

season (3.61, 3.26, and 8.79, respectively). Seasonality influenced fat and protein and at the rainy season, SCC and TBC may have decreased the milk solids. Milk powder yield was higher in the dry season due to the highest solids content of milk. However, the total production of kg of solids was lower due to the lower volume of milk collected in that season. Indeed, seasonality influenced all the studied parameters and it may have affected milk powder yield.

Financial support: FAPEMIG

Key Words: milk, quality, factors

T319 Evolution of milk production and premium payment for total bacterial count, somatic cell count, fat and protein contents in a dairy industry of Minas Gerais state, Brazil.

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Objectives were to characterize milk quality parameters in the state of Minas Gerais, Brazil, from 2002 to 2008. A total of 60,243 raw bulk tank milk samples were collected and analyzed for total bacterial count (TBC), SCC, fat and protein. Results were tabulated according to year and then related to the volume of milk produced and value paid to the producers according to a system of payment for quality established by the local industry. Descriptive analyses were performed to report results. For all 4 parameters used in the payment for milk quality (TBC, SCC, fat and protein contents), the value paid to the producer increased. However, not all parameters followed the same pattern. TBC and SSC followed distinct trajectories. The volume of milk that received premium payment for TBC increased 27.18% between 2005 and 2008, and the average premium payment for TBC increased 3.15% in the same period. In relation to SCC, the volume of milk that received a premium payment decreased 27.52% between 2005 and 2008, but the premium payment for SCC increased 58.89% in the same period. The average fat content decreased, whereas the protein content increased in the period evaluated. The volume of milk that received premium payment for fat content was reduced 0.92% between 2005 and 2008, but the average premium payment for fat content increased 14.38% in the same period. The volume of milk that received premium payment for protein content increased 61.86% between 2005 and 2008. The average premium payment for protein content increased 69.60% between 2005 and 2008. It is necessary to monitor and to evaluate the parameters used in the payment of milk quality so that it has, in fact, a continuous improvement of the productive processes and the economic index.

Key Words: milk, quality, payment system

T320 Comparison of different methods of rearing management in Holstein dairy calves.

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Milk consumption, dry feed intake, body weight (BW) gain and occurrence of diarrhea were studied in male Holstein calves fed milk either through conventional or step-down (STEP) methods. A completely randomized design was used in this study. In conventional method, the calves (n = 9) were fed colostrum and then milk at the rate of 10% of BW for the entire period of 45 d. In STEP method, the calves (n = 9) were given colostrum and then milk for 25 d at the rate of 20% of BW in 2 meals and another calves (n = 9) in 3 meals for 25 d, which was reduced (between d 26 to 30) to 10% of BW for the remaining 15 d. The calves fed through conventional and STEP methods were weaned gradually by milk diluting with water between d 46 and 50. Feed intake

and BW of the calves were monitored until 90 d of age. The STEP calves consumed more milk than conventionally fed calves during the pre-STEP (d 1 to 30) and post-STEP (d 31 to 50) periods ($P < 0.01$). Consumption of starter in calves provided milk using conventional method compared with STEP-fed calves was greater during the pre-STEP period and there was no significant difference during the post-STEP and postweaning (d 51 to 90) periods. Body weight gain (8.5, 18.7 and 21.3 kg/30 d, $P < 0.001$, respectively) and feed efficiency (0.37, 0.49 and 0.55, $P < 0.001$, respectively) of calves were greater in those on the STEP method during the pre-STEP period than on the conventional method and were numerically higher during post-STEP and post-weaning. There was no significant difference in occurrence of diarrhea in calves fed milk through conventional method compared with STEP-fed method. Increasing number of milk meals tended to increase body weight gain (65.4 vs. 70.7 kg/90 d, $P < 0.17$). In conclusion, STEP milk feeding may prevent the problems of depressed solid feed intake associated with ad libitum milk feeding and of poor BW gain with conventional milk feeding in dairy calves.

Key Words: weaning, starter, Holstein bull calves

T321 Differences between expanding and non-expanding Wisconsin dairy farms.

