T363 The effects of confinement and protein levels on carcass traits of kids raised under mixed-species grazing system. S. Gebrelul,* L. Gray, R. Marshall, and C. Chisley, *Southern University Ag Center, Baton Rouge, LA.*

A long-term mixed-species grazing project was designed to determine the performance of goats and cattle grazing together or separately in continuous or rotational systems. To evaluate the carcass traits and lean yield, 50 kids that were born and weaned under the mixed-specie system were randomly assigned to 4 treatments in a 2 × 2 factorial arrangement. The treatments were housing (confinement vs. semi-confinement) and protein levels in the diet. Kids under confinement system were divided into 2 groups and fed ad lib rations which contained 13% or 16% CP. Kids under semi-confinement were allowed to graze on bermudagrass pastures during the day (for 8h) and supplemented with the same experimental rations during the night. After an adjustment period of 2 wk, live weights (LW) and BCS, (1 = thin, 5 = fat) were taken every 14 d for 8 wk. At the end of the study, 24 male kids (14 from confinement and 10 from semi-confinement groups) were humanely harvested and deboned for carcass study. Hot carcass weight and cold carcass weights (CCW), dressing percentages, cold carcass yield, live grades (LG, Selection 1, 2 or 3), conference grade (CG), fat score, etc. were taken at harvest. Ribs, shoulder, shank, leg, back, and neck were cut from each carcass, weighed and deboned to determine percent of lean meat (PLM) and weight of lean meat yield (WLM). Data were analyzed using SAS MIXED procedure where kids were considered random effects. Stepwise regression was used to determine best live measurement predictors for PLM and WLM. No differences in carcass weights were observed due to housing effect or level of CP in the diet. BCS was the best predictor for PLM ($r^2 = 0.34$) followed by LW and CG. LW was the best indicator for WLM ($r^2 = 0.89$) followed by BCS, CG and LG. WLM yield was significantly ($P < 0.05$) correlated with LW (r = 0.92), HCW (r = 0.96), BCS (r = 0.77), CG (r = −0.52), and LG (r = −0.86). Similar relationships were observed for PLM. Ribs, legs, shoulder, shank, back and neck cuts represented 29.4%, 25.2%, 15.1%, 10.1%, 8.6% and 5.6% of the total carcass weight, respectively. Based on these results, one can feed a lower CP level of 13% without negative effect on carcass traits and lean meat yield.

Key Words: mixed-grazing, carcass, goats

T364 Fatty acids profile in *Longissimus dorsi* of Santa Ines lambs fed with different energy levels. P. C. L. Arruda, E. S. Pereira,* P. G. Pimentel, G. M. B. Moreno, J. N. Rocha Junior, J. G. L. Regadas Filho, and R. M. Fontenele, *Federal University of Ceara, Fortaleza, Ceara, Brazil.*

Nutritional strategies have been used to modify the content and the concentrations of the different fatty acids in animal muscle. The assessment of the nutritional quality of lipids in ruminant carcasses has been performed based on the composition of fatty acids, through the determination of indexes that relate the content of saturated fatty acids (SFA), monounsaturated (MUFA) and polyunsaturated (PUFA) n-6 and n-3. The objective of this study was evaluated the influence of rations with different levels of metabolizable energy on the content of total lipids, cholesterol and fatty acid profile of the *Longissimus dorsi* of Santa Ines lambs. Twenty Santa Ines lambs were used, with age and BW of 50 d and 13.0 ± 0.56 kg, respectively, fed rations with different energy levels: 2.08; 2.28; 2.47 and 2.69 Mcal/kg DM. The animals were weighed weekly to follow the ADG and when the mean BW of the treatments reached 28 kg the animals were slaughtered. The reading of the esters of fatty acids was performed by gas chromatography. The atherogenicity (AI) index AI = [(C12:0 + (4 × C14:0) + C16:0)]/ (ΣMUFA + Σn-6 + Σn-3), thrombogenicity (TI = (C14:0 + C16:0 + C18:0)/ [(0.5 × ΣMUFA) + (0.5 × Σn-6 + (3 × Σn-3) + (Σ n-3/Σn-6)]), relation between hypocholesterolemic and hypercholesterolemic fatty acids (h:H = (C18:1cis9 + C18:2n-6 + C20:4n-6 + C18:3n-3 + C20:5n-3 + C22:5n-3 + C22:6n-3)/(C14:0 + C16:0) and the sum of desirable fatty acid = MUFA + PUFA + C18:0 were calculated. The analysis of the lipid profile of the *Longissimus dorsi* muscle presented linear increasing and decreasing effect for the Cis-10 heptadecanoic acid (C17:1) and eicosatrienoic (C20:3), respectively, with the increasing levels of dietary energy. The levels of total cholesterol (mg/100g) decreased with the inclusion of energy in the diets. The relations PUFA:SFA (0.13), PUFA:MUFA (0.12), MUFA:SFA (0.97), desirable fatty acids (66.3), n-6:n-3 (2.19), atherogenicity index (0.63), thrombogenicity index (1.63), relation between hypocholesterolemic and hypercholesterolemic fatty acids (1.98) and the relation (C18:0+C18:1):C16:0 (2.54) were not affected by energy levels ($P > 0.05$). Variation of the energy levels in total mixed rations to lambs influences the lipid profile in *Longissimus dorsi* of Santa Ines lambs.

Key Words: atherogenicity index, lamb meat, unsaturated fatty acids

T365 The effect of induction hypothyroidism on carcass quality and performance in lamb. Y. Baghcheghi,* A. Yousefi, A. Z. Shahneh, M. G. Khanlo, and M. Poorhamdollah, *University of Tehran, Karaj, Tehran, Iran.*

This study was conducted to investigate the effect of induced transient hypothyroidism by propyl-2-thiouracyl (PTU) on the carcass characteristics of Lori-Bakhtiari lambs. In a completely randomized design, 18 Lori-Bakhtiari male lambs (36 ± 4 kg BW, 5 mo old) were divided to 3 groups (n = 6) and subjected to one of 3 treatments: control (C: 0 mg PTU/kg BW), low (L: 10 mg PTU/kg BW), or high (H: 20 mg PTU/kg BW) dose by gavages. Animals were assigned in single pens (2 × 2 m) under ambient conditions for 60 d. Lambs had ad libitum access to fresh water and a fattening diet. Blood samples were collected every week using sterile vacuum tubes before feeding at 8:00 a.m., weekly. Plasma was separated and stored at −20°C before determination of thyroid hormone concentrations. At the end of experimental period, lambs were slaughtered for determination of carcass characteristics. Mean concentrations of T4 and T3 decreased significantly in L and H groups compared with C group (0.72 ± 0.06, 0.90 ± 0.06 and 2.27 ± 0.06, respectively, $P < 0.05$). There were no significant differences among treatment in carcass length, longissimus muscle cross section area, weight of primal cuts, weight of offals, and ADG ($P < 0.05$). Average feed conversion (G: F) ratio in H and L groups improved compared with C group (6.7 ± 0.39, 7.4 ± 0.39 and 8.9 ± 0.39, respectively, $P < 0.05$). Weight percentage of heart decreased in induced hypothyroidism groups (L and H) compared with C group (0.77 ± 0.03, 0.73 ± 0.03 and 0.92 ± 0.03 respectively, $P < 0.05$). Decreased percentages of heart weight and G:F might be a result of decreased basic metabolism in induced hypothyroidism groups.

