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Effects of Sire Line, Creep Feeding, and Plane of Nursery Nutrition on Growth Performance, Carcass Characteristics, Economics, and Removals and Mortalities of Finishing Pigs

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Summary

A total of 1,416 pigs (sire line × PIC 1050) were used in a 119-d trial to determine the effect of sire line, creep feeding, and plane of nursery nutrition on growth performance, carcass characteristics, economics, and removals and mortalities of finishing pigs from sows that had a natural porcine respiratory and reproductive syndrome virus (PRRSV) challenge during gestation. At approximately 19 d of age, pigs were weaned, blocked by sire line and creep feed treatment and sex, then balanced for weight, and allotted to one of two dietary treatments in a randomized complete block design. Treatments were arranged in a 3 × 2 × 2 factorial with main effects of sire line, lactation creep feeding (with or without), and nursery plane of nutrition. Sire line treatments were Pietrain- or Duroc-based, with sire line A being from a Pietrain sire line and sire lines B and C being from Duroc sires. Treatment diets in phases 1 and 2 of the nursery were corn-soybean meal-based with two levels of SID Lys, 1.30% and 1.50%, and formulated with more specialty protein ingredients in the 1.50% SID Lys diet than the 1.30% SID Lys diet. On d 36 of the nursery period, pigs were individually weighed and allotted to pens in the finisher facility, balancing for weight and accounting for previous treatment, with either 19 or 21 pigs per pen and six replicates per treatment. Pigs were placed on a common five-phase feeding program for the grow-finish period. On d 91, 105, and 119, seven pigs per pen were selected by the farm staff, weighed, removed, and transported for harvest. No significant sire line × creep feed × plane of nursery nutrition or sire line × creep feed interactions were observed throughout the finisher portion of the trial. Premarket (d 0 to 91), a significant sire line × plane of nursery nutrition interaction was observed ($P = 0.018$) for F/G, with pigs fed the low plane of nutrition from sire line A exhibiting improved ($P < 0.05$) F/G compared with pigs fed the low nutritional plane from sire lines B and C, with sire line B demonstrating improved F/G compared with sire line C; however, no differences in sire lines were observed with the

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high plane of nutrition. Overall (d 0 to 119), offspring from sire line A had improved ($P < 0.05$) ADG and F/G compared with offspring from sire lines B and C. Offspring from sire line A had decreased ($P < 0.05$) mortalities and total removals and mortalities compared with offspring from sire lines B and C. For carcass characteristics, a significant main effect of sire line was observed ($P < 0.05$) for HCW and percent yield, with pigs from sire line A demonstrating improved HCW and percent yield compared with pigs from sire line C, with pigs from sire line B being intermediate. Offspring from sire line A had improved ($P < 0.05$) carcass ADG and carcass F/G compared with pigs from sire lines B and C. Pigs previously provided creep feed had greater ($P = 0.034$) backfat and lower ($P = 0.012$) percent lean compared with pigs not provided creep feed. Pigs from sire line A had greater ($P < 0.05$) IOFC compared with pigs from sire lines B and C. In summary, before marketing, pigs fed a low plane of nursery nutrition from sire line A had improved F/G compared with sire lines B and C, with sire line B exhibiting improved F/G compared with sire line C; however, when pigs were fed a high plane of nursery nutrition, there were no differences between sire lines. Overall, offspring from sire line A had improved ADG and F/G, carcass characteristics, removals and mortality, and IOFC compared with sire lines B and C.

Introduction

Average daily gain (ADG), feed efficiency, and carcass composition are heritable selection traits emphasized in selection indexes for terminal sires to maximize offspring performance. However, there is limited published data to provide direct comparisons across genetic lines regarding their transition from lactation to the nursery and to the finisher. One practice that has shown potential to help in this transition is creep feeding during lactation, but limited information is available on the impact of sire line on the effect of creep feeding. One study found that pigs fed creep feed from a late-maturing Duroc sire line had increased ADG in the grow-finish period compared with pigs not fed creep; however, in pigs from the early-maturing Duroc sire line there were no differences in ADG between creep feed treatments.[3] In a different study, pigs from a Duroc sire had improved ADG, F/G, and carcass yield compared with pigs from a Pietrain sire line.[4] During the nursery period, it is common for early-phase diets to vary based on nutritional philosophy and goals not only in the standardized ileal digestible (SID) Lys content, but also in the inclusion level of various specialty protein and lactose sources. To our knowledge, no studies have evaluated the combination of offspring sired by different sire lines, creep feeding, and plane of nursery nutrition. Therefore, the objective of this study was to determine the effects of sire line, creep feeding strategy, and plane of nursery nutrition on growth performance, carcass characteristics, economics, and removals and mortalities of finishing pigs weaned from sows that had a natural porcine respiratory and reproductive syndrome virus (PRRSV) challenge during gestation.

