1431 Social stress induced different alterations of dopamine concentrations and adrenal function in genetically selected chicken lines. P. Singleton*[1], Y. Chen[1], M.W. Muir[2], and H.W. Cheng[1], [1]*USDA-ARS, Livestock Behavior Research Unit,* [2]*Dept of Animal Science, Purdue University.*

Dopamine (DA) and corticosterone (CORT) are involved in regulating animals' response to stress. The objective of this study was to examine whether alterations of DA concentrations and adrenal function are associated with behavioral response to social stress in two strains of White leghorns hens that were selected for high (HGPS) and low (LGPS) group productivity and survivability resulting from cannibalism and flightiness in multiple-hen cages. At 17-wk of age, hens were randomly assigned into single and 2-hen cages. The 2-hen cages contained one hen from HGPS or LGPS line and one from a commercial Dekalb XL line that was used as standardized genetic competitors. At 24-wk of age, seventy hens were bled (10 hens from 3 genetic line, 2 replicates, plus 10 extra testers). Plasma concentrations of DA were measured using HPLC. Changes of the adrenal function were indicated by plasma concentrations of CORT, and hypertrophy of the adrenal gland indicated as a percentage of adrenal gland weight/body weight (AW/BW). In single-hen cages, HGPS hens had heavier adrenal glands indicated as a greater AW/BW ratio ($P < 0.05$). However, LGPS hens tended to have greater plasma concentrations of DA ($P = 0.07$). In 2-hen cages, there were no difference in AW/BW ratio between HGPS and LGPS hens ($P > 0.1$). However, both plasma concentrations of CORT and DA were greater in LGPS hens ($P < 0.05$ and $P < 0.0$ 1, respectively). The results suggest that social stress induced an up regulation of DA and adrenal function in LGPS hens but not in HGPS hens. The data was consisted with the previously findings that HGPS hens adapted better to social competition. Some of the parameters, such as concentrations of DA and CORT, could be used as an indicator of chicken well-being.

Key Words: Social stress, Dopamine and corticosterone, Genetic selection, chickens

1432 MHC and Family Effects of Cellulitis on Lymphocyte proliferation in MHC defined broiler chickens. K. S. Macklin*, R. A. Norton, and S. J. Ewald, *Auburn University, Auburn, AL.*

Previous work, using avian cellulitis origin *E. coli* isolate (EC-AR1) in broilers demonstrated that the MHC (B type) effects lesion development, specifically that B^{13} was resistant, while B^{21} was susceptible. Other researchers have reported that B^{13} in leghorn chickens has a stronger response than B^{21}, when tested with a lymphocyte proliferation assay. The purpose of this study was to use a lymphocyte proliferation assay to: 1. Investigate previously reported leghorn MHC responses in broiler chickens. 2. Use pedigreed matings to determine family effects. 3. Determine proliferation responses in MHC family defined (pre-challenged and challenged) birds to 2.5ug ConA, 1:100 Pokeweed and $1x10^6$ killed *E.coli* (EC-AR1). *E.coli* isolate EC-AR1 has been extensively characterized by this lab in developing two cellulitis models. Matings for the following experiments were designed using B^{13}/B^{21} birds (1 male: 10 females). Four experiments were conducted with serological MHC typing at three weeks of age. At week four nine birds of the appropriate MHC (B^{13}/B^{13} and B^{21}/B^{21}) and family types (A-D) were bled and a lymphocyte proliferation assay performed. The following day birds were challenged with a subcutaneous injection of *E.coli* (EC-AR1). Eighteen days post challenge these birds were bled for the proliferation assay, sacrificed and assessed for the presence of cellulitis lesions. Results of lymphocyte proliferation assays closely mimic previously reported results for leghorn type chickens in that B^{13}/B^{13} birds produce a stronger response than do B^{21}/B^{21} birds. A significant sire family difference was also noted in both proliferative response and development of cellulitis lesions. Results support the hypothesis that MHC plays an important role in influencing lymphocyte response and cellulitis development, while also implying that other yet to be identified genes play a role in these responses.

Key Words: MHC, broiler chicken, lymphocyte proliferation

ASAS/ADSA Forages and Pastures: Silages, Forage Quality, and Digestion

1433 Effect of wilting and molasses on silage quality of Leucaena leucocephala. T. Clavero*[1] and Rosa Razz[1], [1]*La Universidad del Zulia.*

A experiment was conducted in the dryland farming area of northwest, Venezuela in order to evaluate the ensiling properties of Leucaena leucocephala through microsilo techniques. Factors studied were two levels of molasses (0 and 5%) added during ensiling and wilting for 0 and 3h. Statistical analysis was made using a 2x2 factorial arrangement and mean values were compared by Fisher's least significant difference test. Response variables considered were: crude protein (CP), content, ammonia nitrogen as percent of total nitrogen, pH, acetic and lactic acid contents. Addition of molasses increasing ($P<0.05$) lactic acid content (2.01 vs 7.15%), the crude protein content was about the same (21.8 vs 21.6) whatever the molasses treatment, while reducing ammonia products (2.8 vs 1.9%), pH, (4.7 vs 4.1) and acetic acid (4.8 vs 3.6%). Silages prepared from non-dehydrated forage had higher ($P<0.05$) CP contents (21.5 vs 20.8%), ammonia products (4.1 vs 2.2%) and acetic acid (5.3 vs 2.6%) and lower pH (4.4 vs 4.7) with less lactic acid (3.5 vs 6.5%). This suggests that combination of molasses and wilting can improve the fermentation quality of Leucaena leucocephala silage more than each of them being as a single treatment.

Key Words: Leucaena leucocephala, molasses, silage

1434 Prediction of reed canarygrass quality as influenced by N fertilization and maturity. D.J.R. Cherney*, D.R. Dewing, and J.H. Cherney, *Cornell University, Ithaca, NY.*

The need for more control over forage quality will increase with expanding herd size and increasing individual cow production. Our objective was to develop equations for predicting NDF and CP of first cutting reed canarygrass (*Phalaris arundinacea* L.) using growing degree days base 32°F (GDD32) and Julian date. Previous research has indicated a base temperature of 32°F resulted in better predictions than the 41°F base typically used for forage crops. Pure stands of established reed canarygrass in replicated field plots were fertilized with 0, 56, or 112 Kg of N/ha at the onset of spring growth at four locations in central and western New York over two growing seasons. Plots were sampled beginning Mid-May and continued until the end of May or early June. Regression analysis indicated that GDD32 was the best single predictor of NDF (R^2=0.608 and and MSE=31.8) across all locations, years, and N rates. At each individual location and N rate, however, prediction equations generally had R^2 above 0.90 and MSE generally was below 6. The harvest window, when forage NDF was between 50 and 60% NDF, was predicted using regression analysis. Harvest window ranged from 6 to 11 days. Julian date was the best single predictor of CP, but maturity explained only 50% of CP variation. Data suggest that development and use of prediction equations at individual locations would assist producers in developing harvest strategies to optimize forage quality.