Key Words: hypothyroidism, meat quality, Lori-Bakhtiari

T366 Effect of transient hypothyroidism on lamb's meat quality. Y. Baghcheghi*[1], A. Z. Shahneh[1], A. Yousefi[1], M. Poorhamdollah[1], and M. Joki[2], *[1]Department of Animal Sciences, University of Tehran, Karaj, Tehran, Iran, [2]Department of food Sciences, University of Tehran, Karaj, Tehran, Iran.*

This study was conducted to investigate the effect of induced transient hypothyroidism by propyl-2-thiouracyl (PTU) on the meat quality of Lori-Bakhtiari lambs. Eighteen Lori-Bakhtiari male lambs (Average BW, 36 ± 4 kg and 5 mo of age) were divided to 3 groups (n = 6) and received one of the 3 treatments as Control (C: 0 mg PTU/kg BW), Low (L: 10 mg PTU/kg BW) and High (H: 20 mg PTU/kg BW) by gavages during 60 d of experimental period. Lambs had free access to fresh water and were fed ad libitum with fattening diet. Blood samples were collected by sterile vacuum tubes before feeding, weekly. At the end of experimental period, lambs were slaughtered and meat quality was determined on *longisimus dorsi* muscle. Data was analyzed by GLM and Mixed procedure of SAS. Mean concentration of T4 and T3 decreased significantly in H and L groups compared with C group (0.72 ± 0.06, 0.90 ± 0.06 and 2.27 ± 0.06, respectively) ($P < 0.05$). There was no significant difference among treatment for pH, chemical composition and shear force value of *longisimus dorsi* muscle ($P < 0.05$). H group had higher ($P < 0.05$) L* (lightness) compare with L and C group (43.0 ± 0.72, 45.2 ± 0.72 and 45.8 ± 0.72, respectively). There were no differences ($P > 0.10$) regarding a* (redness) and b* value among treatments ($P < 0.05$). Hypothyroidism decreased ($P < 0.05$) H and L group cooking loss compared with C group (0.38 ± 0.01, 0.39 ± 0.01 and 0.43 ± 0.01, respectively) ($P < 0.05$). We concluded that, using 10 and 20mL/kg BW of PTU could induce hypothyroidism leading to changes in color and cooking quality of lamb's meat.

Key Words: hypothyroidism, meat quality, Lori-Bakhtiari

T367 Biochemical and hormonal response and chemical composition of milk following ACTH administration in goats fed lemongrass (*Cymbopogon citratus* (DC.) Stapf). T. S. Canaes*[1], S. N. Macedo[1], C. G. Lima[1], V. A. Pimentel[2], and J. A. Negrão[1], *[1]Sao Paulo University, Sao Paulo, Sao Paulo, Brazil, [2]Federal University of Espirito Santo, Sao Mateus, Espirito Santo, Brazil.*

It is evidence that lemongrass can be used as tranquilizer. The aim of this study was to evaluate 4 levels of lemongrass (LG) and their influence on the intravenous ACTH to mimic a stressful response on hormonal (cortisol) and biochemical responses (glucose, urea, creatinine, albumin, cholesterol and HDL cholesterol), milk yield and physico-chemical composition of goat's milk. Forty-four Saanen goats 3 yr of age at 75 d of lactation, BW of 59.2 ± 2.69 kg; BCS of 3.0 and milk yield of 2.58 ± 0.27 kg were used. The animals were kept in 4 feedlot pens (11goats/pen) during 152 d. Four diets were used (roughage:concentrate of 53:47) and provided once a day after milking. The variation was the substitution of corn silage (CS) by lemongrass (LG): T1 control (100% CS), T2 (33.5% LG), T3 (66.5% LG) and T4 (100% LG). They were injected 0.6 IU/kg of BW of ACTH into the jugular vein after 142 d of diet and before the daily feeding. Sterile saline solution was used as the control. Blood samples were collected at 20 min before and 0, 60, 120 and 300 min after application of ACTH. The interval between injection of saline and ACTH was 7 d. The biochemical and hormonal profiles were measured by commercial kits. Milk yield and composition were evaluated for 3 d following application of ACTH. PROC MIXED in SAS 9.1 was used with a repeated week statement to analyze plasma results. Orthogonal contrasts were used to determine the linear and quadratic effects of LG. There was quadratic effect in DMI as the addition of LG was increased. Cortisol concentration was affected ($P < 0.05$) by ACTH and time but not by LG and increased in the plasma of ACTH-treated goat's immediately after application and remained increased throughout 120 min sampling period. The LG in the diet had an influence on concentrations of blood glucose in animals subjected to ACTH application but the interaction of ACTH × LG was observed only in T1. There was no interaction between time groups (saline or ACTH) or diets for the others biochemical variables in plasma. The LG increases the milk yield for T3, but did not change milk composition.

Key Words: cortisol, goat milk, stress

T368 Forage yield and quality changes in mixed cattle and goats grazing practices. Y. Ghebreiyessus,* S. Gebrelul, M. Berhane, and R. Payne, *Southern University Ag Center, Baton Rouge, LA.*

To evaluate the effect of mixed-species grazing on forage yield and quality, 80 Spanish goats and 28 Brangus cows were randomly assigned to continuous or rotational grazing systems, and 3 grazing schemes (goats alone, cattle alone, and goats mixed with cattle) in a 2x3 factorial arrangement of treatments. A forage field of 31 ha of bermudagrass was divided into 6 pastures, 8 ha each for mixed-species grazing, 2 ha each for goats-alone grazing and 5.5 ha each for cattle-alone grazing. The rotational pastures were further divided into 4 paddocks and each paddock was grazed for 7d and allowed to rest for 21d. Animals were stocked at 0.8 ha/AU. Forage samples were collected weekly to determine plant height, forage yield and quality. Forage available for consumption by animals was estimated as the difference of yield of forage from un-grazed (inside a ring) and grazed plots. Forage consumption per animal per day was then determined by multiplying the available forage by the grazing area and dividing the result by the number of animal days. Five goats were assumed to be equivalent to a cow. Data was analyzed using SAS GLM procedure. Plant height ranged from 16 cm in June to 35 cm in April and was significant ($P < 0.05$) in all treatments, including months, years, grazing species, grazing systems, specie x grazing interaction. Available forage yield range was 756 to 2,394 kg/ha in June and April, respectively, while forage available for consumption ranged from 253 to 841 kg/ha for the same period. There was no difference ($P > 0.05$) in available forage between cattle-alone and mixed with goats, indicating presence of goats did not affect negatively the potentially available forage. However, consumption per cow was higher in cattle-alone treatment. Goat consumption of 6.7 kg/hd/d was the lowest ($P < 0.05$) despite the highest available forage. Crude protein content ranged from 8.9 to 11.8%. Acid detergent fiber and NDF values ranged from 31.9% to 39.1% and 47.1 to 62.2% respectively. None of the forage quality measures were affected ($P > 0.05$) due to main effects of months, years, grazing species, grazing systems or interactions. Results demonstrated that goats could graze with cattle without bringing any negative effects to cattle's performances.

Key Words: mixed-grazing, goats, forage quality

T369 Quantitative traits of carcass of Ile de France lambs fed diets containing different percentages of hay mulberry. V. T. Santana, A. G. Silva Sobrinho, L. G. A. Cirne,* V. Endo, N. L. L. Lima, F. A. Almeida, G. M. Manzi, and N. M. B. L. Zeola, *Universidade Estadual Paulista, Jaboticabal, São Paulo, Brazil.*

Alternative protein sources such as mulberry hay can partially or totally replace concentrate feeds commonly used in intensive sheep production system in Brazil. It is essential to study the effect of such rations on quantitative carcass characteristics. This experiment was conducted to evaluate the quantitative carcass traits of Ile de France lambs fed diets

containing various percentages of mulberry hay. Twenty-four Ile de France lambs (15.0 kg BW, 3 mo old) were confined in individual stalls and fed one of 3 diets: sugar cane + concentrate with 0.00% mulberry hay; sugar cane + concentrate with 25.0% mulberry hay; or sugar cane + concentrate with 50.0% mulberry hay. The sugar cane was used as forage (variety IAC 86–2480) that gave a total dietary roughage to concentrate ratio of 50:50, with 10.0% surplus allowance. The confinement period comprised of 80 d, and the first 14 d were allowed for adaptation of animals to the diet and the stalls. The data were analyzed using SAS as a completely randomized design, with 3 treatments (n = 8), and the means were compared using the Tukey test. The lambs were slaughtered at 32.0 kg BW and carcasses were weighed to obtain the HCW and kept in cold storage at 6°C for 24 h, to assess the cold carcass weight (CCW). The HCW (14.1 kg) and CCW (13.7 kg) were not affected ($P > 0.05$) by different percentages of mulberry hay in the diet. There was also no difference ($P > 0.05$) in empty BW (25.9 kg) and true yield (54.7%). The results showed that inclusion of mulberry hay in the diet did not alter carcass characteristics, indicating that it can be used in lamb feeding without negative effects on production.

