1846 Maternal performance of four biological types of Red Poll cows. B.A. Sandelin*[1], A.H. Brown, Jr.[1], Z.B. Johnson[1], A.M. Stelzleni[1], and C.F. Rosenkrans, Jr.[1], [1]*University of Arkansas*.

Maternal performance of four biological types of Red Poll cows born, reared and managed on Ozark Mountain range were evaluated. Growth curve parameters of mature weight (A) and maturing rate (k) were estimated for 59 Red Poll cows using the Brody Model. Cows were assigned to one of four biological types: large late maturing (LL, A > 455 kg, k < 0.0500%), large early maturing (LE, A > 455 kg, k > 0.0500%), small late maturing (SL, A < 455 kg, k < 0.0500%), and small early maturing (SE, A < 455 kg, k > 0.0500%). Weights for calves were recorded at birth, 120, 240, and 360 d. Distribution of calf weights by biological cow type included: LL (n = 99), LE (n = 37), SL (n = 24), and SE (n = 85). Age and age of dam adjusted calf weights were analyzed using a model that included terms for an overall mean, year, type, sire, sex, interactions of type x year and type x sex, and residual error. Year, type, and sex were considered fixed effects and sire was considered a random effect. Year x type interactions were significant for weight at all ages, but sex x type interactions for weight were not significant at any age. Calves born to the four biological cow types had similar (P > 0.05) mean birth and 360 d weights. Small, early maturing cows had calves with smaller (P < 0.05) mean 120 d weights than calves of other biological types (135 5 vs 145 4, 147 5, 148 6 kg). Large and small, late maturing cows and LE cows produced calves with similar (P > 0.05) mean 240 d weights (217 4, 215 6, and 211 6 kg) and their calves were heavier (P < 0.05) than those of SE cows (197 4 kg). However, there was no difference (P > 0.05) in the 240 d weights between the LE and SE cow types. Mean weaning rates for LL, LE, SL, and SE cows were 85 5, 82 7, 76 8, and 83 4 %, respectively. These data suggest that size and maturing rate of Red Poll cows managed with limited resources, influences preweaning calf performance, but may not affect weaning rate.

Key Words: Mature weight, Maturing rate, maternal performance

ASAS Goat Species and ASAS Companion Animal Species

1847 Evaluation of Corn Gluten Meal as a Protein Source in Canine Diets. R.M. Yamka*[1], S.E. Kitts[1], A.D. True[1], D.L. Harmon[1], and W.D. Schoenherr[2], [1]*Dept. of Animal Sciences, University of Kentucky, Lexington, 40546,* [2]*Hill's Pet Nutrition, Topeka, KS 66617*.

Ten mature dogs (19.0 kg + 0.4 kg) surgically fitted with ileal T-cannula were used in an experiment to determine the feeding value of corn gluten meal (CGM) in a complete diet fed to dogs. All diets contained 10% poultry meal and graded levels of CGM (0 to 32% DM) resulting in diets that were 10, 15, 20, 25 and 30% crude protein. Daily dry matter (DM) intake averaged 307 + 7 g/d. An increase in CGM resulted in an increase in fecal moisture from 51.6 to 57.5% (linear; P < 0.0001) and fecal DM output increased from 24.2 to 32.9 g/d (linear; P < 0.0001). Ileal DM flow increased from 34.8 to 51.3 g/d (linear; P< 0.0004). Small intestinal DM digestibility decreased from 88.9 to 83.4% (linear; P < 0.0002) and total tract DM digestibility decreased from 92.3 to 89.4% (linear; P < 0.0001) as CGM increased. Large intestinal digestibility (29.4% DM) was not affected by treatment. Crude protein (CP) fecal excretion increased from 5.6 to 8.1 g/d (linear; P < 0.0004) and ileal flow of CP increased from 9.4 to 16.9 g/d (linear; P < 0.002) as CGM increased. Small intestinal CP digestibility increased from 73.4 to 82.5% (linear; P < 0.002) with increasing CGM. Large intestinal CP digestibility was not affected by treatment (40.4% DM). Total tract CP digestibility increased from 84.5 to 91.1% (linear; P < 0.0001) as CGM increased. Disappearance of all amino acids (g/d) increased (linear; P < 0.0001) with increasing CGM. Glutamate had the highest disappearance ranging from 3.83 to 16.16 g/d. Histidine had the lowest disappearance ranging from 0.49 to 1.41 g/d. Arginine had the highest overall digestibility ranging from 86.2 to 87.6% whereas, threonine had the lowest digestibility ranging from 64.7 to 75.1%. These data indicate that CGM is a highly digestible protein source for canine diets with dietary inclusions of 8.4 to 32.2%.

Key Words: Corn Gluten Meal, Amino Acid, Canine

1848 The effects of an antioxidant system based on tocopherols and novel extracts from Rosemary on petfood shelf-life and acceptability by dogs and cats. C. G. Aldrich* and J. O. Mann, *Kemin Americas, Inc., Des Moines, IA*.