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A survey was administered (September 2009 to January 2010) to a sample of 1,000 randomly selected Wisconsin dairy producers to discern differences between those planning to expand and those not planning to expand their operations. A total of 300 dairy producers (30%) across 33 counties in Wisconsin completed the survey. Results indicated 33% of dairy producers planned to expand their dairies in the future. The majority planned to grow their herds from within. Significant differences between dairy producers and their operations were found regarding producer age, producer experience, farm herd size, and land per cow. Low net profit was the top issue hampering growth and modernization for producers planning to expand. Most producers not planning to expand were satisfied with their current operation size and did not feel expansion was necessary. Producers planning to expand cited an increase in net farm income as their most important motivation, while producers not planning to expand wanted to keep the farm at its best size given available labor. Dairy producers planning to expand were interested in receiving more information about financial planning, profitability measures, and financial efficiency. Producers not planning to expand were interested in topics regarding reproduction and financial efficiency. Results provide evidence toward development of risk management and financial management programs tailored for expanding and non-expanding dairy producers.

Table 1. Characteristics of expanding and non-expanding dairy operations

	Planning to expand (n = 78)	SD	Not planning to expand (n = 222)	SD	P-value
Producer age (yr)	47.08	10.70	51.19	10.70	0.01
Producer experience (yr)	25.33	12.99	29.15	12.14	0.04
Farm herd size (#)	247.35	362.97	82.11	117.03	0.00
Farm land per cow (ha/cow)	0.94	1.06	1.73	2.18	0.00

Key Words: expansion, modernization, survey

affected by breed, while week postpartum, season, parity and breed had greater impacts on NEFA.

Key Words: crossbreds, NEFA, reproduction

T332 The effect of feed sorting on intakes of fiber and phosphorus in dairy cows. A. C. Huisman, R. L. Kincaid*, J. J. Michal, K. A. Johnson, and C. T. Gaskins, *Washington State University, Pullman.*

This study examined the impact of diet sorting on intake of NDF and P by lactating cows fed one of 2 TMRs that were fed for 10% refusals. Holstein cows (n = 24; 114 DIM) were fed a control TMR (CTMR; 27.3% alfalfa haylage, 25.4% alfalfa hay, 6.4% whole cottonseed, 36.4% concentrate, and 4.5% dried distillers grains and soluble) or a TMR in which 40% of the alfalfa hay DM was replaced by bluegrass straw (BGSTMR). After 3 wk the diets were switched and cows fed for another 3 wk. Fresh diet was delivered 1X/d with frequent pushups. Feed sorting by pen was assessed by comparing particle size distribution of fresh feed and 24 h refusals for 2 consecutive days for each treatment and period. Actual intakes of NDF and P were determined from the nutrient concentration in each particle size fraction for both fresh diet and refusals. Total fecal P excretion was estimated using ADL values. Analysis of data was performed using PROC GLM of SAS and the model included the effects of treatment, period, and treatment by period. Cows sorted ($P < 0.05$) against the long fraction (23 percentage unit increase in refusals) and for the short fraction (53 percentage unit decrease in refusals) for both treatments. Although sorting occurred, the % NDF in the consumed diet did not differ from the formulated diet (34% vs. 33% for formulated and consumed CTMR, and 36% vs. 35% for formulated and consumed BGS TMR, respectively). Similarly, the % P (0.41%) in the consumed diet did not differ from the formulated diet for either treatment. The feces contained 0.69 and 0.67% P and total fecal P excretion was 75 and 76 g/d, respectively, for the 2 treatments. However, comparison of particle size fractions of fresh feed to 24-h refusals does not consider within day variation of nutrient intake. In summary, feed sorting had no effect on daily intakes of NDF and P of cows fed these alfalfa-based diets.

Key Words: sorting, fiber, phosphorus

T333 Effect of Tasco on core body temperature of dairy cows exposed to heat stress. L. B. Pompeu¹, J. E. Williams*¹, D. E. Spiers¹, R. L. Weaver¹, M. R. Ellersieck¹, K. M. Sargent¹, N. P. Feyerabend¹, H. L. Vellios¹, and F. Evans², ¹*University of Missouri, Columbia*, ²*Acadian Seaplants, Darmouth, Nova Scotia, Canada.*

