

vikingnews

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Innovative breeding

for a sustainable future

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VIKINGGENETICS
innovative breeding

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Innovative Breeding for a
sustainable future



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VikingGenetics aims to reduce carbon footprint

As the global population increases, global demand for animal products is expected to double in the coming decades. Animal products are a great source of proteins that are an essential part of a healthy and balanced diet. To meet this growing demand, global animal production should increase while taking into account environmental sustainability, efficiency and animal welfare.

The cattle breeding sector can contribute to finding solutions that are cost and resource efficient, and at VikingGenetics we are taking important steps to provide dairy farmers with innovative breeding for a sustainable future. In this issue you can read more about how our breeding programme can support the United Nations global sustainable development goals. As part of our philosophy, we invest in the research and development of a reliable solution to reduce the carbon footprint of cows by genetic selection, and we have the advantage of already having designed a climate-friendly cow several years ago.

In this issue, you can also see the results of the world's longest running study comparing crossbred dairy cows with purebred Holsteins. The study was performed by the University of Minnesota (U.S.), and has demonstrated that ProCROSS cows produce lifetime profits of 33% higher than pure Holstein cows.

As always, we also provide an update on our latest news from our three breeds: VikingHolstein, VikingRed and VikingJersey, and we are proud to share with you the outstanding performance of our genetics in global markets.

Enjoy your reading!

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Sustainability in practice at Torpet Farm

Sustainability is running a profitable business while safeguarding the environment.

By Camilla Rosman, VikingGenetics

Sofia and Gustav Kämpe started their dairy business in 2008 together with Gustav's parents, and bought the farm in 2015. During this time, they built a new barn and increased the herd from 100 to 200 cows. The family also includes Viggo, 10 and Hilda, 8.

The Kämpes both work on the farm, and Sofia also works as a consultant to the local community and is a specialist in reducing agriculture-related eutrophication of rivers.

An advisor from VÄXA (the Swedish coop, and one of the owners of VikingGenetics) visits them four to five times a year to discuss their three-year strategy for the business. "Our main goal in the business is to reach 12.500 kg ECM (Energy Corrected Milk) within the next 3 years. We have used VikingGenetics from the start, and when we increased the herd in 2015, all cows we bought had Viking pedigrees", Sofia says.

To reach their goal they have decided to increase the NTM (Nordic Total merit index) in the herd by 8 units above average. "We know that this is the way to go, as NTM also take health traits into

consideration, and animal welfare is important to us", she adds.

The Kämpes genomically test all heifer calves born, as this is the best solution for them "We use X-Vik semen on our top 20% and beef semen, currently Angus for the rest", she comments.

The latter are sold to a farmer breeding heifers for slaughter.

Efficiency in focus

The couple have a wide-ranging understanding of the challenges of climate change. Environment issues are important to them. "We need to be on our toes in the dairy industry if we are to achieve the goal of net zero CO2 by 2050. This is also one factor behind our strategy to increase production to 12,500 kg. Efficient cows are good for the climate", Gustav explains and there is more to do on the farm in this area for the future, solar cell panels and a biogas station, for example.

"The debate about climate and cows is frustrating, but we feel confident it will calm down. Cows are needed in the cycle, and they eat grass which we can't. Our cattle graze on 60 ha of natural pas-



» When you use a tool like genomic selection, it's important to stick with that 100% and use the results. We never think about cow families, we look at the NTM. And we have been able to see that high NTM heifers also become the highest producing dairy cows «

says Gustav Kämpe

tures, that would become overgrown if the cattle were not there", he says.

VikingGenetics' recently introduced saved feed index will play an important role at Torpet Farm. "Feed is the biggest cost on a farm, and if we can breed more efficient cows, that will be great." They are waiting for the registrations from the CFIT* cameras into the saved feed index, which will be the most sophisticated tool on the market.



» Choosing the breeding company to buy the semen from is like a religion. We believe in NTM because it is based on science, so it's an easy choice for us «

Gustav Kämpe



"We encourage our kids to invite friends and be proud."

Encouraging the next generation

The two Kämpe children are interested in the animals. They have two ponies on the farm and they enjoy riding, sharing their mother's interest. "It's so nice to watch them riding, and especially as the ponies are home bred and same age as the children," says Sofia with a smile.

