

Sheep Species: Sheep Production and Management

W336 Effect of acetylated soybean peptides on ruminal fermentation and nitrogen metabolism in sheep. Z. J. Cao*, L. S. Li, Y. J. Wang, and M. Ma, *China Agricultural University, Beijing, China.*

The objective of this experiment was to determine the effect of acetylated peptides on rumen fermentation and nitrogen metabolism in sheep. Six adult Poll Dorset cross sheep, fitted with permanent rumen and duodenum fistulas, were used in a replicated 3×3 Latin design experiment. Three basic diets, balanced to similar nitrogen intake, were supplemented with 100 g soybean meal (ST), 60 g soybean peptides (PT), or 80 g acetylated soybean peptides (AT). Experimental periods were 15 d in duration (10 d of treatment adaptation and 5 d of data collection). The crude protein of soybean peptides and acetylated peptide powder were 66.8% and 51.0% (based on DM). The acetylation degree was 88.9%. PT had the highest pH value (6.94), followed by AT and ST (6.74 and 6.58, $P < 0.01$). Ruminal ammonia concentrations were affected by treatment (8.25, 10.18 and 14.98 mg/dL for AT, PT and ST, respectively, $P < 0.05$). AT had higher free amino acid (FAA) concentrations compared to ST and PT ($P < 0.01$). Peptide amino acid (PAA) concentrations were higher (522.36 vs 122.81 mg/L, $P < 0.01$) for sheep fed AT than ST. Methionine in total amino acids (TAA) was higher in AT compared to ST (0.45 vs 0.26 g/d, $P < 0.05$). Blood urea nitrogen (BUN) of ST had the highest value compared to PT and AT (5.96, 4.14, and 2.90 mmol/L, $P < 0.05$). Nitrogen losses from the feces of AT were less than that of ST (4.54 vs 6.44 g/d, $P < 0.05$). Similarly, nitrogen losses from the urine were higher for ST than for PT or AT (7.68 vs 5.19 and 5.01 g/d, $P < 0.05$). Apparent nitrogen digestibility of PT and AT (70.53 and 73.51%) was significantly higher than that of ST (62.85%, $P < 0.01$). Based on the results of this study, acetylation of the N-terminus of peptides can protect dietary peptides from rumen degradation. Ruminants might benefit more from acetylated peptides supplementation because of low degradability in the rumen and high digestibility in the intestine.

Key Words: Acetylated Peptides, Nitrogen Metabolism, Sheep

W337 Effects of rearing system on performance of weaned Pelibuey lambs. E. Gonzalez*^{1,2}, J. Arece², O. Cáceres², and P. P. Gomarín², ¹*INRA Antilles-Guyane, Domaine Duclos, Petit Bourg, Guadeloupe, France,* ²*Estación Experimental de Pastos y Forrajes 'Indio Hatuey', Central España Republicana, C.P., Matanzas, Cuba.*

A silvopastoral grazing system was compared with confinement (CF) for growth and general performance of weaned Pelibuey lambs. Lambs were from the EEPF 'Indio Hatuey' flock of Matanzas, Cuba (22°48'N, 81°2'W; 60 m above sea level). Ewes lambed in October and November and grazed at 12 to 14 per ha in a rotational silvopastoral system composed of three grasses distributed by plots (*Panicum maximum*, *Brachiaria decumbens* and *Andropogon gayanus*) and three fodder trees (*Leucaena leucocephala*, *Albizia lebbek* and *Bauhinia* spp.) randomly distributed in the 4.5 ha of pasture. Ewes were supplemented during drought with dehydrated citrus pulp (dcp) and sugarcane molasses containing 2% urea. The trial began with weaning in March and April about 3 months after lambing, with the lambs weighing 13 to 15 kg, and continued for 125 days. After being drenched with Levamisol, 25 lambs were grown on the silvopastoral

system described above (SP) with 18 to 21 lambs/ha and 25 lambs were grown in confinement (CF). A rustic shed was used for CF with 1.5 to 1.8 m² per animal and *ad libitum* fresh water. The CF lambs were fed cut and carried chopped forage (60% *Pennisetum purpureum*, 40% *Morus alba*) and dcp at 0.8 to 1.0 kg/lamb per d. Data were analyzed by one-way analysis of variance. For the whole experimental period differences ($P < 0.0001$) were obtained for ADG (48.2 vs. 88.5 g/d) and incidence of gastrointestinal parasitism, mainly from *Haemonchus contortus* (2117 vs. 144 EPG of feces) for SP and CF feeding systems, respectively. Morbidity rate (data not available) was explicitly higher in SP (*i.e.* worse lamb external appearance), and consequently, the survival level was better under CF conditions (8% mortality in SP vs. 0% in CF). Advantages of the CF feeding system were mainly related to reduced *Trichostrongyle* numbers, which influence feed intake and efficiency, morbidity, growth rate, and survival. These results suggest that CF of lambs is a good alternative for improving the growth and welfare of lambs in the tropics.

