



Event	Montreal (CA), ICAR 2022 Annual Conference	Title of the presentation
Subject	Abstract presented manuscript as ORAL presentation	Magnitude of the reduction in automatically scored BC from calving to nadir BCS affects the fertility of Holstein cows.

Presenter: Pablo Pinedo, Colorado State University, United States
E-mail: pinedop@colostate.edu

Session: Using sensor technologies for health and welfare monitoring and recording as part of dairy herd improvement

Authors: Pablo Pinedo Diego Manriquez Joaquin Azocar Albert De Vries

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ABSTRACT

Automatically generated body condition scores (BCS) through image technology enable daily assessments of body energy reserves of dairy cows. The availability of high frequency data allows for the analysis of specific points of interest, such as nadir BCS, and could result in quick adjustments of management if necessary. The objective of this study was to evaluate the effect of the decrease in BCS from calving to nadir BCS before first artificial insemination (AI1) on pregnancy per AI1 (PAI1) in Holstein cows. A retrospective observational study was completed using data collected from 6,100 lactations (primiparous = 3,683; multiparous = 2,417) starting between April 2019 and March 2021 in a commercial dairy operation located in Colorado, USA. Scores generated by BCS cameras (DeLaval International AB, Tumba, Sweden) at calving (BCScalv) and nadir (BCSnadir) were selected to calculate the ratio BCSnadir/BCScalv (NCR). The NCR is a representation of the BCS change from calving to nadir, where greater BCS loss results in smaller values for the ratio. To facilitate the calculation of PAI1 probabilities, the resulting NCR values were categorized as low (\leq lower quartile, large BCS decreases), medium (interquartile range, moderate BCS decreases), and high (\geq upper quartile, small BCS decreases). Data were examined using logistic regression by univariable models that were followed by multivariable models considering calving season, occurrence of disease, and milk yield up to 60 DIM as covariables. All the analyses were performed separately for primiparous and multiparous cows. Median (range) for NCR were 0.91 (0.61-1.00) and 0.87 (0.53-1.00) for primiparous and multiparous cows, respectively. Predicted probabilities for PAI1 for low, medium, and high NCR categories were 34.1%, 38.2%, and 38.3% in primiparous and 18.2%, 24.3%, and 25.2% in multiparous cows, respectively. The logistic regression analyses identified significant associations between NCR and PAI1, where cows with greater NCR values were more likely to conceive at AI1. The analyses indicated that the odds (95% CI) of PAI1 increased by 2.47 (1.25-4.91; $P = 0.009$) and by 3.22 (1.48-7.06; $P = 0.003$) for each 0.5-unit increment in NCR in primiparous and multiparous cows, respectively. Overall, the magnitude of the drop between BCS at calving and nadir BCS had a significant impact on pregnancy at first artificial insemination. :



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