

limiting constraint to increased livestock productivity and the major contributory aspects of the problem are feed availability and quality. Livestock are fed natural grasses, fodder and farm residues during the dry season, which are poor in quality. The inability of the market place to meet the demand for feed places increasing pressure on existing natural resources. Changes in the nutritive value of forages over the growing season are unknown. In this study, traditional forages were randomly collected monthly from the beginning of the rainy season to the dry season (July, 2004-February, 2005) and analyzed for their nutritive value (DM, CP, Ether Extract, Ash, NDF, ADF, ADL, Gross Energy, In Vitro Dry Matter Digestibility) and mineral content (Ca, P, K, Fe, Mg, Cu, Zn, Na, Mn). The dominant forages during the growing season were *Angropogon pseudapricum*, *Loudecia togoensis* and *Pennisetum pedicellatum*. Many forages disappeared late in the growing season. Mean CP of the forages decreased from 12.6% to 1.9%

(range:12.6-1.3%) during the growing season. Mean ADF increased from 33% to 48% (range:33-50%). Mean ADL increased from 4.6 to 5.3% (range 4.6-6.1%). Mean NDF increased from 50% to 73% (range: 50-76%). Mean OM% increased from 89.9% to 95.5% (range 89.9-95.5%). Mean Ash decreased from 10.1 to 4.5% (range 10.1-4.5%). Mean Ether Extract % decreased from 1.28% to 0.76% (range: 1.28-0.68%). Mean In Vitro Dry Matter Digestibility decreased from 73% to 65% (range:73-60%). Mean Ca, P, K, Mg, Na, Cu, and Zn content all decreased, while Mn increased. The data indicates that traditional forages decline in nutritive value during the growing season in Mali. (Supported by USDA, ISE Competitive Grant No. 2005-51160-02276).

Key Words: Mali, Forages, Nutritive Value

Goat Species II

T154 In vitro volatile fatty acid profile of shrub and cacti species selected by grazing goats. M. Guerrero-Cervantes^{1,2}, R. G. Ramirez-Lozano², R. Montoya-Escalante¹, A. S. Juárez-Reyes¹, and M. A. Cerrillo-Soto*¹, ¹Universidad Juárez del Estado de Durango, Durango, Dgo., Mexico, ²Universidad Autónoma de Nuevo León, Monterrey, N.L., Mexico.

Samples from species commonly selected by range goats in the semiarid region of North Mexico were collected to study their *in vitro* volatile fatty acid production. Samples from *Quercus grisea*, *Acacia shaffneri*, *Proposis leavigata*, *Opuntia leucotricha*, *O. leptocaulis* and *O. imbricata*, were collected. Five hundred mg DM were incubated in triplicate in calibrated 100 ml glass syringes using rumen fluid from two sheep fed alfalfa hay: concentrate (75:25) as inoculum. Incubations were terminated after 24 h. The syringe contents were then centrifuged and 5 ml of the supernatant were mixed with 1 ml of 25% metaphosphoric acid. Volatile fatty acid determination was performed using gas chromatography. Data were analyzed by ANOVA according to a completely randomized design. Total VFA concentrations were highest for *Opuntia leucotricha* whereas lowest values were recorded in *Acacia shaffneri* ($P < 0.05$). A similar trend was observed for acetate concentrations among species. *Opuntia leucotricha* produced 24.2% more acetate than *Acacia shaffneri*. Intermediate values were obtained in *O. leptocaulis* and *O. imbricata* ($P < 0.05$). Propionate concentrations were different among species ($P < 0.05$). *O. imbricata* recorded the highest values, *Proposis leavigata* was intermediate and *Acacia shaffneri* the lowest. Regarding butyrate values, a similar pattern as propionate was observed. *O. imbricata* produced 42.5% more butyrate than *Acacia shaffneri* ($P < 0.05$). *Opuntia leucotricha* resulted in higher valerate values, *O. imbricata* and *Q. grisea* ranked intermediate and *A. shaffneri* the lowest ($P < 0.05$). A higher A:P ratio was observed in *O. leucotricha* and lowest in *P. leavigata*. Results indicated that cacti species, specially *O. leucotricha* represents a good energy source and an important emergency feed in harsh semi-arid areas.

