

Robotic Efficiency

Two studies published in the Journal of Dairy Science evaluated the performance efficiency of automatic milking systems in North American dairy farms.

In the first study, researchers from the School of Veterinary Medicine at the University of Wisconsin-Madison surveyed 635 dairy farms with robotic milking located mainly in Minnesota and Wisconsin, southern Ontario and lower Quebec. Management practices on these dairies included:

1. **Traffic type:** free traffic (93.2%) versus forced: (6.8%).
2. **Robots per pen:** 1 (55.8%), 2 (39.3%), +3 (4.91%).
3. **Breed:** Holstein (89.4%), Jerseys (2.8%), other (7.8%).
4. **Facility:** new (50.3%), retrofit (49.7%).

In summary, average performance was:

- Milk production per cow: 72 lb. per day.
- Cows per robot: 50.5.
- Milk production per robot: 3,666.8 lb. per day.
- Concentrate consumed in the robot: 11.4 lb per day.
- Concentrate refused in the robot: 7.7%
- Milkings per cow: 2.9 per day.
- Nonmilking visits per cow: 1.9 per day.
- Failed milkings per robot: 5.5 per day.
- Milk flow: 5.84 lb. per minute.
- Minutes in the robot: 6.8.

Canadian researchers analyzed a data set collected from 41 commercial Canadian dairy farms with robotic milking systems.

Here is a data summary of robot and cow performance:

- Milk production per cow: 76.0 lb. per day.
- Cows per robot: 49.4.
- Milk production per robot: 3,707 lb. per day.
- Milkings per cow: 3.0 per day.
- Involuntary milkings: 10.4% per day.
- Fetched cows: 8.1% per day.
- SCC: 236 × 1,000 cells/mL.

Interestingly, cows were milked more often on these robotic dairies than on farms using conventional milking systems. According to the “Dairy 2014: Milk quality, milking procedures, and Mastitis on U.S. dairies” report, 88.4% of dairy operations milked cows two times per day.

While the majority (56.8%) of large operations with 500 cows or more milked three times per day, only 15.1% and 2.0% of medium (100 to 499 cows) and small dairies (fewer than 100 cows), respectively, were milking three times per day. Increasing milking frequency improves cow performance; however, average milk production in the robotic dairies was limited for cows in a 3x milking program (72 lb. to 76 lb.).

Unlike conventional milking parlors, cows do not visit the robots at the same time of the day and with the same frequency throughout their lactation. This variation on milking intervals might be the reason for the lower-than-expected milk production. **M**



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