Key Words: Forage quality, Grass, Reed canarygrass

1435 A survey of phytoestrogen activity in Kansas Flint Hills native grass pastures. D.A. Blasi*[1], S.I. Paisley[1], W.V. Welshons[2], and G.E. Rottinghaus[2], [1]*Kansas State University,* [2]*University of Missouri, Columbia.*

Plant-derived estrogens have been implicated as a contributing factor to observed increases in bulling activity and(or) reduced efficiency to growth-promoting implants. In an effort to characterize Kansas Flint Hills native grass pastures, the botanical composition and basal cover in three pastures were surveyed using a modified step-point procedure to estimate the incidence of individual plant species. In order to better characterize estrogenic activity, one hundred individual plant species were collected from the three pastures over three sampling periods and frozen. Using estrogen-stimulated growth of MCF-7 cells in tissue culture, all plant samples were subjected to a bioassay screening procedure designed specifically for feed/forage samples. Results are expressed on a zearalenone equivalent (ZE) ppm basis, which reflects the level of zearalenone required to elicit a comparable response. Approximately 85% of the plant species counted were warm season perennial grasses.

Leguminous (native and introduced) plants and forbs represented approximately 7 to 12% of the plant species. Estrogenic activity varied dramatically among the forage species assayed. The highest estrogenic activity was found in Many-Flowered Scurfpea *Psoralea Tenuiflor, Pursh.* and Ladino Clover *Trifolium repens L.* (average = 43.69 and 10.96 ZE, respectively). Intermediate levels of activity were found in Black medic *Medicago lupulina L.* and Korean lespedeza *Lespedeza stipulacea Maxim.* (average = 5.03 and 8.40 ZE, respectively). This initial survey effort reveals that estrogenic activity exists primarily in native and introduced legumes which compromised only 3 to 4% of the species counted. Consequently, it is not known if the incidence of plant species containing appreciable levels of plant-derived estrogen are sufficient to elicit a detectable response.

Key Words: Phytoestrogen, Buller steer syndrome, Native grass

1436 Changes in nutritive value for bermudagrass hay as affected by initial concentration of moisture and sampling date. J.E. Turner*, W.K. Coblentz, D.A. Scarbrough, K.P. Coffey, D.W. Kellogg, L.J. McBeth, and R.T. Rhein, *Animal Science Department, Univesity of Arkansas.*

Concentrations of moisture ≥20.0% are widely known to cause spontaneous heating and associated deleterious effects on forage nutritive value in alfalfa hay, but relatively little is known about these relationships in warm season grasses. 'Greenfield' bermudagrass was packaged in conventional rectangular bales at 21.9, 26.5, and 30.2% moisture (LM, MM, and HM, respectively). Bales made at each concentration of moisture were core sampled at storage (d 0) and after 4, 8, 12, 24 and 65 d of storage. The MM and HM bales accumulated more (P≤0.05) heating degree days≥35°C than the LM bales. Concentrations of most fibrous and fiber-associated N components increased (P ≤0.05)with time in storage. Concentrations of N increased (P ≤0.05)with time in storage for HM and MM bales, but the concentration of N in the LM bales did not change (P ≤0.05). Concentrations of NDF and ADF and N associated with these fiber fractions were regressed on storage time using a nonlinear model ($Y = \alpha\text{-}\beta e^{-kt2}$); this model was generally effective ($r^2 \geq 0.711$)in describing these relationships. Linear regressions were evaluated that related indices of nutritive value with heating degree days ≥35°C and included observations obtained on all six sampling dates from bales made at each concentration of moisture. Heating degree days≥35°C were related (P ≤0.0001)to indices of nutritive value in all cases. However, tests of homogeneity indicated that regression lines were not homogenous (P≤0.05)across moisture concentrations at baling for each index of nutritive value. The results of this study demonstrate the negative effects on nutritive value that occur in association with packaging bermudagrass hay at concentrations of moisture ≥21.9%. Nutritive value of the hay decreased with increasing concentration of moisture at baling throughout the 65-d storage period.

Key Words: Hay Quality, Heating Degree Days, Bermudagrass

1437 Partitioning of nitrogen in bermudagrass forages in response to nitrogen fertilization. J.L. Gunsaulis, W.K. Coblentz*, M.B. Daniels, J.E. Turner, D.A. Scarbrough, J.B. Humphry, K.A. Teague, K.P. Coffey, and N.W. Galdamez, *University of Arkansas.*

During 2000, three harvests of common bermudagrass were made at two sites (Latta and Stephens) in northwest Arkansas to assess the effects of N fertilization on the partitioning of N within cell-soluble and cell-wall fractions of bermudagrass. Ammonium nitrate was applied in split applications totaling 0, 56, 112, 168, 224, 280, or 336 kg N/ha for the year. These totals were reached by applying various combinations of 0, 56, 112, or 168 kg N/ha on the two application dates (28 April and 19 July). Forages were harvested on 30 May, 7 July, and 18 August. On the first harvest date, concentrations of total N increased linearly (P < .0001) with fertilization rate at both sites. The overall range for concentrations of N in these forages was 1.78 to 3.53% across both sites. Cell-soluble N increased linearly (P < .034) with N fertilization rate at both sites, while cell-wall associated N declined in a linear pattern concurrently. During the second harvest, none of these effects were observed at either site (P > 0.05). Following the second application of N fertilizer, concentrations of N on the third harvest date increased with linear (P < .0001) and quadratic (P = .002) trends at the Latta site and in a linear (P < .0001) pattern at the Stephens site. Greater (P < .047) proportions of the total N pool became associated with the cell solubles as fertilization rates increased. On the third harvest date, concentrations of ADIN declined linearly (P < .011) with N fertilization at both sites from a maximum of 8.58% to a minimum of 5.90% of the total pool of N in the forage. Averaged over all harvests, N fertilization was positively associated with the proportion of N in the cell solubles and the concentration of N in the total plant. Conversely, the proportions of total N remaining after extraction in neutral and acid detergents declined in response to fertilization with N. All of these overall effects were linear (P < .023).

