The Effects of Feeder Adjustment on Growth Performance of Finishing Pigs

A. J. Myers, R. D. Goodband, M. D. Tokach, S. S. Dritz[1], J. R. Bergstrom, J. M. DeRouchey, and J. L. Nelssen

Summary

A total of 234 growing pigs (PIC TR4 × 1050, initially 91.4 lb) were used in an 89-d trial to determine the effects of feeder adjustment on finishing pig performance. Pigs were randomly allotted to 1 of 3 treatments. The treatments consisted of a narrow feeder adjustment (minimum gap opening of 0.50 in.), medium feeder adjustment (minimum gap opening of 0.75 in.), and wide adjustment (minimum feeder gap opening of 1.00 in.). The feeders were adjusted to the minimum gap setting, but the agitation plate could be moved upward to a maximum gap opening of 0.75, 1.00, or 1.25 in., respectively. Treatments were arranged in a completely randomized design with 9 replications of 8 pigs per pen and 1 replicate with 6 pigs. To ensure equal floor space, pen gating was adjusted to provide 8 ft^2 /pig during the study. All pens had the same feeder with 2, 14-in.-wide by 4.5-in.-deep feeder holes. Pigs had ad libitum access to feed and water. All pigs were fed a corn-soybean meal-based diet containing 20% dried distillers grains with solubles (DDGS) in 4 phases. Pen weights and feed disappearance were measured every 2 wk. Also, pictures of feeders were taken and scored by a panel to detemine percentage pan coverage. Results showed that narrow, medium, and wide feeder adjustments averaged approximately 28, 58, and 75% pan coverage, respectively. From d 0 to 28, pigs exposed to increasing feeder gap had improved (linear; $P \leq 0.05$) ADFI, with the greatest ADFI observed at 1.00 in. However, from d 28 to 56 and 56 to 89, ADG was not different among pigs fed from different feeder openings, and F/G was best for those fed from the 0.50-in. opening. Overall (d 0 to 89), there was a trend ($P = 0.08$) for increased ADG with increasing feeder opening. However, pigs fed with a 0.50-in. feeder gap had improved (linear; $P < 0.03$) F/G compared to those with a 0.75- or 1.00-in. feeder opening. These results suggest that from 90 to 150 lb, maximum ADG was observed with a feeder setting of 0.75 in (approximately 58% pan coverage). However, pigs fed from 150 to 270 lb had greater ADG and the best F/G at a setting of 0.50 in (approximately 28% pan coverage). Thus, it appears that optimum feeder-gap setting may differ with growth phase.

Key words: feeder adjustment, feeder gap opening, finishing pig

Introduction

As feed prices rise, producers have begun to consider feeder adjustments as a way to decrease feed wastage while optimizing performance. If feeder openings are adjusted too wide, increased feed wastage and poorer feed efficiency may occur. If feeder adjustment is too restricted, growth performance may be adversely affected. Previous research (Myers et al. 2010[2]) has shown that a minimum feeder gap of 1.00 in. had increased

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

[2] Myers et al., Swine Day 2010, Report of Progress 1038, pp. 172-177.

feed disappearance and resulted in poorer F/G compared to a minimum feeder gap of 0.50 in. Currently little is known about optimal feeder adjustment for performance at various stages during the grow-finishing period. The objective of this study was to determine the ideal feeder adjustment for performance at various growth stages of finishing pigs.

Procedures

The Kansas State University (K-State) Institutional Animal Care and Use Committee approved the protocol used in this experiment. The study was conducted at the K-State Swine Teaching and Research Center, Manhattan, KS.

A total of 234 growing pigs (PIC TR4 × 1050, initially 91.4 lb) were used in an 89-d trial. Pigs were randomly alloted to 1 of 3 treatments. There were 9 pens per treatment with 8 pigs per pen and one replicate with 6 pigs per pen. Treatments were arranged in a completely randomized design with pen as the experimental unit. The treatments consisted of a narrow feeder adjustment (minimum gap opening of 0.50 in.), medium feeder adjustment (minimum gap opening of 0.75 in.), and wide adjustment (minimum gap opening of 1.00 in.). The feeders were adjusted to the minimum gap setting, but the agitation plate could be moved upward to a maximum gap opening of 0.75, 1.00, or 1.25 in., respectively. To ensure equal floor space among pens of 8 and 6 pigs, the gating was adjusted to provide 8 ft^2 per pig during the study. All pens had the same feeder with 2 14-in.-wide by 4.5-in.-deep feeder holes. Pigs were provided ad libitum access to feed and water. A common diet containing 20% DDGS was fed in 4 phases, each approximately 28 d (Table 1). The diet was formulated to meet or exceed NRC[3] requirements for finishing pigs. Average daily gain, ADFI, and F/G were determined by weighing pigs and measuring feed disappearance on d 0, 14, 28, 42, 58, 70, 84, and 89. Pictures of feeder pan coverage were taken once during each phase. The feeder pan pictures were then scored by a panel of 4 for percentage of pan coverage. Data were analyzed as a completely randomized design with repeated measures over time using the PROC MIXED procedure of SAS (SAS Institute Inc., Cary, NC). Linear and quadratic contrasts for the effects of increasing feeder gap use were evaluated. Pen was the experimental unit.

