298 g, respectively). The results of this study show that STX ewes can raise DRP sired lambs under the tropical conditions found on St. Croix. Because the crossbred lambs were heavier than the purebred lambs the potential exists for an increase in meat production.

Key Words: Sheep, Crossbreeding, Growth

Women and Minority Issues in Animal Agriculture

1629 Status and role of women in rural livestock production in central Punjab, Pakistan. A.U. Hyder, M. Abdullah*, and N. Khatoon, *University of Agriculture, Faisalabad, Pakistan.*

A survey of 105 farm families, selected randomly from village Youngpur, Okara, was conducted for ascertaining the contribution of women in livestock production. More than 65 % of the respondent families were having < 6 acres of land, however, some of them acquired some additional land on rent or as a tenants. The second major source of income was livestock after agriculture and 94 % families were engaged in raising livestock. Annual income per family ranged from Rs. 10,000 to 100,000. About 30, 31 and 41 % women were involved in fodder harvesting, hauling and chaffing respectively, while 29, 20 and 33 % were partially involved in these activities and remaining did not perform this work. Participation in livestock management was 82, 89, 91, 94 and 86 % for feeding and watering, milking, milk processing, manure disposal and marketing of products, respectively. Extent of women participation in livestock management was not affected by the level of education, age, size of land holding extent of their involvement in family affairs, their perception as house wives and annual income.

Key Words: Livestock production, Women in agriculture, Socioeconomic status

ADSA Student Affiliate Division
Original Research/Independent Study

1630 Effect of breed, parity, and stage of lactation on milk fat content of CLA in the dairy cow. J.A. Kelsey[1], B.A. Corl*[1], R.C. Collier[2], and D.E. Bauman[1], [1]*Cornell University, Ithaca, NY,* [2]*University of Arizona, Tucson, AZ.*

Conjugated linoleic acid (CLA) has been shown to possess a variety of health benefits in biomedical studies with animal models. Foods of ruminant origin are the major dietary source of CLA. Some milk fat CLA originates from CLA that escapes complete rumen biohydrogenation, but the major source is endogenous synthesis via Δ^9-desaturase from *trans*-11 $C_{18:1}$. The four primary substrates for Δ^9-desaturase are $C_{14:0}$, $C_{16:0}$, $C_{18:0}$, and *trans*-11 $C_{18:1}$. The ratio of these and their products (desaturase index) serves as a proxy for Δ^9-desaturase activity. Diet has a major influence on milk fat CLA, however the effect of animal-related aspects is largely unknown. Our objectives were: 1) to determine the influence of breed, parity and stage of lactation on milk fat content of CLA and 2) to examine variation among individuals in milk fat content of CLA and desaturase index. Holstein (n = 116) and Brown Swiss (n = 106) cows (University of Arizona herd) were fed the same traditional TMR diet and milk was sampled on the same day to eliminate diet and seasonal effects. Cows ranged from 7 to 522 DIM and varied in parity (primiparous = 97 and multiparous = 125). Fatty acid analysis demonstrated that stage of lactation and parity had minimal effect on CLA. Breed differences were significant (p¡0.05), but of small magnitude; CLA averaged 4.4 ± 0.1 vs 4.1 ± 0.1 mg/g fatty acid for Holsteins and Brown Swiss, respectively. Similarly, *trans*-11 $C_{18:1}$ concentration was higher in Holsteins than Brown Swiss (11.4 ± 0.2 vs 9.5 ± 0.2 mg/g fatty acid). Overall, the proportion of fatty acids that were ¡C16, C16, and ¿C16 were 20.7 ± 0.2, 30.7 ± 0.1, and 48.7 ± 0.3 for Holstein, and 22.5 ± 0.2, 30.7 ± 0.1, and 46.8 ± 0.3 for Brown Swiss. There was a three-fold variation among individuals in milk fat content of CLA and in the desaturase index for all desaturase pairs. Overall, results indicate that breed, parity and stage of lactation had only minor effects on CLA concentration, but substantial individual variation existed in CLA content and desaturase index of milk fat.

Key Words: CLA

1631 Nanofiltration of tryptic peptide mixtures in the presence of β-lactoglobulin. J. Lemay*, S. F. Gauthier, and Y. Pouliot, *Centre de recherche STELA, Universite Laval, Sainte-Foy, Quebec, Canada.*

The separation of peptide mixtures by nanofiltration (NF) membranes is strongly affected by electrostatic interactions between peptides and with the negatively charged membrane material. Our work is based on the hypothesis that adding β-lactoglobulin (β-LG) to a peptide mixture can modify its NF-fractionation profile by promoting Donnan exclusion phenomena and by specific interactions between β-LG and peptides. The goal of our study was to evaluate the effect of adding β-LG on the permeation flux and peptide transmission during NF. Solutions 1% w/v of β-LG tryptic peptides were prepared at different levels of added β-LG (0, 0.01, 0.05, 0.07, 0.1, 0.3 and 0.5 %), and the solutions were adjusted at 3 different pH values (5.0, 7.0 et 9.0). Solutions were concentrated using a polymeric NF-membrane mounted on a dead-end cell, to a volumic concentration factor of 3X. A significant effect of the pH (p ¡ 0.001) on permeation flux and protein concentration of the permeate was found. The lowest values of permeation flux was observed at pH 7.0, and the highest nitrogen transmission was obtained at pH 9.0. Levels of added β-LG had a significant effect (p ¡ 0.001) only on the permeation flux. Our results suggest that presence of β-LG in the polarization layer affects the NF-separation characteristics of peptide mixtures. Preliminary data revealed changes in peptides transmission through NF-membranes as a result of the presence of β-LG. Similar experimental conditions are currently used to study the effect of added β-LG on peptides transmission by NF-membranes in tangential filtration mode.

