

tus ventralis and the infraspinatus were among the best. Among the least juicy were the semimembranosus, semitendinosus, and the adductor. Beefy flavor showed little variation among the nine muscles ranked. These rankings may be useful for those seeking to identify muscles with particular shear force and sensory characteristics.

Key Words: Beef tenderness, Shear force, Juiciness

174 Concentrate level effects on carcass traits of Boer cross-bred goats. S. Ryan*, J. Unruh, M. Corrigan, J. Drouillard, and M. Seyfert, *Kansas State University, Manhattan*.

Boer cross-bred goats (n=46) were used to assess the effects of dietary concentrate on carcass composition, primal cut yield, sensory properties, and fatty acid (FA) composition. Goats were fed diets ad libitum with no concentrate (range) or one of three levels of concentrate (low, 50%; medium, 70%; and high, 90%) for 126 d before slaughter. Carcass measurements were taken at 24 hr postmortem before carcasses were fabricated according to Institutional Meat Purchase Specifications (Hotel Style). Sensory, cooking loss, shear force, and fatty acid composition

were determined on *longissimus* samples. No differences ($P > 0.05$) were observed among the three levels of concentrate feeding except carcasses from goats fed a low concentrate diet had a higher ($P < 0.05$) percentage of trimmed shoulder than carcasses from goats fed a medium level of concentrate. In linear contrasts comparing range and concentrate feeding, goats fed concentrate diets had *longissimus* muscles with greater ($P < 0.05$) a*, b*, hue angle and chroma values than those fed range diets. Feeding concentrate diets increased ($P < 0.05$) live weight, hot carcass weight, dressing percent, ribeye area, actual and adjusted 13th rib fat, body wall width, leg circumference, carcass length, marbling score, kidney and pelvic fat compared to range-fed goats. Chops from goats fed concentrate diets had more ($P < 0.05$) off flavor intensity and cooking loss than chops from range-fed goats. Concentrate-fed goats had greater ($P < 0.05$) values for leg; trimmed leg; loin; trimmed loin; rack; trimmed rack; shoulder; trimmed shoulder; trimmed leg, loin, rack and shoulder; foreshank; ribs and breast; and flank than range goats, but lower percentages of trimmed leg; trimmed rack; trimmed shoulder; and trimmed leg, loin, rack and shoulder. Chops from goats fed concentrate diets had greater ($P < 0.05$) total percentage of total FA and n-6 FA but lower percentages of n-3 FA than chops from range-fed goats. Goats fed concentrate diets had heavier carcasses and primal weights but lower percentages of primal cuts and more off flavor intensity than range-fed goats.

Key Words: Goat, Composition, Meat quality

Nonruminant Nutrition - Grow-Finish Nutrition

175 Amino acid compositions of two genotypes of barrows and gilts during the grower finisher period. T. Wiseman*, D. Mahan, J. Peters, N. Fastinger, S. Ching, and Y. Kim, *The Ohio State University, Columbus*.

Two genotypes of pigs with different lean gain potentials (280 vs. 350 g FFL/d) were used to evaluate total body amino acid composition from 18 to 127 kg BW in five weight groups. Both genotypes had equal distributions of gilts and barrows (n = 120 total), were housed at a single site, and fed common diets during the nursery period. The experiment was a 2 x 2 x 5 RCB design conducted in two groups. At an average 18 kg BW the pigs were moved to a complete confinement facility and split sex fed a corn-soybean mixture that met or exceeded NRC (1998) amino acid and mineral requirements for each genotype for their lean gain potential. A total of six pigs for each treatment group were harvested initially and at approximately 27 kg intervals thereafter to 127 kg BW. Pigs were harvested as they reached their pre-allotted harvest weight with individual pigs being the experimental unit. Carcasses were split along the dorsal midline with the right side and internal tissue analyzed for amino acid content. The results demonstrated a linear increase ($P < 0.01$) in total body essential- and nonessential amino acid contents from 18 to 127 kg BW. Pigs of higher lean gain potential had higher essential amino acid levels ($P < 0.01$), than pigs with the lower lean gain. The differences in essential amino acids were initially evident at 18 kg BW with the lean genotype having greater contents, but the differences were more pronounced as body weight increased, resulting in a weight x genotype interaction ($P < 0.01$). Nonessential amino acids contents were higher ($P < 0.01$) in lean genotype pigs with the exception of glycine ($P < 0.03$). Gilts had higher essential amino acid than barrows ($P < 0.05$), but the gilts were also leaner ($P < 0.01$) suggesting that the

greater amino acid content of the gilts was reflective of their lean content. These results suggest that pigs of higher lean gain potential and gilts have higher body concentrations of amino acids.

