

# Genomic Data Adds Value in Marketing Holstein Sires Globally

Jetstream Genetics uses Infinium<sup>®</sup> BovineSNP50 BeadChip-based data to assess the genetic merit of young elite sires, optimize sire selection, and advance genetics for improved herd production.

#### Introduction

With their classic black and white coloring, Holstein cattle are the highest milk producers of the dairy industry. Jeff Butler and Roger Turner of Jetstream Genetics have spent their lives driving genetic improvement of the breed. Growing up on Holstein dairy farms 700 miles apart, they first met as competitors in dairy cattle judging shows. The award-winning calves and cattle they showed became valued parents of future offspring. Later, they bought and sold the progeny of those animals as they made their way into the dairy industry, Jeff as co-owner of Butlerview Farms and Roger as Sire Analyst and International Sales Manager at Alta Genetics (1994–2012).

Through the years, they've seen a shift from using just phenotypic/ pedigree driven selection towards the addition of genomic information to improve the accuracy of selection. When coupled with reproductive technologies such as in vitro fertilization and embryo transfer, this combination reduces genetic interval and more rapidly advances the Holstein breed genetically. The transition has taken several decades. At the competitions that they attended in the 1980s, their cows were judged solely on conformation traits such as udder shape and dimensions, structure of the skeletal frame, and overall dairy strength or appearance<sup>1</sup>. As artificial insemination (AI) and embryo transfer (ET) technologies were integrated into the breeding programs of breeders to shorten generation intervals, Holstein cattle breeders found they were breeding unproven dams and sires\*, with no guarantee that the results would be positive. Genomic tools, such as the Illumina Bovine SNP50K BeadChip, now enable Holstein farmers to assess cattle through a combined statistical genetic analysis of phenotypic and genotypic data to make more informed breeding decisions.

In 2012, Jeff launched Jetstream Genetics, an AI marketing organization, and hired Roger as Global Sales and Genetic Manager. The company is focused on offering the best sire genetics to the global marketplace. iCommunity spoke with Roger to learn how genetic data from the Illumina Bovine SNP50K BeadChip adds value to their Holstein sire selection and mating programs.

## Q: Why did you choose Holstein sire genetics as the product focus of your company?

**Roger Turner (RT):** Jeff and I grew up on dairy farms and have a combined 60 years of experience raising, breeding, and managing Holstein herds. We know a lot about the breed. We also recognize that as members of the food production service industry, dairy farmers need an efficient product to be successful. The Holstein breed delivers the highest level of milk production of any dairy breed. For that reason, it's popular in North America and worldwide.

## Q: When did genetic selection join phenotype-based decisions in Holstein breeding?

**RT:** In the 1950s and earlier, breeding decisions were based on estimated breeding values (EBV)† of cattle within the same herd. Progeny testing of bulls began in the 1960s, where data was collected on young sires and their offspring within a herd. In the early 1980s, a complete genetics-based model came into use. It captured ancestor and progeny information across herds, reducing herd-to-herd bias and providing a better view of the presence of detrimental and valuable traits.



Roger Turner is Global Sales and Genetic Manager at Jetstream Genetics.



View-Home Powerball P epitimizes Jetstream's focus on delivering the best sire genetics to Holstein farmers worldwide. He is the #1 naturally polled (hornless) sire in the world, scoring 80–90 genomic total performance index (GTPI) points higher than the next polled bull. Photo courtesy of Beth Herges

\*Dams and sires with no milking daughters.

†Estimated breeding value is calculated for certain traits based on pedigree information.

### Q: Did the use of in vitro fertilization (IVF) contribute to the shift from phenotype- to genotype-based breeding decisions?

**RT:** It's been a combination of IVF and genetics that's empowered the shift to more genotype-based breeding decisions. Together, they enable today's dairy farmers to obtain hundreds to thousands of calves from an award-winning sire.

The two technologies developed along parallel tracks. About the time that progeny testing began to be used, cryogenics and the use of liquid nitrogen to freeze sperm enabled IVF to shift from a local to a more regional distribution model. Although embryo transfer in cattle was demonstrated successfully in the 1950s, it wasn't until the early 1970s that it became widely used. That was just before genetics-based progeny models began to really take off.

Leveraging the latest advancements in IVF and genetic testing, breeders can now capture more pregnancies by more sires from younger females. Unfertilized ovum can be collected from two-month old heifers or younger, fertilized with young sire semen, and the embryo transferred into a young female for gestation. This shrinks the generation interval from 4.3 years to 2.2 years. Achieving a complete genetic turnover in half the time enables dairy farmers to make huge strides in advancing genetic progress in their herds.

"We use the BovineSNP50 BeadChip-based Zoetis HD50K tool to identify known traits, many of which are responsible for the success of certain cow families."

