stable pH value of 4.2 to 4.6 after 28 days. The faster decline of pH in the inoculated silages resulted in a faster drop of entero bacteria. The levels of ammonia were significantly lower in inoculated silages. The insoluble nitrogen fraction was slightly ($P > 0.05$) higher in inoculated silages. The differences between inoculated and control silages were more pronounced in the high DM silages. Yeasts and moulds were detected at ensiling, but numbers were below detections levels after 90 days with no effect of inoculation. At maximum fermentation rate, amounts of purines in the incubation vials were higher for inoculated silages (18.8 versus 17.7 RNA-equivalents per g of OM for Control; $P = 0.02$). This suggests that inoculation with SilAll4x4 resulted in a better protein quality of the silage, which influences the efficiency of rumen microbial protein synthesis.

Key Words: Silage, Additive, Protein

311 Treating corn silage with formaldehyde and urea: Their effect on nutritve value using gas production technique. A. Taghizadeh*, M. Hatami, and G. A. Moghaddam, *Tabriz University*, *Tabriz, East Azarbayjan, Iran*.

In vitro gas production technique was used to measure the gas production from Iranian treated and untreated corn silage by formaldehyde and urea as test feeds. The formaldehyde and urea were added during the ensiling process for examine of their effect on preserving and fermentation characteristics of corn silage. The corn silage samples were chopped to 2 cm length. Treatments contain CS: untreated corn silage, CSF: CS + 4 g/Kg DM formaldehyde, CSU: CS + 10 g/Kg DM urea, and CSFU: CS + 4 g/Kg DM formaldehyde + 10 g/Kg DM urea. Three sheep were used as donors of ruminal fluid for preparation of inoculum. The sheep (38±4 kg) were fed a diet consisting of 220 g kg^{-1} concentrate and 780 g kg^{-1} forage (corn silage and alfalfa) predicted metabolizable energy 2.98 Mcal/Kg DM and containing crude protein 140 g/Kg DM and used as ruminal fluid donor for the preparation of inoculums. The production of gas was measured in each vial after 2, 4, 8, 12, 16, 24, 36, 48, 72 and 96 h of incubation. The results were analyzed using completely randomized design (CRD) in each incubation time with Duncan, s multiple range test used for the comparison of means. Feeds were the only sources of variation considered. Gas production data were in triplicate fitted to a equation of $p=a+b\ (1-e^{-ct})$; where (p) is the gas production at time, t, (a+b) is the fermentation of soluble and the insoluble (but with time fermentable) fraction, (c) is the fractional rate at which b is fermented per hour. The soluble and insoluble fraction (a+b) for CS, CSF, CSU and CSFU was (ml/g) 241.8, 240.0, 225.0 and 238.1, respectively. The fractional rate (c) was (%/h) 0.028, 0.023, 0.025 and 0.027, respectively. The results showed the soluble and insoluble fraction (a+b) and the fractional rate (c) of CS was higher than the other treatments, ($P<0.05$) The results showed that the differences between of chemical composition of treatments caused to change fermentation parameters determined by In vitro gas production technique. Urea and formaldehyde additions affected corn silage nutritive value.

Key Words: Gas production, Corn silage, Formaldehyde

Ruminant Nutrition: Transition Cow Metabolism

312 Phlorizin administration does not attenuate hypophagia induced by intraruminal propionate infusion. B. J. Bradford* and M. S. Allen, *Michigan State University*, *East Lansing*.

