1-1-2008

Effects of Nutrition During Gilt Development and Genetic Line on Farrowing Rates Through Parity 3, Causes of Culling, Sow Weights and Backfats through Parity 4, and Factors Affecting Farrowing Rates

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Restricting feed intake during the gilt development period may reduce the number available for breeding in some genetic lines, but thereafter has little effect on sow longevity or productivity.

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Summary

Gilts of two genetic lines were developed with either ad libitum access to feed or energy restriction (75% of ad libitum) to determine effects on subsequent sow performance and longevity. Gilts can be developed with regimens in which energy is restricted during the growing period, but the proportion that express pubertal estrus may be reduced in leaner, faster growing lines. Effects on subsequent farrowing rates are small. Sow weight and backfat at farrowing and weaning of Parity 1 litters affect the likelihood of producing a Parity 2 litter, but these effects are dependent on lean growth rate of the line and on the gilt development regimen. Weight was important in the slower growing, fatter line developed with the restricted feeding regimen; backfat was important in the leaner, faster growing line, but the effect was twice as great in females developed with restricted feeding than for those developed with ad libitum access to feed.

Introduction

Many variables contribute to variation in sow mortality and lifetime production, including housing systems, management during gilt development, sow management practices, and use of different genetic lines. At the University of Nebraska–Lincoln (UNL), we are focusing on whether nutritional regimens during gilt development affect longevity and whether the effect differs between two prolific lines that differ in rate of lean growth.

It is generally recommended that gilts be managed to achieve weights of 300 lb or more at breeding and that gilts have adequate backfat; however, the amount of backfat that is adequate is generally not specified. Producers accomplish these targets with various management practices. Gilts may be developed with ad libitum access to feed until weights of 230 to 250 lb, then feed intake is limited until breeding, with a flush just prior to breeding. Other producers maintain gilts with ad libitum access to feed right up to breeding to ensure target weights are achieved. In most cases, breeders attempt to mate gilts at their second or third post-pubertal estrus and mate sows for subsequent litters within five to 10 days of weaning after a 15 to 23-d lactation period.

Optimum gilt development regimens, however, may depend on the prolificacy of the genetic line and on its rate of lean growth. We initiated an experiment to address the effects of two nutritional regimens during gilt development on sow reproduction and longevity. These regimens were 1) providing ad libitum access to feed during the entire growing period until one week before breeding commenced, and 2) providing ad libitum access to feed until 123 days of age; thereafter, until one week before breeding commenced, feed was restricted to 75% of that consumed by gilts on Regimen 1. Nutrients in the diet of Regimen 2 were increased so that gilts consumed the same amounts of protein, vitamins, and minerals per unit of body weight as those on Regimen 1. Mothers of the gilts were 1) an industry Large White x Landrace cross (LW x LR) or 2) sows of the Nebraska Index Line (L45) that has been selected mainly for increased litter size with some selection for lean growth. Sows of these two lines were inseminated with semen from boars of an industry maternal line; the same boars were used across sow lines. Thus, the experimental gilts were paternal half sibs, with 50% of their genes coming from either industry LW x LR or L45, which differ in rate of lean growth. The experiment was designed to determine whether gilt nutritional development strategies affect longevity and lifetime productivity differently for these two kinds of crossbred females.

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The project is being conducted in three replicates in which approximately 160 gilts per replicate started the experiment at 123 days of age. The experiment is nearing its completion. Females in Replications 1 and 2 have completed four parities and females in Replication 3 have completed three parities. The *2007 Nebraska Swine Report* contained feed intake data and weight, backfat, and longissimus muscle area growth curves for all gilts. With ad libitum access to feed, LW x LR cross gilts had greater rates of body weight gain and lean gain than L45 cross gilts. Restricting energy intake caused approximately equal proportional reductions in rate of growth, backfat thickness, and longissimus muscle area of gilts of both lines, but muscle area per unit of body weight was similar to that of gilts allowed ad libitum access to feed.

