Beef Species

T171   The impact of grazing toxic tall fescue on bull growth, fat deposition and blood flow. S. K. Duckett*[1], G. E. Aiken[2], H. M. Stowe[1], M. C. Miller[1], S. M. Calcatera[1], M. D. Owens[1], J. G. Andrae[1], and S. L. Pratt[1], *[1]Clemson University, Clemson, SC, [2]ARS-Forage-Animal Production Research Unit, Lexington, KY.*

Tall fescue is utilized extensively in the Southeastern United States; however, most tall fescue contains an ergot alkaloid producing fungal endophyte. Consumption of ergot alkaloids (EA) results in the syndrome known as tall fescue toxicosis. The objective of this study was to evaluate growth, fat deposition, and blood circulation for bulls grazing an EA containing toxic tall fescue (Toxic) compared to a novel non-toxic (NT) endopyhte, which lacks EA. Angus bulls (n = 21) were stratified by BW and BCS and allotted to graze either KY31 or NT for 155 days. Body weights were taken on d 0 and d 140. Body condition scores were taken on d 0, 35, 84, 112, and 140. Doppler ultrasound was conducted on the caudal and testicular arteries to evaluate blood flow and real-time ultrasound conducted on the loin and rump to determine subcutaneous fat deposition, intramuscular fat (IMF) and muscle depth (MD) on d 8, 57, 106 and 155. GLIMMIX procedures were used to perform an ANOVA to test for the main effects of treatment (TRT), day, and TRT × day interaction for all parameters. TRT × day combination means were generated and compared using Fisher's LSD test. No difference in BW ($P = 0.43$) was observed on d 0; however, by d 140 BW was decreased ($P = 0.04$) in the Toxic bulls (546.2 ± 16.6 kg) compared to the NT bulls (595.9 ± 16.6 kg). The gain in BW was increased in NT bulls compared to bulls grazing Toxic ($P = 0.0001$; 105.8 ± 8.9 versus 33.8 ± 8.1 kg, respectively). No difference was observed for TRT ($P = 0.3$) or TRT × day interactions ($P = 0.08$) for BCS. No differences were observed for IMF ($P = 0.8$) or fat thickness ($P \geq 0.06$) due to TRT; however, the rump MD was decreased in bulls grazing Toxic compared to NT ($P < 0.001$). Luminal area was reduced from 9.7 ± 0.9 to 4.8 ± 0.8 mm^2 for the caudal artery ($P = 0.001$) and 10.3 ± 0.8 to 5.0 ± 0.8 mm^2 for the testicular artery ($P = 0.01$) for NT compared to Toxic bulls, respectively. These data support previous research demonstrating the negative effects of ergot alkaloids on BW and blood flow.

Key Words: fescue toxicosis, bull, ultrasound

T172   Finishing residual feed intake is positively correlated with backgrounding growth of metabolically imprinted Angus-sired steers. J. K. Smith*, S. P. Greiner, and M. A. McCann, *Virginia Polytechnic Institute and State University, Department of Animal and Poultry Sciences, Blacksburg.*

