



They make the most of genomic testing

Everything from management decisions to health care on the farm can be guided by genomics.

Good dairies have a knack for using technology to save money and springboard the farm forward in efficiency, health, and welfare. These farms have found that genomics is the best tool in their tool belts when it comes to advancing their operations.

What is your genomic philosophy?

Ahlem Farms Partnership: We are trying to identify the elite cows. In addition to selling milk to Hilmar Cheese, which is our main source of income, we still get a fair bit of income from marketing genetics through bull sales. We sell close to 50 bulls a year into A.I., and we also sell females that we consign to some of the national sales and such. So, identifying the high-end genomics is an important part of our business.

We gear toward testing everything in the top 20 percent of the breed based on their parent average, and then anything with a deep pedigree of high-type cows will also get tested. We are genomic testing about 50 percent of the animals, the majority of them are being tested in the first few months after birth. We try to identify the elite animals before they are 6 months of age. We have been working with genomics full time for four years, but I worked as a consultant several years before that. Basically, since genomics has been introduced, we have been testing.

George DeRuyter and Sons Dairy: We started genomic testing over two years ago, and everything is genomic tested now . . . that's 5,000 tests. Our philosophy is that we want to milk 5,000 good animals. Instead of trying to grow the herd bigger, let's milk better animals. Since we aren't growing, it gives us a chance to cull more, and genomics is making that choice a lot easier. We can keep the best and get rid of the worst. We also do a lot with embryos.

Sand Creek Dairy: When we first started genomic testing six years ago, our herd-based strategy was to test everything in order to identify at an early age the lower end animals and cull them rather than invest custom heifer raising costs into them. We are testing every animal by 1 month of age and typically have the results by 60 to 80 days of age.

With this strategy, the sale of animals finances the genomic testing. As time has progressed and the overall quality of the herd has improved, we have switched gears and began focusing more on propagating the better animals and using the rest of the herd as recipients. When we are making culling decisions after lactation has begun, decisions are weighed more heavily on production.

Welcome Stock Farm: Genomic testing is completed on all females at the time of registration in the first two to three weeks of life. Males with sufficient genetic merit are Basic ID'd through the

Holstein Association and tested either through A.I. organizations or via the Holstein Association. We have tested several thousand since genomic testing became available.

How are you collecting samples?

Ahlem Farms Partnership: We are pulling hair to collect DNA.

George DeRuyter and Sons Dairy: We use RFID (radio frequency identification) punch tags within one month of birth.

Sand Creek Dairy: We are collecting all samples using Allflex's Tissue Sampling Unit by 1 month of age. Any time we need to verify a pedigree or sample for a bull stud, we are using a hair sample. We have had some issues with invalid samples at the lab, and we are verifying all of those using hair testing.

Welcome Stock Farm: For many years we were pulling hair, but in the last year we converted to RFID (radio frequency identification) punch tags.

How are you managing data flow?

Ahlem Farms Partnership: I get preliminary information every week. From that, I quickly identify which females would be potential bull mothers and code them. Also, we get that same information on the bulls so I'll know which bulls could be high enough to go into A.I. studs.



Frank Robinson

Ahlem Farms Partnership, Hilmar, Calif.

Owned by Bill and Carolyn Ahlem, Roger and Teresa Herrera, and Lindsey and Sabino Ahlem-Herrera, Ahlem Farms Partnership is one of the premier farms for Jersey genetics. The partnership has been recognized as elite breeders by both the American Jersey Cattle Association's Master Breeder Award and the National Dairy Shrine's Distinguished Dairy Cattle Breeder Award.

This long history of breeding success made genomic testing a natural next step. As the farm's genetics specialist, Jonathan Merriam explained the farm is looking for those elite

animals to push the breed. Genomics allows the farm to more quickly identify the best animals to work with.

Ahlem Farms Partnership has three dairies situated in Hilmar, Calif., that are home to the operation's 7,000 milking cows. The herd of 100 percent registered Jerseys is just over 20,000 pounds for a rolling herd average boasting 4.8 percent fat and 3.8 percent protein averages. All mature cows are milked 3x, while first-lactation animals are milked 2x. The farm also grows corn and oats for feed. Pictured is Jonathan Merriam with one of the farm's Jerseys.



