orchardgrass:timothy:tall fescue) were collected from farms in North Central WV (NCWV). Samples were analyzed by a commercial laboratory for crude protein (CP) and digestible dry matter (DDM). There were no significant differences (P>0.05) in CP or DDM (% DM, standard deviation) between samples from hay stored as DRB (CP = 10.8, 3.0; DDM = 57.5, 2.0) or WRB (CP = 12.7, 4.3; DDM = 58.7, 2.6). The general assumption that WRB are of higher nutritive value than hay stored as DRB is not supported by analysis of on-farm data adjusted for date-of-cut. Analysis by date-of-cut showed that producers tended to harvest first cut hay 7 days earlier when storing hay as WRB compared to DRB (P=0.15). Although producers used wrapping technology to harvest first cut hay earlier, the mean harvest date of June 30 is well beyond the date when nutrients in forage are high in NCWV. For aftermath cuttings, producers tended to harvest hay 15 days later when storing hay as WRB compared to DRB (P=0.08). Producers used wrapping technology to extend the harvest season for aftermath cuttings into periods of the year when it is particularly difficult to cure hay for dry storage. On-farm data shows that NCWV livestock producers use wrapping technology to extend harvest periods, thus increasing the quantity of hay harvested in the fall. This use of wrapping technology suggests that, because of the physiological needs of the livestock, NCWV livestock producers are not using wrapping technology optimally to improve hay quality adequately to pay for the use of this technology.

Key Words: Forage, Hay, Large Round Bales

T82   Factors affecting the quality of corn silage grown in hot, humid areas 3: Effect of maturity at harvest of corn hybrids differing in staygreen ranking. K. G. Arriola*, A. T. Adesogan, D. B. Dean, S. C. Kim, N. K. Krueger, S Chikagwa-Malunga, T Ososanya, and M Huisden, *University of Florida, Gainesville.*

To address producer concerns about when to harvest corn hybrids with high staygreen rankings, this study determined the effect of maturity at harvest on the nutritive value and aerobic stability of corn hybrids differing in stay-green ranking. One high stay-green corn hybrid and one average stay-green hybrid with similar relative maturity (118 d) were selected from each of two seed companies. The four hybrids were grown in 1 x 6 m plots at random locations within each of four blocks. The hybrids were harvested at 26 (C1), 34 (C2), and 39 (C3) % DM and ensiled (15 kg) in quadruplicate within plastic bags in 20 l mini-silos. After at least 107 d of ensiling, the silos were opened and the silages were chemically characterized and analyzed for aerobic stability and microbial counts. A Split plot design was used for the study. The staygreen ranking or source (seed company) of the hybrids did not affect their quality. However concentrations (g/kg DM) of CP, NDF, ADF, residual sugars, NH3N, lactate and acetate were greater (P<0.001) at C1, than at C2 or C3, and similar (P>0.05) at C2 and C3. In contrast, pH was greater (P<0.05) at C2 (3.77) and C3 (3.78) than at C1 (3.71). In vitro DM digestibility and aerobic stability were unaffected by maturity. Yeasts counts (log cfu/g) were lower (P<0.05) at C1 (5.93) and C2 (6.05) than at C3 (7.04), but mold counts (log cfu/g) were greater (P<0.05) at C1 (3.28) than at C2 (2.60) and C3 (2.44). In conclusion, harvesting the hybrids at 26% DM seems most appropriate.

Key Words: Corn, Maturity at Harvesting, Stay Green Ranking

T83   Effect of maturity at harvest on the nutritive value and biomass yield of Mucuna pruriens. S. Chikagwa-Malunga*, A. Adesogan, N. Krueger, D. Dean, and L. Sollenberger, *University of Florida, Gainesville.*