Backgrounding is commonly utilized within the beef industry to achieve economical weight gains while providing feeders with a continuous cattle supply. Previous research has indicated implications of early growth dynamics on finishing (FIN) performance and carcass traits. The objective of this study was to identify relationships between FIN residual feed intake (RFI) and early growth performance or carcass traits of conventionally weaned (CW; n = 22; weaned at 204 ± 18 DOA; d 204) or metabolically imprinted (MI; n = 21; weaned at 104 ± 18 DOA; d 104) Angus-sired steers that were MI via concentrate supplementation (100 d) immediately following weaning. Upon completion of the MI feeding period, MI and CW calves were commingled and backgrounded for a minimum of 153 d prior to being finished on a concentrate- and corn silage-based ration for 92 ± 6 d after a 21 day adaptation period. Average daily metabolic BW gain (ADMG) was calculated throughout the early (EG; d 104 to 204), backgrounding (BG) and FIN growth phases. ADFI was measured and used to calculate FIN RFI. Cattle were harvested in groups upon reaching a common subcutaneous fat thickness (BFT) of 1 cm. Pairwise correlations between RFI and growth or carcass measurements were determined using the Multivariate and Pairwise Correlations procedure of JMP. When evaluated irrespective of weaning regimen, RFI was correlated ($P < 0.05$) with ADMG during the EG and BG phases, ribeye area and yield grade, and tended ($P < 0.10$) to be correlated with BFT with respective r values of -0.37, 0.51, -0.30, 0.46 and 0.27. Within weaning regimen, RFI was correlated ($P < 0.05$) with ADMG during the BG phase, ribeye area, yield grade and BFT for MI steers with respective r values of 0.54, -0.42, 0.60 and 0.51, but was not correlated ($P > 0.10$) with growth or carcass traits for CW steers. These results suggest relationships between FIN RFI and pre-finishing growth that were unique to MI cattle in this experiment. Targeting MI cattle for low ADMG during the BG phase may improve FIN feed efficiency through decreasing RFI.

Key Words: metabolic imprinting, residual feed intake, beef

T173   Early metabolic imprinting for improved feed efficiency of backgrounded Angus-sired steers. J. K. Smith*, S. P. Greiner, and M. A. McCann, *Virginia Polytechnic Institute and State University, Department of Animal and Poultry Sciences, Blacksburg.*

Previous research has indicated the ability of energy supplementation early in life to metabolically imprint cattle for improved growth and carcass traits. The objective of this study was to evaluate the effect of metabolic imprinting (IMP) on finishing (FIN) average daily residual feed intake (RFI) of Angus-sired steers. Calves born in the fall of 2009 (FB) and spring of 2010 (SB) were stratified by sire and age before being randomly assigned to a metabolically imprinted (MI; weaned at 104 ± 18 d of age; n = 21) or conventionally weaned (CW; weaned at 204 ± 18 d of age; n = 22) treatment group. Following weaning, MI calves were adapted to and received a concentrate-based ration in a feedlot setting for 100 d. Upon completion of the MI feeding period, previously unsupplemented CW calves were commingled with MI calves and backgrounded for a minimum of 153 d prior to being finished on a concentrate- and corn silage-based ration for 92 ± 26 d following a 21 d adaptation period. ADFI was collected using a Calan Broadbent feeding system and used to calculate average daily TDN intake (TDNI). Cattle were harvested in groups upon reaching a common 12th rib subcutaneous fat thickness (BFT; 1 cm). Predicted average daily metabolic BW (MBW) gain was regressed against predicted mid-finishing MBW and TDNI using the Fit Y by X procedure of JMP to express RFI in kg of TDN. While analysis of a compiled FB and SB dataset using the Fit Model procedure of JMP revealed no effect ($P > 0.10$) of IMP on finished MBW, HCW, BFT, ribeye area (REA), KPH and yield grade (YG), IMP resulted in lower RFI ($P < 0.05$; -0.299 vs. 0.246 kg TDN) and greater marbling score ($P < 0.05$; 542 vs. 595) when compared to conventional weaning. Although not associated ($P > 0.10$) with carcass measurements of CW steers, RFI was associated ($P < 0.05$) with BFT ($R^2 = 0.26$) and YG ($R^2 = 0.36$) of MI steers, with a tendency ($P < 0.10$) toward an association with REA ($R^2 = 0.17$). These results indicate the ability of IMP to decrease the amount of TDN required by FIN cattle to reach a common carcass endpoint. Economic savings in FIN TDN may be capable of offsetting a portion of IMP feed costs.

