New Mexico (NM; n = 767) and Wisconsin (WI; n = 140) and beef feedlot populations from Colorado (CO; n = 999) and Washington (WA; n = 1,005). The subclinical BRD phenotypes were established for the CO population post-harvest. All genes proximal to QTL identified ($p < 1 \times 10^{-5}$) in the clinical BRD analyses for dairy (CA - 126 QTL, NM - 138 QTL, WI - 78 QTL) and beef (CO - 5 QTL, WA - 5 QTL, 2 gene sets) were functionally related to innate and adaptive immunity, but varied according to the pathogen prevalence distribution detected for each population. A robust innate immune response to infection is critical for host defense prior to the activation of the adaptive immune response. The analysis of subclinical BRD in the CO population identified 7 additional QTL, near genes that have functional roles related to the maintenance of lung health. The identification and validation of QTL associated with susceptibility to both clinical and subclinical BRD will provide producers the ability to select cattle that are less susceptible to the disease, ultimately reducing the prevalence of the disease and diminishing its economic impact.

Key Words: bovine respiratory disease, QTL, genome-wide association analysis

POSTER SESSION I: NONRUMINANT NUTRITION I: AMINO ACID REQUIREMENTS

205 Evaluation of High Standardized Ileal Digestible Tryptophan:Lysine Ratios with Ractopamine HCl on Growth and Carcass Performance of Pigs from 110 to 135 Kg.

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Tryptophan is considered the second or third limiting amino acid in corn soybean-meal-based diets fed to growing and finishing swine. The NRC (2012) SID Trp:Lys ratio requirement for pigs above 165 lb is 17.7% of lysine. However, recent research has reported that increasing standardized ileal digestible (SID) Trp:Lys ratio above 20% in finishing pigs fed Ractopamine HCl (RAC) resulted in improved growth and carcass performance. To further evaluate this response, the objective of this experiment was to confirm the effects of feeding high SID Trp:Lys ratios in diets containing RAC on growth and carcass performance of finishing pigs from 110 to 135 kg. A total of 935 pigs (PIC 1050 × 337, initially 107.6 kg BW) were used in a 22-d trial. Pens of 23 or 24 pigs were allotted by BW and randomly assigned to 1 of 5 dietary treatments in a RCBD with 8 replications per treatment. The dietary treatments included 5 SID Trp:Lys ratios (20, 22, 24, 26, and 28% of Lys). Corn-soybean meal based diets were formulated to 0.90% SID Lys and contained 10 ppm ractopamine. Analyzed nutrients and total amino acids contents of experimental diets were consistent with formulated estimates. At d 22, pigs were transported to a packing plant for processing and carcass data collection. For overall growth performance, increasing SID Trp:Lys increased (linear, P = 0.007) ADFI (2.86, 2.91, 2.89, 2.96, and 3.00 kg) and SID Trp g/kg gain (5.2, 5.6, 6.4, 6.7, and 7.4) linear ($P < 0.001$). However, there was no evidence for treatment differences for ADG (1.10, 1.14, 1.10, 1.15, and 1.13 kg) or G:F (0.384, 0.390, 0.378, 0.390 and 0.376). Similarly, for carcass characteristics, there was no evidence for treatment differences for HCW, carcass yield, backfat loin depth, lean, carcass ADG or carcass feed efficiency. In summary, increasing SID Trp:Lys increased ADFI and SID Trp g/kg gain, however, there was no evidence for treatment differences for other growth or carcass parameters measured. Further research is necessary to determine why inconsistencies are observed when feeding high SID Trp:Lys ratios to finishing pigs.

Key Words: tryptophan, finishing pigs, amino acid

206 Effects of Soybean Meal Concentration at a Fixed 12% Dietary CP on Growth and Carcass Performance of Finishing Pigs from 115 to 136 Kg.

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Research has reported performance reduction when finishing pigs are fed corn-soybean meal diets formulated below 12% CP even when diets are fortified with all AA at or above minimum NRC (2012) requirements relative to Lys. A total of 280 pigs (DNA 600 × 241, initially 114.2 kg) were used in a 23-d trial to determine the effects of SBM concentration with CP fixed at 12% on finishing pig performance. Pens of 7 or 8 pigs (balanced number of pigs per treatment) were randomly assigned to 1 of 6 dietary treatments with 6 replications. Treatments consisted of 5 levels of SBM (10.6, 7.7, 4.9, 2.7, and 0%) with 12% CP and a negative control (NC) treatment with 4.0% SBM and 10% CP. All diets were formulated to 0.55% SID Lys with