Summary data and effects of line and diet on final growth traits and on sow production traits are in the preceding report. This report presents results of analyses to determine whether gilt development regimen and genetic line affected the likelihood that females designated for breeding produced litters at Parities 1, 2, and 3, lifetime production per female through Parity 3, and associations of traits related to sow culling through Parity 3.

Materials and Methods

The LW x LR cross gilts were the progeny of UNL swine nutrition females and industry maternal line (L_M) boars and are designated as LW x LR cross. The L45 cross gilts were the progeny of same L_M boars mated with females of the Nebraska Index line (Line 45) and are designated as L45 X. L45 has been selected mainly for large litter size with some selection for lean growth rate.

Gilt management and dietary treatments

All gilts were managed alike in the nursery until approximately 60 days of age (46 lb). They were then moved to the grow-finish facility where they were penned (10/pen) by line-treatment designation. They all were allowed ad libitum access to a corn-soybean meal based diet and were managed alike until 123 days of age. A three-phase growing-finishing diet was used: phase 1; 1.15% lysine (60 d to 80 lb); phase 2, 1.0% lysine (80 to 130 lb); and phase 3, 0.90% lysine (130 lb to 123 days). At 123 days, pens of gilts on treatment 1 (AL) were allowed ad libitum access to a corn-soybean meal based diet (0.70% lysine, 0.70% Ca, 0.60% P) until they were moved into the breeding barn. Gilts on the restricted intake diet (R) received a corn-soybean meal based diet at approximately 75% of the energy intake as AL-fed gilts until moved into the breeding barn. Energy restriction was achieved by predicting intake with a quadratic equation of average daily feed intake on body weight of AL-fed gilts. The predicted ad libitum intake (based on the projected body weight for the upcoming two-week period) was multiplied by 0.75 to determine the daily feed intake for R gilts. The diet contained 0.93% lysine, 1.0% Ca, and 0.80% P. All vitamins and minerals, except selenium, were increased so that daily intake of these nutrients per unit of body weight was expected to be equal for gilts on both diets. Additional details of the diets and management are in two articles in the *2007 Nebraska Swine Report* (Johnson et al., pp. 10-14 and Miller et al., pp. 14-17).

During the growing period, gilts were weighed and backfat and longissimus muscle area were recorded every 14 days. Beginning at approximately 140 days of age, gilts were moved by pen to an adjacent building where boar exposure and estrus detection occurred. Date of first observed estrus and each additional estrus were recorded. Only gilts that could be mated at their third or later estrus were moved to the breeding barn. Gilts were checked twice daily for estrus and were inseminated each day that they were observed in estrus. Insemination was with semen from commercial terminal sire line boars.

Breeding and lactation management

A restricted breeding period of 25 days (Rep 1), 24 days (Rep 2), and 26 days (Rep 3) was used to match the unit's production schedule. Gilts that did not express estrus, those that were mated but diagnosed open with an ultrasound pregnancy test 50 days post-breeding, and those that were diagnosed pregnant but did not farrow a litter were culled. In addition, lame gilts and those in poor health were culled.

Before breeding and during gestation, all gilts were fed a standard corn-soybean meal based diet (13.8% protein, 0.66% lysine) at the rate of 4.0 lb daily until 90 days of gestation when feed intake was increased to 5.0 lb daily. Gilts were in pens of approximately eight per pen until inseminated and then were moved to gestation stalls.

At approximately 110 days of gestation, females were weighed and backfat thickness was recorded ultrasonically. They were placed in farrowing crates in rooms of 12 crates per room and fed 6 lb per day of a corn-soybean meal based lactation diet (18.5% protein, 1.0% lysine). Sows were provided only a small amount of feed on the day they farrowed, 6 lb on the second day, 10 lb the third day, and then were given ad libitum access to feed.

