

Goat Species: Feeding Management of Goats

M56 Characterization of pubertal development in nanny-fed and synthetic milk-fed crossbred meat goat does. K. Collard*¹, M. S. Torres¹, E. Gonzales¹, C. W. O’Gorman¹, R. L. Stanko^{1,2}, and M. R. Garcia¹, ¹Texas A&M University, Kingsville, ²Texas A&M University Agriculture Research Station, Beeville.

Kid goats raised on synthetic goat milk (SM) reportedly have a substantially lower growth rate than nursing doe-reared kids, which may affect age at puberty. Therefore, the effect of SM on pubertal development was determined in January-born crossbred (Boer x Spanish) meat goat does. Newborn doe kids remained with their respective nursing doe during the first 24h. After 24h doe kids were randomly selected to continue nourishment from the nursing doe (N; n=10) or begin a SM regimen (n=7). All doe kids had ad libitum access to pelleted goat feed and sorghum hay throughout the study. At 45 d of age doe kids were weaned. Body weight and ADG were recorded weekly throughout the study. Blood samples were collected twice weekly beginning at 5 mo of age and analyzed for concentrations of serum progesterone (P4), circulating metabolites, and metabolic hormones. To determine serum LH characteristics during development, does were bled every 12 min for 8 h beginning at 6 mo of age and every 30 d thereafter until confirmation of puberty, i.e., 2 consecutive concentrations of P4 (1 ng/ml). Effect of milk source on age at puberty was determined using the MIXED procedure of SAS. Effect on serum hormones and circulating metabolites from 20 weeks prior to puberty until the week of pubertal ovulation were analyzed using the MIXED procedure of SAS for repeated measures. Age at puberty tended ($P=0.1$) to occur earlier in N does compared to SM does ($278.3 \text{ d} \pm 7.7$ vs. $299.4 \text{ d} \pm 9.2$, respectively). Despite an increase ($P < 0.05$) in BW as puberty approached, neither BW nor ADG differed between the two groups. LH pulses were detected at 6 mo of age in all does at a frequency of 1.7 pulses/8 h, increasing ($P < 0.01$) to 3.4 pulses/8 h within 30 d of pubertal onset. LH pulse amplitude decreased ($P = 0.03$) from 3.0 ng/ml at 6 mo of age to 2.2 ng/ml within 30 d of pubertal onset. The baseline of LH did not differ throughout the sampling period. Serum concentrations of total cholesterol and glucose decreased ($P < 0.01$) in all does as puberty approached. Results suggest that SM may not adversely affect the age at puberty in crossbred meat goat does.

Key Words: Goats, Milk, Puberty

M57 Water balance in goats under feed restriction. K. T. Resende*^{1,4}, I. A. M. A. Teixeira¹, J. M. Pereira Filho², and P. J. Murray³, ¹Universidade Estadual Paulista/FCAV, Jaboticabal, SP, Brazil, ²Universidade Federal de Campina Grande, Patos, PB, Brazil, ³School of Animal Studies, University of Queensland, Gatton, Qld, Australia, ⁴FAPESP, São Paulo, SP, Brazil.

The effect of feed restriction on water balance and nutrient utilization was investigated in individually penned Boer x Saanen kids. Twenty-two male Boer x Saanen kids with an initial average BW of 15 kg were used. Seven kids were slaughtered at the beginning of the experiment (reference animals) and the remainders were allocated to one of 3 treatments (0, 30 and 60% water restriction). The feed intake for the 0% restriction treatment animals determined the intake for the animals in the 30% and 60% restriction treatment. When the animals in the 0% restriction treatment group reached 25 kg BW, the animals in the 30% and 60% restriction treatment groups were also slaughtered. There was a negative relationship between DMI and water intake, whereas

the greater intake of water was found in goats in the 60% restriction treatment group ($P < 0.05$). The digestibility coefficients for DM, OM, carbohydrates, ash, ether extract, energy, NDF, ADF and lignin did not differ between treatments ($P > 0.05$), whereas the digestibility coefficient for CP was different between treatment groups ($P < 0.05$). The highest metabolic water production was in animals in the 0% restriction treatment group ($P < 0.05$). No significant differences were observed in the composition of gastro-intestinal tract contents of the goats in the different treatments ($P > 0.05$). Lower water retention was found in the animals in the 60% restriction treatment group ($P < 0.05$). The study showed that feed restriction affected water intake, CP digestibility and water retention in the body of the goat kids. This experiment demonstrated that DM:water intake ratio changed when severe feed restriction was applied (60% restriction) and water was freely available. Our findings suggested that penned goats might have different pattern of drinking, particularly if feed intake is restricted, and caution is needed to extrapolate results from nutritional and physiological trials in pens to goats on pasture.

