179 Growth performance of gilts fed a standard corn-soybean meal diet or low-crude protein diets supplemented with crystalline amino acids. J. L. Figueroa*, A. J. Lewis, P. S. Miller, and R. L. Fischer, *University of Nebraska, Lincoln*.

The purpose of our research was to determine how far the crude protein concentration of a corn-soybean meal diet (with lysine, tryptophan, threonine, and methionine supplementation) can be reduced without reducing pig performance. Thirty-six gilts (initial weight 19.5 kg) were individually penned and fed one of six different diets in a randomized block design for 35 d. A control, 16% CP diet was compared with five low CP, amino acid-supplemented diets. The low CP diets contained 15, 14, 13, 12, and 11% CP and were supplemented with lysine, tryptophan, threonine, and methionine to provide the same concentrations, on a total basis, as those in the control diet. Gilts were allowed ad libitum access to feed and water. There were quadratic effects ($P < .01$) on ADG, ADFI, and ADG/ADFI as CP decreased in diets, with values for the 11% CP group being lower than for the other five dietary groups. Longissimus muscle area decreased linearly ($P < .01$) as CP decreased, but there was no CP effect ($P > .05$) on backfat thickness. Average daily lean gain decreased quadratically ($P < .001$) as dietary CP decreased and was much lower for the 11% CP diet than for all other diets. Plasma urea concentration decreased linearly ($P < .01$) as CP concentration decreased. Plasma concentrations of arginine, histidine, isoleucine, leucine, phenylalanine, and valine decreased as CP decreased ($P < .05$), whereas plasma lysine, threonine, and methionine increased ($P < .05$). Plasma tryptophan concentration was not affected. Thus, only when the CP concentration was reduced to 11% did gilts fail to achieve the same growth performance as gilts fed the 16% CP, control diet. These data suggest that other amino acids (e.g., isoleucine, valine, histidine) may reduce the growth performance when the crude protein concentration is reduced by more than four percentage units.

Key Words: Pigs, Amino Acids, Crude Protein

180 Lack of interaction between lysine levels fed in the grower and finisher diets. J. C. Woodworth*, S. S. Dritz, M. D. Tokach, R. D. Goodband, and J. L. Nelssen, *Kansas State University, Manhattan*.

A total of 1,200 pigs (initially 28 kg) were used to test the interactive effects of diet phase and lysine level on growth performance and carcass characteristics of finishing pigs. Experimental treatments were arranged as a split-plot design with gender (barrows vs. gilts) as the whole plot and dietary treatment as the sub-plots. Dietary treatments were arranged as a 2×2 factorial with main effects of lysine level (adequate vs. low) and phase (grower-28 to 77 kg vs. finisher-77 to 120 kg). All diets were corn-soybean meal based and were fed in meal form in four weight ranges (28 to 52, 52 to 77, 77 to 98, and 98 to 120 kg) and contained 6% choice white grease in the grower phase. Lysine:calorie ratio (g tot lys/Mcal ME) for the barrow adequate and gilt adequate diets were 3.24, 2.56, 1.95, and 1.80; and 3.50, 2.92, 2.75, and 2.10, respectively for the four weight ranges. Lysine:calorie ratio for barrow low and gilt low lysine diets were 2.76, 2.23, 1.50, and 1.27; and 3.01, 2.48, 1.80, and 1.50, respectively for the four weight ranges. As expected, gilts grew slower, had better G/F and leaner carcasses compared to barrows (P < .05). There were no interactions observed between lysine level and growth phase for the entire trial. Pigs fed the low lysine treatment had lower (P < .05) ADG and G/F compared to pigs fed the adequate lysine treatment in the grower (854 g and .51 vs. 876 g and .53, respectively) and finisher (636 g and .27 vs. 735 g and .32, respectively) phases. Carcass characteristics were not influenced (P > .10) by lysine level fed in the grower phase. However, pigs fed the low lysine treatment in the finisher phase had lighter, fatter, and less muscled carcasses; (P < .05). Carcass characteristics were influenced greater by lysine level fed in the finisher phase compared to that fed in the grower phase. These data suggest that feeding a deficient lysine level decreased ADG and G/F during both phases; however, no carryover effects were observed.

Key Words: Pigs, Lysine, Phase feeding

181 The effects of compensatory growth and form of amino acid supply on plasma urea concentration, organ weights, and carcass characteristics in gilts. R.L. Fischer*, P.S. Miller, and A.J. Lewis, *University of Nebraska, Lincoln*.