[3] Wensley, M. R., J. C. Woodworth, M. D. Tokach, R. D. Goodband, J. M. DeRouchey, and J. T. Gebhardt. 2023. Effect of early vs. late maturing sire line and creep feeding on the stress response, intestinal permeability, and growth performance of nursery and finishing pigs. J. Anim. Sci. 101:skad169. doi:10.1093/jas/skad169.

[4] Gomes, J. D., B. P. M. Silva, S. F. P. Duarte, S. V. Ferreira, V. V. Almeida, L. W. Pian, F. N. Ciconello, C. T. M. Gadbem, and A. S. M. Cesar. 2025. Productive performance and carcass quality of pigs from different sire lines under commercial conditions. Vet. Anim. Sci. 29:100491. doi:10.1016/j.vas.2025.100491.

Procedures

The Kansas State University Institutional Animal Care and Use Committee approved the protocol used for this experiment. The study was conducted at the United Animal Health Donald E. Orr farm (Sheridan, IN). In mid-October 2025, the research farm experienced a health challenge with a wild-type PRRSV strain (1-7-4 L1A.5) two months before sows entered the farrowing facility.

Breeding and Gestation

Treatments were arranged in a 3 × 2 × 2 factorial with main effects of sire line, lactation creep feeding (with or without), and plane of nursery nutrition. A total of 177 mixed-parity sows (Line 1050, PIC, Hendersonville, TN) were used across one breed-to-farrow group from August 2025 to January 2026. At breeding, parity 1+ sows were blocked by previous lactation treatment, BW, and parity, and assigned to be bred to one of three commercially available sire lines. Gilts were placed into a gilt development breed room, blocked by breed weight, and assigned to be bred to one of the same sources of sire line semen used for the sows. Sire line treatments were Pietrain- or Duroc-based, with sire line A being from a Pietrain sire line and sire lines B and C being from Duroc sires. In gestation, all females were housed in individual stalls and fed a common gestation diet in meal form. On approximately d 108 of gestation, all females were moved into the farrowing facility, where they were fed a common meal form lactation diet.

Pre-weaning

A total of 177 litters (sire line × PIC 1050) were used. Piglets were cross-fostered within 24 h of birth within sire line treatment to equalize litter size. Seven days before weaning, litters were assigned to one of two creep feeding treatments (with or without creep feed) in a randomized complete block design based on sire line treatment. For litters assigned to the creep feed treatment, the high plane of nutrition phase 1 nursery diet was fed. The creep feed diet was in meal form and fed using a commercial creep feeder.

Post-Weaning

At weaning, 1,692 pigs were weaned and allotted to one of two dietary treatments in a randomized complete block design based on previous treatment. Treatment diets in the nursery were corn-soybean meal-based with two nutritional planes, low and high. In phase 1, the low plane of nutrition was formulated to 1.30% SID Lys with 15.0% whey powder, 3.75% enzymatically treated soybean meal, 3.0% blood plasma, and 2.5% fish meal; however, the high plane of nutrition was formulated to 1.50% SID Lys with 16.5% whey powder, 6.25% enzymatically treated soybean meal, 4.5% blood plasma, and 5.0% fish meal. In phase 2, the low plane of nutrition was formulated to 1.30% SID Lys with 7.5% whey powder, 3.0% enzymatically treated soybean meal, and 2.0% fish meal; however, the high plane of nutrition was formulated to 1.50% SID Lys with 12.5% whey powder, 5.0% enzymatically treated soybean meal, and 4.0% fish meal. Within each phase, soybean meal was held constant between high and low planes of nutrition.

Finisher

On d 36 of the nursery period, pigs were individually weighed and allotted to pens in the finisher facility, balancing for weight and accounting for previous treatment. On d 42, at the end of the nursery period, 1,416 pigs were transported to the finisher facility

and placed with either 19 or 21 pigs per pen and six replicates per treatment. Pens contained a 2-hole wet-dry feeder and a cup waterer to provide ad libitum access to feed and water. A robotic feed system (DryExact Pro; Big Dutchman North America, Holland, MI) was used to record and deliver daily feed additions to each pen. Common corn-soybean meal-based diets were used over a five-phase feeding program throughout the finisher in meal form (Table 1). Pens of pigs were weighed every three weeks, and feed disappearance was measured to determine ADG, ADFI, and feed efficiency. Upon entry into the finisher and at d 91, pigs were individually weighed to determine the pen coefficient of variation. All instances of pig removals and mortalities were recorded to determine removals, mortalities, and total removals and mortalities.