Propionate infusion decreases dry matter intake (DMI). Our working hypothesis is that propionate oxidation in the liver stimulates satiety and decreases meal size. In this experiment, phlorizin was used to increase glucose demand, which was expected to decrease propionate oxidation and attenuate the decrease in DMI caused by propionate infusion. Twelve multiparous Holstein cows (49 ± 33 DIM, 40 ± 7 kg/d milk; mean ± SD) were randomly assigned to square and treatment sequence in a replicated 4x4 Latin square experiment with a 2x2 factorial arrangement of treatments. Treatments were subcutaneous injection of phlorizin or propylene glycol in combination with intraruminal infusion of either Na acetate or Na propionate. Following a 7 d adaptation period, phlorizin (4 g/d) and control injections were administered every 6 h for 7 d. During the final 2 d of injections, Na acetate or Na propionate solutions (1 M, pH 6.0) were infused continuously at the rate of 0.80 L/h. Feeding behavior data were collected during the final 2 d of treatment. Statistical analyses were completed using mixed-effects models. Phlorizin caused urinary excretion of 400 g glucose/d across infusion types. Phlorizin increased plasma non-esterified fatty acid and beta-hydroxybutyrate concentrations in combination with Na acetate infusion, but not with Na propionate infusion. Phlorizin decreased and Na propionate increased plasma insulin and glucose concentrations (all $P < 0.01$). Infusion of Na propionate decreased DMI (18.4 vs. 21.1 kg/d, $P < 0.001$) through an increase in intermeal interval (77.3 vs. 89.2 min, $P = 0.03$), resulting in a decrease in the number of meals/d (13.7 vs. 11.6, $P < 0.001$). Phlorizin did not alter DMI or measures of feeding behavior, nor were there interactions with infusion type. We conclude that increasing glucose demand does not limit the extent to which propionate decreases DMI in lactating dairy cows.

Key Words: Propionate, Glucose demand, Dry matter intake

313 Response of plasma concentrations of gut peptides to abomasal infusion of casein, starch, or soybean oil in lactating dairy cows. A. E. Relling* and C. K. Reynolds, *The Ohio State University*, *Wooster*.

The effect of nutrient supply to the small intestine on gut peptide secretion in ruminants, and particularly cattle, has not been characterized. The objective of the present study was to determine the effects of abomasal infusion of macronutrients on DMI and plasma concentrations of glucagon-like peptide-1 (GLP1), glucose-dependent insulinotropic polypeptide (GIP), and cholecystokinin (CCK). Four rumen cannulated Holstein cows fed a ration containing (DM basis) 17 % alfalfa haylage, 38 % corn silage and 45 % concentrate were used in a 4 X 4 Latin square design with 2-wk periods. Treatments were 7 d abomasal infusions of water (12 kg/d), soybean oil (500 g/d), starch (1100 g/d), or casein (800 g/d). Hormone concentrations (pmol/L, Table 1) were measured in plasma from jugular vein samples (15/d at 30 min intervals) taken during day 1 and 7 of infusions. Oil infusion decreased DMI (kg/d), but not ME, decreased CCK concentration, and increased GLP1 concentration on day 7. Casein and starch infusion had no effect on DMI, but ME and GIP concentration were increased on day 1 and 7. Casein infusion increased CCK concentration on day 1 and

7. Increased GIP concentration with increased ME may be related to effects of this peptide on adipose synthesis.

Table 1. Dry matter intake and plasma concentrations of gut peptides on day 1 and 7 of abomasal infusions of water, casein, starch, or oil.

	Day	Water	Casein	Starch	Oil	SEM	Inf[1]	Day[1]	Int[1]
DMI	1	21.9	21.0	21.0	21.6	2.5	0.82		
	7	23.7	23.5	24.0	21.0*	2.0	0.04		
GLP-1	1	27.6	34.0**	26.3	27.8	1.6	0.01	0.01	0.01
	7	29.8	31.2	26.9*	33.5**				
GIP	1	564	671**	614†	638*	50	0.01	0.05	0.35
	7	558	631*	614**	576				
CCK	1	7.3	8.6†	7.2	6.0†	1.3	0.01	0.05	0.85
	7	8.5	9.6†	8.1	6.6**				

[1]Probability for effect of infusion (Inf), day, or their interaction (Int). **P < 0.01 compared with water. *P < 0.05 compared with water. †P < 0.10 compared with water.

Key Words: Gut peptides, Abomasal infusions, Lactation

314 Effect of fatty acid saturation on gut and pancreatic hormone concentrations. B. J. Bradford*, K. J. Harvatine, and M. S. Allen, *Michigan State University*, *East Lansing*.