Table 1. In vitro VFA profile (mM L⁻¹) of shrub, tree and cacti species

	Total	C:2	C:3	C:4	C5	A:P
<i>Q. grisea</i>	14.17 ^c	8.91 ^{cd}	1.44 ^{cd}	1.17 ^c	0.96 ^b	6.10 ^c
<i>A. shaffneri</i>	10.88 ^c	6.05 ^d	1.10 ^d	0.94 ^c	0.86 ^d	5.53 ^c
<i>P. leavigata</i>	16.14 ^{bc}	9.49 ^{cd}	3.13 ^b	1.03 ^c	0.92 ^c	3.00 ^d
<i>O. leucotricha</i>	30.25 ^a	24.95 ^a	1.99 ^{cd}	1.82 ^b	1.03 ^a	12.6 ^a
<i>O. leptocaulis</i>	23.00 ^{ab}	17.90 ^b	2.12 ^c	1.72 ^b	0.87 ^d	8.45 ^b
<i>O. imbricata</i>	23.44 ^{ab}	14.36 ^{bc}	4.35 ^a	2.23 ^a	0.99 ^b	3.22 ^d
Mean	19.65	13.61	2.35	1.48	0.94	6.50
SEM	3.46	2.76	0.43	0.15	0.01	0.74

Means within columns with different superscript differ ($P < 0.05$)

Key Words: Goats, *In vitro*, Volatile Fatty Acids

T155 Methane emission by goats consuming a condensed tannin-containing lespedeza, alfalfa and sorghum-sudangrass. G. Animut*¹, R. Puchala¹, A. L. Goetsch¹, A. K. Patra¹, T. Sahlul¹, V. H. Varela², and J. Wells², ¹E (Kika) de la Garza American Institute for Goat Research, Langston, OK, ²US Meat Animal Research Center, Clay Center, NE.

Twenty four Boer × Spanish (1/2 Boer; initial BW of 38.3 ± 0.69) wethers six per treatment were used to assess effects of a condensed tannin (CT)-containing forage (sericea lespedeza, *Lepedeza cuneata*; S) with or without polyethylene glycol (PEG), a legume (alfalfa, *Medicago sativa*; A), and grass (sorghum-sudangrass, *Sorghum bicolor*; G) on ruminal methane emission. Treatments were S, S plus 25 g/d of PEG mixed with 50 g/d of ground corn (P), A, and G. Forages harvested daily were fed at 1.3 times the maintenance energy requirement. The experiment lasted 15 d, 7 d for adaptation and 8 d for measurement.

Digestibility of DM differed ($P < 0.05$), whereas digestible DMI and energy expenditure (EE) were similar among treatments (DM digestibility: 49.5, 52.1, 60.9, and 66.5% (SE = 2.22); digestible DMI: 415, 448, 442, and 475 g/d (SE = 26.3); EE: 462, 456, 509, and 476 kJ/kg BW^{0.75} (SE = 17.0) for S, P, A, and G, respectively). Methane emission was 15.8, 20.9, 21.3, and 21.6 l/d for S, P, A, and G, respectively (SE = 1.25), and was lower for S compared with other treatments ($P < 0.05$). There was also a difference ($P < 0.05$) among treatments in in vitro methane release by ruminal fluid incubated for 3 wk with conditions promoting activity by methanogens (12.9, 21.8, 25.3, and 28.5 ml for S, P, A, and G, respectively; SE = 2.73). In summary, CT-containing forage S decreased methane emission by goats, possibly by altering activity of ruminal methanogenic bacteria, and it did not appear that dietary differences of forages other than CT level might play a significant role in reducing ruminal methane emission.

Key Words: Goats, Methane, Condensed Tannins

T156 Evaluation of level of crude protein and undegradable intake protein level in diets of growing Boer goats fed a complete pelleted ration. G. V. Pollard¹, K. F. Wilson², and M. L. Bolfin¹, ¹Texas State University, San Marcos, ²Animal Feed Technologies, Greeley, CO.