Key Words: Lambs, Silvopastoral System, Confinement System

W338 Evaluation of growth and carcass characteristics of pure Pelibuey sheep and their cross with Dorper and Katahdin breeds. J. G. Canton* and J. A. Quintal, *Instituto Nacional de Investigaciones Forestales Agrícolas y Pecuarias, Merida, Yucatan.*

Growth and carcass characteristics of purebred Pelibuey ram lambs were compared with those of Dorper × Pelibuey and Katahdin × Pelibuey ram lambs. Thirty-four Pelibuey, 25 Dorper × Pelibuey and 20 Katahdin × Pelibuey lambs were included in a completely randomized experiment. Lambs were fed a diet composed of 27% of DM as orange pulp silage, 12% of DM as cut and carried Taiwan pasture, and 61% of DM as concentrate. At the end of the 68-d experiment, 3 animals of each breed group were slaughtered to measure carcass characteristics. Estimated DMI were 1143, 1266, and 1180 g/d and final BW ($P > 0.05$) were 40.9, 41.9, and 40.3 ± 1.1 kg, for Pelibuey, Dorper × Pelibuey, and Katahdin × Pelibuey, respectively. No significant differences were detected for ADG, carcass weight, or dressing percentage. The average values obtained for all breeds were 232 g/d, 21.6 kg, and 55.1%, respectively. A higher ($P < 0.05$) percentage of loin and rib weight was observed in Pelibuey and Dorper × Pelibuey, compared with Katahdin × Pelibuey breeds (9.2 and 9.4 vs. 8.9 ± 0.5 %, respectively). There was no breed effect on area of the loin eye, or on proportions of neck, shoulder, leg, or total fat of the carcass. From these results, we conclude that pure Pelibuey sheep have growth rates and carcass characteristics similar to F1 crosses with Dorper and Katahdin breeds.

Key Words: Sheep, Growth, Hair Sheep

W339 Growth and feed efficiency of F1 Pelibuey lambs crossbred with specialized breeds for commercial production of meat. J. G. Canton*¹, R. F. Bores¹, J. J. Baeza¹, J. A. Quintal¹, R. H. Santos², and C. A. Sandoval², ¹*Instituto Nacional de Investigaciones Forestales Agrícolas y Pecuarias, Mérida, Yucatán,* ²*Universidad Autónoma de Yucatán, Mérida, Yucatán.*

Growth and feed efficiency were evaluated for F1 crossbred ram lambs from different genotypes: Pelibuey × Pelibuey (PbPb), Black Head Dorper × Pb (BHDPb), White Dorper × Pb (WDPb), Katahdin × Pb (KdPb) and Ile de France × Pb (IFPb). Forty-five lambs were distributed in a randomized block design with a factorial arrangement of 5 genotypes and 3 concentrations of dietary ME at 2.2, 2.5 and 2.8 Mcal/kg DM. There were two periods representing the initial (33 d) and the final phases (42 d) the growth, with 18 and 14% dietary crude protein, respectively. The IFPb lambs had a higher ($P < 0.05$) DMI than PbPb, BHDPb and WDPb lambs, but no differences were found ($P > 0.05$) between IFPb and KdPb. The values were 75, 76, 79, 80 and 86 g/kg^{0.75} per d, for the PbPb, BHDPb, WDPb, KdPb and IFPb lambs, respectively. No effect on DMI was detected for the level of energy in either the interaction of genotype or main effect. There was a higher DMI ($P < 0.05$) in the final phase of growth (74 vs 84 g/kg^{0.75} per d). No genotype effect was observed for ADG, total weight gain, or feed conversion. A linear effect ($P < 0.05$) was detected for ADG with increasing level of ME. The values obtained were 157, 193 and 240 g/d, for 2.2, 2.5 and 2.8 Mcal ME/kg DM, respectively. Lambs fed the medium and high ME levels had better ($P < 0.05$) feed conversions (4.3 and 5.0, respectively) compared to lambs fed at the lowest level of ME (6.5). Lambs had a lower ($P < 0.05$) total gain (5.6 vs. 8.1 kg) but better ($P < 0.05$) feed conversion (4.9 vs. 5.7) in the initial period than in the final period. Pelibuey lambs have growth and feed efficiency values similar to those of the specialized meat breeds, indicating that the Pelibuey breed can be used for commercial production of meat.

Key Words: Sheep, Crosses, Growth

W340 Introduction to Merino breeding resource flocks at Rafter 7 Ranch in Nevada. T. Wuliji*¹, H. Glimp^{1,2}, W. Jesko², and W. Rauw¹, ¹University of Nevada, Reno, ²Rafter 7 Ranch, The Edwin L Wiegand Trust, Yerington, NV.