Key Words: bermudagrass, N fertilization, cell wall

1438 Brown midrib-3 corn silage as the major forage for transition cows. H.H.B. Santos*[1], V.R. Moreira[1], Z. Wu[2], and L.D. Satter[1,2], [1]*U.S. Dairy Forage Research Center, USDA-ARS,* [2]*University of Wisconsin, Madison.*

The objective was to evaluate brown midrib (bm3) corn silage as a forage for transition cows. Cows (29 primiparous and 83 multiparous) were divided into three groups and balanced according to lactation number and 305d ME milk (multiparous). Two of the three groups were combined for one of two prepartum trts. Cows were placed in trt groups 3-4 wk (mean = 23 days) before their projected calving date. The two prepartum diets contained 65% forage and 35% concentrate, with corn silage (CS) providing 60% and alfalfa silage (alf) 40% of the forage (DM basis). The control CS (Dekalb 512 RR) was stored in two tower silos, and the bm3 (Cargill F657) stored in a bag silo. After calving the three groups, two of which were fed control CS prepartum, were assigned to three postpartum diets for 4-5 wk (mean = 33d). The control diet (control 55 F) contained 55% forage and 45% concentrate, with 58% of the F as control CS and the balance as alf. The second and third postpartum diets contained 65% F, 58% of which was CS and 42% alf. One of these was the control CS (control 65 F) and the other was bm3 CS (bm3 65F). Cows fed control CS prepartum were fed control CS postpartum. Cows were fed a TMR once daily in a tie stall barn. Changes in body weight and body condition score were similar across treatments before and after calving. DMI and post-calving health did not differ between trts. Milk production was similar across trts for primiparous cows, but multiparous cows produced 2 kg/d more with the bm3 trt (P=.09).

		Control 55F	Control 65F	bm3 65F	SEM	—P <— CS	F level
DMI, kg/d	Primi	13.0	13.1	12.8	1.1	0.84	0.91
	Multi	16.7	16.9	17.1	0.6	0.78	0.85
Milk, kg/d	Primi	25.0	24.5	24.3	1.6	0.93	0.82
	Multi	33.4	32.9	35.2	1.0	0.09	0.75
Milk fat, %	Primi	4.25	4.41	4.80	0.25	0.29	0.65
	Multi	4.57	4.81	4.81	0.14	0.99	0.24
Milk CP, %	Primi	3.29	3.24	3.28	0.11	0.84	0.74
	Multi	3.35	3.47	3.26	0.06	0.02	0.20

Key Words: Brown midrib, Corn silage, Transition cow

1439 Effects of the heterotrophic bacterium *Lactobacillus buchneri* on preservation of alfalfa and timothy hay. J. Baah*[1], L. Bos[2], F. H. VanHerk[1], R. C. Charley[3], and T. A. McAllister[1], [1]*Agriculture and Agri-Food Canada Research Centre, Lethbridge, AB,* [2]*Wageningen University, Wageningen, The Netherlands,* [3]*Biotal Canada Ltd., Niagara-on-the-Lake, ON.*

Alfalfa (*Medicago sativa* L.) and timothy (*Phleum pratense* L.) forage were harvested at low (14-18%), medium (18-22%) and high (23-33%) moisture levels (LM, MM, HM) and treated with a heterotrophic bacterium to determine its efficacy for maintaining forage quality during storage. During baling, each forage was treated with *Lactobacillus buchneri* (1.2×10^6 CFU/g fresh forage) as a liquid (LBL) or as a granular preparation (LBG), or with a buffered propionic acid product (10 mL/kg fresh forage, BPA), or was left untreated (control, CON). Triplicate 500-kg bales of each forage × moisture level were prepared. Internal bale temperatures were monitored continuously for 24 d (alfalfa) or 36 d (timothy), and core samples were collected for analysis 0, 15, 30 and 60 d after baling. After 60 d, voluntary DM intake and in vivo digestibility of chopped CON, LBL and PA hays were determined using 12 Canadian Arcott wethers in a double randomized complete block design experiment. All additives prevented heating, compared with CON, in both

forages at all moisture levels. With LBL and LBG, crude protein contents of HM timothy (12.9% and 12.2%, respectively) were higher ($P < 0.05$) than in CON (10.8%). In MM bales, ADIN content was highest ($P < 0.05$) in CON (32.3% in timothy, 25.0% in alfalfa) bales than in treated bales. The lowest ($P < 0.05$) ADIN in alfalfa (18.6%) occurred with LBG. Yeast counts were lowest ($P < 0.05$) in 60-d MM PA-treated alfalfa. Mold counts were lowest (< 100 CFU/g; $P < 0.05$) with LBL; no molds were detected in 60-d HM timothy with LBL. Dry matter digestibility did not differ ($P > 0.05$) among treatments. Treating timothy hay with LBL increased ($P < 0.05$) DM intake by sheep by 28.6% (to 1.33 kg/d) over CON, and by 19.7% over PA-treated timothy. The heterolactic bacterium *L. buchneri* can substantially improve the nutritive value of high moisture alfalfa and timothy hays.

Key Words: *Lactobacillus buchneri*, Forage hay, Nutritive value

1440 Effects of maturity and N fertilization on in vitro biohydrogenation of timothy linolenic and linoleic acids. H. Boufaied*[1], P.Y. Chouinard[1], G.F. Tremblay[2], H.V. Petit[3], R. Michaud[2], and G. Blanger[2], [1]*Universite Laval, QC, Canada,* [2]*Agriculture and Agri-Food Canada, Ste-Foy, QC, Canada,* [3]*Agriculture and Agri-Food Canada, Lennoxville, QC, Canada.*

Up to 75% of total fatty acids (FA) present in forage complex lipids are α-linolenic (C18:3) and linoleic (C18:2) acids. In the rumen, these polyunsaturated FA are liberated by lipolysis, and hydrogenated by microorganisms. Our objective was to determine the effect of maturity (stem elongation, early heading, late heading, and early flowering) and N fertilization (0 and 120 kg N/ha) on in vitro biohydrogenation of timothy (*Phleum pratense L.*) C18:3 and C18:2 FA. Timothy samples were taken during the primary growth of the first production year from a 2 × 4 factorial experiment in a split-plot design with four replications. Forage samples were dried and ground. Fatty acids were methylated using methanlolic HCl, and analyzed by gas chromatography. Concentrations of C18:3 and C18:2 decreased linearly with maturity and increased with N fertilization (P<0.05). Dried samples were incubated with rumen fluid at 39°C for 0, 3, 6, 9, 24, and 36 hours. After each incubation period, the samples were lyophilized, methylated, and analyzed for FA. The C18:3 and C18:2 concentrations decreased with incubation time (t) according to this model: C18:3 and C18:2 = i + b(e^{-ct}). The hydrogenation rates (c) of the potentially hydrogenable fraction (b) were not affected by maturity and N fertilization. The non hydrogenable fractions (i) of C18:3 and C18:2 increased with N fertilization (P<0.05) but they were not affected by maturity. The b fraction, the effective hydrogenation [EH = b(c/(c+0.06))], and the bypass (BP = i + b # EH) of C18:3 and C18:2 were higher in timothy harvested at stem elongation and decreased linearly with maturity (P<0.05). Nitrogen fertilization increased the b fraction, the EH, and the BP of C18:3, and it also increased the BP of C18:2 (P<0.05). The ruminal BP of C18:3 and C18:2 would be respectively 75 and 33% higher for timothy harvested at stem elongation and fertilized with 120 kg N/ha as compared with timothy harvested at early flowering with no N fertilization; this is mainly explained by the higher C18:3 and C18:2 concentrations in well fertilized timothy at early stage of maturity.