On d 91, 105, and 119, seven pigs per pen were selected by the farm staff, weighed, removed, and transported to Tyson Foods (Logansport, IN) for harvest. Carcass yield was calculated using the average pig weight of pigs marketed at the farm and hot carcass weight at the plant at each respective marketing event. At the plant, backfat and loin depth were measured, and a proprietary equation from the plant was used to determine lean percentage. Total revenue/pig, feed cost/pig, feed cost/lb gain, and income over feed cost (IOFC) were determined using a carcass price of $0.85/lb and current ingredient costs. Current ingredient costs included corn = $4.19/bu; SBM = $306/ton; DDGS = $161/ton; L-Lysine HCl = $1.15/lb; DL-Met = $2.15/lb; L-Thr = $0.87/lb; and L-Trp = $3.05/lb.

Statistical analysis

Growth, carcass, and economic data were analyzed as a randomized complete block design using a three-way ANOVA using the lmer function from the lme4 package in R Studio (Version 4.5.0, R Core Team, Vienna, Austria) with pen serving as the experimental unit. Sire line, creep feeding, nursery plane of nutrition, and all associated interactions were included as fixed effects, with replication included as a random effect. Proportion data, including removals, mortalities, and total removals and mortalities, were analyzed using a binomial distribution with a logit link function. Results were considered significant with $P \leq 0.05$ and were considered marginally significant with $P \leq 0.10$.

Results and Discussion

No significant sire line × creep feed × plane of nursery nutrition or sire line × creep feed interactions were observed for finishing performance throughout the trial.
Results are reported as sire line × plane of nutrition (Table 2), main effect of sire line (Table 3), main effect of creep feed (Table 4), and main effect of nursery plane of nutrition (Table 5).

Placement

On d 0, a tendency for a sire line × plane of nursery nutrition interaction was observed ($P = 0.052$) for BW, but there was no mean separation. Pigs from sire line A had greater ($P < 0.05$) d 0 BW compared with pigs from sire line B, with pigs from sire line C being intermediate. Pigs previously fed the high plane of nursery nutrition exhibited increased ($P < 0.001$) d 0 BW compared with pigs fed the low plane of nursery nutrition.

Growth performance

In period 1 (d 0 to 21), offspring from sire line C exhibited increased ($P < 0.05$) ADFI compared with sire line A, with pigs from sire line B being intermediate. Offspring

from sire line A exhibited improved (P < 0.05) F/G compared with sire line C, with pigs from sire line B being intermediate. In period 2 (d 21 to 42), pigs from sire lines B and C tended (P = 0.082) to have greater ADFI compared with pigs from sire line A; however, there was no mean separation. In period 3 (d 42 to 63), a significant main effect of sire line was observed (P < 0.05) for ADG and F/G, with pigs from sire line A exhibiting improved ADG and F/G compared with pigs from sire lines B and C. In period 4 (d 63 to 84), offspring from sire line C exhibited increased (P < 0.05) ADFI compared with sire line A, with pigs from sire line B being intermediate. Offspring from sire line A had improved (P < 0.05) F/G compared with offspring from sire lines B and C. In period 5 (d 84 to 91), a significant main effect of sire line was observed (P < 0.05) for F/G, with pigs from sire line A exhibiting improved F/G compared with sire line C, with pigs from sire line B being intermediate. A significant creep feed × plane of nursery nutrition interaction was observed (P = 0.030) for d 91 BW, but there was no mean separation (data not shown). Premarket (d 0 to 91), a significant sire line × plane of nursery nutrition interaction was observed (P = 0.018) for F/G, with pigs fed the low plane of nursery nutrition from sire line A exhibiting improved (P < 0.05) F/G compared with pigs fed the low nutritional plane from sire lines B and C, with sire line B demonstrating improved (P < 0.05) F/G compared with sire line C; however, with the high plane of nutrition no differences in sire lines were observed. Offspring from sire lines A and B tended (P = 0.074) to have improved ADG compared with sire line C, but there was no mean separation. A significant main effect of sire line was observed (P < 0.05) for F/G, with offspring from sire line A exhibiting improved F/G compared with pigs from sire lines B and C, with offspring from sire line B exhibiting improved (P < 0.05) F/G compared with sire line C. A tendency for a main effect of creep feed was observed (P ≤ 0.089) for ADFI and F/G, with pigs previously provided creep feed exhibiting increased ADFI and F/G compared with pigs not provided creep feed.