A Merino breeding resource flock was established at Rafter 7 Ranch through cooperation of the College of Agriculture, Biotechnology and Natural Resources, UNR and The Edwin L Wiegand Trust in 1990. Initially, 500 Rambouillet ewes were purchased from two established breeders in 1990. These ewes were bred naturally or by AI to imported rams from Australia and to rams selected within the flock. Over the 16 years, 16 rams and semen from 41 rams have been imported from Australia. Selection was based on objective wool measurements and phenotypic performance traits. Merino crossbred ewes showed that wool fiber density, clean wool yield, staple length, and grease fleece weight were increased by 41% per unit area of skin, 15%, 2.5 cm, and 1.14 kg per head shorn, respectively. The current flock wool fiber diameter was reduced by 3 micron on average compared with the foundation flock (23 micron). The flock was expanded to 1200 ewes and was bred in 30 single sire mating groups in 2006. Presently, the Merino flock is managed in two breeding lines, one as a registered Merino flock (n = 600) and the other as Rafter 7 line (n = 600), which is selected for wool, lambing, and meat production traits. Wool sales from Rafter 7 Ranch won 7 consecutive annual shears for the highest price in US grown wool. The 5 finest bales of wool clips in 2006 averaged 16.9 um fiber diameter. Sheep producers from 17 states and Canada have purchased breeding rams and ewes from Rafter 7 ranch

over the past 10 years. These resource flocks have made significant progress over the foundation ewe flock during the crossbreeding and upgrading phase in major selection traits and are now becoming the flagship Merino flocks in the western states. Wool industry experts project that wool fiber diameter and its associated wool characteristics will continue to dominate wool price and textile use. Therefore, genetic improvement in wool and meat traits will increase sheep industry profits, and Rafter 7 ranch is poised to contribute genetic advantages to region-wide wool and sheep enterprises.

Key Words: Merino, Wool, Breeding

W341 Evaluation of Saint Croix ram lambs for growth, feed efficiency, blood urea nitrogen, and glucose levels by multivariate analysis. J. Simroth-Rodriguez*¹, E. Gutierrez-Ornelas¹, H. Bernal-Barragan¹, H. Morales-Treviño¹, J. Colin-Negrete¹, and V- Torres², ¹Facultad de Agronomia, Universidad Autonoma de Nuevo Leon, Marín, Mexico, ²Instituto de Ciencia Animal, Apartado Postal 24, San Jose de las Lajas La Habana, Cuba.

Seventeen Saint Croix ram lambs were evaluated using a combination of growth and feed intake responses, and blood urea N (BUN) and glucose (BG), using multivariate analysis to identify and select those more efficient rams. The growth period was 102 d. Ram lambs (initial body BW: 13.7 ± 1.9 kg) were allocated into individual pens and fed a diet containing 18.7% CP and 2.65 Mcal of ME/kg, composed of ground sorghum grain (53.6%), soybean meal (15.2%), alfalfa hay (5%), wheat bran (15%), cane molasses (6%), tallow (1.5%), urea (1%), and vitamin-mineral premix (2.7%). Blood samples were obtained every 14 d and blood serum was analyzed to obtain BUN and BG levels. Five groups were discriminated by the hierarchical cluster method (Table 1). Group 4, with only one animal, was considered as the best. It had better data for birth type, birth weight, and weaning weight, as well as scrotal circumference, daily feed intake, ADG, feed/gain, and average BUN and BG levels measured throughout the growth period. The use of this method as a selection technique may represent a practical and useful tool for ram lamb selection in situations where scarce information is available.

Table 1. Characteristics of discriminate groups

Discr. group:	1	2	3	4	5
N	5	8	1	1	1
Birth weight, kg	3.4	3.8	4.6	3.3	4.1
WW, kg	12.8	14.5	18	12	12
ADG, g/d	221	231	247	272	197
FI, kg/d	1.2	1.1	1.3	1.1	0.9
Feed/gain	5.8	5.1	6.8	5.2	6.3
SC, cm	29.4	30	27	32.5	—
BUN, mg/dL	27.1	26.0	30.6	29.5	25.2
BG, mg/dL	83.1	70.4	76.5	74.3	78.8

WW: weaning weight; **FI:** feed intake; **SC:** scrotal circumference; **BUN:** blood urea nitrogen; **BG:** blood glucose.

Key Words: Ram Lambs, Multivariate Analysis, Performance Trial

W342 Effect of dried distillers grains substituting for corn-soybean meal on growth and feed intake of Pelibuey sheep. A. Estrada-Angulo^{*1}, G. Contreras¹, A. Perez¹, G. Gamez¹, O. Lozano², F. G. Rios¹, and E. Vazquez¹, ¹FMVZ - UAS, Culiacán, Sinaloa, Mexico, ²Ganadera Flexi, Culiacán, Sinaloa, Mexico.

To determine the effect of four levels of dried distillers grains (DDG) substituting for corn-soybean meal on growth of sheep, 32 Pelibuey ram lambs (BW= 19.0 kg) were fed for 84 d in a randomized block experiment. The animals were weighed and blocked by weight in 16 groups of two, placed into 16 (2 x 3 m) floor pens, and assigned to one of 4 diets: 1) Control had 17.3% CP and 3.48 Mcal DE/kg, and contained 12.5% corn straw, 62% whole corn grain, 15% soybean meal, 8% sugarcane molasses, and 2.5% mineral premix; 2) like Control, DDG15 had 17.3% CP and 3.50 Mcal of DE/kg, but contained 15% DDG, 56% whole corn grain, and 6% soybean meal; 3) like Control, DDG25 had 17.3% CP and 3.53 Mcal of DE/kg, but contained 25% DDG and 52% whole corn grain; and 4) like Control, DDG35 had 18.4% CP and 3.53 Mcal DE/kg, but contained 35% DDG and 42% whole corn grain. Feed was offered twice daily under free access conditions. In the first 28 d of the experiment, diet had no effect on ADG (245, 240, 244, 202 g/day), DMI (865, 821, 838, 828 g/day), or feed/gain (3.55, 3.52, 3.46, 4.14) for Control, DDG15, DDG25, and DDG35, respectively. Also, for the entire 84-d period, ADG (224, 217, 199, 184 g/d), final weight (38.6, 38.2, 36.4, 36.4 kg), and feed/gain (4.17, 4.54, 4.79 4.82) were similar ($P > 0.05$) for Control, DDG15, DDG25, and DDG35 diets, respectively. It is concluded, that DDG can substitute for a mix of whole corn grain and soybean meal in diets for Pelibuey sheep.

