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Effects of feeder adjustment on growth performance of growing and finishing pigs

Abstract

Two studies were conducted to determine the effects of feeder adjustment on growth performance of growing and finishing pigs. Both experiments were conducted at a commercial swine research facility in southwest Minnesota. In Exp. 1, a total of 1,170 barrows and gilts (PIC, initially 129.0 lb) were used in a 70-d study. Pigs were blocked by weight and randomly allotted to 1 of 5 treatments with 9 replications per treatment. The treatments were feeder settings of 1, 2, 3, 4, or 5, based on settings at the top of the STACO stainless steel dry feeders. Pigs were fed corn-soybean meal-based diets. From d 0 to 28, pigs fed from feeders with increasing feeder openings had increased (linear, P < 0.04) ADG and ADFI. For d 28 to 70, increasing feeder setting did not affect (P > 0.10) any growth performance traits. Overall (d 0 to 70), pigs fed from feeders with increasing feeder openings had increased (linear, P < 0.03) ADFI. Changing feeder setting did not affect (P > 0.18) ADG or F/G. In Exp. 2, a total of 1,250 barrows and gilts (PIC, initially 77.3 lb) were used in a 69-d study to determine the effect of feeder setting and diet type on growth performance of growing and finishing pigs. Pigs were blocked by weight and randomly allotted to 1 of 6 treatments with 8 replications per treatment. The treatments were arranged in a 3 Ã— 2 factorial with main effects of STACO stainless steel dry feeder setting (1, 3, or 5) and diet type (corn-soybean meal- or by-product-based (15% DDGS and 5% bakery by-product). Overall (d 0 to 69), there were no feeder setting Ã— diet type interactions (P > 0.31) for growth performance. Diet type did not affect (P > 0.75) growth performance. Increasing feeder openings increased ADG (qu-adratic, P < 0.03) and ADFI (linear, P < 0.01). Feeder setting tended to influence (quadratic, P > 0.08) F/G with the best F/G at feeder set-ting of 3. In conclusion, feeding pigs from feeders with a more open feeder setting increased ADG and ADFI and tended to improve F/G at middle feeder settings compared with more closed feeder settings. With the dry feeders used in this study, feed should cover slightly more than half of the feed pan to avoid limiting pig performance.; Swine Day, 2008, Kansas State University, Manhattan, KS, 2008

Keywords

Swine day, 2008; Kansas Agricultural Experiment Station contribution; no. 09-074-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1001; By-product; Dried distillers grains with solubles; Feeder adjustment; Finishing pigs

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EFFECTS OF FEEDER ADJUSTMENT ON GROWTH PERFORMANCE OF GROWING AND FINISHING PIGS[1]

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Summary

Two studies were conducted to determine the effects of feeder adjustment on growth performance of growing and finishing pigs. Both experiments were conducted at a commercial swine research facility in southwest Minnesota. In Exp. 1, a total of 1,170 barrows and gilts (PIC, initially 129.0 lb) were used in a 70-d study. Pigs were blocked by weight and randomly allotted to 1 of 5 treatments with 9 replications per treatment. The treatments were feeder settings of 1, 2, 3, 4, or 5, based on settings at the top of the STACO stainless steel dry feeders. Pigs were fed corn-soybean meal-based diets. From d 0 to 28, pigs fed from feeders with increasing feeder openings had increased (linear, $P < 0.04$) ADG and ADFI. For d 28 to 70, increasing feeder setting did not affect ($P > 0.10$) any growth performance traits. Overall (d 0 to 70), pigs fed from feeders with increasing feeder openings had increased (linear, $P < 0.03$) ADFI. Changing feeder setting did not affect ($P > 0.18$) ADG or F/G. In Exp. 2, a total of 1,250 barrows and gilts (PIC, initially 77.3 lb) were used in a 69-d study to determine the effect of feeder setting and diet type on growth performance of growing and finishing pigs. Pigs were blocked by weight and randomly allotted to 1 of 6 treatments with 8 replications per treatment. The treatments were arranged in a 3 × 2 factorial with main effects of STACO stainless steel dry feeder setting (1, 3, or 5) and diet type (corn-soybean meal- or by-product-based (15% DDGS and 5% bakery by-product). Overall (d 0 to 69), there were no feeder setting × diet type interactions ($P > 0.31$) for growth performance. Diet type did not affect ($P > 0.75$) growth performance. Increasing feeder openings increased ADG (quadratic, $P < 0.03$) and ADFI (linear, $P < 0.01$). Feeder setting tended to influence (quadratic, $P > 0.08$) F/G with the best F/G at feeder setting of 3. In conclusion, feeding pigs from feeders with a more open feeder setting increased ADG and ADFI and tended to improve F/G at middle feeder settings compared with more closed feeder settings. With the dry feeders used in this study, feed should cover slightly more than half of the feed pan to avoid limiting pig performance.

