

**176 Influence of lysine regimen on growth performance and lean percentage of finishing pigs.** S. S. Dritz\*, R. D. Goodband, M. D. Tokach, and J. L. Nelssen, *Kansas State University, Manhattan.*

We used 11,653 pigs to examine the influence of lysine phase-feeding regimen on growth performance and lean percentage in finishing pigs. Pigs were housed in 12 rooms containing 600 or 1200 head. Half-room was the experimental unit. Treatments were arranged in a 2 x 2 factorial with gender and lysine regimen (high or low) as main effects. All diets were corn-soybean meal-based. The first diet was fed from placement to 52 kg BW. Pigs were fed 60, 61, and 80 kg per pig of the second, third, and fourth diets, respectively, with the fifth diet fed until market. The dietary lysine regimens for the five phases were 1.0, .95, .80, .70 and .60% or 1.0, .75, .67, .58, and .50% for the barrows and 1.15, 1.00, .90, .80, and .70% or 1.15, .82, .72, .61, and .52% for the gilts. The first and second diets contained 3470 kcal of ME/kg. The third diet for gilts contained 3420 kcal. All remaining diets contained 3330 kcal. A random sampling of three pens per half room were weighed and the feed just prior to the day of delivery of the next diet. Intermediate weights and feed inventory were used to calculate cumulative feed intake versus BW curves. There were gender by diet interactions ( $P < .02$ ) for ADFI, gain/feed, and lean percentage. The interaction was the result of gilts fed the high lysine regimen having better feed efficiency and lean percentage while the reverse was true for barrows. Further analysis indicated the largest difference in feed efficiency was from 52 to 72 kg (second diet) in gilts and 90 kg to market for barrows. In conclusion, these results indicate that under commercial production conditions the low lysine regimen was adequate for barrows but inadequate for gilts during the early finisher.

Item <sup>a</sup>	Barrows		Gilts		Gender x Diet (P <)	CV
	High	Low	High	Low		
ADG, kg <sup>b</sup>	.78	.77	.75	.74	.99	4.4
G/F	.32 <sup>c</sup>	.33 <sup>d</sup>	.35 <sup>e</sup>	.33 <sup>f</sup>	.01	3.1
Lean, %	53.8 <sup>c</sup>	54.3 <sup>d</sup>	56.1 <sup>e</sup>	55.3 <sup>f</sup>	.01	1.0

<sup>a</sup>Initial weight (27.5 kg) was used as a covariate.

<sup>b</sup>Main effect of gender ( $P < .04$ ).

<sup>c,d,e,f</sup>Means lacking a common superscript differ ( $P < .05$ ).

**Key Words:** Lysine, Growth, Pigs

**177 How hot is hot - the effect of maximum heat production on voluntary food intake in growing pigs?** N. S. Ferguson, *University of Natal, South Africa.*

One of the major factors responsible for constraining food intake is the maximum amount of heat ( $THL_{max}$ ) that can be lost by an animal to the environment. To predict the food intake of a given animal on a given food and in a given environment  $THL_{max}$  must first be predicted and the estimate must be independent of any dietary factors. The objectives of this research was to quantify and qualify the extent to which the size and state of the animal and the environmental temperature itself influenced  $THL_{max}$  and to test the effect  $THL_{max}$  had on predicting food intake and growth in pigs fed protein-deficient diets. Stepwise regression analysis was used to determine the variables that accounted for most of the variation in  $THL_{max}$ , which included temperature, a scaled temperature variable (45-T), body protein (Pt) and lipid (Lt) content and (body weight)<sup>0.67</sup>. The resultant regression equation in  $kJ/kg^{0.67}/d$  was:  $THL_{max} = 827.3 - 105.8 \times Lt + 49.1 \times (45-T)$ , ( $R^2 = 0.71$ ;  $RSD = 140.9$ ). When  $THL_{max}$  estimated by means of the equation thus derived, was included in a simulation model there was a high degree of accuracy in predicting voluntary food intake, protein retention and total heat loss in pigs fed protein-deficient diets.

