VALACTA – Dairy Production Centre of Expertise

Milking systems: the robotic milking situation

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The popularity of robotic milking systems (RMS) in Quebec is undeniable. Here is an overview of the situation today. More than 7 out of 10 farms in Canada currently use tie-stall barns and milk lines for their herds (Table 1). In Quebec, it is 89 per cent.

Over 500 robotic milking operations are enrolled on DHI in Canada. Quebec has the largest number (216), Western Canada the largest proportion of the total (11 per cent). The growth in the number of robotic installations among Valacta and Atlantic customers is just getting under way. Indeed, in some European countries (Denmark, Sweden and the Netherlands), over 20 per cent of dairy farms are equipped with RMS.

How do Quebec herds compare according to the milking system they use? Table 2 presents comparative statistics for farms on which the Holstein breed is predominant (the number of robots is insignificant for coloured breeds). Tie-stall herds have an average of 56.3 cows, milking parlour operations 115.1, and robotic installations, 94.2.

RMS have higher milk and component yields, despite a slightly lower fat content. The increase in milk production cannot, however, be attributed automatically to the changeover to robotic milking; it may be that the best herds have been switched to robotic milking.

RMS have the highest Transition Cow Index (TCI). This is excellent news since there is a strong correlation between the TCI and productivity over a complete lactation.

Herds in robotic milking operations include a slightly lower percentage of cows in their third lactation or more. An estimate of up to three per cent of cows don't adapt to automatic milking system (AMS) (Rodenburg 2002) among which many mature cows. This difference should diminish over time, since many herds have only recently transited to robotic milking. The culling rate is slightly higher on farms with RMS, but the reasons for culling vary little among milking systems, apart from a slightly higher proportion to lameness in free-stall operations.

RMS and milking parlor show similar indicators of reproductive performance, while they are lower in tie-stall operations. Many free-stall operations rely on automated heat detection systems. As for somatic cell count, herds in milking parlours show slightly better results.

Since AMS show slightly higher component levels, they have the highest milk value. Because of higher feed costs, however, robotic milking installations have a feed profit margin comparable to tie-stall setups and slightly lower than milking parlours.

The time spent on herd management shows significant differences: with AMS, three minutes less time per cow are spent than with milking parlours. That difference doubles with a milk line. For a 60-cow herd migrating towards a robotic milker, the savings is 2 to 3 hours compared to a herd in a milking parlour, and 4 to 6 hours compared to a tie-stall barn. Upgrades in the automated feeding system also contributes to gains in work efficiency. The time savings with robot milking is a gradual process. Initially,

a great deal of time is required to help the animals adapt to the new type of housing and for producers to learn the robotic software to access their management reports on a daily basis.

Unsurprisingly, the labour- and time-saving factor is the number one motivator for the purchase of RMS. Not to reduce the number of employees but to improve the work-time flexibility of the owner. When the work schedule is less demanding, farmers devote more time to other tasks or simply enjoy better quality of life. Nonetheless, managing the herd based on the reports generated by the robotic system remains a priority, since AMS offers less regular direct contact with the cows than manual milking.

AMS provide producers with useful data for herd management, but so do the modern milking parlours and more and more the tie-stall milking systems. Nevertheless, most of the Canadian farms equipped with RMS (and in all countries where RMS are widespread) continue to avail themselves of the benefits of milk recording programs. The added value of this service is mostly attributable to advanced milk analyses, data aggregation, and benchmarks (like those presented here), as well as recognition of performance in genetic improvement. Canadian milk recording agencies continue to adapt their services to the changes in milking systems.

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TABLE 1. NUMBER AND PROPORTION OF CANADIAN FARMS ENROLLED ON MILK RECORDING (VALACTA AND CANWEST DHI) BY MILKING SYSTEM.

