

Small Ruminant: Goat Production

T450 Effect of supplemental grower / finisher ration protein level on growth rate, chevon production and cost of gain of crossbred meat goats grazing Joy Chicory pasture. M. Lema*, S. Murray, and B. Barlow, *Tennessee State University, Nashville.*

Chicory (*Chicorium intybus*) is becoming popular as a warm-season forage for ruminant livestock in the United States. A study was conducted with weaned crossbred meat goats to elucidate how growing / finishing meat goats grazing Joy chicory pasture respond to supplementation with varying levels of dietary protein. Thirty 6 weaned crossbred kids (26 ± 3 kg) were blocked by body weight and genotype and divided into 3 treatment groups. Each treatment group was replicated in 2 0.4 ha Joy chicory and native grass paddocks with 6 kids per paddock and supplemented with isocaloric grower / finisher ration containing 11, 16 or 21% crude protein for 56 d. The data generated from the study was subjected to Analysis of Variance for randomized complete block design. Grower / finisher ration intake (1.13, 1.31 and 1.31 kg / day) and cost (0.41, 0.51 and 0.51 dollars / day) for the 11, 16 and 21% protein supplemented groups, respectively) were not affected by protein content of the diet. Total live weight gain (7.7 kg) and average daily gain (145.0 g) for the 16% protein level were significantly higher ($P < 0.05$) than for the 11% (2.7 kg and 52.0 g, respectively) and 21% (6.0 kg and 113.0 g, respectively) protein levels. Feed cost per kg gain was significantly lower ($P < 0.05$) for the 16% protein level than for the 11 and 21% protein levels (3.5 versus 7.8 and 4.5 dollars / day, respectively). Boneless retail cut from the leg, loin, shoulder and rack followed similar trend as weight gain, being significantly higher ($P < 0.05$) for the 16% protein level than for the 11 and 21% while the 21% level was higher than the 11%. Back fat thickness and fat cover over the carcass tended to increase ($P < 0.05$) with protein level in the diet. It is concluded that optimum performance and return from meat goats grazing Joy Chicory is obtained when they are supplemented with 16% protein in the diet as compared with lower (11%) and higher (21%) levels.

Key Words: meat goat, chicory, protein level

T451 Effects of breed and slaughter endpoint on feed intake, growth performance, and carcass traits of purebred Boer and Kiko goat kids. S. Solaiman*¹, B. R. Min¹, N. Gurung¹, J. Behrends², E. Taha¹, and C. Hill¹, ¹*Tuskegee University, Tuskegee, AL*, ²*Mississippi State University, Mississippi State.*

The objectives of this experiment were to determine the effects of 2 different breeds (Boer vs. Kiko) and 4 slaughter endpoints (SEP; d 0, 35, 63 and 88) on DMI, ADG and carcass traits of male goat kids (n = 6). Forty-eight purebred (BW = 23.9 ± 1.50 kg) kids were used in a completely randomized design experiment with a 2 × 4 factorial arrangement of treatments. Goats were stratified by BW within breed and randomly assign to 4 SEP. Kids were born between March 15 and April 7, and were represented by at least 3 sires within each breed. They were housed indoors in individual pens, had ad libitum access to water and mineral blocks, and were fed concentrate: hay (80:20%, respectively) diet once a day. At designated time, goats were transported to the Meat Science Lab., MSU, MS and were slaughtered. Performance and carcass data were analyzed using PROC MIXED of SAS. There were no interactions between breeds and SEP. Both breeds had similar DMI; however, the Kiko goats consumed more hay ($P < 0.01$) and Boer goats consumed more concentrate ($P < 0.01$). There was no difference in initial BW for 2 breeds, but final BW ($P < 0.03$), ADG ($P < 0.001$), and G:F ($P < 0.001$) were higher for Boer breed. Boer goats tended to

have higher HCW ($P = 0.08$) and cold carcass weights (CCW; $P = 0.08$) only on d 88. No differences were observed in transportation shrink, carcass shrink, dressing percentage, 12th rib fat thickness, and LM area between 2 breeds. Muscle and fat weights were higher for Boer breed ($P < 0.01$) at d 0, but only fat was higher ($P < 0.01$) on d 88. Although bone, muscle, and fat as a % of CCW remained relatively the same ($P > 0.10$) for both breeds up to the 3rd SEP, ratio of fat increased in Boers ($P < 0.002$) and muscle ratio increased ($P < 0.01$) in Kikos by d 88. Breed or SEP did not affect the muscle/bone and muscle/fat ratios. Breed type and SEP had no effect on meat color. We concluded that Boer goats had higher ADG and attained higher BW at earlier age, with higher grain input. However, Kiko goats had more muscle and less fat at the later SEP (d 88) with less grain input.

Key Words: breed, goats, slaughter endpoint

T452 Effects of feeding varying levels of peanut skins on fatty acid profile of growing Kiko crossbred intact male goats. N. K. Gurung*¹, A. R. Stone¹, S. G. Solaiman¹, D. L. Rankins Jr.², K. R. Willian¹, and W. H. McElhenney¹, ¹*Tuskegee University, Tuskegee, AL*, ²*Auburn University, Auburn, AL.*

The objectives of this experiment were to evaluate the effects of feeding different levels of peanut skins (PS) containing diets on fatty acid profile in the longissimus muscle (LM), the mesenteric adipose (MA) depot, and the s.c. adipose (SA) depot of meat goats. Twenty 4 Kiko crossbred intact male goats (18.2 ± 1.41 kg initial BW and 3 to 4 mo of age) were randomly assigned to one of the 4 experimental diets containing 47.3% bermudagrass hay plus 52.7% concentrate mix. Diets contained 0, 10, 20, and 30% of PS on as fed basis. Feed offered and refusals were collected daily. After 92 d, goats were harvested and carcass characteristics were measured. Samples of LM, MA and SA tissues were analyzed for fatty acid profile. Data on carcass quality and fatty acid composition of LM, MA and SA were analyzed as a completely randomized design. Dressing percent, chilled carcass weight and LM area decreased linearly ($P < 0.05$) with increasing level of PS. We were able to detect 18 fatty acids in LM and MS, and 13 in SA. No changes ($P > 0.10$) were detected in the fatty acid composition (on percentage basis) across treatments with the exception of C18:0, stearic acid, which increased linearly in LM ($P = 0.05$), MS ($P = 0.06$) and SC ($P = 0.06$) with increasing level of PS. Total saturated fatty acid percentage increased linearly ($P = 0.05$) in LM fat only. Total C18:1, oleic acid, decreased linearly ($P < 0.05$) in LM fat but a quadratic trend ($P < 0.05$) was observed for MA and SA. Monounsaturated fatty acids decreased linearly ($P < 0.05$) as the level of PS increased in LM fat but was not different among MS and SA fat samples. Polyunsaturated fatty acids were not different ($P > 0.05$) among treatments for all fat samples. It was concluded that the fatty acid composition of carcass can be altered with the addition of PS in the diets.

