Efficiency in dairy cows has been studied widely around the world. On the other hand, small-scale dairy systems (SSDS), from 3 to 30 cows, are key to combating poverty and hunger. Nevertheless, feeding costs represent 70% to 80% of the production costs, which decrease the revenue of the SSDS. However, few studies have focused on the relationship between efficiency (milk yield and feeding costs) and herd size in SSDS. The aim of this work was to estimate the impact of the farm size in the feed efficiency and feeding costs in SSDS. Data from 294 SSDS from the highlands of Mexico, recollected in 2011 (Alfonso-Ávila et al., 2012; Fadul-Pacheco et al., 2013), 2019 (García-Villegas et al., 2020, 2021) and 2023 (project in process), were used. Data were analyzed using the IBM SPSS Statistcs software. Farms were classified by the number of dairy cows: very small (<6 dairy cows), small (7–14 dairy cows) and medium (>15 dairy cows). Feeding costs were estimated using the data of 2011, 2019, and 2023. The costs were updated to September 2023. Feed efficiency was estimated in terms of kg of energy protein corrected milk (EPCM)/kg of DMI. Energy and protein corrected milk was estimated using the equation of Niu et al. (2018): 12.95 × milk fat (kg/d) + 7.65 × milk protein (kg/d) + 0.327 × milk yield (kg/d); and DMI (and the ME) were obtained from the aforementioned studies. The lowest feeding costs occurred in medium-sized farms ($US3.04), whereas the highest costs were in very small farms ($US4.47). However, the quality of the feed (MJ/kg DM) was higher in medium-sized farms (9.85 MJ/kg DM), whereas in the very small farms, the quality decreased (9.45 MJ/kg DM). In the same line, feed efficiency was higher in the medium farms (1.29 kg EPCM/kg DMI), followed by small farms (0.87 kg EPCM/kg DMI) and very small farms (0.84 kg EPCM/kg DMI). In conclusion, feed efficiency in SSDS is related to the farm size, in which the medium-sized farms present higher feed efficiency, a better use of the feed (lower feed costs) and a higher quality of feed (in terms of energy, MJ/kg DM).

Key Words: dairy efficiency, feeding cost, methane

2694 Use of the VaDia vacuum recorder for detection of factors related to mastitis and somatic cell count in organic dairy herds. B. J. Heins*[1], K. T. Sharpe[1], P. J. Pinedo[2], A. DeVries[3], E. Miller-Cushon[3], V. E. Cabrera[4], E. M. Silva[4], R. A. Lynch[5], and G. M. Schuenemann[6], *[1]University of Minnesota, Morris, MN, [2]Colorado State University, Fort Collins, CO, [3]University of Florida, Gainesville, FL, [4]University of Wisconsin, Madison, WI, [5]Cornell University, Ithaca, NY, [6]The Ohio State University, Columbus, OH.*

The objective of the study was to evaluate the use of a vacuum recording device to detect factors related to mastitis and somatic cell count in organic dairy herds. The study was conducted at the University of Minnesota West Central Research and Outreach Center (Morris, MN) organic dairy. A total of 155 Holstein and crossbred certified organic cows were monitored for 5 morning milkings from December 2023 to January 2024. Holstein cows (n = 35) were compared with Grazecross crossbred cows (n = 31) composed of the Normande, Jersey, and Viking Red breeds and ProCross crossbred cows (n = 89) composed of the Montbéliarde, Viking Red, and HO breeds. VaDia vacuum recorders (Biocontrol, Rakkestad, Norway) were attached to the milking cluster during milking. In this cross-sectional study, 259 individual cow milking observations were analyzed. The VaDia recorder collected individual cow vacuum events during the 5 milkings. VaDia Suite software analyzed milking data for average milk flow, let down time, peak flow, and overmilking time. Daily milk weights were recorded with an AfiMilk and AfiLab milking system (Kibbutz Afikim, Israel). Independent variables for statistical analysis were fixed effects of genetic group (HO vs. Grazecross crossbred vs. ProCross crossbred) and lactation number. Machine on time was not different ($P > 0.10$) for breed groups (4 min 49 s for Holstein, 3 min 58 s for Grazecross, 4 min 45 s for ProCross). Mean milk flow rate was 5.27 L/min for first lactation cows and 6.37 L/min for second and greater lactation cows ($P < 0.05$). Average vacuum across the groups was 10.2 Hg ($P > 0.10$). The correlation between milk production at milking time and machine on time was 0.34 ($P < 0.01$). The milk let down time averaged 24.5 to 27.3 s and was not different between groups ($P > 0.2$), and it ranged from 5 to 55 s across all of the milkings. Milking vacuum dynamics are useful to determine milking parlor efficiency in an organic dairy herd.

