breeds. Purebred Angus (A), Brahman (B) and Romosinuano (R) cows grazing Bahiagrass pastures, all nursing 2 to 3 mo old calves were used. External markers were administered to four cows of each breed using an intraruminal device that continuously delivered 320 mg of C32 and C36 daily. After 7 d for equilibration, forage and feces (10 samples/cow) were collected over the next 2 wk. All samples were lyophilized and ground to pass a 1 mm screen. Alkanes were extracted and analyzed by gas chromatography. Digestibility was calculated from the ratio of C31, C33, or C35 in the forage and feces. Ratios of C31/C32, C32/C33, and C35/C36 in feces were to quantify fecal output and intake as a proportion of body weight (BW). Digestibility and intake values were analyzed using a repeated measures model where animals were repeated measures over days using a compound symmetry covariance structure. Coefficients of variation (CV) in digestibility among animals were 2.44, 3.49, and 5.98 % for C31, C33, and C35, respectively, quite low and similar to pen fed measurements. Digestibility was different (P < 0.05) among breeds when estimated with C31 (73, 75 and 73 %) or C35 (64, 63, and 59 %, for A, B and R cows, respectively). Estimates made with C33 approached significance (P = 0.055) with estimates of 71, 71, and 68 % for A, B and R cows. Intake CVs were 27, 20, and 28 % for ratios of C31/C32, C32/C33, and C35/C36, respectively. Mean intakes were 53, 39, and 46 g/kg BW daily for the three alkanes, and were not different among breeds. Mean intake values appeared to be biased upward, possibly due to rather large adjustments for the amount of C32 (13.5 ppm) and C36 (24.6 ppm) in forage samples. Use of other forage species with lower amounts of C32 and C36 should improve estimates of intake. Estimates of intake and digestibility differed with different alkane pairs.

Key Words: Forage intake, Alkanes, Grazing

448 Effect of grazing management on cattle distribution patterns.
M. Haan*, J. Russell, J. Davis, D. Strohbehn, D. Morrical, and W. Powers, *Iowa State University, Ames*.

Because of concern that grazing cattle may elevate nutrient and sediment loads in surface waters, a study was conducted to measure spatial and temporal distribution, defecation, and urination patterns of cattle managed by different stocking systems. Six 12.1-ha cool-season grass pastures were divided into 2 blocks and assigned one of three treatments; continuous stocking - unrestricted stream access (CSU), continuous stocking - restricted stream access (CSR), and rotational stocking (RS). Pastures were stocked with 15 fall-calving Angus cows (650 kg) from May to October 2005. Cow location and activity were recorded at 10 min intervals from 0600 to 1800 h on two consecutive days during 7 observation periods during the grazing season. Location was defined as within stream and 0 to 33.5 m, 33.5 to 67 m, and more than 67 m from the stream. Activities included the number of cattle present, urination, and defecation. The use of RS and CSR decreased (P<0.05) time cows spent in the stream and within 33.5 m of the stream and increased (P<0.05) time spent greater than 67 m from the stream compared to CSU. There was no effect of observation period or observation period × treatment interaction on time cattle spent in the stream. Significant treatment by observation period interactions existed (P<0.05) for time cows spent 0 to 33.5 m from the stream. Cows managed by RS spent 46% of their time in the stream during the September 17 observation period while during other observation periods, cows in the RS pastures spent approximately 1% of their time in the stream. Cows in the CSU pastures spent more than 20% of their time from 0 to 33.5 m from the stream during the May 23 and September 17 observation periods and less (P<0.05) time during other observation periods. In CSR pastures cows spent approximately 1% of their time 0 to 33.5 m from the stream for all observation periods. Patterns of defecation and urination distribution followed that of cow distribution. Compared to CSU, RS and CSR are potential management strategies for decreasing negative impacts of cattle behavior on water quality.

Key Words: Grazing, Animal behavior

Goat Species: Improving Meat, Milk and Parasite Control in Goats

449 Indicators of fitness in Boer, Kiko, and Spanish does managed on pasture in Tennessee (Year 2).
R. Browning, Jr.*, B. Donnelly, T. Payton, M. L. Leite-Browning, P. Pandya, W. Hendrixson, and M. Byars, *Tennessee State University - IAgER, Nashville*.