Four, 5 x 1 m plots of Mucuna pruriens, velvet bean, were randomly established within each of 6 blocks in order to determine the effect of maturity at harvest on DM yield and nutritive value. The Mucuna foliage within each of four quadrats (0.5 m2) that were randomly thrown on six of the plots was harvested at 77, 90, 110 and 123 days after planting (DAP). The total foliage harvested from all the quadrats on each of the six plots was weighed to determine biomass yield. Subsequently, the contents of one of the four quadrats from each plot were chemically analyzed. Mucuna yield increased (P<0.001) with maturity and the peak biomass yield was obtained at 110 DAP. Biomass yields (t/ha) at 110 (8.64) and 123 DAP (9.22) were similar (P>0.05) and higher (P<0.001) than those at 77 and 90 DAP. Concentrations of DM (18.0, 19.6, 26.0, 42.2 %)and NDF (31.0, 46.0, 44.6, 48.5 %) increased (P<0.001) with maturity, but concentrations of CP (13.1, 13.1, 15.8, 15.9 % DM) and EE (1.22, 0.97, 1.37, 1.29 % DM) were unaffected (P>0.05) by maturity. Total tannin concentration (% DM) was highest (P<0.001) at 110 DAP (5.6) followed by 123 DAP (4.4), and lowest at 90 DAP (3.0). Whole plant IVDMD was highest (P<0.001) at 110 DAP (54.9 % DM) when Mucuna had lower (P<0.001) lignin concentration (11.7% DM) than at 123 DAP (49.0 % DM IVDMD, 14.1% DM lignin). Concentrations (% DM) of P (0.29, 0.28, 0.24, 0.21; P<0.001), and Ca (1.21, 1.11, 0.88, 1.17; P=0.0694) also decreased with maturity. Lysine concentration (% CP) was unaffected (P>0.05) by maturity, but methionine concentration (% CP) decreased (P<0.05, 1.30, 1.12, 0.99, 1.06) with maturity. In conclusion, Mucuna should be harvested at approximately 110 DAP to optimize biomass yield and nutritive value.

Key Words: Mucuna pruriens, Nutritive Value, Yield and Maturity

Goat Species: Growth, Genetics, Physiology, Health, and Products

T84   Predictive models for goat cheese yield using milk composition. S. S. Zeng*[1], K. Soryal[2], B. Fekadu[3], and M. Villaquiran[1], [1]*School of Agric. & Applied Sciences, Langston University, Langston, OK*, [2]*Desert Research Center, Matareya, Cairo, Egypt*, [3]*Debub University, Awassa, Ethiopia.*

Prediction of yield and quality of different types of cheeses that could be produced from a given type and/or amount of goat milk is of great economic benefit to goat milk and cheese producers. Bulk tank goat milk was used for manufacturing hard, semi-hard and soft cheeses (N = 25, 25 and 24, respectively) during a whole lactation to develop predictive models of cheese yield based on milk composition. Percentages of fat, total solids, total protein and casein in milk and moisture-adjusted cheese yield were determined to establish relationships between milk composition and cheese yield. In soft cheese, individual components of goat milk or a combination of two or three components predicted cheese yield with a reasonably high correlation coefficient (r^2 = 0.73-0.81). However, correlation coefficients of predictions were lower for both semi-hard and hard cheeses. Overall, total solids of goat milk was the best indicator of yield in all three types of cheese, followed by fat, total protein and casein. When compared with moisture-adjusted cheese yield, the developed yield formulae in this study predicted yield of semi-hard and hard cheeses as well as the standard formula used for cow cheese (Van Slyke formula). In soft cheese, however, the Van Slyke formula under-estimated, while the newly derived formulae over-estimated yield. Further validation of the yield predictive models for hard and semi-hard cheeses of goat milk using larger data sets over several lactations might be needed, because of variations in relationships between milk components due to breed, stage of lactation, season and feeding regime.

Key Words: Goat Milk, Cheese Yield, Predictive Models

T85   Distribution of conjugated linoleic acids and *trans*-fatty acids in longissimus muscles of sheep and goats. J. H. Lee*, G. Kannan, K. R. Eega, B. Kouakou, W. R Getz, and Y. W Park, *Fort Valley State University, Fort Valley, GA.*