Saturated and unsaturated fat sources were evaluated for effects on plasma metabolites and gut and pancreatic hormone profile from before feeding through the second meal of the day. Eight ruminally and duodenally cannulated cows were used in a replicated Latin square design with 21 d periods. Treatments were control (CON) and 2.5% added rumen-protected fatty acids in the form of saturated (SAT; prilled hydrogenated free FA, Energy Booster 100®) and unsaturated (UNS; calcium soaps of long-chain FA, Megalac-R®) fat supplements. All experimental diets included 2.5% rumen available vegetable oil as whole cottonseed. Blood samples were collected every eight minutes with an automated blood collection system that minimizes influence on behavior. Feeding and ruminating behavior were observed during sample collection and for the following 4 days by a computer data acquisition system. Duodenal flow of unsaturated FA was greater for UNS (471 g/d) than SAT (360 g/d) or CON (330 g/d) while flow of saturated FA was greater for SAT (1350 g/d) than UNS (840 g/d) or CON (890 g/d). Dry matter intake for SAT was not different from control, while UNS decreased DMI 3.2 kg/d by decreasing mean meal size by 0.22 kg (9%). Blood plasma data was analyzed using a mixed model with repeated measures in time. UNS increased plasma NEFA concentration relative to SAT and CON (223 vs. 116 and 81 μEq/mL, respectively), and increased insulin concentration compared to CON (3.9 vs. 2.1 μIU/mL). Both UNS and SAT increased glucagon concentration compared to CON, and SAT increased glucose concentration compared to CON. UNS increased CCK concentration relative to both SAT and CON (16.6 vs. 13.8 and 12.2 pmol/L), and tended to increase GLP-1 concentration compared to CON (12.0 vs. 10.2 pg/mL). Finally, rumen-protected fat treatments tended to suppress ghrelin concentration relative to CON immediately prior to the first meal (28.3 vs. 53.9 pg/mL). Temporal changes in concentrations of plasma variables during the early feeding period suggest that insulin, CCK, GLP-1, and/or ghrelin may be involved in intake depression induced by unsaturated fatty acids.

Key Words: Dry matter intake, Gut peptide, Fat supplements

315 Prepartum nutrient intake alters gluconeogenic capacity in liver slices from peripartal dairy cows. N. B. Litherland*, H. M. Dann, and J. K. Drackley, *Universtiy of Illinois*, *Urbana*.

Plane of nutrition before parturition might affect hepatic gluconeogenic capacity, which might impact subsequent cow health and productivity. Our objectives were to determine the effects of nutrient intake during far-off (FO) and close-up (CU) dry periods, and their interaction, on adaptations in metabolism of propionate and alanine in liver slices. Multiparous Holstein cows (n = 71) were assigned to treatments in a 3 (FO diet) × 2 (CU diet) factorial arrangement. During the FO period (d –60 to –25) cows received a high-straw control diet fed for ad libitum intake (FOCA) to meet NRC recommendations for NE_L , a higher-density diet fed ad libitum to exceed NRC recommendation for NE_L by 60% (FOHA), or the higher-density diet at restricted intake to meet 80% of NE_L requirements (FOHR). During the CU period (d –24 until parturition), cows were fed one diet for either ad libitum intake (CUA) or in restricted (CUR) amounts to provide 80% of NE_L requirements. All cows received a lactation diet postpartum. Liver slices from biopsies at d –30, –14, +1, +14, and +28 relative to parturition were utilized to determine in vitro conversion of [1-^{14} C] alanine and [1-^{14} C] propionate to glucose and CO_2 . Interactions of FO and CU diets were not significant. Gluconeogenesis from propionate was numerically greater on d –14, +1, and +14 and was significantly greater on d –14 and d +28 for FOHR cows than for FOCA and FOHA. Oxidation of propionate to CO_2 on d –14 tended (P = 0.08) to be lower for FOCA than for FOHA and FOHR. Gluconeogenesis from alanine tended (P = 0.06) to be greater for CUR on d +14 and was also numerically greater on d +1 and +28. Oxidation of alanine to CO_2 did not differ among treatments. The CU treatment had minimal impact on gluconeogenesis and substrate oxidation. Cows restricted in energy intake during the FO dry period had greater hepatic gluconeogenic capacity prepartum and postpartum than cows allowed to consume energy in excess of requirements.