Litters were weaned at an average age of approximately 17 days of age. Each sow was weighed and ultrasonic backfat was recorded at weaning. Sows were then moved to the breeding area and placed in groups of approximately eight sows per pen. Feeding, estrus detection, insemination, and management during gestation and subsequent lactations were as described above for gilts. The breeding period for sows within replications and parities ranged from 24 to 32 days. Breeding continued until 10 days after the last sow in the replication was weaned. Thus, every sow had at least 10 days to express post-weaning estrus, and most had 15 to 20 days. Sows that did not express estrus, those that were detected to be open by an ultrasonic pregnancy test, and those diagnosed pregnant but

Table 1. **Number of gilts that finished the performance test (NF), number that expressed puberty (PUB), number moved to breeding (B), and numbers that did not express estrus during the breeding period (NE), died or culled due to lameness or unhealthy status (D), number mated but not pregnant (NP) from movement to breeding to Parity 1 (P0 to P1), Parity 1 to Parity 2 (P1 to P2) and Parity 2 to Parity 3 (P2 to P3), and number that farrowed at each parity (F).**

					P0 to P1				P1 to P2				P2 to P3			
Line[a]	Trt[b]	NF	PUB	B	NE	D	NP	F	NE	D	NP	F	NE	D	NP	F
LW/LR	AL	129	118	105	8	1	19	77	17	10	7	43	2	0	8	33
LW/LR	R	127	99	93	4	3	16	70	13	1	8	48	2	2	9	35
L45 X	AL	103	100	94	1	2	12	79	3	2	14	40	3	2	6	29
L45 X	R	103	97	87	3	4	10	70	11	6	8	45	3	1	5	36
LW/LR		256	217	198	12	4	35	147	30	11	15	91	4	2	17	68
L45 X		206	197	181	4	6	22	149	14	8	22	85	6	3	11	65
	AL	232	218	199	9	3	31	156	20	12	21	83	5	2	14	62
	R	230	196	180	7	7	26	140	24	7	16	93	5	3	12	71
Total		462	414	379	16	10	57	296	44	19	37	176	10	5	26	133

[a]LW/LR = females were progeny of LW x LR sows, L45 X are progeny of Nebraska selection line sows.
[b]AL = gilts developed with ad libitum feeding, R = gilts developed with energy restriction.

that did not farrow a litter were culled. In addition, lame and unhealthy sows were culled.

Traits and data analysis

Based on females designated for breeding, each female was scored as 1 if she farrowed a litter at Parity 1, Parity 2, and Parity 3 and 0 if not. These scores, which are measures of success/failure to reproduce, were fitted with general linear models designed for binomial data to determine the importance of line, gilt treatment, and interaction of line with treatment. Performance variables were fitted as covariates to estimate their effect on whether sows reproduced. Variables fitted for Parity 1 scores were gilt final test weight, backfat, longissimus muscle area, and age at puberty. Variables fitted to Parity 2 scores were the sow's Parity 1 total litter size born, total weight of litter weaned, prefarrowing sow weight and backfat, sow weight and backfat at weaning, and weight and backfat loss from farrowing to weaning. These same variables recorded in Parity 2 sows were fitted in models analyzing success/failure to produce a Parity 3 litter. Solutions for each variable were obtained and are presented as the change in probability of producing a litter per unit change in the co-variable.

Total number of pigs produced per female through Parity 3 was calculated for each sow based first on all females that entered the breeding herd (those females that did not produce a Parity 1 litter were credited with a 0), and second based only on those sows that produced Parity 1 litter. These two measures of lifetime production, designated LNBA1 and LNBA2, were fitted to models to estimate line, treatment, and interaction effects.