The objectives of this research were to determine the effects of dietary crude protein and undegradable intake protein (UIP) levels on growth and carcass characteristics of crossbred Boer meat goats. Forty-eight crossbred wether goats (23.1 kg) were assigned to 16 pens in a completely randomized design. Crude protein level and UIP level were randomly assigned to goats in a 2 × 2 factorial arrangement. Factors were: A) 15 or 18% CP, and B) 40% or 60% UIP level. All goats received a complete, pelleted diet fed at approximately 3.5% of BW consisting of corn, oats, alfalfa, cottonseed hulls, soybean meal, blood meal, fish meal, dried distillers grains, urea, and monensin with appropriate levels of minerals and vitamins, and free access to water for 84 d prior to slaughter. Levels of cottonseed hulls, blood meal, and soybean meal were altered to produce the diets listed previously. Performance variables measured were ADG, FC (gain/feed), and FI. Carcass variables measured were hot carcass weight (HCW), dressing percentage (DP), body thickness (BT), back fat (BF), leg score, and muscle conformation (MC). Data were analyzed as a factorial with resulting means separated by main effects since no interactions were observed using SAS. As expected, no differences ($P = 0.830$) were detected for FC and FI due to all goats fed at 3.5% of BW. Average daily gains were lower ($P = 0.03$) during the initial 28 d period for all treatments than during the final 56 d of the study. Diets containing 60% UIP tended ($P = 0.17$) to have greater ADG over the entire 84 d, while the diet containing 18% CP and 40% UIP had lower ($P = 0.07$) ADG. However, no differences ($P = 0.38$) for growth were detected when comparing 15 and 18% CP diets. Goats receiving diets containing 15% CP tended ($P = 0.13$) to have heavier HCW. The results of this study suggest that meat goats with Boer influence may not require diets with increased levels of crude protein or undegradable intake protein when fed at 3.5% of BW.

Key Words: Boer, Goat, Protein

T157 Effects of dietary methionine and lysine sources on particular blood parameters in growing goats. Z. H. Sun¹, Z. L. Tan^{*1}, G. O. Tayo^{1,2}, B. Lin¹, and S. X. Tang¹, ¹Institute of Subtropical Agriculture, The Chinese Academy of Sciences, Changsha, P.R. China, ²Babcock University, Ikeja Lagos, Nigeria.

The objective of this study was to study the effects of supplementing various sources of methionine (Met) and lysine (Lys) on certain plasma variables. Four wether goats (20.0±0.5 kg) were used in a 4×4 Latin square experiment and assigned to four dietary treatments: (1) control; (2) control+lipid-coated Met-Zn chelate and Lys-Mn chelate (PML); (3) control+Met-Zn chelate and Lys-Mn chelate (CML); (4) control+DL-Met, L-Lys-HCl (FML). The amounts of Met and Lys supplemented in the four treatments were 0.77 g and 0.91 g per 100 g concentrate (DM basis). Control and FML groups were supplemented with 0.09 g/100 g (DM basis) ZnSO₄·7H₂O and 0.05 g/100 g MnSO₄·H₂O in the concentrate to keep the same content of Mn and Zn among the four diets. The basal diet consisted of 50% maize stover and 50% concentrate. Ten ml blood sample was collected from the jugular vein of each goat for analyses of plasma biochemical indices at the end of each period. Goats offered PML had higher plasma growth hormone concentrations than control ($P < 0.05$), and higher plasma insulin concentration than in the FML group ($P < 0.05$) and control ($P < 0.01$). Plasma insulin concentration in CML group was higher than in control ($P < 0.05$). T3 serum concentrations of PML and CML groups were higher than in the FML group and control ($P < 0.05$). The activity of alkaline phosphatase in plasma of PML and CML groups was higher than those of FML group and control ($P < 0.05$), and there was no difference in alkaline phosphatase between PML and CML groups ($P > 0.05$). Plasma levels of triglycerides and total protein and lipase activity did not differ among treatments ($P > 0.05$). The results indicate that chelated Met and Lys supplementation can affect some plasma parameters in growing goats, and the lipid-coated technology could be of potential benefit for AA utilization.

