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Sustainability -Not an empty word for VikingGenetics



VJ LEADERS

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Cover photo Marianne Jansson with her grandchildren Alex and Alexander. The heifers are sired by VJ Hitman, VR Toffee and VH Baylor.



Editorial

Innovation and sustainability, not empty words at VikingGenetics

H ow can we find the right balance between productive and healthy, climate friendly cows? How can we contribute to reducing greenhouse gases to alleviate climate change? Those questions are taking up more and more media space today, we listen to discussions about them around the world and the answers proposed are often linked to two words: innovation and sustainability.

Innovation and sustainability have been a part of the VikingGenetics philosophy for over 120 years thanks to visionary dairy farmers. They understood that pooling their experiences would provide plenty of answers and therefore began to register performance of individual cows as early as in 1900 when they joined forces to create a **unique registration system**.

In this issue, you will find articles that demonstrate our commitment to sustainable dairy farming. Cows that need less feed to produce milk, meaning lower methane emissions. The Natural Resources Institute Finland (LUKE), the Nordic Cattle Genetic Evaluation (NAV) and the University of Aarhus in Denmark together with VikingGenetics have been doing research for a **Saved Feed Index**, that will be ready this autumn.

We are very proud of our performance outside our home. VR Tokyo NTM +27 is the number one bull in Australia, leading the Balanced Performance Index (BPI). What's more, our VikingJersey daughter proven bulls top the ranking list in the United States (USA). VikingJersey bulls take up top 10/10 positions on the Expected Future Inbreeding list so they offer great outcross pedigrees. The best high-performance bull is VJ Huzar NTM +17 with high rankings in many of the categories, including fertility and pregnancy rate, udder health and solids.

We also have leading positions in the United Kingdom where VikingJerseys dominate the Top Proven Jersey Bull lists where VikingJerseys comprise nine out of 10 top bulls on the Spring Calving Index, £SCI, eight out of 10 top bulls on the Autumn Calving Index, £ACI and five out of 10 top bulls on Profitable Lifetime Index, £PLI. While in Germany, VikingHolstein bulls are dominating the new health index, RZ health with VH Bradoc as number one and 12 other bulls on top 15 list. Innovation and sustainability are more than ever making sense at VikingGenetics!

Enjoy your reading!



David Stenkær Ravnkilde, Chief Business Development Officer, VikingGenetics





Saved feed index, a new tool in autumn 2019



The advantages of the use of beef as a dairy breeding strategy



VikingJersey leader in Udder health

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PUT GENETIC DIVERSITY AT THE CORE TO AVOID ECONOMIC LOSS

Genetic diversity is something a successful dairy cattle breeder really should consider when planning the next generation of dairy cows. It is no secret that inbreeding - the mating of related animals - is an invisible, costly and growing hazard for dairy farmers all around the world.

By Verónica Löfgren, Marketing Department, VikingGenetics

I n a well-coordinated and planned breeding programme, a large number of sires of sons with different pedigrees used in the breeding programme play an essential role in avoiding inbreeding. So, asking which is your top bull? is by no means a silly question. At VikingGenetics we have set a clear goal of the number of sire of sons with different pedigrees to use every year to guarantee genetic diversity and, at the same time, enable genetic gains and a sustainable breeding programme.

In countries with a high production of milk and a vigorous dairy industry such as the United States, the very best bull would be the hero of the market. The study "Effects of Inbreeding on Production and Survival in Jerseys" by J. R. Thompson, estimates that the level of inbreeding in the United States dairy population is increasing and many factors have contributed to this rise. "The main factor is that the AI (Artificial Insemination) industry has significantly reduced the effective number of males in the population, and relationships between males have increased over time. " According to this research, by focusing on the very best top bulls, the different AI companies have compromised genetic diversity and increased the level of inbreeding.

Peter Larson, Breeding Manager for VikingJersey, explains that a high merit bull can be sold by many different AI companies where there is "tough" competition and all of them tend to use the same genetics by using the same bulls or the same high merit dams. "There are several American based companies running a Jersey programme and all of them use the top bulls as sires of sons, to breed the next generation of bulls and cows," he says. "The use of sires of sons is not coordinated and the risk of inbreeding is increasing. Money and test capacity could be spent more wisely by focusing on breeding outcross lines, instead of main stream bulls," Larson adds.

To ensure a healthy breeding programme, the only solution would be for AI companies in the US to agree on a voluntary basis to compromise on the use of bulls. The Nordic countries, Denmark, Sweden and Finland, have a National breeding programme for Holstein, Jersey and RDC (Red Dairy Cattle), managed by VikingGenetics. In the case of VikingJersey, ap-

Minimising inbreeding in a herd gives less loss of production and greater survivability. proximately 40 bulls are selected to be part of the yearly breeding programme; and no more than three sons will come from the same sire (family).

"At VikingGenetics we use new bulls from 20 different sires of sons or family lines every year," Larson says. What is more, sires only stay on the active marketing list until such time the managers of the breeding programme decides the sire has contributed enough to the gene pool in the population (normally for only 6-9 months).

Keeping a close eye on the number of sires of sons is not the only strict control VikingGenetics uses to design the breeding programme. Saija Tenhunen, breeding specialist at VikingGenetics explains that there is a high-quality support programme that focuses on population management to avoid inbreeding.

"We also offer our own breeding tool VikMate, which enables us to control inbreeding and genetic gain at herd level. If mating plans are created in VikMate, we can limit the increase of inbreeding in a herd and find the most suitable sires based on the traits of interest. As such, we focus on controlling the problems caused by inbreeding at both population level and herd level," she says.

What does inbreeding cost you?

