

1625 Effects of NPN in alfalfa and red clover silages on production of lactating cows. JJ Olmos Colmenero^{*1}, AF Brito¹, GA Broderick, and SM Reynal, ¹University of Wisconsin-Madison, ²US Dairy Forage Research Center.

Sixteen multiparous and 8 primiparous Holstein cows (8 ruminally fistulated) were randomly assigned to six 4 x 4 Latin squares to assess the effect of NPN level in alfalfa and red clover silages on milk production, ruminal metabolites, microbial protein synthesis, and ruminal escape of amino acids and peptides. The experimental diets contained (DM basis): 50% control alfalfa silage (AS), 50% formic acid-treated alfalfa silage (AAS), 50% red clover silage (RCS1, lower NDF and CP than AS), or 50% red clover silage (RCS2, similar to AS in NDF and CP). Diets were formulated to contain about 17% CP and NDF content was 28, 29, 27 and 29%, respectively, for diets AS, AAS, RCS1 and RCS2. DMI and milk yield were higher for AS and AAS compared to RCS2, whereas RCS1 was intermediate. Fat and protein yield, MUN and rumen ammonia were higher for the alfalfa silages relative to both red clover silages. Apparent digestibilities of DM and NDF were highest on RCS2, intermediate on RCS1 and lowest on the alfalfa silages. Rumen pH, acetate, propionate and acetate:propionate ratio did not differ. RCS1 had higher N efficiency than the alfalfa silages while RCS2 was intermediate. Overall, feeding alfalfa silages resulted in greater DMI and milk yield

than feeding red clover silages; however, N utilization, BW gain, and nutrient digestibilities were greater in cows fed red clover silages.

Item	AS	AAS	RCS1	RCS2	SELSMD ¹
DMI, kg/d	23.3 ^{ab}	23.7 ^a	22.2 ^{bc}	21.5 ^c	0.7
BW gain, kg/d	0.19 ^{bc}	0.09 ^c	0.66 ^a	0.62 ^{ab}	0.25
Milk yield, kg/d	30.5 ^a	30.8 ^a	29.5 ^{ab}	28.6 ^b	0.8
Milk fat, kg/d	1.23 ^a	1.25 ^a	1.14 ^b	1.10 ^b	0.04
Milk protein, kg/d	0.99 ^a	1.02 ^a	0.94 ^b	0.90 ^b	0.03
MUN, mg/dl	19.1 ^a	18.1 ^a	15.3 ^b	14.9 ^b	0.8
Milk-N/N-intake, %	22.3 ^b	22.4 ^b	24.6 ^a	23.2 ^{ab}	1.0
DM digestibility, %	58.7 ^c	57.4 ^c	60.7 ^b	63.9 ^a	1.1
NDF digestibility, %	37.2 ^a	36.9 ^c	48.2 ^b	55.0 ^a	1.2
Rumen pH	6.38	6.41	6.45	6.45	0.05
Rumen ammonia, mM	10.0 ^a	9.1 ^a	4.7 ^b	5.7 ^b	0.7
Rumen TAA, mM	4.0 ^a	3.4 ^{ab}	2.3 ^c	2.9 ^{bc}	0.4
Rumen Acetate, mM	74.4	73.8	75.8	73.5	2.3
Rumen Propionate, mM	21.2	21.1	21.9	21.15	0.9
Rumen Ace:Prop	3.56	3.57	3.55	3.54	0.09

¹Standard error of least square mean difference; ^{a,b,c}Means in rows without common superscripts are different (P<0.05)

Key Words: NPN, Red clover silage, Alfalfa silage

Sheep Species

1626 Assessment of gestational age in Chall ewes by ultrasonography. Sarang Sooroi¹, Parviz Tajik², and Abbas Veshkini, ¹Ferdowsi University of Mashhad, Faculty of Veterinary Medicine, Mashhad, Tehran, ²University of Tehran, Faculty of Veterinary Medicine, Tehran, Iran.

To assess gestational age by ultrasonography, 16 synchronized estrous Iranian Chall ewes were placed with fertile rams from the same breed. After mating these ewes were separated from the rams and ultrasonography program was performed. In order to assess the earliest time of pregnancy, ultrasonography was performed daily from the day 10 to 26 of mating, and two times a week from day 26 to 68, and once a week from day 68 until parturition for all ewes. Ultrasonography diagnosis was performed using intrarectal technique as well as transcutaneous. The earliest assessment of pregnancy was day 18 in which pregnancy could be diagnosed in two ewes. The best criterion pregnancy diagnosis in primary days of pregnancy was observation of embryonic vesicle by intrarectal ultrasonography. By increasing of gestational age some criteria such as Thoracic Depth (Dorsoventral diameter of thoracic cavity), Abdominal Depth (Dorsoventral diameter of abdominal cavity) and Intercostal Space were measured. Regarding to the results of the present study some morphometric values were gained by which the gestational age could be assessed in this breed.

