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Title of the presentation

Using Box Time indicators to rank
cows according to their efficiency in
Robotic Milking Systems

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Session: Artificial intelligence for adding value (to be confirmed)

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ABSTRACT

Large amounts of data are generated by the robotic milking systems (RMS), creating an opportunity to add value to these data by developing tools that can help improve decision making and RMS management. One of the strategies to improve RMS efficiency is to select cows based on their performance at the RMS (kg of milk produced per total time spent in the RMS; kg milk/minute of box time). The objective was to develop box time based indicators to rank the cows according to their performance at the RMS. Data was collected for 8 months (October 5, 2020, until June 14, 2021) from 41 RMS Holstein herds, for a total of 5,429 cows and 411,405 records. Data included milk production, box time, preparation time, DIM, parity, milking start and end time, milk composition and milk prices. Calculations were done based on the ICAR standards (i.e., 4-day average). Preliminary analysis has shown that box time and hence the indicators vary significantly across and within lactation. Variability was very high during early lactation, presumably associated with the important increase of production during that period. The variability was also very high in late lactation, because of a decreasing number of observations due to ended lactations, thus data were limited to DIM between 28 and 365. Regression analysis was performed to generate factors to correct indicators for parity groups (1,2 and +3) and stage of lactation (DIM). Herd was considered as random effect. The best fittings were obtained with quadratic polynomials. The resulting equations can be used to generate a factor to correct the data to 150 DIM within each parity, and to adjust to parity 2 for data in the other two parity groups. In addition to the amount of milk produced by minute of box time an economic indicator was also developed: dollars per minute of box time. The average of box time was 7.22 min/cow, and the average of the indicators were 1.86 kg milk/min of box time and 1.50 Can\$/min of box time. The box time indicators can be used to rank and subsequently select cows according to their performance at the RMS, in addition to other indicators such as somatic cell count. They can also be used to calculate benchmarks for comparative analysis across RMS herds, as the RMS efficiency is key for the economical success of the farms. :



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