Results and Discussion

Table 1 contains numbers of gilts at each stage of production and the numbers that were culled for failure to express estrus, died or were unhealthy, or that were mated, but open. The percentage of gilts that expressed pubertal estrus was affected by both genetic line ($P < 0.001$) and developmental diet ($P < 0.005$). More L45 X gilts attained puberty (96%) than LW/LR gilts (85%) and more gilts developed with ad libitum access to feed attained puberty than those developed with energy restriction (95% vs. 85%). Thus, as a percentage of those gilts that finished the performance test, a higher percentage of L45 X gilts than LW/LR gilts (88% vs. 77%) and a higher percentage of gilts on treatment AL than R (86 % vs. 78%) were moved into the breeding barn. However, there was a line x treatment interaction ($P < 0.01$) on the proportion of gilts that attained puberty. Of the LW/LR gilts developed on treatment AL, 118 of 129 (91.4%) attained puberty, whereas 99 of 127 (78.0%) of those developed on treatment R attained puberty. Gilt development diet did not affect whether a L45 X gilt attained puberty (AL = 97.1%, R = 94.2%).

The most common cause of culling from breeding to P1 litters was mated gilts that were not pregnant (57), which was not affected by either genetic line or gilt development diet. Failure to express estrus during the breeding period and mated gilts that were not pregnant were approximately equal causes of culling from P1 to P2 and P2 to P3. Again, these causes were not related to either genetic line or to diet during gilt development. Overall, 34 females (9.0 % of those designated for breeding) died or were culled due to poor health before farrowing a Parity 3 litter.

Table 2 contains mean proportions of gilts designated for breeding that farrowed litters and lifetime number of live pigs per female through Parity 3. A greater proportion of L45 X than LW/LR gilts designated for breeding produced litters at each parity, but the difference was significant only at parity 1 (L45 X = 69%, LW/LR = 56%, $P < .01$). Treatment and interaction were not significant for any trait. Thus, gilt development diet did not significantly affect the likelihood

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that a female would produce litters up through Parity 3.

Based on females designated for breeding, Line 45 X gilts produced 2.85 ± 1.57 ($P = 0.07$) more live pigs through Parity 3 than LW x LR females. This difference was due entirely to more L45 X females than LW x LR females producing a Parity 1 litter as there was no difference in lifetime number of live pigs per sow that farrowed a Parity 1 litter. Gilt development diet did not affect lifetime number of live pigs per female based on those females that entered the breeding herd. However, when based on those females that produced a Parity 1 litter, females developed with R intake produced 2.91 ± 1.61 ($P = 0.07$) more live pigs than those developed with AL intake. Because there was little difference in number born alive at each parity due to gilt development diet (see the preceding report), this cumulative difference came about because of slightly greater success rate from P1 to P2 and P2 to P3 for females developed with the R diet.

Table 3 contains mean sow weights and backfats at farrowing and when litters were weaned by line, treatment, and parity. Probability values for effects in the model are shown in each column under that effect. Parity significantly affected all traits. Sows increased in weight and declined in backfat from Parity 1 to 3, but means were similar for Parity 3 and 4 sows. Both weight loss and backfat loss were greatest at Parity 1. Line by treatment interaction existed ($P < 0.05$) for sow weight at farrowing and for farrowing to weaning weight loss. LW x LR females developed with the AL treatment had greater farrowing weights and greater weight loss than those developed on the R treatment, but that did not occur for L45 X females. Interaction between gilt development diet and parity existed for sow backfat at farrowing and at weaning and for backfat loss from farrowing to weaning. Females developed on the AL diet had more backfat at Parity 1 than those developed on the R diet and they lost more backfat from farrowing to

Table 2. Mean proportion, estimated with general linear models, of females of each line and treatment that were retained as breeders that produced Parity 1, 2 and 3 litters, lifetime number of live pigs produced per female, and probabilities associated with tests of significance for line, treatment, and interaction.