A study was conducted to determine the shelf life and palatability of extruded petfood stabilized with tocopherols and novel extracts from rosemary. The treatments included a negative control in which fat was not treated with an antioxidant, a positive control in which fat was treated with Naturox^{TM} at 3000ppm, and fat treated with an experimental formula, RX13, at 3000 ppm. Naturox^{TM} is a tocopherol-based antioxidant system, whereas RX13 is a blend of tocopherols and the novel extract of purpose-bred rosemary. Equal portions of fat were applied internally and externally during processing in an Extru-Tech E525 extruder run at a rate of 800 lb/hr. Diets consisted of corn (49.5%), chicken by-product meal (30%), chicken fat (10%), beet pulp (4%), egg (3%) and yeast (3%), as well as, minerals and vitamins to 100%. Processing conditions remained constant for the test runs. In the oxygen bomb analysis, an accelerated shelf-life method, an induction time of 3.85 h was recorded for the negative control. This compared to 6.75 h for the positive control; petfood that contained tocopherol-based Naturox^{TM}. The experimental formula, RX13, had an 11.2% longer predicted shelf-life than the positive control with an induction time of 7.60 h. Crude extracts of rosemary contain compounds that impart a distinctive aroma to which dogs and cats have an aversion. It is necessary to remove these volatile compounds through the use of rolled-film evaporation. To verify that the negative aromas were removed, the Naturox^{TM} and RX13 diets were fed to 20 Beagle dogs and 20 American Shorthair cats in a 4 day split-plate palatability test. In dogs, first bite, a reflection of aroma, was not affected by treatment (1.00:1.11). Likewise, total consumption, an indication of flavor, was not different (1.30:1.00). In cats, a similar result was observed in that first bite was similar between treatments (1.59:1.00), as was total consumption (1.34:1.00). It was concluded from this study that the novel extract of purpose-bred rosemary and its subsequent deodorization was an effective component of an antioxidant system for the stabilization of fat in extruded pet foods.

Key Words: Rosemary extract, Shelf-life, Palatability

1849 The effect of hay and /or concentrate on performance, organ mass, blood metabolites and hormones in weaned kids. B. Kouakou*, S. Gelaye, G. Kannan, T. H. Terrill, E. A. Amoah, and S. Miller, *Agricultural Research Station, Fort Valley State University*.

Weaned kids (BW = 12 .6 kg; n = 12) were used in an experiment to determine the effect of hay, concentrate, or concentrate following hay feeding on performance, organ mass, thyroid hormones and blood metabolites. Kids were stratified by BW and randomly assigned to dietary regimen. Chopped rhizoma peanut (*Arachis glabrata*) hay or an 18 % CP concentrate diet were fed during the two periods of 60 d each. During the first period, two groups of kids (n = 4; total = 8) were fed hay alone, and one group (n = 4), the concentrate diet. During the second period, one of the hay-fed groups (n = 4) was switched to the concentrate, while the other groups remained on the previous diets (hay, n = 4; concentrate, n = 4). Dietary treatments were identified as HH (Hay, Hay), HC (Hay, Concentrate) and CC (Concentrate, Concentrate) to indicate hay or concentrate for first and second period, respectively. Weights, feed and blood samples were taken every 20 d. At the end of the second period (120 d), all animals were slaughtered and digestive tract (reticulo-rumen and intestines including digesta), liver and hot carcass weight were recorded. Blood samples were analyzed for BUN, NEFA, glucose, T_4 and T_3. In period one, T_4 and T_3 were higher (P < .05 and P < .01, respectively), BUN and NEFA were lower (24.9 vs 33.4 mg/dL and 159.9 vs 271.8 mEq/L, respectively) in concentrate-fed than in those fed hay. Glucose levels were similar (57.8 mg/dL) for hay or concentrate-fed kids but BW gain was greater (P < .01) for concentrate-fed than for hay-fed animals . During period two, gain was similar (3.25 vs 4.25 kg for HC and CC animals, respectively) and T_3 was highest (P < .01) in HC followed by CC and HH animals. Both groups of animals fed concentrate in period two had lower (P < .05) levels of NEFA (483 and 415.6 vs 1264 mEq/L) and higher levels of glucose (69.9 and 53.6 vs 43.5 mg/dL) than those fed hay. Overall gain was highest (P < .01) for CC (11 kg)followed by HC (5.5 kg)and HH (1 kg) animals. Liver

weights were similar (424 and 388.5 g) for CC and HC but greater (P < .01) than in HH (247 g) animals. Digestive tract as a percent of BW was higher (P < .01) for HH than HC and CC animals. These results suggest that concentrate feeding increases liver weight, level of T_3 and decreases digestive tract mass as a percent of BW.

Key Words: Goat, Hormones Metabolites, Organ mass

1850 Weight Gain In Beetal Goats Under Two Different Rearing Systems. S. H. Raza*, A. Iqbal, and M. Abdullah, *University of Agriculture, Faisalabad, PAKISTAN.*

Amongst the goat breeds of Pakistan "Beetal" goat is important due to its better production performance. Goats are reared under extensive to semi extensive systems. Their production under "zero" grazing has not been explored. In this study production potentials of Beetal male animals under "zero" grazing and "total" grazing systems were tested. 24 Beetal male animals were randomly allotted to 2 treatments viz., "A" and "B", having 12 animals each. Animals under treatment "A" were allowed grazing along with a supplement of 200 g of concentrate/head. The animals in group "B" were kept indoors under "zero" grazing and fed green fodder *ad ibitum* along with concentrate as in case on "A". The animals were kept on treatments for 100 d including 7 d of adjustment period. The data on weekly weight gain were recorded to calculate daily weight gain. At the end of the experiment, 2 animals from each group were slaughtered and data on different carcass parameters were recorded. Data analysis revealed that weight gain in both the groups differed significantly. Animals in treatment "A" gained 0.0236g more weight/d than animals on "zero" grazing. The dressing (12.63±0.63, 11.25±0.52), head and trotters (3.05±0.35, 2.80±0.28) and pluck (1.45±0.07, 1.45±0.00) weights (Kg) were found to be non significant for "A" and "B". The dressing, head and trotters and pluck percentages were found to be 49.50 and 44.10; 11.43 and 10.95 and 5.70 and 5.75, respectively. The dressing % was almost 1.38 Kg more for group "A" with non-significant difference. The values for bone (33.00, 42.08) and fat (6.25, 6.65) percentage were also found to be, statistically, non significant for "A" and "B" but the lean meat weight (Kg) differed significantly (P<0.05)in group "A" (44.65±0.85) than animals on zero grazing 40.75±0.25. It can be concluded that under prevailing conditions, for the rearing of this free ranging animal, extensive system is most suitable unless a reasonably longer adjustment period from the time of birth is not provided.