Key Words: goats, fatty acid profile, peanut skins

T453 Effect of cull-chickpeas on carcass characteristics and commercial cuts of feedlot hair sheep. F. G. Rios*^{1,4}, H. Bernal-Barragán^{2,4}, M. A. Cerrillo-Soto^{3,4}, A. Estrada-Angulo^{1,4}, E. Gutiérrez-Ornelas^{2,4}, A. S. Juárez-Reyes^{3,4}, J. F. Obregon^{1,4}, and J. J. Portillo-Loera^{1,4}, ¹*FMVZ-Universidad Autónoma de Sinaloa, Culiacán, Sinaloa, México*, ²*FA-Universidad Autónoma de Nuevo León, Monterrey, Nuevo León, México*, ³*FMVZ-Universidad Juárez del Estado de Durango, Dur-*

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A study was carried out to determine the effect of cull-chickpeas (CCH) on carcass characteristics and their commercial cuts from Katahdin × Pelibuey lambs. Forty animals (36.1 ± 2.9 kg initial BW) were fed 5 dietary treatments based on substitution of diet cracked corn grain and soybean meal for 0, 15, 30, 45, or 60% of CCH. Animals were allotted in pens (2/pen) and randomly grouped to 4 blocks of 10 animals. At the end of a feeding trial of 84 d, the lambs were humanly slaughtered at a weight of 50.3 ± 4.2 kg. The left half of the carcass was used for carcass evaluation and dissection according to commercial standards. The fat depth was measured at the level the 12th rib. Single cuts such as neck, rack, breast, shoulder, foreshank, loin, leg, and flank were also classified. Data were analyzed according to a completely randomized block design using the GLM procedure; means comparisons were performed using Duncan's test. Orthogonal polynomial contrasts were used to determine lineal effect of treatments. Hot carcass weight (29.1 ± 2.36 kg), dressing carcass ($57.8 \pm 2.58\%$), rib eye area (15.9 ± 2.21 cm²), and backfat thickness (3.0 ± 1.15 mm) were similar ($P > 0.05$) among treatments. Empty body weight was higher ($P < 0.05$) in lambs receiving 30% of CCH (48.5 kg), and lowest in those fed 0% (46.4 kg). Kidney, pelvic and heart fat was modified by the effect of the treatments where a lineal pattern ($P < 0.01$) was observed. Yields of loin ($8.5 \pm 0.84\%$), shoulder ($19.4 \pm 1.94\%$), rack ($11.4 \pm 0.85\%$), and foreshank ($11.4 \pm 1.28\%$), were similar ($P > 0.05$) among treatments. Breast (7.9%) was similar between lambs receiving 15 and 45% CCH, and higher ($P < 0.05$) than the other treatments (7.3%). Leg (28.6%) was lower ($P < 0.05$) in lambs receiving 60% CCH. Flank (8.2%) was higher ($P < 0.05$) in lambs fed 45% CCH. It is concluded that CCH can be included up to 45% in the diet of hair lambs. Nonetheless, as the inclusion level of CCH is favored, enhanced fat deposition results, while leg yield is reduced.

Key Words: hair sheep, cull-chickpeas, carcass characteristics

T454 Effects of intraduodenally infused soybean small peptides and amino acids on absorption of peptides in the small intestine of dairy goats. L. Wang^{1,2}, S. Li^{*1}, Z. Cao¹, and H. Liu¹, ¹China Agricultural University, Beijing, China, ²Ningxia University, Yinchuan, China.

The object of the study was to investigate the effects of intraduodenally infused soybean small peptides (SSP) and AA on absorption of peptides in the small intestine and the net fluxes of mesenteric-drained viscera (MDV) and portal-drained viscera (PDV). Four dairy goats (BW = 38.38 ± 3.09 kg), fitted with permanent cannulas at the proximal duodenum and fitted with indwelling catheters in carotid artery, proximal and distal mesenteric vein and portal vein were used in a crossover treatment design. The treatments were intraduodenal infusion of 60 g/d SSP (SSP group) or AA (AA group) providing the same daily quantities of individual free AA as SSP group. The results showed that the mesenteric, portal venous and arterial plasma concentration of PAA in SSP group were higher than in the AA group, but only the concentration of peptide serine, valine, isoleucine and arginine were significant higher than in the AA group ($P < 0.05$). The MDV net fluxes of PAA in SSP group were significant higher than in the AA group ($P < 0.05$). The PDV net fluxes of PAA in the SSP group were higher than in the AA group, but there was no significant difference between the SSP group and the AA group ($P < 0.05$). The mesenteric, portal venous and arterial plasma concentrations and the MDV and PDV net fluxes of total FAA in AA group were significant higher than in the SSP group ($P < 0.05$). The concentration of plasma glucose, insulin, glucagon and growth hormone were higher in SSP group than in the AA group, the concentration of PUN and IGF-1 in SSP group were lower than in the

AA group, however, there was no significant difference between SSP group and AA group ($P > 0.05$).

Key Words: small peptide, amino acid, dairy goat

T455 Effects of graded intraduodenal soybean small peptide infusion on absorption of small peptides in the small intestine of dairy goats. L. Wang^{1,2}, S. Li^{*1}, Z. Cao¹, and H. Liu¹, ¹China Agricultural University, Beijing, China, ²Ningxia University, Yinchuan, China.

