

Accelerate Your Herd's Potential With Genotyping

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Hannah discovered her passion for agriculture during her undergraduate degree at the University of Guelph and through work experience in the dairy industry. She holds a B.Sc. in Molecular Biology and Genetics and a Ph.D. in Animal Genetics, focusing on the genetic improvement of dairy cattle fertility.

Since the very first Canadian genomic evaluations were published in August 2009, genomics has transformed the dairy cattle industry. Although the impact of genomics may vary between breeds, today genotyping is a vital tool to help dairy producers with breeding and management decisions. In fact, about 25% of BC milk recording herds have at least 20% of their females genotyped.

Genomics and genetic evaluations

Genomics is the study of an animal's complete set of DNA, including the interactions between genes and the environment. The information is used to help an animal reach its full potential and increase the rate of genetic improvement.

With this data, genetic evaluations are then calculated to measure an animal's genetic merit for a particular trait to support sound breeding decisions. Currently, Lactanet estimates genetic evaluations for over 80 different traits, including those related to an animal's production, conformation, disease resistance, fertility, longevity, and other functional traits. This information is freely available via the Lactanet website. Overall, the more animals that are genotyped, the more accurate the evaluation.

Genetic progress

Genomic testing has accelerated the genetic progress realized in dairy cattle by identifying genetically superior animals at an earlier age. In Holsteins in particular, there is now a greater rate of genetic gain in Daughter Fertility, Milking Temperament, and Lactation Persistency, which were negatively impacted prior to genomics. Genetic gains in Canada's national indexes, LPI and Pro\$ for Holstein females (Figure 1) have more than doubled annually.

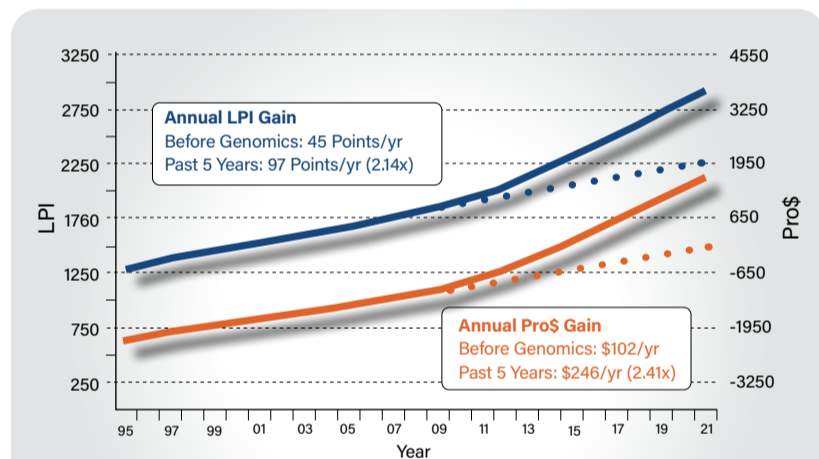


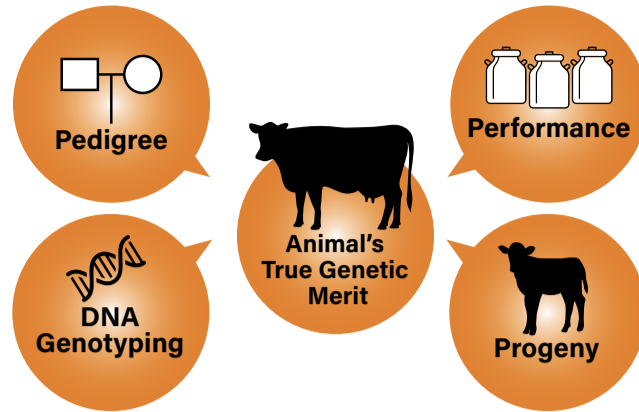
Figure 1: Realized LPI (blue line) and Pro\$ (orange line) genetic trends for Canadian Holstein females.

One of the most obvious impacts of genomic selection has been the accelerated rate of genetic gains realized. LPI and Pro\$ are now more than double, compared with the period prior to genomics as shown in Figure 1.

Why genotype?

