ractopamine supplemented diets at 5 ppm 14 to 28 days and 10 ppm 7 to 28 days prior to slaughter improved growth rate and feed efficiency. Ractopamine feeding duration (in conjunction with increased dietary lysine level) also linearly reduced fat depth and increased lean percentage in this study.

Key Words: Ractopamine, Dose, Duration

183 Effect of ractopamine (Paylean®) feeding program on growth performance and carcass value. M. T. See*[1], T. A. Armstrong[2], and W. C. Weldon[2], [1]*North Carolina State University,* [2]*Elanco Animal Health.*

To determine if ractopamine (RAC) response can be enhanced by changing the levels in the diet during different phases of feeding, 100 barrows and 100 gilts (initial BW = 71 kg) were randomly allotted to one of four dietary treatments. Treatments were: 1) Control diet containing no RAC wk 0-6; 2) Step-up RAC: 5 ppm wk 1 and 2; 10 ppm wk 3 and 4; and 20 ppm wk 5 and 6; 3) Step-down RAC: 20 ppm wk 1 and 2; 10 ppm wk 3 and 4; and 5 ppm wk 5 and 6; and 4) Average RAC: 11.7 ppm wk 0-6. All diets were formulated to contain 1.2% lysine. Overall, ADG was increased (1.0 vs. .93 kg/d; $P < .05$) and feed/gain decreased (2.77 vs. 3.21; $P < .01$) for pigs fed RAC compared to the control. Feed cost/kg gain did not differ between dietary treatments but total feed cost/pig was greater ($21.67 vs. $19.44; $P < .01$) for pigs fed RAC. Loin muscle area, kg of boneless trimmed ham and % fat free lean increased ($P < .01$) in pigs fed RAC. Carcass value was calculated using a common North Carolina pricing system and lean value of the carcass was based on USDA reported prices for boneless pork primal cuts. When value was adjusted to a common final weight, carcass value/pig did not differ ($P > .10$) among treatments but lean value/head was increased by $4.69 ($P < .01$) for pigs fed RAC. When value was not adjusted for final weight allowing a comparison of equal time on feed, a treatment x sex interaction ($P < .01$) was observed for carcass value with control gilts having the least value ($114.86) and barrows fed the average RAC treatment having the greatest value ($132.07) but not significantly different from control barrows ($130.59). Lean value per head was greater for the Step-up and Average RAC treatments than the Step-down or Control ($129.27^a, $128.11^a, $127.35^b, $123.49^c; $P < .01$) treatments. Ractopamine resulted in a favorable response in growth performance and yielded more lean pork at a greater feed cost. Carcass and lean value data indicate that the decision to feed RAC and the feeding program used with it should be made based on marketing plans. Economic benefits from RAC feeding may be achieved if pigs are sold on pounds of lean pork and not on a typical carcass value basis. Economic benefits of RAC feeding may also be achieved for pigs fed to a constant age rather than a constant weight.

Key Words: Ractopamine, Growth Performance, Economics

184 Evaluation of the effects of dietary fat, conjugated linoleic acid, and ractopamine on growth performance and carcass quality in genetically lean gilts. T. E. Weber*, B. T. Richert, and A. P. Schinckel, *Purdue University.*

Gilts (n=180; Newsham XL sires x Newsham parent females; initial BW 59 kg) were assigned to a 2 x 2 x 3 factorial arrangement consisting of ractopamine (RAC; 0 or 10 ppm), conjugated linoleic acid (CLA; 1% of a product containing 60% CLA isomers or 1% soybean oil) and dietary fat in an 8 wk feeding trial. Dietary fat treatments consisted of : 1) 0% added fat; 2) 5% choice white grease (CWG); and 3) 5% beef tallow (BT). RAC treatments were imposed when the gilts reached an average BW of 85.5 kg and lasted for the duration of the final 4 wk until carcass data were collected at an average BW of 112 kg. Gilts fed CLA had greater (0.40 vs 0.38; $P < 0.01$) G/F wk 0 to 8 than gilts not fed CLA. Fat provided as CWG or BT tended to increase ADG (0.98 vs 0.95 kg; $P < 0.10$), decreased ADFI (2.45 vs 2.55 kg; $P < 0.02$) and increased G/F ($P < 0.01$) as compared to gilts fed 0% added fat. RAC increased ADG (1.05 vs 0.87; $P < 0.01$) and G/F (0.42 vs 0.35; $P < 0.01$) wk 4 to 8. Gilts fed RAC had greater ($P < 0.01$) dressing percentages than gilts fed no RAC. Added dietary fat tended ($P < 0.06$) to increase dressing percentage. Tenth rib backfat (BF) tended ($P < 0.06$) to be decreased by feeding CLA. Gilts fed RAC tended ($P < 0.10$) to have lower 10th rib BF than gilts fed diets devoid of RAC. Gilts fed CWG had greater ($P < 0.05$)10th rib BF and last rib BF than gilts fed BT. Feeding RAC increased (57.8 vs 56.2; $P< 0.01$) predicted percent lean. Predicted percent lean was also increased by feeding CLA (57.5 vs 56.5; $P < 0.03$) Gilts fed CLA tended to have greater loin eye areas (LEA; $P < 0.06$) than gilts fed no CLA. Feeding RAC or 5% fat increased ($P < 0.01$) LEA. Gilts fed either CLA or fat tended ($P < 0.10$) to have greater marbling scores than gilts fed diets devoid of CLA or fat. Gilts fed CLA had greater ($P < 0.01$) belly firmness than gilts fed no CLA. These results demonstrate that RAC, CLA, and added fat each enhance certain growth performance and carcass characteristics when used alone or in conjunction with one another.

