187 Effects of lysine level fed from 19 to 36 kg on growth performance and backfat of barrows and gilts. B. W. James*, S. S. Dritz, M. D. Tokach, R. D. Goodband, and J. L. Nelssen, *Kansas State University*.

Growth performance and carcass traits were evaluated on 1,200 pigs (PIC C-22 x 337) to determine the effects of dietary lysine level fed from 19 to 36 kg. Pigs were blocked by gender in a split plot design. Gender served as the whole plot with dietary treatments assigned within the subplot. Weights and feed intake were obtained biweekly. Ultrasound measurements of 10th rib fat depth and longisimuss muscle area were obtained on d 28. Experimental diets were assigned for the first 28 d of the experiment. Corn-soybean meal diets, containing 6% choice white grease, were formulated to contain .80, 95, 1.10, 1.25, or 1.40% total lysine. Common corn-soybean meal diets containing 6% choice white grease (1.25% and 1.10% lysine for gilts and barrows, respectively) were fed for a subsequent 28-d phase from d 28 to 56. Increasing dietary lysine from .80 to 1.40% increased (quadratic, $P < .01$) ADG and feed efficiency (G:F) during the treatment phase (.56, .60, .66, .66, and .68 kg and .55, .62, .64, .65, and .68, respectively). The greatest response in ADG and G:F occurred as lysine was increased from .80 to 1.10%; however, G:F continued to improve with every incremental increase in lysine. Longissimus muscle area was not affected by dietary lysine. Fat depth at the 10th rib decreased (quadratic, $P < .02$) as lysine level increased with the largest reduction observed as lysine increased from .80 to .95% of the diet (4.1, 3.3, 3.6, 3.3, and 3.3 mm). Subsequent performance from d 28 to 58 was not influenced by lysine level fed from d 0 to 28 of the experiment. The results of this experiment indicate the slight improvement in G:F at higher lysine levels offset the increase in diet cost to result in similar return over feed cost. Thus, diets for pigs weighing 19 to 36 kg can be formulated with a dietary lysine level ranging from 1.10 to 1.40% lysine with similar economic results.

Key Words: Lysine, Growth, Carcass characteristics

188 Nutritional modifications to late finishing swine diets during periods of high ambient temperatures in a commercial production system. J. D. Spencer*[1], G.L. Allee[1], N. Allen[2], J. Usry[3], R.D. Boyd[4], and M.E. Johnston[4], [1]*University of Missouri-Columbia,* [2]*Goldsboro Milling Co.,* [3]*Heartland Lysine,* [4]*PIC-USA*.

Nutritional modifications were made to late finishing swine diets in a commercial swine operation to determine the effects on growth performance and carcass characteristics when pigs were exposed to high ambient temperatures. One barn of 588 gilts (87 kg), and one barn of 588 barrows (89 kg) each contained four treatments with seven replications (pens)/trt. Treatments consisted of: 1) a high heat increment diet with 15% wheat midds, 2) a corn/SBM diet with 2% added fat, 3) diet with 8% added fat to reduce the heat increment, 4) diet with 8% added fat and amino acids (AA) to the same true digestible lysine to ME ratio as the control. Initially and at the end of the trial, five pigs/pen in both barns were scanned for 10^{th} rib backfat (BF) and loin depth. All barrows were individually weighed to determine treatment effects upon weight variation within pen. Termination for each barn occurred when the pigs within the barn approached 113 kg. Temperatures were high the first two weeks, but the remainder of the study was cooler than expected. During the first two weeks of growth (ave. high temp. 32.4°C) pigs fed diet 4 in both barns displayed higher ADG and GF ($P \leq .01$) than all other treatments. However after temperatures decreased, pigs fed diets 3 and 4 both displayed improved GF compared to pigs fed diets 1 and 2 by reducing ADFI for the entire period. Pigs fed high fat supplemented diets had slightly higher depositions of BF. However gilts fed diet 4 with added AA had less BF compared to those fed a diet with only supplemental fat (3) ($P \leq .13$). Variation within pen was decreased when pigs consumed diets containing added fat and AA (4) ($P \leq .07$). These results show that reducing the heat increment of the diet by adding fat and adjusting for lysine content improves the rate and efficiency of gain during high temperatures in a commercial operation, with improved uniformity among pig weights.

Key Words: Pig, Growth, Temperature

189 Predicting lysine requirements of finishing pigs using protein and lipid accretion curves. M. De La LLata*[1], M.D. Tokach[1], S.S. Dritz[1], R.D. Goodband[1], J.L. Nelssen[1], and A.P. Schinckel[2], [1]*Kansas State University, Manhattan,* [2]*Purdue University, West Lafayette, IN*.

