

Small Ruminant: Reproduction, Parasites, and Environment

W379 Effects of meat goat breed, sex, and conditions before and between measures on behavior in pens with barb wire and electric fence strands. Y. Tsukahara,* T. A. Gipson, G. D. Detweiler, T. Sahl, and A. L. Goetsch, *Langston University, Langston, OK.*

Growing meat goats of 4 types (Boer (B) wethers and doelings, 25 ± 1.0 and 22 ± 0.7 kg BW; Spanish (S) wethers and doelings, 17 ± 0.3 and 16 ± 0.2 kg BW, respectively) were used to evaluate conditions for a method to test efficacy of electric fence strand addition to barb wire fence for cattle to contain goats. Animals were allocated to 8 sets of 20, consisting of 5 groups/set and 1 animal type/group. There were 5.24×3.7 m test pens consisting of 3 sides of metal panels and 1, adjacent to a pasture with abundant vegetation, of barb wire strands at 30, 56, 81, 107, and 132 cm from the ground. Fence treatments were electric strands at 15 and 43 (LH), 15 and 23 (LM), 15 (L), 23 (M), and 43 cm (H) at 6 kV. Adaptation procedures entailed 4 sequential weekly exposures to test pens: no electric strands, 1 strand at 0 kV, LH, and LH. Two preliminary treatments were imposed the week before the first observation period in wk 1: barb wire with no electric strands vs. LH. All sets were observed for 1 h in wk 1, and 4 sets were exposed to the same fence treatment in wk 6. During the 5 wk between observations, sets were exposed to 2 washout treatments while on pasture: without or with electric strands at ≥ 6 kV situated next to concentrate feeders. There were no effects of gender, preliminary, or washout treatments ($P > 0.05$). The % of animals exiting test pens differed ($P < 0.05$) among fence treatments in wk 1 (25, 47, 38, 66, and 84%; SE = 7.7) and in wk 1 and 6 (6, 22, 22, 63, and 81% for LH, LM, L, H, and M, respectively; SE = 4.9) and between breeds in wk 1 (34 and 70%) and in wk 1 and 6 (28 and 50% for B and S, respectively). The % receiving a shock was similar among fence treatments in wk 1 and in wk 1 and 6, although for the latter analysis the value was greater ($P < 0.05$) in wk 1 vs. 6 (11 vs. 1%). In conclusion, dissimilar behavior of B and S is a consideration for the testing method being developed and adaptation procedures employed appeared generally conducive to use of an experiment with one observation period, whereas repeated observations would necessitate evaluation of other washout treatments.

Key Words: goat, fence, containment

W380 GIS grid analysis of utilization of adjacent pastures by two herds of goats. T. A. Gipson*¹, S. P. Hart¹, and R. Heinemann², ¹*Langston University, Langston, OK*, ²*Kiamichi Forestry Research Station, Oklahoma State University, Idabel.*

Many goat producers divide their herd into 2 or more groups for grazing in adjacent pastures with or without other livestock species. The objective of this study was to observe the spatial patterns of 2 adjacent herds of goats pastured with and without cattle. A 15.8-ha pasture was stocked with 36 Spanish goats and 12 Angus cows (GC), and a 14.1-ha pasture was stocked with 36 Spanish goats without cattle (GO). Neither group of goats had been exposed to cattle before. The pastures consisted of fescue, bermudagrass, various *Panicum* such as switchgrass, bahiagrass, and broomsedge bluestem, but areas were reverting to woody plant species such as sapling-sized trees of pecan, elm, and honey locust. Eleven goats in GC and 10 goats in GO were fitted with GPS collars that recorded a fix every 5 min in the first 2 wk. A GIS point-in-polygon analysis using

a 10×10 m grid was conducted for each pasture. The GO had greater ($\chi^2 = 858$, $P < 0.01$) explored space (65% of 1473 grids) compared with GC (13% of 1584 grids). Of the grids explored, GO had a higher percentage with a density of 100 or more fixes than did GC (55 vs. 33%; $\chi^2 = 11$, $P = 0.01$), indicating a wider area of methodical exploration or habituation. Only 21% of fixes were within 100 m of the water point. Goats in GO preferred pasture locations closer ($\chi^2 = 15106$, $P < 0.01$) to the water point than did GC (200 vs. 300 m); however, GC came to the water point earlier ($P < 0.01$) than did GO (0730 vs. 1000 h). The favored location in the morning for each pasture was near the water point in the eastern intersection of the pastures. During the remainder of the day GC favored the southwestern-most corner of their pasture near a central fence line. In the afternoon, GO preferred the location near GC but also had a favorite location shaded by trees in the center of the pasture. The spatial behavior of the groups of goats appeared to be influenced by each other, and presence of cattle may have inhibited GC from fully exploring their pasture.