Corey Geiger

George DeRuyter and Sons Dairy, Outlook, Wash.

Founded in 1972, George DeRuyter and Sons Dairy in Outlook, Wash., began genomic testing their animals just over two years ago. At that time, the farm had reached capacity at 5,000 milking animals. Instead of growing further, George, his son and partner Dan, and their herdsman, Jeremy Waterman, made the decision to focus on milking the best cows.

Genomics was the tool they employed to reach that goal. By selecting for high Net Merit animals that have good feet and legs' scores and good health traits, the trio hopes to raise the average of the herd.

In order to do so, they divide their young stock into four groups — donor animals, those that are good but aren't quite donor level, recipient animals, and young stock to sell before raising.

The farm's 5,000 head of Holsteins average 85 pounds of milk with 4.1 percent fat and 3.3 percent protein. The cows are housed on two dairies within two miles of each other and milked in double-40 and double-28 parallel parlors. The dairy also farms 6,300 acres of land where they grow forages for their herd. Pictured here in front of some of the farm's heifers is Jeremy Waterman.



Sand Creek Dairy LLC, Hastings, Mich.

For more than 100 years, the Haywood family has been farming in Hastings, Mich. Today, the operation is owned by the third and fourth generation Luke and Larry Haywood, while Luke's sons make up the potential fifth generation of the dairy farm family.

Genomic testing was incorporated to the reproduction program on the farm six years ago as a way to isolate animals that should be culled before money was invested to custom raise them. Today, the program is used to improve the cows they are milking, propagate

their best genetics, and identify the lower end. Luke explained that it has gotten harder and harder to find those low animals.

Sand Creek Dairy is home to 1,150 milking Holsteins and Jerseys that boast a rolling herd average of 31,070 pounds of milk with 3.5 percent fat and 3.1 percent protein. All animals are genomic tested shortly after birth, and about a third of the herd is registered. The cows are housed in four 300-head barns and milked 3x in a double-20 parallel parlor. Pictured are (L to R) Renee, Luke, Larry and Ellen Hayward.

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Welcome Stock Farm, Schuylerville, N.Y.

To breed efficient, strong, and long-lasting cattle is the goal of the reproduction program at Welcome Stock Farm in Schuylerville, N.Y. Genomics play a large role in achieving these goals on the farm today as every calf is genomic tested within two to three weeks of birth.

Co-owner Bill Peck says genomics have sped up the dairy's ability to locate cattle that align with their breeding philosophy and to find young sires that reliably match their goals. They breed for medium-sized cows that are strong and wide nose to tail. Good milk production,

protein, and fat are also important, while daughter pregnancy rate, productive life, and calving ease are depended on to gauge longevity.

The farm is jointly owned by sixth-generation dairy farmers, Bill and Neil Peck. Their father, William Peck, still helps at the dairy. The pair's 900 Holsteins record a rolling herd average of 28,642 pounds of milk with 4.0 percent fat, 3.1 percent protein, and a somatic cell count of 90,000, while being milked 3x. The century farm is also home to Bacon Hill Holsteins. Pictured here is Bill Peck.

Each month is the official evaluation. I quickly check to make sure nothing has changed and then continue to identify elite animals. Every four months when a new bull genomic evaluation comes out, I look over those lists to see if there have been any adjustments so I don't miss any heifers that may move higher based on a bull moving up.

George DeRuyter and Sons Dairy: Zoetis helps a lot, and we use the Clarafide test. The Enlight program co-developed by Zoetis and the Holstein Association is used to find our donors and culls.

Sand Creek Dairy: Finding a data system is the more challenging part of genomic testing. We test with Zoetis, so all of our data is returned using Excel spreadsheets. At our farm, we can get as many as four of these a month, which is at times difficult to congregate into a master form.

