

a result of leaching of other compounds. This leaching, as evidenced by decreasing NDF, left more protein as a percent of the whole. In conclusion, seeding triticale between windrowed millet offers no benefit if the triticale is not able to provide a substantial portion of the diet. However, windrowed millet is a viable, low cost option for winter-feeding.

Key Words: Heifer calves, ADG, Windrow grazing

M228 Forage intake and in vivo digestibility of two rhizoma peanut genotypes harvested for hay in the tropics. T. Ruiz* and L. Rivera-Estremera, *University of Puerto Rico, Mayaguez.*

Rhizoma perennial peanut (RPP) is a forage legume that has shown high nutritive value and yield potential when grown in the tropics. Two genotypes, TARS line nos. 17033 (PI No. 276233) and 17097 (PI No. 262839) with the highest and second highest DM yield, respectively, have an excellent potential for commercial release in the Caribbean. The apparent digestibility and intake of hay from these lines was determined in a feeding trial with young sheep (25 kg), during November and December of 2001. Animals were fed ad libitum to stimulate maximum consumption of hay from the two RPP lines and coastcross no. 1 Bermudagrass. Intake and apparent digestibility of DM and organic matter (OM) were similar between RPP lines. Compared to Bermudagrass, intake of DM (1.01 vs. .74kg/d), OM (.92 vs. .68 kg/d), and apparent digestibility of DM (57.7 vs. 47.7%) and OM (59.8 vs. 50.7%) were higher ($P < .01$) for the RPP hays. The apparent digestibility of CP was higher in 17033 compared to 17097 (64.6 vs. 59.4%) legume hay. The CP digestibility in the RPP hays was close to being twice that of the Bermudagrass hay (33.9%). Despite differences in DM and OM consumption among the treatments, the experimental animals consumed similar amounts of NDF (.50 kg/d). It can be concluded that these two RPP genotypes show similar quality potential which is greater than that of Bermudagrass hay harvested at a similar stage of maturity.

Key Words: Tropical legume, Bermudagrass hay, Rhizoma perennial peanut

M229 Apparent digestible dry matter intake of ammoniated wheat straw diets in beef cows as affected by wheat middlings and biotin supplementation. R.D. Wiedmeier*¹, P.R. Schmidt¹, B.A. Kent¹, and D.R. ZoBell¹, ¹Utah State University, Logan, Utah.

The objective of this study was to determine the effect of supplemental wheat middlings (WM) and biotin on intake and digestibility of ammoniated wheat straw (AWS) diets. Sixteen fall calving, lactating beef cows and their calves were stratified into four groups and placed in four pens, four cows and calves/pen. Each pen had a creep feeding area for calves with alfalfa hay (AH) offered ad-libitum. Two pens received 4.58 kg of AH and 0.22 kg of vitamin-mineral premix/cow/d. The other two pens received 4.08 kg of WM and 0.19 kg of vitamin-mineral premix/cow/d. All pens received ad-libitum access to AWS with intake measured daily. After a 60 d adaptation period apparent nutrient digestibility was estimated twice at 30 d intervals, each with a 5 d diet

and fecal collection period and acid insoluble ash (AIA) as an internal marker. Intake of AWS was higher ($P = 0.0001$) when supplemented with WM compared to AH (12.41 vs 8.65 kg DM/cow/d, respectively). Digestibility of DM was also higher ($P = 0.005$) when supplemented with WM compared to AH (53.1% vs 47.7%, respectively). As a result, DDMI was 9.22 vs 6.42 kg/cow/d. After weaning, 12 of the dry, pregnant cows were stratified into six groups of two cows each per pen. Three of the pens received 2.73 kg/cow/d of WM supplement that was fortified with 30 mg of biotin (WMWB). The other three pens received 2.73 kg/cow/d of WM supplement without biotin (WMWOB) fortification. All pens received ad-libitum access to AWS with intakes measured daily. After a 30 d adaptation period, apparent nutrient digestibility was estimated with a 5 d diet and fecal collection period and AIA as an internal marker. Intake of AWS was not affected by biotin fortification ($P = 0.89$, 12.68, WMWOB vs 12.48, WMWB kg DM/cow/d). However, biotin fortification enhanced ($P = 0.008$) DM digestibility (52.75%, WMWOB vs 61.15%, WMWB). Thus, DDMI was improved by 14.6% with biotin fortification (8.13, WMWOB vs 9.32, WMWB kg/cow/d).