Key Words: goats, GPS, grid analysis

W381 Ruminant methane emission by Boer and Spanish does supplemented with garlic. R. Puchala,* Z. Wang, A. L. Goetsch, and T. Sahl, *Langston University, Langston, OK.*

Twenty Boer (B; 2–7 yr of age and 48.5 ± 2.2 kg) and 20 Spanish (S; 4–6 yr of age and 39.3 ± 1.5 kg) does were used to examine effects of garlic on ruminal methane emission and heat production. Ten does of each breed were randomly allocated to control (C) and garlic (G) treatments. All does received 200 g/d (as-fed basis) of a concentrate mixture consisting of 54.4% ground corn, 26.0% soybean meal, 12.9% molasses, and 6.7% mineral and vitamin sources. The G does also received 20 g/d (as-fed basis) of garlic powder. For at least 2 mo does grazed grass/forb pastures in the summer. Thereafter, sets of 4 does consisting of 1 doe per treatment (CB, CS, GB, and GS) were sequentially placed in metabolism crates for 2 wk, continued to receive supplements, and were fed coarsely ground alfalfa hay free-choice. Gas exchange was measured on the last day for 24 h in an indirect, open circuit respiration calorimetry system with 4 metabolism cages fitted with head-boxes. There were no interactions between breed and supplement treatment ($P > 0.10$). Alfalfa hay DMI during the calorimetry measurement period was greater ($P < 0.05$) for G vs. C (781, 742, 934, and 853 g/d for CB, CS, GB, and GS, respectively; SEM = 29). Ruminal methane emission was less ($P < 0.05$) for G than for C in g/d (12.0, 10.8, 8.5, and 6.4, respectively; SEM = 0.56) and relative to intake of DM (15.2, 14.6, 9.1, and 7.6 g/kg; SEM = 0.44) and GE (4.31, 4.12, 2.58, and 2.14% for CB, CS, GB, and GS, respectively; SEM = 0.124). Treatment did not affect ($P > 0.10$) respiratory quotient (1.012, 1.004, 1.003, and 0.994), heart rate (73, 72, 72, and 70; SEM = 1.6), heat production (450, 444, 447, and 432 kJ/kg BW^{0.75}; SEM = 10.7), or the ratio of heat production:heart rate (6.18, 6.19, 6.18, and 6.21 kJ/kg BW^{0.75} per heart beat for CB, CS, GB, and GS, respectively; SEM = 0.056). In conclusion, supplementation with garlic decreased ruminal methane emission and increased DMI by Boer and Spanish does consuming alfalfa hay.

Key Words: goats, garlic, methane

W382 Effects of Roscovitine on maturation and fertilization of ovine oocyte in vitro. S. Nasrollahi,* A. Z. Shahneh, S. Zeinoaldini, H. Kohram, and M. Poorhamdollah, *University of Tehran, Karaj, Tehran, Iran.*

The purpose of this study was to determine the effect of Roscovitine on maturation and fertilization of Ovine oocyte. Roscovitine was added in doses of 0, 6.25, 12.5, 25, 50 and 100 μ M with control group to maturation culture. Ovaries were collected from abattoir in normal saline at approximately 30°C and transported to the laboratory within 2 to 3 h from collection. After washing with fresh normal saline, cumulus-oocyte complexes (COCs) were recovered by aspiration. Cumulus-oocyte complexes were collected under a stereomicroscope and washed in the passed-through washed aspiration containing HEPES-TCM-199 culture supplemented with 2% fetal Bovine serum, 2/0 μ M sodium pyruvate and 1% penicillin-streptomycin and then COCs were delivered into plates containing maturation medium and cultured for 24 h in 5% CO₂ at 39°C and maximum humidity. In the first step, nuclear situation was assessed by removing of cumulus cell and oocyte staining. Then, oocytes were cultured without Roscovitine for 24h to determine the inhibitory effects of treatment and then again strained. Finally, oocytes were washed with fertilization medium and the fertilized with fresh semen. Data were analyzed by ANOVA and G mode procedure of SAS (version 9.1). Results showed those expansions level and mucosal rates were not influenced by different concentrations of Roscovitine ($P < 0.05$). Although, there was no difference in nuclear maturation between control treatment and 6.25 micro molar Roscovitine, other concentrations increased the nuclear maturation in oocyte ($P < 0.05$). All of treatment increased reaching to M-II phase than control treatment ($P < 0.05$). In conclusion, treatments 6.25, 12.5 and 25 were selected for in vitro fertilization. The results obtained of these treatments indicated that the oocyte affected by Roscovitine (25 μ M), could make the better fertilization ability than control group.

Key Words: Roscovitin, fertilization, sheep

W383 Anthelmintic efficacy of medicinal herbs in goats infected with nematode parasites. R. Z. Zhong^{1,2}, Z. Wang^{*2}, D. Zhou¹, A. L. Goetsch², S. P. Hart², and T. Sahl², ¹*Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences, Changchun, China,* ²*Langston University, Langston, OK.*