Key Words: Goat kids, Metabolic water production, Penned goats

M58 Energy and protein requirements for maintenance and growth of Boer crossbred kids*. M. H. M. R. Fernandes*¹, K. T. Resende¹, L. O. Tedeschi², J. S. Fernandes Jr.¹, H. M. Silva¹, G. E. Carstens², and I. A. M. A. Teixeira¹, ¹Universidade Estadual Paulista/FCAV, Jaboticabal, Sao Paulo, Brazil, ²Texas A&M University, College Station.

Meat production by goats has become an important livestock enterprise in several parts of the world. However, energy and protein requirements of meat goats have not been well defined. The objective of this study was to determine energy and protein requirements for maintenance and growth of 34 intact male crossbred ($\frac{3}{4}$ Boer $\frac{1}{4}$ Saanen) from 20 to 35 kg BW. The baseline group (BL) was comprised of seven randomly selected kids, averaging 20 kg BW. An intermediate group was fed ad libitum and consisted of six randomly selected kids that were slaughtered when they reached 27.5 kg BW. The remaining kids (n = 21) were randomly allocated to three levels of DMI (treatments: ad libitum and restricted to 30 and 60% of the ad libitum) within seven groups. A group was slaughtered when the ad libitum treatment kid reached 35 kg BW. Body components were weighed, ground, mixed, and subsampled for chemical analysis. Initial body composition was determined using equations developed from the composition of the BL kids. The diet DM consisted of 47% corn hay and 53% concentrate (21.4% CP). A digestion trial was conducted in parallel to determine dietary DE and ME. The NE_m calculated was $77.3 \pm 1.05 \text{ kcal/kg}^{0.75}$ EBW ($67.4 \pm 1.04 \text{ kcal/kg}^{0.75}$ BW). The ME for maintenance (ME_m ; $118.1 \text{ kcal/kg}^{0.75}$ EBW) was calculated by iteration assuming heat produced is equal to ME intake at maintenance. Therefore, the partial efficiency of use of ME to NE for maintenance was 0.65. A value of $391 \pm 59 \text{ mg N/d/kg}^{0.75}$ EBW for N losses (or $2.44 \pm 0.4 \text{ g}$ of $NP_m/\text{d/kg}^{0.75}$ EBW) was determined. Net energy (NE_g) and protein (NP_g) requirements for growth ranged from 2.55 to 3.0 Mcal/kg empty weight gain (EWG) and 178.8 to 185.2 g/kg EWG for 20 and 35 kg BW; respectively. These findings suggested that net energy and protein requirements for growth of Boer crossbreds, a meat type breed, might be higher than published requirements for dairy goats. * Sponsored by FAPESP and CAPES, Brazil.

Key Words: Gain, Goat, Net requirement

M59 Effects of feeding method, diet nutritive value and physical form, and genotype on feed intake, feeding behavior, and growth performance by meat goats. T. Gipson*, A. Goetsch, G. Detweiler, and T. Sahlu, *American Institute for Goat Research, Langston University, Langston, OK.*

