

Take breeding to the next level w

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For many producers, genomic testing heifers could provide the final piece of the breeding 'puzzle'. And a new service, set to be launched by NMR at the Livestock Event, could be the next step to speed up your herd's genetic progress. We spoke to two leading genetic and breeding experts to find out more.

text **Rachael Porter**

DNA profiling, or genomic testing, is no longer just for bulls or potential bull dams. More and more females – predominantly heifers – are being tested around the world in a bid to reduce heifer rearing costs, manage pedigree 'risk' and increase the rate of genetic gain.

Genomic testing identifies the genetic potential of an animal. Genomic test results contribute to more accurate corrective mating and they can increase the rate of genetic progress in the dairy herd. A genomic test can identify the potential of a young animal. This can help to target specific traits that could, in future, extend to traits such as feed efficiency and disease resistance. The real gain is its use in achieving breeding selection goals much faster than previously afforded with conventional breeding systems.

Testing females is particularly popular in the US, according to GeneSeek's business development manager for Europe Gary Evans. "It's used heavily on commercial female cattle in the US and Canada, and is taking off across Europe. It's available now for use in the UK using UK specific calculations," he says.

Greater accuracy

"I believe that once producers see the benefits of knowing the genomic profile of their heifers, it will take off here too." Benefits include the ability to avoid inbreeding and being able to improve matches between sires and dams. "Breeding will be more tailored to suit the female if more information about her is available," he says. "If a producer knows that he has a

particularly good heifer, he can more easily justify the use of a more expensive AI bull – or sexed semen. Genetic profiling heifers will allow producers to be more selective than ever before and this greater accuracy – when matching sires to dams, particularly heifers, – will help to speed up the rate of genetic gain."

There are also benefits for producers who sell surplus stock. DNA profiling will allow them to select the heifers that they want to keep and those they want to sell with greater ease and more accuracy.

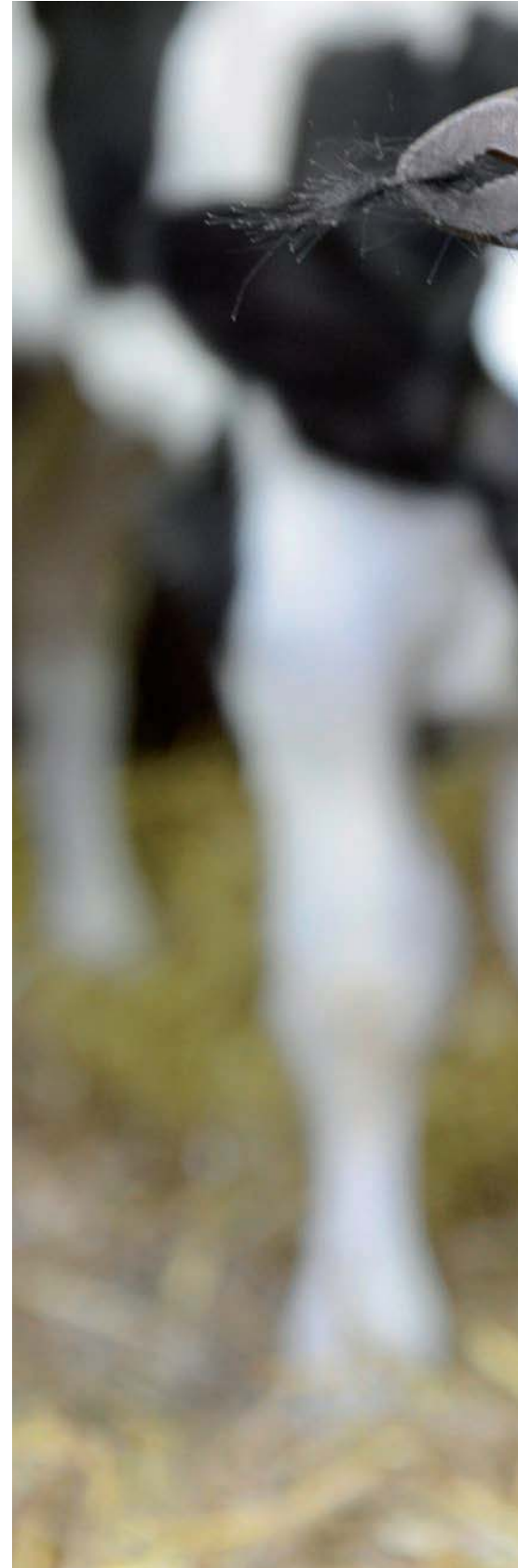
Clear benefits

"They'll be able to keep those that better suit their breeding programme or commercial objectives. I think that selling a heifer with additional paperwork, aside from the usual pedigree and health information, may also help them to command a better price," says Dr Evans.