Key Words: confinement, protein sources, sheep

T370 Relationships among internal fat depots and subcutaneous fat in sheep. R. C. Gomes,* C. Constantino, F. Fernandes Jr., N. A. Koritiaki, M. V. G. Niwa, M. N. Marconato, F. A. B. Castro, and E. L. A. Ribeiro, *Department of Animal Science, State University of Londrina, Londrina, Parana, Brazil.*

The understanding of the relationships among the different adipose tissue depots as well as accurately predicting their masses is critical for animal growth modeling. Thus, the aims of this study were 1) to evaluate the phenotypic correlations among internal fat masses and subcutaneous fat thickness in sheep and 2) to predict the internal total fat mass using KPH fat weight and subcutaneous fat thickness information. Sheep in this study were either Texel-cross or Santa Ines-cross, 6 to 61-mo old and 27.3 ± 6.5 kg empty BW, composed of ewes (n = 7), ewe lambs (n = 15) and ram lambs (n = 26). Ewes were grazing (*Brachiaria* spp.) whereas ram and ewe lambs were feedlot finished before slaughter. The sum of kidney, pelvic and heart fats (KPH, kg), the mesenteric (MES, kg) and omental (OME, kg) fats were measured at slaughter. The subcutaneous fat thickness was measured 24 h postmortem (0 to 2°C) on the *Longissimus dorsi* muscle, at the 12th-13th rib region. Pearson correlation analyses were carried out. Simple and multiple regressions were employed to generate prediction equations with VISC as the dependent variable and both SFT and KPH as predictors. Linear and quadratic terms were tested. High correlations of KPH with OME, MES and VISC were observed (0.79; 0.70 and 0.92; $P < 0.001$). However, the correlations were only moderate between SFT and OMEN (0.43; $P < 0.01$) and between SFT and VISC (0.43; $P < 0.01$). Correlations between SFT and MES (0.20; $P = 0.12$), and between SFT and KPH (0.53; $P = 0.0001$) were both non-significant and moderate, respectively. The equation generated for predicting VISC as a function of KPH was VISC, kg = 0.31571 + 2.51105*KPH, kg ($R^2 = 0.8418$; RMSE = 0.214 kg). SFT did not entered ($P > 0.05$) in the model with KPH as predictor. The prediction equation using SFT as independent variable was VISC, kg = 0.68429 + 0.2508*SFT, mm ($R^2 = 0.1826$; RMSE = 0.4867 kg). No quadratic terms were significant for both KPH and SFT. The KPH fat weight, unlike SFT, is highly correlated with the fat mass presented on the gastrointestinal tract. Accordingly, the KPH fat but not SFT can be used to predict the total internal fat mass in sheep with relative accuracy.

Key Words: channel fat, visceral fat, *Ovis aries*

T371 Impact of different stocking rates of goats under pine silvopasture systems on understory biomass, crown cover density, and animal productivity. I. Howard,* A. S. Kumi, N. K. Gurung, U. Karki, R. Smith, S. G. Solaiman, W. H. McElhenney, and B. R. Min, *Tuskegee University, Tuskegee, AL.*

Meat goat production has potential to be integrated into the pine silvopasture systems as a means of supplemental income for forest land owners. Objectives were to determine changes in understory plant biomass, crown cover density and animal productivity using different goat stocking rates. A completely randomized design was used on an 11 years old loblolly pine silvopasture systems at the Federation of Southern Cooperatives in Epes, Alabama with 36 Kiko male goat kids ((21.0 ± 1.04 kg initial BW and 4 to 5 mo of age) using low (L; 4 goats/acre), medium (M; 8 goats/acre), and high (H; 12 goats/acre) stocking rates from July through October, 2011. Goat BW, understory plant biomass and plant cover density (CD) were determined before and at the end of grazing. The initial understory plant biomass was similar among treatments ($P > 0.05$) but decreased linearly ($P < 0.05$) with increasing stocking rates at the end of grazing. Goats were similar in BW at the start and at the end but did not grow as expected. Although the initial CD values were similar among treatments ($P > 0.05$), a significant treatment x height interaction was detected for the final CD values. Differences among treatments were detected ($P < 0.05$) at the lower heights (0.5 m and 1.0 m), but no differences among treatments were detected at heights above 1.0 m. Overall fecal DOM and CP ratios were 4.9, 5.1, and 4.8 for L, M, and H stocking rates, respectively and were not different among treatments ($P > 0.05$) indicating that the diet quality selected by goats were similar. Based on these data, goats can be utilized to minimize understory up to 1.0 m in pine silvopasture systems; however, feed supplementation may be required to improve animal performance.

Key Words: meat goats, silvopasture, stocking rate

T372 Influence of trenbolone acetate and estradiol ear-implant level on feedlot-performance of hair lambs. B. Ortiz*[1], J. J. Álvarez[2], and R. Barajas[1], *[1]FMVZ-Universidad Autonóma de Sinaloa, Culiacán, Sinaloa, México, [2]Productores de Ovinos de Guanajuato, SPR de RL, Silao, Guanajuato, México.*

Four hundred and 80 hair lambs (21.83 ± SD 2.28 kg) were used to determine the influence of trenbolone acetate and estradiol ear-implant level on feedlot-performance of hair lambs. Lambs were weighed, grouped by initial weight in 4 blocks of 120 lambs, and placed in 4 × 5 m elevated pens fitted with plastic-slot floor (30 lambs per pen). Each block contained 4 pens, and the pen constituted the experimental unit. In a complete randomized block design experiment, inside of each block, pens were randomly assigned to receive one of 4 treatments: 1) Feedlot diet without additional implant (CTRL); 2) Ear-implanted with 20 mg of trenbolone and 4 mg of estradiol (T20); 3) implanted with 40 mg of trenbolone and 8 mg of estradiol (T40); and 4) implanted with 60 mg of trenbolone and 12 mg of estradiol (T60). Trenbolone /estradiol levels were obtained with the application of one, 2 or 3 pellets contained in the regular implant-cartridge of Component TES (Elanco). Lambs were weighed on d 1 and 30. Results were analyzed by ANOVA and the quadratic trend tested by polynomial contrasts. Final weight showed a quadratic response ($P = 0.02$) to implant-level with values of 27.7, 28.3, 28.5 and 28.4 kg for CTRL, T20, T40 and T60 treatments, respectively. A quadratic trend ($P = 0.03$) was observed in ADG, with mean values of 195, 216, 223 and 220 g/day for CTRL, T20, T40 and T60 treatments, respectively. Dry matter intake was not affected by implant level ($P > 0.30$). Gain:feed ratio responded in a quadratic form to implant-level ($P < 0.01$), with mean values of 207, 229, 229, and 222 g of gain/kg of DMI

for CTRL, T20, T40 and T60 treatments, respectively. It is concluded that implants containing trenbolone and estradiol improves performance of feedlot lambs, and that dose of 40:8 of trenbolone-estradiol induces the highest biological response.