Meat from ruminants contains high proportions of saturated fatty acids and small amounts of *trans*-fatty acids, both of which are associated with high blood

cholesterol in humans. However, conjugated linoleic acids (CLA) are naturally present in ruminant fats, which have anti-atherogenic and anti-carcinogenic effects. Objective of this study was to determine variations in the distribution of conjugated linoleic acids (CLA) and *trans*-fatty acids in loin chops from sheep and goat carcasses. Sheep (n = 16) and goats (n =16) raised on pasture (mixture of rye grass and cover) with a concentrate supplement (1.0 kg/head/d, 16% CP for goats, 17% CP for sheep) were slaughtered. Intramuscular fat, sampled from the loin chops by removing external fat layers, was extracted by the chloroform (0.013% BHT)-methanol. Extracted lipids were prepared for the fatty acid methyl esters (FAME), and were analyzed by gas chromatography. Proximate analysis was done using the muscle tissue from loin chops. Analysis of data as a Completely Randomized Design showed no significant differences (P > 0.05) in moisture, protein, and fat percentages between *longissimus dorsi* (LD) muscles of sheep and goats. LD muscles from sheep and goats contained 69.0 and 68.3% moisture, 23.4 and 23.4% protein, 4.56 and 4.97% fat, and 1.17 and 1.73% ash, respectively. The ash content in goat LD muscles was higher (P < 0.05) than that in sheep LD muscles. Four major fatty acids, palmitic (16:0), stearic (18:0), oleic (18:1n9), and linoleic (18:2n6) acids, made up 91% of the total lipids in the loin chops of either species. Compared to sheep, goats had a higher level of 18:1n9 and lower levels of 16:0 and 18:0 in the loin chops. Loin chops from sheep and goats contained 4.6% and 5.5% polyunsaturated fatty acids (PUFA), respectively. Compared to sheep, goats had a higher (P < 0.05) level of *cis*-9, *trans*-11 CLA in the loin chops. No significant differences (P > 0.05) were found in the levels of other CLA isomers and *trans*-fatty acids (18:1t) in the loin chops. The results indicate that goat meat may have healthier fatty acid profiles compared with lamb.

Key Words: Sheep and Goat, Trans Fatty Acids, Conjugated Linoleic Acids

T86 Prediction of meat goat body weight from heart girth measurement, body condition score and sex. M. Villaquiran*, S. Hart, T.A. Gipson, G. Detweiler, R. M. Merkel, A. Patra, and T. Ngwa, *E (Kika) de la Garza American Institute for Goat Research, Langston University, Langston, OK.*

Body weights are needed for accurate dosing of medicine and for marketing and management decisions. However, producers do not always have access to scales. Therefore, other means of predicting body weights are needed. Prediction equations using heart girth exists for dairy goats, no such equations are available for meat goats. Breeds of meat goats differ greatly in conformation and may require different prediction equations. It is not known if body condition score or sex affects these equations. The objective of this study was to develop equations to predict body weight of meat goats from heart girth measurements. The meat goat herd at Langston University was weighed (BW, kg), body condition scored (BCS) and heart girth (cm) measured four times throughout the year (N=3374). Genotypes represented included Spanish (S), Boer (B), Boer × Spanish cross (BX), Fainting goats (F), and Angora (A). Prediction equations were developed using the GLM procedure of SAS. Heterogeneity of slopes analysis indicated that 10 equations were adequate to predict the 7 genotypes represented. Sex affected the equations for S, F, 3/4 and 7/8 BX goats. For S and F females BW = -46.52+1.14* cm (r^2= 0.82, N=729) and for S and F males BW = -53.54+1.26* cm (r^2= 0.88, N=61). For 3/4 and 7/8 BX females, BW = -57.42+1.34* cm (r^2= 0.91, N=624); for 3/4 and 7/8 BX males, BW = -49.75+1.20* cm (r^2= 0.87, N=320). BCS affected the equations for 1/2 BX and for A. For BCS < 2.5, BW = -39.36+1.04* cm (r^2= 0.81, N=665); for BCS = 2.5, BW = -57.44+1.32* cm (r^2 = 0.77, N=705). Sex and BCS affected the equations for B. For females with BCS = 2.5, BW = -60.54+1.41* cm (r^2= 0.91, N=104), for BCS = 3.0 BW = -54.80+1.34* cm (r^2= 0.81, N=30), for males with BCS = 2.5, BW = -73.56+1.64* cm (r^2= 0.92, N=106), for BCS = 3.0 BW = -107.52+2.11* cm (r^2= 0.95, N=30). Bodyweight of meat goats could be predicted with acceptable accuracy, but it was necessary to use separate equations for sex and BCS for some genotypes.