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Key Words: Growth Hormone, Triglycerides, Alkaline Phosphatase

T158 Effects of dietary NDF level on the duodenal and ileal flows of endogenous nitrogen and amino acids in growing goats. C. S. Zhou, Z. L. Tan^{*}, H. L. Jiang, Z. H. Sun, and S. X. Tang, *Institute of Subtropical Agriculture, The Chinese Academy of Sciences, Changsha, P.R. China.*

The objective of this study was to investigate effect of dietary NDF levels on the duodenal and ileal flows of endogenous nitrogen (EN) and endogenous amino acids (EAAs) in growing goats. The duodenal EN and EAAs flows were determined by the difference method and the amino acid profile (AAP) as described by Larsen (2000) and Jensen (2006) respectively. The ileal EN and EAAs were measured by the water soluble N (WSN) and linear regression method described by Larsen (2000) and Van Soest (1982) respectively. A trial with four ruminally, duodenally and ileally cannulated goats (BW=25.0±2.5 kg) were allocated to four treatments in a 4×4 Latin square design. Goats were fed diets containing four levels of NDF (39.69%, 36.95%, 34.22% and 31.49%), respectively. The duodenal flow of EN and EAAs was 1.05, 1.12, 1.01, 1.06 g/d ($P > 0.05$) and 12.62, 11.37, 12.19,

11.18 g/d ($P > 0.05$) as determined by the difference method; and 1.31, 1.37, 1.30, 1.36 g/d ($P > 0.05$) and 7.73, 6.79, 6.29, 6.14 g/d ($P > 0.05$) as determined by AAP method respectively for the four dietary treatments. The duodenal EN determined by AAP was 22-29% higher than that determined by the difference method, while the duodenal EAAs determined by the difference method was two times that by AAP. The ileal flow of EN and EAAs was 0.59, 0.58, 0.55, 0.54 g/d ($P > 0.05$) and 5.28, 5.22, 5.16, 5.28 g/d ($P > 0.05$) determined by WSN. The regression equations of the duodenal and ileal flow of EN (Y, g/d) and the flow of N (X, g/d) were $Y = 0.12X$ ($R^2 = 0.94$, $P < 0.01$) and $Y = 0.23X$ ($R^2 = 0.94$, $P < 0.05$), respectively. Results indicated that dietary NDF level within the range of 39% to 31% did not affect the duodenal and ileal flows of EN and EAAs and that the determination technique had significant effect on the duodenal and ileal flows of EN and EAAs.

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Key Words: Endogenous Nitrogen, Endogenous Amino Acids, Determining Technique

T159 Effects of dietary NDF levels on digestion, serum biochemical parameters and hormonal concentrations in growing goats. X. G. Zhao¹, H. L. Jiang¹, Z. H. Cong¹, S. X. Tang¹, Z. H. Sun¹, Z. L. Tan^{*1}, and G. O. Tayo^{1,2}, ¹*Institute of Subtropical Agriculture, The Chinese Academy of Sciences, Changsha, China*, ²*Babcock University, Ikeja Lagos, Nigeria*.

The effects of dietary NDF levels on digestion and serum biochemical parameters were examined in this study. Four growing wether goats (19.6 ± 1.2 kg) were used in a 4×4 Latin square experiment, assigned to one of four dietary treatments. The four diets contained 16.4, 19.9, 23.2 and 26.6% forage with 31.5 (LF), 34.2 (MF1), 37.0 (MF2) and 39.7% (HF) NDF on dry matter basis, respectively. Other chemical components were the same for the four diets. Each experimental period lasted 19 d, which included 14 d of adaptation followed by 7 d sampling period. The amount of feed offered to each goat was restricted to 85% of its ad libitum intake to maintain no orts during the whole experimental period. Blood samples (15 ml) was collected from the jugular vein of each animal at day 19 of each experimental period. The total tract digestibility of DM ($P = 0.05$), OM ($P = 0.01$), N ($P = 0.01$) and NDF ($P = 0.05$) decreased linearly with increase in dietary NDF level. Goats offered the LF diet had higher levels of serum total protein ($P < 0.05$) and higher urea nitrogen ($P < 0.05$) than goats offered MF2 and HF diets. LF diet also resulted in higher amylase activity and serum glucagon concentration than MF1 and MF2 diets, respectively ($P < 0.05$). Serum triiodothyronin concentration decreased with the increase of dietary NDF level ($P < 0.05$). Serum lactic acid, glucose, lipase, growth hormone, insulin, leptin, motilin and thyroxin concentrations, and activity of lactate dehydrogenase did not differ between treatments ($P > 0.05$). The results indicated that increasing dietary NDF content decreased the total tract digestibility of DM, OM, CP and NDF within the current range of 31~40% NDF in dietary DM and partly affected biochemical parameters in growing goats.