Key Words: Transition cow, Gluconeogenesis, Liver

316 Effects of PPAR-A agonists on in vitro liver fatty acid metabolism in Holstein calves. N. B. Litherland*, D. B. Carlson, R. L. Wallace, and J. K. Drackley, *University of Illinois*, *Urbana*.

Our hypothesis was that peroxisomal proliferator-activated receptor (PPAR)-α agonists would increase hepatic β-oxidative capacity for fatty acids, which would decrease circulating NEFA and hepatic lipid accumulation in transition cows. The objectives of this study were 1) to determine if weaned Holstein calves are a suitable model for liver metabolism in periparturient cows, 2) to determine if PPAR-α agonists alter NEFA metabolism in bovine liver, and 3) to compare in vitro metabolism of palmitate and oleate by liver slices. Male Holstein calves (n=15) were assigned at 7 wk of age to 1 of 3 groups for a 5-d treatment period: untreated control, clofibrate (62.5 mg/kg BW), or fish oil (250 mg/kg BW). Calves were euthanized on d 6 and liver slices were incubated for 2, 4, and 8 h to determine conversion of [1-^{14}C] palmitate and [1-^{14}C] oleate to CO_2, acid-soluble products (ASP), and esterified products (EP). Calves treated with clofibrate tended (P = 0.05) to consume less dry matter. Body weight, liver weight, and ratio of liver to body weight were not significantly different among treatments. In liver slices incubated for 8 h, conversion of palmitate to CO_2 was greater (P < 0.05) for calves treated with clofibrate than for untreated or fish oil. Conversion of palmitate to ASP was numerically greater for calves treated with clofibrate or fish oil compared with controls. Palmitate conversion to EP, total palmitate metabolism, and

metabolism of oleat did not differ among treatments Conversion of NEFA to CO_2 was greater for palmitate than oleate for all treatments ($P < 0.05$), but rates of total metabolism were not different. Rates of palmitate oxidation by liver slices from calves in this study were nearly 10 times greater than rates previously observed for adult cows. Clofibrate increased the rate of oxidation of palmitate in liver slices from male Holstein calves. Applications of PPAR-α agonists may be of interest in enhancing the rate of hepatic fatty acid oxidation in transition dairy cows.

Key Words: Liver, PPAR-α, Bovine

317 Effects of abomasal lipid infusion on liver triglyceride accumulation during fatty liver induction. A. E. Kulick*, T. F. Gressley, J. A. A. Pires, and R. R. Grummer, *University of Wisconsin*, *Madison*.

Previous research has implicated linseed oil in altering lipid metabolism of dairy cattle when infused intravenously as lipid emulsion. The objective was to determine the effects of abomasal linseed oil (LO) infusion on liver triglyceride (TG) accumulation and subcutaneous adipose tissue lipolysis during fatty liver induction. Eight nonpregnant, nonlactating Holstein cows were randomly assigned to treatments in a replicated 4 x 4 Latin square design. Treatments included abomasal infusion of water (W), tallow (T), LO, or half tallow plus half LO (LOT) at a rate of 0.56 g/kg BW per day for 4 d. Daily treatments were administered directly into the abomasum, divided into 6 doses and administered every 4 h. Infusion of treatments was concurrent with a 4 d fast. Cows were fed *ad libitum* for 24 d between periods of fasting and lipid infusion. T contained 43% C18:1, 24% C16:0 and 14% C18:0. LO contained 51% C18:3, and 17% C18:2. For most parameters, contrasts were: W vs. LO + LOT + T (effect of lipid), LO vs. T (linear effect of LO), and LOT vs. LO + T (nonlinear dose effect of LO). For measurement of blood fatty acid composition, differences among treatment means were determined using the PDIFF procedure of PROC MIXED. Infusion of linseed oil (LO or LOT) increased α-linolenic acid (g/100 g fatty acid) in serum ($P < 0.05$) but not in the nonesterified fatty acid (NEFA) fraction of plasma. Treatments had no effect on plasma NEFA concentrations. Infusion of LO increased total serum fatty acid concentration (nonlinear dose effect; $P = 0.06$). Abomasal infusion of lipid significantly increased isoproterenol stimulated lipolysis by subcutaneous adipose tissue explants in vitro. Liver TG content increased 4.8, 4.9, 2.3 and 2.3 µg TG/ µg of DNA during the fast for W, LO, LOT and T, respectively; infusion of lipid decreased liver TG accumulation ($P = 0.06$) when compared to W, but this was due to T (LO vs. T; $P = 0.03$). Abomasal LO infusion failed to reduce liver TG accumulation, plasma NEFA concentration or alter subcutaneous adipose tissue lipolysis.