The objective of the study was to investigate the effects of graded intraduodenal soybean small peptide (SSP) infusion on absorption of small peptides in the small intestine and the net fluxes of mesenteric-drained viscera (MDV) and portal-drained viscera (PDV). Seven dairy goats (body weight 37.88 ± 3.03 kg) were used to a 4×4 Latin square design, fitted with permanent cannulas at the proximal duodenum and implanted with indwelling catheters in carotid artery, proximal and distal mesenteric vein and portal vein. Four infused SSP levels, i.e., 0 g/d (0.9% normal saline, 700 mL/d), 60 g/d, 120 g/d and 180 g/d, were used. Infusions were conducted continuously using a peristaltic pump. Each infusion period lasted for 12 d. On the last day, Para-aminohippuric acid (PAH) was infused into the mammary vein catheter. After 1 h of infusing PAH, blood samples were collected from the carotid artery and mammary vein at 1 h intervals into centrifuge tubes containing heparin-saline. The results showed that with the increase of SSP infusion level, the mesenteric, portal venous and arterial plasma concentration and the net fluxes of MDV, PDV of peptide amino acids (PAA) were all raised significantly. The total PAA net flux of MDV in group infused with 180 g/d was higher than that group infused with 60 g/d. The absorption rate of total PAA in small intestine was decreased with the increase of quantities of SSP infusion into duodenum, the values were 28.43%, 22.23% and 17.43% respectively. The PDV net fluxes of total FAA were all lower than the MDV net fluxes of total FAA in 4 groups. The concentrations of plasma urea nitrogen were significantly increased with increasing the quantities of SSP infusion, but the concentrations of plasma glucose, insulin, growth hormone, glucagon and IGF-1 had not been affected by infusing SSP.

Key Words: dairy goats, soybean small peptide

T456 Effects of shearing on energy use by growing Angora goats. R. Puchala^{*1}, A. Helal^{1,2}, A. L. Goetsch¹, and T. Sahl¹, ¹American Institute for Goat Research, Langston University, Langston, OK, ²Animal and Poultry Nutrition Department, Desert Research Center, El Matareya, Cairo, Egypt.

Eight Angora wethers (initial BW 19.0 ± 1.14 kg) and 8 doelings (initial BW 16.3 ± 1.15 kg), approximately 17 mo of age, were used to assess effects of shearing on energy expenditure (EE) and heart rate (HR). Animals were fed a pelleted diet at 1100 h to achieve 12.5 g/d tissue gain and 7.5 g/d mohair fiber growth. Animals were placed in an indirect, open-circuit respiration calorimetry system in 4-animal sets (2 wethers and 2 doelings) for gas exchange measurement 1 d before (d 0) and for 3 d after shearing (d 1, 2, 3). Temperature and relative humidity were controlled at 20°C and 50%, respectively. Shearing was at 0900 h. To avoid effects of feeding on HR and EE, data collected during the daytime (0800 to 1900 h) were omitted. Energy expenditure was greater ($P < 0.05$) after than before shearing (3.48, 4.30, 4.01, and 3.82 MJ/d on d 0, 1, 2, and 3, respectively; SEM = 0.142). Similarly, HR (92.6, 104.8, 97.5, and 100.0 beats/min; SEM = 3.02) and EE relative to metabolic size (405, 503, 468, and 448 kJ/kg BW^{0.75} on d 0, 1, 2, and 3, respectively; SEM = 10.8) were affected ($P < 0.05$) by shearing. The ratio of EE to HR was similar among days after shearing (4.45,

4.87, 4.87, and 4.52 kJ/kg body weight^{0.75} per heart beat on d 0, 1, 2, and 3, respectively; SEM = 0.151). A decline ($P < 0.05$) in respiratory quotient after shearing (1.049, 1.034, 1.016, and 1.015 on d 0, 1, 2, and 3, respectively; SEM = 0.0079) suggests increased body fat catabolism. Regression analysis indicated that more than 4 d would be required for EE and HR to return to pre-shearing levels. In conclusion, even with non-stressful environmental conditions, shearing Angora goats increases energy consumption.

Key Words: goats, shearing, energy

T457 Optimum duration of performance testing growing Boer bucks for growth rate, feed intake, and feed efficiency. W. Hu^{*1}, T. A. Gipson¹, S. P. Hart¹, L. J. Dawson^{1,2}, A. L. Goetsch¹, and T. Sahl¹, ¹American Institute for Goat Research, Langston University, Langston, OK, ²College of Veterinary Medicine, Oklahoma State University, Stillwater.

Central performance testing of meat goats has increased in popularity recently, but minimum test length has not been ascertained. This study was conducted to determine the minimum length of time required for accurate evaluation of growing Boer bucks for ADG, DMI, and feed efficiency as assessed by ADG:DMI and residual feed intake. Data were collected from 425 bucks in Langston University tests from 2000 to 2009. Bucks averaged 111 ± 25 d of age and 27 ± 8 kg BW at the beginning of the test, consumed a pelletized 50% concentrate diet ad libitum, and were weighed weekly. Daily feed intake was determined with Calan feeding gates (American Calan, Inc., Northwood, NH) and automated feeding units (MK3 FIRE, Osborne Industries Inc., Osborne, KS). Weekly data of 4 performance traits were analyzed using the MIXED procedure of SAS with a repeated-measures model. The first-order ante dependence [ANTE(1)] structure type was selected as the appropriate covariance structure based on goodness-of-fit criteria. Residual variance relative to that at 84 d (%) was 338, 272, 223, 188, 153, 129, 119, and 108% for ADG, 167, 159, 149, 141, 130, 119, 112, and 106% for DMI, 427, 305, 223, 164, 135, 123, 112, and 105% for ADG:DMI, and 156, 138, 131, 118, 107, 103, 102, and 102% for residual feed intake at 28, 35, 42, 49, 56, 63, 70, and 77 d, respectively. Grafted polynomial break-points determined by nonlinear regression indicated that residual variance had stabilized at 63, 63, and 57 d for ADG, ADG:feed intake, and residual feed intake, respectively. A break-point for DMI was not estimable, although the correlation between DMI at 63 and 84 d was 0.99 ($P < 0.01$) compared with r of 0.95, 0.96, and 0.97 ($P < 0.01$) for ADG, ADG:DMI, and residual feed intake, respectively. In conclusion, under these conditions the duration of Boer buck performance tests could be decreased from 84 to 63 d with little loss in accuracy.

Key Words: goats, performance testing

T458 Feeding behavior of intact yearling hair sheep and meat goat males pen-fed in single- and mixed-species groups. S. Wildeus^{*} and R. A. Stein, Virginia State University, Petersburg.

