Small Ruminant: Sheep and Goat Production 2

751 Live and carcass leg characteristics in terminally sired lambs. M. R. Mousel*[1], T. D. Leeds[2], D. R. Notter[3], H. N. Zerby[4], S. J. Moeller[4], and G. S. Lewis[1], [1]*USDA, ARS, U.S. Sheep Experiment Station*, *Dubois, ID,* [2]*USDA, ARS, National Center for Cool and Cold Water Aquaculture*, *Leetown, WV,* [3]*Virginia Polytechnic Institute and State University*, *Blacksburg,* [4]*The Ohio State University*, *Columbus*.

Live and carcass leg characteristics of F_1 wether lambs were investigated to determine whether there were terminal-sire breed differences. Over a 3-yr period, Columbia, MARCIII, Suffolk, and Texel rams were mated with mature Rambouillet ewes to produce the lambs (n = 521). Lambs were finished in a feedlot to a mean BW of 61.9 kg (SD = 9.5 kg) and harvested at comparable ages. Before transport to slaughter, width of hind legs was measured at the widest point of the hind legs above the twist and BW was recorded for all lambs. For each carcass, weight and leg width were measured and a subjective leg score was assigned. Carcasses were fabricated into subprimal cuts, which were weighted. Live leg width (LLW), carcass leg width (CLW), leg score (LS), bone-in leg weight (BIL), and boneless leg weight (BLL) were described using mixed models that included fixed effects of breed of sire (breed), year of birth (YR), age of dam (ADAM), and type of rearing (TR) to weaning (i.e., single or as twins) and random effects of sire and maternal grandsire. The ADAM was not significant in any model, but YR and TR affected ($P < 0.01$) LLW, CLW, BIL, and BLL. The TR, but not YR, affected ($P < 0.01$) LS. Leg widths, scores, and weights were greater for single-reared than for twin-reared lambs. Breed affected ($P < 0.01$) LLW, CLW, and LS. Texel-sired lambs had the greatest leg widths, and MARCIII-sired lambs had the least. Texel-sired lambs had the greatest LS, and Columbia-sired lambs had the least. The BIL and BLL differed with breed ($P < 0.01$). Suffolk-sired lambs had the heaviest weights and MARCIII-sired lambs had the lightest. Even though breed of terminal sire affected F_1 lamb live and carcass leg traits, breeds that excelled for progeny leg shape differed from those that excelled for progeny leg weights. With this information, producers could select a terminal sire breed that would fit their production system to improve market lamb leg shape or weights.

Key Words: lamb, leg traits, terminal sire

752 The relationship of real-time ultrasound body composition measurements, body weight and hip height with body condition score in mature Suffolk x Hampshire ewes. J. A. Carter*, C. A. Hughes, K. N. Gates, and F. R. B. Ribeiro, *Texas A&M University-Commerce*, *Commerce*.

The objective of this study was to determine the relationship between real-time ultrasound (RTU) measurements of body composition, BW, and hip height (HH), with body condition score (BCS) in mature Suffolk × Hampshire ewes (n = 48). BCS was assessed visually using a 1 to 5 scale. The body composition traits measured by RTU were 12–13th rib *longissimus lumborum* muscle area (uLMA, mean = 11.75 cm^2), 12–13th rib fat thickness (uBF, mean = 0.28 cm), and ultrasound rump fat thickness (uRUMP, mean = 0.24 cm). Ultrasound measurements were taken using an Aloka 500 with a 12 cm 3.5 MHz transducer, each animal′s wool was clipped to no longer than 0.64 cm, and vegetable oil was used as a coupling agent to enhance image quality. Data were analyzed using the Proc CORR and Proc REG procedures of SAS. BW was correlated ($P < 0.05$) with BCS and HH (−0.33 and 0.60, respectively). BCS was correlated ($P < 0.05$) with HH, uLMA and uRUMP (−0.33, 0.32, and 0.46, respectively) and HH was not correlated with any of the RTU traits measured. Linear regression to predict BCS was developed using a stepwise selection. The first variable added in the model was uRUMP accounting for 21% of the variation. HH entered next in the model, accounting for an additional 6% of the variation. The full model included BW, uLMA and uRUMP and accounted for 35% of the variation in BCS. When evaluating sheep for BCS, evaluators should palpate the rump area to get a better assessment of total body fat of sheep. These results show that RTU and BW can be used to predict BCS in ewes. However, more research needs to be done to ensure the accuracy of the model.

Key Words: ultrasound, body composition, sheep

753 Redberry juniper as a roughage source in lamb finishing rations: wool and carcass characteristics, meat fatty acid profiles, and sensory panel traits. T. R. Whitney* and C. J. Lupton, *Texas AgriLife Research*, *San Angelo*.