Key Words: Linseed oil, Abomasal infusion, Liver triglyceride

318 Acute effects of subcutaneous injections of glucagon and/or oral administration of glycerol on blood metabolites and hormones of dairy cows affected with fatty liver disease. M. A. Osman*, N. A. Mehyar, G. Bobe, J. F. Coetzee, D. C. Beitz, and K. Keohler, *Iowa State University*, *Ames*.

Our objective was to study the effects of the subcutaneous injection of glucagon and /or oral administration of glycerol for the first 14 days postpartum on blood metabolites and hormones of Holstein dairy cows induced with fatty liver disease. Twenty multiparous cows were fed a dry cow ration supplemented with 12 kg of cracked corn during the dry period to increase the likelihood of fatty liver disease development. Cows with a body condition score of 3.5 points (1-5 scale) were assigned randomly to one of four treatment groups--saline, glucagon, glycerol, and glucagon plus glycerol. Following treatment, serial blood samples were collected to determine the effect of glucagon and/or glycerol on blood composition. Glucagon injection alone increased plasma glucose (P=0.001), glucagon (P=0.0044), decreased plasma BHBA (P=0.0217), and did not affect plasma NEFA during the postpartal period.Glucagon plus glycerol treatment significantly increased plasma glucose postinjection ($P \leq 0.001$), glucagon (P=0.0001) and insulin. Treatment of cows with glucagon plus glycerol increased plasma glucose and decreased plasma BHBA. Glucagon plus glycerol treatment caused the greatest response in plasma glucose BHBA, and glucagon, .These responses suggest that treatment of postpartal cows with glucagon plus glycerol as well as with glucagon alone would decrease the likelihood of fatty liver disease in dairy cows.

Key Words: Fatty liver disease (hepatic lipidosis), Glucagon, Glycerol

319 Effect of prepartum anionic diets on cortisol, adiponectin, and tumour necrosis factor-A expression at varying levels of body mass index in preparturient dairy cows; implications for insulin resistance. S. B. Puntenney* and P. D. French, *Oregon State University*, *Corvallis*.

Twenty-six Holstein and 18 Jersey multiparous cows were assigned to a randomized block design by calving date and breed to either a control group fed a traditional non-anionic diet (CTRL) or to a treatment group with the diet containing the commercial anionic salt supplement (Animate®- IMC-Agrico, Bannockburn, IL). The control and treatment diets were formulated to a dietary anion-cation difference (DICAD) of 21.3 and -14.29 meq/100 grams, respectively. Cows were evaluated for body condition score (BCS) prior to parturition and assigned to one of six BCS groups by breed the week prior to parturition. The effects of prepartum dietary treatment by BCS were evaluated for serum concentrations of cortisol, adiponectin, insulin, TNF-α, calcium and magnesium. on days -21 preparturition through 21 days post-parturition. No significant effect of treatment on energy balance was observed; however, cows receiving the anionic diet numerically returned to positive energy balance faster than their cohorts on the control diet. Dry matter intake differed significantly by day, with the the anionic diet resulting in an additional 3.71 kg/day of DMI for the Holsteins, providing more than enough NE to account for the increase in milk yield. Herd health parameters were not significantly different by treatment. Plasma NEFA and adiponectin concentrations were unaffected by dietary treatment, nor were they affected by BCS. BHB concentrations were not directly affected by dietary treatment; however, cows on the anionic diet had higher serum BHB concentrations until BCS reached 3.5 and, beyond that point serum BHB concentrations increased dramatically for the control diet. Plasma cortisol concentrations were not different by dietary treatment. TNF-α significantly increased and insulin significantly decreased based on BCS on the anionic diet.

