[d]	0.04
d 0 to d 74	1.09[a]	1.19[b]	1.25[c]	1.29[d]	1.32[e]	1.35[ef]	1.38[f]	0.02
d 74 to 156	1.76[a]	1.87[b]	1.91[bc]	1.90[bc]	1.95[cd]	1.98[d]	1.98[d]	0.03
d 0 to 156	1.45[a]	1.55[b]	1.60[c]	1.61[c]	1.66[d]	1.69[de]	1.71[e]	0.02
Pig weight, lb								
Weaning (d 0)	12.26[a]	15.05[b]	15.78[c]	16.70[d]	17.33[e]	18.68[f]	19.81[g]	0.23
d 22	24.93[a]	29.51[b]	31.56[c]	33.00[d]	34.25[e]	36.56[f]	38.51[g]	2.70
d 44	50.39[a]	57.75[b]	61.18[c]	63.51[d]	66.14[e]	68.72[f]	72.20[g]	3.60
d 74	92.23[a]	103.10[b]	107.94[c]	111.61[d]	114.95[e]	118.10[f]	121.33[g]	3.45
d 156	239.22[a]	258.09[b]	264.99[c]	268.80[c]	276.35[d]	282.77[e]	286.09[e]	6.08
Body condition score[3]								
d 0	2.73[a]	2.85[b]	2.88[bc]	2.88[bc]	2.85[b]	2.93[d]	2.92[cd]	0.03
d 22	2.98	2.97	2.99	2.98	2.99	2.98	2.99	0.01
d 44	3.00	3.00	3.00	3.00	3.00	3.00	3.00	0.01
Cull and < 215 lb BW, %	17.38[a]	10.48[b]	4.95[c]	7.35[bc]	3.09[cd]	2.35[cd]	1.77[d]	2.15
Postweaning mortality, %	1.15	1.21	1.02	2.71	1.16	1.96	1.73	0.84

continued

Table 2. Effect of pig birth weight on subsequent growth and carcass characteristics[1]

	Birth weight category, lb							
Growth performance	≤ 2.5	2.6 - 3.0	3.1 - 3.3	3.4 - 3.6	3.7 - 3.9	4.0 - 4.4	≥ 4.5	SEM
Carcass characteristics[4]								
Pigs, no.	58	69	62	60	56	59	56	
Final BW (181 d of age), lb	258.73^{a}	264.37^{b}	269.74^{b}	269.33^{bc}	270.15^{bc}	274.96^{cd}	277.70^{d}	3.60
HCW (192 d of age), lb	195.75^{a}	204.43^{b}	209.66^{bc}	209.47^{bc}	210.98^{bc}	210.81^{bc}	214.96^{c}	2.93
Backfat depth, mm	17.83	18.17	18.55	17.98	17.66	17.45	17.09	0.62
Loin depth, mm	55.11	56.62	57.29	57.66	58.51	57.12	58.27	0.97
Fat-free lean, %	51.99	51.89	51.55	51.99	52.23	52.20	52.51	3.94

[1] A total of 1,995 pigs were used to evaluate the effects of birth weight (7 categories) on pig performance and carcass characteristics.
[2] Results are reported as least squares means.
[3] 1 = emaciated, 2 = thin, or 3 = full-bodied.
[4] Carcass data were obtained from a subsample of 420 pigs harvested in a single day (d 167 postweaning).
[abcdefg] Within a row, means without a common superscript differ ($P < 0.05$).

Table 3. Effect of gender on growth and carcass characteristics of pigs[1]