Results and Discussion

The narrow, medium, and wide feeder adjustments averaged approximately 28, 58, and 75% pan coverage, respectively (Figures 1, 2, and 3, respectively). From d 0 to 28, no differences among pigs fed from feeders with different adjustments were observed for ADG. While pigs with increasing feeder gap had increased (linear; $P < 0.05$; Table 2) ADFI, there was a tendency for pigs with increasing feeder gap to have improved ($P<0.07$) F/G.

From d 28 to 58, no differences among pigs fed from feeders with the different adjustment settings were observed for ADG. Increasing feeder gap setting increased (linear, $P < 0.05$) ADFI. This resulted in pigs with 0.50-in. feeder gap having improved (quadratic, $P < 0.04$) F/G compared to pigs with 0.75- or 1.00-in. feeder opening.

From d 58 to 89, there were no differences in ADG, ADFI or F/G among treatments.

[3] NRC. 1998. Nutrient Requirements of Swine. 10th ed. Natl. Acad. Press, Washington, DC.

Overall (d 0 to 89), (linear; $P < 0.08$) ADG tended to improve as feeder gap setting increased, with no further benefit over the 0.75-in. setting. Also, pigs fed with either a 0.75- or 1.00-in. gap setting had increased (linear; $P < 0.01$) feed intake compared to those with 0.50-in. feeder gap. However, pigs fed with the 0.50-in. feeder gap had improved (linear; $P < 0.03$) F/G compared to pigs fed with a 0.75- or 1.00-in. feeder gap.

For carcass measurement, no significant differences were found among treatments for HCW, percentage lean, percentage carcass yield, backfat depth, or loin depth (Table 3).

These results suggest that when pigs first enter the finisher, the feeder gap should be set to at least 0.75 in. (approximately 58% pan coverage) to maximize gain without affecting feed efficiency. However, after pigs reach 150 lb, feeders should be adjusted to a 0.50-in. gap width (approximately 28% pan coverage) to minimize feed wastage and optimize both ADG and F/G. Thus, it appears that optimum feeder gap setting may differ with growth phase.

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

Item	Phase 1	Phase 2	Phase 3	Phase 4
Ingredient, %				
Corn	63.25	67.45	70.45	72.40
Soybean meal, (46.5% CP)	14.4	10.4	7.55	5.7
DDGS[2]	20	20	20	20
Limestone	1.25	1.20	1.13	1.08
Salt	0.35	0.35	0.35	0.35
Vitamin premix	0.15	0.13	0.10	0.08
Trace mineral premix	0.15	0.13	0.10	0.08
L-lysine HCl	0.34	0.29	0.27	0.26
Phytase 600[3]	0.14	0.09	0.06	0.04
Total	100	100	100	100
Calculated analysis				
Standardized ileal digestible amino acids, %				
Lysine	0.88	0.75	0.66	0.60
Isoleucine:lysine	66	69	71	73
Methionine:lysine	31	34	37	39
Met & Cys:lysine	34	70	75	80
Threonine:lysine	60	64	67	69
Tryptophan:lysine	16.5	16.5	16.5	16.6
Valine:lysine	80	85	90	94
Total lysine, %	1.02	0.88	0.78	0.72
CP, %	17.8	16.3	15.2	14.5
ME kcal/lb	1,519	1,521	1,524	1,526
Ca, %	0.55	0.52	0.48	0.46
P, %	0.42	0.40	0.39	0.38
Available P, %	0.28	0.25	0.23	0.21

[1] Each dietary phase was fed ~ 24 days.
[2] Dried distillers grains with solubles.
[3] Phyzyme 600 (Danisco Animal Nutrition, St. Louis, MO) provided 231 FTU/lb, with a release of 0.10% available P.

