

SMALL RUMINANT II

1917 (W358) The effects of live yeast, glucan and mannan on performance, rumen and blood parameters of fattening lambs. O. Canbolat¹, I. Filya¹, V. Akay^{*2} and A. Kamalak³, ¹University of Uludag, Faculty of Agriculture, Department of Animal Sciences, Bursa, Turkey, ²Global Nutritech Biotechnology LLC, Richmond, VA, ³University of Kahramanmaraş Sutcu Imam, Faculty of Agriculture, Department of Animal Sciences, Kahramanmaraş, Turkey

The objective of this study was to evaluate the effects of a live yeast (*Saccharomyces cerevisiae* NCYC R618, 4×10^9 CFU/g), glucan and mannan containing feed additive (Synerall (SYN), Global Nutritech Biotechnology LLC, Richmond, VA) on performance, and rumen and blood parameters of fattening ram lambs. Forty 4-mo old Kivircik ram lambs (29.58 ± 1.6 kg initial BW) were stratified and blocked by BW to 1 of 4 individually fed, isocaloric, isonitrogenous dietary treatments containing 0, 1, 2 or 4 kg SYN per ton of TMR on DM basis. Diets containing cracked barley, wheat and corn grains, sunflower meal, and premix were fed once daily for ad libitum consumption. Lambs were weighed on 21-d intervals, and the study continued 63 d. At the end of the study, rumen fluids and blood samples were collected. Dry matter intake and F:G ratio were similar among treatments ($P > 0.05$). Weight gain during the study was statistically significant among treatments ($P < 0.001$), and was highest in the 2 kg SYN per ton treatment. Daily weight gain was statistically significant among treatments ($P < 0.001$), and was highest in the 2 kg SYN per ton treatment. Rumen pH was statistically significant among treatments ($P < 0.001$), and was highest in the 2 kg SYN per ton treatment. Rumen ammonia N levels were statistically significant among treatments ($P < 0.001$), and was lowest in the 2 kg SYN per ton treatment. Total VFA, acetic acid and propionic acid percentages were also the highest in the 2 kg SYN per ton treatment. Rumen lactic acid levels were statistically significant among treatments ($P < 0.001$), and were lowest in the 2 and 4 kg SYN per ton treatments. Blood glucose levels were statistically significant among treatments ($P < 0.001$), and was highest in the 2 kg SYN per ton treatment. In conclusion, the addition of 2 kg Synerall per ton in fattening lamb diets increased weight gain and improved rumen and blood parameters.

Key Words: Synerall, yeast, glucan, mannan, weight gain, rumen parameters

1918 (W359) Effect of prostaglandin $F_{2\alpha}$ on fertility of ewes treated with a short-term progesterone-based estrous synchronization protocol. C. D. Paul*, West Virginia University, Morgantown

Previous studies have shown either no effect or a lower fertility in ewes treated with $PGF_{2\alpha}$ at the end of a short-term progesterone-based estrous synchronization (STPBES) protocol. The objective of this study was to further evaluate the effects of $PGF_{2\alpha}$ when used as a component of STPBES treatments in ewes. Ewes ($n = 423$) from 4 farms located in WV and PA were randomly assigned to receive controlled internal drug releasing devices (CIDR-g, 0.3 g progesterone) for 5 ($n = 243$) or 7 ($n = 180$) days. At insert removal, approximately half of the ewes in each treatment group were randomly assigned to received either 0 ($n = 203$) or 4 ($n = 220$) mL Lutalyse (20 mg dinoprost; $PGF_{2\alpha}$) and were joined with sexually mature rams. Data were analyzed using analysis of variance with the model consisting of the main effects of duration of treatment with CIDR devices, injection with $PGF_{2\alpha}$, farms, and their interactions and additionally, least square means for treatment effects were determined. The mean estrous response was $82.2 \pm 36.9\%$ and was not affected by treatments. Conception rate ($P = 0.01$; $67.1 \pm 4.0\%$ vs. $52.9 \pm 4.0\%$), pregnancy rate ($P < .01$; $58.1 \pm 3.5\%$ vs. $44.0 \pm 3.3\%$) and proportion of ewes lambing to the first service ($P < .0001$, $45.8 \pm 3.8\%$ vs. $33.9 \pm 3.9\%$) were higher in ewes that did not receive $PGF_{2\alpha}$ (CIDR devices alone) than in ewes treated with CIDR devices and $PGF_{2\alpha}$. Conception ($P = 0.01$; $67.1 \pm 4.1\%$ vs. $52.9 \pm 3.9\%$) and pregnancy rates ($P < .0001$; $56.0 \pm 3.1\%$ vs. $46.2 \pm 3.9\%$) were higher, and proportion of ewes lambing to the first service period ($P = 0.07$, $44.3 \pm 3.9\%$ vs. $35.4 \pm 3.8\%$) tended to be higher in ewes treated with CIDR devices for 5 d compared to those treated for 7 d. In conclusion, injection of $PGF_{2\alpha}$ at insert removal in STPBES protocols did not increase estrous response and decreased fertility at the synchronized estrus.

Key Words: prostaglandin, ewes, fertility, progesterone

1919 (W360) Anthelmintic activity of selected aldehydes and ketones against sheep gastro-intestinal nematodes. E. Ortu^{*1}, G. Sanna², A. Scala², G. Pulina¹, P. Caboni³ and G. Battacone¹, ¹Dipartimento di Agraria, University of Sassari, Sassari, Italy, ²Dipartimento di Medicina Veterinaria, University of Sassari, Sassari, Italy, ³Dipartimento di Scienze della Vita e dell'Ambiente, University of Cagliari, Cagliari, Italy

