

with three steers (374 kg \pm 6.43 initial BW) per paddock. All steers had access to salt and minerals free-choice. Grazing was initiated on Jan 19, 2006, when average forage mass reached 1000kg ha⁻¹ as the first of two replicate years. When forage quality could no longer sustain growth, cattle were transported 50 km to the Auburn University Lambert-Powell Meat Laboratory and humanely harvested. Carcass data, pH, lean and fat color was measured 48 h postmortem and a boneless ribeye roll was removed from each carcass, vacuum-packaged, and stored (4C) until 21 d postmortem. Steaks were removed from the posterior end of the ribeye roll, overwrapped in PVC film and stored under simulated retail conditions for 7 d. Lean color was measured daily on each steak to monitor L*, a*, and b* values. Average daily gain was not affected ($P > 0.10$) by forage treatment. Type of forage did not affect ($P > 0.50$) HCW, preliminary yield grade, KPH fat%, LM area, maturity, marbling, final yield grade or final quality grade. Carcasses from steers finished on rye tended ($P = 0.08$) to have lighter (higher L* values) subcutaneous fat color compared to carcass from steers finished on either ryegrass or oats. Subcutaneous fat redness and yellowness and lean lightness, redness, and yellowness did not differ ($P > 0.24$) among the three forage treatments. Lean lightness (L*) and redness (a*) decreased ($P < 0.05$) with increasing days of retail display. The type of forage used to finish steers did not ($P > 0.05$) affect color traits of steaks under retail display. Type of forage used to finish Angus-cross steers does not affect carcass or meat color traits.

Key Words: Forage-Fed, Beef, Carcass

745 Impact of litter size and birth weight on growth performance, carcass characteristics, and meat quality in pigs. J. Bérard¹, M. Kreuzer², and G. Bee^{*1}, ¹*Agroscope Liebefeld-Posieux, Research Station ALP, Posieux, Switzerland*, ²*ETH Zurich, Institute of Animal Science, Zurich, Switzerland*.

There is some evidence that within litter low birth weight (**Btw**) pigs not only grow slower and have fatter carcasses but also meat quality traits are impaired compared to their high Btw siblings. Because the variability of the Btw is greater in large compared to small litters, the aim of this study was to test the hypothesis that effects of Btw on growth performance, carcass characteristics, and meat quality in the LM and the light portion of the semitendinosus muscle (**ST**) are different when pigs originate from small or large litters. The 60 Swiss Large White barrows used originated from 20 litters with either less than 10 (**S**) or more than 14 (**L**) piglets born per litter. Within each litter, the lightest (**L-Btw**), the heaviest (**H-Btw**), and the barrows with a Btw nearest to the average Btw of the litter (**M-Btw**) were selected. At weaning the barrows were individually penned and had free access to the diet until slaughter at 105 kg BW. The Btw of L- as compared to S-litters were lower in L-Btw (1.2 vs. 1.6 kg) and M-Btw barrows (1.6 vs. 1.9 kg) and similar in H-Btw barrows (1.9 vs. 2.0 kg) (litter size \times Btw interaction; $P < 0.01$). The L-Btw barrows grew slower (0.81 vs. 0.90 kg; $P < 0.01$), ingested less feed (2.30 vs. 2.42 kg; $P = 0.03$), and were still less efficient (2.84 vs. 2.71 kg feed/kg gain; $P < 0.01$) than H-Btw- and M-Btw barrows, regardless whether they originated from S- or L-litters. The carcass yield was higher (81 vs. 82%; $P < 0.01$), the liver (1.58 vs. 1.74 kg), and kidney (0.31 vs. 0.34 kg) were lighter ($P \leq 0.01$) in L-Btw barrows in the S- and L-litters. Drip loss and shear force was neither affected by litter size nor by Btw. The LM of L-Btw was less red (6.1 vs. 6.9; $P = 0.02$) than the LM of H-Btw barrows and b*-values of the ST was lower (3.4 vs. 3.8; $P = 0.03$) in barrows originating from L- than from S-litters. The present results confirm the marked effect of Btw on growth performance whereas the hypothesized impact on carcass characteristics and meat quality could not be demonstrated. Although the litter size affected average Btw its impact on growth performance, carcass and meat quality was minor.

