



# Genomics: Where Are We Headed?

Looking ahead, what can breeders expect over the next 12 months?

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Volatility and rapid change are difficult for dairymen to manage, whether it is the ups and downs of the milk market, or not knowing which direction genetic trends are going. The breeders who make up the majority of the Holstein Association USA membership spend decades building their herds, choosing sires and making investments that they believe will pay dividends down the road, not only for their own business, but for the improvement of the Holstein breed.

Genomics was first billed by the industry as “another tool in a breeder’s toolbox” to consider when selecting bulls to incorporate in breeding programs. However, it seems as if it has taken off at a more rapid pace than was initially expected; between the narrowing of sires whose daughters find their way to the top of the lists, changing predictions, and the ill-explained imputation and re-scaling of cows’ PTAs that occurred in April 2010, many breeders’ confidence has been shaken in genomic technology.

Holstein Association USA’s goal is to provide dairy producers with clear, accurate, and unbiased information. CEO John Meyer asked Dr. Duane Norman, Research Leader at USDA-Animal Improvement Program Laboratory (AIPL) to outline the next steps that AIPL is planning to take while continuing to develop and improve the accuracy of genetic evaluations and genomic predications. While other parties aside from AIPL are involved in the decision-making process for several items, the following should give a basis for what breeders can anticipate.

## August 2010

- Extra codes will be added to the genomic indicator in the official cow evaluation file to differentiate between animals that were genotyped and those that were imputed. Codes will also be given to label whether the genotype was produced by the 3K, 50K or the HD (High-Density, 860K) SNP chips. Holstein Association USA is considering the most practical way to publish that information.
- Interbull will perform tests to validate U.S. genomic evaluations, which are required before countries can participate in genomic MACE (GMACE), and before young bulls can be marketed in several European countries. As a result, U.S. genomic-tested bulls should be eligible for marketing in Europe following the August 2010 Interbull release.
- Service sire fertility evaluations (Sire Conception Rate, SCR) will be re-initiated, after the National Association of Animal Breeders (NAAB) finalizes plans on how to best deliver insemination data. Some modifications to AIPL programs may be necessary to tailor to the data they are sent to maintain unbiased evaluations.
- Information on Cow and Heifer Conception Rate will be included in the official cow evaluation file.

## December 2010

- Genotypes derived from the 3K SNP chip will be utilized the same way as information coming from 50K chips currently is, providing that the 3K chip becomes marketed publicly within the next few months. Imputing will be done so the improvement in reliability from the 3K chip will approach that achieved from the 50K chip. AIPL will include the genotypes from animals tested with the HD chip as soon as they are available.
- The set of SNPs used in genomic evaluation will be updated to accommodate the changes in the SNP list with the second version of the BovineSNP50 chip.
- Norman feels that AIPL will be in a position at this point in time to add heifer data into Sire Conception Rate and/or provide a second evaluation reflecting fertility for sexed semen, if the NAAB Dairy Sire Fertility Committee supports the effort.

**April 2011** is AIPL’s target date for resolving a major issue that was created in April 2010, and will put genotyped and imputed cows on the same base as cows that are not genotyped. Also in April 2011, Interbull is planning to introduce GMACE, which will allow for the exchange of genomic evaluations, in addition to traditional evaluations, internationally.

Extensive discussion was held during the recent board of directors meeting and during the Holstein USA Annual Meeting in Bloomington, Minn. Dr. Tom Lawlor provided an analysis of the changes that occurred in April 2010 and outlined the measures listed above. Following Lawlor’s presentation, members had the opportunity to ask questions. Concern was expressed with the accuracy of evaluations, as well as the narrowing of the gene pool and failure of genomics to discover many genetic “outliers” in the breed as was originally hoped. The board of directors discussed ways to provide breeders with clear information, and staff is looking into ways to fully utilize data from USDA for the benefit of the membership.

Genomic technology is here to stay. Like many new developments, great care must be taken to ensure the system is working as desired and providing beneficial results to those who must use it. While we cannot undo anything that has already occurred, Holstein USA can continue to work to provide transparent, impartial, accurate information to U.S. Registered Holstein breeders, and keep members informed of the latest developments as we learn them. Genomics is an exciting tool, and our hopes are that it will help dairy producers breed better Holstein cattle; a cow with improved fertility and sound mobility, while maintaining the outstanding milk production and desirable type that has made her resoundingly the breed of choice in the United States.