Key Words: Goat, grazing, carcass

1851 Preslaughter stress effects on physiological responses and meat quality characteristics in goats. G. Kannan*, B. Kouakou, T. H. Terrill, S. Gelaye, and E. A. Amoah, *Agricultural Research Station, Fort Valley State University, Fort Valley, GA.*

This experiment was conducted to determine the effects of transportation stress on physiological responses and meat quality characteristics in dairy goats of different age groups. The goats (n = 28) were classified as young (Y, 6 to 12 mo of age) and old (O, 24 to 30 mo of age) groups (AGE), feed deprived overnight, and slaughtered in three replicates. On the day of each replicate trial, one group was subjected to a two-hour transportation (T) to impose stress and the other group was held (H) in holding pens (treatment, TRT) prior to slaughter. Blood samples were collected from both T and H goats at 0, 1, and 2 h after beginning of transportation (TIME). Meat quality was assessed on Longissimus dorsi muscles. The data were analyzed as Split-Unit designs using MIXED procedures in SAS. The T goats had higher plasma cortisol concentrations than H goats (P < 0.01), however, plasma leptin, T3, and T4 concentrations were not affected by TRT, TIME, or TRT x TIME. The initial (15 min postmortem) and ultimate (24 h postmortem) muscle pH were not influenced by TRT. Muscle glycogen concentrations were higher in H than in T animals (P < 0.05). Muscle glycogen was also higher in O compared to Y goats (P < 0.01), and the decline in glycogen over 24 h was not influenced by TRT or AGE. Water holding capacity and CIE L*a*b* color values, measured at 24 h postmortem, were not affected by TRT. The O group had lower L* values (P < 0.01) and greater a* (P < 0.01) and chroma (P < 0.01) values than the Y group. Cooking loss and Warner Bratzler shear (WBS) values of loin chops, vacuum packed and aged for different times (0, 6, and 12 d), were not influenced by TRT. Age of animal (P < 0.01) and meat aging time (P < 0.01) influenced WBS, as expected. The data indicate that short-term preslaughter transport can cause significant changes in stress response and muscle metabolism in goats, although the overall meat quality may not be affected.

Key Words: Goats, Preslaughter stress, Meat quality

1852 Live weight changes in grazing goats supplemented with protein during the dry season. A.S. Juarez-Reyes, M.A. Cerrillo*, and G. Nevarez-Carrasco, *Universidad Juarez del Estado de Durango, Durango,Dgo. Mexico.*

Sixty criollo goats were arranged into four groups, fifteen animals each, according to a randomized block design to determine the effect of protein supplementation on weight loss during the dry season (January-June) in a semi-arid region of northern, Mexico. The supplementation requirements were determined by two protein systems named: Digestible Intestinal Protein (PDI) (Verite *et al.*, 1987) and Metabolizable Protein (Burroughs *et al.*, 1975). The protein supplements (T1 = 10 g wheat hulls + 120 g cotton seed meal; T2 = 10 g wheat hulls + 120 g poultry litter; T3 = 10 g wheat hulls + 60 g cotton seed meal + 60 g poultry litter; T4 = control) were offered to the animals once a week. Statistical differences (P<.05) in weight loss were found between the animals fed the supplement and the control group 120 d from parturition. The effect was even more evident 150 d from parturition where the control group lost 13 kg (34% of the weight registered at parturition), whereas the supplemented animals lost from 7 to 8 kg (T1 = -7.9; T2 = -7.4; T3 = -8.1), which corresponds to 20-22% of the weight at parturition. The results obtained in this study indicate that the weight loss in the control group makes the animals extremely vulnerable to the rough climatic conditions at the begining of the rainy season, whereas the supplement guarantees the survival of the goats during the dry season.

Key Words: Goats, Grazing, Supplementation

1853 Determination of supplementation requirements of grazing goats utilizing two protein systems. A.S. Juarez-Reyes*, M.A. Cerrillo, and G. Nevarez-Carrasco, *Universidad Juarez del Estado de Durango. Durango, Dgo. Mexico* .

Three goats fitted with esophageal and ruminal cannulae (38±1.7 kg BW) from a flock of 250 grazing animals, were used to estimate the intake of metabolizable protein (IMP) and content of metabolizable protein in the diet (DMP) utilizing two protein systems. Values from crude protein, *in situ* degradability of crude protein (48 h incubation) and content of TDN were incorporated into the Burroughs' Metabolizable Protein System (USA). The values used for the French Intestinal Digestible Protein System (IDP) were crude protein, *in situ* degradability of crude protein and organic matter fermented in rumen were utilized. Extrusa samples were collected twice a day (12:00 and 16:00) for two consecutive days per month. Two periods of sampling were evaluated, the dry season from February to June and the rainy season, from July to November. Data were analyzed in a completely randomized block design. Means obtained from MP system were 11.7%, 85 g/kg DM and 127 g/d for the CP, DMP and IMP respectively; whereas for the IDP System the data obtained were 11.7%, 74 g/kg MS and 110 g/d for CP, DMP and IMP respectively. To determine the ruminal nitrogen-energy balance in the MP system, the urea fermentation potential (UFP) was used, whereas for the French system, the difference between the intestinal digestible protein originated from nitrogen (NIDP) and energy (EIDP) was utlilized. Data indicated that the UFP for the dry season was 5.2 g/kg DM suggesting the necessity to incorporate this amount of urea to the diet. The value of -14.4 g/kg DM for the rainy season indicates that no urea is required. The difference between NIDP and EIDP was 15 g/kg DM in favor of EIDP during the dry season; no difference was registered for the rainy season (P> .05). Results from both systems indicate that a source of degradable protein in the diet of grazing goats is required during the dry season to increase the amount of microbial metabolizable protein.