Key Words: feedlot-performance, lambs, trenbolone

T373 Femur biometry and densitometry of Saanen goats subjected to feed restriction. D. C. Soares,* K. T. Resende, A. K. Almeida, S. P. Silva, M. H. M. R. Fernandes, E. M. Oliveira, S. M. B. Artoni, and I. A. M. A. Teixeira, *UNESP/Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil.*

The aim of this study was to evaluate the effect of sex and feed restriction on biometric aspects and bone mineral density (BMD) of femurs from 51 growing goats (18 non-castrated males, 18 castrated males, and 15 females) with initial BW of 30 ± 0.21kg. The animals were randomly allocated into 17 groups (blocks) of 3 animals of the same gender, subjected to 0, 25 or 50% feed restriction. A group was slaughtered when the animal set in the 0% restriction reached 44.1 ± 1.95 kg BW. After slaughter and evisceration, the carcasses were weighed and cooled at 4°C for 24 h. At the end of this period, the femur of the left leg of each animal was removed for further analysis. The BMD assessment craniocaudal radiographs were taken of femur using a Lunar DPX (DEXA). In the femur, the following measurements were made: weight, length (LE), diameter of the diaphysis (DDIA) and the proximal (DPE) and distal (DDE) epiphysis, length of the latero-lateral (LLD) and craniocaudal (LCCD) diaphysis. The data were analyzed as a randomized block design in a factorial scheme (3 × 3) using SAS. The BMD decreased linearly as feed restriction increased (ranged from 1.02 to 0.83 g/cm^2) and it was greater for female (0.96 g/cm^2) and male (0.93 g/cm^2) than for castrated (0.87 g/cm^2). The biometrics variables were not affected by level of feed restriction, except for femur weight and LE that decreased linearly ($P < 0.001$) as feed restriction increased. All biometric variables were affected by gender ($P < 0.05$), except for LLD (17.74 ± 0.19 cm). The biometric variables DPE, DDE and DDIA were greater ($P < 0.05$) for male (14.1 cm, 17.0 cm and 7.0 cm, respectively) and castrated (14.9 cm, 17.1 cm and 6.9 cm, respectively) than for female (13.1 cm, 15.8 cm and 6.8 cm, respectively). The LCCD was greater for male (19.8 cm) than for castrated (19.1 cm) and female (18.6 cm). In conclusion, BMD is affected by gender and nutritional levels, emphasizing its importance as a tool to investigate bone metabolism in goats (FAPESP project number 2011/04786–3).

Key Words: bone, density, nutrition

T374 Influence of dry period length on blood leukocyte subsets of Sarda dairy ewes and their offspring. P. Bonelli[1], C. Carzedda[2], A. Fenu[2], G. Spanu[2], C. Dimauro*[2], R. Re[1], P. Nicolussi[1], and SPG Rassu[2], *[1]Istituto Zooprofilattico Sperimentale della Sardegna, Sassari, Italy, [2]Dipartimento di Agraria, Sezione di Scienze Zootecniche, University of Sassari, Italy.*

The aim of the present work was to evaluate the effects of different dry period lengths on blood leukocyte subpopulations in ewes and lambs during the first month postpartum. Two groups of 8 lactating ewes were dried off 60 d (short dry off—SDO) and 90 d (long dry off—LDO) before lambing. After birth, 6 lambs were included in the same treatment group of their mothers. Ewe and lamb blood samples were collected at 1, 2, 7 and 30 d postpartum and were analyzed for white blood cell differential count (WBC) and lymphocyte subsets. Ovine specific monoclonal antibodies were used to identify T-helper lymphocytes (CD4+), T-cytotoxic lymphocytes (CD8+) and a subset of γδ T lymphocytes (WC1) in flow cytometry. Data were analyzed by a GLM model, using dry off length, sampling time and their interaction as fixed factors. The SDO ewes compared with LDO ewes, had lower WBC (9.9 vs 13.1 cells × 10.000/μL; $P = 0.001$) and eosinophil counts (2.4% vs 4.1%; $P = 0.002$) as well as an increased number of lymphocytes (51.1% vs 47.7%; $P = 0.009$). No significant differences were found between lambs, except for monocytes which were higher in SDO than LDO ewes (3.4% vs 2.1%; $P = 0.006$). Ewe lymphocyte subsets were similar in both groups, while SDO lambs had lower CD4+ (44.6% vs 50.1%; $P = 0.042$) and WC1+ (7.1% vs 9.6%; $P = 0.039$) values compared with LDO lambs. Although differences between groups of ewes and lambs were observed for WBC and for lymphocyte subsets, values were always within the normal reference interval for the ovine species. Our results evidenced that shortening the dry period to 60 d did not significantly affect leukocyte subpopulations of ewes and lambs during the first month postpartum. Further research is required to determine to what extent dry period shortening could influence immune response to possibly, enable lengthening of lactation and milk yield increase without any detrimental effect on animal health. Research funded by OIGA (MiPAAF) and PRIN 2009 (MIUR) Projects.

Key Words: dry period, sheep, leukocytes subsets

T375 Effects of plant extracts and monensin on metabolite status and performance of peripartum ewes. H. Mirzaei Alamouti,* H. Namdarpor, H. Amanlo, M. H. Shahir, and D. Aliyari, *University of Zanjan, Zanjan, Iran.*

Thirty-two estrus-synchronized multiparous Afshari ewes (BW 90 kg and BCS 3, based on 1–5 scale) were used in a completely randomized design and assigned to one of 4 dietary treatments to evaluate the effects of a blend of plant extracts and monensin on metabolite status and performance of ewes in the periparturient period. Afshari is a major fat-tail dual purpose (milk and meat) sheep breed in northwest Iran. Dietary treatments contained 1) no additive (CO), 2) 30 mg/d monensin (M), 3) 2 g/d commercial plant extract containing extracts of peppermint and Plantago major (PE), and 4) a mix of 30 mg monensin and 2 g commercial extract (MPE). Ewes (8/treatment) were individually fed diets with 65:35 forage to concentrate ratio from −21 d relative to expected lambing until 28 d after lambing. Blood was sampled weekly relative to lambing. Data from pre-partum and postpartum was separately analyzed using proc mixed in SAS software. The result showed that ewes fed the M diet had lower DMI pre-partum and ewes fed the MPE diet had greater DMI ($P < 0.05$). Ewes fed the MPE diet had lower ($P < 0.05$) BCS postpartum. There were no differences in DM and organic matter digestibility in the periparturient period. There was no effect of diet on plasma concentration of glucose and albumin in the periparturient period however, the PE diet increased ($P < 0.01$) plasma concentration of cholesterol. The MPE diet increased milk production when compared with others, 1.19 vs 0.87, 0.98, 0.85 kg /d (MPE vs CO, PE, and M, respectively). The PE diet increased milk fat content ($P < 0.05$). Ewes fed the MPE diet produced more milk protein and were more efficient in nitrogen utilization. In conclusion, this study showed some plant extracts have health benefits and a mix of monensin and plant extract peripartum can improve production of fresh ewes.

Key Words: monensin, plant extracts, peripartum ewes

T376 Efficacy of a bovine colostrum replacement product for goat kids. S. Hart*[1], S. Genova[2], D. M. Haines[3,4], and B. Bah[1], *[1]American Institute for Goat Research, Langston Univ., Langston, OK, [2]Boren Veterinary Teaching Hospital, Oklahoma State Univ., Stillwater, [3]Department of Veterinary Microbiology, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, SK, Canada, [4]The Saskatoon Colostrum Co., Saskatoon, SK, Canada.*

For various reasons, adequate doe colostrum is not always available for neonatal goat kids and thus, an alternative source of colostrum is necessary to support health of the neonate. The objective of this study was to determine the efficacy of a commercially available bovine colostrum replacement product (Land O'Lakes Colostrum Replacement, manufactured by The Saskatoon Colostrum Co. Ltd., Saskatoon, Canada) for neonatal goat kids. Alpine goat kids (n = 29) were removed from does at birth and a jugular blood sample was taken for analysis of serum IgG. The colostrum replacement containing 100 g IgG/470 g of powder was reconstituted with water using 76 mL of warm water to 40 g of colostrum powder and mixed using a plastic jar with a spring similar to those used to mix protein drinks for athletes. Kids were fed reconstituted colostrum replacement at 10% of BW divided into 3 feedings over a 16-h period. At 6 h after the last feeding, another blood sample was collected for determination of serum IgG. Kids were observed for 10 min after each feeding for any adverse reactions. After the 3 feedings of colostrum, kids were fed a milk replacer twice daily at 470 mL per meal, along with offering a starter diet. Health and BW gain were compared with other kid cohorts fed heat treated goat colostrum up to 3 wk of age. Prefeeding levels of IgG were approximately 0.2 mg/dL and were increased ($P < 0.01$) to 18.9 mg/dL (SE = 0.9) post-feeding. There were no cases of scours or off-feed in test animals or cohorts. Gain of BW was similar for kids fed bovine colostrum replacement or heat treated doe colostrum (138 vs. 121 g/d; $P > 0.10$). In conclusion, the bovine colostrum substitute resulted in satisfactory blood levels of IgG in kids and similar health and BW gain as cohorts consuming heat treated goat colostrum.