Ruminant gastrointestinal nematodes cause annually important economic losses to livestock production such as reduction of milk and meat yield. Because the resistance of parasites to conventional anthelmintic products is growing, studies evaluating the effectiveness of alternative products against gastrointestinal nematodes seem interesting. Compounds of botanical

origin are considered as an important source of secondary metabolites with anthelmintic activity. This study was performed to evaluate the nematocidal activity of aldehydes of plant origin such as furfural, 2-hydroxybenzaldehyde and (E,E)-2-4-decadienal and ketones such as 2-undecanone against gastrointestinal nematodes. Fecal samples were collected from the rectum of Sarda dairy ewes and worm eggs were identified by Mc Master technique, while the third stage larvae (L_3) of Strongyle type nematodes were obtained by coproculture after 10 d. Larvae were identified as *Haemonchus contortus* (24,7%), *Teladorsagia* spp.(51,5%) and, *Trichostrongylus* spp. (23,8%). The larval development assay, by using Cellstar 96-well cell culture plates, was performed to evaluate the effects of the plant origin compounds against L_3 larvae. For calculation of EC_{50} (mg/mL) inhibition effects, for the tested compounds on L_3 of gastrointestinal nematodes, the motility was assayed at concentration range of 0.28–5.99 mg/mL. Stock solutions were prepared in methanol whereas aqueous solution of tween (0.3% v/v) or 0.1 M phosphate- buffered saline solution (PBS) were used for further dilutions or as negative control. Each treatment consisted of 25 L_3 per well and was replicated six times. L_3 were analyzed after 1, 24, and 48 h with an inverted microscope 10x and were ranked into two categories: motile and immotile/paralyzed. The percentages of L_3 paralyzed were corrected by eliminating the natural death-paralysis in the negative control in according to the Schneider-Orelli formula. The 2-undecanone and (E,E)-2-4-decadienal showed the highest nematocidal activity with a $EC_{50/24h} = 0.88$ and 1.03 mg/mL respectively, while for furfural and 2-hydroxybenzaldehyde this concentration reference was 1.83 and 2.19 mg/mL, respectively. The experimental data revealed in vitro dose- dependent anthelmintic activity. However, the in vitro promising effects against gastrointestinal nematodes have to be carefully evaluated under in vivo conditions.

Key Words: parasite infection, in vitro, sheep

1920 (W361) Ovine footrot gene marker screening in a

Katahdin sheep flock. T. Wuliji¹, J. G. Hickford², W. R. Lamberson³, B. C. Shanks¹ and S. Azarpajouh¹,
¹*Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO,* ²*Lincoln University, Lincoln, New Zealand,* ³*University of Missouri, Columbia*

An extensive polymorphism at the DQA2 and DQA2-like loci located within the Major Histocompatibility Complex (MHC) in sheep have been identified and subsequently have been utilized to develop a gene marker testing procedures for footrot resistance. Although hair sheep breeds, such as Katahdin, are reputed to have better disease resistance, no genotypic markers have been reported for footrot resistance. The footrot gene-marker test reports five basic footrot scores (1, 2, 3, 4, and 5) corresponding to alleles of the MHC DQA2 and DQA2-like loci. This gives 15 possible score combinations (1,1; 1,2;...

4,5; 5,5), where 1,1 is claimed to have the highest resistance and 5,5 the lowest resistance to footrot infection. Blood samples were collected on FTA blood DNA collection paper cards from 600 Katahdin sheep and Katahdin crossbred ewes and rams from Lincoln University farms, Jefferson City, Missouri. DNA extraction and the gene marker test were performed at the Lincoln University Gene Marker Laboratory, Lincoln, NZ. Blood samples from 583 sheep with gene marker test results were analyzed. A chi-square test was used to test difference in variant alleles, animal genotypes, and score group distribution frequency. As footrot tolerance genes are assumed to exert a dominant effect, an expressed value for a pair of alleles was derived and animals were grouped into five categorical groups (1 to 5). Variant allelic distributions in 5 score groups were 10.0%, 21.2%, 45.3%, 17.6%, and 5.9%, respectively. Whereas, animals classed into five gene marker score groups were 18.5%, 33.3%, 42.0%, 5.8%, and 0.3%, respectively. Both allelic distribution and genotypic distributions were significantly ($P < 0.01$) different among the five gene marker score groups. The percentage of animals in the footrot tolerance score (1 and 2) was 52%, with a moderate score of 3 was 42%, and with scores of 4 and 5 were 6%. Therefore, by using footrot marker screening, the potential to select a high resistant flock is possible within three to five breeding seasons.

Key Words: Katahdin, footrot, DNA marker

1921 (W362) The effects of gonadotropic stimulation on fertility of progesterone-treated nulliparous ewes bred during seasonal anestrous. A. K. Redhead*, *West Virginia University, Morgantown*

Attempts to breed fall born ewe lambs and yearlings (nulliparous females) during seasonal anestrous have resulted in limited success. Low fertility in these nulliparous females may be related to a deficiency of ram induced gonadotropic release necessary to stimulate sufficient estrogen production to induce estrus. The objective of this study was to evaluate the effects of gonadotropic stimulation on fertility in nulliparous females bred out of season. Nulliparous females ($N = 311$) from 5 farms throughout WV and PA received progesterone using CIDR inserts (0.38 g progesterone) for 5 d before ram introduction between the months of April and July. At insert removal, females at each farm were randomly assigned to receive a single injection of gonadotropin containing 240 IU eCG and 120 IU hCG (GS: 3mL P.G. 600, Intervet, i.m) or to receive no further treatment (C). Pregnancy diagnosis was conducted using transrectal ultrasonography between Days 25–30 post ram introduction, at which time rams were removed, and a second pregnancy diagnosis was conducted 20–30 d later. Analysis of variance was conducted using the GLM procedures of SAS to evaluate the effects of gonadotropic stimulation, farm and their interaction, and the least square means were computed for reproductive performance variables. Gonadotropin treated females had higher estrous re-

sponse ($P = 0.002$, $72\% \pm 3.7$ vs. $51\% \pm 4.0$), conception rate ($P = 0.0562$, $68.3\% \pm 6.0$ vs. $44.5\% \pm 11$), pregnancy to the first service ($P = 0.003$, $66\% \pm 4.2$ vs. $37\% \pm 4.4$), proportion of females lambing to the first service period ($P = 0.0051$, $54.5\% \pm 4.4\%$ vs. $34\% \pm 4.4\%$), proportion of females lambing ($P = 0.0013$, $54\% \pm 4.4$ vs. $34\% \pm 4.4$) and lambing rate ($P = 0.0018$, $77.6\% \pm 7.0$ vs. $45.1\% \pm 7.0$) than C females. The results of the current study indicate that inadequate gonadotropin stimulation or estrogen production might be limiting fertility in nulliparous ewes bred during seasonal anestrus. Further, supplementation with the gonadotropin combination, P.G. 600 at progesterone withdrawal significantly increased fertility of progesterone-primed nulliparous females when bred outside their normal breeding season.