Table 2. Effects of feeder adjustment (gap setting) on finishing pig performance[1]

	Feeder gap, in.				*P*-value	
Item	0.50	0.75	1.00	SEM	Linear	Quadratic
d 0 to 28						
ADG, lb	1.93	2.15	2.11	0.056	0.15	0.23
ADFI, lb	4.89	5.51	5.59	0.169	0.04	0.35
F/G	2.54	2.58	2.64	0.054	0.06	0.76
d 28 to 58						
ADG, lb	2.37	2.40	2.42	0.056	0.30	0.81
ADFI, lb	6.90	7.44	7.37	0.169	0.02	0.06
F/G	2.92	3.10	3.05	0.054	0.05	0.03
d 58 to 89						
ADG, lb	1.51	1.46	1.50	0.056	0.87	0.33
ADFI, lb	5.22	5.33	5.45	0.169	0.18	0.96
F/G	3.47	3.65	3.64	0.054	0.12	0.30
d 0 to 89						
ADG, lb	1.94	2.00	2.01	0.028	0.08	0.36
ADFI, lb	5.67	6.09	6.14	0.123	0.01	0.22
F/G	2.97	3.11	3.11	0.040	0.03	0.18
Feeder coverage score, %[2]						
	27.7	58.2	75.0	7.56	0.01	0.31

[1] A total of 234 pigs (PIC TR4 ×1050, initially 91.4 lb) were used in an 89-d study to evaluate the effects of feeder adjustment on finisher growth performance. There were 8 pigs per pen and 9 pens per treatment. There was one pen per treatment with 6 pigs per pen.
[2] Pictures of feeder pan coverage were taken once during each dietary phase. A panel of 4 scored feeder pan pictures for percentage of pan coverage.

Table 3. Effects of feeder adjustment on carcass characteristics of finishing pigs[1]

	Feeder gap, in.				*P*-value	
Item	0.50	0.75	1.00	SEM	Linear	Quadratic
Live weight, lb	280	283	285	4.23	0.35	0.92
HCW, lb	208	211	208	4.95	0.37	0.58
Yield, %	74.2	74.0	74.0	0.56	0.81	0.18
Lean, %[2]	50.5	50.2	51.1	0.51	0.21	0.60
Backfat depth, in	1.07	1.07	1.00	0.91	0.25	0.89
Loin depth, in	2.50	2.39	2.48	1.34	0.61	0.17

[1] A total of 234 pigs (PIC TR4 ×1050, initially 91.4 lb) were used in an 89-d study to evaluate the effects of feeder adjustment on finisher growth performance.
[2] Percentage lean, backfat depth, and loin depth were adjusted to a common HCW.

Figure 1. Narrow feeder adjustment (minimum feeder gap was 0.5 in. with a maximum gap of 0.75 in.) averaged 27% feeder pan coverage.

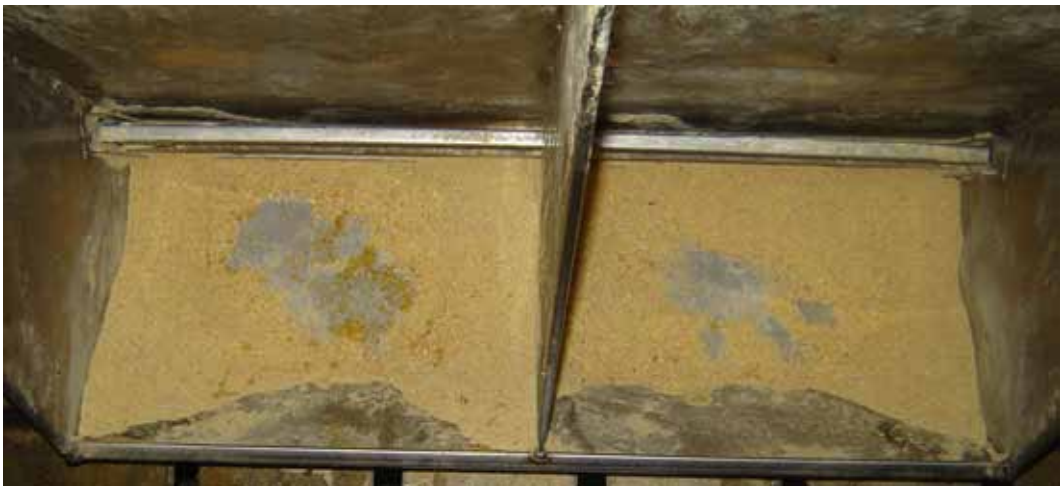

Figure 2. Medium feeder adjustment (minimum feeder gap was 0.75 in. with a maximum gap of 1.00 in.) averaged 58% feeder pan coverage.

Figure 3. Wide feeder adjustment (minimum feeder gap was 1.00 in. with a maximum gap of 1.25 in.) averaged 75% feeder pan coverage.