Key words: by-product, dried distillers grains with solubles, feeder adjustment, finishing pigs

Introduction

Because of the increase in commodity and feed ingredient prices, more emphasis has been put on improving efficiency of growing

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[1] Appreciation is expressed to New Horizon Farms for use of pigs and facilities and Richard Brobjorg, Scott Heidebrink, and Marty Heintz for technical assistance.
[2] Food Animal Health and Management Center, College of Veterinary Medicine, Kansas State University.

and finishing pigs. Proper feeder adjustment is often an area of focus for improvement in many production systems. Having feeder openings too wide can lead to feed wastage. Operating feeders too tight leads to more plugged feeders and out-of-feed events that could adversely affect performance.

Therefore, the objective of these trials was to determine the effect of different feeder settings on growth performance of growing and finishing pigs and whether diet type influenced the optimal feeder setting.

Procedures

Procedures used in these experiments were approved by the Kansas State University Institutional Animal Care and Use Committee. The experiment was conducted at a commercial research facility in southwest Minnesota. The facility had a totally slatted floor, and each pen was equipped with a STACO (Schaefferstown, PA) stainless steel dry self-feeder and 1 cup waterer. The STACO stainless steel dry self-feeder is a 5-hole single sided feeder with a feed pan dimension of 60-in. × 7-in. × 5.75-in. (length × width × height).

Feeder settings were based on the factory-cut holes in the side of the feeder (Figure 1). Moving a dial from one hole to the next adjusted the feeder gate via a rod that connected the dial to the agitation gate in the feed pan. The feeders had 10 possible feeder settings. Feeder setting 1 was the most open feeder setting. Feeder setting 5 was the most closed feeder setting used in our trials.

The facility was a double-curtain-sided deep-pit barn that operated on mechanical ventilation during the summer and automatic ventilation during the winter. Exp. 1 was conducted in late spring and early summer of 2007, and Exp. 2 was conducted in late spring of 2008.

Experiment 1. A total of 1,170 barrows and gilts (PIC 337 × 1050, initially 129.0 lb) were used in a 70-d study. Pigs were blocked by weight and randomly allotted to 1 of 5 treatments with 9 replications per treatment. Each pen contained 23 to 28 pigs with an equal distribution of barrows and gilts. Pigs were fed corn-soybean meal-based experimental diets (Table 1) in meal form. For the 5 experimental treatments, feeder settings were set at 1, 2, 3, 4, or 5. Feeder settings were left at their respective setting for the duration of the trial.

Pigs and feeders were weighed on d 0, 14, 28, 50, and 70 to determine the response criteria of ADG, ADFI, and F/G. On d 50, the barn was "topped" to simulate normal pig marketing under commercial production practices. The 2 heaviest pigs from all pens were visually selected, removed, and marketed. The remaining pigs were marketed on d 70.

During the week of each weigh day (wk 2, 4, 7, and 10), a digital photo of each feed pan was taken (Figures 2 to 4). The pictures were analyzed separately by a trained panel of 6 people; every picture was scored individually for pan coverage percentage.