Key Words: metabolic imprinting, residual feed intake, beef

T174 Comparison of serial and parallel beef fabrication methods in a traceable supply chain. T. Foster*[1], D. Buskirk[1], and J. Schweihofer[2], *[1]Michigan State University, East Lansing, [2]Michigan State University Extension, East Lansing.*

Traceability of meat attributes from small and mid-sized farms through supply chains is recognized as a market barrier. Automatic identification and data capture technologies, such as radio frequency identification (RFID) and two-dimensional (2-D) barcodes, offer the feasibility of maintaining animal and product data through carcass fabrication. The objective of this study was to determine the influence of fabrication method on beef traceability system requirements. Individual animal identity of seventy-two (72) beef carcasses were maintained during either serial or parallel processing of carcass quarters. Each carcass quarter was labeled with a 2-D barcode containing the animal's unique RFID ear tag number at harvest. Nine carcasses were processed on alternating days of processing by one of two methods for eight days of processing. Carcasses were serially fabricated (SER) resulting in creation of all wholesale cuts of a single carcass before moving on to the next, or parallel fabricated (PAR) by processing 10 hindquarters, followed by 10 forequarters, 8 hindquarters, and 8 forequarters. The major difference between processing method was that beef from only one animal was on a cutting table for SER, whereas beef from multiple carcasses was on a cutting table for PAR. In-process, 5.1×2.5 cm "child" labels were generated by scanning the 2-D barcode on the parent carcass label with a handheld mobile computer and wirelessly printed with a mobile printer. Tracking of SER and PAR carcass quarters were accomplished by creating in-process labels for lugs and individual wholesale cuts, respectively. The amount of time required to fabricate each carcass was similar ($P > 0.05$) for SER (2 hours 35 minutes) and PAR (2 hours 49 minutes). The mean number of in-process labels generated per carcass for SER was 3.7 and for PAR was 30.9 ($P < 0.01$). The amount of time required for generating labels for SER (2 minutes 16 seconds) was less than that for PAR (8 minutes 45 seconds) ($P < 0.01$). Logistics of traceability was less complex for SER than PAR and did not significantly add to the time of processing beef carcasses.

Key Words: radio frequency identification, two-dimensional, beef traceability

T175 Effect of supplement and resynchronization protocol on body weight, body condition score, and estrus appearance of Charolais cows grazing Buffelgrass in Northeastern Mexico. E. Garza Brenner*[1], H. Bernal Barragán[1,3], E. Gutiérrez Ornelas[1,3], F. Sánchez Dávila[1], A. S. Juárez Reyes[2,3], and E. Olivares Sáenz[1], *[1]Universidad Autónoma de Nuevo León, San Nicolás de los Garza, Nuevo León, México, [2]Universidad Juárez del Estado de Durango, Durango, México, [3]Red Internacional de Nutrición y Alimentación Animal, México.*

The effects of type of supplement and resynchronization protocol on condition and reproductive performance were evaluated using 32 Charolais cows grazing Buffelgrass (*Cenchrus ciliaris* L.), supplemented daily with 1 kg of either dried distillers grains with solubles (DDGS) or 50% DDGS:50% dried citrus pulp (DDGS:DCP) during 30 d. Estrus was synchronized by inserting on d 0 a controlled internal drug-releasing (CIDR) device, containing 1.38 g of progesterone, with retrieval on d 9; artificial insemination (AI) was conducted 12 h after estrus onset. Resynchronization started 5 d after AI, reinserting to each female its own CIDR device, for either 8 d (R8D) or 14 d (R14D). Body weight (BW) and body condition score (BCS) were registered at d 0, 9, 15, 23, and 30. Intervals from CIDR retrieval to estrus were registered by visual observation. Cows were blocked (age, parity, weight) and randomly

assigned in a 2×2 factorial arrangement of treatments (two supplements: DDGS and DDGS:DCP, and two resynchronization protocols: R8D and R14D). Data were analyzed using two-way ANOVA (BW, BCS, intervals to estrus), and nonparametric test (Mann-Whitney for estrus appearance). Initial and final BW were similar (mean = 485 kg); however, on d 15 (487 vs. 464 kg) and d 23 (500 vs. 485 kg), cows receiving DDGS:DCP were heavier ($P < 0.05$) than those receiving DDGS. BCS changed ($P < 0.05$) from 4.7 (d 0) to 5.1 (d 30), but there was no effect ($P > 0.05$) of supplements. Fourteen out of 16 cows receiving DDGS:DCP, and 8 out of 16 cows receiving DDGS ($P < 0.05$), showed estrus. There was no effect ($P > 0.05$) of supplement on interval of CIDR retrieval to estrus onset (mean = 34.2 h). After resynchronization, 5 and 6 out of 16 cows for each protocol ($P > 0.05$) showed estrus, but it started later ($P < 0.01$) by R8D than R14D (141.9 vs. 27.8 h). In conclusion, Charolais cows grazing Buffelgrass and supplemented with DDGS:DCP had greater estrus appearance rate than those receiving DDGS. Length of resynchronization affected time, but not rate, of estrus appearance.