Last summer, when they had visitors to the farm and both Sofia and Gustav was busy, Viggo showed them around and explained everything about the farm, from machinery to the cows. "That made me really proud as a father!" Gustav says. "They already know and have picked up so many things."

Sofia is eager to show the kids that it's not all hard work on a dairy farm. "We need to show them it's also fun and let them show others and be proud of what we are doing," says Sofia. To this end, Sofia and Gustav invited 15 youngsters to their farm aged from 8 to 16, on a two-day look and learn camp last summer. They learned how to prepare the heifers for a show, how to train them, how to "read" them, and at the end held a showmanship competition. "It was a lot of fun, and the competition at the end

was the icing on the cake. We are organising another camp next summer," the proud parents say. "It was also very good for us, because we got a whole group of heifers trained and handled," Sofia adds.

"We encourage our kids to invite friends and be proud. We will also encourage them to take their schooling seriously to gain a wider perspective on life before deciding on their own future," Gustav adds. ●

Facts of the farm

- 3 robots
- 200 cows: 60% VikingRed, 40% VikingHolstein
- Production: 11,500 kg ECM, 3.6% protein, 4.3% fat

VikingGenetics is leading efforts to **reduce carbon footprint by genetic selection**

Ruminant livestock make a significant contribution to greenhouse gas emissions and livestock production can account for up to 15% of greenhouse gases produced worldwide according to various scientific studies. As methane is a potentially harmful greenhouse gas there is a global interest in reducing the amount of methane produced.

By Jan Lassen, project manager R&D

Methane production in the rumen is related to many biological processes: Feed intake, Body weight, Rumination, Milk yield, Milk composition etc., and the largest proportion of methane production comes from enteric fermentation while a smaller proportion comes from anaerobic digestion in liquid manure. Moreover, up to 90% of methane gas is produced in the rumen of the animal. By designing a more climate-friendly cow that eats less, but produces the same output, goes hand in hand with reducing methane emissions. VikingGenetics is contributing a reliable solution to tackle climate change challenges.

Genetic selection and climate-friendly cows

Genetic selection can reduce methane emissions. Assuming that the production of methane in the rumen is related to feed consumption in cattle, a phenotype that can be used in breeding for environmental impact as well as feed efficiency has been

developed. The challenge of reducing greenhouse gasses from cattle production through breeding is to define the best trait for methane emission. In other words, for a breeding programme to be successful, it requires large datasets of individual animal data.

The variation coming from the genetic make-up of a cow must be distinguished from other sources of variation, and methane can also be considered in relation to digestive and feed efficiency. The output of methane also appears to be related to dry matter intake, which is dependent on live weight, milk yield, stage of lactation, rumination rate, passage rate, digestibility and eating behaviour.

VikingGenetics has taken essential steps to achieve a reliable index for reducing methane emissions, and to this end, we have just released a Saved Feed Index to breed dairy cows that produce the same amount of milk from less feed and we are now using pioneering technology with 3D cameras to develop a system able to select for climate-friendly cows. ●



Three reasons why VikingGenetics has an innovative breeding programme for the future

The dairy industry is going to play a key role in meeting the rising demands of sustainable food production. This will put the spotlight on dairy farmers who, to accomplish this must ensure their farms are sustainable and their herds efficient.

At VikingGenetics, we have a broad understanding of this challenge and possess the knowledge required to achieve this with sustainable and innovative solutions. Our new Genetic Development Manager, Lars-Peter Sørensen, has extensive experience of breeding value selection in the Nordic Total Merit (NTM) Index. He points to three strengths of VikingGenetics that empower users of our genetics as efficiency becomes increasingly important.

1. Complete breeding programme

"We have a very comprehensive breeding programme in which everything we do is based on calculations, simulations and optimisation. This scientific approach to designing our breeding programme is, as far as I am aware, unique," Lars-Peter says.

The VikingGenetics breeding programme for the three breeds takes a financial approach based on the balance between health and production.

The breeding department at VikingGenetics works very hard to control inbreeding rates in the three Viking breeds. "Whereas other countries have seen a big increase in inbreeding rates after the introduction of genomic selection, VikingGenetics calculations are healthier. Because we are aware of the risk of inbreeding when we select breeding stock for future generation, we use quite a lot of variety in unrelated animals and so have avoided any such increase," he says.

