abstracts

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Western Section	July 15–19, 2012	Phoenix, AZ
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Monday, February 6, 2012

SYMPOSIA AND ORAL SESSIONS

Undergraduate Student Competition

1 Residual feed intake and meat quality in Angus-sired cattle. S. D. Perkins*, C. N. Key, C. F. Garrett, C. D. Foradori, C. L. Bratcher, L. A. Kriese-Anderson, and T. D. Brandebourg, *Auburn University, Auburn, Al.*

Residual feed intake (RFI) is a heritable feed efficiency measure. Mechanisms underlying RFI are currently poorly understood while the relationship between RFI and meat quality is unknown. To address these issues, 48 Angus-sired steers were trained to the Calan Gate (Northwood, NH) system at the Beef Evaluation Unit at Auburn University. Daily feed intake and RFI were assessed during a 70 d feeding trial. The test diet was 50% sorghum-sudan silage, 50% grain (2.9 Mcal ME/kg DM). Feed intake was recorded daily while body weights and hip heights were recorded at 14 d intervals. Ultrasound measurements of rib eye area (REA) and backfat (BF) were recorded initially and before slaughter. Upon completion of the feeding trial, RFI was calculated for each animal as the difference between actual dry matter intake and the expected intake to create 2 divergent cohorts consisting of High (H) and Low (L) RFI individuals. Steers were humanely harvested and subcutaneous adipose tissue (SC), trigeminal ganglion (TG) and hypothalamic tissue (HT) samples were collected, immediately frozen and stored at −80°C to facilitate microarray studies into the mechanisms underlying variation in RFI. After chilling for 24 h post harvest, carcass characteristics were measured. Carcass and growth data were analyzed using a mixed model with RFI level (L, H) as the independent variable (SAS, 2002). Means were separated using lsmeans at a significance level of $P < 0.05$. The lsmeans for RFI were −1.3 and 1.5 respectively for the L and H cohorts ($P < 0.001$) and were greater than 2 standard deviations apart. As expected dry matter intake was higher for the H individuals versus the L steers ($P < 0.001$) while on test gain was not different between the 2 groups. There were no differences in marbling score, the objective color measures L*, a*, and b*, adjusted back fat, ribeye area or yield grade between L and H cohorts suggesting there is no relationship between RFI and meat quality.

Key Words: RFI, cattle, meat quality

2 Lean beef trim improved fresh and cooked quality characteristics of ground beef patties. C. T. Moon*, J. W. S. Yancey, J. K. Apple, J. J. Hollenbeck, T. M. Johnson, and A. R. Winters, *Department of Animal Science, University of Arkansas Division of Agriculture, Fayetteville.*

Lean beef trim (LBT) is commonly used in ground beef and other foods to yield a lower fat, lower cost product and is created from meat and fat trimmings, centrifuged to remove the fat, leaving a product that is 94 to 97% lean. Thus, the objective of this study was to determine the effects of LBT on fresh and cooked quality characteristics of ground beef patties. Ground beef was formulated into 6 treatments in a 2 × 3 factorial of 82 or 93% lean and 0, 10, or 20% LBT. Five 11.3-kg batches of each treatment combination were ground through a 9.5-mm plate and formed into 150-g patties. Patties were aerobically-packaged and placed in simulated retail display for 5 d, and lightness, redness, and yellowness (L*, a*, and b*, respectively) were measured daily. TBARS, a measure of lipid oxidation, were assayed on aerobically-packaged patties after 0, 1, 2, and 4 d of display. Patties for instrumental cooked color (internal and external), cooked TBARS, cooking loss, and Lee-Kramer shear force were frozen for 5 d before being thawed overnight at 2°C and cooked to 71°C on electric griddles. Values for pH increased ($P < 0.05$) with increasing fat levels and LBT percentage. Regardless of lean percentage, patties with greater LBT percentage were lighter, redder, and less yellow ($P < 0.05$) throughout display. Although LBT did not ($P > 0.05$) affect hue angle in 82% lean patties, hue angle decreased (indicating redder, $P < 0.05$) as LBT increased in the 93% lean patties. Lipid oxidation (TBARS) was similar among fresh patties on d 0, but TBARS were lower ($P < 0.05$) with increasing LBT on d 1, 2, and 4 of display. Shear force declined ($P < 0.05$) with increasing fat levels and increased LBT. Cooking loss was lowest ($P < 0.05$) in 20% LBT patties, but LBT inclusion percentage did not affect ($P \geq 0.07$) internal or external color of cooked patties. Cooked TBARS were lower ($P < 0.05$) in 93% vs. 82% lean patties, but LBT did not affect ($P = 0.82$) cooked TBARS. Overall, LBT incorporation up to 20% in ground beef increased pH, improved fresh color and TBARS, and decreased shear force in 82 and 93% lean patties, with no detrimental effects on cooked color.

Key Words: ground beef, lean beef trim, fat level

3 Color development and stability in the beef longissimus thoracis (LT) and psoas major (PM). R. A. Reese*, J. K. Apple, J. W. S. Yancey, J. J. Hollenbeck, and T. M. Johnson, *Department of Animal Science, University of Arkansas Division of Agriculture, Fayetteville.*

Fresh meat color is dependent on the state of myoglobin and is influenced by oxygen consumption (OC) and the activity of metmyoglobin reductase (MRA); thus, the objective of this study was to determine the effect of beef quality grade (QG) on OC and MRA in the LT and PM by examining color change. The PM and LT were obtained from USDA Prime-, Choice-, and Select-grade carcasses (n = 6/QG category). After aging for 10 d at 2°C, 3 2.5-cm-thick steaks were cut from each muscle. Instrumental color was measured at 13 time intervals on 1 steak beginning immediately after cutting. A second steak was aerobically packaged and displayed for 7 d, and instrumental color was measured daily. Samples were cut from a third steak for OC and MRA analysis. During bloom, the PM was initially redder and more yellow ($P < 0.05$) than the LT, but color of the PM stopped changing after 30 min, while the color of the LT continued to increase ($P < 0.05$) in redness and yellowness up to 90 min after cutting. The K/S610:K/S525 ratio was initially greater ($P < 0.05$) in the LT (indicating less oxymyoglobin), decreased more rapidly during bloom, and was lower ($P < 0.05$) than the PM at 120 min (indicating more oxymyoglobin). The PM had a greater ($P < 0.05$) OC rate than the LT, whereas the LT had greater ($P < 0.05$) MRA than the PM. Lightness, redness, and yellowness (L*, a*, and b*, respectively) were all greater ($P < 0.05$) in the LT than the PM, and, although color values decreased ($P < 0.05$) with time in display for both muscles, the LT decreased less drastically over time. When comparing QG during display, Prime steaks were lightest and least yellow ($P < 0.05$), whereas Select steaks were reddest ($P < 0.05$). The K/S610:K/S525 ratio increased and the K/S572:K/S525 ratio decreased more rapidly in the PM than the LT, indicating that oxymyoglobin formation decreased and metmyoglobin formation increased at a faster rate in the PM than the LT. Results indicate that QG had minor influence on color development and stability, and the LT was a more stable-colored muscle as indicated by a lower OC rate and greater MRA.

Key Words: beef, color, quality grade

4 Regulation of marbling in heifers in response to age and pasture versus grain finishing. C. N. Key*, S. D. Perkins, C. F. Garrett, C. L. Bratcher, L. A. Kriese-Anderson, and T. D. Brandebourg, *Auburn University, Auburn, Al.*

The regulation of intramuscular fat (IMF) development is poorly understood in cattle and this limits the development of calf to finish beef production systems in the Southeast. To test the hypothesis that a developmental delay in IMF results from differential expression of regulatory genes, a serial slaughter approach examined the effects of age and diet on carcass merit and gene expression in subcutaneous fat (SC) and IMF. Twenty-four crossbred heifers were randomly distributed between 4 groups comparing days on trial and finishing strategy during the final 100 d: d0 (baseline, 272 kg), d120 (rye grass), d220 (finished on ryegrass), d220 (finished on grain-based ration). Longissimus dorsi (LD) and SC samples were collected at slaughter, quickly frozen and stored at −80°C to allow gene expression studies. Carcass characteristics were measured 24h post-slaughter. Carcass and growth data were analyzed using a general linear model with group and sire breed as independent variables (SAS, 2002). Means were separated using lsmeans and a significance level of $P < 0.05$. Hot carcass weight, ribeye area, adjusted back fat, kidney pelvic heart fat and marbling values all increased while average daily gains decreased with age ($P < 0.05$). Adjusted back fat was greater ($P < 0.01$) while marbling values trended greater in grain versus forage-finished heifers. Additionally, L*, a* and b* values were increased with age with a* and b* values also being higher in grain versus forage-finished heifers ($P < 0.05$). Final pH was not affected by age but was lower in grain versus forage finished heifers ($P < 0.05$). Warner Bratzler shear force values were unaffected by either age or finishing strategy but cook loss decreased with days on trial ($P < 0.01$). Preliminary gene studies suggest peroxisome proliferator-activated receptor gamma (PPARγ) expression was higher in SC than in LD (site of IMF) across groups. PPARγ expression was higher in the loin from grain versus forage-finished heifers. These data support the hypothesis that marbling is limited by expression of key regulatory genes.

Key Words: marbling, cattle, forage

5 The use of real-time ultrasound and predictive software to estimate carcass yield and quality of fed cattle. K. J. Kelly*[1], B. C. Williamson[1], R. S. Miculinch[1], C. Hunt[2], and T. J. Wistuba[3], *[1]Morehead State University, Morehead, KY, [2]Paradox Farms, Ewing, KY, [3]Novus International, Inc., St. Charles, MO.*

The use of real-time ultrasound as a means of predicting endpoints of fed-cattle has shown variable results. Sixty-four crossbred steers and heifers (276 ± 42 kg) were grouped based on similar endpoints that would result in maximum carcass value. Body measurements of rib fat (RF), percent intramuscular fat (IMF), and longissimus muscle depth (LMD) were recorded using real-time ultrasound one week before transport to a commercial feedyard in Iowa and predicted carcass composition was estimated (Cattle Performance Enhancement Co., Stratford, TX); ADG′s were calculated based on feedyard performance. Cattle were harvested when visually appraised to have 1 cm of RF. Carcass parameters were recorded for hot carcass weight (HCW), yield grade (YG), and quality grade (QG). Pearson square correlations were used to determine the relationship between predicted carcass measurements, carcass grades, HCW, and performance parameters. Predicted HCW was correlated ($P < 0.05$) with actual HCW and final BW (r = 0.30 and 0.29, respectively). Yield grade was correlated ($P < 0.01$) with predicted RF (r = 0.33) and tended ($P < 0.06$) to be correlated with the probability of grading prime (r = 0.24). Predicted final BW was correlated ($P < 0.01$) with HCW (r = 0.31) and final BW (r = 0.30). A negative correlation tended ($P < 0.10$) to exist between ADG and probability of qualifying for Certified Angus Beef (r = −0.21). Hot carcass weight and final BW tended ($P < 0.10$) to be inversely correlated with predicted IMF (r = −0.22 and −0.23, respectively). Ultrasound IMF was correlated ($P < 0.05$) with YG (r = 0.25); however, tended to be inversely correlated ($P < 0.08$) with HCW and final BW (r = −0.22 and −0.23, respectively). Average daily gain was correlated with HCW and YG ($P < 0.05$; r = 0.77 and 0.29, respectively). Predicted carcass composition was correlated with carcass grid values, actual HCW, and final BW. Carcass predictive software may be a beneficial tool to market cattle in more uniform groups.

Key Words: bovine, real-time ultrasound, carcass composition

6 The effect of pyruvate dehydrogenase E1-∝ subunit (*PDHA1*) on fresh pork quality. M. L. Penick*[1], R. E. Miculinich[1], B. C. Williamson[1], and S. J. Moeller[2], *[1]Morehead State University, Morehead, KY, [2]Ohio State University, Columbus.*

Consumers and many segments of the pork industry continue to demand improvements in the quality of fresh pork products. Previous research has determined that carcass and meat quality traits may be improved with the help of marker assisted selection. The objective of this study is

to determine the effect of a promising candidate gene, pyruvate dehydrogenase E1-α subunit (*PDHA1*), on fresh pork quality. 200 Berkshire and Landrace sired pigs, highly characterized for both carcass and meat quality characteristics, were genotyped for a *PDHA1 AciI*, marker using PCR-RFLP procedures. A statistical analysis was completed using the PROC MIXED procedure in SAS (SAS Inst., Inc. Cary, NC). *PDHA1 AciI*, allele-2 was found at a higher frequency (0.70) in the Berkshire population as compared with the Landrace population (0.47). *PDHA1*, genotype-22 pigs had a higher pH ($P < 0.05$) when compared with both *PDHA1*, genotype-11 and 12 pigs. *PDHA1*, genotype-11 and 12 pigs had significantly larger loin muscle area ($P < 0.05$) compared with the 22-genotypes. *PDHA1*, genotype groups did not differ significantly ($P > 0.05$) for Minolta reflectance, Warner-Bratzler shear force, purge loss, color score, firmness and cooking loss percentage; however, numerical trends indicate that in addition to higher pH, 22-genotypes had better purge and cooking loss, were firmer, darker in color and more tender when compared with 11-genotypes. Results confirm that *PDHA1*, may have potential for use in marker assisted selection for the improvement of pork quality attributes associated with loin pH. Further characterization of the effects of *PDHA1 AciI*, in a larger population is ongoing.

Key Words: swine, genetics, meat quality

7 Annual ryegrass (*Lolium multiflorum* Lam.) production and quality as influenced by planting date and irrigation during early seedling development. W. B. Smith*, R. B. Muntifering, E. van Santen, E. A. Guertal, and D. M. Ball, *Auburn University, Auburn, AL.*

Annual ryegrass (*Lolium multiflorum* Lam.) is a commonly utilized cool-season forage in the Southeast. Yield is typically greater in early spring than winter, and management to achieve greater growth during late autumn/winter could increase total seasonal production. We conducted a field experiment to determine ryegrass DM yield as affected by planting date and irrigation during early seedling development. Ninety-six plots were established at 2-wk planting-date (PD) intervals (16 plots/date) at the E.V. Smith Research Center in Tallassee, AL, beginning in September and ending in November 2008. Cultivars were Marshall, Gulf, Shiwasuaoba, and SWIPAR. The experimental design was a randomized complete block (n = 4) with split-plot restriction on randomization in which irrigation treatments (+,–) were main plots and cultivars were subplots. Immediately after seeding, 2.54 cm of water was applied via a drip system to irrigated plots. Water applied for 2 wk thereafter was based on evapotranspiration (ET) and was gradually reduced to 65% ET. Plots were harvested when forage canopy height reached 20 cm. There was no effect of irrigation on cumulative forage yield from PD 1, 3, 4, 5 and 6; however, yield was significantly increased ($P = 0.004$) by irrigation for PD 2. Across the first 3 PD, mean DM yield penalty of a 2-wk delay in seeding was 67 kg/ha/d in the first (primary growth) harvest and 55 kg/ha/d in the second (first regrowth) harvest. Regression of forage IVDMD on concentration of total nonstructural carbohydrates (TNC) had r^2 values of 0.33 and 0.42 (first harvest), 0.77 and 0.59 (third harvest), and 0.41 and 0.96 (fourth harvest) for the first and second planting dates, respectively. Data are interpreted to mean that seasonal forage production from early plantings of ryegrass may be increased vs. delayed planting, and that forage concentration of TNC is an increasingly important determinant of nutritive quality with advancing forage regrowth cycles.

Key Words: annual ryegrass, planting date, irrigation

8 Determining the relationship between body temperature and hair shedding scores in Angus cows. M. R. Woolfolk*, J. J. Mayer, J. D. Davis, and T. Smith, *Mississippi State University, Starkville.*

The objective of this trial was to determine the relationship between hair shedding and tympanic temperatures in Angus cows. A scoring system was developed to evaluate hair shedding in cattle based on a scale of 1 to 5, with 1 = winter coat completely shed and a 5 = no shedding of the winter coat. Shedding scores were taken every 28 d from March to July. Cows were selected based on hair shedding score data collected in 2008 and 2009 and placed in groups based on ability or inability to shed during the spring of each year. Cattle with hair shedding scores of ≥4 in June of each year were placed in the high (H) shedding group (n = 10), while cows with a score of ≤3 by March were placed in the low (L) shedding group (n = 10). Tympanic temperature sensors were placed in the right ear of each cow in March, May, and July and temperature data were recorded by a data logger every 5 min for a period of 7 d. Due to loss of sensors during the trial period, only cattle with complete data were used in the data analysis (n = 5 for H and n = 7 for L). Total observations for the trial were 5,184 temperature points. Data were analyzed using the mixed procedure in SAS with hourly average tympanic temperature (ATT) as the response variable with fixed effects of trial time period, hair shedding group and interactions. Ambient temperature was included as a covariate. Overall, cattle from the H group had a greater ATT at 38.89 ± 0.10°C than the L group with an ATT of 38.36 ± 0.08°C ($P < 0.01$). When comparing across time periods, ATT from March and July were similar ($P > 0.05$) for both groups but, were greater than those recorded in May ($P < 0.01$). Average tympanic temperatures for cows in the H group were 38.84 ± 0.10°C in March, 38.85 ± 0.10°C in May and 38.98 ± 0.10°C in July and were greater than ($P < 0.01$) those from the L group (38.45 ± 0.09, 38.27 ± 0.09, 38.37 ± 0.09°C for March, May, and July, respectively). Results suggest that hair shedding scores could be related to differences in tympanic temperatures in Angus cattle.

Key Words: cattle, shedding, tympanic

9 Effect of dam temperament on birth weight in Brahman cattle. A. B. Keith*[1,2], A. W. Lewis[1], D. A. Neuendorff[1], R. C. Vann[3], T. H. Welsh, Jr.[2], and R. D. Randel[1], *[1]Texas AgriLife Research, Overton, TX, [2]Texas AgriLife Research, College Station, TX, [3]MAFES, Mississippi State University, Raymond.*

Brahman heifers (n = 297) were assigned Pen Scores (PS) at weaning of 1 through 5, with calm receiving a 1 and temperamental a 4 or 5. Within 24 h of calving, birth weights (BW) were obtained from calves (n = 515) born to these heifers. Mature Brahman females (n = 437) were assigned Temperament Scores (TS) of calm (1), intermediate (2), or temperamental (3). BW were obtained within 24 h of calving from calves (n = 977) of these females. Temperament data were subjected to Mixed Model Analyses. Calf BW was the dependent variable. BW was covaried by the dam's d of age at calving. Class variables included either TS or PS, and sex of calf, parity of dam, month of birth and interactions between parity and calf sex and parity and temperament. Sire was included as a random effect. Non-significant variables were eliminated. Least squares means for BW by class are reported. There was a tendency for a TS by calf sex interaction ($P = 0.0586$), with a decrease seen in male BW as TS increased. Male BW for TS 1 = 37.4 ± 0.6 kg, 2 = 36.6 ± 0.4 kg, and 3 = 35.6 ± 0.5 kg. Female BW for TS 1 = 33.5 ± 0.6 kg, 2 = 33.7 ± 0.4 kg, 3 = 33.7 ± 0.5 kg. Heifers with a PS of 4 or 5 produced lower BW calves than those scoring 1 through 3. BW for PS 1 = 35.7 ± 0.5 kg, 2 = 35.4 ± 0.5 kg, 3 = 35.8 ± 0.6 kg, and 4 or 5 = 34.6 ± 0.6 kg. Calf sex affected BW for TS and PS ($P < 0.0001$). BW for TS females = 33.6 ±

0.4 kg and males = 36.6 ± 0.4 kg. BW for PS females = 33.8 ± 0.5 kg and males = 36.0 ± 0.5 kg. Dam parity (primiparious and multiparious) affected BW for both TS ($P = 0.0017$) and PS ($P = 0.0423$). TS calf BW were primiparious = 34.4 ± 0.5 kg and multiparious = 35.8 ± 0.4 kg. PS calf BW were primiparious = 34.8 ± 0.6 kg and multiparious = 36.0 ± 0.5 kg. TS was correlated with PS (r = 0.58, $P < 0.0001$). These data suggest that dam temperament at weaning (PS) does not affect calf BW. However, dam temperament at maturity (TS) does have an influence on BW, particularly in male calves born to temperamental dams. These data confirm that both calf sex and dam parity influence BW.

Key Words: temperament score, weaning pen score, birth weight

10 Impact of different handling styles (good vs. adverse) on growth performance, behavior, and cortisol concentrations in beef cattle. J. M. Bauer*, E. B. Kegley, J. T. Richeson, D. L. Galloway, J. A. Hornsby, and J. L. Reynolds, *University of Arkansas, Fayetteville.*

The public is increasingly concerned with the animal handling and well-being. Our objective was to determine effects of aggressive handling on growth performance, behavior, and cortisol concentrations in beef calves. Crossbred calves from a single herd (313 ± 4.7 kg; n = 54; 24 steers, 30 heifers) were stratified by gender, BW, and initial chute score, then allocated randomly to 1 of 6 pens. Each pen was assigned to 1 of 2 handling treatments (good or adverse) applied on d 7, 35, 63, and 91. Good treatment involved moving calves quietly from pastures with minimal prodding, a 15 min period of quiet rest before being worked, and handling quietly through the chute with minimal prodding. Adverse treatment involved rapid movement from pasture to working facility, a 15 min period of exposure to many extraneous noises and stimuli. While being worked, cattle were exposed to loud talking, taped sale barn noises, and aggressive prodding. Body weight, exit velocity, and chute scores (based on 5 point subjective scale) were recorded on d 0, 7, 35, 63, and 91. In addition, salivary samples for cortisol were collected (4 calves/pen). Pen scores (5 point subjective scale) were recorded on d 12, 42, and 87. Data were statistically analyzed using a mixed model with treatment, sex, and when appropriate day, and the interactions as fixed effects. Replication was the random effect and pen was specified as the subject. Chute scores tended to be higher (more agitated) for cattle in the adverse treatment on d 7, but scores did not differ on subsequent days (treatment × day; $P = 0.06$). Salivary cortisol concentrations on d 63 were greater in cattle on the adverse treatment (treatment × day, $P = 0.001$). Body weight, exit velocity, and pen scores were not affected by treatment ($P \geq 0.24$). While some differences were observed, cattle on this study appeared to acclimate to short-term adverse handling which did not seem to dramatically affect performance or behavior of beef cattle.

Key Words: beef cattle, handling methods, stress

11 Determination and correlation of internal and external scrotal temperature in stallions. A. L. Perrin*, C. A. Cavinder, and D. D. Varner, *Texas A&M University, College Station.*

ABSTRACT: This study was conducted to measure and correlate scrotal skin (SST) and subcutaneous scrotal (SQST) temperature in stallions and to determine the accuracy of 2 devices for measuring SST. Stallions (n = 9) were randomly assigned to either a non-exercise (non-EX; n = 5) or exercise (EX; n = 4) group. Exercise stallions were worked for 90 min followed by a 30 min recovery while non-EX stallions were maintained in shade. Every 10 min, rectal temperature (RCT), SQST and SST were measured for both groups. To measure SST, InfraCAM SD (InfraCAM SD®, Flir Systems Inc., Wilsonville, OR) and LT300 (Sixth Sense LT300 Infrared Thermometer) were used. After 90 min of exercise, RCT and SQST increased in EX stallions by 1.60°C and 2.25°C, respectively ($P < 0.0001$). Additionally, SST measured by InfraCAM SD increased 0.68°C ($P < 0.0001$) Unexpectedly, SST measured by LT300 experienced a 0.71°C decrease ($P < 0.0001$), however, after the first 20 min of exercise temperatures dropped 2.78°C ($P < 0.0001$) before increasing until cessation of exercise. Rectal, SQST and SST measured by InfraCAM SD did not change for non-EX stallions. As with EX stallions, SST measured by LT300 for non-EX stallions decreased 2.81°C ($P < 0.0001$) after 10 min. Subsequent LT300 measurements remained consistent with a slight decrease. Rectal and SQST were the most highly correlated parameters (r = 0.90; $P < 0.0001$). Rectal and SQST also had positive correlations with InfraCAM SD (r = 0.60; $P < 0.0001$) and LT300 (r = 0.63, 0.59 respectively; $P < 0.0001$). InfraCAM SD and LT300 were positively correlated (r = 0.59, $P < 0.0001$). Measurements by InfraCAM SD were consistently higher than SQST while LT300 repeatedly measured lower ($P < 0.0001$). This discrepancy could be due to differing temperature perception; while LT300 considers a small point on the skins surface, InfraCAM SD analyzes a larger surface area. Despite this variation, both are viable ways to predict alterations in internal testicular temperature, however, to ensure accuracy LT300 may need to be desensitized to its environment.

Key Words: stallion, exercise, scrotum

12 Growth, intake and feed efficiency in hair sheep lambs fed a hay-based diet with increasing levels of soyhull inclusion. S. D. Szabo*[1], S. Wildeus[1], C. D. and Teutsch[2], *[1]Virginia State University, Petersburg, [2]Virginia Tech, Blackstone.*

The trial evaluated the inclusion of soyhull as source of digestible fiber and energy in hay-based diets for hair sheep lambs. Thirty-six Barbados Blackbelly and St. Croix ram lambs (8 mo of age; mean body weight 33.5 kg; 18/breed) were allocated to 12 pens, and fed diets of orchard grass hay ad libitum and pelleted soyhull at either 0, 1, 2, or 3% of body weight (3 animals/pen; 3 pens/diet). Hay was chopped for feeding, and fed as a separate component from the soyhull. Hay was fed at approximately 125% of previous day′s consumption and refused hay recorded daily. Animals were provided with a loose mineral mix that included ammonium chloride free choice. There was complete consumption of soyhull at all inclusion levels throughout the trial. The trial was conducted for 56 d and bodyweight was recorded in 14 d-intervals, and soyhull feeding levels were adjusted at that time. Intake and feed efficiency was determined on a pen basis, and growth on an animal basis. Average daily gain (ADG) increased linearly ($P < 0.01$) from 121 to 224 g/d as soyhull inclusion increased from 0 to 3%. There was no difference ($P > 0.1$) between breeds in ADG. Dry matter hay intake (DMI) (% body weight) decreased linearly ($P < 0.01$) from 3.45 to 1.48%, whereas total DMI increased from 3.45 to 4.16% as soyhull inclusion increased from 0 to 3%. Feed efficiency (feed: gain) also improved in a linear fashion ($P < 0.05$) and was 11.43, 9.04, 7.10 and 7.55 for soyhull inclusion levels of 0, 1, 2, and 3%, respectively. Data indicate that ADG and feed efficiency improved with inclusion of soyhull at 2 to 3% in rations for hair sheep lambs adapted to utilizing forage-based diets, and may be a useful alternative to corn in this setting.

Key Words: hair sheep, soyhull, growth

13 Evaluating the effect of TASCO-14 on gastrointestinal nematodes in small ruminants. T. E. Lutz*[1], F. N. Mhlanga[2], E. Pierce[1], and J. Howard[1], *[1]Abilene Christian University, Abilene, TX, [2]Lipscomb University, Nashville, TN.*

TASCO-14, an extract from the brown seaweed *Ascophyllum nodosum* has been shown to have beneficiary effects on livestock growth and production due to its antioxidant capacity. The objective of this study was to assess the effect of TASCO-14 on gastrointestinal nematodes (GIN) in goats. Twenty 4 naturally infested Boer goats were randomly allocated into one of 2 pens and maintained on a free choice Sudangrass hay based diet for 20 8 d. Ten goats received a protein supplement that contained 15% TASCO-14 while the other 10 goats received a protein supplementation that did not contain TASCO-14 (control). The protein supplement was fed at a rate of 70g/animal/day. A completely randomized design with 10 animals per pen was used. On d 0, 7, 14, 21, and 28, blood and fecal samples were collected to determine the packed cell volume (PCV) and the fecal egg count (FEC), respectively. FAMACHA scores were also recorded every 7 d and for the same period. The Generalized Linear Models procedure in SAS was used for data analysis. The FEC and FAMACHA score variables were log-transformed before statistical analysis. Fecal egg counts and FAMACHA scores showed significant variation between the 2 groups ($P < 0.05$). Measurements of FEC and FAMACHA scores were consistently lower from d 21 to d 28 in goats that received TASCO-14. During the same period, the PCV was consistently higher in goats receiving TASCO-14 compared with the control group ($P < 0.05$). The results in this study seem to indicate that TASCO-14 may be beneficial in controlling GIN in small ruminants.

Key Words: gastrointestinal nematodes, TASCO-14, small ruminants

Graduate Student Competition I

14 Effect of pre–finishing implant strategy and nutrient restriction on finishing performance. J. Robinette*1,2, R. Reuter[2], P. Beck[3], F. Ribeiro[4], B. Stewart[3], H. Gray[3], and J. Apple[1], *[1]University of Arkansas, Fayetteville, [2]The Samuel Roberts Noble Foundation, Ardmore, OK, [3]University of Arkansas-Southwest Research and Extension Center, Hope, [4]Texas A&M University, Department of Agricultural Sciences, Commerce.*

Implant strategy and nutrient restriction before entry into the feedyard may alter feedlot performance of cattle. The objective of this study was to determine the effect of pre–finishing implant strategy and energy balance on feedlot performance. Spring-born calves were weaned in the fall (n = 96) and were either placed on a high–concentrate diet immediately (CALF–FED, n = 32), or on one of 2 growing programs (nutrient restricted, RSTR, n = 32; nutrient unrestricted, UNRSTR, n = 32). After a 60–d backgrounding period, cattle in the CALF–FED treatment were shipped for finishing. Cattle in RSTR and UNRSTR treatments were placed on small grain pasture for 120–d before finishing with the goal of 0.45 kg and 0.91 kg ADG. One–half of each nutrient treatment group received moderate potency hormonal implants (Synovex S/H) 28–d after weaning (IMP). Before shipment to finishing, CALF–FED were placed on *ad lib* growing ration and yearlings were limit–fed growing ration to meet performance goals before being placed on pasture. At feedlot arrival, all cattle were implanted (Synovex S/H) and reimplanted at 99 d (CALF–FED) or 81 d on feed (RSTR and UNRSTR). Daily feed intake was recorded using an individual animal intake monitoring system (GrowSafe Systems, Ltd.). Animal performance data were analyzed using PROC MIXED of SAS with animal as the experimental unit and fixed effects of sex, stocker–phase implant, and nutrient restriction. There were no interactions between IMP and plane of nutrition. Implantation before finishing decreased ADG ($P < 0.01$) and DMI ($P < 0.05$) and improved G:F ($P = 0.008$) during finishing, but had no effect on feedlot arrival BW ($P = 0.22$) or BW at slaughter ($P = 0.43$). Steers had greater DMI, ADG, and G:F ratio ($P < 0.01$) than heifers. Cattle in the RSTR group had greater DMI than CALF–FED ($P < 0.01$) and tended to have greater DMI than UNRSTR ($P = 0.06$). CALF–FED had a greater G:F ratio ($P < 0.01$) than RSTR and UNRSTR, which did not differ from each other ($P = 0.80$). Producers who retain their calf crops past weaning have several stocker–phase management options calves that allow acceptable finishing–phase performance.