Key Words: goats, kids, colostrum

T377 Effect of chromium supplementation on carcass traits and blood parameters of Mahabadi goat kids. A. Emami, M. Ganjkhanlou,* A. Zali, A. Akbari, and A. Hojabri, *University of Tehran, Tehran, Iran.*

The objective of this study was to evaluate the possible effects of supplementing chromium-methionine (Cr-Met) on carcass traits and selected blood parameters of goat kids. Thirty-two male kids (BW = 22 ± 2 kg, 4 mo old) were used in a completely randomized design with 4 treatments: 1) control (without Cr),2) 0.5, 3) 1.0 and 4) 1.5 mg Cr as Cr-Met/animal/d. Diets were formulated to meet NRC requirements with forage (alfalfa and corn silage):concentrate ratio of 30:70 in TMR form. Diets were the same except for top-dress addition of Cr-Met fed in 2 equal meals (0800 and 1600 h). Animals were kept in individual pens with self-mangers for 90 d. Kids were weighed after 14 d of adaptation and at 21 d intervals after feed restriction and slaughtered at the end of the trial. Jugular vein blood samples drawn via EDTA vacuum tubes on d 70 of the experiment were analyzed for selected parameters via an autoanalyzer apparatus and commercial kits. Data were analyzed by the GLM procedure of SAS 9.1 and Tukey test ($P \leq 0.05$). Weight at slaughter (WAS), HCW and carcass yield (CY) were not affected ($P > 0.05$) by the Cr supplementation. Addition of different levels of Cr failed to significantly affect red blood cells, neutrophils and monocytes. However, Cr supplementation increased white blood cells count [$P = 0.051$; 8.46, 9.39, 11.8, 12.1 (10^3 μL) for treatment 1, 2, 4, and 3, respectively[. These results indicate that supplementation of goat kid diet with Cr-Met did not influence carcass traits and most blood parameters but increased white blood cells.

Table 1. WAS, HC and CY of kids fed different levels of Cr-Met

	Treatment (mg of Cr)				
Trait	0 (control)	0.5	1.0	1.5	SEM
WAS (kg)	32.2	31.3	32.6	32.9	1.64
HC (kg)	13.1	12.3	13.9	12.7	0.85
CY%	40.8	39.0	42.7	38.8	0.13

Key Words: chromium-methionine, carcass traits, white blood cell

T378 Pasture lambing: An alternative to intensive indoor management at lambing. N. L. Pettifor* and M. L. Thonney, *Cornell University, Ithaca, NY.*

Advantages of pasture lambing include reduced labor and lessened exposure to infectious disease, and the decreased stocking density allows for improved expression of maternal care relative to barn conditions. But, if a flock of sheep has been barn-lambed for decades, is it reasonable to expect those ewes to lamb successfully and raise their offspring on pasture? To test this, 35 Dorset, Finnsheep and Dorset × Finnsheep ewes were lambed on pasture during 30-d June and August lambing seasons. They were compared with random samples of equal numbers of barn-lambing ewes. At the time of ear-tagging and recording, a maternal behavior score (MBS) was recorded. Scores ranged from 1 (ewe flees at approach of the shepherd and does not return to her lamb(s) when ear-tagging is completed) to 5 (ewe makes physical contact with her lamb(s) while they are being ear-tagged). Survival of lambs to weaning (85.7 to 95.5%) did not differ by chi-squared analysis between barn- and pasture-lambing. The statistical model for weight per day of age (WPDA) included main effects of season (June or August), lambing type (pasture or barn), litter size (1 or 2), and all 2- and 3-way interactions. The linear and quadratic effects of ewe age were included as covariates. WPDA was affected ($P < 0.01$) by litter size, ewe age, and the season x lambing type interaction. There were different ($P < 0.003$) quadratic effects of ewe age for lambing type. These effects translated into increasing WPDA with increasing ewe age for barn-lambing ewes, but not for pasture-lambing ewes; suggesting that older ewes on pasture were not able to consume sufficient digestible feed components to maximize milk production. In addition and not surprisingly, for all but the June barn-lambing ewes, WPDA was greater for single than twin lambs ($P = 0.03$). WPDA increased 22.6 ± 9.18 g/d for each increase in MBS for pasture-lambing ewes ($P = 0.021$). Thus, scoring maternal behavior may be a tool to predict a ewe's performance in raising lambs on pasture. These results indicated that moving a barn-lambing flock to pasture lambing should not be a difficult transition, even for a flock that has been barn-lambed for generations.

Key Words: sheep, management, maternal behavior

T379 Evaluation of the impact of dietary sericea lespedeza on rumen microflora and innate immunity in goats. A. Abdalla,* H. Ismail, S. Ibrahim, N. Whitley, and M. Worku, *North Carolina A&T University, Greensboro.*

Gastrointestinal nematodes have developed resistance to chemical anthelmintics resulting in the need for alternative control strategies such as the use of sericea lespedeza (SL) as a high-quality, low input forage that suppresses gastro-intestinal parasites in goats. However,

little is known about its effect on rumen micro flora and innate immunity in goats. A diverse collection of microorganisms is found in the goat rumen. Bifidobacteria are important organisms in the immunity of the gastrointestinal tract and its presence in the goat rumen is not fully studied. The objective of this study was to evaluate the impact of a diet containing SL on goat rumen microflora, especially bifidobacteria and on markers of goat innate immunity. Blood was collected from female goats (n = 16) fed a diet of 75% SL (n = 9) and a control group (n = 7), 0% SL. Serum was extracted and used for evaluation of secretion of pro-inflammatory cytokines (TNFa, IFNr, GCSF, GMCSF, IL-1a, IL-8, IP-10 and RANTES) using a commercial ELISA kit. Rumen contents were collected at slaughter and stored at −20°C. Microbial DNA was isolated from frozen rumen samples using the QIAamp DNA kit (Qiagen) to test for the presence of bifidobacteria. The concentration and purity of DNA were determined using a Nanodrop spectrophotometer. The 16S rDNA targeted genus specific PCR primers for *Bifidobacterium* were used to amplify specific DNA. Amplified samples and DNA markers were separated by electrophoresis on a 2% agarose gel, stained with ethidium bromide and visualized. Data was analyzed by GLM of SAS 9.2. A 580-bp *Bifidobacterium* specific band was observed in samples from goats fed the SL free diet. *Bifidobacterium* DNA was not detected in goats fed a diet containing SL. However, diet affected the secretion of proinflammatory cytokines by increasing ($P < 0.0002$) the serum level of TNFa, IFNr, GCSF, GMCSF, IL-1a, IP-10 and decreasing ($P < 0.0001$) IL-8, and RANTES in goats fed SL in the diet. Dietary tannins may affect the goat′s innate immune response and the composition of rumen micro flora. This approach may be useful in studies to assess the recommended level of SL in the diet and the significance of Bifidobacteria in the immunity of the goat.