Marketing

On the first marketing event (d 91), a tendency for a main effect of sire line was observed (P = 0.082) for BW, with pigs from sire lines A and B demonstrating numerically increased BW compared with pigs from sire line C; however, no mean separation was observed. In period 6 (d 91 to 105), offspring from sire lines A and B tended (P = 0.080) to have increased ADG compared with pigs from sire line C; however, there was no mean separation. Pigs from sire line A had improved (P < 0.05) F/G compared with pigs from sire lines B and C, with sire line B exhibiting improved F/G compared with sire line C. In period 7 (d 105 to 119), a tendency for a main effect of sire line was observed (P = 0.054) for F/G, with pigs from sire lines A and B exhibiting improved F/G compared with pigs from sire line C; however, there was no mean separation. On the third marketing event (d 119) and on average across marketing events, significant creep feed × plane of nursery nutrition interactions were observed (P ≤ 0.021) for BW, with pigs previously fed creep feed with the high plane of nursery nutrition exhibiting increased (P < 0.05) BW compared with pigs previously not fed creep feed; however, there were no differences in creep feeding strategy with the low nursery nutritional plane (data not shown). Pigs previously fed creep feed had increased (P = 0.013) d 119 marketing BW compared with pigs not fed creep feed. During marketing (d 91 to 119), offspring from sire lines A and B had improved (P < 0.05) F/G compared with offspring from sire line C. Pigs previously fed the low plane of nursery nutrition exhibited improved (P ≤ 0.022) ADG and F/G compared with pigs previously fed the high plane of nursery nutrition.

Overall (d 0 to 119), offspring from sire line A had improved (P < 0.05) ADG and F/G compared with offspring from sire lines B and C. Pigs previously fed creep feed tended (P = 0.080) to have greater AFDI compared to pigs not fed creep feed, but there was no mean separation.

Within-pen coefficient of variation

There were no sire line × plane of nursery nutrition interactions or main effects of sire line observed for d 0 CV, d 91 CV, or CV change (d 0 to 91). On d 91, a significant creep feed × plane of nutrition interaction was observed (P = 0.024) for within-pen weight CV, with pigs without creep feed and previously fed the high plane of nutrition exhibiting increased (P < 0.05) CV compared with pigs provided creep feed and the high plane of nursery nutrition; however, there were no differences in CV between creep feeding strategies when pigs were fed the low plane of nursery nutrition (data not shown). A tendency for a main effect of creep feed was observed (P = 0.078) for d 91 within-pen weight CV, with pigs previously provided creep feed exhibiting decreased CV compared with pigs not provided creep feed. A tendency for a main effect of plane of nursery nutrition was observed (P = 0.058) for d 0 within-pen weight CV, with pigs fed the low plane of nursery nutrition exhibiting an increased CV compared with pigs fed the high plane of nursery nutrition. A significant main effect of plane of nursery nutrition was observed (P = 0.009) for within-pen weight CV change, with pigs fed the low plane of nursery nutrition exhibiting greater CV change compared with pigs fed the high plane of nursery nutrition.

Removals and Mortalities

No significant sire line × plane of nursery nutrition interactions, creep feed main effects, or plane of nursery nutrition main effects were observed for removals, mortalities, or removals and mortalities throughout the trial. A significant creep feed × plane of nursery nutrition interaction was observed (P = 0.048) for mortalities; however, no significant mean separation was observed (data not shown). Pigs from sire line A had decreased (P < 0.05) mortalities and total removals and mortalities compared with pigs from sire lines B and C.

Carcass Characteristics

There were no sire line × plane of nursery nutrition interactions or plane of nursery nutrition main effects observed for carcass characteristics. A tendency for a creep feed × plane of nursery nutrition interaction was observed (P = 0.055) for HCW; however, no significant means separation was observed (data not shown). A significant creep feed × plane of nursery nutrition interaction was observed (P = 0.048) for loin depth; however, no significant means separation was observed (data not shown). A significant main effect of sire line was observed (P < 0.05) for HCW and percent yield, with pigs from sire line A demonstrating improved HCW and percent yield compared with pigs from sire line C, with pigs from sire line B being intermediate. Pigs from sire lines A and B had decreased (P < 0.05) backfat compared with pigs from sire line C. Offspring from sire line A had increased (P < 0.05) loin depth compared with pigs from sire lines B and C. A significant main effect of sire line was observed (P < 0.05) for percent lean, with pigs from sire line A exhibiting increased percent lean compared with pigs from sire lines B and C, and pigs from sire line B exhibited increased (P < 0.05) percent lean compared with sire line C. A significant main effect of sire line was observed (P < 0.05) for carcass ADG and carcass F/G, with pigs from sire line A exhibiting improved carcass ADG and carcass F/G compared with pigs from sire lines B and C. Pigs previously

provided creep feed had greater (P = 0.034) backfat and lower (P = 0.012) percent lean compared with pigs not provided creep feed.

Economics

No significant sire line × plane of nursery nutrition interaction or plane of nursery nutrition main effects were observed for economics. A tendency for a creep feed × plane of nursery nutrition interaction was observed (P = 0.055) for revenue; however, no mean separation was observed (data not shown). A tendency for a creep feed × plane of nursery nutrition interaction was observed (P = 0.095) for feed cost/pig, but there was no mean separation (data not shown). Pigs from sire line A had increased (P < 0.05) revenue compared with pigs from sire line C, with pigs from sire line B being intermediate. Offspring from sire line C exhibited increased (P < 0.05) feed cost/lb of gain compared with offspring from sire lines A and B and offspring from sire line B had increased (P < 0.05) feed cost/lb of gain compared with offspring from sire line A. Pigs from sire line A had improved (P < 0.05) feed cost per pig and IOFC compared with sire lines B and C. A tendency for a creep feed main effect was observed (P = 0.065) for feed cost/pig, with pigs fed creep feed having increased feed cost per pig compared with pigs not fed creep feed. Pigs offered the high plane of nursery nutrition had increased (P = 0.049) feed cost/lb of gain compared with pigs offered the low plane of nursery nutrition.