Key Words: implant, nutrient restriction, efficiency

15 Effects of mature size on intake, calf weight, and milk yield in a spring-calving commercial cow/calf operation. G. L. Mourer*, C. P. McMurphy, A. J. Sexten, C. D. Dobbs, S. K. Linneen, J. D. Sparks, and D. L. Lalman, *Oklahoma State University, Stillwater.*

Angus sired spring calving cows (n = 36) were used to evaluate the effect of mature size on forage intake during late gestation (LG), early lactation (EL; 38 ± 11 d in milk), and late lactation (LL; 180 ± 11 d in milk) on milk yield and calf weight. Two blocks of 18 cows each, were selected for large and moderate mature size groups based on their BW at weaning the previous year and adjusted to 5 yr of age and BCS 5. Cows were individually fed with ad libitum access to prairie hay and a protein supplement. Cows were adapted to pens and diets for 10 d followed by a 5 d collection period. Ultrasound was used to measure rib fat (RBF), rump fat (RPF), and rib eye area (REA) along with milk yield. The mixed procedure of SAS was used with cow size treatment as a fixed effect and block as a random effect. Large cows had greater adjusted BW (601 vs. 546 kg; $P < 0.01$), and DMI (8.98 vs. 8.51 kg/d; $P < 0.01$) during LG as compared with moderate cows. There was no difference in RBF, RPF, REA and BCS between large and moderate cows, or when DMI was expressed as a percent of BW. Adjusted BW during EL remained greater for large cows compared with moderate cows (565 vs. 512 kg; $P < 0.01$), but BCS ($P < 0.01$) was lower for large cows (4.47) than moderate (5.04). DMI, DMI expressed as a percent of BW, RPF, RBF, REA, calf weight and milk yield were not different between cow size groups while in EL. During LL cow BW ($P < 0.01$) was greater for large cows (582 kg) than moderate cows (535 kg) and large cows consumed more forage than moderate cows (11.73 vs. 10.35 kg/d; $P < 0.01$) but no differences were found when DMI was expressed as a percent of BW. Weaning weight, milk yield, RPF, RBF, REA were not statistically different during LL. When cow size classifications were determined using kg of BW adjusted to equal age and BCS at weaning, large cows consumed more forage, produced a similar amount of milk, and weaned a calf the same size as compared with moderate size cows.

Key Words: mature cow weight, forage intake, milk yield

16 Effects of respiratory vaccination timing and zeranol growth implant on health, performance, and immunity of newly received stocker calves. K. D. Poe*, P. A. Beck, J. T. Richeson, T. W. Hess, D. S. Hubbell, J. G. Powell, and D. L. Kreider, *University of Arkansas, Fayetteville.*

Stress alters the immune system and vaccination during this time may reduce vaccine response; whereas, growth implants may shift metabolism to enhance tissue deposition in exchange for energy required for immunity during bovine respiratory disease (BRD) challenge. This study was conducted to determine the effects of pentavalent respiratory vaccination timing (d 0 or 14; VAC) and a zeranol growth implant (IMP) on health, performance, complete blood count and vaccine response in high–risk, newly received stocker calves during a 42–d receiving period. Crossbred bull and steer calves (n = 384) were weighed (initial BW = 202 ± 4.1 kg), stratified by gender (bull or steer), and assigned randomly to 1 of 4 treatments arranged in a 2 × 2 factorial: 1) arrival (d 0) VAC, with IMP, 2) arrival VAC, no IMP, 3) delayed (14 d) VAC, with IMP, 4) delayed VAC, no IMP. Overall ADG (d 0 to 42) did not differ due to VAC timing ($P = 0.53$) or IMP ($P = 0$ 0.64). The percentage of calves treated for BRD once, twice, or thrice was 80, 50 and 20%, respectively, but did not differ ($P > 0.05$) among treatments. Likewise, days to initial BRD treatment was not affected by VAC timing ($P = 0.66$) or IMP ($P = 0.24$). Total white blood cell count was similar for all treatments ($P > 0.76$). Bovine viral diarrhea virus type 1a titers were increased ($P = 0.02$) for calves vaccinated on d 0. Results indicate a zeranol growth implant administered on–arrival to high–risk stocker calves did not increase ADG. Morbidity rate was high but was not impacted by VAC timing or implant. Vaccination on arrival increased BVDV type 1a titer levels during the receiving period.

Key Words: beef calves, implant, vaccination timing

17 Effects of creep feeding supplementation on performance of cows and calves grazing limpograss pastures in Florida. A. D. Aguiar*[1], J. M. B. Vendramini[1], J. D. Arthington[1], L. E. Sollenberger[2], J. M. Bennet[2], M. Hersom[2], A. Valente[1], and P. Salvo[1], *[1]Range Cattle Research Education Center, Ona, Florida, US, [2]University of Florida, Gainesville.*

Limpograss (*Hermatria altissima* [Poir] Stapf and C.E. Hubb) is a warm-season grass widely used for cow-calf production in South Florida, however, the usual decreased crude protein (CP) and rumen-degradable protein (RDP) concentrations may affect animal performance. The objective of this study was to investigate the effect of creep feeding protein supplements on cow-calf pairs (*Bos* sp.) performance grazing limpograss pastures. The experiment was conducted in Ona, FL from June to September 2011. Treatments were: 1) Calves receiving 200g/d of soybean meal [60% RDP and 40% rumen-undegradable protein (RUP)] on creep feeding, and 2) Calves not receiving creep feeding supplementation (Control; C). The treatments were distributed in randomized complete block design with 4 replicates. Twenty 4 cow-calf pairs (488 ± 23 and 177 ± 14 kg, respectively) were randomly distributed in 8 limpograss pastures (experimental units; 1.0 ha/pasture; 3 cow-calf pairs/pasture). Cows BCS and cows and calves weights were recorded every 28 d to calculate average daily gain. Herbage mass (HM) and nutritive value was measured every 14 d. The data were analyzed using PROC GLMMIX with treatment and months as fixed effects, and replicates as random effects. There was no difference in HM ($P = 0.58$; mean = 4600 kg/ha; SE = 600), herbage allowance (HA; $P = 0.75$; mean = 2.3 kg DM/kg LW; SE = 0.3), and CP concentration ($P = 0.45$; 10.4%; SE = 0.6) between treatments. Herbage mass and HA decreased from June to September from 6.0 to 2.9 kg/ha and 3.2 to 1.4 kg DM/kg LW, respectively. There was no effect of the creep feeding treatment on BCS ($P = 0.47$; mean = 4.8; SE = 0.2) and ADG ($P = 0.72$; mean = 0.16 kg/d; SE = 0.1) of the cows and calves ($P = 0.58$; mean = 0.55 kg/d; SE = 0.1). The ADG of the calves decreased from June to September from 1.2 to 0.1 kg/d. The level of RDP supplemented to calves in this study was ineffective to improve performance of cow-calf pairs grazing limpograss pastures in Florida.

Key Words: creep feeding, limpograss, rumen degradable protein

18 Growth and carcass characteristics of pigs fed plum juice concentrate as a feed additive. J. C. Wicks*, T. K. Welch, W. F. Owsley, S. P. Rodning, M. Singh, M. D. Hayden, H. M. Finegan, K. A. Cummins, L. A. Kriese-Anderson, and C. L. Bratcher, *Auburn University, Auburn, AL.*

Purebred Yorkshire pigs (n = 32) were fed at the Auburn University Swine Teaching and Education Center to determine the influence of supplementation of plum juice concentrate (PJC) on growth, slaughter, and quality characteristics of pork. Pigs were allotted to 1 of 4 diets containing 0% (Control), 0.5%, 1%, or 2.9% PJC. Pigs were allotted to pens by sex (n = 16 barrows, 16 gilts) and weight, 2 pigs were housed in each pen. Pigs had ad libitum access to feed and water, and treatment diets were formulated to be isocaloric. During the feed trial (Group 1 = 84 d; Group 2 = 100 d), feed intake and weight gain were measured every 14 d. Pigs were harvested (n = 2 groups) at an average pen weight of 114 kg, and carcass and quality characteristics were recorded according to National Pork Producers Council Guidelines (2000). Growth and carcass data were analyzed using mixed model analysis (SAS, 2002). Pen was the experimental unit and independent fixed effects included: diet, sex, rep, and harvest group. While, the level of PJC did not affect ADG, G: F or ADFI, there was a date of harvest effect on ADG ($P = 0.0016$) and G: F ($P = 0.0091$). Wetness was the only carcass characteristic to be affected by level of PJC supplement ($P = 0.0163$), however, muscle scores tended to be higher ($P = 0.0530$) for pigs harvested on the first harvest day. Dressing percentage was greater ($P < 0.0001$) for pigs harvested on the second slaughter day. Fat thickness measured along the midline of the 10th rib was thicker ($P = 0.0182$) for barrows and they had a greater ($P = 0.0005$) loin pH. Supplementation of PJC had no effect on quality characteristics; however, pigs from the second harvest date had lower Warner-Bratzler shear force. There were no differences in initial or sustained tenderness or juiciness, pork flavor intensity or off flavor ($P > 0.05$). Finally, gilts had more fat free lean ($P = 0.05$), percentage fat free lean ($P = 0.0063$), and drip loss ($P = 0.0261$), but barrows had a higher percentage ($P = 0.0386$) cook loss. Independent of harvest date or sex, these results indicate that the supplementation of PJC has no effect on growth, carcass, or quality characteristics of pork.

Key Words: swine, plum juice concentrate, carcass quality

19 Effects of stocker phase grazing system and implantation on performance and carcass characteristics of fall born steers. C. P. McMurphy, G. L. Maurer, S. K. Linneen*, B. P. Holland, G. W. Horn, and D. L. Lalman, *Oklahoma State University, Stillwater.*

This study investigated the effects of stocker phase growth promoting implants and grazing system on performance and carcass characteristics of fall-born steers using a 2x2 factorial treatment arrangement in a completely randomized design. Angus and Angus x Hereford steers (n = 113; BW = 226 ± 4.5kg) were allotted by weight and assigned to 1 of 4 treatment combinations for the study first conducted in June 2008 and repeated in June 2010. Stocker phase grazing system treatments

were late season tallgrass native range with protein supplementation from June to December each year (NR), followed by placement in the feed yard in December, or NR followed by wheat pasture grazing from December to March (NR-WP) followed by placement in the feed yard in March. Stocker phase implant treatments were Component TE-G administered at weaning in June (Implant) and no implant (Control). Steers assigned to the NR-WP Implant combination were reimplanted with Component®E-S in December at wheat pasture turnout. All steers were managed similarly upon feed yard entry. Data were analyzed using Mixed in SAS 9.3 with implant treatment, system treatment, and year in the model. Grazing phase implantation increased ADG and final grazing BW during both the NR and WP grazing periods ($P < 0.05$). However, grazing phase implantation reduced ADG during the finishing period ($P = 0.01$). Carcass weight, DP, fat thickness, nor yield grade were not influenced by grazing phase implant, although the percent of cattle grading in the upper 2/3 of the Choice quality grade was reduced ($P = 0.01$). Compared with the NR system, the NR-WP system increased final BW, finishing phase ADG, HCW, DP, and rib eye area ($P < 0.01$). Grazing phase implantation of cattle with high genetic capacity for marbling increases performance during grazing, although feed yard performance and percent of cattle grading in the upper 2/3 of the Choice quality grade may be reduced. Extending the grazing season through winter wheat pasture may increase carcass weight without compromising carcass quality.

Key Words: grazing system, implant, steers

20 Carcass and growth characteristics of grain and forage finished cattle with varying body types. T. K. Welch*, J. C. Wicks, L. A. Kriese-Anderson, H. M. Finegan, M. R. Worosz, T. D. Brandebourg, R. B. Muntifering, J. Edmonson, and C. L. Bratcher, *Auburn University, Auburn, AL.*

Crossbred standard cattle (STD, n = 7) and crossbred miniature cattle (MINI, n = 7) were raised on 2 different finishing systems to determine the differences in growth performance, carcass characteristics, and retail yield performance. Initial BW of STD cattle were 218 kg to 263 kg, and 59 kg to 122 kg for MINI cattle. Cattle either grazed ryegrass forage (FOR, n = 8) or were fed a 50% grain, 50% sorghum sudan diet (GRAIN, n = 6) until an average back fat thickness of approximately 0.76 cm was reached. Cattle BW were measured approximately every 14 d. Final BW, total gain, and total ADG were greater for STD than MINI ($P < 0.01$). GRAIN diet produced cattle with a greater final BW, total gain, and total ADG than FOR ($P < 0.01$). Once an average back fat of 0.76 cm was reached, cattle were humanely harvested. After chilling for 24 h, carcass characteristics were evaluated. Hot carcass weight ($P < 0.01$), adjusted back fat ($P < 0.01$) and ribeye area ($P < 0.01$) were greater for STD than MINI. In addition, dressing percentage, L*, b*, and final pH were greater for STD than MINI ($P < 0.01$). Adjusted back fat, KPH, yield grade, quality grade, and marbling values were greater for GRAIN than FOR ($P < 0.01$). MINI cattle exhibited greater WBS values than STD cattle (4.45 kg and 3.22 kg, respectively). As expected, retail yield values were affected by size. The STD yielded a greater number of each cut and a greater weight of each cut than MINI. Feeding system did not have a significant effect on retail yield performance. These results indicate that standard cattle finished on grain or forage diets had greater growth performance, carcass characteristics, and retail yield performance than miniature cattle raised under the same conditions. Similarly, cattle finished on a mixed forage grain diet had greater growth performance and carcass characteristics than those finished on grazed forage.

Key Words: carcass traits, growth performance, beef cattle

21 The impact of swine management operations on large airway morphology of pigs. C. McClendon*, S.-H. Oh, and J. T. Waterman, *North Carolina A&T State University, Greensboro.*

North Carolina is the second highest pork producer in the United Sates, with most of the swine being raised in confinement facilities. Among the 2 major types of porcine management programs, commercial/indoor operations and pasture-based outdoor operations, indoor has been shown to significantly increase the susceptibility of airway inflammation and tissue damage with short and long-term exposure inside these facilities. We hypothesize that airways of pigs reared indoors will have morphological and proteome differences compared with pigs reared outdoors. Airway morphology and proteomic analyses were conducted for pigs reared indoors and outdoors. For analyses, porcine tracheas (n = 24) from each operation were collected at random from freshly slaughtered animals. Seven parameters were measured and compared; however our particular interest for the present study were the metrics of airway airspace and diameter. To evaluate correlation between bodyweight and the size of the trachea, body weights were documented weekly for 7 weeks. Outdoor animals were shown to have a larger variation of body weights compared with the indoor animals; however there was no correlation observed. A 2-way ANOVA (ANOVA) was performed at a p-value of 0.05 to detect model significance between means followed by lsmeans PDiff Option to compare all groups. Airway airspace and diameter measurements showed that there is no significance between outdoor tracheas compared with indoor airways. Proteomic analysis was performed by homogenizing approximately one gram of epithelium tissue from the inner airway. Protein levels were determined using the Bradford Assay and equal amounts of proteomes were separated using 2-dimensional (2D) gel electrophoresis-based proteomics. Preliminary comparative proteomic results suggest there are only subtle differences among airway epithelial proteomes originating from animal reared indoors versus outdoors. Taken together, these results demonstrate that there may be only a small difference between the 2 hog management programs and that more studies are warranted.

Key Words: airway, swine, management

22 Evaluation of different methods of cattle hip height data collection. M. L. Marks*, J. A. Parish, B. M. Bourg, N. B. Simmons, and T. Smith, *Mississippi State University, Mississippi State.*

Reporting accurate cattle hip height (HH) is important for calculation of frame score and yearling and mature height expected progeny differences. The objectives of this study were to evaluate 3 HH measurement methods, determine if head restraint affects the accuracy of HH data, and assess reproducibility of HH measurements using different observers. Hip heights and chute behavior scores (CS) (1 calm, stands still; 2 restless, shifting; 3 restless, shaking chute; 4 vigorously shaking chute; and 5 berserk frenzy) were collected on beef cows (n = 329) and calves (n = 341) in squeeze chutes during routine cattle handling. Methods were visual appraisal using a pre-measured board place on the opposite side of the animal from the observer (VIS), measurement of the difference in distance to the hips from the distance to the floor with a descending tape placed above the animal (TAPE), and measurement using an altitude stick (STICK). Two observers independently collected VIS, TAPE, and STICK data with and without cattle head restraint (CAUGHT and LOOSE, respectively). The GLM Procedure in SAS was used to estimate least squares means for the response variable HH with a model including the fixed effects of method, head restraint, CS, and their interactions. Cow data were analyzed separately from calf data. The CORR Procedure in SAS was used to assess observation reproducibility. Cow HH was greater ($P < 0.01$) for TAPE than VIS and

STICK (135.3, 133.8, and 133.8 ± 0.2 cm, respectively). There was a significant interaction for restraint × CS for cows ($P < 0.01$) and calves ($P < 0.03$). Calf HH was greater ($P < 0.01$) for LOOSE (110.2 ± 0.2 cm) compared with CAUGHT (108.3 ± 0.2 cm). As CS increased (1, 2, 3), calf HH (110.4 ± 0.1; 109.7 ± 0.2; 107.7 ± 0.3 cm, respectively) decreased ($P < 0.01$). Significant Pearson correlation coefficients ($P < 0.01$) between observers were found for VIS (r = 0.88, r = 0.94), TAPE (r = 0.89, r = 0.92), STICK (r = 0.90, r = 0.94), CAUGHT (r = 0.90, r = 0.93), and LOOSE (r = 0.87, r = 0.93) for cows and calves, respectively. Hip height was affected by collection method, head restraint, and CS, and was reproducible across observers.

Key Words: hip height, frame score, measurement method

Breeding and Genetics

23 Genetic parameter estimates for susceptibility/resistance to infectious bovine keratoconjunctivitis (IBK) in Angus calves. E. L. Oxford*, A. H. Brown, J. G. Powell, K. S. Anschutz, B. R. Kutz, M. L. Thomas, and C. M. Turner, *University of Arkansas, Division of Agriculture, Fayetteville.*

Pre-weaning records in Angus calves (n = 843) were used to obtain genetic parameter estimates for susceptibility/resistance to Infectious Bovine Keratoconjunctivitis (IBK). Calves were born in the spring and fall at 3 Arkansas locations in 2009 and 2010 under procedures of objective 1a, Southern Regional Research Project, S1045. All calves were sired by purebred Angus bulls registered with the American Angus Association, one of which was Bon View New Design 878, the in common sire among locations. At weaning incidence of IBK was determined using a subjective scoring system where 0 = no evidence of IBK in either eye, and 1 = evidence of IBK in one or both eyes. Scarring occurred in 19.6% of calves. Heritability, genetic, environmental, and phenotypic correlations were determined using variance component obtained with a single and 2-trait animal model and MTDFREML. Fixed effects of contemporary group generated by birth year, season of birth, location and sex were included in the mixed model procedures. Age of dam and age of calf at weaning were included as covariates. Standard errors for the phenotypic correlations were estimated using residuals from the mixed model analysis. The single trait analysis, genetic, environmental, and phenotypic variances for IBK were 0.0778, 0.09099, and 0.09877, respectively. Estimates of heritability and environmental variance were 0.08 ± 0.074 and 0.92 ± 0.074, respectively. From the 2 trait analysis, genetic, environmental and phenotypic variation of IBK with birth weight were 0.27 ± 0.39, −0.03 ± 0.10, and 0.02 ± 0.03, respectively. The environmental and phenotypic correlations of IBK with weaning weight were −0.29 ± 0.10 and 0.05 ± 0.03, respectively. In these data, the heritability of IBK is low, however, because of the small sample size additional data may be required to further explain the inheritance of resistance/susceptibility in calves to IBK.

Key Words: susceptibility/resistance, infectious bovine keratoconjunctivitis, heritability

24 Relationship of horn fly infestation to polymorphisms in heat shock protein 70 gene in beef cows. C. M. Turner*[1], A. R. Mays[1], A. H. Brown[1], C. D. Steelman[1], and C. F. Rosenkrans[1], *[1]University of Arkansas, Fayetteville, [2]USDA/ARS Grasslands Research Laboratory, El Reno.*

Objectives of this study were to determine associations among heat shock protein 70 (Hsp70) single nucleotide polymorphisms (SNP) on horn fly infestation of beef cattle, forage type, and week. Individual horn fly counts for 21 weeks (May to October) were tallied by walking around each cow at a distance of 5 to 10m, and individually noted with numbers ≤25 or in groups of 5 when numbers >25. Unrelated Angus (A = 20), Brahman (B = 17), and crossbred (BA = 13 and AB = 18) breed types were utilized, and genotyped for the G2033C SNP. Genomic DNA, prepared from buffy coat, and polymerase chain reaction (PCR) primers (forward and reverse), were used to amplify the base sequence before purification and sequencing for G2033C SNP determination. Results reveal 2 genotypes: homozygous guanine (GG) and heterozygous guanine-cytosine (GC), with a guanine (G) to cytosine (C) base substitution identified at base 2033 of the full nucleotide sequence. The homozygous cytosine (CC) genotype was not observed in this study, or previously in our lab. Genotype by week interaction for horn fly numbers was observed ($P < 0.08$) with genotype GG generally having fewer horn flies over the 18 weeks. However, similar counts were noted between genotypes during wk 13 with (19.36 ± 33.75 vs. 16.57 ± 13.31). In this study, cattle grazed either common bermudagrass (BG) or endophyte-infected tall fescue (E+). A forage by date interaction ($P < 0.0001$) occurred, with cows grazing E+ displaying lower numbers of horn flies over the 18 weeks. However, in wk 15,16,17 cows grazing E+ had greater horn fly numbers than cows grazing BG (118.03 ± 22.90 vs. 110.75 ± 21.12, 103.53 ± 22.92 vs. 89.82 ± 21.12, 137.68 ± 22.91 vs. 129.20 ± 21.10). Different Hsp70 genotypes, forage, and week appear to have an effect on horn fly infestation. Further research is needed to conclude if Hsp70 SNP genotypes provide a superior genetic marker for horn fly resistant cattle.

Key Words: horn flies, heat shock protein, polymorphisms

25 Comparison of pork quality characteristics among Hereford, Tamworth and Large Black crossbred pigs raised in a hoop barn during the finishing phase. S.-H. Oh*[1], D. Bautista[2], D. Hanson[2], N. Whitley[1], M. Morrow[2], and M. T. See[2], *[1]North Carolina A&T State University, Greensboro, [2]North Carolina State University, Raleigh.*

The objective of this study is to compare pork quality characteristics of Hereford, Tamworth and Large Black crossbred pigs raised in a hoop barn during the finishing phase, which were produced by the use of Berkshire sows. The experiments were conducted at the North Carolina A&T State University Farm. Thirty Berkshire purebred sows were impregnated with the semen of Hereford, Large Black, Tamworth and Berkshire boars, where 10 Berkshire sows were inseminated artificially by each boar breed, respectively. Pigs were raised in a confinement facility, and then moved to the deep-bedded hoop house for finishing. The deep bedding, generally straw, corn stalks, or hay, was spread approximately 35–45 cm thick and maintained as needed. Thirty 6 crossbred finishing pigs (5 Hereford x Berkshire; 7 Large Black x Berkshire; 12 Tamworth x Berkshire; 12 Berkshire x Berkshire) were used to compare pork characteristics including pH, color score, L*, a*, b*, marbling score, drip loss, hot carcass weight (HCW), backfat thickness, loin muscle area (LMA), and shear force. The data were analyzed using GLM in

SAS 9.01 including research season and breeding group as fixed effects. Backfat thickness was significantly different among breeding groups ($P < 0.05$). Large Black breeding group (3.99 cm) showed significantly higher backfat thickness than Berkshire (2.94 cm), and Tamworth (2.21 cm) groups. Color score, marbling score, HCW, LMA and drip loss were not significantly different among breeding groups. This information could assist small scale farmers who raise alternative swine breeds to choose breed combinations for outdoor environments.

Key Words: pork quality, Berkshire, crossbred

26 Growth of Berkshire crossbreds sired by Tamworth and Large Black. S.-H. Oh*[1], M. Morrow[2], and T. See[2], *[1]North Carolina A&T State University, Greensboro, NC, [2]North Carolina State University, Raleigh, NC.*

The purpose of this study was to analyze the growth performance of Berkshire crossbreds sired by Tamworth and Large Black raised in a hoop facility. Pigs were reared within deep-bedded hoop houses at finishing phase. The swine unit at North Carolina A&T State University has a 15m x 30m hoop facility that is different from standard confinement facilities. The deep bedding, generally straw, corn stalks, or hay, is spread approximately 34–45 cm thick and provides a comfortable environment for the animals which allows rooting and other natural behaviors. It is relatively difficult to measure feed intake and growth rates for pigs raised in outdoor systems compared with confinement systems. Eight Feed Intake Recording Equipment (FIRE, Osborne Industries Inc. Osborne, Kansas) stations were used to collect body weight, feed intake, feeding time, feeding rate, number of feedings per day, and feed conversion. This abstract was limited to comparison of daily weights among breeding groups that were 55 finishing pigs in total. Before analysis, each individual's complete feed intake record was evaluated for outliers by plotting feed intake by day and testing each feed intake observation with the Cook's D test statistic and studentized residuals. After removal of outliers, analyzed data include 4687 effective weight records over time between 18 and 174 d of age. And again, 5 time points at 128, 136, 144, 152, 160, and 168 d of age, were selected to analyze the data with the repeated measurement method, which included 614 observations. Sire breed and days of age within crossbreds were included as fixed effects in the statistical model. As a result, Tamworth breeding group (Tamworth x Berkshire) showed significantly higher weights than Large Black and Berkshire groups ($P < 0.05$). This information helps the small farmers who raise rare breeds to choose better breed combinations for outdoor environments.

Key Words: growth, Berkshire, crossbred

27 Relationship of underline score with growth, carcass and maternal traits in Beefmaster cattle. B. R. Kutz*[1], A. H. Brown Jr.[1], E. L. Oxford[1], T. L. Perkins[2], Z. B. Johnson[1], and C. F. Rosencrans[1], *[1]University of Arkansas, Division of Agriculture, Fayetteville, [2]Beefmaster Breeders United, San Antonio, TX.*

The objective of this study was to determine the relationship between underline scores and growth, carcass and maternal traits. Performance records of Beefmaster Breeders United (BBU) recorded from 1966 through 2008 were studied. The calf, the sire and dam of each calf are recorded in the registry of the Beefmaster Breeders United. Scores were recorded by classifiers approved by Beefmaster Breeders United. Underline scores (1–4) are based on the different sizes and shapes of sheaths in bulls and navels in heifers. A score of 1 is used to designate the least amount of navel or sheath and a score of 4 represents the maximum amount of navel or sheath accepted as a Beefmaster Breeders United registered Beefmaster. Relationship of the traits was determined using the Pearson correlation analysis. The degree of relationship was then measured by regression procedure. Inspector was included as a covariate and growth traits were adjusted for age of dam and sex of calf. Carcass traits were not related to underline score. Correlation of underline score with scrotal circumference ($n = 445$, $r = -0.09$, $P = 0.03$), adjusted birth weight ($n = 22{,}256$, $r = 0.114$, $P < 0.0001$), adjusted weaning weight ($n = 40{,}305$, $r = 0.114$, $P < 0.0001$) and yearling weight ($n = 16{,}884$, $r = 0.165$, $P < 0.0001$) were determined. For each increment increase in underline score, scrotal circumference decreased 0.52cm., adjusted birth weight increased 0.763kg, adjusted weaning weight increased 5.986kg, and yearling weight increased 16.488kg. In these data, the relationship of underline scores with maternal and growth traits suggest that underline score could be considered in performance programs.

Key Words: Beefmaster cattle, underline score, relationship

28 Selection for small frame size of Angus cattle in Alabama. 1. Growth rate, weight gain, hip height of calves and cow efficiency. D. L. Kuhlers*[1], K. Nadarajah[1], G. L. Thompson2,3, B. E. Norris[3], H. D. Harkins[3], and L. Kriese-Anderson1,2, *[1]Department of Animal Sciences, Auburn University, AL, [2]Alabama Cooperative Extension System, Auburn, AL, [3]Tennessee Valley Research and Extension Center, Belle Mina, AL.*

For successful grass-finished beef production, small framed cattle may be viewed as optimum but production efficiency of small framed cows compared with large framed cows has not been fully investigated. The objective of this study was to investigate the efficiency of 2 lines of cows (Small to medium frame (SM) and medium to large frame (ML)) in a traditional cow-calf production system. In 2006, based on mature cow size (weight, height and age of cow), brood cows and replacement heifers ready for breeding were assigned to 2 distinct lines, SM (mean BW = 487 kg, hip height = 126 cm) and ML (mean BW = 558 kg, hip height = 134 cm), respectively, to establish base generation. Cows within each line were mated in single-sire breeding groups using 2 bulls per line that were selected on EPDs for mature height and milk. Each year, selected replacement heifers based on their frame size were added into respective lines. Cow efficiency (COWE) was defined as ratio of 205 d adjusted weaning weight (205ADJW) of calf per unit of cow BW for each cow-calf pair. Data on 325 calves born during 2007–2011 out of ML (n = 131) and SM (n = 194) lines subjected to selection for frame size were analyzed using the GLM procedure in SAS. Average birth weight (BWT) of calves born to ML cows were heavier ($P < 0.001$) than calves born to SM cows (42.1 ± 0.6 vs. 38.5 ± 0.5 kg). Adjusted means for hip height (HHT) of calves for the respective lines (ML = 110.2 ± 0.5 cm vs. SM = 108.5 ± 0.4 cm) were significantly different ($P < 0.001$) and similar differences were seen for frame scores of calves (ML = 4.8 ± 0.08 vs. SM = 4.5 ± 0.07) between lines ($P < 0.001$). Means for 205 d adjusted weight (205ADJW) of calves (ML = 218.3 ± 2.7 vs. SM = 218.6 ± 2.2 kg) and ADG of calves (859 ± 12 vs. 879 ± 9 g) did not differ between lines ($P = 0.14$). Means for COWE calculated for each cow-calf pairs in SM line (42 ± 0.4%) were higher ($P < 0.001$) compared with the ML line (37 ± 0.4%). Selection for smaller frame size may lead to higher COWE cows with lighter mature weight with no reduction in 205ADJW and ADG of calves.

