and total AA, as only tryptophan ($P = 0.02$) and cystine ($P < 0.01$) were greater with this treatment. Plasma concentration of 3-methyl-histidine was lower ($P < 0.05$) in response to CHO, suggesting less protein mobilization in these cows. Overall, data from the present study indicate that peripartal supplementation of rumen protected methionine has positive effects on plasma AA status.

Key Words: amino acid, choline, methionine, transition cow

ADSA–SOUTHERN SECTION GRADUATE STUDENT ORAL COMPETITION

0760 The nutritional quality of winter crops for silage in monoculture or with legumes. A. N. Brown*[1], G. Ferreira[1], C. L. Teets[1], W. E. Thomason[2], and C. D. Teutsch[3], *[1]Department of Dairy Science, Virginia Polytechnic Institute and State University, Blacksburg, [2]Department of Crop and Soil Environmental Sciences, Virginia Polytechnic Institute and State University, Blacksburg, [3]Dep. of Crop and Soil Environmental Sciences, Virginia Polytechnic Institute and State University, Blacksburg*.

The objectives of this study were to determine the nutritional quality of different winter crops for silage within various regions of Virginia and to determine the impact of the various winter crops on the succeeding productivity of corn and sorghum. Experimental plots were planted with 15 different winter crop treatments at 3 locations in Virginia. At each site, 4 plots of each treatment were planted in a randomized complete block design. The 15 treatments included 5 winter annual grasses (barley, wheat, rye, ryegrass, and triticale) in monoculture [NO] or with one of two winter annual legumes (crimson clover [CC] and hairy vetch [VE]). The nutritional composition (DM, ash, CP, NDF, ADF, ADL, starch, and sugars) was determined for the fresh samples. Additionally, 200

Table 0760.

Table 1. Effect of winter crops in monoculture or with legumes on nutritional quality of feed.

	Grass					Legume				P-Value		
	Barley	Ryegrass	Rye	Triticale	Wheat	NO	CC	VE	SEM	Grass	Legume	Interaction
Fresh												
DMY, kg/ha	2767	2189	2223	1983	2283	2141	2538	2188	367.7	0.04	0.08	
DP,%	19.5	18.9	17.5	17.0	18.7	19.9	17.7	17.3	0.9	< 0.01	< 0.01	
Ash,%	8.8	9.2	8.8	8.7	8.8	8.8	8.8	9.1	0.6			
CP,%	14.2	14.2	16.1	16.1	15.7	13.0	15.5	17.3	1.3	< 0.01	< 0.01	
NDF,%	54.0	43.3	49.9	46.0	44.5	49.7	46.4	46.5	1.6	< 0.01	< 0.01	
ADF,%	31.8	26.9	30.5	27.8	26.8	28.5	28.7	29.1	1.5	< 0.01		0.03
ADL,%	2.7	2.6	2.5	2.5	3.0	2.3	2.7	2.9	0.3	0.02	< 0.01	
Starch, %	3.0	2.7	3.5	3.5	4.0	3.2	3.6	3.2	0.2	< 0.01	0.02	
Sugar, %	10.8	9.9	13.2	13.4	15.9	14.2	13.2	10.5	2.2	< 0.01	< 0.01	
Silage												
DP,%	29.3	27.4	24.1	23.5	25.3	28.4	24.6	24.8	2.5	0.04	0.04	
Ash,%	9.3	10.6	9.6	10.3	9.5	9.0	10.2	10.4	1.0	< 0.01	< 0.01	
CP,%	15.1	15.8	16.5	17.3	17.0	14.2	16.6	18.3	0.9	< 0.01	< 0.01	
NDF,%	59.1	45.4	54.7	49.7	46.7	53.3	49.3	50.7	1.9	< 0.01	< 0.01	0.04
ADF,%	32.6	28.7	31.8	29.2	28.9	29.9	29.3	31.5	1.4	< 0.01	0.04	
Sugar, %	2.2	3.5	2.3	2.5	3.0	3.1	3.0	2.0	0.7	< 0.01	< 0.01	
ADL,%	3.3	3.5	3.3	3.1	4.0	3.0	3.5	3.9	0.6		0.02	
pH	4.39	4.17	4.28	4.30	4.11	4.14	4.20	4.42	0.13	0.01	< 0.01	