Key Words: Birth Weight, Litter Size, Meat Quality

Extension Education - Livestock and Poultry: Extension Dairy Session

746 A Net Present Value Dashboard of the dairy cow in a commercial setting. D. T. Galligan*, J. Ferguson, R. Munson, and D. Remsburg, *University of Pennsylvania, School of Veterinary Medicine, Kennett Square*.

An economic model of the production life of a modern dairy cow was created in a dashboard environment. The user enters information that characterizes the production life of a cow using sliders arranged in a menu driven series of screens: Milk and Feed \$, Reproduction, BST, Heifer, Finance, Other Cost, Labor, Longevity. Over 30 input variables (management factors, production parameters, economic values) are controlled by the user. Based on entered values, an economic model of annual cash flows is created and discounted to reflect the opportunity of value money. Several gauges show: the cow net present value, annuity value per year, internal rate of return estimate, time in the herd and the resulting cull rate. These gauges respond to user changes of inputs instantly demonstrating the magnitude of impact. Lactation yields are shown in a graph format and are changed by altering first lactation yields. For example a cow having 3 lactations and culled at 100 DIM in the last lactation, with a first lactation yield of 22,000 (305 milk) valued at \$13/cwt, with debt/cow at \$2000 financed at 7% over ten years will have a NPV of \$662 and an annuity value of \$160. Use of BST starting at 100 DIM in all lactations, will increase the NPV to \$925 and the annuity value to \$226, assuming a 10 lb daily response

and a start DIM at 100 for each lactation. Other investment strategies can be explored with the model.

Key Words: Net Present Value, Economics, Dashboard

747 Accuracy of prediction of future uniform milk prices in Florida from Class III and IV futures markets. S. Feleke* and A. De Vries, *University of Florida, Gainesville*.

The objective of this study was to evaluate the accuracy of a method to predict the future uniform milk price in Florida from the Class III (cheese) and Class IV (butter) futures markets. Milk futures contracts are traded at the Chicago Mercantile Exchange for delivery 1 to 18 months in the future. Futures market theory holds that futures prices may be unbiased predictors of spot prices. The uniform milk price in Florida is a function of the announced Class III and IV prices, butter price, and the utilization of Class I, II, III, and IV skim milk and butterfat prices. To accurately predict future uniform milk prices, unbiased estimates of these factors are needed. Therefore, future butter prices were predicted from the future Class IV price and the ratio of the most recently announced butter price and the Class IV price. Future

utilizations of skim milk and butterfat prices were predicted from the most recently announced utilizations. Daily traded Class III and IV futures prices from 2003 to 2006 (48 mo) were obtained and were averaged per month. The monthly average milk futures prices were taken as unbiased predictors of the actual Class III and IV prices that are announced every month by USDA. The predictions of uniform milk prices for 1 to 6 months in the future from 2003 to 2006 were used to assess the accuracy of our method of prediction. Average uniform milk price in Florida in this period was $\$16.53 \pm 2.20$ / cwt. The mean and standard deviation of the prediction error for 1-month-ahead forecast were $\$0.11 \pm 1.01$ / cwt. For 2, 3, 4, 5, and 6-month-ahead forecasts, prediction errors were $\$0.26 \pm 0.97$, $\$0.43 \pm 1.42$, $\$0.53 \pm 1.87$, $\$0.52 \pm 2.14$, $\$0.47 \pm 2.29$ /cwt. Thus, the actual uniform milk price was typically overestimated. The majority of the prediction error was due to the inefficiency of the futures market to predict the announced Class III and IV prices by USDA. The implication of the study is that the uniform milk price in Florida for more than a few months into the future cannot be accurately estimated from the Class III and Class IV futures market prices.

Key Words: Futures Market, Milk Price, Prediction

748 Economic evaluation of decision choices facing dairy producers in Sicily, additional milk or additional cows? D. T. Galligan^{*1}, G. Azzaro², and G. Licitra^{2,3}, ¹*University of Pennsylvania, School of Veterinary Medicine, Kennett Sqaure*, ²*CoRFiLaC, Regione Siciliana, Ragusa, Italy*, ³*DACP University of Catania, Catania, Italy*.