Key Words: Dried Distillers Grains, Soybean Meal, Pelibuey Sheep

W343 Effect of dried distillers grains substituting for corn-soybean meal on apparent digestibility and energy concentration of feed in growing Pelibuey sheep. A. Estrada-Angulo^{*1}, G. Contreras¹, M. Osuna¹, A. Perez¹, O. Lozano², and E. Vazquez¹, ¹FMVZ - UAS, Culiacán, Sinaloa, Mexico, ²Ganadera Flexi, Culiacán, Sinaloa, Mexico.

To determine the effect of four levels of dried distillers grains (DDG) substituting for corn-soybean meal on apparent digestibility in sheep, four male Pelibuey sheep (15.0 kg) were used in a 4 x 4 Latin square with the following diets: 1) Control had 17.3% CP and 3.48 Mcal DE/kg, and contained 12.5% corn straw, 62% whole corn grain, 15% soybean meal, 8% sugarcane molasses, and 2.5% mineral premix; 2) like Control, DDG15 had 17.3% CP and 3.50 Mcal of DE/kg, but contained 15% DDG, 56% whole corn grain, and 6% soybean meal; 3) like Control, DDG25 had 17.3% of CP and 3.53 Mcal of DE/kg, but contained 25% DDG and 52% whole corn grain; and 4) like Control, DDG35 had 18.4% of CP and 3.53 Mcal of DE/kg, but contained 35% DDG and 42% whole corn grain. The DM excreted in feces was higher ($P = 0.01$) for DDG35 (88.8 g/d) compared to Control, DDG15, and DDG25 (66.1, 75.3, and 76.1 g/d, respectively). The apparent digestibility of DM for Control, DDG15 and DDG25 (84.8, 82.7, 82.4, respectively) was better than for DDG35 (79.8%, $P = 0.10$). The DE concentration was lower ($P = 0.01$) for DDG35 (3.42 Mcal/kg of DM) than for Control, DDG15, and DDG25 (3.64, 3.54, and 3.53, respectively). The observed/calculated DE ratio was lower for DDG35 (0.97) while it was higher or equal (1.05, 1.01, and 1.0) for Control, DDG15, and DDG25, respectively. It is concluded that a whole corn

grain-soybean meal mixture can be substituted with DDG at 15 or 25% of the diet without an effect on apparent digestibility of DM and energy concentration, but the inclusion of 35% of DDG reduces the apparent digestibility of DM and DE concentration in diets for growing Pelibuey sheep.

Key Words: Dry Distillers Grains, Apparent Digestibility, Pelibuey Sheep

W344 Quantitative carcass characteristics of different sheep categories. R. S. B. Pinheiro, A. G. Silva Sobrinho, R. M. S. Emediato^{*}, and S. M. Yamamoto, São Paulo State University, Botucatu, São Paulo, Brazil.

Thirty-six 1/2 Ile de France, 1/2 Polwarth sheep (12 ram lambs, 12 culled ewes and 12 culled wethers) were used to evaluate carcass quantitative characteristics of different sheep categories. Animals were grazed on Tifton-85 pasture and supplemented with concentrate. Lambs were weaned at 17 kg and slaughtered at 32 kg of live weight, at around 5 mo of age. Ewes and wethers were slaughtered at 55 kg and 60 mo of age. Sheep categories did not affect dressing percentages of hot or cold carcass, but chilling losses were higher in carcasses from young (3.67%) than adult animals (2.35%). The percentages of leg, rib and shoulder cuts did not differ among animal categories, but neck percentages were higher in wethers (9.29%) and loin percentages were higher in lambs (14.56%). In conclusion, sheep categories influenced carcass chilling losses, without alterations on carcass yield.

Key Words: Carcass Yield, Dressing Percentage, Sexual Condition

W345 Measurements of *Longissimus dorsi* muscle cross-section and leg muscularity index of sheep from different categories. R. S. B. Pinheiro, A. G. Silva Sobrinho, A. M. Jorge, R. M. S. Emediato^{*}, and S. M. Yamamoto, São Paulo State University, Botucatu, São Paulo, Brazil.