	Gender			
Growth performance	Barrows	Gilts	SEM	Probability, $P <$
Pigs, no.	980	1,015		
Preweaning ADG, lb[2]	0.52	0.52	0.01	---[3]
Initial birth wt, lb	3.51	3.50	0.01	---
Weaning age, d	25.09	25.06	0.44	---
ADG, lb				
d 0 to d 22	0.73	0.76	0.03	0.0001
d 22 to 44	1.40	1.39	0.07	---
d 0 to d 44	1.06	1.08	0.02	0.06
d 44 to 74	1.63	1.50	0.04	0.0001
d 0 to d 74	1.29	1.25	0.02	0.0001
d 74 to 156	2.02	1.80	0.03	0.0001
d 0 to 156	1.68	1.54	0.02	0.0001
Pig weight, lb				
Weaning (d 0)	16.49	16.54	0.15	---
d 22	32.24	32.99	2.68	0.01
d 44	62.49	63.19	3.55	---
d 74	111.44	108.35	3.33	0.0001
d 156	278.87	257.22	5.79	0.0001
Body condition score[4]				
d 0	2.87	2.86	0.02	---
d 22	2.98	2.99	0.01	0.01
d 44	3.00	3.00	0.01	---
Cull and < 215 lb BW, %	4.60	8.90	1.50	0.001
Postweaning mortality, %	1.73	1.40	0.41	---
Carcass characteristics[5]				
Pigs, no.	203	217		
Final BW (181 d of age), lb	279.33	258.65	2.87	0.0001
HCW (192 d of age), lb	215.04	200.65	1.95	0.0001
Backfat depth, mm	19.66	15.93	0.38	0.0001
Loin depth, mm	57.04	57.41	0.53	---
Fat-free lean, %	50.90	53.23	0.24	0.0001

[1] A total of 1,995 pigs were used to evaluate the effects of gender on pig performance and carcass characteristics.
[2] Results are reported as least squares means.
[3] Probability, $P > 0.10$.
[4] 1 = emaciated, 2 = thin, or 3 = full-bodied.
[5] Carcass data were obtained from a subsample of 420 pigs harvested in a single day (d 167 postweaning).