Previous research in our laboratory revealed Tasco (*Ascophyllum nodosum*) temporarily lowers core body temperature (Tc) in rats and steers fed diets with endophyte-infected tall fescue during heat challenge. The present study determined the impact of Tasco on Tc in dairy cows exposed to elevated ambient temperature (Ta). Holstein cows (n = 32; DIM 107 ± 43; parity 2.7 ± 1.5) were assigned to treatments (trt) using a randomized complete block design, with 8 cows per trt. The study was divided into 3 periods: Period 1 (7 d) was adaptation to the Calan gate system; in Period 2 (28 d) trt were: Control-1 (C-1); Control-2 (C-2); 0.25% Tasco (0.25T); 0.50% Tasco (0.5T); in Period 3 (28 d) C-2 changed to 0.50% Tasco (C-.5T) to evaluate length of feeding Tasco. Each cow had a telemetric temperature transmitter (SmartStock, Pawnee, OK) placed in the reticulum, to record Tc every 20 min. Ta was continuously recorded (Hobo, Onset Computer Corp., Bourne, MA). Daily feed intake and milk production were collected for each cow. For Periods 1, 2 and 3 the average maximum Ta was 29.6, 28.0 and 31.0°C, respectively. In Period 2, no differences ($P > 0.10$) were found between

C-1 and C-2 for any parameter, so they were combined for this period (C). Tasco trt had no effect ($P > 0.10$) on milk production, even with occasionally lower ($P < 0.05$) DMI for 0.25T compared with C and 0.5T. In Periods 2 and 3, there was a trend ($P < 0.10$) for a higher Tc for 0.5T compared with other trt. Linear regression of Tc vs Ta showed that, in Period 2, 0.25T had a slower increase in Tc with the rise in Ta during the day compared with C, while in Period 3, both 0.25T and 0.5T had a slower increase in Tc compared with C-1 and C-.5T ($P < 0.05$). In this same study, for Period 3, 0.25T had a slower increase in rump and ear surface temperature than C-1 and C-.5T as Ta increased. These results revealed that 0.25T maintained lower Tc, rump and ear temperature with increasing Ta.

Key Words: Tasco, heat stress, dairy cows

T334 An update of bulk tank milk quality in California. N. Silva-del-Rio*¹ and C. Collar², ¹*University of California Cooperative Extension, Tulare County*, ²*University of California Cooperative Extension, Kings County.*

Information about bulk tank milk (BTM) quality parameters can be used by dairy producers to compare their milk quality to industry wide benchmarks, and to define achievable goals for their operations. The objective of this study was to describe BTM quality for the California dairy industry. Individual herd information on somatic cell count (SCC), standard plate count (SPC), laboratory pasteurization count (LPC) and coliform count (Coli) from Oct-08 to Sep-09 were provided by a large dairy cooperative in California. All the milk loads shipped by each dairy were sampled weekly (ranging from 1 to 7 loads per week per dairy). Only herds with BTM samples collected throughout the 12 mo period were included in the final data set (n = 537) which comprised a total of 56,455 BTM observations. BTM samples below the regulatory threshold set by the California Department of Food and Agriculture (CDFA) were: 99.4% for SCC (<600,000 cell/mL), 96.5% for SPC (<50,000 CFU), 96.1% for LPC (<750 CFU/mL), and 93.0% for Coli (<750 CFU/mL). BTM quality parameters were described with Proc Univariate of SAS. Season effects (S1 = Jan-Mar, S2 = Apr-Jun, S3 = Jul-Sep, S4 = Oct-Dec) of log-transformed data were evaluated using Proc Mixed of SAS with repeated measurements on herd. Description of BTM quality parameters for the top 25% herds, the bottom 25% herds and the median counts are presented in Table 1. There was a significant effect of season on each of the BTM quality parameters ($P < 0.001$). SCC were lower in S2 than S1-S3-S4. SPC were higher for S1 than S2-S3-S4. However, SPC and Coli were higher in S1-S4 than in S2-S3. Overall, during the study period, California BTM quality was within acceptable parameters.

Table 1. SCC, SPC, LPC and Coli counts in California BTM, top 25% herds, bottom 25% herds and median counts from Oct-08 to Sep-09

	SCC (cell/mL)	SPC (CFU/mL)	LPC (CFU/mL)	Coli (CFU/mL)
25% top herds	<156,698	<2,969	<43	<25
25% bottom herds	>252,679	>5,729	>129	>63
Median	202,208	3,534	74	39

Key Words: bulk tank milk quality, dairy, California

T335 Determination of variation in dairy cows response to heat stress using radiotelemetry. L. B. Pompeu, J. E. Williams, D. E.

Spiers*, R. L. Weaver, and M. R. Ellersieck, *University of Missouri, Columbia*.