Key Words: out of season, ewe lambs, yearlings, fertility, P.G. 600, gonadotropic stimulation

1922 (W363) Effects of hair sheep breed on performance response of ram lambs to artificial infection with *Haemonchus contortus*. Y. Tsukahara*, T. A. Gipson, S. P. Hart, L. J. Dawson, Z. Wang, R. Puchala, T. Sahlu and A. L. Goetsch, *American Institute for Goat Research, Langston University, Langston, OK*

Twelve Dorper (D; 4.5 ± 0.44 mo, 31.9 ± 1.75 kg), 18 Katahdin (K; 3.8 mo, 24.3 ± 0.76 kg), and 12 St. Croix (C; 4.5 ± 0.17 mo, 19.7 ± 0.99 kg) ram lambs were used to investigate among and within breed differences in the first year of a centralized test for growth performance and response to artificial infection with *Haemonchus contortus*. Rams were randomly selected from 3 commercial farms in Missouri and Oklahoma. The test at Langston University entailed an adjustment period of 2 wk followed by 8 wk of data collection. Breeds were housed separately in adjacent pens with automated feeders allowing free-choice access to a 15% CP (DM) and 50% concentrate pelletized diet. During adaptation, anthelmintic treatment resulted in low fecal egg count (FEC; < 550 /g), after which 10,000 infective larvae were administered orally. Packed cell volume (PCV) was measured weekly and FEC was determined 4 times in wk 6–8. For analysis, initial BW and FEC were covariates, and the logarithmic transformation $\ln(x + 2000)$ was used for mean FEC (MFEC). Variability in MFEC and mean PCV (MPCV) was homogenous among breeds. Breed affected ($P \leq 0.01$) DMI (2.5, 2.2, and 1.9 kg; SEM = 0.10), MFEC (3431, 1273, and 1241 eggs/g, original scale; SEM = 90.7), and MPCV (29.1, 29.7, and 32.9% for D, K, and C, respectively; SEM = 0.68). Residual feed intake (RFI), ADG, and ADG:DMI were similar ($P > 0.05$) among breeds. Rams were categorized into 3 groups within breeds based primarily on MFEC and MPCV (High, Medium, and Low resistance) using the cubic clustering criterion of SAS, which resulted in unbalanced numbers in the groups (5, 5, and 2 for D, 12, 5, and 1 for K, and 8, 1, and 3 for C, respectively). Group means were similar ($P > 0.05$) in ADG, DMI, and RFI but varied ($P < 0.05$) in

MFEC (627, 2137, and 3302 egg/g; SEM = 109.7) and MPCV (32.3, 30.2, and 29.2% for High, Medium, and Low, respectively; SEM = 0.72). In conclusion, D appeared less resistant than C or K based on MFEC after an artificial challenge with *H. contortus* larvae in a standardized environment. However, variability in MFEC and MPCV within breed was sufficient to allow assignment to different classes for use in a breeding program to enhance flock resistance.

Key Words: internal parasitism, resistance, sheep

1923 (W364) Effect of sodium butyrate administered in the concentrate on rumen development and productive performance of lambs in intensive production system during the suckling and the fattening periods. S. Cavini¹, S. Iruira¹, A. Siurana^{*2}, A. Foskolos¹, A. Ferret¹, M. A. Gomez³ and S. Calsamiglia¹, ¹*Animal Nutrition and Welfare Service, Universitat Autònoma de Barcelona, Bellaterra, Spain*, ²*Animal Nutrition and Welfare Service, Department of Animal and Food Sciences, Universitat Autònoma de Barcelona, Bellaterra, Spain*, ³*Nutega/Novation, Madrid, Spain*

Sodium butyrate (SB) has been shown to improve growth rate, rumen development and health of calves. In intensive lamb production systems, the fattening period starts after a relative short suckling period, and lambs are fed a high concentrate diet. The aim of this experiment was to determine the effect of supplementing SB in the concentrate on rumen development and productive performance of lambs during the suckling and the fattening periods. During suckling, 66 Ripollés-breed lambs were distributed with their mothers in 4 pens. Treatments were: control concentrate (CON), and concentrate supplemented with 3.6 g of SB (Butirex C4)/Kg of DM (SBC). At weaning, 9 lambs were slaughtered for sample collection and 10 were used for the herd replacement, and the remaining 47 lambs were distributed into 12 pens for the fattening period. Treatments were: 1) CON-CON for lambs fed CON in both periods; 2) CON-SBC for lambs fed CON in the suckling and SBC in the fattening period; 3) SBC-CON for lambs fed SBC in the suckling and CON in the fattening period, and 4) SBC-SBC for lambs fed SBC in both periods. At 88 d of age all lambs were slaughtered. In both periods, concentrate dry matter intake (DMI), average daily gain (ADG), body weight (BW), hot carcass weight (HCW), dressing percentage (DP), reticulum-rumen weight (RRW), rumen fluid pH, and density, length, width and keratinization of rumen papillae were measured. Feed conversion ratio (FCR) was calculated for the fattening period only. During the suckling period, SBC lambs had higher DMI (69.3 vs. 101.7 g \pm 6.25), ADG (232.0 vs. 250.5 g \pm 5.84), HCW (8.42 vs. 9.23 kg \pm 0.196) and DP (49.3 vs. $53.8\% \pm 1.04$) ($P < 0.05$), and tended to have higher rumen papillae length (1.15 vs. 1.68 mm \pm 0.168) and lower RRW (303.4 vs. 262.7 g \pm 12.8; $P < 0.10$). During the fattening

period, no difference was found among treatments. Results indicate that the supplementation of SB in the concentrate improved rumen development and productive performance of lambs during the suckling period. However, at 3 mo of age, the administration of SB did not improve production in lambs reared in an intensive production system.

Key Words: sodium butyrate, lamb, rumen development, productive performance.

1924 (W365) Nutrients intake and performance of lambs fed diets with two levels of crude protein and concentrate. R. S. Santos¹, K. G. Ribeiro², O. G. Pereira³, S. C. Valadares Filho³, S. D. J. Villela⁴, J. L. Silva¹ and P. G. F. Duarte¹, ¹Federal University of Vicosa, Vicosa, Minas Gerais, Brazil, ²Universidade Federal de Vicosa, Vicosa, Minas Gerais, Brazil, ³Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil, ⁴Federal University of Vales do Jequitinhonha e Mucuri (UFVJM), Diamantina, Brazil