Boer (BR; n = 55), Kiko (KK; n = 51), and Spanish (SP; n = 50) straightbred does representing a broad base of within-breed genetic lines were managed together on pasture from September 2004 to August 2005. Three-quarters of each breed were mated in October and the remainder bred in December. Herd health records were analyzed by GLM for the 2004-2005 production year to assess animal fitness under the prevailing production environment. Does were treated for hoof scald and hoof rot upon observed lameness. Breeds differed (P < 0.01) for lameness cases treated during the year. Boer does required more (P < 0.01) treatments for lameness (2.15 ± 0.19 cases/doe) than SP (0.80 ± 0.2 cases/doe) or KK (0.57 ± 0.2 cases/doe). A higher (P < 0.01) frequency of BR required hoof treatments per year compared with SP or KK (86.9 vs. 37.7 and 36.9 ± 6.2%, respectively). Does due to kid in March were dewormed with ivermectin as a group in February. All does were dewormed with moxidectin individually at parturition.

Individual does presenting clinical signs of internal parasitism during the year received extra anthelmintic treatments. Breeds differed (P < 0.01) for extra anthelmintic treatments. Extra dewormings were more numerous for BR than for SP or KK (0.56 vs. 0.23 and 0.13 ± 0.08 cases/doe, respectively). A higher (P < 0.01) frequency of BR received extra dewormings during the year (43.1 ± 5.5%) compared to SP (17.3 ± 5.8%) or KK (13.1 ± 5.7%). Fecal egg counts (FEC) were determined on a random subset of does (31 BR, 28 KK, 25 SP) across kidding groups near the weaning of kids at 3 mo of age (June and August). Breed affected (P < 0.01) log-transformed FEC with values higher (P < 0.04) for BR than for SP. Geometric mean FEC for BR, KK and SP were 419, 274, and 137 eggs/g, respectively. The proportion of does weaning kids and doe survival rate through the production year were lower (P < 0.01) for BR does (67 ± 5%, 84 ± 4%) than for KK (88 ± 6%, 98 ± 4%), SP does were intermediate (82 ± 6%, 90 ± 4%). Results mirror Year 1 and suggest differences among meat goat breeds for doe fitness under southeastern US conditions.

Key Words: Breed, Fitness, Meat goats

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450 Concentrate protein level for finishing intact or castrated Boer-cross meat goats. M. Poore*, A. Shaeffer, S. Freeman, H. Glennon, and J.-M. Luginbuhl, *North Carolina State University, Raleigh*.

Producers often add value to meat goats by feeding after weaning, but information on post-weaning nutrient requirements are limited. Some producers castrate male kids destined for post-weaning feeding programs, whereas others leave kids intact. Data to evaluate the practice of castration are also limited. This trial was conducted to evaluate protein level in a pelleted concentrate fed post-weaning to kids that were either intact or castrated at birth. Kids were at least ¾ Boer. As kids were born, litters within doe age and litter size were randomly designated to be castrated or left intact until there were 21 intact and 19 castrated males generated. After weaning, the heaviest 18 of each castration status were selected, and they were individually housed for the 84-d finishing trial. The kids were blocked by weight within castration status and assigned to one of three concentrates fed at 2% of BW (1.7% on a dry basis). The commercial pelleted concentrates were composed primarily of corn, wheat middlings, and soybean hulls, and contained trace minerals, vitamins, decoquinate (25 mg/kg), and ammonium chloride (0.75%). Soybean meal was substituted for soybean hulls to give protein levels of 13, 15, or 17% as fed (analyzed 14.2, 16.7, or 18.7% dry basis). Mixed grass hay was fed ad libitum and contained 9.9% CP and 40.2% ADF. Following 84 d on the finishing diets, ruminal and blood samples were taken 4 h after feeding. On the following day kids were harvested, and carcass weight and other carcass measures were determined. Carcass weight and the average carcass yield was used to adjust final live BW. Few diet by castration status interactions were observed. As indicated in the following table, intact kids had higher DMI, gained faster, and had higher final BW, carcass weight and other carcass measurements than castrated kids. Increased protein level in the concentrate had no impact on DMI, but resulted in linear increases in gain, carcass weight, gain/feed and improved carcass grade.

