Production, Management and the Environment: Dairy

525   Use of electrical conductivity for the detection of subclinical mastitis in dairy cows in Saudi Arabia. A. Alyemni[1,2], R. Aljummah[2], M. Ayadi[2], M. Hussein[2], and M. Alshaikh*[2], [1]*Arasco, Riyadh, Saudi Arabia, [2]King Saud University, Riyadh, Saudi Arabia.*

The objective of this study was to evaluate the use of milk electrical conductivity (EC) for predicting subclinical mastitis in high-producing dairy cows under Saudi Arabian conditions. Three hundred and 60 lactating Holstein cows were randomly selected and divided into 2 herds of 180 cows each, based on parity and days in milk (DIM). A total of 11350 quarter milk samples were collected weekly from the animals during the morning milking. Both EC and somatic cell count (SCC) were used as indirect measures of udder health. Milk fat, protein, lactose, and solids non-fat (SNF) were measured weekly. The effect of seasonal variation during summer and winter months was taken into account. Data were analyzed using a mixed model. The average milk EC and SCC values of cows were 4.68 mS/cm and 181,900 cells/ml, respectively. The highest EC value for healthy quarters was 5.27 mS/cm. Milk EC values were lower ($P < 0.01$) in summer (4.62 mS/cm) than winter (4.73 mS/cm) months. Using inter-quarter ratio (IQR), 232 cases were diagnosed as subclinical mastitis at different periods of time. Our results indicated that low or high basic levels affect the sensitivity and specificity of EC test, while using (IQR) improved the results. There was a significant correlation between milk EC, SNF and lactose content. A significant positive correlation ($r = 0.36$; $P < 0.01$) between EC and SCC was also observed, which increased the percent sensitivity and specificity of the results and the certainty of the diagnosis for cows with subclinical mastitis. The significant effects of stage of lactation on milk EC and milk components varied significantly with different stages of milking. Hence, it was not possible to conclude that milk EC can be used as an effective means for detecting early signs of subclinical mastitis and predicting clinical cases before symptoms arise, unless it is used in combination with other methods.

Key Words: milk electrical conductivity, dairy cows, mastitis

526   Effect of feeding duration on growth, health, and economics of group-fed dairy calves in an organic production system. B. J. Heins* and E. A. Bjorklund, *University of Minnesota, West Central Research and Outreach Center, Morris.*

Heifer calves (n = 67) were used to evaluate the effect of early life feeding duration in an organic group management system on growth, health, and economics of organic dairy calves. Calves were assigned to replicate feeding groups of 10 in super hutches by birth order, and were born at the University of Minnesota West Central Research and Outreach Center, Morris, Minnesota from March to June 2011. Breed groups of calves were: Holsteins (n = 11) selected for high production (HO), Holsteins (n = 10) maintained at 1964 breed average level (H64), crossbreds (n = 28) including combinations HO, Montbéliarde, and Swedish Red selected for high production (HMS), and crossbreds (n = 18) including combinations of HO, Jersey, and Swedish Red selected for durability (HJS). Calves were weaned at 30 (EW), 60 (MW), or 90 (LW) days of age, and groups were fed 1.5% of birth weight of 13% total solids organic milk once daily and then weaned when the group consumption averaged 0.91 kg starter/calf/day. Body weight and hip height were recorded at birth, once per week, and at weaning. Analysis was with PROC GLM of SAS, and independent variables for statistical analysis were the fixed effects of weaning group and breed group.

Weaning group performance was weaning age (days), EW (44.2), MW (61.3). LW (91.5) ($P < 0.01$); gain per day (kg), EW (0.52), MW (0.68), LW (0.75) ($P < 0.01$); weaning weight (kg), EW (61.7), MW (79.6) LW (106.8), ($P < 0.01$); and weaning hip height (cm), EW (88.3), MW (91.4), LW (97.0) ($P < 0.01$). The HO (0.72; 89.0), H64 (0.61; 80.5), HMS (0.67; 84.5), and HJS (0.60; 76.6) calves were not significantly different for gain per day (kg) or weaning weight (kg), respectively. Total costs (grain and organic milk) to weaning per calf were \$108.81 for EW, \$167.68 for MW, and \$275.79 for LW groups; however, the cost per pound of gain was significantly higher ($P < 0.01$) for the EW (\$4.83) group than the MW (\$4.18) or LW (\$4.06) groups. In summary, late weaned calves had higher daily gains than early weaned calves; however, the optimum time for weaning of organic dairy calves may be between 30 and 90 d.

