PSIII-A-8 Daily Clenbuterol Administration to Lambs Born with low Birthweight due to Intrauterine Growth Restriction Recovered Growth Rates and Improved Body Composition at 60 D of age. Rachel L. Gibbs¹, Rebecca M. Swanson², Joslyn Beard¹, Ty B. Schmidt¹, Dustin T. Yates¹, ¹University of Nebraska-Lincoln, ²University of Arizona

Abstract: Low birthweight due to intrauterine growth restriction (IUGR) results from unfavorable in utero conditions (i.e., hypoxemia, hypoglycemia) that impairs growth capacity for muscle and other tissues. This programming effect reduces growth efficiency in IUGR offspring below their genetic potential. Specific programming mechanisms are not known, but recent evidence indicates reduced β2 adrenergic regulation of IUGR muscle. Thus, our objective was to determine if early-life growth deficits in IUGR juvenile lambs are improved by manipulating β2 adrenergic activity with daily IM administration of the β2 agonist, clenbuterol (Clen), from birth to 60 d of age. Maternal heat stress-induced IUGR (n=10) and IUGR+Clen (n=9) lambs were smaller (P<0.05) than controls (n=11) at birth, weighed 18% and 11% less (P<0.05), respectively, than controls at 30 d of age, and weighed 16% and 13% less (P< 0.05), respectively, at 60 d of age. Average daily gain at 30 and 60 d of age was reduced (P≤0.05) for IUGR but not IUGR+Clen lambs compared to controls. Bioelectrical impedance analysis was used to estimate body composition in live lambs at 58 d of age. Estimated fat-free lean mass and estimated muscle mass were less (P≤0.05) for IUGR but not IUGR+Clen lambs compared to controls. Estimated protein and fat content as well as protein:fat were likewise reduced (P<0.05) for IUGR but not IUGR+Clen lambs. At necropsy, whole hindlimbs tended to be lighter (P=0.09) and flexor digitorum superficialis muscle was lighter (P< 0.05) for IUGR but not IUGR+Clen lambs compared to controls. Loin-eye areas measured in chilled carcasses were 15% smaller (P< 0.05) for IUGR lambs and 19% larger (P< 0.05) for IUGR+Clen lambs compared to controls. From this study, we conclude that poor postnatal growth and body composition observed in IUGR juvenile lambs was improved when clenbuterol was used to target programmed deficits in β2 adrenergic regulation of muscle.

Keywords: low-birthweight, fetal growth-restriction

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PSIII-A-19 Thermotolerance and Residual Feed Intake in Bos-Indicus Influenced Beef Heifers.

Gleise Medeiros da Silva¹, Federico Podversich², Tessa M. Schulmeister¹, Angela M. Gonella², Raluca Mateescu¹, Nicolas DiLorenzo², ¹University of Alberta, ²University of Florida

Abstract: This study investigated the relationship between thermotolerance and residual feed intake (RFI) in Bos-indicus influenced replacement beef heifers. Multiple individual vaginal temperatures (VT) collected during the summer in Florida were used to select the most (n = 14; thermotolerant) and least (n = 13; non-thermotolerant) heat tolerant heifers to undergo a feed efficiency test in the fall. The maximum initial VT difference between groups was of 0.19 and 1.2 ± 0.065 °C (P < 0.01) for thermotolerant and non-thermotolerant heifers, respectively. Heifers (398 ± 11.3 kg; approximately 720 d of age) were randomly allocated to four concrete-floored pens equipped with two GrowSafe feed bunks each and received a common ad libitum total mixed ration (16.9% crude protein and 52% total digestible nutrients) for 56 d (14 d adaptation and 42 d evaluation period). Body weight (BW) was collected on d -1, 0, 14, 28, 41, and 42, while VT was recorded (10 min intervals for 4 consecutive d) from d 29 to 32, using temperature probes placed intravaginally with a hormone-free controlled internal drug release device. Final BW, average daily gain (ADG), dry matter intake (DMI), DMI as a percentage of BW, RFI, and VT were analyzed as a completely randomized design. Final BW, ADG, DMI, and VT collected during the feeding period were not affected by thermotolerance phenotype (P ≥ 0.42); however, heifers previously classified as thermotolerant had decreased RFI (P = 0.01; -1.32 vs. 1.27 ± 3.31 kg, respectively) and DMI as a percentage of BW (P = 0.01) when compared with non-thermotolerant heifers. In conclusion, Bos-indicus influenced replacement beef heifers previously classified as thermotolerant based on multiple vaginal temperature measurements collected throughout the summer had decreased residual feed intake when measured in the fall, indicating the potential of more heat tolerant heifers to be more feed efficient.

Keywords: heat tolerance, heat stress, feed efficiency