Thirty one dairy herds in Sicily, subscribing to the Corfilac dairy herd record collection system, were visited during 2006 and interviewed regarding basic herd characteristics (cow demographics, production levels, culling rates, calving interval) and economic factors (milk price, cow purchase price, calf value, variable production cost, quota cost, financing options) associated with their herd. Under the quota system, additional milk either from existing cows or by adding cows must have quota purchased and financed (mean rate 5.1%/year and terms 5 years). Of the herd reporting their purchased quota, eight herds were producing below their purchased quota, while 10 herds were at quota and 11 over. Milk price per kg averaged .37 Eur/kg (range .30 - .40) and the average herd size was 84 (range 20 to 340) with cows producing an average of 6721 kg/yr (range 1,100 to 25,500). The herds would increase marginal profits per/cow/year by increasing milk yield by 1 kg/day (average 107 Eur) and with the purchase of quota (average 77 Eur/cow/year). Twenty two herds were estimated to see a positive profit by adding an additional cow averaging 966 Eur/cow/yr without quota purchase. Fifteen herds were estimated to see a positive profit by adding an additional cow and purchasing the necessary quota averaging 357 Eur/cow/year. If the additional cow can be added to the herd without additional labor, then the marginal increases per cow are 1454 Eur/cow/year without quota purchase and 846 Eur/cow/year with quota purchase. Economic analysis of existing farm situation can help producers make more informed decisions concerning cow numbers and quota purchase.

Key Words: Economics, Quota, Marginal

749 Spartan Dairy Ration Evaluator/Balancer Version 3: A user-friendly, windows-based software program for dairy nutrition management. M. J. VandeHaar^{*}, H. F. Bucholtz, D. K. Beede, M. S. Allen, and R. D. Kriegel, *Michigan State University, East Lansing*.

Version 2 of the Spartan Dairy Ration Evaluator/Balancer software program was used widely because it was user-friendly and enabled formulation of reasonable diets relatively quickly. Our goal with version 3 was to retain those aspects of version 2 that made it successful, while also incorporating the latest scientific findings related to diet formulation and completely redesigning the program as a MS Windows application. The nutrition model largely is based on the 2001 version of the Nutrient Requirements of Dairy Cattle by the National Research Council (NRC). The 2001 NRC made fundamental changes in the sub-models for almost all nutrients. The NRC model was designed as an evaluation tool and created some challenges for routine use in formulating diets on farms. Version 3 of Spartan Dairy incorporates modifications of the 2001 NRC system, but energy and protein values based on the 1989 and 2001 NRC systems can be monitored simultaneously. Some of the most notable changes in Spartan version 3 compared with version 2 are that the predicted feed intake is greater, energy values of diets are calculated based on nutrient composition and depend upon rate of feed intake, the % CP required is typically lower, mineral adequacy can be assessed on an absorbed basis, concentrations of met and lys can be tracked, and N and P excretion are predicted. Many of these changes are based on the 2001 NRC. Spartan Dairy 3 is a stand-alone Windows application written in Delphi that stores data in MS Access database files. Like Spartan Dairy 2, the application features a ration worksheet at its center. It also includes the ability to open multiple rations and feed libraries simultaneously, and graphics to display nutrient adequacy. It features movable columns, feed characteristics organized by tabs, the ability to copy and paste feeds to and from MS Excel, previews of printed reports, and, of course, you can now use your mouse! The program works best with computers running Windows XP or later. Spartan Dairy 3 should prove to be a useful tool for use in formulating diets for commercial farms as well as for teaching.

Key Words: Dairy Cattle, Nutrition, Software

750 Nitrogen and phosphorus in by-product feeds and dairy diets in central Texas. T. D. Nennich^{*1}, N. M. Cherry¹, R. A. Whitney², R. J. Scott³, and W. H. Weems⁴, ¹*Texas A&M University, Stephenville*, ²*Texas Cooperative Extension, Comanche*, ³*Texas Cooperative Extension, Stephenville*, ⁴*Texas Cooperative Extension, Hamilton*.

