Small Ruminant: Health, Growth, Extension, and Dairy

T384 Selected condensed tannin-containing plant extracts and their effects on *Haemonchus contortus* larvae. K. J. Stutts*, M. J. Thomas, M. M. Beverly, R. A. Lane, and S. F. Kelley, *Sam Houston State University, Huntsville, TX.*

Several studies have been conducted recently to determine if condensed tannins could be used to augment traditional deworming protocols since many plant extracts have exhibited anthelmintic properties in vitro. The objective of this study was to evaluate the effects of varying concentrations of crude plant extracts from selected condensed tannin containing-forages on motility of infective larvae of *H. contortus*. Extracts from sericea lespedeza (SL), white oak (WO), and black locust (BL) were evaluated in vitro for their effect on *H. contortus* motility. Larvae cultured from fecal samples collected from goats were exposed to one of 4 concentrations of plant extract. Extract concentrations were 2.5, 5, 10, and 20 mg/mL for each plant species. Treatment groups were compared with negative (distilled water) and positive controls (0.55 mg/mL albendazole). Motility was evaluated as an inferred measure of larvae morbidity using a 6 s rule. Motility counts were performed at 2, 6, and 12 h post-inoculation. At 2 and 6 h post inoculation, motility was lowest ($P < 0.05$) for the positive control, the 2 highest concentrations of WO, and the highest concentration of BL. At this time, motility was highest ($P < 0.05$) for the negative control and the lowest concentration of SL. At 12 h post inoculation, motility was lowest ($P < 0.05$) for the positive control, the 3 highest concentrations of WO, and the highest concentrations of BL and SL. At this time, motility was highest ($P < 0.05$) for the negative control and the lowest concentration of SL and BL. These results indicate that the 2 highest concentrations of WO and the highest concentration of BL were as effective in decreasing motility of *H. contortus* larvae in vitro as albendazole within 2 h of inoculation. Within 12 h of inoculation, the highest concentration of SL and BL, and the 3 highest concentrations of WO were all as effective in decreasing motility of *H. contortus* larvae in vitro as albendazole. These results indicate that there is potential for development of these plant species as a component of an anthelmintic regimen.

Key words: goats, parasite control, condensed tannins

T385 Effect of subclinical mastitis and stage of lactation on somatic cell count, composition and plasmin activity of goat milk. R. Shangguan[1,2], L. Spicer[2], C. DeWitt[2], J. Wang[1], and S. Zeng*[1], *[1]Langston University, Langston, OK, [2]Oklahoma State University, Stillwater.*

A total of 91 goat milk samples from individual udders of Alpine does during early, middle and late lactations were collected to investigate the impact of subclinical mastitis induced SCC increase on changes in composition and plasmin (PL) activity in milk. Samples were collected and analyzed for fat, protein, lactose, solids non-fat (SNF) and total solids (TS), SCC and PL activity. Within 3 stages of lactation, all milk samples were sorted into 3 groups based on levels of SCC (low $<2.5 \times 10^6$, middle = 2.5 to 5.0×10^6, high $>5.0 \times 10^6$) and statistically analyzed in a 3 × 3 factorial ANOVA. There were no interactions of level of SCC and stage of lactation on variables measured ($P > 0.05$). Log_{10} (SCC) and percentage lactose in milk were negatively correlated ($r = -0.34$, ($P = 0.001$). Fat, protein, SNF, TS and PL were altered by stage of lactation ($P < 0.05$). PL activity was greatest in early lactation. In conclusion, in high SCC milk, lactose content may be more indicative of SCC level than milk fat, protein, SNF, TS and PL activity during lactation. Stage of lactation is an important factor affecting milk composition and PL activity in goats with infection, and thus a necessary parameter in optimizing goat milk quality in conditions of sub-clinical mastitis.

Key words: dairy goat, subclinical mastitis, plasmin activity

T386 Hematological and spermatological evaluations of Honamli goat in Turkey. M. S. Gulay*[1], A. Ata[1], O. Elmaz[1], M. Saatci[1], N. Mamak[1], B. Dag[2], and A. H. Aktas[3], *[1]Mehmet Akif Ersoy University, Faculty of Veterinary Medicine, Burdur, Turkiye, [2]Selcuk University, Faculty of Agriculture, Department of Animal Science, Konya, Turkiye, [3]Bahri Dagtas Uluslararasi Hayvacilik Arastirma Enstitusu, Konya, Turkiye.*

Honamli goat is distributed throughout the mountains of south-west Mediterranean region in Turkey. This breed is an important breed among the goat breeds of Turkey. However there is no information available on their hematological and spermatological characteristics. Thus, packed cell volume (PCV), plasma protein (PP), hemoglobin (Hg), red blood cell (RBC), white blood cell (WBC), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentrations (MCHC) from the blood samples and ejaculate volume (EJ), motility (MT), dead spermatozoa (DS), abnormal spermatozoa (AS), spermatozoa concentrations (SC) and acrosomal abnormalities (AA) from freshly collected semen were evaluated from Honamli goats. One to 3 year old female goats (n = 35) were randomly selected from the 7 different farms located in different parts of the Mediterranean region. The does used in this study were 205–220 d in lactation and were on free range feeding with no additional supplements as it is traditionally done for this breed. Blood was withdrawn from the jugular vein into vacationer tubes containing EDTA and evaluated the same day. Sperm from 3 bucks were taken from the 3 different farms by artificial vagina (41–44°C) with the presence of females in estrus. The semen collection procedure was repeated weekly during the mating season for 4 total collections. All animals were healthy with no clinically signs of disease. PCV, PP, Hg, RBC, WBC, MCV, MCH, and MCHC were 22.1 ± 0.45%, 7.5 ± 0.17 g/dL, 8.2 ± 0.23 g/dL, $13.0 \pm 0.4 \times 10^6$ /μL, $5.2 \pm 0.17 \times 10^3$ /μL, 17.5 ± 0.47 fL, 6.6 ± 0.28 pg, and 37.6 ± 1.15%, respectively. EV, MT, DS, AS, and SC were 4.0 ± 1.1 mL, 75 ± 10%, 10 ± 4.0%, 10 ± 5.0%, and $3.25 \pm 1.15 \times 10^9$ /mL, respectively. Sperm with acrosomal abnormalities were 1%. Our results indicated that Honamli goats have smaller red blood cells with higher hemoglobin concentrations than other goat breeds. Moreover, spermatologic parameters of Honamli goats were very suitable for goat breeding.

Key words: hematology, spermatologic parameters, honamli goat

T387 Managing seasonal outbreak of foot rot in sheep flocks. T. Wuliji* and C. Clifford-Rathert, *Lincoln University, Jefferson City, MO.*

Foot rot in sheep flocks during hot, humid and rainy season in Midwest region of the US are on the increase. Foot rot is caused by the synergic activity and infection by bacteria *D. nodosus* and *F. necrophorum* species. In field inspection of a small sheep flock (n = 73), showed that 89% of the flock appeared to be suffering from mild to severe foot rot infection on either one, 2, 3 or 4 feet. Feet were examined for

lesions and assessed for the severity. Sick sheep were hoof trimmed and initially treated with KopperTox and "Purple Wound Spray," and re-examined in 2 weeks. Feet lesions were re-scored and the number of effected feet was recorded. The foot rot lesion scores and number of feet treated at the 2 intervals were analyzed for a Chi-squared goodness of fit test. The results showed a significant ($P < 0.05$) increase in the animals scored for 0, 1, 2 and 4 at the second interval from the first, which means there was improvement in alleviation of the symptoms in the lower score level groups while worsen for score level 3 and 4. The number of feet treated also significantly ($P < 0.05$) decreased at the second examination from the first attendance for all groups except 4 feet infection. Foot lesions from 4 lame sheep were swabbed for bacteria culture. Culture results revealed positive test for *F. necrophorum* and possibly *D. nodosus*. Animals with severe lameness were treated with antibiotic spray (3.9% tetracycline) and most of them responded favorably. However, 20 sheep were culled as result of precaution and management requirement. This case study demonstrated the potential foot rot infection, treatment and labor cost, and early culling of valuable animals by the seasonal foot rot outbreaks.

