Case study



Nasal samples as an alternative source of high yield, high quality genomic DNA for livestock genotyping

Holstein Canada, backed by 127 years of history and over 11,000 active members, has established itself as an internationally recognized thought leader in the agriculture industry. Holstein Canada's mission is to provide its membership with the opportunity to enhance their profitability and competitiveness through genetic improvement programs. In support of this mission in 2011, Holstein Canada partnered with Semex to launch GenoTest, a Genomic Testing Service which promotes collecting nasal DNA samples using Performagene™. Nasal DNA samples are proven to be a reliable alternative to blood and tail hair samples for genetic applications.

Benefits of genomic testing

Genomic information can be used to significantly impact overall herd profitability by allowing breeders to select better calves at a younger age. Genomic testing increases the accuracy of predicting an animal's genetic merit, based on actual inherited traits, particularly in younger animals where the gain in accuracy is largest. Due to the ongoing tracking of phenotype traits Canadian dairy producers are well positioned to take advantage of genomic information to increase the value of their herds.

Holstein Canada applications of genomics

Due to the maturity of Holstein Canada's genetic database, genetic information can be used for a wide range of applications including:

Establishment of genomic evaluations for genetic selection: i.e., production traits, durability, health and fertility

Recessive gene diagnostic: i.e., red coat colour in Holsteins, polled

Parentage verification: detecting potential errors that can occur

when recording pedigrees

Parentage discovery: determining parentage of an animal

Current challenges

New genomic testing technologies require reliable samples and larger amounts of DNA. Tail hair roots are inefficient to process in the laboratory and can result in failed samples due to cross-contamination and minimal DNA in the sample. Tail hair samples are particularly challenging with calves (< 2 years) as their follicles are difficult to collect and often result in insufficient amounts of DNA due to the size of the bulbs. Failed samples require repeat sample collection, which incurs additional time, cost and effort.



Sample ready for transport, storage and processing





Performagene kits are mailed in groups of 10 to producers via regular mail. For ease of sample traceability, the moisture resistant packaging allows producers to document the animal identification on both the collection device and package label at the time of collection. The sample is returned in a plastic bio-specimen bag to Holstein Canada through regular mail.

Holstein Canada performs an inspection of inbound samples to ensure that the user instructions were properly followed to maximize the quality of the DNA sample. The approved sample is sent to the lab for processing using DNA Genotek purification reagents and run on Illumina Bead Express* LD or 50K panels.

Genotype information is then sent to the Canadian Dairy Network for creation of Genomic Breed Values (DGV) which are posted monthly on the Holstein Canada and Canadian Dairy Network (CDN) websites. Producers can access a secure online Holstein Canada account to obtain their specific DGVs approximately 6 weeks from the time the sample has passed inspection at Holstein Canada and has been successfully processed at the lab.

Industry benefits

Within this program, producers have the option to submit either tail hair or nasal samples for genotyping. To date Holstein Canada has received over 20,000 DNA samples. Sixteen months after launching the program, a majority of samples, greater than 52%, are being collected with Performagene. The high compliance can be attributed to the ease of use, fast and non-invasive nature of the collection device which makes the process intuitive for producers. Performagene kits can be used within minutes of birth and collected samples can be stored at ambient temperature for up to 1 year allowing producers a flexible option to maximize their valuable time. In addition, the high quality, high quantity of DNA derived from the kits result in lower costs and effort as the need for repeat testing is eliminated.

GenoTest fees per animal: June 2012		
Genomic test	DNA sample	
	Hair	Nasal swab
Low density	\$45	\$45
50K SNP	\$135	\$135

*additional \$5 fee for nasal kits

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Conclusion

Holstein Canada chose Performagene for one of their DNA sample collection options because the kits are non-invasive and provide a reliable, high quality sample. Holstein Canada worked with DNA Genotek to customize the packaging and unique barcoding to address operational workflow needs, traceability, market branding requirements and overall improved sample management efficiency.

™Performagene is a trademark of DNA Genotek Inc. All other brands and names contained herein are the property of their respective owners. All DNA Genotek protocols, white papers and application notes, are available in the support section of our website at www.dnagenotek.com.