						Lifetime No. Live pigs per female	
Line[a]	Trt[b]	No Breeders	Parity1	Parity2	Parity3	LNBA1[c]	LNBA2[c]
LW/LR	AL	105	.58	.39	0.25	12.99	22.24
	R	93	.54	.33	0.27	13.38	24.81
L45	XAL	94	.73	.37	0.26	15.77	21.97
	R	87	.65	.36	0.33	16.30	25.22
LW/LR		198	.56	.35	0.26	13.19	23.53
L45 X		181	.69	.39	.30	16.04	23.59
	AL	199	.65	.34	.26	14.38	22.11
	R	180	.59	.39	.30	14.84	25.01
		Probability for effects in model					
Line			0.004	0.42	0.40	0.07	0.97
Trt			0.17	0.28	0.28	0.75	0.07
Line x Trt			0.73	0.97	0.60	0.97	0.83

[a]LW/LR = females were progeny of LW x LR sows, L45 X are progeny of Nebraska selection line sows.
[b]AL = gilts developed with ad libitum feeding, R = gilts developed with energy restriction.
[c]Based on gilts entering the breeding herd.
[d]Based on females that farrowed Parity 1 litter.

Table 3. Mean sow weight and backfat at farrowing and at weaning, and weight and backfat loss from farrowing to weaning, by line, treatment and parity.

Line, treatment, and parity			Farrowing		Weaning			
Line	Trt	Parity	Wt, lb	BF, in	Wt, lb	BF, in	Wt loss	BF loss
LW/LR			479.4	0.80	417.4	0.72	62.1	0.08
L45 X			469.7	0.79	408.1	0.72	59.3	0.07
			0.07[a]	***0.70***[a]	***0.16***[a]	***0.94***[a]	***0.55***[a]	***0.26***[a]
	AL		476.7	0.81	411.2	0.73	62.0	0.08
	R		472.5	0.79	414.3	0.71	59.4	0.08
			0.38[a]	***0.46***[a]	***0.59***[a]	***0.31***[a]	***0.57***	***0.69***
		1	453.6	0.97	354.8	0.83	99.0[a]	0.15[a]
		2	462.8	0.79	403.7	0.72	58.3	0.07
		3	484.0	0.71	438.8	0.66	43.2	0.05
		4	497.9	0.72	454.0	0.67	42.4	0.05
			<0.01[a]	***<0.01***[a]	***<0.01***[a]	***<0.01***[a]	***<0.01***[a]	***<0.01***[a]
LW/LR	AL		485.8	0.82	413.9	0.73	67.9	0.09
LW/LR	R		473.0	0.79	421.2	0.71	56.4	0.08
L45 X	AL		467.7	0.79	408.8	0.73	56.2	0.06
L45 X	R		471.9	0.79	407.7	0.71	62.3	0.08
			0.04[a]	***0.53***[a]	***0.43***[a]	***0.76***[a]	***0.03***[a]	***0.06***[a]
LW/LR		1	459.5	0.97	361.6	0.84	98.8	0.15
LW/LR		2	471.2	0.80	410.6	0.73	63.2	0.07
LW/LR		3	486.9	0.71	442.5	0.65	43.3	0.06
LW/LR		4	500.1	0.72	455.1	0.65	43.3	0.06
L45 X		1	447.4	0.96	347.9	0.82	99.1	0.14
L45 X		2	454.2	0.77	396.9	0.70	53.4	0.07
L45 X		3	481.1	0.71	435.0	0.67	43.1	0.04
L45 X		4	495.9	0.73	452.9	0.69	41.4	0.03
			0.58[a]	***0.82***[a]	***0.50***[a]	***0.13***[a]	***0.59***[a]	***0.68***[a]
	AL	1	458.2	1.03	352.8	0.87	105.7	0.17
	AL	2	463.9	0.79	401.5	0.72	57.1	0.07
	AL	3	488.0	0.71	441.0	0.67	43.1	0.04
	AL	4	496.1	0.69	450.0	0.66	42.2	0.02
	R	1	448.7	0.90	356.8	0.79	92.3	0.12
	R	2	461.5	0.78	405.9	0.72	59.5	0.07
	R	3	480.0	0.72	436.6	0.65	43.3	0.06
	R	4	480.9	0.85	415.9	0.72	42.5	0.07
			0.61[a]	***<0.0***[a]	***10.45***[a]	***<0.01***[a]	***0.16***[a]	***0.02***[a]

