59   Divergent Planes of Nutrition Altered Concentrations of Hormones and Metabolites but not Semen Characteristics in Mature Rams.
Kerri A. Bochantin[1], Friederike Baumgaertner[1], Jennifer L. Hurlbert[1], Ana Clara Baiao B. Menezes[1], James D. Kirsch[1], Sheri L. Dorsam[1], Christopher S. Schauer[1], Carl R. Dahlen[2], *1North Dakota State University, 2North Dakota State University, Department of Animal Sciences*

Abstract: Objectives were to evaluate impacts of divergent planes of nutrition on body weight (BW), hormone and metabolite concentrations, and semen characteristics in rams. Mature Rambouillet rams (n = 24, BW = 83.1 ± 2.64 kg) were individually housed and randomly assigned to positive (POS; n = 8), maintenance (MAINT; n = 8), or negative (NEG; n = 8) planes of nutrition for 84 d. Rams were fed a common diet with feed allocations adjusted weekly based on BW to achieve targeted weight gain or loss (approximately 12% initial BW). On d 0, 28, 56, and 84, body condition scores (BCS) and scrotal circumference (SC) were recorded, and blood and semen were collected. Blood was analyzed for triiodothyronine (T3), thyroxine (T4), testosterone, insulin-like growth factor-1 (IGF-1), glucose, and non-esterified fatty acids (NEFA). Semen was collected via electroejaculation and analyzed by Computer Assisted Semen Analysis. Data were analyzed with the GLM or MIXED procedure of SAS, with ram as experimental unit and significance determined at $P < 0.05$. By design, BW was influenced by a treatment × day interaction ($P < 0.0001$), and daily weight change was greater ($P < 0.0001$) for POS (0.11 ± 0.011 kg) than MAINT (0.01 ± 0.011 kg), which was greater ($P < 0.0001$) than NEG (-0.12 ± 0.011 kg). Consequently, BCS, and SC were greater for POS than NEG as evidenced by a treatment × day interaction ($P < 0.0001$). Concentrations of T3, IGF-1, and NEFA were increased in POS compared with NEG and MAINT by day 84 ($P ≤ 0.03$), whereas T4, testosterone, and glucose remained unaffected ($P ≤ 0.39$). No differences were observed among treatments for semen volume/concentration, motility, or morphology ($P ≤ 0.49$). Collectively, BW, hormone, and metabolites differed among treatments, indicating a potential for epigenetic alterations which could influence offspring outcomes.

Keywords: divergent nutrition, hormones, semen characteristics

262   Ability of Model that Predict Growing-Finishing Pigs Requirements to Predict Dietary Phosphorus Use in Replacement Gilts.
Piterson Floradin[1], Candido Pomar[2], Patrick Schlegel[3], Marion Lautrou[1], Marie-Pierre Létourneau-Montminy[1], *1Laval University, 2Agriculture and Agri-Food Canada, 3Agroscope*

Abstract: A modeling approach to predict dynamics of body phosphorus (P) and calcium (Ca) independent of soft-tissue growth in growing-finishing pigs has been developed (Lautrou et al., 2020). Considering that the feeding of replacement gilts differs from that of growing pigs, this study was investigated to evaluate the ability of this model and other available models for growing-finishing pigs (INRAE of Jondreville and Dourmad, 2005; NRC, 2012; CVB of Bikker et Block, 2017) to predict body P and Ca retention in gilts. Data from gilts fed in 2 phases (Growing (C): 55-95 kg, finishing: 95-140 kg) was used to evaluate the models. In the first phase, the gilts received a diet that provided 100% of the Ca and P requirements (C100; 2.1 g of digestible P) ad libitum. In the finishing phase, the gilts received a control diet (F100; 2.1 g of digestible P) or a rich diet providing 160% of the requirements (F160; 3.5 g of digestible P), and daily feed intake and the energy content was reduced for a gain of 700 g/d. Body composition data were used to evaluate the predictive ability of the model according to the mean square error of prediction (MSEP) and its subdivision into central tendency error (CTE), regression (RE) and disturbance (DE). At 95 kg, the proposed model adequately predicted body P (MSPE=2.26%, CTE=0.016%, RE=13.4% and DE=86.5%), while the other models had a higher CTE, thus indicating an underestimation. At 140 kg, accuracy of predictions decreased for all models, with the proposed model overestimating body P and the other models underestimating it. These results will help adapt existing models to replacement gilts.

Keywords: gilt, modeling, phosphorus