Key Words: Amino acid, Body composition, Pigs

176 The effect of diet on the occurrence of osteochondrosis dissecans and cartilage properties in pigs. N. Frantz*, J. Nelssen, G. Andrews, M. Tokach, S. Dritz, T. Loughin, R. Goodband, and J. DeRouchey, *Kansas State University, Manhattan*.

An 84-d study with 80 gilts (initially 39 kg BW) was conducted to determine the effects of dietary nutrients or additives related to cartilage and bone metabolism on the occurrence of osteochondrosis dissecans (OCD) and cartilage properties. Dietary treatments were: 1) control (corn, soy, 3% choice white grease), or the control diet with added: 2) fish oil as the added fat source, 3) proline and glycine (300 and 200% of lysine), 4) leucine, isoleucine, and valine (BCAA; 200, 100, and 100% of lysine, respectively), 5) silicon (1000 ppm), 6) Cu and Mn (250 and 100 ppm), 7) methionine and threonine (150 and 100% of lysine), and 8) combination of diets 2 through 7. The distal aspect of the left femur was evaluated for OCD lesions. Each femur was sliced into 3 mm sections and assigned a severity score for surface abnormalities, the underlying articular cartilage, and physal growth plate. Also, cartilage samples were tested for compression and shear properties. Growth performance ($P > 0.21$) and cartilage compression values ($P > 0.51$) were unaffected by diet. Shear values were lower ($P < 0.02$) in pigs fed fish oil and the ratio of compression/shear was higher ($P < 0.03$) in pigs fed fish oil or proline/

glycine. Pigs fed diets containing fish oil or silicon tended to have higher surface abnormality severity scores ($P < 0.06$) than pigs fed BCAA, methionine/threonine, or the combination diet. Pigs fed the control diet tended to have higher underlying articular cartilage severity scores ($P < 0.09$) than pigs fed fish oil, proline/glycine, silicon, Cu/Mn, or methionine/threonine. Occurrence of growth plate lesions was unaffected by diet ($P > 0.18$). Total severity score tended to be reduced ($P < 0.14$) in pigs fed methionine/threonine or the combination diet compared with pigs fed fish oil or the control diet. In summary, these data indicate that feeding nutrients or additives related to cartilage metabolism tended to influence the severity of OCD lesions.

Key Words: Pigs, Osteochondrosis, Cartilage

177 Effects of continuous or intermittent ractopamine HCl feeding on late finishing pig growth performance. C. N. Neill*, M. D. Tokach, S. S. Dritz, R. D. Goodband, J. L. Nelssen, J. M. DeRouchey, C. N. Groesbeck, and K. R. Brown, *Kansas State University, Manhattan, KS*.

A total of 110 barrows (PIC) with an initial BW of 70.0 kg were used in a 56-d growth trial with 2 pigs per pen and 11 pens per treatment to evaluate the effects of continuously feeding Ractopamine HCl (RAC), RAC withdrawal, or intermittent RAC feeding on finishing pig performance. Diets were sorghum-soybean meal-based and formulated to contain 1.0% lysine with or without 10 ppm RAC. The five treatments were: 1) control diet (no RAC) fed for 56 d; 2) RAC fed for 56 d; 3) RAC fed for 21 d, control for 14 d, then RAC for 21 d; 4) control fed for 7 d, RAC fed for 21 d, control fed for 7 d, then RAC fed for 21 d; and 5) control fed for 35 d, then RAC fed for 21 d. There was a treatment by week interaction for ADG ($P < 0.001$). From d 0 to 21, pigs fed RAC had increased ($P < 0.001$) ADG and G:F compared with pigs fed the control diet. Pigs fed RAC for 56 d had greater ($P < 0.05$) ADG and G:F from d 0 to 21, but were not different from control pigs by d 56 (see table). When RAC was fed for 21 d then withdrawn for either 7 or 14 d and re-fed for 21 d, these pigs had the same overall ADG and G:F as pigs only fed RAC the last 21 d. Pigs fed RAC for only the last 21 d had increased ($P < 0.05$) ADG compared with control pigs. In conclusion, withdrawing RAC for 7 or 14 d after feeding for 21 d and re-feeding for 21 d provided a similar response to feeding RAC for only the last 21 d before market.