Thirty high-percentage Boer does (2.9 ± 0.12 yr; 48 ± 1.9 kg BW) naturally infected with *Haemonchus contortus* from grazing pasture of Langston University were allocated to 5 groups and moved to a barn to investigate anthelmintic efficacy of 3 medicinal herbs, *Rheum palmatum* L. (rhubarb; R), *Meliae cortex* (melia bark; M), and *Quisqualis indica* L. (rangoon creeper; Q). Does were given ad libitum access to grass hay and water, along with 200 g/d per doe of a concentrate-based pelleted supplement. Treatments were control (C), R, M, Q, and a 1:1:1 mixture of the 3 herbs (RMQ). The herbs in powder form were mixed with water at 20 g/100 mL just before drenching. After being acclimated for 7 d, does were drenched with 100 mL of water alone or with the respective herbs at 20 g/d for 10 d. Fecal samples were collected on d 0, 3, 6, 9, 13, and 16 after the start of drenching for worm egg count (FEC). Blood samples were taken on d 0 and 13 for measuring packed cell volume (PCV). Initial FEC was 2,208, 3,933, 3,025, 2,350, and 3,033/g for C, R, M, Q, and RMQ, respectively (SEM = 425.2; $P > 0.05$). After 10 d of treatment, none of the herbs showed anthelmintic effects. The FEC on d 16 was 1,350, 3,058, 1,525, 825, and 2,067/g for C, R, M, Q, and RMQ, respectively (SEM = 332.9, $P > 0.05$). Change in PCV was 1.8, 20.1, 9.1, 10.7, and 13.3% for C, R, M, Q, and RMQ, respectively (SEM = 1.68). Compared with C, the PCV value increased in does treated with

R and RMQ ($P < 0.05$); however, the increases may have been due to scouring in response to treatment with R. In conclusion, these herbs were not effective anthelmintics for the most problematic internal parasite of goats, *H. contortus*, in much of the US.

Key Words: goats, anthelmintic herb, *Haemonchus*

W384 The effects of confinement and protein levels on the growth and parasitic loads of kids raised under mixed-species grazing system. S. Gebrelul, L. Gray,* R. Marshall, and Y. Ghebreyessus, *Southern University Ag Center.*

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 potential of producing kids of desirable market weight of 20 kg or more, 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 Bermuda grass pastures during the day (for 8h) and supplemented with the same experimental rations during the night. After an adjustment period of 2 weeks, initial measurements of BW, BCS, (1 = thin, 5 = fat) and FAMACHA scores (FS, 1 = red, healthy, 5 = white, anemic) were taken. These measurements were taken every 14 d for 8 wk. Data were analyzed using SAS MIXED procedure where kids were considered random effects. Kids under confinement were 1.7 kg heavier ($P < 0.05$) than kids under semi-confinement housing. Male kids were 3.0 kg heavier ($P < 0.05$) than female kids. No differences in BCS or FS were observed due to housing effect. Level of CP in the diet had no effect ($P > 0.05$) on BW, BCS or FS. Kids from pastures that were comingled with cattle had higher BW (19.1 ± 0.4 vs. 17.9 ± 0.4 kg) and BCS (2.6 ± 0.05 vs. 2.4 ± 0.05), and lower FS (1.8 ± 0.1 vs. 2.4 ± 0.1) than kids that originated from goats-alone pastures. Kids that were confined and fed 16% CP were heavier ($P < 0.05$) than any other group. BW was positively correlated (0.48) to BCS but negatively correlated (-0.34) to FS. BCS and FS were negatively (-0.28) correlated. Results showed that kids raised under mixed-species system can be confined and fed for 8 wk to achieve desirable market weights.

Key Words: mixed-grazing, FAMACHA, confinement

W385 The anthelmintic effect of Juniper and Tifton 85 on the infective larval stage of *Haemonchus contortus* in an in vitro system. S. A. Armstrong^{*1}, B. D. Lambert^{1,2}, T. R. Whitney³, J. P. Muir², and A. McEwin¹, ¹*Tarleton State University, Stephenville, TX,* ²*Texas Agrilife Research, Stephenville,* ³*Texas Agrilife Research, San Angelo.*

This experiment tested the effect of inclusion of buffered rumen fluid with and without Tifton 85 bermudagrass (T85) or Juniper in an in vitro larval migration assay (LMI) for *Haemonchus contortus* (HC). Inclusion of a forage material in control samples is time consuming, risks introducing unknown compounds that could reduce larvae viability in the control treatment, and limits the number of test compounds that can be studied in a single assay. Rumen fluid from a mature ruminally-cannulated goat was mixed with McDougall's buffer in a 1:4 ratio. Aliquots of buffered rumen fluid were placed in an anaerobic incubator along with one of 3 forage treatments. Treatments included control (no forage material), control plus T85 or control plus dried juniper. Treatment solutions were incubated for 18 h to extract any potential bioactive anthelmintic

compounds. Ivermectin (40 µg/ml) was included as a positive control treatment. Following the 18-h incubation, solutions were centrifuged. Five milliliters of supernatant was added to individual 100-mL plastic cups containing approximately 1000 ensheathed HC larvae. All treatment cups (buffered rumen fluid, buffered rumen fluid + Tifton 85, buffered rumen fluid + Juniper and buffered rumen fluid + ivermectin) were anaerobically incubated for 4 h. Following incubation, larvae were transferred onto a screen in a 96-well plate which contained the same treatment rumen fluid mixture (9 replicate wells per treatment). Larvae were incubated overnight; those which passed through a screen were considered to be viable. Percent larval migration inhibition was calculated as: % LMI = $[(A - B)/A] \times 100$ where A is the number of viable larvae in the control wells, B is the number of viable larvae in the test wells. Juniper and ivermectin treatment resulted in similar LMI, which was greater ($P < 0.05$) than control or control plus T85. We conclude that inclusion of dried juniper was as effective at inhibiting larval migration as ivermectin at 40 µg/mL and future LMI assays need not include forage in the control treatment.