In summary, pigs fed a low plane of nursery nutrition from sire line A had improved F/G compared with sire lines B and C, with sire line B exhibiting improved F/G compared with sire line C; however, when pigs were fed a high plane of nursery nutrition there were no differences in sire lines. Offspring from sire line A had improved F/G, carcass characteristics, removals and mortality, and IOFC compared with sire lines B and C.

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Table 1. Composition of experimental diets (as-fed basis)[1]

Ingredients, %	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Corn	51.42	57.29	61.68	69.07	72.12
Soybean meal, 47.7% CP	24.98	19.41	15.15	7.66	4.57
Corn DDGS	20.00	20.00	20.00	20.00	20.00
Choice white grease	1.00	1.00	1.00	1.00	1.00
Monocalcium phosphate, 21.0% P	0.12	---	---	---	---
Sodium chloride	0.55	0.55	0.56	0.56	0.56
Calcium carbonate	1.20	1.15	1.13	1.09	1.08
L-Lys-HCl	0.35	0.30	0.25	0.34	0.38
DL-Met	0.10	0.05	---	---	---
L-Thr	0.06	0.03	0.02	0.05	0.07
L-Trp	---	---	---	0.02	0.03
Phytase[2]	0.02	0.01	0.01	0.01	0.01
Vitamin and trace mineral premix	0.20	0.20	0.20	0.20	0.20
Total	100	100	100	100	100
Calculated analysis					
Standardized ileal digestible (SID) amino acids, %					
Lys	1.11	0.94	0.80	0.70	0.65
Ile:Lys	63	65	68	61	57
Met and Cys:Lys	58	58	58	58	58
Thr:Lys	62	62	65	65	65
Trp:Lys	18	18	18	18	18
Val:Lys	71	74	78	74	71
Total Lys, %	1.29	1.11	0.96	0.83	0.78
NE, kcal/lb	1,055	1,070	1,080	1,098	1,106
Total Ca, %	0.63	0.57	0.54	0.50	0.48
Available P, %	0.34	0.26	0.23	0.22	0.22
Ca:P	1.25	1.25	1.25	1.25	1.25

[1] A common 5-phase feeding program was used throughout the grow-finish period. Feed budgets per pig were 95 lb, 125 lb, 150 lb, 150 lb, and the feed needed until market for phases 1 to 5, respectively.

[2] Natuphos E 2500 (BASF, Mt. Olive, NY) provided an estimated release of 0.14% available P with 1,500 FTU/kg.

Table 2. Interactive effects of commercial sire line and plane of nursery nutrition on finishing pig performance, removals and mortality, carcass characteristics, and economics[1]

	Sire line:	A		B		C			*P* =
Item	Plane of nutrition[2]:	Low	High	Low	High	Low	High	SEM	Sire line × nutrition
BW, lb									
d 0		49.9	51.6	49.5	50.4	50.1	50.7	0.67	0.052
d 91		293.6	293.5	293.3	295.6	290.5	292.6	1.79	0.694
Marketing BW, lb[3]									
First cut (d 91)		318.7	316.4	314.0	318.2	309.7	314.0	3.41	0.346
Second cut (d 105)		314.4	311.4	313.3	314.6	309.9	313.1	2.72	0.463
Third cut (d 119)		302.7	304.7	308.3	304.0	303.1	302.0	3.47	0.548
Average		311.8	310.9	311.6	312.6	307.7	309.7	1.85	0.704
Premarket (d 0 to 91)									
ADG, lb		2.32	2.29	2.29	2.29	2.25	2.28	0.018	0.189
ADFI, lb		6.01	6.05	6.08	6.11	6.11	6.13	0.052	0.965
F/G		2.59^{c}	2.64^{bc}	2.65^{b}	2.67^{ab}	2.71^{a}	2.69^{ab}	0.012	0.018
During marketing (d 91 to 119)									
ADG, lb		2.54	2.52	2.65	2.40	2.48	2.37	0.087	0.218
ADFI, lb		8.33	8.37	8.41	8.11	8.40	8.67	0.241	0.296
F/G		3.29	3.33	3.20	3.40	3.40	3.70	0.112	0.309
Overall (d 0 to 119)									
ADG, lb		2.31	2.27	2.22	2.18	2.18	2.19	0.033	0.649
ADFI, lb		6.15	6.20	6.22	6.22	6.24	6.29	0.059	0.886
F/G		2.67	2.73	2.81	2.86	2.87	2.87	0.034	0.688
Within-pen weight CV									
d 0		16.97	14.27	15.00	14.81	16.25	14.02	3.124	0.472
d 91		9.91	9.17	8.53	9.83	8.74	9.00	0.800	0.132
CV change (d 0 to 91)		-7.06	-5.10	-6.47	-4.98	-7.51	-5.03	2.453	0.858
Removals, %		0.00	0.00	1.20	2.40	0.85	2.08	1.026	0.984
Mortalities, %		1.70	2.93	5.69	5.59	6.77	5.49	1.724	0.608
Removals and mortalities, %		1.70	3.29	7.10	8.19	7.63	7.63	1.970	0.673
Carcass characteristics									
HCW, lb		231.1	230.6	229.1	230.5	226.8	227.3	1.53	0.825
Yield, %		74.1	74.3	73.5	73.8	73.7	73.4	0.25	0.432