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Key Words: Blood Variables, Digestion, Neutral Detergent Fiber

T160 Selenium concentrations in forages and in blood of meat goats. T. K. Hutchens^{*1}, A. H. Cantor¹, H. D. Gillespie¹, P. B. Scharko¹, M. Neary², and J. E. Tower², ¹*University of Kentucky, Lexington*, ²*Purdue University, West Lafayette, IN*.

Forages grown in many areas of the USA are considered to be selenium-deficient. These regions include Indiana and Kentucky. The present study was conducted to determine Se concentrations in pasture and hay samples and in blood and plasma samples of goats consuming these forages. A composite sample of Kentucky 31 tall fescue was obtained in August 2006 from 10 locations within a 10-acre grazing paddock in Dubois, IN. In addition, four grab samples of alfalfa-orchardgrass hay from an early summer cutting were taken. Blood samples were obtained from percentage Boer-crossed meat does, approximately 3 yr of age, in August and December of 2006 and in January 2007. Selenium was determined using a fluorometric procedure following wet digestion. The pasture and hay samples contained $0.055 \pm 0.009 \mu\text{g Se/kg DM}$ and $0.044 \pm 0.010 \mu\text{g Se/kg DM}$ (mean ± SD), respectively. Goats sampled shortly after weaning in August 2006 ($n = 10$) were on pasture with access to a mineral supplement containing Se. Their respective values ($\mu\text{g/mL}$) for whole blood and plasma Se were 0.132 ± 0.022 and 0.066 ± 0.011 . Does sampled in December 2006 ($n = 8$) had been bred, were still on pasture and were given hay with access to the mineral supplement. Their whole blood and plasma Se concentrations were 0.191 ± 0.028 and $0.071 \pm 0.007 \mu\text{g Se/mL}$, respectively. The same does sampled in January 2007 ($n = 8$) had continued to receive the same feeding regimen. Whole blood and plasma Se concentrations from these goats were 0.198 ± 0.031 and $0.078 \pm 0.006 \mu\text{g Se/mL}$, respectively. Average Se concentrations for whole blood, but not for plasma, of samples taken in December and January were significantly ($P < 0.001$) higher than for samples taken in August. These data show that the forages sampled were very low in Se content. In addition, a substantial change in the Se concentration in whole blood, but not in plasma, of breeding does was observed during the course of sampling.

Key Words: Forages, Goats, Selenium

T161 Supplementation with selenium boluses and its effect on milk and blood serum concentration of dairy goats. J. G. Librado Cruz^{*1}, M. Huerta Bravo¹, M. González Alcorta¹, J. G. García Muñiz¹, P. A. Martínez Hernández¹, and R. López Arellano², ¹*Universidad Autónoma Chapingo, Chapingo, México*, ²*Facultad de Estudios Superiores Cuautitlán, UNAM, Cuautitlán Izcalli, México*.

The objective of this trial was to determine the effect of supplementing oral selenium (Se) boluses on blood serum and milk selenium concentrations of lactating dairy goats. Forty lactating dairy goats grazing natural rangelands from two flocks (twenty animals for each one) were assigned randomly to two treatments: 0 and 500 mg of Se per bolus. Blood and milk samples were collected at 0, 8, 15, 22, 36, and 50 d post treatment to determine Se concentrations. Data were analyzed using a mixed model with repeated measures. Goat was the random effect while flock and treatment were the fixed effects. Initial live weight, milk yield, and number of kidding were included as covariates, when appropriate. Selenium concentrations were determined by acid decomposition-fluorometric detection. Milk Se concentrations were affected ($P = 0.0012$) by flock × treatment interaction. In one flock, the supplemented goats had 15.3% more milk Se in comparison with non-supplemented animals. However, there was no response in

milk Se concentration in the other flock. Concentrations of Se in blood serum were influenced ($P = 0.0002$) by treatment \times flock \times sampling day interaction. In both flocks, supplemented goats maintained higher Se levels ($P < 0.0001$) during the experiment than non-supplemented goats (156 ng/mL vs 93.6 ng/mL and 158 ng/mL vs 43.5 ng/mL). Concentrations of Se in blood serum for supplemented goats in both flocks showed a peak at day 8 post dosing that differed ($P < 0.0001$) from other sampling days. However, this peak was higher ($P < 0.0001$) in one flock (349 ng/mL vs 201.5 ng/mL). The administration of selenium boluses in dairy goats increases the content of Se in milk, and maintains appropriate levels of this mineral in blood serum during 50 days.

