



PROJECT 2013-2018

DEVELOPMENT AND TESTING OF NEW METHODS FOR GENOMIC EVALUATION IN DAIRY CATTLE



Principal Investigator:

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COLLABORATORS:

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Number of students trained (MSc, PhD, Post-Doc):

9

TOTAL BUDGET

\$501,412

INVESTMENT PARTNERS



Agriculture and Agri-Food Canada



OBJECTIVE:

The overall goal of this activity was to carry out research on the development of new genomic evaluation methods in order to ensure that Canadian dairy cattle makes genetic progress at a rate that is competitive or even higher than that of other countries for traits such as production, fertility, longevity and resistance to disease.

KEY OUTCOMES:

- A novel flexible algorithm to build up haplotype libraries was implemented in the Fimpute software, which is routinely used by the Canadian Dairy Network (CDN) in the national genomic evaluations. This algorithm will allow for efficient implementation of haplotype based genomic predictions and mapping of QTLs.
- Use of random regression models in single-step genomic evaluation of Canadian dairy breeds (Ayrshire, Holstein and Jersey). This sets the base for a future implementation of single step genomic evaluation for all traits in Canada.
- Single-step genomic evaluation incorporating external (MACE) information. This will allow single-step genomic predictions for traits with available MACE EBVs without loss of information.

BENEFITS TO THE DAIRY INDUSTRY

A single-step genomic evaluation method has been implemented by CDN in December 2017. This is the first official implementation of this new methodology worldwide. Outcomes from this research activity allows Canada to maintain the world leadership in development and implantation of new evaluation methods to increase accuracy of selection and achieve accelerated genetic rates for all economically important traits.