This study was used to determine if dry redberry juiper leaves can replace cottonseed hulls in lamb finishing rations without negatively affecting wool and carcass characteristics and meat fatty acid profiles of Rambouillet ram lambs (n = 24, initial BW = 28.6 ± 4.9 kg). In a study with 2 feeding periods (Period 1 = 65% concentrate ration, 28 d; 5-d transition; Period 2 = 85% concentrate ration, 49 d), lambs were individually fed ad libitum diets containing cottonseed hulls (control; CSH), half of the cottonseed hulls replaced by dry juniper leaves (CSHJ), or all the cottonseed hulls replaced by dry juniper leaves (JUN). Lambs were completely shorn on d −1 and 83 and wool characteristics were evaluated. Lambs fed CSH, CSHJ, and JUN grew the same amount of wool when measured as greasy fleece ($P > 0.18$), clean fleece ($P > 0.45$; 0.85, 0.88, 0.81 kg ± 0.06), and clean wool production per unit of BW ($P > 0.54$;15.2, 15.8, 16.0 g/kg of BW ± 1.0). Average fiber diameter measured on mid-side samples quadratically decreased ($P = 0.04$; 20.6, 20.8, and, 19.7 μm ± 0.28) as percentage of juniper increased in the diet. On d 86, 6 lambs per treatment were randomly selected, humanely slaughtered and evaluated for carcass characteristics and meat fatty acid profiles and sensory panel traits of the LM. Carcass characteristics were not affected ($P > 0.16$) by diet, but myristic, palmitic, palmitoleic, CLA (18:2 cis-9,trans-11; 0.59, 0.64, and 0.81% ± 0.08), and arachidic fatty acids increased ($P < 0.09$) as percentage of juniper increased in the diet. Sensory panel traits were similar ($P > 0.36$) among lambs, except for off-flavor linearly increasing ($P = 0.02$) as percentage of juniper increased in the diet. Results suggest that replacing cottonseed hulls with dry juniper leaves can reduce fiber diameter and negatively affect meat flavor, but can increase CLA.

Key Words: carcass characteristics, juniper, wool

754 Evaluating roughage level in lamb finishing diets containing 40% distillers dried grains: Carcass characteristics, meat fatty acid profiles, and sensory panel traits. T. R. Whitney*, M. G. Williamson, and J. K. Mceachern, *Texas AgriLife Research Center*, *San Angelo*.

Cottonseed hulls are a common roughage source used in lamb finishing diets, especially in Texas, because of their high concentrations of NDF and ADF. Cottonseed hulls also contain condensed tannins, which can reduce rumen solubility and degradability of protein. Effects of increasing concentrations of cottonseed hulls in diets containing high concentrations of DDG on carcass characteristics, meat fatty acid profiles, and sensory panel traits are unknown. Rambouillet wether

lambs (n = 33 ± 2.3 kg) were individually fed ad libitum pelleted diets for 100 d containing 40% distillers dried grains and other ingredients, with 10% (CSH10), 20% (CSH20), or 30% (CSH30) cottonseed hulls replacing an increasing amount of ground milo. On d 100, 8 randomly selected wethers per treatment were humanely slaughtered and evaluated. Quadratic trends ($P < 0.07$) were observed for hot carcass weight (27.7, 29.3, and 27.4 kg ± 1.56) and body wall thickness (1.5, 1.8, and 1.4 cm ± 0.04) as percentage of cottonseed hulls increased in the diet. The LM area was similar ($P > 0.59$) among lambs. Quadratic trends ($P < 0.05$) were also observed for oleic acid, CLA *cis*-9,trans-11 isomer (0.19, 0.26, and 0.27% ± 0.01), CLA isomers other than *cis*-9,trans-11 (0.13, 0.13, 0.12% ± 0.01), myristic acid, palmitoleic acid, arachidic acid, and arachidonic acid as percentage of cottonseed hulls increased in the diet. The *cis*-vaccenic acid linearly decreased ($P = 0.04$) as percentage of cottonseed hulls increased in the diet. Sensory panel traits were similar ($P > 0.13$) among lambs except for initial juiciness and sustained tenderness linearly decreasing ($P < 0.05$) as percentage of cottonseed hulls increased in the diet. Results suggest that increasing percentage of cottonseed hulls in lamb finishing diets affects some carcass characteristics, meat fatty acids, and sensory traits and can increase meat CLA concentrations.