This study aimed to evaluate the dry matter (DMI), crude protein (CPI) and total digestible nutrients (TDNI) intake, the average daily gain (ADG), daily carcass gain in relation to body weight fasting (CG_{BWF}) and feed conversion (FC) of lambs fed diets containing two levels of concentrate (CONC) and two levels of crude protein (CP). Thirty-two intact Santa Ines x Texel lambs with an average body weight of 19 kg were used. They were distributed in a 2x2 factorial in a randomized block design with four treatments and eight replicates. The diets had 40 or 60% of CONC (plus corn silage as forage source) and 10.0 or 14.4% CP (high or low), in relation to the requirement of 12.5% CP according to the NRC (2007) for lambs with live weight of 20 kg and gains of 200 g/day. Feed was offered ad libitum to the animals at 8 h and 15 h. The offered and leftover feeds were weighed to estimate the daily DMI. The predetermined slaughter weight was 30 kg, when the animals were submitted to a solid fasting period of 16 h, and weighed again to determine the slaughter weight. The durations of the confinement varied from 50 (14.25% CP and 60% CONC) to 106 (10% CP and 40% CONC) days. The data were subjected to analyses of variance and F test at a 10% probability using the statistical program SAEG 9.1. There was no interaction effect on intake of nutrients, but there were independent effects of CP and CONC levels. Higher nutrients intake were recorded for lambs fed the higher CONC or CP levels, whose CP intakes of DM, CP and TDN were, respectively, 972.8 and 821.68, 79.46 and 142.56, and 603.56 and 711.63 g/day. Only ADW was affected by the interaction CP x CONC, with values of 0.090 (10% CP and 40% CONC) to 0.200 kg/day (14.25% CP and 60% CONC). The CP levels affected CG_{BWF} (0.059 vs. 0.106 kg) and FC (7.19 and 5.29) and CONC levels affected CG_{BWF} (0.066 and 0.098 kg) and FC (7.27 and 5.20). We concluded that diets with highest CP or concentrate levels resulted in greater nutrients intake and better animal performance.

Key Words: average daily gain, daily carcass gain, feed conversion

1925 (W366) Milk production, blood glucose, insulin and non-esterified fatty acids concentration in ewes fed diet containing crude glycerin.

D. M. Polizel¹, R. S. Gentil¹, E. M. Ferreira¹, R. A. Souza¹, M. V. C. Ferraz Jr.², M. C. A. Sucupira³ and I. Susin^{*1}, ¹Escola Superior de Agricultura Luiz de Queiroz- ESALQ/USP, Piracicaba, Brazil, ²University of São Paulo-FMVZ/USP, Pirassununga, Brazil, ³Faculdade de Medicina Veterinária e Zootecnia- FMVZ/USP, São Paulo, Brazil

Crude glycerin is a glucogenic substrate in ruminants and can decrease symptoms of pregnancy toxemia. The objective in this trial was to determine the effects of partial replacement of corn by crude glycerin (CG) on dry matter intake (DMI), milk yield, milk composition and blood metabolites (glucose, insulin and non-esterified fatty acids) in periparturient ewes. One hundred and eighteen, 90 d pregnant, Santa Inês ewes were used. After lambing, 32 ewes (BW 62.8 ± 1.3 kg) were allotted in a randomized complete block design, defined by pre-lambing diet, sex and offspring number. Diets were isonitrogenous ($13.0 \pm 0.3\%$ CP, DM basis), composed of 70% concentrate and 30% raw sugarcane bagasse and fed daily, "ad libitum". Crude glycerin (83.6% glycerol, DM basis) levels were zero or 10% (DM basis), corresponding to the experimental diets G0 and G10, respectively. From the second until the eight week of lactation dry matter intake was determined. In the same period, once a week, the ewes were separated from the lambs and mechanically milked after intravenous administration of 10 IU of synthetic oxytocin. Three hours after the first milking, the ewes were milked again and milk production and composition were determined. Glucose and NEFA were measured at -14, -7, 0, 7, 14, 28, and 56 d relative to lambing and insulin at -14, -7, 0, and 7 d. Data were analyzed as repeated measures over time using the MIXED procedure (SAS Inst. Inc.). The LSMEANS option was used to obtain the means. Crude glycerin did not affect ($P > 0.05$) DMI (2.2; 2.2 kg/d) and milk production (168.6; 164.7 g/3 h). However, there was a decrease ($P = 0.01$) in milk fat percentage (8.0 vs. 7.0%). Ewes fed diets with glycerin had decreased ($P < 0.01$) NEFA concentration (0.27 vs. 0.18 mEq/L). Glucose (61.8 vs. 67.6 mg/dL) and insulin (10.8 vs. 15.5 μ IU) were not affected by treatments, but there was an interaction between treatment x week ($P < 0.05$). Crude glycerin increased glucose (101.2 vs. 133.7mg/dL) and insulin concentration (10.5 vs. 24.5 μ IU) at parturition. Crude glycerin can partially replace corn without affecting DMI, milk yield and milk composition. Crude glycerin improves energy balance of periparturient ewes.

Key Words: glycerol, free fatty acids, NEFA

1926 (W367) Apparent digestibility, rumen metabolism and nitrogen balance in lambs fed high-concentrate diets containing increasing levels of ground cottonseed. R. A. Souza¹, R. S. Gentil¹, E. M. Ferreira¹, D. M. Polizel¹, A. P. A. Freire^{*1}, J. A. Faleiro Neto² and I. Susin¹, ¹*Escola Superior de Agricultura Luiz de Queiroz- ESALQ/USP, Piracicaba, Brazil*, ²*Faculdade de Medicina Veterinária e Zootecnia- FMVZ/USP, São Paulo, Brazil*

The objective in this trial was to determine the effects of feeding ground cottonseed (GCS) on apparent digestibility, rumen metabolism and nitrogen balance. Five ram lambs, Dorper x Santa Inês (45.2 ± 0.8 kg), cannulated in the rumen, were allotted in a 5x5 Latin Square design. Each experimental period lasted 22 d, 17 d for adaptation and 5 d for sampling. Diets were isonitrogenous (15% CP, DM basis) and composed of 90% concentrate and 10% coastcross hay. Treatments were defined by the levels of GCS inclusion: 0, 7, 14, 21 or 28% (DM basis). Diets were fed ad libitum and total feces and urine were collected. On the last day of sampling, the rumen content was sampled every 2 h during 12 h, starting before feeding. The data were analyzed as repeated measures over time by using the MIXED procedure (SAS Inst. Inc.) The LSMEANS option was used to generate individual diet means. Orthogonal polynomials for diet responses were determined by linear, quadratic, and cubic effects. Apparent digestibilities of DM (80.7, 77.3, 79.2, 76.2 and 74.4%), OM (82.3, 78.8, 80.8, 77.7 and 76.2%), CP (81.4, 80.9, 81.8, 79.3 and 79.7%) and NFC (89.4, 82.6, 84.0, 78.8 and 80.7%) were linearly reduced ($P < 0.05$) and EE (89.7, 93.3, 94.4, 95.0 and 93.7%) was linearly increased ($P < 0.05$) while NDF was not affected. Total SCFA (90.5, 95.7, 96.5, 83.4 and 71.7 mM) and propionate (35.1, 34.5, 36.4, 31.4 and 24.7 mM) had quadratic response ($P < 0.05$) with higher values for the inclusion of 14%. Acetate (47.4, 50.4, 47.8, 43.3 and 38.4 mM) had a linear decrease ($P < 0.05$) and pH (5.4, 5.5, 5.4, 5.6 and 5.7) showed a linear increase ($P < 0.05$). Isobutyrate, butyrate, acetate:propionate ratio and ammonia were not affected ($P > 0.05$). Nitrogen intake and excretion were linearly reduced ($P < 0.05$) resulting in no effect on retained nitrogen ($P > 0.05$). The inclusion of GCS affected negatively DM, OM, CP and NFC apparent digestibilities. Propionate and SCFA were higher with the inclusion of 14% of GCS.