Table 1. Main effects of castration and concentrate protein level on finishing meat goats

Item	Bucks	Wethers	P	13%	15%	17%	P[1]
Start wt, kg	19.7	18.4	0.01	19.3	18.9	19.0	0.47
Final wt, kg	29.2	25.3	0.01	26.3	27.3	28.1	0.02
ADG, g/d	106	84	0.01	82	94	106	0.01
Gain/Feed	0.138	0.127	0.12	0.113	0.141	0.145	0.01
DMI, g/d	768	655	0.01	711	693	730	0.53
Carcass grade [2]	2.16	2.33	0.22	2.42	2.20	2.11	0.07
Carcass wt, kg	14.6	13.0	0.01	13.3	13.8	14.3	0.02
Ruminal ammonia, mg/dL	41.7	39.9	0.56	39.0	42.4	41.0	0.58
BUN, mg/dL	19.1	20.7	0.10	17.9	19.2	22.5	0.01

[1]P value for linear effect of protein level; [2]1 to 1.9 = prime, 2 to 2.9 = choice

Key Words: Castration, Meat goats, Protein

451 Generation and annotation of expressed sequence tags (ESTs) for the goat. B. L. Sayre*[1], G. Harris[1], J Dzakuma[2], S. Samake[3], N. Whitley[4], and Z. Wang[5], [1]*Virginia State University, Petersburg*, [2]*Prairie View A&M University, Prairie View, TX*, [3]*Fort Valley State University, Fort Valley, GA*, [4]*University of Maryland-Eastern Shore, Princess Anne*, [5]*Langston University, Langston, OK*.

Goat and sheep producers across the southeastern U.S. have identified control of internal parasites as their primary production issue. The best long-term solution for producers is the development of an effective method for determining genetically resistant animals and selecting for resistance to parasites. Our basic approach is to use a combination of quantitative trait loci (QTL) mapping and microarray analysis to identify genes associated with parasite resistance. However, we need greater genome research in goats to effectively compare species and search for the genes related to traits important for productivity, such as parasite resistance genes. The objective of this project was to increase the genomic information related to gene expression in the goat. Total RNA was collected from mixed tissues from goats (n=10) using the RNAeasy extraction kit. A cDNA library was developed as a unidirectional library in the pAGEN vector, with an average insert size of 1.7 kb. We had approximately 92% of the clones that were recombinants. The library was plated and redundancy checked by BLAST after the initial sequencing (500 – 700 clones). Redundancy was normal, so sequencing was continued. Randomly chosen clones were sequenced generating 12,821 sequences from the library. The sequences were assembled and clustered with the Paracel Transcript Assembler. Of the 12,821 sequences, 8,373 were members of 1,921 primary clusters with 4,433 sequences remaining as singletons. A functional annotation was assigned to each consensus and singleton. This cDNA library and EST data will be a useful resource for goat research for comparative analyses with other species, development of a physical map for the goat, microarray development, and identification of potential genes involved in resistance to parasites.

Key Words: EST, Genomics, Goat

452 Effects of preparturient intramuscular injection of vitamin E and selenium on milk somatic cell counts in dairy goats. I. Lin*[1,2], Y. Fan[1], and H. Chang[1,3], [1]*National Chung Hsing University, Taichung, Taiwan, ROC*, [2]*National Taiwan University, Taipei, Taiwan, ROC*, [3]*Uni-President Enterprises Corp., Tainan, Taiwan, ROC*.