Thirty-two F₁ Boer x Spanish (28.7 kg, SE = 0.49) and 40 3/4 Boer-1/4 Spanish (31.9 kg, SE = 0.47) wethers, 5 mo of age, were used to compare feeding systems with different dietary treatments. Feeding systems were Calan gates and automated feeding units allowing one animal to consume feed at a time. Two diets included concentrate (C) and two were dehydrated alfalfa (A), fed pelletized (P) or loose (L). Main effects of feeding method were not significant. There was an interaction in DMI involving feeding method, diet, and genotype, which indicated that with a concentrate diet, regardless of physical form, DMI was not influenced by feeding method. Main effect dietary treatment means (1.78, 1.67, 2.04, and 1.70 kg for C-P, C-L, A-P, and A-L, respectively; SE = 0.030) indicated that pelletizing had a slightly greater effect on DMI with A vs C. ADG was lowest ($P < 0.05$) among treatments for A-L (212, 205, 190, and 157 g for C-P, C-L, A-P, and A-L, respectively; SE = 8.9), and ADG:DMI was greater for C vs A (127, 120, 94, and 94 g/kg for C-P, C-L, A-P, and A-L, respectively; SE = 7.8). ADG and ADG:DMI were similar ($P > 0.05$) between genotypes. For wethers subjected to automated feeding units, the number of feeder visits was lowest among diets ($P < 0.05$) for C-P (23.1, 31.2, 35.7, and 35.7 per day); total feeder occupancy time per animal ranked ($P < 0.05$) C-P < A-P < C-L and A-L (74, 130, 105, and 122 min/d), and rate of DMI was greater ($P < 0.05$) for P than for L diets (24.6, 12.9, 22.0, and 13.7 g/min for C-P, C-L, A-P, and A-L, respectively). In summary, there appear limits to change by meat goats in feeding behaviors in response to diet types and forms, as exemplified by lowest ADG for A-L. Calan gates and automated feeding systems appear similar in the ability to compare growth performance with treatments such as the concentrate-containing diets and genotypes of this experiment. Pelletizing does not seem to affect growth performance with diets consisting of appreciable concentrate and effects with forage diets may be attributable to change in level of feed intake.

Key Words: Feed intake, Goats, Growth

M60 Methane emission by goats consuming diets with different levels of condensed tannin-containing lespedeza and sorghum-sudangrass. G. Anicut*¹, R. Puchala¹, A. Goetsch¹, T. Sahlu¹, G. Detweiler¹, A. Patra¹, V. Varela², and J. Wells², ¹*American Institute for Goat Research, Langston University, Langston, OK*, ²*US Meat Animal Research Center, Clay Center, NE.*

Boer (7/8) x Spanish wethers (24; BW = 34.1 kg, SE = 1.02) were used to determine effects of dietary levels of a condensed tannin (CT)-containing forage Kobe lespedeza (*Lespedeza striata*; K) and sorghum-sudangrass (*Sorghum bicolor*; G) on methane emission. Treatments were K levels (DM basis) of 100, 67, 33, and 0% (100K, 67K, 33K, and 0K, respectively). Forages harvested daily were fed at 1.3 times the maintenance energy requirement. The experiment lasted 21 d, with measures on the last 8 d. N was 1.7 and 2.2%, in vitro true DM digestibility was 85.5 and 68.0%, and CT was 0 and 15.1% for G and K, respectively. DMI was similar among treatments (677, 664, 633, and 626 g/d; SE = 30.8) and gross energy (GE) digestibility increased linearly ($P < 0.05$) with decreasing K (47.1, 51.4, 58.9, and 65.6% for 100K, 67K, 33K, and 0K, respectively). ME intake increased linearly ($P < 0.05$; 398, 431, 485, and 513 kJ/kg BW^{0.75}),

whereas energy expenditure (356, 350, 399, and 504 kJ/kg BW^{0.75}) and methane emission changed linearly and quadratically ($P < 0.05$) with decreasing K (10.9, 13.8, 17.6, and 26.2 L/d; 3.3, 4.0, 5.4, and 8.2% GE; 7.0, 7.7, 8.8, and 11.9% DE for 100K, 67K, 33K, and 0K, respectively). In vitro methane production by incubation of ruminal fluid for 3 wk with a medium for methanogenic bacteria and other conditions promoting activity by methanogens also was affected linearly and quadratically ($P < 0.05$) by K (7.0, 8.1, 9.2, and 16.1 mL for 100K, 67K, 33K, and 0K, respectively). The total bacterial count was similar among K levels, but the number of total protozoa increased linearly ($P < 0.05$) as K declined (8.3, 11.8, 15.6, and 27.1 x 10⁵/mL for 100K, 67K, 33K, and 0K, respectively). In conclusion, the CT-containing forage K decreased methane emission by goats regardless of nonzero level. The impact of K CT on methane emission appears attributable to changes in methanogenic bacterial activity, although alterations of protozoal actions might be involved as well. This project was supported by USDA Project No. 2004-38814-15045.