The Nordic countries utilise a programme called EVA to select animals. EVA makes suggestions as to



The world needs to understand that dairy farmers are a part of the solution to cope with future challenges.

how we should mate the animals and how to minimise the rate of inbreeding. What you need to know is how fast the inbreeding percentage is increasing annually. The actual level of inbreeding is not relevant as this will depend on when you start counting (which generation).

2. Unique registration system

Millions of cow performance data registered give VikingGenetics an exclusive source of information to improve the breeding programme. In the Nordic countries, farmers are willing to share data on their cows at no charge. Over 40 years ago, dairy and beef farmers understood the importance of having a unique registration system to determine how to design an efficient cow.

Such a long-term approach requires documented data to generate value for the farmer. By adopting a scientific approach to everything we do,

VikingGenetics can drive developments to bring concrete solutions to dairy farmers.

3. Reliable health indices

Sustainability and Innovation go hand in hand at VikingGenetics. We understand farmers are now facing a key time in terms of climate change where milk production is a big contributor to greenhouses gas emissions. Cows produce methane gas naturally, and these emissions along with other factors in the dairy industry puts dairyman in the spotlight. However, the world needs to understand that dairy farmers are a part of the solution to cope with future challenges.

"Health indices such as Hoof Health and YSS are unique and very reliable – our competitors are trying to catch up, some can calculate their breeding values, but we need to bear in mind that we are improving all the time and able to stay ahead of the rest of the pack," he says. ●



Partners

of dairy farmers

It takes innovation and experience to understand farmers

Farmers carry the weight the world on their shoulders. They really do, as without farmers, there's no food at our tables. They are the hidden heroes. We strive to make the life of dairy farmers easier by providing world-class genetic solutions. We help farmers overcome challenges driven by government regulations, consumer demands, and the increasing pressure of being a competitive and profitable dairy farmer. VikingGenetics - innovative breeding.

We move fast, but are we moving too fast?

When genomic selection was first being introduced, whether this would result in more or less inbreeding for the animals was a topic of debate. As we can now scientifically demonstrate, it has not resulted in more inbreeding for VikingHolstein. So, the answer to the headline is "NO".

By Claus Langdahl, VikingHolstein Breeding Manager

Genetic progress is now at 4.3 NTM units per year – the aim is 4.0 NTM units per year. This is measured from the sale of VikingHolstein semen doses. There is no doubt that the VikingGenetics breeding programme is very efficient, but how is inbreeding doing?

From basic breeding theory, we know that a very one-sided use of the best bulls and cows leads to high genetic progress, but also much inbreeding. Genetic variation will be reduced and with this, the chance of maintaining genetic progress in the long run. Plus,

we can face an increased risk of genetic defects. Finding the right balance between these two parameters – genetic progress and inbreeding – is essential.