We did just recently begin using Enlight online access, and so far that has been good for data management. Of course, we still have to wade through the data to exclude animals that have left our herd, so there is still some time and labor required.

Welcome Stock Farm: We manage data flow through the Enlight program.

How do you separate animals?

Ahlem Farms Partnership: On Jersey pedigrees, they come with a P value anywhere from 0 to 9, and that's their percentile ranking. A P9 would be animals that are above 90 percent of the breed, so they are in the top 10 percent of the breed. We genomically test all P8s and P9s.

When we market animals to other dairies, we will usually market those that are below a P5. They are still good cows because of the intense sire selection used the last 30 years, but they are not going to help us with our genomic marketing, so they are a good option to market to other dairies.

George DeRuyter and Sons Dairy: We have a top group that we use as donors. The next group is decent genomics, so we'll just use sexed semen on those. The next group is the recipients. Any-

thing that falls below about 250 Net Merit goes to slaughter. We are firm believers in good bulls, so we use all kinds of different studs for our bulls. In our second tier, we try to use really good sexed semen bulls. In the third tier, daughter pregnancy rate plays a factor of becoming a recipient or not. As far as the donors themselves, we start working those donors at about 10 months of age. It's mostly all IVF (in-vitro fertilization).

Sand Creek Dairy: We are still trying not to raise the far low end to save on raising expenses, but for the most part, our herd has advanced so that everything is above breed average. We are working with our top 5 percent in embryo transfer and IVF programs to propagate those genetics. Any animals not in the top 25 percent of the herd then are eligible to be recipients. Those that are in the top half and do not settle with eggs will still be bred. This year, we have expanded our recipient pool into the lactating cows. We use higher end mating on the better animals, particularly those we are working with ET (embryo transfer) or IVF.

Welcome Stock Farm: The top-tier animals are incorporated into embryo transfer and IVF programs. The next tier is for breeding with conventional semen. The bottom 85 percent are recipient eligible. GTPI (Genomic Total Performance Index) levels continue to rise to meet the top two tiers.

How has genomics helped to build your herd?

Ahlem Farms Partnership: We use the genomic evaluations to help us identify heifers that we want to get multiple offspring from. We have been utilizing ET for a couple of decades now. We prefer to use IVF on heifers because there is less likelihood of upsetting their hormone balance than with ET. Genomics help us identify those IVF animals.

Although we try to be really balanced, one of the traits we look at closest is the Cheese Merit dollars since we market to a cheese plant. We also look at the udder breakdown and the Jersey Ud-

der Index (JUI) to maintain good udders.

We are known for longevity in our herd. We have a lot of older cows and that is because we have strongly selected for type traits and particularly udder traits, so we continue to do that. We also look at DPR (daughter pregnancy rate) to maintain our strong reproductive performance. Production protein is probably the most important, but we look at all production traits.

George DeRuyter and Sons Dairy: The biggest traits we're looking for are taking in all of the components and milk flow; that's why I'm so big on the Net Merit. We also focus on health as well as feet and legs. We're getting very close to starting to milk heifers that were bred based on genomics, and I'm getting excited.

Sand Creek Dairy: The further we have gotten into the use of genomics and genomic data, the more difficult it has been for us to find animals in our herd below the national average. That has allowed us to continue to raise the bar in our herd. We have also been able to market animals that are above average and that tend to be better than what most commercial guys can find elsewhere.

For the most part, we try to maintain a program that makes a balanced cow. We focus on Net Merit, and in the Jerseys especially, Cheese Merit. Productive life and related health traits will continue to factor in more and more. Our goal is to breed a cow that is as profitable as possible.

Welcome Stock Farm: We want efficient, strong, long-lasting cattle. To propagate this, the breeding philosophy has not changed with the onset of genomics, it has only sped up with the selection and increased reliability of young sires through genomic testing.

We seek medium-sized cows for stature that are strong and wide from muzzle to rump. We look for high milk, high protein and fat pounds with acceptable productive life, DPR, and calving ease. To be a

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top-tier genomic sire for TPI (Total Performance Index), the type has to be acceptable or they wouldn't make it to the top group.