Environmental concerns associated with N and P in surface and ground waters have encouraged efforts to improve management of these nutrients on dairy operations. Understanding the nutrient variation in feeds provides an opportunity to fine tune the nutrient content of the diet and decrease the overfeeding of nutrients. A study was conducted to determine the amount of N and P in dairy diets and by-product feedstuffs in Central Texas. Samples were collected from 50 dairy operations, representing over 40,000 cows, in central Texas. Producers were asked to complete a survey on their knowledge and the importance of P in their dairy rations. Samples of total mixed rations (TMR) were collected from each dairy operation, along with individual by-product feeds whenever they were available. Samples were collected by taking approximately 10 grab samples, compositing and mixing the sample,

and taking a sub-sample. By-product feed samples were collected from commodity barns, and TMR samples were collected at several places along the feed lane. A total of 12 by-product feeds were collected, including dried distillers grains, wet brewers grains, canola pellets, corn gluten pellets, and wheat midds. Diet and feed samples were analyzed to determine crude protein (CP) and P concentration. Overall, 54 TMR samples and 52 individual by-product feed samples from 50 dairy operations were collected. The CP and P contents of the TMR samples collected averaged 18.7% and 0.44% on a dry matter basis, respectively. The phosphorus contents of by-product feeds were greatly variable and often differed from average book values. For example, corn gluten feed samples (n = 8) averaged 22.3% CP and 0.67% P as compared to 2001 Dairy NRC book values of 23.8% CP and 1.00% P. Reducing the concentrations of N and P in dairy diets to recommended levels reduces nutrient excretion and improves the overall balance of these nutrients on dairy operations.

Key Words: Dairy, Nitrogen, Phosphorus

751 An evaluation of family farm transfer in Vermont. S. Purchase¹, C. Ballard^{*2}, and D. Maynard¹, ¹University of Vermont, Burlington, ²W.H. Miner Agricultural Research Institute, Chazy, NY.

One of the most significant challenges to a family farm operation is the transfer of ownership to the next generation. Two surveys were developed to identify obstacles to farm transfers as determined by professionals who work with farmers during the transfer process and by farmers themselves. A total of 6 farm transfer professionals and 42 farmers throughout the state of Vermont completed a 4-page survey. The respondents from non-dairy farms, small dairy (<100 milking cows), medium (100-300 cows), and large farms (>300 cows) were 7.1, 40.5, 31, and 21.4 %, respectively. Thirty-four percent of the farms had been in operation for over 50 years and 53.7% were sole proprietorships. Ninety-eight percent of the farms had 2 or more family members involved with the day-to-day operation of the farm. Nearly half of the respondents indicated their plans for bringing additional family members into the business as owners. Half of the farms surveyed had been family-owned for at least one generation. These farmers were asked to rank obstacles experienced during the process of transferring farm ownership (1=most, 5=least significant). Both interpersonal relations with farm family members and the business plan were ranked 1 or 2 for 62% of respondents. The farmers who experienced difficulties with family members during the transfer process identified personal temperaments as contributing more to these conflicts than money, time commitment or work responsibilities. Although the business plan was considered an obstacle during past farm transfers, less than 10% of the farms surveyed had a 5-10 year business plan for their farm. In looking ahead to the future farm transfer, 72% felt the business plan would be the primary obstacle, ranking 1 or 2. Interpersonal relations with farm family members was predicted to be a substantial obstacle for 53% with personal temperaments and time commitment being the primary contributor to the conflict. Five of six professionals surveyed find a 5-10 year written plan is beneficial during a farm transfer. However, all professionals identified interpersonal relations with farm family members as being the most significant obstacle as farm ownership is conveyed to the next generation.

Key Words: Family Farm, Transfer

752 A survey of AABP-L members concerning training of farm personnel. D. W. Remsburg*, D. T. Galligan, and J. D. Ferguson, *University of Pennsylvania School of Veterinary Medicine, Kennett Square.*

A survey regarding the frequency of veterinary tasks, issues facing the dairy industry, skills desired in a herd manager, and disadvantages of working with a herd manager was conducted as part of a pilot herd manager project. An internet link to 21 questions was distributed to the American Association of Bovine Practitioners Listserv in December 2006. Eighty-seven veterinarians from 30 states and 6 countries participated. On average, respondents worked in practices containing 3.93 vets and 1.61 veterinary technicians. The mean practiced allocated its services as follows: 67.2% Dairy, 18.6% Small Animal, 9.6% Beef, and 4.6% other. The most frequent tasks performed by veterinarians were pregnancy exams, surgery, and postpartum reproductive exams. The least frequent services performed were milking system evaluation, ration formulation, and labor management consulting. Veterinarians principally serving herds of greater than 1200 cows performed postpartum checks and surgery less often than did their colleagues. When asked about issues facing the dairy industry, implementing, learning and client adoption of new technologies were respondents' largest concerns. However, when characterized by region and principle herd size served the concern regarding decreasing number of farms, biosecurity, time available for family and recreational activities, income from veterinary service, foreign animal disease outbreak and animal welfare differed. In regards to desired herd manager skills, veterinarians thought management of fresh cows, record keeping and diagnosis and treatment of sick cows were the most important tasks a herd manager should be trained to accomplish. Milking instruction and labor management were rated of higher importance by veterinarians working with medium (301-600 cows) and large (>1200 cows) farms, while fresh cow management was less important to large farm vets. These results demonstrate the difference in frequency of veterinary tasks, concerns about the dairy industry and skills expected of herd managers, and the need to account for these demographic and regional variations when offering training to on-farm personnel.

