Beef Species: Beef Cattle Production

T19 Association of slaughter and dressing traits with ultrasound and computed tomography data in cattle. G. Hollo*[1], J. Tõzsér[2], A. Szentléleki[2], F. Szabo[3], I. Anton[4], T. Somogyi[1], I. Repa[1], and I. Hollo[1], [1]*Kaposvár University, Kaposvár, Hungary,* [2]*St. István University, Gödöllö, Hungary,* [3]*Pannon University, Keszthely, Hungary,* [4]*Research Institute for Animal Breeding and Nutrition, Herceghalom, Hungary.*

The aim of this study was to establish the relationship among slaughter and dressing traits as well as cross sectional imaging data measured by ultrasound (UH) and x-ray CT method (CT) in cattle. Seventy growing-finishing bulls from 6 different genotypes were used. The animals were kept and fed under the same condition. Animals were ultrasound scanned (Falco 100, Pie Medical) for Longissimus muscle area between 12-13th rib (UHLMA), backfat thickness (P8) and rump fat (RF) determinations (average live weight of 398 kg). The target live weight was determined at 600 kg. At slaughter, slaughter weight (SW), hot carcass weight (HCW), kidney fat proportion (KF) and EU beef carcass classification data were recorded. After 24 hr chilling the right sides of carcasses were dissected. For the CT-analysis (Siemens Emotion 6) ribs joint was removed from right half carcasses between 11-13th ribs. Areas and proportions of muscle, fat and bone tissue were calculated and the area of Longissimus muscle (CTLMA) was measured. For estimation of linear association Pearson correlation analysis and multi- and bivariate regression were applied (SPSS 10.0). Slaughter data moderately correlated with UH and CT data. The KF positively related to P8 (r = 0.52) and RF (r = 0.53) as well as CT-fat area (r = 0.77) and CT-fat percentage (r = 0.78). A positive relationship was determined between EU conformation score and UHLMA (r = 0.59) and CTLMA (r = 0.66). The EU fatness score showed a higher relationship with RF (r = 0.42) than P8 (r = 0.57). The lean % and fat % in carcass correlated closer with CT-muscle and CT-fat % in rib joint (r = 0.85; r = 0.92) than UH data (r = 0.39; r = 0.65). Predictors derived from CT alone accounted for a high proportion of the variance in dissected fat proportion ($R^2 = 0.85$), but lower proportions for dissected lean meat yield ($R^2 = 0.77$). For predicting lean weight from combinations of HCW and UH measurements the R^2 value found 0.87. R^2 of 0.83 was measured for fat weight using UHLMA and CT fat area. In conclusion, the in vivo UH measurements and CT scanning of rib joint can provide opportunities to estimate the beef carcass value objectively.

Key words: cattle, carcass composition

T20 Effect of arrival health risk status of steer calves on feedlot performance and health during a 61-d preconditioning program. C. Flaig[1], L. Clark[1], O. C. Schunicht[1], M. L. May[1], R. E. Peterson[1], C. W. Booker[1], R. Krehbiel[2], G. K. Jim[1], B. P. Holland[3], and L. O. Burciaga-Robles*[1], [1]*Feedlot Health Management Services Ltd., Okotoks, Alberta, Canada,* [2]*Department of Animal Science, Oklahoma State University, Stillwater,* [3]*Department of Animal and Range Sciences, South Dakota State University, Brookings.*