to 400 g of chopped material were placed into mini-silos and analyzed after 60 d of ensiling. The statistical model included the effects of grass, legume, the 2-way interaction, and the random effect of site. Sorghum and corn were planted after harvesting the winter crops in split plots. For the split-plot design, the statistical model included the effects of treatment, the random effect of site, treatment × site, summer crop, summer crop × site, and summer crop × treatment. There were no grass × legume interactions except for fresh ADF and silage NDF. Crimson clover tended to increase forage DM yield. Adding legumes increased CP and decreased NDF of both fresh and silage samples. However, addition of legumes increased ADL in contrast to NO. Legumes did not affect ADF concentrations of fresh samples, but for silage, VE increased ADF compared with CC and NO. In contrast to VE, inclusion of CC increased sugar content for both fresh and silage samples. Corn yields were greatest succeeding barley compared with the other grasses (15,800 vs. 14,700 kg/ha). Addition of legumes did not affect DM yield of corn (14,900 kg/ha) or sorghum (15,300 kg/ha). We conclude that although inclusion of legumes did not have a residual effect on summer annual yields, including CC could increase yield of winter crops. Addition of legumes increases CP, decreases NDF, and, for VE, decreases the sugar content of the silage.

Key Words: winter crops, cover crops, nutritional quality

0761 Housing and demographic effects on somatic cell score in southeast United States dairies. A. Stone*[1], C. Blakely[2], K. Bochantin[1], P. D. Krawczel[2], M. Myers[1], D. T. Nolan[1], C. S. Petersson-Wolfe[3], G. M. Pighetti[2], S. Ward[4], and J. M. Bewley[1], *[1]University of Kentucky, Lexington, [2]University of Tennessee, Knoxville, [3]Virginia Tech University, Blacksburg, [4]Mississippi State University, Mississippi State*.

The objective of this study, as part of the Southeast Quality Milk Initiative, was to evaluate the effects of housing systems and farm demographics on SCS. From June 22, 2014, to June 21, 2015, dairy producers in Kentucky (n = 96), Tennessee (n = 83), Virginia (n = 96), and Mississippi (n = 7) participated in an on-farm survey. Each survey variable's effect on SCS was evaluated using the GLM procedure in SAS with no covariates. Significant farm demographic variables were then included as covariates in a GLM alongside herd size, state, and all two-way interactions. The same process occurred for significant housing variables with confinement type also included (total confinement, <4 h outside access, ≥4 h outside access, or exclusively pasture). Backward stepwise elimination was used to eliminate nonsignificant interactions ($P > 0.05$). In the housing model, state ($P < 0.01$) and confinement type ($P < 0.04$) were significantly associated with SCS. Herds in Kentucky (4.33) and Virginia (4.43) had a lower SCS than Mississippi (4.84) and Tennessee (4.70; $P < 0.02$) herds. Total confinement herds had a lower SCS than herds with outside access (4.23, 4.67, 4.51, and 4.71 for total confinement, <4 h outside, ≥4 h outside, and exclusively pastured herds, respectively; $P < 0.03$). Nonsignificant variables included herd size, alley scraping frequency, fan availability, sprinkler availability, year of last housing renovation, and all interactions. In the farm demographic model, state ($P < 0.01$), age ($P < 0.01$), and plans to be in business in 5 yr ($P = 0.02$) were significantly associated with SCS. Producers ≥66 yr old managed herds with higher SCS compared with all other age groups (4.43, 4.38, 4.56, 4.45, 4.58, and 5.06 for <26, 26 to 35, 36 to 45, 46 to 55, 56 to 65, and ≥66 yr old, respectively; $P < 0.01$). Producers responding that they were "almost certainly" going to be in business in 5 yr had lower SCS than producers responding they were "very likely" to be in business in the same time frame (4.38 and 4.72, respectively; $P < 0.01$). Nonsignificant variables included herd size, regularly scheduled veterinarian visits, producer education level, plans to be in business in 10 yr, and all interactions. These results suggest both housing and demographics are associated with SCS in the southeastern United States.