Key Words: CLA, Ractopamine, Dietary Fat

185 Effects of ractopamine and carnitine in diets containing 5% fat for finishing pigs. S. A. Trapp*[1], B. T. Richert[1], A. P. Schinckel[1], and K. Q. Owen[2], [1]*Purdue University, West Lafayette, IN,* [2]*Lonza, Inc., Fair Lawn, NJ.*

To study the effect of ractopamine (RAC) in conjunction with carnitine in elevated fat diets, three hundred gilts (avg. initial BW = 85.4 kg) of two terminal crosses (European, ET; and US, UST) were assigned diets fed for the last four weeks before slaughter. Five dietary treatments (TRT) were used: 1) control; 2) 50 ppm carnitine; 3) 5 ppm RAC; 4) 50 ppm carnitine and 5 ppm RAC; and 5) 10 ppm RAC. All diets were formulated to 1.15% lysine and contained 5% added choice white grease. The gilts were weighed and feed intake was recorded on d 0, 14, and 28. In addition, 3 gilts/pen (36/TRT) were ultrasonically scanned on d 0, 14, and 28 for backfat and loin eye area to estimate composition and tissue accretion curves. Individual hot carcass weight and carcass ultrasound of loin and backfat depth measurements were taken at a commercial pork processor. Pigs fed TRTs 4 and 5 had greater ADG during d 0-14 (834, 866, 952, 1052, 1073 g/d, $P<.001$, TRTs 1-5, respectively) and d 0-28 (854, 845, 907, 960, 943 g/d, $P<.01$, TRTs 1-5, respectively) compared to pigs fed treatments 1 and 2. No difference was found in ADFI between diets. Gilts fed TRTs 3, 4, and 5 had greater gain:feed ($P<.01$) from d 0-14 (375, 379, 430, 451, 466 g/kg, TRTs 1-5, respectively) and d 0-28 (357, 348, 391, 399, 398 g/kg, treatments 1-5, respectively) compared to pigs fed TRTs 1 and 2. Pigs fed diets with RAC had increased carcass loin depths (67.8, 66.4, 70.6, 70.5, 71.7 mm; $P<.05$, TRTs 1-5 respectively). However, only TRTs 3 and 5 had increases in plant measured percent lean ($P<.01$) compared to the other TRTs. The UST gilts tended to have greater ADG d 0-28 (922 vs 885 g/d; $P<.07$), but had increased plant fat depth (15.5 vs 13.4 mm; $P<.001$) with reduced plant percent lean (56.0 vs 56.6%; $P<.01$) and reduced carcass yield (75.2 vs 76.1%; $P<.01$) compared to the ET gilts. This data indicates that during the first 14 days while feeding ractopamine, carnitine may enhance the ractopamine response with increased body weight gain and improved feed efficiency.

Key Words: Carnitine, Ractopamine, Pigs

186 Interactive effects between Paylean® (Ractopamine HCl) and dietary lysine on pork quality and loin, belly, and ham composition. M. J. Webster*, R. D. Goodband, M. D. Tokach, J. A. Unruh, J. L. Nelssen, S. S. Dritz, D. E. Real, J. M. DeRouchey, J. C. Woodworth, and T. A. Marsteller[1], *Kansas State University, Manhattan, KS,* [1]*Elanco Animal Health, Indianapolis, IN.*