Inbreeding can cause many undesirable effects that reduce profitability. Inbred animals have lower fertility, reduced milk production and a higher risk of contracting diseases resulting in a shorter productive life as well as more stillborn calves or born with abnormalities. The Council on Dairy Cattle Breeding (CDCB) based in the United States, calculated the financial cost of one percent of inbreeding depression to better understand why it is important to prevent inbreeding.

Table 1 shows the size of the inbreeding depression for different traits per 1% increase in inbreeding. A conservative estimate of how much 1% increased inbreeding would influence the Lifetime Net Income is minus US\$ 24.60 per cow by the year 2017.

In US Jerseys, the average inbreeding percentage in heifers born in 2018 is 8.09%, which will cause a considerable drop in production as well as in lifetime profitability.

A better measurement of calculating the effects of inbreeding is actually to look at future inbreeding instead of observed inbreeding per se. According to CDBC, in December 2018, the expected future inbreeding among heifers born in US in 2019 is 8.1%, while the future inbreeding percentage for heifers from VikingJersey bulls would instead be 4.7% on average. That effect is possible because of the different lineages in the Danish Jersey population compared to the US Jersey population.

Importance of genetic diversity

With closer relationships between animals in a population, the risk of genetic defects increases.

"When undesirable recessive genes appear in the homozygous state, the condition is often fatal. Such fatality may occur very early in embryonic development and look like a failed conception to a dairy producer. If the genes are semilethal, and the individual does survive, it may be totally unprofitable," Bennet G. Cassell, Extension Dairy Scientist, of the Virginia Tech states in studies about Inbreeding.

Accordingly, genetic diversity is an important consideration when dairymen select genetics to improve their cattle, especially when the level of inbreeding is rather high. Complete pedigree information dating four or five generations back is needed to manage inbreeding well, Cassell argues.

Choose outcross bulls

Where to find outcross bulls with a good ranking has become an open question for more and more dairymen, especially among Jersey breeders in the US.

In each breeding population, the most successful pedigrees will become influential. Offering outcross

TABLE 1: EFFECT OF INBREEDING DEPRESSION PER 1% INCREASE IN INBREEDING

	%
Milk Kg	-63.9
Fat Kg	-2.37
Protein Kg	-1.89
Productive Life	-0.26
Somatic Cell Score	0.00
Daughter Pregnancy Rate	-0.13
Heifer Conception Rate	-0.08
Cow Conception Rate	-0.16
Liveability	-0.08

Source: The Council on Dairy Cattle Breeding (CDCB). August 2017.

bulls of high merit to the global markets comes with the added bonus that they are easier for any dairyman to select and use. This is an advantage that VikingJersey's breeding manager emphasises when talking about the Nordic offer. "We have a better chance of finding an outcross bull among all the family lines we have in our VikingJersey breeding programme," Larson says. "All females are registered and 95% are pure Jersey while all bulls are minimum 99.5% pure. VikingJersey bulls are measured for any increase in inbreeding per generation and we are under 1% per generation the limit recommended by the Food and Agriculture Organization of the United Nations (FAO).

"Inbreeding levels would most likely drop quite a lot when using Danish bulls in the US," Tenhunen adds.

"We can lower inbreeding at herd levels when combining DK and US lines together. When we minimise inbreeding in a herd, there is less loss of production and greater survivability," she says. •

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VikingJersey leader in udder health

The VikingJersey cow has had a major impact on the Jersey breed globally and is the leader regarding their performance for udder health. Viking cows are well known around the world for their extraordinary health, excellent fertility, high solids and functional conformation.

By Joakim Hansen, Marketing Department, VikingGenetics

astitis is one of the costliest diseases that can happen to a cow. It reduces their yield due to illness and might even cause permanent damage to udder tissue.

For the dairyman, it brings veterinary bills for treatment and medicine. Milk must be thrown away due to medicine use. And at last, the cow takes up more of your time, increasing the labour load.

For so many reasons, when creating the breeding strategy, selecting for an optimal performance for udder health is crucial. Since a healthy udder increases yield, while reducing cost, choosing the best genetics for udder health results in an improved bottom line.

VikingJerseys are by far outperforming the competition when it comes to udder health on a global basis. The Council of Dairy Cattle Breeding (CDCB) has compared the top 100 Jersey bulls for udder health in the different national scales, by country of most daughters and the results are great news for VikingJersey.

It is clear that the VikingJersey (represented in the DFS category for Denmark, Finland & Sweden) is ranking among the top in every evaluation scale. 76 on NLD, 50







on USA, 63 GBR – 459 in total compared to USA's 276.

And while these results on so many evaluation scales are very impressive, it might not even be the most impressive part.

Throughout all evaluation scales Viking-Jersey bulls (DFS) do not have a single bull in the bottom 100 for udder health. The Nordic dairy breeders were the pioneers in breeding for health traits 40 years ago while eliminating bad health traits in the breed.

Other countries are performing well and have a strong position in the top 100 bulls like the Nordic countries do, although, all of those countries are also very well represented in the bottom 100 bulls for udder health. Table #2 shows no consistency for other Jerseys populations.

The key factor for the VikingGenetics breeding programme is that farmers get what they select for, and in the case of the VikingJersey, there is a positive genetic trend for all health indices, fertility and longevity included. This high-performance profile has been able to be developed thanks to all the data registered by Nordic Jersey breeders.