Key Words: *Haemonchus contortus*, anthelmintic, in vitro

W386 Panicked tickclover, a native herbaceous legume, suppresses internal parasites without negative effects on kid performance. N. M. Cherry¹, M. Bullinger³, B. D. Lambert^{*1,3}, J. P. Muir¹, and T. Whitney², ¹Texas AgriLife Research, Stephenville, ²Texas AgriLife Research, San Angelo, ³Department of Animal Science, Tarleton State University, Stephenville, TX.

This trial looked at the effects of 2 condensed tannin (CT) containing legumes, *Lespedeza cuneata* (sericea lespedeza; SL), *Desmodium paniculatum* (panicked tick-clover; PTC), and a non-CT containing legume, *Medicago sativa* (alfalfa) on growth and fecal egg counts (FEC) in goat kids. The 3 legumes were each pelleted into a complete feed that contained 3.94% CT, 18% CP and 2.8 Mcal/kg digestible energy and fed to goats at 3.5% of their BW in a 4 wk feeding trial with 36 Boer × Spanish doe kids with an average BW of 19.1 kg. Goats were weighed every 14 d, refusals were collected throughout the study and weighed on d 14 and 28, blood samples were collected on d 25 and 28, and rumen fluid was collected at slaughter. Fecal eggs counts were done every 7 d. Compared with alfalfa, SL decreased feed efficiency and ADG, and had no effect on dressing percentage, BUN, and ruminal NH₃-N. In contrast, PTC had the same feed efficiency, ADG, dressing percentage, BUN, and ruminal NH₃-N as alfalfa. Sericea lespedeza and PTC increased feed intake overall ($P < 0.05$) by 5.1 and 4.3 kg, respectively, compared with alfalfa, and kids consuming pellets with SL and PTC also showed 44% reduced FEC ($P < 0.05$) compared with alfalfa. If PTC, native in North America from Texas to Georgia and north to Canada, can be cultivated as easily as SL and alfalfa, it may be an alternative for small ruminant systems looking for natural means of reducing internal parasites or as a protein source in regions such as central Texas where alfalfa and SL are not easily cultivated.

Key Words: goat, internal parasites, legume

W387 Relative resistance to gastrointestinal nematode parasitic infection in sheep and goats. R. Merriott,* H. Ismail, G. Summers, and M. Worku, *North Carolina Agricultural and Technical State University, Greensboro.*

Co-grazing of parasite resistant and susceptible animals may aid in on-farm control of parasite load and offer a system for reducing production losses in goats. An experiment was conducted to evaluate the effect of

nematode infection in goats co-grazed with St Croix sheep reported to be parasite resistant under fall and summer grazing conditions. St. Croix sheep (10), Boer goats (10), and Spanish Boer cross goats (10) were co-grazed on the same pasture. A second group of Boer (5) and Spanish Boer cross (5) goats were grazed on a separate pasture. The duration of both fall and summer trials was 56 d. Fecal and blood samples were collected on d 0, 28 and 56. Fecal egg counts, packed cell volumes, FAMACHA scores, BW and white blood cell differentials were used to assess relative resistance to parasite infection using SAS PROC GLM and PROC TTEST. Goats had higher levels of infection than sheep. The parasite resistant St Croix sheep had higher percentages of eosinophils in peripheral blood when compared with co-grazed goats or goats on a separate pasture ($P < 0.05$). During the fall co-grazed sheep and goats had lower percentages of neutrophils in peripheral blood than goats grazing on a separate pasture ($P < 0.05$). Parasite resistance in sheep was associated with low fecal egg counts and increased eosinophil levels. In goats parasite burden and the neutrophil mediated inflammatory response may be influenced by management practices such as co-grazing.

Key Words: parasitic infection, parasite resistance, goats

W388 Effects of supplementing fat sources in pre-mating ewe diets on reproductive performance. Z. Mohammadi^{*1}, H. Mirzaei Alamouti¹, M. H. Shahir¹, H. Amanlo¹, and M. Yavari², ¹University of Zanjan, Zanjan, Iran, ²University of Hamedan, Hamedan, Iran.

