

IMPROVE LIFE.

Elora Research Station — Dairy Facility

research



Cows in the lactating barn of the dairy facility are housed in eight freestall pens and produce up to 34 kg of milk per day. PHOTO: REBECCA REBUS

Dedicated to world-class dairy research

The Elora Research Station is one of the largest agricultural research farms in Canada, covering 2,310 acres. It's designed to support intensive research in crops, soils, beef and dairy.

The Dairy Facility at the Elora Research Station is a state-of-the-art dairy research facility, drawing visitors from around the globe. Since January 2016, the facility has enabled world-class research that helps keep the Ontario and Canadian dairy sectors innovative, competitive and sustainable.

The facility's unique design allows researchers to conduct a wide range of research projects with adaptable, leading-edge technologies, while supporting education and training. Research at

the facility includes optimal weaning strategies, genetics of feed-efficient cows and reduced methane emissions, and best management practices for new technologies such as automated milk feeders for calves.

The \$25-million, 175,000-square-foot facility, completed in May 2015, is a joint project of the Agricultural Research Institute of Ontario (ARIO), the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), the University of Guelph and the Ontario dairy industry represented by the Dairy Farmers of Ontario. The Dairy Facility is managed by the University of Guelph through the Ontario Agri-Food Innovation Alliance, a collaboration with OMAFRA.



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An innovative management approach to ketosis treatment in lactating dairy cows

Maggie Williamson, M.Sc. student
Supervisor: Prof. Todd Duffield

What is your research project about?

I research ketosis diagnosis and treatment in dairy cows. Ketosis is a metabolic disease caused by the presence ketones, a by-product of fat metabolism that increases when a cow is not taking in enough food to meet energy demands, such as the demands of lactation.

The first part of my work is focused on improving our understanding of the path that ketones take in the body, specifically in the blood, milk and urine of lactating cows, and how this progression changes over time. The path of ketones is critical to understanding when and why ketosis occurs — this information will then help us develop better tests to identify cows at risk of developing ketosis.

The second part focuses on reducing milking frequency from two milkings per day to one milking per day as a method to support the treatment of ketosis — typically oral propylene glycol — and promote recovery.

What do you like about conducting research at the Dairy Facility?

1. The staff is incredible — you can be confident that everything you need to ensure your trial runs smoothly will be done.
2. Through my trial I've also gained an abundance of data, much of which was collected automatically, that I can continue to use in the future.



University of Guelph graduate student, Maggie Williamson, research's ketosis diagnosis and treatment in dairy cows. Maggie's graduate research is conducted at the Elora Research Station – Dairy Facility.

PHOTO: MAGGIE WILLIAMSON

3. The cows were also very easy to work with and definitely made sample collection much easier for me.

How will this research benefit dairy producers?

If we can better understand the path of ketones in fresh cows, veterinarians will be able to advise producers on better ways to monitor and diagnose ketosis in their herds.

I also hope the research encourages more producers to regularly test lactating cows for ketosis, as clinical symptoms are difficult to detect in many ketotic cows. If we can find a more effective treatment for ketosis without causing losses in production, further research could lead to milking reduction as an effective preventive measure for ketosis.

What are your goals once you finish school?

I look forward to entering the industry and working with dairy farmers to solve problems on-farm and operate more efficiently, whether that involves reproduction, barn design or health-focused aspects. Someday, I would also like to own my own land and raise beef cattle on the side.

Learning and development opportunities



Elora facilities provide an unparalleled environment to train the next generation of highly qualified individuals who will contribute to the health and productivity of the dairy sector. Here, undergraduate, graduate and Doctor of Veterinary Medicine students work alongside their advisers, professors and staff to learn about dairy management and take part in dairy research.



Canada's dairy industry will see big gains with the introduction of feed efficiency.

PHOTO: RICHARD SECK

Research Spotlight

Improving cattle feed efficiency

Technology improvements in cattle breeding could lead to significant savings for producers.