Key Words: organic, milking, mastitis

2695 Rectal temperature is positively correlated with body surface temperature using infrared thermography in Holstein dairy calves. A. S. Silva[1], L. F. M. Neves[2], M. B. Gomes[2], J. Diavão[1], E. M. B. Souza[2], M. M. Campos*[1], and S. G. Coelho[2], *[1]Empresa Brasileira de Pesquisa Agropecuária - Embrapa Gado de Leite, Juiz de Fora, Minas Gerais, Brazil, [2]Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil.*

The aim was to evaluate the rectal (RT), eye, flank, and perineal temperature, and correlations between a data logger temperature and image infrared thermography in Holstein dairy calves under heat stress in the first 28 d after birth. A total of 35 calves (15 male and 20 female) were individually housed in pens and randomly allocated into 2 treatments: (1) control (CTRL; body weight at birth = 35.6 ± 4.18 kg; temperature-humidity index [THI] = 66; n = 17) and (2) heat stressed (HS; body weight at birth = 36.0 ± 5.13 kg; THI = 82 during 9 h/d; n = 18). Both groups received 6 L of milk divided into 2 meals (0730 and 1430 h) and concentrate (crude protein = 192 g/kg of DM; crude energy = 4.05 Mcal/kg of DM) ad libitum. The RT were measured daily at 6 and 10 a.m. and at 2 and 4 p.m. determined with the data logger (model: DS1921H2kb; Thermodata Pty. Ltd., Australia). Additionally, eye, flank, and perineal temperature were measured using an infrared thermography camera (FLIR T420; FLIR Systems Inc., Wilsonville, OR). Data were analyzed using R software with ANOVA, at 95% confidence interval in a completely randomized design, where the treatment was the main plot, and week was the subplot. Pearson correlation between the RT measured with the data logger and eye, flank, and perineal temperature was performed. Statistical significance was declared at $P \leq 0.05$. RT increased by 0.4 degrees in HS calves (CTRL = 38.7 vs. HS = 39.1°C; $P < 0.01$). Eye, flank, and perineal temperature were greater at 10 a.m., 2 p.m., and 4 p.m. in HS calves compared with CTRL ($P < 0.05$), but not at 6 a.m. The RT measured with a data logger was positively correlated with eye (r = 0.52; $P < 0.01$), flank (r = 0.42; $P < 0.01$), and perineal temperature (r = 0.50; $P < 0.01$). Calves under heat stress had increased rectal temperature and surface temperature of the eye, flank, and perineal area. The substantial correlation between the logger and body surface temperature measured with image infrared thermography indicates that it can be used for non-invasive measures of heat stress in Holstein calves.

Key Words: correlation, infrared thermography, surface temperature

2696 Characterization of milk production, milking frequency, and rumination outcomes of early-lactation Jersey cows diagnosed with concurrent hyperketonemia and hypoglycemia in an automated milking system. A. C. Mocelin[1], M. Bugoni[1], N. Biersteker[2], D. Henriquez[3], and R. Almeida*[1], *[1]Universidade Federal do Paraná, Curitiba, PR, Brazil, [2]Lagoa Dourada Farm, Arapoti, PR, Brazil, [3]Jefo Brasil, Curitiba, PR, Brazil.*