Key Words: organic, calf growth, crossbreeding

527   Survey of lameness, body condition score, hygiene, and hock lesions of Colorado dairy cows housed in outdoor dirt lots or free stalls with outdoor access. R. Woiwode,* T. Grandin, and I. Roman-Muniz, *Colorado State University, Fort Collins.*

The objective of this study was to conduct a survey of the conditions of dairy cattle in Colorado. Dairies were visited between July and December 2011. Data were collected on locomotion score, body condition score (BCS), hygiene, and hock lesions. Cattle were observed on 10 dairies ranging in size from 400 to 3800 cows. An average of 12% of the lactating herd was scored on each dairy for lameness and hock lesions. Lactating cows observed were housed either in free stalls with outdoor access available (80%) or in dirt lots (20%). Lactating cows were gait scored using the Zinpro Locomotion Score, a 5 point numerical rating system, with 1 and 2 classified as non-lame and ≥ 3 classified as lame. An average of 3.2% (±2.5) of all cattle observed were classified as lame. Severe hock lesions were negligible, with only 0.1% (±0.04) of lactating cows exhibiting hock swelling ≥ baseball size. Lameness was much lower than the estimated national average of 20–25% (Cook, 2003; Espejo et al., 2006), possibly due to a combination of factors, including cows housed in free stalls having access to outdoor dirt lots, and other management practices. Body condition was scored on all lactating cows using a 5 point numerical rating system, with ≤ 2 classified as too low. The average BCS of lactating cows classified as too low was 2.4% (±1.7). Hygiene was scored using a 4 point numerical rating system, with 4 classified as unacceptable. Lactating and nonlactating cow hygiene was observed to be very good with an average of 2.4% (±3.2) cows classified as having unacceptable hygiene. Cow hygiene was observed to be better than calf hygiene, as an average of 7.8% of calves were observed to have unacceptable hygiene. Additional dairies and data will be included at the time of presentation.

Key Words: dairy, lameness, hygiene

528   Economics of using sheath protectors at the time of AI in dairy cows. S. Bas*[1], K. N. Galvão[2], and G. M. Schuenemann[1], [1]*Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, [2]Department of Large Animal Clinical Sciences, University of Florida, Gainesville.*

The use of disposable sheath protectors (SP) to minimize contamination of the AI catheter at the time of AI improved conception risk (CR; 5

percentage points) of lactating dairy cows. The objective was to assess the effect of 5 percentage points increase in CR (from 32% to 37%) on dairy herd economics using an individual cow-based stochastic model. For the simulation, lactating dairy cows were enrolled in a Presynch-Ovsynch for first AI followed by estrus detection (ED) and resynchronization of cows diagnosed open 32 d after AI using Ovsynch. Herd size was maintained at 1,000 cows. Mortality was set at 6% and abortions at 13%. Cows not AI after 365 DIM and open cows were culled after 450 DIM. Culled cows were immediately replaced. The dry and VWP were set to 60 d. Compliance to each injection of the synchronization program was 95% and estrus detection (ED) was set to 60% with an accuracy of 95%. Simulation was performed at 32% for 3,000 d until steady-state was reached, then the model was set at 37% CR for the subsequent 2000 d to calculate the new economic values ($/cow/d). Average values from 10 runs were used. Net daily value was calculated by subtracting the costs of replacements ($1,800/heifer), feeding costs ($0.25/kg of lactating cow diet; $0.25/kg of dry cow diet), breeding costs ($0.1/cow/d for ED; $2.5/dose PF2α ; $3.0/dose GnRH; $0.17/injection administration, and other costs ($3.5/d) from the daily income [milk sales ($0.31/kg milk), cow sales ($0.75/kg live weight), and calf sales ($200/calf)]. According to the model, the use of SP provided an additional $4.8 cow/yr (or $4,800/yr for a 1,000-cow herd) for each point increase in CR (from 32% to 37%). Use of SP can increase farm profitability by increasing CR at a minimal cost.