A major challenge in management of most sheep breeds especially low prolific sheep is low lambing rate. Ewe feeding in pre-mating with glucogenic ingredient such as cereal grain has used as a strategy in several past years. Fat supplements have caloric and noncaloric effects that can change energy status of ewes. An experiment was conducted to determine noncaloric effect of some fat supplements in pre-mating ewe diets on reproductive efficiency of Afshari ewes. Afshari sheep are major fat-tail sheep breed in northwest of Iran. Thirty 2 estrus-synchronized Afshari ewes (62 ± 7kg) were assigned randomly to 4 diets containing a basal diet (alfalfa, barley, soybean meal, and a blend of mineral and vitamin) and different fat supplements, 3% of dry matter. Fat supplement were consisting 1) sunflower oil (SFO), 2) fish oil (FO), 3) rumen protected calcium salt of palm oil (RPO), and 4) an equal blend of SFO+FO. For adapting ewes to concentrate (35% of total diet), they were individually fed with basal diet for 7 d and then they were fed with basal diet and fat supplements for 14 d until the day of mating (d 14). Estrus-synchronizing was conducted using intravaginal progesterone releasing device (CIDR) for 12 d and a single dose injection of 400IU PMSG immediately after CIDR withdrawal. Ewes were exposed to rams 24–36 h after PMSG injection. Body weight, BCS, back fat thickness, blood sampling, and ultrasonography were conducted in initial (0), CIDR withdrawal (12), estrus days (13) and 30 d after mating. Data were analyzed using the PROC MIXED of SAS software. Three covariance structures were tested and the best was fitted. The results showed that ewes fed with fat sources had no differences in daily DMI, BW, and BCS and also glucose, cholesterol, and albumin as well in aforementioned days. The ewes fed FO compared with SFO, RPO, and SFO+FO diets had lower ($P < 0.05$) insulin concentration, 19.5 vs 19.5, 22.6, and 21.2 IU/mL respectively, on d12 and 20.4 vs 20.4, 23.2, and 21.8 IU/mL respectively, on d13, and greater ($P < 0.01$) estradiol concentration, 69.2 vs 57.5, 54.2, and 53.5 pmol/mL respectively. There was no difference in progesterone concentration among diets. The ewes fed FO diet had greater ($P < 0.05$) large follicle (>5 mm diameter) number, 1.5 and 2.25, in d 12 and 13, respectively compared with SFO, RPO, and SFO+FO (d12: 1.15, 1.13, and 0.7; d13: 1.5, 1.63, and 1.00, respectively). Also, ewes fed with FO diet had larger follicle size ($P < 0.05$) than ewes fed

to other diets (5.7 vs 5.5, 5.23, and 3.9 mm) in d13. Number of lambs born per ewe exposed ranked FO > SFO > RPO > SFO+FO (175, 150, 138, and 114%). It was concluded that short-term supplementing fish oil in pre-mating diets can have a beneficial effect on reproductive performance of Afshari ewes.

Key Words: fish oil, sunflower oil, pre-mating ewes

W389 Effect of equine chorionic gonadotropin dosage and administration moment on reproductive performance in Pelibuey ewes. A. González-Reyna¹, J. Hernández-Meléndez¹, F. A. Lucero-Magaña¹, J. Cedillo-Monroy², and J. F. Vázquez-Armijo*², ¹Universidad Autónoma de Tamaulipas, Facultad de Ingeniería y Ciencias, Cd. Victoria, Tamaulipas, Mexico, ²Centro Universitario UAEM Temascaltepec, Universidad Autónoma del Estado de México, Temascaltepec, México, Mexico.

This study was conducted to evaluate the effects of 4 doses of eCG and 3 application times on the estrus percentage (EP), time to estrus (TE), ovulation rate (OR), and prolificacy (PR) in hair sheep ewes, under a synchronization of estrus program. Ninety 7 Pelibuey adult ewes were treated with vaginal sponges impregnated with 40 mg of fluorogestone acetate during 12 d, at -48, -24, and 0 h before the sponge withdrawal. The ewes were assigned to the following treatments: 1 = 0; 2 = 100; 3 = 200 and 4 = 400 IU of eCG; and ewes showing estrus were mated by natural service. The statistical analysis was carried out using GLM procedure of SAS, and chi-squared tests. There was no effect of eCG dose on EP; however, the application time affected ($P < 0.01$) the EP. The application time ($P < 0.0006$) and the eCG dose ($P < 0.0001$) had important effects on TE. The dose of eCG affected ($P < 0.003$) the OR, and the OR for the dose of 400 IU of eCG was greater ($P < 0.05$) than the OR for the 0, 100 or 200 IU of eCG doses. These values were of 3.5 ± 2.5 , and 2.05 ± 0.9 , 1.86 ± 0.7 and 2.26 ± 1.3 , respectively. The application time did not have effect on the lambing rate, but the eCG dose did ($P < 0.05$), showing superior values of 83 and 75%, respectively for the 100 and 400 eCG doses, versus 48 and 63% for the 0 and 200 eCG doses. PR was affected ($P < 0.05$) by the eCG dose, being greater for the 400 eCG dose (2.28). Based on the results of this present study, the use of eCG did not affect EP; however, it reduced the interval TE and increased the OR and PR.