Region	MILKING SYSTEM						
	MILK LINE		MILKING PARLOUR		ROBOTIC MILKING		Total
	Number	%	Number	%	Number	%	Number
Canada	6115	71.4	1941	22.7	503	5.9	8559
Atlantic Canada	149	47.2	151	47.8	16	5.1	316
Quebec	3892	88.7	280	6.4	216	4.9	4388
Ontario	1948	68.0	752	26.3	164	5.7	2864
Western Canada	126	12.7	758	76.5	107	10.8	991

TABLE 2. COMPARATIVE STATISTICS FOR QUEBEC HERDS ON MILK RECORDING IN WHICH THE HOLSTEIN BREED IS PREDOMINANT (>75%) BY MILKING SYSTEM. (VALACTA, JUNE 2015)

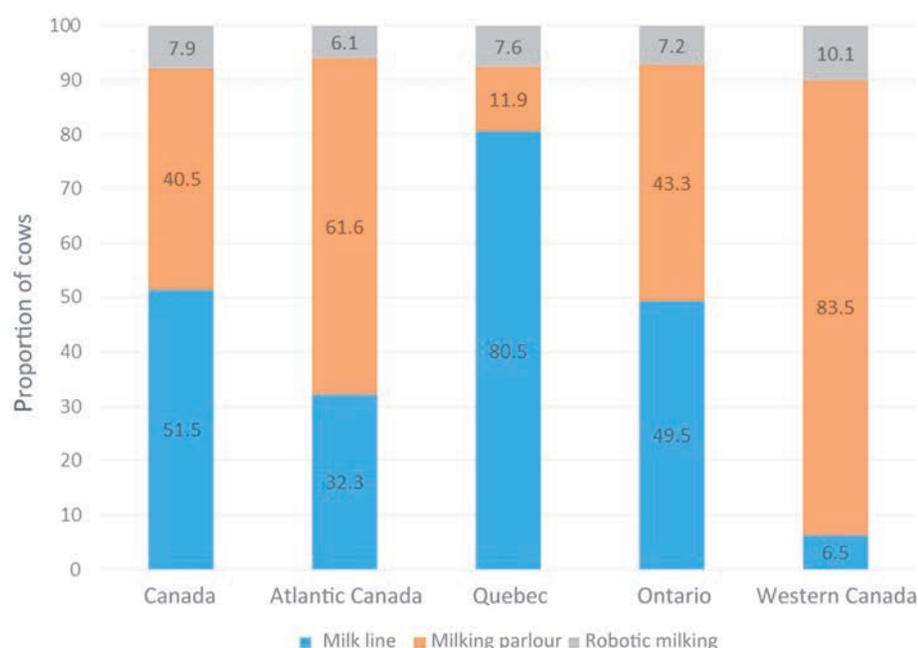|	MILKING SYSTEM		
	Milk line	Milking parlour	Robotic milking
Number of cows/herd	56.3	115.1	94.0
Annual milk production (kg)	9224	9177	9776
Annual fat production (kg)	369	371	385
Average fat content (%)	4.00	4.04	3.94
Annual protein production (kg)	303	300	320
Average protein content (%)	3.28	3.27	3.27
Transition Cow Index	133	79	150
3rd lactation and + (%)	39.6	39.0	37.5
Culling rate (%)	34.2	33.4	35.5
Mortality rate (%)	3.9	4.4	4.1
Culling for lameness (%)	3.0	3.6	3.7
Culling for reproduction (%)	5.9	5.5	5.9
Culling for udder health (%)	4.8	4.0	4.5
Culling for production (%)	4.1	2.1	2.8
Calving interval (d)	423	413	414
Days to 1st service	79.8	76.7	76.1
Days dry	63.4	59.6	63.3
Annual SCC	227	206	227
Milk value ($/cow/year)	6955	6972	7166
Feed profit margin ($/cow/year)	4790	4933	4792
Feed cost ($/hL)	24.26	23.89	24.62
Work time (minutes/cow/day)	12.6	9.7	6.8

Figure 1. Proportion of cows enrolled on milk recording (Valacta and CanWest DHI) by milking system.