The objective of this experiment was to compare measurements of *Longissimus dorsi* muscle cross section at the 13th rib, fat depth, and leg muscularity index of different categories of sheep. Thirty-six 1/2 Ile de France 1/2 Polwarth animals (12 ram lambs, 12 culled ewes and 12 culled wethers) were used. Animals were raised on Tifton-85 pasture and were supplemented with concentrates. Lambs were weaned at 17 kg and slaughtered at 32 kg live weight, at about 5 mo old. Ewes and wethers were slaughtered at 55 kg and about 60 mo of age. Measurements of *Longissimus dorsi* muscle cross section were different among all animal categories, except for the maximum linear dimension of the muscle cross section, with an average value of 5.4 cm. Maximum depth of muscle was higher for adult animals (3.4 cm) than lambs (3.0 cm); consequently, the loin eye area of lambs was also smaller than for adult ewes and wethers. Maximum fat thickness of wethers was 2.6 cm. This was higher than for ewes (1.9 cm) and lambs (0.8 cm). Leg muscularity index was different among animal categories, with higher values (0.46) for adults (ewes and wethers) and lower values (0.40) for lambs. In conclusion, sheep categories affected measurements of *Longissimus dorsi* muscle cross-section and leg muscularity index.

Key Words: Carcass, Sheep, Muscle

W346 Yield of wholesale cuts and non-carcass components of Morada Nova and Somális Brasileira × Morada Nova ram lambs. R. S. B. Pinheiro¹, A. G. Silva Sobrinho¹, A. M. Jorge¹, R. M. S. Emediato*¹, S. Gonzaga Neto², and S. M. Yamamoto¹, ¹São Paulo State University, Botucatu, São Paulo, Brazil, ²Paraíba Federal University, Areia, Paraíba, Brazil.

The objective of this experiment was to evaluate carcass cut percentages and non-carcass component yields of Morada Nova and Somális Brasileira × Morada Nova lambs grown in a feedlot. Lambs were fed a diet containing 40:60 forage:concentrate ratio. Sixteen ram lambs averaging 15 kg initial BW were included in each genetic group. Morada Nova lambs had higher percentages of neck (9.7%) and loin (13.3%) cuts than crossbred lambs (8.0 and 10.4%, respectively). Leg and rib cut yields were higher for crossbred lambs (35.1 and 27.0%, respectively) than Morada Nova lambs (32.7 and 25.0%, respectively). There was no breed effect for shoulder blade percentage, which averaged 19.4%. Except for the liver and tongue, with no breed effect and average values of 2.29% and 0.35%, respectively, non-carcass component percentages were influenced by breed. Crossbred lambs had higher percentages of skin (8.96), head plus foot (10.68), heart (0.88), and kidney (0.93) than purebred lambs (7.15, 9.69, 0.56 and 0.35, respectively). In conclusion, Somális Brasileira × Morada Nova lambs had different percentages of carcass cuts as well as non-carcass components compared with Morada Nova lambs.

Key Words: Commercial Cuts, Crossbreeding, Sheep

W347 Effect of rumen-protected fat in diets of Bergamasca ewes on lamb growth, ewe weight gain, and milk production. M. M. Stradiotto, E. R. Siqueira, R. M. S. Emediato*, S. A. Maestá, and A. Piccinin, São Paulo State University, Botucatu, São Paulo, Brazil.

The amount and quality of milk may be reduced if the ewe diet is improperly balanced. At the beginning of their development, lambs rely almost uniquely on ewe milk. If the ewe diet limits milk production, lamb development is limited, with low weight at weaning. The objective of this project was to determine the effect of rumen-protected fat on milk production and weight gain of Bergamasca milk ewes and their lambs. The experiment was carried out at the Ewe Milk Production Research Unit of the School of Veterinary Medicine and Animal Science of the São Paulo State University (UNESP), with 80 Bergamasca ewes allocated at random to one of two diets: 1) a concentrate and corn silage diet; and 2) diet 1 with rumen-protected fat added to the concentrate at 35 g/ewe per d starting 20 d prior to lambing. In both groups, lambs were kept with their dams on pasture during the day and separated at night. After the morning milking, lambs were returned to their mothers. Lambs were weaned at 45 d of age. Ewes were mechanically milked for 60 d. Ewe and lamb ADG, milk protein, milk fat, milk lactose, and total milk solids were analyzed by t-tests. Added fat did not influence ($P > 0.05$) lamb birth weight, weight weaning, or ewe or lamb ADG. Adding protected dietary fat to the diet of lactating ewes did not affect lamb growth or ewe milk production or weight gain.

Key Words: Energy, Weight Gain, Sheep Milk

W348 Effect of weaning system on composition and yield of milk of Bergamasca ewes. L. S. Serrão, E. R. Siqueira, R. M. S. Emediato*, E. O. Queiroz, C. C. Boucinhas, M. M. Stradiotto, and S. A. Maestá, São Paulo State University, Botucatu, São Paulo, Brazil.