Key Words: TNF-α, Insulin, Adiponectin

320 Prepartum energy intake affects health and lactational performance in primiparous and multiparous Holstein cows. N. A. Janovick Guretzky*, N. B. Litherland, K. M. Moyes, and J. K. Drackley, *University of Illinois*, *Urbana*.

Previous research from our group has demonstrated that control of prepartum energy intake improved transition success in multiparous cows; however, data are lacking for their primiparous counterparts and for cows in single-group dry period management. Primiparous (n=23) and multiparous (n=24) Holsteins were randomly assigned by expected date of parturition to one of three prepartum energy intakes. A high energy diet (1.62 Mcal NE_L/kg; 15% CP) was fed for either ad libitum intake (HI-E) or restricted intake (REST) to supply 150 or 80% of NRC (2001) energy requirement for dry cows in late gestation. To limit energy intake to 100% of NRC requirement at ad libitum intake (CON), a high straw (29% of DM) diet (1.30 Mcal NE_L/kg DM; 14% CP) was fed. Multiparous and primiparous cows began dietary treatments on d -65 and d -42 prior to expected parturition, respectively. Data were analyzed as repeated measures. Postpartum intake (% of BW) did not differ among treatments (P=0.16). Multiparous cows consumed more DM than primiparous cows (P=0.01), which likely influenced parity differences in energy balance postpartum (P<0.01). HI-E cows were in greater negative energy balance than CON and REST cows postpartum (P<0.01). Weekly FCM yield (kg/d) tended (P=0.10) to be higher for HI-E compared to CON or REST cows. Incidences of ketosis (P=0.03) and DA (P=0.01) were higher for HI-E than CON and REST cows regardless of parity (P>0.48). Liver total lipid (% of wet wt) tended to be higher (P=0.07) for multiparous HI-E cows than for CON or REST on d 1 and 14 after parturition. Blood glucose tended to be higher (P=0.05) prepartum for multiparous HI-E cows than for CON or REST, but BHBA was higher (P=0.03) postpartum for multiparous HI-E cows than for CON or REST cows. HI-E cows gained body condition during the dry period (initial BCS=3.3), but were not overconditioned by calving (BCS=3.5). Overfeeding energy during the dry period, even in absence of overconditioning, can adversely affect transition success.

Key Words: Primiparous cow, Energy intake, Transition period

321 Effect of dietary energy source on energy partitioning in dairy cattle in early lactation. A. van Knegsel*, H. van den Brand, J. Dijkstra, S. Tamminga, and B. Kemp, *Wageningen University*, *Wageningen, The Netherlands*.