How has genomics improved quality and profitability in your herd?

Ahlem Farms Partnership: It has allowed for us to make faster progress by identifying high-end animals at a much earlier age. It also helps to identify which are the best from a flush and just work with the best ones.

In the short term, we can identify some of the extreme animals, whether we're looking for an extreme on some of the production traits or maybe an extreme on DPR or udders. In one generation, it makes a big difference. But what we also have to do is look at the long term and what type of cow we want to end up with in a few generations. For some of these traits, like DPR, extremely high calves usually means that production traits are going to be a little lower. If you have an extreme udder index bull, usually the production traits are going to be lower. So, if you continue to use those, you're probably going to start to sacrifice production.

We want to balance it out. We want to use some of those extremes to correct some problems we may have, but we make sure in the overall breeding program we have a group of bulls that are going to continue to improve all areas.

George DeRuyter and Sons Dairy: We are able to cull animals that we know aren't going to benefit us instead of potentially getting rid of good animals. It has had a huge impact on our employees as well. We look at animals a little differently now. With some of the success we've had, it has created a very good change of pace.

As we develop this embryo program, we are also able to sell more embryos. As that builds stronger, it will give us more immediate cash flow. Long term, I think we will see the biggest impact of genomics as we start milking these animals we have created.

Sand Creek Dairy: We justified jumping into genomics by agreeing to sell the bottom end animals to pay for the testing. As we have progressed, our ET work and options to contract with bull studs have grown. Although we have reached some of our short-term goals as far as improving our herd and selling some lower-end animals, new goals are currently established to continue improvement.

Ours is an evolving philosophy, and I don't foresee a day where we won't be trying to make the best genomic advancements available. We still find it very important to incorporate environmental factors into our management.

Welcome Stock Farm: The goal is to continue improving efficiency in all aspects of our dairy operation, whether it be on the dairy side or in crop production. Genomics speeds up progress through intense sire selection. On the female side, we're more clearly sorting the top females sooner, and they have more reliability to further propagate. It also is necessary as a producer of bulls for A.I., embryo sales internationally, and selling females either privately or through consignment sales.

What has been your key learning moment?

Ahlem Farms Partnership: Before genomics, your most valuable animals were the young cows because they had a production record and scored well, so they had the evaluation that promoted them. All of the heifers were just basically an average of the sire and dam. But now that you can identify which heifers are your best, quite often a calf that is just a few months old is your most valuable animal and can sell for tens of thousands of dollars. My biggest realization has been how quickly that generation interval can be turned over and how valuable the young offspring can be because of that.

George DeRuyter and Sons Dairy: The biggest thing is just how we look at these animals differently and treat them differently since we started registering all these cows and calves when we began genomic testing. It's really changing the way we dairy.

Sand Creek Dairy: The biggest surprise for us occurred when we had some of our Jerseys genomic tested, and the tests showed that we had some elite genetics. Jerseys make up about 15 percent of our herd, and those high genomic animals have allowed us to propagate some of our farm's genetics. It's been fun to get into the genomics market and work with bull studs. My sons, through their FFA projects, have been able to own and develop some elite animals and had some go to bull stud as well.

We treat genomic testing as one more tool in our tool belts. We put a great deal of stock in genomics when we are working with heifers as opposed to an emphasis on production in our cows.

Welcome Stock Farm: Through genomic testing enough animals, the genomic score compared to parent average should make a bell curve. What we are seeking is that outlier, which can go well above parent average by receiving just the right DNA from its lineage. What I have learned from our herd with a high genetic base is that it can happen anywhere, and that is why all females are tested. From the male side, I would like to test all that are born. But it does need to be cost effective, so about 75 percent are tested with the chance to be A.I. eligible.

How have you dealt with haplotypes and undesirable genes?

Ahlem Farms Partnership: We make sure that we identify those that are carriers. It does not eliminate them from our breeding program because, in some cases, they offer some other genes that will be really important to us.