After the trial was started, the distance between the feeder trough and the top of the feed plate was measured on both the left and right side of the feeder. The width of the feed plate (3.625 in.) was subtracted from the height measurement to determine gap opening. The feed gate was designed to have some "give" or "play" in the feed gate to allow for feed agitation. Thus, the gap opening of the feeder had a low and high position. The gap opening was measured when the feed plate was in both the lowest and highest position possible. Thus, 2 measurements (right and left side of feeder) of gap opening were obtained and averaged for each respective position (low or high) for each feeder. The high gap opening measurements and percentage of pan coverage were plotted, and the resulting graph was used to develop a regression equation. With this regression equation, it is possible to estimate the pan coverage at any feeder gap opening.

Experiment 2. A total of 1,250 barrows and gilts (PIC 337 × 1050, initially 77.3 lb) were used in a 69-d study. Pigs were blocked by weight and randomly allotted to 1 of 6 treatments with 8 replications per treatment. Each pen contained 27 to 28 pigs with an equal distribution of barrows and gilts. The treatments were arranged in a 2 × 3 factorial with main effects of STACO stainless steel dry feeder setting (1, 3, 5) and diet type (corn-soybean meal- or by-product based (15% DDGS and 5% bakery by-product; Table 2). Similar to Exp. 1, feeder settings remained at their respective setting for the duration of the trial. Pigs and feeders were weighed on d 0, 15, 30, 42, 55, and 69 to determine the response criteria of ADG, ADFI, and F/G.

During weeks 2 and 6 of the trial, a digital photo of each feed pan was taken. As in Exp. 1, all pictures were analyzed separately by a trained panel of 6 people; every picture was scored individually for pan coverage percentage. Also, after the trial was started, gap opening was measured using the same procedures as in Exp. 1. High gap opening was also graphed using the same procedures as in Exp. 1.

Statistical analysis. Data were analyzed as a randomized complete block design by using the PROC MIXED procedure of SAS with pen as the experimental unit.

Results

Experiment 1. From d 0 to 28, pigs fed from feeders with increasing feeder openings had increased (linear, $P < 0.01$) ADG and increased (linear, $P < 0.04$) ADFI (Table 3). For d 28 to 70, increasing feeder setting did not affect ($P > 0.10$) any growth performance traits. Overall (d 0 to 70), pigs fed from feeders with increasing feeder openings had increased (linear, $P < 0.03$) ADFI. Changing feeder setting did not affect ($P > 0.18$) ADG or F/G.

The range in feeder settings provided a wide range of feeder gap openings and corresponding pan coverage (Figure 5). As feeder setting increased from 1 to 5 (or tighten down), low and high gap opening decreased (linear, $P < 0.01$) as expected (Table 4). Furthermore, as feeder setting increased (or feeder gap opening decreased), feeder pan coverage percentage decreased (linear, $P < 0.01$) for wk 2, 4, 7, and 10 of the trial (Table 5).

Experiment 2. From d 0 to 30 and d 30 to 69, pigs fed from feeders with increasing feeder openings had increased (linear, $P < 0.01$) ADG and ADFI (Table 6). Overall (d 0 to 69), there were no feeder setting × diet type interactions ($P > 0.31$) for growth performance. Diet type did not affect ($P > 0.75$) growth performance (Table 7). Pigs fed from feeders with increasing feeder openings had increased (quadratic, $P < 0.03$) ADG. The pigs on feeder setting 1 grew the fastest; there was a slight reduction in growth rate for pigs fed with feeders on setting 3 and a large decrease in ADG as feeder setting was increased from 3 to 5. Pigs fed from feeders with increasing feeder openings had increased (linear, $P < 0.01$) ADFI. Feeder setting tended to influence (quadratic, $P > 0.08$) F/G; optimal F/G occurred when feeders were on setting 3.

As expected, as feeder setting increased (linear, $P < 0.01$), low gap opening and high gap opening decreased (Table 8). As feeder setting increased (or feeder gap opening decreased), feeder pan coverage percentage decreased for wk 2 (linear, $P < 0.01$) and 6 (quadratic, $P < 0.01$) of the trial (Table 9). Feed pan coverage at each gap opening was similar to coverage in Exp. 1; approximately 50% of the feed pan was covered with a high gap opening of 1.15 in. (Figure 6).