Key words: sheep, foot rot, *Dichelobacter nodosus*

T388 Comparison of nematode parasite-susceptibility and performance of Boer and Spanish goats supplemented with garlic. R. Zhong[1,2], Z. Wang*[1], A. Goetsch[1], S. Hart[1], and T. Sahlu[1], *[1]American Institute for Goat Research, Langston University, Langston, OK, USA, [2]Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences, Changchun, Jilin, China.*

Twenty Boer (B; 2–7 yr of age) and 20 Spanish (S; 4–6 yr of age) does with their single- or twin-kids (1–4 mo of age) were used to compare nematode parasite-susceptibility and performance of the 2 breeds supplemented with garlic. Initially, all does and kids were treated with a combination of Cydectin (0.8 mg/kg BW), Levasole (11.2), and Valbazen (21.6) on 2 consecutive d to clear existing nematode parasites. The goats were kept in a barn for 7 d and fecal samples from the does were checked for fecal egg count (FEC). Then all does and kids were moved to a pasture known to be contaminated with H. contortus. The goats grazed together for 3 wk before being assigned to 2 treatments for a 98-d experiment. Five does (3 B and 2 S, or 2 B and 3 S) with their kids grazed 8 0.4-ha pastures (68% bermudagrass, 32% other grasses and forbs). Treatments were control (C) and garlic (G), with 4 pastures per treatment. Control does received 200 g/d of concentrate (%: corn 54, SBM 26, molasses 13, dical 1.3, limestone 1.3, trace mineralized salt and vitamin mixes 3.4, $MgSO_4$ 0.7), garlic does received the same amount of concentrate plus 20 g/d of G powder. Kids were weaned on d 32 and removed from the experiment. On d 0, 32, 67, and 98, all goats were weighed and fecal and blood samples collected. Means were separated by LSD. Initial mean FEC was 533 (0 - 8,650) and 440 (0 - 2,050) for B and S does, respectively (SEM = 257; $P > 0.05$). The FEC was not different ($P > 0.05$) between breeds or treatments on any day. Likewise, ADG (−8 and −28 g/d vs 4 and −26 g/d, SEM = 8.0), packed cell volume (25 and 24 vs 25 and 26, SEM = 1.6), FAMACHA score (3.5 and 3.5 vs 3.3 and 3.3, SEM = 0.18), and body condition score (2.4 and 2.4 vs 2.4 and 2.4, SEM = 0.07) of does and ADG of kids (109 and 136 g/d vs 115 and 120 g/d, SEM = 11.0) were similar ($P > 0.05$) for B and S regardless of treatment. In conclusion, nematode parasite-susceptibility appears similar in these 2 common meat goats and garlic supplementation has no effect on internal parasitism under these experimental conditions.

Key words: garlic, goats, internal parasitism

T389 Effect of sericea lespedeza *(Lespedeza cuneata)* leaf meal pellets fed to gastrointestinal nematode infected goats. N. C. Whitley*[1], T. H. Terrill[2], J. E. Miller[3], J. M. Burke[4], K. Moulton[1], L. Townsend[5], J. R. Horton[5], J. French[6], A. K. Cooper[1], and D. S. Kommuru[2], *[1]North Carolina A&T State University, Greensboro, [2]Fort Valley State University, Fort Valley, GA, [3]Louisiana State University, Baton Rouge, [4]USDA-ARS, Booneville, AR, [5]NCDA-UMRS, Laurel Springs, NC, [6]NCDA-UPRS, Reidsville, NC.*

Thirty-six female and castrated male Boer crossbred goats were used at 227 ± 0.4 d of age and 24.0 ± 0.2 kg BW to determine the effect of sericea lespedeza leaf meal pellets (SLP) on gastrointestinal nematode (GIN) parasitism. Goats artificially infected with *Haemonchus contortus* were used when fecal egg counts (FEC) were ≥1000 eggs per gram (epg). Goats were individually penned and fed diets similar in available protein containing 0 (control; commercial alfalfa pellets) or 75% SLP with 18 goats/treatment. Animals were allocated to treatment for similar group d –1 FEC, BW and sexes. Pre-weighed rations were fed once daily to allow for 10% orts. Blood samples for packed cell volume (PCV) and fecal samples for FEC (using the Modified McMasters technique) were collected on d 0, 7, 14, 21 and 28 (d 0 = pen placement and first day of treatment). Orts were measured on sampling dates for estimation of intake; BW was measured on d 0. Data were log-transformed and analyzed using the MIXED procedure of SAS but lsmeans are reported. The FEC were influenced by a treatment by d interaction ($P < 0.02$) in which FEC were similar between treatments on d 0 and were lower ($P < 0.03$) for both treatments at all other sampling dates, and were lower ($P < 0.03$) for 75% SLP treated animals than for control on all other days (control: 5326, 4101, 2715, 2198 and 1858 ± 523 epg and SLP: 5272, 1534, 1376, 1181 and 777 ± 483 epg for d 0, 7, 14, 21 and 28, respectively). There was no influence of treatment on PCV, but there was an influence of d ($P < 0.001$) in which PCV for all animals was lowest on d 0 at 27.8 ± 1.14%, increased to 37.0 ± 1.15% by d 14 and decreased again to 30.9 ± 1.14% on d 28. Intake as a percentage of initial BW was not different between treatments at any time point measured ($P > 0.13$). However, intake for 0% SLP was lowest on d 7 than for any other time point and intake for 75% SLP was highest on d 14 than for any other time point measured ($P < 0.002$; treatment by d). Overall, SLP decreased GIN FEC, supporting the concept of using this pelleted forage-based supplement as a component of a small ruminant integrated GIN control program.

Key words: sericea lespedeza, parasites, goats

T390 Influence of type of pasture and transport stress on microbial loads in meat goats. A. Mechineni, S. Gujja, D. S. Kommuru, T. H. Terrill, G. Kannan*, B. Kouakou, and J. H. Lee, *Fort Valley State University, Fort Valley, GA.*

Livestock transport has been identified as one of the risk factors of microbial contamination in the red meat production. Sericea lespedeza (SL; *Lespedeza cuneata*), a leguminous forage high in condensed tannins, has been reported to reduce gut microbial loads in ruminants. This experiment was conducted to assess the effects of SL grazing and stress associated with transport on microbial load on skin and carcass of meat goats, as well as in their gastrointestinal tracts. In a Completely Randomized Design with split-plot, 30 Spanish intact male kids (6 mo of age; BW = 20.3 ± 3.28 kg) were grazed on either bermudagrass (BG; *Cynodon dactylon*), SL, or a combination of BG and SL pasture for 8 wk (n = 10 goats/treatment). At the end of the grazing period, 5 kids from each pasture were randomly selected, loaded onto a trailer, and then transported to the holding pen at the university abattoir after

driving 3 h. The rest of the kids were directly transported to the abattoir after loading onto the trailer. Animals were held overnight with access to water only before slaughter. Skin swab samples were made on the hind legs immediately after transportation and just before slaughter. Immediately after evisceration, carcass swab samples were taken and rumen and rectal content samples were also collected. Microbial counts in both rectal and rumen contents were not different ($P > 0.05$) among goats grazed on the experimental pastures. Neither pasture type nor transport stress significantly influenced ($P > 0.05$) *E. coli*, total coliform and aerobic plate counts on skin or carcasses. The *E. coli* counts on skin were 0.18 and 0.13 ± 0.091 (mean ± SEM) $\log_{10}$cfu/cm^2 in transport and non-transported groups, respectively. The aerobic plate counts on carcasses were 2.62, 2.91, and 2.41 ± 0.310 (mean ± SEM) $\log_{10}$cfu/cm^2, respectively, in goats grazed on SL, BG and BG plus SL pastures. The results indicate that neither pasture type nor transportation stress appear to significantly influence gut, skin, or carcass microbial loads in meat goats.