Key Words: β-lactoglobulin, peptides mixtures, nanofiltration

1632 The effect of dietary zeolites on fecal ammonium concentrations. E. L. Williams*[1], F. Lundy[2], and G. A. Varga[1], [1]*Pennsylvania State University,* [2]*Clemson University.*

The objectives of this study were to determine the effects of type of zeolite on the release rate of ammonium nitrogen from manure and effects on dry matter intake, nutrient digestibility, and milk production. Phillipsite and Clinoptilolite, both naturally occurring hydrophilic zeolites, were selected for their ability to adsorb ammonium. The synthetic hydrophobic zeolite, CBV, was selected for its ability to remove odor causing organic molecules. The experiment was conducted using multiparous Holstein cows (197 ± 25.41 DIM), in a 4 x 4 replicated Latin Square design. Cows were fed one of three zeolites, Clinoptilolite, Phillipsite, or CBV, topdressed at 2% DMI and a control ration without zeolite. Diets were formulated to contain on a DM basis 49% forage and 51% concentrate with a nutrient composition of 17.5% CP, 1.73 Mcal/kg NEl, and 34% NDF. Experimental periods were 21 days in duration and feces and urine were collected on d 17, 18, 19 pooled and then subsampled. Fecal ammonium concentrations were evaluated using a system for indirect measurement of ammonium nitrogen. The Quantofix-N-Volumeter, a commercially available product, utilizes a system of reactions that allows ammonium nitrogen content to be determined through water displacement. Compared to the control, addition of the zeolite to the diets did not have an effect on dry matter intake (20.8 kg/day ± 0.64), fiber digestibility (41.8% ± 1.1), or milk production (24.3 kg/day ± 1.1). An average increase of 30% fecal ammonium nitrogen concentration was observed for all zeolites compared to the control (P ¡ 0.11; 1.90 kgs/m^3 vs 2.46 kgs/m^3). Results of this study demonstrate that the addition of zeolites to the diets of Holstein cows increases ammonium nitrogen binding in the manure, thereby decreasing the release rate of ammonium nitrogen into the environment.

Key Words: Zeolite, Ammonium, Manure

1633 The effects of Echinacea on immune function of transitional calves. N. R. Gill*[1], C. Powell[2], S. T. Franklin[1], and K. I. Meek[1], [1]*University of Kentucky,* [2]*Western Kentucky University.*

In making the transition from a relatively isolated environment in the calf hutch, to a community within the heifer barn, calf immune efficiency may be challenged. The objective of this study was to determine the effects of Echinacea, a suspected herbal immuno-stimulant, on immune function in transitional calves. Ten weaned calves were assigned to treatments of 0 or 2.5 g of Echinacea and supplemented daily for seventeen days in the normal calf ration. Blood samples and body weights were obtained periodically. Immune function was evaluated using flow cytometric analysis of mononuclear leukocytes, white blood cells counts, neutrophil assays, packed cell volumes, serum protein concentrations. Monocyte percentages in treated calves decreased (P¡0.0343) over time and varied between breeds. B cell percentages also decreased (P¡0.0403) with treatment as well as with treatment over time. CD4+ T cell levels significantly increased (P¡0.0253) with Echinacea supplementation and CD2+ T cell and white blood cell percentages tended to be higher in treated calves. Neutrophil assays indicated no effect of treatment on neutrophil function. Packed cell volumes, serum protein concentrations and body weight values also demonstrated no effect by treatment. Calf handlers observed that calves fed the supplement had firmer feces than the untreated calves, but these observations were so few that they were not included in the statistical analysis. The results of this experiment indicate a potential for Echinacea to modulate immune function in calves.

Key Words: Echinacea, Immune Function, Calves

1634 Comparison of Holstein and Holstein-Jersey crossbred heifer calves for body weight, hip height, and average daily gain from birth to 56 days of age. R.M. Templeton*[1], J.G. Linn[1], A.J. Seykora[1], and B.J. Heins[1], [1]*University of Minnesota.*