Key Words: sericea lespedeza, cytokines, *Bifidobacterium*

T380 Effect of continuous suckling/ewe-rearing and supplementation on growth performance of Katahdin lambs. S. L. Rastle-Simpson,* K. N. D'Souza, M. Knights, and Q. S. Baptiste, *West Virginia University, Morgantown.*

The effects of continuous-suckling and supplementation on growth performance of crossbred Katahdin lambs (Birth weight 4.2 kg ± 0.2 kg) were investigated. Lambs (n = 68; 17.2 kg ± 1.0 kg) were randomly assigned within birth-type to be weaned at approximately 75d or to continuously suckle ewes. All lambs were given ad libitum access to hay, and half of the lambs in each rearing method were randomly assigned to be supplemented (10% CP, 3.5% crude fat lamb pellet) ad libitum (weaned + supplemented, WS (n = 16); suckling + supplemented, SS (n = 17) or received no further treatment (weaned + no supplementation, WNS (n = 18); suckling + no supplementation, SNS (n = 17). All lambs were weighed at birth, at the initiation of the trial and at approximately biweekly intervals for another 3 (3) mo. An ANOVA was used to determine the effect of type of rearing, supplementation and the interaction between the 2 main effects on ADG and final weights of lambs. Average daily gain during the pretrial period (~75 d) did not differ among treatment groups (0.18 kg ± 0.01 kg/d). The ADG during the trial period was greater ($P < 0.001$) in supplemented (WS, 0.22 kg ± 0.01 kg/d; SS, 0.24 kg ± 0.01 kg/d) than in un-supplemented (WNS, 0.06 kg ± 0.01 kg/d; SNS, 0.05 kg ± 0.01 kg/d) lambs. Among supplemented lambs, there was a tendency ($P = 0.1$) for greater growth rates in continuous suckled than in weaned lambs. Average final weights were greater ($P < 0.001$) in supplemented (WS, 36.2 kg ± 1.36 kg; SS, 40.2 kg ± 1.36 kg) compared with un-supplemented groups (WNS, 21.7 kg ± 1.36 kg; SNS, 20.6 kg ± 1.36 kg). Final weights were greater in the SS lambs compared with lambs in all other groups. The results of the current study indicated that supplementation of lambs increased total ADG and end-weight. Furthermore, continuous suckling along with supplementation resulted in the greatest ADG and end weights.

Key Words: continuous suckling, ewe-rearing, weaning

T381 Pre-partum nutritional supplementation strategies in goats managed under grazing conditions: 2. Serum glucose concentration profiles and milk production. V. Contreras-Villarreal[1], O. Angel-Garcia[1], J. M. Guillen-Muñoz[1], R. Rodriguez-Martinez[1], G. Arellano-Rodriguez[1], C. A. Meza-Herrera[2], M. Mellado[3], and F. G. Véliz*[1], *[1]Universidad Autónoma Agraria Antonio Narro, Torreón, Coahuila, México, [2]URUZA, Universidad Autónoma Chapingo, Gómez Palacio, Durango, México, [3]Universidad Autónoma Agraria Antonio Narro, Saltillo, Coahuila, México.*

The aim of this study was to evaluate the effect of nutritional supplementation on d 15 or 35 pre-partum upon both serum glucose levels at kidding and milk yield in goats grazing a semiarid range. Ranging goats (n = 31; 1200 to 1800 h) were divided in 3 experimental groups during the last third of gestation: i) control group (CG; n = 7) without nutritional supplementation, ii) 15-Group (15G; n = 14) which received a 15d pre- to 7d postpartum supplementation of 500 g per animal per day of a mixed ration (20% chicken manure, 37% rolled corn, 37% bran, 4% treacle, 2% salt) during the morning at 0800 h, and iii) 35-Group (35G; n = 10) which received the same mixed ration on 35d pre- to 7d postpartum. Before the onset of the supplementation period and immediately after parturition, blood samples were taken to quantify blood glucose concentration in all animals. In addition, milk yield was measured on d 7 and 15 postpartum; all goats were milked at 2000 h, separated from their off-spring, and milk yield was recorded the next day at 0800 h. Serum glucose concentrations (mg/dL) and milk yield (kg) among groups were compared by ANOVA (SYSTAT 12, 2007, USA). While no differences ($P > 0.05$) for serum glucose concentration were observed among experimental groups on d 35 pre-partum, supplemented groups depicted greater serum glucose concentrations ($P < 0.05$) on d 7 postpartum with respect to control goats. In addition, a greater ($P < 0.05$) milk yield was observed in the supplemented groups either at d 7 or d 15 postpartum with respect to control group (Table 1). Present results demonstrated that a 15-d supplementation period increased both serum glucose levels at parturition and milk production of goats under range-grazing conditions in northern Mexico. Such nutritional scheme represents an important strategy to increase not only the goat's energy balance but also milk production, while may potentially increase the survival rate of the offspring.

Table 1. Pre-partum serum glucose concentrations (mg/dL) and milk production (kg/day) in goats receiving different nutritional supplementation strategies under grazing conditions in northern Mexico

	Glucose (mg/dL)		Milk production (kg)	
	−35 d	0 d	7 d	15 d
Control	47 ± 4.1[a]	181 ± 25[a]	1.1 ± 0.2[a]	1.0 ± 0.2[a]
G15	48 ± 3.1[a]	275 ± 20[b]	1.6 ± 0.1[b]	1.5 ± 0.2[b]
G35	56 ± 4.6[a]	259 ± 32[b]	1.6 ± 0.1[b]	1.6 ± 0.2[b]

[a,b]Different letters indicate statistical differences ($P < 0.05$).

Key Words: milk, goats, birth

T382 Comparison of different mathematical models applied to lactation adjustment of F_1 sheep in an organic production system. J. C. Angeles Hernandez,* B. Albarran Portillo, A. V. Gomez Gonzalez, N. Pescador Salas, and M. Gonzalez Ronquillo, *Universidad Autonoma del Estado de Mexico, Facultad de Medicina Veterinaria y Zootecnia, Toluca, Estado de Mexico, Mexico.*

The appropriate adjustment of mathematical models applied to lactation curves, allows the analysis of biological and environmental factors affecting milk yield. The lactation curve models generally come in 2 categories: mechanistic models based on the biology of lactation and empirical models, based on current records on milk production. The aim of the present study was to compare the degree of fit of mathematical lactation curve models, empirical and mechanistics, and to determine the effect of environmental factors affecting lactation curve parameters of F1 sheep under an organic production system. A total of 5,382 weekly records from 150 dairy sheep lactations of F1 (East Friesian × Pelibuey, Suffolk or Blackbelly) were used. Four mathematical models were applied: 2 empirical models, Wood (WD), Wilmink (WL), and 2 mechanistic models, Pollott multiplicative 2 parameters (POL2) and 3 parameters (POL3), to determine the degree of adjustment of each function, using the following criteria: coefficient of determination adjusted to the number of parameters (R2), sum of mean square predicted error (MSPE), and the correlation between the observed and the predicted value (R), plus the comparison of the values of total milk yield (TMY), peak yield (PY), and peak time (PT) estimated from each mathematical model. Factors like number of parity (1,2,3,4), type of lambing (single or twin) and season of lambing (spring, summer, autumn, winter) were analyzed to determine their influence on TMY of each function. The parameters of each model were estimated from a non-linear regression analysis using the NLIN procedure of SAS with Marquardt methodology. There were no differences ($P > 0.05$) for environmental factors, as well as for the adjustment in different mathematical models. The values of R2 and R were higher than 0.90 and 0.95, respectively for all models. Both empirical models (WD and WL) had difficulty to calculate the TMY. Only the WL model presented no difference ($P > 0.05$) between observed and estimated PY, and this parameter was underestimated by the other models. The mathematical models have an adequate lactation curve fitting, whereas empirical models have difficulty estimating PT and PY, due to the shape of sheep's lactation curve in this study showing no PY, resulting in erroneous values of the parameters. Mechanistic models POL2 and POL3 were more flexible at this. According to the evaluation criteria curve fitting, the WL model presented the best adjustment.