Summer heat is a major problem for dairy cattle, which have an elevated body heat production. At air temperature (T_a) above thermoneutrality, reduction in feed intake and milk production occur along with increased core body temperature (T_c). However, individual animals vary in response to heat stress, which can provide large variance between groups. To evaluate different levels of animal response to heat stress, a study was performed utilizing 15 Holstein cows, housed in a free-stall barn, during June and July (2008). A telemetric temperature transmitter (SmartStock, Pawnee, OK) was placed in the reticulum of each cow to record T_c . T_a was recorded using Hobo loggers (Onset, Bourne, MA). Feed intake and milk production were collected daily. A period of progressively increasing heat stress (9 d) was chosen to be analyzed (max T_a : 29.7°C, min T_a : 20.7°C). T_c and milk production relationships to T_a were assessed by quadratic and linear regressions, respectively, to separate cows into sensitive (S; $n = 5$) and non-sensitive (NS; $n = 5$) groups based on R^2 . Five cows showed an intermediate response and were removed from analysis. For the analysis, hours 1000 to 1500 were used to assess the major rise in T_c during the day. A 1-h lag in T_c and 1-d lag for milk production were utilized for better correlation with T_a . Linear regression of T_c vs. T_a showed a difference between regression coefficients and slopes of S ($R^2 = 0.68$; slope = 0.12) and NS ($R^2 = 0.54$; slope = 0.08). Daily max, min, and mean T_a were tested against milk production, with min T_a yielding the best correlation. Milk production also showed a large difference with the linear fit and slope of S ($R^2 = 0.75$; slope = -0.71) being larger than NS ($R^2 = 0.27$; slope = -0.25). The greater slopes of sensitive animals indicate a larger response to T_a compared with non-sensitive animals, indicating variations in responses between animals among the same group of cows. Thus, to evaluate heat strain, it is essential to analyze animals separately by their level of response.

Key Words: heat stress, dairy cow, core temperature

T336 Corn silage management practices on California dairies. N. Silva-del-Río*¹, J. M. Heguy², and A. Lago³, ¹*University of California Cooperative Extension, Tulare County*, ²*University of California Cooperative Extension, Stanislaus and San Joaquin Counties*, ³*APC Inc., Ankeny, IA*.

The aim of this study was to obtain information on current corn silage feed management practices in California's Central Valley. In summer 2009, a feed management survey was mailed to dairy producers in Tulare, Stanislaus, and San Joaquin; the first, third and seventh largest dairy counties in California, respectively. Producers received an envelope containing an invitation letter to participate in the study, a one-page survey, and a pre-paid return envelope. Response rate was 16.9% (120/710). Herd size ranged from 160 to 6,600 cows (median = 950). Corn silage in California was more frequently stored in piles (85.0%) and on concrete (75.0%), versus bunkers or dirt. Dairies reported top surface spoiled forage: <7.5 cm (25%), 7.5 to <15 cm (53.9%), 15 to <23 cm (15.7%), ≥ 23 cm (4.9%). Only one producer indicated that silage was not covered. A total of 54.7% ($n = 55$) of dairies covered silage with oxygen barrier (OB) technology. Top surface spoiled forage was reported to be < 15 cm in 89.3% of silages covered with OB technology and in 64.0% of silages covered with conventional plastic material. Bacterial inoculants of various types were used in 54.0% of corn silages. Most respondents (73.4%) considered that silage faces were maintained smooth, but only 5 producers used face shavers. The entire width of the silage face was removed daily in 41.7% of dairies, and of those, 27% removed less than 15 cm depth per day. Of dairies that did not remove the entire width of the silage face (1/2 face-24.0%, 1/3 face-26.9%, 1/4 face -7.4%), 15.0% advanced less than 15 cm depth per day. Determination of silage dry matter (DM) was conducted at least once a month in 52.3% of dairies. Only 8.3% of dairies determined DM weekly, or more often. Most dairies delegated DM determination to an outside nutrition consultant (86.6%). A total of 25.0% of dairies suspected mycotoxins in 2008. Top surface spoiled forage was discarded by 70.4% of dairies suspecting mycotoxins, and by 55.8% of those that did not suspect mycotoxins. Although dairy owner and manager responses are subjective, results indicate areas where corn silage management can be improved, such as removal rate, surface spoilage, and pile size.

Key Words: corn silage, dairy, survey