Key Words: co-product, SCFA, rumen ammonia nitrogen

1927 (W368) Intake and performance of finishing lambs fed diets with licuri nut (*Syagrus coronata*) cake. R. L. Oliveira*, J. B. Costa, T. M. Silva, M. S. Borja, M. D. C. Magalhães, A. D. S. Nunes, C. B. D. Pellegrini, W. F. D. Souza and N. G. D. N. Júnior, *Universidade Federal da Bahia, Salvador, Brazil*

The objective of this study was to determine the impact of including licuri nut (*Syagrus coronata*) cake in the diet of crossbred Santa Inês finishing lambs on their intake and performance. Forty-four vaccinated and vermifuge-treated non-castrated lambs aged on average 6 mo and with an average weight of 21.2 kg ± 2.7 were fed equal proportions of roughage (Tifton 85 grass hay) and a concentrate mix composed of corn meal, soybean meal, 1% urea, vitamin-mineral premix, and inclusion of licuri cake at the levels of 0, 8, 16, and 24% in substitution of the soybean meal and corn meal in isonitrogenous diets, these levels being the treatments. Animals were confined in individual stalls for 70 d, fed twice daily, and weighed at the beginning and end of the experiment to calculate weight gain and feed conversion. Samples of feed and orts were collected to determine the intakes of dry matter (DM), crude protein (CP), ether extract (EE), non-fibrous carbohydrates (NFC) and total digestible nutrients (TDN). The data were adjusted to regression analysis, using the SAS 9.1 (2004) statistical software. The increase in the inclusion level of licuri cake led to a linear decrease in DM intake ($\hat{Y} = -21.352 X + 1312$; $P < 0.001$), with reduction of 39% between the level with 0 and 24% of cake, respectively. Probably this reduction may be associated with the elevation in NDF content, thereby demonstrating a considerable elevation in ADF representing the accrual in the lignin fraction, linked to decrease in NFC. The decrease in the intakes of CP, NFC and TDN is a consequence of the drop in DM intake. On the other hand, EE intake was quadratically affected ($\hat{Y} = -0.0551 X^2 + 1.4271 X + 31.967$; $P < 0.05$), increasing until addition of 12.95% of licuri cake, and reducing from this point. The average daily gain decreased linearly ($\hat{Y} = -0.004x + 0.218$; $P < 0.0001$) as the licuri cake was added. This decrease is mainly related to the drop in CP and TDN intakes. Feed conversion was not affected by the proposed levels. Including licuri cake reduces the intake and performance of the animals and the decision of whether or not to use it in the feeding of lambs will depend on the cost and economic return.

Key Words: intake, sheep, weight gain

1928 (W369) Growth and carcass characteristics of lambs fed high-concentrate diets containing different sources of non-protein nitrogen.

A. P. A. Freire^{*1}, F. L. M. Silva¹, D. M. Polizel¹, R. A. Souza¹, R. S. Gentil¹, R. C. Araujo² and I. Susin¹, ¹*Escola Superior de Agricultura Luiz de Queiroz- ESALQ/USP, Piracicaba, Brazil,*
²*GRASP Ind. & Com. LTDA, Curitiba, Brazil*

Nitrate supplements can be used as non-protein nitrogen (NPN) in ruminant diets. The interest in this NPN source is due to its capability of reducing methane emissions. Forty-four Dorper x Santa Inês lambs (initial BW 21.05 ± 2.65 kg and 79 ± 5 d old) were used in a randomized complete block design, according to initial BW and age, to determine the effects of supplementing urea or calcium nitrate on growth and carcass characteristics. Lambs were penned individually during 56 d and fed an isonitrogenous (16% CP, DM basis) total mixed ration composed of 80% concentrate and 20% coastcross hay. The experimental diets were: C (control, with soybean meal), U (1.1% urea), NEN (2.65% non-encapsulated calcium nitrate) and EN (3.0% encapsulated calcium nitrate). Diets containing nitrate were formulated to have the same content of NO³⁻ (DM basis). Urea was added to have the same crude protein equivalent as nitrate. In the first week of feeding a gradual adaptation period was used to avoid toxic effects of nitrate or urea. Data were evaluated using orthogonal contrasts. The first contrast was the C vs. non-protein nitrogen (NPN), the second contrast was U vs. calcium nitrate (U vs. CN) and the third was formed by NEN vs. EN. The control animals had greater ($P < 0.01$) ADG (389, 355, 345, and 346 g for C, U, NEN and EN, respectively) and feed efficiency (gain:feed = 0.286, 0.265, 0.269 and 0.264 for C, U, NEN and EN, respectively) compared with NPN. However, there was no difference ($P > 0.05$) between U vs. CN and NEN vs. EN. Dry matter intake (1.37, 1.35, 1.29 and 1.32 kg/d for C, U, NEN and EN, respectively) and carcass characteristics (dressing percentage, longissimus muscle area, back fat thickness and body wall thickness) were unaffected ($P > 0.05$) by the experimental diets. Lambs fed 2.65% non-encapsulated or 3% encapsulated calcium nitrate have similar performance and carcass characteristics of lambs fed 1.1% urea.

Key Words: calcium nitrate, urea, sheep

1929 (W370) Zilpaterol hydrochloride modify the fatty acids profile of intramuscular fat of feedlot lambs. H. Dávila-Ramos* and J. C. Robles-Estrada, *Universidad Autonoma de Sinaloa, Culiacan, Mexico*

The objective of this study was to determine the effects of dietary zilpaterol hydrochloride supplementation on fatty acid profile of lambs' intramuscular fat. Forty crossbred male lambs (37.7 ± 0.67 kg) were used in a 43-d feeding trial (5 pens per treatment in a randomized complete block design).