Key Words: Condensed tannins, Goats, Methane

M61 Efficiency of energy use for pregnancy by crossbred Boer x Spanish does with different litter size. I. Tovar-Luna¹, A. L. Goetsch¹, R. Puchala*¹, T. Sahlu¹, G. E. Carstens², H. C. Freetly³, and Z. B. Johnson⁴, ¹*Kika de la Garza American Institute for Goat Research, Langston, OK*, ²*Texas A&M University, College Station*, ³*USDA/ARS Meat Animal Research Center, Clay Center, NE*, ⁴*University of Arkansas, Fayetteville.*

Twenty-four Boer x Spanish does (3 yr of age, having kidded once previously and with an initial BW of 42.7 ± 1.2 kg) were used to determine the efficiency of ME utilization for pregnancy (k_{preg}). Six does were nonpregnant and, based on ultrasound determination on day 45 of gestation, six had a litter size (LS) of 1, 2, and 3. However, only 10 of the pregnant does delivered the expected number of kids (three, four, and three with LS of 1, 2, and 3, respectively). Does were fed a diet of approximately 50% concentrate in accordance with assumed maintenance plus pregnancy energy requirements based on estimated nonpregnancy tissue BW and LS. Recovered energy (RE) was determined by subtraction of energy expenditure (EE; respiration calorimetry) near day 80, 100, 120, and 140 of gestation from ME intake (MEI). RE was assumed attributable to pregnancy tissues (fetus, fetal fluids and membranes, uterus, and mammary gland), and ME used for pregnancy (ME_{preg}) was estimated by subtracting ME_m determined with nonpregnant goats from MEI by those pregnant. For does with actual LS equal to that expected, the no-intercept equation for the regression of RE against ME_{preg} was: RE = ME_{preg} x 0.252 (SE = 0.030; R² = 0.64), indicating a k_{preg} of 25%. Although, a regression including LS (1 vs. 2 or 3) suggested greater k_{preg} for LS of 1 (40.2% ± 5.6) vs. 2 or 3 (20.5% ± 3.2). Regressions for goats with LS different from expected suggested positive effects of use of energy mobilized from nonpregnancy tissues on k_{preg} and of use of dietary ME for energy accretion in nonpregnancy tissues on the efficiency of whole body ME utilization. In conclusion, the average efficiency of ME use for pregnancy regardless of LS in goats was near 25%, which when considering the expected proportion of all pregnancy tissues attributable to fetal or conceptus tissues implies an energy requirement for pregnancy of goats similar to common recommendations for sheep and cattle.

Key Words: Energy, Goats, Pregnancy

M62 Relationship between energy expenditure and heart rate in pregnant Boer x Spanish does with different litter size. R. Puchala*, I. Tovar-Luna, A. L. Goetsch, and T. Sahl, *E (Kika) de la Garza American Institute for Goat Research, Langston, OK.*