A total of 432 pigs was used to evaluate the effects of Paylean and dietary lysine on pork quality and loin, belly, and ham composition. The 12 dietary treatments included Paylean (0, 5, and 10 ppm) and 4 levels of lysine. For pigs fed no Paylean, lysine levels were 0.6, 0.8, 1.0, and 1.2%. For pigs fed Paylean, lysine levels were 0.8, 1.0, 1.2, and 1.4%. The dietary treatments were fed to pigs from 79 to 109 kg. There were three pigs per pen and 12 pens per treatment (six pens of each sex). One pig per pen was harvested on d 14 and d 28 of the experiment. At 24 h postmortem, carcasses were fabricated into the primal cuts. After a 30 min bloom, the loin surface at the 10^{th} rib was analyzed for color (Hunter $L^*a^*b^*$ values), drip loss, ultimate pH, visual color, firmness, and marbling. After spareribs were removed and the belly trimmed, belly firmness was evaluated by suspending the belly perpendicularly over a bar (skin side up) and the distance was recorded between the belly ends initially and after a five-minute period. A sample from each loin (9^{th} rib), ham (biceps femoris), and belly, from the same anatomical region, was collected, frozen, and analyzed for protein, lipid, ash, and moisture content. For the endpoint data, increasing Paylean decreased (linear, $P< .0001$) initial and 5-minute belly firmness. Visual marbling score decreased (linear $P < .05$) as lysine increased for pigs

fed Paylean. As Paylean dosage increased, loin fat percentage decreased (linear, P< .04) and loin crude protein percentage increased (linear, P< .01). In addition, as Paylean dosage increased, belly moisture and crude protein percentage increased (linear, P < .05) while belly fat percentage decreased (linear, P< .001). The results indicate that pigs fed Paylean and increasing levels of lysine will have less loin marbling and belly firmness compared to control pigs.

Key Words: Paylean®, Lysine, Finishing Pigs

187 Interactive effects between Paylean® (Ractopamine HCl) and dietary lysine on finishing pig growth performance, carcass characteristics and tissue accretion. M. J. Webster*, R. D. Goodband, M. D. Tokach, J. A. Unruh, J. L. Nelssen, S. S. Dritz, D. E. Real, J. M. DeRouchey, J. C. Woodworth, and T. A. Marsteller[1], *Kansas State University, Manhattan, KS,* [1]*Elanco Animal Health, Indianapolis, IN.*

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Key Words: Paylean®, Lysine, Finishing Pigs

188 Effects of lysine and energy density of performance and carcass traits of finishing pigs fed ractopamine. D.C. Brown*[1], J.K. Apple[1], C.V. Maxwell[1], K.G. Friesen[1], M.E. Davis[1], R.E. Musser[2], Z.B. Johnson[1], and T.A. Armstrong[3], [1]*University of Arkansas,* [2]*The Pork Group, Rogers, AR,* [3]*Elanco Animal Health, Greenfield, IN.*

A total of 216 crossbred barrows and gilts (Yorkshire x Landrace females mated to Dekalb EB sires) were used to test the effects of energy density (E) and lysine-to-energy ratio (Lys) on performance and carcass characteristics of finishing pigs fed ractopamine. Pigs, with an average initial BW of 84 kg, were blocked by weight and sex and assigned to one of 36 pens. Pens were randomly assigned to 1 of 6 dietary treatments arranged in a 2 x 3 factorial design, with two levels of E (3.30 or 3.48 Mcal/kg of ME) and three lysine-to-energy ratios (1.7, 2.4, or 3.1 g lysine/Mcal). Ractopamine was included in all diets at a level of 10 mg/kg, and pigs were fed the experimental diets for 28 d prior to harvest. Individual pig weights and feed disappearance were recorded weekly to calculate ADG, ADFI, and G:F. Upon completion of the feeding trial, pigs were transported to a commercial pork harvest/processing plant, and hot carcass weight (HCW) was recorded. After the 24 h chilling period, fat and LM depths at the 10^{th} rib were measured with a Fat-O-Meater, and used to calculate standardized lean yield (SLY). Overall main effects means are reported where no E x Lys interaction (P > 0.05) was observed. Results indicate that to optimize lean tissue deposition in pigs fed ractopamine, 3.3 Mcal/kg is sufficient energy ,and the Lys to energy ratio may be higher than reported in the literature and higher than levels currently utilized in the industry.

	Energy (Mcal/kg)			Lysine (g/Mcal)			
Item	3.30	3.48	SE	1.7	2.4	3.1	SE
ADG, kg	0.640	0.679	0.02	0.579	0.660	0.741[c]	0.03
ADFI, kg	2.15	2.08	0.04	2.12	2.13	2.09	0.05
G:F	0.298[a]	0.326[b]	0.01	0.272	0.310	0.355[c]	0.01
HCW, kg	78.3	78.5	0.50	76.3	79.5	79.2[c]	0.63
Fat depth, mm	19.1[a]	20.2[b]	0.39	20.7	19.3	19.0[d]	0.49
LM depth, mm	59.1	58.7	0.69	56.7	59.3	60.7[c]	0.85
SLY, %	51.4[a]	50.6[b]	0.30	50.1	51.2	51.7[c]	0.37

[ab]E effects (P < 0.05). [c]Linear Lys effect (P < 0.01).
[d]Linear Lys effects (P < 0.02).

