

Genomics is Key to Decrease the Environmental Footprint of the Dairy Industry

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Genomic approaches to improve milk production have been very successful in the Canadian dairy industry with an estimated benefit to the industry of \$210M/year since 2009. This project will build on this success by targeting two novel traits, feed efficiency and methane emissions. *Increasing* feed efficiency and *decreasing* methane emissions will help to address the increasing demand for high quality milk while reducing feed costs for producers and reducing the overall environmental impact of the dairy industry. Estimates show that breeding for these two traits can reduce feed costs by \$108/cow/year and decrease methane emissions by 11-26%.

This \$10.3M project brings together research and industry experts from Canada and around the world. Data of individual dairy feed intake and methane emissions for cows and heifers will be collected in Canada. DNA sequence information will identify new markers or mutations that affect the traits. This data will be combined with data from international partners to create the world's first database to routinely validate genomic predictions. In addition, research will be conducted to identify and measure the social benefits and costs of selecting for these two traits, market level implications in Canada and internationally, and public support for the use of genomic information in breeding.

Implications: This 4-year study will generate new genomic tools to allow routine genetic evaluation services for feed efficiency and methane emission to facilitate effective selection and improvement of these novel traits. Ultimately, Canadian dairy producers will have access to bulls whose daughters are more efficient at converting feed into milk and who have lower methane emissions yet with the same level of production, fertility and health.