Key Words: Ultrasonography, Pregnancy, Ewe

1627 The effects of offering grass or maize silages with mineral lick supplementation to pregnant ewes on ewe performance and IgG absorption in the lamb. T.F. Crosby^{*1}, J.V. O'Doherty¹, P. Nowakowski², P.J. Quinn¹, J.J. Callan¹, B. Flynn¹, D. Cunningham¹, P. Reilly¹, and D. Joyce¹, ¹University College Dublin, Faculty of Agriculture, Belfield, Dublin 4, IRELAND, ²Agricultural University Wroclaw, Department of Sheep Breeding, Wroclaw, POLAND.

Individually fed twin bearing ewes (n=64) were offered either grass or maize silage ad-libitum which was supplemented with 400g concentrates per day in addition to they having limited access (3-5h/d) to a molasses based mineral lick (ML) from day 92 of pregnancy until lambing, in order to evaluate the effects of the mineral lick supplementation on ewe performance and immunoglobulin (IgG) absorption in the lamb. Average daily ML intake was 84.3g and 93.7g for the grass and maize silages respectively. Forage DM intake was higher for the maize than for grass silage (1.11 vs 0.95 kg/ewe; SEM 0.037; P<0.05) and also when ewes had access to ML (1.10 vs 0.96 kg/ewe; SEM 0.037; P<0.01). A similar trend applied to protein intake. There was a big increase in daily water intake when ewes had access to ML (3.7 vs 2.69 l/day; SEM 0.101; P<0.01). The ML treatment had no effect on ewe live weight change, body condition score change, gestation length, litter weight or the incidence of mal-presentations at lambing (P>0.05). When ewes had access

to ML, colostrum yield tended to be higher at the 1h milking (598 vs 436 g/ewe; SEM 60.6; P=0.06) but there was no effect on the concentration of solids, crude protein or colostral IgG concentration (P>0.05). In contrast, lambs fed colostrum obtained from ewes on the ML treatment had significantly lower serum IgG concentration (6.8 vs 18.8 g/litre; SEM 1.48; P< 0.05) and the percentage of IgG absorbed from the colostrum was also lower (9.71 vs 24.74; SEM 2.140; P<0.01) These data clearly show that when pregnant ewes have access to molasses based mineral licks in late pregnancy that water intake is considerably increased and the lamb has a dangerously lowered level of protective antibodies in the serum, so necessary to protect it from disease. Further research is needed to determine if the lowered IgG absorption is due to programming of the foetus in utero or is due to changed characteristics of the colostrum.

Key Words: Sheep, Colostrum, Immunoglobulin

1628 Performance of St. Croix White and Dorper x St. Croix White lambs from birth to weaning in the tropics. R.W. Godfrey^{*}, A.J. Weis, and R.E. Dodson, Agricultural Experiment Station, University of the Virgin Islands.

To evaluate the neonatal and pre-weaning performance of crossbred lambs under tropical conditions a Dorper (DRP) and a St. Croix White (STX) ram were bred to STX ewes (n = 12 and 14 ewes/sire, respectively). Ewes were maintained on guinea grass pastures (4 ha) in a rotational grazing system from the start of breeding (June) through weaning (August/September). The 24-hr milk production of all ewes was measured on days 7, 21, 35, 49 and 63 (lambing = d 0). Ewes were given 1 IU of oxytocin (i.v.) and milked by hand and separated from their lambs. Four hours later ewes were hand milked, using oxytocin, and the milk was weighed to determine 24-h milk production. Total milk production was determined as the sum of 24-h milk production for each day of milking. Ewes were weighed weekly. Lambs were weighed at birth and at weaning at 63 d of age. Data were analyzed using GLM procedures of SAS. Dorper-sired lambs were heavier at birth (P< 0.008) than STX-sired lambs (3.4 ± 0.1 vs 2.9 ± 0.1 kg, respectively). Lamb survival rate at birth, 1 wk of age or weaning was not different (P > 0.10) between DRP and STX sire groups (100, 95.2 and 85.7 vs 100, 88.5 and 84.6 %, respectively). Ewe body weight at lambing was not different (P > 0.10) between DRP and STX sire groups (41.1 ± 1.5 vs 41.1 ± 1.3 kg, respectively). Weaning weight of DRP lambs was greater (P< 0.008) than STX lambs (14.7 ± 0.4 vs 13.2 ± 0.4 kg, respectively). Ewe weight at weaning was not different (P> 0.10) between DRP and STX sire groups (42.8 ± 1.6 vs 44.3 ± 1.6 kg, respectively). Milk production of ewes during the 63-d lactation was not different (P > 0.10) between sire groups. There was no difference (P > 0.10) in total milk production between DRP and STX bred ewes (4577 ± 324 vs 4507 ±

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. Khatoun, *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. Kelsey¹, B.A. Corl^{*1}, R.C. Collier², and D.E. Bauman¹, 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 γ C16, C16, and δ 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. Lundy², and G. A. Varga¹, 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/m³ vs 2.46 kgs/m³). 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