Key Words: Swine, Ractopamine, Energy x Lysine Level

189 The efficacy of Paylean® (ractopamine hydrochloride) addition to late-finishing swine diets in a controlled cycling hot environment. J.D. Spencer*[1], C.A. Stahl[1], A.M. Gaines[1], D.C. Kendall[1], G.F Yi[1], J.W. Frank[1], E.P. Berg[1], D.J. Jones[2], and G.L. Allee[1], [1]*University of Missouri, Columbia, MO,* [2]*Elanco Animal Health, Greenfield, IN.*

To determine the efficacy of Paylean addition to late-finishing swine diets during high ambient temperatures, seventy-two barrows (Newsham x PIC 327) (81 kg) were utilized in a growth study with a 2 x 2 factorial arrangement of treatments with two controlled environments (constant 21^{o}C, 50% relative humidity (TN), or a cycling temperature 27 to 35^{o}C (HS)) and two levels of Paylean addition (0 or 10 ppm). Nutrient content was the same in both diets (1.15% lysine, 3513 kcal ME/kg). There were six replicate pens/treatment with three pigs/pen. Pigs were weighed and scanned via real-time ultrasound for measurement of 10^{th} rib backfat (BF) and loin eye area (LEA) weekly. Pigs were harvested at approximately 105 kg for pH and color measurement of the ham and loin. During the growth trial (d 0-26), there was no interaction between temperature and Paylean level (P > .15). HS reduced ADFI (HS vs. TN) (1.78 vs. 2.58 kg/d; P < .01), ADG (.54 vs. .88 kg/d; P < .01) and G:F (.30 vs. .34; P < .01). Paylean addition, independent of environmental temperature, improved ADG (0 vs. 10 ppm) (.67 vs. .75 kg/d; P < .09) and G:F (.30 vs. .34; P < .01). Paylean addition did not significantly affect feed intake (P > .10). Additionally, HS reduced BF accretion (+.05 vs. +.25 cm; P < .01) and LEA gain (+3.56 vs. +7.50 cm^2; P < .01). Paylean addition also reduced BF accretion (+.20 vs. +.10 cm; P < .08) but increased LEA gain (4.64 vs. 6.43 cm^2; P < .08), regardless of temperature. Paylean had no affect on meat quality. Hams and loins from pigs reared in the hot environment had a significantly higher ultimate pH (P < .05). Supplementing late-finishing swine diets with 10 ppm Paylean resulted in similar improvements in ADG (10 and 14%) and GF (14 and 18%) (TN, HS, respectively) in both environments. Paylean addition also reduced BF and increased LEA accretion in both environments with no affect on meat quality attributes.

Key Words: Swine, Ractopamine, Temperature

190 Effect of ractopamine on optimum dietary phosphorus regimen for pigs. T.R. Lutz* and T.S. Stahly, *Iowa State University, Ames, IA.*

Ten replications of individually-penned gilts from a high-lean strain were utilized to determine the effect of ractopamine (RAC) on the optimum dietary available phosphorus (AP) regimen. At 70 kg BW, pigs were randomly allotted to a corn-soybean meal basal diet (.08% AP) adequate in all nutrients except AP. The basal diet was supplemented with mono-dicalcium phosphate to create six AP concentrations (.08, .13, .18, .23, .28, .33%) and ractopamine HCL to create two RAC concentrations (0 vs. 20 ppm). A constant Ca/AP ratio of 2.5:1 was maintained in each diet. BW gain and feed intake were recorded weekly for 5 weeks and total urine output was collected via urinary catheter the last two days of each 7-day period. Over the five periods, RAC improved (P<.01) BW gain (1075 vs. 934 g/d) and gain/feed ratio (431 vs. 371 g/kg), but lowered (P<.01) P content of BW gain (4.66 vs. 4.05 g/kg) and urinary P excretion (219 vs. 67 mg/d) independent of dietary AP. The magnitude of change in BW gain and P content of BW gain was reduced in later periods of growth. Dietary AP additions also improved (P<.01) daily BW gains and P accretion, P content of BW gain, and efficiency of feed utilization (P<.07). To achieve maximum BW gain, the amount of AP needed was not altered by RAC. However, when defining P needs as