There are some clear benefits to be gained by producers from genomically testing young heifer calves. It identifies calves that may have a high inbreeding coefficient. If this is greater than 6.25% it is possible that production will be suppressed and the risk of inherited diseases increases so these animals should be bred to a terminal beef sire until it can be established whether or not the inbreeding has had a detrimental effect on their performance.

It can also make planning the next generation quicker and easier by using sire matching to compensate for known weaknesses before the breeding season starts.

The reliability of a young animal's genetic index is around 35%, based on its parent



with heifer genomic-testing service

the jigsaw



average. But with the addition of genomic information this increases to 60% where animal ancestry is known. This is the same as a cow completing its second lactation. So breeding decisions can be made with more confidence. Outcross semen can be used if family lines are found to be too inbred. And herd replacement rate can be reduced as more sexed semen can be used more accurately. It can bring other management benefits too. Surplus female calves can be sold earlier, releasing land and accommodation for milking animals, while older animals can be put in calf to beef for enhanced calf prices, more than covering the cost of the test.

More widespread use of genomic testing means that the cost has dropped significantly and it is now a potential tool for the commercial breeder to consider using. That's why NMR is launching a dairy heifer genomic testing service – at the Livestock Event.

NMR is working with GeneSeek, part of the Neogen Corporation, and one of the largest providers of genomic profiling in the world.

NMR's new Genetracker dairy heifer service uses the custom GeneSeek Genomic Profiler (GGP) low density BeadChip. This is based on Illumina Infinium chemistry and features nearly 25,000 SNPs, including many for disease and performance traits. The GGP is fast becoming the global standard for performance testing.

Producers can contact NMR Customer Services by telephone or email to request testing kits. These contain bar-coded sample plastic wallets, to hold the hair sample and record calf details.

Producers must then follow the comprehensive instructions enclosed in each kit. Hair samples are posted via NMR to GeneSeek for testing. Results are sent directly to SRUC and then to DairyCo and the data is converted into PLI values before being reported to the producer via NMR iReports – a facility already used by NMR customers for many test results. This process will take between six and eight weeks.

"This service will allow producers to pre-

screen heifers, to mate the first time as maidens, so that they then only get heifer calves, particularly if they're using sexed semen, from their superior animals," says independent breeding consultant Kevin Lane. "As it costs as much to rear a bad heifer as a good one, this will make sound financial sense."

The cost of the test is expected to be around £32 – just a tiny fraction of the cost of rearing a replacement heifer. And Mr Lane says it would be good practice to test all the heifers in a herd. "It's impossible to tell which animals are carrying the best genetics just by looking at them or their pedigree. For producers who are looking for a specific improvement, such as fertility or cell counts, it will be essential to test all heifers if they want to make the most of their breeding decisions."

Mr Lane adds that all UK dairy herds could benefit from testing their heifers, although he has no idea what the uptake will be on a national basis.

"But herds that do use it should test all their heifers, unless they have already identified one or two that they wouldn't breed from for whatever reason."

Avoid inbreeding

As for cost effectiveness, he says it's difficult to give an exact figure. It will depend on the individual producer's breeding goals, as well as many other factors.

"Testing will, however, pay for itself in several ways. It will enable producers to identify calves that are superior, to breed them to the best bulls that they can afford and avoid inbreeding issues.

"Corrective mating will be more accurate than before and producers can also make the best use of sexed semen.

"If they have a static herd size, they can also be more selective and reduce the number of animals that they rear for replacements, possibly by mating the rest of the herd to terminal beef sires for a quicker cash return," adds Mr Lane.

"As the reliability of genomics increases and new indexes are added, such as feed efficiency and disease resistance, it will be of even greater value." |