Key Words: Grazing goats, Metabolizable protein, Supplementation

1854 Effects of urea treatment of straw and dietary broiler litter on feed intake and digestion in Spanish wethers. G. Abebe[1], R. C. Merkel*[2], G. Animut[3], A. L. Goetsch[2], and T. Sahlu[2], [1]*Awassa College of Agriculture, Debub University, Awassa, Ethiopia,* [2]*E (Kika) de la Garza Institute for Goat Research, Langston University, Langston, OK ,* [3]*Alemaya University, Dire Dawa, Ethiopia.*

Eight Spanish wethers (29.3 ± 1.15 kg) were allocated to simultaneous 4 × 4 Latin squares to test effects on intake and digestion of urea treatment of wheat straw and supplementation with different levels of broiler litter (BL). Wheat straw, untreated (U, 0.41% N; DM basis) or treated with urea (T, 2.25% N), was consumed ad libitum; supplement treatments (ST) were C: corn-based (1.42% N, 0.64% BW); S: C + 0.25% BW soybean meal (3.10% N, 0.89% BW); L: C + 0.5% BW BL (2.97% N, 1.14% BW); and H: C + 1.0% BW BL (3.06% N, 1.64% BW). Chromic oxide was included in supplements to estimate apparent digestibilities. Straw type and ST did not interact in OM and N intakes and digestibilities. Straw OM intake was similar between U and T; total OM intake was greatest among ST ($P < 0.05$) for H and lowest ($P < 0.05$) for C (476, 566, 649, and 739 g/d for C, S, L, and H, respectively). Digestibility of OM was not influenced by straw type, but was lower ($P < 0.10$) for L and H than for C and S (67.9, 68.3, 61.9, and 60.7% for C, S, L and H, respectively; SE = 2.5). Digestible OM intake (DOMI) was greater ($P < 0.05$) for T than for U (436 vs 327 g/d); among ST DOMI was lowest ($P < 0.05$) for C and greater ($P < 0.05$) for H vs S (314, 377, 396, and 440 g/d for C, S, L, and H, respectively; SE = 19.6). Intake of straw N was greater ($P < 0.05$) in goats consuming T than U (9.7 vs 1.0 g/d) and greatest among ST for H (8.0, 13.6, 15.8, and 19.6 g/d for C, S, L, and H, respectively). Apparent N digestibility was not affected by straw type and was greatest among supplement treatments ($P < 0.05$) for S (51.5, 67.8, 51.4, and 46.4%, for C, S, L, and H, respectively). In conclusion, improvements in DOMI by supplementing a basal wheat straw diet with S or BL were not influenced by urea treatment. The increase in DOMI with a low level of BL (i.e., 0.5% BW) was comparable to that with S, and greater change occurred with 1.0% BW BL.

Key Words: goats, wheat straw, broiler litter

1855 Feed intake and growth by Spanish and Boer x Spanish doelings consuming diets with different levels of broiler litter. T. Negesse[1], R. C. Merkel[2], A. Tolera[1], A. L. Goetsch[2], T. Sahlu[2], R. Puchala[2], T. A. Gipson[2], and L. J. Dawson*[2], [1]*Awassa College of Agriculture, Debub University, Awassa, Ethiopia,* [2]*E (Kika) de la Garza Institute for Goat Research, Langston University, Langston, OK.*

Sixty Spanish (S) and 40 Boer × S (BS) doelings, 14.9 ± 3.8 and 21.9 ± 3.8 kg, respectively, were allocated to five treatments in an 84-d experiment (four 21-d periods) to test effects of dietary level of broiler litter (L) on feed intake and ADG. Six S and four BS doelings were assigned to two replicates per treatment. Treatments were OL: 20% chopped millet hay (H; 6.1% CP, DM basis) + 80% concentrate (11.9% CP); 20L: 20% H + 80% concentrate (12.9% CP) with 20% dietary L; 40L: 20% H + 80% concentrate (17.0% CP) with 40% dietary L; 60L: 20% H + 80% concentrate (21.0% CP) with 60% dietary L; and 80F: 80% H + 20% concentrate (24.4% CP). Diets were consumed ad libitum, group feed intake was determined daily, and BW was measured at 21-d intervals. DMI differed ($P < 0.05$) among all treatments in period 1 (772, 620, 683, 371, and 468 g/d; SE = 12.6) and 2 (816, 657, 748, 347, and 579 g/d; SE = 11.1) for 0L, 20L, 40L, 60L, and 80F, respectively. Goats consuming 0L had greatest and 60L lowest ($P < 0.05$) DMI in period 3 (938, 825, 859, 557, and 832 g/d; SE = 15.9) while in period 4, DMI was greatest for 0L and 40L and lowest ($P < 0.05$) for 60L (1,007, 933, 1,007, 682, and 905 g/d; SE = 19.9) for 0L, 20L, 40L, 60L, and 80F, respectively. ADG was similar between S and BS with 60L but greater ($P < 0.05$) for BS with other diets, and the difference between genotypes in ADG was greatest among treatments with 0L (interaction, $P < 0.05$). ADG of S was 108, 81, 71, 9, and 37 g/d (SE = 8.7), and that of BS was 177, 118, 105, 12, and 58 g/d (SE = 10.6) for 0L, 20L, 40L, 60L, and 80F, respectively. In conclusion, S and BS doelings can be fed diets with up to 40% L for growth comparable to or greater than that with a low quality forage-based diet, and diets with moderate to high levels of L or based on low quality forage may lessen differences in ADG between S and BS compared with concentrate-based diets.