Canada's dairy industry will see big gains with the introduction of feed efficiency as a new breeding stock trait, says University of Guelph animal biosciences adjunct professor Filippo Miglior.

Miglior, chief scientific officer and vice-president, Sector Innovation and Programs, at Ontario Genomics, is looking at how to target feed efficiency as a new trait to improve dairy breeding stock selection.

His research, through the Canadian Dairy Network, aims to improve the dairy industry by reducing costs to producers, creating environmental awareness and meeting consumer demands for a healthier dairy market. Feed is one of the largest costs in dairy operations, accounting for more than 50 per cent of production costs.

"If we can do anything to change that and better utilize feed in dairy production, there could be huge savings for producers," Miglior says.

Technological improvements

over the last 10 years have allowed researchers to take a better look at genomics—the study of how genetics affect cattle traits. Patterns that emerge from this field help researchers target new traits for genetic improvement, such as feed efficiency, which is the dairy cow's ability to convert feed into high-quality milk.

Over the last three years, Miglior has been leading a \$10.3-million project focused on creating more profitable, fertile and healthy Canadian cattle. By using Canadian dairy cattle productivity and genomic databases and conducting genomic testing, Miglior has identified factors that drive improvement in traits affected by more than one gene, known as polygenetic traits.

The outcome of this project is a genomic evaluation of feed efficiency using consolidated data from Canada, the United States, United Kingdom, Australia, Denmark and Switzerland.

Another benefit of the project is its role in Canadian environmental stewardship. Feed efficiency helps to mitigate methane, a greenhouse gas and culprit in the current global

warming crisis.

"If you improve feed efficiency, the animal is not only digesting feed better for production but also producing less methane," Miglior says.

The next step for this research is to design systems that target feed efficiency traits under a variety of conditions. Specifically, researchers aim to reduce negative impacts of heat stress on feed efficiency and select for overall resiliency. University of Guelph animal bioscience professor, and director of the centre for genetic improvement of livestock, Flavio Schenkel is the current principal investigator. Prof. Schenkel's current research focuses on the use of genomic information to enhance genetic evaluation of livestock, with an emphasis on genomic selection.

This research is funded by Genome Canada, the Ontario Ministry of Research and Innovation, the University of Guelph — Ontario Ministry of Agriculture, Food and Rural Affairs Alliance and Ontario Genomics, along with Genome Alberta, Alberta Agriculture, GrowSafe and the Canadian Dairy Network.

Our extensive research expertise in dairy



Animal health and welfare



Food science



Genetics and genomics



Food safety



Human health and nutrition



Environmental sciences



Computer sciences and engineering

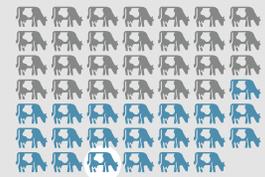


Economics



Business and management

Dairy Facility fast facts



Total number of cows in the facility: 466, of which 208 are milking.



Three milking systems in four locations, with an average milk production per cow, per day of 34 kg

240 free-stalls for lactating cow housing, 24 tie-stalls for special project housing, 72 stalls for close-up/dry cow housing and 18 pens for maternity housing



Number of research projects since 2016 opening: 27

Visitors from around the world



The University of Guelph Dairy Facility has hosted more than 185 tours involving over 3,000 people, including guests from more than 10 countries. Tours provide an inside look at this unique facility's design and research capacity and help foster opportunities for partnerships. Guests see first-hand how the provincial, national and international dairy sectors will benefit from the management practices and research developed at the facility to promote healthy herds and provide safe food to consumers.



Take a tour

Step inside and experience the leading-edge world of research, learning and outreach at the Dairy Facility at the Elora Research Station. Watch our short video and learn about this outstanding facility that's improving productivity, training students and conducting research to be applied on dairy farms in Ontario and around the world. uoguelph.ca/a5udc PHOTO: RICHARD SECK



uoguelph.ca/research

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