Key Words: dried citrus pulp, DDGS, resynchronization

T176 Influence of previous experience on performance and grazing behavior in beef heifers. G. A. Perry*, E. L. Larimore, and J. A. Walker, *Department of Animal Science, South Dakota State University, Brookings.*

Previous research has reported that grazing experience can impact performance when heifers are moved from a drylot to forage. The objective of this study was to determine the impact of prior grazing experience on weight change and activity when heifers were moved to spring forage. Angus-cross beef heifers were developed in a single pen following weaning. At the start of treatment (d 0) heifers were blocked by weight and allot to either remain in the drylot (n = 34) or were move to spring forage (n = 35). Body weights were collected on d 0, 9, 20, 41, 53, and 74. Pedometers were placed on 5 heifers per treatment on d 25 and measured numbers of steps taken, and amount of time standing and lying down. On d 44 all heifers were moved to spring forage, but were maintained in their respective group (12.1 ha/group). The statistical model included treatment, time, and their interaction. There was a treatment ($P < 0.01$), time ($P < 0.01$), and a treatment by time ($P < 0.01$) effect on ADG. Heifers moved to spring forage on d 0 had decreased ($P < 0.01$) ADG from d 0 to 9 compared to heifers that remained in the drylot. There was no difference between treatments in ADG from d 9 to 20 and from d 20 to 41. Following being moved to spring forage on d 44 the drylot group had decreased ($P < 0.01$) ADG from d 41 to 53 and from d 53 to 74 compared to the group that had previous grazing experience. From d 25 to 38, there was an effect of treatment ($P < 0.01$), time ($P < 0.01$), and a treatment by time ($P = 0.03$) on the number of steps taken each day, with heifers on forage taking more ($P < 0.05$) steps per d than heifers in the drylot. However, there was no effect of treatment on the amount of time a heifer spent standing or lying down per d. Following being moved to spring forage, heifers that remained in the drylot took more ($P < 0.05$) steps per d on d 44, 45, 46, and 47 compared to heifers that had previous grazing experience. However, there was no treatment effect on the amount of time a heifer spent standing and lying down per day. In summary, prior grazing experience can impact grazing behavior and heifer performance when heifers are moved to spring forage.

Key Words: heifer development, grazing behavior, ADG

T177 Immunocastration effect on performance in feedlot cattle. G. Z. Miguel*[1,3], R. O.Roça[2], C. T. Santos[3], M. H. de Faria[4], F. D. de Resende[4], G. R. Siqueira[4], J. M. Homem[3], A. D. Moreira[5], and B. R. C.