Discussion

Our data show that feed intake and daily gain increased as feeder opening increased, whereas feed efficiency improved at the middle feeder adjustment setting. These differences may be explained by increased feed wastage at a very open setting and restricted feed intake resulting in poorer ADG and F/G when feeders are adjusted too tightly.

These trials illustrate the importance of proper feeder management and adjustment. In both trials, feeder setting 3 appeared to be optimal for the feeder studied. However, to apply this data to other dry feeder types, feeder gap opening was measured. The average gap opening for feeder setting 3 from the feed trough to the bottom of the feed plate when the feed plate was in the high position was approximately 1.15 in. The amount of feed covering the bottom surface of the feeder pan for this setting averaged 61%. However, the range for individual feeders on this adjustment setting was large with a range of 14 to 93%. On the basis of this data, our recommendation is for feeders to be adjusted to allow feed to cover slightly more than half of the feed pan without feed accumulating in the corners.

Figure 1. Example of STACO stainless steel dry feeder on feeder setting 3.

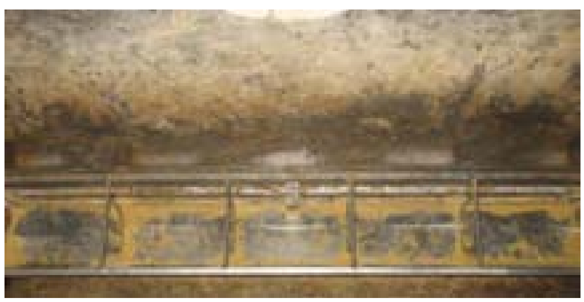

Figure 2. Example of pan coverage for feeder setting 5.

Figure 3. Example of pan coverage for feeder setting 3.

Figure 4. Example of pan coverage for feeder setting 1.

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

Ingredient, %	Phase 1	Phase 2	Phase 3
Corn	68.74	72.49	65.10
Soybean meal (46.5% CP)	23.30	19.65	26.90
Choice white grease	6.00	6.00	6.00
Monocalcium phosphate (21% P)	0.45	0.40	0.55
Limestone	0.85	0.80	0.80
Salt	0.35	0.35	0.35
Vitamin premix	0.06	0.06	0.03
Trace mineral premix	0.07	0.07	0.04
Optiphos 2000[2]	0.03	0.03	0.03
L-lysine HCl	0.15	0.15	0.15
L-threonine	---	---	0.03
Paylean, 9 g/lb	---	---	0.03
Total	100.00	100.00	100.00
Calculated analysis			
SID[3] amino acids, %			
Lysine	0.90	0.81	0.97
Methionine:lysine	27%	28%	27%
Met & Cys:lysine	57%	59%	56%
Threonine:lysine	60%	60%	64%
Tryptophan:lysine	19%	19%	20%
SID Lysine:calorie ratio, g/Mcal of ME	2.48	2.23	2.68
ME, kcal/lb	1,644	1,646	1,643
Total lysine, %	1.00	0.90	1.10
CP, %	16.82	15.44	18.21
Ca, %	0.51	0.47	0.52
P, %	0.45	0.42	0.48
Available P, %[4]	0.25	0.23	0.23
Avail P:calorie ratio, g/mcal of ME	0.68	0.64	0.64

[1] Phase 1 fed from 208 to 259 lb, phase 2 fed from 170 to 222 lb, phase 3 fed from 222 to 253 lb.
[2] Provided per pound of diet: 227 phytase units of phytase.
[3] Standardized ileal digestible.
[4] Includes expected P release of 0.07% from added phytase.