[a]Bold values in italics within each trait are significance probabilities for effects above them; e.g., the probability that farrowing weight is equal for LW/LR and L45 cross sows is 0.07 (significant at $P < 0.10$), whereas the probability that backfats for the lines are equal is 0.70 (nonsignificant).

Table 4. Changes in probability (effect and standard error, SE) of farrowing Parity 1 litter per deviation of 10 lb weight or 0.10 in backfat from line x treatment mean off-test weight and backfat (interaction of effects with line x treatment were significant, $P < 0.05$).

		Off-test Means		Wt-dev			BF-dev		
Line	Trt	Wt, lb	BF, in	Effect	SE	Pr[a]	Effect	SE	Pr[a]
LW/LR	AL	311.3	1.16	.0039	0.014	0.79	0.033	0.016	0.03
LW/LR	R	266.1	0.79	-.0219	0.016	0.16	0.078	0.024	0.001
L45	AL	295.2	1.24	.0162	0.016	0.34	-0.019	0.018	0.27
L45	R	248.7	0.79	.031	0.014	0.04	0.040	0.029	0.17

[a]Pr = probability for test of whether effect equals 0.

Table 5. Change in probability of farrowing a Parity 2 (P1) litter per 10 lb deviation from average sow weight at farrowing and weaning of Parity 1 (P1) litter and loss in weight from farrowing to weaning of Parity1 litter.

Trait	Overall Mean	Change per 10 lb	SE	Pr[a]
P1 sow farrow wt	453.4	-0.018	0.010	.07
P1 sow weaning wt	361.6	0.019	0.007	0.005
Wt loss	91.8	-0.018	0.007	0.005

[a]Pr = probability for test of whether effect equals 0.

weaning, but differences between AL and R females were relatively small at Parities 2 to 4.

The only traits that significantly affected whether gilts produced a Parity 1 litter were off-test weight and backfat. Because treatment affected these traits, each female's record was expressed as a deviation from the respective line x treatment mean. These deviations were then fitted in general linear models to test whether they were related to the likelihood that a female produced a litter. Similar analyses were performed with off-test longissimus muscle area and with age at puberty, but these traits had no effect ($P > 0.25$) on whether a female produced a Parity 1 litter.

Results for weight and backfat deviations are in Table 4. Weight deviation from line means significantly affected the likelihood that L45 X gilts developed on the R diet farrowed a Parity 1 litter, but did not significantly affect the outcome for L45 X gilts developed with the AL diet or LW x LR gilts developed with either diet. For each increase of 10 lb from the mean of 248.7 lb, L45 x gilts developed with the R diet had an increase of .031 ± 0.014 ($P < 0.05$) in the likelihood they would produce a litter; a deviation of -10 lb caused an average decrease of 0.031 in this likelihood.

Off-test backfat, however, did not affect the likelihood that a L45 X gilt produced a Parity 1 litter, regardless of which diet gilts were fed. However, backfat significantly affected the likelihood that LW x LR cross gilts produced a Parity 1 litter and the effect was more than twice as large for gilts developed on the R than AL diet. For LW x LR gilts developed on the AL diet, a change of 0.10 in backfat from the mean off-test backfat of 1.16 in was associated with a change in likelihood of producing a Parity 1 litter of 0.033 ± 0.016; the change was 0.078 ± 0.024 per 0.10 change in backfat for LW x LR gilts developed on the R diet.