Ranch-direct steer calves (n = 120; BW = 289 ± 6.84 kg; RANCH) and ultra-high risk steer calves (n = 120; BW = 250 ± 6.84 kg; UHR) were allocated to evaluate the effect of risk status at arrival on feedlot performance and health during a 61-d preconditioning program. Arrival processing included a metaphylactic treatment for control of BRD and proprietary health procedures based on animal health risk assessment (Feedlot Health Management Services, Ltd. Okotoks, Alberta, Canada) and individual numbered and electronic ear tags were also applied. Intact males were band castrated. After initial processing, cattle of the same risk group were randomly allocated to one of 6 pens (40 head/pen) equipped with individual feed intake data collection systems (GrowSafe Systems Ltd., Airdrie, Canada) and fed for 61 d. Cattle were observed by trained personnel for detection and treatment of disease during the trial. Cattle were re-weighed on d 30 and d 61. Animal performance was analyzed using PROC GLIMMIX (SAS Institute, NC). Animal was the experimental unit, and the model included the fixed effect of treatment and the random effect of replicate. Initial body weight was heavier for RANCH than UHR (289 vs. 250 ± 6.50 kg; $P < 0.001$) and it was included as a covariate in the model. Animal health parameters were analyzed using the chi-squared procedure of SAS. A total of 24 animals (15 RANCH and 9 UHR) were removed from the trial and not included in the analysis. In addition, 2 (1.67%) RANCH and 1 (0.80%) UHR died ($P = 0.56$) and were removed from the analysis. Treatments for BRD were higher for RANCH vs. UHR calves (22.5 vs. 10.0%; $P = 0.01$). No differences in ADG, DMI, or FG ($P > 0.05$) were observed from d 0 to 30 and d 0 to 61. Based on these data, health risk status at arrival has no effect on feedlot performance; however based on the differential arrival health protocol, RANCH were treated more often for BRD than UHR during a 61-d preconditioning program. Economic modeling is important when determining arrival health protocols and purchase price based on health risk assessments of specific populations of cattle.

Key words: feedlot performance, health risk status, BRD

T21 Effect of residual feed intake on blood urea nitrogen concentration in growing heifers from an Angus-Brahman multi-breed herd. R. O. Myer[1], M. A. Elzo[2], G. C. Lamb[1], and N. DiLorenzo*[1], [1]*University of Florida, NFREC, Marianna,* [2]*University of Florida, Gainesville.*

Blood urea N can be used as an indicator of N use and excretion by an animal. The objective of this research was to assess the effect of residual feed intake (RFI) on blood plasma concentration of urea N (PUN) in 85 growing beef heifers ranging from 100% Angus to 100% Brahman born in 2008. Calves were assigned to pens in a GrowSafe feeding facility by sire group and fed ad libitum a total mixed ration (62% chopped grass hay, 30% whole corn, 3% cottonseed meal, and 5% molasses-mineral-vitamin supplement; 90% DM, 11% CP, and 68% TDN). The pre-trial adjustment period lasted 14 d. Individual daily feed intake was collected during the 70 d feeding trial; BW were recorded every 2 wk. Blood (jugular) was drawn on d −10, 0, 56, and 70 for PUN. Residual feed intake (RFI) was computed as the difference between actual and expected intakes. Data (PUN) were analyzed using a mixed model. Fixed effects were pen, age, RFI of calf, Brahman fraction of calf, heterozygosity of calf, and daily feed intake. Random effects were sire and residual. Overall ADG was 0.91 ± 0.02 kg/d. Brahman had higher PUN concentrations at each sampling day compared with Angus ($P < 0.01$). Only d −10 PUN concentration was slightly related to RFI ($P = 0.07$), in that low RFI cattle also had low PUN beyond that expected due to the lowered feed intake; the other sampling days were not affected by the RFI of the calf ($P > 0.10$). Results indicate that PUN concentration appeared to be little affected by RFI beyond that accounted for by reduced feed intake.

Key words: beef cattle, blood urea, feed efficiency

T22 Post-weaning feed efficiency of tropically adapted purebred and crossbred calves when fed in either winter or spring.
S. W. Coleman*[1], C. C. Chase[1], W. A. Phillips[2], and D. G. Riliey[1], [1]*USDA ARS Subtropical Agricultural Research Station, Brooksville, FL,* [2]*USDA, ARS, Grazinglands Research Laboratory, El Reno, OK.*