Key Words: cow frame size, calf growth, cow efficiency

29 Selection for small frame size of Angus cattle in Alabama. 2. Phenotypic correlations and growth pattern of replacement heifers. K. Nadarajah*[1], D. L. Kuhlers[1], G. L. Thompson2,3, B. E. Norris[3], H. D. Harkins[3], and L. Kriese-Anderson1,2, *[1]Department of Animal Sciences, Auburn University, Auburn, AL, [2]Alabama Cooperative Extension System, Auburn, AL, [3]Tennessee Valley Research and Extension Center, Belle Mina, AL.*

Cow-calf data from 2 lines of Angus selected for frame size (SM and ML) were used to examine phenotypic correlations of cow-calf traits and growth pattern of replacement heifers. Repeated measurements of BW, hip heights (COWHHT) and condition scores (COWCS) of cows, and birth weight (CFBWT), weaning weight (CFWWT) and hip height (CFHHT) of calves at weaning were available. Frame scores (COWFS) for cows and for calves (CFFS) within sex were computed. Cow efficiency (COWE) was defined as ratio of 205 d adjusted weaning weight (205ADJW) of calf per unit of cow BW for each cow-calf pair. Phenotypic correlations were computed from cow-calf pair records within each lines of SM (n = 194) and ML (n = 131)) among cow and calf traits using Proc Corr procedure in SAS. Correlations between cow BW and CFBWT, 205DAJW, ADG, CFHHT, CFFS and CFCS in the ML line were 0.39, 0.43, 0.38, 0.35, 0.39 and 0.41 ($P < 0.001$). Similar correlations in the SM line were 0.48, 0.41, 0.33, 0.29, 0.34 and 0.39 ($P < 0.001$). In the ML line, correlations between COWHHT and CFBWT, 205DAJW, ADG, CFHHT, CFFS and CFCS were 0.24, 0.25, 0.22, 0.15, 0.18 and 0.16 and the respective correlations in SM line were 0.50, 0.31, 0.22, 0.31, 0.36 and 0.31 ($P < 0.001$). Phenotypic correlations between COWE with BW, COWHHT and COWFS of cows were negative ($P < 0.001$) and were −0.59, −0.42 and −0.35 for ML and −0.67, −0.47 and −0.34 for SM lines, respectively. Mean weaning and yearling weights of replacement heifers (n = 22) born to ML cows were 249.7 and 462 kg while heifers (n = 29) born to SM cows were 254.7 and 465.9 kg. This suggests the growth rate of replacement females from SM lines were equally good as that from ML lines. Average mature BW of replacement heifers as 2-, 3-, and 4 yrs olds from ML line were higher (488, 549 and 597 kg) compared with respective mature BW of heifers from the SM lines (480, 512 and 518 kg). Phenotypic correlations between COWE with calf ADG and 205DAJW were positive ($P < 0.001$), thus selecting for COWE and small frame size may lead to lighter mature weight cows with improvement in ADG of calves.

Key Words: cow frame size, phenotypic correlations, cow-calf traits

30 Breed group effects for chute exit velocity as an indicator trait for temperament in weaner cattle. M. L. Thomas*[1], A. H. Brown[1], Z. B. Johnson[1], S. W. Coleman[2], M. A. Elzo[3], S. M. DeRouen[4], D. E. Franke[5], W. E. Wyatt[6], R. C. Vann[7], G. R. Hansen[8], and D. G. Riley[9], *[1]University of Arkansas Division of Agriculture, Fayetteville, [2]USDA/ARS, Brooksville, FL, [3]University of Florida, Marianna, [4]Louisiana State University AgCenter, Homer, [5]Louisiana State University AgCenter, Baton Rouge, [6]Louisiana State University AgCenter, Iberia, [7]Mississippi State University, Raymond, [8]North Carolina State University, Plymouth, [9]Texas A&M University, AgriLife, College Station.*

The objective of this study was to determine breed differences in chute exit velocity (CEV) in weaner cattle (n = 3176). Data were collected in 2004 through 2008 under procedures of objective 3, Southern Regional Research project S1013 with the following states contributing data: FL, LA, and MS. Chute exit velocity was time required for a calf to traverse 1.8 m when released from the chute and calculated as (velocity = distance (m)/time (s)). Included were Angus (A), Braford (BF), Brangus (BN), Brahman (B), Charolais (C), Hereford (H), Romosinuano (R), Commercial (X) and 2-and 3-way crosses. Data were analyzed by location with ANOVA and a model with terms for an overall mean, year, breed, calf gender where applicable, calf age, dam age, and error. Calf and dam ages were covariates. At Brooksville, FL, CEV did not differ ($P = 0.42$) among breed types involving A, B, and R breeds. At Marianna, FL, breed group affected ($P < 0.10$) mean CEV; A was similar ($P > 0.05$) to CA, CBN, BN and AB; B was similar ($P > 0.05$) to ABN, AB, BN, CBN, and CA. At Baton Rouge, LA, mean CEV was affected ($P < 0.01$) and B had greater ($P < 0.05$) mean CEV when compared with A and BF, whereas BF had lesser ($P < 0.05$) mean CEV than A and B. Breed types (A and BN) did not differ ($P = 0.32$) in mean CEV at Iberia, LA. At Raymond, MS, mean CEV was affected ($P = 0.03$) by breed type, but AX (lowest value) did not differ ($P > 0.05$) from AB, BNX, and A. The HX (highest value) was similar ($P > 0.05$) to BNX, AB and A for mean CEV. Breed type-differences for CEV has potential for among breed selection for temperament in weaner cattle.

Key Words: exit velocity, Weaner cattle, breeds

31 Relationship of temperament scores and prolactin promoter polymorphisms in purebred Angus calves. A. R. Starnes*, A. H. Brown, Jr., Z. B. Johnson, and C. F. Rosenkrans, Jr., *University of Arkansas, Fayetteville.*

The objective of this study was to determine the relationship between single nucleotide polymorphisms (SNPs) of the prolactin promoter and temperament scores in Angus calves. Data were collected over a 4-year period (2005 through 2008) on spring-born calves (n = 110) and weaned in the fall of each year. Temperament was determined using a chute score of 1 to 5, where 1 was calm and 5 was berserk frenzy. In addition, calves were genotyped using genomic DNA prepared from buffy coat and previously published primers for the prolactin gene. Genotypes were homozygous cytosine (CC; n = 9), heterozygous (CT; n = 80), and homozygous thymine (TT; n = 21). Estimates were obtained through Proc Mixed and correlations were obtained through Proc Corr (SAS Inst. Inc., Cary, NC). Results indicate that chute scores were affected by prolactin genotype only in December. The genotypes CC and TT were more excitable ($P < 0.05$). than the CT genotype in December. No other months show an interaction between chute scores and prolactin genotypes; however, average daily gain (ADG) and genotypes have an interaction ($P < 0.05$). Genotype TT have the lowest ($P < 0.05$) ADG when compared with CC and CT genotypes, but weaning and yearling weights did not differ among the genotypes.

Key Words: chute score, prolactin, SNPs

32 QTL identification for udder traits in *Bos indicus-Bos taurus* cows using Bayesian inference. M. E. Williams*, L. L. Hulsman, A. J. Cooper, J. O. Sanders, A. D. Herring, C. A. Gill, and D. G. Riley, *Department of Animal Science, Texas A&M University, College Station.*

The objective was to conduct QTL discovery for udder traits of cows (n = 270) using Bayesian analyses. Average teat diameter (TD) and length (TL), and udder support score (USS; 1 to 9; lower scores indicate pendulous udders) were evaluated in cows (age ranged from 2 to 6 years) at calving from 13 embryo transfer Nellore-Angus F^2 families and 4 natural service families sired by the same bulls in central Texas from 2005 to 2009. Effects in repeated measures analyses were sire, season of cow birth, and cow age within calf birth year. Cow within family and cow's dam within breed type were random. Residuals (averaged per cow) were

used in association analyses. Cows were genotyped with a commercial SNP array (n = 54,001 loci). After quality editing, association analyses were conducted with 34,980 SNP using Bayes C procedures. Effects of SNP were random in a mixture model with an inclusion fraction (1- Π) of 0.001. Proportions of variance explained by markers were 0.027, 0.04, and 0.14 for TD, TL, and USS, respectively. Inclusion of a particular SNP in 0.1% of chains (model frequency [MF] > 0.001) was assumed indicative of QTL association. TD had 37 associated markers with an average effect and MF of 3.06E-05 cm and 9.62E-04, respectively. Effect range was 1.65E-07 to 8.10E-05 cm and MF range was 0.001 to 0.0012. The 40 best associated markers for TL had an average effect of 8.37E-05 cm and average MF 0.0014. Effect range was 5.49E-07 to 3.46E-04 cm and MF ranged from 0.0012 to 0.0032. For USS, the 35 best associated markers had an average effect of 2.37E-03 and average MF 0.0232. Effect range was 5.10E-04 to 2.53E-02 and MF ranged from 0.0061 to 0.2228. Strongest evidence of association for TD (MF = 0.0012) was for 2 SNP at 49.8 and 62.8 Mb on BTA 5. TL had the strongest evidence of association (MF = 0.0032) in 1 SNP at 44.9 Mb on BTA 28. Strongest evidence of association for USS (MF = 0.2228) was 1 SNP at 51.7 Mb on BTA 5.

Key Words: Bayesian inference, QTL, udder conformation

33 Comparison of genes associated with beef sensory characteristics in a Nellore-Angus population utilizing two association methods. L. L. Hulsman*[1], M. R. S. Fortes[2], A. Reverter[2], R. K. Miller[1], J. O. Sanders[1], A. D. Herring[1], C. A. Gill[1], and D. G. Riley[1], *[1]Department of Animal Science, Texas A&M University, College Station, [2]CSIRO Livestock Industries, Queensland Bioscience Precinct, Brisbane, Australia.*

The objective of this study was to compare 2 association methods using 8 beef sensory traits in crossbred cattle for 2 treatments (TR; electrically stimulated (ES) and not stimulated (NON)). Sensory traits of cooked beef fat, cooked beef lean, muscle fiber tenderness, overall tenderness, connective tissue, overall flavor, juiciness, and serum ("bloodiness") taste were subjectively assessed from 1 to 8, where 1 was unfavorable and 8 was favorable. Traits were evaluated for both ES and NON steaks from the same steer (n = 300), corrected for effects, and used for association analyses. Steers were genotyped using the BovineSNP50 assay, with 34,980 SNP after quality editing. SNP were mapped to UMD3 coordinates and included as random effects for 1) Bayesian inference (BayesC) with inclusion fraction (1 - π) of 0.05 and 2) single-step regression approach using a mixed animal model (AM). Lists of genes associated with each TR per method were generated by using criteria based on gene proximity to identified markers (<2,500 base pairs) and associations for traits per TR (P-value <0.05 for AM; model frequency >0.05 was indicative of association for BayesC). In total, 4 gene lists were generated for comparison (2 TR by 2 methods). Comparing all gene lists, 204 genes were the same. Both methods identified 740 (ES) and 537 (NON) common genes, whereas 1,509 (ES) and 1,521 (NON) were unique to method. Comparing TR within method, 1,102 and 288 were common in BayesC ES/NON and AM ES/NON respectively, whereas 1,596 and 1,208 were unique per TR. Between TR, ES analyses had more identified genes than NON, which may be due to ES causing biological changes postmortem. In summary, BayesC analyses identified more genes than AM analyses, resulting in more genes available for network construction even after stringent selection criteria.

Key Words: cattle, gene association, beef sensory traits

34 Influence of residual average daily gain or residual feed intake on birth weight in Brahman cattle. A. B. Keith*1,2, A. W. Lewis[1], D. A. Neuendorff[1], T. D. A. Forbes[3], T. H. Welsh, Jr.[2], and R. D. Randel[1], *[1]Texas AgriLife Research, Overton, TX, [2]Texas AgriLife Research, College Station, TX, [3]Texas AgriLife Research, Uvalde, TX.*

Residual average daily gain (RADG) and residual feed intake (RFI) are measures of feed efficiency in beef cattle. Selection for F:G has been reported to result in selection for higher birth weights(BW); however, selection for RADG or RFI have not been examined relative to BW. Weaned Brahman heifers (n = 230) were fed at 2.65% of body weight for 70 d in 8 cohorts via the Calan gate system. RADG data were classified by separating the data into those heifers $^1/_2$ SD above the mean as efficient (1), those within $^1/_2$ SD of the mean but above the mean as less efficient (2), those less than $^1/_2$ SD below the mean as less inefficient (3) and those greater than $^1/_2$ SD below the mean as inefficient (4). Similarly RFI data were classified as those heifers more than $^1/_2$ SD below the mean as efficient (1), those within $^1/_2$ SD but below the mean as less efficient (2), those above the mean but within $^1/_2$ SD of the mean as less inefficient (3) and those greater than $^1/_2$ SD above the mean as inefficient (4). Within 24 h of calving, BW were obtained (n = 438) for calves born to these heifers. Feed efficiency data were subjected to Mixed Model Analyses. Calf BW was the dependent variable. Dam's d of age at calving and d of age at mid-test of the feeding period were covariates in each analysis. Class variables included RFI or RADG class, sex of calf, dam parity, month of birth and parity by calf sex interaction. Calf sire was included as a random effect. Non-significant variables were eliminated. RADG class BW ($P > 0.1$) were 1 = 36.03 ± 0.54 kg, 2 = 35.47 ± 0.59 kg, 3 = 35.87 ± 0.65 kg, 4 = 35.41 ± 0.55 kg. RFI class BW ($P > 0.1$) were 1 = 35.03 ± 0.62 kg, 2 = 36.19 ± 0.61 kg, 3 = 35.36 ± 0.57 kg, 4 = 36.06 ± 0.55 kg. Calf sex affected ($P < 0.0001$) BW for RADG (heifers 34.19 ± 0.51 kg; bulls 37.20 ± 0.51 kg) and RFI (heifers 34.13 ± 0.55 kg; bulls 37.19 ± 0.55 kg). Neither RADG (−0.079) or RFI (−0.012) were correlated ($P > 0.1$) with BW. These results suggest that efficiency in Brahman females (using either RADG or RFI) is not associated with BW of their calves.

Key Words: residual average daily gain, residual feed intake, birth weight

35 Evaluation of calving and weaning rates for Nellore-Angus straightbred and crossbred cows. M. Obeidat*, D. Riley, J. Sanders, and A. Herring, *Texas A&M University, College Station.*

The objective of this study was to evaluate calving rate (CR) and weaning rate (WR) of straightbred and crossbred Nellore (N) and Angus (A) cows from 1997 to 2009 (n = 1527 records). Breed groups were A (n = 51 cows), N (n = 43), F1 (NA; n = 50), and 3/8 N 5/8 A first and second generation (3N5A, n = 63; 3N5A2, n = 52). Models included cow age (4 groups: 2-, 3-, and 4-yr-old, and older than 4 yr), breed, and their interaction as fixed effects, and year and cow as random effects. For 2-yr-olds, CR ranged from 0.94 ± 0.05 for NA to 0.05 ± 0.05 for N; N was lower ($P < 0.001$) than all others. For 3- and 4-yr-olds, CR did not differ ($P > 0.05$) among breeds. For 4-yr-olds, CR ranged from 0.99 ± 0.05 for NA to 0.8 ± 0.05 for N. For cows older than 4 yr, N (0.76 ± 0.03) had lower ($P < 0.001$) CR means than 3N5A (0.95 ± 0.03), A (0.90 ± 0.03), and NA (0.95 ± 0.02). For 2-yr-olds, WR ranged from 0.83 ± 0.06 for NA to 0.03 ± 0.07 for N; N cows had lower WR than all other breed groups. For 3-yr-olds, WR ranged from 0.82 ± 0.06 for NA to 0.73 ± 0.06 for N. In 4-yr-olds, WR ranged from 0.88 ± 0.06 for the F1 to 0.48 ± 0.06 for N. For cows older than 4 yr, WR ranged from 0.92 ± 0.08 for 3N5A2 to 0.64 ± 0.04 for N; N was lower ($P < 0.05$)

than 3N5A2, A (0.82 ± 0.04), and NA (0.88 ± 0.03). The lower calving and weaning rates of N 2-yr-old cows is due to later sexual maturity. Estimates of heterosis for CR and WR for NA were 0.20 ± 0.03 and 0.24 ± 0.03, respectively ($P < 0.001$). Estimates of heterosis for CR and WR in 3N5A were 0.12 ± 0.03 and 0.12 ± 0.04 ($P < 0.001$), respectively. Estimates of heterosis for CR and WR in 3N5A2 were 0.13 ± 0.03 and 0.15 ± 0.04 ($P < 0.001$), respectively. Estimates of heterosis in 3N5A and 3N5A2 cows did not differ ($P > 0.05$) for either trait. This study provides evidence of strong heterosis for reproductive traits of Nellore-Angus crossbred cows. There was no evidence for loss of heterosis for reproductive traits of the 3N5A2 cows relative to cows in the first generation (3N5A), as expected by the dominance model.

Key Words: heterosis, Nellore-Angus, reproductive rate

Graduate Student Competition II

36 Inflammation and oxidative stress in airway epithelial cells following exposure to swine confinement facility dust. C. L. Gerald*, S. D. Tatum, C. Y. Watson, and J. T. Waterman, *North Carolina A&T State University, Greensboro.*

Chronic lower respiratory diseases are the fourth leading cause of death in the United States of America and hog confinement facility workers have emerged as a subpopulation with increasingly high risk in developing chronic respiratory conditions such as asthma and chronic bronchitis. Exposure to dust from SCFs has been linked to inflammatory respiratory symptoms in farmers; however the impact on animals is poorly understood. Many of the respiratory diseases and conditions associated with SCF dust exposure are mediated by inflammatory mediators, we hypothesize that SCF dust stimulates the expression of pro-inflammatory genes, such as cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase (iNOS), through activation of the nuclear factor kappa B (NF-κB) signaling pathway in porcine airways. To evaluate this hypothesis, porcine tracheobronchial epithelial cells were isolated from the tracheas of freshly slaughtered swine (one year old, market weight, reared outdoors). Confluent cultures of porcine tracheobronchial epithelial (PTBE) and normal human bronchial epithelial (NHBE) cells were treated with 1% SCF Dust Extract (DE) for various times (0, 4, 6, 18, and 24 h). Following endpoints, 2-way ANOVA (ANOVA) was performed at a p-value of 0.05 to detect significance among means followed by a Bonferroni correction post-test for comparison of all groups. Western blot analysis showed a trend for DE-induced activation of NF-κB, and expression of iNOS and COX-2 ($P < 0.05$) proteins. Further, it was shown that DE-exposure caused significant secretion of pro-inflammatory cytokines such as interleukin-8 (IL-8) in NHBE cells. Acute, global oxidant stress in airway epithelial cells is associated with exposure to SFC dust evidenced by enhanced protein carbonylation in cells stimulated with DE. These findings demonstrate that SCF dust mediates its pro-oxidative and pro-inflammatory effects, at least in part, via activation of the immune response regulator NF-κB and downstream effector molecules in airway epithelial cells of pigs.

Key Words: airway, swine dust, oxidative stress

37 Effects of forage type and gender on performance and carcass characteristics of hair lambs. J. D. Kohler*[1], W. W. Miller[1], J. L. Vest[1], M. A. Brown[2], M. D. Hudson[1], and E. L. Walker[1], *[1]Missouri State University, Springfield, [2]USDA ARS Grazinglands Research Laboratory, El Reno, OK.*

Forty crossbred (Dorper x Katahdin x St. Croix) hair lambs were examined in an 84-d study conducted from April to June to determine the effects of gender (castrate vs. intact) and forage type on animal performance and carcass characteristics. Lambs were purchased from a single source in Missouri. In early March, October–born lambs were procured and one-half were randomly selected for castration. Initial fecal egg counts (FEC), FAMACHA© scores, and blood hematocrit data indicate lambs were not adversely affected by *Haemonchus contortus*. Lambs were stratified by gender and initial BW (mean 30.6 kg ± 3.7) and randomly assigned to treatment and individual dirt-floor pens (1.2 × 1.2 m). Dietary treatments were formulated to be isonitrogenous and included: 1) Alfalfa (*Medicago satvia*), n = 20 (AL) and 2) Sericea lespedeza (*Lespedeza cuneata*), n = 20 (SL). Lambs were fed AL during a 2-wk acclimation pd to their pens. Diets were pelletized and fed at 6% of BW (DM basis) daily. Fasted weights were collected fortnightly. In late June, after a 24-h fast, lambs were transported (97.4 km) to a USDA inspected abattoir for processing. Color, flank streaking, body wall thickness, leg score, and pH (45 min and 48 h post-harvest) were evaluated. Data were analyzed using PROC Mixed of SAS. The model included the fixed effects of gender and forage and the interaction between the 2. There were no significant interactions between gender and forage; therefore, the main effects of each are reported. Diet did not affect final BW, overall ADG, or any carcass characteristics measured ($P > 0.34$), indicating that the presence of condensed tannins in the SL diet were not deleterious to performance. Intact lambs had heavier final BW (42.3 vs. 37.9 kg; $P = 0.05$), greater overall ADG (0.22 vs. 0.15 kg/d; $P < 0.0001$) and greater HCW (18.8 vs. 16.6 kg; $P < 0.01$). Loins from intact lambs tended to be darker ($P < 0.10$) than those from castrates. However, loin from castrated lambs were significantly ($P < 0.01$) more red and yellow than those from intact lambs. In conclusion, castration has a greater effect on lamb performance and carcass traits than does diet type.

Key Words: lambs, gender, carcass

38 Effect of season of collection and heat shock protein 70 haplotype on semen qualilty characteristics of Holstein bulls. J. D. Patterson*[1], G. R. Gilbert[2], M. A. Sales[1], and C. F. Rosenkrans, Jr.[1], *[1]University of Arkansas, Fayetteville, [2]Genex Cooperative, Inc., Shawano, WI.*

Cellular expression of heat shock protein 70 (Hsp70) is related to animal stress induced by stressors including elevated temperature, which often reduces fertility. Haplotypes of Hsp70 have been related to female fertility; however, limited information is available demonstrating the effect of Hsp70 haplotype on bull semen characteristics. Objective was to determine the effect of season of collection and Hsp70 haplotype on Holstein bull semen traits. Bulls (n = 26) were collected using artificial vagina and ejaculates (n = 8964) evaluated for volume, morphology, sperm concentration, and motility. In addition, potential breeding units were calculated, and post-thaw motility assessed. Motility and concentrations were determined using computer-assisted sperm analysis. Bulls

were haplotyped based on a Hsp70 promoter sequence ('N' = no single nucleotide polymorphism (SNP), 'D' = nucleotide deletion at base 895, and 'Y' = SNP other than D). Data were analyzed using mixed models with haplotype as a random component, season of collection as a fixed affect, and age at collection as a covariate for testing the main effects of season and haplotype. The interaction ($P < 0.01$) between season and haplotype affected ejaculate volume, morphology, and potential breeding units. Deletion bulls collected in spring (444 ± 30) and winter (444 ± 30) had more ($P < 0.01$) breeding units than the same bulls collected in summer (413 ± 30) and fall (394 ± 31). Young bulls (<600 d) were affected ($P < 0.01$) by the interaction between season and haplotype for post-thaw motility (n = 52%, D = 49%, and Y = 33% for semen collected during the winter). Age at collection affected ($P < 0.01$) ejaculate volume, sperm concentration, morphology, potential breeding units, percent motility at collection, and percent post-thaw motility. Haplotypes of Hsp70 were associated with seasonal differences in semen characteristics. Marker assisted management of cattle may be useful in eliminating breeding stock with seasonal variation in traits associated with successful reproduction.

Key Words: Hsp70, sperm, cattle

39 Use of a lipopolysaccharide (LPS) challenge to evaluate the innate immune response of Angus heifers with genotypic differences in GeneSTAR Markers for intramuscular fat deposition. J. O. Buntyn*[1], J. A. Carroll[2], T. Smith[1], S. M. Falkenberg[3], J. D. Rivera[4], N. C. Burdick[2], and T. B. Schmidt[1], *[1]Department of Animal and Dairy Sciences, Mississippi State University, [2]Livestock Issues Research Unit, USDA-ARS, Lubbock, TX, [3]Ruminant Diseases and Immunology Research Unit, USDA-ARS, Ames, IA, [4]Mississippi Branch Experiment Station, Poplarville, MS.*

Intramuscular fat can serve as an energy reserve for cattle during an immune challenge, thus cattle with a genotypic variation in DNA markers (DNAm) for IMF may have an altered response to an immune challenge. The objective of this study was to evaluate the innate immune response of Angus heifers selected for genotypic variation in intramuscular fat deposition (IMFD). Genotypic variation (QG1 and QG2) in heifers was determined by presence or absence of DNAm for IMFD. Nineteen heifers (274 ± 24 kg) were sorted into 2 treatment groups based upon DNAm; heifers with no DNAm for IMFD (n = 9; NoIMFD), and heifers with one or more DNAm for IMFD (n = 10; IMFD). Prior to challenge (24 h), indwelling jugular catheters and indwelling vaginal temperature (VT) data loggers were inserted. Blood samples were collected at 30-min intervals and VT at 1-min intervals from −2 to 8 h relative to the immune challenge (LPS: 0.5 µg/kg BW) at time 0. Heifers with IMFD displayed greater ($P \leq 0.05$) VT 6–9 h post-LPS challenge compared with heifers with NoIMFD (39.57 and 39.22 ± 0.15°C, respectively). This alteration in VT at 6 - 9 h account for 20.5% of the change in VT due to the LPS challenge and signifies a significant redistribution of energy. Heifers in the NoIMFD group had greater ($P \leq 0.05$) concentrations of IFNγ 4 h post-LPS compared with IMFD heifers (701.1 and 324.3 ± 175 ng/ml, respectively). No differences ($P \geq 0.05$) were observed between groups of heifers for IL-6 concentrations. Heifers within the IMFD group had a greater ($P \leq 0.05$) concentrations of TNFα at 1.5–2 h post-LPS compared with NoIMFD heifers, while NoIMFD heifers had a greater ($P \leq 0.05$) concentrations of haptoglobin at 20–24 h post-LPS. Coupled with the results of our previous trial, these results suggest that there are significant differences in the innate immune response of heifers with genotypic variation in intramuscular fat deposition.

Key Words: pro-inflammatory, GeneSTAR, Angus

40 A comparison of ruminal microbial populations of residual feed intake-indexed Brahman bulls under grazing conditions. L. M. Wiley*[1], L. O. Tedeschi[1], T. D. A. Forbes[2], F. M. Rouquette, Jr.[3], R. D. Randel[3], and S. E. Dowd[4], *[1]Texas A&M University, College Station, TX, [2]2Texas Agrilife Research, Uvalde, TX, [3]Texas Agrilife Research, Overton, TX, [4]Medial Biofilm Research Institute and Research and Testing Laboratory, Lubbock, TX.*

The objective of this study was to compare the ruminal microbial population of 16 Brahman bulls grazing Coastal bermudagrass ([*Cynodon dactylon* (L.) Pers]) for 60 d at 2 stocking rates. Previously, a residual feed intake (RFI) trial was conducted and bulls were assigned as either efficient (LRFI) or inefficient (HRFI). Then, they were randomly assigned to either 2 high stocking rate (HSR) or 2 low stocking rate (LSR) pastures that sufficiently provide different forage mass levels. At the end of this grazing period, rumen contents were aspirated with a flexible tube that was inserted into the ventral sac of the rumen. Approximately 400 mL of rumen fluid were collected and frozen. Ruminal microbial populations were profiled using the 16 rDNA bacterial tag-encoded FLX amplicon pyrosequencing technique. Bacterial populations were identified at the genus level and reported as a % of the total DNA. Each genus was organized according to known substrate affinities for cellulose, hemicellulose, pectin, starch, protein, and lipids. The statistical analysis was conducted as a split-plot design in a 2 × 2 factorial arrangement (RFI x SR) with pastures within SR as random effects and individual animal as one experimental unit. There was an significant interaction between SR and RFI for non-fiber carbohydrate (NFC)-degrading bacteria ($P = 0.02$) and a tendency for an interaction for starch-degrading bacteria ($P = 0.09$). Bulls in the HSR and LRFI had greater percentage of bacterial DNA than those bulls in the HSR and HRFI (20.0 vs 15.7% for starch and 23.0 vs 18.6% for NFC, respectively). Our results indicated that efficient bulls might have a greater percentage of NFC-degrading bacteria compared with inefficient bulls when forage availability is low (HSR). However, when forage availability is not limited (LSR) no differences between efficient and inefficient bulls were observed ($P > 0.05$).

Key Words: bacteria population, cattle, fermentation

41 Characterization of enrichment terms essential to beef sensory characteristics in a Nellore-Angus population utilizing Bayesian Inference. L. L. Hulsman*[1], M. R. S. Fortes[2], A. Reverter[2], R. N. Vaughn[3], P. K. Riggs[1], R. K. Miller[1], J. O. Sanders[1], A. D. Herring[1], C. A. Gill[1], and D. G. Riley[1], *[1]Department of Animal Science, Texas A&M University, College Station, [2]CSIRO Livestock Industries, Queensland Bioscience Precinct, Brisbane, Queensland, Australia, [3]Graduate Program in Genetics, Texas A&M University, College Station.*

The objective of this study was to use a systems biology approach to identify and characterize genes and enrichment terms of 8 sensory traits for beef using a crossbred population and 2 treatments (TR; electrically stimulated (ES) and not stimulated (NON)), with the hypothesis that different TR would identify different enrichment terms. Sensory traits of cooked beef fat, cooked beef lean, muscle fiber tenderness, overall tenderness, connective tissue, overall flavor, juiciness, and serum ("bloodiness") taste were subjectively assessed from 1 to 8, where 1 was unfavorable and 8 was favorable. Traits were evaluated for both ES and NON steaks from the same steer (n = 300), corrected for effects, and used for association analyses. Steers were genotyped using the BovineSNP50 assay, with 34,980 SNP after quality editing. SNP were mapped to UMD3 coordinates and included as random effects for Bayesian inference (BayesC) with inclusion fraction (1 - π) of 0.05.

Lists of genes associated with each TR were generated by using criteria based on gene proximity to identified markers (<2,500 base pairs) and trait associations per TR (model frequency >0.05 as indicative of association). Gene lists were used for ontology searches of significant gene enrichment terms ($P < 0.001$) involved with biological processes (BP), molecular functions (MF), and cellular components (CC). Search identified 4 BP, 5 MF, and 6 CC common between ES and NON, with 14 BP, 39 MF, and 10 CC unique. Common MF included actin binding, calcium ion binding, glutamate receptor activity, ion channel activity, and substrate-specific channel activity. Common BP included biological adhesion, cell adhesion, cell-cell adhesion, and neuron cell-cell adhesion. In a separate study using microarray data and Warner-Bratzler Shear Force, both biological adhesion and cell adhesion were also identified as significant terms for differentially expressed ES data. In summary, more unique terms were identified between TR than common terms and will aid in network construction of these genes.