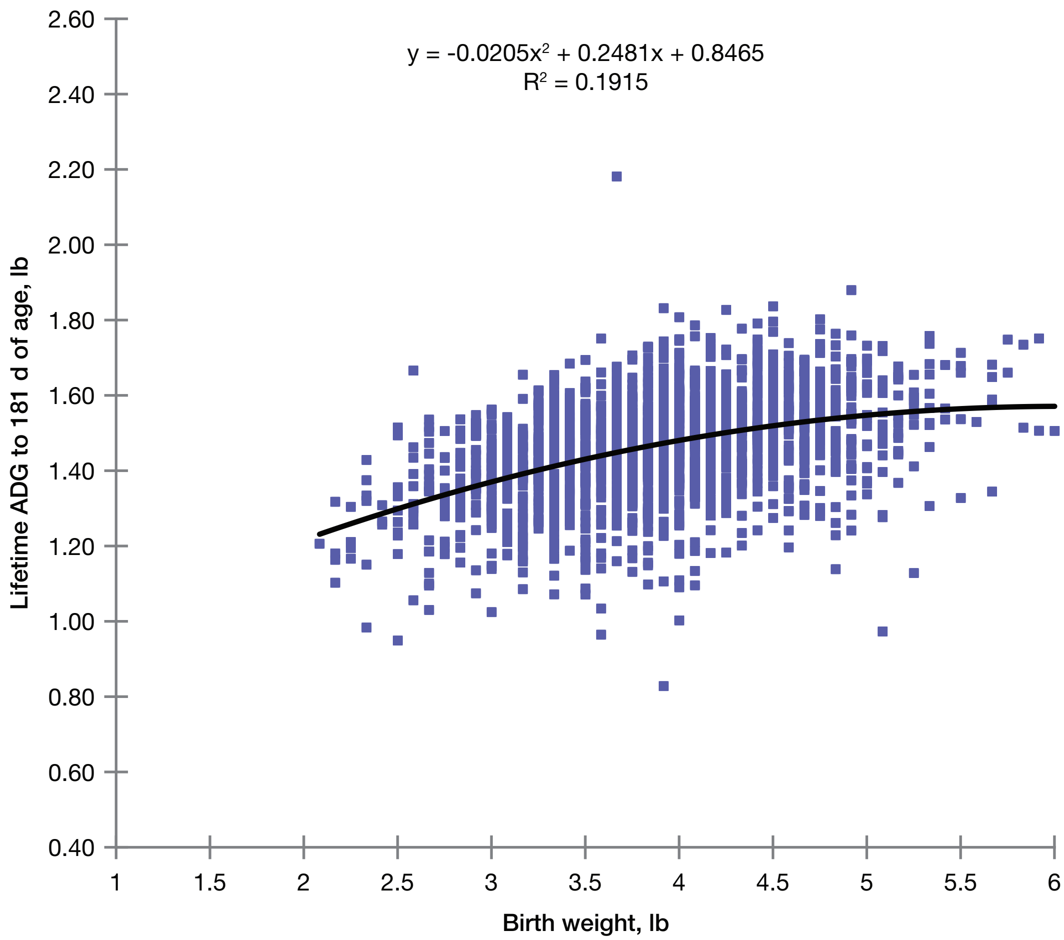

Figure 1. Relationship of birth weight and lifetime ADG.

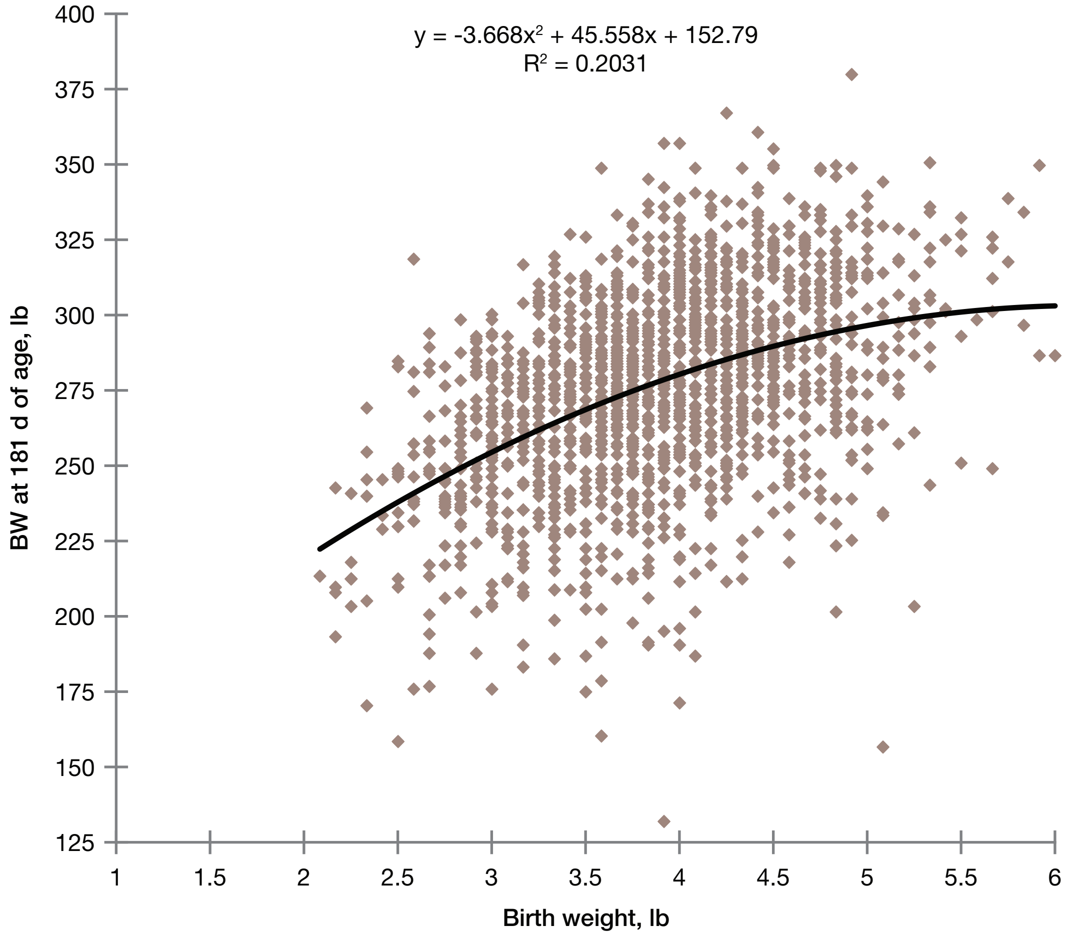

Figure 2. Relationship of birth weight and BW at 181 d of age.