

## Evaluation of Environmental Enrichment on Feed Intake and Growth Performance of Weanling Pigs

*Jenna J. Bromm, Mike D. Tokach, Jason C. Woodworth, Robert D. Goodband, Joel M. DeRouchey, and Jordan T. Gebhardt<sup>1</sup>*

### Summary

A total of 360 pigs (DNA 200 × 400; initially  $13.8 \pm 1.83$  lb BW) were used in a 42-d nursery trial to determine the effects of the addition of an environmental enrichment, in the form of ropes tied to the feeder dividers, on feed intake and growth performance of weanling pigs. Pigs were weaned at approximately 21-d of age and randomly assigned to 1 of 2 treatments with 5 pigs per pen and 36 pens per treatment. At placement, a rope was secured to each of the dividers in the feed pans of the feeder (3 ropes/feeder) and remained tied to the feeders from d 0 to 10. There was no statistical difference ( $P > 0.10$ ) in ADG, ADFI, or F/G in phases 1 or 2 for pigs in pens with or without ropes tied to the dividers in the feed pan. Feed intake was not recorded for phase 3, but there was no evidence of a difference in phase 3 ADG or final BW between treatments ( $P > 0.10$ ). There was no observed difference in daily feed disappearance from d 0 to 14 based on the presence or absence of the environmental enrichment used in this trial. These results indicate that exposing newly weaned pigs to an environmental enrichment, in the form of ropes tied in the divider of the feed pan, at placement into the nursery did not impact growth performance or feed intake.

### Introduction

It is known that the weaning process is one of the most stressful events in a pig's life leading to a period of nutrient intake disruption. Many strategies have been used to in an attempt to ease the weaning transition.<sup>2</sup> Attachment of ropes or cloth to the creep feeder has been shown to increase the percentage of pigs consuming creep feed prior to weaning.<sup>3</sup> Providing environmental enrichment, in the form of ropes tied to the feeder may attract pigs to the feeder and improve feed intake and growth performance. However, research is needed to confirm if this strategy will improve pig performance.

<sup>1</sup> Department of Diagnostic Medicine/Pathology, College of Veterinary Medicine, Kansas State University.

<sup>2</sup> Sundman, E. R., N. K. Gabler, S. T. Millman, K. J. Stalder, L. A. Karriker, and A. K. Johnson. 2022. The use of attractants to stimulate neonatal piglet interest in rope enrichment. *Animals* 12(2), 211. doi:10.3390/ani12020211.

<sup>3</sup> Wensley, M. R., M. D. Tokach, J. C. Woodworth, R. D. Goodband, J. T. Gebhardt, J. M. DeRouchey, and D. McKilligan. 2021. Maintaining continuity of nutrient intake after weaning. II. Review of post-weaning strategies. *Traditional Animal Science*. Volume 5: Issue 1. doi:10.1093/tas/txab022.

Therefore, the objective of this study was to determine the influence of environmental enrichment on feed intake and growth performance of newly weaned nursery pigs.

## Procedures

### *General*

The Kansas State University Institutional of Animal Care and Use Committee approved the protocol used in this experiment. The study was conducted at the Kansas State University Segregated Early Weaning Research Facility in Manhattan, KS. Each pen contained a 4-hole, dry, self-feeder and a nipple waterer for *ad libitum* access to feed and water. Pens (4 × 4 ft) had metal tri-bar floors and allowed approximately 3.2 ft<sup>2</sup>/pig.

### *Animal treatment and structure*

A total of 360 barrows (DNA 200 × 400; initially 13.8 ± 1.83 lb BW) were used in a 42-d nursery trial. Pigs were weaned at approximately 21-d of age. At the time of allotment, pigs were assigned to 1 of 2 treatments with 5 pigs per pen and 36 pens per treatment. Pigs and treatments were evenly divided into two identical nurseries. The first treatment contained no environmental enrichment, and the second treatment contained environmental enrichment in the form of ropes (~ 22 inches long) tied to the dividers in the feed pan (3 ropes/feeder) and they remained in place from d 0 to 10 (Figure 1). Ropes were replaced if they became untied or destroyed.

Pigs were individually weighed on d 0 and 3 to determine initial change in BW. Pigs were then weighed on d 10, 14, 21, and 42 to determine ADG. Feeders were weighed daily from d 0 to 14 to determine feed disappearance on a daily basis. Following d 14, feed disappearance was measured on d 21 to determine ADFI and F/G.

### *Diet preparation*

Pigs were fed common, corn-soybean meal-based diets from d 0 to 42. Diets were formulated to 1.36% SID Lys for phase 1 (d 0 to 10), 1.35% SID Lys for phase 2 (d 10 to 21), and 1.35% SID Lys for phase 3 (d 21 to 42). All 3 phases were manufactured at Hubbard Feeds (Beliot, KS). Phase 1 was fed in pellet form, and phases 2 and 3 were fed in meal form.