This experiment investigated the effects of high dose D-α-tocopherol (vit E) and selenium (Se) injection intramuscularly on the blood concentrations of vit E, Se and GSHpx activity, and milk somatic cell counts (SCC) at wk 2 and 4 postpartum in dairy goats. Twelve multiparity dairy goats (4 Toggenburg, 2 Nubian, 2 Alpine, 1 Lamancha, 2 Alpine × Toggenburg hybrids, 1 Lamancha × Saanen hybrid; averaging body weight 63.6 kg; 3.73 year-old; 2.92 parities) were randomly allotted into four treatments, e.g., intramuscular injection with 4.4 g Tween 80 (Tw), 3,000 IU vit E plus 5 mg Na_2SeO_3 dissolved in 4.4 g Tw (E3Se), or 1,000 IU vit E plus 5 mg Na_2SeO_3 dissolved in 2.2 g Tw (E1Se) as well as controls (CON) without injection. Goats were injected twice, two and one week prepartum. The goats in E3Se or E1Se had higher level of vit E in their blood plasma (2.08 fold, $P < 0.05$) and milk (1.55 fold, $P < 0.05$). Elevated plasma and milk levels of vit E were sustained longer ($P < 0.05$) for treatment E3Se than for E1Se. Blood plasma level of vit E in E3Se dropped not so abruptly as those in other treatments ($P < 0.05$). No correlation ($P > 0.05$) existed between vit E concentration in milk and that in blood plasma. The goats in E3Se and E1Se had increased Se concentrations in blood

serum (1.21 fold, $P < 0.05$) and in milk (1.35 fold, $P < 0.05$). Whole blood GSHpx activities in E3Se and E1Se were 143% higher ($P < 0.05$) than those in TW and CON. SCC at wk 2 postpartum in E1Se and TW were 8.48 % lower ($P < 0.05$) than those in E3Se and CON. Clinically, no mastitis or retained placenta occurred in these goats. The correlation of iron concentrations between milk and blood serum, or the correlations among lactoferrin, transferrin, and SCC were not significant ($P > 0.05$). In conclusion, intramuscular injection of high dose vit E and Se to preparturient goats does prevent abruptly drop of vit E level in their blood plasma at parturition. Preparturient injections of vitamin E and Se did not markedly effect somatic cell counts in postparturient dairy goats.

Key Words: Selenium, Somatic cell count, Vitamin E

453 Genetic parameters for milk yield in dairy goats across lactations in Germany. B. Zumbach[1,2], S. Tsuruta*[1], I. Misztal[1], and K. J. Peters[2], [1]*University of Georgia*, *Athens*, [2]*Humboldt University*, *Berlin, Germany*.

Breeding value estimation for dairy goats in Germany is still based on herd mate comparison within breeding society. The objective of this study is to estimate genetic parameters for milk yield based on a test day model as basis for a new national evaluation. For the analysis 35,463, 29,871, and 23,103, test day records from lactations 1, 2 and 3 from 5.217, 4.125, and 3.133 animals, respectively, were used. The data between 1987 and 2003 were obtained from 6 German breeding societies. The multiple trait (lactation 1-3) repeatability model included the fixed effects of herd-year (1239 levels), litter size (1, 2 ≥ 3), kidding season (1, 2, .., 11), and days in milk of 3rd order (1-270) nested within herd-year, and the random effects of animal additive and permanent environment. The 3-trait random regression model included also the random regressions based on 2nd order Legendre polynomials for animal additive and permanent environmental effects. Heritability estimates in the repeatability model were 0.27±0.02, 0.20±0.02, and 0.37±0.02 for the 1st, 2nd and 3rd lactation, respectively. Genetic correlations between lactations were 0.69 (1-2), 0.77 (2-3), and 0.43 (1-3), respectively. Heritability estimates from the random regression model decreased continuously in the 1st and 2nd lactation from the beginning to the end of the lactation, and increased at the extreme, with average values of 0.28 and 0.26. Estimates in the 3rd lactation showed a maximum in the middle of lactation, averaging 0.36. Genetic correlations between lactations averaged 0.60 (1-2), 0.65 (2-3), and 0.44 (1-3), respectively. Despite the small data set and restricted relationship structure - use of selected males in natural service within herds - the estimates are reasonable with the exception of estimates from the 3rd lactation, which seem inflated. Genetic evaluation can be based on estimates from lactations 1 and 2.

Key Words: Dairy goats, Genetic parameters, Test day model

Horse Species: Equine Nutrition

454 Endocrine changes in peri-parturient mares and their newborn. E. L. Berg*, D. L. Meyer, and D. H. Keisler, *University of Missouri*, *Columbia*.