The objective of this experiment was to study the effects of three weaning systems on milk production and composition and somatic cell count (SCC) of Bergamasca ewes. Prior to parturition ewes were allocated to one of the following three treatments: 1) ewes weaned from their lambs at 48 h postpartum, and their lambs raised artificially (D1); or 2) beginning 48 h postpartum, ewes separated from their lambs for 17 h during the evening, ewes machine milked once daily in the morning, lambs allowed to suckle for 7 h during the day; lambs weaned at 45 d of age (MIX); or 3) ewes not machine milked and exclusively suckled by their lambs during first 30 d and then lambs were weaned (DY30). During the 90 d of the trial, ewes in all treatments were milked once a day after weaning of their lambs. Milk yield was recorded daily and samples of milk were collected weekly for milk composition analysis. Differences among weaning systems for milk yield and milk fat percentage were significant while ewes were nursing their lambs, and final average milk production was higher for D1 followed by MIX and D30, with 0.400, 0.351 and 0.293 kg/ewe per day, respectively. Although the experimental period was 90 d, D1 had a longer lactation (84 d) than D30 and MIX (71 and 70 d, respectively). No difference ($P > 0.05$) was observed for SCC (249, 164 and 188 × 10³ cells/mL for D1, MIX and D30, respectively) or milk protein percentage, but higher milk fat percentage was observed for D1 (5.24%) and D30 (5.00%) than MIX (3.55%). The weaning system can be an important variable when the objective of the herd is intensive milk production. The D1 system will result in higher milk yield while the MIX system will result in a lower milk fat percentage as long as the lambs are nursing. This lower fat percentage could have a detrimental effect for cheese manufacturing.

Key Words: Dairy Ewe, Milk Constituents, Sheep Milk

W349 Effect of use of bypass fat in the feeding of Bergamasca milk ewes on gastrointestinal nematode infections. M. M. Stradiotto, E. R. Siqueira, R. M. S. Emediato*, A. F. T. Amarante, S. A. Maestá, and A. Piccinin, São Paulo State University, Botucatu, São Paulo, Brazil.

The goal of this trial was to evaluate the effect of bypass fat added to ewe diets on gastrointestinal nematode infections. The experiment was carried out at the Ewe Milk Production Research Unit of the School of Veterinary Medicine and Animal Science of the São Paulo State University (UNESP). Eighty Bergamasca ewes were submitted to two feeding systems. The randomized block experimental included two treatments: 1 – balanced diet (concentrate + corn silage) and 2 – same diet as 1 however with bypass fat (35 g/ewe per d) added to the concentrate. In both groups, lambs were kept with their mothers on pasture during the day, being separated at night. After morning milking, lambs were returned to their mothers, being weaned at 45 days of age. Ewes from both groups were mechanically milked for 60 days. Every fourteen days, blood samples and feces were collected to determine packed cell volume (PCV), total plasma protein levels (TPP), peripheral eosinophil counts, fecal nematode egg counts (FEC) and worm cultures. Data were analyzed by one-way analysis of variance,

with statistical significance between treatment means determined at $P < 0.05$. There was no effect of diet on any variable studied. *Haemonchus* spp, followed by *Trichostrongylus* spp were the predominant nematodes in the worm cultures. Protected fat added to diets of dairy ewes did not affect gastrointestinal nematode infections.

Key Words: Energy, Gastrointestinal Nematodes, Lactation

W350 Sheep mastitis: Pathogens and susceptibility to antimicrobial agents. L. S. Serrão, E. R. Siqueira, R. M. S. Emediato*, P. F. Domingues, E. O. Queiroz, C. C. Boucinhas, M. M. Stradiotto, and S. A. Maestá, *São Paulo State University, Botucatu, São Paulo, Brazil.*

A total of 655 samples of Bergamasca ewe milk were examined for subclinical mastitis by the California Mastitis Test and assigned scores of 1+, 2+ and 3+. The same samples were examined by bacteriological culture on blood agar and MacConkey agar. The isolated microorganisms were identified by Gram stain and taxonomy tests. Soon afterward, each microorganism was tested for in vitro antibacterial susceptibility. In total 49 microorganisms were isolated in pure culture distributed as follows: *Staphylococcus* sp (n=39; 79.6%), *Streptococcus* sp (n=4; 8.16%), *Mannheimia haemolytica* (n=2; 4.1%), *Bacillus* sp (n=2; 4.1%), *Corynebacterium* sp (n=1; 2.05%), and *Escherichia coli* (n=1; 2.05%). In antibiotic susceptibility tests for *Staphylococcus* sp and *Streptococcus* sp, the agents isolated with highest frequency, florfenicol, gentamicin and cefalexin were the drugs of best efficacy.

Key Words: Mastitis, Microorganism, Antibiotics

W351 Postpartum ovarian activity of Santa Ines lactating ewes fed soybean hulls replacing coastcross hay. R. C. Araujo¹, A. V. Pires¹, I. Susin¹, C. Q. Mendes¹, G. H. Rodrigues¹, F. S. Urano¹, C. A. Oliveira², and P. Viau², ¹ESALQ/University of São Paulo, Piracicaba, SP, Brazil, ²FMVZ/University of São Paulo, São Paulo, SP, Brazil.