Key Words: sheep, mathematical model, curve lactation

T383 Pre-partum nutritional supplementation strategies in goats managed under grazing conditions: 1. Doe and offspring BW dynamics. V. Contreras-Villareal[1], O. Angel-Garcia[1], J. M. Guillen-Muñoz[1], R. Rodriguez-Martinez[1], G. Arellano-Rodriguez[1], C. A. Meza-Herrera[2], M. Mellado[3], and F. G. Véliz*[1], *[1]Universidad Autónoma Agraria Antonio Narro, Torreón, Coahuila, México, [2]URUZA, Universidad Autónoma Chapingo, Gómez Palacio, Durango, México, [3]Universidad Autónoma Agraria Antonio Narro, Saltillo, Coahuila, México.*

The aim of this study was to evaluate the effect of nutritional supplementation on d 15 or 35 pre-partum upon both doe and offspring BW managed under a grazing-semiarid system. Ranging goats (n = 31; 1200 to 1800 h) were divided in 3 experimental groups during the last third of gestation: i) control group (CG; n = 7) without nutritional supplementation, ii) 15-group (15G; n = 14) which received a 15 d pre- to 7 d postpartum supplementation of 500 g per animal per day of a mixed ration (20% chicken manure, 37% rolled corn, 37% bran, 4% treacle, 2% salt) during the morning at 0800 h, and iii) 35-group (35G; n = 10) which received the same mixed ration 35 d pre- to 7 d post-kidding. Before the onset of the supplementation period, (35 d) and at parturition, all goats were weighed; besides, the offspring of the 3 experimental groups were weighted at parturition, and at 7 d and 15 d after birth. Doe and offspring BW of the experimental groups were compared by ANOVA; afterward paired mean comparisons considered X^2 analysis (SYSTAT 12, 2007, USA). While no differences ($P > 0.05$) for doe BW were observed on d35 pre-partum among experimental groups, supplemented does (15G and 35G) depicted greater BW values at kidding ($P < 0.05$) with respect to control goats. Doe BW differences ($P > 0.05$) among groups were observed on 7 d postpartum. Regarding offspring BW, the 35G depicted the largest BW values at birth ($P < 0.05$), without differences among groups on 7 d postpartum. Nonetheless, supplemented groups, either 15G or 35G, depicted the largest offspring weights values ($P < 0.05$) on 15 d post-kidding with respect to the other experimental groups (Table 1). Present results demonstrated that either 15 d or 35 d supplementation period prepartum increased both doe and offspring BW. Such supplementation regimen could be of particular importance because of the well established kid-meat market for milk-fed kids in this region of Mexico with the potential increases in the survival rates of replacement kids.

Table 1. Effect of feed complementation over the mother and kid body weight at parturition in goats from northern Mexico in grazing conditions

	Mother weight (kg)			Kid weight (kg)		
	−35 d	Birth	7 d	Birth	7 d	15 d
CG	54 ± 3.1[a]	44 ± 2.2[a]	44 ± 2.2[a]	3.5 ± 0.2[a]	4.4 ± 0.2[a]	5.4 ± 0.3[a]
G15	54 ± 2.3[b]	46 ± 2.0[a,b]	44 ± 1.6[a]	3.4 ± 0.2[a]	5.0 ± 0.2[a]	6.3 ± 0.1[b]
G35	55 ± 1.3[b]	49 ± 1.3[b]	47 ± 1.2[a]	3.8 ± 0.1[b]	4.7 ± 0.1[a]	6.2 ± 0.1[b]

[a,b]Different letters indicate statistical differences ($P < 0.05$).

Key Words: goats, offspring

T384 Pre-partum nutritional supplementation (energy or protein) strategies in goats managed under grazing conditions: 3. Offspring growth dynamics and doe milk production. V. Contreras-Villarreal[1], O. Angel-Garcia[1], J. M. Guillen-Muñoz[1], R. Rodriguez-Martinez[1], G. Arellano-Rodriguez[1], C. A. Meza-Herrera[2], M. Mellado[3], and F. G. Véliz*[1], *[1]Universidad Autónoma Agraria Antonio Narro, Torreón, Coahuila, México, [2]URUZA, Universidad Autónoma Chapingo, Gómez Palacio, Durango, México, [3]Universidad Autónoma Agraria Antonio Narro, Saltillo, Coahuila, México.*

The effect of 3 nutritional pre-partum regimens in goats under semiarid grazing conditions in northern Mexico upon offspring growth dynamics and doe milk yield were evaluated. Ranging goats (n = 31) were divided in 3 experimental during the last third of gestation: i) Control Group (CG; n = 8) without nutritional supplementation, ii) Protein Group (PG; n = 13) which received a 500 g per animal per day of a mixed protein ration (40% chicken manure, 27% rolled corn, 27% bran, 4% treacle, 2% salt) and iii) Energy Group (EG; n = 11) received 500 g per animal per day of a mixed energy ration (20% chicken manure, 37% rolled corn, 37% bran, 4% treacle, 2% salt). Supplements were offered 25-d pre- to 7-d postpartum during the morning at 0800 h. While kids were weighed at birth, d-7 and d-15 post-kidding, milk production was recorded on d-7 and d-15 postpartum; goats were milked at 2000 h, separated from their offspring, and milk yield was recorded the next day at 0800 h. Offspring BW and milk production of the 3 experimental groups were compared with ANOVA (SYSTAT 12, 2007, USA). While the greatest offspring

birth weight ($P < 0.05$) was observed in the EG-group, no differences ($P < 0.05$) among groups occurred on 7-d for offspring BW; however, on d-15, supplemented groups depicted the greater ($P < 0.05$) BW with respect to the CG. The same was true regarding milk production; both supplemented groups, had the greatest ($P < 0.05$) milk production values at either d 7 or d 15 postpartum (Table 1). Present results demonstrate that either energy or protein before and immediately after parturition enhanced both the offspring growth dynamic as well as milk production of goats under range-grazing conditions in northern Mexico, enabling us to recommend a management strategy for goats under marginal production systems.

Table 1. Effect of two diets, one protein and one energetic, given to adult pregnant goats near parturition on their offspring BW and milk production

	Offspring BW			Milk production	
	Parturition	7 d	15 d	7 d	15 d
CG	3.5±0.2	4.5 ± 0.2	5.4 ± 0.2	1.1 ± 0.2	1.0 ± 0.2
PG	3.4±0.2[a]	4.8 ± 0.2[a]	6.1 ± 0.2[b]	1.7 ± 0.1	1.6 ± 0.2
EG	3.6±0.1[b]	4.8 ± 0.2[a]	6.4 ± 0.2[b]	1.5 ± 0.1	1.6 ± 0.1

[a,b]Different letters indicate statistical differences ($P < 0.05$).

Key Words: offspring, goat, milk

T385 Effects of ground linted cottonseed on growth and carcass characteristics of feedlot lambs fed high-concentrate diets. R. A. Souza, R. S. Gentil, E. M. Ferreira, D. M. Polizel, M. I. C. Alves, L. G. M. Gobato, A. V. Pires, and I. Susin,* *Escola Superior de Agricultura Luiz de Queiroz (ESALQ)/University of São Paulo (USP), Piracicaba, São Paulo, Brazil.*

Linted cottonseed is an ingredient of high interest in ruminant nutrition due to its high content in protein, fiber and energy. The objectives of this experiment were to determine the effects of ground linted cottonseed on growth and carcass characteristics of lambs fed high-concentrate diets. Forty-five Dorper × Santa Inês ram lambs (initial BW 21.3 ± 3.7 kg and 79 ± 6 d old) were assigned to a randomized complete block design defined by BW and age at the beginning of the trial. The experimental diets were isonitrogenous (16% CP) and composed of 90% concentrate and 10% coastcross hay. The levels of ground linted cottonseed (DM basis) were: 0 (CS0), 7 (CS7), 14 (CS14), 21 (CS21) or 28% (CS28). Diets were fed once a day as a TMR and the trial lasted 56 d. At the end of the performance trial, lambs were slaughtered, after a 16-h fast period, and carcass measures (dressing percentage, LM area and back fat thickness) were recorded. There was a linear ($P < 0.01$) decrease in DMI (1.24, 1.12, 1.16, 1.02 and 0.83 kg) as CS increased in the diet. ADG (342, 290, 309, 259 and 182 g), and G:F were 0.29, 0.26, 0.29, 0.25 and 0.22, for CS0, CS7, CS14, CS21 and CS28, respectively. Carcass characteristics followed the linear decrease observed with the performance data. Increasing levels of ground linted cottonseed adversely affected lamb performance and carcass characteristics. However, dietary cottonseed inclusion may be dictated by its cost compared with soybean meal.