The reliability of the breeding values rests on a large reference population with accurate data. There are 70,000 Danish Jersey cows registered on the three domestic markets. Almost all of them are part of a milk recording system, and their health status is monitored and recorded. •

TABLE 1. JERSEY BULLS IN TOP 100 FOR UDDER HEALTH (SCS) BY COUNTRY OF MOST DAUGHTERS, DECEMBER 2018

Evaluation	Number of bulls in top 100				
Scale	CAN	DFS	NZL	USA	
AUS	1	32	34	33	
CAN	0	51	14	35	
CHE	0	57	13	30	
DFS	0	66	12	22	
GBR	0	63	14	23	
NLD	0	76	8	16	
NZL	1	20	51	28	
USA	0	50	11	39	
ZAF	0	44	6	50	
All Scale	2	459	163	276	

Source: The Council of Dairy Cattle Breeding (CDCB) - Dec. 2018

TABLE 2. JERSEY BULLS IN BOTTOM 100 FOR UDDER HEALTH (SCS) BY COUNTRY OF MOST DAUGHTERS, DECEMBER 2018

Evaluation	Number of bulls in bottom 100					
Scale	AUS	CAN	NZL	USA	ZAF	DFS
AUS	6	7	28	57	2	о
CAN	4	7	26	62	1	о
CHE	4	5	30	60	1	о
DFS	4	6	30	59	1	о
GBR	4	6	22	67	1	о
NLD	4	6	25	64	1	о
NZL	6	9	27	56	2	о
USA	2	4	19	74	1	о
ZAF	3	4	42	50	1	0
All Scale	37	54	249	549	11	о

As seen in the table, not a single VikingJersey (DFS) bull is represented in the bottom 100 for udder health, meanwhile you see that USA bulls are very heavily represented in this table.

Source: The Council of Dairy Cattle Breeding (CDCB) - Dec. 2018

"When health is in the genes, you can focus on other things"

The Mortensen family, owners of the Nørskovgaard farm in Danmark with 160 Jersey cows, are making steady generational progress to guarantee their high-performance standard with the introduction of milking robots.

By Joakim Hansen, Marketing Department, VikingGenetics

Jorn Mortensen started working at Nørskovgaard when he was 18 years old, back when his father owned the farm. He ended up buying the farm two years later, and now owns and runs it together with his wife and son. They manage the 170 ha farm and a 160 Jersey cow herd.

Mortensen and his wife are gradually paving the way for the transition to their son to take over and buy the farm. As part of this process, they have invested in new barns and have also bought three Lely milking robots. "This way we believe we are getting the farm ready for the future," Mortensen says.

His herd is high performing, and the generation change requires preparation in all areas. Currently, the herd produces an average of 10,402 kg ECM milk which is well above the Danish average for Jerseys: 9,519 kg ECM. With a fat percentage of 5.88 and a protein percentage of 4.28, the farm is also one of the most highly productive in Denmark, in terms of solids.

We don't need to focus on health

When asked about his successful breeding strategy, Mortensen explains that the family has been keen to prepare the herd for milking robots. "We have known for some time that we were going to switch to robot milking. Accordingly, our breeding focus over the last five years has been to breed strong cows, with great udders suited to robot milking," he says.

This strategy has worked and all 160 cows are now milked on average 2.5 times a day by the milking robots. "We are aiming to get them milked three times a day and getting there slowly, but it is a process that takes a bit of time."





» It is great not having to worry about sick animals, we are very busy as it is just me and my family running the farm. If we had to spend time looking out for sick animals it would be a nightmare «

Jørn Mortensen, owner of Nørskovgaard farm



Mortensen is delighted that they have been able to breed for animals with great udders suited to robot milking in such a short period of time, without compromising on health or production traits.

"I haven't focused on health as this hasn't been necessary; we've had only three mastitis treatments in the last year," he says. Mortensen adds that he relies on the NTM because "what you want is what you get" when selecting the traits of the sires. "It is great not having to worry about sick animals; we are very busy as it is, as it is just me and my family running the farm. If we had to spend time looking out for sick animals it would be a nightmare," he says.

Jørn Mortensen started working at Nørskovgaard when he was 18 years old, back when his father owned the farm.

"We want to keep breeding strong cows, with good udders, and we want to try and increase the milk production," he adds.

He uses almost 100% X-Vik as it is today and plans to continue with this in the future. \bullet

Facts of the farm

- 10,402 kg ECM
- 5.88% fat
- 4.28% protein
- 160 cows
- Employees are just himself, his wife and his son



SUCCESSFUL BREEDING strategy with X-Vik

Havdal Jersey farm is located in Søften a few kilometres outside Denmark's second largest city, Aarhus. Jørn Mikkelsen and his daughter, Mette, own and run this prosperous dairy farm where the speciality is fresh Jersey milk and home-made ice cream.

By loakim Hansen, Marketing Department, VikingGenetics

ikkelsen took over the Havdal Jersey Farm from his parents in 1985. At that time, the farm had 40 Jersey cows on an area of 35 hectares. Now, more than three decades later, the farm has a herd of 100 Jersey cows and an area of 115 ha. Mikkelsen has the main responsibility for the farm and cows, while Mette takes care of the business which includes sales of fresh milk and home made ice cream.

"Breeding has always been important to me," Mikkelsen says. His enthusiasm about the kind of cow he wants to have on his dairy farm is firmly established as he is also a board member of the Danish Jersey Association.

"My main focus regarding breeding strategy, right now, is to increase production as well as achieving better udder health and udder quality for my cows," he says.

He is also keen on selecting long-lived cows. "Longevity is also very important," he says. And the fact that he has a low replacement rate of 25% backs up this statement.

Full use of tools and solutions

As a breeding enthusiast, Mikkelsen has kept track of the new solutions VikingGenetics has offered and is a full user of all of the available tools to breed the best dairy animals.

He uses X-Vik sexed semen on 100% of his heifers. He wants to make sure that he is breeding his future herd based on the best genes of his herd. As such, Mikkelsen tests all his animals genomically. This knowledge enables him to determine his breeding strategy.