Generation interval

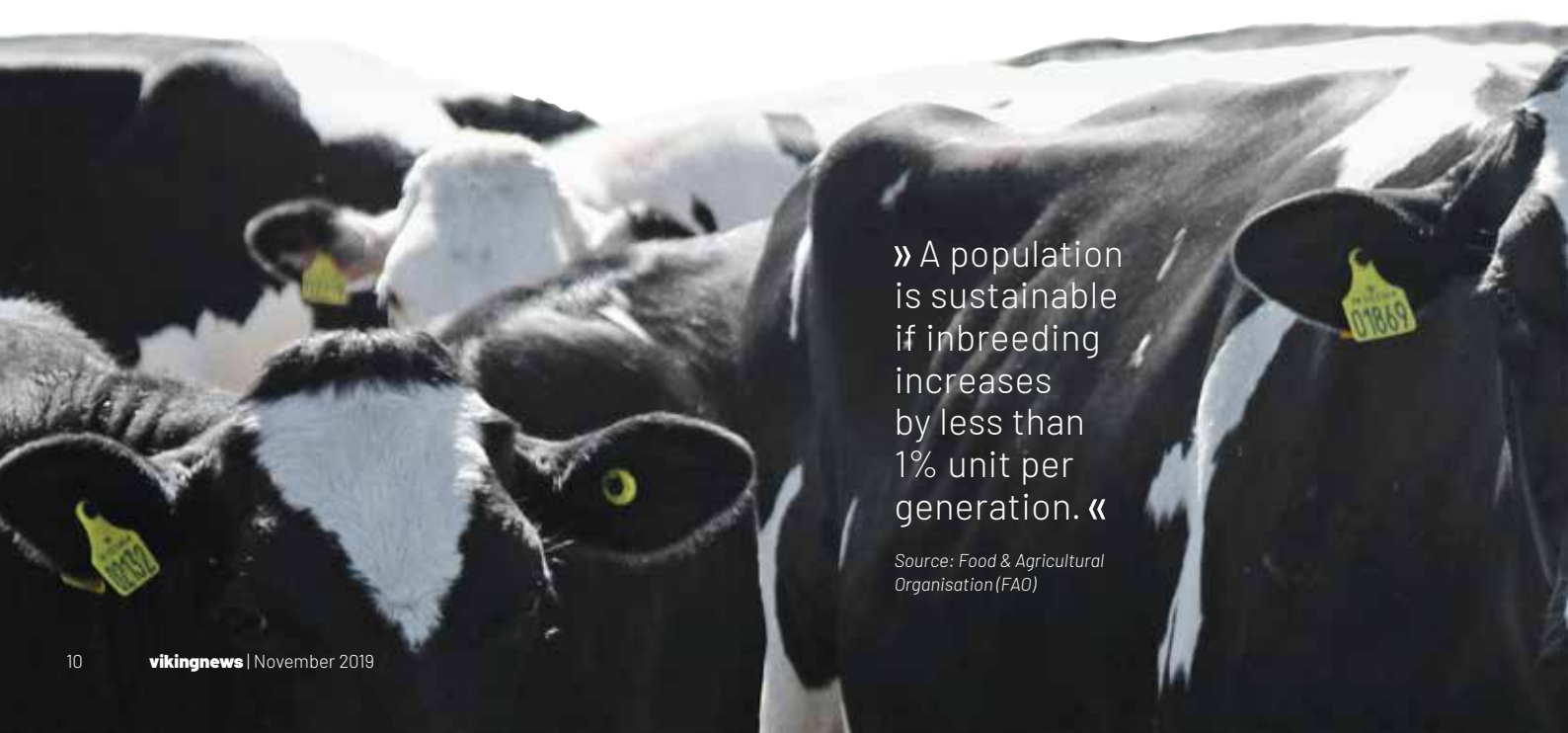
The main factor for high genetic progress is the generation interval. In Figure 1 we can see the development between 2009 that was before genomic selection and today. It is measured on all purchased VikingHolstein bulls during this period. The figures show in particular bulls and not females in 2009 that bulls were 2,500 days old when they had sons born and

now they are almost 800 days old.

The parental average falls from 1,910 days to 819 days – less than half. This means that the parents were 18 months old at time of insemination. For bulls in particular, we can shorten the interval even further, today it is primarily foreign sires of sons that are a bit older when the semen is available.

Pedigree variation

We purchase and start semen production of approx. 90 VikingHolstein bulls a year. Almost all of these bulls will be used for high index females and thus have a



» A population is sustainable if inbreeding increases by less than 1% unit per generation. «

Source: Food & Agricultural Organisation (FAO)

chance to become the sires of the next generation. We also use a few foreign bulls. Genomic testing of all animals in a herd is done on many herds today, which certainly contributes to VikingGenetics finding good bulls in many of these herds. This high degree of variation in the bulls' pedigree is the first indicator that we have inbreeding under control.

Inbreeding control

To control the balance between genetic progress and inbreeding, VikingGenetics uses an optimisation programme called EVA (EVolutionary Algorithm). The results from the programme are included in the total evaluation both when it comes to selecting females for the embryo transfer programme and when purchasing the next generation of bulls. It is a very useful programme that is also used in the breeding programmes for pigs, elks and fish. One of the results from the EVA programme shows inbreeding in the population.

Figure 2 shows the degree of inbreeding measured in a dataset consisting of high index animals in the VikingGenetics area. According to the Food & Agricultural Organisation (FAO), a population is sustainable if inbreeding increases by less than 1% unit per generation. In practice, this means approx. 0.4 percentage point based on the 819-day generation interval shown above.

