Genomic testing for award-winning herd

A decade of development on one dairy unit culminated in two brothers being awarded the NMR Silver Salver and their herd was runner up in the NMR RABDF Gold Cup 2018. But what's next?

TEXT KAREN WRIGHT

Ambitious to keep developing their award-winning herd, Stephen and Mark Montgomery have set out their plans for the next decade – and this is being helped by adopting the latest technology to determine the true genetic merit of the cows in their herd. In autumn 2008, they bought 100 pedigree Holsteins from a neighbour and walked them half a mile up the road to their new dairy unit – Gortree Farm, near Drumahoe.

"These cows came with full production and disease testing records," says Stephen. "They were a good start and they formed the core of our current milking herd."

The herd remained closed and Stephen and Mark have taken cow numbers up to the current 180 with home-bred heifers.

Gortree Farm was all but a greenfield site, so Stephen and Mark have faced a hefty but necessary investment to build a set-up suited to a modern dairy unit and one that will stand them in good stead for the foreseeable future. This started with a 126-cow cubicle house with feed passage and underground slurry tank to comply with winter NVZ restrictions. Soon to follow was a calf house and calving pens, and a GEA 50° 20:40 swing-over, fully computerised herringbone parlour and collecting yard.

"In 2009 we put in cubicle housing for heifers and since then we have added another silage pit, extended the calf house and built another cubicle house to accommodate 72 cows," says Stephen,

So looking ahead, the pair are consolidating. "No more major investments just for now," he adds. "We want to fine tune our systems, cut costs and improve our efficiency."

Progress, they believe, will come mainly from improving milk from forage, fine tuning the diets and breeding more efficient cows. The autumn-calving herd reliably averages more than 10,000kg on twice-a-day milking and the seasonal production suits buyer, Lakeland Dairies, which produces milk powder. Calving starts in mid-October and the brothers aim to calve 80% of the cows by Christmas.

Fertility focus

The focus in January and February is fertility and making sure cows get back in calf to maintain a tight calving pattern. Cows are typically inseminated 42 days post calving and all heifers are served with sexed semen. And it's focusing on improving the genetic merit of the herd, particularly by selecting the highest ranking heifers, where the brothers believe they'll make significant improvements in herd efficiency during the next 10 years.

With cow numbers almost at capacity at the unit, they've enough cows producing enough milk.

"Our breeding goals are improving milk solids, herd health, and lifespan," says Stephen, who looks after the breeding programme while Mark takes care of daily cow management and all the machinery. The brothers share the milking routine.

"If we produce more solids our milk cheque goes up, and healthier longer lasting cows increase our efficiency. And if our replacement rate goes down and we're not increasing cow numbers, we will soon be in a position where we can sell surplus heifers."

After an introduction into genomic testing, the Montgomerys can see that the technology has an important role to play in the Gortree herd's progress.

"We breed all the heifers and selected cows to sexed semen, assuming that, by doing so, we're breeding from the best genetic merit animals."

Genomic testing uses the animal's own DNA and gives each animal a genotype score for traits. The increased reliability of genomic testing, compared with using parent averages for heifers and young cows, offers a more reliable selection tool for breeding.

Ahead of a Gold Cup farm walk at the unit, in August 2019, NMR carried out genomic tests on 10 heifers. All were born in October 2018 and there was no pre-selection of the heifers. Genomic test results were compared with the parent averages for these 10 animals.

"And our ranking based on parent averages was quite different to the ranking based on genomic results,"

Table 1: Range in genomic tests (GeneTracker) compared with parent averages (PA) for 10 heifers (July 2019)

Geno	Range	PLI	PLI	milk	milk	fat kg	fat kg	pro kg	pro kg	fat%	fat%	pro %	pro %
PA	Max	597	610	551	488	34.2	31.7	21.5	19.3	0.19	0.25	0.08	0.11
	Min	429	212	232	200	18.6	12.7	13.5	10.3	-0.01	-0.04	0.03	0

The Montgomery family (clockwise from top left): Grace, Stephen, Mark, Anne, Kathryn, Lynne and Leah

COMPANY PROFILE

Name	**Stephen and Mark Montgomery**
Farm size	**145 hectares**
Herd size	**180 pedigree Holsteins**
Yield	**10,074kg of milk at 4.20% butterfat and 3.28% protein**
SCC	**136,000 cells/ml**
Calving interval	**375 days**

explains Stephen. "But it also showed up the range in the genetic merit of the group of heifers, which was far wider than we'd expected, and much greater than the range shown on the PLI results."

The range in PLI for the 10 heifers was from £429 to £597, compared with the range in genomic PLI (gPLI) from £212 to £610 (see Table 1).

Explaining these results, NMR's genomics manager Richard Miller highlights that the heifers ranked eighth and ninth for parent average PLI, are seventh and sixth, respectively, when ranked for gPLI. And the tenth-ranked cow for PLI on PA moves to fourth on gPLI.

"If you were using sexed semen on the top 70%, none of these three heifers would have been included if you relied on parent averages," says Richard Miller.

Breeding replacements

Aware of the higher reliability of genomic tests, which is around 70% depending on trait compared with 30% reliability for parent averages, and the key extra traits that can be determined by genotyping, Stephen intends to genomic test all his heifers.

"This will improve our accuracy in identifying and breeding replacements from those heifers and cows that will improve milk solids, health and fertility in the herd," he adds. "We'll select sires according to the genomic scores available for each heifer. In the past we may have not used the most ideal sire for each heifer to maximise our progress."

And they will look to exploit this genetic potential and improve efficiency by fine tuning forage quality and utilisation.

The herd is housed from October until April and fed a grass and wholecrop rye silage-based TMR. The latter is a crop that they can grow successfully and it provides starch and fibre in the diet. "It's a substitute for maize," says Stephen, adding that the climate in their area isn't suited to growing it.

Cows are then fed an 18% protein concentrate in the parlour, according to yield. Average concentrate use per cow is 3.3 tonnes per cow – a rate they'd like to see reduce alongside an increase in milk from forage, from the current 2,300kg.

"We're looking to bring first- and second-cut dates earlier for the grass if the weather allows," says Stephen. "This will boost silage quality. We're also reseeding with higher sugar grass seed mixtures."

In balancing the TMR, they're working closely with their nutritionist, Jonathan Knox, and monitoring cow performance alongside their milk recording so the diet can be tweaked in order to keep production on target.

Consolidation and maximising the potential on farm will hopefully see the Montgomery brothers progress their herd.

And maybe, in a few years, they'll enter the NMR RABDF Gold Cup again, with a close eye on the top spot. |

Next generation: future milkers for the Holstein herd