In the seventh and final part of this series on efficient dairying we take a close look at what the benefits of reliable breeding values are and find out if genomically tested bulls live up to their expectations.

Analysis shows that sires retain genomic proof when daughter breeding values become available

Genomic bulls prove their worth

The use of genomic sires in the UK has greatly increased during the past year and producers continue to be impressed with their performance. There are exceptions, of course, but on average genomic bulls retain their breeding values well.

text **Inge van Drie**

The use of genomic sires is increasing very rapidly across the world. In Germany in spring 2014, genomic bulls accounted for two thirds of all inseminations. In Canada more than half of all inseminations are with genomic bulls and in The Netherlands genomic bull Batenburg Stellando was the second most used black-and-white bull, during the past year, with more than 28,000 first inseminations.

After a cautious start, the use of genomic bulls is also growing in the UK. "Producers' confidence in genomic bulls is rapidly increasing," says CRV Avoncroft's David Matthews. The breeding organisation saw the use of genomic bulls increase from just 3% in the period from November 2013 to April 2014 to almost 20% during the past six months. Mr Matthews puts the increase, among other things, down to the fact that foreign AI organisations are typing their genomic bulls using British breeding values. That has been possible since April 2014 and the company arranged for Apina Norman, among others, be typed. In August he led the British PLI ranking.

Table 1: The difference per trait between the latest daughter breeding value and the latest genomic proof (average of 821 sires)

trait	difference
NVI	–9.0
reliability NVI	26.3
kg milk	–36
kg fat	–0.6
kg protein	–0.9
life span (days)	–40
type	–0.5
frame	–0.4
dairy strength	–0.5
udder	–0.1
feet and legs	–0.4
somatic cell count	–0.3
udder health	–0.2
fertility	0.1

Meeting expectations

The increasing use of genomic bulls provides a good opportunity to take a closer look at the breeding values of these bulls. Do genomic bulls live up to their figures? In order to be able to assess this the head of CRV's Animal Evaluation Unit, Gerben de Jong, took the breeding values of more than 800 bulls on the basis of daughter information and then compared them with their latest genomic breeding values. What was the result?

On average there was hardly any difference. For NVI – the Dutch total index – the bulls fell nine points on the transition from genomic to daughter breeding values (see Table 1), while the reliability of the NVI increased by more than 26%. "Nine NVI points is a small difference and nobody will worry about that. It shows that the bulls come out well as a group," says Mr De Jong. "The genomic breeding values of the bulls are neither underestimated nor overestimated."

The other characteristics, including

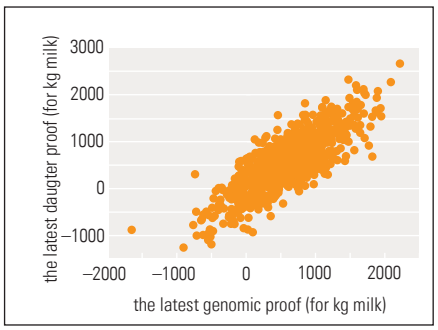

Figure 1: Comparison genomic and daughter proofs for kilogrammes milk

Table 2: Distribution of 821 sires based, on their genomic proofs, in five categories for kilogrammes milk and to which category they belong based on daughter breeding values

		kg milk category based on genomic proofs				
		low				high
kg milk category based on daughter proofs		1	2	3	4	5
1	1-20%	110	42	9	3	0
2	21-40%	40	54	40	26	4
3	41-60%	12	38	53	40	23
4	60-80%	1	26	50	62	23
5	81-100%	1	4	12	33	115

The majority of the bulls that have a high genomic score also have a high daughter breeding value

kilogrammes of milk and lifespan and the conformation breeding values, also show small differences. "All characteristics show an average difference that is less than 15% of the genetic spread."

Of equal interest is whether bulls that are at the top level with their genomic breeding value also remain at the top if the breeding value on the basis of daughters is known. In order to determine that, Mr De Jong plotted on a points graph the latest daughter values of all the bulls against the latest genomic breeding value for kilogrammes of milk (see Figure 1).

"Bulls that score highly on the basis of genomics also score highly for breeding values on the basis of daughter information. For example, Newhouse Banker scores 541kg milk on the basis of his latest genomic breeding value, while his current daughter value stands at 615kg.

"Bulls do not fall short by much nor do they suddenly increase a lot," adds Mr De Jong.

Breeding 'buffer'

The fact that the majority of the bulls that scored highly for genomics also have a high daughter breeding value can also be seen in Table 2.

Mr De Jong divided the 800 bulls into five groups. Of the bulls that ended up on the basis of genomics in class five for kilogrammes milk – or in the highest 20% – about 70% were also in class five based on their daughter information. Another 20% were in class four.

The figures may look good, but in practice there is regular discussion about bulls that fall short once their daughter proofs become available. "Examples can always be found of bulls that fall considerably short of their genomic proof once their daughter proof is published," says Mr Matthews.

"It is logical that these are the very examples that gain attention. But cattle breeders often forget that these bulls always come out higher than the breeding bulls that are used at the same time. Indeed, owing to their high genomic breeding value this type of bull has a 'buffer', so to speak."

Although the daughter breeding values of breeding bulls correspond well on average with their genomic breeding values, Mr Matthews does recommend spreading the use of genomic bulls. "Don't just look at one top-level bull, but spread your bets," he says. "That way you are more likely to have a couple of daughters in milk from different genomic bulls." |

Atlantic proves his genomic value

As a genomic bull he was already one of the top ranking sires, but with his daughter-proven breeding values he is still one of the highest bulls. Delta Atlantic, who was widely used as an InSire bull, has more then met his expectations. As a genomic bull he scored 257 NVI in the Netherlands, whereas now he has 332 NVI. He is a good example of a bull with firm guarantees and high reliability.

This Ramos son is currently, by far, the most widely used CRV bull, because he produces trouble-free daughters with height and style and fine udders. He adds strength and capacity to herds and he scores well on somatic cell count, fertility, hoof health and calving ease. He also has the highest score for Better Life Health. His very convincing and reliable figures make him very popular with producers.