Figure 1: Change in age of parents measured in days from 2009 to 2017 for VikingHolstein bulls.

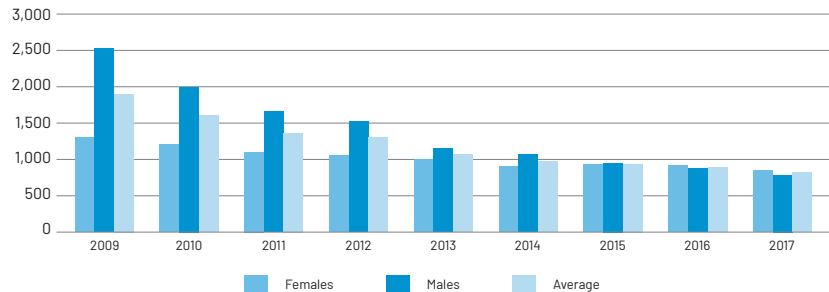
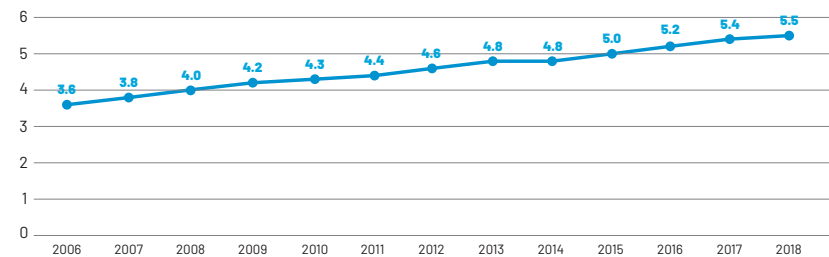


Figure 2: The annual degree of inbreeding for VikingHolstein measured on high index females in the Viking-Genetics region.



In VikingHolstein, we have the luxury of being able to use the local female population actively to create long term genetic variation along with optimal genetic progress. This is due to both a

very strong market share and the fact that VikingGenetics is the only company selecting for NTM. At the same time, this is also a great responsibility that we take seriously as the numbers also show. ●



ARLA accelerating the “green” transition

At our most recent VikingAcademy, which is a forum where we meet our Global Distributors, Poul Bank Petterson, Director, Regional Manager and Member relations Denmark from Arla Foods, explained how the company is working with their members to implement a plan to reduce the carbon footprint of milk production.

Today, ARLA pays according to fat and protein in the milk, but in the future, it will put extra value on milk produced on a farm that is more sustainable.

Consumer demands will focus far more on climate issues in the future. Young people, far removed from dairy business, will drive this focus.

ARLA Food has identified three main areas where they will focus on accelerating what they call the “green transition” towards 2050. Aligned with the climate goals of Carbon Net Zero by 2050 agreed at the United Nations, these three areas are: Better climate: Carbon net Zero, Clean air and water: Nitrogen and phosphorus Cycles in balance, and more nature, i.e. greater biodiversity and access to nature.

“We plan to visit all our dairy farmers and explain how they can work more efficiently. We are going to measure the carbon footprint of every farm in 2020, after which we will know exactly where each of our 11,000 owners are in terms of carbon footprint at herd level. This is the first step for us and will give us data on where we are regarding climate challenges and implementing our green transition towards 2050,” says Poul Bank Petterson.

Milk production is an important contributor to greenhouse gases. Cows produce methane gas and each kilo of methane gas corresponds to 28 kg of CO₂, according to scientific calculations. Greenhouse gas emissions at farm level come from enteric fermentation, manure handling and storage, feed production, fuel and electricity etc. However, the industry also intends to offset such emissions with carbon sequestration.

“Our long-term aim is to implement the sustainability compass,” Petterson said while explaining that in addition to this focus on climate, other factors such as animal welfare, the responsible use of antibiotics, people, air, water and nature will also play a crucial role in this strategy.

“Dairy farmers are already doing all they can to cope with climate new challenges, but there is room to improve in term of more efficient practices in the dairy industry,” he says. ●

Breeding towards lower carbon footprint 2050

Agriculture, forestry and other land use account for 24% of global greenhouse gas emissions. The livestock sector is a significant contributor to global human-induced emissions. FAO projects that meat consumption will increase globally towards 2050. For that reason, it is imperative to reduce emissions in the livestock sector. This should happen through innovations, new technologies, genetic solutions and on-farm implementation of knowledge.