Lambs were fed with finishing diet (2.57 Mcal/kg of ME) containing cracked corn 60%, sudangrass hay 16%, soybean meal 12%, molasses 9.5%, and mineral premix 2.5%, twice daily. Animals were randomly allotted to pens (6 m²) with full shade and ad libitum water. Treatments were: 1) control, no zilpaterol supplementation (ZIL-0); 2) zilpaterol for 20 d (ZIL-20); 3) zilpaterol for 30 d (ZIL-30); and 4) zilpaterol for 40 d (ZIL-40). Zilpaterol was supplemented at a rate of 0.20 mg/kg of live weight d⁻¹ (as zilpaterol hydrochloride, Zilmax, Intervet México, México City). Twenty *Longissimus dorsi* muscle samples (50 g, five per treatment) were collected from left side carcass of twenty crossbred male lambs (Pelibuey × Katahdin, 50.3 ± 3.83 kg final live weight). The muscle samples were frozen (-18°C) and transported to laboratory for fatty acids analysis. Samples were thawed (4°C) and ground to homogenize them. Modified method (Folch et al., 1956) was used for lipid extraction from the muscle samples. The fatty acid composition was determined with gas chromatography (Varian, USA) and column (SP TM-2560 Fused Silica Capillary Column) 100 × 0.25 mm × 0.2 mm filmthickness and flame ionization detector. The results were analyzed with a completely randomized design, comparing means of treatments with orthogonal contrasts and orthogonal polynomials. Zilpaterol hydrochloride supplementation decrease 3.2% ($P = 0.01$) stearic fatty acid, and increase ($P = 0.06$) 3.6% linoleic fatty acid of intramuscular fat. ZIL-30 improved fatty acids profile with respect ZIL-20, reducing the level of stearic fatty acid (4.6%; $P < 0.01$) and increased linoleic (5.2%; $P = 0.06$) and araquidonic fatty acids (1.8; % $P = 0.07$). The results indicated that zilpaterol hydrochloride supply until 40 d reduced ($P = 0.01$; linear component) stearic fatty acid proportion and increased ($P \leq 0.05$) linoleic and araquidonic fatty acids. However, the oleic fatty acid present in greater proportion was not modified by zilpaterol supplementation. Zilpaterol hydrochloride supplementation resulted in increasing the levels of polyunsaturated fatty acids and a reduction in the levels of saturated fatty acids.

Key Words: zilpaterol chlorhidrate, fatty acids, lambs

1930 (W371) Composition of cheeses made from milk of ewes fed with soybean seed or linseed concentrates.

C. F. A. M. Penna^{*1}, M. I. Simão², F. P. Paula³, M. O. Leite¹, M. P. Cerqueira¹, L. M. Fonseca³, M. R. Souza¹ and I. Borges³, ¹*Universidade Federal de Minas Gerais (School of Veterinary Medicine), Belo Horizonte, Brazil,* ²*Universidade Federal de Minas Gerais (Veterinary School/UFMG), Belo Horizonte, Brazil,* ³*Universidade Federal de Minas Gerais, Belo Horizonte, Brazil*

High solids, fat and protein contents of sheep's milk render it an attractive option for production of exclusive cheeses. However, this activity is still being structured in Brazil. The objective of the present work was to evaluate the composition and yield of cheeses produced with milk obtained from sheeps

fed diets containing soybean seed or linseed. Twenty-eight Lacaune, Santa Inês and crossbreeds sheep were allocated to two equal groups according to the diet. The milk obtained from each experimental group was used for cheese manufacture, and samples of this milk and whey were collected for laboratorial analyses and to complement cheese yield determination. The cheeses were aged for 30 d under low temperature storage (10–12°C), and analyzed for determinations of fat, protein, moisture and total solids contents. The data was evaluated using SNK test at 5% of significance. No influence of the diets on milk and whey composition was found ($P > 0.05$). Similarly, no difference was found for cheese yield and composition in both treatments and the general values observed were: yield of 26.9% (3.77 L/kg), moisture (42.6%), total solids (57.2%), fat (26.2%), protein (22.1%), and fat in dry matter (FDM) (45.8%). It is concluded that choice of the best concentrate to be used for sheep milk production should be based on diet cost, since the option of soybean seed or linseed did not affect cheese yield and composition.

Key Words: cheese composition, diet, cheese yield

1931 (W372) Pregnancy and lambing rates in anestrus ewes bred to a new synchronization protocol and laparoscopic timed artificial insemination (TAI).

S. B. Turner^{*1}, M. B. Gordon¹, T. Gowan², J. A. Small² and D. M. W. Barrett¹, ¹Faculty of Agriculture, Dalhousie University, Truro, NS, Canada, ²Agriculture and Agri-Food Canada, Truro, NS, Canada

Reproductive performance in seasonally anestrus ewes is poor even after the application of conventional controlled breeding techniques. Estradiol-17 β (E_2) has been shown to synchronize follicular wave emergence in anestrus ewes treated for 12 or 14 d with a medroxyprogesterone acetate sponge. The objective of this study was to determine the effects of an E_2 treatment administered 6 d after CIDR insertion on E_2 concentrations, estrus, pregnancy rates, and lambing rates in ewes bred out of season. Ewes from three farms (Farm A: $n = 22$; Farm B: $n = 48$; Farm C: $n = 28$) received CIDRs (Day -12) followed by an injection of eCG (500 IU; Day 0) at CIDR removal and an injection of sesame oil without (1 mL; Control) or with E_2 (350 μ g; Day -6) 6 d before CIDR removal. Treatments were balanced for breed, age, parity, and BCS. Blood samples were taken from half of the ewes on Day -6 and 0 to determine E_2 concentrations. On Day 1 ewes were exposed to rams to observe estrus. Ewes were subjected to laparoscopic TAI on Day 2. Pregnancy was diagnosed by transabdominal ultrasonography on Day 50. Estrus, pregnancy rates, and lambing rates were analyzed using logistic regression. Day of lambing and E_2 concentrations were analyzed using ANOVA. The percent of ewes observed in estrus within 36 h of CIDR removal was similar between treatments (E_2 : 24.5%; Control: 34.7%; $P > 0.05$). Pregnancy rates were similar between treatments (E_2 : 40.8%;