Table 2. Composition of diets (Exp. 2; as-fed basis)[1]

	Phase 1		Phase 2		Phase 3	
Ingredient, %	Corn-soy	By-product	Corn-soy	By-product	Corn-soy	By-product
Corn	69.38	52.69	73.73	57.06	78.80	61.96
Soybean meal (46.5% CP)	25.05	22.04	20.99	17.86	16.11	13.14
Dried distillers grains with solubles	---	15.00	---	15.00	---	15.00
Bakery by-product	---	5.00	---	5.00	---	5.00
Choice white grease	3.00	3.00	3.00	3.00	3.00	3.00
Monocalcium phosphate (21% P)	0.55	0.20	0.40	0.05	0.35	0.03
Limestone	0.90	1.00	0.88	1.05	0.80	0.95
Salt	0.35	0.35	0.35	0.35	0.35	0.35
Vitamin premix	0.15	0.15	0.13	0.13	0.10	0.10
Trace mineral premix	0.15	0.15	0.13	0.13	0.10	0.10
Optiphos 2000[2]	0.03	0.03	0.03	0.03	0.03	0.03
L-lysine HCl	0.30	0.35	0.28	0.33	0.27	0.31
DL-methionine	0.06	---	0.04	---	0.02	---
L-threonine	0.09	0.05	0.07	0.04	0.07	0.04
Total	100.00	100.00	100.00	100.00	100.00	100.00
Calculated analysis						
SID[3] amino acids, %						
Lysine	1.06	1.06	0.94	0.94	0.81	0.81
Methionine:lysine	30%	27%	29%	29%	29%	31%
Met & Cys:lysine	56%	56%	56%	59%	58%	63%
Threonine:lysine	62%	62%	62%	62%	64%	64%
Tryptophan:lysine	17%	17%	17%	17%	17%	17%
SID Lysine:calorie ratio, g/Mcal of ME	3.04	3.04	2.70	2.68	2.32	2.30
ME, kcal/lb	1,578	1,588	1,581	1,591	1,585	1,594
Total lysine, %	1.17	1.21	1.05	1.07	0.90	0.93
CP, %	17.93	19.72	16.36	18.11	14.51	16.32
Ca, %	0.55	0.52	0.50	0.50	0.45	0.44
P, %	0.48	0.46	0.44	0.41	0.41	0.39
Available P, %[4]	0.18	0.18	0.25	0.25	0.23	0.24

[1] Phase 1 fed from 77 to 125 lb, phase 2 fed from 125 to 175 lb, phase 3 fed from 175 to 219 lb.
[2] Provided per pound of diet: 227 phytase units of phytase.
[3] Standardized ileal digestible.
[4] Includes expected P release of 0.07% from added phytase.

Table 3. Influence of feeder adjustment on growing-finishing pig performance (Exp. 1)[1]

	Feeder Setting						Probability, *P* <		
Item	1	2	3	4	5	SE	Treatment	Linear	Quadratic
d 0 to 28									
Initial wt, lb	129.0	129.2	128.4	128.7	129.7	1.54	0.97	0.82	0.60
ADG, lb	1.85	1.84	1.80	1.80	1.78	0.03	0.29	0.04	0.92
ADFI, lb	4.51	4.46	4.32	4.30	4.30	0.06	0.02	0.01	0.32
F/G	2.45	2.43	2.41	2.39	2.42	0.03	0.64	0.28	0.40
d 28 to 70									
ADG, lb	1.72	1.78	1.81	1.73	1.74	0.04	0.27	0.80	0.10
ADFI, lb	4.85	4.93	4.88	4.73	4.76	0.10	0.58	0.23	0.57
F/G	2.81	2.78	2.69	2.75	2.73	0.05	0.49	0.22	0.36
d 0 to 70									
ADG, lb	1.77	1.80	1.81	1.76	1.75	0.02	0.33	0.22	0.18
ADFI, lb	4.71	4.74	4.65	4.55	4.56	0.07	0.18	0.03	0.84
F/G	2.65	2.63	2.57	2.59	2.60	0.04	0.48	0.18	0.30
Final wt, lb	251.6	253.7	256.5	251.6	252.5	2.23	0.45	0.96	0.21

[1] A total of 1,170 pigs (PIC, initially 129.0 lb) were used in a 70-d experiment with 23 to 28 pigs per pen and 9 pens per treatment.