Available data about the duration of anestrus postpartum of Santa Ines ewes are scarce. The objective of this experiment was to evaluate the effects of replacing coastcross hay NDF with soybean hull (SH) NDF on postpartum ovarian activity measured by progesterone (P_4) profiles. Fifty-six lactating ewes (initial BW 56.1 ± 6.8 kg) were penned individually and used in a complete randomized block design according to parity, type of rearing, offspring gender and lambing date. Hay NDF from a 70% roughage-based diet was replaced with SH NDF by 0 (SH0), 33 (SH33), 67 (SH67), and 100% (SH100), resulting in 0, 25, 54 and 85% of SH in the diet DM, respectively. Diets provided a similar NDF (56%) and CP (16%) content. BCS (1 to 5 scale) was assessed at the second and eighth week (weaning date) after lambing. Blood samples were collected by venipuncture twice a week, from the first to the twelfth week after lambing. Serum P_4 concentration was determined by RIA. Intra-assay and inter-assay coefficients of variation were 9.6% and 3.8%, respectively. The assay sensitivity was 96.1% for a minimal concentration of 0.01 ng/mL. Ovarian activity resumption was defined as six days prior to the date when P_4

concentration was ≥ 1 ng/mL. A linear increase ($P < 0.01$) for final BCS was observed with SH addition (3.09, 3.24, 3.34, and 3.36). Determined P_4 concentration ≥ 1 ng/mL and estimated mean ovarian activity resumption were 40.5 ± 15.6 and 34.5 ± 15.6 days after lambing, respectively, showing no difference ($P > 0.10$) among treatments. A quadratic effect ($P < 0.05$) was observed for NEFA concentration with values of 0.323, 0.244, 0.204, and 0.216 mEq/L for SH0, SH33, SH67, and SH100, respectively. Average ovarian activity resumption in Santa Ines ewes is attained earlier than two months postpartum.

Key Words: Hair sheep, Postpartum, Progesterone

W352 Multivariate analysis of within-litter birth weight variation, litter weight and litter size in the Ripollesa ewe. J. Casellas*, G. Caja, and J. Piedrafito, *Grup de Recerca en Remugants, Universitat Autònoma de Barcelona, Bellaterra, Spain.*

Birth weight plays a central role in lamb survival and growth, and the knowledge of its genetic determinism has become essential in worldwide selection programs. Within this context, within-litter birth weight variation (BWV) has been suggested as an attractive trait to homogenize litters in prolific species, although it has not been analyzed in sheep. The objective of this study was to ascertain whether maternal additive genetic variance exists for BWV in Ripollesa ewes, and to study its genetic, permanent and residual relationships with litter weight (LW) and litter size (LS) at birth. Data were recorded in the Ripollesa experimental flock of the Universitat Autònoma de Barcelona (Spain), between 1986 and 2005, and included 1,662 litters from 380 ewes, with 712 records of BWV and 1,530 records of LW. Traits were analyzed with a multivariate animal model solved through Bayesian methodologies, and with a threshold characterization of LS. Additive genetic variance was observed for BWV ($h^2 = 0.061$), as well as for LW ($h^2 = 0.200$) and LS ($h^2 = 0.141$). Nevertheless, genetic correlations among those traits were not substantial and suffered from a high degree of uncertainty, with the null correlation included within the highest posterior interval at 95%. Within-litter birth weight variation and LS showed a negative and large permanent environmental correlation (-0.872), and LW and LS were negatively correlated due to residual (-0.762) and permanent environmental (-0.449) random sources of variation. The low heritability found indicates that slow genetic progress may be expected from selecting for BWV. Close to zero genetic correlations suggest that this selection will probably not affect LS and LW, although some significant permanent and residual correlations must be taken into account. Further studies are needed to better understand the genetic architecture among these three reproductive traits.

Key Words: Birth Weight, Litter Size, Ripollesa Breed

W353 The influence of maternal and fetal breed on vascularity of the placenta in sheep. P. P. Borowicz*, A. T. Grazul-Bilska, D. A. Redmer, K. A. Vonnahme, J. S. Caton, and L. P. Reynolds, *Center for Nutrition and Pregnancy, and Department of Animal and Range Sciences, North Dakota State University, Fargo.*

The aim of the experiment was to determine the influence of fetal and maternal breeds on fetal placental (cotyledonary, COT), and maternal

placental (caruncular, **CAR**) vascularity in sheep. Previously we have reported the profound effect of maternal and fetal breed on placental and fetal weights (Borowicz et al., 2006). We hypothesized that the vascularity of placentas of highly prolific Romanov (**R**) sheep (litter-bearing, small birthweight) differs from that of Columbia (**C**) sheep (traditional, large birthweight). We also hypothesized that not only the maternal but also the fetal genome determines the size and vascularity of the placenta. Straight-bred (controls) and reciprocal pregnancies were established by transferring embryos from R or C ewes to R or C recipients (n = 1 embryo per dam; n = 4 to 11 total dams per group; groups: R×R, R×C, C×C, and C×R, where the first letter is the embryo breed and the second is the ewe breed). Gravid uteri were collected on d 130 of gestation and separate placentomes were fixed with Carnoy's solution by perfusion of the main arterial vessels supplying the CAR or COT, embedded in paraffin, sectioned, and stained, and vascularity was determined by image analysis (Image-Pro Plus) using 15 micrographs/placentome. For each CAR and COT, we determined: the capillary area density (**CAD**, total capillary area as a proportion of tissue area), capillary number density (**CND**, total number of capillaries per unit of tissue area), and capillary surface density (**CSD**, total capillary circumference per unit of tissue area). For CAR, CND and CSD were not different between fetal or maternal breeds. CAD was greater in the R dams regardless of the embryo breed ($P < 0.05$). For COT, CND and CSD were greater in C×C and R×R vs. R×C ($P < 0.06$). These data suggest minimal effects of fetal and maternal breed on placental vascularity in sheep with different prolificacies. Supported by *NIH grant HL64141 to LPR and DAR; and NIH grant P20 RR016741 from INBRE*.