Parity 1 sow weight, but not backfat, litter size, or litter weaning weight, affected whether a sow produced a Parity 2 litter. Effects of 10 lb changes from the mean weight at farrowing, weaning and weight loss from farrowing to weaning on likelihood of producing a Parity 2 litter are in Table 5. These effects did not interact with line or treatment, so only the overall effect is presented. Greater pre-farrowing sow weights at Parity 1 decreased the likelihood that sows produced a Parity 2 litter, but greater sow weights at weaning increased the likelihood. The magnitude of these effects was approximately equal (-0.018 ± 0.010 change per 10 lb increase in farrowing weight, 0.019 ± 0.007 change per increase of 10 lb in sow weight at weaning). The most useful measure of the effect of weight on subsequent reproduction is weight loss. The average sow lost 91.8 lb from farrowing to weaning of her Parity 1 litter, including the weight of the litter produced. Whether a sow produced another litter was not related to the number or weight of the pigs she produced, but was related to her weight loss. For each deviation of 10 lb from the mean weight loss, the likelihood of producing a Parity 2 litter changed by 0.018 ± 0.007 (increased deviation caused a decline in likelihood of producing a Parity 2 litter, and decreased deviation caused an increase in likelihood).

The likelihood of producing a Parity 3 litter was not affected ($P > 0.25$) by any trait measured in Parity 2 sows. Therefore, neither litter size or weight, or sow weights and backfats had a bearing on whether Parity 2 sows produced a Parity 3 litter.

Conclusions

Restricting feed intake to 75% of that of gilts allowed ad libitum access to feed from 123 days of age to breeding decreased the proportion of gilts that expressed pubertal estrus. However, the effect was line dependent, causing a greater reduction in the leaner, faster growing LW x LR (91.4% vs. 78%) gilts than in the L45 X gilts (97.1% vs. 94.2%). Once designated for breeding, the most frequent causes of female culling through Parity 3 were those that were mated but not pregnant and those that did not express estrus during the breeding period.

More L45 X gilts than LW x LR gilts produced a Parity 1 litter, but lines did not differ in the likelihood of producing Parity 2 and 3 litters. Thus, L45 X females produced 2.85 ± 1.57 more live pigs per female entering the breeding herd than LW x LR cross females. Gilt development diet did not significantly affect the likelihood of females producing a litter at any parity; however, because those developed with restricted feed intake had somewhat greater success at Parities 2 and 3, those developed with restricted

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feed intake produced 2.91 ± 1.61 more live pigs from Parity 1 to 3 than those developed with ad libitum access to feed.

Gilt weight and backfat at 135 days of age affected the likelihood that gilts farrowed a Parity 1 litter. The effect depended on genetic line and development regimen. Each 10 lb increase/decrease in weight from the mean weight of 248.7 lb was associated with an increase/decrease of .031 ± 0.014 in the likelihood a L45 X gilt developed with restricted feed intake farrowed a P1 litter. Weight had no effect on the likelihood of producing a Parity 1 litter for L45 X gilts developed with ad libitum access to feed or LW x LR cross gilts developed with either feeding regimen. Backfat at 135 days affected the likelihood that a LW x LR gilt produced a Parity 1 litter, but did not affect L45 X gilts. The effect was more than twice as large for LW x LR gilts developed on the restricted feeding regimen (increase/decrease of 0.078 ± 0.024 increase/decrease of 0.10 in deviation in backfat from the mean backfat of 0.79 in) than those developed with ad libitum access to feed (increase/decrease of 0.033 ± 0.016 per increase/decrease of 0.10 change from the mean backfat of 1.16 in)

Parity 1 sow weight, but not backfat, litter size, or litter weaning weight, affected whether a sow produced a Parity 2 litter. The average sow lost 91.8 lb from farrowing to weaning of her Parity 1 litter. Each increase/decrease of 10 lb from the mean weight loss was associated with a decrease/increase of 0.018 ± 0.007 in the likelihood of producing a Parity 2. The likelihood of producing a Parity 3 litter was not affected by any trait measured in Parity 2 sows.

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