

Farm Aid: How Genomics Changed Herd Management

Genotyping enables a farmer to enhance the quantity and quality of milk produced by his herd for cheese production.

Introduction

Just west of the Ain River, the Groupement Agricole d'Exploitation en Commun (GAEC) des Culards, a collectively owned farm, sprawls across 240 hectares in the small town of Saint-André d'Huiriat. Alain Decher has worked these lands since 1995, cultivating grain and managing a herd of just over 100 Montbéliarde cattle. "Our milk is collected by our cooperative to make cheeses like Bleu de Bresse, Apérvivrais, and Le Carré Frais," Decher said. "These cheeses are well known and highly regarded in France and Europe."

Montbéliarde is a breed that originated not far from the Ain region. Past generations of local dairy farmers chose to raise cows of this breed because they adapt well to pasture and to the corn and grass silage that are used for feed in the winter. The breed has a strong character and is easy to raise and work with on the farm. Yet their biggest advantage is the milk that they produce. "They produce a large quantity of milk that is quite rich," Decher explained. "Our milk is sold to make high-quality cheese, so there is always a reasonable return on our investment."

iCommunity spoke with Decher about how genetics has changed the way he manages his herd and what it means for the future of dairy farming.

Q: How has your farm, and dairy farming in general, changed over the past few decades?

Alain Decher (AD): Before I partnered with my colleague, I had a herd of 35-40 cows. After we joined our herds, we had over 100 animals. We transitioned from hay stalling to free stalls and acquired mixers so we that we could move from simple to mixed feeds and now use dispensing bowls for more efficient feeding. Today, we also use genotyping to help us with breeding selection.

Farmers used to select animals based on milk quality or the look of the cow, and partly on the animals' descendants and which progeny were good. With the introduction of genotyping, we can now select animals efficiently using specific criteria. It has enabled us to make genetic progress in animal morphology, milk production, and quality. It's been a radical change that is saving us years over the way we used to perform breeding selection.

Q: What are the advantages of rapid breeding selection?

AD: Genotyping came about at the same time that we had interesting bulls for selection from UMOTEST, an agriculture cooperative that has led the way in using genomics in animal husbandry. Genotyping enabled us to collect genetics on the bulls that were born, which we shared with UMOTEST so that our fellow farmers could use them, too. With that genetic data, we

started working with a blood line and defining different kinds of animals by the good and bad traits that they possessed.

Q: Are genetic anomalies an issue in your herd?

AD: We consider genetic abnormalities when drawing up our mating plans. We are careful about which animals are mated when we know that there are certain bulls who are carriers of abnormalities or cows who might also be carriers. When we draw up our mating plan, we are careful not to make mistakes and perpetuate any defects.

Q: How many animals have you genotyped?

AD: Since 2009, we have produced more than 200 genotyped heifers. When we averaged it with our technician, we had a value of 120. Since 2018, we've genotyped just under 20 animals or so, and our new value is 134. In 2018, > 65% of the renewal herd could be selected through genotyping.

The genetic value of our herd has increased since we began genotyping. We can see that our production and quality levels have also increased, compared to the production and quality output of heifers from previous years. That's important because we are always trying to produce milk rich enough to make cheese. Some blood lines were a little hard to work with; however, we have managed to improve temperament a little. When we draw up our mating plan, we can immediately feel that.

Q: What is your return on investment with genotyping?

AD: Genotyping has enabled us to select cows in a way that is essential for the good of the herd. It also has an impact on our revenue as farmers. If we have cows who are healthy, who produce correctly, who have good udder, who are pleasant to milk, who are easy to inseminate, and who also give good quality milk, it has a direct impact on our income.

Genotyping also gives us another way of managing our herd. We know the cow and we know their value. Those who aren't



Alain Decher is a farmer at the GAEC des Culards, a collectively owned farm in Saint-André d'Huiriat, France.

valuable are inseminated with the Charolais breed so that the veal are worth more. Using sexed semen, we can plan to have more female offspring. Genotyping has really changed our selection methods positively.

"I would encourage my fellow breeders to use genotyping so that they are aware of the value of their animals. It will make their work easier and help them to avoid selection errors."

Q: What do you hope consumers understand about genomics?

AD: It can be difficult to explain genotyping to consumers. It's important for us to communicate the way we are working and that genomics is a tool for us to use that doesn't modify anything. It's more like genotyping provides us with a magnifying glass so that we can get a better look at the animals.

When I talk to my friends who are not farmers, they are really surprised that we work with cutting-edge technologies like this. They didn't know that agriculture was so high-tech.

Q: What would you like other breeders to know about genotyping?

AD: I would encourage my fellow breeders to use genotyping so that they are aware of the value of their animals. It will make their work easier and help them to avoid selection errors.

Two years ago, four of us created a GAEC group to exchange information and work on our genetics together. We discuss things and motivate each other. We exchange embryos and offer heifers or even males for UMOTEST. If we had continued working alone, I don't know if we could have achieved as much as we have together.

Q: What is the future of genotyping for herd management?

AD: I think those who aren't genotyping will soon see the value that the rest of us are gaining from it and will adopt it in 4-5 years. It's too bad that they aren't starting now so that they can benefit from increased earnings. My hope is that genotyping will continue to bring us better criteria, better results, enable us to avoid health crises, and help French dairy breeding.

See how the UMOTEST breeding program is producing gains for dairy cattle herds:

UMOTEST video, www.illumina.com/company/video-hub/deQZ4kNnTU0.html

UMOTEST Manager, Breeding Program iCommunity article, www.illumina.com/science/customer-stories/icomunity-customer-interviews-case-studies/fayolle-umotest-interview-ag.html

UMOTEST Head of R&D Initiatives iCommunity article, www.illumina.com/science/customer-stories/icomunity-customer-interviews-case-studies/brochard-umotest-interview-ag.html

Learn more about Illumina genotyping products and systems:

Commercial Agriculture, www.illumina.com/areas-of-interest/agrigenomics/commercial-agriculture.html