Key Words: Goats, Body Weight, Heartgirth

T87 Effect of feeding system on performance test traits of young meat bucks in a central performance test. T. A. Gipson*[1], L. J. Dawson[2], and T. Sahlu[1], *[1]E (Kika) de la Garza American Institute for Goat Research, Langston University, Langston, OK, [2]Oklahoma State University, Stillwater.*

Central performance testing of meat goats is increasing in popularity in the US as indicated by increasing number of bucks on-test and increasing number of test stations. Various feeding systems are available which enable measurement of individual performance traits such as intake, gain, etc. The objective of this research was to compare the effect of two different feeding systems on performance test traits. In 2004, 56 young meat bucks (entry age 101 ± 20.0 d and weight 24.3 ± 5.8 kg), predominately Boer, were enrolled in the buck performance test at Langston University. Bucks were ranked by weight and alternately assigned to Calan (C) gate feeders or to automated Feed Intake Recording Equipment (F) feeders. The F system is a completely automated electronic feeding system, which records body weight and feed intake of each individual animal's visit. For the C feeders, each buck wears a collar with an electronic key, which allows access to an individual feeder, feed is weighed and intake is calculated manually. For both C and F feeders, all bucks were weighed weekly for the 12 wk of the performance test. Beginning weight, end weight, gain, average daily gain (ADG; calculated by linear regression), feed intake (FI), feed conversion ratio (FCR), and residual feed intake (RFI) were analyzed using general linear models procedure of SAS. After a 2-wk adjustment period, bucks averaged 29.4 kg for C and 30.7 for F (± 6.9 kg, *P = 0.49*). At the end of the performance test, bucks averaged 52.9 kg for C and 55.6 for F (± 8.0 kg, *P = 0.24*). Gain was 23.5 kg for C and 24.9 for F (± 3.9 kg, *P = 0.22*), which resulted in an ADG of 290.2 g/d for C and 297.3 for F (± 43.2 g/d, *P = 0.56*). FI averaged 160.5 kg for C and 166.1 for F (± 29.3 kg, *P = 0.49*), which resulted in a FCR of 0.149 for C and 0.150 for F (± 0.02, *P = 0.83*). RFI averaged -0.003 kg/d for C and -0.008 for F (± 0.13 kg/d, *P = 0.89*). The type of feeding delivery system had no effect upon any of the performance test traits. Therefore, the feeding delivery system should have no effect upon a buck's final ranking on a central performance test.

Key Words: Central Performance Test, Feeding Systems, Goats

T88 Factors influencing urea space estimates in goats. A. Asmare[1,2], L. J. Dawson[3], R. Puchala[1], T. A. Gipson[1], M. Villaquiran[1], I. Tovar-Luna[1], G. Animut[1,3], T. Ngwa[1], R. C. Merkel[1], G. Detweiler[1], and A.L. Goetsch*[1], *[1]Langston University, Langston, OK, [2]Alemaya University, Dire Dawa, Ethiopia, [3]Oklahoma State University, Stillwater,.*

Female Alpine goats, 18 approximately 17 mo (yearling) and 18 that were 5 mo (growing), were used to determine effects of animal age, urea dose (100, 130, and 160 mg/kg BW), and time without feed and water (shrink; 0, 16, and 24 h) on urea space estimates. A 20% (wt/vol) urea solution was infused into a jugular vein, with blood sampled before infusion and every 3 min to 21 min later. Body weight was 49.8, 47.4, and 47.0 kg for yearlings and 26.1, 24.6, and 23.9 kg for growing animals after 0, 16, and 24 h shrinks, respectively (SE = 0.80). Time of urea equilibration with body water, determined by a grafted polynomial quadratic-linear model, was affected by a dose x age x shrink interaction (P < 0.05); yearling means did not differ (ranging from 7.3 to 10.8 min), whereas those for growing animals were greater (P < 0.05) for 0 h-130 mg (13.0 min) and 24 h-130 mg (13.2 min) compared with 24 h-100 mg (7.6 min) and 16 h-130 mg (7.1 min). Based on these times, 12-min samples were used to determine urea space. Urea space was influenced by an age x shrink interaction (P < 0.05), being similar among shrinks for yearlings (17.8, 18.8, and 18.9 kg) and greater (P < 0.05) for growing animals after 0 than 24 h shrink (12.9, 11.3, and 10.0 kg for 0, 16, and 24 h, respectively). Hemoglobin concentration in plasma, as an index of hemolysis, was greater (P < 0.05) for growing than for yearling animals (1.16 vs 1.86%), lowest among doses (P < 0.05) for 100 mg (1.05, 1.74, and 1.75% for 100, 130, and 160 mg, respectively), and highest among shrinks (P < 0.05) for 24 h (1.46, 1.42, and 1.61% for 0, 16, and 24 h, respectively). In conclusion, 13 min after infusion appears a reasonable sampling time for determining urea space in goats. Shrink time may have greater effect on urea space with growing vs older goats, and 24 h of shrink or at least 16 seem desirable before estimating urea space. Urea space estimates were similar with urea doses of 130 and 160 mg/kg BW, and a lower dose such as 100 mg, though