Key words: sericea lespedeza, transport, *E. coli*

T391 Gastro-intestinal parasitic infestation in meat goats and its relationships with production traits under a pasture-based performance test in Western Maryland. K. Nadarajah*[1], S. Schoenian[2], D. L. Kuhlers[1], M. D. Carpenter[1], and D. Rankins[1], *[1]Auburn University, Auburn, AL, [2]University of Maryland Extension, Keedysville.*

Variation among meat goats for gastro-intestinal parasitic (GIP) infestation and its relationships with production traits should be explored for selecting goats for resistance to GIP. The objective was to examine between animal variation for GIP infestation and growth performance of bucks participated in a pasture-based performance test in 2009 (n = 60) and 2010 (n = 72), respectively, in Western Maryland. Bucks were managed as a single group on pasture with access to free choice minerals, and were rotationally grazed among 5, 2 acre paddocks. Using SAS, data were analyzed within test-years for fecal egg count (FEC), FAMACHA score (FAM), BCS and growth performance of individual bucks at initial-entry-to-test (IT) and end-of-test (ET). Mean, SD and correlations among traits for IT-weight (IT-WT), IT-FEC, IT-FAM, and IT-BCS and similar parameter estimates for ET-weight (ET-WT), ET-FEC, ET-FAM, and ET-BCS, as well as overall ADG on test were computed. Mean ± SD of bucks on tests in 2009 and 2010 for IT-WT were 21.3 ± 4.8 kg and 20.1 ± 4.5 kg, respectively. For same years, means ± SD of bucks were 1,202 ± 1,614 and 682 ± 1,201 for IT-FEC, 1.82 ± 0.83 and 1.61 ± 0.78 for IT-FAM, and 2.68 ± 0.33 and 2.72 ± 0.40 for IT-BCS, respectively. Means and SD of bucks for ET-WT were 28.1 ± 4.8 kg and 26.3 ± 4.4 kg, for ET-FEC 1,584 ± 1,229 and 400 ± 417, for ET_FAM 2.4 ± 1.1 and 1.57 ± 0.53, and for ET-BCS 2.7 ± 0.4 and 1.6 ± 0.5 in 2009 and 2010, respectively. The mean ADG were 63.5 ± 30.8 g and 54.4 ± 25.8 g for 2009 and 2010, respectively. In both test years, the correlations between IT-FEC and IT-FAM with IT-WT were negative ($P = 0.5$), but IT-WT with IT-BCS was positive ($P < 0.001$). In 2010 test, correlation between IT-FEC and IT-FAM was positive ($P = 0.06$) and correlation between ET-FEC and ET-FAM was positive ($P = 0.08$) in 2009 test. Between variations among bucks for FEC were large. Lack of pedigree information on bucks restricted the estimation of genetic (co)variances from these data. Phenotypic parameters will be used to simulate performance and pedigree data to conduct genetic analyses.

Key words: gastro-intestinal parasite, meat goats, performance test

T392 Gastro-intestinal parasitic infestation and its relationships with growth performance in meat goats on pasture with supplemental grain feeding test at the Kerr Center in Oklahoma. K. Nadarajah*[1], M. Penick[2], D. L. Kuhlers[1], M. D. Carpenter[1], and D. Rankins[1], *[1]Auburn University, Auburn, AL, [2]Kerr Center, Poteau, OK.*

Understanding the relationships between growth performance and gastro-intestinal parasitic (GIP) infestation in meat goats was the objective in this study that should help in selecting goats for resistance to GIP infestation. Data used for this investigation were collected through the buck performance tests at the Kerr Center in Oklahoma in 2009 (n = 58) and 2010 (n = 60), respectively. Bucks on test were grazed on mixed pasture consisting of bermuda, fescue, lespedeza, warm season native grasses and forbs. Bucks also received approximately 340 g of distillers dried grain per head/d and free choice mineral. Using SAS, phenotypic means, SD and correlations among traits of interest were computed within test-years for fecal egg count (FEC), FAMACHA score (FAM) and growth performance of individual bucks at initial-entry-into-test (IT) and end-of-test (ET). Relationships among bucks for performance were estimated for IT weight (IT-WT), IT-FEC and IT-FAM and ET weight (ET-WT), ET-FEC and ET-FAM as well as overall ADG on test. The means ± SD of bucks entered for test in 2009 and 2010, for IT-WT were 22.5 ± 3.4 kg and 23.3 ± 3.5 kg, respectively. In the respective years, the means and SD of bucks for IT-FEC were 976 ± 1,239 and 405 ± 587, and for IT-FAM were 2.6 ± 0.56 and 2.6 ± 0.62. Means and SD of bucks on test in 2009 and 2010, respectively, at ET as follows: for ET-WT 24.6 ± 3.3 kg and 33.7 ± 3.9 kg, for ET-FEC 1,688 ± 2,540 and 1,290 ± 742, and for ET-FAM 2.1 ± 1.2 and 2.75 ± 0.47. Between variations among bucks were large for FEC across test years. The mean ADG in 2009 test was 19.9 ± 30.8 g and the mean ADG in 2010 was 99.8 ± 34.4 g. In 2009 test, correlation between ET-WT and ET-FAM was negative ($P = 0.09$) and ET-FEC and ET-FAM was positive ($P < 0.01$). In both years, correlations between ET-WT and ADG were positive ($P < 0.001$). Lack of pedigree information on individual bucks restricted the estimation of genetic (co)variances from this data. Phenotypic parameters from this study will be used to simulate pedigree and performance data to conduct genetic analyses.

