PROJECT 2013-2018

CANADA'S TEN THOUSAND COW GENOMES PROJECT

Principal Investigator:
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COLLABORATORS:
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Number of students trained (MSc, PhD, Post-Doc):	**6**
TOTAL BUDGET	**$443,176**

INVESTMENT PARTNERS

Agriculture and Agri-Food Canada

Réseau laitier canadien
Canadian Dairy Network

OBJECTIVE:

The goal of the activity was establishing a database of cows genotyped with high quality records for fertility, survival, health, novel traits and other key traits, and these have been imputed to the entire sequence genotypes of these cows.

KEY OUTCOMES:

- A national cow genomic data base with unique and high quality cow phenotypes. A reference data base of 9,830 cows imputed to sequence genotypes with minimized preferential treatment coming from herds with high quality phenotypes for fertility, survival, health, other key traits, and novel trait phenotypes such as immune response, hoof health, feed efficiency and related traits, and milk spectral data. This reference database is already being used by several research and development projects with direct relevance to the Canadian Dairy Network and the dairy industry in general.
- An efficient method to maximize imputation accuracy to whole-genome sequence by applying various quality control filters in post-alignment sequence data. This efficient method maximizes sequence imputation accuracy and, therefore, accuracy of the associated analyses.
- An efficient pipeline to construct genomic relationship matrices based on haplotypes for genomic prediction and genome wide association studies analyses. This will allow the efficient use of haplotype based models.

BENEFITS TO THE DAIRY INDUSTRY

This activity has allowed the development of a female reference population (phenotyped and 50K genotyped), which has allowed the implementation of single step genomic evaluation for novel traits. This technology yields a higher reliability of genomic breeding values and thus accurate selection even for low heritable traits.