Twenty-four Boer x Spanish does (3 yr of age, having kidded once previously and initial BW of 42.7 ± 1.19 kg) were used to determine effects of litter size (LS) and stage of gestation (near day 80, 100, 120 and 140) on the relationship between energy expenditure (EE) and heart rate (HR). Six does were nonpregnant (0) and, based on ultrasound determination on day 45 of gestation, six had LS of 1, 2 and 3. However, only 10 of the pregnant does had the expected number of kids (three, four, and three with LS of 1, 2 and 3, respectively). Does were fed a diet of approximately 50% concentrate in accordance with assumed maintenance plus pregnancy energy requirements based on LS. EE determined by respiration calorimetry on d 80, 100, 120 and 140 of gestation with head-boxes was expressed relative to average BW within the 2-d measurement periods and HR was determined at the same time using Polar S610 HR monitors. There was an effect of animal within LS ($P < 0.05$), CV of 10.2, 11.2, 3.8, and 8.6% and maximum differences of 41.7, 16.6, 5.2, and 12.0 of means for LS 0, 1, 2, and 3, respectively). Time of the day affected ($P < 0.05$) EE, HR, and EE:HR; highest values 0900 and 1600 and lowest values between 0200 and 0700). CV for hourly values were 3.9, 2.1, and 2.4%, and maximum differences relative to means were 9.0, 4.1, and 4.8% for EE, HR and EE:HR, respectively. There was an interaction in EE:HR between LS and stage of gestation ($P < 0.05$). EE:HR decreased as gestation progressed (LS 1:7.29, 6.79, 6.14, and 5.53; LS 2:6.73, 6.42, 6.07, and 5.02; LS 3: 6.53, 6.07, 5.71, and 5.07 (kJ/kg BW^{0.75})/(beats/min) on d 80, 100, 120, and 140, respectively, whereas nonpregnant goats had stable EE:HR (8.04, 7.78, 7.78, and 7.74 (kJ/kg BW^{0.75})/(beats/min)). In conclusion, changing EE:HR in pregnant animals may preclude use of HR to predict EE. Magnitudes of difference in EE:HR among animals and time of the day suggest benefit from determinations for individual animals and over extended periods of time.

Key Words: Energy expenditure, Goat heart rate, Pregnancy

M63 Tethering meat goats grazing forage of high nutritive value and moderate to high mass. A. Patra*¹, R. Puchala¹, G. Detweiler¹, L. Dawson², G. Anmut¹, T. Sahl¹, and A. Goetsch¹, ¹*American Institute for Goat Research, Langston University, Langston, OK,* ²*Oklahoma State University, Stillwater.*

Yearling Boer x Spanish goats (n=24) were used in a crossover design to determine effects of tethering with forage of high nutritive value and moderate to high mass. Four 0.72-ha pastures of wheat (*Triticum aestivum*) and berseem clover (*Trifolium alexandrinum*) were grazed in April to May. Each pasture hosted six animals, three with free movement (Free) and three attached to a 3 m tether (Tethered) for access to a circular area of 28.3 m². One animal of each treatment and pasture was used to determine forage selection, fecal output, or grazing behavior and energy expenditure (EE). Measures were in the second week of 2-wk periods. Mass of forage DM before grazing in Tethered areas averaged 2,649 and 2,981 kg/ha in periods 1 and 2, respectively. The CP concentration in ingesta was greater ($P < 0.05$) 23.1 and 20.3%; SE = 0.82) for Free vs Tethered animals. The level of NDF (54.0 and 55.9%; SE = 1.66) and in vitro true DM digestion (75.7 and 76.5%; SE = 1.20) were similar between treatments. Metabolizable

energy intake was greater ($P < 0.05$) for Free vs Tethered animals (12.7 and 10.4 MJ/d; SE = 0.89). There were small treatment differences ($P < 0.05$) in in vivo apparent digestibility of OM (71.7 and 72.3.4%; SE = 0.24) and NDF (63.3 and 65.2% for Free and Tethered, respectively; SE = 0.92). There were no treatment effects on time spent ruminating, idle, or eating (405 and 366 min/d for Free and Tethered, respectively; SE = 42.5). Energy expenditure was considerably greater ($P < 0.05$) for Free vs Tethered animals (633 and 512 kJ/kg BW^{0.75}, respectively; SE = 27.4). In conclusion, differences in EE between goats freely grazing and tethered may not be solely attributable to ME intake, distance traveled, and/or grazing time. Tethering as a model for free movement may offer a reasonable means of studying some aspects of grazing such as ingesta composition but appears inappropriate for others, including EE and efficiency of energy metabolism. This project was supported by National Research Initiative Competitive Grant no. 2004-35206-14166 from the USDA Cooperative State Research, Education, and Extension Service.

