implementing a convolutional neural network (CNN) for spatial feature extraction and a long short-term memory module to capture the eating patterns of individual cows. RGB images were collected from 2 cows housed in a tie-stall barn, with an RGB camera (DAHUA, model: DH-SD1A404XB-GNR, 2.8–12 mm lens) positioned above the feeding plate for each cow. The camera, capturing the feed pile on the plate, recorded images at a resolution of 2,560 × 1,440 pixels. The plate was equipped with a weighing scale to provide the ground truth for FI. Cows were fed 2×/d at 0800 and 1730 h respectively, creating 2 feeding sessions per day. Data from 5 feeding sessions were collected, and for each session images without cow's head were selected at 10-min intervals to establish the time series data set for training and evaluation of the model. In total, 144 images were collected throughout the day, with 56 images generated from the a.m. feeding session and 78 images from the p.m. feeding session. The baseline CNN model used for this study was EfficientNet-B0. For the purpose of adapting the model to our dataset, we first trained and evaluated on data from 3 feeding sessions of 1 cow with a time step of 30 min (3 images), resulting in a mean absolute error (MAE) of 0.44 kg and a root mean square prediction error (RMSPE) of 7.99% on the test set. Model parameters were then retained and fine-tuned using data from another cow, which included 2 feeding sessions. This resulted in an MAE of 1.89 kg and an RMSPE of 32.4%. The suboptimal performance of the second cow's data might be due to insufficient data, particularly the lack of a complete full day feeding period in the training set. More data are being collected to enhance the model's robustness and performance.

Key Words: dairy cows, feed intake, computer vision

2128 Heat stress negatively influences milk yield, somatic cell count, and body surface temperature of Girolando cows? J. Diavao[1], L. C. Mendonça[1], A. S. Silva[1], M. M. Campos*[1], W. A. Carvalho[1], and J. A. Negrão[2], *[1]Empresa Brasileira de Pesquisa Agropecuária–Embrapa Gado de Leite, Juiz de Fora, Minas Gerais, Brazil, [2]Universidade de São Paulo–Faculdade de Zootecnia e Engenharia de Alimentos, Pirassununga, São Paulo, Brazil.*

The aim was to evaluate the respiration rate (RR), vaginal temperature (VT), eye and mammary surface temperature, milk yield (MY), and somatic cell count (SCC) of lactating Girolando cows under heat stress (HS). Twenty-four Girolando cows (3/4 Holstein × 1/4 Gir), averaging 561 ± 74 kg of body weight, 111 ± 54 d in milk, 19.4 ± 4.5 kg/d of MY, and 183,000 ± 138,000 cells/mL of SCC. Twelve cows were subjected to HS for 8 h/d in a climate chamber regulated to maintain a temperature-humidity index (THI) of 84 ± 0.94, while the other 12 (CTRL) were housed in a freestall barn with a cooling system during 8 d, with an average THI of 71 ± 3.92. VT was measured using an intravaginal device with data loggers (iButton®, Whitewater); RR was measured by counting the number of movements on the flank, twice a day (9:00 a.m. and 2:00 p.m.). The surface eye and mammary gland temperature were measured using an infrared thermography camera (FLIR T420; FLIR Systems Inc., Wilsonville, OR). Data were analyzed using a completely randomized design (SAS Institute Inc.) with repeated on time measures (1, 2, 4, 6, and 8 d) with significance of $P \leq 0.05$ and marginal significance $P > 0.05$ $P \leq 0.10$. Heat stress did not influence eye ($P = 0.98$) and vaginal temperature ($P = 0.54$). However, cows under heat stress tended to have greater temperature in the left quarter mammary ($P = 0.07$) at d 4 and 6 of evaluation, and on right quarter mammary there was a trend ($P = 0.09$) only at d 6. The respiration rate was not influenced by treatments. The HS cows had lower MY (17.3 ± 3.36 vs.18.1 ± 3.97 kg/d; $P < 0.09$) during the experimental period. However, there was no significant difference in milk SCC ($P = 0.20$). Heat stress negatively influences milk yield in Girolando cows, but does not change eye and vaginal temperature, respiratory rate and somatic cell count. Nevertheless, the mammary gland temperature tended to be greater from d 4.

Key Words: infrared thermography, milk somatic cell, milk yield

2129 Protein intake from corn silage and alfalfa hay and their influence on milk urea nitrogen and nitrogen excretions in dairy cows. D. Scoresby[1], M. G. Podda[2], D. Salis[2], M. Chahine[1], and I. A. M. A. Teixeira*[1], *[1]University of Idaho, Twin Falls, ID, [2]University of Sassari, Sassari, Italy.*

Usually, alfalfa, as hay or haylage (AH), and corn silage (CS) are the main forage sources for lactating cows in Idaho. A shift in the inclusion of these forages in diets has occurred in the last decades though. AH inclusion in lactating cow diets has consistently decreased and CS has increased. Nitrogen (N) efficiency of feeding CS to cows compared with AH is not well known. Our study aimed to evaluate the relationships between protein intake from CS and AH with milk urea N (MUN) and N excretions, using a meta-analytical approach. A database with 450 treatment means from 124 studies published in peer-reviewed journals from 2018 to 2022 was used. Eligible studies included lactating Holstein dairy cows fed diets with CS, AH, or both as the primary forage sources, and available information on MUN, milk production, and dry matter intake (DMI). Meta-regression was used to identify the relationships between protein intake (from CS and AH) and MUN and N excretions, considering the random effect of study. Backward stepwise was used to remove nonsignificant factors until all remaining factors in the final model had a $P < 0.05$. All analyses were conducted using R studio. We also considered lowest AICc and independent variables that had variance inflation factor <10. Including milk production in addition to CP intake from CS did not improve MUN prediction models (9.59 vs. 9.66 RMSE, % mean). An increase in CP intake from CS resulted in lower MUN (slope −0.0181 mg/dL per 1 g increase in CP intake) and higher urinary N excretion (slope 0.3565 g per 1 g increase in CP). Similar patterns were found in MUN when RDP and RUP intakes from CS were considered in the models (slope −0.02698 mg/dL per 1 g increase in RDP intake and −0.05473 mg/dL per 1 g increase in RUP intake). The CP intake from AH with or without CP intake from CS was not a good predictor of MUN or N excretions. Substituting AH for CS in diets affected MUN, NUE, and N excretions. Further studies will be conducted to better understand the effects of different alfalfa maturities on protein intake and their influence on MUN, N efficiency, and N excretions in dairy cows.

Key Words: alfalfa, corn silage, milk urea nitrogen (MUN)

2130 Relationship between behaviors, vaginal temperature, and environment of lactating dairy cows in freestall barns. T. N. Marins*, C. G. Savegnago, A. M. Roper, Y-C. Chen, J. Gao, and S. Tao, *Department of Animal and Dairy Science, University of Georgia, Athens, GA.*

Understanding the environmental impacts on behavior is critical to enhance welfare and performance. Our aim was to identify associations between meteorological variables (MV), vaginal temperature (VT) and behaviors of Holstein dairy cows during summer. Mid- to late lactating cows in freestall system from 2 farms were randomly enrolled: farm A (n = 26; 130 milking cows; milked 2×/d, fans and misters for cooling) and farm B (n = 57; 950 milking cows; milked 3×/d; fans and sprinklers for cooling). The VT was recorded every 5 min and behaviors were recorded