WHO NEEDS A BLANKET? IT’S SUMMER AND HOT!!

ISU DAIRY RESEARCHES DEVELOP AND VALIDATE NOVEL ELECTRIC HEAT BLANKET MODEL FOR STUDYING HEAT STRESS AND MITIGATION STRATEGIES

In winter, calf jackets or snuggling under a warm blanket on chilly nights is heavenly. But blankets in the summer – no way!

Heat stress is upon us already and is a leading issue in lost production and health issues in all species, especially dairy. For years, research relied on expensive experimental climate chambers for research and mitigation strategy evaluation.

Dairy researchers at Iowa State University have developed and validated a new unique and more cost-effective applicable model for inducing and studying heat stress using ELECTRIC HEAT BLANKETS. They conducted 2 studies where the EHB are applied for 7 days following an acclimation period, then also monitoring 1-week post heat stress recovery. In both studies, physiological and production changes mimicked environmental chamber models. Application of EHB resulted in increased respirations and rectal temperatures, and both decreases in feed intake and milk production. However, feed intake only accounts for 50% of milk production losses, with the other 50% accounted for by increased nutrient use and loss through physiological and behavioral changes like panting and heat dissipation.

During the first study, Cow Manager® (Agis Automation, Netherlands) ear tag behavior monitors were used. P0 is normal housing prior to move to acclimation barn (25-40°F); P1 is a 7 day acclimation (68-71°F) radiant heat mimicking early heat stress; P2: 7 days with EHB; P3 and 4: 1-4 days and 5-7 days post EHB in 35°F free stall barn (normal cold barn). Behavior changes during these periods are shown in table below. In P1 (early very low heat stress), cows decreased eating times (40%) and shifted eating patterns with an increase in respirations (at this time, tag could not decipher a chew from panting). During EHB heat stress, cows further reduced eating times (65% lower than baseline) and feed intake with extremely high respiration rates (measured as rumination) and lower milk production. Even post heat stress, only 50% of cows returned to normal behavior within 4 days (more lying or resting time rather than eating), and only 90% by 1-week post heat stress.

These results have been published in the Journal of Dairy Science and Veterinary Research Journal and ISU Animal Science Animal Industry reports. Based on this work, some behavior monitor companies have developed algorithms to differentiate rumination from panting and enhancing monitoring abilities in early heat stress. These EHB and models have now been utilized at 3 other universities and ISU Dairy researchers have used them in trials to evaluate HS and immune challenges and nutrient utilization (3 studies) and also novel nutritional supplementation strategies (electrolyte/ energy compounds and yeast products).

https://lib.dr.iastate.edu/ans_air/vol663/iss1/27/  Developing heat stress model using electric heat blanket (EHB)

https://lib.dr.iastate.edu/ans_air/vol663/iss1/39/  Evaluating behavior changes during a heat stress model using electric heat blankets (EHB)