Key Words: goats, broiler litter, growth rate

1856 Comparison of goats raised intensively versus pasture raised. N.C. Beckford*, J.M. Dzakuma, E. Risch, C.O. Smith, P.M. Johnson, and L.C. Nuti, *Prairie View A&M University, Prairie View, TX. USA.*

After weaning at 70±7 days of age 72 kids of Tennessee Stiff-legged (TS), Spanish (SP) and Boer (BR) breeds were individually fed an 18% CP and 65% TDN diet. These breeds represent goats with small, intermediate and large mature sizes (TS, SP, and BR). An equal number of offspring randomly selected from both sexes (36 Females and 36 Males) were used. They were divided into three groups of 8 per breed. The first group was fed *ad libitum*. The second and third groups were fed at 85% and 70% levels of the *ad libitum* diet. An equal number of kids born of the same breeds were maintained on pasture and run with their dams. One half the population of kids were creep fed and the oher half were not. After weaning, both creep and non-creep fed goats were randomly assigned to pasture only and pasture with supplementation (corn). Goats in stalls were weighed biweekly and those on pasture monthly. All kids were slaughtered at approximately 6 mo of age. Birth weights were similar for BR and SP breeds (3.47 and 3.30 kg) and differed significantly ($P<.05$) from TS breed (2.75 kg). On goats fed the formulated ration at weaning, however, the BR breed (23.5 kg) was significantly heavier ($P<.001$) than the TS breed (14.76 kg) which also differed from the SP breed (11.81 kg). On pasture, the BR weighed 21.8 kg and was significantly heavier ($P<.001$) than the TS and SP breeds which were similar and weighed 13.7 and 14.45 kg, respectively. Kids from all 3 breeds that were creep fed were only slightly heavier ($P<.17$) than those that were not (17.4 vs 16.0 kg). Prior to slaughter, goats that had been creep fed were significantly heavier ($P<.05$) than those that had not (25.1 vs 21.8 kg). Within each breed, goats that were supplemented on pasture showed increases in weight (P ranging from P=.08 to P=.11) compared to those not supplemented. On the average, goats that had been raised intensively (BR 32.7; SP 16.3 and TS 21.1 kg) were heavier than those raised on pasture (BR 26.4; SP 24.4 and TS 19.6 kg). The cost benefit of raising goats intensively versus pasture raised will be evaluated. The study suggests supplementing pasture raised goats.

Key Words: Tennessee Stiff-legged, Spanish, Boer, Goats, Pasture, Intensive

1857 Survey of goat meat sales in New Jersey. James Lechner*, James Wohlt, Ramu Govindasamy, and Patricia Schoknecht, *Rutgers, The State University of New Jersey, New Brunswick, NJ.*

Goat meat may be a potential specialty product for farmers in the Eastern U.S., due to the large ethnic populations within this region and their consumer preference for this product. To determine the potential market for goats, 368 butcher shops in the state of NJ (listed in the yellow pages) were surveyed. Surveys were initially conducted by phone establishing that shops sold goat meat. Then in-person surveys with the butchers were conducted, using a translator when necessary, to record data on both supply source and consumer preference for goat meat. A total of 65 shops (18%) sold goat meat year-round, with an additional 34 shops (9%) willing to order goat meat when requested. A majority of the butchers, 42% acquired goat meat from a distributor, with 28% of the meat obtained from a distributor being imported. Butcher shops in northern NJ sold most of their goat to either a European or Muslim consumer, while in southern NJ the consumers were primarily Caribbean. European and Muslims preferred carcasses or select cuts, while Caribbean's preferred cubed meat. All meat purchased by butchers averaged $3.72/kg, with an average sale price of $6.14/kg for carcasses, $6.16/kg for legs and $5.61/kg for cubed meat. Shops sold an average of 145 kg/wk. Findings indicate that the NJ goat market is very price sensitive. Over 55% of the shops indicated that the consumer would not pay more for a higher quality product and 75% indicated that the consumer base would not be broadened if a higher quality product were available. The major source of goat meat sold in NJ is either goat trucked in live from Texas and sold for $40/head or meat imported from Australia and New Zealand which sold for an average of $3.39/kg. Our data suggests that NJ butcher shops would not have a market for a higher quality, higher priced product, making it difficult for eastern goat producers to compete with the established supply channels.

Key Words: Goat meat, Butcher shops, Marketing

1858 Extension of the Cashmere Growth Period in Spanish Goats with Melatonin. T. Wuliji*[1], A. Litherland[2], A.L. Goetsch[1], T. Sahlu[1], R. Puchala[1], T.A. Gipson, and L.J. Dawson[1], [1]*E (Kika) de la Garza Institute for Goat Research, Langston University, Langston, OK,* [2]*AgResearch, Grasslands Research Centre, Palmerston, New Zealand.*