Key Words: sheath protector, pregnancy, economics

529   Effect of AI technicians on reproductive performance and economics of lactating dairy cows. G. M. Schuenemann*[1], S. Bas[1], and K. A. Galvão[2], [1]Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, [2]Department of Large Animal Clinical Sciences, University of Florida, Gainesville.

It is common to observe large within-herd variation in AI technician conception risk (CR). The objective was to assess the effect of AI technicians on reproductive performance and economics using a stochastic dynamic model. CR from 3 distinct AI technicians (A = 38%, B = 32%, and C = 26%) were assessed. For the simulation, lactating dairy cows were enrolled in a Presynch-Ovsynch for first AI followed by estrus detection (ED) and resynchronization of cows diagnosed open 32 d after AI using Ovsynch. Cows were not AI after 365 DIM and open cows were culled after 450 DIM. Culled cows were immediately replaced. Herd was maintained at 1000 cows. Death losses were set at 6% and abortion at 11.3%. Dry period of 60 d. Net daily value was calculated by subtracting the costs with replacement heifers ($1,800/heifer), feeding costs ($0.25/Kg of lactating cow diet; $0.25/Kg of dry cow diet), breeding costs ($0.1/cow/d for ED; $2.5/dose PGF; $3.0/dose GnRH; $0.17/injection administration), and other costs ($3.5/d) from the daily income with milk sales ($0.31/Kg milk), cow sales ($0.75/Kg live weight), and calf sales ($200/calf). CR from AI technician A (38%), B (32%), and C (26%) was compared. Simulation was performed until steady-state was reached (3000 d), then average daily values for the subsequent 2000 d was used to calculate profit/cow/yr. ED was set to 60%. Accuracy of ED and compliance with each injection were set at 95%. Inaccurate ED resulted in 0% CR. Missing a Presynch injection resulted in loss of 50% of the benefit (40% increase to first AI), and missing an Ovsynch injection resulted in decrease in CR by 70%. The breeding costs/cow/yr for AI technician A, B, and C were $88, $96, $106, respectively. The profit/cow/yr for AI technician A, B, and C were $179, $139, and $82, respectively. Assuming that the herd remains constant, each point increases in CR (from 26% to 38%) represented $6 per cow/yr or $6,000/yr for a 1000-cow dairy. Compliance with the AI procedure

(semen handling, accuracy of ED, hygiene, site of semen deposition) affects the bottom line of dairy herds and should not be compromised for convenience. Investing in educational training for professional AI technicians should be a top priority.

Key Words: AI technician, economics, dairy cow

530   The effect of reproductive performance on the herd value assessed by integrating a daily dynamic programming with a daily Markov chain model. A. S. Kalantari* and V. E. Cabrera, *Department of Dairy Science, University of Wisconsin-Madison, Madison.*

The objective of this study was to determine the effect of reproductive performance on the herd value. The herd value was defined as the herd's average retention payoff (RPO) which is the expected profit from keeping the cow compared with immediate replacement. First, a daily dynamic programming model was developed to calculate the RPO of all cow states in a herd. Second, a daily Markov chain model was applied to estimate the herd demographics. Then, herd value was calculated by aggregating the RPO of all cows in the herd. Cow states were described by 5 milk classes (MC1 = lowest to MC5 = highest), 9 lactations, 750 d in milk (DIM) and 282 d in pregnancy. Five different reproductive programs were studied (RP1 to RP5). The RP1 used 100% timed artificial insemination (TAI) (42% conception rate (CR) for 1st TAI and 30% for 2nd and later services) and the other programs combined TAI with estrous detection (ED). The proportion of cows receiving AI after ED ranged from 30 to 80%, with CR of 25, 30, and 35%. These 5 reproductive programs were categorized according to their 21 d pregnancy rate (21 d PR), which is an indication of the rate the eligible cows become pregnant every 21 d. The 21 d PR was 17% for RP1, 14% for RP2, 16% for RP3, 18% for RP4, and 20% for RP5. Results showed a positive relationship between 21 d PR and the herd value. The most extreme herd value difference ($/cow per year) between 2 RP was $77 for MC3 (RP5 – RP2); $13 for MC1 (RP5 – RP1); and $160 for MC5 (RP5 – RP2). Reproductive programs were ranked based on their calculated herd value. With exception of the best reproductive program (RP5), all other programs showed some level of ranking change with MC. The most dramatic ranking change was observed in RP1, which moved from being the worst ranked for MC1 to the second best ranked for MC5. Supported by AFRI Competitive Grant no. 2010–85122–20612