Key Words: gene enrichment, Bayesian inference, beef sensory traits

42 Beef cattle carcass characteristics from continuously stocked triticale, wheat and ryegrass pasture. D. A. Tigue*, R. B. Muntifering, S. P. Schmidt, W. F. Owsley, and C. L. Bratcher, *Auburn University, Auburn, AL.*

An experiment was conducted to evaluate carcass characteristics of growing-finishing beef cattle from continuously stocked triticale (T, *Triticale secale*), wheat (W, *Triticum aestivum*) and ryegrass (R, *Lolium multiflorum*). Eighteen yearling Angus x Simmental steers (mean initial BW, 302 ± 19 kg) were randomly assigned to continuously graze 6 1.42-ha pastures (3 steers/pasture) planted with monocultures of triticale, wheat or ryegrass (2 pasture replicates/treatment). Pastures were grazed beginning December 9, 2010 when forage DM availability had reached approximately 1,000 kg/ha, and additional put-and-take steers were used as necessary to maintain forage DM availability at approximately 2,000 kg/ha. Forages were sampled throughout the experiment along with steer weights. Grazing was discontinued after 133 d on April 21, 2011 when forage quality and availability were no longer adequate to support satisfactory steer ADG. Data were analyzed as a completely randomized design by the PROC GLM procedure of SAS. No differences ($P > 0.05$) were observed for steer ADG among forage treatments (1.32, 1.40 and 1.48 kg/d for T, W and R, respectively). Steers were humanely harvested, and carcasses were measured for hot carcass weight, back-fat thickness, adjusted back-fat thickness, Longissimus muscle area, kidney pelvic and heart fat, pH, skeletal maturity, lean maturity, average maturity, marbling, quality grade, lean color (L*, a* and b*-values), and fat color (L*, a* and b*-values). No differences were observed ($P > 0.05$) among forage treatments for any of the carcass traits measured. Results are interpreted to mean that the same finishing point can be reached from continuously stocked T, W and R using adjustable stocking rates as necessary to maintain high forage quality and availability throughout the winter grazing season.

Key Words: beef cattle, carcass, cool-season forage

43 Initial trends in the Kentucky Buck Test Program. R. S. Kelly*[1], T. J. Wistuba[2], T. Caudill[3], B. C. Williamson[1], and R. E. Miculinich[1], *[1]Morehead State University, Morehead, KY, [2]Novus International, Inc., St. Charles, MO, [3]Kentucky Department of Agriculture, Frankfort, KY.*

US meat goat producers are moving toward selection for improved growth and carcass traits. As a result of the increased demand for quality seedstock, the Kentucky Buck Test Program (KBTP) was initiated by the Kentucky Department of Agriculture in 2005. 150 bucks from 63 different producers have completed the test to date. Greater than 90% of the bucks placed on test have been registered purebred Boer with the remaining 10% originating from meat-breed crosses. The objective of this study is to establish initial trends in growth and carcass traits in the KBTP. Bucks were acclimated 14 d then placed on test at Western Kentucky University Farm in Bowling Green, KY. For the test years 2005–2010, an initial weight was taken at the beginning of the test period (ONTEST), then followed by weights taken at d 28 (D28), d 56 (D56) and d 84 (OFFTEST). An adjusted average daily gain for the entire test period (ADG) was calculated. In addition, for the test years 2007–2010, real-time ultrasound measurements of loin eye area (LEA) and back fat (BF) at the 12th rib were recorded. A statistical analysis to evaluate differences in ADG, BF and LEA between the test years was completed using the PROC GLM and PROC CORR procedures in SAS (SAS Inst., Inc. Cary, NC). Results indicate that ADG for Boer bucks in the KBTP increased significantly ($P < 0.05$) between the test year 2005 (0.20 kg/day) and the test year 2010 (0.24 kg/day). Although LEA LSMeans increased numerically each year of the test, no significant difference ($P > 0.05$) was detected for LEA differences between the test years. BF was significantly ($P < 0.001$) higher in the years 2009 and 2010 compared with the first year BF was measured (2007). As expected, the correlation between ADG and BF and BF and LEA was significant ($P < 0.01$). While the initial trends indicate that Boer bucks tested through the KBTP program have improved slightly in growth and muscle over time, expansion of this initial evaluation of growth and carcass trends is planned in a larger population over an additional 10 year period. Results indicate the need for further measurement of and selection for improved growth and carcass traits in the meat-goat buck population of Kentucky.

Key Words: goat, production, carcass

44 Characterization of ruminal lipase-producing bacteria and their lipolytic activities *in vitro*. H. D. Edwards*[1], R. C. Anderson[2], S. B. Smith[1], R. K. Miller[1], T. M. Taylor[1], N. A. Krueger[2], and N. J. Nisbet[2], *[1]Texas A&M University, College Station, TX, [2]United States Department of Agriculture/Agricultural Research Service, Southern Plains Agricultural Research Center, Food & Feed Safety Research Unit, College Station, TX.*

Lipolytic activity in the rumen has been primarily attributed to *Anaerovibrio lipolyticus* and *Butyrivibrio fibrisolvens*. Recently, *Propionibacterium avidum* and *acnes* have also been examined as contributors. To further characterize ruminal lipolysis, pure and mixed populations of lipase-producing bacteria were cultured in the presence and absence of 2.0% glycerol and 0.05% glucose. Mixed populations were obtained from the rumen fluid of a cannulated cow. Tubes used to culture the bacteria were pre-loaded with 0.3 mL olive oil, 21 g glass beads, and 6.0 mL anaerobic medium. Free fatty acids were measured colorimetrically after 0 and 48 h incubation at 39°C under CO_2. Glycerol and glucose were administered in a factorial design. Rates were analyzed for main effects of the presence/absence of glucose and glycerol using a general ANOVA. There was a significant effect of glucose and glycerol presence/absence for all treatments. The presence of glucose decreased the lipolytic activity of *A. lipolyticus*, *B. fibrisolvens*, and *P. acnes* by 63 ± 31%, 36 ± 34%, and 26 ± 21%; mean ± SD, respectively. Conversely, glucose increased lipolytic activity of *P. avidum* and mixed populations 100 ± 0% and 36 ± 19%, respectively. Glycerol increased lipolytic activity for all 4 pure culture bacteria, where as it reduced lipolysis in mixed populations by 91 ± 7%. Mixed populations and *P. acnes* dis-

played a significant glucose-glycerol interaction. Glucose appears to differentially regulate lipolysis in the bacteria tested, downregulating lipase activity, with the exception of *P. avidum* or mixed populations of ruminal microbes. Lipase-producing bacteria examined in this study demonstrated contrasting characteristics to the mixed populations. This suggests that pure cultures of lipolytic bacteria tested here are not the main contributors to ruminal lipolysis and rather the identity of highly active lipolytic rumen bacteria has yet to be made.

Key Words: lipolysis, glycerol, glucose

Ruminant Animal Production I

45 Supplemental concentrate for heifers grazing stockpiled fescue. M. H. Poore*[1], A. D. Shaeffer[1], S. R. Freeman[1], J. M. Scruggs[1], G. R. Hansen[1], M. L. Alley[1], C. S. Whisnant[1], and M. E. Drewnoski[2], *[1]North Carolina State University, Raleigh, [2]Iowa State University, Ames.*

Stockpiled tall fescue managed with strip grazing is an efficient winter forage system; however, nutritive value may be inadequate for developing replacement heifers (H). A 2-yr study was conducted to evaluate level of a 50:50 mix of soyhulls and corn gluten feed (17.9% CP and 22.6% ADF) during a 56-d period (Nov and Dec) before breeding. Fescue (Ky-31) was fertilized in early Sep with 56 kg/ha N, plus P and K to soil test. Yearling H (initially 262 kg and BCS 5.2) were blocked by BW and assigned to 16 pastures arranged in 4 land reps. Each group had 4 animals, but in yr 1, 2 reps had 3 H and one steer, and in yr 2 all groups had 3 H. Only H were used for statistical analysis and group was the experimental unit. Supplement (S) was provided daily at 0, 0.5, 1.0 or 1.5% of initial BW. Forage was allocated every 2 d allowing for a 5 cm target grazing height. Following 56-d of grazing, H were synchronized (7-d Select-Synch plus CIDR), bred AI, and then exposed to a bull. Forage mass was determined pre- and post-grazing 3 times in yr 1 and twice in yr 2 to determine forage disappearance. Pre-grazing mass averaged 4530 kg/ha, and forage averaged 11.1% CP and 28.7% ADF. Forage utilization did not differ between treatments (88% of the mass above 5 cm and 53% of mass above the soil). Average daily gain (kg/d), change in BCS, H grazing d/ha, and kg gain/ha increased linearly (L; $P < 0.01$) with increasing S level (0.53, 0.74, 0.93 and 1.08; 0.43, 0.48, 0.75 and 0.97; 444, 498, 508, 601; and 219, 355, 466 and 635 respectively). Forage disappearance decreased L ($P < 0.01$) with increased S (6.87, 5.92, 6.36 and 5.37 kg/d) while total DMI increased L ($P < 0.01$; 6.87, 7.27, 9.01 and 9.30 kg/d). Percent of H that settled to AI increased L ($P < 0.03$, 32, 51, 66 and 60), while the effect on total breeding rate was quadratic ($P < 0.03$, 77, 96, 96 and 91%). Heifers responded L to S for most measures, but 0.5% of BW was adequate to improve overall breeding rate.

Key Words: stockpiled fescue, supplementation, replacement heifers

46 Effect of daily or alternate day distillers grains supplementation with or without monensin on performance of growing calves – three trial summary. P. Beck*[1], S. Gadberry[2], J. Butterbaugh[3], B. Rudolph[3], J. Tucker[4], T. Hess[4], D. Hubbell[4], B. Stewart[1], and H. Gray[1], *[1]University of Arkansas SWREC, Hope, [2]University of Arkansas Cooperative Extension Service, Little Rock, [3]Furst-McNess Co, Freeport, IL, [4]University of Arkansas LFRS, Batesville.*

Three studies were conducted in the summers of 2010 and 2011, using 240 growing steers and heifers (BW ± SE = 245 ± 18.8) to determine the effects of daily or alternate day supplementation of dried distillers grains plus solubles (DDGS) with or without Rumensin addition on performance of growing beef calves grazing warm-season grass pastures. In Exp. 1 and 2, 80 heifers were implanted with Component TE-G with Tylan (VetLife, Overland Park, KS) on 28 May 2010 and 29 June 2011, respectively, and allocated into equal BW groups of 4 at the SWREC near Hope. In Exp. 3, 40 steers were implanted with Component TEG and 40 heifers were assigned to equal BW mixed gender groups at the LFRS near Batesville on 2 June 2011. Groups were placed on mixed grass pastures (Exp. 1, 0.8 ha; Exp. 2, 1.6 ha; Exp. 3, 1.0 ha) and randomly assigned to 1 of 5 supplementation treatments (n = 4 pastures/treatment in each Exp.). Treatments were 1) Control, free choice mineral only; 2) daily DDGS at 1.02 kg/calf; 3) Daily DDGS + Rumensin (monensin, Elanco, Greenfield, IN) at 1.02 kg/calf supplying 160 mg monensin/calf daily; 4) alternate day DDGS to supply 2.04 kg/calf offered on alternate days; 5) alternate day DDGS + Rumensin to supply 2.04 kg/calf 320 mg monensin/calf on alternate days. Heifers in Exp. 1 were weighed shrunk at the initiation and termination of the study. Cattle in Exp. 2 and 3 were weighed full on consecutive days at the initiation and termination of each Exp. Combined analysis was conducted in mixed procedure of SAS and included experiment and pasture within experiment in the random term. Contrasts were used to separate the effects of control vs supplement, medicated vs non-medicated, and daily vs alternate-day supplementation. Across the 3 Exp., supplementation increased ($P < 0.01$) daily BW gain by 0.22 kg, but there were no effects ($P \geq 0.50$) of Rumensin addition or supplementation timing on BW or performance. Considerable economic benefits can accrue to producers by feeding on alternate days with no loss in performance.

Key Words: distillers grains, supplementation, growing cattle

47 Comparison of ground, pelleted peanut hulls to loose peanut hulls in diets fed to growing beef cattle. J. Starnes*, D. Rankins, Jr., and B. Gamble, *Auburn University, Auburn, AL.*

Early research indicated that ground peanut hulls (PH) were not a satisfactory roughage source in corn-based diets. Our objective was to compare ground, pelleted PH to loose PH as a roughage source in a corn gluten feed-based diet. The trial was repeated in consecutive years. Year 1. Twenty-seven Brangus x continental steers (initial BW 277 kg) were fed one of 3 diets for 106 d (3 steers/pen; 3 pens/diet). On a DMB, diets were as follows: 1) 50% pelleted PH and 50% pelleted corn gluten feed, 2) diet 1 plus free-choice hay and 3) 50% loose PH and 50% pelleted corn gluten feed plus free-choice hay. All diets were fed free-choice and a free-choice mineral containing lasalocid was offered. Year 2. Same as year 1 except initial BW of the steers was 264 kg and the trial lasted for 102 d. In year 1, ADG was slower ($P = 0.03$) in steers fed loose PH (0.80 kg/d) than those fed pelleted PH with (1.51 kg/d) or without hay (1.32 kg/d). There was no difference in ADG ($P = 0.78$) between those fed pelleted PH with or without hay. Feed intake followed the same pattern ($P = 0.01$) and was 3.6 kg/d for steers fed loose PH and 13.9 and 12.9 kg/d, respectively for those with and without hay. Daily hay intake was greatest ($P = 0.01$) for steers fed loose PH (5.4 kg/d) intermediate for those fed pelleted PH (1.9 kg/d) and lowest for those fed no hay (0

kg/d). In year 2, ADG was slower ($P = 0.02$) in steers fed loose PH (0.58 kg/d) than those fed pelleted PH with (1.15 kg/d) or without hay (1.10 kg/d). There was no difference ($P = 0.89$) in ADG between those fed pelleted PH with or without hay. Feed intake followed the same pattern ($P = 0.01$) and was 4.4 kg/d for steers fed loose PH and 13.7 and 13.5 kg/d, respectively for those with and without hay. Daily hay intake ($P = 0.01$) was greatest for steers fed loose PH (3.1 kg/d) intermediate for those fed pelleted PH (1.5 kg/d) and lowest for those fed no hay (0 kg/d). No digestive problems were observed in any of the cattle in either of the 2 years. When mixed with corn gluten feed, pelleted PH appear to be an acceptable roughage source.

Key Words: beef cattle, peanut hulls, corn gluten feed

48 Effect of breed and level of inclusion of dried distillers grain (DDG) supplement on intake and digestibility of round bale silage (RBS) diets. E. N. Alava*, C. A. Welchons, M. J. Hersom, and J. V. Yelich, *University of Florida, Gainesville.*

The objective was to evaluate breed and level of DDG on voluntary DMI, digestion kinetics, and fermentation parameters in Angus (AN; n = 4) and Brangus (BN; n = 4) steers assigned to one of 4 treatments: 1) Tifton 85 bermudagrass RBS; 2) RBS + 0.33% of BW DDG (RBS+0.33); 3) RBS + 0.66% of BW DDG (RBS+0.66); 4) RBS + 1% BW DDG (RBS+1). RBS was offered at 110% of the previous days intake. Ruminally cannulated steers (2–4 yr old; 581 ± 100 kg) were used in an incomplete 2 × 4 Latin Square with 4 periods (n = 8 for each treatment). Diet adaptation occurred d 1–12 and fecal bag adaptation for total fecal collection was d 10–12. Total fecal output and DMI occurred d 13–17. Ruminal pH was measured hourly on d 18 at −2 to 12 h after feeding. Steers fed RBS+1 had lower ($P \leq 0.05$; 6.6 kg/d) RBS DMI than all other treatments (mean = 8.5 kg/d). Steers fed RBS had lower total DMI ($P \leq 0.05$; 8.4 kg/d) than DDG treatments (mean = 11.5 kg/d). Steers fed RBS+0.33 had lower total DMI ($P \leq 0.05$) than RBS+1, and tended ($P = 0.08$) to have lower total DMI than RBS+0.66. AN tended ($P = 0.06$; 11.2 kg/d) to have greater total DMI than BN (10.3 kg/d). As level of DDG increased, fecal DM output increased ($P \leq 0.05$; RBS = 3.9 to RBS+1 = 5.0 kg/d). AN had greater ($P \leq 0.05$; 4.7 kg/d) fecal DM output than BN (4.3 kg/d). Steers fed RBS had lower ($P \leq 0.05$; 53%) total tract apparent DM digestibility (TTADMD) than DDG treatments (mean = 59%), but there was no breed effect ($P > 0.05$). Steers fed RBS had greater ($P \leq 0.05$) mean and minimum daily ruminal pH (6.43 and 6.15, respectively) compared with DDG treatments (mean = 6.22 and 5.86, respectively). AN had lower ($P \leq 0.05$) mean daily and minimum daily ruminal pH (6.20 and 5.84, respectively) than BN (6.34 and 6.03, respectively). In conclusion, DDG increased total DMI and TTADMD, but decreased RBS DMI and mean and minimum daily ruminal pH. AN tended to have greater total DMI, greater fecal DM output, and lower pH than BN steers.

Key Words: Brangus, dried distillers grain, forage

49 Between-animal variation in intake and behavioral patterns associated with consumption of salt-limited dried distillers grain in forage-fed growing steers. J. Moreno*, R. Kalina, G. Carstens, J. Walter, A. Hafla, and T. Wickersham, *Texas A&M University, College Station.*

Proper intake patterns of supplemental feeds are critical for the establishment of effective nutrition programs for grazing cattle. Limited research has focused on characterization of behavioral patterns of supplement intake by forage-fed cattle. This study was conducted to examine between-animal variation in intake and feeding patterns of growing steers offered ad libitum access to bermudagrass hay and a salt-limited supplement (75% dried distillers grain; 25% NaCl; DDG). Twelve Angus steers (initial BW = 318 ± 28 kg) were confined to 2 pens equipped with a GrowSafe feeding system. Chopped bermudagrass hay (6.9% CP) was provided in 2 bunks and the DDG supplement in a third bunk. Daily intakes, and feeding bout (FB; bunk visit events with recorded intakes) frequencies and durations of hay and DDG were measured for 56 d. During the study, steers gained 0.90 ± 0.12 kg/d, and consumed 6.30 ± 0.77 kg DM/d of hay. Average daily DDG intake measured by the GrowSafe system was 2.23 ± 0.72 kg DM/d, which did not differ ($P = 0.60$) from amount measured manually as weight of DDG supplied minus orts (2.23 kg DM/d). Average frequency (79 ± 17 vs 22 ± 8 events/d) and duration (171 ± 31 vs 22 ± 13 min/d) of FB events were higher for hay than DDG, respectively. However, the eating rate associated with consumption of hay was less than that of DDG (37 ± 5 and 120 ± 48 g/min, respectively). DM intakes of hay and DDG during the first 28-d period were similar ($P = 0.50$) to intakes of hay and DDG during the second 28-d period. Moreover, correlations between the first and second 28-d periods for DDG intake, and FB frequency and duration were 0.67, 0.75 and 0.82, respectively, indicating that repeatability of feeding patterns associated with DDG consumption were strong. Results from this study demonstrate that the GrowSafe system can be used to accurately measure supplement intake in cattle, and that between-animal variations in intake (CV = 33 vs 12%), FB frequency (CV = 36 vs 22%) and duration (CV = 61 vs 18%) were greater for DDG than hay, respectively, in growing steers.

Key Words: supplement intake, distillers grain, growing steers

50 Determining the effects of previous nematode control on feedlot growth performance and carcass merit in beef cattle. J. J. Hollenbeck*, J. G. Powell, J. K. Apple, K. P. Coffey, C. A. Tucker, M. P. Rowe, and J. L. Reynolds, *University of Arkansas, Fayetteville.*

Gastrointestinal nematodes have a major negative impact on beef cattle performance. However, according to USDA NAHMS data, nearly 40% of cow-calf operations do not treat their unweaned calves with an anthelmintic and over 40% of stocker cattle operations do not treat with an anthelmintic. Therefore, this study was undertaken to assess the impact of treating calves with an anthelmintic during pre-weaning, weaning, and(or) post-weaning phases and its effects on growth performance and carcass characteristics in beef cattle. Fall-born beef steers (n = 46) carrying natural nematode infections were utilized in a single experiment. While still nursing, calves were randomly allocated to 1 of 3 treatment groups: 1) calves injected with 1% moxidectin at 85 d before weaning, at weaning, mid-point through the stocker phase and entry into the feedlot (TRT1); 2) calves injected at weaning and entry into the feedlot (TRT2); or 3) only at entry into the feedlot (TRT3). Throughout the feedlot phase, a slick bunk feed management approach was taken, and orts were measured on an as-needed basis. Statistical analysis was performed using PROC MIXED in SAS, and pen was considered the experimental unit. Results from the pre-weaning and stocker phases of this study have been previously reported. The ADG was not ($P > 0.19$) different among treatment groups throughout feedlot phase. The average number of days on feed (DOF) was lower ($P < 0.03$) for TRT1 compared with TRT2 and TRT3, but no difference ($P > 0.67$) existed between TRT2 and TRT3 (165, 178, and 180 d, respectively). Gain:feed did not differ ($P = 0.32$) among treatments averaging 0.16, 0.17, and 0.17 for TRT1, TRT2, and TRT3, respectively. Carcass merit was not different ($P > 0.23$) among treatments for the following parameters HCW, backfat, REA, LMA, KPH, YG, marbling and quality grade.

Total costs associated with the feedlot phase were greater ($P = 0.02$) for TRT2 and TRT3 compared with TRT1. Overall, the number of previous anthelmintic treatments affected DOF and total costs during the feedlot phase but had no appreciable effect on carcass traits.

Key Words: moxidectin, nematodes, cattle

51 Use of shrunk body weights did not effectivley reduce variability of weight gain of growing steers. R. R. Reuter* and C. A. Moffet, *The Samuel Roberts Noble Foundation, Inc., Ardmore, OK.*

Shrinking cattle is a standard procedure in experiments, intended to reduce variability of BW measurements and increase precision of ADG measurements. Shrinking should improve ability of experiments to detect treatment differences. However, shrinking cattle can be stressful on animals and people, and may require additional labor expenses. To explore the effectiveness of shrinking cattle, data were used from an experiment designed to evaluate the effect of anthelmintic formulations on parasite infection levels and 42-d ADG. The study used crossbred stocker cattle (n = 497; 205 ± 24 kg) that were purchased from sale barns. The protocol for this experiment resulted in cattle being weighed on consecutive days at the beginning (P1) and end (P2) of the 42-d study. The first weight (full weight) of each pair occurred with no shrink, while the second weight (shrunk weight) occurred the following day after a 16-h shrink without feed or water. During the experiment, cattle were housed in 50-animal groups in 3.5-ha paddocks and offered rye hay ad libitum and supplement. Mean shrink at P1 and P2 was 4.9 and 5.2%, respectively. However, the CV was 12.0% for both full and shrunk P1 weights. Further, the CVs of full and shrunk weight at P2 were 12.2% and 12.1%, respectively. Bartlett's test for heteroscedasticity indicated that variances of full and shrunk weights were not different in either period ($P > 0.18$). The SD of total gain calculated with either full or shrunk weights was 11.5 and 11.1 kg, respectively. Based on these SDs, in a future study, assuming an α of 5%, power of 80%, and 20 animals (experimental unit) per treatment, using full weights allows detection of a 10.5 kg difference between 2 treatments. Conversely, under the same assumptions, using shrunk weights allows detection a 10.1 kg difference, only marginally better. Using full weights with an additional 2 animals per treatment is superior to using shrunk weights. In the current study, shrinking cattle did not dramatically reduce variation in body weight. In research situations with adequate numbers of cattle, shrinking cattle may be unnecessary.

Key Words: shrink, cattle, power

52 Effects of between-animal variation in feed efficiency, performance, and carcass traits on net revenue in Angus-based composite steers. J. T. Walter, A. N. Hafla*, G. E. Carstens, J. C. Bailey, J. W. Behrens, J. G. Moreno, D. S. Hale, R. K. Miller, J. E. Sawyer, and D. Anderson, *Texas A&M University, College Station.*

Objectives of this study were to evaluate the effects of residual feed intake (RFI) classification on performance, feed efficiency and carcass traits, and to determine the relative contributions of between-animal variation in these traits on net revenue (NR) of feedlot steers. Individual DMI and performance were measured using the GrowSafe system (2 pens, 85 head/pen) in Angus-based composite steers (n = 508; initial BW = 310 ± 56 kg) fed a high-grain diet (3.08 Mcal ME/kg DM) for 70 d in 3 consecutive yr. RFI was computed as actual DMI minus expected DMI from linear regression of DMI on ADG and mid-test $BW0^{0.75}$. Thereafter, steers were fed the same diet in group pens, harvested at 1.14 cm backfat depth, and carcass traits recorded to determine quality and yield grades. Feed costs were based on actual feed consumed during feed-intake measurement periods, and model-predicted intake adjusted for RFI during group-feeding periods. NR was calculated as grid-formula carcass value minus feeder calf, yardage and feed costs, using 3-yr average fixed prices from 2008 to 2010. Steers with low RFI (<0.50 SD) had \$48/hd lower ($P < 0.0001$) feed costs, \$16/hd numerically ($P = 0.29$) higher carcass values and \$62/hd more favorable ($P < 0.0001$) NR compared with steers with high RFI (>0.50 SD). NR was positively correlated with ADG, HCW and marbling score (0.38, 0.49 and 0.24, respectively), and negatively correlated with DMI, F:G, RFI and YG (−0.14, −0.50, −0.48 and −0.20, respectively). Stepwise regression was used to determine factors contributing to between-animal variation in NR, with year, DMI, ADG, RFI, F:G, HCW, marbling score, and YG included as independent variables. The R^2 of the full model was 0.775 with performance (HCW, ADG), carcass-quality (marbling score, YG), feed efficiency (DMI, F:G) and year accounting for 18.2, 12.4, 46.3 and 0.6% of the variation in NR. Results demonstrate that substantial variation in NR can be attributed to individual-animal variances in performance and feed efficiency of feedlot steers.

Key Words: net revenue, residual feed intake

Teaching and Undergraduate Education

53 Student perceptions of the MTSU School of Agribusiness and Agriscience. W. Gill, J. Gardner, A. Neely, and J. Carter*, *Middle Tennessee State University School of Agribusiness and Agriscience, Murfreesboro.*

The purpose of this study is to better understand the factors that lead to the recruitment and retention of undergraduate agriculture students and to collect demographic data on current students. During the Fall semester of 2011 students in Middle Tennessee State University (MTSU) School of Agribusiness and Agriscience (ABAS) were asked to complete a survey detailing their perceptions of the school and the university, their level of interest and activity in school events, their reasons for choosing an ABAS major and their experiences in high school. ABAS students choose one of 3 majors, Animal Science (290 students), Plant Science (97 students) and Agribusiness (131 students). Out of the 518 ABAS majors 257 responded to the survey (15.3% Freshman, 21.5% Sophomore, 28.5% Junior, 33.1% Senior and 1.7% Other).

The majority of the survey respondents, 55.6%, did not take agriculture classes in high school. Many of the survey respondents, 34.7%, had college credit before enrolling in MTSU. Of particular interest is measuring the impact of dual credit agricultural courses offered by ABAS, 12% of the current freshmen indicated that they participated in dual-credit courses, a result that is statistically significant ($P = .07$) relative to dual credit participation among upper-classmen. Survey respondents were presented with a list of factors that may have influenced their decision to MTSU's School of Agribusiness and Agriscience and were asked to select all that apply. The top five factors

are specific program or professor (43.2%), location (36.1%), friends (20.3%), a suggestion by a high school ag. teacher (16.6%), and parents (13.3%). The majority of the survey respondents plan to return to ABAS next semester or graduate (99.8%). We suspect that this high intention to persist is the result of selection bias, motivated students are more likely to graduate and more likely to complete a student survey.

Key Words: student recruitment, student retention, dual credit

54 Case study on development and effectiveness of a practicum in livestock welfare and management course. D. Mulvaney*, B. Anderson, A. Chandler, G. Richburg, and D. Coleman, *Animal Sciences, Auburn University, Auburn, AL.*

Students majoring in animal sciences are increasingly limited by minimal prior hands-on experience with livestock species. To address this need, we developed a 2 credit Practicum course in livestock welfare and management for students with minimal experience with large animals but having completed or enrolled in introductory animal science. After 2 iterations as a special topics course, a hands-on laboratory course in the applied management of beef cattle, dairy cattle, swine, small ruminants and horses with participatory assignments of common techniques utilized in livestock production was solidified in the curriculum offering. Emphasis is on acquisition of and exposure to skills and sound, safe techniques / routine procedures needed by those who manage livestock to optimize animal well-being, productivity and enjoyment. Students are expected to demonstrate basic proficiency in care, handling, and routine procedures for swine, beef cattle, and horses as well as operation of support farm equipment and facilities. Using a customized mid and end of semester assessment instrument, students reported achievement of learning outcomes in areas of animal behavior, ability to work animals, the basis of husbandry techniques for the care and management of livestock and 26 proficiency areas. This case study provides insight for others developing hands-on courses and a framework for scholarly exchange on best practices of teaching practicum courses.

Key Words: animal sciences, livestock welfare and management, undergraduate teaching

55 Creation of media and issues management simulation modules for students enrolled in a course dealing with issues in animal science. D. R. Mulvaney*[1] and M. V. Morgan[2], *[1]Animal Sciences, Auburn, AL, [2]Alabama Cooperative Extension System, Auburn, AL.*

In our fast-paced, interconnected, complex, global agriculture context, a crisis could be merely seconds away. Agriculture, especially Food Animal Agriculture, is under constant challenge with management practices coming under perpetual scrutiny and under the microscope of the media, watchdog activist groups and regulatory agencies. Equipping graduates with communication and advocacy skills is becoming increasingly important to employers within the agriculture sector. Students (n = 21) enrolled in an Issues in Animal Agriculture course were anonymously polled with a 29 item, 5 point Likert scale survey before discussing media and crisis management skills, and after completion of a learning module on media and issues management. Survey questions addressed self proclaimed knowledge or abilities (NK = No Knowledge or ability, LK = little/some knowledge or ability, K = knowledgeable and capable, GK = Good/Above average knowledge and ability, and EK = Excellent, high level of knowledge or ability) related to communication and media skills and crisis management. The learning module included lecture content and group work around analysis, decisions and stakeholder communication in relevant situational crises within animal agriculture. Groups shared their findings with the class and engaged in discussion of theoretical and practical aspects of the group′s action plans. Analysis of the group responses indicated an overall increase in knowledge or ability as a result of the module. Students also demonstrated practice of principles in additional exercises of the class. These observations indicate that intentional training of media skills and crisis management contributed to enhanced learning outcomes for students enrolled in an Issues in Animal Science course.

