DAIRY GENETICS AND GENOMICS

Research Highlights 2017 – 2018

DAIRY FARMERS OF CANADA

Dairy Farmers of Canada, as part of the Canadian Dairy Network (CDN) DairyGen Research Council, is financing nine research projects with other dairy sector partners, Agriculture and Agri-Food Canada, the Natural Sciences and Engineering Research Council of Canada (NSERC) and Genome Canada, to advance dairy genetics and genomics.

Key Outcomes:

- A national cow genomic database with unique and high quality cow phenotypes. This national database is already being used by several research and development projects with direct relevance to CDN and the dairy industry in general.

- Predicted milk BHB (Beta-hydroxybutyrate) was examined and led to a better understanding of the trait and the regions of the genome and biological processes influencing metabolic disease in dairy cattle. This trait has been used in Canadian genetics evaluations since December 2016.

- A data pipeline was developed for exchanging data between hoof trimmers, Canadian DHI, and CDN. A database for hoof health was created at Canadian DHI and CDN, allowing for the storage of hoof health data in the national dairy databank. This pipeline facilitates data storage, the generation of genomic evaluations for digital dermatitis, and the compilation and calculation of information for the DHI herd management report.

- Development of an index, using genomics, farmers can use to select animals that are the most efficient at digesting their feed and the lowest methane emitters.

- New knowledge in development for the use of mid-infrared spectroscopy (MIR) and MIR spectral data to predict fatty acids in genetic selection and as a new indicator trait for other novel traits.

Ongoing Projects:

1. Development and testing of new methods for genomic evaluation in dairy cattle – PI: Flavio Schenkel, University of Guelph

2. Improving hoof health in Canadian dairy farms – PI: Filippo Miglior, University of Guelph

3. Improving cow health and the nutraceutical value of milk with Infra-red technology – PI: Filippo Miglior, University of Guelph

4. Canada's ten thousand cows genome project – PI: Flavio Schenkel, University of Guelph

5. Improving feed efficiency and reducing methane emissions from dairy cows using milk Mid-infrared spectroscopy to support "green Alberta milk" – PI: Zhiquan Wang, University of Alberta

6. Increasing feed efficiency and reducing methane emissions through genomics: A new promising goal for the Canadian dairy industry – PIs: Filippo Miglior, University of Guelph and Paul Stothard, University of Alberta

7. Analysis of runs of homozygosity from next generation sequence data in Canadian dairy cattle – PI: Christine Baes, University of Guelph

8. Development and validation of genetic markers for resistance to ketosis in dairy cattle – PI: Jim Squires, University of Guelph

9. Breeding strategies for improving feed efficiency and reducing methane emissions in dairy cattle – PI: Christine Baes, University of Guelph

RESEARCH SUCCESS STORY

In December 2017, Canada joined the handful of leading countries worldwide that have national genetic evaluations aimed at directly improving hoof health. This success story has resulted from various research initiatives since 2009 culminated by a national project under Dairy Research Cluster 2 led by Filippo Miglior from the University of Guelph, and then the development of genomic evaluations for Digital Dermatitis in Holsteins.

"Genomic selection is paying big dividends for the Canadian dairy farmers. Dairy farmers can make more efficient selections for all traits, and base their selections on traits that affect their costs of production at the farm level, like health, fertility and cow longevity."

Jacques Chesnais,
Genetics Consultant, Ottawa

For information: info@dairyresearch.ca

www.dairyresearch.ca   www.dairyknowledge.ca
www.dairyresearchblog.ca   www.dairynutrition.ca

f Dairy Research Cluster @dairyresearch

Twitter @dairyresearch

YouTube Dairy Research Cluster Channel