The metabolic events that the female endures as she transitions from the pregnant to non-pregnant condition are decisive, dramatic, and challenging. Our objective was to characterize a portion of this process via endocrine changes in peri-parturient mares and their offspring. Nine pregnant Quarter Horse mares, aged 4-21 y, and their newborn were used. Once weekly, 2 wk prior to their predicted parturition date, pregnant mares were weighed, body condition scored (BCS), and blood sampled via jugular venipuncture. Within 2 h of parturition and before foals nursed (d 0), blood samples were taken from mares and foals, and a milk sample collected from the mares. Blood from foals, and blood and milk from mares were also collected at 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4 4.5, 5, 12, 19, 26, 33 and 61 d post-partum. Blood and milk serum were assayed for concentrations of leptin, IGF-1, and TSH. On d 0, 5, 12, 19, 26, 33 and 61 mares and foals were weighed and BCS. Ultrasound images of fat depth and muscle area of the longissimus dorsi immediately cranial to and parallel with the last rib on the left side of foals were measured to characterize changes in fat depth and muscle area over time. Time series analysis revealed no change in mare blood serum concentrations of IGF-1 or TSH over time ($P>0.07$), nor were there any changes in foal blood serum concentrations of leptin or TSH over time ($P>0.10$). Mare blood serum leptin changed dramatically over time ($P<0.01$), decreasing from d 0 to d 5. Foal blood serum IGF-1 increased ($P<0.01$) to d 19 where it remained for the duration of study. Milk serum leptin and TSH were highest on d 0, decreasing to nadir levels on d 61 ($P<0.01$). Milk serum IGF-1 was also highest on d 0 ($P=0.02$) and decreased to undetectable levels by d 12. Mare BCS was not detectably different between pre-and post-partum ($P=0.61$), while BW differed dramatically ($P<0.01$) due to parturition. During the 61 d interval that mares were studied post-partum neither BW nor BCS differed over time ($P>0.75$). As foals aged, ultrasonic fat depth and longissumus dorsi muscle area increased ($P<0.04$) as did BCS and BW ($P<0.01$).

Key Words: Horse, Leptin, IGF-1

455 Effect of parity and day on foal nursing behavior during the first month of lactation. T. N. Stamper*[2], B. D. Nielsen[1], J. Liesman[1], and N. L. Trottier[1], [1]*Michigan State University*, *East Lansing*, [2]*Grand-Valley State University*, *Grand-Rapids, MI*.

Arabian mares, three primiparous and three multiparous, were used to examine nursing behavior of foals. All nursing bouts and their duration were recorded for 24 h on d 9, 19 and 29 of lactation. A nursing bout was defined as any uninterrupted nursing interval lasting 27 sec or longer. Nursing frequency (number of nursing bouts per h), duration of a nursing bout, and total duration of nursing per h were averaged over the daytime (0830 to 1600) and nighttime (1600 to 0830) periods. Across parities, nursing frequency (bouts/h) was higher ($P ≤ 0.01$) during the day time compared to that of night time (4.0, 3.2 and 3.1 vs 1.1, 1.0, and 0.9 on d 9, 19, and 29, respectively), and was lower ($P = 0.097$) in primiparous during day time on d 9 and 19 compared to multiparous mares (3.73 vs 4.36 and 2.67 vs 3.69 on d 9 and 19, respectively). Nursing frequency decreased with d of lactation in both primiparous and multiparous mares ($P ≤ 0.05$ and $P = 0.08$, respectively) during day time only. Total duration of nursing per h (min/h) was higher during daytime compared to nighttime ($P ≤ 0.001$) and decreased (linear, $P ≤ 0.05$) with d of lactation in both primiparous and multiparous mares (3.74, 2.9, and 2.98 vs 4.12, 3.43, 2.81 for d 9, 19, and 29, respectively). Duration of a single nursing bout (min/bout) did not differ between day and nighttime, parities or d of lactation, and varied between 1.34 and 1.61 min. In conclusion, nursing frequency and total nursing duration per h declined with d of lactation during the daytime, and nursing frequency and total nursing duration per h were greater during the daytime compared to nighttime. The duration of a

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