Group size and social hierarchy influence animal performance, and here we evaluated interactions of yearling rams and bucks housed indoors in 3 × 2.5 m pens with a single feeding station. Animals were fed chopped grass hay mixed with corn and soybean (~14% CP). In Exp. 1, 2 males were allocated to 15 pens either as single- or mixed-species groups (5 replications/grouping; 15 rams and 15 bucks total). In Exp. 2, 2 or 4 males were assigned to 16 pens, either as sheep-only, or an equal number of rams and bucks (4 replications/grouping; 36 rams and 12 bucks total). In both experiments animals were fed for 17 d. Immediately after feed was placed into each pen, behavior was recorded for 10 min (position

changes at feeder, duration of first meal, and incidence of fighting). Observations were made for 3 consecutive days at the beginning, middle and end of each experiment. Data were analyzed for the effect of pen composition and time of trial in Exp. 1, and pen composition, stocking rate and time of trial in Exp. 2. In Exp. 1 initial time at the feeding station was shorter ($P < 0.01$), and number of fights and position changes at feeder more frequent ($P < 0.01$) in sheep-only pens (142 ± 32 s, 6.0 ± 0.8 and 14.3 ± 2.4, respectively) than goat-only (381 ± 41 s, 0.3 ± 0.09 and 1.8 ± 0.1, respectively) and mixed pens (380 ± 41 s, 0.1 ± 0.04 and 2.0 ± 0.2, respectively). Number of fights and position changes increased ($P < 0.01$) from the start to the end of the trial in sheep-only pens (6.6 to 23.1 and 3.6 to 6.1, respectively), but not in goat-only and mixed pens. In mixed pens, goats initiated feeding more frequently than sheep (81.8 vs. 18.2%, $P < 0.01$). In Exp. 2 observations on feeding time, fighting and position changes for sheep-only and mixed pens were similar to Exp. 1. However, fighting and position changes increased in sheep-only, but not mixed pens as stocking rate increased from 2 to 4 animals (stocking rate by pen composition interaction: $P < 0.05$). Data suggest that bucks were more dominant than rams, activity levels were lower in pens with bucks, and that increasing stocking rate differentially affected behavior in the 2 species.

Key Words: behavior, goats, sheep

T459 Feeding glucogenic precursors to dairy goats carrying twins around kidding. S. Cavini¹, M. Rodriguez-Prado¹, S. Calsamiglia^{*1}, A. Foskolos¹, and M. A. Gomez², ¹Universitat Autònoma de Barcelona, Bellaterra, Spain, ²NUTEGA, Madrid, Spain.

Ketosis is the result of an unbalance between energy supply and requirements. Dairy goats carrying twins are highly susceptible to gestational ketosis. Monopropylene glycol is a glucogenic precursor that has been successfully used to prevent ketosis. The objective of this study was to compare monopropylene glycol with other glucose precursors to prevent ketosis. Twenty-two pregnant Murciano-Granadina goats carrying twins were assigned to 4 different treatments in a randomized complete block design, where group was the experimental unit: monopropylene glycol (MG: 36.9 g/goat/d, 65% purity) considered as positive control; glycerol (GLY: 60.0 g/goat/d, 40% purity); monopropylene glycol plus B vitamins (MGB: 44.3 g/goat/d, 54% purity); glycerol plus monopropylene glycol plus B vitamins plus oligoelements (GMGB: 56.4 g/goat/d, 33 and 9.5% purity, respectively). Goats were controlled from 25 before 30 d after kidding. Goats were group fed, were received an ad libitum forage diet and were individually supplemented with 400 and 800 g of concentrate before and after kidding, respectively. Intake was recorded daily, milk production and composition determined weekly, body weight and condition score were recorded -15, 0, 15 and 30 d around kidding, and blood samples were taken on days -15, -7, -3, -1, 0, 1, 3, 5, 7, 15 and 30 around kidding to measure insulin, glucose, non-esterified fatty acids, triglycerides and β-hydroxybutyrate. Results were analyzed using the PROC MIXED procedure of SAS and differences declared at $P < 0.05$. No differences were found in body weight and condition score. Intake of DM increased ($P < 0.04$) in GLY compared with MG (1.36 vs. 1.43 ± 0.02 kg/d) with no effects on milk production (1.93 ± 0.18 L/d). Milk fat and protein tended ($P < 0.10$) to be higher in GLY (5.69 vs. 4.83 ± 0.24% and 4.15 vs. 3.55 ± 0.16%, respectively) compared with MG. There were no differences in blood metabolites among treatments. Glycerol may be a good alternative to propylene glycol in dairy goats around kidding.

Key Words: glycerol, glycol, goats

T460 Evaluation of milk serum amyloid A3 (M-SAA3) protein as a potential mammary health indicator in goats. A. Domènech¹, A. Gómez-Martín², C. De la Fe², J. C. Corrales², and A. Serrano¹, ¹Ruminant Production, IRTA, Barcelona, Spain, ²Department of Animal Health, University of Murcia, Murcia, Spain.

The objective of this study was to investigate the potential of M-SAA3 protein as a mammary health indicator in caprine milk. For this purpose, a preliminary study of quantification of SAA3 in half milk samples from healthy (n = 26) and clinical mastitic (n = 28) Murciano-Granadina goats was conducted. Clinical mastitis milk samples were characterized in accordance with bacterial isolation in blood and McConkey agar, Gram staining and catalase and oxidase tests. Gram + and catalase + samples were further characterized with a *Staphylococcus aureus* agglutination test. Milk samples from healthy goats were verified by negative bacterial culture and somatic cell count. Results from bacterial identification in mastitic milk samples reported 75% of Gram + infections (90.5% *Staphylococcus* spp. and 9.5% *Streptococcus* spp.). 71.5% of the Gram – milk infected samples were oxidase + (no enterobacteriae) and *Escherichia coli* was identified in the rest of them (28.5%). Milk levels of SAA3 were measured using a commercial ELISA kit (Mast ID SAA3 kit, Tridelta, Ireland). Milk levels of SAA3 from healthy and mastitic goats were log-transformed and compared using an ANOVA. Results indicated no significant differences ($P = 0.22$) in milk SAA3 levels in samples obtained from mastitic ($35.05 \pm 0.30 \mu\text{g/mL}$) or healthy goats ($20.36 \pm 0.32 \mu\text{g/mL}$). However, the CV of SAA3 milk contents was numerically greater in mastitic milk (59%) than in milk from healthy goats (26%). Results indicate that M-SAA3 might not be an accurate indicator of clinical mastitis in goat milk but do not exclude the potential of exploring M-SAA3 levels in samples of caprine subclinical mastitis. Further studies with a greater number of samples are being conducted.

Key Words: SAA3, caprine, mastitis

T461 Milk fat synthesis is progressively reduced in dairy goats fed increasing levels of an unprotected conjugated linoleic acid (U-CLA) supplement. D. Fernandes¹, J. Souza¹, M. Baldin¹, R. Dresch¹, E. C. Sandri¹, J. H. Bruschi², F. C. F. Lopes², M. A. S. Gama², and D. E. Oliveira^{*1}, ¹Santa Catarina State University, Chapecó, Brazil, ²National Dairy Cattle Research Center, Juiz de Fora, Minas Gerais, Brazil.