Key Words: retention pay-off, economics, dairy cattle

531   Regression meta-models to predict the value of pregnancy in dairy cows. A. De Vries,* *University of Florida, Gainesville.*

The value of a new pregnancy can be calculated with a complex dynamic programming model (DairyVIP) for a variety of input parameters, but the model needs to be installed on a computer and each calculation takes time. The objective of this study was to predict the values of pregnancy for 9 important input parameters using a regression meta-model. Meta-models provide instant predictions of the value of pregnancy for the fitted inputs and can be used in web-based dashboard tools for easy access by interested users. Nine input parameters were randomly varied over reasonable ranges using 265 design points. The value of pregnancy and profit per cow per year were calculated for each design point with DairyVIP. Mean ± SD of the 265 values of pregnancy was $246 ± $131. Values of pregnancy increased with greater replacement costs and lower pregnancy rates. The procedure Glmselect in SAS was used to fit the meta-model. The Glmselect procedure included learning (n = 150 design points), validation (n = 50) and testing (n = 65). The 9 main effects included the prices of replacement heifers, milk, feed, cull

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cows, and calves, as well as the probabilities of insemination, conception, culling, and the level of milk yield. The main effects, logs of the main effects, and all 2-way interactions were fitted. At most 10 effects were selected for the regression model. Stepwise selection with the Press criteria was used to select the best fitting meta-model. Statistics for the final meta-model were $R^2 = 0.987$ and AIC = 990. Mean ± SD of the prediction error was $0 ± $15 (range -$30 to $41). Prediction errors were independent of the profit per cow per year. In conclusion, regression meta-models were able to accurately predict the value of pregnancy in most cases. Meta-modeling may be a useful approach to make results from complex computer models widely available.

Key Words: regression, meta-model, value of pregnancy

532 Effect of heat stress during the dry period on immune function and growth performance of the offspring fed standardized pooled colostrum. A. P. A. Monteiro,* S. Tao, I. M. Thompson, and G. E. Dahl, *University of Florida, Gainesville.*

Calves born and fed with colostrum from dairy cows exposed to heat stress during the dry period have compromised passive immunity and cell-mediated immune function compared with calves born to cows under cooling. However, it is unknown if this compromised immune response is caused by calf or colostrum intrinsic factors. Our objective was to evaluate the effect of maternal heat stress during the dry period on calf specific factors related to immune response and growth performance of the offspring. Cows were dried off 46 d before expected calving and randomly assigned to a cooling (CL, n = 18) or heat stress (HT, n = 18) environment. Cows of the CL group were housed with sprinklers, fans and shade, whereas cows of HT group had only shade. Colostrum from cows exposed to neutral environmental conditions during the dry period was pooled and stored frozen (−20°C). Within the first 4 h of birth, 3.78 L of pooled colostrum was fed to calves from both treatment groups. All the calves were exposed to the same management and were weaned at 50 d of age. The day of birth was considered study d 0. Blood samples were collected before colostrum feeding, 24 h after birth and twice weekly up to d 32. Total plasma protein and IgG concentrations were determined. Body weight was recorded at birth and at d 15, 30, 45 and 60. HT calves were lighter ($P < 0.01$) at birth than CL calves (38.3 vs. 43.1 kg), and no differences ($P = 0.36$) in weight gain were observed up to d 60 (31.9 vs. 34.2 kg gain). Additionally, HT calves had lower ($P < 0.05$) apparent efficiency of IgG absorption (26.04 vs. 30.24%), but no differences were observed for total plasma protein (5.42 vs. 5.50 g/dL; $P = 0.34$) and serum IgG concentration (2.09 vs. 2.15 g/dL; $P = 0.57$). Calves born from cows exposed to heat stress during the dry period had lower birth weight and lower apparent efficiency of IgG absorption. Thus, heat stress during the last 6 wks of gestation negatively affects the ability of the calf to acquire passive immunity regardless of colostrum source.