Key words: gastro-intestinal parasite, meat goats, performance test

T393 Lamb immune status (blood IgG, IgM and chitotriosidase activity) during weaning, preliminary results. L. E. Hernandez-Castellano*[1], A. Morales-delaNuez[1], I. Moreno-Indias[1], D. Sanchez-Macias[1], A. Torres[2,1], A. Arguello[1], J. Capote[2], and N. Castro[1], *[1]Universidad de Las Palmas de Gran Canaria, Arucas, Las Palmas, Spain, [2]Instituto Canario de Investigaciones Agrarias, La Laguna, Tenerife, Spain.*

The effect of weaning on some blood immune status-related parameters was investigated using 10 lambs (Canaria dairy breed). Lambs were raised with ewes until they reached 10 kg of live BW with open access to ewe feed. After that, to start the weaning period, lambs were removed from dams and placed in a pen for 6 wk, with free access to starter feed and water. The ewes were milked once a day (morning). During the first week, lambs had access to ewes twice daily (10:00 a.m. after milking, and 17:00 p.m.). During the second week, lambs accessed ewes once a day (17:00 p.m.), and thereafter, the lambs did not have access to ewes. A blood sample was obtained from lambs before the beginning of weaning protocol and subsequently once a week until the end of the experiment. IgG and IgM were measured using a commercial ELISA (Bethyl Laboratories, Montgomery, TX)

and chitotriosidase activity was determined using a fluorescence assay. Blood plasma IgG concentration before the beginning of weaning protocol was 5.14 mg/mL, which was higher than that at wk 4 of weaning protocol (3.93 mg/mL). At wk 6, the IgG concentration increased to values close to the initial ones (6.24 mg/mL). Weaning did not affect the blood plasma IgM concentration, which ranged from 0.64 to 0.76 mg/mL. Weaning did not affect blood serum chitotriosidase activity, which ranged from 2756 to 3292 nmol/mL/h. In conclusion, it would be necessary to improve the knowledge through further research to avoid decreases in blood IgG concentrations in lambs during the critical period in their growth.

Key words: immunoglobulins, chitotriosidase, lamb

T394 Comparison of FAMACHA scores and need for deworming in hair sheep and meat goats grazed together or sheep grazed alone. S. Hart*[1], T. A. Gipson[1], R. Pirtle[2], and W. Cubbage[2], *[1]E (Kika) de la Garza American Institute for Goat Research, Langston, OK, [2]Oklahoma State University Cooperative Extension, Stillwater.*

This study compared FAMACHA scores and need for deworming in hair sheep and goats being grazed together or hair sheep grazed alone. The study involved Boer and Spanish goats and hair sheep crosses of Katahdin, St. Croix, Dorper, Gulf Coast Native and Barbadoes Blackbelly. Treatments were 1) hair sheep grazed alone (88 hd/16.2 ha) or 2) goats and hair sheep grazed together (38 hd of hair sheep and 71 hd of goats/24.3 ha) on tallgrass native range during the summer (average annual precip. 922 mm). Animals were FAMACHA scored (FS) April 30 at the beginning of the study and animals scoring 4 and 5 were treated with moxidectin (MOX; 10 mL). Animals then were FAMACHA scored May 17, June 8, Jul 26, Aug 18 and Sep 20. Animals with FS of 4 were administered either 2.0 g. of copper oxide wire particles (COWP) or 3.4 g of Cayenne pepper (CP). Animals with a FS of 5 were treated with MOX. Animals that were dewormed were fecal sampled for determination of fecal egg counts (FEC) by McMaster procedure and an additional 3 to 6 animals that were not dewormed were fecal sampled. On the hair sheep and goat treatment, goats had higher FS than hair sheep (3.80 vs. 2.63; $P < 0.01$), higher FEC (532 vs. 188 epg; $P < 0.02$) and required more deworming (61.8 vs. 13.5%; $P < 0.001$). Hair sheep grazing alone had a lower FS than hair sheep grazing with goats (2.20 vs. 2.63; $P < 0.01$), lower FEC (50 vs. 188 epg; $P < 0.01$) and required less deworming (2.1 vs. 13.5%; $P < 0$ 0.001). When animals were administered CP, FEC at the subsequent sampling increased by 63%. whereas COWP decreased FEC 36% at the subsequent sampling. Administration of MOX reduced FEC 47% in the subsequent sampling. Hair sheep grazed with goats had lower FS, lower FEC and required substantially less deworming than the goats they grazed with, but sheep grazing with goats required more deworming than sheep grazing alone. COWP was more effective than CP in reducing FEC.

Key words: gastrointestinal nematodes, alternative anthelmintics

T395 Lack of an effect of pelletized diets containing pumpkin seeds on gastrointestinal nematode fecal egg counts in goats. M. Gooden*[1], E. N. Escobar[1], N. C. Whitley[2], D. J. Jackson-O'Brien[3], and H. Taylor[1], *[1]University of Maryland Eastern Shore, Princess Anne, [2]North Carolina A&T State University, Greensboro, [3]Delaware State University, Dover.*

This investigation evaluated the effect of diets containing ground pumpkin (*Cucurbita* sp.) seeds (PS) on an artificial *Haemonchus contortus* infection in goats. Thirty 6 to 8 mo old female and castrated male Boer-crossbred kids at an average body weight of 25.3 ± 4.9 kg were used. Following a 2-week adjustment period in 6-m^2 individual pens with slotted floors, kids were dewormed with albendazole (10 mg/kg) and moxidectin (0.2 mg/kg). After a 21-d dewormer withdrawal period, all kids were orally inoculated 3 times over 5 d with a 3 mL larval inoculum containing 1,450 H. contortus L3. A pelletized 15% crude protein diet was used as the control (C) feed. The treatment diet was formulated with the same ingredients in C diet plus PS. The pelletized treatment diet contained 200 g PS per kg of feed. Two treatment feed levels were used: PS1 had 100 g PS/kg and consisted of PS2 (treatment diet with 200 g PS/kg) mixed equally with the C feed. Weekly, the goats were weighed, fecal samples were taken to determine fecal egg counts (FEC, eggs/g) using the modified McMaster′s technique, and blood samples were collected to determine percentage packed cell volume (PCV). Only goats with FEC ≥200 epg were used for the study, resulting in 9 C, 4 PS1 and 6 PS2 treated animals. Goats were fed the experimental diets for 4 weeks and individual daily feed intake was recorded. Data were analyzed by SAS PROC MIXED. There was no effect of treatment on FEC or PCV; FEC averaged 608 ± 107 for C, 472 ± 134 for PS1 and 780 ± 160 eggs/g for PS2;PCV were C: 27.9 ± 0.5; PS1: 29.8 ± 0.6 and PS2: 28.5 ± 0.8). Average daily feed intake was higher (treatment by week, $P < 0.01$) for the goats eating C diet than PS1 or PS2 for the study′s first 2 weeks only and were similar for the last 2 weeks. Weekly BW was lowest for wk 1 for C but was similar for PS goats over time (treatment by week, $P < 0.05$). In this experiment, PS did not reduce gastrointestinal nematode fecal egg counts in goats, but more research is needed.

Key words: *H. contortus*, goats, fecal egg counts

T396 Comparative efficacies of alternative anthelmintics against natural nematode infection in grazing goats. P. B. Collyer* and E. G. Brown, *Stephen F. Austin State University, Nacogdoches, TX.*

The objective was to determine the efficacy of 3 anthelmintic treatments in East Texas Boer goats. Goats (n = 22) were treated based on sex, age, and initial fecal egg count (FEC). Goats were given a single treatment (TR) that included control (no anthelmintic), Cydectin oral sheep drench (CY, 0.4 mg/kg BW orally), copper wire particles (COWP) in a gel capsule (Copasure, goats <5 mo 1g, goats >5 mo 3 g orally) or cayenne pepper (CP) in a gel capsule (goats <5 mo 3g; goats >5 mo 6g orally). FEC were performed with the FECPAK system. Body weight, FAMACHA score and packed cell volume (PCV) were measured on the day before beginning TR, and weekly for 6 weeks. The obtained measurements were evaluated with a permutation test. COWP reduced nematode eggs ($P < 0.03$) for 2 weeks beginning the second week after TR. CP and CY reduced nematode egg numbers after one week ($P = 0.01$ and 0.03, respectively). FAMACHA scores decreased with COWP after one ($P = 0.01$) and after 3 weeks ($P = 0.03$). FAMACHA scores decreased with CY after 3 weeks ($P = 0.05$). Five weeks post treatment, FAMACHA scores were lower in goats that had been treated with CP compared with the COWP group ($P = 0.04$). Furthermore, COWP TR demonstrated higher FAMACHA scores than the control group after 5 weeks ($P = 0.04$), and also higher FAMACHA scores than CY treated goats after 5 weeks ($P = 0.04$). FAMACHA score and PCV were negatively correlated ($r = -0.31$, $P = 0.01$). Changes in PCV were not evident with any of the treatments. Increase in body weight was seen with COWP after one week of treatment ($P = 0.04$), three weeks ($P = 0.02$), four weeks ($P = 0.02$) and five weeks ($P = 0.02$). Goats treated with CP had an increase in body weight after

4 weeks ($P = 0.04$) and 5 weeks ($P = 0.05$) compared to goats who had received COWP. Results indicate that the onset of FEC reduction with COWP is later and the duration longer, compared to CY and CP, which demonstrated a comparable result in reducing FEC, but shorter in duration. Thus, as an affordable alternative treatment, CP might be considered for a short-interval dosing regimen.