Forty-six, medium-lean growth gilts (35.1 kg BW) were used to examine the effects of compensatory growth and amino acid supply on plasma urea concentrations, organ weights, and carcass characteristics. The two dietary treatments used in the experiment were a corn-soybean meal diet and a corn-soybean meal diet supplemented with crystalline lysine. Four gilts were slaughtered at the beginning of the trial to determine initial carcass composition. Eighteen gilts were randomly allotted to a 21-d ad libitum (AL) eating period and 24 gilts were assigned to a 42-d restricted-realimentated (RR) treatment. The RR regimen consisted of a 21-d restriction period followed by a 21-d ad libitum eating period (realimentation). At the end of the restriction period, six gilts were slaughtered to determine initial carcass measurements for the RR group. Three gilts from each diet treatment were slaughtered in six consecutive weeks during the ad libitum eating periods. During wk 1 of the ad libitum eating period, ADG and ADG/ADFI were greater ($P < .05$) and ADFI was lower ($P < .05$) in the RR gilts compared to the AL gilts. During wk 2 of the ad libitum eating period, ADG and ADFI were greater ($P < .05$) in the RR than the AL gilts. Ultrasound scanning measurements showed an increase ($P < .05$) in longissimus muscle area and a decrease ($P < .05$) in backfat depth during the first 2 wk of the ad libitum eating period in the RR group compared to the AL group. Plasma urea concentrations were lower ($P < .05$) in gilts fed the lysine-supplemented diet than in gilts fed the corn-soybean meal diet. Livers of the RR gilts were heavier ($P < .05$) than those of AL gilts during wk 1 and 2 of the ad libitum eating period. These results show that the gilts in the RR group exhibited compensatory growth during the first 2 wk of the ad libitum eating period. Also, during the restriction period pigs deposited less backfat and maintained longissimus muscle deposition.

Key Words: Pigs, Compensatory Growth, Carcass Composition

182 Effect of reduced dietary crude protein on nitrogen retention and ammonia production in growing pigs. E. R. Otto*, M. Yokoyama, S. Hengemuehle, and N. L. Trottier, *Michigan State University, East Lansing, MI*.

Six crossbred barrows (44.67 ± .76 kg), arranged in a 6 x 6 Latin square were used to investigate the effect of six dietary crude protein (CP) + crystalline amino acid (CAA)treatment combinations on nitrogen (N) balance and ammonia (NH_3) emission. Dietary treatments (TRT) were: 15% ICP corn-soybean meal (CSBM)(1), 12% CP+CAA (2), 9% CP+CAA (3), 6% CP+CAA (4), 15% CP casein (5) and protein-free(6). The ratio of essential and non-essential amino acid N was maintained at 45:55 by addition of L-glutamate. Following adaptation (5d) to diets, feces and urine were collected over a 5-d period. Total feces and total urine within pig and period were pooled. Pooled samples of feces and urine were sub-sampled and mixed 1:5 ratio (fecal wt/urine vol) into slurries. The slurry samples were fermented for 31d at room temperature (21°C). Fermented slurries were sub-sampled and headspace air measured for NH_3 at 24, 48 and 72h. Nitrogen retention was not different ($P>.05$) for TRT 2,3 and 4 when compared to TRT 1. Nitrogen utilization (NU) increased as levels of CP decreased ($P<.05$). Nitrogen digestibility (ND) for TRT 4 and 5 was higher ($P<.05$) compared to TRT 1, but TRT 2 and TRT 3 were similar to TRT 1 ($P>.05$). Nitrogen digestibility for TRT 4 and 5 were different from each other ($P<.05$). Ammonia decreased as CP levels decreased. Ammonia production from TRT 2,3,4,and 6 were different from TRT 1 ($P<.001$). Therefore, NU can be maintained and NH_3 production can be decreased with lower CP levels (down to 6%) with CAA and L-glutamate supplementation.

Item	15% CP	12% CP +CAA	9% CP +CAA	6% CP +CAA	Casein	SEM
N In, g/d	42.47^{ab}	39.36^{bc}	33.37^{c}	26.33^{d}	48.81^{a}	1.56
N Out, g/d	18.76^{a}	14.78^{b}	11.90^{b}	6.89^{c}	14.62^{b}	0.82
N Ret., g/d	23.71^{b}	24.57^{b}	21.46^{b}	19.44^{b}	34.19^{a}	1. 42
N Dig.	80.28^{c}	81.09^{bc}	80.13^{c}	85.54^{b}	95.81^{a}	1.03
N Util.	55.90^{d}	62.38^{cd}	64.69^{bc}	73.80^{a}	70.49^{ab}	1.63
†NH_3 ppm/100 ml·min^{-1}	357.88	178.21^{f}	63.48^{f}	70.31^{f}	339.06	23.01