He crosses 50% of his cows outside the top group with beef semen, while using conventional Jersey semen on other cows, in order to try and breed some good bulls, that he can sell to VikingGenetics for the genetic progress of the Jersey breeding programme. Mikkelsen also does embryo flushing on some of his best heifers to further increase the genetic improvement gains.

Mikkelsen is also keen to share how genetics from Viking has helped him in other ways besides producing healthy, high performing cows. In 2015, he won "Denmark's most beautiful dairy cow" with his - at the time – four-year old Jersey cow Gaia.

Mikkelsen lets his cows go out to pasture in the summer despite not running an organic farm. He says that people who visit the farm to buy ice cream, seem to really enjoy watching the cows happily wandering around outdoors.



Find the best VikingJerseys for you with VikRank!





Superior Hoof Health
High Production
VikingDefence™ sire









Breeding for a sustainable future with climate friendly cow

By Joakim Hanssen, Marketing Department, VikingGenetics

e hear it on the news, more and more often – the world is under pressure, the climate is changing, and we have to act now before it is too late.

The beef and dairy industry get its fair share of the blame for the environmental challenges we face, even though you could argue that other things weigh more heavily – such as the use of fossil fuels. However, we still believe we need to do our part and we are doing this in the best way we can - through breeding.

That is another area where Viking-Genetics is the pioneer. We started breeding for healthy and productive animals 40 years ago. This has had the bonus that we now have the lowest use of antibiotics in cattle in the European Union (EU) and the world, because we don't need it. Our cows have a natural defence against diseases in their genes. The widespread use of antibiotics in cattle and other food producing livestock in different parts of the world has resulted in a severe global health issue with multi resistant bacteria.

Now we are beginning to broaden our scope and to breed the most climate friendly cows possible.

At VikingGenetics we are proud that we are already breeding some of the world's most climate friendly cows, due to the very high productivity of the Nordic cow population. With higher production per cow, individual farmers need fewer cows to meet the demand of end consumers, thereby reducing the total number of cows in the world.



Our aim is to produce more climate friendly cows that need less feed to produce the milk, because lower feed intake means lower methane emissions.

And while this is great, we don't want to settle for just breeding a high producing cow. Because as human population numbers grow, so too will the demand for dairy products and meat, and we therefore also need to make cows more climate friendly on an individual level.

How then, can we make cows more climate friendly on an individual basis? Namely be producing cows that need less feed to produce the milk, because lower feed intake means lower methane emissions. This autumn, VikingGenetics is launching a new index, the Saved Feed Index, which will enable us to select bulls who breed daughters that use less feed. On average, 6% of the energy a cow eats, goes to produce methane, although this can vary from 2-12%. By breeding cows that eat less, we can reduce methane emissions.

By monitoring 5,000 cows, our researchers have found that around 20% of this total variance is due to genetics, making methane emission something that you can actually breed for. The best part is that this trait has no negative correlation with any other breeding trait, which makes it possible to breed for more climate friendly cows, without any negative side effects on the rest of your breeding goals. In the near future, we will not only be able to breed for the healthiest and highest producing cows, but also for the most climate friendly cows.

Saved Feed Index to be released in autumn 2019

For the past two years, The Natural Resources Institute Finland (LUKE), the Nordic Cattle Genetic Evaluation (NAV) and the University of Aarhus in Denmark together with VikingGenetics have been working on developing a Feed Efficiency Index that can stand out from other ones available on the market – an index that dairy farmers around the world can trust.

By Camilla Rosman, Marketing Department, VikingGenetics

airy farmers around the world know that the biggest cost on farms is feed for the herd. Breeding for a cow that is more efficient in converting feed into milk kg will soon be possible with the new index VikingGenetics is about to launch.

After collecting a great deal of data in the most modern way, the cooperation between LUKE, NAV, the University of Aarhus and VikingGenetics has resulted in the index called "Saved Feed Index" that will be published by VikingGenetics in autumn 2019. Dairy farmers will be able to use the Saved Feed Index to select bulls that breed daughters that consume less feed.

The **Saved Feed Index** will actually consist of two indices; **Maintenance** and **metabolic**. Maintenance is how much energy is needed for purely subsistence feeding, not for any production. Data registered from Denmark include body weight, and from Finland girth width. Correlated conformation traits are also input; stature, body depth and body width.

The Metabolic index is the element of feed needed for

production. This is called the residual feed intake". This part will be reinforced when we introduce data from

Cattle feed intake (CFIT), obtained via 3D cameras installed above the cows in feeding areas. The cameras recognize each cow by their back conformation and measure the pile of silage in front of each cow before the cow begins to eat, and when the cow has left the feeding trough. This technology gives us the exact feed intake of each individual cow. CFIT is currently at the research stage and as soon as we have enough data, it will be included in the metabolic part of the Saved Feed Index.

More climate friendly cows into the bargain

By breeding cows that eat less, farmers will also lower the methane emissions because less feed intake means lower methane emissions. Research regarding greenhouse gases indicates that, on average, 6% of the energy that a cow eats, are spent on producing methane. However, this varies from 2-12% depending on how efficient the cow is in converting feed into milk.

The advantages of the use of Beef semen as a breeding strategy

Genetic data will soon be published in the Nordic national cattle databases in Finland, Denmark and Sweden, and will be available on all bull profiles on the web.

By Morten Kargo, Aarhus University and SEGES, Denmark

I is no secret that dairy farmers can improve profits by adjusting their breeding strategy. If you can reduce your replacement rate, then the use of beef semen for the genetically lowest ranking cows is something for you. You will have economic benefits with a few exceptions as if, for example, you rear heifers for sale with an income which is not so common.