Backfat, in	0.61	0.63	0.62	0.66	0.68	0.67	0.012	0.308
Loin depth, in	3.14	3.13	2.92	2.92	2.89	2.91	0.018	0.820
Lean, %	57.8	57.7	56.8	56.6	56.3	56.4	0.09	0.240
Carcass ADG, lb	1.71	1.69	1.65	1.64	1.63	1.63	0.022	0.872
Carcass F/G	3.59	3.66	3.77	3.80	3.84	3.87	0.040	0.829
Economics, $/pig								
Revenue[4]	197.44	196.03	194.74	195.93	192.74	193.23	1.303	0.825
Feed cost	70.06	70.71	72.97	73.75	73.06	73.60	0.748	0.987
Feed cost, $/lb gain	0.266	0.271	0.271	0.273	0.277	0.277	0.0014	0.143
IOFC[5]	126.38	125.32	121.77	122.19	119.68	119.63	1.214	0.821

[1] A total of 1,416 mixed-sex pigs (initially, 50.6 ± 0.67 lb) were used with 19 or 21 pigs per pen and 12 replicates per treatment. Treatments began with sows allotted to three different sire lines, then offspring were provided or not provided creep feed 7 days prior to weaning, and after weaning, offspring were allotted to diets with a low or high plane of nutrition through phases 1 and 2 with a common phase 3 diet to complete a 3 × 2 × 2 factorial design. A common diet was fed throughout the grow-finish period of the trial.

[2] Treatment diets were corn-soybean meal-based with two nutritional planes, low and high. In phase 1, the low plane of nutrition was formulated to 1.30% SID Lys with low inclusion of whey powder, enzymatically treated soybean meal, blood plasma, and fish meal. The high plane of nutrition was formulated to 1.50% SID Lys with higher inclusion of specialty ingredients.

[3] On d 91, 105, and 119 approximately 33% of the pigs/pen were marketed at each marketing event.

[4] Revenue = carcass price × HCW.

[5] Income over feed cost (IOFC) = revenue – feed cost.

Table 3. Main effect of commercial sire line on finishing pig performance, removals and mortality, carcass characteristics, and economics[1]

	Sire line				
Item	A	B	C	SEM	*P* =
BW, lb					
d 0	50.7[a]	49.9[b]	50.4[ab]	0.65	0.006
d 21	91.1	91.0	91.3	0.78	0.871
d 42	138.2	139.7	139.3	0.92	0.209
d 63	196.3	196.3	195.1	1.02	0.503
d 84	260.7	261.6	259.3	0.98	0.263
d 91	293.6	294.5	291.5	1.37	0.186
Marketing BW, lb[2]					
First cut (d 91)	317.5	316.1	311.9	2.88	0.082
Second cut (d 105)	312.9	313.9	311.5	2.04	0.638
Third cut (d 119)	303.7	306.2	302.6	2.82	0.451
Average	311.4	312.1	308.7	1.36	0.140
d 0 to 21					
ADG, lb	1.92	1.95	1.93	0.027	0.464
ADFI, lb	3.45[b]	3.53[ab]	3.55[a]	0.034	0.013
F/G	1.80[b]	1.82[ab]	1.84[a]	0.020	0.015
d 21 to 42					
ADG, lb	2.35	2.39	2.37	0.027	0.385
ADFI, lb	5.21	5.31	5.32	0.050	0.082
F/G	2.22	2.22	2.25	0.023	0.410
d 42 to 63					
ADG, lb	2.51[a]	2.41[b]	2.40[b]	0.025	< 0.001
ADFI, lb	6.47	6.49	6.49	0.057	0.932
F/G	2.58[b]	2.69[a]	2.71[a]	0.021	< 0.001
d 63 to 84					
ADG, lb	2.40	2.39	2.35	0.024	0.113
ADFI, lb	7.41[b]	7.59[ab]	7.61[a]	0.073	0.032
F/G	3.10[b]	3.18[a]	3.24[a]	0.026	< 0.001
d 84 to 91					
ADG, lb	2.33	2.34	2.30	0.052	0.576
ADFI, lb	7.79	7.93	7.94	0.102	0.244
F/G	3.35[b]	3.40[ab]	3.47[a]	0.056	0.031
d 91 to 105					
ADG, lb	2.31	2.30	2.28	0.015	0.080
ADFI, lb	6.13	6.16	6.22	0.048	0.150
F/G	2.65[c]	2.68[b]	2.73[a]	0.010	< 0.001
d 105 to 119					