This objective was to evaluate the dose-response effect of dietary U-CLA on milk fat synthesis in dairy goats. Eight Toggenburg goats (4 primiparous and 4 multiparous; 120 to 150 DIM) received 4 levels of U-CLA in a 4×4 Latin square (LS) design. The treatments were: 1) Control: 45 g/d of calcium salts of soybean oil (CSSO); 2) CLA15: 30 g/d of CSSO plus 15 g/d of U-CLA; 3) CLA30: 15 g/d of CSSO plus 30 g/d of U-CLA and 4) CLA45: 45 g/d of U-CLA. Each experimental period lasted 12 d, separated by 6 d washout intervals. The U-CLA contained 29% of trans-10 cis-12 CLA; therefore, it was delivered about 0, 4.5, 9.0 and 13.5 g/d of trans-10 cis-12 CLA for control, CLA15, CLA30 and CLA45, respectively. Lipid supplements were mixed into the concentrate (1.0 kg/goat/d) and fed twice a day after milking. Corn silage was fed ad libitum and orts were recorded daily to calculate forage intake. Milk production was recorded daily and milk samples were collected in the last 3 d of each period (d 10, 11 and 12). Body condition score was recorded on the 1st and 12th day of each period. Data were subjected to ANOVA and the statistical model included animal, period, LS, animal within LS, treatment and interaction LS x treatment as sources of variation. There was no interaction LS x treatment for any variable, showing that responses to U-CLA doses did not differ between primiparous and multiparous. Milk fat content and yield were linearly reduced ($P < 0.0001$) in response to increased U-CLA dose (2.90, 2.40, 1.94 and 1.72%; SE = 0.08 and

67.8, 57.7, 46.9 and 40.3 g/d; SE = 2.72, respectively). However, the increase in U-CLA dose had no effect on milk yield (2.32, 2.37, 2.41 and 2.35 kg/d; SE = 0.08), milk protein content (2.76, 2.78, 2.75 and 2.79%; SE = 0.03), milk protein yield (63.7, 65.5, 65.5 and 65.5 g/d; SE = 1.95), forage intake (2.21, 2.25, 2.15 and 2.19, SE = 0.09) and BCS (2.75, 2.75, 2.72, 2.78; SE = 0.07).

Key Words: goat, conjugated linoleic acid, milk

T462 Requirements of magnesium, potassium and sodium for maintenance and growth of Boer crossbred kids. M. H. M. R. Fernandes¹, K. T. Resende¹, L. O. Tedeschi², J. S. Fernandes Jr.¹, and I. A. M. A. Teixeira^{*1}, ¹Universidade Estadual Paulista/UNESP and INCT-CA members, Jaboticabal, SP 14870, Brazil, ²Texas A&M University, College Station

The requirements of magnesium (Mg), potassium (K) and sodium (Na) of goats have been assumed to be identical to those for cattle and sheep (3.5, 50, 15 mg/kg of BW, respectively). The objective of this study was to determine the requirements of Mg, K, and Na for maintenance and growth of 34 intact male crossbred kids (3/4Boer 1/4Saanen), varying BW from 20 to 35 kg. The comparative slaughter technique with 3 slaughter periods was used to determine the mineral requirements. A baseline (BL) group was comprised of 7 randomly selected kids, averaging 20 kg BW. The intermediate slaughter group was fed ad libitum and consisted of 6 randomly selected kids that were slaughtered when they reached 27.5 kg BW. The remaining kids (n = 21) were allocated randomly on d 0 to 3 levels of DMI (treatments were ad libitum or restricted to 70 or 40% of the ad libitum intake) within 7 slaughter groups. A slaughter group contained 1 kid from each treatment, and kids were slaughtered when the kid fed ad libitum 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 (0.95% Ca, 0.52% P, 0.19% Mg, 0.62% K, 0.22% Na). A digestion trial with 15 kids at 3 levels of intake was concurrently conducted to determine the apparent absorption coefficient and endogenous fecal and urinary losses. During the trial, all kids (n = 34) were fed once daily (0800) in individual pens with free access to water. The requirements of Mg, K, and Na for maintenance were 7.8 ± 7.0 mg/kg BW, 39.7 ± 0.38 mg/kg BW and 10.4 ± 0.35 mg/kg BW, respectively. The net Mg, K and Na requirements for growth ranged from 0.29 to 0.31 g/kg empty weight gain (EWG), 1.18 to 1.05 g/kg EWG and 0.67 to 0.62 g/kg EWG for 20 and 35 kg BW, respectively. These results indicated that Mg, K, and Na requirements for Boer crossbred, a meat type breed, are less than those recommended for cattle and sheep. Further studies are required to confirm these findings for growing goats.

Key Words: Boer, minerals, net requirement

T463 Calcium and phosphorous requirements for maintenance and growth of Boer crossbred kids. M. H. M. R. Fernandes¹, K. T. Resende¹, L. O. Tedeschi², J. S. Fernandes Jr.¹, and I. A. M. A. Teixeira^{*1}, ¹Universidade Estadual Paulista/UNESP and INCT-CA members, Jaboticabal, SP 14870, Brazil, ²Texas A&M University, College Station.

Calcium (Ca) and phosphorous (P) play an important role in several metabolic functions. The net requirements of Ca and P for goat dairy breeds are 2 and 1.4 g/d (BW of 30 kg). The objective of this study was to determine Ca and P requirements for maintenance and growth of 34 intact male crossbred kids (3/4Boer 1/4Saanen) varying BW from 20

to 35 kg. The comparative slaughter technique with 3 slaughter periods was used to determine the mineral requirements. A baseline (BL) group was comprised of 7 randomly selected kids, averaging 20 kg BW. The intermediate slaughter group was fed ad libitum and consisted of 6 randomly selected kids that were slaughtered when they reached 27.5 kg BW. The remaining kids (n = 21) were allocated randomly on d 0 to 3 levels of DMI (treatments were ad libitum or restricted to 70 or 40% of the ad libitum intake). These kids were pair-fed in 7 slaughter groups. A slaughter group contained 1 kid from each treatment, and kids were 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 (0.95% Ca, 0.52% P). A completely randomized design digestion trial was conducted in parallel with the comparative slaughter trial and used 15 kids at 3 levels of intake to determine apparent absorption coefficient and endogenous fecal and urinary losses. During the trial, all kids (n = 34) were fed once daily (0800) in individual pens with free access to water located in a masonry shed and protected from rain and wind. The Ca and P requirements for maintenance were 16.1 ± 29.1 mg/kg BW and 31.6 ± 14.3 mg/kg BW, respectively. The net Ca and P requirements for growth ranged from 6.7 to 7.0 g/kg empty weight gain (EWG) and 5.3 to 5.4 g/kg EWG for 20 and 35 kg BW, respectively. These findings suggested that net Ca and P requirements for growth of Boer crossbred, a meat type breed, might be lower than those requirements published for dairy goats.