Key words: cayenne pepper, goats, anthelmintic

T397 Effects of immunomodulatory substances added to milk replacer on white blood cell populations during weaning. S. Paez Lama, A. Morales-delaNuez, V. Mendoza-Grimon, L. E. Hernandez-Castellano, D. Sanchez-Macias, N. Castro, and A. Arguello*, *Universidad de Las Palmas de Gran Canaria, Arucas, Las Palmas, Spain.*

To investigate the effect of immunomodulatory substances added to milk replacers on white blood cell populations during the first week of weaning, 21 goat kids (Majorera dairy breed) were randomly allotted into 3 groups. The first group was a control (CON), the second group received a daily dose of 200 mg/kg BW of *Echinacea purpurea* (ECH) and the third group received a daily dose of 20 mg/kg BW of *Polypodium leucotomos* (POL). Goat kids were artificially raised with a milk replacer ad libitum until they reach 10 kg of life BW. After that, animals were enrolled in the weaning protocol. Starter and fresh water were available throughout the weaning period. The first weaning week goat kids received 1 L/d of milk replacer twice daily (morning and afternoon). A blood sample was obtained before starting the weaning protocol and at the end of the first week in heparin containers. Immediately after collection, 50 µL of unclotted blood were added with 5 µL of CD4 (FITC) and 5 µL of CD8 (RPE) monoclonal antibodies (Serotec, Dusseldorf, Germany) and the reaction ran for 15 min at room temperature. After that, 50 µL of Optilyse (Beckman Coulter, Brea, CA) were added and the reaction ran for 15 min at room temperature to lyses red blood cells. Subsequently, 150 µL of saline serum were added to clarify the solution. Fifteen minutes later, the samples were redden using an FC500 flow cytometry device (Beckman Coulter, Brea, CA). An ANOVA (with repeated measures) procedure from SAS was used. Two white blood cell populations were observed clearly, lymphocytes plus macrophages (L+M) and polymorphonuclear (PMN) at both tested times. Control L+M, PMN and CD8 lymphocytes per mL were lower ($P \leq 0.05$) than in preweaning samples but no differences were observed with ECH and POL. Control and ECH CD4 lymphocytes per mL were lower ($P \leq 0.05$) than preweaning samples and POL kids. The addition of immunomodulatory substances would improve the immune status during the weaning in goat kids.

Key words: goat kid, weaning, immunomodulatory

T398 Goat browsing for invasive shrub and internal parasite control. J. C. Warren*[1], D. J. O'Brien[1], C. Heckscher[1], R. Beaman[2], and N. C. Whitley[3], *[1]Delaware State University, Dover, [2]Delaware Department of Transportation, Dover, [3]North Carolina A&T State University, Greensboro.*

The objectives of this study were to determine whether goats were effective in the control of Autumn Olive (AO; *Elaeagnus umbellate*), Multiflora Rose (MR; *Rosa multiflora*), and Japanese Honeysuckle (JH; *Lonicera japonica*) and whether browsing controls internal parasites in goats. 1.95 ha of land was divided into 5 fenced paddocks with 3 treatment (TRT; with goats; 0.45 ha each) and 2 control (CON; without goats; 0.30 ha each) paddocks at the study site, Wrangle Hill (WH). At the University farm site, Hickory Hill (HH), 1.35 ha of mixed grass/legume pasture was divided into 3 fenced paddocks (0.45 ha each). Seventy crossbred meat type goats averaging 745 ± 146 d of age and 39.3 ± 7.2 kg BW from the HH herd were used in the experiment (n = 35/location). Goats at WH were used to browse each TRT for 14 d, after which they were moved to the next TRT. At HH, goats grazed paddocks in the same 14-d rotations concurrently with WH goats. The study lasted 112 d. On rotation days, WH paddocks were analyzed for percentage ground cover and visual estimates were made for AO, MR, and JH using the double DAFOR method; additionally, at this time, for both sites, animal BW and FAMACHA scores were measured and recorded and fecal samples were collected to determine fecal egg counts (FEC) in eggs per gram (epg) using the modified McMaster′s technique. All data was analyzed using the PROC MIXED procedure of SAS. Visual Estimates of both AO and MR were similar between treatments, but JH decreased ($P < 0.01$) in the TRT paddocks compared with the CON over the study period. Browsing goats did not influence groundcover percentage. Goat BW and FAMACHA scores were not influenced by site and averaged 43.2 ± 3.3 kg and 3.1 ± 0.1, respectively. There was a location by d effect with WH goats having lower FEC ($P < 0.05$) than HH goats on d 14 (216 ± 90 and 476 ± 90 epg, respectively), d 42 (33.0 ± 63 and 206 ± 63 epg, respectively), d 56 (45.0 ± 66 and 368 ± 68 epg, respectively), and d 112 (219 ± 83 and 621 ± 82 epg, respectively). In summary, browsing reduced FEC in goats and decreased JH during one grazing season. Multiple grazing seasons may be required to have an impact on AO and MR.

Key words: goat, parasites, invasive shrubs

T399 Gastrointestinal nematode (GIN) resistance and GIN management on small ruminant farms in the mid-Atlantic U.S. D. J. O'Brien[1], K. K. Matthews*[1], E. K. Crook[2], N. C. Whitley[3], B. Storey[4], S. Howell[4], and R. Kaplan[4], *[1]Delaware State University, Dover, [2]Virginia Maryland Regional College of Veterinary Medicine, Blacksburg, [3]North Carolina A & T State University, Greensboro, [4]University of Georgia, Athens.*

The objective was to characterize gastrointestinal nematode (GIN) anthelmintic resistance and parasite control programs on 20 goat and 13 sheep farms in DE (10 farms), MD (10 farms), VA (3 farms), WV (4 farms), and PA (6 farms). Farms were evaluated for GIN resistance to benzimidazole (BZ), ivermectin (IVM), moxidectin (MOX), and levamisole (LEV) using the DrenchRite Larval Development Assay. Fecal samples were collected rectally from at least 10 animals on each farm, placed into labeled zippered bags, and shipped to the University of Georgia for analysis. Completion of a survey to determine previous anthelmintic use and current integrated parasite management methods as part of an overall parasite control program was required of farmers participating. On 100% of farms tested, BZ was ineffective; IVM was ineffective on 79% (26/33) of farms, and MOX was ineffective on 48% (16/33) while LEV was only ineffective on 27% (9/33) of farms tested. Rotational grazing, FAMACHA, fecal egg counts, or mixed species grazing were strategies utilized to help control parasites on 62, 48, 14, and 7% of farms, respectively. The most common anthelmintics previously used by producers was a combination of BZ, IVM, and MOX on 72% of farms. Overall, 90, 79, and 31% of producers had previously utilized macrocyclic lactones (IVM and MOX), BZ and LEV, respectively; 86% of producers had utilized 2 or more classes of anthelmintics, while 17% of producers had utilized all 3 classes of anthelmintics. When asked about frequency of anthelmintic treatments, most participants utilized selective drenching techniques (41%) or used anthelmintics one to 3 times per year (41%). The remaining 17% treated with anthelmintics more than 4 times/year. Results indi-

cate that GIN resistance is a serious problem on small ruminant farms in the mid-Atlantic region, but that producers seem to be trying to utilize some types of integrated parasite control strategies to extend the efficacy of available anthelmintics.

