

**132 Effects of weaning time (pm or am) on nursery pig growth performance.** C. R. Neill\*, M. D. Tokach, J. L. Nelssen, R. D. Goodband, S. S. Dritz, J. M. DeRouchey, C. N. Groesbeck, and K. R. Lawrence, *Kansas State University*.

An experiment was conducted to evaluate the effects of weaning time (PM or AM) on nursery pig growth performance. The objective was to determine whether removing sows from the farrowing crates 12 h before moving pigs to the nursery would influence how weanling pigs adjust to the nursery environment. Each sow and litter was randomly allotted to a wean time of either 18:00 on d 0 (d 0 PM) or 6:00 on d 1 (d 1 AM). For pigs weaned on d 0 PM, the sow was removed leaving the pigs in the farrowing crate until d 1 when the other litters that remained on the sow were weaned. All pigs, both PM and AM treatments, were moved from the farrowing house to the nursery on the morning of d 1. A total of 542 weanling pigs (PIC L 327 x L42) from 50 litters were used in the experiment. Pigs were approximately 21 d of age with an average initial body weight of 6.05 kg. All pigs were weighed in the farrowing house just prior to weaning the d 0 PM litters. Pigs were weighed again on d 7, 14, 21, and 28 to determine ADG, ADFI, and G:F. There was an improvement in G:F (0.88 vs 0.79;  $P < 0.01$ ) from d 0 to 7 for pigs that were left on the sow until actual weaning on d 1 AM compared with those weaned on d 0. The reason for this difference was that d 1 AM litters were allowed to nurse for an additional 12 h compared to those litters whose sows were removed on d 0 PM. Although not significant ( $P = 0.17$ ), pigs that had their sow removed on d 0 PM tended to have higher ADFI compared to the d 1 AM weaned pigs for d 0 to 7 (166 vs 159 g, respectively). From d 0 to 28, removing sows from the farrowing house early (d 0 PM) had no influence on ADG (391 vs 391 g), ADFI (506 vs 504 g), or G:F (0.77 vs 0.78). This suggests that weaning time may be scheduled for either early or late in the day to optimize workflow in the sow farm without influencing nursery growth performance.

**Key Words:** Nursery, Weaning, Growth

**133 Particle size of salt and grinding of samples influence the results of mixing efficiency testing.** C. N. Groesbeck\*, R. D. Goodband, M. D. Tokach, S. S. Dritz, J. L. Nelssen, and J. M. DeRouchey, *Kansas State University*.

Two experiments were conducted to evaluate the effect of salt with different particle sizes and sample preparation (unground or ground) on mixing efficiency testing (time required to achieve a CV of 10% or less among 10 feed samples). A 1,360.8 kg capacity horizontal ribbon mixer was used to mix batches of feed. Ten samples were collected at eight times during mixing (0, 30, 60, 120, 210, 330, 480, and 630 s) from pre-determined locations in the mixer. Coefficient of variation was used to measure mixer efficiency by analysis for chloride concentration with Quantab chloride titrators. In Exp. 1, four 1,360.8 kg batches of feed were prepared, two with 440 micron salt and two with 730 micron salt. Samples were analyzed as collected (unground; approximately 700 microns), or ground with a coffee grinder (ground; approximately 400 microns). A salt particle size sample preparation mixing time interaction ( $P < 0.001$ ) was observed; however, a CV of 10% or less was never achieved, indicating inadequate mixing. In Exp. 2, all samples were collected from 907.2 kg batches of feed made in the same 1,360.8 kg capacity mixer. Salt particle sizes of 440, 730, 1,999, and 3,000 microns were analyzed as unground or ground. A salt particle size sample preparation mixing time interaction ( $P < 0.04$ ) was observed. As salt particle size decreased and mixing time increased, there was a decrease in CV. Grinding samples before analysis decreased CV compared with the unground samples, but to a greater extent with coarse salt compared with fine salt. Batches with 440 and 730 micron salt (ground) reached a CV of less than 10%, indicating a uniform mixture. All other treatments did not reach a CV of 10% or less. When the mixer was filled to the rated capacity, we were unable to achieve an acceptable CV for mixing efficiency. Our study also showed that when conducting mixer efficiency testing it is important to use a fine mixing salt.

**Key Words:** Mixing efficiency, Particle size, Salt

**134 Effects of in-feed antimicrobials on growth performance of weanling pigs in a research environment.** R. O. Gotlob\*, J. M. DeRouchey, M. D. Tokach, R. D. Goodband, S. S. Dritz, J. L. Nelssen, C. W. Hastad, C. N. Groesbeck, and K. R. Lawrence, *Kansas State University*.