Key Words: Energy, Goats, Tether

M64 Tethering meat goats grazing forage of high nutritive value and low to moderate mass. A. Patra*¹, R. Puchala¹, G. Detweiler¹, L. Dawson², G. Anmut¹, T. Sahl¹, and A. Goetsch¹, ¹*American Institute for Goat Research, Langston University, Langston, OK,* ²*Oklahoma State University, Stillwater.*

Yearling Boer x Spanish goats (n=24) were used to determine effects of tethering with forage of high quality and low/moderate mass. Four 0.72-ha pastures of wheat (*Triticum aestivum*) and berseem clover (*Trifolium alexandrinum*) were grazed in December and January. Each pasture hosted six animals, three with free movement (F) and three attached to a 4.11 m tether (T) for access to a circular area of 53.1 m². One animal of each treatment and pasture was used to determine forage selection, fecal output, or grazing behavior and energy expenditure (EE). Measures were in the second week of 2-wk periods. Mass of forage DM before grazing in T areas averaged 1,280 and 1,130 kg/ha in periods 1 and 2, respectively. CP concentration in ingesta was greater (23.9 and 20.9%) and the NDF level (50.3 and 53.8%) was lower for F vs T ($P < 0.05$); in vitro true DM digestion was similar between treatments (80.8 and 80.7% for F and T, respectively; SE = 0.96). Intakes of DM (1,013 and 968 g/d; SE = 78.6) and ME (10.9 and 10.7 MJ/d; SE = 0.90) were similar between treatments. There was a difference ($P < 0.05$) in in vivo apparent digestibility of OM (78.0 and 81.4%; SE = 0.49) and no treatment effects on time spent ruminating, idle, or eating (346 and 347 min/d for F and T, respectively; SE = 42.5). EE was considerably greater ($P < 0.05$) for F vs T (571 and 489 kJ/kg BW^{0.75} for F and T, respectively; SE = 8.9). Based on estimates of ME intake and recovered energy and an assumed efficiency of use of ME for energy accretion, this difference equated to an energy cost for free movement of 111 kJ/kg BW^{0.75}. A greater distance traveled for F than for T presumably accounted for some but doubtfully all of this difference, suggesting that free movement influenced other physiological conditions impacting EE. In conclusion, in some instances tethering may offer a production advantage over free grazing of less activity energy. This project was supported by National Research Initiative Competitive Grant no. 2004-35206-14166 from the USDA Cooperative State Research, Education, and Extension Service.

Key Words: Energy, Goats, Tethering

M65 Effect of polyethylene glycol on *in vitro* gas production and substrate degradation of diets selected by grazing goats. M. A. Cerrillo-Soto*, M. Guerrero-Cervantes, G. Nevárez-Carrasco, R. Montoya-Escalante, E. Herrera-Torres, M. Murillo-Ortiz, and A. S. Juárez-Reyes, *Universidad Juárez del Estado de Durango, Durango, Dgo. Mexico.*

The study was conducted to evaluate the effect of polyethylene glycol (PEG-6000) on *in vitro* gas production and substrate degradation of diets selected by goats grazing a shrub and oakland range in the semiarid region of Durango, Mexico. Six Spanish criollo goats (35 to 40 kg BW) were used to obtain diet samples utilizing the hand-plucking method during Spring (Apr-Jun), Summer (Jul-Sep), Autumn (Oct-Dec) and Winter (Jan-Mar). A total of three days each month from 0900 to 1200 were used to collect samples. Operators followed and observed the animals and manually mimicked animal forage preferences. Collections from six goats were composited to obtain a representative monthly sample. Five hundred mg (DM) samples were incubated in calibrated glass syringes in triplicate with or without PEG-6000 (1 g). The *in vitro* gas production was recorded at 0, 3, 6, 9, 12 and 24h after inoculation. Moreover, after 24 h of incubation the content of the syringes was completely transferred into a pre-weighed nylon bag (5 cm x 10 cm: pore size 40-60 μ m) and thoroughly washed for estimation of the *in vitro* substrate degradation. Data were analyzed using ANOVA for a completely randomized block design. The addition of PEG-6000 increased the *in vitro* gas production ($P < 0.05$) at 24h of incubation by 13, 13, 16 and 10% during Winter, Spring, Summer and Autumn, respectively. The *in vitro* degradation of the substrate was also affected ($P < 0.05$) by the addition of PEG-6000. Increments of 46, 21, 22 and 36% were recorded during Winter, Spring, Summer and Autumn, respectively. Increases in gas production and substrate degradation by addition of PEG-6000 evidence the *in vitro* detrimental effects of phenolic compounds contained in the forage selected by grazing goats.