152

J. Anim. Sci. Vol. 83, Suppl. 1/J. Dairy Sci. Vol. 88, Suppl. 1

lessening hemolysis, could allow relatively greater effect of shrink time on urea space.

Key Words: Goats, Body Composition, Urea Space

T89   Effects of insulin administered to a perfused area of skin on mohair growth in Angora goats. R. Puchala*, S. G. Pierzynowski, A. L. Goetsch, and T. Sahlu, *E (Kika) de la Garza American Institute for Goat Research, Langston University, Langston, OK.*

The effect of insulin on mohair growth of Angora goats was investigated using a skin perfusion technique. Seven 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. Goats were shorn before the 28 d experimental period. For the first 14 d of the experiment, the deep circumflex iliac arteries were infused with 2.4 mL/h of saline solution. The infusate for one side contained insulin, delivered at 48 mIU/h and estimated to triple the blood 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 x 28 d), 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 vs the control side (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 limited influence on fiber producing follicles.

Key Words: Mohair, Insulin, Skin Perfusion

T90   Heritability of kidding rates and the effect of number of offspring per litter on kid birth weights in the Caprine species. N. Buzzell*, J. Altbuch, S. Blash, D. Melican, and W. Gavin, *GTC Biotherapeutics, Spencer, MA.*

Increased reproductive capacity is an important selection criterion for breeding goats to maximize the number of offspring produced from a given animal. This is especially true in a biotechnology setting when dealing with expansion of a herd from one transgenic founder animal. Additionally, another important selection criterion is kid birth weight, as higher birth weight kids are expected to reach an acceptable breeding weight in a shorter period of time. A retrospective study was undertaken to evaluate the heritability of kidding rates and to evaluate the effect of number of offspring per litter on kid birth weights. Non-transgenic goats were divided into two groups for this analysis based on having been born as either a singleton (n=79) or as part of a multiple kid birthing (n=183). Kidding rates in these goats were compared in their first parturition. Does born from a multiple kidding event compared with does born as singletons produced significantly more offspring on their first parturition, 1.75 ± 0.05 vs. 1.55 ± 0.64 kids, respectively ($p < 0.05$). In addition, does that produced multiple kids on their first gestation (n=89) compared with does that produced singletons (n=54) produced significantly more offspring per subsequent parturition, 2.08 ± 0.07 vs. 1.70 ± 0.09 kids, respectively (p = 0.01). Birth weights were significantly different for female singletons (n=66), twins (n=153), and triplets (n=41) at 3.8±0.08, 3.4±0.05 and 2.9±0.12 kg, respectively ($p<0.05$). Birth weights were also significantly different for male singletons (n=73), twins (n=139), and triplets (n=40) at 4.2±0.09, 3.8±0.06 and 3.2±0.13 kg, respectively ($p<0.05$). In summary, this analysis shows that fecundity as measured by kidding rates is a heritable trait and should be considered when making decisions for breeding and management. This study also found an effect of number of kids per birthing on birth weight which should be a further consideration for selecting offspring for herd expansion and breeding.