Nutrition has been indicated to be important to limit the severity of a negative energy balance (NEB) and related metabolic disorders in dairy cattle in early lactation. The NEB related metabolic problems suggest a role for the balance in supply of lipogenic and glycogenic nutrients. Therefore, the objective of this study was to compare the effects of a mainly glycogenic and a mainly lipogenic diet on energy partitioning in dairy cows in early lactation. The roughage composition of both diets was identical. Maize and milocorn or rumen protected fat and beet pulp were the main concentrate ingredients of the glycogenic and lipogenic diet, respectively. Energy and nitrogen balance of 16 lactating dairy cows in four batches, were determined by indirect calorimetry in climate respiration chambers from week 2 to 9 postpartum (pp). Repeated analysis of variance was used for data analysis and results are presented as MEANS ± SE. There was no effect ($p \geq 0.05$) of diet on gross energy intake (3453 ± 59 kJ/($kg^{0.75}$•d)), metabolizable energy intake (2102 ± 41 kJ/($kg^{0.75}$•d)) and heat production (1110 ± 10 kJ/($kg^{0.75}$•d)). However, cows on a lipogenic diet partitioned more energy to milk than cows on a glycogenic diet (1175 ± 18 vs. 1073 ± 12 kJ/($kg^{0.75}$•d); $p \leq 0.05$) and had a higher milk fat yield (1.67 ± 0.03 vs. 1.89 ± 0.02 kg/d; $p \leq 0.05$). No difference was found in energy retained as body protein (19 ± 6 kJ/($kg^{0.75}$•d)), but energy mobilised as body fat tended to be higher in cows fed the lipogenic diet than in cows fed the glycogenic diet (190 ± 23 vs. 113 ± 26 kJ/($kg^{0.75}$•d); $p \leq 0.10$). Cows fed the glycogenic diet were in a positive energy balance from week 8 pp, whereas cows fed the lipogenic diet had still a NEB in week 9 pp. This study confirms the hypothesis that energy partitioning between milk and body tissue can be altered by feeding isocaloric diets differing in lipogenic and glycogenic nutrient content.

Key Words: Energy partitioning, Negative energy balance

322 The effect of calcium pantothenate on productive and reproductive performance in lactating dairy cows. J. Nocek[1] and M. Vazquez-Anon*[2], [1]*Spruce Haven Farm and Research Center*, *Auburn, NY*, [2]*Novus International*, *St. Louis, MO*.

Two hundred cows were balanced by parity and previous lactation 305d ME to one of two treatments to determine the effect of supplementing calcium pantothenate (CP, CRYSPAN™, beta crystalline form of calcium pantothenate, Daiichi Fine Chemical Co. Ltd.) on production and reproductive performance in lactating dairy cattle. The Control group was fed a pre- and postpartum diet to meet NRC (2001) requirements. The CP group was fed the Control diet with the addition of 6g/cow/d of CP in the TMR. Cows were housed in free stall group pens (approx. 100cows/group). The experimental period started 21 days before estimated calving date to about 160 days in the subsequent lactation. Approximately 100 cows were assigned to each treatment. The design was a split-plot in time with repeated measures, with cow as the experimental unit. Milk production was not significantly influenced by CP supplementation; however, cows receiving CP produced 0.5 kg more than Control. The 3.5% fat-corrected milk was higher (P = .01) for cows consuming CP compared to Control (38.9 vs. 37.4 kg). This difference was primarily influenced by a higher (P = .02) fat test for cows receiving CP (3.65 vs. 3.51%). This resulted in an increased fat yield (P = .01) for cows receiving CP. Protein percentage was not influenced by treatment; however, yield of protein was higher (P = .02) for cows receiving CP. Cows receiving CP had fewer (P=.10) days open (88.7 vs. 95.6) and a greater (P=.03) percentage of cows pregnant by 150 DIM (76.9 vs. 61.3%) compared to Controls. Supplementing CP in diets of lactating cows improved productive and reproductive performance.

Key Words: Calcium pantothenate, Lactation, Reproduction

Sheep Species

323 Effect of supplementation and stage of lactation on performance of grazing ewes. C. M. Mikolayunas*, D. L. Thomas, K. A. Albrecht, and Y. M. Berger, *University of Wisconsin*, *Madison*.

This study evaluated the effects of stage of lactation and supplementation on lactation performance of 95 dairy ewes grazing kura clover-orchardgrass pastures. Ewes lambed in January or April and consumed 0 or 0.82 kg/d of supplement (16% CP mixture of corn and high protein pellet) in a 2 x 2 factorial arrangement of treatments. The trial began when ewes went to pasture on May 25 and continued for 82 days. Unsupplemented ewes in both lambing groups showed a greater range