Two experiments using 240 gilts and 240 barrows (PIC C22 × 337) with initial BW of 27 and 34 kg, respectively, were conducted to model the lysine:calorie ratio requirements of grow-finish pigs based on protein and lipid accretion rates from estimations made using real-time ultrasound. In both experiments, pigs used were selected from an ongoing growth study. The dietary treatments consisted of a 2 × 4 factorial with 2 levels of added dietary fat (0 and 6%) and four lysine:calorie ratio regimens in each of the four phases (described in J. Anim. Sci. 77(Suppl. 1):197). In each study, five pigs per pen from a total of 48 pens were randomly selected, weighed, tagged, and scanned every 3 weeks until pigs were marketed at an average weight of 120 kg. Growth and real-time ultrasound data were used to calculate daily body weight gain and lipid and protein accretion rates. Subsequently, daily requirements for ME and total lysine were calculated to model lysine:calorie ratio requirements. In both experiments, protein and lipid accretion rates were greater for the third and fourth lysine:calorie ratio regimens. In both experiments, the treatments with greater protein accretion (third and fourth lysine:calorie ratio regimens) and, thus, with greater requirement for total lysine also demonstrated increased lysine:calorie requirements when compared to the first and second lysine:calorie ratio regimens. In both experiments, the modeled lysine:calorie ratios accurately predicted the actual lysine:calorie ratio requirements observed in the growth performance experiment. These results indicate that real-time ultrasound can be used to accurately predict growth and lysine:calorie ratio requirements for grow-finish pigs reared in specific environments. Lysine:calorie ratio requirements (g/Mcal ME) for pigs used in this experiment can be determined at any body weight (x; kg) by the regression equations ($0.00019x^2$ - 0.05635x + 5.499) for gilts, and ($0.000049x^2$ - 0.037319x + 4.929) for barrows.

Key Words: Pigs, Lysine, Ultrasound

190 Nitrogen and phosphorus excretion from pigs fed different soybean fractions. B.W. Senne*, S.D Carter, L.A. Pettey, and J.A. Shriver, *Oklahoma State University, Stillwater*.

Six sets of four littermate barrows (40 kg BW) were used to determine N and P excretion of pigs fed different soybean fractions. Treatments were cornstarch-based diets with either SBM, SBM + 4% hulls (SBMH), soy protein concentrate (SPC), or soy protein isolate (SPI) used as source of N. All diets were formulated to contain .75% digestible lysine, .61% Ca, and .32% available P. Crystalline Met and Thr were added to provide an ideal ratio to lysine in all diets. Pigs were housed individually in metabolism chambers and fed diets for 5 d to allow for total collection of urine and feces. Rate and efficiency of gain were not affected by dietary treatment. Dry matter excretion (55, 102, 59, and 41 g/d) was highest ($P<.01$) for pigs fed SBMH. Pigs fed SPC excreted more ($P<.07$) DM compared with pigs fed SPI. Daily N and P intakes were 38.1, 38.7, 34.2, and 32.9 g; and 10.8, 11.9, 8.1, and 5.7 g/d for pigs fed SBM, SBMH, SPC, and SPI, respectively. Fecal N, urinary N, and total N excretion for the 4 diets was 3.3, 5.2, 2.6, and 1.5 g/d; 8.2, 8.2, 7.7, and 7.4 g/d; and 11.5, 13.6, 10.2, and 8.9 g/d. Nitrogen absorption (% of intake) was higher ($P<.01$) for pigs fed SBM compared with pigs fed SBMH. Pigs fed SPI absorbed more ($P<.01$) N than pigs fed SBM or SPC. Retained N (% of intake) was lower ($P< .10$) for pigs fed SBMH compared with SBM, and pigs fed either SPC or SPI retained more N ($P<.03$) than pigs fed SBM. Fecal P excretion for the four diets was 2.1, 2.9, 2.1, and 1.8 g/d. Urinary P excretion was minimal across treatments, thus total excretion of P was similar to fecal P. Excretion of P (g/d) was greater ($P<.01$) for pigs fed SBMH compared with all other dietary treatments. Retention of P (% of intake) was lowest for pigs fed SPI ($P<.04$); however, there were no differences among any other treatments. These results suggest that retention of N increases and excretion of N decreases as level of refinement increases for soybeans. Furthermore, the addition of soybean hulls to SBM increases DM, N and P excretion while decreasing N retention.

Key Words: Nitrogen, Phosphorus, Excretion