Key words: small ruminants, parasite resistance, FAMACHA

T400 Effects of supplemental dried distillers grains on performance and internal parasites of grazing lambs. C. L. Pickworth*[1], T. L. Felix[1], I. Susin[2], L. M. Shoup[1], and S. C. Loerch[1], *[1]The Ohio State University, Wooster, [2]Universidade de São Paulo, Piracicaba, São Paulo, Brazil.*

Weaned lambs grazing on pasture have high susceptibility to internal parasites which can greatly reduce growth rates and can contribute to lamb mortality. The objective of these studies was to investigate the effects of supplementing weaned lambs grazing orchardgrass pastures with dried distillers grains with soluble (DDGS) or soybean hulls (SH) on parasitism, growth rate, and cost of production. In each experiment, lambs were assessed weekly for 10 wk for parasitism based on FAMACHA eye scores and BW was recorded. Every 3 wk, blood hematocrit and fecal egg counts were determined. Lambs with FAMACHA scores of ≥ 3 were treated with an anthelmintic. Each treatment was replicated in 2 paddocks and data were analyzed as a completely randomized design. In Exp. 1, 62 lambs (26.3 ± 0.1 kg) were allotted to 4 paddocks. The treatments were a control with no supplementation (CONT) or 0.53 kg/head supplemental DDGS (SDG1). The SDG1 lambs had greater ($P < 0.01$) ADG and decreased ($P < 0.01$) anthelmintic costs because fewer lambs were treated (19 vs. 90% for SDG1 and CONT, respectively). In Exp. 2, 96 lambs (25.1 ± 0.4 kg) were allotted to 6 paddocks. The treatments included a CONT, 0.61 kg/head supplemental SH (SSH), or 0.63 kg/head supplemental DDGS (SDG2). The SSH and SDG2 lambs had greater ($P < 0.01$) ADG as compared with CONT lambs (95, 188, and 224 g/d for CONT, SSH, and SDG2, respectively). Both SSH and SDG2 reduced ($P < 0.02$) percent of lambs treated with anthelmintics (31 and 9%, respectively) when compared with CONT (81%). The FAMACHA scores were improved ($P < 0.01$) for SSH and SDG2 lambs than CONT on d 22, 43, and 72. In Exp. 3, 92 lambs (21.0 ± 0.5 kg) were allotted to 6 paddocks. The treatments included CONT, 0.59 kg/head supplemental SH with 0.7% P from monosodium phosphate (SSHP), or 0.54 kg/head supplemental DDGS (SDG3).The ADG was greater ($P < 0.03$) for SDG3 and SSHP than CONT. Only 52% of SDG3 lambs were treated with anthelmintics as compared with 87.5% of CONT or 71.9% of SSHP lambs. In all 3 studies, supplementation of DDGS reduced parasitism and improved weaned lamb growth rates on pasture.

Key words: distillers grains, parasites, lambs

T401 Feeding North American panicled tick-clover containing condensed tannins to growing goats reduces *Haemonchus contortus* infection. N. M. Cherry[1], B. D. Lambert*[1,2], J. P. Muir[1], M. Bullinger[2], J. E. Miller[3], R. M. Kaplan[4], and T. R. Whitney[5], *[1]Texas Agrilife Research, Stephenville, [2]Tarleton State University, Stephenville, TX, [3]Louisiana State University, Baton Rouge, [4]The University of Georgia, Athens, [5]Texas Agrilife Research, San Angelo.*

A major obstacle for goat production, especially in warm humid and sub-humid regions, is gastrointestinal nematodes, specifically *Haemonchus contortus* (HC; barberpole worm). Recent concern over resistance to commercial anthelmintics has led to the search for other ways to suppress HC populations. Condensed tannins (CT) from *Lespedeza cuneata* (sericea lespedeza, SL) have proven effective in suppressing HC but this legume cannot be grown in some edapho-climatic conditions or situations in which aggressive exotics are not ideal. So the search for native legumes that contain equally effective CT while still providing crude protein (CP) continues. In this study alfalfa, SL and a native North American herbaceous legume *Desmodium paniculatum* (panicled tick-clover; PTC) were pelleted into a complete feed that contained 3.94% CT, 18% CP and 2.8 Mcal/kg digestible energy and fed to goats at 3.5% of their body weight. At d 0 average fecal egg counts (FEC) for all infected animals was 2190; by d 14, FEC in kids fed PTC were 2976 and by d 28 FEC were 2665 compared with 4920 and 4560 for infected alfalfa on d 14 and 28, respectively. By d 28 FEC for infected animals fed SL and PTC were not different from each other but were 44% lower than infected animals in the alfalfa treatment. Packed cell volumes throughout the trial were not different among goats fed SL, PTC, or alfalfa. Results indicate that the North American native legume panicled tick-clover has potential as an HC suppressant.

Key words: *Haemonchus contortus*, condensed tannin, panicled tick-clover

T402 Demographic factors of meat goat producers completing an online certification program. T. A. Gipson*, R. C. Merkel, and T. Sahlu, *American Institute for Goat Research, Langston Univ., Langston, OK.*

In 2006, an online training program for meat goat producers was unveiled, consisting of 22 learning modules (http://www2.luresext.edu/goats/training/qa.html). Participants take a pre-test for each module and if a score of 85% or greater is recorded, the post-test is not required. If required, participants may retake the post-test until a passing score of 85% or greater is achieved. For certification, passing scores are required on all 16 required modules and a minimum of 3 elective modules. Demographic data are collected upon enrollment. Participants had the option of not responding to certain demographic questions and those observations were removed from this analysis. As of the end of 2010, 198 of 1,430 enrollees successfully completed the certification program, with 182 from the US and 16 from foreign countries. For those 182 certified in the US, a higher percentage (62%, $\chi^2 = 143.2$, $P < 0.01$) was from the South than from any other region, followed by 22, 12, and 4% from the Midwest, West, and Northeast, respectively. All certified producers reported their gender and there were more males (60% vs. 40%, $\chi^2 = 8.1$, $P < 0.01$) than females. Of the certified, 92% responded to the question on race, and an overwhelming percentage classified themselves as white (89%, $\chi^2 = 686.5$, $P < 0.01$ for equal proportions); however, this is similar to the US population as a whole (89% vs. 80%, $\chi^2 = 0.1$, $P = 0.73$). The response to a question on farm size was 88%; 9% owned <2 ha, 43% 2–8 ha, 14% 9–16 ha, 13% 17–32 ha, 9% 33–65 ha, 8% 66–130 ha, and 4% > 130 ha ($\chi^2 = 162.5$, $P < 0.01$). An 84% of the certified responded to a question on occupation; 78% were part-time farmers and 22% were full-time ($\chi^2 = 53.2$, $P < 0.01$). The response of those certified to a query on herd size was 82%, with 46% owning less than 25 goats, 29% 25–49, 16% 50–99, 6% 100–250, and 3% greater than 250 ($\chi^2 = 103.9$, $P < 0.01$). Demographics indicate that the typical certified participant is a white male living in the southern US and farming part-time with less than 25 goats on 2–8 ha.