Key Words: calves, dry period, heat stress

533 Accuracy of the AfiLab real time milk analyzer to predict DHIA fat, DHIA protein and lactose. K. Kanyiamattam,* K. D. Gay, E. J. Diepersloot, D. R. Bray, C. R. Staples, and A. De Vries, *University of Florida, Gainesville.*

Objective of this study was to quantify the agreement between the AfiLab real time milk analyzer based on light scattering and test day DHIA fat, DHIA protein and lactose, all based on the Bentley 2000 analyzer (BA). AfiLab data were collected twice daily at 12h intervals from the double 12 parlor at the University of Florida Dairy Unit in Hague, FL, from January 2010 to December 2011. Alternating AM/PM BA data for the 24 test days in 2010 and 2011 were also obtained. Approximately 450 cows were tested each month. AfiLab data were matched with DHIA fat and protein (n = 10,273; 23 test days) and lactose (n = 6,741; 16 test days). Means and SD of BA fat, protein and lactose were 3.76 ± 0.80%, 3.08 ± 0.37% and 4.72 ± 0.30% respectively. Mean and SD of average AfiLab minus BA observations of the test day milking were −0.077 ± 0.116% for fat (n = 23), 0.024 ± 0.107% for protein (n = 23) and −0.024 ± 0.083% for lactose (n = 16). Mean and SD of within test day SD of AfiLab minus BA observations of the test day milking were 0.659 ± 0.110% for fat, 0.274 ± 0.031% for protein and 0.262 ± 0.025% for lactose. Mean and SD of the corresponding correlations were 0.59 ± 0.09 for fat, 0.74 ± 0.03 for protein and 0.46 ± 0.08 for lactose. The accuracy of various combinations of AfiLab observations from up to 6 milkings before and after the test day milking was also evaluated. The accuracy of fat predictions was not improved. The average of the 13 protein observations improved the average difference to 0.011 ± 0.095% and SD of the difference to 0.227 ± 0.029%. The correlation increased to 0.78 ± 0.04. The average of 13 lactose observations improved the SD of the difference to 0.229 ± 0.021% but the mean of the difference was −0.031 ± 0.089%. The correlation increased to 0.55 ± 0.05. In conclusion, the accuracy of protein prediction was better than the accuracy of lactose and fat prediction. Combination of AfiLab observations from various milkings may improve the accuracy of prediction.

Key Words: accuracy, agreement, fat, protein, lactose

534 Potential utility of a parlor-based individual quarter milking system. A. E. Sterrett,* C. L. Wood, K. J. McQuerry, and J. M. Bewley, *University of Kentucky.*

Overmilking may lead to teat end hyperkeratosis (HK). The objective of this study, conducted at the University of Kentucky Coldstream Dairy, was to examine changes in teat end HK in a herd transitioning from a standard pulsation system to an individual quarter pulsation milking system. Teat end HK was evaluated immediately after cluster removal using the scoring system outlined by Mein et al. (2001) where N signifies no ring; S signifies a smooth, raised ring; R signifies a rough ring; and VR signifies a very rough ring. Scorings were classified for 69 cows (48 Holstein, 12 Crossbred, and 9 Jersey) relative to installation (April 28, 2011) of the Milpro P4C™ (Milkline, Gariga di Podenzano, Italy) system as follows: PRE1-April 7; PRE2-April 21; POST1-May 12; POST2-May 26; POST3-June 9. The Milpro P4C™ system stops milking individual quarters using a unique individual quarter pulsation system with 4 pulsation channels instead of 2. Hyperkeratosis scores were converted to numerical values as follows: n = 1; S = 2; R = 3; VR = 4. The MIXED Procedure of SAS® (Cary, NC) was used to evaluate fixed effects of age, breed, parity, and teat position and their interactions with variables repeated by scoring with cow within breed as subject. The effects of position and scoring × breed were significant ($P < 0.01$ and $P = 0.02$, respectively). Hyperkeratosis scores improved for Holsteins from PRE1 to POST3 (1.75 ± 0.09 and 1.41 ± 0.10, respectively, $P < 0.01$), PRE1 to POST2 (1.75 ± 0.09 and 1.54 ± 0.09, respectively, $P < 0.01$), PRE2 to POST3 (1.64 ± 0.09 and 1.41 ± 0.10, respectively, $P < 0.01$) and POST1 to POST3 (1.62 ± 0.10 and 1.41 ± 0.10, respectively, $P < 0.01$) whereas Jersey and crossbred scores did not change among scorings ($P > 0.05$). Right front HK scores varied significantly from right rear and left rear scores (1.58 ± 0.09, 1.37 ± 0.09, and 1.36 ± 0.09, respectively, $P < 0.01$) and left front teat end HK scores varied significantly from right rear and left rear scores (1.62 ± 0.09, 1.37 ± 0.09, and 1.36 ± 0.09,

