What does genetic profiling really mean for the commercial dairy producer?

Genomics – so what?

Genomics is gathering pace with AI and breeding organisations harnessing the technology to select young sires prior to progeny testing. All very exciting for breeding enthusiasts, but what difference is it really making – or could it make – in UK dairy herds?

text **Rachael Porter**

Genomic selection – what do those two words mean to you? Producers understand how the technology works – hair samples are sent off to the lab and analysed and a DNA profile of the animal can be made – but how can it and, moreover, is it making a difference on UK dairy units?

"Genomics is set to have the biggest impact on breeding since the inception of AI in the 1940s," says Avoncroft's David Matthews. "It will speed up the rate of genetic gain and some producers, who have and are using genomically selected sires, are already doing that," "But the truth is that uptake in the UK has been slow and on a small scale, compared to the Netherlands or the US.

"To some degree that's down to UK breeding companies who haven't pushed the technology and also due to the scepticism with which some producers still view the technology."

Improve efficiency

Genus ABS' Mark Smith says that genomic testing is undoubtedly an exciting new technology. "And, in time, may deliver considerable benefits to the dairy industry. But we believe that it is currently best restricted to use as an innovative way to improve the effectiveness of progeny testing rather than as a replacement for proven, well-established bull selection methods.

"Other breeding companies are actively promoting sires based on genomic data, but the technology is still unproven. Producers need to be aware of its limitations and the possible pitfalls of over-reliance on this new information," he says, adding that the company is a committed supporter of the development of this technology and fully expects it to be a major advance in the future.

"To date, Genus ABS has genomically tested more than 1,500 bulls in our global programme and will test 500 bulls a year as part of our screening programme prior to progeny test – more than any other company globally.

"If we can improve the quality of the bulls going into our progeny testing, then it follows that higher quality proven bulls should graduate from these programmes," he adds.

David Matthews agrees. Avoncroft sources much of its semen from CRV in the Netherlands and it too is using genomic selection to 'sort the wheat from the chaff' when it comes to choosing the most promising sires to enter its progeny testing programme. But it's also going a step further, and genomically selected sires are available for producers to buy. In fact these sires are proving very popular among Dutch producers.

In 2008, CRV introduced InSires – genomically selected young sires. In the breeding programme, genomic selection was used to select the best 200 sires from 1,000 young bulls that were all from the highest genetic matings. By applying 1:5 selection, the level from young bulls was greatly improved and the principles of progeny testing fundamentally changed. The 200 selected entered the InSire test programme to generate additional daughter proofs.

Although the price of this semen was increased from £3.75 for the old young bull semen to £6 for InSire semen, and the test premiums were reduced, the test programme was very well received by the Dutch and Flemish members of CRV. The minimum requirements for usage under the test contract was relaxed, but the actual usage remained as high as under the old system.

'Bull' packs

In addition, since 2008, a selected proportion of genomically selected young sires are available in 'six packs'. In this case, the bulls are not part of the test programme, but sold commercially at £12 per straw. Bulls are sold in a pack to counteract the slightly lower reliability of using such bulls. "By using six different bulls, instead of one, producers, for want of a better description, 'spread the risk'," says Dutch breeding co-operative CRV's Sijne van der Beek.

"We find that our members prefer to use these InSire bulls, rather than a proven bull that's priced at £4 per straw. They're eager to embrace the technology and take a small risk in order to reap the benefits on their units."

So, why are they so much more open to the concept of genomics than UK producers? Dr van der Beek says it's down to making sure they were kept well informed and ensuring that they were with CRV every step of the way.

"CRV has been developing genomic research for some 10 years now and our producers have been involved in that process right from the start. And, as a result, they've been really eager to know more about the technology and how it will benefit their herds.

"It's been a step-by-step approach that really began to take off and get exciting during the past four or five years. And our members understand it – they're familiar with it. And I think that's why they're so keen to embrace it and, ultimately, use it."

Technology grows

"We are seeing trust in the technology grow and we expect that to continue, particularly as the Netherlands is adding genomically selected sires to its list the August proof run. And, based on these figures, that's when we expect to see sales really take off," adds Dr van der Beek. Later this year, due to the improved reliability of genomically selected young bulls, and due to the increased genetic level, CRV will start to sell semen of individual young bulls.

And the good news for the 'early adopters' is that all the signs are that the average predicted breeding values of the genomically selected sires match their actual figures once their daughter proofs come through. "Producers are getting what they expect to get from these sires and this will add to the growing confidence in this technology."

Such confidence is in its infancy in the UK. "We are lagging behind a little, but it'll come. It's a little like when AI was first introduced – there was considerable scepticism," says David Matthews. "But it's the norm now and has totally revolutionised dairy breeding. Genomics is set to do the same, but on a larger and wider scale."

He's excited by genomics and says that the possibilities are endless. "Ultimately, this is a tool that takes so much of the guess work and time-consuming bull testing out of breeding healthy, fertile and productive cows. "I can see a time when it could also help us to select cows that have a greater resistance to bovine TB and other devastating diseases. Or maybe cows that produce fewer methane emissions. The sky really is the limit."

UK producers literally want proof – bull daughter proofs that show, inconclusively, that genomics can predict sire and daughter performance. "That's what we'll get eventually and that's when the technology will take off in the UK – and the rest of the world – and commercial producers will really start to reap the benefits." |