As we look back in the history, some of the best bulls we've used have been carriers. It's kind of scary to think where the breed would be if people had just eliminated them because they were carriers. So we continue to use some that are carriers, but we're careful not to mate them to others. As soon as they have sons that are coming out, we look for some of the best that may not be carriers just so we can slowly reduce it in our population.

George DeRuyter and Sons Dairy: We haven't done a whole lot yet. We watch DPR quite a bit on the recipients and while selecting donors. We also look at those health traits just to make sure we're not passing something bad through. I know we can do more.

Sand Creek Dairy: We haven't done as good of a job in this area as we could have. We have worked with some animals carrying some of these haplotypes, and we do our best to make good breeding decisions to minimize their impact and provide a better outcome in successive generations. We are definitely using the information to make decisions in our breeding program.

Welcome Stock Farm: Some undesirable genes are deadly, so we stay away from those. Others, such as haplotypes affecting fertility, are weighed against a sire's benefits in deciding whether to use or not. A.I. sire selection for young bulls is intensely competitive. Through this selection, some undesirable genes are being removed quickly from the population, while others that have lower economic costs to dairymen will be slower to remove as the sire may have other very strong economic benefits.

How will genomics shape the next five to 10 years?

Ahlem Farms Partnership: I think we are going to continue to see a lot of progress, not just in production but a lot of the health traits because

we are able to identify those now. I think we're going to have healthier animals that can reproduce better. As they continue to identify more genes, I think there is potential for quantifying genetics related to feed efficiency and immune system traits against not just mastitis but other diseases. It's becoming more and more difficult to use antibiotics to treat things because of new regulations. If we can, through breeding and selection, identify cows that are naturally immune to some diseases, that's going to help us quite a bit in the long run.

George DeRuyter and Sons Dairy: I think it's going to help conception rates across the industry. Genomic selection allows for bulls and heifers and cows that breed more easily. Stillborn rates are going to improve. Overall, I think we'll see better cows. As far as innovations, we're on the right track. There are a couple of things that scare me, such as DNA altering or anything like that.

Sand Creek Dairy: The industry as a whole will continue to make bigger and bigger genetic strides. As we're able to cull the poorest animals, we can improve the gene pool.

One area I hope we can continue to improve is the speed of information. Perhaps we won't reach instantaneous genomic results, but faster results would mean better and quicker decisions.

Welcome Stock Farm: I just think it will be very fun to watch. So much progress has been gained in such a short amount of time, I can't even guess five to 10 years out. I do believe as the data becomes more reliable, feed efficiency will have a great impact moving forward. Reducing our carbon footprint while feeding a growing world population will have great benefits both economically and environmentally.

What advice would you give others?

Ahlem Farms Partnership: Be aware of your goals. Know whether you want to identify elite animals to sell, want to identify low animals to cull from the herd, or just want to understand on a broad base what's in the herd. Start out small or slow until you are familiar with the information you're getting. Then you can decide how much of the herd you want to test.

If you just go out and test the whole herd and don't understand everything, that's going to be a lot of information all at once. If you start with a group that may be fitting the goal you have, once you understand that then you can expand from there to whatever level you are comfortable with.

George DeRuyter and Sons Dairy: Depending on how you're managing your farm or dairy, I think genomics is a huge stepping stone to make sure you're culling and keeping the right animals. A lot of people look at the price of a genomic test, and it scares them away. I think with just culling the right animals you can pay that back while at the same time keeping the better animals going in your herd.

Sand Creek Dairy: Genomics is just one more piece of the puzzle, and it's not for everyone. I think it works best in herds with managers and owners who are very aggressive and who want to really advance their herd. Management will always be a factor, so those who do a good job with the environmental issues have more opportunities with genetic potential. For those who are trying to expand, it might be difficult to find top genetics, and hopefully genomics will be able to help fill some of those spots.

Welcome Stock Farm: Use a group of sires when purchasing semen rather than falling in love with just one. Overall herd progress will be made, but the reliabilities, although having greatly increased, are not 100 percent, so occasionally one in the group will falter. Having the majority succeed will move the genetic progress of your herd forward at lightning speed. 🐄