Key Words: Dairy Goats, Milk, Selenium

T162 Effects of fibrolytic enzymes and seaweed extract on performance and carcass characteristics of meat goats fed a non-pelleted diet. G. V. Pollard¹, K. F. Wilson², H. Anderson³, and R. V. Machen⁴, ¹Texas State University, San Marcos, ²Animal Feed Technologies, Greeley, CO, ³Anderson Consulting and Training, Garden City, KS, ⁴Texas Agricultural Experiment Station, Uvalde.

Meat goats ($n=32$), averaging 43.8 kg with a minimum of 75% Boer influence, were utilized to determine the effects of supplemental fibrolytic enzymes and (or) seaweed extract on performance and carcass characteristics when fed a non-pelleted diet. Treatments evaluated were: control, fibrolytic enzymes, seaweed extract, and fibrolytic enzymes plus seaweed extract. The diet utilized in this study was 50% concentrate and 50% roughage with fibrolytic enzymes and seaweed extract added at 200 g and 4.54 kg, respectively, per 907 kg of diet. All diets were fed at 3.5% of body weight along with unlimited access to water for 87 d. Sixteen pens with 2 goats per pen were utilized for this study. All goats were placed on the control diet for 14 d prior to initiation of the study to allow for dietary acclimation. Goats were weighed on 14 d intervals for 84 d, on d 87 all goats were shipped to a commercial slaughter plant where kosher slaughter was performed and carcass data was collected. Carcass variables measured were hot carcass weight (HCW), dressing percentage, body thickness between the eleventh and twelfth rib (BT), back fat, leg score, and muscle conformation. All data were analyzed as a randomized design using the GLM procedure of SAS. Seaweed extract did not improve ADG ($P = 0.660$) compared to the control (112 g/d versus 98 g/d), while the combination treatment improved ($P = 0.048$) ADG (162 g/d) and the fibrolytic enzyme treatment tended ($P = 0.106$) to improve ADG (122 g/d) compared to the control. Carcass characteristics were unaffected by treatment with the exception of BT ($P = 0.130$) and HCW ($P = 0.212$) which both tended to be improved by use of the combination treatment compared to the control. The results of this study indicate that fibrolytic enzymes and seaweed extract used in combination can improve performance of meat goats fed high roughage diets.

Key Words: Enzyme, Goat, Seaweed

T163 Effect of fibrolytic enzyme supplementation on fermentation characteristics of ensiled maize stover morphological fractions. Z. H. Sun, Z. L. Tan, and S. X. Tang*, *Institute of Subtropical Agriculture, The Chinese Academy of Sciences, Changsha, P.R. China.*

Effect of supplemented fibrolytic enzymes from *Trichoderma longibrachiatum* on in vitro fermentation characteristic of ensiled morphological fractions of maize stover was determined using gas production technique. Enzymes (Cellulase activity: 2500 IU/ml) mixed with about 1000 g leaf blade (LB), leaf sheath (LS), stem (S) and whole plant (WP) of maize stover at 0, 10, and 20 ml/kg of fresh sample before ensiling, respectively. After 60 d of ensiling, the silage was sampled for determining the gas production. Three goats (18 ± 1 kg), fed a diet consisting of 500 g kg^{-1} concentrate and 500 g kg^{-1} forage containing DE (3.15 Mcal/kg DM) and CP (140 g/kg DM), were used as ruminal fluid donors for the preparation of inoculums. The gas production was measured in each vial after 2, 4, 8, 12, 15, 24, 48, 56 and 72 h of incubation. Gas production data were in triplicate fitted to an equation of $GP = P \times \exp\{-\exp[1 + r \times (LAG - t) \div P]\}$; where GP is the gas production at time (t), P is the potential gas production, r is the constant rate of gas production, LAG is the lag time of fermentation. The values of P and r of ensiled S and WP were higher than those of ensiled LB and LS ($P < 0.05$), LAG values of ensiled LB and LS were higher than those of ensiled S and WP ($P < 0.05$). There were differences in P, r and LAG ($P < 0.05$) for S and WP, and in P ($P < 0.05$) for LS and LB among three enzymes treatments. These data suggest that addition of fibrolytic enzymes affected fermentation characteristic for ensiling morphological fractions of maize stover.