Key Words: Birth Weight, Goat, Kidding Rate

T91   Cholesterol-loaded cyclodextrin improves post-thaw goat sperm motility. M. H. Barrera-Compean*[1], P. H. Purdy[2], J. M. Dzakuma[1], G. R. Newton[1], and L. C. Nuti[1], [1]*Prairie View A&M University, Prairie View, TX,* [2]*National Animal Germplasm Program, USDA-ARS, Fort Collins, CO.*

Membrane destabilization can occur when the sperm plasma membrane undergoes a phase transition from the liquid crystalline phase to the gel phase due to a decrease in temperature. Various lipids have been added to sperm prior to cooling to avoid this phase transition. It is documented that increasing the cholesterol membrane concentration of liposomes removes the phase transition during cryopreservation. Furthermore, treating bull, ram, and stallion sperm with cholesterol-loaded-cyclodextrin (CLC) prior to cryopreservation results in higher proportions of motile and membrane intact sperm after thawing. Application of the CLC treatment has not been documented using goat sperm. Therefore, the goal of this study was to determine if treating buck sperm with CLC in a Tris-citric acid-fructose diluent (15% egg-yolk, 7% glycerol) would improve the post-thaw sperm quality. Semen samples were collected from 25 bucks. Aliquots (240 x 10^6 sperm) from each ejaculate were treated with 0 (control), 1.5, 2.0, 2.5, and 3.0 mg CLC in separate test tubes and then cryopreserved. After thawing, sperm motility, plasma membrane integrity, and acrosome integrity were assessed using a computer assisted sperm analysis system and flow cytometry. Treatment differences between control and CLC-treated sperm for motility and membrane integrities were determined by ANOVA. CLC treatment resulted in significantly higher proportions of motile sperm at 1.5, 2.0, 2.5, or 3.0 mg CLC dosages (46, 50, 52 and 50%, respectively) compared to control sperm (42%; P < 0.0003). No significant differences were detected in the plasma membrane or acrosomal membrane integrity analyses. These results demonstrate that treating buck sperm with cholesterol prior to cryopreservation results in higher post-thaw motility without affecting plasma membrane and acrosomal membrane integrity.

Key Words: Goat Sperm, Cryopreservation, Cholesterol-Loaded-Cyclodextrin

T92   Factors influencing pregnancy rate after AI with fresh and chilled semen in meat goats treated with melengestrol acetate. S. Wildeus* and J. R. Collins, *Virginia State University, Petersburg.*

Artificial insemination (AI) is routinely used in the U.S. dairy goat industry, but this technology has not found widespread application in meat goat production. This experiment evaluated factors influencing pregnancy rate in primi- and multiparous Spanish and Myotonic goats (n=57) inseminated with extended semen during the breeding season (September). For estrus synchronization does were group-fed once daily a corn/soybean meal supplement (16% CP) providing 1.13 μg/kg BW/d melengestrol acetate (MGA) for 12 d. At the end of feeding, sterile harnessed bucks were placed with the does and estrus marks recorded twice daily (AM/PM). Does were inseminated by the AM - PM rule, approximately 12 h after first estrus marks with either fresh (within 2 h of collection) or chilled (stored at 4°C for 24 h) semen extended in one step in a Tris-egg yolk-fructose diluent at 200 million sperm/ml and packaged in 0.5 cc straws. The site of semen deposition was recorded. Pregnancy rate was determined by transrectal ultrasound 25 d after AI. The effect of semen type (fresh vs. chilled), breed, site of deposition, days after MGA feeding, and time of insemination (AM vs PM) on pregnancy rate was determined by Chi-square analysis. MGA feeding resulted in 95% of does displaying estrus within 120 h of last MGA feeding, with a peak activity between 84-96 h (57%). Pregnancy rates were higher (P<0.01) in does inseminated with fresh (65%) than chilled semen (29%), and were higher for semen deposited in the uterus (70%), than in the cervix (43%), cervical os (42%), or posterior vagina (40%). Pregnancy rates were also higher (P<0.01) for PM (65%) than AM (28%) inseminations, and tended to decrease (P<0.1) from 75% to 48% to 29% for inseminations on d 3, 4 and 5 after last MGA feeding, respectively. There were no differences between Myotonic (58%) and Spanish (44%) does. Results demonstrate a considerable decline in fertility of extended chilled semen after 24 h of storage and suggest the need to penetrate the cervix to achieve satisfactory pregnancy rates in a meat goat AI system.

