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GENETICVISIONS[®]



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MARKER TECHNOLOGY

Accelerated Genetics' research and development efforts are essential in providing superior products and service. Genetic Visions, Inc., a wholly owned subsidiary of Accelerated Genetics, was the first A.I. subsidiary to lead the industry into the future with genetic marker research. Genetic Visions, Inc., was founded in 1988 to advance sire selection by utilizing DNA information in addition to traditional pedigree selection.

What is the present use of genetic markers for customers?

Mostly limited to yes or no types of answers. For example, yes, the animal carries the BLAD defect or no CVM is not present. Lethal genes' defects like BLAD, CVM, DUMPs, Citrillinemia are common tests. The value of replacement heifers has increased the interest in testing females born twin to males for Freemartinism. A DNA test of blood for male DNA can be quickly performed at any age. If present in a twin female, the animal is listed as a freemartin. Interest in coat color continues to increase, largely due to one gene variation that is associated with the "born red turns black" condition in some Holstein sire families. Producers want to know if the "Red" gene is a true red or the Black/Red version.

What does the future hold for genetic markers for customers?

As we learn more about the bovine genome, more genetic defects will be uncovered and corresponding tests developed. There will be an interest by some to remove these problems from their herds faster than breeding programs alone can achieve.

A select group of animals will have genetic marker adjusted pedigrees to compensate for lack of performance or progeny data. Based on recent research using a 50,000 marker chip conducted at the USDA, April 2008 will be the start of genetic marker adjusted pedigrees for some A.I. bulls.

It is projected that starting January, 2009, the USDA will publish Genomic Predications along with the Traditional Pedigree Estimates for some animals.

Traceability of animals with DNA markers will rapidly expand in all aspects of the dairy industry.

How is Accelerated Genetics utilizing markers today to improve genetics?

Accelerated Genetics invests significant time and funds testing each young sire. We often have a choice between full brothers. When we do, we will utilize further tests including DNA. Additional testing can provide insight into a bull's genetic potential and identify differences among brothers. Once a bull arrives at Accelerated Genetics, it is tested again to ensure that this is the one we selected from the farm. We also re-check the first semen collected from each bull and compare it to the results obtained on the farm to confirm it is the correct sire before semen is released for progeny testing.

Genetic Visions has conducted genome scans of several sires of sons to identify markers that impact yield, type and management traits. Markers provide a means to track the inheritance of a chromosome section from an individual to its offspring, grand-offspring and beyond.

Our marker-trait data is information that is held as a trade secret. Whenever

possible it is employed to compare and contrast the genetic potential of young sires prior to selection for Accelerated Genetics' Young Sire Program. In addition to in-house research, Accelerated Genetics is using the global genomic predictions issued by the USDA functional Genomics group. Here, additive gene action is assumed to be associated with genetic markers. At least some markers or groups of markers will be linked to economic traits in a similar fashion across sire families.

Using a commercially available Bovine50K SNP Array to determine allele sharing, the USDA then predicts the Breeding Value of an individual from its DNA, thus doubling to accuracy predicting an individual's true genetic value over traditional pedigree estimates only.

Here genetic markers are believed to capture a portion of the additive variance normally achieved by daughter performance information. This data and other information is then used to calculate a "Genomic Prediction" for each trait. Progeny test data will later confirm or reject the genomic predictions.

As these technologies continue to develop, it will likely cause major changes in the A.I. industry from sire selection to the way bulls are priced and marketed. Accelerated Genetics is positioned to address these developments.