

**94 Protein sources for segregated early weaned pigs.** S. L. Norin, P. S. Miller\*, A. J. Lewis, D. E. Reese, and H.-Y. Chen, *University of Nebraska, Lincoln.*

Three studies were conducted to investigate the effects of incorporating extruded (expelled) soybeans, soybean meal (SBM), and spray-dried egg product (SDEP) in diets for segregated early weaned (SEW) pigs. Cross-bred pigs (n = 200; Exp. 1, n = 72; Exp. 2 and 3 n = 64 per experiment) were weaned between 11 and 14 d postpartum and immediately transported to an isolated, 18-pen nursery. In each experiment, the treatment period was 14 d (d 4 to 18) and thereafter all pigs consumed a common corn-soybean meal-based diet. Experimental diets were formulated to contain 1.34% lysine (apparent digestible basis), 1.0% Ca, and .80% P. The dietary treatments used were: Exp. 1, standard (corn-soybean meal (10%)-spray-dried plasma protein (SDPP)-dried whey) vs simple (36% CP extruded soybeans); Exp. 2, standard vs extruded soybeans + 6% SDPP vs 3% SDPP + 6% SDEP vs 12% SDEP; Exp. 3, standard vs extruded soybeans vs extruded-expelled soybeans vs SBM (46.5% CP). For the three experiments, performance was excellent (ADG = 310 g/d, d 4 to 18). In Exp. 1, pigs fed the standard diet had greater (P < .05) ADG, ADFI, and ADG/ADFI than pigs fed the simple diet. Pigs fed diets containing SDEP (Exp. 2) had lower (P < .05) ADG (275 g/d) than pigs fed the standard diet (300 g/d). In Exp. 3, pigs fed the extruded-expelled soybean meal diet had lower (P < .05) ADG than pigs fed the other three treatments. Pigs fed the SBM diet had similar ADG to pigs fed the standard diet (330 vs 340 g/d). Apparent protein digestibilities and plasma urea concentrations indicated that differences in growth performance among treatments were related to differences in protein availability and/or quality. Although the standard SEW diet was superior to the other treatments tested, the excellent performance of pigs consuming egg and soybean proteins suggests that further reevaluation of protein sources for early weaned pigs is warranted.

**Key Words:** Early Weaning, Protein Products, Growth Studies

**95 Evaluation of soybean meal variety and processing temperature on growth performance of 10 to 20 kg pigs.** J. A. Loughmiller, J. L. Nelssen, R. D. Goodband, M. D. Tokach, T. T. Lohrman\*<sup>1</sup>, P. R. O'Quinn, S. Moser, J. C. Woodworth, M. De La Lata, and G. S. Grinstead, *Kansas State University, Manhattan, <sup>1</sup>DuPont Quality Grains, Des Moines, IA.*

A 17 d growth assay was conducted to compare growth performance of 10 to 20 kg pigs fed diets containing soybean meal produced under pilot plant processing conditions from either DuPont high oleic soybeans (HOSBM), DuPont check line soybeans (CLSBM), or conventional soybean meal (SBM). Three hundred and ninety pigs (Newsham Hybrids) were blocked by weight (initially 10.1 kg and 35 d of age) in a randomized complete block design. A 2x4 factorial arrangement was used with main effects including soybean meal variety (HOSBM and CLSBM) and processing temperature (80-85, 85-90, 90-95, and 100-105°C) with a positive and negative control SBM (1.30 or .95% lysine). All diets were corn-soybean meal based and were formulated using analyzed total amino acid values to .95% lysine, except the positive control SBM diet which was formulated to 1.30% lysine. Increasing dietary lysine to 1.30% improved both ADG and G/F when compared to all other treatments (P < .05). A soybean variety x processing temperature interaction (P < .05) was observed for ADG and G/F. This interaction resulted from pigs fed HOSBM processed at 80-85°C having decreased ADG and G/F compared to pigs fed other treatments. Within the HOSBM treatments, linear and quadratic effects were observed for ADG and G/F as processing temperature increased (P < .05), indicating that pigs fed HOSBM processed above 80-85°C had similar performance to pigs fed CLSBM. Due to the poorer growth performance of pigs fed HOSBM processed at 80-85°C, ADG, ADFI, and G/F of pigs fed HOSBM was decreased compared to pigs fed CLSBM or SBM (P < .05). Pigs fed soybean meal produced under pilot plant processing conditions from high oleic acid soybeans have similar growth performance to pigs fed other soybean meal varieties when HOSBM is processed above 80-85°C.