Key Words: Boer, minerals, net requirement

T464 Blood mineral concentration of adult goats in a subtropical region of southern Mexico during the rainy and dry season. R. Rojo*, A. Z. M. Salem, F. Jiménez, S. Rebollar, J. L. Tinoco, B. Albarán, J. F. Vázquez, D. Cardoso, J. Hernández, and F. González, *Centro Universitario UAEM-Temascaltepec, Temascaltepec, Estado de México, México.*

The aim of work was to evaluate the effects of season (rainy: RS; and dry: DS) and sample location of 3 different places (Rio Topilar: RT; El Devanador: ED; y San Pedro Limon: SPL) at the province of Tlatlaya in Mexico State on mineral status of blood plasma in crossbred adult goats (LW 35 ± 1.5 kg) during transition period under the semiarid rangeland of southern Mexico. Representative samples of 7 adult Creole goats were taken from each production unit (7 animals \times 3 production unit) within each season (dry and rainy). Mineral concentrations (Ca, P, K, Mg, Na, Zn and Cu) in plasma were assayed using the Atomic absorption. Data were analyzed using one way ANOVA test; significant differences between means were tested by Tukey. Higher Ca and P concentrations were observed during the DS than RS ($P < 0.01$), with a lowest value in SPL during the DS. No significant differences ($P > 0.05$) were observed between seasons or production units in concentration of Mg, while Na concentration was affected by the production unit ($P 0.05$), and the highest values were during the DS. Lowest Zn concentration was observed during the DS in SPL (0.18 mg/dL), while Cu concentration was significantly ($P < 0.01$) increased during the same season than in RS (0.07 to 0.10 mg/dL, respectively). Generally, the concentration of K, Zn and P in goat plasma was above the recommended levels by NRC (2007), while the concentration of Ca, Mg, Na and Cu were below. Adult Creole goats during transition period under the semiarid rangeland of southern Mexico had a deficiency in some blood minerals such as K, Zn and P, and this maybe due to their native grazing behavior on browse shrubs and 3 foliages in the province of Tlatlaya in México State.

Key Words: adult goats, blood serum, mineral concentration

T465 Effect of copper and zinc on in vitro ruminal fermentation of total mixed ration in goats. J. F. Vazquez¹, R. Rojo*¹, D. Lopez¹, A. Z. M. Salem¹, J. M. Gonzalez², D. Colín¹, and J. L. Tinoco¹, ¹Centro Universitario UAEM-Temascaltepec, Temascaltepec, Estado de México, Mexico, ²Facultad de Agrobiología, Universidad Autónoma de Tlaxcala, Ixtacuixtla, Tlaxcala, México.

One in vitro experiment was conducted with the objective of evaluate the effect of copper and zinc addition on some parameters of ruminal fermentation of total mixed ration (TMR) (14% CP, 25.6% NDF and 18.3% ADF) using ruminal inoculum of goats. The TMR was incubated during 96 h with 4 different supplementary treatments: Control, Cu (860 ppm), Zn (224 ppm), Cu-Zn (860–224 ppm) provided as mineral premixed at 3 per cent of TMR. One g of TMR with each treatment was incubated in serum bottles with 90 mL nutritive solution and 10 mL ruminal fluid from goats. In vitro gas production (ml g⁻¹ DM) after 24 (GP₂₄), 48 (GP₄₈) and 96 h (GP₉₆) of incubation, dry matter degradability (IVDMD: g/kg DM) were determined while *b* (asymptotic gas production (ml g⁻¹ DM)), *k* (rate of gas production (/h)), lag phase (lag) and metabolizable energy (ME: MJ kg⁻¹ DM) were estimated. Data were analyzed using the general lineal model (GLM) procedure in SAS in a complete random design and differences among means by Tukey test. Addition of Zn increased fraction B, but addition of Zn-Cu decreased this fraction. Treatments did not affect the fraction lag and IVDMD. Cu addition tended to increase the volume of GP at 24, 48 and 96 h of incubation. Cu treatment had the highest value for the fraction K and ME, while Zn appeared to have the lowest values. Addition of Cu in the diet improved gas production volume and fermentation efficiency in goats.

Table 1. In vitro ruminal fermentation parameters of total mixed ration with four different supplemental treatments

Parameters	Control	Zn	Cu	Zn-Cu	SEM	P <
b	273.5 ^{bc}	334.9 ^a	288.8 ^b	241.6 ^c	10.71	0.01
k	0.014 ^c	0.008 ^d	0.037 ^a	0.019 ^b	0.00	0.01
lag	0.87 ^a	1.32 ^a	1.78 ^a	0.68 ^a	0.19	0.15
GP						
24	69.3 ^c	58.5 ^c	169.3 ^a	90.7 ^b	13.2	0.01
48	140.6 ^{bc}	114.0 ^c	237.0 ^a	153.2 ^b	14.1	0.01
96	202.6 ^b	182.9 ^b	291.0 ^a	210.0 ^b	12.8	0.01
IVDMD	724.3 ^a	714.1 ^a	707.0 ^a	703.3 ^a	4.09	0.30
ME	15.1 ^c	14.4 ^c	21.9 ^a	16.5 ^b	0.90	0.01

Means in the same row with different superscripts differ ($P < 0.05$).

Key Words: copper, goats, ruminal fermentation, zinc

T466 Nutritional supplementation does not improve the sexual response of goats managed in northern Mexico. F. G. Véliz*¹, C. A. Meza-Herrera², M. A. De Santiago-Miramontes¹, R. Rodríguez-Martínez¹, and M. Mellado³, ¹Universidad Autónoma Agraria Antonio Narro, Torreón, Coahuila, Mexico, ²Universidad Autónoma Chapingo, Unidad Regional Universitaria de Zonas Áridas, Bermejillo, Durango, México, ³Universidad Autónoma Agraria Antonio Narro, Buenavista, Saltillo, Coahuila.