Key Words: Meat Goats, Artificial Insemination, Melengestrol Acetate

T93 Phenotypic and genotypic aspects of *Staphylococcus aureus* isolated from chronic subclinical infections in dairy goats. P. Moroni[1], G. Pisoni[1], C. Vimercati[1], M. Antonini[2], B. Castiglioni[2], P. Cremonesi[2], and P. Boettcher*[2], [1]*University of Milan, Milan, Italy*, [2]*Institute of Agricultural Biology and Biotechnology, National Research Council, Milan, Italy*.

The objectives of this study were to identify goats with chronic infections by *Staphylococcus aureus* (SAUR), isolate bacteria from these animals, genotype the bacteria to identify different strains, and perform tests of antimicrobial sensitivity. A herd of 75 Alpine goats in Northern Italy was monitored for a complete production season. Bacterial cultures were taken from each udder half during eight monthly visits. Goats with at least 2 consecutive positive tests for SAUR (n = 28) in the same udder half were identified as chronically infected. Goats with no infections in either udder half during any visit were considered healthy (n = 26). The bacteria isolated from one sample from each infected goat were genotyped based on variable numbers of tandem repeats in 6 genomic regions. One sample from each animal was also subject to a test for beta-lactamase production and to Minimum Inhibitory Concentration tests for 11 antimicrobial agents: benzylpenicillin, ampicillin, amoxicillin, amoxicillin plus clavulanic acid, cloxacillin, cephalonium, cephoperazone, oxytetracycline, doxicycline, kanamycin, and lincomicin. A linear mixed model was used to examine the relationship between chronic infection by SAUR and somatic cell score. This analysis involved 841 records. Factors in the statistical model were sample day, parity, infection status, goat, and udder half nested within goat. No genetic variability was observed among the bacteria isolated, suggesting that all were from the same strain. All SAUR isolates were negative for the beta-lactamase production test and no isolate was resistant to any of the antimicrobial agents used. Penicillins were the most effective drugs tested, however. As expected, SCS was significantly higher in infected goats (least-square mean = 7.55) than in healthy goats (LSM = 5.50). With regard to specific udder halves, mean SCS from infected udder halves (LSM = 8.02) was greater than in uninfected udder halves from the same goats (LSM = 6.44). No differences were observed in milk yield or fat and protein percentages between infected and healthy goats.

Key Words: Goat, Staphylococcus Aureus, Subclinical Infection

Graduate Student Competition—CSAS

T94 Validation of a new equation predicting digestible energy of forage for sheep. M. Vachon*[1,2], J. F. Bernier[1], G. Allard[1], A. Brégard[1], and D. Pellerin[1], [1]*Université Laval, Québec, Québec, Canada*, [2]*Centre d'expertise en production ovine du Québec, La Pocatière, Québec, Canada*.

Single-component equations are actually used to evaluate DE of forages for sheep in Quebec. Previous study pointed out that multi-component empirical models generally improve slightly the precision of digestibility determination. The aim of this project was to compare the precision of a new multi-component empirical model (new) to predict DE of forages fed to sheep (DE Mcal kg^{-1} =3.245+0.035xCP%-0.024xADF%-0.003LEGUME% (R2=0.52;n=202)) with the equation actually used in Quebec (old) for grasses (DE Mcal kg^{-1} =4.681-0.0573xADF% (R2=0.68;n=69)). Comparisons were made in two separate trials with 48 lactating and 46 pregnant ewes in a 2 X 2 factorial arrangement. Factors were two equations used to predict DE of forage (old vs. new) and two grass hays harvested at different stage. ME requirements were calculated with the NRC model (1985) and with a factorial model based on the NRC (1985) and ARC (1980). Residual ME (intake - requirements) was used to evaluate precision of equations. The new equation predicted more DE in forages so less concentrates were needed to meet energy requirements of ewes. Feeding costs were thus lower when the new equation was used. Lactating ewes lost more weight (-0.25 vs. -0.19 kg d^{-1} p=0,01) and more body condition score (-0.61 vs. -0.33 p=0.05) and their lambs gained less weight (0.52 vs. 0.57 kg d^{-1} p=0.04) when the new equation was used. Residual ME was closer to 0 (lactation: old 0.36 vs. 2.18 Mcal d[-1], new 1.12 vs. 2.94 Mcal d[-1] p<0.01; pregnancy: old -0.64 vs. -0.95 Mcal d[-1], new -0.16 vs. -0.46 Mcal d[-1] p<0.01) when the NRC model (1985) was used to calculate ME requirements. For lactating ewes, residual ME was closer to 0 (0.36 vs. 1.12 Mcal d[-1] p<0.01) with the old equation. For pregnant ewes, residual ME was not different from 0 (Student t, p<0.05) with the new equation but was different from 0 (Student t, p<0.05) with the old one. These results do not allow to recommend the systematic use of the new empirical model to predict forage energy for sheep.