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Table 1.

Item	Enzyme level, ml/kg	LB	LS	S	WP
P	0	128.0 ^{cb}	143.7 ^{bC}	158.1 ^{aC}	166.8 ^{aC}
	10	138.6 ^{dB}	162.3 ^{cb}	174.9 ^{bB}	193.1 ^{aB}
	20	156.2 ^{cA}	183.2 ^{ba}	208.9 ^{aA}	217.9 ^{aA}
r	0	2.1 ^{aA}	2.4 ^{ba}	2.7 ^{aB}	3.1 ^{aB}
	10	2.2 ^{cA}	2.6 ^{ba}	3.3 ^{aB}	3.5 ^{aAB}
	20	2.5 ^{cA}	2.7 ^{bcA}	3.8 ^{aA}	3.7 ^{aA}
LAG	0	4.9 ^{aA}	3.1 ^{ba}	1.2 ^{cA}	1.3 ^{cA}
	10	4.3 ^{aA}	2.3 ^{ba}	0.3 ^{dA}	1.2 ^{cA}
	20	3.7 ^{aA}	3.3 ^{aA}	-0.8 ^{bb}	-0.3 ^{bb}

^{a,b,c,d}Means in a row or A,B,C means in a column sharing different letters are significantly different respectively.

Key Words: Maize Stover, Fermentation Characteristic, Fibrolytic Enzyme

T164 Kidding performance of Myotonic and Spanish goats mated to Boer and Kiko sires in an accelerated mating system. S. Wildeus* and J. R. Collins, *Virginia State University, Petersburg.*

This experiment evaluated the performance of Myotonic and Spanish does mated to Boer and Kiko sires in an 8-mo breeding scheme. A herd of 50 Spanish and 40 Myotonic does were mated in single sire groups to 4 Boer and 4 Kiko bucks during 30-d breeding periods in November, July and March. Each breeding period was replicated. Does were managed as one group in a pasture-based system, except during mating, and supplemented with concentrate (1.5% BW) during late gestation and lactation. Kids were weaned at 9 wk. Pregnancy was determined on d 1 and 21 after the end of breeding. Data were analyzed in a model that included dam breed, sire breed, and breeding season. Pregnancy rates were 88.3, 13.0, and 64.4% for November, July and March breeding ($P < 0.01$), respectively, and were not affected by dam breed. Kidding rates were lower ($P < 0.05$) in Myotonic (42.7%) than Spanish dams (63.6%) for March breeding, but similar between dam breeds for November and July breeding. Litter size at birth was greater ($P < 0.01$) for November (1.96) than July (1.78) and March (1.70) breeding, and Myotonic dams had smaller litters for March breeding than Spanish dams (1.56 vs. 1.84; $P < 0.05$). Litter birth weight was lower ($P < 0.05$) for March (4.87 kg) than November (5.51 kg) and July (5.41 kg) breeding. Litter birth weight was heavier in Spanish dams when sired by Boer bucks, while they were heavier in Myotonic dams when sired by Kiko bucks (dam by sire breed: $P < 0.05$). Litter ADG and 60-d adjusted weaning weight were greater ($P < 0.05$) in Spanish (205 g/d and 18.1 kg) than Myotonic dams (165 g/d and 14.1 kg), and when sired by Kiko (205 g/d and 17.4 kg) than by Boer bucks (164 g/d and 15.2 kg). Spanish does (44.3 kg) were heavier ($P < 0.001$) than Myotonic does (34.7 kg), however, litter weight weaned as % doe weight was similar between dam breeds, but higher for November (46.7%) than July (39.6%) breeding, with March intermediate (42.0%). Data indicate that Spanish and Myotonic dams were not well suited for a pasture-based accelerated mating system due to low conception rates following July, and increased pre-natal losses following March breeding.