Key Words: Veterinary Service, Staff Training, Management

753 The "Summer to Winter performance ratio" as a tool for evaluating heat stress relief efficiency of dairy herds. I. Flamenbaum*¹ and E. Ezra², ¹Ministry of Agriculture, Extension Service, Beit-Dagan, Israel, ²Israel Cattle Breeders Association, Caesarea, Israel.

Summer conditions in Israel make heat stress relief from cows an important tool for efficient milk production. New cooling methods have been developed and introduced to dairy farms all over the country. The Extension Service of the Israeli Ministry of Agriculture in cooperation with the Israel Cattle Breeders Association (ICBA) have developed a computerized report, based on the "Israeli Herd book" data, that evaluates the effectiveness of farmer's activities in reducing the impact of summer on cow's performance. The "Summer to Winter (S:W) performance ratio" report includes S:W Economical Corrected Milk (ECM), fat, protein, Somatic Cells Count (SCC) and Conception Rate in the first five inseminations (C.R.). The higher the ratio is (close or above 1.0) for production and fertility data and the lower ratio is for SCC data, the better the farm is dealing with summer heat-stress. The calculation includes the estimation of L.S.M for milk yield (ECM-kg/day) fat and protein percent, SCC (000/ml) and conception rate

percent for each season, followed by calculation of S:W ratios. During 2005, S:W ECM ratios above 0.96, 0.90 to 0.96 and below 0.90 were recorded in 40, 38 and 22% of the dairy farms in Israel respectively. S:W - ECM, fat, protein, SCC and C.R. ratios were 0.93, 0.94, 0.96, 1.2 and 0.4, in 495 family farms averaging 50 cows and 0.93, 0.95, 0.96, 1.05 and 0.51, in 191 cooperative farms averaging 300 cows, respectively. High, middle and low producing herds (mean winter ECM yields of 35.2, 33.1 and 30.2 kg/d respectively), had S:W ratios of 1.03, 0.93, 0.82 and 0.63, 0.51, 0.38 for ECM and C.R. respectively.

S:W production ratio was above 0.96 in 70% of the farms located in cool regions, compared to only 30% of the farms located in extremely hot regions. The computerized report described here, enables the detection of farms that need improvement of summer performance and allows the provision of necessary consultancy and follow up by extension agents.

Key Words: Heat Stress, Milk Production, Conception Rate

Lactation Biology: Applied Lactation Biology

754 Induced lactation in nulliparous dairy goats with or without prolactin secretion enhancement. A. A. K. Salama*, G. Caja, E. Albanell, S. Carné, R. Casals, and X. Such, *Universitat Autònoma de Barcelona, Bellaterra, Spain*.