Key Words: Timothy, Growth Stage, Fatty acids

1441 Effects of ensiling carbohydrates with wheat straw and 4% urea. T.V. Nguyen*, M.J. Montgomery, and C.J. Richards, *University of Tennessee, Knoxville, TN.*

Two experiments were conducted to evaluate protein fractions of wheat straw ensiled with urea and additional carbohydrate sources. In the first complete randomized design experiment, 40 g of dried molasses, corn meal, rice mill or tapioca were added to 1000 g of wheat straw, 40 g urea and 1000 g water. The combination was ensiled anaerobically for 21 days before grinding for chemical analyses. Wheat straw treated with carbohydrate had a higher (P<0.01) CP content than the control. The CP contents were 8.33, 7.99, 7.74, 7.58 and 7.02% for dried molasses, corn meal, rice mill, tapioca and control treatments, respectively. Soluble nitrogen contents measured by direct distillation were lowest (P<0.05) for dried molasses (1.76) and corn meal (1.88%), intermediate for tapioca (1.96%) and highest (P<0.05) for rice mill (2.27%) and the control (2.06%). Insoluble CP was highest (P<0.05) in dried molasses (7.93%) and corn meal (7.12%) treatments, intermediate in rice mill (4.38%) and tapioca (4.55%) treatments and lowest (P<0.01) in the control (3.02%). The second experiment was a randomized complete block design. No additional carbohydrate or 3 levels (40, 60, or 80 g) of dried molasses or corn meal were added to 1000 g of wheat straw, 40 g urea and 1000 g water before ensiling and analyses as in the first experiment. Straw ensiled with dried molasses or corn meal had a higher (P<0.05) CP content (avg 8.69 and 8.88%, respectively) than control (7.46%). Level of corn meal addition did not affect (P>0.10) the CP content of ensiled straw, while addition of 80 g of dried molasses resulted in higher (P<0.01) CP concentrations than the addition of 40 g of dried molasses. An addition of carbohydrate into 4% urea treatment of wheat straw could increase both CP content and insoluble fraction of protein of silo.

Key Words: Urea, Crude Protein, Wheat straw

1442 Production and quality of Buffel grass (*Cenchrus ciliaris*)grown and utilized under different conditions in Northern Mexico. C Lizarazo-Ortega, H Bernal-Barragan, and E Gutierrez-Ornelas*, *Facultad de Agronomia, UANL. Marin N.L. Mexico.*

The objective of this study was to determine the effect of type and intensity of utilization on DM production and quality of Buffel grass (*Cenchrus ciliaris* cv Nueces) grown under natural rainfall or irrigation conditions in Northern Mexico. Sixteen plots (64 m^2 each) were grazed by Charolais cattle in order to achieve a 50% (G50) or 75% (G75) utilization of DM production. Eight plots (40 m^2 each) were hand clipped to use 50% (H50) of DM. Half of the experimental plots received only natural rainfall (yearly average = 583 mm), the rest of the plots were additionally irrigated with 70 mm after each utilization, which occurred in September and November 1999, and in June and November 2000. Production and quality variables were analyzed under a randomized block design. Year, type and intensity of utilization and irrigation were included in the model as main factors. Yearly forage crop was 22% higher ($P < 0.05$) for G50 than H50 (1893 vs 1541 kg DM/ha), without affecting ($P > 0.05$) residual forage (1421 vs 1213 kg DM/ha). No differences ($P < 0.05$) in forage crop were found between G50 and G75, after 2 years of study the available forage in G75 plots was similar to G50 (3363 vs 3253 kg DM/ha). Irrigation increased forage crop by 15% ($P = 0.13$) compared to those plots under natural rainfall conditions (1195 vs 1720 kg DM/ha). No differences ($P > 0.05$) due to type and intensity of utilization were found in CP, NDF, and ADF content of Buffel grass, but ADF was increased ($P < 0.05$) in irrigated plots. In vitro DM digestibility was higher ($P < 0.05$) in H50 than in G50 and G75 grazed plots (56.7, 54.7 and 53.3%). Buffel grass production was increased by grazing, but IVDMD was better in hand clipped forage.

Key Words: Buffel grass, Grazing intensity, Forage quality

1443 Effect of Mott Dwarf Elephant grass (*Pennisetum purpureum*) silage on dry matter intake, milk production, digestibility and rumen characteristics in Nili-Ravi buffaloes. M. Q. Bilal, M. Abdullah*, and M. Lateef, *University of Agriculture, Faisalabad, PAKISTAN 38040.*

The effect of Mott grass (*Pennisetum purpureum*) silage was determined on the performance of 12 lactating Nili-Ravi buffaloes in a Randomized Complete Block Design (RCBD) with three replicates. The four treatments included; 100 % green chop (control, T_1), 2/3 green chop and 1/3 Mott silage (T_2), 1/3 green chop and 2/3 Mott silage (T_3) and 100 % Mott silage (T_4). The combination of green chop and silage in the treatments T_2 and T_3 was on dry matter basis. Average daily dry matter intake was higher (16.83 kg/d) in buffaloes on T_3 as compared to those fed the control (13.52 kg/d), T_2 (13.96 kg/d) or T_4 (12.00 kg/d) diets. The intake of crude fiber had the same trend as in case of dry matter for different treatments. Buffaloes fed the combinations of green chop and silage produced more 4 % FCM than those fed either green chop or silage alone (10.03 and 11.30 vs. 8.23 and 8.47 kg/d) for T_2 and T_3 vs. T_1 and T_4, respectively. Different treatments had no effect on the composition of milk. The digestibility of dry matter and crude fiber was significantly greater (p<0.05) in buffaloes fed the combination diets T_2 and T_3 (65.1 and 65.0 %, and 52.4 and 52.8 %) as compared to T_1 and T_4 (62.6 and 60.8 %, and 50.7 and 51.0 %) for dry matter and crude fiber respectively. Increased digestibility may be attributed to some positive associative effect between the two forage sources. The difference in rumen pH (6.69 to 6.72) for all the four experimental diets appeared to be non-significant. However, rumen ammonia nitrogen

was higher ($p< 0.05$) in buffaloes fed the green chop or the silage alone (25.0 and 24.3 mg/100ml, respectively) than in those fed the combination of the two forage sources (16.7 and 16.5 mg/100ml) for T_2 and T_3, respectively.

Key Words: Mott grass, Buffaloes, Milk production, Digestibility

1444 Assessment of forage quality and DM digestion kinetics for wheat forage as affected by harvest technique and sampling date. W.K. Coblentz, K.P. Coffey, J.E. Turner, D.A. Scarbrough, J.B. Humphry, J.V. Skinner, and D.W. Kellogg, *University of Arkansas*.