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respectively, $P < 0.01$). Teat end HK scores improved for Holsteins after installation of the individual quarter pulsation milking system.

Key Words: hyperkeratosis, teat end, individual quarter pulsation

535 Reducing dietary protein decreased the ammonia-emitting potential of manure from commercial dairy farms. A. N. Hristov,* K. Heyler, E. Schurman, K. Griswold, P. Topper, M. Hile, V. Ishler, E. Wheeler, and S. Dinh, *The Pennsylvania State University, University Park.*

The objective of this project was to decrease manure NH_3 emissions through reducing dietary crude protein (CP) concentration on commercial dairy farms. Twelve Pennsylvania dairies (169 ± 50 cows) with scrape, gravity-flow, or flush manure management systems participated in the project. Background data on barn floor and laboratory manure emissions (i.e., emitting potential, EP) of NH_3, N_2O, CH_4, and CO_2 were collected during 4 sampling events (2 in the spring and 2 in the fall) in Yr 1 of the project. In Yr 2, dietary CP concentration was reduced ($P < 0.001$) from an average across all farms of 16.5 (in Yr 1; HighCP period) to 15.4% (LowCP period) and data collection was repeated. Diets were sampled throughout the project to verify CP levels. Milk yield and milk composition data were also collected throughout the project. Data were analyzed with farm as random effect using the MIXED procedure of SAS. Barn floor NH_3 emissions were drastically lower during the LowCP compared with the HighCP periods (186 vs. 445 mg/m^2/h; $P < 0.001$). These results, however, were confounded by lower ambient temperature during the LowCP period (6.3 vs. 13.6°C, respectively). The NH_3 EP, which was based on evaluation of reconstituted (urine and feces) manure at the same temperature, was on average 23% lower ($P < 0.001$) for LowCP vs. HighCP manure (292 vs. 378 mg/m^2/h). Emissions of CH_4, and CO_2 were not affected by dietary CP and emissions of N_2O were negligible. Barn floor NH_3 emissions were lower ($P = 0.02$) for flush vs. scrape and gravity-flow manure management systems. The greatest ($P < 0.001$) CH_4 emissions were observed for the gravity-flow manure system (1,215 vs. 486 and 37 mg/m^2/h, gravity-flow, scrape, and flush, respectively). Milk yield (32.2 vs. 32.5 kg/d; $P = 0.81$) and milk composition were not different between the HighCP and LowCP periods. MUN tended to be lower during the LowCP period (13.2 vs. 14.5 mg/dL; $P = 0.06$). This on-farm project demonstrated that manure NH_3 emissions can be significantly reduced by moderately decreasing dietary CP content without affecting milk yield and composition in dairy cows.