Key Words: issues in animal agriculture, Ag communication, media skills

Ruminant Animal Production II

56 Poured protein blocks, a distillers grain product and cottonseed fed with hay to beef cows in winter. G. M. Hill*[1], K. C. Halbig[1], J. Moore[1], C. H. Knight[1], A. Scheaffer[2], and B. G. Mullinix, Jr.[1], *[1]University of Georgia, Tifton, [2]SweetPro, LLC, Walhalla, ND.*

A 90-d study compared performance of beef cows fed 3 energy and protein supplements with free-choice bermudagrass hay (88.2% DM, 11.8% CP, 52.5% TDN). Cows (n = 84; initial BW 636 ± 25.2 kg; Brangus; Angus crossbred) were grouped by BW, cow age (mean, 4.6 ± 1.1 yr), breed type, and randomly assigned to 8 dormant pasture replicates, which were experimental units. Treatments initiated December 15, 2010, were: hay only (H); hay plus whole cottonseed (HWCS; WCS, 23% CP, 20% fat; WCS at 0.5% of cow BW daily); hay plus poured molasses product (HPMP; PMP, 24% CP, 5% fat); hay plus dried distillers grain product (HDFP; DFP, 16% CP, 3.5% fat). Body condition scores (BCS; scale 1 to 9; 5.45 ± 0.5 on d 1), and ultrasound rib (URB) and rump (URU) fat (cm), were measured on d 1 and d 90. Change in ADG, BCS, URB and URU were adjusted for initial BW, BCS, URB and URU. Calf ages at d 90 (55.6 ± 16.0 d) were similar for treatments. Hay disappearance (kg/d) and supplement DMI (kg/d) by treatments were: 17.54, 0.0; 14.54, 2.15; 16.44, 0.69; and 16.74, 0.37. Cow pregnancy rates (%; 70-d breeding interval) were: 81.0, 95.4, 92.3, and 95.4. Cows fed HWCS retained more initial BW, and had less URB and URU fat change than HPMP and HDFP (Table). Cows regained BW losses in spring (d 90 to d 197) on HPMP and HDFP. Pregnancy rates and calf gains were lowest for H, but similar for HWCS, HPMP, and HDFP, supporting the need for winter supplementation.

Table 1

Item	HAY	HWCS	HPMP	HDFP	SE	$P\leq$
Cow 90-d ADG, kg	−0.51	−0.26	−0.59	−0.41	0.08	0.02
ADG d 90 to d 197, kg	−0.10	0.00	0.55	0.35		
BCS Δ at 90 d	0.08	0.07	−0.31	−0.07	0.07	0.14
Cow initial URB fat, cm	0.69	0.49	0.65	0.64	0.04	0.09
URB fat Δ 90 d, cm	−0.07	−0.02	−0.19	−0.09	0.02	0.01
Cow initial URU fat, cm	0.93	0.66	0.93	0.92	0.07	0.13
URU fat Δ 90 d, cm	−0.04	−0.04	−0.24	−0.10	0.03	0.01
Calf ADG to d 197, kg	1.08	1.17	1.16	1.17		

Key Words: cottonseed, cow, protein

57 Intake, in situ disappearance, and ruminal fermentation of bermudagrass hay by lactating beef cows offered hominy feed or corn as supplements. Z. Madzonga, A. Young, K. Coffey*, D. Philipp, and E. Kegley, *University of Arkansas Division of Agriculture, Fayetteville.*

Hominy feed, a co-product of dry corn milling, has been evaluated to a limited extent in feedlot and dairy rations, but has not been evaluated as a supplemental energy source for lactating beef cows. The objective of this study was to determine the effect of level of hominy feed supplementation on intake, in situ DM disappearance, and ruminal fermentation characteristics of medium-quality bermudagrass hay. Five ruminally cannulated lactating beef cows (BW = 596 kg, SE = 13.9) were used in a 5 × 5 Latin square design. Treatments (as-fed basis) were low hominy (LH; 0.25% of BW), medium hominy (MH; 0.50% of BW), low corn (LC; 0.25% of BW), medium corn (MC; 0.50% of BW) and no supplement (Cont). Supplements were offered at 0800 daily, and corn was offered as ground corn. Hay was offered to maintain 10% refusal, and water was offered for ad libitum consumption. Five consecutive 16-d periods were used, each consisting of 9 d for adaptation followed by a 6-d in situ period. Dacron bags containing approximately 5 g of ground (2-mm screen) bermudagrass hay were not incubated, or incubated for 4, 8, 12, 16, 24, 52, 76, 100, and 124 h to measure forage DM disappearance. Ruminal fluid was sampled on d 14 of each period at 0, 1, 3, 5, 7, 9, 11, and 13 h after the morning feeding, and pH was measured. Mixed-models ANOVA was used and means were separated using a protected *t*-test. Hay DMI (% of BW) was greater ($P < 0.05$) for Cont and LC than MH, but total DMI (% of BW) was greater ($P < 0.05$) for MC and MH than the other treatments. Hay fraction B (potentially degradable DM) was greater ($P < 0.05$) for LH and MC than MH, whereas hay fraction U (undegradable DM) was greater ($P < 0.05$) for MH than MC and LH. Mean ruminal pH tended ($P = 0.07$) to be greater for LC and Cont (6.43 and 6.34, respectively), than LH (6.12). Therefore, hominy feed does not appear to have advantages over ground corn as a supplemental feedstuff for lactating beef cows offered bermudagrass hay.

Key Words: hominy feed, forage intake, in situ disappearance

58 Evaluating hay waste and animal performance when fed supplemental liquid protein or dried distillers grains with aged low- to medium quality hay to late gestating beef cattle. R. S. Walker*[1], D. LaMay[1], J. R. Davis[2], and C. A. Bandyk[2], *[1]LSU AgCenter, Hill Farm Research Station, Homer, [2]Quality Liquid Feeds, Dodgeville, WI.*

Hay waste is costly to a beef producer and can be magnified when feeding warm vs. cool season hay, because of the lower nutritional quality typical of C4 grasses. This project evaluated hay waste and animal performance when providing a liquid protein supplement poured into aged low- to medium quality hay vs. feeding in a lick tank, or dried distillers grains plus solubles (DDGS). Supplement was fed for 77 d before calving with a diet consisting of low- to medium quality one- to 2- year old Bermuda grass hay (CP = 8.5%, TDN = 45.2%) fed at 2.5% of BW in round hay bale rings. Non–lactating pregnant Angus cross beef cows (n = 191) averaging 532 ± 161 kg BW, 6.5 ± 3 yr of age, and BCS of 4.7 ± 0.7 were allotted by age, BCS, and BW to one of 6 pastures with 3 supplement treatments: 1) QLF DFS 35 liquid protein provided in a lick tank free choice (TANK, projected daily intake of 0.91 kg/d), 2) QLF DFS 35 liquid protein poured into round bales at 10% of bale weight (POUR), or 3) DDGS fed in feed bunks daily at 1.25 kg/hd. The diet was formulated to be isonitrogenous. Hay DMI and percent bale DM waste was measured once weekly from 2 bales per group, 2 to 3 d after bales were weighed and fed. Bale DM waste was calculated as total DM wt of bale recovered from within and around the hay ring divided by DM wt of bale fed. Estimated DMI of bale was the difference between DM wt of bale and amount of bale recovered. Cow performance measures included ADG, and BW gain. Bale DM waste ($P = 0.6$; 23.9, 21, and 25%) and DMI of bale ($P = 0.5$; 8.9, 9.9, 9.7 kg) were similar between the DDGS, POUR, and TANK treatments, respectively. Cows supplemented with DDGS had greater ($P < 0.05$) ADG (0.24 ± 0.2 kg) and BW gain (16.7 ± 13.8 kg) compared with both the TANK (0.06 ± 0.3 kg and 4.1 ± 18.6 kg) and POUR (0.05 ± 0.3 kg and 3.5 ± 23.3 kg) groups, respectively. We conclude that there were no differences in bale waste or bale DMI when applying a liquid protein supplement into older, low- to medium quality hay; however, animal performance was improved with DDGS.

Key Words: hay waste, intake, beef cattle

59 Effects of ruminally undegradable protein supplement on performance and feed intake of beef heifers fed ryegrass baleage. J. D. Rivera*, L. W. Fitzgerald, M. L. Gipson, K. L. Odom, and R. A. Gipson, *MAFES South MS Branch Experiment Station, Poplarville, MS.*

Ryegrass baleage, if properly prepared, can be a high quality feedstuff; however, because of the high digestibility of CP in baleage, cattle may benefit from additional RUP. Therefore, 21 head of crossbred (primarily *Bos Taurus*) beef heifers (BW = 247.3 kg) were used in a completely random design to evaluate effect of protein supplementation on performance and intake while consuming ryegrass baleage (15.8% CP and 63.7% TDN). Heifers were allowed ad libitum access to ryegrass baleage and were individually-supplemented 3 times weekly with 0.80 kg of dried distillers grains with solubles (DDGS, CP = 29.4%); 0.61 kg of a mix of dried distillers grains with solubles and ruminally protected soybean meal (SBM, CP = 40.4%); or no supplement (CONT). Supplements were formulated to provide a similar quantity of RUP. Cattle were weighed on d 28, and 51. Following the weigh period on d 51, heifers were administered 10 g of chromic oxide for 10 d. After 5 d, daily fecal grab samples were collected at the same time daily, dried, composited, and analyzed for Cr, to calculate intake. Random grab samples were obtained of the baleage offered and analzyed for IVDMD. Supplement type did not affect BW at d 0, 28 or 51. However, there was a tendency ($P = 0.13$) for increased ADG on d 28 for cattle fed SBM compared with DDGS and CONT (0.27, 0.08 and 0.06 kg, respectively). Nonetheless, ADG from d 29 to 51 was greater ($P < 0.05$) for cattle fed DDGS compared with CONT and SBM (0.98, 0.44 and 0.58 kg, respectively). Overall ADG was greater ($P < 0.05$) for cattle fed either SBM or DDGS compared with CONT (0.40, 0.47 and 0.23 kg,

respectively) and no difference ($P = 0.39$) was detected between DDGS and SBM. Calculated supplement only feed conversion did not differ ($P = 0.39$) between supplement types. A tendency ($P = 0.15$) for decreased intake was noted for heifers supplemented with SBM, compared with other treatments. Cattle consuming ryegrass baleage may benefit from the addition of a RUP supplement.

Key Words: beef cattle, ryegrass baleage, undegradable protein

60 Effects of trace mineral injection 28 days before weaning on calf health, performance, and carcass characteristics. E. B. Kegley*[1], K. P. Coffey[1], J. T. Richeson[1], and D. S. Hubbell, III[2], *[1]Animal Science Department, University of Arkansas Division of Agriculture, Fayetteville, [2]Livestock and Forestry Research Station, Batesville.*

The effects of injecting a trace mineral product 28 d before weaning on growth performance, health, and carcass characteristics of beef calves were investigated to determine if it would be an effective addition to traditional loose dietary mineral supplementation. Crossbred calves (initial BW = 175 ± 3.9 kg; n = 34 steers and 39 heifers) were allocated randomly to receive no injectable trace mineral or an injection of a trace mineral solution containing 60 mg zinc, 15 mg copper, 10 mg manganese, and 5 mg selenium/mL at a rate of 1 mL/45.45 kg of BW. Calves were returned to their dams after treatment and grazed pastures containing a mixture of bermudagrass and fescue. Throughout the study, calves had free-choice access to a dietary mineral supplement containing trace minerals. After 28 d calves were removed from cows, placed in pastures that were adjacent to their dams′ pastures, offered corn gluten feed (0.9 kg/d), and had ad libitum access to hay. After a 43 d weaning period, cattle were moved to wheat pasture for 155 d. After grazing wheat, a portion of the heifers (n = 23) were removed, then steers and the remainder of the heifers were shipped to a feedlot and finished on a concentrate diet. Injection of trace mineral solution did not affect BW ($P \geq 0.73$), ADG ($P \geq 0.47$), or hair coat scores ($P = 0.44$) at any time point. Steers were allocated to 2 pens/treatment at the feedlot. Feedlot DMI was greater for steers that had received an injection of trace mineral solution ($P < 0.001$), resulting in a tendency ($P = 0.07$) for a reduced G:F for the 169 d in the feedlot. There were no differences in carcass measurements ($P \geq 0.11$) due to the injection of trace mineral solution. There was no benefit of using an injectable trace mineral 28-d before weaning in calves that were continuously supplemented with dietary trace minerals and were managed to minimize stress throughout their lifetime.

Key Words: beef cattle, injectable trace minerals

61 Effects of trace mineral-fortified, limit-fed supplements on performance of beef calves. P. Moriel* and J. D. Arthington, *University of Florida, Range Cattle Research and Education Center.*

The study evaluated the effects of limit-fed supplements, with or without trace mineral fortification, on performance of pre- and post-weaned beef calves. The study was conducted in the final 102 d before weaning (July). Treatments were randomly applied to 8 pastures containing 17 Brahman x British cow/calf pairs per pasture (BW = 450 ± 59 and 104 ± 5 kg for cows and calves, respectively) and consisted of a compressed cube fortified with trace minerals (Min+) or not (Min-), or no supplement (n = 3, 3, and 2 pastures, respectively). Cubes contained 37 and 78% CP and TDN, and 2,265 and 61, 648 and 15, 8.50 and 0.07, and 3,548 and 60 mg/kg of Zn, Cu, Se, and Mn for Min+ and Min-, respectively (DM basis). Cubes were offered 3 times/wk within cow exclusion areas and limited to 0.23 kg/d. Cow and calf BW and cow BCS were recorded on d 0 and 102. Calves provided Min- gradually increased their voluntary intake and reached the targeted intake of 0.23 kg/d on wk 9. Calves provided Min+ never reached the target intake, thus, overall average intake of creep feed was greater for Min- vs. Min+ (16.2 and 2.3 kg/calf for the 102 d period). Pre-weaned calf supplementation did not affect ($P > 0.25$) cow BW or BCS changes during the study. Limit-fed supplementation resulted in an average of 0.07 kg/d of added gain compared with non-supplemented calves. The cost of added gain (feed cost only) were $0.88 and 0.13/kg for Min- and Min+ calves, respectively. After weaning, 45 heifers (15/treatment) were transported for 1,600 km over a 24-h period, and then placed into feedlot pens (3 heifers/pen) and offered free-choice access to grain concentrate and ground hay. Liver concentrations of Cu and Fe on d 9 after weaning and transport were greater for Min+ than non-supplemented calves, Min- calves were intermediate. Treatment had no impact ($P > 0.25$) on voluntary DMI of grain and hay or heifer ADG. No treatment effects were detected ($P > 0.25$) on acute phase proteins. These results suggest that beef calves may experience efficient pre-weaning ADG when provided supplemental feed limited to a maximum daily intake of 0.23 kg.

Key Words: calves, creep feeding, trace minerals

62 Association between a lactate dehydrogenase gene mutation and horn fly infestation of beef cows. C. F. Rosenkrans, Jr.*[1], A. R. Mays[1], M. A. Brown[2], A. H. Brown, Jr.[1], and C. D. Steelman[1], *[1]University of Arkansas, Fayetteville, [2]USDA-ARS, El Reno, OK.*

Previously, we have demonstrated that external parasite load is a heritable trait for beef cattle. In addition, we have noted associations between lactate dehydrogenase activities and polymorphisms with cattle production traits. Our objective was to determine the relationship between lactate dehydrogenase-B (LDH-B) genotype and forage type on horn fly infestation of Angus (n = 21), Brahman (n = 15), and reciprocal cross (n = 30) cows. Within breed, cows were assigned to permanently graze either common bermudagrass (BG) or toxic endophyte-infected tall fescue (E+). Horn fly counts were determined on individual cows, while grazing, for 21 wks beginning in May and ending in October. Cows were genotyped at LDH-B single nucleotide polymorphism C669T using genomic DNA isolated from buffy coats. Base transition at C669T resulted in 3 observed genotypes (CC, CT, and TT). Data were analyzed using a mixed model that included fixed effects of cow genotype, forage type, and date of observation as repeated. Cow was defined as subject, and cow genotype within breed was random. Genotypes were associated ($P < 0.01$) with breed, the T allele was not observed in Angus. Main effects, 2-way interactions, and the 3-way interaction affected ($P < 0.01$) horn fly counts. Interaction of cow genotype, forage type, and date of observation did not reveal a consistent interpretation. Horn fly density was affected ($P < 0.001$) by an interaction between cow genotype and permanent forage assignment. Specifically, CC cows grazing BG had more flies than all other groups, CC cows grazing E+ and CT cows grazing BG were not different and had more flies than CT-E+, TT-BG, and TT-E+ which were not different from one another (266, 144, 134, 86, 67, 63 ± 13 flies/cow, respectively). Horn fly resistance to common insecticides has led to alternative pest control strategies. Our data suggest that cattle may be selected for parasite resistance and that resistance appears to be associated with LDH-B genotype and forage type. Additional research is required to link genetic and physiological mechanisms of horn fly resistance.

Key Words: SNP, external parasites, LDH

Tuesday, February 7, 2012

SYMPOSIA AND ORAL SESSIONS

Physiology

63 Effects of transportation duration on feeding behavior, watering behavior and feed efficiency of freshly-weaned Brahman x Hereford calves. A. N. Loyd*[1,5], R. R. Reuter[2], B. L. Bradbury[1,6], R. C. Vann[3], J. P. Banta[4], J. A. Carroll[5], T. H. Welsh, Jr.[1], and R. D. Randel[6], *[1]Texas AgriLife Research, College Station, TX, [2]The Samuel Roberts Noble Foundation, Ardmore, OK, [3]MAFES, Mississippi State University, Raymond, [4]Texas AgriLife Extension, Overton, TX, [5]Livestock Issues Research Unit, USDA-ARS, Lubbock, TX, [6]Texas AgriLife Research, Overton, TX.*

This experiment was conducted to determine the effects of long (25.5 h) versus short (5.5 h) duration transport on the feeding behavior, watering behavior and feed efficiency of Brahman x Hereford calves. Calves (8.5 ± 0.4 mo of age) from Overton, TX were blocked by sex (n = 18 steers; n = 14 heifers), BW, and temperament score and randomly assigned to a transportation treatment of long (L; n = 16) or short duration (S; n = 16). L calves were weighed, abruptly weaned and transported 12 h on a 7.3-m livestock trailer (300 kg/m^2 stocking density). L calves were unloaded and rested for 6 h before being transported again for 13.5 h. S calves were weighed, abruptly weaned and transported for 5.5 h on another 7.3-m livestock trailer (300 kg/m ^{2} stocking density). All calves were unloaded in Marietta, OK at the same time and weighed. Calves received ad libitum access to water and a high roughage diet offered in GrowSafe® bunks for 28 d to monitor feeding and watering behavior and for an additional 70 d to determine residual feed intake (RFI). L calves had greater shrink (5.3 vs. 3.0 ± 0.2%; $P < 0.0001$) than S calves due to transport. Although L calves tended to begin consuming feed quicker post-transport than S calves (0.08 and 0.32 ± 0.1 d; $P = 0.10$), there was no difference in the time it took calves to first attend the feed bunks or consume enough feed to meet estimated NE_m requirements ($P > 0.30$). Transportation duration did not affect ($P > 0.25$) the number of meal events, head down time, feed intake, watering behavior or ADG during the adaptation period. RFI did not differ ($P = 0.84$) due to transportation duration. These results suggest that while long duration transportation increased BW shrink, post-transport feeding behavior, performance and feed efficiency were not compromised relative to calves transported for a much shorter duration.

Key Words: cattle, feeding behavior, transport stress

64 Effects of long versus short duration transportation on body composition of Brahman x Hereford calves. A. N. Loyd*1,5, R. R. Reuter[2], R. C. Vann[3], J. P. Banta[4], J. A. Carroll[5], T. H. Welsh, Jr.[1], and R. D. Randel[6], *[1]Texas AgriLife Research, College Station, TX, [2]The Samuel Roberts Noble Foundation, Ardmore, OK, [3]MAFES, Mississippi State University, Raymond, [4]Texas AgriLife Extension, Overton, TX, [5]Livestock Issues Research Unit, USDA-ARS, Lubbock, TX, [6]Texas AgriLife Research, Overton, TX.*

This study was designed to determine the effects of transport duration on body composition of Brahman x Hereford calves. Calves (8.5 ± 0.4 mo of age) from Overton, TX were blocked by sex (n = 18 steers; n = 14 heifers), BW, and temperament score and were randomly assigned to a transportation treatment of long (L; 25.5 h; n = 16) or short duration (S; 5.5 h; n = 16). L calves were abruptly weaned and transported for 12 h on a livestock trailer (300 kg/m^2 stocking density). L calves were unloaded and rested for 6 h before being transported again for 13.5 h. S calves were abruptly weaned and transported for 5.5 h on another livestock trailer (300 kg/m^2 stocking density). All calves were unloaded in Marietta, OK at the same time. Calves received ad libitum access to water and a high roughage diet offered in GrowSafe® bunks for 98 d. Calves were weighed and sonogrammed immediately before transport, immediately after transport, and 28 and 98 d post-transport. Heifers had more ($P < 0.0001$) rib fat (RIB; 0.53 vs. 0.34 ± 0.06 cm) and rump fat (RUMP; 0.86 vs. 0.63 ± 0.06 cm) than steers at all time points, and heifers tended ($P < 0.08$) to gain RIB at a faster rate than steers. There was no effect ($P > 0.10$) of transport duration on longissimus muscle area per kg BW (LMA/BW), percent intramuscular fat (IMF), RIB or RUMP. However, transportation did induce changes ($P < 0.006$) in body composition as LMA/BW increased (0.17 vs. 0.20 ± 0.005 cm^2/kg BW) and IMF decreased (2.87 vs. 2.54 ± 0.16%) from pre- to post-transport. LMA/BW at 28 d post-transport (0.17 ± 0.005 cm^2/kg BW) was similar ($P = 0.60$) to pre-transport; however, IMF was less ($P < 0.0001$) at d 28 post-transport (2.42 ± 0.16%) than pre-transport. Day 98 IMF (3.28 ± 0.16%) exceeded ($P < 0.0001$) pre-transport IMF. Results from this study suggest that calves may mobilize IMF for use as an energy source during transportation. Since IMF may be diminished for up to 28 d post-transport, this could ultimately impact the carcass quality of cattle transported to harvest.

Key Words: cattle, body composition, transportation

65 Use of unique semen collection device improves conception rates of bovine. K. Graves-Evenson*[1], J. Weathers[3], L. Penrose[2], D. Johnson[2], R. Kauffman[1], and S. Prien[2], *[1]Texas Tech University Health Sciences Center, Amarillo, [2]Texas Tech Health Sciences Center, Lubbock, [3]Southeast Missouri State University, Cape Girardeau.*

Previous research from this laboratory using canine and equine models demonstrated that semen collected in a modified collection device, the Device for Improved Semen Collection (DISC), remained fertile for longer periods as compared with samples collected using standard techniques. The objective of the present study was to perform controlled breeding trials involving cattle comparing semen collected in the DISC to a traditional control (TC). Proven sires were collected in both the DISC and the TC. Following collection, all semen samples were processed using standard techniques designed to produce breeding doses consistent with industry standards. Analyses were conducted for volume, concentration, motility, and forward progression. A subsample was taken from each collection and preserved for subsequent testing of cells to determine acrosome reaction. Proven breeding females were synchronized using the 2-shot prostaglandin protocol and were continuously

observed by the HeatWatch Estrus Detection System. Animals were randomly assigned at onset of estrus and bred 12 ± 6 h after onset of estrus. Combined conception rates for the 43 animals bred were 74.4% [32/43] and combined pregnancy rates followed a similar pattern, 67.4% [29/43] of animals maintaining pregnancy to parturition. Females that were bred with DISC collected semen conceived at a rate of 86% [19/22], females bred with TC semen conceived at a rate of 62% [13/21], P = 0.06. Mean acrosome reaction rates were approximately 35% for the TC and 52% for the DISC, $P < 0.012$. Pregnancy rates were 22% higher in animals inseminated with the DISC 73% [16/22] compared with the traditional collection device 57% [12/21], $P = 0.22$. Research using the DISC in the bovine proved to have overall better semen parameters and higher conception rates and potentially pregnancy rates when compared with the TC. Use of the DISC for collection of bovine can prove to be beneficial for producers.

Key Words: beef cattle, artificial insemination, semen collection

66 Relationship between horn fly infestation and polymorphisms in the cytochrome P450 gene in beef cows. A. R. Mays*[1], M. A. Brown[2], A. H. Brown, Jr.[1], C. D. Steelman[1], and C. F. Rosenkrans, Jr.[1], *[1]University of Arkansas, Fayetteville, [2]USDA-ARS, Grazinglands Research Laboratory, El Reno, OK.*

Use of insecticides to control horn flies has led to parasite resistance and management problems for cattle producers. Genetic selection for horn fly resistant cattle may be a more sustainable method in managing horn flies. Our objectives were to determine associations among cytochrome P450 3A28 (CYP3A28) single nucleotide polymorphisms (SNP) and forage type on horn fly infestation of beef cows. Purebred Angus (PA; n = 15), purebred Brahman (PB; n = 12), and reciprocal cross (RC; n = 22) were permanently assigned to graze either common bermudagrass (BG) or endophyte-infected tall fescue (E+). Number of horn flies was counted on each cow for 21 wks beginning in May and ending in October. Genomic DNA was purified, and a specific sequence within the coding sequence of CYP3A28 was amplified using polymerase chain reaction. Amplicons were purified, sequenced and cows genotyped at transversion SNP site C994G. All 3 genotypes (homozygous cytosine (CC) and guanine (GG) and heterozygous (CG)) were observed in this population. Cows genotyped CC had fewer ($P < 0.06$) horn flies than GC (100 ± 18 vs. 168 ± 17), while horn fly numbers were similar among CC and GG (100 ± 18 vs. 138 ± 26) and GC and GG (168 ± 17 vs. 138 ± 26). Week affected ($P < 0.0001$) horn fly numbers, with the greatest number of horn flies occurring in August. Cows grazing E+ had fewer ($P < 0.08$) horn flies than cows grazing BG (112 ± 18 vs. 158 ± 15). A genotype x week ($P < 0.0001$) and forage x week interaction ($P < 0.0001$) occurred. The GC and GG cows grazing E+ had fewer horn flies than GC and GG cows grazing BR (104 ± 7 vs. 214 ± 13 and 113 ± 13 vs. 158 ± 20; $P < 0.07$), with little evidence of forage differences for CC cows. Cattle with different cytochrome P450 genotypes appear to have varying levels of horn fly resistance. Coupling of genetic selection for profitability traits and health (i.e., horn fly resistance) may be achievable using molecular technologies. However, further research is needed to verify our findings in a larger sample and to determine the physiological mechanism(s) of our described associations.

Key Words: cytochrome P450, fescue, horn flies

67 Influence of heat stress on the immune response of Angus and Romosinuano heifers to an LPS challenge. N. C. Burdick*[1], R. Chaffin[2], J. A. Carroll[1], C. C. Chase, Jr.[3], S. W. Coleman[3], and D. E. Spiers[2], *[1]USDA-ARS Livestock Issues Research Unit, Lubbock, TX, [2]University of Missouri, Division of Animal Science, Columbia, [3]USDA-ARS Sub-Tropical Research Station, Brooksville, FL.*

The difference in the response of a heat tolerant and a heat sensitive breed to lipopolysaccharide (LPS) when housed at different air temperatures (T_a) was studied. Angus (AG; n = 11; 306 ± 26 kg BW) and Romosinuano (RO; n = 10; 313 ± 32 kg BW) heifers were transported from Florida to Missouri. Heifers were housed in stanchions in 4 temperature-controlled environmental chambers. Initially, T_a in 4 chambers was cycling at thermoneutrality (TN; 18.5 to 23.5°C) for a 1-wk adjustment period, followed by an increase in 2 chambers to cycling heat stress (HS; 24 to 38°C) for 2 wk. On d 19, heifers were fitted with jugular catheters and rectal temperature (RT) recording devices. On d 20, heifers were challenged with LPS (0.5 μ g/kg BW; 0 h) and blood samples were collected from −2 to 8 h and at 24 h relative to LPS challenge. Serum was isolated and stored at −80°C until analysis for cortisol and cytokine concentrations. Sickness behavior scores (SBS) were also measured. The AG heifers displayed greater RT than RO heifers when housed at either TN or HS temperatures ($P < 0.01$), and produced a greater febrile response to LPS ($P < 0.01$). In response to LPS, SBS tended to be greater in AG than RO when heifers were housed at TN ($P = 0.06$). However, RO produced a greater SBS compared with AG heifers when housed at HS ($P < 0.01$). The cortisol response to LPS was greater in TN than HS heifers ($P < 0.01$) and were also greater in RO than AG heifers ($P = 0.03$). There was a breed by T_a interaction ($P < 0.01$) for tumor necrosis factor-α (TNFα) concentration such that TNFα was greater in RO heifers at TN, yet AG heifers had greater TNFα at HS. There was a tendency for a breed by T_a interaction for interleukin 6 (IL6) concentrations ($P < 0.06$) such that RO heifers produced greater IL6 at HS. There was a breed by T_a interaction for interferon gamma (IFNγ; $P < 0.01$) concentration such that IFNγ was greater in AG heifers at TN. These data demonstrate differences in the acute phase response between heat tolerant and heat sensitive breeds under different T_a which may aid in elucidating differences in productivity, disease resistance, and longevity among cattle breeds.

Key Words: cattle, heat stress, LPS

68 Heat stress decreases the metabolic response of Angus but not Romosinuano heifers to an LPS challenge. N. C. Burdick*[1], R. Chaffin[2], J. A. Carroll[1], C. C. Chase, Jr.[3], S. W. Coleman[3], and D. E. Spiers[2], *[1]USDA-ARS Livestock Issues Research Unit, Lubbock, TX, [2]University of Missouri, Division of Animal Sciences, Columbia, [3]USDA-ARS Sub-Tropical Agricultural Research Station, Brooksville, FL.*

While the innate immune and stress axis responses have been assessed following a lipopolysaccharide (LPS) challenge in cattle, the role of metabolism in mediating energy requirements during the acute phase response (APR) has not been sufficiently studied. Therefore, this study examined differential metabolic responses between heat tolerant and heat sensitive Bos taurus breeds to LPS when housed at different air temperatures (T_a). Angus (AG; n = 11; 306 ± 26 kg BW) and Romosinuano (RO; n = 10; 313 ± 32 kg BW) heifers were housed in stanchions in 4 temperature-controlled chambers. Initially, T_a in all 4 chambers was cycling at thermoneutrality (TN; 18.5 to 23.5 C) for a 1-wk adjustment period, followed by an increase in 2 chambers to cycling heat stress (HS; 24 to 38 C) for 2 wk. On d 19, heifers were fitted with jugular catheters. On d 20, heifers were challenged with LPS (0.5 μg/kg BW; 0 h) and blood samples were collected from −2 to 8 h and at 24 h relative to LPS challenge. Serum was analyzed for glucose, insulin, and nonesterified

fatty acid (NEFA) concentrations. Pre-LPS glucose concentrations were greater in RO ($P = 0.01$) heifers and greater in heifers housed in TN ($P = 0.02$). Post-LPS glucose initially increased before decreasing below baseline concentrations ($P < 0.01$) in all heifers. Post-LPS, AG heifers in HS had lesser glucose (breed*T_a $P < 0.01$) compared with heifers at TN. Pre-LPS NEFA concentrations were not affected by breed ($P = 0.37$) or T_a ($P = 0.60$). Post-LPS NEFA concentration was not affected by T_a ($P = 0.78$), but there tended to be a breed x T_a interaction ($P = 0.07$) such that NEFA was greater in RO than AG at HS ($P = 0.01$), while NEFA concentration in heifers at TN did not differ from each other ($P = 0.89$) or from heifers at HS ($P > 0.12$). Pre-LPS insulin concentration was greater in RO than AG ($P < 0.01$). Post-LPS insulin increased ($P < 0.01$), with RO producing a greater insulin response than AG ($P < 0.01$). These data suggest that HS decreases the metabolic response of AG heifers in response to LPS challenge, thus providing physiological evidence that may explain differences observed in the APR between heat sensitive and heat tolerant cattle breeds.