### *Statistical analysis*

Growth performance data were analyzed using the nlme package of R (Version 4.0.0, R Foundation for Statistical Computing, Vienna, Austria) as a completely randomized design with pen as the experimental unit. Differences between treatments were considered significant at  $P \leq 0.05$  and marginally significant at  $0.05 < P \leq 0.10$ .

## Results and Discussion

There was no difference in daily feed disappearance from d 0 to 14 for pigs exposed or not exposed to the environmental enrichment (Figure 2). The presence of the ropes on the feed dividers did not influence early feed disappearance, with all pigs experiencing low intake at the beginning of the trial and then feed disappearance increased after 4 days post-placement.

For phases 1, 2, and overall (d 0 to 21) there were no statistical differences observed in ADG, ADFI, and F/G for pigs with or without exposure to the environmental enrich-

ment (Table 1). Feed intake was not recorded for phase 3, but there was no evidence of a difference in phase 3 ADG or final BW between treatments ( $P > 0.10$ ). In conclusion, exposing pigs to an environmental enrichment in the form of ropes secured to the feeder pan dividers at the beginning of the nursery period did not influence feed intake or growth performance in weanling pigs.

**Table 1. Evaluation of environmental enrichment on feed intake and growth performance of post-weaned pigs<sup>1</sup>**

Item	Control	Environmental enrichment <sup>2</sup>	SEM	$P =$
BW, lb				
d 0	13.7	13.7	0.22	0.940
d 3	13.1	13.1	0.17	0.876
d 10	16.1	16.1	0.49	0.931
d 14	18.9	19.0	0.47	0.687
d 21	26.0	26.1	0.78	0.717
d 42	54.5	54.7	0.80	0.850
d 0 to 10 (Phase 1)				
ADG, lb	0.25	0.24	0.024	0.568
ADFI, lb	0.24	0.23	0.020	0.691
F/G	0.94	0.96	0.149	0.741
d 10 to 21 (Phase 2)				
ADG, lb	0.89	0.91	0.031	0.371
ADFI, lb	1.25	1.26	0.027	0.267
F/G	1.41	1.40	0.022	0.905
d 0 to 21				
ADG, lb	0.58	0.59	0.028	0.572
ADFI, lb	0.68	0.68	0.011	0.502
F/G	1.15	1.16	0.035	0.805
d 21 to 42 (Phase 3)				
ADG, lb	1.37	1.36	0.018	0.677
d 0 to 42 (Overall)				
ADG, lb	0.97	0.97	0.018	0.912

<sup>1</sup> A total of 360 barrows (DNA 200 × 400; initially 13.7 ± 1.83 lb) were used in a 42-d experiment with 5 pigs per pen and 36 replications per treatment.

<sup>2</sup> One rope was secured to each of the dividers in the feed pans of the feeder (3 ropes per feeder) from d 0 to 10.



Figure 1. Ropes secured to dividers in the feed pan. On d 0, a rope (~ 22 inches long) was secured to each of the dividers in the feed pans of the feeder (3 total/feeder).

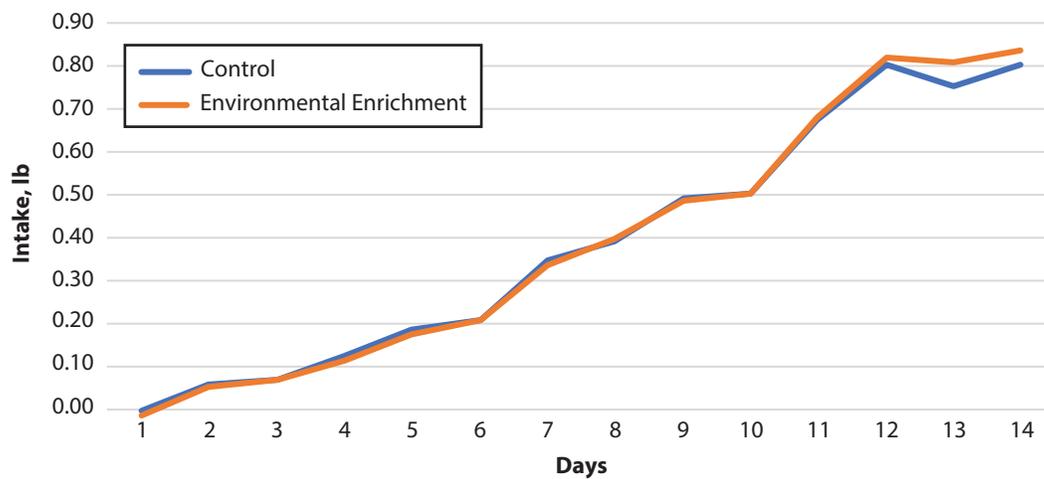


Figure 2. Average daily feed intake from d 0 to 14 post-weaning.