Fourteen Murciano-Granadina nulliparous goats were used to evaluate the effects of a standard protocol for inducing lactation with or without using a prolactin releasing agent (reserpine). Goats were submitted to a hormonal challenge consisting of daily s.c. injections of estradiol-17 β and progesterone (0.5 and 1.25 mg/kg BW, respectively) for 7 d (d 1 to 7). Goats were divided into 2 groups and i.m. injected with 1 mg/d of reserpine (n = 7) or vehicle as control (n = 7) on d 12, 14, 16, 18 and 20. Lactation was triggered by i.m. injections of dexamethasone (10 mg/d) during d 18 to 20. Goats were machine-milked once daily from d 21 to 120 when goats were mated jointly with the rest of the herd after the buck effect. Goats initiated lactation on d 21 (100%) and milk yield increased logarithmically ($R^2 = 0.95$) thereafter. Difference in milk yield between control and reserpine goats increased as lactation advanced, peaking at wk 10 of lactation when reserpine goats yielded more milk than control goats (1,079 vs. 850 mL/d, respectively; $P = 0.08$). However, milk yield at the peak averaged only 55% of peak milk yield observed in primiparous goats from the same herd. Composition of initial milk (d 21) was lower than the expected for colostrums ($P < 0.001$). Milk composition steadied after d 3 of lactation. Teat length increased in control goats during mammogenesis (d -2 to 35; $P < 0.05$) but steadied in reserpine goats. Distance between teats, and volume and depth of the udder increased ($P < 0.05$) similarly in both goat groups during mammogenesis and lactation. After mating, 82% of the contemporaneous goats in the herd became pregnant, whereas only 21% of the experimental goats conceived (1 reserpine and 2 control goats), revealing the occurrence of side effects after the lactation induction treatment. In conclusion, lactation induction was effective and reserpine improved milk yield in nulliparous goats, but it seems that neither the obtained milk yield nor the side effects on fertility support its recommendation in practice.

Key Words: Lactation Induction, Prolactin, Dairy Goat

755 Effects of shortening the dry period from 60 to 40 days on milk yield and composition during the subsequent lactation. D. J. Grusenmeyer*, C. M. Ryan, R. W. Everett, D. M. Galton, and T. R. Overton, *Cornell University, Ithaca, NY*.

Holstein cows (n = 306) at the end of first (n = 158) or greater (n = 148) lactation on three commercial farms were used to determine effects of dry period length on subsequent milk yield and composition. Cows

producing 22 kg/d of milk or more at 60 d before expected calving were assigned randomly to receive either a 60 d (actual mean = 58.5 d; n = 150) or 40 d (actual mean = 40.6 d; n = 156) dry period. Milk yield and composition data were collected for the first 10 monthly test days of the subsequent lactation; previous 305-d mature equivalent milk yield for each cow was used as a covariate during data analysis. Shortening the dry period from 60 to 40 d decreased milk yield (39.2 vs. 37.7 kg/d; $P < 0.004$); however, the difference was attributable largely to effects on one farm (40.4 vs. 40.3; 40.8 vs. 37.4; 36.3 vs. 35.4 kg/d; farm by treatment, $P < 0.02$) for 60 vs. 40 d dry on the three farms, respectively, and to cows at the end of their first lactation (39.6 vs. 37.1 and 38.8 vs. 38.4; treatment by parity, $P < 0.04$). Shortening the dry period tended to increase subsequent milk fat content (3.63 vs. 3.70; $P < 0.11$) and increased true protein content (2.98 vs. 3.05; $P < 0.001$); therefore, overall effects of dry period length on yields of milk fat (1.41 vs. 1.38 kg/d; $P = 0.18$) and true protein (1.15 vs. 1.13 kg/d; $P = 0.29$) were not significant. Farm by treatment interactions ($P < 0.04$) for yields of milk fat and true protein followed the same pattern as those described for milk yield. Somatic cell linear score was not affected by dry period length (2.76 vs. 2.79; $P < 0.81$), although effects varied by farm (farm by treatment, $P < 0.04$). Results from data analysis following Test Day Model adjustment were consistent with those reported above. Overall, results support the concept that shortening the dry period of multiparous cows from 60 to 40 d results in minimal impact on subsequent production, and that shortening the dry period of primiparous cows from 60 to 40 d may decrease subsequent production.

Key Words: Dry Period, Transition Cow

756 Effects of altered timing and duration of unilateral frequent milking during early lactation on milk production of dairy cows. E. H. Wall* and T. B. McFadden, *Lactation and Mammary Gland Biology Group, Department of Animal Science, University of Vermont, Burlington*.

Several studies have reported that increased milking frequency during early lactation can elicit immediate and long-lasting increases in milk yield, however the timing and duration of frequent milking has not been optimized. Our objective was to utilize a half-udder model to determine milk yield response to 2 wk of frequent milking imposed at two different times in early lactation. Multiparous Holstein cows were assigned at parturition to unilateral frequent milking (UFM), which entailed twice-daily milking (2X) of the left udder half and four-times daily milking (4X) of the right udder half on d 1 to 14 (UFM-1-14) or 7 to 21 (UFM-7-21) of lactation (n = 10 cows per treatment). Before