Key Words: co-product, feedlot, sheep

T386 Effect of concentrate versus forage diet on feed intake and reproductive traits in crossbred ewes. R. R. Cockrum,* S. L. Lake, R. H. Stobart, and K. M. Cammack, *University of Wyoming, Laramie.*

The aims of this research were to 1) evaluate the effects of ration differences on measures used to determine individual residual feed intake (RFI), 2) establish if individual RFI ranking (most efficient to least efficient) is affected by changes in diet composition, and 3) determine if more or less efficient ewes differ in reproductive parameters. Targhee × Rambouillet (n = 61; 7 mo of age) ewes were evaluated on the GrowSafe System to determine individual RFI values and ranking. Ewes were first tested on a concentrate diet (14.2% CP) for 62 d, and then retested (10 mo of age) with a forage diet (15.2% CP) for 66 d. Differences in RFI, ADG, average feed intake, and metabolic mid-weight (MMWT) from the concentrate and forage diets were analyzed using the GLM procedure in SAS. Residual feed intake rankings from the 2 rations were analyzed for similarity with the CORR procedure using the Spearman method. Ewes (n = 18) were further selected to measure reproductive efficiency based on their forage ration RFI ranking: highly efficient (HE, n = 6), moderately efficient (ME, n = 6) and lowly efficient (LE, n = 6). Age of puberty, date bred, and pregnancy status were determined in RFI selected groups and analyzed using the GLM procedure in SAS. Overall, average intake, ADG, and MMWT were higher ($P < 0.001$) in the forage diet compared with the concentrate diet. There was a high positive correlation (r = 0.69; $P < 0.001$) between RFI rankings based on the concentrate and forage rations in both overall and selected ewes. Residual feed intake and average feed intake on the concentrate ration were lower ($P \leq 0.002$) in the HE and ME ewes compared with the LE ewes, but did not differ ($P = 0.161$) between the HE and ME ewes. As expected, RFI and average feed intake differed ($P < 0.001$) between the HE, ME, and LE ewes when on the forage diet. Age of puberty, day bred, and pregnancy status did not differ ($P \geq 0.337$) among selected ewes. Results indicated that the least efficient animals remained in the bottom 15% of RFI ranked ewes regardless of diet (forage versus concentrate). However, re-ranking of RFI is possible in more efficient animals when diet is changed. Additionally, this study and previous literature provide little evidence to support that RFI selection negatively affects reproductive parameters in sheep.

Key Words: diet, reproduction, residual feed intake

T387 Influence of level of zilpaterol hydrochloride supplementation at different live weight on carcass characteristics of feedlot lambs. J. C. Robles-Estrada*[1], H. Dávila-Ramos[1], A. Estrada-Angulo[1], F. G. Ríos[1], K. I. Leyva-Medina[1], and A. Plascencia[2], *[1]Universidad Autónoma de Sinaloa, Culiacán, Sinaloa, México, [2]Universidad Autónoma de Baja California, Mexicali, Baja California, México.*

Fifty-four male lambs Pelibuey × Katahdin (41.8 ± 1.64 kg) were used in a 33 d feeding trial (3 pens per treatment in a completely randomized design with a 3 × 3 factorial arrangement) to evaluate the effect of zilpaterol hydrochloride on the carcass characteristics, using the final live weight as covariate. The lambs were fed on cracked corn-based finishing diet (1.40 Mcal/kg of NE_g). Three weight groups (31.6 ± 1.27, 41.8 ± 1.85 and 51.8 ± 1.42 kg) were assigned to receive 0 (Z0), 0.15 (Z15), and 0.30 (Z30) mg/kg of live weight d-1 zilpaterol (as zilpaterol chlorhydrate, Zilmax, Intervet México, México City) during 30 d and withdrawn from zilpaterol for the last 3 d on feed. No interactions ($P > 0.10$) were observed between levels of zilpaterol and weight groups. The HCW was greater ($P < 0.01$) for Z30 compared with Z15, but both were greater with respect to Z0 (24.2, 25.1 y 26.0 kg for Z0, Z15 and Z30, respectively). The dressing percent (52.2, 54.7, and 55.7% for Z0, Z15 and Z30, respectively) and LM (5.81, 6.29 and 6.60 cm^2 for Z0, Z15 and Z30, respectively) were higher ($P < 0.01$) for Z30 and Z15 compared with Z0. The zilpaterol supplementation did not affect ($P > 0.10$) the KPH fat (2.18%) and fat thickness (2.46 mm). We concluded that the zilpaterol response was not affected by the weight group; however, the

zilpaterol improved the HCW, dressing percent and LM area without affecting the deposited fat.

Key Words: β-agonist, lambs, zilpaterol

T388 Fatty acids in milk of goats fed sunflower seeds at different crude protein levels in the diet and thrombogenicity and atherogenicity indexes. C. Vázquez Fontes*[1], A. Domïnguez López[1], N. Pescador Salas[2], L. R. Bernal Martinez[1], and M. Gonzalez Ronquillo[2], *[1]Universidad Autónoma del Estado de Mexico. Facultad de Ciencias Agricolas, [2]Facultad de Medicina Veterinaria y Zootecnia, Toluca, Estado de Mexico. Mexico. 50000.*

Fatty acids are part of the human diet and are involved in important functions. In the 70s, a concern began to reduce saturated fats in the human diet. One approach focuses on its intake, an important factor in determining the fat content and composition of the milk. The amount and type of fatty acid supplement is the result of fat in the animal feed, particularly those products from extraction of oils. The objective was to identify the profile of fatty acids in milk from goats fed on pasture and supplemented with 2 levels of protein (12 vs 14% CP). Milk was obtained from 8 dairy goats (60 ± 2 kg BW) fed on pasture (35%), corn silage (20%), supplemented with a concentrate of 12% or 14% CP, based on sunflower seed, corn grain, soybean meal and minerals. Chemical analysis were performed using the infrared Ecomilk Milk Analyzer (Milkana Kam 98–2 meetings, Hillerød, Denmark). The fatty acid profile was performed by detergent solution with 50 g of sodium hexametaphosphate (SHMP) and 24 mL of Triton X-100 dissolved in distilled water. Samples were processed in water bath (90°C) until fat separation from the milk. Samples were injected into the gas chromatograph (Perkin Elmer Autosystem 9000). The percentage of each fatty acid was calculated by dividing the area under the curve of each peak by the sum of the integrals of the fatty acids identified. To calculate the index of atherogenicity (IA) and thrombogenicity (IT) the formulas proposed by Ulbricht and Southgate (1991) was used. Animals were distributed in a 2 × 2 Latin square design, repeated 4 times. Experimental periods consisted of 15 d for adaptation and 5 d for sample collection. There were no differences ($P > 0.05$) between treatments with 12% and 14% CP in milk content and fatty acids profile (Table 1). Also there were no differences ($P > 0.05$) in terms of atherogenicity and thrombogenicity indexes. Levels of IA and IT for the treatment of 12% CP were 1.23 and 0.78, respectively. This content is low and is not indicative of promoting increased serum cholesterol levels in humans. There are similar characteristics of the 2 treatments, suggesting that a diet containing 12 or 14% protein did not change fatty acid profile of milk.

Table 1. Effect of the crude protein supplemented to dairy goats on the fatty acids (FA) profile (g/100g) of milk

Item	C8:0	C10:0	C12:0	C14:0	C16:0	C18:0	C18:1	C18:2	C18:3
14% CP	3.98	13.01	5.33	9.81	23.1	10.1	25.4	3.34	0.80
12% CP	3.92	13.0	5.34	10.03	24.6	10.5	25.1	3.09	0.76
SEM	1.35	0.88	1.33	1.02	1.08	0.79	1.31	1.3	0.88
P-value	0.69	0.26	0.28	0.26	0.16	0.06	0.64	0.19	0.20

Key Words: atherogenicity, fatty acids, thrombogenicity