## Q: How is Jetstream Genetics enabling Holstein dairy farmers to take full advantage of what IVF offers?

**RT:** Jetstream Genetics was created with the goal of increasing the use of breed-defining young Holstein sires to improve herds worldwide. The genes for high milk production come through a sire's paternal and maternal lines. While many market the ovum and embryos of their females, not all dairy farmers are tapping into the earning potential of their sires. Through Jetstream Genetics leased royalty contracts, dairy farmers receive the full value of the highquality dams they have in their herds. The higher the genetic value and maternal pedigree of the sire, the higher royalty they'll receive for its semen. They can then reinvest that royalty income into the female nucleus of their herd.

Butlerview Farms already has extensive experience in marketing embryos, females, and bulls from the latest generation of Holstein cows. Providing sire genetics enables us to expand our offering to the other half of the IVF equation. We're not a "brick and mortar" business. Instead of owning bull housing, we're partnering with Alta Genetics to leverage their high fertility expertise and logistics experience. With low operating overhead and high-quality sire genetics, we're able to return high royalty payments to bull owners.

#### Q: How important are cow family pedigrees to your customers?

**RT:** Breeders and their clients are really looking for the depth of maternal pedigree. We look at sire stacks—the sire, the maternal grandsire, the maternal great-grandsire—that have had a lot of success within the industry. The pedigree provides reliability and credibility that a high genomically ranked bull will become a proven sire with daughters in milk production and classification.

#### *Q:* What are the important attributes you look for in selecting Holstein genetic sires?

**RT:** Conformation, production, health traits, and cow family certainly play a large factor in our selection. This lineage trait information is compiled by trained people using a scoring system that classifies the animals.

When you look at our current lineup, you'll see a number of sires that possess cow family names that are recognized globally. Families like Regancrest, Missy, and Sonnek. For example, Regancrest S Chassity has strong confirmation, was a 92 points Gold Medal, and was a Dam of Merit for a high-production cow. We have two or three of her sons and several other male descendants in our lineup. Chassity and her offspring package have sold for over \$1 million USD in 2009 and have proven to be a great financial investment.

Wesswood-HC Rudy Missy was a former #1 productive life cow. Cows with high production lactation months directly impact a dairy farmer's costs. A bull from the Missy cow family can sire several hundred daughters, increasing productive lactation by several months, and positively impacting a farm's bottom line. Missy now has great, great, great-grandsons that have successfully carried on that productive life trait.

Sonnek Damion Charlie is the Dam of one of our outstanding bulls called Golddust. He's the number 2 type bull in the breed today. He has been extremely popular since his release and basically sells out every month of production. What's unique about the family is that the Sonnek name (breeding prefix) has been carried under the same ownership for 40 years. Their philosophy of breeding good cows has withstood the test of time. We now have genomics data identifying several tremendous females within the Sonnek family.

#### Q: How many generations of cow family data do you assemble for each sire sample?

**RT:** We gather as much generational data from the Holstein Association as we can, often going back 10–15 generations. It's a comprehensive database that includes production classification and breed award information for all males and females within a cow family. Generation data validates cow family strength, enhancing the reputation of our product.

We're proud of the fact that all of our sires expect one have dams that carry VG (Very Good) or EX (Excellent) classification scores. We know of no other sire genetics organization that offers that level of quality.

#### Q: How does the genomic data you obtain from BovineHD BeadChip-based tools enhance the value of the pedigree data?

**RT:** The Dairy Herd Improvement Association (DHIA) and the USDA-Animal Improvements Programs Laboratory (AIPL) built a statistical algorithm to incorporate genomic information generated with the original BovineSNP50K, and now the BovineHD BeadChip, into the statistical generational information that's compiled on these cow families. Moving forward that information will be compiled by the Council on Dairy Cattle Breeding (CDCB).

We use the BovineSNP50 BeadChip-based Zoetis HD50K tool to identify known traits, many of which are responsible for the success of certain cow families. Traits such as productive life (PL), somatic cell score (SCS), daughter pregnancy rate (DPR), and sire calving ease (SCE).

Genetic tools also identify new traits that are increasingly requested by customers, including the gene marker to select for hornless or polled cattle. Polled bulls eliminate the need to put calves through the stressful dehorning process and save farm staff time and money. However, many polled bulls don't rate as high in production traits and other attributes. Some dairy farmers haven't been willing to accept the genetic loss that polled bulls offer.

We're pleased to have the #1 polled sire in our lineup, View-Home Powerball P. He's about 80–90 genomic total performance index (GTPI) points higher than the next polled bull. He's the highest priced young sire ever in the industry, with his semen selling at \$1,500 USD per unit. The average price for Holstein semen is \$20–30 USD per unit. He's attracted a lot of attention and generated many sales in a short time.