**Key Words:** High-oleic Soybeans, Soybean Processing, Pigs

**96 The use of cottonseed meal as a protein source for nursery pigs.** C. R. Dove\*, *University of Georgia, Tifton.*

Two trials utilizing a total of 200 pigs (100 pigs/trial) were conducted to determine the effect of cottonseed meal as a protein source on the growth performance and hematological status of nursery pigs. Pigs were weaned at 25 +/- 2 d (avg. initial weight 7.65 kg) and moved to an environmentally controlled nursery. Pigs were weighed and allotted to experimental treatment by weight, sex and ancestry. There were 5 pigs/pen and the number of males and females in a pen was consistent in all pens within a replication. The pen was considered the experimental unit. Pens within a replication were randomly assigned to one of 4 dietary treatments. Experimental diets were fed in 2 phases. Phase 1 was fed d 1-7 postweaning and phase 2, d 8-28 postweaning. Experimental diets contained 0, 4, 8 or 12% cottonseed meal during both phases. The cottonseed meal was analyzed to contain .85% total gossypol and .10% free gossypol. Diets were formulated to contain similar levels of protein and lysine and all other nutrients were provided above recommended levels. Pigs were weighed and feed intake was recorded weekly. Blood samples were collected on d 1, 14 and 28 of the trial. Data were analyzed as a randomized complete block design using SAS. Initial values were used as covariants in the analysis of the hematology data. The addition of increasing levels of cottonseed meal to the diets of nursery pigs had no effect on growth performance (P > .10). Average daily gain, feed intake and feed efficiency were similar across all treatments during both nursery phases and over the entire nursery period. The addition of increasing levels of cottonseed meal to the diet tended to reduce (P < .09) hemoglobin on d 14 of the study, but had no effect (P > .10) on hemoglobin levels on d 28 of the study. Hematocrit levels were not affected on d 14 of the study (P > .10) but were reduced (P < .05) in pigs fed diets containing increasing levels of cottonseed meal on d 28 of the study. Hemoglobin and hematocrit levels were considered to be within normal biological ranges throughout the study. The data from this study indicates that up to 12% cottonseed meal can be added to the diets of nursery pigs without adversely affecting the growth performance of the pigs.

**Key Words:** Pigs, Cottonseed Meal, Nursery

**97 Effects of expander processing on nutritional value of whole soybeans in nursery pigs.** H. Cao\*, J. D. Hancock, J. M. Jiang, J. R. Froetchnner, J. S. Park, C. S. Moloney, K. C. Behnke, and R. H. Hines, *Kansas State University, Manhattan.*

A total of 150 weanling pigs (avg initial BW of 6.8 kg) was used in a 32-d growth assay to determine the effects of expanding whole soybeans on growth performance and nutrient digestibility. All pigs were fed the same diet to d 7 and then switched to experimental diets with whole soybeans expanded at 0, 28, 56, 70, and 84 kg/cm<sup>2</sup> cone pressure. The diets were formulated to 90% of NRC recommendations for lysine (1.05% for d 7 to 21 and .86% for d 21 to 35). For d 7 to 21, d 21 to 32, and overall (d 7 to 32), there was a cubic effect of cone pressure on ADG, ADFI, and gain/feed (P < .006). These effects resulted from the little improvement in growth performance as cone pressure was increased from 0 to 56 kg/cm<sup>2</sup> and the marked increase as cone pressure was increased to 70 kg/cm<sup>2</sup>. Then, there was a plateau or slight decrease in growth performance as cone pressure was increased further to 84 kg/cm<sup>2</sup>. Our results suggest that the optimal cone pressure for dry expansion of soybeans is near 70 kg/cm<sup>2</sup> with heat damage from overprocessing at 84 kg/cm<sup>2</sup>.

Overall	Cone Pressure, kg/cm <sup>2</sup>					SE
	0	28	56	70	84	
ADG (g)	161	142	196	424	377	11
ADFI (g)	582	511	565	799	783	22
G/F (g/kg)	277	279	346	531	482	10
DM dig (%)	76.3	72.4	75.0	79.1	80.0	1.1
N dig (%)	63.7	50.0	57.9	75.2	74.4	2.2
GE dig (%)	75.9	71.7	75.3	79.8	80.3	0.1

**Key Words:** Pigs, Expander, Soybeans