Profitability and strategic breeding are the primary reasons why progressive dairy producers genotype females in the herd. The benefits of genotyping heifers include:

- Accurate parentage verification**
 Genotyping guarantees identification of the animal's correct dam and sire when they too are genotyped, which is required for accurate genetic evaluations.
- Improved mating and removal decisions**
 Genetic information on heifers allows for a more confident ranking among females and enables predictions on top herd performers. The data is powerful and can help with a balanced mating strategy, as well as which animals might be good candidates to remove from the herd.
- Managing genetic recessives**
 There are several known genetic recessive traits in Holsteins, including Cholesterol Deficiency and haplotypes affecting fertility. However, by knowing which heifers carry undesirable genes, better selection and mating to a non-carrier sire can reduce abnormalities affecting the next generation.

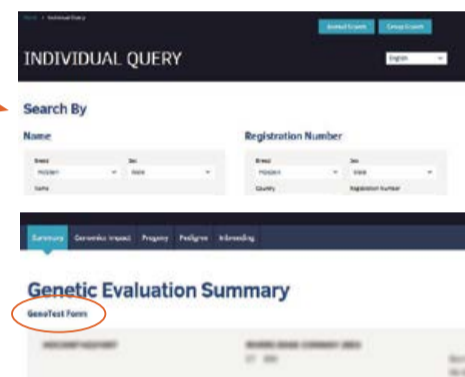


How do I start genotyping?

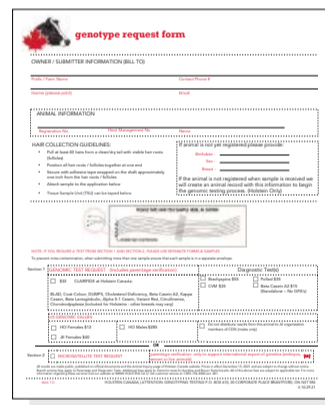
At \$33 per animal, standard genotyping is simple, non-invasive, and can be a part of your management routine. One option is to follow the steps below for genomic testing through Holstein Canada.

- Step 1:** Ensure the animal is registered in the applicable breed association herdbook. Note: If you are genotyping a newborn calf, the application for registration can be submitted with the animal's DNA sample.
- Step 2:** Collect the animal's tissue sample, tail hair or nasal swab.
- Step 3:** Navigate to the Lactanet Animal Query page (<https://lactanet.ca/en/genetic-evaluations/animal-query/>):

Step 4: Search for the animal you are interested in genotyping.



Step 5: Click **GenoTest Form** to download the pre-filled form.



Step 6: Print the form and complete the remaining information.

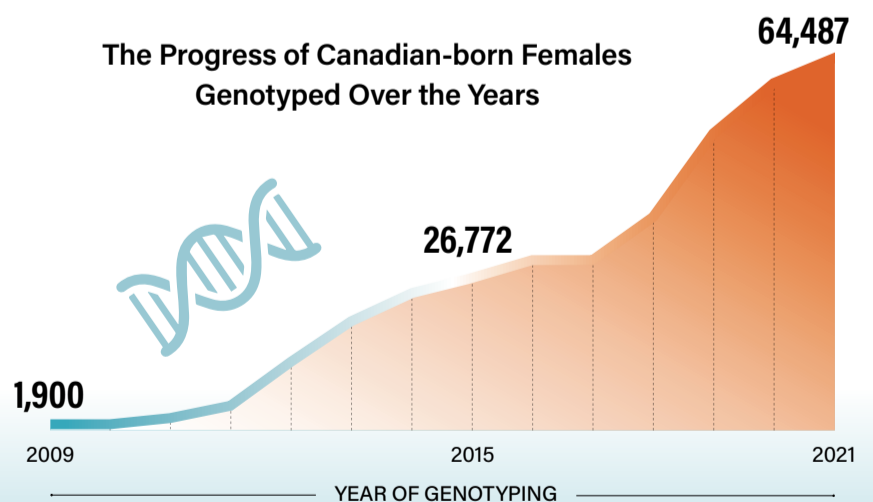
Note: The **GenoTest** application form can also be found through your breed association website.

Step 7: Submit the completed application form and animal sample.

How will my information be used?

As with all raw data collected on farm, any DNA sample submitted for genotyping, and the resulting genotype, belongs to you. The genomic results that are calculated by Lactanet can be accessed via the Lactanet website. Lactanet also provides a variety of tools to help manage and view your results, including the Genomics Impact Visualization Tool.

The Progress of Canadian-born Females Genotyped Over the Years



INSPIRED BY RESULTS

For more information on genotyping, visit lactanet.ca or call 1-800-549-4373.