A trial was initiated in September of 1999 to assess the effects of harvest techniques and sampling dates on DM digestion kinetics and forage quality of wheat forage. "Delta King 9027" soft-red winter wheat was established at the Forage Research Area in Fayetteville. Wheat forage was grazed lightly throughout the fall to control growth. Forages were harvested on three dates in the spring, which corresponded to vegetative, mid-elongation, and boot stages of growth (6 March, 27 March, and 11 April, respectively). Sampling techniques evaluated on each date included three clipping techniques (whole plant, random pluck, and top half) and two evaluations of masticates (oven dried at 50°C or freeze dried). Concentrations of total N, NDF, ADF, hemicellulose, cellulose, and lignin were affected ($P < .0001$) by the harvest technique and sampling date main effects. In all cases, there was an interaction ($P \leq .0002$) of main effects. Digestion kinetics of DM for these forages were evaluated by the in situ technique using five ruminally fistulated (393±54-kg) crossbred steers. The potential extent of DM degradation was affected ($P < .0001$) by both main effects and their associated interaction. Harvest technique and sampling date both affected ($P < .0001$) degradation rate of DM; but their associated interaction did not ($P > .05$). Averaged over three sampling dates, rates of degradation for freeze-dried masticate (.088/h) were greater ($P < .05$) than all other treatments. Clippings of the top half of the canopy (.076/h) and oven-dried masticate (.070/h) had faster ($P < .05$) degradation rates than did the random-pluck (.055/h) and whole-plant (.055/h) clipping treatments. Lag time was affected ($P = .027$) by harvest technique only; lag times for freeze-dried masticate (.88 h) were shorter ($P < .05$) than all other treatments (mean = 1.65 h). Estimates of effective degradability of DM were high for all treatments (overall mean = 73.3%); however, main effects and their associated interaction were all highly significant ($P < .0001$).

Key Words: wheat forage, degradation kinetics, forage quality

1445 Physical and chemical characteristics affecting in vitro digestibility of corn silages of different particle sizes. G. Ferreira*[1] and D.R. Mertens[2], [1]*Universidad Catolica Argentina, Buenos Aires,* [2]*US Dairy Forage Research Center, Madison, WI.*

Nutritive evaluation of corn silage is complicated by interactions between grain and stover and between chemical composition and physical form. Thirty-two diverse corn silages were selected to study the relationships among in vitro digestibility and silage characteristics. Dried silages were incubated whole and after grinding (4 and 1 mm) for 24 h using in situ bags in a rotating jar in vitro system. Ranges in variables were: DM, 19-48%; CP, 6-12%; starch, 12-36%; aNDF, 30-56%; ADF, 18-35%; ADL, 1.2-3.5%; mean particle size (PS), 2.1-7.3 cm; in vitro DM disappearance (IVDMD) of whole silage, 45-77%; IVDMD 4-mm, 61-79%; IVDMD 1-mm, 59-82%; IV true DM disappearance 1-mm, 68-85%; and IV NDF disappearance 1-mm, 38-57%. Corn kernels and fragments >1/4 kernel were retained on sieves with apertures >4.75 mm. The proportion of total DM recovered as starch in kernels and fragments >4.75 mm (ST>4.75) ranged from 2 to 33%. Total starch was related to nonfibrous carbohydrate (NFC) calculated by difference: starch = -6.0 + .76(NFC), R^2 =0.87; ADF = 0 + .61(aNDF), R^2=0.84; and grain DM = 36.7 + .56 (silage DM), R^2=0.77. Individual relationships of aNDF, ADF, or ADL with IVDMD 4-mm or 1-mm yielded R^2 ranging from 0.59 to 0.76, with ADF having the highest R^2. These R^2 were from 0.21 to 0.40 for IVDMD of whole silages. The relationship of aNDF with IVDMD 4-mm or 1-mm was improved by the addition of ADL suggesting that both the amount and characteristics of fiber are important: IVDMD 1-mm = 96.4 - .26(aNDF) - 3.26(ADL), R^2=0.73. The R^2 between aNDF and IVDMD of whole silage was improved to 0.64 by the addition of ST>4.75 and ADL. The relationship between IVDMD of 1-mm and whole silage was poor R^2=0.29, and was improved (R^2 >0.74) by the addition of ST>4.75, PS, ADL, and CS DM. It is concluded that fiber characteristics impact the ultimate digestion of finely ground corn silages. In addition, particle size and the proportion of DM recovered as starch from kernels and large fragments affect digestion of whole silages.

Key Words: Corn silage, Digestibility, Fiber

1446 Factors affecting the measurement of forage digestibility. W. A. Scheer*, D. M. Chatman, and J. N. Spain, *University of Missouri, Columbia, MO*.

The objective of this study was to evaluate the factors affecting the measurement of the digestibility of various types of forages as related to accurate prediction of relative feed value. Forage samples used in this experiment were obtained from the 2000 Missouri State Fair hay contest and included alfalfa (ALF; n=29), clover (CLV; n=6), cool (CSG; n=12) and warm (WSG; n=3) season grass, and mixed alfalfa-grass hays (MIX; n=6). Representative core samples from two bales of each forage submitted were collected and composited. Samples were ground (5 mm) and analyzed for DM, CP, NDF, and ADF using standard analytical procedures. Samples were then digested in situ in two ruminally fistulated cows fed identical lactation diets. Cow 1 was 105 DIM, second parity, and cow 2 was 334 DIM, fifth parity. For each cow, triplicate 5 g samples of each forage were placed into individual 10 cm x 20 cm Dacron polyester bags with a mean pore size of 50 ± 15 μm. Incubation times were 0 and 24 hours. Chemical analysis of forages yielded expected differences and were as follows: ALF: DM 88.0%; CP 21.9%; NDF 42.4%; ADF 29.1%; CLV: DM 88.7%; CP 16.3%; NDF 46.6%; ADF 31.0%; CSG: DM 89.9%; CP 12.4%; NDF 66.0%; ADF 34.0%; WSG: DM 90.2%; CP 13.6%; NDF 75.6%; ADF 34.2%; MIX: DM 88.4%; CP 19.3%; NDF 47.9%; ADF 31.0%. Average 24-hour in situ dry matter digestibility was different (ALF 61.0%^{a}; CLV 60.2%^{a}; CSG 53.6%^{b}; WSG 39.0%^{c}; MIX 57.8%^{a}). Furthermore, regression analysis described different relationships between ADF and in situ degradation between forages, as well as differences in the in situ digestion of the same forages between cows. In summary, these results point out the need to standardize the in situ conditions used to describe the DM digestibility of forages.