Earlier work has shown that young, tropically adapted (Brahman and Romosinuano) cattle do not gain as rapidly as temperately adapted (Angus) cattle during the winter in OK. The objective for this study was to compare efficiency of gains between tropically- and temperately-adapted cattle breeds. Over 3 yr, 239 purebred and crossbred steers (F1 and 3-way crosses) of Angus, Brahman or Romosinuano breeding were born in Brooksville, FL, transported to El Reno, OK in October each year, and fed in 2 phases to determine individual intake and performance. Phase 1 (W, ~127 d) began in November and phase 2 (S, 56 to 162 d) began in March. A grower diet (14% CP, 1.10 Mcal NEg/kg) was fed in W and a conventional feedlot diet (12.8% CP; 1.33 Mcal NEg/kg) in S. Body weights were recorded at approximately 14 d intervals, ADG was determined by regressing BW on days on feed (DOF) within phase. Daily DMI was then regressed by phase on median BW and ADG to determine residual feed intake (RFI). Gain to feed (GF) was also calculated as a measure of efficiency. The statistical model included fixed effects of yr, harvest group (3 per year), age on test, and a nested term DT(ST x XB) where DT = proportion tropical breeding of dam (0, 0.5, or 1), ST = proportion tropical breeding of sire (1, or 0), and XB whether the calf was straightbred or crossbred. Sire(ST x XB) and pen were random effects. In the W, 100% tropical steers ate less, gained less, and were less efficient (GF) than steers with some Angus breeding ($P < 0.01$), but not ($P > 0.10$) by RFI. Gain and efficiency in the S phase were not different ($P > 0.05$) due to tropical influence. Simple correlations between RFI of the same animal in W and S were 0.51 ($P < 0.01$) whereas that for GF was 0.20 ($P < 0.01$). Poor performance of tropically adapted steers as stockers in OK during the winter apparently resulted from a decrease in both feed intake and feed efficiency.

Key words: tropical adaptation, postweaning feed efficiency, seasonal performance

T23 Finishing steers and bulls with high-vitamin E diets: Effect on circulating immune cells and creatine kinase after a mild stress.
C. Reyes, C. Fuentes, and R. E. Larraín*, *Pontificia Universidad Catolica de Chile, Santiago, Chile.*

Release of glucocorticoids to the blood stream after stress may change the number of immune cells circulating in blood within minutes. A stressful event may also increased creatine kinase (CK) in blood if muscle tissue is damaged or mobilized. Vitamin E reduced activation of the hypothalamic-hypophysial-adrenocortical axis in farm animals, so the objective of this study was to test if finishing bovines with a high vitamin E diet modulate changes in immune-cells counts and CK after a mild stress. Thirty-eight steers and bulls were blocked by sex, then grouped in 16 pens of 2 or 3 animals of similar weight, and randomly assign to one of 2 treatments: a control diet design to provide 60 IU vitamin E•animal^{-1}•d^{-1} and the control diet supplemented with 2,000 IU vitamin E•animal^{-1}•d^{-1}. Each pen was considered an experimental unit (n = 8). Feed was offered once daily to each pen to provide ad libitum access to feed. After 105 d of feeding the experimental diets, all animals were subjected to a mild stressor consisting of 45 min restraint in a single-file chute, with 3 brief shots (about 0.5 s each) of an electrical cattle prod at 0, 15, and 30 min. Blood samples were taken by jugular venipuncture at d 0 (to be used as baseline for CK) and after stress. Factors in the model were sex and treatment, and initial BW was included as covariate. Differences were considered significant when ANOVA had $P < 0.05$. We observed no changes in any of the variables analyzed, concluding that feeding 2,000 IU vitamin E•animal^{-1}•d^{-1} produced no changes in immune cells counts and CK after a mild stress.

Table 1. Immune cells (cells/μL) and creatine kinase (CK, U/L) after a mild stress in bovines fed vitamin E

Item	Control	Vitamin E	*P*-value
Leucocytes	9,448 ± 443	10,009 ± 439	0.35
Bacilliform	38.6 ± 23.6	66.1 ± 23.4	0.39
Neutrophils	2,858 ± 316	3,401 ± 313	0.21
Lymphocytes	5,870 ± 260	5,894 ± 258	0.94
Monocytes	99.5 ± 30.2	74.1 ± 30.0	0.53
Eosinophils	396 ± 52.3	345 ± 51.9	0.46
Basophiles	66.8 ± 16.3	32.4 ± 16.1	0.13
Change in CK from d0	−0.41 ± 29.2	−7.35 ± 29.0	0.86

Vitamin E: 2000 IU•animal^{-1}•d^{-1}.

Key words: vitamin E, immune cells, creatine kinase