

Breeding plays a key role in improving milk quality – and price

Adding value to milk

Improving and altering milk constituent levels can increase the size of your milk cheque – particularly when supplying milk to a cheese processor or other dairy manufacturer. And genetics have an important role to play here.

text **Rachael Porter**

Milk constituents are increasingly under the spotlight, as producers look to add value to their milk cheque by supplying their buyer with the butterfat and protein levels that they require – be that for cheese production or other dairy produce.

So how can producers increase milk components and add value? There are three key ways to add value to milk: increase fat and protein (percentages) in the milk; increase the level of specific compounds in the milk, for example more casein for cheese production or less saturated fat; and by producing ‘specialist’ milk, such as A2.

In the Netherlands, the average black-and-white cow produces 9,856kg of milk at 4.32% butterfat and 3.53% protein each year. The higher protein percentage, compared to the average cow yield in other countries, is the result of years of breeding and selection on protein percentage.

According to CRV’s senior researcher Erik Mullaart, breeding has a much bigger role to play in boosting milk components, compared to feeding. “The factors affecting the protein content of milk include genetics, which accounts for 66% of variation, and the environment, feeding and management, as well as the cow – her age, lactation and lactation stage, as well as her health. This all makes up the remaining 44%,” says Mr Mullaart.

So, how can producers breed for higher components? “Taking a genetic approach is important, since this has such a huge influence on fat and protein yield and percentage. So producers must select sires with the highest breeding value for protein percentage.”

The sire average of 3.51% is set at ‘0’. A cow gets half of her protein-producing genes from her sire – the other half she will get from her dam. If a sire scores 0.21% more than the average for protein,

half of this (0.105%) is given to the daughter. So his daughters should have the potential to produce $3.51 + 0.105 = 3.62\%$ protein.

Mr Mullaart says that producers should also select cows and heifers in their herd that yield the highest protein percentage. “Adult animals can be selected on their own performance and, in the case of calves and young heifers, selection can be made based on genomic selection.”

Cheese-making protein

Another way to add value to milk is to look at breeding to increase specific compounds in the milk, such as more casein for cheese production or less saturated fat.

Both kappa-casein and beta-lactoglobulin are important here, particularly for herds producing milk that will be processed into cheese. Within total protein the casein proteins are the most important for making cheese. A higher percentage of casein means more cheese will be produced per kilogram of total milk protein.

All CRV Avoncroft sires’ status for both beta-lactoglobulin and beta-casein is known and this allows producers to select sires that transmit high levels of both proteins (BB) and higher levels of protein overall.

One herd that is focusing on milk components, in order to secure a better

Young stock at Downton Estates



The 190-cow herd is managed and fed as two groups – high and low yielders



name	milk	fat%	protein%
Delta Bouncer	+402	+0.11	+0.14
Delta Moutard Red	+130	+0.25	+0.16
Manders Dazzel	+585	+0.17	+0.05
Horst Allard RC	+308	+0.14	+0.17
D'n Driehoek Nilson	+125	+0.17	+0.14

Table 1: High-component sires available from CRV Avoncroft

milk price both now and in the future, is based at Downton Estates, near Ludlow in Shropshire.

High components

Herd manager Graham Whatmore says that CRV Avoncroft's top red-and-white Holstein genetics have been used on the pedigree herd for more than 20 years. The 190-cow herd, based at Downton on the Rock, calves all year round and is managed as two groups – high (more than 26 litres per day) and low yielders. The herd is currently averaging 8,720kg of milk with constituents levels of 4.1% butterfat and 3.3% protein. Graham is particularly proud of the high component yield, some of which is down to feeding and management. But much of it is the result of breeding.

He says that most of the herd is red and white – the herd was founded with Ayrshires back in the 1970s and the owner stipulated that it must remain 'red and white' in appearance. "We started using Holstein bloodlines in 1989, in a bid to push up milk yield," explains Graham, adding that the focus is now not only on yield but also compositional quality.

High-protein sires Delta Fidelity, Topspeed Kodak, and Kian daughters are



Farm manager James Latham (left) and herd manager Graham Whatmore (right)

all currently milking well in the herd, according to Graham. "It's important that we use sires that offer the milk constituents that we're looking for."

Balanced breeding

CRV Avoncroft's Richard Williams, who works closely with Graham and also uses SireMatch to help them to optimise herd matings, adds that sire selection at Downton also focuses on bulls that produce long-lasting cows with functional type.

Graham says that udders, feet and legs are all important too: "If a cow can't walk or be easily milked then she's not really a cow." He looks for good udder attachment and teat placement. "We used Lilac for a while because our udders

were so bad. Now they're nice and tight again and that's certainly helped with milk yield, fat and protein, as well as udder health and milk quality."

Bulls currently being used extensively include Kingfarm Holsteins' Anreli, as both sexed and conventional semen. "He will sire daughters that have superb longevity, as well as excellent feet and legs and udders, with good milk yield and components at +0.16% fat and +0.11% protein," says Richard.

Delta Webmail is also in use. Graham is also impressed by his daughters' longevity, feet and legs and udders. "And milk yield and components – at +0.11% fat and +0.06% protein – are also exactly what we're looking for to keep the milk cheque looking as healthy as possible." |

The majority of the all-year-round calving herd is red and white