Key Words: roughage level, distillers dried grains, carcass characteristics

755 Accuracy of the FAMACHA system for estimating degree of *Haemonchus contortus* induced anemia in Hampshire, Polypay and percentage White Dorper ewes. D. K. Aaron*, M. M. Simpson, D. G. Ely, E. Fink, B. T. Burden, M. E. Hoar, and J. Farris, *University of Kentucky*, *Lexington*.

The FAMACHA system is designed to provide sheep producers with tools for on-farm detection and treatment of *Haemonchus contortus* infection. The objective of this study was to evaluate accuracy of the FAMACHA system for categorizing ewes on the basis of severity of anemia as measured by packed cell volume (PCV). A total of 1,507 records was collected on Hampshire (H; n = 414), Polypay (PP; n = 385) and percentage White Dorper (WD; n = 708) ewes from 2005 through 2009. Eyelid scores based on color of the ocular conjunctiva (1 = red, healthy to 5 = white, anemic) were assigned by the same trained technician using the FAMACHA card. Blood samples were collected and PCV were determined using a digital microhematocrit reader. Percentages of eyelid score values in each category (from 1 to 5) were 19, 38, 31, 10 and 2%, respectively. PCV decreased linearly as eyelid scores increased; however, the magnitude of change (percentage of red cells per unit change in eyelid score) was dependent upon breed (H: −2.26 ± 0.28, PP: −4.06 ± 0.22, WD: −3.69 ± 0.18; $P < 0.01$). Similarly, strength of the linear association between PCV and eyelid score varied among breeds (H: −0.388, PP: −0.671, WD: −0.610; $P < 0.01$ as per Chi-squared test of homogeneity). Across breeds, measured PCV were higher than expected within each eyelid score. Percentages of PCV exceeding the expected upper limit of the eyelid score category (from 1 to 5) were 93, 80, 92, 91 and 78% ($P < 0.01$). Few PCV were below the expected lower limits in any eyelid score category. These data confirm the FAMACHA system will allow detection of anemic animals. However, if ewes with eyelid scores of 3, 4 and 5 are considered anemic, many non-anemic ewes will be treated for parasite infection. Also, the association between eyelid score and PCV may be influenced by face color.

Key Words: anemia, *Haemonchus contortus*, sheep

756 Using FAMACHA and alternative dewormers to manage gastrointestinal nematodes in a dairy goat herd. S. P. Hart*[1] and L. J. Dawson[2,1], [1]*E (Kika) de la Garza American Institute for Goat Research, Langston University*, *Langston, OK,* [2]*Oklahoma State University CVM*, *Stillwater*.

Gastrointestinal nematodes (GIN) are the greatest health problem in goat production. FAMACHA eye color scores have been developed for selective treatment of animals to reduce the rate of development of anthelmintic resistance. Alternative anthelmintics generally are only moderately effective (40–60% fecal egg count reduction; FECR) which may not be adequate for use with FAMACHA. The purpose of this study was to test the use of alternative anthelmintics in a FAMACHA program. Lactating Alpine dairy goats (n = 91) were FAMACHA scored at 2 wk intervals from June 10 to October 15. Does with FAMACHA scores of 4 were administered one of 3 alternative anthelmintics and those with FAMACHA score of 5 were treated with levamisole HCl at 12 mg/kg BW (L). Fecal samples were taken for fecal egg counts (FEC) and blood samples were taken for packed cell volume (PCV) and serum total protein (TP). The 3 alternative anthelmintics were: 1) 2.0 g of copper oxide wires in a gelatin capsule (W), 2) 2.0 mL of a 4% solution of copper sulfate per 4.5 kg of BW as an oral drench (S), and 3) 4.0 g of cayenne pepper in a gelatin capsule (P). At least 3 animals in each period that had FAMACHA score of 3 were used as controls. FECR was low and not significantly different ($P > 0.10$)among anthelmintics (35, 52, 3, 1, and −11% for L, W, P, S, and C, respectively). FAMACHA score was improved ($P < 0.05$; except for treatment P) by administering an anthelmintic (−0.48, −0.41, −0.16, −0.37, and +0.67, for L, W, P, S, and C, respectively). TP was improved ($P < 0.01$) by administering an anthelmintic (0.45, 0.10, 0.08, 1.20, and −0.96 for L, W, P, S and C respectively). PCV was improved ($P < 0.05$) by administering an anthelmintic (−1.2, 1.0, 0.3, 1.6, and −2.4% for L, W, P, S and C, respectively. Most anthelmintics improved physiological values above the control, but W appeared superior to other alternative anthelmintics and comparable to L and would be the alternative anthelmintic of choice to use with a FAMACHA program.