Key Words: gonadotropins, reproductive behavior, hair sheep

W390 Blood metabolites and insulin concentrations during pregnancy in ewes carrying one to five fetuses and supplemented with propylene glycol. H. Honig,* A. Rozov, E. Gootwine, L. Lifshits, and U. Moallem, *Volcani Center, Bet Dagan, Israel.*

Our previous studies demonstrated the susceptibility of prolific ewes to metabolic disorders during late pregnancy. In this study we examined blood metabolites and insulin concentrations in 60 Afec Assaf ewes carrying 1 to 5 fetuses from 60 d of pregnancy (DOP), and investigated the effect of supplementation from 110 DOP of propylene glycol (PGLY) to ewes carrying ≥ 3 fetuses. Ewes were examined for number of fetuses by ultrasonography at 35 DOP. At 110 DOP ewes carrying ≥ 3 fetuses were divided into 2 groups: (i) control — ewes were fed daily with an average of 0.70 kg of grain mix, 0.35 kg of corn silage and 1.34 kg of oat hay (DM basis); and (ii) PGLY — ewes were fed similar diet which included 55 g/d ProGlyc-55 that contained 55% 1,2-propanol. Blood samples were collected every 2 wk from 60 to 100 DOP and then weekly until lambing, and concentrations of glucose, β -hydroxybutyrate (BHBA), nonesterified fatty acids (NEFA) and insulin were determined. Glucose

concentrations decreased gradually from 95 DOP. Insulin concentrations elevated between 70 and 100 DOP, which followed by a dramatic decline in ewes bearing 3-5 fetuses. The increase in NEFA concentrations started moderately between 80 to 95 DOP and then rose rapidly until a peak at lambing. Average concentrations of BHBA (12.2 and 11.3 mg/dL, $P > 0.10$), NEFA (866.4 and 888.1 μ Eq/L, $P > 0.10$) and insulin (7.3 and 5.9 μ IU/ml, $P > 0.10$) during the last 40 DOP were not different between control and PGLY groups, whereas glucose concentrations were lower in PGLY than in the control ewes (50.0 and 58.5 mg/dL, respectively; $P < 0.02$). In conclusion, our results indicate that the metabolic stress in prolific ewes starts early during pregnancy, at 70 DOP, most likely due to the high metabolic demands of the placenta being in its maximal growth rate during this period. In addition, PGLY supplemented from 110 DOP was not effective in improving the metabolic status of ewes conceiving multiple fetuses.

Key Words: Afec Assaf, multiple fetuses, propylene glycol

W391 Withdrawn by author

W392 Bone morphogenetic protein 15 (BMP-15) in crossbred goat fertility. R. Hill, L. Canon, H. Ismail, R. Noble, and M. Worku,* *NC A&T State University, Greensboro.*

A study was conducted to identify bone morphogenetic protein 15 (BMP-15) in goat genomic DNA, to evaluate its role in fertility. Bone morphogenetic protein 15 is a growth factor and a member of the TGF β superfamily that is recognized by the bone morphogenetic protein receptor. It is specifically expressed in oocytes and is important for ovulation and for increasing litter size. Blood was collected from does and their kids of 2 goat breeds, Boer (n = 3 does each) and Spanish x Boer (n = 3 does each), on FTA elute cards (Whatman Inc.). Genomic DNA was extracted from the FTA card according to the manufacturer's protocol. Specific primers for BMP-15 and the loading control GAPDH were used for PCR amplification. Amplified products were run on a 1% agarose gel with DNA markers. Gels were stained with ethidium bromide and visualized using a gel documentation system. All Boer goats and their offspring had the BMP-15 gene. The BMP-15 gene was also detected in does and twin offspring of Boer x Spanish goats. However, Boer x Spanish cross goats that did not have the BMP-15 gene had single offspring. These offspring also did not have the BMP-15 gene. This preliminary evidence indicates that BMP-15 might be a gene that influences prolificacy of crossbred goats, but further research is needed to reach a final conclusion.

Key Words: goat, bone morphogenetic protein 15, fertility

W393 Induction of sexual activity of male goats during the reproductive resting season. O. Angel-García¹, J. M. Guillen-Muñoz¹, M. A. De Santiago-Miramontes¹, P. A. Robles-Trillo¹, R. Rodríguez-Martínez¹, C. A. Meza-Herrera², F. G. Véliz¹, and G. Arelano-Rodríguez*¹, ¹Universidad Autónoma Agraria Antonio Narro, Torreón, Coahuila, México, ²URUZA, Universidad Autónoma Chapingo, Gómez Palacio, Durango, México.

The aim of this study was to evaluate different protocols to induce the sexual behavior in male goats during the season of reproductive arrest in northern Mexico. Adult male goats (n = 24; dairy crossbred genotype) were divided into 4 experimental groups (n = 6, each) which were homogeneous regarding to BW, BCS, scrotal circumference and smell at the onset of the experimental period. Animals received alfalfa

hay ad libitum and 200 g per animal per day of a commercial concentrate (14% CP). On May 15, one group of males (G-T4) was treated with 25mg of testosterone per male, every third day during 3 weeks. A second group (G-GnRH) was treated with 25 ug of GnRH per male every third day, during 3 weeks. A third group (G-females) of males was set in contact with 3 estrogenized females, separated by a fence that permitted visual contact between them. Each of these females received 0.3 mg of estradiol cypionate every third day. A fourth group (G-Control) of males was treated with a saline solution each every third day during 3 weeks. At the end of the experimental period (April 11) each male was submitted to a behavioral test. Each male was exposed to an estrogenized female for 15 min. The behavioral test considered the number of sniffing, vocalization, approaches, complete mounts, mounts with ejaculation as well as latency to first ejaculate. The odor of the males was measured at the end of the experimental period, considering a 0–4 scale; 0 = female odor, 4 = very active male odor. The sexual behavior data were compared with χ^2 . The smell intensity and latency to ejaculate were compared with ANOVA as well as paired-mean comparisons with a “t” of student test (SYSTAT 10, Evanston, IL, USA, 2000). Data regarding sexual behavior, smell and latency to the first ejaculate for all groups is shown on Table 1. The results for the present study allow us to conclude that GnRH and testosterone administration besides the exposure to estrogenized females to dairy crossbred male goats in northern Mexico during the sexual resting season can promote a clearly active sexual behavior.