Table 1. Ractopamine fed during these days

Item	None	0 to 21 and		7 to 28 and		SE
		0 to 56	35 to 56	35 to 56	35 to 56	
ADG, kg	1.01 ^b	1.04 ^{ab}	1.08 ^{ab}	1.08 ^{ab}	1.10 ^a	0.043
ADFI, kg	3.43	3.29	3.45	3.36	3.51	0.111
G:F	0.29	0.32	0.31	0.32	0.31	0.012

^{ab} Means in the same row without common superscript differ ($P < 0.05$).

Key Words: Finishing pig, Intermittent, Ractopamine withdrawal

178 The effects of increased dietary energy concentration on the performance and economics of growing-finishing pigs housed in a commercial facility. A. D. Beaulieu*, J. F. Patience, M. Rivard, and D. Gillis, *Prairie Swine Centre, Inc., Saskatoon, SK, Canada*.

If gut capacity is limiting energy intake, then increasing dietary energy concentration should improve growth. In a previous experiment however, no difference in performance was observed among pigs receiving diets with increased DE. The objective of the present experiment was to examine the performance and economic impact of elevating the dietary energy concentration in the diet of growing-finishing pigs housed under commercial conditions. A commercial barn was chosen to provide an environment different from that used in previous studies. A total of 720 pigs (36.85 ± 0.98 kg, mean \pm SE), blocked by gender and initial weight, were assigned to receive diets formulated to contain 3.20, 3.35 or 3.50 Mcal DE/kg. Dietary energy was increased by wheat and tallow (maximum 4%) replacing barley. A constant dlys:DE ratio was maintained across treatments and decreased as the pigs grew. Actual DE concentration, determined at the mid-point of each of three phases, averaged 3.12, 3.30 and 3.43 Mcal/kg. From 37 to 80 kg BW, ADG ($0.93, 0.98, 1.03 \pm 0.05$ kg/d) and feed efficiency ($0.40, 0.41, 0.43 \pm 0.01$; 3.12, 3.30, 3.43 Mcal/kg respectively) improved with increasing dietary energy ($P < 0.05$). Feed intake was unchanged ($P > 0.10$); thus DE intake increased with increasing DE concentration ($P < 0.05$). Conversely, from 80 to 120 kg BW, ADFI decreased as DE concentration increased ($P = 0.02$) and ADG and feed efficiency were similar among treatments ($P > 0.05$). Treatment did not affect carcass backfat thickness, lean yield, index, or value ($P > 0.10$). Loin thickness tended to increase with DE concentration ($P = 0.08$). The coefficient of variability of BW on d 57 (first pull) averaged 12.2, 11.5 and 12.2% for the 3.12, 3.30 and 3.43 Mcal DE/kg treatments, respectively. An economic analysis, conducted using 5 yr mean feed and market prices, indicated an advantage for the lower energy diets. Increased dietary energy concentration improved the growth of commercially housed pigs, but only up to 80 kg BW. Overall (37 to 120 kg) performance was not affected by dietary energy concentration.

Key Words: Swine, Dietary energy, Tallow

179 Evaluation of yellow field peas in growing-finishing swine diets. G. I. Petersen* and J. D. Spencer, *JBS United, Inc., Sheridan, IN*.

This study evaluated the effects of feeding yellow field peas (WFP 0097) as a replacement for corn and soybean meal in pig growing-finishing diets. Pigs (750 Ausgene x Ausgene) were allotted to one of three treatments in a randomized complete block design trial with ten replicate pens per treatment. Pigs were allotted by sex and placed in pens (25 pigs per pen) allowing for 0.74 square meters per pig. Treatments consisted of a corn-soybean meal control, a low pea inclusion with peas added to replace approximately 45% of the soybean meal in the control treatment, and a high pea inclusion that replaced 100% of the soybean meal in the control treatment. Pigs were fed in five phases during the course of the trial. The five phases were fed from 30-45 kg, 45-65 kg, 65-80 kg, 80-100 kg, and 100-120 kg. All diets were formulated to contain similar energy and digestible lysine concentrations, and were adequate in all other nutrients. All peas and corn used for diet formulation were ground through a roller mill. Pigs had ad libitum access to feed and water throughout the trial. Body weight and feed intake measurements were taken weekly for the initial four weeks, then every