Use of beef and sexed semen increases profit

When using beef semen, it is important to use the semen on the genetically lowest ranking cows. These may in many cases be high yielding old cows, and many farmers hesitate to inseminate these with beef semen. If you look at it from a financial perspective however, it is the best breeding strategy. If you also have good herd management, the use of sexed semen and genomic testing will further increase your profit. Key variables for defining good herd management are reproduction efficiency (>0.2), cow mortality (< 5 %), disease level and replacement rate.

Sexed semen increases the genetic level

You could think that it is contradictory to use sexed semen when the goal is to reduce the number of heifers. Nevertheless, by using sexed semen, you will be able to raise replacement heifers from genetically higher-ranking females. This results in an improved genetic herd level, which compensates for the increased semen price.

Genomic testing aids selection

When using both beef and sexed semen, it is of great importance to select the correct animals. Sexed semen should be used to inseminate the genetically highest-ranking animals and beef semen for the lowest level. Genomic testing is the tool to rank animals correctly. It offers far higher reliability than selection based on parent average. Therefore, testing your heifer calves is financially beneficial in combination with the use of beef semen and sexed semen.

Better decisions make for increased profit

For genomic testing to be profitable, it should be used to improve your decision making via the information you receive from the tests. If you use the information to select the 50% best heifers for insemination with sexed semen and select the 60% lowest ranking cows to be inseminated with beef semen, genomic testing is very valuable. If you don't use the information from genomic testing to actively improve selection in combination with beef and sexed semen, then there will be no profit.

SimHerd, a Danish tool, helps make management decisions

The financial effects of using these tools depend on your local circumstances, therefore the above-mentioned recommendations are general statements. More herd specific advice can be obtained by the use of SimHerd – a tool for calculating the financial effects of different management decisions at herd level. In table 1, the consequences of using geno-



mic testing at herd level, given different use of beef semen for the cows, can be seen. The assumptions used reflect a Nordic dairy herd with good management.

Improved breeding strategy increases profit

In a simulation farm with 200 cows and earning from 5,500 Euro to 12,400 Euro extra per year using between 30 and 60% beef semen, the highest profit is obtained when using 60% beef semen. The reason why the extra profit is reduced when 70% beef semen is used and becomes negative with 80% beef semen, is due to the lack of replacement heifers. Furthermore, the results show that by using genomic testing you can earn 900 to 1000 Euro extra when using 60% beef semen.

Conclusion

Use of beef semen and sexed semen in combination with genomic testing will increase profit levels for a great majority of dairy producers with above average management level.

- Replacement rate: 33%
- Reproduction efficiency: 25%
- Percentage of heifers inseminated with sexed semen: 75%
- Accuracy of genomic tests: 60%

TABLE 1 ADDITIONAL PROFIT FROM USING DIFFERENT LEVELS OF BEEF SEMEN IN COWS, IN A 200-COW HERD, WITHOUT (BLUE BARS) AND WITH (GREY BARS) GENOMIC TESTING OF ALL HEIFERS. ALL VALUES ARE IN EURO





Genomic selection and embryo transfer, **cutting edge technology**

By Ann Tidström, Product Manager Embryo, VikingGenetics

T oday, when genomic breeding values are equally accurate for both young bulls and young heifers, this offers dairy farmers, a great opportunity to select the best heifers in your herd to become the mothers of the next generation. If you decide to use the top one for ET (Embryo Transfer), you will be at the cutting edge when it comes to utilising the best genetics that can really help you make progress in your herd that will pay for itself.

As females normally only have one offspring a year, scope to contribute to the next generation is limited. By using ET on heifers, you can have more of the best offspring and increase the genetic level of the herd. Flushing the best females in the herd and putting their embryos in heifers with lower breeding values, means you increase genetic gain faster in your herd than by inseminating most of your cows and heifers.

With genomic testing on heifers, we at VikingGenetics can make better decisions on which females to use more densely in the breeding programme. In 2018, 52% of the dams for the tested bull calves were genotyped and the corresponding figure for bought bulls was 92%. 20% of the tested bull calves were embryo calves and among the bought calves 55% were from embryo. This shows that using genomic selection on females gives you higher reliable breeding values and a better chance of selling a calf.

VikingEmbryo

VikingGenetics has two facilities where we flush the heifers we buy from Danish, Swedish and Finnish dairy farmers. One is in Denmark, where we keep our heifers at a private farm with extensive experience of embryo flushing. The other one is in Hollola, Finland, where the VikingGenetics Embryo Centre is located and where we have our specialist ET team. The team works with both OPU (Ovum Pick Up) and normal flushing. They also engage in various research projects and right now we are working with genotyping at embryo level.

VikingGenetics also enters into agreements for flushing on farms, if the farmer does not wish to sell their best heifer. VikingGenetics plan to flush 720 females in 2019.





VikRank makes bull selection fast and easy



VikRank is a tool to select the best bulls for your herd. The categories help to guide you in your selection for the right bulls you need to improve your herd performance. Using the categories makes the bull selection easy, fast and reliable!



Safe and easy calvings are important for all dairy businesses. Increase the possibility to get a calf born without any problems.



Cows that have healthy and strong hooves have higher productivity and longer production lifetime. Hoof health is not just a management issue - you can breed for better hooves!



If you are paid for solids, use sires that improve the solids production. Genetics play a vital role in increasing the solids production. VikingSolids[™] will give you the best results.



Get strong natural defence against diseases. VikingDefence™ combines all the health traits that we have been breeding for decades. No tricks, just results.



VikingGrazing will give you perfect cows suitable for grazing systems. These are medium sized cows with good fertility and hoof health, together with high solids production.



By selecting a VikingRobot™ sire you can be sure that your herd is developing to the right direction with excellent udders and fast milking speed.



VikingFertility™ bulls will improve the pregnancy rates in your herd. All dairy farmers knows the importance of this!