**Key Words:** Temperature, Protein, Pigs

**178 Environmental temperature and dietary lysine level on the performance of pair-fed pigs.** F. Cisneros, M. Ellis, and F. McKeith, *University of Illinois at Urbana-Champaign.*

The objective was to study the influence of air temperature and lysine level on performance of growing-finishing pigs. Two identical buildings with 36 individual pens in each were used. Four treatments were: Thermoneutral, *Ad libitum*, normal lysine (TAL); High temperature, *Ad libitum*, normal lysine (HAL); Thermoneutral, Pair-fed to HAL, regularly lysine (TPF) and High temperature, *Ad libitum*, high lysine (HHL). Nine barrows and nine gilts from a crossbred line were assigned to each treatment from 30 to 120 kg of BW. Three pigs of each gender and treatment were slaughtered at either 60, 90 or 120 kg of body wt (72 pigs total). A 3-phase feeding was used with lysine % of .99 and .91 (30 to 60 kg), .76 and .70 (60 to 90 kg), .64 and .61 (90 to 120 kg) for gilts and barrows resp. for TAL, HAL and TPF. High lysine diets (HHL) were formulated to contain 29% more lysine than the normal level. Air temperatures were 18-22 C (thermoneutral) and 32-36 C (high temperature). From 30 to 60 kg, ADG (kg) was higher ( $P < .01$ ) for TAL and HHL than for HAL and TPF (.94, .91, .75 and .80 resp.; SE .021). ADFI (kg) was higher ( $P < .01$ ) for TAL, intermediate for HAL and TPF and lower for HHL (2.1, 1.8, 1.8 and 1.7 resp.; SE .04). HHL gave the best ( $P < .01$ ) gain:feed ratio. From 60 to 90 kg, ADG (kg) was higher for TAL, intermediate for HHL and lower for HAL and TPF (1.01, .87, .70, .70 resp.; SE .034). ADFI (kg) was similar for TAL and HHL and higher ( $P < .01$ ) than HAL and TPF (2.8, 2.8, 2.1 and 2.0 resp.; SE .160). Gain:feed was not affected ( $P > .05$ ). For 90 to 120 kg, ADG (kg) and ADFI (kg) were higher ( $P < .01$ ) for TAL than for HHL, HAL and TPF (1.09, .73, .77 and .75 for ADG and 3.34 vs 3.16, 2.36 and 2.26 for ADFI; SE .066 and .157, resp.). Gain:feed was similar ( $P > .05$ ) for all treatments. This study suggests that equal feed intake, performance is similar in both hot and thermoneutral conditions and that there is a response to increased lysine under hot environmental conditions in the growing phase.

**Key Words:** Lysine, Temperature, Pair-feeding, swine.

**179 Dietary methionine and total sulfur amino acid requirement for optimal growth performance and carcass characteristics in gilts from 73 to 104 kg.** J. A. Loughmiller, J. L. Nelssen, R. D. Goodband, M. D. Tokach, E. C. Titgemeyer, I. H. Kim, J. W. Smith II, J. R. Bergstrom, and W. B. Nessmith Jr. *Kansas State University, Manhattan.*

A total of 185 gilts (PIC 326 x C-22) was used in two 36 d growth assays to determine the total sulfur amino acid (TSAA) and methionine requirement of gilts from 73 to 104 kg. In Exp. 1, 80 gilts (initially 74 kg) were blocked by initial weight in a randomized complete block design with 2 gilts per pen and 5 replications per treatment. Experimental diets consisted of: .26, .285, .31, .335, and .36% dietary TSAA (.225, .25, .275, .30, and .325% apparent digestible (app. dig.)). All diets were sorghum-soybean meal based with added L-lys, L-met, L-thr, L-trp and L-glu. L-methionine was supplied to meet the TSAA levels. All diets contained .50% apparent digestible lysine, with all other amino acids, except TSAA, formulated to exceed current University of Illinois recommendations on an apparent digestible basis. Results from Exp. 1 indicate increasing TSAA concentrations tended to decrease ADG (798, 894, 757, 762, 739 g/d; linear  $P < .06$ ) and G/F (322, 345, 316, 307, 304 g/kg; linear  $P < .03$ ). No effect was observed for ADFI or carcass composition. In Exp. 2, 105 gilts (initially 72 kg) were blocked by initial weight in a randomized complete block design with 7 gilts per pen and 5 replications per treatment. Experimental diets consisted of: .11%, .14%, and .17% total methionine (.10%, .125%, and .15% app. dig.). Diets were formulated to exceed the cystine requirement of the highest methionine level and were similar in composition to Exp. 1, with the exception of added L-cysteine. Increasing total methionine in Exp. 2 from .11 to .17% improved ADG (767, 875, 898 g/d; linear  $P < .001$ ), ADFI (2.24, 2.41, 2.48 kg/d; linear  $P < .01$ ) and G/F (342, 362, 362 g/kg; quadratic  $P < .03$ ). No effect was observed for backfat depth ( $P > .67$ ). The results of these experiments indicate the dietary TSAA requirement for optimal growth performance and carcass characteristics is not greater than .285% (25% app. dig.; 50% of lysine) and is lower than recently suggested recommendations. Additionally, the results of Exp. 2 indicate that the methionine requirement of finishing gilts in diets containing adequate cysteine is .14% total methionine (.125% app. dig.).

**Key Words:** Pigs, Methionine, Cystine