The objective was to determine if nutritional supplementation of native goats under an extensive management system in northern Mexico improves pregnancy rate in goats. Native multiparous goats (n = 79), were divided in 2 homogenous groups with respect to BW and body

condition. Both experimental groups grazed (11:00 to 17:00 h) rangeland and crop residues fields. Five days before and 20 d after breeding, the supplemented group (SS, n = 37) received a supplemental ration to provide 75% of its energy and protein maintenance requirements. The control group (CC; n = 24) received no supplementation during the experimental period. In March 20th, experimental groups were exposed to 4 male bucks, which were induced to an intense sexual activity by means of a photoperiodic treatment of 2.5 mo. Data were analyzed by means of Chi-squared test. More than 90% of goats in both experimental groups showed sexual behavior during the experimental period. In fact, during the first 6 d, 91% (38/42) of the CC-group exhibited estrual activity, while the SS-group exhibited corresponding values of 95% (35/37). The observed pregnancy and ovulatory rates were 1.26 and 64% and 1.15 and 75% in the CC and SS groups, respectively. Our results suggest that native multiparous goats under extensive-range production systems in Northern Mexico, receiving or not nutritional supplementation before or after breeding season, had similar productive and reproductive outcomes.

Key Words: nutritional supplementation, goat reproduction, male effect

T467 Seasonal reproductive activity of Nubian, Alpine and Criollo female goats exposed to natural photoperiod in a semiarid region of central-north Mexico. M. T. Rivera¹, M. O. Diaz-Gomez¹, M. Rincon¹, F. J. Escobar¹, C. F. Arechiga², H. G. Gamez³, J. Urrutia^{*3}, and H. Vera-Avila³, ¹Universidad Autonoma de Zacatecas, Zacatecas, Mexico, ²Universidad Autonoma de San Luis Potosi, San Luis Potosi, Mexico, ³Instituto Nacional de Investigaciones Forestales, Agricolas y Pecuarias, San Luis Potosi, Mexico.

Female goats in a temperate climate have showed a seasonal reproduction influenced by photoperiod and great differences have been observed among breeds: Alpine goats have showed a much shorter reproductive season than Nubian goats. It is not clear whether this behavior will persist under tropical conditions, where photoperiod variations are less accentuated. In this study, variation of reproductive activity of Nubian, Alpine and Criollo goats was examined in the semiarid region of central-north Mexico (San Luis Potosi State; 22° N latitude). The study was conducted at the UASLP-Goat Unit under natural photoperiod and temperate conditions during a whole year (from April to April). Female goats, Alpine, Nubian and Criollo (n = 8 of each breed), were included in the study and exposed to presence of 2 Alpine bucks kept in a separate barn, but close enough to detect their visual, olfactory and audible signals. Progesterone concentrations indicate that all goats showed a great variation in reproductive activity throughout the year, showing ovulatory cycles between September and February. Nubian goats showed a shorter breeding season (113.8 d), than Alpine (132.1 d) and Criollo goats (138.5 d; $P = 0.12$). A slight variation on live body weight ($P > 0.05$) throughout the study allowed to assume that BW did not affect reproductive activity. Results indicate that Nubian, Alpine and Criollo goats kept at 22° N present a wide seasonal variation in ovulatory activity, which was not influenced by breed, despite the fact that these breeds have shown great differences in length of their reproductive season at higher latitudes. Alpine goats showed a higher number of ovulatory cycles than Criollo and Nubian goats (51 vs. 45 vs. 40; respectively). Induction of long ovulatory cycles (≥ 26 d) was greater for Criollo goats than Nubian or Alpine goats (25.5 vs. 10 vs. 2%; respectively). These results demonstrate that the main influence that photoperiod exerts on seasonal reproductive activity of female goats persist under tropical photoperiodic conditions.

Key Words: goats, seasonal reproduction, photoperiod

T468 Conditions to test electric fence modifications of cattle barb wire fence for goat containment. A. L. Goetsch*, G. D. Detweiler, R. Puchala, T. Sahl, and T. A. Gipson, *American Institute for Goat Research, Langston University, Langston, OK.*

Two 6 × 6 Latin squares, each with 24 yearling meat goat doelings previously exposed to electric fence, were conducted to identify appropriate conditions to test electric fence modifications of cattle barb wire fence for goat containment. After overnight fasting, groups of 4 doelings were placed in 2.4 × 2.4 m pens without forage. Pens had 3 metal panel sides and 1 side with 5 strands of barb wire 31, 56, 81, 107, and 132 cm from the ground adjacent to a pasture with forage and browse. Intervals between the 6 periods of 2–3 d and 1 wk were assigned to the 2 squares. The 6 treatments in each square were 4 strands 15, 28, 43, and 58 cm from the ground at low voltage of 4–4.5 kV (4S-LV); 2 strands at 15 and 43 cm and high voltage of 8.5–9 kV (2S-HV); 2 strands at 15.2 and 43.2 cm and low voltage (2S-LV); 1 strand at low height of 15 cm and low voltage (1S-LH-LV); 1 strand at 43 cm and low voltage (1S-HH-LV); and 1 strand at 23 cm and high voltage (1S-MH-HV). Means were separated by least significant difference with a protected F-test. The percentage of doelings exiting after 2 (during continuous visual observation) and 6 h was similar between intervals (6.3 and 4.2% at 2 h (SE = 2.49) and 9.7 and 6.3% at 6 h (SE = 2.33)) for long and short intervals, respectively). Doelings receiving a first shock in 2 h did not differ between intervals (16.7 and 19.4% for long and short intervals, respectively; SE = 3.20). The percentage of doelings exiting at 2 and 6 h was not affected by fencing treatment ($P > 0.05$). Period of the squares affected ($P < 0.05$) the percentage of doelings shocked in 2 h (62.5, 29.2, 6.3, 6.3, 0, and 4.2%; SE = 4.92) and exiting pens after 2 (20.8, 8.3, 2.1, 0, 0, and 0%; SE = 3.24) and 6 h (27.1, 10.4, 6.3, 4.2, 0, and 0% for 4S-LV, 2S-HV, 2S-LV, 1S-LH-LV, 1S-HH-LV, and 1S-MH-HV, respectively; SE = 3.44). Low pen exit, particularly in latter periods, suggests desirability of more thorough prior training to electric fence. Memory of previous exposure to electric fence appeared substantial, implying need to evaluate longer intervals. The overnight fasting period may not have created an adequate impetus to test electric fence for pen exit.