By choosing VikingMilk™ bulls you can be sure your herd is both high producing and healthy. The production level of your herd is a direct measurement of profitability.



In dairy farming, there's no farm exactly like one another and not one breeding plan that will suit all herds. Customize your bull selection based on the traits that matter the most to you.

Clear breeding strategy, the key to managing market fluctuations

Nina and Hannu Hokkanen have adapted to the lower milk prices. They don't use external labour anymore and have minimised machinery and other investments. Their efforts in the breeding plan have been the secret behind their high-yielding herd's daily life.



By Mikko Säynäjärvi, FABA



he Hokkanens are the sole carers of the farm. Four years ago, Nina, 45, worked as a paediatrician, but the fall in milk prices led to a career change. "Our employees were leaving at that time, so the timing for Nina's full-time employment at the farm was just right," Hannu says.

Hannu, 50, has been a member of dairy company advisory boards for 20 years and became a member in the Valio Supervisory Board in April 2018.

Breeding specialist Helena Korkee has worked with the Hokkanen family for many years. Previously, Hannu was more involved in breeding planning, but now Nina has taken over the responsibility. "Helena does the planning, but with some input from me. All in all, improving the milk solids, health, and udder conformation are clear goals for us," says Nina.

The herd has been involved in the GenVik project for a long time. "Genomic testing of females is a great tool. We've been able to achieve rapid genomic progress with it," says Nina. As evidence of this achievement, Nina shows print outs of genetic progress in the herd.



Hannu with the heifer called Pööna gNTM +26 (VH Nordman x VH Bolus).

Embryos and inseminations

The Hokkanen farm uses professionals for AI services. AI Technicians take care of all inseminations. The share of beef semen has gradually increased to 25%, and they mainly use conventional and sexed Blonde semen.

They have had good experience with embryo flushing and embryo transfers. Nina and Hannu sold a heifer called Nelli gNTM +35 (VH Liftoff x Lastyear) to VikingGenetics' VikingEmbryo programme. Nelli was the best Holstein female in 2017 in Finland. Unfortunately, her embryo transfers didn't result in any calves for the Hokkanen home herd.

Luckily, other farms who acquired embryos from Nelli had a better luck. Nelli has daughters in other herds and there was a bull calf born too, VH Pikachu, gNTM +31.

Even though there was no luck with Nelli's embryos, the Hokkanen farm continues with VikingEmbryo embryo flushing on their own farm. In December, they flushed two Viking-Holstein heifers and got 15 viable embryos from those.

Hannu and Nina have also bought a lot of embryos. "With embryos you

can't be too sure how it will work out, but at least for us it has worked really well," Nina says. They have had some really good replacements born out of embryo transfers such as a heifer called Pööna gNTM +26 (VH Nordman x VH Bolus).

Communal machinery

The situation is currently quite stable. Production levels have risen after a difficult summer and autumn, due to extreme weather conditions in the Nordic countries. Thanks to the farm's large fields, they have been able to produce feed for sale purposes too. Investments in machinery are not urgent at the moment. "We have a lot of communal machinery with our neighbours," Nina says.

In addition to common custody of farming equipment, the farming neighbours do a lot activities together. "We have a really nice group and we travel together in Finland and abroad," says Nina. Advisory board duties take up a lot of Hannu's time, but he always makes time to go hunting with their two sons and their dog Sulo.

Facts of the farm

- Location: Ala-Rantala, Kangasniemi, Finland
- Family: Hannu and Nina Hokkanen and sons Tuomas 15 and Juho 14
- Built in 2001 and free stall barn renovated and heifer barn built in 2012
- Herd: 60 milking (40 VikingHolstein and 20 VikingRed)
- Production: 12,000 kg ECM
- Are a part of the GenVik project (VikingGenetics supported genomic test of females)
- Acreage: 136 ha, (half grass and half grain)
- Forest: 45 ha

ProCROSS herd in Denmark

Feed efficient cows power Ellinglund Organic Farm in Denmark

By Joakim Hansen, Marketing Department

ert Glob Lassen took over (organic) farm in Silkeborg, Denmark, from his father in 2006. Gert and his wife Anne are passionate organic milk producers and have become a reference farm in Europe for efficiency and success with the three-way crossbreeding system, ProCROSS.

Lassen's father switched from pure Holstein to Pro-CROSS cows in 2002. At that time, they were facing many challenges with health issues in their animals. Veterinary costs increased due to many cases of mastitis and reduced fertility. Lack of longevity was another of the difficulties facing the farm.

Now, 17 years after the change in breeding strategy, the Lassens are keen to identify those areas where they can save costs and improve the performance of the dairy farm. Feed for the cows is one of the most important areas they focus on.

"Feed is the biggest cost you have on a farm. We are always looking for savings. If you can save just one percentage every day; that is a lot of money," Lassen says. "We





Facts of the farm

- Animals: 340 cows. Crossed between: VikingHolstein, VikingRed and Montbeliarde. Performance goal is 11,000 kg of milk ProCROSS cow
- Land and feed: Approx. 600 ha with grass, rye and oats, which are primarily used for feed
- Stable facilities: The cows are housed on sand beds. All animals are out to pasture in summer. Milked twice a day in a carousel
- Staff: Three full time Danish employees and seven part-time employees who work three full-time equivalent hours
- Family: Wife Anne, four children

know our cows do their job, they stay healthy and productive, they eat and produce at their best," he adds.

Having a healthy, organic ProCROSS herd of 340 cows with average production of 10,389 kg ECM (Energy Corrected Milk), "efficiency" is not just a word. "The less your costs to get milk, the more competitive you can be," he says.