Control: 40.8%; $P > 0.05$) and were higher on Farm C than Farm B (Farm A: 45.5%; Farm B: 22.9%; Farm C: 67.9%; $P < 0.05$). Lambing rates were also similar between treatments (E_2 : 34.7%; Control: 34.7%; $P > 0.05$) and were higher on Farm C than Farm B (Farm A: 40.9% Farm B: 16.7%; Farm C: 60.7%; $P < 0.05$). Relative to CIDR removal, ewes lambed earlier on Farm B (Farm A: 141.7 ± 1.3 d; Farm B: 136.6 ± 1.4 d; Farm C: 143.2 ± 0.9 d; $P < 0.05$) and ewes treated with E_2 lambed earlier (E_2 : 138.9 ± 1.0 d; Control: 142.2 ± 1.0 d; $P < 0.05$). Concentrations of E_2 were similar between treatments on Day -6 (E_2 : 1.5 ± 0.1 pg/mL; Control: 1.6 ± 0.1 pg/mL; $P > 0.05$) and Day 0 (E_2 : 1.6 ± 0.1 pg/mL; Control: 1.3 ± 0.1 pg/mL; $P > 0.05$). Differences were mainly observed among farms potentially due to differences in breed, BCS, semen, or management practices. The addition of an E_2 treatment during a CIDR-eCG heat synchronization protocol does not clearly increase pregnancy and lambing rates in seasonally anestrus ewes.

Key Words: anestrus, ewes, controlled breeding

1932 (W373) Effect of supplementation with water-washed neem fruit and/or yeast on the performance and digestibility of west african dwarf sheep.

M. K. Adewumi* and T. O. Ososanya, University of Ibadan, Ibadan, Nigeria

This experiment was conducted to determine the performance of rams fed diets supplemented with water-washed neem (*Azadirachta indica*) fruits with or without yeast (*Saccharomyces cerevisiae*). Sixteen West African Dwarf (WAD) rams with an average weight of 14.41 (s.d = 2.54kg) were assigned to one of four diets with 4 animals per diet in a complete randomized design. The diets were: a total mixed ration (A); B (A plus 5.0 g of baker's yeast per animal per day); C (A plus 5.0% water-washed neem fruit inclusion in the diet); and D (A plus 5.0% water-washed neem fruit inclusion in the diet and 5.0 g of yeast per animal per day). The animals were fed at 5% body weight. At the end of the 56-d feeding trial, three animals per treatment were moved into individual metabolic cages. Average daily gain was higher ($P < 0.05$) in the D (120 g) compared to the other diets. Average daily dry matter intake (g) in C (929.58) and D (958.62) was similar ($P > 0.05$) but higher ($P < 0.05$) than B (839.32). The feed conversion ratio for A (10.05) was similar ($P > 0.05$) to B (11.99) and C (11.61) but higher ($P < 0.05$) than D (7.99). The digestibility of dry matter, crude protein and ash were similar ($P > 0.05$) for A, B and C. However, there was a significant difference between A and D. There was no significant ($P > 0.05$) difference in the digestibility of neutral detergent fibre, acid detergent fibre and cellulose of A and B. The metabolizable energy intake and the digestibility of organic matter was not different ($P > 0.05$) among B, C and D but were higher ($P < 0.05$) than A. The nutrients digestibility of D was consistently higher ($P < 0.05$) than A except for ether extract and hemicelluloses components. Water-washed neem fruits significantly ($P <$

0.05) increased nitrogen intake (g) in C (14.02) and D (14.76). Nitrogen retention (g) was higher ($P < 0.05$) for D (11.32) than for A (5.47), B (6.49) and C (8.78), respectively. These results suggest a positive synergic effect of baker's yeast and water-washed neem fruit on the performance characteristics, digestibility and nitrogen retention of WAD rams.

Key Words: baker's yeast, water-washed neem fruit, nitrogen retention

1933 (W374) Effect of crude protein level and zilpaterol supplementation on growth performance and carcass dressing of finishing hairy lambs.

A. E. Angulo¹, I. C. Perez¹, A. Plascencia², H. L. Lopez¹, P. M. Peraza¹, E. I. Gonzalez¹ and F. G. R. Rincon¹, ¹Universidad Autonoma of Sinaloa, Culiacan Sinaloa, Mexico, ²UABC, Mexicali, Mexico.

Forty Pelibuey × Katahdin (37.66 ± 2.2 kg) crossbred intact male lambs were used to evaluate the interaction of two dietary protein levels (15 and 18% CP) and two dietary zilpaterol (ZH) levels (0 and 6 mg/kg of feed) on growth performance and carcass dressing. Lambs were equally grouped by weight into five uniform weight groups and assigned to 5-pen blocks (two lambs per pen). The experiment lasted 30 d. Low protein and high protein diets contained 2.92 and 2.89 Mcal ME/kg, respectively. Treatments were: 1) Low protein-no ZH (LP-0); 2) Low protein-ZH supplementation (LP-ZH); 3) High protein-no ZH (HP-0), and 4) high protein-ZH supplementation (HP-ZH). No interactions were detected between protein level and ZH supplementation. Protein level did not affect ($P > 0.05$) dry matter intake or ADG, but low-protein diets tended to increase ($P = 0.08$) feed efficiency and carcass dressing; however, the latter could be more by the slight difference on energy concentration between LP and HP diets (2.92 vs. 2.89) rather than protein level per se. ZH supplementation did not affect DM intake, but increased ADG (13.8%, $P < 0.05$) and feed efficiency (16.2%, $P < 0.05$) with no effects on carcass characteristics. The Increases on protein level of diet from 15 to 18% did not improve the response to ZH supplementation.

Key Words: zilpaterol clorhidrate, CP level, pelibuey sheep

1934 (W375) Performance of lambs fed with crude glycerin diets.

V. B. Carvalho^{*1}, J. M. Bertocco Ezequiel², R. F. Leite¹, S. F. F. Petrorossi³, T. R. Delphino³, H. L. Perez³, J. R. Paschoaloto³, M. T. C. Almeida³, V. R. Favaro⁴ and E. H. Fernandes³, ¹UNESP, Univ Estadual Paulista, Department of Animal Science, Jaboticabal, SP, Brazil, ²UNESP, Jaboticabal, Brazil, ³UNESP, Univ Estadual Paulista, Department of Animal Science, Jaboticabal, Brazil, ⁴State University of Sao Paulo, Jaboticabal, Brazil