Key Words: Forages, Digestibility, Relative feed value

1447 Comparison of three methods to estimate digestible NDF of forages. D. K. Combs*[1] and P. Berzaghi[2], [1]*University of Wisconsin, Madison,* [2]*University of Padova, Italy and U.S. Dairy Forage Research Center, Madison, WI.*.

The objective of this study was to compare NDF digestiblity estimated from in vitro NDF digestion kinetics, in vitro NDF degradation at single time points (24h and 48h) and the empirical equation used in the NRC Nutrient Requirements of Dairy Cattle (2001). Grass, legume and grass-legume hays and silages (n=99) were analyzed for DM, NDF, lignin, and NDFICP. Truly digestible NDF was estimated as 0.75 x[(NDF-NDFICP) × lignin] × [1- (lignin/(NDF-NDFICP))$^{0.667}$. Dried, ground forages (0.5 g) were incubated in 50 ml of 1:4 medium of rumen fluid and buffer (Goering and Van Soest, 1970) for 0, 3, 6, 9, 12, 24, 36, and 48 h, and the residues analyzed for NDF. Percentage of residual NDF verses incubation time was fitted by a non-linear least squares estimating procedure to a first order model with an indigestible fraction and a discrete lag time before digestion. Kinetics parameters lag time (lag), potentially degradable NDF (Fraction B), rate of Fraction B disappearance (kd), and the asymptotic estimate of indigestible NDF (fraction C), were estimated. Estimated NDF digestibility (% of NDF) at maintenance intake was estimated by assuming a fractional NDF passage rate (kp) of 0.02/hr. NDF digestiblity at 24h was similar to the kinetic estimate of NDF digestibility at maintenance and the two estimates were correlated (r^2=.68). However, NDF digestibility at maintenance was more highly correlated to the single time point at 48h (r^2 = .78). The empirical and kinetic estimates of NDF digestibility were also similar, but the correlation between the empirical estimate and the single timepoint at 48 h was lower (r^2=.42).

Item	Mean	S.D.	Min.	Max.
NDF, % DM	43.1	5.8	32.1	57.5
Lag, h	1.8	1.5	0.0	7.0
Fraction B, % NDF	52.8	12.4	34.2	100.0
kd, h^{-1}	0.01	0.05	0.01	0.27
DNDF (kinetic), % NDF	40.0	7.3	26.5	58.2
DNDF (24h), % NDF	44.1	10.8	20.1	72.2
DNDF (48h), % NDF	50.5	10.7	28.1	74.7
DNDF (empirical), % NDF	38.2	5.0	25.1	48.9

Key Words: Forage, Digestibility, NDF

1448 Evaluation of the influence of host animal diet and forage type on the ruminal degradation of grass silage and intercropped pea-wheat silages. A.T. Adesogan*[1], M.B. Salawu[1], and R.D. Dewhurst[2], [1]*IRS, University of Wales, Aberystwyth, SY23 3AL UK,* [2]*Institute of Grassland and Environmental Research, SY23 3EB, UK.*

This study compared the rumen degradability of grass silage and intercropped pea-wheat silages in order to understand why dairy cows fed a short straw, pea-wheat intercrop needed only half as much concentrates to produce the same amount of milk as the grass silage (Adesogan et al., 2000). The effect of host animal diet on rumen degradation was also examined. Two spring sown intercrops of wheat and tall (cv. Magnus; MW) or short straw (cv. Setchey; SW) peas were compared with grass silage (GS). The silages were ruminally incubated in three dry Friesian cows in a 3x3 change over design. Degradability was measured in the last week of each period after two weeks of adaptation. Each forage was incubated in quadruplicate in cows fed that forage alone, at maintenance, for 4, 8, 16, 24, 48, 72, and 96 h. The kinetic degradation parameters were described with the exponential model (D = A+B(1-exp(c(t-tL))) where A = washing loss, B = potentially degradable insoluble fraction, c = fractional degradation rate and tL = lag time. Effective degradability (ED) was calculated using a fractional outflow rate (k) of 0.05/h. To study the effect of host animal diet, four replicate samples of each forage were also incubated for 24 or 48 h in the rumen of cows fed on the other forages in each period. Although A was highest in MW ($P<0.05$), SW and GS had similar values. The other DM degradation parameters and the N loss after 24 or 48 h were unaffected by forage type. Over 90% of N and 73% of starch disappeared from SW within 24 h. NDF loss was consistently higher in GS. Host diet did not affect the ruminal degradation in the intercrops but affected ($P<0.05$) the DM, N, starch and NDF degradation of GS. In conclusion host diet only affected the degradation of grass silage, hence grass silage fed sheep can be used to generate accurate degradability data on bi-crops. The rapid degradation of the appreciable starch and N in the intercrops (Adesogan et al., 2000) suggests that they could synchronously supply energy and protein to the rumen and thereby enhance microbial protein production.
Reference Adesogan, TA, Salawu, MB and Dewhurst, RD 2000. Concentrate requirement for dairy cows halved with pea-wheat bi-crops. Proc. Res. Conf. Brit. Grassl. Soc. Aberdeen.

Key Words: Rumen degradation, Intercropping, Silage

1449 Eastern gamagrass digestion kinetics and forage quality as influenced by harvest management. D.J.R. Cherney*[1], P.R. Salon[2], and J.H. Cherney[1], [1]*Cornell University, Ithaca, NY,* [2]*USDA-NRCS, Big Flats Materials Center, Big Flats, NY.*

Objectives were to evaluate the digestion kinetics and forage quality of eastern gamagrass (*Tripsacum dactyloides* L.) as influenced by date of initial harvest and second-cutting interval (4-, 5-, and 6-wk). Gamagrass, variety 'Pete', was harvested in 1997 and 1998 from triplicate plots of an established stand at Big Flats, New York. Plots were fertilized with 112 kg of N/ha. Crude protein, digestible NDF and in vitro true digestibility decreased ($P < 0.05$) with increased cutting interval in both years. Mean crude protein was clearly reduced for the 6-wk second cutting interval, regardless of initial harvest date. There were interactions ($P < 0.05$) between initial cutting date and second cutting intervals for NDF, ADF and lignin both years. Interactions between initial cutting dates and second cutting dates were not significant ($P > 0.05$) for potentially digestible fiber (Do), indigestible fiber (I), and rate of fiber digestion (k). Gamagrass cut at the 6-wk cutting interval had lower Do (48.2 1.7% vs 50.5 0.6% and 50.3 0.6% vs 55.3 1.5% for 1997 6- vs 4-wk and 1998 6- vs 4-wk, respectively) and higher I (23.0 2.5% vs 20.2 1.7% and 21.7 2.2% vs 17.7 2.2% for 1997 6- vs 4-wk and 1998 6- vs 4-wk, respectively) than the 4-wk cutting interval, regardless of initial harvest date. This was generally true for k as well. Forage quality and digestion kinetics of gamagrass harvested at 5-wk cutting intervals tended to be intermediate between 4- and 6-wk cutting intervals. This data, coupled with yield data suggest that a 5-wk cutting interval is optimal.

