Global collaboration leading to improved feed efficiency and reduced methane emissions of dairy cows

Lowered inputs with greater outputs for dairy farmers

By Kathryn Kroeze

Global efforts co-led by University of Guelph researchers to select more feed-efficient dairy cows could save money for producers and consumers and reduce greenhouse gas emissions.

Dr. Flavio Schenkel, Department of Animal Biosciences, was the project co-lead of the Efficient Dairy Genome Project (EDGP). Many universities in Canada and abroad involved in this project developed a unique database by phenotyping feed intake and methane emission.

This database was used to develop genomic evaluation to select cows that are more feed-efficient and produce less methane. The database expansion and related research are continuing in the current Resilient Dairy Genome Project (RDGP), co-led by Dr. Christine Baes in the Department of Animal Biosciences.

"Feed costs are the largest expense for dairy producers," says Schenkel. "Improving feed efficiency in dairy cows reduces these costs, increasing the sustainability of the dairy industry."

The researchers, along with industry partners at Lactanet, developed genomic breeding values for feed efficiency using first lactation cows; they are currently expanding their project to use second and later lactations. Genomic breeding values allow selection of cows that are more feed-efficient.

Schenkel says this information is already being used by Canadian breeders to improve feed efficiency.

At U of G's Ontario Dairy Research Centre, some of the data are collected by student volunteers using a GreenFeed machine to track the cows' methane emissions. The researchers are using these data to develop procedures to predict methane emissions of all cows based on their milk production traits and milk mid-infrared spectra (MIR) data to allow for large-scale prediction of genomic breeding values for methane emission.

Schenkel says this research is strengthening Canada's lead in genetic selection to improve production efficiency of dairy cattle with minimized environmental impact.

A dairy cow using a GreenFeed machine to have her emissions tracked while eating. PHOTO: KERRY HOULAHAN

The EDGP was a Canadian-led project with international and national funding and researchers from Ontario, Alberta, Australia, Denmark, Switzerland, the United Kingdom, and the United States.

This project began in 2015 with $10.3 million in funding from Canadian funders, which included Genome Canada's Large Scale Applied Research Project competition, Genome Alberta, the Alberta Livestock and Meat Agency, the Ontario Ministry of Research and Innovation, the Canadian Dairy Network and Growsafe Alberta (now Vytelle).

The project was co-led by Dr. Paul Stothard, a professor at the University of Alberta, and Dr. Filippo Miglior at University of Guelph. U of G co-investigators included Baes, Dr. Angela Cánovas, Dr. Getu Hailu, and Dr. Vern Osborne, all in the Ontario Agricultural College.

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