

Effect of Body Condition and Gait Score on Estrous Expression Parameters Measured by an Automated Estrous Detection System

T.A. Burnett, A.M.L. Madureira, B.F. Silper, A.C. Fernandes, and R.L.A. Cerri

University of British Columbia, 2357 Main Mall, Vancouver, Canada V6T 1Z4
Email: tracyanneburnett@gmail.com

The aim of this study was to determine if body condition and gait scores in early lactation of dairy cows affected the expression of estrus events detected by an automated estrus detection system (Heatime, SCR Engineers, Israel). Lactating Holstein cows ($n=323$) were equipped with collar-mounted automated activity monitors (AAM). The AAM consisted of an accelerometer that continuously recorded physical activity. Animals had their estrous synchronized with two injections of PGF2a and had their body condition score (BCS; scale 1-5), gait score (GS; scale: 1-4) and the presence of corpus luteum by ovarian ultrasonography recorded; a total of 466 estrus episodes were used. Estrous expression was quantified using two parameters: 1) peak activity and 2) duration of the estrus episode. Peak activity was defined as maximum activity index during an estrus episode; the threshold activity considered an estrus event was set as an index level of 35, approximately a 80% increase in activity. The duration of an estrus episode was defined as amount of time the animal spent with an index level greater than 35. Data was analyzed using ANOVA for repeated measures and logistic regression of SAS. Contrary to our initial hypothesis, animals considered lame ($GS>2$) and those with low amounts of body fat reserves ($BCS < 3$) did not differ in duration and peak intensity of estrus episodes ($P > 0.10$). However, cyclicity affected peak intensity ($P = 0.04$) and duration ($P < 0.01$), where animals cyclic by 50 DIM had greater intensity and longer duration estrus episodes. Estrus detection was reduced in cows with low body condition and those that were non-cyclic. Cows that became pregnant from the first postpartum AI had a greater average peak intensity of their estrus episodes previous to AI (74.5 ± 1.8 vs 70.5 ± 1.5 ; $P=0.03$). Average duration did not affect pregnancy success outcome. Pregnancy per AI at first breeding postpartum was decreased in animals with $BCS < 2.75$ (41.5% vs 28.1%; $P < 0.01$), gait score > 2 (36.9.4% vs 26.1%; $P = 0.04$) and non-cyclic cows (35.6% vs 17.4%; $P = 0.01$). Body condition, gait score and cyclicity strongly affect pregnancy per AI. However, intensity and duration of estrus episodes measured by an AAM are not affected by these parameters.

Implications: Although estrous expression measured by AAM is not affected by body condition or lameness, animals with reduced health are at risk for estrus detection failure and lower conception rates.