Key Words: Digestible energy, Forage, Sheep

T95 Nutrient digestibility of diets containing graded levels of meat and bone meal for pigs and ducks. S. A. Adedokun* and O. Adeola, *Purdue University, West Lafayette*.

Apparent digestibility of calcium (Ca), phosphorus, (P) and nitrogen (N) of diets containing meat and bone meal (MBM) were determined using 288 barrows with an average weight of 35 kg. Apparent N utilization was also determined in 288 ducks with mean weight of 3.4 kg. For each of 12 MBM samples, diets were formulated by substituting 0, 5, or 10 % MBM in a basal 170 g CP kg-1 corn-soybean meal diet; corn and soybean meal were adjusted at the same ratio to account for the substitution. Each diet was fed to 8 barrows in individual metabolism crates in a digestibility assay that employed a 5-d acclimation followed by a 5-d period of total collection of feces. Each of the diets was also fed to 8 ducks in a metabolism assay that employed a 4-d acclimation and 3-d period of excreta collection. The gross energy (GE), CP, crude fat (CF), ash, Ca, and P contents of the MBM samples, on per kg dry matter basis, ranged from 3,493 to 4,732 kcal, 496.7 to 619.1 g, 91.1 to 151.2 g, 200.3 to 381.9 g, 54.3 to 145.8 g, 25.6 to 61.7 g, respectively.. In most of the diets, there were increases in dietary Ca, P and CP with increase in substitution levels of MBM from 0 to 10 %. Calcium digestibility in pigs increased linearly (P < 0.05) for diets containing MBM samples 3 and 8 and decreased linearly (P < 0.05) for diets containing MBM sample 1. Phosphorus digestibility in pigs increased linearly (P < 0.05) with MBM samples 3, 7 and 10 with an increase in MBM substitution. Nitrogen digestibility was either unaffected (MBM 3 or 9) or decreased (MBM samples 2, 4, 5, 11 or 12, P < 0.05) in the pigs and an increase in N utilization (MBM samples 3 and 9, P < 0.05) for ducks. This study shows that the digestibility of N, Ca and P in diets supplemented with MBM compares favorably with that of the diet supplemented from inorganic sources when MBM replaced up to 10 % corn and SBM in the basal diet.

Key Words: Duck, Pig, Meat and bone meal

T96 Growth performance, carcass characteristics and fat quality of pigs fed Manitoba-grown corn cultivars. F. O. Opapeju*, C. M. Nyachoti, and J. D. House, *University of Manitoba, Winnipeg, MB, Canada*.

An experiment was conducted to determine growth performance, carcass characteristics and fat quality of growing-finishing pigs fed diets based on two widely grown corn cultivars in Manitoba. Twenty-four Cotswold growing pigs (~41 kg initial BW) individually housed in floor pens were blocked by BW and sex and randomly allotted from within block to one of three diets to give eight replicate pigs per diet. Experimental diets consisted of a control based on barley and two corn based diets containing corn cultivar 1 or corn cultivar 2 as the main energy source. A three-phase feeding program for 20-50 kg (phase 1), 50-80 kg (phase 2) and 80-110 kg (phase 3) BW range was used. Diets for each phase contained 3.5 Mcal/kg DE but total lysine was 0.95%, 0.75% and 0.64% in phase 1, 2 and 3 diets, respectively. Average daily gain (ADG), average daily feed intake (ADFI) and gain to feed ratio (G:F) were monitored weekly during each phase. Pigs were slaughtered after reaching a minimum BW of 100 kg. There were no ef-

154

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