Key Words: cattle, heat stress, metabolism

69 Live yeast and citrus pulp supplementation reduces the presence of rectal salmonella without impairing performance in young pigs. N. C. Burdick*[1], J. A. Carroll[1], T. R. Callaway[2], E. Chevaux[3], and D. Rosener[3], *[1]USDA-ARS Livestock Issues Research Unit, Lubbock, TX, [2]USDA-ARS Food and Feed Safety Research Unit, College Station, TX, [3]Lallemand Specialties Inc., Milwaukee, WI.*

The effect of supplementing the diets of young pigs with live yeast (LY) and/or citrus pulp (CP) on growth performance and the presence of Salmonella in various tissues following a dual lipopolysaccharide (LPS) and Salmonella challenge was evaluated. Forty barrows (26 ± 0.2 d of age; 7.8 ± 0.2 kg BW), housed in individual stanchions (1.2 × 0.6 m) with ad libitum access to feed and water, were assigned to 1 of 4 treatments (n = 10/trt): 1) Control (C), fed a commercial starter diet; 2) LY, fed a commercial diet supplemented with LY ($4.4x10^9$ cfu/kg of *S. cerevisiae boulardii* CNCM I-1079); 3) CP, fed a commercial diet supplemented with CP (5% as fed); and 4) LY and CP (LYCP), fed a commercial diet supplemented with LY ($4.4x10^9$ cfu/kg) and CP (5% as fed). On d13, i.p. temperature (T_{IP}) loggers were inserted into all pigs. On d 20, pigs were administered LPS (25 µ g/kg BW) i.v. at 0 h, and then orally dosed with Salmonella typhimurium (10^6 cfu/pig) at 3 h. On d 24, pigs were humanely euthanized for the collection of intestinal contents and lymph tissue. Pigs and feeders were weighed on d 0, 6, 13, 19, and 24. Pre-challenge ADG was greater ($P < 0.01$) in C and CP compared with LY and LYCP pigs. Pre-challenge feed intake was greater ($P = 0.01$) in C, LY and LYCP, while F:G was lower ($P = 0.04$) in CP pigs. However, post-challenge feed intake was greater ($P < 0.01$) in the C and LY pigs. Pre-challenge, LY, CP and LYCP had lower T_{IP} than C ($P < 0.01$). An LPS-induced increase in T_{IP} occurred within 1 h ($P < 0.01$) post-LPS. Salmonella also induced an increase in T_{IP} at approximately 60 h. Post-challenge T_{IP} was lowest in LY and CP ($P < 0.01$), with no difference between C and LYCP ($P = 0.44$). There was no treatment effect on Salmonella counts in ileum ($P = 0.11$) and cecum ($P = 0.23$) contents collected 99 h post-challenge. However, Salmonella counts were lower in the rectum of LY and CP pigs ($P < 0.01$) and were lower in the lymph of LY pigs ($P < 0.01$) compared with C pigs. These data suggest that feeding LY or CP can reduce rectal Salmonella content and the febrile response of young pigs to a dual LPS and Salmonella challenge without negatively affecting pig performance.

Key Words: pig, salmonella, yeast

70 *In vitro* fertility of cryo-preserved spermatozoa from boars fed diets supplemented with selenium. M. J. Estienne*[1] and B. D. Whitaker[2], *[1]Virginia Tech, Blacksburg, [2]University of Findlay, Findlay, OH.*

We have reported positive effects of an organic source of selenium (Sel-Plex; Alltech, Inc.; Nicholasville, KY) on sperm characteristics in boars and that dietary supplementation with Sel-Plex enhances fertility of semen stored for 9 d at 18°C (Speight et al., 2012). The objective here was to evaluate the in vitro fertilizing capability of cryo-preserved semen collected from boars fed diets supplemented with Sel-Plex or inorganic selenium (sodium selenite; Premium Selenium 270; North American Nutrition Co., Inc., Lewisburg, OH). At weaning and through the end of the experiment, boars were fed one of 3 dietary treatments: I. basal diets that contained no supplemental selenium (n = 4), II. basal diets supplemented with 0.3 ppm selenium from Sel-Plex (n = 4), and III. basal diets supplemented with 0.3 ppm selenium from sodium selenite (n = 7). At 1.5 yr of age, semen was collected and diluted with Modena Extender (Swine Genetics International, Cambridge, IA) at a rate of 1.5 times the volume of the collected semen. Extended semen was shipped overnight to Swine Genetics International and the day after collection was frozen using commercial procedures, stored in liquid nitrogen for 8 mo, and then thawed and used for in vitro fertilization (IVF) procedures (Whitaker and Knight, 2004). At 12 h post-IVF, there were no effects ($P > 0.4$) of dietary treatment on the percentages of oocytes penetrated, polyspermic penetration, or male pronucleus formation. The percentage of embryos cleaved by 48 h post-IVF, however, was greater ($P < 0.01$) for Sel-Plex fed boars (32.5%) compared with sodium selenite-fed boars (23.1%) or controls (22.1%). The percentage of embryos that progressed to the blastocyst stage of development by 144 h post-IVF was greater ($P < 0.01$) for Sel-Plex (21.3%) and sodium selenite-fed (18.3%) boars compared with controls (10%). These results suggest that dietary supplementation of boar diets with selenium has a beneficial effect on early embryonic development after IVF by sperm cells exposed to the freeze/thaw process.

Key Words: boar, spermatozoa, selenium

71 Single nucleotide polymorphisms of the FSHβ gene and effects on semen quality. A. J. Davis*[1], D. L. Kreider[1], C. F. Rosenkrans[1], J. G. Powell[1], R. W. Rorie[1], M. L. Looper[1], M. P. Rowe[1], C. L. Williams[1], R. J. Page[1], T. D. Lester[1], and J. B. Woolley[2], *[1]Dept. of Animal Science, University of Arkansas, Fayetteville, [2]USDA-ARS, Booneville, AR.*

The objective of this study was to characterize polymorphisms (SNP) in the promoter region of the bovine FSHβ gene; examine breed differences in SNP; and determine effects of SNP on semen quality. DNA samples were collected from 5 Angus (ANG), 13 Balancer (BAL), and 16 Brahman influenced (BI) bulls. Polymorphisms identified by sequencing of 3 sequential PCR products from the promoter region revealed 17 SNP (169, 170, 171, 225, 353, 410, 411, 412, 485, 643, 783, 887, 1130, 1369, 1376, 1494, 1702) and 4 insertion/deletions (INDEL; 413–414, 1063–1064, 1256–1257, 1703–1704) compared with the published sequence. Chi-squared indicated breed differences in frequency of occurrence of SNP at 169, 170, 171, 225, 353, 410, 411, 412, 413–414 and INDEL, 485, 783, and 1702 ($P \leq 0.014$). In separate studies, semen collections were obtained for the BI bulls (monthly, June – Aug) and BAL and ANG bulls (weekly, July – Sept.). Computer assisted sperm analysis (CASA) or stained smears were used to determine % motile (MOT), progressive (PROG), rapid (RAP), and live (LIVE) sperm; path velocity (VAP) progressive velocity (VSL) and track speed (VCL); lateral amplitude

(ALH); beat frequency (BCF); % straightness (STR) and linearity (LIN); minor:major axes of all sperm heads (ELONG); avg size of sperm heads (AREA); & % major (MAJAB), minor (MINAB), & total abnormalities (TOTAB). The MIXED procedure for ANG and BAL indicated effects of week on BCF, ELONG, AREA, LIVE, & MINAB ($P \leq 0.05$); SNP 485 on MOT, PROG, RAP, VAP, VSL, VCL, ALH, BCF, AREA, & LIVE ($P \leq 0.03$); and SNP 1130 on VCL, ALH, STR, & LIN ($P \leq 0.05$). For BI there were effects of month on LIN ($P \leq 0.05$); SNP 783 on MINAB and TOTAB ($P \leq 0.03$); SNP 1702 on MINAB and TOTAB ($P \leq 0.05$); and SNP 1130 on VCL ($P \leq 0.05$). Data from this study indicate breed differences on SNP in the FSHβ gene promoter, and that SNP may be useful as markers related to semen quality.

Key Words: FSH beta subunit gene, single nucleotide polymorphism, bulls

72 Does altering the timing of insemination with gender sorted bovine semen affect pregnancy rates? J. D. Rhinehart*[1], L. H. Anderson[2], F. N. Schrick[1], A. Fisher[1], A. M. Arnett[3], R. Burris[2], and M. DeJarnette[3], *[1]The University of Tennessee, [2]University of Kentucky, [3]Select Sires Inc.*

Cryopreserved bovine sperm that have been sorted by flow cytometry to significantly shift gender ratio yield lower conception rates than conventionally-packaged frozen semen. Anecdotal indications suggest that insemination later, relative to the first signs of behavioral estrus, improve pregnancy rate to gender-sorted semen. Pertinent literature indicates that sperm head surface proteins are stripped and the acrosomal cap is damaged during flow cytometry such that the sorted sperm resemble the capacitated state. These damaged sperm would likely have a shorter window of post-thaw viability relative to conventional semen. Therefore, the hypothesis that insemination with gender sorted semen closer to the time of ovulation increases pregnancy rate was tested. To test that hypothesis, nulliparous (n = 55), primiparous (n = 26) and multiparous (n = 186) females were synchronized for timed insemination with conventionally frozen semen (C) or gender sorted semen at 56h (GS), 68 h (GS12) or 80 h (GS24) post prostaglandin injection and CIDR removal. Pregnancy was determined via transrectal ultrasonography between 30 d - 40 d post insemination. Pregnancy rate did not differ among treatments C (52%; 37/71), GS (42%; 27/65), GS12 (46%; 31/67) and GS24 (39%; 25/64). For C, pregnancy rate tended to differ ($P = 0.11$) among sires. However, these sires were not evenly distributed across gender sorted treatments and an interaction was not tested. Other trials with gender sorted semen have reported wide variation in fertility among sires. While pregnancy rate was not statistically improved by delaying the timing of insemination with gender sorted semen, relative to normal time breeding protocol for conventional semen, these data suggest that further investigation is warranted. However, the economic viability of gender sorted semen should be analyzed relative to the overall shift in sex ratio and decreased fertility.

Key Words: gender sorted semen, beef cattle, artificial insemination

Extension I

73 Assessment of beef cattle extension publication use via Internet download monitoring. B. M. Bourg*, J. A. Parish, and R. Noffsinger, *Mississippi State University, Mississippi State.*

In recent years, beef producers have increased computer usage, and many have turned to the Internet as a source of information for beef cattle operations. The Mississippi State University Extension Service (MSU-ES) provides many educational materials electronically on its msucares.com Web site. On the Beef Extension Publications page, 124 beef cattle publications are accessible, ranging in topics from reproduction to end product. From January 1, 2010 to September 1, 2011 there were 7,145,511 total PDF downloads from the msucares.com Web site. Of the beef publications, the "Beef Cattle Facilities: Building and Construction Plans" was downloaded 141,095 times and was the second most popular download on the msucares.com Web site. The Spanish Language version of the Mississippi Beef Quality Assurance manual was a popular publication with 2,699 views. This indicates that there is an increasing need for Spanish language translations of Extension publications. The Beef Cattle index page had 18,604 pageviews, with users spending an average of 0102 min on the page. Considering only beef cattle-related publications, the most popular download was "The Estrous Cycle of Cattle" with 12,347 views followed by "Body Condition Scoring of Beef Cattle" (12, 302 views). The remainder of the top 5 most downloaded beef publications were "Beef Cattle Calving Management" (9,451 views), "Understanding the Ruminant Digestive System" (8,727 views), and "Mississippi Beef Cattle Producer Guide to Coping with Drought Conditions" (6,946 views). Topic areas for the 10 most popular beef cattle publications were reproduction (40%), nutrition (20%), forage (20%), management (10%), and disaster recovery and preparation (10%). The most viewed publications typically dealt with basic production topics. For example, the most viewed reproduction topics were understanding the estrous cycle, estrus detection, and estrus synchronization. Internet download monitoring offers Extension specialists a better understanding of the topics of interest to producers and provides insights for further publication and training opportunities.

Key Words: extension, beef cattle, internet use

74 Electronic delivery of a regional beef cattle genetics learn at lunch extension program. J. A. Parish*[1], T. Smith[1], B. M. Bourg[1], S. Hankins[1], S. M. Fulgham[1], W. S. Belvin[1], L. A. Kriese-Anderson[2], and M. F. Elmore[2], *[1]Mississippi State University, Mississippi State, [2]Auburn University, Auburn, AL.*

The Mississippi State University Extension Service and Alabama Cooperative Extension System continued a history of collaborative programming for beef cattle producers by offering a Beef Cattle Genetics Learn at Lunch Program in 2011. This effort was sponsored by the Beef Cattle Improvement Associations in Mississippi and Alabama. The objective of this program was to provide producer education and Extension agent in-service training on beef cattle breeding and genetics topics. The program consisted of 8 1-h sessions on the following topics: records for genetic improvement, computerized record keeping, genetic selection tools, improving female genetics, bull buying decisions, stocker cattle genetics, industry trends and lessons, and new genetic tools. Instructors were animal science faculty from 7 states with expertise in each subject area. The course was offered as a live, interactive broadcast at beginning at 1200 h on Tuesdays and Thursday in September over Scopia Desktop

and Polycom systems. Participants were able to ask questions and engage in discussions with the presenters using these personal computer- and interactive video system-interfaces. The sessions were also streamed live over the Internet and archived online for later viewing. The live broadcasts averaged 17 viewing sites per session. In addition, some of these viewing sites hosted multiple participants. The archived sessions averaged 40 views per week during September 2011. Views of archived sessions typically peaked 2 to 4 d after each live broadcast. Time of day for views of archived sessions ranged from 0120 to 1752 h and included early morning, midday, and late night views. These results indicate that educational program participation can be increased by offering programs over electronic media such that participants can access these programs at their leisure. This format also provided an economically efficient means to utilize presenters from outside of Mississippi and Alabama and to offer programming that limited travel and time requirements of participants. Continued tracking of archived session views will follow to further assess program reach.

Key Words: genetic improvement, beef cattle, extension

75 Reaching a connected audience by posting conference video recordings to the internet. S. Gadberry*[1], B. Barham[1], T. Troxel[1], J. Jennings[1], P. Beck[2], and J. Powell[3], *[1]University of Arkansas, Cooperative Extension Service, Little Rock, AR, [2]University of Arkansas, Southwest Research and Extension Center, Hope, [3]University of Arkansas, Department of Animal Science, Fayetteville.*

The internet provides an opportunity to educate producers using non-traditional methods. Beginning November, 2009, video recordings of conference presentations were posted to the internet. The objective of this study was to summarize the usage report data for the University of Arkansas, Animal Science Vimeo page, http://vimeo.com/user2572116, from its creation through September, 2011. Summary statistics include page loads, embeds, plays, and finishes. Summary statistics are grouped into total views, url embeds, countries, and activity by video. Sixty-four videos, all but 1 pertaining to beef cattle production, were posted. Total video loads were 21,044. Sixty-four percent were loaded from Vimeo and 36% were embedded video loads. Plays were 15 ± 8% (mean ± SD) of loads and finishes were 25 ± 15% of plays. The percentage of finishes was greater than the percentage of loads ($P < 0.01$), as determined by generalized linear model (GLM) with a binomial response distribution. The mean monthly play count was 915 ± 858, and monthly loads increased 79.4/mo since creation ($P < 0.01$), as determined by the linear regression slope coefficient with no intercept. Videos were embedded at 26 different sites. Facebook had the greatest percentage plays (71.4%); whereas, http://www.arbeef.org had the greatest loads (3,406). Videos were loaded from 91 recognized countries. The US represented 80% of loads; however, Turkey had the greatest play percentage (73%) for countries with 10 or greater loads. Video activity was categorized into forages (23.5%), economics (20.3%), 300 d grazing (12.5%), selection (10.9%), nutrition (9.4%), herd health (7.8%), meat product (7.8%), and other (7.8%). The number of loads tended to differ among category ($P = 0.11$) with selection topics having the greatest loads, based on GLM with a poisson response distribution. The percentage plays differed among video categories ($P < 0.01$). Posting videos of conferences to the internet provides an opportunity to increase the number of people reached and because live conferences are single events, the number reached through video posting may ultimately exceed the count attending the live conference.

Key Words: extension, internet, video

76 Impact of phenotypic characteristics on selling price of Texas feeder cattle. M. Beverly*, S. Kelley, K. Stutts, and B. Freel, *Sam Houston State University, Huntsville, TX.*

This study was conducted to evaluate the impact of phenotypic characteristics on selling price of feeder calves in Texas livestock markets. Data were collected at 9 livestock auctions throughout Texas on 15,371 lots of cattle consisting of 95,932 head. The data were collected by trained livestock market reporters and included subjective identification of breed, color, USDA frame and muscle scores, and selling price. An ANOVA was performed using SPSS. Calf characteristics were analyzed individually as dependent variables in which the model included BW as a covariate. Least squares means were generated for each variable and separated based on predicted differences. All selling prices are reported in US dollars per 45.45 kg of BW. Eight breed types were analyzed. British breed types had the highest ($P < 0.01$) mean selling price ($135.56) with cattle that were 1/2 American ($131.03) and Continental breed types ($130.69) having the second highest selling prices. Dairy influenced ($87.40) calves had the lowest ($P < 0.01$) mean selling price. Eleven color categories were analyzed. Black baldy calves ($140.24) had the highest ($P < 0.01$) mean selling price followed by solid black ($137.67) and yellow ($132.47) calves. Spotted ($104.37) calves had the lowest ($P < 0.01$) mean selling price of all color categories. Differences ($P < 0.01$) existed in mean selling price among all frame scores. Mean selling price for large-, medium-, and small-framed calves were $136.32, $129.61, $119.55, respectively. Mean selling price also differed ($P < 0.01$) for muscle scores 1, 2, 3, and 4 ($137.64, $130.41, $129.48, and $122.64, respectively). These data indicate that producers can influence the selling price of their calves through proper breed selection, and genetic selection within breeds to meet market demand.

Key Words: feeder cattle, livestock auction, selling price

77 Management practices on selling price of Texas feeder cattle. K. Stutts*, M. Beverly, S. Kelley, and B. Freel, *Sam Houston State University, Huntsville, TX.*

This study was conducted to evaluate the impact of management characteristics on selling price of feeder calves in Texas livestock markets. Data were collected at 9 Texas livestock auctions on 15,371 lots of cattle consisting of 95,932 head. The data were collected by trained livestock market reporters and included gender, horn status, body condition, lot size, uniformity of the lot, and selling price. An ANOVA was performed using SPSS. Calf characteristics were analyzed individually as dependent variables in a model that included BW as a covariate. Least squares means were generated for each variable and separated based on predicted differences. All selling prices are reported in US dollars per 45.45 kg of BW. Mean selling price for steers ($136.90) was $5.36 greater ($P < 0.01$) than bulls ($131.54) and $10.25 greater than heifers ($126.65). The mean selling price of horned ($114.88) calves was $19.03 less ($P < 0.01$) than polled ($133.91) calves. Differences in mean selling price existed among body condition categories as well. Calves that were classified as very thin ($143.56) had the highest ($P < 0.01$) mean selling price. Calves classified as thin ($141.56) or average condition ($131.03) had a higher ($P < 0.01$) mean selling price than calves classified as fleshy ($120.68) or fat ($118.73). Lot size also influenced mean selling price. Calves sold in lot sizes of 6 or more ($134.51) had a higher ($P < 0.03$) mean selling price than calves sold individually ($118.10) or in lot sizes of 2 to 5 ($131.69) calves. Lots that were uniform ($133.12) had a higher ($P < 0.01$) mean selling price than lots that lacked uniformity ($126.53). Beef cattle producers can greatly influence the selling price of their calves through modification of their "on ranch" management

practices such as castration, monitoring body condition, and selling calves in larger, more uniform groups.

Key Words: feeder cattle, livestock auction, selling price

78 Health characteristics and their impact on selling price of Texas feeder cattle. S. Kelley*, K. Stutts, M. Beverly, and B. Freel, Sam Houston State University, Huntsville, T*X*.

This study was conducted to evaluate the impact of various health characteristics on selling price of feeder calves in Texas livestock markets. Data were collected at 9 Texas livestock auctions on 15,371 lots consisting of 95,932 head. The data were collected by trained livestock market reporters and included body condition, fill, health status, and selling price. An ANOVA was performed using SPSS. Calf characteristics were analyzed individually as dependent variables in which the model included BW as a covariate. Least squares means were generated for each variable and separated based on predicted differences. All selling prices are reported in US dollars per 45.45 kg of BW. Differences ($P <$ 0.01) in mean selling price existed among all fill categories with gaunt, average, and full calves selling for $142.68, $131.49, and $126.22, respectively. Producers, on average, received $16.46 more for gaunt calves than for calves that were full when marketed. Body condition also had a significant impact on mean selling price. Calves classified as very thin ($143.56) had the highest ($P < 0.01$) mean selling price. Calves classified as thin ($141.56) had a higher ($P < 0.01$) mean selling price than calves in average ($131.03) condition, and calves in average condition had a higher ($P < 0.01$) mean selling price than calves classified as fleshy ($120.68) or fat ($118.73). Calves that appeared healthy ($133.04) received $48.22 more than calves that appeared sick ($84.82). Along with management and breeding decisions, producers can improve the selling price of their calves by properly managing body condition, fill, and visual appearance of health status.

Key Words: feeder cattle, livestock auction, selling price

79 The effect of livestock auction barn size and phenotypic traits on sale price of calves in Oklahoma. D. O. Alkire*[1], J. A. Robinette[2], and R. R. Reuter[1], *[1]The Samuel Roberts Noble Foundation, Ardmore, OK, [2]University of Arkansas, Fayetteville.*

Many beef cattle producers in Oklahoma market their calves through livestock auction barns and seek to maximize the price they receive. Quantifying potential premiums would be useful in making marketing and management decisions. Data were collected from 4 Oklahoma livestock auction barns in June and July of 2010 to determine factors affecting sale price. Auction barns in Oklahoma were categorized as large, greater than 1000 head per week, or small, less than 1000 head marketed per week. Two barns were randomly selected from each group. Data were collected on 1001 lots consisting of 13,350 calves. Data included: price, weight, hide color, sex, lot size, sale order, presence of horns, presence of Brahman influence and if comments were made by the auctioneer. All prices are reported in US dollars per 45.45 kg. Calves sold at the large barns received a premium of $2.21 ($P <$ 0.01). Heifers and bulls were discounted $7.53 and $9.18 respectively, when compared with steers ($P < 0.01$). Black and smoky colored calves received a premium of $4.15 and $4.42 respectively, when compared with calves with a red hide ($P < 0.01$). Sale lots devoid of calves with horns received a premium of $3.10 compared with lots that contained at least one horned animal ($P < 0.01$). Premiums were paid for larger lots of cattle but the premium decreased as lot size increased (quadratic, $P < 0.01$). In addition, any comment by the auctioneer resulted in a $3.20 increase in price paid ($P < 0.01$). Sale order did not affect sale price ($P = 0.18$). Additionally, lots with visible Brahman influence were not discounted significantly ($P = 0.20$). Brahman influence was defined as at least one animal in the lot with any visible Brahman influence. The effect of weight on sale price was quadratic ($P < 0.01$) with heavier calves receiving a lower price. This study shows that livestock auction barn size and management decisions that affect cattle phenotype can greatly impact sale price.

Key Words: premiums, livestock auction

80 Historical assessment of distance between bull buyer addresses and sale sites in the southeast USA. M. L. Marks*[1], J. A. Parish[1], B. M. Bourg[1], L. A. Kriese-Anderson[2], M. F. Elmore[2], and J. P. Cassady[3], *[1]Mississippi State University, Mississippi State, [2]Auburn University, Auburn, AL, [3]North Carolina State University, Raleigh.*

Limited data are currently available regarding distance bull buyers travel to purchase bulls. The objectives of this study were to assess the distance bull buyers traveled to purchase bulls at beef cattle improvement association (BCIA) multi-breed consignment and bull evaluation center sales throughout the Southeast USA. Distance between bull buyer address and sale site (n = 4682) were recorded from 4 different bull sales. Sales were Mississippi BCIA (1969 to 2011; MBCIA), Hinds Community College Bull Test (1983 to 2011; HCC), North Alabama Bull Evaluation Center (1995 to 2010; NALBEC), and North Carolina Piedmont Bull Test (1974 to 1999; NCPBT). The Means Procedure in SAS was used to determine descriptive statistics. Observations were grouped into decades as follows: 1969 to 1979 (SEV), 1980 to 1989 (EIG), 1990 to 1999 (NIN), and 2000 to 2011 (TTH). The mean distance bull buyers traveled to all sales was 129.9 (114.7) km, and the range was 0 to 2403 km. Mean buyer travel distances by sale were: MBCIA, 143.8 km; NALBEC, 127.7 km; NCPBT, 122.5 km; and HCC, 72.9 km. Distance between bull buyer address and sale site by time period were: HCC 58.1, 71.7, and 86.8 km (EIG, NIN, and TTH, respectively); MBCIA 157.7, 149.9, 132.0 km, and 122.8 km (SEV, EIG, NIN, and TTH, respectively); NALBEC 122.3 and 130.8 km (NIN and TTH, respectively); and NCPBT 116.5, 138.5, and 106.1 km (SEV, EIG, and NIN, respectively). Trends in bull buyer distance from sale site over time were dependent on individual sale. Different sales attracted bull buyers from varying distances, which may have been related to differing sale reputations and promotional efforts. This information can be used by sale management and consignors in planning promotional efforts to expand customer base.

Key Words: bull buyer, buyer distance, extension

81 Effect of anthelmintic formulations on FECR and ADG of stocker steers. R. R. Reuter* and R. S. Wells, *The Samuel Roberts Noble Foundation, Inc., Ardmore, OK.*

Cross-bred stocker cattle (n = 497; 205 ± 24 kg) were purchased from 7 sale barns in Oklahoma and north-central Texas to evaluate the effect of popular anthelmintic ingredients and formulations on 14-d fecal egg count reduction (FECR) and 42-d ADG. Cattle were purchased and delivered to the research location over the course of 5 d in February 2011, and vaccinated and castrated as needed the day following delivery. From delivery to the initiation of the trial (range of 3 to 7 d), calves were commingled in a non-experimental area and offered free choice rye hay in round bales. To obtain fecal samples, steers were individually weighed and a fecal sample was collected from the rectum on d 0, 14, and 42. To measure ADG, steers were weighed following a 16-h shrink

without feed or water on d 1 and 43. On d 0, steers were randomly sorted into 50-steer groups and groups were randomly assigned to one of 10, 3.5-ha bermudagrass pens, which were essentially devoid of grazeable forage. On d 1, the anthelmintic treatments [1) control – no anthelmintic, 2) Safeguard, 3) Ivomec®, 4) Noromectin® 1%, and 5) Noromectin Pour-On] were randomly assigned to steer groups and products were applied to steers according to label directions. During the study, steer groups were offered rye hay in round bales ad libitum and 2.3 kg/steer/d of a commercial receiving pellet containing decoquinate. Following sampling, fecal samples were stored on ice and shipped to a blinded commercial laboratory where eggs were counted. To calculate FECR for each pen, the difference in mean egg counts on d 14 and d 1 was divided by mean egg count on d 1. Results were evaluated by ANOVA with pen as the experimental unit and a fixed effect of treatment. Day 0 fecal egg counts (100 ± 73 eggs/gram) were not different among treatments ($P = 0.48$). The 14-d FECR of the treatments (in the order listed above) was −12%, 99%, 40%, 40%, and 40% (F-test on means: ($P = 0.01$). Safeguard reduced fecal egg counts by 99%, while the other treatment's FECRs were not different from zero ($P > 0.27$). There was no effect of anthelmintic on 42-d ADG ($P = 0.40$) or FECR ($P = 0.90$).

Key Words: anthelmintic, stocker cattle, egg count

Pastures and Forages

82 Additive effects of implants and ionophores on performance of growing steers grazing wheat pasture. P. Beck*[1], T. Hess[2], D. Hubbell[2], B. Fieser[3], and D. Hufstedler[4], *[1]University of Arkansas SWREC, Hope, [2]University of Arkansas LFRS, Batesville, [3]ADM Alliance Nutrition, Stillwater, OK, [4]Elanco Animal Health Beef Cattle - Stocker District, Guthrie, OK.*

This research was designed to evaluate the effect of Rumensin supplementation via mineral or pressed protein block with or without growth promoting implants on performance of steers grazing wheat (*Triticum aestivum*) pasture in Arkansas. One hundred 80 preconditioned steers (BW = 236 ± 5.4 kg) grazed 15 wheat fields (1.6 ha) in the fall (n = 60 steers, stocking rate of 2.5 steers/ha) and 30 wheat fields (0.8 ha) in the spring (n = 120 steers, stocking rate of 4.9 steers/ha). Steers in each pasture were given free-choice access to non-medicated mineral (Control, MoorMan's WeatherMaster Range Minerals A 646AAA, ADM Alliance Nutrition, Inc., Quincy, IL), or were supplemented with monensin via mineral containing 1,620 g monensin/ton (RMin, MoorMan's Grower Mineral RU-1620 590AR, ADM Alliance Nutrition, Inc.), or protein block containing 300 g monensin/ton (RBlock, MoorMan's Mintrate Blonde Block RU, ADM Alliance Nutrition, Inc.). Each mineral supplementation treatment was replicated in 5 pastures in the fall and 10 pastures in the spring. Additionally, one-half of steers in each pasture were implanted with Component TE-G with Tylan (Ivy Animal Health, Inc., Overland Park, KS). Animal performance data were analyzed as a randomized complete block design with a split-plot; season was the block, supplementation treatment was the whole plot, and implant was the split plot. Pasture was considered the experimental unit of the whole plot and steer the experimental unit of the split plot. There were no significant mineral treatment by implant interactions ($P \geq 0.69$) indicating the responses to monensin and growth promoting implants were additive. Overall, monensin increased ($P \leq 0.05$) final BW by 8.6 kg, total gain by 9 kg, and ADG by 0.09 kg/day over non-medicated Control, but there was no difference ($P \geq 0.39$) between RMIN and RBlock. Implanting steers increased ($P \leq 0.03$), final BW by 8.6 kg, total gain by 10.4 kg, and ADG by 0.13 kg/day over non-implanted steers. Steers that received both an implant and monensin gained 0.23 kg more per day and 20 kg more overall than steers that did not receive monensin and were not implanted.