Table 4. Influence of feeder adjustment on feeder gap opening (Exp. 1)[1]

	Feeder Setting						Probability, *P* <		
Gap opening, in.[2]	1	2	3	4	5	SE	Treatment	Linear	Quadratic
Low	1.14	1.04	0.90	0.79	0.68	0.03	0.01	0.01	0.92
High	1.42	1.30	1.16	1.05	0.87	0.03	0.01	0.01	0.45

[1] A total of 1,170 pigs (PIC, initially 129.0 lb) were used in a 70-d experiment with 23 to 28 pigs per pen and 9 pens per treatment.
[2] Measured from the bottom of the feed pan to the bottom of the feed plate with the feed plate at the lowest (low) and highest (high) possible positions.

Table 5. Influence of feeder adjustment on feeder pan coverage (Exp. 1)[1]

	Feeder setting						Probability, *P* <		
Pan coverage, %	1	2	3	4	5	SE	Treatment	Linear	Quadratic
wk 2	74.0	71.3	57.0	34.3	20.6	4.63	0.01	0.01	0.09
wk 4	73.1	65.9	62.9	41.9	24.9	4.28	0.01	0.01	0.03
wk 7	78.0	67.0	63.7	46.3	24.8	3.39	0.01	0.01	0.01
wk 10	78.9	73.9	64.6	45.2	26.1	3.04	0.01	0.01	0.01

[1] A total of 1,170 pigs (PIC, initially 129.0 lb) were used in a 70-d experiment with 23 to 28 pigs per pen and 9 pens per treatment.

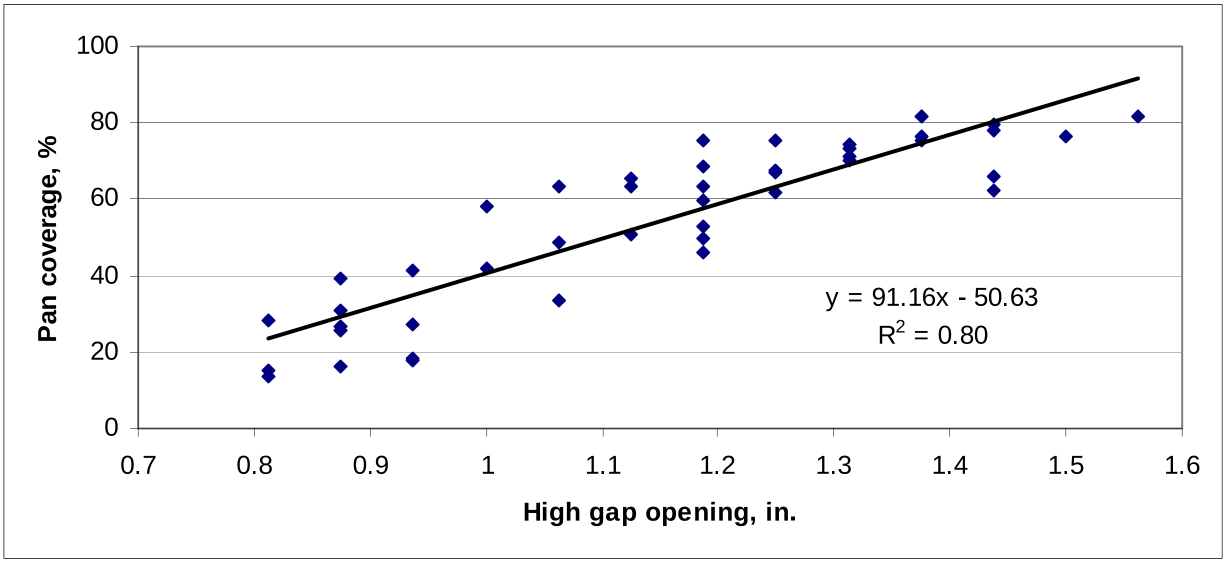

Figure 5. Percentage of pan covered with feed at different high gap opening measurements (Exp. 1).