Key Words: goats, fence, pasture containment

T469 Accuracy of calculated distances between consecutive fixes of GPS collars worn by goats. T. A. Gipson*, G. D. Detweiler, and A. L. Goetsch, *American Institute for Goat Research, Langston University, Langston, OK.*

Small ruminants have been fitted with GPS collars to estimate distance traveled in grazing studies; however, accuracy has not been assessed. To do so, a mobile stand was developed to hold 21 Lotek 3300 GPS collars (Lotek Wireless, Newmarket, Ontario, Canada) and was moved a prescribed distance between fixes on 4 azimuthally different courses (NE at 45°, S at 180°, W at 270°, and NW at 315°). Fixes were scheduled at 5-min intervals. Distances traveled on a course were 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 m. Distances were replicated 3 times for each course and the order of the distances was randomized within each replicate. Two courses were run per day and each course was paired with every other course, for a total of 6 different dates. Fixes were downloaded and distances between fixes were calculated using spherical geometry. The BIAS was estimated as distance calculated from collars minus true distance and was analyzed using a repeated measures design (PROC MIXED; SAS). Dependent fixed effects included true distance (0 to 100 m), course (NE, NW, S, W), and the 2-way interactions. Collars and dates were considered random effects. There was no effect ($P > 0.10$) of course on BIAS. For true distance, BIAS was greatest for 0 m (7.6 m ± 0.36) and least for 60 m (0.5 m). Other estimates of BIAS were

intermediate at 10 (2.9 m), 20 (1.6 m), 30 (0.9 m), 40 (1.7 m), 50 (1.4 m), 70 (0.6 m), 80 (0.8 m), 90 (1.2 m), and 100 m (1.3 m). There were linear and quadratic ($P < 0.01$) effects on BIAS when all distances were analyzed. However, if 0 and 10 m distances were eliminated, the linear effect disappeared ($P > 0.10$) but the quadratic remained ($P < 0.05$). The ability of GPS collars to differentiate between when an animal is stationary or moving only a short distance between fixes appears very limited; however, if an animal is moving more than 20 m between GPS fixes, collar estimates are within 1.6 m of actual distance traveled.

Key Words: goats, GPS, distance

T470 Use of biometric measurements to estimate fetal mass in dairy goats. C. J. Härter*, I. A. M. Teixeira, L. D. Lima, H. G. O. Silva, A. R. Rivera, and K. T. Resende, *Universidade Estadual Paulista, Jaboticabal, SP, Brasil*.

An understanding of fetal mass is important to check for normal fetal growth. Moreover, it can be helpful for estimating nutritional requirements of pregnant females. The aim of this study was to estimate fetal mass based on biometric measurements. Data were obtained from 39 dairy female goats with an average BW = 50.59 ± 7.71 , and body condition scored as 2.58 ± 0.59 . After the pregnancy confirmation, female goats were distributed to treatments according to a $2 \times 2 \times 3$ factorial design as follows: 2 breeds (Oberhasli and Saanen), 2 types of pregnancy (single and twin) and 3 gestational ages (80, 110 and 140 d). Multiple linear regression was used to analyze the data using SAS PROC MIXED. At pre-established pregnancy ages goats were slaughtered and the mammary gland and reproductive tract were removed and separated from the cervix, and the uterus, fetus, placenta, and placental fluid were dissected. After fetal removal, weights, body length in centimeters (BL), height at withers, height at rump, chest width, rump width, rump length, hearth girth (HG) and abdominal girth were recorded for fetuses. The slaughter procedures followed the recommendations of the ethics committee for animal experimentation. The biometric measurements highly correlated with fetal mass ($P < 0.001$) which allowed the creation of predictive equations for fetal mass. The best equations were generated using body length ($Y = -549.4 \pm 520.4 + 22.14 \pm 50.25 \text{ BL} + 3.296 \pm 1.12 \text{ BL}^2$ ($R^2 = 0.89$); and hearth girth ($Y = 103.0 \pm 305.2 - 54.18 \pm 30.31 \text{ HG} + 5.175 \pm 0.696 \text{ HG}^2$ ($R^2 = 0.94$), whereas $Y = \text{fetal mass (g)}$. Fetal mass can be precisely estimated based on fetus biometry show-

ing an interesting perspective of pregnancy management as biometric measurements can be further determined using ultrasound, similar to what has been demonstrated in humans. Fapesp (2009/10125-0).

Key Words: biometry, fetal weight

T471 The relationship of real-time ultrasound body composition measurements, body weight and hip height with body condition score in mature Boer crossbred does. A. M. Duff*, J. A. Carter, C. A. Hughes, K. N. Gates, C. S. Ellason, W. S. Stewart, and F. R. B. Ribeiro, *Texas A&M University-Commerce, Commerce*.

The purpose of this study was to determine the relationship between real-time ultrasound (RTU) measurements of body composition, BW, and hip height (HH), with body condition score (BCS) in mature Boer crossbred does ($n = 27$). BCS was assessed visually using a 1 to 5 scale. The body composition traits measured by RTU were 12–13th rib *longissimus lumborum* muscle area (uLMA, mean = 9.08 cm^2), 12–13th rib fat thickness (uBF, mean = 0.27 cm), and ultrasound rump fat thickness (uRUMP, mean = 0.24 cm). Ultrasound measurements were taken using an Aloka 500 with a 12 cm 3.5 MHz transducer, and each animal's hair was clipped to no longer than 0.64 cm, and vegetable oil was used as a coupling agent to enhance image quality. Data were analyzed using the Proc CORR and Proc REG procedures of SAS. BW was correlated ($P < 0.05$) to HH, uBF, uLMA and uRUMP (0.55, 0.44, 0.67, and 0.58, respectively). BCS was correlated ($P < 0.05$) to uBF, uLMA and uRUMP (0.83, 0.77, and 0.92, respectively), and HH was not correlated ($P > 0.05$) to any of the RTU traits measured. Linear regression to predict BCS was developed using a stepwise selection. The first variable to enter the model was uRUMP which accounted for 84% of the variation and HH entered next in the model, accounting for an additional 6% of the variation, with the full model accounting for 90% of the variation in BCS. Body condition scoring done before breeding is very important to ensure that animals have enough body reserves to go through gestation and lactation. Since uBF was not a good predictor of BCS evaluators should give more emphasis in palpation of the rump area rather than the back of the animal when evaluating goats for BCS in order for a better assessment of total body fat reserves. Results of this study suggest that BCS can be accurately predicted from uRUMP and HH.

Key Words: ultrasound, body composition, goat