#### Q: Are there any other new markers that represent traits valued by customers?

**RT:** In addition to all the modern day markers that deliver strong conformation and classification traits, there are several newly identified genetic traits that are attractive to international customers. In certain Europe countries, red and red carrier cattle are valued highly. Red hair is a recessive Holstein trait and these cows are red and white, rather than black and white. Red and red carrier Holsteins offer higher milk production, good somatic cell count, and high conformation scores.

In Australia, milk containing A2 beta casein is considered to have health benefits. Beta casein is one of six milk proteins and is produced by the CSN2 gene. We can identify the A2/A2 beta casein CSN2 variant through genetic testing. There are some herds in Australia that are moving to 100% A2/A2, generating a 20% premium based on that milk quality. Including data on that variant enables us to compete effectively in the Australian market.

## Q: Do you have data on the impact your sire genetics have had on dairy herds?

**RT:** The progeny from our bulls are not into milk production yet, so it's a little early in our lifecycle to look at production levels. We've had many repeat customers because we've shown them the value of high elite genomic young sires providing a next generation for them. Our early customers have captured revenue from the sale of

male and female offspring from our sires. They're already creating the next generation through embryo transfer and IVF, so we'll soon have maternal grandsires in the lineage that we'll follow to track production and genetic traits.

We'll also get some of that information through the CDCB. We remain in constant contact with our customers to receive fertility and calving ease reports. As the animals are registered into the Holstein USA breed database and move into production, we'll be tracking the daughters and add that information about proven sire status into our reports.

"Genomics also enables us to capture new opportunities through the identification of new trait-linked markers, such as the polled, red and red carrier, and A2/A2 genes."

## Q: Are there certain reports that must accompany every exported sample?

**RT:** Holstein USA has been around for 125 years and the integrity of their database is recognized throughout the world. When data becomes available on the offspring from our sire genetics, we can obtain DNA reports from Holstein USA with official 3–5 generation pedigrees to accompany the semen samples we export. It's part of the protocol that's put in place within the industry to maintain a high level of integrity.

We're in about 30 and 35 markets internationally. There is a high demand globally for U.S. and North American Holstein genetics. Dairy farmers in the rest of the world have seen the increase in productivity and efficiency achieved here and the reliability that genetic testing provides. By marketing Holstein sire genetics, we're enabling dairy farmers worldwide to improve their herds and offering U.S. and North American dairy farmers with a revenue stream to enhance their farms.

## Q: How have genomics and Illumina Bovine BeadChip-based tools enhanced your business?

**RT:** We've been using Illumina Bovine BeadChips for years at Butlerview Farms and now at Jetstream Genetics. We started with the BovineSNP30K BeadChip, moved up to the BovineSNP50K, and now work with BovineHD (80K) BeadChip-based tools. The data these BeadChips provide add value and accuracy to the reports we provide customers.

Honestly, we couldn't be in this business without genomics. We're able to assess the genetic value of an animal when it's 30–40 days old, which enhances our business and enables customers to validate the impact of our sire genetics quickly.

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Genomics also enables us to capture new opportunities through the identification of new trait-linked markers, such as the polled, red and red carrier, and A2/A2 genes. Without the data showing that View-Home Powerball P carries the polled and A2/A2 genes, he would be just another Holstein bull.

## Q: Do you need to educate any of your customers on the value of genetics?

**RT:** As a judge at dairy breed competitions, I've meet dairy farmers from over 20 countries and can see that the use and understanding of genomics has grown over the past decade. Yet, the education process is ongoing and a part of every conversation we have with clients. Teaching them about dairy genetics creates value and adds another link to our relationship with dairymen around the world.

Jetstream Genetics is unique in that Jeff can provide information on the female side of Holstein breeding. With Butlerview Farms, he's established an elite ranked female nucleus herd. He's constantly buying and selling elite females and understands the value genetics brings in supporting those decisions. With Jetstream Genetics offering sire genetics, we can help customers understand how genomics impact both sides of the Holstein reproductive equation.

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#### Q: What are the next steps in your business?

**RT:** I think the accuracy and acceptance of genomics is growing worldwide, which will enhance our business and enable us to enter new markets. Some countries have taken longer than others to accept genomic young sires into their breeding programs. For example, Poland will finally be opening its markets for genomic young sires by the end of the year. After the daughters of our genomic sires are into milk production, we'll be able to market proven sires as well. The combination of pedigree, lineage trait information, and genomic and proven sire data will enable us to provide comprehensive reports to our worldwide customers.

#### References

1. www.holsteinfoundation.org/pdf\_doc/workbooks/Dairy\_Judging\_ Workbook.pdf (7 July 2014)

#### Learn More

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