Key Words: anthelmintic, alternative dewormer, gastrointestinal nematodes

757 Effects of garlic supplementation on nematode parasite infection in grazing goats. Z. Wang*, A. L. Goetsch, G. D. Detweiler, S. P. Hart, and T. Sahlu, *American Institute for Goat Research, Langston University*, *Langston, OK*.

Effects of garlic supplementation on internal parasitism and performance of lactating meat goat does grazing grass/forb pastures in the summer were determined. Forty multiparous Boer does (2 to 5 yr of age) naturally infected with nematode parasites, mainly *Haemonchus contortus*, were used in the 84-d experiment. Litter size was 1 or 2, with kids 1 to 4 mo of age when the experiment began. Five does with their kids grazed each of the 8 0.4-ha pastures. Treatments were control and garlic, with 4 pastures per treatment. Control does received 80 g/d of a mixture of 25% molasses and 75% ground corn. Does on the garlic treatment received the same supplement plus 20 g/d of garlic powder. A loose mineral-vitamin supplement was available free-choice. Means were separated by LSD. Initial mean fecal egg count (FEC; number per gram) of does was 448 (range of 0 to 1,450) and 500 (range of 0 to 2,450) for control and garlic, respectively (SEM = 119; $P > 0.05$). On d 42, doe FEC was less ($P < 0.06$) for garlic vs. control (2,837 and 6,105, respectively; SEM = 927). Does with high FEC and appreciable BW loss were treated with Levasole on d 42. Thereafter, FEC of the garlic treatment remained steady and tended to be lower compared

with the control (1,739, 1,689, and 1,303 for garlic and 1,532, 2,340, and 1,967 for control at d 56, 70, and 84, respectively; SEM = 280, 517, and 340, respectively). Doe BW was similar between treatments ($P > 0.05$). These data suggest that garlic supplementation of lactating meat goats grazing grass/forb pastures in the summer can lessen level of nematode parasitism.

Key Words: garlic, goats, internal parasitism

758 Efficacy of ginger and pumpkin seeds in controlling internal parasites in meat goat kids. D. J. O'Brien[1], M. C. Gooden[2], J. C. Warren*[1], E. K. Crook[1], J. E. Miller[3], N. C. Whitley[4], and J. M. Burke[5], [1]*Delaware State University*, *Dover,* [2]*University of Maryland Eastern Shore*, *Princess Anne,* [3]*Louisiana State University*, *Baton Rouge,* [4]*North Carolina A&T State University*, *Greensboro,* [5]*USDA, ARS, Dale Bumpers Small Farms Research Center*, *Booneville, AR*.

Twenty-two naturally infected Boer crossbred kids (mixed sex), averaging 144.4 ± 1.1 d of age and 17.6 ± 0.6 kg were used to determine the effect of 2 possible natural dewormers on BW, packed cell volume (PCV) and fecal egg counts (FEC). Goats were randomly assigned to treatments of water (CON; n = 7), 170 g pumpkin seed drench/34.0 kg BW (PUM; n = 10) or 3 g ginger/kg BW (GIN; n = 5). Treatments were administered orally to individually penned animals every other day starting at d 0 and ending on d 40. All treatment groups received a 15% CP meat goat feed daily fed at approximately 3% of their BW daily and BW and blood and fecal samples were collected weekly throughout the study period. Blood PCV were measured using microhematocrit tube centrifugation and FEC were determined using the Modified McMaster's technique (reported as eggs per gram; epg) with a sensitivity of 50 epg. Data for FEC were log-transformed for analysis but actual means ± SEM are reported. Goat BW were influenced by day, increasing over time such that d 42 BW (20.1 ± 0.6 kg) were greater ($P < 0.01$) than d 0 BW (17.6 ± 0.6 kg). Goats in the CON group had greater ($P < 0.05$) FEC than both the PUM and GIN groups (4,683 ± 483 epg, 3,409 ± 404 epg, and 2096 ± 572 epg, respectively). Goat FEC were also influenced by day with d 0 (6194 ± 750 egg) and d 7 (3749 ± 750 epg) FEC greater ($P < 0.01$) than d 35 (661 ± 750 epg) and d 42 (1308 ± 750 epg). Treatment influenced PCV with PCV for GIN (31.4 ± 1.2%) treated animals being greater than that of both CON (25.2 ± 1.0%) and PUM (27.4 ± 0.9%) treated animals. In conclusion, under the conditions of this study, additional research using ginger and pumpkin seeds are needed to further evaluate the efficacy of these natural dewormers in controlling internal parasites in goats.

Key Words: parasite, pumpkin, ginger