increasing levels of corn gluten meal used as SBM was decreased to maintain the 12% CP. Data was analyzed with PROC GLIMMIX procedure in SAS with pen as the experimental unit and initial BW as a blocking factor. For growth performance, decreasing SBM while maintaining 12% CP marginally decreased (linear, P=0.06) ADG (0.95, 0.94, 0.93, 0.90, and 0.90 kg/d), increased (linear, P=0.01) ADFI (3.36, 3.37, 3.43, 3.56, and 3.50 kg/d), worsened (linear, P<0.01) G:F (0.284, 0.278, 0.273, 0.253, and 0.257) and marginally worsened (linear, 0.07) final BW (136.2, 135.7, 135.7, 134.9, 134.9 kg). Feed intake was lowered (P<0.01) in pigs fed the diet with 12% CP and 10.6% SBM compared with pigs fed the NC diet (3.36 vs 3.60 kg), resulting in a marginal improvement (P=0.06) in G:F for pigs fed the 12% CP, 10.6% SBM diet (0.284 vs 0.267). For carcass characteristics, decreasing SBM decreased (linear, P=0.03) carcass ADG (0.73, 0.72, 0.71, 0.69, and 0.69 kg/d) and worsened (linear, P<0.01) carcass feed efficiency (0.218, 0.213, 0.209, 0.193, and 0.197). Pigs fed the diet with 12% CP and 10.6% SBM had improved (P=0.04) carcass G:F compared with pigs fed the NC diet (0.218 vs 0.204). Reducing the concentration of SBM worsened ADG, G:F, BW, carcass ADG, and carcass feed efficiency. Additionally, pigs fed the 12% CP and 10.6% SBM had improved G:F and carcass G:F compared with pigs fed the NC diet. These results suggest that reduced SBM concentration could be one of the reasons finishing pig performance is decreased when low CP diets are fed.

Key Words: crude protein, finishing pigs, soybean meal

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207 The Ideal Dietary Protein Profile for Finishing Pigs in Precision Feeding Systems and Phase Feeding Systems: Threonine.

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Optimal AA ratios have been established for conventional group phase feeding (GPF) systems, but these ratios may differ in finishing pigs when fed with precision feeding systems (IPF). The aim of this study was to evaluate the response of different levels of threonine (Thr; 70, 85, 100, 115 and 130% of the 0.65 Thr: Lysine ideal protein ratio) in pigs raised in GPF or IPF systems. A 110 finishing pigs (110 kg BW ± 7.02; 11 pigs per treatment) were housed in the same pen and fed for 21 days using automatic feeders. Individual pigs were the experimental units. Five pigs per treatment were slaughtered at the end of the trial. Data were analyzed in a 2x5 factorial arrangement by the mixed model procedure of SAS. During this finishing phase, G: F presented a quadratic effect for Thr levels (P<0.05) and was not affected by feeding programs. The intake of SID Lys and Thr were greater (P<0.05) in GPF (Lys: 24 g/d; Thr: 18 g/d) than IPF (20 g/d; Thr: 15 g/d) pigs. Protein deposition (PD) was higher in GPF (130 g/d) than IPF pigs (122 g/d; P<0.05), while the level×feeding system interaction for protein in gain presented a quadratic effect of Thr level for GPF (average minimum: 10.7%, maximum: 12.4%; P<0.05) and a no effect of Thr level for IPF (average minimum: 10.3%, maximum: 11.7%; P<0.10). Pigs in IPF systems consumed 14% less crude protein and excreted 17% less nitrogen than GPF pigs (P<0.05). Pigs in IPF retained 9% more nitrogen than GPF pigs (P<0.05) and the Thr level effect was quadratic in both systems (P<0.05). Threonine concentration in plasma presented a linear increase (P<0.05) as Thr in the diet increased and Thr in plasma was 8% higher in the plasma for GPF (203 μmole/L) pigs than IPF pigs (187 μmole/L). Dietary Thr levels had a cubic effect on arginine and histidine, as well, quadratic effect on valine in the liver of pigs in both systems (P<0.05). Pigs in IPF had a different response to Thr levels than pigs in GPF system, the last had higher PD at Thr: Lys ratio of 0.85 while in IPF Thr: Lys ratio had no impact on PD.

Key Words: precision feeding, amino acids, nitrogen retention

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208 Evaluation of the Standardized Ileal Digestible Total Sulfur Amino Acid:Lysine Requirement for 14-27 Kg PIC Nursery Pigs.

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One thousand two hundred PIC (337 × Camborough; PIC, Hendersonville, TN) barrows and gilts were used to further evaluate the Standardized Ileal Digestible (SID) total sulfur amino acid (TSAA) ratio relative to lysine requirement in 14-27.5 kg nursery pigs. Prior to the start of the study, pigs were fed a basal diet that contained 1.45% SID lysine for one week. At the start of the study, the pigs averaged 14.0 kg. The lightest 10% of pigs were sorted off to form one replication and the remaining pigs were sorted by gender and placed into blocks with 25 pigs per pen. Blocks were set for the 5 treatments (52.0, 56.5, 61.0, 65.5, 70.0 SID TSAA:Lys) within gender of similar weights with the