Key Words: Eastern gamagrass, Forage quality, Digestion kinetics

1450 Nutrient digestibility and bacterial protein synthesis of a pasture diet in response to increased level of dietary brassica in continuous culture. K. J. Soder*[2], L. A. Holden[1], S. R. Hershey[1], and M. R. Long[1], [1]*The Pennsylvania State University, PA,* [2]*USDA-ARS, University Park, PA.*

A dual effluent continuous culture system was used to investigate the effect of inclusion of four levels of brassica in a pasture diet on nutrient digestibility and bacterial protein synthesis and efficiency. Four fermenters were fed three times daily an orchardgrass (*Dactylis glomerata* L.) pasture diet containing either 0%, 15%, 30%, or 45% brassica (*Brassica rapa* L.). Four 10-d periods were conducted, with 7 d for adaptation and 3 d for sample collection in each period. Ruminal pH was recorded at each feeding, and solid and liquid effluent was collected during the last 3 d of each period. Bacterial pellets were harvested at the end of each period. Pasture and effluent samples were analyzed for CP, DM, OM, in vitro DM digestibility, NDF, ADF, and TNC. Bacterial samples were analyzed for DM, OM, CP, and purine content. Bacterial yield and N flow were calculated based on the purine and N content of the effluent and bacterial samples. NDF digestibility increased when brassica was included at 45% of the diet DM compared with the other treatments (70.6, 68.37, 71.6, and 76.0% DM for 0, 15, 30, and 45% brassica, respectively). Valerate increased in a linear fashion with increased brassica inclusion (2.17, 2.53, 2.82, and 3.06, M/ml, respectively), but other VFA's were not significantly affected by diet. Bacterial protein synthesis increased in a linear fashion with increased brassica (44.3, 46.6, 48.1, and 50.2% CP, respectively). Ruminal pH, non-NH_3 N flow and bacterial efficiency were not affected by treatment. This study suggests that brassicas may be utilized in a pasture diet as an alternative forage source to increase NDF digestibility and bacterial protein synthesis, but these increases did not translate into increased bacterial efficiency.

Key Words: Pasture, Brassica, Microbial Protein

1451 Crop processing and chop length effects in brown midrib corn silage on chewing activity and mean particle size of silage and masticates. E. C. Schwab* and R. D. Shaver, *University of Wisconsin, Madison, WI.*

Brown midrib-3 corn silage was harvested using a crop-processing harvester with rolls set at 2 mm clearance (PR) or unprocessed (UP). Theoretical lengths of cut (TLC) were 13 and 19 mm for UP corn silage treatments (13UP and 19UP), and 19 and 32 mm for the PR corn silage treatments (19PR and 32PR). Mean particle size of 13UP, 19UP, 19PR, and 32PR corn silage treatments were 9.7, 12.0, 9.7, and 10.8 mm, respectively. Twenty-four Holstein cows were used in a replicated 4 X 4 Latin square design with 28-d periods. Orthogonal contrasts were used to evaluate TLC (13UP vs. 19UP and 19PR vs. 32PR) and crop processing (19UP vs. 19PR) effects. Increasing TLC increased ($P < 0.05$) eating time (min/kg DMI; 9.2 for 13UP vs. 9.9 for 19UP) for UP but not PR. Crop processing of 19 mm TLC silage reduced ($P < 0.05$) eating time (min/d and min/kg DMI; 244 and 9.9 for 19UP vs. 224 and 8.9 for 19PR, respectively). Rumination time (min/kg DMI) was higher ($P < 0.05$) for 19UP than 13 UP (15.7 vs. 14.6). Crop processing increased ($P < 0.02$) and longer TLC of PR silage reduced ($P < 0.005$) rumination min/kg of NDF intake. Total chewing times (min/d) were unaffected by treatments, but 19UP was greater ($P < 0.01$) than 13UP when expressed as min/kg DMI (25.6 vs. 23.8). Masticate boluses from respective corn silage treatments were collected at the cardia of 8 ruminally cannulated cows, and mean particle size (MPS) was determined via wet sieving (MPS of 6.4, 7.6, 5.8, and 7.1 mm for 13UP, 19UP, 19PR, and 32 PR, respectively). Increasing TLC had no effect on masticate MPS, silage MPS minus masticate MPS (DIFF), or percent MPS reduction. Crop processing reduced ($P < 0.05$) masticate MPS (3.8 mm for 19UP vs. 3.2 mm for 19PR) and DIFF (3.7 mm for 19UP vs. 2.6 mm for 19PR). Small differences among treatments in MPS of corn silage masticates may partially explain the lack of response in lactation performance

trials to increased chop length. Crop processing of 19 mm TLC silage reduced eating time and mean particle size of silage and masticates.

Key Words: corn silage, mean particle size

1452 N-alkanes as markers for estimation of dry matter intake and diet composition in steers consuming all-forage or forage-concentrate diets. S.A. Moshtagh Nia*[1], K.M. Wittenberg[1], and W. Chen[2], [1]*University of Manitoba, Winnipeg, MB,* [2]*Agriculture and Agri-Food Canada, Brandon, MB.*

Eight Holstein steers weighing approximately 208 kg were assigned to four dietary treatments in a three period cross over design to compare the alkane-based and chromium/in vitro-based procedures with the total fecal collection technique relative to estimating of dry matter intake (DMI) and diet composition for forage or forage:concentrate based diets. The four dietary treatments were 1) pure meadow brome grass hay (B); 2) 1/2 B + 1/2 alfalfa hay (BA); 3) 1/2 B + 1/2 barley grain (BB); and 4) 1/4 B + 1/4 alfalfa hay + 1/2 barley grain (BAB). The two types of hay were chosen to achieve a wide range of hydrocarbon intake. Appropriate portions of forages and grain were mixed as a total mixed ration and fed in two equal portions twice daily at 2.5% of body weight. Two controlled release capsules, one containing n-alkanes (C_{32} and C_{36}) and other chromic oxide were placed into the steer reticulo-rumen by oral administration on day 1 of each period (30 days). Total fecal output was collected twice daily from day 8 to 14 of each period to establish the fecal recovery of chromium and the alkanes. Recovery of alkanes was also calculated by in-vitro digestion of individual feed samples. Fecal recovery of the natural alkanes, C_{31} and C_{33}, was low, ranging from 59.5 to 73.3%, whereas the range in fecal recovery of the dosed alkanes, C_{32} and C_{36}, was 83.3 to 95.5%, and of chromium was 82.7 to 95.8 across the diets. The estimated DMI was similar across all diets using the C_{31}/C_{32} and C_{33}/C_{32} alkanes; however, the estimated DMI using C_{31}/C_{32} was significantly ($P < 0.05$) lower compared to total collection or chromium/in-vitro methods. The use of least-squares to estimate ingredient proportions in the diet using n-alkanes is excellent when marker recovery values from total collection are used. Estimates of ingredient proportions in the diet were less reliable when in-vitro digestion was used for n-alkane recovery estimates.