Key Words: management, mastitis, Southeast Quality Milk Initiative

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0762 Feeding low crude protein diets in lactating dairy cows during summer months: 1. Improvements in milk production and nitrogen utilization. J. Kaufman*, K. Kassube, and A. G. Rius, *The University of Tennessee, Knoxville*.

Heat stress increases protein catabolism and urinary nitrogen excretion resulting in reduced nitrogen-use efficiency (NUE) in livestock. Feeding low CP diets may improve performance of lactating dairy cows during summer. A study was conducted to evaluate the effect of feeding low RDP and RUP levels in cows during summer. Forty-eight midlactation Holstein cows were assigned to treatments using a complete randomized block design in a 2 × 2 factorial arrangement of treatments (n = 12/treatment). Treatments included two levels of RDP (10 and 8%) and two levels of RUP (8 and 6%). A common diet (10% RDP and 8% RUP) was fed from d 1 to 21 followed by the respective treatment diets from d 22 to 42. Milk samples were collected from d 36 to 42. Cows were housed in a freestall barn and exposed to the prevailing temperature and humidity of July and August with no supplemental cooling. Main effects and their interaction were tested using the Mixed procedure of SAS and reported as least squares means ± SEM. Rectal temperatures and respiration rates were recorded before noon and after noon during the treatments. Compare with before noon, after noon increased temperature and respiration rates (38.9–39.7 ± 0.07°C [$P < 0.001$] and 64.0–87.1 ± 1.4 breaths/min [$P < 0.001$]). Compared with the 10% RDP, the 8% RDP treatment increased DMI and milk protein yield in the 6% RUP treatment (19.0 vs. 18.4 ± 0.32 kg/d and 1.02 vs.

0.96 ± 0.02 kg/d) but decreased DMI and milk protein yield in the 8% RUP treatment (19.4 vs. 20.1 ± 0.32 kg/d [interaction, $P < 0.01$] and 1.02 vs. 1.08 ± 0.02 kg/d [interaction, $P < 0.01$]). There was a trend ($P < 0.07$) for an interaction such that the 8% RDP treatment increased energy-corrected milk (ECM) yield compared with 10% RDP in the 6% RUP treatment (31.7 vs. 29.4 ± 0.76 kg/d) but reduced ECM yield in the 8% RUP treatment (32.5 vs. 33.0 ± 0.76 kg/d). The 10% RDP treatment increased ($P < 0.001$) milk-urea nitrogen compared with the 8% RDP treatment (10.2 vs. 6.9 ± 0.28 mg/dL). The 8% RUP treatment increased ($P < 0.001$) milk-urea nitrogen compared with the 6% RUP treatment (9.8 vs. 7.2 ± 0.28 mg/dL). The 8% RDP treatment increased ($P < 0.001$) NUE compared with 10% RDP (35.1 vs. 31.6 ± 0.76%). The 6% RUP treatment increased ($P < 0.001$) NUE compared with 8% RUP (35.1 vs. 31.6 ± 0.76%). Therefore, lower RDP diets can be fed with 6% RUP diets without compromising milk production, whereas the combination of low RDP with 8% RUP depressed productivity. Lower RDP and RUP diets increase NUE in heat-stressed cows.

Key Words: crude protein, nitrogen-use efficiency, heat stress

0763 Influence of a bovine respiratory disease complex vaccine with a modified live virus or KV infectious bovine rhinotracheitis component on estrous cycle parameters and anti-Müllerian hormone concentration in nulliparous heifers.

C. L. Widener*, D. J. Hurley, W. M. Graves, A. H. Nelson, D. A. L. Lourenco, and J. F. Bohlen, *University of Georgia, Athens*.