A total of 168 weanling pigs (initially 6.3 kg) were used to determine the effects of different feed-grade antibiotics on pig performance. There were six pigs per pen and seven pens per treatment. Pigs were fed 4 experimental diets: a control diet with no in-feed antimicrobials; or the control diet with tiamulin (39 ppm) and chlortetracycline (441 ppm; tiamulin/CTC), neomycin sulfate and oxytetracycline (154 ppm; Neo/oxy), or carbadox (55 ppm). Carbadox had been the standard in-feed antimicrobial fed in this research facility for the previous 10 years. The corn-soybean meal-based diets contained 15% dried whey and 3.75% fishmeal from d 0 to 14. No other specialty protein sources or pharmacologic concentrations of Zn or Cu were used in either phase. From d 0 to 28 after weaning, pigs fed diets containing tiamulin/CTC or Neo/oxy had greater ADG and ADFI ( $P < 0.05$ ) than pigs fed all other diets and had improved G:F compared to pigs fed the control diet. Pigs fed carbadox were intermediate and had greater ( $P < 0.05$ ) ADG and G:F compared to pigs fed the control diet. The addition of in-feed antimicrobials resulted in improved growth performance in this research facility. The magnitude of response was surprising because the pigs used were healthy and the herd of origin is free of all major swine pathogens. In order to prudently use in-feed antimicrobials, further research is needed to predict the conditions that result in optimum benefit while minimizing usage.

	Control	Tiamulin/CTC	Neo/oxy	Carbadox	SED
ADG, g	327 <sup>a</sup>	381 <sup>c</sup>	399 <sup>c</sup>	358 <sup>b</sup>	11.50
ADFI, g	426 <sup>a</sup>	472 <sup>b</sup>	472 <sup>b</sup>	440 <sup>a</sup>	10.72
G:F	0.76 <sup>a</sup>	0.81 <sup>b</sup>	0.85 <sup>b</sup>	0.81 <sup>b</sup>	0.02

<sup>abc</sup>Means in the same row with different superscripts differ ( $p < 0.05$ ).

**Key Words:** Nursery pig, Antimicrobial, Growth

**135 Evaluation of normal corn and quality protein maize in feed rations for laying hens.** S. W. Zhai\*<sup>1,2</sup>, G. H. Qi<sup>1</sup>, and F. Z. Liu<sup>2</sup>, <sup>1</sup>*FRI, Chinese Academy of Agriculture Science*, <sup>2</sup>*Northwest Sci-Tech University of Agriculture and Forestry*.

This experiment was carried out to study the effect of diets containing quality protein maize (QPM)-Zhongdan9409 on the performance and egg quality. 528 157-day-old Hyline brown commercial laying hens were divided into three treatments of four replicates each. The treatment 1 (T1) was fed normal corn (NC) diet with lysine level 0.71%, the treatment 2 (T2) was fed QPM diet with lysine level 0.76%, and the treatment 3 (T3) was fed QPM diet with lysine level 0.69%. The results were as follows. Laying hens fed on QPM diets had higher daily feed intake than NC diet ( $P < 0.05$ ), it indicated the palatability of QPM was better than that of NC. T3 had significantly higher egg production than T1 and T2 ( $P < 0.05$ ). However, there was no significant difference between T1 and T2. There were no significant differences in the average egg weight, feed conversion and soft-shell egg and broken egg ratio among any two treatments ( $P > 0.10$ ). Compared to T1 and T2, T3 tended to have the highest performance and T2 tended to have the worst performance. The egg yolk color was improved by replacing NC with QPM equally ( $P < 0.10$ ), but Haugh unit score and eggshell strength were not increased by replacing NC with QPM ( $P > 0.10$ ). These results indicate that performance of layers could be improved by replacing NC with QPM equally and maintaining an optimal lysine level. The improvement of QPM nutritive value was due to the changing of amino acid content and composition.

**Key Words:** Quality protein maize, Laying hens, Normal corn

**136 Effects of long term feeding of virginiamycin in growing-finishing pigs fed phosphorus deficient diets.** J. H. Agudelo\*<sup>1</sup>, M. D. Lindemann<sup>1</sup>, M. C. Newman<sup>1</sup>, G. L. Cromwell<sup>1</sup>, and R. D. Nimmo<sup>2</sup>, <sup>1</sup>*University of Kentucky*, <sup>2</sup>*Phibro Animal Health*.

A study was conducted to evaluate the effects of removing 0.15% dietary dicalcium phosphate (DICAL; i.e., 0.028% P) when virginiamycin (VIR) was supplemented to the diet (11 mg/kg) of growing-finishing pigs on growth, metacarpal (MC) and metatarsal (MT) responses, carcass traits, and ileal bacterial populations. The level of DICAL removal was based