ADG, lb	2.42	2.53	2.27	0.138	0.156
ADFI, lb	8.62	8.50	8.59	0.169	0.845
F/G	3.61	3.52	3.95	0.228	0.054
Premarket (d 0 to 91)					
ADG, lb	2.30	2.29	2.27	0.014	0.074
ADFI, lb	6.03	6.09	6.12	0.041	0.147
F/G	2.62[c]	2.66[b]	2.70[a]	0.009	< 0.001
During marketing (d 91 to 119)					
ADG, lb	2.53	2.52	2.42	0.074	0.183
ADFI, lb	8.35	8.26	8.53	0.203	0.316
F/G	3.31[b]	3.30[b]	3.55[a]	0.094	0.007
Overall (d 0 to 119)					
ADG, lb	2.29[a]	2.20[b]	2.19[b]	0.026	0.002
ADFI, lb	6.17	6.22	6.27	0.048	0.164
F/G	2.70[b]	2.83[a]	2.87[a]	0.024	< 0.001
Within-pen weight CV					
d 0	15.62	14.90	15.13	3.029	0.796
d 91	9.54	9.18	8.87	0.720	0.405
CV change (d 0 to 91)	-6.08	-5.73	-6.27	2.371	0.828
Removals, %	0.00	1.70	1.33	0.631	0.908
Mortalities, %	2.23[b]	5.64[a]	6.10[a]	1.168	0.024
Removals and mortalities, %	2.37[b]	7.63[a]	7.63[a]	1.289	0.003
Carcass characteristics					
HCW, lb	230.9[a]	229.8[ab]	227.0[b]	1.09	0.042
Yield, %	74.2[a]	73.7[ab]	73.6[b]	0.18	0.030
Backfat, in	0.62[b]	0.64[b]	0.68[a]	0.009	< 0.001
Loin depth, in	3.14[a]	2.92[b]	2.90[b]	0.013	< 0.001
Lean, %	57.7[a]	56.7[b]	56.4[c]	0.074	< 0.001
Carcass ADG, lb	1.70[a]	1.65[b]	1.63[b]	0.017	0.001
Carcass F/G	3.63[b]	3.79[a]	3.85[a]	0.030	< 0.001
Economics, $/pig					
Revenue[3]	196.23[a]	195.34[ab]	192.98[b]	0.928	0.042
Feed cost	70.39[b]	73.36[a]	73.33[a]	0.556	< 0.001
Feed cost, $/lb gain	0.268[c]	0.272[b]	0.277[a]	0.0010	< 0.001
IOFC[4]	125.85[a]	121.98[b]	119.65[b]	0.872	< 0.001

[1A] total of 1,416 mixed-sex pigs (initially, 50.6 ± 0.65 lb) were used with 19 or 21 pigs per pen and 24 replicates per treatment. Sire line treatments were Pietrain- or Duroc-based, with sire line A being from a Pietrain sire line and sire lines B and C being from Duroc sires. A common diet was fed throughout the grow-finish period of the trial.

[2On] d 91, 105, and 119, approximately 33% of the pigs/pen were marketed at each marketing event.

[3] Revenue = carcass price × HCW.

[4] Income over feed cost (IOFC) = revenue – feed cost.

Table 4. Main effect of creep feeding on finishing pig performance, removals and mortality, carcass characteristics, and economics[1]