Melatonin suppresses blood prolactin levels, and the prolactin surge in fur animals is usually associated with fiber shedding. Therefore, use of melatonin to induce out-of-season breeding could affect the seasonal pattern of cashmere fiber growth in goats by extending the active, anagen phase. Eighty 80 female Spanish goats (15 2 yr of age and 65 doelings) were used to determine influences of spring melatonin treatment on cashmere fiber growth. Treatments were control (C); melatonin implant (18 mg; Regulin, Shering Pty. Ltd.) without (I) and with three bromocryptine mesylate (215 mg) implants (IB) (Innovative Research of American, Sarasota, FL); and oral administration of melatonin (3 mg/d for 5 wk) (Sigma Chemical Co., St. Louis, MO) without (O) or with bromocryptine mesylate (OB). Melatonin treatments started 5 wk before breeding. Cashmere growth was examined by clipping fiber regrowth in a 10 x 10 cm area on the mid-side each month. Mean daily clean fiber growth rate (mg/d) estimated by mid-side patch clipping was greater ($P < 0.05$) for melatonin-treated groups compared with C in April (44.7, 82.9, 77.5, 80.6 and 71.5 mg/d) and May (39.6, 69.8, 81.4, 63.9 and 63.5 mg/d); in the overall 12-mo period fiber growth was greatest ($P < 0.05$) among treatments for I and IB (12.5, 15.9, 15.3, 13.1, and 12.9 g for C, I, IB, O, and OB, respectively). Mean cashmere fiber diameter was greater ($P < 0.05$) for I, IB, O and OB compared with C (17.4, 18.7, 18.9, 18.4, and 18.1 microns) in a pooled sample for February, March, and April, while in May, June, and July diameter for C was lowest ($P < 0.05$) among treatments (16.8, 18.6, 18.7, 18.4, and 18.8 microns for C, I, IB, O, and OB, respectively). In conclusion, spring melatonin treatment for out-of-season breeding appeared to extend the period of cashmere fiber growth, and the lack of effect of bromocryptine mesylate suggests no additive effect to melatonin treatment. Oral administration of melatonin had effects on cashmere fiber growth measured by mid-side patch similar to those of an implant early in the experiment, but over the entire 12-mo period fiber growth was not influenced.

Key Words: Goats, Cashmere fiber, Melatonin

1859 Milk yield, body weight and some physiological traits of Baladi goats and their crosses with Damascus and Anglo-Nubian breeds in Egypt. A. Hassan, M. Samak, A. Elkomy*, and M. Anwar, *Fac. of Agric. Alex. ElShatby, Egypt.*

Thirty lactating goats (10Baladi, B, (10BaladixDamascus, BxD) and (10BaladixAnglo-Nubian, BxA-N), one week post partum were used in this study to evaluate lactation performance and some blood parameters. Milk and blood were sampled biweekly intervals. Results showed that milk yield,total solids and fat percentages were significantly ($P<0.01$) affected by breed. These values were 1.17kg,14.54 and 4.83%, respectively which were higher in (BxD) cross than (BxA-N) or (B) goats. Parity had significant effect on milk yield and protein % ($P<0.01$) and fat % and lactose % ($P<0.05$). In the second parity milk yield and fat % were higher, while lactose and protein percentages were higher in the first one. Throughout the duration of lactation, only milk yield, TS % and fat % were significantly affected ($P<0.01$). Counts of (RBC) and (WBC) and (PCV%), but not (HB%) were significantly affected ($P<0.01$) by breed. Parity had significant effect ($P<0.01$) on RBC counts and PCV% only. Regarding blood composition, breed had a significant effect on percentages of glucose, total lipids, albumin, A:G ratio, calcium(Ca), inorganic phosphorous(P), Ca:P ratio and Got and Gpt. Results indicated that parity affected, significantly, all the biochemical parameters studied, except albumin and (P). Kid's body weight was significantly affected by breed, sex and type of birth, but not parity.

Key Words: Milk, Blood, Goats

1860 Differences in growth and carcass characteristics in young goats of different genotypes. R. Kraig Peel*[1] and W. Shawn Ramsey[2], [1]*Sam Houston State University,* [2]*Texas A&M University.*

Boer-Spanish (BxS), Boer-Angora (BxA), Angora-Spanish (AxS), Spanish (S), Angora (A), and 12 Boer-Spanish intact males (BxSi) were used to compare (n=175) genotypic effects onperformance and carcass quality in pasture and feedlot. Feedlot goats were fed ad libitum diets containing 64 % TDN and 14% CP. Using 20 d adjustment, weights were taken at 14 d intervals for 154 d with refusals taken every 3 d. Pasture goats were grazed on native Texas range and weighed at 14 d intervals. BxS had the highest ($P<.05$) AGD followed by the BxA and S (143 g/d, 119 g/d and 116 g/d). Angora and SxA had the lowest ($P<05$) ADG (81g/d and 91 g/d). Feed efficiency and intake followed the same trend as ADG with BxS consuming the most feed (1.15 kg/hd/d) and A consuming the least (.89 kg/hd/d). BxS were the most efficient ($P<.05$), A were least efficient ($P<.05$) (7.55 kg/kg vs. 11.70 kg/kg). Generally, BxS had the heaviest carcasses, least fat at the 12th rib, largest loineye area, largest leg circumference, highest percent kidney and pelvic fat (KP), and produced the longest carcasses. Generally A observations were the lowest for all attributes considered. The BxA goats did deposit more ($P<.05$) body wall fat over the 12th rib (1.91 cm vs .16 cm- all breed avg.). No differences were observed due to breed type in pasture goats. Fed goats gained faster and produced fatter, heavier muscled carcasses than pasture goats. Castration increased feed efficiency, percent hindsaddle, body wall thickness and percent KP, ($P>.05$).

Key Words: Goat, Carcass

1861 Effects of insulin administered to a perfused area of skin in Angora goats. R. Puchala*[1], S.G. Pierzynowski[2], T. Wuliji[1], A.L. Goetsch[1], and T. Sahlu[1], [1]*E (Kika) de la Garza Institute for Goat Research, Langston University, Langston, OK 73050,* [2]*Department of Zoophysiology, Lund University, Lund, Sweden.*

The effect of insulin infusion on mohair growth of Angora goats was investigated using a skin perfusion technique. Six Angora wethers (average BW 32 4 kg) were implanted bilaterally with silicon catheters into the superficial branches of the deep circumflex iliac artery and vein. For the first 14 d of the experiment, 2.4 mL/h of saline solution was infused into the deep circumflex iliac arteries. The infusate for one side contained insulin, delivered at 48 mU/h and estimated to triple the blood insulin concentration in the perfused region. The area of skin supplied by the deep circumflex iliac artery was approximately 250 cm^2. An area of 100 cm^2 within the perfused region was used to determine mohair growth. Two weeks after cessation of infusions, perfused areas were shorn. Greasy and clean mohair production from the perfused region was not affected by insulin infusion compared with the side infused with saline (4.57 vs 4.69 and 3.67 vs 3.74 g/100 cm^2/28 d for greasy and clean mohair, respectively; $P > 0.10$). Similarly, insulin did not change mohair fiber diameter or length ($P > 0.10$). Plasma glucose concentration was lower ($P < 0.05$) in blood from the deep circumflex iliac vein on the side infused with insulin (57.2 vs 63.4 mg/dL). Blood flow and plasma concentrations of amino acids were not different between treatments ($P > 0.10$). The lack of an insulin effect on mohair fiber growth may be due to insufficient supply of amino acids or, similar to IGF-1, insulin may have limited effects on fiber-producing follicles.