Key words: goats, online, training

T403 Variability among enumerators in assigning body condition scores in meat goats. R. C. Merkel* and T. A. Gipson, *Langston University, Langston, OK.*

Body condition score (BCS) is a subjective measure of an animal's condition. In research settings, teams of 3 enumerators determine a true BCS, defined as the median score. The variability among team member scores in determining an animal's true BCS is not well studied. Twenty-four Spanish (28 – 40 wk of age; 26.6 ± 4.43 kg) and 28 predominately Boer (B) blood (24 - 75%B, 4 – 100%B; 33 – 46 wk of age; 33.9 ± 6.99 kg) wethers were allocated to 4 groups having equal breed numbers. Goats were raised on pasture with unlimited access to alfalfa hay with 2 groups consuming either 0.5% or 1.5% BW of a pelleted diet (16% CP, 29% ADF, 60% TDN). BCS (1 = very thin, 5 = obese, 0.25 increments) was taken bi-weekly by the same 3 enumerators with the median value recorded as the true BCS. A total of 1728 observations (576 per enumerator) were recorded. Data was analyzed using repeated measures. The repeatability score was 0.6 ± 0.05. Median BCS and percent of individual scores at the median, respectively, for the BCS given throughout the trial were 2.0, 0.35; 2.25, 1.56; 2.5, 25.0; 2.75, 43.4; 3.0, 20.0; 3.25, 5.9; and 3.5, 3.8 ($\chi^2 = 107.1$, $P < 0.01$). On the same animal at the same time, all enumerators gave the same BCS 37.9 and 2 of the 3 enumerators agreed 56.4% of the time. When only 2 enumerators agreed, enumerators A and B, B and C, and A and C agreed 24.3, 17.7, and 14.4% of the time, respectively. In only 5.7% of animals were all 3 scores different. All scores were either at the median, 0.25 above, 0.25 below, 0.5 above, or 0.5 below (77.4, 10.8, 11.2, 0.23, and 0.46%, respectively; $\chi^2 = 166.2$ $P < 0.01$ for equal distribution). In no instance did an individual score deviate from the median by 0.75 of a score. Results show close agreement in assigning BCS to growing meat goats with 99.4% of scores given by enumerators either at or within 0.25 of the median score. In 94.3% of animals scored by 3 enumerators, at least 2 scores were at the median whereas combinations of 2 enumerators giving the same score ranged from 52.3 to 62.2%. Data confirms that 3 enumerators are preferable to 2 in determining an animal's true BCS.

Key words: body condition score, meat goats

T404 Comparative effect of implants with trenbolone-estradiol or zeranol on feedlot-performance of Katahdin × Pelibuey hair-lambs. B. Ortiz*[1], A. Camacho[1], N. E. Villalba[2], L. R. Flores[1], J. J. Lomeli[1], J. A. Romo[1], and R. Barajas[1], *[1]FMVZ-Universidad Autonóma de Sinaloa, Culiacán, Sinaloa, México, [2]Agricola Ganadera Mojolo, Culiacán, Sinaloa, México.*

The objective of this study was to compare the effect of trenbolone-estradiol and zeranol implants on feedlot-performance of Katahdin × Pelibuey lambs. Thirty-six lambs 3/4 Katahdin × 1/4 Pelibuey (24.23 ± SE 0.67 kg of initial BW) were assigned to 1 of 3 treatments. In groups of 3, lambs were placed in elevated (0.6 m) plastic floor pens (0.9 × 1.9 m). In a completely randomized block design lambs were assigned to next treatments: 1) Feeding with a 95% concentrate corn-canola meal based diet (14.2% CP; 2 Mcal of NEm/kg) without hormonal implant (CTRL); 2) Diet similar to CTRL and implanted with 12 mg of zeranol (one pellet of Ralgro implant; Intervet Schering-Plough Animal Health); and 3) Diet similar to CTRL and implanted with 40 mg of trenbolone acetate and 8 mg of estradiol (2 pellets of Component-TES; ELANCO). Lambs were weighed on d 28 and 49. During first 28 d, lambs implanted with trenbolone-estradiol were 8.5% heavier ($P = 0.02$), gain 27.8% more weight ($P = 0.03$), and had a gain/feed ratio 14% higher ($P = 0.05$) than CTRL. Zeranol was not different from the other 2 treatments ($P > 0.10$). From d-29 to 49, there was not effect of treatments ($P > 0.10$). Over the complete 49-d experiment, lambs implanted with trenbolone-estradiol gain 18.9% more weight than CTRL ($P = 0.04$). Zeranol implant did not show any effect ($P > 0.10$). It is concluded, that trenbolone-estradiol implants are better option than zeranol implants to promote feedlot performance of Katahdin × Pelibuey hair-lambs.

Key words: feedlot-performance, lambs, trenbolone

T405 Influence of zeranol implant on performance of Dorper × Katahdin feedlot lambs. B. Ortiz*[1], A. Camacho[1], N. E. Villalba[2], L. R. Flores[1], J. J. Lomeli[1], J. A. Romo[1], and R. Barajas[1], *[1]FMVZ-Universidad Autonóma de Sinaloa, Culiacán, Sinaloa, México, [2]Agricola Ganadera Mojolo, Culiacán, Sinaloa, México.*

With the objective to determine the influence of zeranol implant on performance of feedlot lambs. A 35-d feedlot experiment was performed. Twenty-four lambs ¾ Dorper × ¼ Katahdin with 29.23 ± SE 0.87 kg of initial weight were used. In groups of three, lambs were placed in elevated (0.6 m) plastic floor pens (0.9 × 1.9 m) fitted with automatic drinker. Animal were blocked by weight, and in agreement with a completely randomized block design were assigned to 1 of 2 treatments: 1) Feeding with a 95% concentrate corn-canola meal based diet (14.18% CP; 2.002 Mcal of NEm/kg) without hormonal implant (CTRL); or 2) Diet similar to CTRL and ear implanted with 12 mg of zeranol. Commercial presentation of Ralgro implant cartridge (Intervet Schering-Plough Animal Health) contains 36 mg of zeranol (12 mg by each pellet). One Ralgro pellet was used to obtain the dosage of 12 mg of zeranol. Lambs were feed ad libitum. Final weight was not affected ($P > 0.20$) by implant (38.8 vs. 40.5 kg). Average daily gain was improved 20% ($P = 0.06$) by zeranol implant 273 vs. 329 g/d for CTRL and Zeranol, respectively. Dry matter intake (1.23 ± SE 0.03 kg/d) was not affected by treatments ($P > 0.20$). Lambs that received zeranol implant showed a feed/gain ratio 25% higher ($P = 0.02$) than non implanted lambs. It is concluded that implantation with 12 mg of zeranol is enough to improve feedlot performance of Dorper × Katahdin feedlot lambs

Key words: feedlot-performance, lambs, zeranol

T406 Seasonal changes in chemical composition of Hungarian raw goat′s milk. L. Varga*, *Department of Dairy Science, Institute of Food Science, Faculty of Agricultural and Food Sciences, University of West Hungary, Mosonmagyarovar, Hungary.*