Key Words: dairy farm, ammonia emission, dietary protein

536 Dose effects of monensin on methane emissions from lactating Holstein dairy cattle. S. E. Place*[1], Y. Pan[1], Y. Zhao[1], C. E. Moore[2], J. K. Wittman[2], and F. M. Mitloehner[1], *[1]Department of Animal Science, University of California-Davis, Davis, [2]Elanco Animal Health, Greenfield, IN.*

Monensin is a feed additive used in dairy cattle diets that may reduce methane emissions; however, past results have been variable, which could be due to the dose of monensin fed to cattle. To test the dose effects of monensin, 20 lactating Holstein cows were stratified by days in milk and randomly assigned to one of 4 treatments provided in a pelleted top dress (CON, LOW, MED, HIGH containing 0, 175, 368, and 518 mg cow^{-1} d^{-1} of monensin, respectively). All cows were fed the same basal

TMR throughout the trial and CON top dress for 19 d (PRE period), then their respective treatment top dress for 21 d (MON period), then returned to the CON top dress for 21 d (POST period). Milk production and feed intake (DMI) were monitored daily, milk composition once during each period, and gas emissions were collected on the last day of each period for each cow. Gas emissions were sampled with a ventilated hood system. All statistical analysis was conducted using Proc Mixed procedures in SAS version 9.3 (SAS Institute Inc., Cary, NC). Methane emissions, milk production, DMI, and milk composition were similar across treatments in the MON period. There were no carryover effects of monensin in the POST period. The change in methane emissions from the PRE to MON period across treatments varied (6.4, 6.1, 1.6 and 3.9 g cow^{-1} h^{-1} for the CON, LOW, MED, and HIGH treatments, respectively), with MED having a lower ($P < 0.05$) change in methane emissions per cow, per kg of DMI, and per kg of milk compared with CON. Changes from the PRE to MON period in milk yield (3.5, 2.8, 1.3, and 2.4 kg cow^{-1} d^{-1} for CON, LOW, MED, and HIGH, respectively) and DMI (1.6, 0.63, 0.15, and 0.92 kg cow^{-1} d^{-1}, for CON, LOW, MED, and HIGH, respectively) were lower for the MED treatment cows compared with those in CON ($P < 0.05$). All treatments had similar emissions and animal performance measures within the MON period, but the MED treatment did have lower changes over time in methane emissions, DMI, and milk yield from the PRE to MON periods. Over time, monensin had dose effects on methane emissions, DMI, and milk yield, but the effects do not seem to be linear in nature.

Key Words: monensin, methane, dairy cows

537 Characterization of Shanghai dairy cattle lactation performance in 2008. C. G. Zhang[1], G. L. Liu*[1,2], L. M. Huang[1], Z. G. Wang[1], and G. Yang[1], *[1]State Key Laboratory of Dairy Biotechnology, Shanghai Bright Holstan Co. Ltd., Shanghai, China, [2]Shanghai Dairy Breeding Center Co., Ltd., Shanghai, China.*

Accurate knowledge of a lactation performance has an important relevance to management and research of dairy cattle production systems. The purpose of the study presented was to determine the characterization of Shanghai dairy cattle lactation performance in 2008. Milk production data for 157 dairy farms (31,800 cows and 357,600 data points) were obtained from Dairy Herd Improvement (DHI) project of Shanghai Dairy Breeding Center, the data of 305-d milk yield was collected and calculated by each farm′s records. Daily and 305-d milk yields were summarized and evaluated by parity using ANOVA procedure of SAS. We also compared 2008 milk yield with previous milk data from 2003 and 1998. The results indicated that average daily milk yield for parity 1, parity 2 and parity 3 or greater was 17.2 ± 2.9 kg, 23.5 ± 3.3 kg and 22.2 ± 3.9 kg, average peak milk yield was 29.5 ± 4.6 kg, 34.5 ± 6.2 kg and 33.4 ± 5.7 kg, and average days to peak milk were 65 ± 9 d, 47 ± 8 d and 54 ± 9 d, respectively. Parity 2 cows had greater ($P = 0.04$) average 305-d milk yield (8,300 ± 973 kg) than parity 1 (7,789 ± 845 kg) cows and tended ($P = 0.11$) to have greater yield than parity 3 or greater cows (7,956 ± 899 kg). In contrast, the highest average 305-d milk yield was found for parity 4 cows (7,569 ± 813 kg) in 1998 and parity 3 cows (8,361 ± 937 kg) in 2003. These results are valid to suggest that a better understanding of lactation curves would allow producers to evaluate their production compared with averages in Shanghai region.

Key Words: lactation curve, dairy cattle, Shanghai (China)

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