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)