

Critical success factors transitioning from conventional to automatic milking in the United States

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Introduction

Early studies on automatic milking systems (AMS) in Europe revealed an increase in bulk tank somatic cell counts (BTSCC) and difficulties for farmers to adapt to new management routines. Since then AMS technology and information management have improved with its introduction in the US. Herd management support has increased to assist producers during the transition from conventional to AMS. The aim of this study was to determine milk production and quality results of AMS in the US and define key success factors for successful transition to AMS milking.

Materials and Methods

Sixty farmers who started Lely Astronaut™ AMS between Jan 2008 and Jan 2011 were invited to participate in an internet survey. Questions were asked in the categories: 1) setup of the dairy (herd size / barn type / feed ration / free stall and bunk ratio / bedding / bunk management); 2) results three months prior and one year after introduction of the AMS: (yield / milkings / SCC / PI / DIM / reproduction / cull rate and reasons / BST use; 3) intensity management support during the AMS transition; and 5) recommendations users would give to farmers considering AMS in the future.

Normality of data was visually checked with frequency plots, and a log-transformation was applied to data when needed (e.g. SCC) to normalize its distribution. Student *t*-tests were used to test for pre- and post-AMS differences, regression analyses were used to assess for interactions between data, and $P < 0.05$ was considered significant for all analyses.

Results

A total of 35 (58%) farmers responded. Performance changes after AMS start-up included:

- On average, daily milk yield improved by 5% over all herds in the survey. Herds that milked twice a day without the use of BST prior to AMS improved their milk production by 10%. Five herds stopped BST use during the transition period to AMS. Age and type of barn did not have a significant effect on milk production.

- BTSCC and PI did not differ significantly. This was a better result than in previous studies, in which milk quality was lower after AMS start-up.
- BTSCC improvement during the transition to AMS was dependent on BTSCC before start-up. Farms with a high BTSCC ($> 250k$) before AMS had a significant reduction in BTSCC after adoption of AMS. Farms with a normal BTSCC ($< 250k$) before AMS had no significant change in BTSCC after AMS.
- Reproduction results improved in the first year of AMS. Average days to first breeding, days to conception, and calving interval decreased by 4 ($P = 0.037$), 7 ($P = 0.14$), and 9 ($P = 0.002$) days, respectively.
- Cull rates did not change significantly; however, farms that had high cull rates prior to AMS decreased their cull rates during the first year after adoption of AMS. Cull rates for farms that had good cull rates prior to AMS remained constant.
- Reasons cows were culled shifted during the first year after adoption of AMS. Cull rates for fertility and age decreased by 11% and 4.1%, respectively; whereas, cull rates for slow milking and teat placement increased by 5.3% and 9.3%, respectively.
- Other significant associations identified after AMS adoption: 1) farms with higher cow density (cows/free stall) had an increase in BTSCC, 2) farms with a lower bunk space per cow had an increase in SCC, and 3) farms with higher cow density had increased days to first breeding.
- Given the relatively recent adoption of AMS in the US, conclusions regarding cow longevity cannot be made, but it is likely that the combined effects of the previously mentioned results will contribute to herd longevity.

Significance

AMSs are accompanied by a lot of additional sensors and information tools, which allow producers to be proactive rather than reactive, so problems can be solved before they appear. Good results are not achieved

by machines, but rather by the application of good cow management practices.

Recommendations respondents gave to future AMS users include: “Change daily management, use AMS information tools.”, “Have an experienced AMS

nutritionist, because the feed ration is the key to AMS success.”, “Visit other robot farmers and learn from them.”, “Prepare yourself. Take time to listen to Lely specialists, they have experience.” and “Prepare the herd for the transition: health, feeding, feet. and cow comfort”.