Producer experience with transitioning to automatic milking: Cow training, challenges, and effect on quality of life

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ABSTRACT

Despite the growing popularity of automatic milking systems (AMS), or milking robots, in Canada, little documentation is available on how Canadian dairy producers experience the transition to this milking technology. The objective of this national study was to document the experiences of Canadian dairy producers during the transition to, and use of, AMS. This paper reports on producers' experiences with cow training, challenges during the transition and their solutions, and effect of the AMS on quality of life. The AMS producers (n = 217) were surveyed from 8 Canadian provinces. Overall, producers experienced a positive transition to AMS. Producers perceived that AMS improved profitability, quality of their lives and their cows' lives, and had met expectations, despite experiencing some challenges during transition such as learning to use the technology and data, cow training, demanding first few days, and changing health management. Less than half of the AMS producers (42%) trained cows or heifers to use the AMS before the first milking with the robot. Producers who implemented training before first milking reported that it took an average of 1 wk to train a cow or heifer to use the AMS. Producers reported it took a median of 30 d for an entire herd to adapt to the AMS, whether or not cow training took place. On average, 2% of a herd was culled for not adapting, or not voluntarily milking, when otherwise physically and behaviorally normal. With AMS, producers suggested they gained more time flexibility, found work to be less stressful and physically demanding, found employee management easier, and had improved herd health and management. The vast majority (86%) of producers would recommend others to transition to AMS.

INTRODUCTION

In Europe, the United States, Australia, and New Zealand, automatic milking systems (**AMS**), or milking robots, have had a positive effect on the quality of producers' lives (Reinemann and Smith, 2000; Bergman and Rabinowicz, 2013; Molfino et al., 2014; Woodford et al., 2015). When operating optimally, AMS have many benefits: improved cow health, easier health detection (Tse et al., 2017), increased milk production (Tse et al., 2018), more interesting/less routine activities (Woodford et al., 2015), needing less labor (Hansen, 2015), and a more flexible lifestyle (de Koning, 2010). Many of these benefits may only become apparent after a transitional period. This transitional period has yet to be documented in detail for Canadian AMS herds.

Training is an important aspect of transitioning to AMS and involves exposing the animal to the sounds and mechanical movements of the AMS before first milking (Jago and Kerrisk, 2011). Introducing heifers to the AMS before calving has been shown to have a positive effect on milking intervals, frequency of feeding, and milk production after calving (Widegren, 2014). The AMS companies recommend following a cow-training program to help with the transition to and use of AMS. However, the programs are not standardized, often differing in method, duration, and specificity, and little is known about whether or not producers invest time in cow training or what methods they use.

During the transition to AMS, producers experience many changes (e.g., building modifications and cow health management; Tse et al., 2017), some of which are more challenging than others. This technology is growing in popularity in Canada: the proportion of Canadian dairy farms that use AMS grew from 5.6% (493 farms) in 2014 to 6.8% (574 farms) in 2015 (Canadian Dairy Information Centre, 2016). Still, limited documentation is available on how producers experience the

transition and how AMS has affected the quality of Canadian dairy producers' lives. The objective of this study was, therefore, to determine how Canadian dairy producers experienced the transition to, and use of, AMS, focusing on experiences with cow training, challenges during the transition, and effect on quality of life.

MATERIALS AND METHODS

This research was part of a larger study aimed at determining the effect of transitioning to AMS on producers' perceptions of change in farm management and cow health in the Canadian dairy industry (Tse et al., 2017), as well as economic profitability (Ferland et al., 2016). Methodology of the study is presented in detail in Tse et al. (2017 and 2018). Institutional human ethics certification was received before contacting participants (University of Calgary, certification no. REB14–0149_MOD1). Consent was received before each survey. Surveys that were terminated before completion, as well as farms that reverted back to conventional milking systems (n = 3), were excluded from the study.

Farm Selection and Data Collection

In short, provincial milk boards (Alberta Milk, Edmonton, AB, Canada, and Dairy Farmers of Manitoba, Winnipeg, MB, Canada), Lely Canada (Woodstock, ON, Canada), and DeLaval Canada (Peterborough, ON, Canada) provided access to Canadian producers who were using AMS. Producers' contact information was compiled to make our sampling frame. All 530 AMS producers in our sampling frame were contacted and data were collected on those willing to participate. The response rate was 41%. Surveys were conducted from May 2014 to the end of June 2015. The AMS farms were surveyed in British Columbia (n = 8), Alberta (n = 43), Saskatchewan (n = 7), Manitoba (n = 12), Ontario (n = 73), Quebec (n = 66), New Brunswick, and Nova Scotia by telephone, email, and in person. New Brunswick and Nova Scotia were referred to collectively as the Maritimes (n = 7). One respondent chose not to specify their province of residence. Producers were initially contacted by phone with the General Survey and those who were interested were emailed a link with follow-up questions. Producers who could not be reached by phone were emailed a link to the Combined Survey, which contained the General Survey and follow-up questions. Most respondents completed the survey over the phone (n = 149), whereas 15 respondents completed the survey exclusively online and 5 respondents completed it exclusively in person. A total of 37 respondents completed the survey over the phone

and the follow-up questions online, and 11 respondents completed the survey over the phone and the follow-up questions in person.

Interviewers were trained to explain at the beginning of each phone or in-person survey that the study was being conducted through the University of Calgary (independent of AMS companies), allowing them no risk or benefit by giving an honest account of the transition. This would have helped to minimize social desirability bias, which is the tendency to respond differently in the presence of an interviewer so one appears in a favorable light (Green and Thorogood, 2013), as well as reduce postproduct rationalization, which is a bias that causes a purchaser of an expensive product to ignore product faults as a way to justify their purchase (Cohen and Goldberg, 1970). However, only having access to farms that successfully transitioned (or were still transitioning at the time) meant collecting data that were likely partial to positive outcomes. Interviewers were also trained to ask questions exactly as scripted in the final version of the survey and to provide standardized prompts and clarifications only when necessary, to limit the effects of interviewer bias.

Surveys

The mixed-methods surveys are available online ("General Survey," Supplemental File Appendix I, https://doi.org/10.3168/jds.2016-11521, and "Combined Survey," Supplemental File Appendix II, https://doi.org/10.3168/jds.2016-11521). To reduce the chances of respondents misinterpreting questions, a pilot study was conducted and questions that caused confusion were modified.

The General Survey covered the following topics that were addressed in this manuscript: experience with cow training, challenges and solutions experienced during the transition, changes in quality of life, and overall level of satisfaction with AMS. The Combined Survey contained the same questions from the General Survey, as well as more in-depth questions related to the topics covered in the General Survey. The follow-up to the General Survey consisted of questions exclusive to the Combined Survey. Sample size varied per question, as respondents had the option to skip questions. Giving respondents the option to skip questions helped to minimize recall bias. The General Survey questions had 217 respondents, and the follow-up questions, which were specific to the Combined Survey, had 69 respondents.

Statistical Analyses

Statistical analyses were performed with R version 3.2.2 (The R Foundation for Statistical Computing