Key Words: Skin Perfusion , Insulin, Mohair

1862 Effects of Preweaning Concentrate Supplementation on Performance of Meat Goats. A. L. Goetsch*, G. Detweiler, and T. Sahlu, *E (Kika) de la Garza Institute for Goat Research, Langston University, Langston, OK.*

Sixty-four Spanish does with 112 Boer x Spanish or Spanish kids (16 singles and 96 twins) were used to determine effects of preweaning feeding of a concentrate-based supplement on preweaning and early postweaning growth. In mid-April, from approximately 6 to 14 wk after birth, animals grazed wheat forage (Phase 1), followed by 5 wk on native grass pasture (Phase 2) and an 8-wk postweaning period with a moderate level of supplemental concentrate (Phase 3). Treatments were no supplementation in Phases 1 and 2 (C), *ad libitum* consumption of a concentrate-based supplement in Phases 1 and 2 (A), no supplementation in Phase 1 and *ad libitum* consumption of supplement in Phase 2 (A-2), and limit feeding of supplement (approximately 1% of live weight, DM) in Phases 1 and 2 (L). Supplement intake averaged 30, 74, 90, 157, and 158 g/d for L and 36, 87, 192, 240, and 229 g/d for A in wk 2-4, 5-6, and 7-8 of Phase 1 and wk 1-2 and 3-5 of Phase 2, respectively; supplement intake for A-2 averaged 171 and 249 g/d in wk 1-2 and 3-5 of Phase 2, respectively. Forage DM mass was 2,474, 2,062, 1,315, 1,434, 2,245, 1,405, and 1,161 kg/ha in wk 1, 3, 5, and 7 of Phase 1 and wk 1, 3, and 5 of Phase 2, respectively. Kid live weight gain was similar among treatments in Phase 1 (108, 131, 119, and 113 g/d), lower ($P <$

0.05) for A than for C and A-2 and lower for L than for C ($P < 0.05$) and A-2 ($P = 0.09$) in Phase 2 (73, 21, 15, and 60 g/d), and lower ($P < 0.05$) for C than for A and A-2 in Phase 3 (44, 67, 90, and 83 g/d for C, L, A, and A-2, respectively). In conclusion, under conditions of this experiment preweaning feeding of a concentrate-based supplement did not enhance kid growth preweaning but generally improved early postweaning growth.

Key Words: Goats, Growth, Supplement

1863 Optimum herd size of small goat holders in Qinba Mountain district in China. J. Luo[1], H. Yao*[1], X. F. Zhao[2], and H. Y. Yang[2], [1]*Northwest Agricultural University, Yangling, Shaanxi, China,* [2]*Animal husbandry bureau of Xixiang county, Xixiang, Shaanxi, China.*

Our objective was to optimize the production and herd size for goat holders in Qinba Mountain district of China using a linear programming technique. The capital input, goat herd structure, grassland condition and economic profit were surveyed on 15 typical small goat holders in 15 locations within Xixiang county of Qinba mountain area, China. Using these survey data from goat holders, resource allocation and management factors were analyzed to identify 12 variables which exhibited a close relationship with goat production at these locations, such as number of bucks, base breeding does, replacement doelings, fattening kids, shed space, grassland area, fertilizer costs, veterinary costs, amount of crop residues and silage, amount of concentrate supplement, labor cost and farm investment in goat production. Parameters of each variable was defined, thereafter, considering net profit as an objective function, applying a linear programming technique to simulate an optimum herd size of small goat holders under differing condition of investment, labor and grazing land. Results suggested that the amount of investment was a major determining factor of herd size under the specific circumstances of Qinba Mountain district, with an average investment, small goat holders possessed approximately 7 hectare pasture could attain the maximum profit if they keep a herd with 20 to 40 does and 1 to 2 bucks. The herd size under two other similar management regimens including bred by either artificial insemination or natural mating in goat herd were also analyzed, the mean profit of investment for three identified conditions were 73.9%, 72.9% and 139.8%, respectively.

Key Words: Optimum Herd Size, Goat Holder, Linear Programming

1864 Growth and survival of kids of three goat breeds during different seasons. S. Wildeus* and T. A. Gipson, *Virginia State University, Petersburg, VA.*