Key Words: implants, ionophores, stocker cattle

83 Evaluation of early weaned calves grazing annual ryegrass or annual ryegrass-triticale mixtures in South Florida. R. D. Speckmann*[1], J. M. B. Vendramini[1], J. D. Arthington[1], A. R. Blount[2], and A. D. Aguiar[1], *[1]University of Florida, Range Cattle Research and Education Center, Ona, [2]University of Florida, North Florida Research and Education Center, Marianna.*

Blending triticale (*Triticosecale* sp.) with annual ryegrass (*Lolium multiflorum* Lam.) may improve forage production and performance of early weaned beef calves in South Florida. An experiment conducted in Ona, FL from January to May 2011 evaluated forage characteristics and performance of beef calves (~90 d age) grazing annual ryegrass-triticale mixture (RT) or annual ryegrass (RG). Treatments (RG or RT) were distributed in a completely randomized design with 4 replicates. Pastures were broadcast-seeded with 17 kg/ha of Jumbo RG with or without 100 kg/ha of Trical 2700 triticale on 19 November 2010. Four calves (*Bos* sp.; 2 heifers and 2 steers; Initial BW = 196.5 ± 52.5 kg) grazed 0.3 ha pastures in a fixed and continuous stocking rate. Calves were supplemented daily with concentrate (14% CP and 78% TDN) at 1% BW during the experimental period. Forage was evaluated every 14 d for herbage mass (HM) and nutritive value. Botanical composition and calf body weight were recorded every 28 d. Data were analyzed using the GLIMMIX procedure of SAS, with the main effects of treatment, month, and their interaction. Herbage mass was similar for RG and RT (1676 and 1840 kg/ha, respectively; $P = 0.46$). There was a month effect on HM; RG and RT had greater HM in February than April (1884 and 1557, respectively; $P = 0.04$). A greater proportion of the mixture was triticale in February (79%) than March or April (52 and 51%, respectively; $P = 0.0001$). The RG had greater CP (21.7%) and IVOMD (81.9%) than RT (18.3% and 78.5%, respectively; $P < 0.0001$). Crude protein was greater in April (18.6%) than March or February (16.6 ± 0.3%; $P < 0.0001$), and IVOMD was greater in February (83.3%) than March or April (76.0 ± 0.7%; $P < 0.0001$). Despite these differences, calf ADG (0.88 ± 0.04 kg/d; $P = 0.36$) and gain per hectare (1307 ± 55 kg/ha; $P = 0.35$) were similar among treatments.

Key Words: annual ryegrass, early weaned calves, triticale

84 Breed and winter nutrition effects on diet digestibility and intake of cows grazing bahiagrass pastures. S. W. Coleman*, C. C. Chase, Jr., M. J. Williams, D. G. Riley, and E. J. Bowers, *USDA ARS Subtropical Agricultural Research Station, Brooksville, FL.*

Winter feed comprises one of the largest costs for cattle production. This study was initiated to evaluate 2 winter nutrition programs for cows grazing bahiagrass (*Paspalum notatum*) pastures in central Florida. Purebred Angus, Brahman, or Romosinuano cows (30/breed), aged 3 to 13 yrs, were assigned to one of 2 nutrition regimens. Treatments (WT) began after weaning, continued for 2 years, and were replicated (R)over the 3 farms located at STARS. Treatments were: WT1) perennial peanut (*Arachis glabrata*)/bahiagrass hay fed *ad libitum* from first frost and supplemented with heavy blackstrap molasses at 2.2 kg/hd/day from weaning until end of breeding; and WT2) bahiagrass hay supplemented with urea-fortified molasses (16% protein equivalent) at 2.2 kg/hd/d from weaning until Jan 15 and then 4.5kg/hd/d of 50% heavy blackstrap molasses and soybean hulls until end of breeding (approximately on June 15). At monthly intervals fecal samples were collected from each cow, dried, ground and scanned for NIR reflectance using a NIRsystems 6500 spectrophotometer. Diet digestibility and DMI were predicted using calibrations developed from feces of other cows grazing the same pastures at various seasons over 6 subsequent years. Digestibility and DMI data were analyzed with Proc Mixed of SAS. The statistical model included fixed effects of year (Y), cow breed (BR), cowage, WT, month (M) and R. Cow was a repeated observation over months(year). Two-(WTxR; and WTxM) and 3-way (YxMxBR and BRxMxR)interactions were significant ($P < 0.05$) for digestibility and WT x R, YxWTxM, and BRxMxR were significant ($P < 0.001$)for DMI. Differences in diet digestibility were quite subtle with no consistent patterns. Intake was very high for the WT2 group during the supplementation period, possibly biased by the high level of supplement. Diet digestibility peaked in April and declined through the summer as expected. The data suggest that diet digestibility and intake predicted from NIR spectra of feces can be used to detect seasonal herbage patterns and diet differences, and may also be sensitive enough to detect breed differences.

Key Words: cow-calf, diet digestibility, intake

85 Overseeding cool season legumes into Bermudagrass pastures: Impact on winter forage yield and quality over two growing seasons. S. R. Freeman*, M. H. Poore, H. M. Glennon, and A. D. Shaeffer, *North Carolina State University, Raleigh.*

Winter grazing where Bermudagrass is the primary forage presents challenges. Dormant pastures can be supplemented by sod-seeding cool season legumes (Leg). This practice may also add N to the soil by fixation while capturing residual soil nutrients. Our objectives were to measure legume yield, estimate nutrient uptake, and observe impact on subsequent grass growth. Arrowleaf clover, cv. Yuchi (Y, 2009 and 2010) and Apache (A; 2010, only); Crimson clover, cv. Dixie (C); Austrian winter pea, (W); and hairy vetch, cv. AU Merit (V) were seeded into randomly assigned strips in Bermudagrass sod during mid-October in a split plot design with 4 replicates per year. One strip in each plot received no legume to serve as a control (X). Plots were subdivided into 3 grazing sequences (S1–3) and one S grazed every 2 weeks after S1 reached about 20 cm height. Following Leg senescence, hay was harvested. Three cuttings of hay were made in 2010 and 2 in 2011. Measurements to determine DM yield were made at each S and forage samples analyzed to determine quality. Statistical models with year, S, Leg, and their interactions were analyzed with Proc Mixed (SAS, Cary, NC). Yield was similar among Leg and greater for Leg than X plots (3730, 3797, 3711, 3601, and 1255 kg/ha for C, W, V, Y, and X, respectively; $P < 0.01$). Nutrient capture peaked at S2 with N yield of 107.6 kg/ha and P yield of 12.5 kg/ha. Similar N capture was found in C, W, and V. Forage removed from Y captured less N than W and V; however, all Leg had more than X (113, 139, 152, 105, and 29 kg/ha for C, W, V, Y, and X, respectively; $P < 0.01$). Legumes captured similar quantities of P at S2 and more than X (13.2, 14.6, 16.4, 13.1, and 5.4 kg/ha for C, W, V, Y, and X, respectively; $P = 0.01$). Cultivar A did not differ from Y ($P > 0.10$). Seeding Leg into Bermudagrass resulted in increased forage DM yield (2750 kg/ha over control) and improved soil nutrient capture (98 and 9 kg/ha more than control for N and P, respectively).

Key Words: bermudagrass, cool season legumes, sod-seeding

86 Evaluation of three bermudagrass varieties for grazing and hay production. G. Scaglia*[1], J. Rodriguez[1], and H. T. Boland[2], *[1]Louisiana State University Agricultural Center, Iberia Research Station, Jeanerette, LA, USA, [2]Mississppi State University, Prairie Unit, Prairie.*

The objective was to evaluate 'Jiggs', 'Alicia', and 'Tifton 85' bermudagrass (*Cynodon dactylon* (L.) Pers.) for stocker and hay production under rotational stocking. Spring weaned steers (n = 36, BW = 252 ± 8.9 kg) were allotted in a completely randomized design to 6–3.1 ha pastures (n = 2 pastures/bermudagrass variety, stocking rate 1.9 steers/ha). Fertilization rate was 243 kg/ha of urea on d 0 and each time round bales hay (408 kg) were harvested. Herbage mass was estimated and nutritive value samples were taken on d 0 and every 28 d thereafter. Performance data were analyzed using GLM with year, treatment and their interaction in the model while forage data also included sampling day. There were year ($P = 0.03$) and bermudgrass variety ($P < 0.001$) effects on ADG. Steers grazing 'Jiggs' and 'Tifton 85' gained more (0.47 and 0.45 kg/d, respectively) than of those grazing 'Alicia' (0.31 kg/d). In year 2, steers gained 0.44 vs. 0.39 kg/d in year 1. There was a quadratic effect ($P = 0.03$) of sampling day on forage mass which was greatest on d 56 (4,365 kg/ha). There was a year and sampling day effect on CP and a year effect on ADF and NDF ($P < 0.05$). Crude protein and ADF were smaller and NDF greater in year 1 (8.9, 34.4, and 66.7%, respectively) compared with year 2 (11.1, 41.7, and 70.6%, respectively). Crude protein was greater on d 28 (12.8%) compared with the rest of the sampling dates except on d 0 (10.8%) of the grazing period. There was a quadratic effect ($P = 0.03$) on CP concentration with d 56 being the lowest (7.8%). Lignin concentration was greater ($P = 0.02$) in 'Alicia' (6.0%) compared with 'Tifton 85' (5.0%) and 'Jiggs' was intermediate (5.2%). There was an effect of year ($P = 0.001$) and bermudagrass variety ($P = 0.04$) on bale production. 'Jiggs' produced an average of 15.9 bales/ha which was similar to 'Tifton 85' (14.9 bales/ha) but different from 'Alicia' (14.1 bales/ha). Under the conditions of the present experiment, managing bermudagrass for grazing and hay production assuming a cost of $118/ha (includes all costs except land, management, overhead and risk), is a profitable management strategy for producers in south Louisiana.

Key Words: bermudagrass, grazing, hay

87 Steer performance and nitrogen use efficiency in stocker production systems utilizing warm-season perennial grass pasture. B. D. Wallis*, P. A. Lancaster, E. D. Sharman, D. B. Arnall, J. G. Warren, T. E. Ochsner, S.R. Lancaster, and G. W. Horn, *Oklahoma Agricultural Experiment Station, Stillwater.*

In grazing systems only 5–30% of ingested nitrogen (N) is retained in BW gain of growing beef cattle. The objective of this study was to evaluate effect of N fertilizer and source of N for growing beef cattle on N use efficiency of stocker cattle grazing systems using warm-season perennial grass pastures. Mixed-breed steers (n = 233; 238 ± 23 kg) grazed Plains Old World bluestem (*Bothriochloa ischemum* L. Keng)

pastures (3 pastures/system) in a randomized complete block design comparing 4 summer grazing systems: (1) non-fertilized, low stocked (336 kg of BW/ha) pastures (CONT); (2) N fertilized (90 kg N/ha), high stocked (672 kg of BW/ha) pastures (NFERT); (3) N and phosphorus (P) fertilized (39 kg P/ha), high stocked pastures (NPFERT); and (4) non-fertilized, high stocked pastures plus supplementation of dried distillers grains with solubles (DDGS; 0.75% BW•hd^{-1}•d^{-1}). Steers continuously grazed the pastures for only 63 d from May 17 to July 19, 2011 due to drought and lack of forage. Gain per hectare (kg/ha) was greater for NPFERT and DDGS than for CONT and NFERT (Table 1). N recovery (%; N retained in BW gain/total N inputs) was greatest for CONT due to low N inputs. However, replacing N fertilizer with DDGS supplementation improved N recovery by 24.9 and 23.9 percentage units compared with NFERT and NPFERT, respectively. These data indicate that DDGS can be effectively used to replace N fertilizer in stocker cattle grazing systems to increase stocking rate, increase BW gain/ha, and increase N use efficiency of the production system.

Table 1. Cattle performance and nitrogen use efficiency

Item	CONT	NFERT	NPFERT	DDGS	SEM
Gain, kg/steer	69[a]	67[a]	80[b]	86[b]	2.23
Gain, kg/ha	40[a]	76[b]	91[c]	97[c]	2.13
N inputs[1], kg/ha	5.6[a]	95.2[b]	95.2[b]	21.4[c]	0.08
N retention[2], kg/ha	2.7[a]	5.1[b]	6.0[c]	6.5[c]	0.14
N recovery, %	48.3[a]	5.4[b]	6.4[b]	30.3[c]	0.56

[1]Includes atmospheric N deposition from http://nadp.sws.uiuc.edu.
[2]Calculated as N in BW gain using NRC (1996) equations. .
[abc]Means within a row without a common superscript letter differ (P < 0.05).

Key Words: dried distillers grains, N use efficiency, stocker cattle

88 Economics of utilizing clover in tall fescue pastures for stocker cattle. P. Beck*[1], M. Haque[2], J. Biermacher[2], T. Hess[3], and D. Hubbell[3], *[1]University of Arkansas SWREC, Hope, [2]Noble Foundation, Ardmore, OK, [3]University of Arkansas LFRS, Batesville.*

Addition of non-toxic forages to complement toxic endophyte (TE) infected tall fescue (*Festuca arundinacea Schreb.*) has long been suggested as a way to dilute toxins and reduce the impacts toxic fescue has on performance of stocker cattle. This research was conducted to determine the effects of clover additions to both TE and non-toxic endophyte infected (NE) tall fescue on animal performance and net returns of a stocker cattle enterprise. Over 4-yr, toxic endophyte infected tall fescue (TE, cv. Kentucky-31) was compared with the non-toxic endophyte tall fescue cultivars Jessup MaxQ (MQ, Pennington Seed, Madison, GA) and Texoma MaxQII (MQII, Pennington Seed) either with 67 kg actual N/ha applied in fall and spring or grown in combination with white clover (WC, *Trifolium repens*, cv. RegalGraze, CalWest Seeds). Each tall fescue and clover treatment combination was replicated in 3 pastures (0.8-ha). Each fall pastures were stocked with 3.7 steers/ha (228 ± 13.6 kg). In the spring, pastures were initially stocked according to forage accumulation so that steers (228 ± 9.1 kg) had forage allowance of approximately 1.0 to 1.5 kg DM/kg BW. Enterprise budgeting was used to compute net returns for each tall fescue forage system. Data were analyzed using mixed procedure of SAS as a 3 × 2 factorial. In the fall, ADG was not affected ($P = 0.73$) by WC, but NE gained 0.20 kg more ($P \leq 0.01$) daily than TE. In the spring WC increased ($P < 0.01$) ADG by 0.17 kg for both TE and NE. Also, ADG of NE were increased ($P < 0.01$) by 0.60 kg compared with TE across clover treatment in the spring. Total BW gain per ha was reduced ($P < 0.01$) by 65 kg/ha in WC pastures for all cultivars. Total BW gain/ha was greater ($P < 0.01$) for NE than TE, and MQII tended ($P = 0.09$) to be greater MQ. Net returns were greater ($P < 0.01$) for TE with WC than TE with N and were greater ($P < 0.01$) for NE than TE. Clover additions to tall fescue pastures improved ADG equally regardless if cultivar was TE or NE. Even though total production and gross revenue were reduced by WC replacement of N fertilizer, net returns were improved due to reduced costs.

Key Words: clover, economics, tall fescue

Small Ruminant Production

89 The identification of testosterone-regulated genes in the goat testis. O. Bolden-Tiller*, A. Knox, A. Reyes, L. Clark, C. Collins, and C. Wright, *Tuskegee University, Tuskegee Institute, AL.*

To create an industry that will meet the increasing demand for chevon, new technologies must be developed and adopted to increase the economic value and impact of goats. Traditionally, improvement of livestock has been achieved through conventional methods; however, genetic improvements from these practices are usually slow. Biotechnological innovations now permit rapid propagation of superior genes and offer the opportunity to design animals that fit market demands and better accommodate environmental challenges. Further, rapid methods for generating these superior animals, such as germ cell transplantation, have been developed. However, the procedure remains inefficient, but can be enhanced by understanding the molecular mechanisms of spermatogenesis. Testosterone (T) has long been associated with this process; recent reports in rodents have identified several T-regulated genes, many of which have not been previously characterized in the testis. The objective of the current study was to characterize mRNA expression and determine a possible role of 4 testicular T-regulated genes, NKX-3, MYC, STAT-3, IL-6. A review of ontology analysis revealed that each gene was involved in processes associated with spermatogenesis. Total RNA from neonatal, pre-pubertal, and post-pubertal goat testes was extracted and reverse transcribed into cDNA, which was amplified by using PCR and visualized by agarose gel electrophoresis. Amplicons of the expected sizes were present for each gene. In conclusion, NKX-3, MYC, STAT-3, IL-6 were present in the goat testis and associated with pathways involved in processes pertinent to spermatogenesis, such as cell proliferation and cell migration, suggesting that the elucidation of the mechanisms resulting from T action on the testis may be beneficial in enhancing and developing methods, such as germ cell transplantation, used for genetic improvement.

Key Words: germ cell transplantation, testis, testosterone

90 Productivity of Polypay, White Dorper and White Dorper x Polypay ewes bred to Hampshire rams in a pasture-based production system. D. K. Aaron*, D. G. Ely, M. E. Hoar, E. Fink, and B. T. Burden, *University of Kentucky, Lexington.*

During a 3-wk breeding season (Nov 15 - Dec 6, 2010), Polypay (PP; n = 10), White Dorper (WD; n = 10) and 1/2 White Dorper x 1/2 Polypay (WD x PP; n = 10) ewes were exposed to Hampshire rams (H; n = 2) to evaluate production of lambs by ewes in a terminal crossbreeding system. At the same time, 22 PP ewes were exposed to PP rams (n = 2) and 18 WD ewes were exposed to WD rams (n = 2) for comparison. Lambs were born in April, 2011; any lambs in excess of 2 were removed from ewes and artificially reared. Ewes and their remaining lambs were managed as a single flock on pasture, until lambs were weaned at 60 d. Ewes received a daily supplement of 0.45 kg shelled corn/hd and lambs had access to a corn-based creep. Pregnancy rate was 100% in each breeding group [H x PP, H x WD, H x (WD x PP), PP x PP, WD x WD]. Lambing rates were 2.1, 1.6, 1.9, 2.4 and 1.7, respectively. WD ewes produced the fewest ($P < 0.05$) lambs. At 30 d postpartum, mean litter weights were similar for PP (32.7 kg) and WD x PP (30.4 kg) ewes bred to H rams; WD ewes with H-sired lambs were less productive (26.6 kg; $P < 0.05$). Among ewes rearing H-sired lambs, mean litter weight at weaning was heaviest for PP (57.8 kg) and WD x PP (52.6 kg) followed by lower-producing WD (46.7 kg; $P < 0.05$). PP ewes rearing purebred lambs weaned 48.2 kg, which was comparable to PP and WD x PP ewes bred to H rams. In contrast, WD ewes rearing purebred lambs were the least productive (36 kg; $P < 05$). Mean body weights of WD ewes were lighter ($P < 0.05$) at 30 d and weaning than PP or WD x PP ewes. Ewe body condition scores were similar at 30 d, but PP and WD x PP ewes had higher condition scores ($P < 0.05$) than WD ewes at weaning. Indicators of internal parasites (FAMACHA, packed cell volume and fecal egg count) were similar for all ewes. Lamb production of PP, WD and F-1 cross ewes can be increased by using H rams. Lower production of smaller WD ewes may be offset by their natural shedding, which eliminates the need for shearing.

Key Words: ewes, polypay, White Dorper

91 Carcass characteristics of pasture vs. pen-fed goats. S. Schoenian*[1], J. Semler[2], D. Gordon[3], M. B. Bennett[4], and D. J. O'Brien[5], *[1]University of Maryland, Keedysville, MD, [2]University of Maryland, Boonsboro, [3]University of Maryland, Derwood, [4]West Virginia University, Martinsburg, [5]Delaware State University, Dover.*

Eighteen buck kids, of various breed types, were used in a study to compare the carcass characteristics of pasture- vs. pen-fed goats. Consigners to the 2011 Western Maryland Pasture-Based meat Goat Performance Test provided goats of similar genetics for comparison. The [TEST] goats (n = 9) consumed a pasture-only diet and were rotationally-grazed among 6 2-acre paddocks, composed of various cool and warm season grasses. The [PEN] goats (n = 9) were housed in zero-grazing pen (4.9m2), given unlimited access to grass hay, and hand-fed grain (ADM Goat Power) the amount they could eat in 20 min, once daily. Over the duration of the feeding period, grain consumption averaged 0.45 kg per day. After 112 d of consuming their respective diets, the goats were weighed and transported (60 km) to a custom-exempt slaughterhouse (Country Foods, Waynesboro, PA) for same day slaughter. The carcasses were deboned and measured 6 d later. Live weights did not differ between the 2 groups (27.4 ± 1.2 kg), but the PEN goats had heavier ($P < 0.05$) cold carcass weights (12.3 ± 1.3 vs. 9.4 ± 0.5 kg) and tended ($P < 0.07$) to have heavier hot carcass weights. Dressing percentage was higher ($P < 0.02$) for the PEN goats than the TEST goats (44.4 ± 1.6 vs. 39.4 ± 1.2%). The carcasses of the PEN goats were fatter, as evidenced by thicker ($P < 0.04$) body wall (0.62 ± 0.09 vs. 0.41 ± 0.04 cm), a higher ($P < 0.001$) percentage of kidney and heart fat (2.6 ± 0.03 vs. 1.5 ± 0.01%), and a higher ($P < 0.001$) percentage of overall carcass fat (4.3 ± 0.26 vs. 2.1 ± 0.08%). The differences in percent lean and rib eye area were not significant, but the PEN goats yielded a higher ($P < 0.02$) percentage of lean meat than the TEST goats (24.5 ± 1.5 vs. 19.8 ± 0.01%). While these data show that pen-feeding can improve carcass yield, the economics of pen-feeding will vary by operation.

Key Words: carcass, goat, meat

92 Effect of season and by-pass fat supplementation on milk composition of hair sheep ewes lambing in spring and fall. S. Wildeus*[1] and S. S. Zeng[2], *[1]Virginia State University, Petersburg, [2]Langston University, Langston, OK.*

Barbados Blackbelly and St. Croix ewes have been managed in an 8-mo accelerated mating system at our research farm (37°N) for several years. In this experiment we evaluated if rumen by-pass fat supplementation would affect the milk composition of ewes following fall and spring lambing. Ewes were joined for 30 d in 3 single-sire mating groups per breed in March and again in November, and were managed as one group during pregnancy, and lambed unassisted on pasture. As ewes lambed they were allocated, blocked by breed, to be supplemented at 1.5% BW with cracked corn and soybean meal (16% CP) with or without rumen by-pass fat (Megalac-R; 150 g/d per ewe). Within 7 d after lambing ewes were transferred randomly together with their lamb(s) to 1 of 6 experimental 0.4 ha pastures (3 pastures/treatment). Ewes were fed supplement as a group on pasture, and provided additional grass hay as forage availability warranted. Milk samples were collected from ewes 7–8 weeks postpartum by stripping teats after lambs had been separated for 3 h. Samples were collected from 84 ewes following spring and 93 ewes following fall lambing. Milk composition was determined by an automated infrared milk analyzer, and analyzed for the effect of diet, season, breed, and number of lambs nursing. Rumen by-pass fat supplementation had no effect on milk fat, but reduced ($P < 0.001$) protein (4.97 vs. 4.64%), lactose (5.23 vs. 4.98%), and solids-not-fat (SNF; 11.09 vs. 10.50%). Season affected milk fat, protein, and SNF, which were higher ($P < 0.001$) in fall than in spring. Differences between season in protein and SNF were more pronounced in control than by-pass fat-supplemented ewes (diet x season interaction; $P < 0.05$). There was no effect of breed on milk composition, but lactose was higher ($P < 0.01$) in ewes nursing single compared with twin lambs. Rumen by-pass supplementation surprisingly affected the protein, rather than the fat component of milk in this study, which may be related to total milk production that was not evaluated here.

Key Words: by-pass fat, hair sheep, milk composition

93 Efficacy of pumpkin seed oil in controlling internal parasites in Katahdin lambs. K. K. Matthews*[1], D. J. O'Brien[1], N. C. Whitley[2], J. E. Miller[3], J. M. Burke[4], and R. A. Barczewski[1], *[1]Delaware State University, Dover, [2]North Carolina A&T State University, Greensboro, [3]Louisiana State University, Baton Rouge, [4]USDA, ARS, Dale Bumpers Small Farms Research Center, Booneville, AR.*

Twenty-six Katahdin lambs (mixed sex), approximately 8–10 mo of age and 30 Â ± 1.1 kg were used to determine the effect of a pumpkin seed oil drench on BW, packed cell volume (PCV) and fecal egg counts (FEC). All lambs were dewormed with moxidectin (0.2mg/kg) and levamisole (6mg/kg). Following a 21 d dewormer withdrawal period, lambs were artificially inoculated twice with a 2 mL larval inoculation containing 750 L3 H. contortus. When FEC were ≥200 eggs per gram (epg), lambs were placed into individual 1.2 mx1.2 m pens on solid concrete floors and randomly assigned to treatments of water (CON; n = 10), 2.0 mL/kg BW pumpkin seed oil once every week (PUM1; n =

9), or 2.0 mL/kg BW pumpkin seed oil divided equally over 3 doses in one week (PUM2; n = 7). All treatment groups received a 16% CP meat lamb feed fed at approximately 3% of their BW daily. BW, blood and fecal samples were collected weekly for 28 d. Blood PCV were measured using microhematocrit tube centrifugation and FEC were determined using the Modified McMaster′s technique with a sensitivity of 50 epg. Data for FEC were log-transformed for analysis but actual means ± SEM are reported. Lamb BW were influenced by day, increasing over time such that d 21 (35.4 ± 1.1 kg) and d 28 BW (36.3 ± 1.1 kg) were greater ($P < 0.01$) than d 0 BW (30 ± 1.1 kg). Lamb FEC were not influenced by treatment (d 0; 1637 ± 337, 1672 ± 356, and 1898 ± 403: d 7; 668 ± 337, 997 ± 356, and 410 ± 403: d 14; 180 ± 337, 753 ± 356, and 68 ± 403: d 21; 63 ± 337, 367 ± 356, and 61 ± 403: d 28; 38 ± 337, 144 ± 356, and 43 ± 403 epg for CON, PUM1 and PUM2, respectively. Lamb FEC were influenced by day with d 0 FEC (1736 ± 212 epg) being the highest ($P < 0.02$; 692 ± 212, 333 ± 212, 163 ± 212, and 75 ± 212 epg, for d 7, 14, 21, and 28, respectively). Lamb PCV was not influenced by treatment, day or treatment x day and averaged 31.6 ± 0.3%. In conclusion, pumpkin seed oil was not effective in controlling internal parasites in Katahdin lambs.

Key Words: Katahdin lambs, parasites, pumpkin seed

94 Potential of copper sulfate to cause toxicity when used as an anthelmintic for sheep. M. M. Simpson, M. E. Hoar*, D. K. Aaron, E. Fink, B. T. Burden, and D. G. Ely, *University of Kentucky, Lexington.*

Eighty-four Hampshire ewes were blocked by age and balanced for fecal egg count (FEC) 7 d before the study (d-7). Initial FAMACHA scores (1 to 5) were recorded and blood serum hematocrits (packed cell volume; PCV) were determined at the same time. Forty-two ewes were assigned to each of 2 treatments: nondrenched (ND) or orally drenched (D) with $CuSO_4$ to determine if any toxic effects were evidenced by elevated levels of blood serum aspartate aminotransferase (AST), alanine aminotranferase (ALT), or creatine kinase (CK). A 10 mL sample of jugular blood was collected from all ewes at 0 h on d 0. The D ewes were drenched with 100 mL of a 1% solution of $CuSO_4$ immediately after the 0 h bleeding. Jugular blood serum was subsequently collected from all ewes at 2, 4, 8, and 12 h post drenching on d 0. After the 12 h collection, all ewes received 0.91 kg grass hay/hd (group fed) and remained in confinement overnight until a 24-h post drenching blood sample was collected on d 1. Other blood samples were obtained at 48, 72, 96 and 120 h, as well as 12 d, after initial collection. Ewes returned to grass pasture following each bleeding. Blood samples were centrifuged at 1000 RPM for 10 min at 22°C and immediately frozen until analyzed for AST, ALT and CK. FAMACHA scores, PCV and FEC were also evaluated 12 d post drenching. No differences were found between ND and D ewes for FAMACHA scores on d-7 (2.4 vs. 2.3) or d 12 (2.7 vs. 2.6). PCV were not different between ND and D on d-7 (34 vs. 34) or d 12 (31 vs. 31). Log FEC values were not different between ND and D ewes on d-7 (2.2 vs. 2.2), but ND ewes had a higher log FEC ($P < 0.01$) than D ewes on d 12 (2.8 vs. 2.5). AST, ALT and CK values were not different between ND and D ewes at any collection time. Furthermore, all values for AST, ALT and CK were within normal published ranges indicating $CuSO_4$ drench was not toxic, but was effective in maintaining lower FEC levels. These results indicate that $CuSO_4$ can be used as an effective anthelmintic without causing toxicity in sheep.

Key Words: anthelmintic, copper toxicity, sheep

95 Impact of tannins-containing pine bark as feed ingredient on dry matter intake, digestibility, nitrogen balance and mineral retention in goats. B. R. Min*, S. Solaiman, E. Taha, and N. Gurung, *Tuskegee University, Tuskegee, AL.*

Condensed tannins (CT) are naturally occurring plant polyphenols that can have a major impact on the nutritive value of the diet. The objective of this experiment was to assess the effects of a partial replacement of ground wheat straw (WS) with CT-containing pine bark (PB) on DM intake, nutrients digestibility, nitrogen balance, and mineral retention using goats. Ground PB replaced WS at 0, 15, and 30% (containing 0.19, 1.63, and 3.2% CT DM, respectively) of the diet. Eighteen Kiko cross goats (BW = 31.8 ± 1.49 kg; 5 mo) were randomly assigned to 3 treatment groups (n = 6). Intake, digestion, and nitrogen balance were measured in a total collection digestion trial with 2 different periods. Two main dietary ingredients used in this study were the PB that contained about 11% CT on DM basis, while the WS contains a little or no CT. Across variables, there was no significant interaction between level of PB supplementation and experimental periods. Although DM intake and digestibility was not affected ($P > 0.10$) by feeding PB, the NDF (linear; $P = 0.01$), ADF (linear; $P = 0.001$) and lignin digestibility (linear; $P = 0.01$) decreased, and CP digestibility tended to decrease ($P = 0.09$) as PB increased in the diet. Up to 30% PB supplementation did not affect nitrogen balance in goats, but urinary N excretion tended to be greater ($P = 0.06$) in 30% PB supplemented group. Apparent retention of Ca ($P = 0.09$), P ($P = 0.03$), Mg ($P = 0.01$), Mn ($P = 0.01$), Zn ($P = 0.01$) and Fe ($P = 0.09$) was greater linearly as PB increased in the diets. However, apparent retention of K ($P = 0.001$), S ($P = 0.1$), and Cu ($P = 0.07$) was lower linearly as PB increased in the diets. These results suggest that CT containing PB has negative impact on fiber, lignin, and protein digestibility. It did not alter nitrogen balance and positively impacted trace mineral retention in gastro-intestinal tract. These results support the hypothesis that feeding CT-containing PB correlates with primarily impact of tannin on protein, fiber and individual minerals digestion without detrimental impact on DMI and DM digestibility.