	Creep feed			
Item	No	Yes	SEM	*P* =
BW, lb				
d 0	50.3	50.4	0.64	0.325
d 91	292.6	293.7	1.20	0.411
Marketing BW, lb[2]				
First cut (d 91)	316.3	314.1	2.68	0.299
Second cut (d 105)	311.7	313.8	1.75	0.326
Third cut (d 119)	301.2	307.1	2.57	0.013
Average	309.7	311.7	1.15	0.176
Premarket (d 0 to 91)				
ADG, lb	2.28	2.29	0.013	0.442
ADFI, lb	6.05	6.11	0.037	0.089
F/G	2.65	2.67	0.007	0.084
During marketing (d 91 to 119)				
ADG, lb	2.46	2.53	0.069	0.167
ADFI, lb	8.33	8.43	0.188	0.528
F/G	3.42	3.35	0.087	0.314
Overall (d 0 to 119)				
ADG, lb	2.22	2.23	0.023	0.938
ADFI, lb	6.19	6.26	0.044	0.080
F/G	2.78	2.82	0.020	0.225
Within-pen weight CV				
d 0	15.31	15.13	2.997	0.841
d 91	9.56	8.83	0.691	0.078
CV change (d 0 to 91)	-5.75	-6.30	2.343	0.455
Removals, %	0.00	0.00	9.921	1.000
Mortalities, %	4.45	4.09	0.918	0.768
Removals and mortalities, %	5.60	4.84	1.032	0.584
Carcass characteristics				
HCW, lb	229.5	229.0	0.90	0.599
Yield, %	73.9	73.7	0.15	0.232
Backfat, in	0.64	0.66	0.008	0.034
Loin depth, in	2.99	2.98	0.011	0.292
Lean, %	57.0	56.8	0.06	0.012
Carcass ADG, lb	1.66	1.66	0.015	0.896
Carcass F/G	3.73	3.78	0.026	0.117
Economics, $/pig				
Revenue[3]	194.57	195.13	0.763	0.599
Feed cost	71.82	72.90	0.476	0.065

Feed cost, $/lb gain	0.272	0.273	0.0008	0.265
IOFC[4]	122.76	122.23	0.723	0.591

[1] A total of 1,416 mixed-sex pigs (initially, 50.6 ± 0.64 lb) were used with 19 or 21 pigs per pen and 36 replicates per treatment. Creep feed was offered for 7 days prior to weaning. A common diet was fed throughout the grow-finish period of the trial.

[2] On d 91, 105, and 119, approximately 33% of the pigs/pen were marketed at each marketing event.

[3] Revenue = carcass price × HCW.

[4] Income over feed cost (IOFC) = revenue – feed cost.

Table 5. Main effect of plane of nursery nutrition on finishing pig performance, removals and mortality, carcass characteristics, and economics[1]

	Plane of nursery nutrition			
Item	Low	High	SEM	*P* =
BW, lb				
d 0	49.8	50.9	0.64	< 0.001
d 91	292.5	293.9	1.20	0.283
Marketing BW, lb[2]				
First cut (d 91)	314.1	316.2	2.68	0.329
Second cut (d 105)	312.5	313.0	1.75	0.810
Third cut (d 119)	304.7	303.6	2.57	0.660
Average	310.3	311.1	1.15	0.617
Premarket (d 0 to 91)				
ADG, lb	2.29	2.29	0.013	0.962
ADFI, lb	6.06	6.10	0.037	0.359
F/G	2.65	2.67	0.007	0.167
During marketing (d 91 to 119)				
ADG, lb	2.56	2.43	0.069	0.022
ADFI, lb	8.38	8.38	0.188	0.992
F/G	3.30	3.48	0.087	0.012
Overall (d 0 to 119)				
ADG, lb	2.24	2.22	0.023	0.407
ADFI, lb	6.21	6.24	0.044	0.416
F/G	2.78	2.82	0.020	0.148
Within-pen weight CV				
d 0	16.08	14.37	2.997	0.058
d 91	9.10	9.33	0.691	0.501
CV change (d 0 to 91)	-7.02	-5.03	2.34	0.009
Removals, %	0.00	0.00	52.476	1.000
Mortalities, %	4.06	4.49	0.896	0.726
Removals and mortalities, %	4.56	5.93	0.960	0.325
Carcass characteristics				
HCW, lb	228.9	229.6	0.90	0.691

Yield, %	73.8	73.8	0.15	0.776
Backfat, in	0.64	0.65	0.008	0.125
Loin depth, in	2.98	2.99	0.011	0.816
Lean, %	57.0	56.9	0.06	0.374
Carcass ADG, lb	1.66	1.65	0.015	0.580
Carcass F/G	3.74	3.77	0.026	0.197
Economics, $/pig				
Revenue[3]	194.64	195.06	0.763	0.691
Feed cost	72.03	72.69	0.476	0.260
Feed cost, $/lb gain	0.271	0.273	0.0008	0.049
IOFC[4]	122.61	122.38	0.723	0.811

[1] A total of 1,416 mixed-sex pigs (initially, 50.6 ± 0.64 lb) were used with 19 or 21 pigs per pen and 36 replicates per treatment. Treatment diets were corn-soybean meal-based with two nutritional planes, low and high. In phase 1, the low plane of nutrition was formulated to 1.30% SID Lys with low inclusion of whey powder, enzymatically treated soybean meal, blood plasma, and fish meal. The high plane of nutrition was formulated to 1.50% SID Lys with higher inclusion of specialty ingredients.

A common diet was fed throughout the grow-finish period of the trial.

[2] On d 91, 105, and 119, approximately 33% of the pigs/pen were marketed at each marketing event.

[3] Revenue = carcass price × HCW.

[4] Income over feed cost (IOFC) = revenue – feed cost.