percentage of cows per area 4.99% (SD 4.34) and 5.01% (SD 3.95), moisture 43.36% (SD 6.04) and 43.32% (SD 6.26), NH_3 0.03 ppm (SD 0.24) and 0.01 ppm (SD 0.15) and C:N ratio 12.47 (SD 1.39) and 12.71 (SD 1.59). Mixed models were used to evaluate the effects of treatment over time on bedding temperature, moisture, and cow preference with no changes ($P > 0.05$) being found. Ammonia was detected on 6 monitoring days over 3 farms. The farms evaluated for C:N were below the recommended 30:1, which is expected to cause increased microbial NH_3 production in the bedding and increased aerial NH_3 in the barn but this did not occur. There was no clear benefit of Manure Pro treatment in the study farms. A low C:N ratio may have led to reduced effectiveness in these CBPB. More studies to understand the interactions of Manure Pro with bedding should include cultivation time, moisture, C:N and controlled use of material additions.

Key Words: cow preference, ammonia, bedding temperature

1450 AI for a dairy cattle heat tolerance phenotype. A. Chlingaryan*[1,2], P. C. Thomson[1,2], S. C. Garcia[1,2], and C. E. F. Clark[3,2], [1]*The University of Sydney, Sydney, NSW, Australia,* [2]*Dairy UP Program, Sydney, NSW, Australia,* [3]*Charles Sturt University, Sydney, NSW, Australia.*

Climate change and extreme weather events pose substantial risks to dairy cattle production and welfare, with heat stress being a major disruptor. Current approaches for heat tolerance phenotype selection in dairy cattle primarily use statistical models. To enhance selection of heat-tolerant dairy cattle, we integrate AI with a statistical genetic model that links heat tolerance to declines in milk, fat, and protein yield with temperature-humidity index (THI) rising above 60. This decline is modeled at both herd "population" and individual level, where the individual decline per unit increase in THI is represented by the corresponding random slope with the intercept providing the baseline. For this modeling, 20 yr of climate data were preprocessed and combined with New South Wales dairy cow herd test data for the Holstein breed, covering the same time period and resulting in 1.3 million records. Comparative analysis between the statistical and AI-based models demonstrated that the AI model had a smaller standard deviation of the residuals (3.25 L/d) compared with that for the statistical model (3.37 L/d). A high correlation ($R^2 = 0.90$) was observed between the random slopes estimated by both models, indicating that the models resulted in similar heat tolerance estimates but with a meaningful difference emphasized by the lower modeling error for the AI-based approach. A negative association between estimated random intercepts and slopes was identified, indicating that highly producing animals are less heat tolerant. Further analysis for heritability of the 2 traits (slope and intercept) using each method were done resulting in intercept: 0.354 ± 0.007, and slope: 0.166 ± 0.006 for the AI model, and intercept: 0.362 ± 0.007 and slope: 0.140 ± 0.006 for the statistical model. Our findings highlight the importance of considering both traits to improve the selection for heat tolerance without compromising overall production levels. The proposed model combines the strengths of statistical modeling with the capabilities of AI, resulting in a more accurate and efficient means of identifying heat-tolerant cattle.

Key Words: heat stress, individual cattle level, milk production