Last summer, the University of Minnesota, that has headed several research projects regarding the crossbreeding system ProCROSS, presented the results of a study into feed efficiency that showed that ProCROSS cows are inherently able to convert feed more efficiently into milk solids compared to pure Holstein cows. Dairy farmers like Lassen already know this from everyday practice: Pro-CROSS cows are high performers when it comes to feed efficiency.

The trial also demonstrated that ProCROSS cows are in a significantly better physical condition than pure Holsteins of the same body weight. "The smaller frame sizes of ProCROSS cows combined with superior physical condition improves fertility and health which are other advantages of ProCROSS cows over Holstein," says Professor Les Hansen, who headed the research studies in Minnesota.

Lassen explains that the physical condition is also a "plus" in his organic herd: "Physical body condition means more muscle - not skinny cows - that also keeps them healthy, and they will achieve a better price when we send them for slaughter," he says.

With an annual average of 4.06% fat and 3.42% protein, Ellinglund is one of the best organic crossbreeding herds with high performance and one of the most prestigious herds in Denmark. •





VikingRed offers free genomic test for international females

The VikingRed breeding committee, that is in charge of the VR breeding programme, is coordinating an ambitious plan to increase reliability and make the largest red breed more competitive by offering free genomic testing of females around the world.

By Auli Himanen, Breeding Manager VikingRed

t the beginning of 2019, the VikingRed breeding committee took an important step to assure profitability for farmers using red dairy cattle, especially Viking-Red. They decided to make an offer for free genomic testing of international females. The offer was sent to all member organisations of the International Red Dairy Breed Federation, European Red Dairy Breeds and World Ayrshire Federation. The aim is to bring red populations around the world together and enable them to profit from the large reference population NAV (Nordic Evaluation Centre) has for red breeds containing more than 9,000 progeny



proven sires and over 40,000 females. "Our vision is to make red breeds more competitive in the future," says Auli Himanen, Breeding Manager for VikingRed.

She adds that the plan is addressed in particular to those red breeds that do not have genomic testing as yet, to have an opportunity to rank their females. "At home, breeders are using genomic testing more and more as a valuable selection tool within the herd, and that has created more value in their farms," she says. Last year more than 22,000 red females were genomically tested in Denmark, Finland, and Sweden.

She adds that the genomic value of the tested females will have high reliability since they have a genetic linkage to the NAV reference population. "Breeding values will be published in all the same traits that NAV publishes for Nordic animals meaning index values for yield, health, fertility, type, functional traits and NTM (Nordic Total Merit)," Himanen says.

Free genomic test also available for Viking Export Markets

Himanen explains that the free trial is also available for Viking export markets through Export managers at VikingGenetics. "They can also invite other associations who are not members in these organisations to participate in the project. As testing is coordinated by the organisations, they will choose which animals to include," she says.

One example of cooperation was with German Anglers and RSH a few years ago with superior tested females in our reference. This now also includes genomic testing of bull calves for a breeding scheme to give Angler good opportunities for selection and semen production of high-quality sires.

More recently, DataGene in Australia made a contract about a project for the exchange of data to define if the correlation between Nordic and Australian red populations is high enough to create a joint reference group.

More information about GenVik testing is available at the VikingGenetics website www.vikinggenetics.com.

Participants in the project are invited to send an email to GenVik@ vikinggenetics.com to request further information about what to do next. The offer is available to the end of 2019. If you have any further questions, please contact Auli Himanen, VikingRed Breeding Manager, auhim@vikinggenetics.com.



VikingHolstein, master of udder health

VikingGenetics has more focus on improving udder health than any other company in the world and is the leader when it comes to genetic level for udder health.

By Claus Langdahl, Senior Breeding and Product Manager, VikingGenetics

Astitis causes direct financial losses to dairy farmers no matter where in the world you farm. It reduces milk yield, the milk can be contaminated with antibiotics and unable to be sold, plus associated veterinary and antibiotic labour costs, a higher culling rate and occasional fatalities. To avoid extra charges on dairy farms, prevention of mastitis infection is the best approach. By breeding for higher Nordic Total Merit (NTM), you automatically get fewer mastitis cases in your herd. The Udder health index has the third highest economic weighting in NTM; only production and fertility have a higher weighting.

In the Nordic countries, we use both the direct measure, Mastitis, and the indirect measure, SCC, where the latter is only an indicator of mastitis. Mastitis registrations come from veterinary and farmer records on clinical mastitis. In other countries where Holsteins are more dominant, mastitis cases are usually, and if they are only by farmers, not veterinarians.

Choosing the right bull has a significant effect. In table 1, you can see the number of daughters with mastitis in relation to the bulls index for mastitis resistance.

Sustainable genetic improvement

From 2002 to 2012, the Nordic countries have improved udder health by 13.5 index units. These results mean 3,5 cases of mastitis in a 100 cow herd.

The graph below shows the genetic level of major Holstein populations. VikingGenetics is on average four units higher in udder health than the second best and almost ten units better on average than many of the major European countries. •

TABLE 1: EFFECT OF BULLS WITH DIFFERENT BREEDING VALUES ON AN AVERAGE DAUGHTER

Breeding value	80	90	100	110	120
Mastitis %	17.4	14.7	12	9.3	6.6



FIGURE 1: GENETIC TREND MASTITIS IN MOST SIGNIFICANT HOLSTEIN POPULATIONS



VH Bradoc.

Germany goes "healthy"

he April index run of Germany announced an interesting change in their focus. Germany introduced a new overall health index and are next in line to see the value of cost reduction also from a breeding perspective – a focus that the Nordic countries and VikingGenetics have had for over 40 years.

RZhealth, as the new index is called, is a combination of udder health, hoof health, reproduction and metabolic diseases.