Key Words: Placenta, Vascularity, Sheep

W354 Genetic resistance to nematode parasites in sheep: Use of Box-Cox transformation in QTL mapping. M. V. B. Silva*¹, C. P. Van Tassel¹, T. S. Sonstegard¹, J. Mugambi², S. Nagda², S. McClintock², M. Malek³, P. Boettcher³, S. Kemp², J. F. Garcia³, F. Iraq², and O. Hanotte², ¹*United States Department of Agriculture, Agricultural Research Service, Beltsville, MD*, ²*International Livestock Research Institute, Nairobi, Kenya*, ³*Atomic Energy Agency, Vienna, Austria*.

Fecal egg count (FEC) is used to quantify gastrointestinal parasite infestations. However, FEC values are not distributed normally, and a small percentage of the herd is often responsible for a majority of parasite transmission. Non-normality is a possible source of error when (co)variance components and genetic parameters are estimated, as well as decreasing likelihood of quantitative trait loci (QTL) detection. Typically, the distribution of FEC is right-skewed with a long tail and a high frequency of zero values (zero-inflated distribution). Nearly all QTL studies to date have used logarithmic transformations of FEC data before QTL analysis. In our study, six first cross (F1) Red Maasai x Dorper rams were mated to both Red Maasai (R) and Dorper (D) ewes to produce 1342 reciprocal backcross progeny. These six

resource families were used to identify QTL controlling resistance to gastro-intestinal (GI) nematode parasites (particularly *Haemonchus contortus*). FEC measures were determined for 361 animals from 1 to 6 months old. In this study, original data were transformed using an extension of the Box-Cox transformation to approach normality and to estimate the position and variance components of the QTL in 19 of the 26 ovine autosomes. QTL detection was done using QxPak. Transformation of ovine FEC data utilizing the Box-Cox were effective in reducing the coefficients of asymmetry and kurtosis for the variable studied, which improved estimates of variance components of the QTL. Significant QTL for FEC were detected in chromosomes 7, 8, 9, 13, 14, 15, 16, 22, and 23. These results indicate that after transforming data by the Box-Cox procedure the genetic parameters in relation to QTL were more exact.

Key Words: QTL, Parasites, Sheep

W355 Effect of HCl-Zilpaterol and HCl-ractopamine on non-carcass components of hair sheep grown in the feedlot. F. G. Rios*, J. C. Robles, A. Estrada-Angulo, J. F. Obregon, G. Contreras, and A. B. Perez, *FMVZ - UAS, Culiacan, Sinaloa, Mexico*.

To determine the effects of beta-agonists clorhidrate of zilpaterol (HCL-Z) and clorhidrate of ractopamine (HCL-R) on non-carcass components of hair sheep grown in the feedlot, 60 ram lambs (35.81 ± 3.05 kg initial weight) were used in a randomized complete block experiment where block was initial weight. The lambs were assigned to one of three diets fed ad libitum: 1) control diet with 17% CP and 3.62 Mcal of DE/kg consisting of 11.9% Sudan grass hay, 62% whole corn grain, 14% soybean meal, 2.0% meat meal, 5.0% cane molasses, 2.0% animal fat, 2.5% mineral premix and 0.6% sodium bicarbonate; 2) diet similar to control but with the addition of 15.5 ppm of HCL-R; and 3) diet similar to control but with addition of 3.75 ppm of HCL-R. Hot carcass (HCW), full gut (FGW), empty gut (EGW), and mesenteric fat weights (MFW) were recorded. The data were analyzed by one-way ANOVA with the 2 df for diet fitted as orthogonal contrasts comparing: 1) control with the average of HCL-Z and HCL-R; and 2) HCL-Z with HCL-R. The hot carcass weight was increased 5.54% ($P < 0.05$) for lambs fed diets with beta agonists, but the dressing percentage was improved 1.31% only for lambs fed the diet with HCL-Z compared with lambs fed the diet with HCL-R. Diets with beta agonists increased ($P < 0.05$) empty body weight (38.98 vs. 37.71 kg; 0.78 SEM) and EGW (3.16 vs. 2.82 kg; 0.076 SEM). A similar effect ($P < 0.05$) was observed for the percentage of empty gut weight (7.45 vs. 6.89% of HCW; 0.10 SEM), but there was no effect for FGW, which averaged 6.77 kg and 16.04% of HCW. MFW averaged 819 g and was not affected by diets. These data show that addition of HCL-Z and HCL-R to diets of hair sheep increased hot carcass, empty body, and empty gut weights.

Financial support by PROFAPI-UAS 2006

Key Words: B-agonist, Empty Body Weight, Hair Sheep