Table 1. Number of registered behavior during the behavior test for the four groups exposed to an estrogenized female during 15 min

	Vocalization	Approaches	Complete mount	Mount & ejaculation	Ejaculate latency (s)	Odor (0-4 scale)
G-Control	7 ^a	53 ^a	5 ^a	3 ^a	436 ± 121 ^c	0.7 ± 0.1 ^a
G-GnRH	84 ^b	210 ^b	16 ^b	10 ^b	187 ± 89 ^b	1.4 ± 0.3 ^b
G-Female	60 ^b	168 ^b	3 ^a	2 ^a	507 ± 93 ^c	1.4 ± 0.1 ^b
G-T4	1 ^a	114 ^b	27 ^b	17 ^b	24 ± 8 ^a	1.3 ± 0.2 ^b

^{a-c}Different letters in columns mean significant statistical differences ($P < 0.05$).

Key Words: sexual behavior, goat, season

W394 Induction to sexual activity of goats from the Mexican semidesert during the seasonal anestrus throughout the “female-to-female effect.” J. M. Guillen-Muñoz¹, O. Angel-García¹, M. A. De Santiago-Miramontes¹, G. Arellano-Rodríguez¹, C. A. Meza-Herrera², M. Mellado³, F. G. Véliz¹, and R. Rodríguez-Martínez^{*1}, ¹Universidad Autónoma Agraria Antonio Narro, Torreón, Coahuila, México, ²URUZA, Universidad Autónoma Chapingo, Gómez Palacio, Durango, México, ³Universidad Autónoma Agraria Antonio Narro, Saltillo, Coahuila, México.

The aim of this study was to determine if administration of PMSG during the seasonal anestrus stimulates sexual activity of goats exposed to the “female-to-female effect” (FTF) in northern Mexico (26° N). The FTF effect considers that direct contact of estrus females with anovulatory females, stimulates reproductive function. Crossbred adult goats (n = 138) under grazing conditions were divided into 4 experimental groups and received alfalfa and water ad libitum. On May 13, all anestrus goats received a single i.m. injection of 25 mg progesterone in 1 mL vegetable oil, to reduce the occurrence of short luteal cycles. On May 14 (d 0), a group of females (PMSG-G; n = 30) was treated with 240 IU of PMSG and 50 ug of cloprostenol i.m. per animal, a second group of females (FTF-G; n = 39) was untreated but interacted with the first treated group. The third and fourth groups were set 300 m apart from the previous groups; while

the third group (CS, n = 30) received 0.5 mL of saline i.m. per animal, the fourth group (control, CG; n = 39) remained untreated. At this time 3 males were introduced in every group of females. Female estrus activity was registered twice per day (0800 and 1800 h) during 15 d. On day-45 after male introduction, the proportion of pregnant goats was determined by ultrasonographic scanning. The percentage of estrus females, diagnosed as pregnant and giving birth were compared with a χ^2 . The latency of the first estrus was compared with a Student t-test (SYSTAT 10, Evanston, IL). Reproductive outcomes considering estrus females, pregnant females, first heat latency and prolificacy in the 4 experimental groups is shown in Table 1. Results of this study clearly demonstrated that anovulatory females can be induced to sexual activity by the female-to-female effect.

Table 1. Percentage of females (no./no. in parentheses) that demonstrated estral activity, diagnosed as pregnant

	Estrus females (%)	Pregnancy rate (%)	Time to onset of estrus (h)	Litter size	Kidding rate (%)
PMSG-G	97 (29/30) ^a	83 (25/30) ^a	54.2 ± 1.3 ^b	1.9 ± 0.1 ^a	77 (23/30)
FTF-G	95 (37/39) ^a	85 (33/39) ^a	72.6 ± 2.8 ^a	1.7 ± 0.1 ^a	70 (27/39)
CS	0 (0/30) ^b	0 (0/30) ^b			
CG	0 (0/39) ^b	0 (0/39) ^b			

^{a,b}Different letters between columns indicate statistical differences at $P < 0.01$.

Key Words: sexual activity, female effect, goat

W395 Influence of different GnRH treatments in an 11-d CIDR timed AI synchronization program in Santa Inês ewes. M. V. Biehl^{*3}, A. V. Pires², I. Susin², R. S. Gentil², E. M. Ferreira², F. M. Abreu¹, M. V. C. Ferraz Junior³, L. H. Cruppe¹, and M. L. Day¹, ¹The Ohio State University, Columbus, ²University of Sao Paulo, Piracicaba, SP, Brazil, ³University of Sao Paulo, Pirassumunga, SP, Brazil.