A crossbreeding project involving the Holstein and Jersey breeds was initiated at the University of Minnesota, St. Paul Dairy Teaching and Research Facility. Twenty-four Holstein heifer calves and twenty-seven Holstein-Jersey crossbred heifer calves were born from September 2001 to February 2002. Duration of this study was from birth to 56 days of age. Calves were fed colostrum for the first 3 days and then milk replacer at 10of birth weight until weaning at 42 days of age. Calves were also fed a dry calf starter ad libitum from 3 days of age. No hay was fed during this period. They were housed in individual calf hutches. Survivability of calves to 56 days was 100immediately following birth and at 28 and 56 days of age. Least squares means were determined using the PROC GLM of SAS. Holstein calves were significantly larger than crossbred calves at birth. At birth, Holstein calves weighed 42.1 kg and the crossbred calves weighed 35.2 kg. Hip heights averaged 62.9 cm and 60.5 cm for the two genetic groups. From birth to 28 days of age, Holstein calves averaged .41 kg gain per day, while the crossbred calves averaged .37 kg (P¿.10). The Holstein calves did gain significantly faster (P¡.01) from 28 to 56 days of age; averaging .96 kg per day versus .82 kg per day for the crossbreds. The average daily gains for the first 56 days of life averaged .68 kg per day for the Holsteins and .60 kg per day for the crossbreds (P¡.01). The 56 day average weights for the Holsteins and crossbreds were 80.1 kg and 68.2 kg, respectively (P¡.01). Holsteins averaged 74.2 cm tall at 56 days and the crossbreds averaged 70.3 cm tall (P¡.01).

Key Words: Holstein-Jersey Crossbreeding, calf size

1635 Am vs. Pm harvest of alfalfa forage for hay and haylage. I. A. Norris*[1], K. Ballard[2], C. Cotanch[2], M. Carter[2], and E. Thomas[2], [1]*Louisiana State University, Baton Rouge, LA,* [2]*W. H. Miner Agricultural Research Institute, Chazy, NY.*

In the last few years a significant amount of research has focused on the question, "Is it better to mow forages in the morning or the afternoon?" To address this question, the objective of this research was to determine if there were differences in forage quality in Am and Pm cut alfalfa. Two alfalfa seedings were selected based on approximate stage of growth and density in the field. Each field was divided into plot A or B, and each plot was sub-divided into Am and Pm sections. Fresh forage samples were collected after mowing, and additional samples collected after being wilted for 6 hours and 24 hours. When the alfalfa had been wind-rowed for chopping, samples were taken one-hour before being harvested and after chopping. Daily air temperature, humidity, wind speed, and solar radiation were measured to account for differences in drying time and possibly forage quality at harvest. All samples were analyzed for dry matter, crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), non-structural carbohydrates (NSC), sugar, and starch levels. Additionally, approximately 4000 grams of undried chopped samples for both Am and Pm sections of fields 1 and 2 were packed into mini silos. After 90 days silage samples were analyzed to determine changes in forage quality. Alfalfa cut in the Am was higher (P=.02) in ADF. For both fresh and chopped samples CP and NDF did not differ (P¿.05) between Am and Pm cuttings. The percent NSC of fresh Pm samples was greater (P=.0129). There also was a trend for chopped samples to be slightly higher (P= .05) in NSC in Pm cut sections. Sugar levels were greater in the afternoon for both fresh (P=.005) and chopped samples (P=.02). Starch levels were numerically higher in the fresh and chopped Pm samples. These data indicate that the time of cutting may affect alfalfa forage quality. Although this factor should be taken into consideration in forage management, it may not be feasible for all producers to alter their current cutting and harvesting practices.

Key Words: alfalfa, cutting time, quality

1636 Stability of oil in water emulsions formed in presence of skim milk powder: effect of calcium salts and heat treatments. Deepa Mathew* and Phillip, S Tong, *Califirnia Polytechnic State University, San Luis Obispo, CA.*

Stability of oil in water emulsions made with soy oil, water and skim milk powder fortified with calcium salts was studied. Four salts - calcium carbonate, calcium phosphate, calcium citrate and calcium lactate were studied separately. The amounts of skim milk powder and calcium salts were adjusted so that the protein content in the final emulsion was either 3.5% or 1.75% (w/w) and calcium content was either 0.24% (w/w) (2 times the amount naturally present in milk) or 0.36% (w/w) (3 times the amount naturally present in milk). Skim milk powder and calcium salt were blended together. The dry mixture was reconstituted in the required quantity of water and was kept at 5^0C for 18 hrs for proper hydration of the powder. The temperature was then brought up to 25^0C; soy oil was added (10% (w/v) and homogenized with a two stage homogenizer (first stage pressure of 13.8 MPa and second stage pressure of 3.45MPa). The emulsions were subjected to either pasteurization (63^0C for 30 minutes) or retorting (121^0C for 16 minutes) and then were cooled to 25^0C. Stability of emulsions was studied by measuring particle size distributions and fat analysis of the cream layer after centrifugation. Calcium phosphate caused immediate instability at both levels of calcium and protein. As a result, further studies were not pursued with calcium phosphate. It was observed that with the other three salts, instability of emulsions decreased as the protein content increased, for the same level of calcium. In all cases, retorted samples were more unstable compared to pasteurized samples. Emulsions containing calcium lactate and calcium citrate were more sensitive to heat treatments than emulsions containing calcium carbonate. The most stable emulsions were obtained when calcium carbonate was added (even more stable than control sample with no added calcium at 1.75% protein).

Key Words: Emulsion, Stability, Calcium