High gap opening is the maximum distance from the feed pan to the bottom of the feeder agitation gate.

Table 6. Influence of feeder adjustment and diet type on growing-finishing pig performance (Exp. 2)[1]

	Corn-soybean meal			By-product							Probability *P*<	
	Feeder setting			Feeder setting							Feeder setting	
Item	1	3	5	1	3	5	SE	Diet × Feeder setting	Diet	Feeder setting	Linear	Quadratic
d 0 to 30												
Initial wt, lb	77.4	77.5	77.2	77.2	77.5	77.1	0.04	1.00	0.97	0.99	0.93	0.89
ADG, lb	2.09	2.04	1.91	2.01	2.04	1.97	0.04	0.22	0.92	0.01	0.01	0.16
ADFI, lb	4.35	4.16	4.03	4.36	4.29	4.05	0.08	0.68	0.42	0.01	0.01	0.70
F/G	2.07	2.06	2.14	2.19	2.09	2.06	0.05	0.13	0.63	0.46	0.55	0.29
d 30 to 69												
ADG, lb	2.11	2.06	1.94	2.09	2.07	1.94	0.03	0.90	0.97	0.01	0.01	0.08
ADFI, lb	5.49	5.25	5.03	5.43	5.26	5.04	0.07	0.86	0.81	0.01	0.01	0.83
F/G	2.60	2.55	2.60	2.60	2.55	2.60	0.04	1.00	0.88	0.26	0.99	0.10
d 0 to 69												
ADG, lb	2.10	2.05	1.92	2.06	2.05	1.95	0.02	0.37	0.87	0.01	0.01	0.03
ADFI, lb	4.99	4.77	4.59	4.95	4.84	4.61	0.06	0.74	0.75	0.01	0.01	0.69
F/G	2.37	2.34	2.40	2.42	2.34	2.35	0.03	0.31	0.87	0.19	0.67	0.08
Final wt, lb	223.5	220.6	212.1	221.4	220.3	214.2	3.27	0.81	0.97	0.02	0.01	0.33

[1] A total of 1,250 pigs (PIC, initially 77.3 lb) were used in a 69-d experiment with 27 to 28 pigs per pen and 8 pens per treatment for the treatments of feeder setting 1 and 3 for both diet types and 7 pens per treatment for the treatments of feeder setting 5 for both diet types.

Table 7. Main effects of feeder adjustment on growing-finishing pig performance (Exp. 2)[1]

					Probability, *P* <	
	Feeder setting				Feeder setting	
Item	1	3	5	SE	Linear	Quadratic
d 0 to 30						
Initial wt, lb	77.3	77.5	77.1	1.57	0.93	0.89
ADG, lb	2.05	2.04	1.94	0.03	0.01	0.16
ADFI, lb	4.35	4.22	4.04	0.05	0.01	0.70
F/G	2.13	2.07	2.10	0.04	0.55	0.29
d 30 to 69						
ADG, lb	2.10	2.06	1.94	0.02	0.01	0.08
ADFI, lb	5.46	5.26	5.03	0.05	0.01	0.83
F/G	2.60	2.55	2.60	0.03	0.99	0.10
d 0 to 69						
ADG, lb	2.08	2.05	1.94	0.02	0.01	0.03
ADFI, lb	4.97	4.80	4.60	0.05	0.01	0.69
F/G	2.39	2.34	2.38	0.03	0.67	0.08
Final wt, lb	222.5	220.4	213.2	2.31	0.01	0.33

[1] A total of 1,250 pigs (PIC, initially 77.3 lb) were used in a 69-d experiment with 27 to 28 pigs per pen and 8 pens per treatment for the treatments of feeder setting 1 and 3 for both diet types and 7 pens per treatment for the treatments of feeder setting 5 for both diet types.