The aim of this study was to determine the effect of GnRH doses at different times on reproductive performance of Santa Inês ewes (n = 299) synchronized with 11-d CIDR timed AI (TAI) program. Ewes were blocked according to BW (45.8 ± 0.39) and BCS (2.22 ± 0.03, scale 1 - 5). The treatments were: 25µg/12h (n = 52) and 10µg/12h (n = 51) which means that ewes received 25 µg or 10 µg of GnRH 12h before TAI; 25µg/TAI (n = 47) and 10µg/TAI (n = 51) which means that ewes received 25 µg or 10 µg of GnRH at time of TAI; no-GnRH (n = 46); and NM (n = 52) bred by natural mating. The CIDR was inserted on day -11 and it was removed 11d later (d 0). All ewes received 5 mg PGF (Lutalyse) and 300 IU eCG (Novormon) on d 0. Estrus detection was performed for 55 h after CIDR withdrawal. Ewes were exposed to rams 10 d after CIDR removal for rebreeding for 7 d. Pregnancy diagnoses by ultrasonography were performed 30 and 50 d after TAI. Data were analyzed using GLIMMIX procedures of SAS. Estrus detection was greater ($P < 0.05$) for 10µg/12h (96.1%) treatment compared with 25µg/TAI (74.5%), 10µg/TAI (60.8%), no-GnRH (73.9) and NM (55.8%), where the 25µg/12h (86.5%) did not differ from any of the treatments. The time of onset of estrus did not differ among treatments (29.9 ± 0.56 h). TAI pregnancy rate was greater ($P < 0.05$) in 10µg/12h (60.8%) and 25µg/TAI (63.8%) compared with 10µg/TAI (41.2%), no-GnRH (30.4%) and NM (42.3%), where the 25µg/12h (51.9%) did not differ from any of the treatments. Natural mating rebreeding pregnancy rate was greater ($P < 0.05$) in no-GnRH (47.8%) when compared with 25µg/12h (28.8%), 10µg/12h (17.6%), 25µg/TAI (19.1%) and NM (28.8%). Final pregnancy rates did not differ among treatments. In conclusion, 10 µg of GnRH 12 h before TAI was effective in promoting estrus response and had a

similar AI pregnancy rate as when 25 µg of GnRH was given at TAI. However, the convenience of a single injection of GnRH at TAI makes this approach more desirable in sheep operations.

Key Words: ewes, timed AI, laparoscopy

W396 Effect of AI method on pregnancy rate following an 11d-CIDR estrus synchronization program in Santa Ines ewes. M. V. Biehl*³, A. V. Pires^{2,3}, I. Susin², R. S. Gentil², E. M. Ferreira², M. V. C. Ferraz Junior³, D. D. Nepomuceno², F. M. Abreu¹, L. H. Cruppe¹, and M. L. Day¹, ¹The Ohio State University, Columbus, ²University of Sao Paulo, Piracicaba, SP, Brazil, ³University of Sao Paulo, Pirassununga, SP, Brazil.

The objective of this study was to compare reproductive performance of nonlactating Santa Ines ewes (n = 267) synchronized using an 11-d CIDR program and a laparoscopic AI followed by different insemination methods following estrus detection. Ewes were blocked by BW (53.4 ± 0.42) and BCS (3.08 ± 0.04 ; scale 1 – 5). The treatments were: 1) timed AI (n = 65), when half of the ewes were detected in estrus, and AI was performed on the whole group; 2) AM/PM rule (n = 66), AI 12 h after estrus detection; 3) timed AI-48h (n = 67) AI 48 h after

CIDR withdrawal; or 4) control (n = 69), ram exposure for 60 h after CIDR withdrawal. After insertion, CIDRs remained in place for 11 d. Upon CIDR removal, all ewes received 5 mg PGF (Lutalyse®) and 300 IU eCG (Folligon®), and estrus detection was performed for 60 h thereafter. Fresh semen from 5 proven rams was used for AI. Ten days after the initial AI, ewes were exposed to rams for rebreeding for 7 d. Pregnancy diagnosis by ultrasonography was performed 30 and 50 d after AI. Data were analyzed using GLIMMIX and MIXED procedures of SAS. Estrus detection within 60 h was 82.8% across treatments and was greater ($P < 0.05$) for timed AI, AM/PM rule, and control (86.2, 87.9 and 85.5%, respectively) than timed AI-48h (71.6%). The moment of AI was greater ($P < 0.05$) for the timed AI (47.1 h), AM/PM rule (46.3 h), timed AI-48h (48.8 h) compared with the control (34.4 h). Pregnancy rate of the synchronized estrus did not differ among treatments (timed AI, 41.5%; AM/PM rule, 53.0%; timed AI-48h, 41.8% and control, 59.4%). Rebreeding pregnancy rate was greater ($P < 0.05$) for the timed AI (32.3%) compared with the AM/PM rule (15.2%) or control (13.0%), however, the timed AI-48h (25.4%) group did not differ from any of the treatments. Final pregnancy rate was 70.4% and did not differ among treatments. In conclusion, timed AI was comparable to AM/PM breeding and natural mating in Santa Ines ewes.

Key Words: ewes, timed AI, laparoscopy