The objective of this trial was to evaluate the effect of total corn replacement by crude glycerine (CG) on performance of feedlot lambs. Forty Santa Ines intact males lambs were used with initial BW of 22.9 ± 4.10 kg, assigned in a completely randomized block. Diets consisted of Tifton-85 hay, corn, crude glycerin (83% glycerol), corn gluten meal, corn oil, urea, sunflower meal, soybean hulls and mineral. The diets presented 18% of roughage and 82% of concentrate. Five treatments were used: 0% CG, 7.5% CG, 15% CG, 22.5% CG and 30% CG on dry matter basis. The animals were housed in individual pens with free access to water. The feed intake of animals were adjusted to ensuring 10% daily feed leftovers (ad libitum). The diets were offered twice daily at 0700 and 1600 h with 50% of total in each meal. Weekly before feeding, the animals were weighed to evaluate of BW gain. The DMI, days in feedlot, average daily gain (ADG) and feed efficiency (FE) were calculated at the end of the experiment. The data were analysed using the MIXED procedure of SAS and the treatments were compared using orthogonal contrasts (linear and quadratic) considering 5% significance level. There was no difference treatments among the variables measured ($P > 0.05$). On average, the animals presented 73 d in feedlot and 37.85 ± 1.42 kg final BW. The DMI in average was 1.35 kg d⁻¹, 0.21 kg d⁻¹ of ADG and 0.15 kg of FE (kg of gain per kg of DMI). These results indicated that the use of the diets containing high concentrations of glycerin did not affect negatively the dry matter intake and animal performance.

Key Words: byproducts, feed efficiency, feedlot

1935 (W376) Sexual response of anovulatory Dorper X Pelibuey nulliparous and nulliparous and multiparous ewes exposed to males + estrogenized females. M. D. L. A. De Santiago*, *Universidad Autonoma Agraria Antonio Narro, Torreon, Mexico*

The aim of this study was to determine whether the stimulus exerted by the presence of males + estrogenized females, promotes both estrus (EA) and ovulatory activity (OA) in anestrus ewes in northern Mexico, (26°N). The study was conducted in April during the natural sheep anestrus season at this latitude. Sheep ewes ($n = 104$) were isolated from males 2 mo before the beginning of the experiment. All females were subjected to evaluation of ovulatory activity by transrectal ultrasonography (Aloka SSD- 500) on days -21, -14 and -7, and all of them were classified as anovulatory. To synchronize reproductive activity, each ewe was treated with an intravaginal sponge impregnated with fluorogestone acetate (FGA; Chronogest CR; Intervet) on days -9 to -2. Thereafter, on Day 0, 50 nulliparous and 54 multiparous females were randomly assigned to four experimental groups: two groups of nulliparous (Stimulated Nulliparous, SN; $n = 25$, and Non Stimulated Nulliparous NSN; $n = 25$) with similar body weight; 30 ± 1.1 Kg and body condition; 2.9 ± 0.1) and two groups of multiparous (Stimulated Multiparous, SM; $n = 24$, and non stimulated multiparous; NSM $n = 30$), with similar body weight; 42 ± 1.0 kg and body condition 3.2 ± 0.1 . Males and females were fed with rolled corn, sorghum, wheat and sorghum silage. On March 19 (Day 0) each group of the stimulated females (SN and SM) was exposed to two inactive males (3.0 ± 0.1 BCS; scale 1–4) and 5 estrogenized females, (2 mg estradiol cypionate IM every third day). In the same way, each group of the non-stimulated females (NSN and NSM) was exposed to two inactive males and 5 non estrogenized females. Rams were alternated between groups, and remained in contact during 15 d. Experimental groups were placed at a distance of approximately 100 m from each other. EA was recorded twice daily (AM and PM) and OA by ultrasonographic scanning, observing the presence of corpora lutea, on d 16. EA and OA were compared using Chi² test (MYSTAT 12). The percentage of multiparous ewes depicting estrus [SM (63); NSM (60)] was greater ($P < 0.05$) regarding nulliparous [SN (0); NSN (16)]. The same was true with respect to ovulation, favoring ($P < 0.05$) to the multiparous group [SM (75); NSM (57)] with respect to nulliparous [SN (4) and NSN (25)]. Therefore, multiparous ewes depicted a greater ability to respond to male effect than nulliparous, regardless the presence or not of estrogenized females.

Key Words: Ewes, sexual activity, female effect

1936 (W377) Feeding behavior of feedlot lambs fed with high levels of crude glycerin. V. B. Carvalho^{*1}, J. M. Bertocco Ezequiel², R. F. Leite¹, S. F. F. Petrorossi³, T. R. Delphino³, M. T. C. Almeida³, J. R. Paschoaloto³, H. L. Perez³, V. R. Favaro⁴, E. M. Oliveira³ and A. P. D' Aurea³, ¹UNESP, Univ Estadual Paulista, Department of Animal Science, Jaboticabal, SP, Brazil, ²UNESP, Jaboticabal, Brazil, ³UNESP, Univ Estadual Paulista, Department of Animal Science, Jaboticabal, Brazil, ⁴State University of Sao Paulo, Jaboticabal, Brazil

The objective of this trial was to evaluate the effect of crude glycerin (CG) inclusion on feeding behavior of feedlot lambs. Forty Santa Ines intact males lambs were used with initial BW of 22.9 ± 4.10 kg, assigned in a completely randomized block. Diets consisted of Tifton-85 hay (*Cynodon dactylon*), corn, crude glycerin (83% glycerol), corn gluten meal, corn oil, urea, sunflower meal, soybean hulls and mineral. The diets presented 18% of roughage and 82% of concentrate. The CG used is a byproduct from biodiesel originated from vegetable oils of soybean and sunflower. Five treatments were used: 0% CG, 7.5% CG, 15% CG, 22.5% CG and 30% inclusion of CG on dry matter basis, whereas, the diet with 30% of CG promoted a total replacement of corn. The animals were housed in individual pens with free access to water. The feed intake was adjusted to ensuring 10% of orts (ad libitum). The diets were offered twice daily at 0700 and 1600 h with 50% of total in each meal. Feeding behavior was performed during 48 h by 2 trained observers that made visual observations every 5 min of feeding, drinking, ruminating, resting and other activities. Further, the ruminating efficiency was determined. The means of 2 d were calculated expressed in 24 h. The data were analyzed using the MIXED procedure of SAS and the treatments were compared using orthogonal contrasts (linear and quadratic) considering 5% of significance level. There was no difference treatments among the variables measured ($P > 0.05$). The exception was drinking activity that showed a quadratic response ($P = 0.04$). On average, the animals presented 16.6 min drinking, 234.4 min eating, 428 min ruminating, 535 min resting and 226.8 in other activities. The ruminating efficiency was 325 (min of ruminating/kg DMI). In conclusion, crude glycerin in feedlot lambs influences only time spent drinking.

Key Words: animal nutrition, biodiesel, feed intake