The aim of this research was to monitor the changes in chemical composition, acidity, and freezing point of raw caprine milk during lactation, from milking to refrigerated storage, on a Hungarian dairy goat farm. The herd involved in the study consisted of approximately 200 goats belonging to a Hungarian native breed. The following sampling locations were selected: (i) individual animals, (ii) milk sampling unit in pipeline, (iii) milk flowing from pipeline into refrigerated bulk tank, and (iv) refrigerated bulk tank. Four samples were taken each time at each sampling location, and samples were collected biweekly over a 7-mo period from May through November. The data was subjected to ANOVA using the general linear model procedure of Statistica data analysis software system, version 9.1 (StatSoft Inc., Tulsa, OK). Significant differences among the means were determined by using Duncan′s multiple comparison test at $P < 0.05$ (StatSoft). A total of 216 sample units were tested. In terms of all the chemical components analyzed, decreased values were found in the samples compared with the average gross composition of goat′s milk. Fat and protein contents

were especially low in the first 5 mo of the study, and the concentrations of these components were not influenced ($P > 0.05$) by the sampling location. Similarly, lactose levels were rather low with values ranging from 4.1% to 4.3% (w/w) all through the study. It is worth mentioning, however, that the raw goat milk samples collected contained no extraneous water and their pH was mostly acceptable. The low freezing points, together with the low lactose contents, suggested that the milk produced by Hungarian native goats must have contained high levels of minerals. In conclusion, because profitability of milk production and processing largely depends on the fat and protein contents of raw milk, the levels of these components need to be increased by genetic improvement and nutrition of goats.This work was supported by the National Development Agency of Hungary (Project No.: TÁMOP-4.2.1.B-09/1/KONV-2010-0006).

Key words: goat milk, chemical composition, freezing point

T407 Examination of microbiological and physicochemical quality of raw materials and end products during manufacture of cheeses from caprine and ovine milk. L. Varga*, *Department of Dairy Science, Institute of Food Science, Faculty of Agricultural and Food Sciences, University of West Hungary, Mosonmagyarovar, Hungary.*

In Hungary, over 99% of the raw milk processed commercially is bovine milk. Only a few thousand tonnes of milk are produced annually by small ruminants. The majority of ovine and caprine milk is processed into various types of cheese, which have gained popularity among Hungarian consumers in recent years. For this reason, the purpose of the present study was to monitor the manufacturing process of semi-hard cheeses made from sheep and goat milk in a small-size cheesemaking factory located in the northwestern part of the country. Raw bulk milks were analyzed for aerobic mesophilic microorganisms, coagulase-positive staphylococci, inhibitory substances, total solids, fat, protein, lactose, solids-non-fat, pH and freezing point. In addition to detection of *Salmonella* spp. and *Listeria monocytogenes*, viable counts of the following microorganisms were enumerated in pasteurized milk and cheeses: coliforms, *Escherichia coli*, yeasts, molds, coagulase-positive staphylococci, and mesophilic sulfite-reducing clostridia. Pasteurized milk samples were also tested for the same physicochemical attributes as raw bulk milk samples. As for cheese samples, total solids and fat measurements were made. The results showed that the overall microbiological quality of raw goat milk was slightly better than that of raw sheep milk; however, total plate counts and coagulase-positive staphylococci counts were rather high in both types of milk. The mean protein content of caprine milk was as low as 2.99%, which should be considerably increased by breeding and feeding methods. By contrast, ovine milk had a mean protein level of 6.94%. None of the raw milk batches processed contained extraneous water because their freezing point was well below −0.520°C in each case. In conclusion, both raw goat and sheep milk were effectively heat-treated and this, together with the proper implementation of manufacturing technology, resulted in high quality and microbiologically safe finished products. This work was supported by the National Development Agency of Hungary (Project No.: TÁMOP-4.2.1.B-09/1/KONV-2010–0006).

Key words: goat milk, sheep milk, cheese

T408 Milk yield and milk composition of ewes fed diets with canola oil or linseed oil. C. P. Nolli*, I. Susin, A. V. Pires, M. O. Maia, E. M. Ferreira, R. S. Gentil, and D. Eysink, *University of São Paulo/ESALQ, Piracicaba, SP, Brazil.*

Sheep rations have a diversity of sources and some ingredients can improve animal growth and product quality. Additionally, vegetable oils can modify milk fatty acid profile and are an alternative to achieve nutritional requirements, especially in early lactation. Thirty 3 Santa Inês ewes (63.9 ± 9.3 kg BW and 12 ± 2 DIM) were penned individually and assigned to a randomized complete block design to determine the effects of adding canola or linseed oil on lactation performance. Ewes were fed a basal diet (13% CP and 54% NDF, DM basis) containing 50% concentrate and 50% coastcross hay. The experimental treatments included control (0% oil, CONT), canola oil (3% oil, CAN) or linseed oil (3% oil, LIN). Ewes were fed the diets from wk 2 to 8 of lactation. Milk production was determined every 7 d during the experiment. Ewes were separated from lambs, oxytocin (10 IU) was infused i.v. to stimulate milk letdown and ewes were mechanically milked. After 3 h the procedure was repeated, milk production recorded and a sample collected for milk composition analysis. Ewes were weighed for 3 consecutive days at the start and at the end of the experiment. Data were analyzed using the MIXED procedure of SAS and means compared by Tukey Test. No effect was observed on DMI among treatments (2.5, 2.2 and 2.3 kg/d for CONT, CAN and LIN, respectively). Milk production in 3 h (177, 164 and 152 g for CONT, CAN and LIN, respectively), milk fat, milk protein and total solids were not different ($P \geq 0.05$) among diets. Final BW was greater for LIN fed ewes compared with CAN fed ewes (64.9, 63.5 and 69.4 kg for CONT, CAN and LIN, respectively). Adding 3% of canola oil or linseed oil in diets had no detrimental effect on DMI, milk yield and milk composition of ewes.

Key words: lactation, lipids, sheep

T409 The mammary gland of the Canarian dairy goats undergone two different milking frequencies: morphological characterization of the tissular components. A. Suarez-Trujillo[1], J. Capote[2], A. Arguello[1], A. Arencibia[1], N. Castro[1], J. Morales[1], and M. A. Rivero*[1], *[1]Universidad de Las Palmas de Gran Canaria, Arucas, Las Palmas, Spain, [2]Instituto Canario de Investigaciones Agrarias, La Laguna, Tenerife, Spain.*

The morphological characteristics of the tissular components of the mammary gland in Canarian dairy goats were studied. Furthermore, the influence of the milking frequency on the histological composition of the mammary parenchyma was determined. The udders of 9 goats of the 3 autochthonous breeds of the Canary Islands (Majorera, Tinerfeña and Palmera) were milked at different frequencies: right half udder was milked twice a day and left half udder was milked once a day. Two samples of each gland were obtained and histologicaly processed. The samples were photographed randomly choosing different fields, which were processed by morphometric analysis software (Image-Pro plus 4.5). The tissular components measured were the secretor tissue, connective tissue, excretor tissue and vascular tissue. In Majorera goats parenchyma the major percentage of tissue are secretor tissues, and the connective tissue was observed in a higher percentage in Tinerfeña goats than in the other studied breeds. No difference was observed between the 2 milking frequencies. We conclude that the use of once daily milking or twice daily milking does not have consequences on the histological structure of the mammary gland. However, the 3 Canary dairy goats have different tissular percentages, which could explain their distinct milk yield.

Key words: goat kid, mammary gland, milking frequency