Ranking

When looking at the ranking of bulls on this index it is quite clear that VikingHolstein occupies a unique top position. The top list is dominated by VikingHolstein bulls with VH Bradoc (VH Blush x VH Bynke) the leader. As shown in table 1, 12 of the top 15 are from VikingGenetics. One sub index looks like this;

- Udder health: 7 of the top 15 bulls are from VikingGenetics, with VH Oonsun (VH Optimal x Rodgers) no. 1 and VH Bradoc close behind
- Hoof health: VH Oxel (VH Op x D Orange) is the no. 1
- Reproduction: 7 of the top 15 bulls are from VikingGenetics with a shared no. 1 position between VH Best (VH Bliss x VH Salomon), VH Bradoc and VH Gaucho (VH Griffin x VH Peder).

Components

Besides this new focus on health, they have also added extra weighting to components. Here too, the Viking-Holstein bulls are impressively placed.

- Fat% index: 5 of the top 10 bulls are from VikingGenetics with VH Faur (Fageno x VH Grafit) and VH Gambler (VH Grate x VH Lyrik) as no. 2 and 3
- Protein % index: 7 of the top 15 bulls are from VikingGenetics with VH RulerRC (Red Power x VH Goblin), VH Gambler and VH Faur as no. 1, 2 and 3.

Great genetic level among polled VikingHolstein bulls

he number of polled VikingHolstein bulls is constantly growing and so is their genetic level. 10% of purchased bulls the last year have been polled and the homozygotic polled (PP: 100% polled offspring) are starting to show up also at high level. The average NTM of the purchased polled bulls is gNTM +33.

TABEL 1. AVAILABLE POLLED VIKINGHOLSTEIN BULLS

Navn	Far	Morfar	gNTM
VH Laval P	Louxor	Powerball	+32
VH MixPPRC	Mission RCP	Powerball	+22
VH MeP Red	Mission RCP	Brekem	+24
VH Monty P	Milford P	Balisto	+31
VH Arrow P	Adagio P	Ocean PP	+26
VH Perth P	Pledge	Powerball	+26
VH Comxa P	Commander	Xacobeo	+19
VH SnoozP	Style P	Saleen	+26
VH Bill P	VH Bosman	Parker P	+22
VH Mandy P	Milford P	Anton	+20
VH Sebeo P	Superhero	Style P	+21
VH Phil P	VH Pogba P	Rodgers	+24
VH Liege P	Lemon P	Go Now RC	+19

 $(RC = red \ carrier, P = 50\% \ of the offspring become hornless, PP = 100\% \ of the offspring become hornless)$



VH MixPPRC with gNTM +22, gives 100 % hornless offspring (PP), and is red carrier.

IRDBF Conference in Australia 2019

 P Bringing Red Breeds Together" was the title of the International Red Dairy Breed Federation conference in March 2019 in Australia. Viking had the honor of presenting how Genomic Selection in VikingRed started in 2009 in one of the conference sessions.

VR Viktor (and VR Fonseca) calf. The breeder of VR Viktor Lars Iversen from Denmark was participating and very proud seeing the result at Brett and Bronwyn Davies herd.





Estonians might be the next joining the VR breeding scheme.

Ron Graham's and Auli Himanen's joint effort, ARB Abbot, an AI bull whose dam comes from Ron's farm Beaulands and the bull's paternal grandsire is Voltti coming from Auli's farm in Finland.





ARB Abbot in his box.

VR Tokyo – The #1 bull for BPI in Australia

The best production sire with outstanding levels of fat and protein

R Tokyo (VR Toumi x V Foske x A Sale ET) is leading the Balanced Performance Index (BPI) in Australia with a BPI of \$298, according to April proofs. There is no doubt: this sire is one of a kind and a "must have" in a herd to increase the production of milk and milk solids.

"We always look to create value for farmers. And what we say regarding the performance of a bull is actually what the farmer gets. If a dairyman is paid by solids then we have the best bulls to suit that need," says Rex A. Clausager, Chief Executive Officer of VikingGenetics.

With a Total Nordic Merit of NTM +27, VR Tokyo combines a high level of production (122) with strong components 122 for fat kg and 121 for protein kg.

Speaking of Top Type, Tokyo is the #1 for Type Weighted Index (TWI) with an index of 105 Overall Type and 106 for Mammary. Also #1 in Longevity in Australia.

What's more, VikingRed Tokyo also has a remarkable health profile. He is #2 among the best bulls in Australia with a Health Weighted Index (HWI) of 198, peaking on Survival with 108 and a Daughter Fertility of 101. And number 1 when it comes to maternal calving with an excellent index of 124 on NTM scale. VR Tokyo's breeder is Göran Carlsson from Linköping, Sweden. VR Tokyo has 1,496 daughters around the whole world, in ongoing production.

VR Tokyo is a top performer with a complete profile where production, type and health combine to make daughters with no weaknesses. •



VR Tokyo daughter no 12254474 Niitty from Peltola Juha ja Les Sysmä



Suvi Johansson making acquaintance and saying farewell to one of the first VH Solvind daughters.

We are making more friends in Chile!

ikingHolstein is very popular in Chile thanks to its high milk solids, easy calvings and moderate size. In the picture you can see our Export Manager for Latin America, Suvi Johansson making acquaintance and saying farewell to one of the first VH Solvind daughters. The photo was taken in the farm Fundo Los Esteros, owned by the family Stolzenbach in Los Muermos, Southern Chile. Our Export Manager is now promoted to another position as a Product Manager for the VikingHolstein. VIKING MILK By choosing VikingMilk™ bulls you can be sure your herd is both high producing and healthy. The production level of your herd is a direct measurement of profitability.

VR Tokyo

- Excellent performance -Production with functional conformation

VIKINGGENETICS

breeding for what truly matters