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Our objective was to determine the effect of immunocastration on performance of finishing cattle of 2 genetic groups (GG) and 3 sex conditions (SC). Thirty Nellore (NE) and 30 Nellore × Angus (NA) with average of 450 kg BW and 20 mo of age were evaluated during two periods: pre-feedlot and feedlot. The first period was defined from 130 to 90 d prior to harvest, while the second period was the last 90 d prior harvest. In the pre-feedlot period 10 NE and 10 NA were immunocastrated (IM) by vaccinating twice with Bopriva (anti-GnRH vaccine; Pfizer Animal Health) at 28 d and 1 d prior to transfer to feedlot. Surgical castration (CA) treatment was imposed on 10 animals from each GG, which occurred at 28 d before transferring to feedlot. Ten animals from each GG were kept intact (NC). During the pre-feedlot period the animals were raised on pasture and supplemented at 0.25% of BW, while during the feedlot period, the animals were fed ad libitum a high-grain diet formulated to contain 85% concentrate. In the feedlot the animals were finished in individual pens. Statistical analyses were performed according to a 2 × 3 factorial scheme (2 GG × 3 SC) in a completely randomized design. Data were analyzed using the MIXED procedure of SAS with initial weight as a covariate, and the means were compared by Student's t-test at 5% probability. As expected, NA animals had greater BW and ADG than NE ($P < 0.05$), but similar DMI and G:F ($P > 0.05$). Although IM and CA animals showed similar results for ADG, DMI and G:F ($P > 0.05$), IM had greater BW ($P < 0.05$). NC bulls had greater BW, ADG and G:F than the other SC ($P < 0.05$), but equivalent DMI ($P > 0.05$). Among IM treatments NA had greater BW, ADG and G:F than NE ($P < 0.05$). In this study NA animals and NC bulls were more efficient on high-grain diets due to greater BW and ADG. Additionally IM-NA animals had better performance than IM-NE with greater BW, ADG and G:F.

Key Words: sexual conditions, *Bos indicus*, beef cattle

T178   Correlations of visual scores and ultrasound carcass traits with economically relevant traits in Nellore cattle. R. C. Gomes*[1], P. H. Cancian[2], F. Manicardi[2], A. C. Ianni[2], M. N. Bonin[2], P. R. Leme[2], and S. L. Silva[2], [1]*Embrapa Beef Cattle, Campo Grande, MS, Brazil,* [2]*Faculdade de Zootecnia e Engenharia de Alimentos, Universidade de Sao Paulo, Pirassununga, SP, Brazil.*

Visual scores (VS) and carcass ultrasound have been used for genetic selection purposes in the Brazilian Nellore herd. However, the impacts on economically relevant traits, such as feed efficiency and the yield of commercial meat cuts, still lack investigation. The aim was to evaluate the correlations of VS and carcass traits evaluated by ultrasound (US), with feed efficiency (FE), hot carcass weight (HCW), dressing percentage (DP) and retail product yield (RPY). Fourty-two bulls and 44 steers were evaluated for both VS and US, in the postweaning phase (15 mo of age) and in the beginning of the finishing phase (21 mo of age). Cattle were ultrasound scanned for measuring backfat thickness (UBFT), rump fat thickness (URFT) and ribeye area (UREA). Visual scores of conformation (C), precocity (P) and muscling (M) were attributed individually. Gain-to-feed ratio (G:F) and residual feed intake (RFI) were measured in feedlot. HCW, DP and RPY were determined at harvest. Pearson correlation analyses were carried out. Bulls had greater HCW (321 vs. 292 kg; $P < 0.0001$) and RPY (74.5 vs. 71.8%; $P < 0.0001$) and lower finishing UBFT (0.58 vs. 1.60 mm, $P < 0.0001$) and URFT (1.96 vs. 3.64 mm; $P < 0.0001$) than steers. C and P did not differ across sex types ($P > 0.05$) in both phases, but bulls had greater M scores in the finishing phase (4.49 vs. 3.42, $P < 0.01$). Feedlot RFI and G:F were poorly correlated with postweaning VS and US in both sex types ($P > 0.05$). G:F was negatively correlated with finishing C (r = −0.39; $P < 0.05$), P (r = −0.50; $P < 0.01$) and M (r = -0.50; $P < 0.01$) in steers. DP was negatively correlated with postweaning P (r = −0.31; $P < 0.05$), M (r = −0.32; $P < 0.05$) and UREA (r = −0.51; $P < 0.01$) in steers. Finishing URFT was negatively correlated with RPY in bulls (r = −0.41; $P < 0.01$). Greater subcutaneous fat thickness in the beginning of the finishing phase may indicate cattle with lower retail product yield. The associations of visual scores and ultrasound carcass traits with feed efficiency and retail product yield are affected by age at evaluation and by castration, but are generally small.

Key Words: body composition, edible portion, feed conversion

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