This experiment evaluated pre-weaning growth and survival in Myotonic, Nubian, and Spanish kids born either in May, December or August. Dams were managed either on a high forage base (HI: moderate stocking rate, rotational grazing), or restricted forage base (LO: high stocking rate, drylot hay feeding). Kids were born on pasture with limited assistance and weaned at 10 wk of age. Seasonal kiddings were replicated and a total of 875 records analyzed in a model that included kidding season, breed, forage base, birth type and sex as main effects. Kids born in August were lighter ($P<.001$) than in May and December (2.31, 2.56 and 2.59 kg, respectively), and Myotonic were lighter ($P<.001$) than Nubian and Spanish (2.31, 2.72 and 2.76 kg, respectively). Myotonic kid birth weights in LO were heavier than in HI, while the other breeds were not different (season x breed interaction: $P<.001$). Birth weights were heavier in HI than LO in May and December, but not August (season x forage base interaction: $P<.001$). Kid survival at birth was higher ($P<.05$) in August than May and December (98.5, 95.3, and 93.8%, respectively). Pre-weaning ADG was higher ($P<.001$) in December (119 g/d), than in May and August (107 g/d), as a result of higher ADG in Myotonic and Spanish, but not Nubian (season x breed interaction: $P<.001$). Pre-weaning ADG was not different between seasons in LO (103 g/d), but higher in December (133 g/d) than May and August (114 g/d) in HI (season x forage base interaction: $P<.05$). Adjusted weaning weights (60 d) reflected pre-weaning ADG and were heavier ($P<.001$) in December than May and August (9.85, 9.07 and 8.79 kg, respectively). Survival to weaning was lower ($P<.001$) in August than May and December (60.4, 76.6 and 70.5%, respectively), and lower ($P<.001$) in Nubian than Myotonic and Spanish (53.8, 73.4 and 79.9%). Data indicate that 'early season' kids born in December performed similar to spring-born (May) kids, whereas birth weights and survival to weaning was depressed in 'late season' (August) kids.

Key Words: meat goat, season, kid performance

1865 Differences in intake, growth rate and carcass characteristics in young males of three hair sheep and meat goat breeds. S. Wildeus*[1], M. B. Solomon[2], A. D. Mitchell[2], J. S. Eastridge[2], and J. R. Collins[1], [1]*Virginia State University, Petersburg, VA,* [2]*Beltsville Agricultural Research Center, USDA, Beltsville, MD.*

There is still limited information available on hair sheep (HS) and meat goat (MG) carcass traits. In this experiment 36 postweaning males, representing HS (Barbados Blackbelly: BB, Katahdin: KA, St. Croix: SX) and MG breeds (F_2 Boer Cross: BX, Myotonic: MY, Spanish: SP), were weaned at 9 wk of age, and either left intact or castrated. Animals were allocated to 6 pens by species, stratified by breed and sex class, at 4 mo of age, and fed a diet of moderate quality grass hay *ad libitum* and a corn/whole cottonseed-based concentrate (16% CP) at 2% of BW. Pen intake was measured on d 1-5, d 50-55, d 105-110, and d 148-153 of the trial. At 160 d animals were slaughtered, and carcass characteristics and body composition, using dual energy X-ray absorptiometry, recorded. Data were analyzed in a model with species, breed within species, and sex class as main effects. Forage intake was higher ($P<.001$) in HS than MG (20.8 vs. 16.5 g/kg BW/d). Average daily gain was higher ($P<.001$) in HS than MG (97 vs. 66 g/d), but was not affected by sex class. Within species, ADG was higher ($P<.001$) in KA than SX and BB (129, 85 and 76 g/d, respectively), but was not different in MG breeds. Dressing percent (DP; includes hide), REA and KPH was higher ($P<.05$) in HS than MG (55.9 vs.54.2%, 10.5 vs. 8.3 cm^2, and 0.98 vs. 0.66%, respectively), however, weight-adjusted REA and back fat thickness (BF) was not different between species. Within species, KA had higher ($P<.05$) BF and body fat content than BB and SX. In MG, MY had a higher ($P<.001$) DP than BX and SP (56.1, 53.3 and 53.2%, respectively), and a similar KPH in intact and castrate males, while sex classes were different in BX and SP (breed x sex class: $P<.05$). These results confirm differences in growth and carcass characteristics between HS and MG, and point to unique differences in KA and MY within their species.

Key Words: meat goats, hair sheep, carcass traits

1866 Modeling extended lactation curves in dairy goats using grafted polynomials. T.A. Gipson*[1] and G.R. Wiggans[2], [1]*E (Kika) de la Garza Institute for Goat Research, Langston University, Langston, OK ,* [2]*Agricultural Research Service, USDA, Beltsville, MD.*

Some dairy goat producers milk their does for an extended period before rebreeding and drying off, but little information is available about the shape of extended lactation curves for goats. To examine the effect of extending lactations upon the shape of the lactation curve, test-day records (n = 7425) of 469 does with extended lactations were obtained from USDA/AIPL. Range for days in milk was 419d to 696d with an average of 530d. Number of test days ranged from 12 to 20 with an average of 16 per lactation. Lactations from six breed types (Alpine, LaMancha, Nubian, Saanen, Toggenburg and Experimental) and four parities (first, second, third and fourth or greater) were included. Nonlinear regression analysis using several grafted polynomial models was conducted for each animal. The models used were quadratic-linear (**QL**), quadratic-quadratic (**QQ**), quadratic-quadratic-linear (**QQL**), quadratic-quadratic-quadratic (**QQQ**), quadratic-quadratic-quadratic-linear (**QQQL**), quadratic-linear-quadratic-quadratic (**QLQQ**), and quadratic-linear-quadratic-quadratic-linear (**QLQQL**). The most appropriate model was selected by testing for significant ($P<.05$) reduction in error sums of squares relative to the **QL** model for each individual animal. A significantly ($P<.01$) higher percentage of selected models were **QL** than were **QQQ**, (64% vs. 22%), respectively. The selection of other models was 6% for **QQQL**, and 3%, 3%, and 2% for, **QLQQ**, **QQ**, and **QQL**, respectively. The **QLQQL** model was not selected. There were no significant ($P>.10$) breed or parity effects on the distribution of selected models. The median join point was 300 for **QL**, and 348 for **QQ**. Points were 193 and 343 for **QQQ**; 87 and 147 for **QQL**; 445, 331, 131 for **QQQL**; and 287, 185, 57 for **QLQQ**. A **QL** grafted polynomial model appears sufficient to model the majority of extended lactation curves in dairy goats.