The objective of this study was to examine the impact of a bovine respiratory disease complex (BRDC) vaccine with a modified live virus (MLV) infectious bovine rhinotracheitis (IBR) component on estrous cycle parameters and the follicular pool. Twenty-four Holstein heifers (mean 12.4 mo [SD 0.5]) in two replicates (spring, $n = 10$, and fall, $n = 14$) were synchronized for estrus using a 7-d CIDR protocol with 2 injections of PGF_{2a}, one at CIDR removal and a follow-up injection 16 h later. Heifers were calf-hood vaccinated with an IBR MLV. Heifers were observed for one complete estrous cycle to establish normal cyclicity. At Heat 2, heifers were vaccinated with either the calf-hood MLV (MLV; $n = 12$) or a BRDC vaccine with a killed (K; $n = 12$) IBR component. Heifers were blocked into treatment groups according to prevaccination bovine viral diarrhea virus (BVDV) serum neutralizing titers. Heifers were then tracked for two complete estrous cycles. Serum samples for estradiol (E2) and progesterone (P4) and ultrasound of ovarian structures were collected to track cyclicity every other day. Serum samples for anti-Müllerian hormone (AMH) were collected at estrus and mid cycle to evaluate the follicular pool. Data was normalized with ovulation as Day 0. Data were analyzed with the PROC MIXED procedure of SAS with cycle number, season, and vaccine as fixed effects. The model for P4 analysis added day of cycle as a fixed effect. There was no difference ($P > 0.05$) in postvaccination titers. Vaccination had no impact on P4 concentrations, luteal tissue area, peak E2 production, or estrous cycle lengths ($P > 0.05$). Overall variables that affected AMH concentrations were season (spring = 138.92 ± 43.1 pg/mL; $P = 0.0043$), vaccine type (MLV = −92.4 ± 42.9 pg/mL; $P = 0.0435$), and cycle number ($P < 0.0001$). Anti-Müllerian hormone concentration decreased between cycles 1 and 2 and cycles 1 and 3 for MLV vaccinated heifers ($P < 0.0003$). Anti-Müllerian hormone concentrations of cycle 2 were numerically lower between vaccine types (K = 308.22 ± 33.3 pg/mL and MLV = 181.13 ± 32.9 pg/mL; $P = 0.0953$), although not statistically different. This may be due to low animal numbers, the variability between animals, or the differences observed in the Fall killed vaccine (−70.93 ± 21.1 pg/mL; $P = 0.0145$) from cycle 1 to 2 but not in the Spring killed vaccine (3.40 ± 45.1 pg/mL; $P = 0.9969$). Anti-Müllerian hormone was weakly correlated with small follicle count ($r^2 = 0.15$, $P < 0.0001$). Although no differences were seen in overall cycle parameters, these differences in AMH concentrations may indicate a reduction of the follicular pool as a result of vaccination with an IBR MLV.

Key Words: infectious bovine rhinotracheitis modified live virus, cyclicity, anti-Müllerian hormone

GROWTH AND DEVELOPMENT

0764 Functional characterization of porcine SCD1 in stably transduced porcine SK6 cells.

J. Hwang*, N. Singh, C. Long, and S. B. Smith, *Texas A&M University, College Station*.

Fatty acid composition is an important component of foods derived from livestock species, as it contributes to both the healthfulness and the functionality of beef, lamb, pork, and dairy products. The most highly regulated and most abundant fatty acid in animal tissues and dairy products is oleic acid (18:1*n*-9). Oleic acid is synthesized by the Δ9 desaturase, stearoyl CoA desaturase (SCD1), which also is responsible for the synthesis of the putative cytokine palmitoleic acid (16:1*n*-7) and *cis*-9, *trans*-11 CLA. Owing to the importance of SCD1 in lipid metabolism, we generated a porcine SK6 transgenic cell lines for sustained overexpression or knockdown of pSCD1 in an inducible manner by using a novel All-in-One Tet-On Lentiviral expression system. We combined the inducible transcriptional activator (tetracycline-controlled transactivator protein) vector and the vector encoding the pSCD1 gene under the influence of a tetracycline-responsive promoter element into one to generate an inducible all-in-one lentiviral vector system. The cell culture models were validated for expression and functionality of pSCD1 by documenting that