Key Words: condensed tannins, digestibility, pine bark

Extension II

96 Efficacy of ivermectin and fenbendazol in weaned calves. M. H. Poore* and M. L. Alley, *North Carolina State University, Raleigh.*

Fecal egg count reduction tests (FECR) were conducted at the Upper Piedmont Research Station (UPRS) and the Center for Environmental Farming Systems (CEFS) during 2007 and 2008 to evaluate efficacy of ivermectin (IV) or fenbendazol (Safeguard®) drench (F). At UPRS there was a history of frequent IV use, while at CEFS IV was rarely used. In all trials calves received treatments (trt) according to label directions approximately 7 d post-weaning, and fecal egg counts (FEC) were determined 14 d after trt. Untreated groups (C) were used to calculate FECR and reported differences are $P < 0.05$. In exp 1 at UPRS, 21 calves per trt received C, Ivomec pour-on (I), generic ivermectin pour-on (G), or F, and FEC were performed by a public lab (GL). FEC were higher

for C compared with I, G and F (137, 54, 28 and 0), while FECR was 60, 80 and 100% for I, G, and F, respectively. In Exp 2 at CEFS 18 to 21 calves per trt received C, I, Ivomec injectible (INJ) or F. Samples were submitted to 3 GL. For all labs FEC were lower for I, INJ and F compared with C. FEC were; 43, 6, 6, and 0 for GL1; 77, 11, 6, and 0 for GL2; and 118, 13, 5, and 0 for GL3 for C, I, INJ, and F, respectively. FECR was; 86, 85, and 100% for GL1; 85, 92, and 100% for GL2; and 89, 96 and 100% for GL3 for I, INJ, and F, respectively. Exp 3 at UPRS included 25 or 26 calves per trt, samples were submitted to a private lab (PL) and a GL, and trt included C, INJ, I, G and F. FEC was lower for all trt compared with C for both labs and were lower for F than INJ and G for PL, and lower for F than INJ for GL. FEC were 88, 37, 20, 31, and 0 for PL, and 202, 82, 43, 55, and 0 for GL, for C, INJ, I, G and F, respectively. FECR was 58, 77, 65 and 100% for PL, and 59, 79, 73 and 100% for GL, for INJ, I, G and F, respectively. In exp 4 at CEFS, 19 calves per trt received C, INJ, I, G, and F, and one PL was used. FEC were lower for C vs. other trt, and were 71, 6, 4, 7 and 0 for C, INJ, I, G and F, respectively. FECR was 91, 94, 90 and 100% for INJ, I, G and F, respectively. Results showed poor efficacy of IV at UPRS, while F was efficacious at both locations.

Key Words: ivermectin, fenbendazol, calves

97 Anthelmintic resistance testing and agricultural professional training on horse farms in North Carolina. N. C. Whitley*[1], R M. Kaplan[2], R. A. Franco[1], K. Moulton[1], and A. E. Cooper[1], *[1]North Carolina A&T State University, Greensboro, [2]University of Georgia, Athens.*

Ninety-one horses on 6 farms in North Carolina were used for training Extension agents and farm managers/owners while conducting fecal egg count (FEC) reduction testing for gastrointestinal nematode (GIN) parasite anthelmintic resistance. Horses (39 females, 52 males) of various breeds averaging 563.0 ± 11.6 kg BW and 10.1 ± 0.6 years of age (age range of 1 to 30+ years) were used in the Spring of 2011. Animals were assigned to anthelmintic treatment to account for preliminary fecal egg count (FEC), sex, breed type and age as possible; 21 horses on 3 farms were used in a switch-back design and analyzed as individual data points. Ivermectin (Zimectrin; IVM; n = 54) and Pyrantel (Strongid; PYR; n = 58) were used as labeled for body weight (measured by equine weigh tape) plus 15% with doses rounded up to the nearest 22.7 kg (50 lb). At treatment (d 0) and at d 14, fecal samples were collected for FEC using the Modified McMasters technique with a sensitivity of 8 eggs per gram (epg). Reductions were calculated as: (FEC before treatment - FEC after treatment)/FEC before treatment x 100%. Treatment was considered effective with reduction of > 80% for PYR and > 90% for IVM. Statistical means and standard errors were calculated using Proc Means in SAS and reported by treatment. Day 0 FEC averaged 681.9 ± 67.7 epg. The average FEC reduction was 99.7 ± 2.6% for IVM and 42.0 ± 11.1% for PYR. Looking at effectiveness in individual horses, IVM was effective in 98.1 ± 1.9% of the horses tested while PYR was only effective in 46.6 ± 6.6% of the horses tested. As previously reported in other states and livestock species, this study confirms GIN resistance to PYR in NC horses and has allowed for the training of 5 agricultural professionals in equine GIN anthelmintic resistance testing.

Key Words: anthelmintic resistance, FEC training, horse

98 Comparison of antibiotic post-treatment intervals for bovine respiratory disease in high-risk stocker calves. A. C. Brown*, J. T. Richeson, E. B. Kegley, J. G. Powell, and J. A. Hornsby, *Department of Animal Science, University of Arkansas, Fayetteville.*

Antibiotics are critical for control and treatment of bovine respiratory disease (BRD); however, few studies have evaluated the ideal post-metaphylaxis interval (PMI) and post-treatment interval (PTI) for BRD subsequent metaphylaxis. Increasing the duration of the PMI and PTI regimen may result in effective BRD control and treatment outcomes while reducing the total labor and antibiotic required. Our objective was to evaluate the efficacy and cost of different PMI and PTI duration in high-risk stocker calves that received metaphylaxis with tilmicosin phosphate. Crossbred bull and steer calves (n = 265; 3 arrival sets; 155 bulls and 110 steers) were weighed (initial BW = 246 ± 1 kg), stratified by sex, and assigned randomly to pen (n = 24; 8 pens/arrival set). Pens were assigned randomly to treatments consisting of short-term PMI and PTI of 48 h (STI) or long-term PMI and PTI of 96 h (LTI). Antibiotics used for 1st, 2nd, and 3rd BRD treatment were enrofloxacin, florfenicol, and ceftiofur, respectively. Body weights were recorded on d 0, 14, 28, and 42. Daily gain did not differ ($P \geq 0.34$), averaging 0.99 and 0.95 kg/d for STI and LTI, respectively, for the entire 42-d trial. Length of PMI did not affect the percentage of calves treated initially with enrofloxacin ($P = 0.86$) averaging 35 and 37% for STI and LTI, respectively. Similarly, 23% of calves on either PTI regimen were treated with florfenicol ($P = 0.98$), and 9 and 8% of calves on LTI and STI, respectively were treated with ceftiofur ($P = 0.84$). Therefore, antibiotic costs did not differ ($P \geq 0.92$) between PTI regimen. Results suggest the duration (48- or 96-h) of PMI and PTI does not impact health or growth performance; nevertheless, a longer PMI and PTI allows flexibility regarding BRD surveillance in newly received cattle.

Key Words: beef cattle, antibiotic treatment, bovine respiratory disease

99 Animal Ag 101: Basics concepts of animal care. N. Jaeger[2], R. Owen*[1], W. F. Owsley[1], D. Wolfe[1], and S. Rodning[1], *[1]Auburn University, Auburn, AL, [2]Alabama Farmers Federation, Montgomery, AL.*

Animal Ag 101 is a program to help educate law enforcement officers and animal control officials on the basics of animal care and handling. The program was sponsored by the Alabama Coalition for Farm Animal Care and Well-Being (ACFACWB). Speakers represented member organizations of the ACFACWB, primarily Auburn University Animal Sciences Department, the Auburn University College of Veterinary Medicine, the Alabama Farmers Federation, and the Alabama Department of Agriculture and Industries. Six programs were conducted during the summer and fall of 2011. The programs consisted of 2 segments. First, speakers gave a general overview of equine, dairy, beef, swine, and small ruminants, concentrating on basic care. Emphasis was placed on assessing body condition as a method to determine animal care. Speakers in the second segment discussed more detail in the areas of herd health, behavior, laws concerning animal care, and dealing with the media. The average attendance per program was 35 with approximately 6percent of the attendees representing law enforcement and 2percent representing animal control. Attendees were asked to evaluate the presentations at the end of each program and to rate the overall program on a scale of 1 to 5, where 1 was poor and 5 was excellent. Content evaluations ranged from 2 to 5 with a mode of 5. Additional comments emphasized the need for a second, more detailed, hands-on, training. The next phase of training is tentatively scheduled for summer of 2012.

Key Words: animal care, law enforcement, training

100 Ability of novice producers to identify their information needs. J. C. Wright*[1], J. D. Donnell[1], R. R. Reuter[1], D. O. Alkire[1], and

C. A. Craige2,1, [1]*Samuel Roberts Noble Foundation, Inc., Ardmore, OK,* [2]*Oklahoma State University, Stillwater.*

Most applicants for the Noble Foundation's consultation service are novice producers with limited agricultural knowledge. This may be true for new extension clientele. To meet the growing number of these producers, on-farm consultation efforts must be supplemented with other means of providing appropriate information. A barrier to these other means may be a producer's inability to accurately self-assess his primary information needs. On the application for consultation service, producers rank their primary information needs in 8 subjects: crops, soil fertility, financial/marketing, pasture, horticulture, livestock, wildlife, and ponds. Experienced consultants then identify primary needs on-farm and make appropriate recommendations. In 2011, 100 such engagements were evaluated as to the producer's ability to self-assess primary information needs on the application. We considered the professional consultant's on-farm assessment to be the producer's actual primary needs. Novice producers were able to accurately identify only 51% of their actual primary needs on the application. Neither the size of operation nor years of experience improved their ability to identify primary information needs (observed ranges: 0.5 to 575 ha and 1 to 50 years, respectively). Also, those who spent over 50% of their time on-farm were only 3% more accurate than those who spent less time (53% vs. 50%, respectively). Producers 35–44 years of age were least able to identify their primary information needs (42%) while the most accurate were 25–34 years of age (63%). Most novice producers inaccurately listed their primary information needs as 1) pasture management and 2) livestock; their actual needs were 1) soil fertility and 2) pasture management. This data indicates the need for a more accurate initial assessment tool and/or more on-farm interaction with consultants to determine the actual information needs of novice producers. This data also suggests the need to evaluate assumptions used to develop educational programs for novice producers.

Key Words: novice, producer, education

101 Building confidence, skills and leadership of women cattle producers. A. D. Shaeffer*, J. A. Moore, S. R. Freeman, M. L. Alley, M. H. Poore, and M. J. Kistler, *North Carolina State University, Raleigh.*

During the NC Forage and Livestock annual extension training, lecture and hands-on activities are presented to both genders of extension agents. Observations made during hands-on exercises showed that male agents actively participated, while female agents were more likely to watch. The authors have observed similar behavior with female cattle producer participation in extension activities. These observations demonstrated the need for female cattle producer training with the goal of building self-confidence and providing skills and knowledge needed for success in a non-intimidating atmosphere. A 1-d training was held at the NCSU Beef Unit with 21 female participants. Before being accepted into the training, the female producers were asked to fill out an application. The application was designed to get a better understanding of the type of farm, number of cattle, reason they would like to attend the workshop, and what they hope to take away from the training. After the training, producers responded to a questionnaire. The questionnaire included 5 questions (scale of 1 = Not Satisfied to 4 = Very Satisfied). Selected questions and mean evaluation score ± SD were; the overall quality of the training workshop (4.0 ± 0.0), relevance of information to your needs (3.95 ± 0.2) and subject matter knowledge of instructors (4.0 ± 0.0). The questionnaire included a comparison of participants′ knowledge before and after the training (scale of 1 = Very Low to 5 = Very High). Results of selected questions showed an increase ($P < 0.01$) from pre-test to post-test knowledge; low stress cattle handling (2.2 ± 0.2, 4.0 ± 0.2), proper vaccination techniques (2.3 ± 0.2, 4.3 ± 0.2), reproductive technologies and calving management (2.2 ± 0.3, 3.9 ± 0.3) and pasture management (2.5 ± 0.2, 3.9 ± 0.2). Selected results from impact evaluation showed 100% of participants will include low stress handling on their farm, 78% of participants will now take on new leadership roles within their community and 100% of the participants would recommend this training to other women.

Key Words: female, cattle producers, training

102 Outcome measurements of small ruminant tool box workshops. S. M. Jones*[1], L. Coffey[2], and M. Hale[2], [1]*University of Arkansas, Little Rock,* [2]*National Center for Appropriate Technology, Fayetteville, AR.*

Sheep and goat production is popular with many beginning farmers and is a new enterprise for some experienced farmers. Many sheep and goat producers are new to the business, and there is a scarcity of mentors and of trained educators and veterinarians experienced with sheep and goats. Extension educators working with these farmers need tools to support them. This project, the Toolbox for Small Ruminant Educators: Building on the Small Ruminant Resource Manual, involved producing, collecting, and expanding materials to assist educators. The educational toolbox is meant to be used by producers and educators to help assess the whole farm, iwith the aim of improving the sheep or goat enterprises on the farm. In Arkansas, an In-Service Trainings were conducted for Extension Educators and producers. A follow-up survey was designed to find out how the educators were using the educational resources (Tool Box), and evaluate the impact of the educational materials for producers. Survey Monkey was used as the vehicle for the survey. Responding educators indicated the workshop and included educational resources improved their ability to assist small ruminant producers (4.5). Educational materials were useful for educating producers (4.6). Educators also indicated the teaching method was effective (4.5). The topics included in the workshop (4.78) and the relevance to small ruminant producers (4.68) was effective. The Check Sheet for evaluating farm resources and setting goals is an effective tool for producers (4.6) and the workshop prepared Educators to assist producers in using the Check Sheet (4.5). The Tool Box of Educational Resources prepared Educators to plan and conduct small ruminant producer workshops (4.6). Educators indicated the Tool Box of Educational Resources is an informational resource for answering individual producers production questions (4.5). Evaluations were overwhelmingly positive, and it is clear the Toolboxes are helpful to the educators and are being used. Also, many educators indicated they are using the Toolbox for self-study in an effort to be more prepared to assist producers.

Key Words: small ruminants, sheep, goats

103 Producer evaluation of the TN master beef producer program. J. B. Neel*[1], B. T. Campbell[1], F. D. Kirkpatrick[1], C. D. Lane[1], and W. W. Gill[2], [1]*The University of Tennessee, Knoxville,* [2]*Middle Tennessee State University, Murfreesboro, TN.*

"The Master Beef Producer Program" is a 12-week educational program to provide information to Tennessee's beef producers, to improve the profitability and sustainability of their operations, and to help the Tennessee beef industry become one of the best in the country. Participants in the TN Master Beef Producer Program (MBPP) during 2004–2010 were asked to evaluate the impact of MBPP to their operations. To date

9,000 TN cow-calf producers have been taught. MBPP focused on 12 topics: managing and planning for success, marketing, genetics, carcass merit, nutrition, forage production, reproduction, health, handling and behavior, environmental issues, food safety and managing the cow herd. Beef Quality Assurance training was also included. Participants were asked to provide feedback and indicate topics they would apply to their operation. Data were analyzed using the FREQ procedure in SAS 9.2. Managing and Planning for Success was indicated as the most beneficial with 85% saying it would apply to their operation. Other topics that were selected were forage production (82%), health (76%), behavior and handling facilities (75%), and feeding management (74%). Only 33% indicated they would make changes in using records, and "No changes" was only selected by 1.5% of the participants. Participants were also asked to estimate the value to their operations if they applied what was taught. Responses ranged from $1,000 to $10,000. Twenty 4 percent ranged from $1,000 to $2,000, 19% indicated a benefit of less than $1,000, 45% percent indicated an economic impact of $2,000 to $6,000, and 13% indicated a benefit greater than $6,000. When this impact was broken down into $1,000 increments starting at $500 the greatest percentage said the program was worth $1500. If the 9,000 producers realized an additional economic impact of $1,500, this would have a $13,500,000 impact on the state's beef industry. The Master beef producer program is an excellent program that has been greatly supported by the state legislature as well as being highly regarded by many of the beef producers in the state of Tennessee.

Key Words: master beef, cow-calf producers

104 Comparison of temperature susceptibilty in three different types of outdoor swine huts. W. Choi and S.-H. Oh*, *North Carolina Agricultural and Technical State University, Greensboro.*

The purpose of this study was to examine the temperature susceptibility of outdoor swine hut with 3 different materials: One was made of plastic material (121.9 × 165.1 × 274.3 cm^3; height x width x depth; G type), the second was galvanized steel (106.7 × 284.5 × 152.4 cm^3; S type), and the third was plywood (121.9 × 177.8 × 114 × 3 cm^3; O type). These 3 different types of huts were used in this study with 3 replications, resulting in 9 huts in total for the study. The HOBO data loggers are typically used in the building structures to measure the temperature, humidity, and dew point. Nine temperature data loggers (HOBO) were placed on the ceiling inside of each hut in this study. Data were collected every 15 min for 13 d from 11th April 2011 to 1st May 2011. For this abstract, the data collected every 1 h were used for the statistical analysis. The selected data were analyzed with SAS 9.2, and PROC MIXED was used to get least squares means of temperatures of each hut. Type of hut and the time collected the data were included in the statistical model. The least squares means of temperatures in each hut were significantly different each other, and were estimated as 22.4°C, 21.16°C, and 20.86°C in G, O, and S types, respectively. The results will help small-scale pig producers to choose a type of huts in outdoor environments.

Key Words: pig, outdoor, hut

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1970–71	L. S. Pope	Texas A&M University
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1966–67	C. E. Lindley	Mississippi State University
1965–66	R. F. Sewell	University of Georgia
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1961–62	G. K. Davis	University of Florida
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1941–42	R. E. Hunt	VPI & SU
1940–41	M. G. Snell	Louisiana State University
1939–40	L. E. Richardson	University of Tennessee
1938–39	E. W. Sheets	USDA
1937–38	L. I. Case	NC State University
1936–37	M. P. Jarnigan	University of Georgia
1935–36	J. B. Francioni	Louisiana State University
1934–35	A. L. Shealy	University of Florida
1933–34	L. V. Starkey	Clemson University
1932–33	W. L. Blizzard	Oklahoma State University

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2011	Paul G. Harms	Texas	1988	Clarence B. Ammerman	Florida
2010	M. Rouquette, Jr.	Texas	1987	Lowell E. Walters	Oklahoma
2009	Not Given		1986	Lemuel Goode	North Carolina
2008	R. D. Randel	Texas	1985	O.M. Hale	Georgia
2007	A. H. Brown	Arkansas	1984	L.C. Ulberg	North Carolina
2006	Gary M. Hill	Georgia	1983	C.J. Brown	Arkansas
2005	Samuel W. Coleman	USDA	1982	W.C. McCormick	Georgia
2004	Don G. Ely	Kentucky	1981	Elliot R. Barrick	North Carolina
2003	Don E. Franke	Louisiana	1980	J.A. Whatley, Jr.	Oklahoma
2002	Fred Thrift	Kentucky	1979	Marvin Koger	Florida
2001	Robert Wettmann	Oklahoma	1978	Thomas J. Marlowe	Virginia
2000	Philip Utley	Georgia	1977	Sam Hansard	Tennessee
1999	Paul R. Noland	Arkansas	1976	J.C. Hillier	Oklahoma
1998	Not Given		1975	J.K. Riggs	Texas
1997	William G. Luce	Oklahoma	1974	T.J. Cunha	Florida
1996	Raymond W. Harvey	North Carolina	1973	O.D. Butler	Texas
1995	Gary L. Cromwell	Kentucky	1972	George W. Litton	Virginia
1994	George E. Mitchell, Jr.	Kentucky	1971	Ray H. Dutt	Kentucky
1993	L.E. McDowell	Florida	1970	Robert C. Carter	Virginia
1992	Joseph Fontenot	Virginia	1969	Henry H. Leveck	Mississippi
1991	Robert Totusek	Oklahoma	1968	Wesley P. Garrigus	Kentucky
1990	Virgil Hays	Kentucky	1967	Byron L. Southwell	Georgia
1989	Frank Baker	Arkansas	1966	Charles S. Hobbs	Tennessee

Extension Award

2011	Richard D. Coffey	Kentucky	1995	John T. Johns	Kentucky
2010	M. T. See	North Carolina	1994	David W. Freeman	Oklahoma
2009	E. van Heugten	North Carolina	1993	J.R. Jones	North Carolina
2008	F. T. McCollum, III	Texas	1992	James B. Neel	Tennessee
2007	M. H. Poore	North Carolina	1991	Keith Lusby	Oklahoma
2006	Allen F. Harper	Virginia	1990	Joe Hughes	Oklahoma
2005	Glen Selk	Oklahoma	1989	Henry Webster	Clemson
2004	Roger L. McCraw	North Carolina	1988	Donald R. Gill	Oklahoma
2003	Darrh Bullock	Kentucky	1987	H. John Gerken, Jr.	Virginia
2002	Warren Gill	Tennessee	1986	M.K. Cook	Georgia
2001	Walter R. Burris	Kentucky	1985	W.G. Luce	Oklahoma
2000	Tom R. Troxel	Arkansas	1984	Charles Cooper	Virginia
1999	George V. Davis, Jr.	Arkansas	1983	C.W. Absher	Kentucky
1998	G. L. Monty Chappel	Kentucky	1982	C.M. Triplett	Georgia
1997	Steven H. Umberger	Virginia	1981	Arden N. Huff	Virginia
1996	Clyde D. Lane, Jr.	Tennessee	1980	A.L. Eller, Jr.	Virginia

Young Animal Scientist Award

2011[1,2]	J. Chance Brooks	Texas
2010[1]	T. J. Wistuba	Morehead State University
2010[2]	D. L. VanOverbeke	Oklahoma State University
2009[1]	G. G. Hilton	Oklohoma State University
2009[2]	M. L. Looper	USDA, ARS
2008[1]	Jodi A. Sterle	Texas
2008[2]	Jeffery Escobar	VPI & SU
2007[1]	Les Anderson	University of Kentucky
2007[2]	Sung Woo Kim	Texas Tech University
2006[1]	Michael L. Looper	USDA, ARS
2006[2]	Scott T. Willard	Mississippi State University
2005[2]	Clinton Krehbiel	Oklahoma State University
2004[1]	M. Todd See	NC State University
2004[2]	Theo Van Kempen	NC State University
2003[1]	Sam Jackson	Texas Tech University
2003[2]	Tom Spencer	Texas A&M University
2002[1]	Joel Yelich	University of Florida
2002[2]	Beth Kegley	University of Arkansas
2001[1]	Shawn Ramsey	Texas A&M University
2001[2]	Jason Apple	University of Arkansas
2000[1]	Andy D. Herring	Texas Tech University
1999[2]	Chad C. Chase, Jr.	USDA, ARS
1998[1]	Markus F. Miller	Texas Tech University
1998[2]	Arthur L. Goetsch	Langston University
1997[1]	Tim Marshall	University of Florida
1996[1]	William L. Flowers	NC State University
1996[2]	Markus F. Miller	Texas Tech University
1995[1]	Craig H. Wood	University of Kentucky
1995[2]	Jeffrey D. Armstrong	NC State University
1994[1]	Debra K. Aaron	University of Kentucky
1994[2]	Peter J. Hansen	University of Florida
1993[1]	Kevin Pond	NC State University
1993[2]	Rod Geisert	Oklahoma State University
1992[1]	David S. Buchanan	Oklahoma State University
1992[2]	James L. Sartin	Auburn University
1991[1]	W.E. Beal	VPI & SU
1991[2]	Wayne Greene	Texas A&M University
1990[1]	J.W. Mabry	University of Georgia
1990[2]	T.H. Welsh	Texas A&M University
1989	J.W. Spears	NC State University
1988	S.B. Smith	Texas A&M University
1987	D.L. Thompson, Jr.	Louisiana State Univ.
1986	G.J. Hausman	USDA, ARS, Athens, GA
1985	J.W. Savell	Texas A&M University
1984	D.R. Notter	VPI & SU
1983	T.S. Stahly	University of Kentucky
1982	D.N. Marple	Auburn University

[1]Education
[2] Research

NPB Swine Industry Award

2011	M. Estienne	Virginia Tech
2010	J. A. Carroll	ARS, USDA
2009	E. van Heugten	NC State University
2008	Sung Woo Kim	NC State University
2007	Chad W. O'Gormon	Texas A&M University-Kingsville
2006	Jeffery A. Carroll	USDA, ARS
2005	Zelpha B. Johnson	University of Arkansas
2004	Jason Apple	University of Arkansas
2003	Theo van Kempen	NC State University
2002	Kim Cole	University of Arkansas
2001	G. E. Conatser	University of Tennessee
2000	Not given	
1999	Not given	
1998	Robert A. Cushman	NC State University
1997	M. Todd See	NC State University
1996	William L. Flowers	NC State University
1995	M. Todd See	NC State University
1994	Robert Dove	University of Georgia

Graduate Student PaperAward

Year	Awardee	Place of Meeting	University
2011	L. A. Smith	Corpus Christi	Auburn University
2010	J. S. Fry	Orlando	North Carolina State University
2009	S. J. Winterholler	Atlanta	Oklahoma State University
2008	S. L. Hansen	Dallas	North Carolina State University
2007	P. Williams	Mobile	Texas A&M University-Kingsville
2006	L. R. Legleiter	Orlando	North Carolina State University
2005	Margaret Bowman	Little Rock	University of Arkansas
2004	E. G. Brown	Tulsa	Texas A&M University
2003	C. Realini	Mobile	University of Georgia
2002	J. A. Parish	Orlando	University of Georgia
2001	J. Montgomery	Ft. Worth	Texas Tech University
2000	M. R. Stivarious	Lexington	University of Arkansas
1999	T. E. Engle	Memphis	North Carolina State University
1998	C. Barnett	Little Rock	Univ. of Tennessee
1997	D.H. Crews, Jr.	Birmingham	Louisiana State University
1996	None Given		
1995	E.B. Kegley	New Orleans	North Carolina State University
1994	R.D. Coffey	Nashville	University of Kentucky
1993	D.K. Bishop	Tulsa	Oklahoma State University
1992	R.L. Stanko	Lexington	North Carolina State University
1991	G.A. Rohrer	Ft. Worth	Texas A&M University
1990	K.A. Meurer	Little Rock	Mississippi State University
1989	G.M. Davenport	Nashville	University of Kentucky
1988	M.J. Esteinne	New Orleans	University of Georgia
1987	T.W. Burnell	Nashville	University of Kentucky
1986	M.J. Wylie	Orlando	Texas A&M University
1985	M.W. Richards	Biloxi	Clemson University
984 J.	C. Betts	Nashville	Texas A&M University
1983	J.B. Lutz	Atlanta	University of Georgia
1982	K.R. Pond	Orlando	Texas A&M University
1981	L.W. Greene	Atlanta	VPI & SU
1980	D.K. Aaron	Hot Springs	University of Kentucky
1979	T.W. Robb	New Orleans	University of Kentucky
1978	E.F. Gray	Houston	University of Kentucky
1977	T.A. Puglisi	Atlanta	University of Georgia
1976	D.L. Thomas	Mobile	Oklahoma State University
1975	J.C. Cornwell	New Orleans	Louisiana State University
1974	D.M. Hallford	Memphis	Oklahoma State University
1973	A.C. Mills	Atlanta	University of Florida
1972	C. McLellan, Jr.	Richmond	Oklahoma State University
1971	C.L. Fields	Jackonsville	University of Kentucky
1970	A.R. Bellve	Memphis	North Carolina State University
1969	W.L. Brown	Mobile	Auburn University
1968	W.E. Powell	Louisville	Auburn University
1967	F.W. Bazer	New Orleans	North Carolina State University
1966	D.G. Ely	Jackson	University of Kentucky
1965	R.D. Goodrich	Dallas	Oklahoma State University
1964	C.K. Vincent	Atlanta	North Carolina State University
1963	C.B. Ramsey	Memphis	University of Tennessee
1962	J.R. Crockett	Jacksonville	University of Florida

Undergraduate Student Paper Award

Year	Awardee	Place of Meeting	University
2011	J. Tyus	Corpus Christi	Tennessee State University
2010	W. N. Tapp, III	Orlando	University of Arkansas
2009	C. M. Ballou	Atlanta	North Carolina State University
2008	C. R. Boldt	Dallas	Texas A&M University
2007	L. Starkey	Mobile	University of Arkansas
2006	D. Sykes	Orlando	Mississippi State University
2005	N. Burdick	Little Rock	Texas A&M University-Kingsville
2004	J. L. Roberts	Tulsa	Oklahoma State University
2003	M. Seitz	Mobile	Mississippi State University
2002	B. Spader	Orlando	University of Missouri
2001	R. Horsley	Ft. Worth	Virginia Polytechnic University
2000	B. Robbins	Lexington	Virginia Tech
1999	J. L. Bardugone	Memphis	Virginia Tech
1998	S. F. Flohr	Little Rock	Virginia Tech
1997	T. M. Weick	Birmingham	Louisiana State Univ.
1996	K. J. Goodson	Greensboro	Texas A&M University
1995	B. C. Bloom	New Orleans	Auburn University
1994	Beth Good	Nashville	Oklahoma State University
1993	C. J. Kirby	Tulsa	North Carolina State University

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2011	Texas A&M University	1997	Oklahoma State University
2010	University of Florida	1996	Oklahoma State University
2009	University of Georgia	1995	Virginia Tech
2008	University of Kentucky	1994	Oklahoma State University
2007	Texas A&M University	1993	Texas A&M University
2006	Texas A&M University	1992	Oklahoma State University
2005	North Carolina State University	1991	University of Kentucky
2004	University of Kentucky	1990	Virginia Tech
2003	Texas A&M University	1989	Oklahoma State University
2002	University of Florida	1988	Texas A&M University
2001	University of Kentucky	1987	University of Georgia
2000	Texas A&M University	1986	University of Georgia
1999	University of Kentucky	1985	University of Kentucky
1998	University of Kentucky	1984	Texas A&M University

Emerging Scholar Award

Year	Awardee	Place of Meeting	University
2011	R. S. Fry	Corpus Christi	University of Arkansas
2010	C. Taylor-Edwards	Orlando	University of Kentucky

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ASAS Southern Section

Future Meeting Dates and Locations

2013	Orlando, Florida	TBA
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2015	Atlanta, Georgia	TBA
2016	Jacksonville, Florida	TBA