Key Words: Beef, Supplementation, Digestibility

M230 Influence of supplementing soybean hulls to steers consuming endophyte infected tall fescue pasture. R. B. Pugh*, J. B. Pulliam, J. C. Waller, and C. J. Richards, *University of Tennessee, Knoxville TN.*

Six steers (289 ± 2 kg BW) fitted with ruminal and duodenal cannulas were used in a crossover design to evaluate intake and site of nutrient digestion of fresh clipped endophyte infected tall fescue (*Festuca arundinacea*) pasture with or without soybean hull supplementation at 0.70% BW (DM basis). Steers were placed in metabolism units within an environmentally controlled room and provided with free choice access to fresh forage, water and a vitamin/mineral block. The spring growth of tall fescue was harvested daily for feeding during the experiment. Supplement was fed at 0700 with approximately 65% of the estimated daily forage. Additional forage was stored in a cooler and fed at 1900 to maintain a fresh forage supply. Periods were 21 d with 15 d of adaptation and six d of sample collection. Chromic oxide was dosed twice d starting on d nine for use as a digesta flow marker. Duodenal samples were taken 4 times d with times shifting one hour each d to represent all hours of a d. Soybean hull supplementation decreased ($P < 0.01$) forage intake from 2.6 to 2.2% BW, but increased ($P < 0.01$) total DMI from 2.6 to 2.9% BW. Apparent ruminal DM digestibility percentage (61%) was not affected ($P > 0.10$). Crude protein intake was not different ($P > 0.10$) between treatments, but duodenal CP flow for the supplemented treatment (775 g/d) was greater ($P > 0.01$) than the control treatment (563 g/d). Ruminal pH was not affected (6.5; $P > 0.15$) and ruminal ammonia nitrogen concentration was decreased ($P < 0.01$) from 3.7 to 2.3 mM with soybean hull supplementation. Supplementation of soybean hulls at a rate of 0.70% BW to calves consuming fresh tall fescue decreased forage consumption, but resulted in greater total intake, no change in percentage of ruminal dry matter digestion and greater flow of protein to the duodenum.

Key Words: Feed supplementations, Digestion, Forage

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M231 Nitrogenous fractions of *Pithecellobium dulce* in tropical dry forest. T. Clavero* and R. Razz, *Centro de Transferencia de Tecnología en Pastos y Forrajes. La Universidad del Zulia. Venezuela.*

In an *Pithecellobium dulce* plantation located in the western part of Venezuela a trial was carried out to assess the content of the nitrogenous fractions during different growing seasons. Three growing seasons were studied (maximum, P1; mean, P2 and minimum, P3; rainfall). The experiment was laid out as randomized block design with four replications. The data showed significant differences ($P \leq 0.05$) for total nitrogen content (TN), rumen soluble nitrogen (SN) and non protein nitrogen of the soluble nitrogen (NPN/SN) in relation to growing season. The solubility of the total nitrogen ranged from 38.3 to 45%. The highest values of TN and SN were reported during the maximum rainfall. Nitrogen fixed to the cell wall of the insoluble nitrogen and nitrogen in fiber acid

detergent (NFAD) were not affected for growing season. *Pithecellobium dulce* has an adequate content of TN, SN and NPN/SN and represent an alternative as source of nitrogen for ruminant in tropical conditions.

Key Words: Nitrogenous fractions, *Pithecellobium dulce*

M232 Silage quality of *Leucaena leucocephala* ensiled with molasses. T. Clavero* and R. Razz, *Centro de Transferencia de Tecnología en Pastos y Forrajes. La Universidad del Zulia. Venezuela.*

The study aimed to evaluate the influence of molasses in ensiling leucaena tops in western Venezuela. Chopped fresh plant materials of about 1 cm length were ensiled into laboratory silo and stored at 25C. The experimental design was a completely random with a 3x3 factorial arrangement. Factors studied were three rates of legumes:molasses, 1:4, 1:8 and

1:12(w/v) and three storage periods (2, 4 and 6 months). After opening the silos, DM, pH, total nitrogen content (NT), rumen soluble nitrogen (SN), protein nitrogen (NP), nitrogen in fiber acid detergent (NFAD), nitrogen fixed to the cell wall of the total nitrogen (NFND/NT), fiber acid detergent (FAD) and fiber neutral detergent (FND) were determined. DM of leucaena was not changed during ensiling and the molasses additive had not significant effect on the silage DM. Molasses addition decreased significantly ($P \leq 0.05$) pH values. The lowest pH value (3.8) was obtained with the relation 1:12. Longer storage period (4 months or more) significantly reduced pH in leucaena silages. Contents of NT, SN and NP increased significantly ($P \leq 0.05$) with increased level of molasses and decreased with storage period, respectively. No significant differences ($P \geq 0.05$) in NFAD, NFND/NT, FAD and FND were found between levels of molasses. The time of storage significantly affected ($P \leq 0.01$) the loss of NFAD and NFND/NT. According to the results, it is concluded that addition of molasses to leucaena improved silage quality characteristics.