Key Words: Goats, Kidding Performance, Accelerated Breeding

T165 Effects of alfalfa hay and/or concentrate diets on growth, organ mass, blood and muscle metabolites, and volatile fatty acids in Boer × Spanish male kids. B. Kouakou*, G. Kannan, J. H. Lee, and T. H. Terrill, *Agricultural Research Station, Fort Valley State University, Fort Valley, GA.*

Weaned kids (BW = $18 \pm .8$ kg; n = 36) were used to determine the effect of alfalfa hay, concentrate, or concentrate following hay feeding on performance, organ mass, metabolites and ruminal volatile fatty acids. Kids were stratified by BW, housed in 9 pens (4 kids/pen), with free access to water. Ground alfalfa (*Medicago sativa*) cube hay or an 18 % CP concentrate diet were fed during two periods of 45 d each. During the first period, two groups of kids (6 pens) were fed hay alone, and one group (3 pens), the concentrate diet. During the second period, one of the hay-fed groups (3 pens) was switched to the concentrate, while the other groups remained on the previous diets. Dietary treatments were HH (Hay, Hay), HC (Hay, Concentrate) and CC (Concentrate, Concentrate) for first and second period diets, respectively. Weights and blood samples were taken every 45 d. At the end of the second period (d 90), all animals were moved to the meat

processing facility for overnight holding (water available but without feed). At slaughter, reticulo-rumen and intestines (with and without digesta), and liver weights were recorded. Rumen fluid was collected. Blood samples were analyzed for glucose. Liver and muscle samples were analyzed for glycogen. Proportions of propionate, butyrate, and isovalerate and blood glucose increased with concentrate finishing while proportion of acetate, and acetate:propionate ratio increased with hay finishing. Liver and muscle glycogen concentrations were not influenced by diet. Final weights were lower ($p < 0.001$) for kids fed hay (21.5 and 22.7 kg for HH and HC) compared to those fed concentrate (30.3 kg). Ruminal ammonia was lower ($p < 0.001$), but intestinal and ruminal pH was higher ($p < 0.001$) in goats finished on hay. Liver, rumen (g and % BW), and small intestine (g not % BW) increased ($p < 0.001$) with concentrate feeding. Concentrate finishing increased weight (% BW) of liver and rumen but not the small intestine. Starting weaned kids on alfalfa cube hay and finishing on concentrate for only 45 d may not add benefit in terms of weight gain.

Key Words: Goat, VFA, Glucose, Organs

T166 The effect of mixed species grazing management on forage yield and quality. Y. Ghebreyessus*, V. Bachireddy, S. Gebrelul, R. Payne, and M. Berhane, *Southern University.*

Cow calf production is one of the major sources of income for small farmers in Louisiana. Goat production has great potential to be an alternative source of income. A study to evaluate the effect of mixed species grazing systems on the forage yield and quality was conducted. Animals were grazed on Bermuda grass pastures during the summer and ryegrass during the winter. In a 3×2 factorial, 80 Spanish goats and 28 Brangus cows were randomly assigned to continuous or rotational grazing systems, and three grazing schemes (goat-alone, cattle-alone or mixed). A land area of 28 ha on Bermuda grass was divided into six pastures, 8 ha each for mixed-species grazing, 2 ha each for goats-alone grazing and 5.5 ha each for cattle-alone grazing. The rotational pastures were further divided, using electric fences, into four paddocks. Each paddock was grazed for seven days and allowed to rest for approximately 21 days. Soil samples were collected and based on soil test results, lime and fertilizers 8-24-24 in fall and ammonium nitrated in spring were applied. Forage samples were collected weekly to determine plant height, forage yield and forage quality. Animals were weighed every 28 days. Based on two years data significant difference in forage yield was found among species and species by grazing interaction ($P < 0.05$). Yield ranged from 972 to 1,030 kg/ha. Grazing systems did not show significant differences but yield from rotational grazing was higher than continuous. Yield difference between years and among months was highly significant, ranging from 410 to 1,895 kg/ha. Plant height was significant for grazing and species interaction. Lowest plant height of 18 cm was obtained from cattle alone under rotational grazing and highest of 22 cm was from mixed species under rotational grazing. Crude protein varied significantly between years, among months and species and grazing interaction (8.4 to 11.7%, $P < 0.05$). ADF values ranged from 37.6 to 38.3% and were significant with all treatments. NDF values ranged from 41.2 to 60.2% and were significant with species and months interaction.

Key Words: Cattle, Forages, Goats