Key Words: Alkanes, Chromium, Dry matter intake

1453 Estimation of forage intake of lactating dairy cows on pasture using n-alkanes. H. M. Froebe*, K. M. Wittenberg, and S. A. Moshtaghi Nia, *University of Manitoba, Winnipeg, Canada.*

The objective of this study was to determine the forage intake of lactating dairy cows on pasture using the n-alkane marker technique when fed at different levels of concentrate supplementation. In two separate trials, fifteen primiparous Holstein cows weighing approximately 552 ± 49 kg were randomly assigned to three dietary treatment groups according to milk production (33.1 ± 5.0 kg/day) and days in milk (168 ± 89). The three dietary treatments consisting of concentrate supplement were fed at 20% (L), 35% (M), and 50% (H) of pre-trial total dry matter intake (DMI). The supplement was fed in equal portions at each milking (AM and PM). Cows grazed a primarily orchardgrass (*Dactylis glomerata*) pasture and were moved to a new section of the pasture daily. A controlled-release capsule containing n-alkane (C_{32} and C_{36}) was placed into the cow reticulo-rumen by oral administration. Fecal grab samples were collected twice daily at milking for a seven day period, starting on the seventh day post administration. Milk production was 21.8, 26.4 and 30.5 ± 1.6 kg/day for the L, M, and H groups respectively. The L group had significantly lower ($P< 0.05$) milk production compared to the M and H groups. The estimated forage DMI was calculated using the C_{31}/C_{32} and C_{33}/C_{32} alkane ratios. The estimated forage DMI using C_{33}/C_{32} had higher intake of 15.1, 13.3, and 11.0 ± 1.0 kg/day compared to using C_{31}/C_{32} with intake of 14.0, 12.2, and 10.0 ± 1.0 kg/day for L, M, and H respectively. However, with both ratios, the L treatment had significantly ($P<0.05$) higher forage DMI estimates than the H treatment. The estimated total DMI using C_{33}/C_{32} was similar across all dietary treatments with an average value of 19.4 ± 1.1 kg/day, reflecting 3.5 ± 0.2% of body weight, whereas, the estimated DMI using C_{31}/C_{32} had an average value of 18.4 ± 1.0 kg/day, reflecting 3.3 ± 0.2% of body weight. Daily fecal output estimates using C_{36} were similar for all dietary treatments averaging 5.9 ± 0.3 kg/day (DM basis). It was concluded that at lower level of concentrate feeding, the cows compensated by higher level of forage intake on pasture.

Key Words: N-alkanes, Pasture intake, Dairy cow

1454 Evaluation of cultivates of alfalfa (Medicago sativa L.) by in situ degradability technique. E. C. J. Sales, A. R. Evangelista*, R. A Santos, and J. C. Teixeira, *Universidade Federal de Lavras, Minas Gerais, Brazil.*

Fifteen cultivates of alfalfa (Medicago sativa L.): Alpha 200, SW 8210, High, Rio, Monarca SP INTA, Victria SP INTA, Semit 711, P 30, P 205, F 208, Florida77, MH 4, Br 1, Br 2 and Creole, were studied with to evaluate the ruminal degradability of the dry matter (DM), crude protein (CD) and neutral detergent fiber (NDF). Samples of each cultivate they were placed in nylon bags and incubated in the rumen of cows for 0, 6, 12, 24, 48, 72 and 96 h. The disappearance of the nutrients data (DM, CB and NDF) in the bags, were submitted to the analysis of non lineal regression of Gauss-Newton, being used the model DP = a + b (1 × exp(-c*t)), to potential degradability and DE = a + ((b x c)/(c+k)), to effective degradability. Assuming rate of passage of 5 %/h, there was not difference ($P>0.05$) between cultivates to dry matter effective degradability. Significant values ($P<0.05$) were found to CP and NDF effective degradability, standing out cultivate Loud, Monarch SP INTA, Victria SP INTA, Semit 711, P 30, P 205, F 208, Florida 77, MH 4, Br 1, Br 2 and Creole. To the degradation rate of CP was not verified significant effect ($P>0.05$). The largest degradation values of CP, they can be attributed to the largest efficiency of degradation of N for the microorganisms, once the animals received balanced diet with the incubated cultivates. To NDF, there were variations ($P<0.05$) in the degradation rate between cultivates. The soluble fraction from CP and NDF differed between cultivates; the difference found in those cultivates can not be attributed to the handle of the samples and consequent bedding of particles, and also due the presence of soluble components (starch, pectin).

Key Words: Alfalfa, Degradability, Cultivate

ASAS/ADSA Ruminant Nutrition: Fat, Protein, Intake, and Feedlot

1455 Effect of Housing and Fat Supplementation on Reproduction and Productivity of Holstein Cows in early Lactation . S.L. Boken*, C.R. Staples, L.E. Sollenberger, W.W. Thatcher, and P.J. Hansen, *University of Florida, Gainesville, FL.*

The objective of this trial was to investigate the effects of feeding a soybean oil refining byproduct (SORB) on estrus behavior and productivity of early postpartum Holstein cows managed in a free stall barn or in an intensive rotational grazing system of cool season rye-ryegrass pasture. Multiparious Holstein cows (n=35) were assigned randomly at calving to one of four treatments arranged in a 2 by 2 factorial design. The SORB was suspended in a molasses slurry (30% of slurry DM). The SORB was mixed into a TMR (2% of diet DM) for cows in the barn and into the grain supplement (3.9% of DM) for cows on pasture. Control cows were fed liquid molasses without SORB. Cows on pasture grazed in groups of three and were fed supplement twice daily at a rate of 1 kg/ 2.5 kg of milk produced. During the first 14 wk of lactation, milk production of cows kept in free stalls peaked higher (41.8 vs. 38.1 kg/d) and was more persistent than cows kept on pasture (housing x time, P = 0.03). Average milk fat content was greater for barn-fed cows (3.39 vs. 3.16%, P = 0.02) but average milk protein content was unchanged (2.98 vs. 2.89%). Fat supplementation did not affect milk production or composition. Cows on pasture relied more on body reserves to help support milk production as plasma NEFA concentrations peaked higher (772 vs. 579 mEq/L) and later postpartum (wk 4 vs. 1) (housing x time, P = 0.002). Production of microbial nitrogen as estimated by allantoin and creatinine analyses of spot samples of urine was unaffected by treatment (326 g/d, SE = 30). Estrus activity was recorded using the HeatWatch® estrus detection system. Cows not detected in estrus (n = 14) were assigned 98 DIM as the number of days to first estrus and this did not differ among treatments (69 DIM, SE = 6). When only