Table 1. Effect of PEG-6000 on *in vitro* gas production and substrate degradation in goat diets

	Seasons			
	Winter	Spring	Summer	Autumn
Degraded substrate (% DM)				
With PEG	43.0 ^a	40.0 ^a	37.7 ^a	42.8 ^a
Without PEG	29.4 ^b	33.0 ^b	30.9 ^b	31.4 ^b
Mean	26.2	36.4	34.3	37.1
sem	4.79	5.15	5.08	4.50
Cumulative gas production at 24h (ml/500 mg DM)				
With PEG	71.4 ^a	81.4 ^a	71.0 ^a	78.5 ^a
Without PEG	62.9 ^b	72.2 ^b	61.2 ^b	71.2 ^b
Mean	67.1	76.8	66.1	74.8
sem	3.52	7.50	7.60	6.50

Columns with different superscript differ ($P < 0.05$)

Key Words: Grazing goats, *In vitro* gas production, Polyethylene glycol

M66 Evaluation of cultivated summer pastures for meat goats in Tennessee. M. Lema*, K. Souleymane, R. Opio, and C. Fenderson, *Tennessee State University, Nashville.*

A grazing trial was conducted to evaluate Puna forage chicory *Cichorium intybus L.*, Hybrid Penleaf pearl millet *Pennisetum glaucum* and Sahara bermudagrass *Cynodon dactylon* as summer pasture for meat goats. Thirty weaned F1 does (18 Spanish x Kiko, 6 Spanish x Boer and 6 Boer x Kiko) were blocked by body weight and genotype and randomly assigned to the three pasture types. Each pasture type was stocked with 10 does (5 does per replicate) at a stocking rate of 5 does per acre. Puna chicory was 28.3 and 67.7 % higher ($P < 0.05$) in crude protein (CP), 28.1 and 35.4 % lower ($P < 0.05$) in acid-detergent fiber (ADF) and 40.0 and 46.0 % lower ($P < 0.05$) in neutral detergent fiber (NDF) than Penleaf pearl millet and Sahara bermudagrass, respectively. Penleaf pearl millet was 37.7 % higher ($P < 0.05$) in CP, 10.2 and 10.0 % lower ($P < 0.05$) in ADF and NDF than Sahara bermudagrass, respectively. Relative Feed Value (RFV), Ca, P, Mg and K contents were significantly higher ($P < 0.01$) for Puna chicory than for Penleaf pearl millet and Sahara bermudagrass. Penleaf pearl millet was higher ($P < 0.01$) than Sahara bermudagrass in P, K and Mg content. Puna chicory and Pearl millet produced 73 and 70 % higher ($P < 0.05$) forage CP per ha, respectively than Sahara bermudagrass. Average daily gain and live weight gain per acre of does grazing Puna chicory were significantly higher ($P < 0.05$) than does grazing Sahara bermudagrass and Penleaf pearl millet.

Key Words: Meat goat, Penleaf pearl millet, Puna chicory

Growth and Development

M67 Differences in adipogenesis between bovine intramuscular and subcutaneous preadipocytes are not related to expression of PPAR γ_2 or secretion of PGI $_2$. G. Ortiz-Colón*, A. C. Grant, M. E. Doumit, and D. D. Buskirk, *Michigan State University, East Lansing.*

The objectives of this study were to determine if intramuscular (IM) and subcutaneous (SC) bovine preadipocytes differ in their expression of peroxisome proliferator-activated receptor γ_2 (PPAR) or in their

secretion of prostacyclin (PGI $_2$). Preadipocytes isolated from IM and SC adipose tissue of three steers were propagated in culture and upon confluence were exposed to 0 or 25 nM dexamethasone (DEX) for 48 h. After exposure to differentiation media for 12 d, cell lysates were subjected to PPAR immunoblot analysis, which detected an immunoreactive band of ≈ 53 kDa. The relative expression of PPAR was equivalent between IM and SC cells ($P = 0.39$), and DEX did not affect PPAR abundance ($P = 0.98$). Heterogeneous preadipocytes