Key Words: *Leucaena leucocephala*, Silage, Molasses

M233 The effects of rumen liquor pre-treatment of desiccated coconut waste on the performance of Growing Pigs in Samoa. A. O. Ajuyah, C. Okere*, and S. Kumar, *The University of the South Pacific, Alafua Campus, Apia, Samoa.*

The feeding value of desiccated coconut waste (DCW) pre-treated with rumen liquor was investigated using 24 weaned crossbred (LW x LR) pigs weighing approximately 8.9 kg. DCW was fermented in rumen liquor for three days in a sealed container, and then sun-dried. Fermented DCW was incorporated into a weaner diet at 50% (Diet 1). Another diet (Diet 2), based on untreated DCW included at 50% in the diet, served as control. A third diet (Diet 3), a commercial pre-grower diet served as a practical control. Pigs were assigned to six pens (2 barrows and 2 gilts per pen) and fed as a group on ad libitum basis for six weeks. Daily feed intake and weekly live weights were recorded. The weekly backfat depth was determined with Recon Lean Meter. Dietary treatment means were compared and differences determined using the Least Significant Difference (LSD) test method. For pigs fed fermented DCW (Diet 1), the number of days required to attain the 30 kg target live weight was decreased by 4 days. This decrease was, however, not significant ($P \geq 0.05$). Also, for pigs on Diet 1, average daily gain increased by 3.0% and feed conversion ratio was reduced by 2.0% and average daily feed intake increased by 4%, these differences were, however, not significant ($P \geq 0.05$). Data obtained on backfat thickness indicated no significant differences ($P \geq 0.05$) between diets. These results suggest that pre-treatment with rumen liquor is a sustainable processing technique to formulate nutritionally effective and economically cheap weaner diets using DCW, the most abundant and cheapest local ingredient for use in pig feed formulations in the South Pacific region.

Key Words: Desiccated coconut waste, Pigs, Samoa

M234 Prediction of the amino acid content in wheat based on the crude protein value. M. Cervantes*¹, F. Copado², R. Soto¹, N. Torrentera¹, S. Espinoza¹, and J.L. Figueroa², ¹*Instituto de Ciencias Agrícolas, Universidad Autónoma Baja California, Mexicali*, ²*Colegio de Postgraduados, Montecillos, Mexico.*

The amino acid (AA) composition in commercial wheat samples was analyzed, and models were created to predict the AA content on the basis of the cereal crude protein (CP) content. One hundred and fifty samples

of the cereal were collected at the field during the 2001 harvest. The CP value was obtained by multiplying the nitrogen content by the 5.65 factor. The samples were grouped in three lots based on the percentage of CP (high, medium, and low). Nine representative samples of each group were analyzed for AA. Correlation and regression analysis were performed between the contents of real protein (sum of the contents of all AA) and each AA. Glutamate and proline were the most abundant AA. A high variation in the crude protein and amino acids content (CV from 7.4 to 14.0%) was observed in the evaluated wheat samples. The non-essential AA were mainly responsible for this variation, apparently because of their higher content, as compared with the essential AA. Phenylalanine, isoleucine and leucine were the AA with the highest variations; arginine, histidine, methionine, threonine and valine were of moderate variation; lysine was the less variable AA. There was a high ($r = 0.97$) and significant ($P < 0.01$) correlation coefficient between the real and the CP content in the cereals. The regression was significant for all AA. The prediction models for histidine, threonine, methionine and lysine had the lowest regression coefficients. The regression equations of the first limiting AA were as follows: Lysine = $0.15982 - 0.012 + 0.01709 - 0.001$ ($P < 0.01$; $R^2 = 0.897$); Threonine = $0.08364 - 0.011 + 0.02293 - 0.001$ ($P < 0.01$; $R^2 = 0.952$). These results show a great variation in the AA and the protein content in commercial wheat. Based on the regression analysis, it is concluded that protein content is a good estimator of the amino acid content in wheat, and that the regression models obtained from this study allow to save time and money in the analysis of the amino acid content in this cereal.

Key Words: Wheat, Prediction equation, Amino acids

M235 Effect of parturition body condition and breed on production performance in crossbred dual purpose cows. O. Araujo-Febres* and J. A. Gutierrez, *La Universidad del Zulia, Maracaibo, Venezuela.*

Multiparous dual purpose crossbred cows ($n = 28$) were used in a randomized block design to determine the effect of parturition body condition and racial predominance: of Holstein (H), Brown Swiss (BS) and Brahman (B) cows on milk production (MP) and calving to conception interval, in a tropical dry forest environment. Body condition is a useful tool to evaluate the energy status in cows. It was used on a scale of 1 to 5 to body score cows (1 = emaciated; 5 = obese). Data were collected every two weeks in six time periods: prepartum, at calving, postpartum, prebreeding, postbreeding and 120 days postpartum. Individual cows with multiple observations were included in the analysis as repeated measures (368). Cows were managed as a simple group. Body condition score changes were defined as BCS-final minus BCS-initial. Analysis of variance was conducted with GLM procedures of SAS. It was observed that the cows milk production was independent of precalving BCS, but cows that showed a greater milk production lost greater rank of BCS, obtaining a significant ($P < .05$) and negative correlation ($r = -0.42$). The H cows reached the greater average of MP and greater loss of BCS (9.50 L and -0.48, respectively); the BS cows were intermediate (8.94 L and -0.25) and the B were the inferior (8.28 L and -0.20). BCS had no influence on calving to conception interval, while racial predominance had influenced ($P < .05$) calving to conception interval (H = 86.8 days; BS = 101.6 d; and B = 183.0 d). It is concluded that BCS at the time of parturition is an important factor affecting subsequent milk production, while racial predominance affects either milk yield or calving to conception interval.

Key Words: Dual purpose cattle, Body condition, Milk production