Table 8. Influence of feeder adjustment on gap opening (Exp. 2)[1]

					Probability, *P* <	
	Feeder setting				Feeder setting	
Gap opening, in.[2]	1	3	5	SE	Linear	Quadratic
Low	1.13	0.86	0.62	0.02	0.01	0.50
High	1.42	1.14	0.87	0.02	0.01	0.83

[1] A total of 1,250 pigs (PIC, initially 77.3 lb) were used in a 69-d experiment with 27 to 28 pigs per pen and 8 pens per treatment for the treatments of feeder setting 1 and 3 for both diet types and 7 pens per treatment for the treatments of feeder setting 5 for both diet types.

[2] Measured from the bottom of the feed pan to the bottom of the feed plate with the feed plate at the lowest (low) and highest (high) possible positions.

Table 9. Influence of feeder adjustment and diet type on feeder pan coverage (Exp. 2)[1]

	Corn-soybean meal			By-product							Probability, *P* <	
	Feeder setting			Feeder Setting							Feeder setting	
Feeder pan coverage, %	1	3	5	1	3	5	SE	Diet × Feeder setting	Diet	Feeder setting	Linear	Quadratic
wk 2	73.3	46.9	19.4	85.5	63.2	17.8	6.87	0.37	0.10	0.01	0.01	0.28
wk 6	74.7	53.3	25.9	85.3	70.3	22.4	6.34	0.17	0.10	0.01	0.01	0.04

[1] A total of 1,250 pigs (PIC, initially 77.3 lb) were used in a 69-d experiment with 27 to 28 pigs per pen and 8 pens per treatment for the treatments of feeder setting 1 and 3 for both diet types and 7 pens per treatment for the treatments of feeder setting 5 for both diet types.

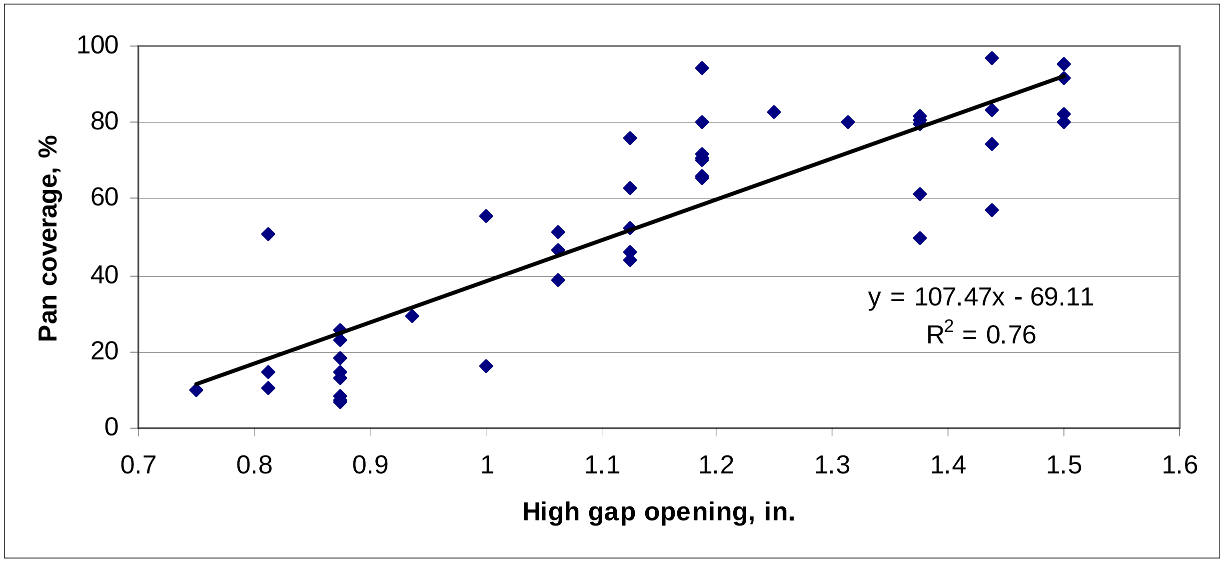

Figure 6. Percentage of pan covered with feed at different high gap opening measurements (Exp. 2).
High gap opening is the maximum distance from the feed pan to the bottom of the feeder agitation gate.