Breeding and Genetics
Producing more with less is a guiding star for Danish agriculture on the road to a lower carbon footprint. One way of achieving this is through breeding and genetics. VikingGenetics, a company owned by 22,000 Danish and dairy farmers in Denmark, Sweden and Finland, VikingGenetics are global leaders in providing genetics to improve cattle breeding through healthy, fertile and high producing cows.

New Solutions for Lower Methane Emissions
New development programs of Viking Genetics are at the forefront of future sustainable dairy farming. New research and development areas include:

- A Saved Feed Index to breed dairy cows that produce the same amount of milk from less feed
- Breeding of climate-friendly cows to reduce methane emission
- Developing a 3D camera system that can measure the feed intake of each cow
- An index for reducing methane emission

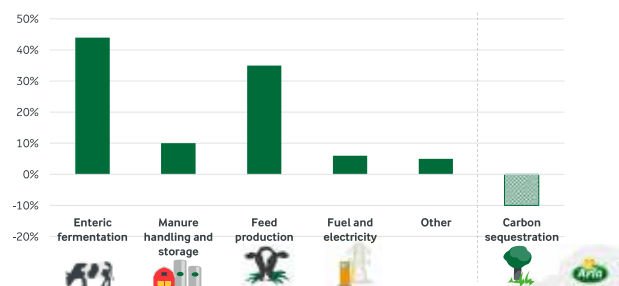
Meat consumption will increase towards 2050

Danish Agriculture & Food Council

VikingGenetics represented at the Climate Change Summit 2019

At the 2019 climate change summit in New York, Professor Niels Peter Nørring, Climate Director of Sustainability, the Environment & EU, Danish Agriculture & Food Council presented a plan on how Denmark is strategically preparing its path to becoming climate-neutral by 2050. VikingGenetics plays a major role in this plan. ●

Contribution to the Carbon Footprint on farm Greenhouse gas emissions at farm level (incl. input to farm)



ProCROSS 10-year study

by University of Minnesota reveals high level of profitability

The world's longest running study comparing crossbred dairy cows with purebred Holsteins delivered its final conclusions this summer. The study by the University of Minnesota in the United States has demonstrated that ProCROSS cattle deliver a lifetime profit 33% greater than pure Holstein; while daily profits are, on average, 9-13% higher.

The financial advantage of the ProCROSS was demonstrated to come from a range of factors including greater lifetime production of fat plus protein solids, better fertility, fewer health treatments, higher calf and cull values and improved rates of survival.

When production of fat plus protein was converted on a daily basis, the crossbred cattle produced between 1% more for the two-breed crossbreds (VikingRed × Holstein and Montbeliarde × Holstein) and 1% less for the three-breed crossbreds, than their Holstein herd mates.

However, the substantial difference in crossbreed financial performance stemmed from lower production costs. The savings came from significantly lower reproductive costs (e.g. improved conception rate to first service by up to 8.7%, and up to 17 fewer days open), up to 23% lower health costs at the beginning of the system and 17% for the three-way system. (This is mainly attributable to fewer cases of mastitis and metabolic diseases, plus lower feed costs during both lactation and dry periods).

However, the greatest single contributor to the lower costs for ProCROSS cattle came through their lower replacement costs. These, in turn,



Fewer cases of mastitis and metabolic diseases, plus lower feed costs.

are explained by almost twice the rate of survival to fourth lactation (41%) compared to Holsteins (22%).

Once all income (including milk quality penalties) and costs of production were considered, the three-breed cross delivered an average additional profit of 9% per day higher than Holsteins.

The trial, which was performed by researchers at the University of Minnesota, was the first to assess the benefits of crossbreeding on such a scale and through such a highly structured breeding programme. Running over the course of 10 years, it has involved the participation of around 2,300 ProCROSS

and 2,000 Holstein cattle in seven herds. These were high-performance, commercial herds in which animals had the opportunity to express their genetic potential. For each of the three breeds, semen was used from high-ranking proven bulls, corrective breeding was carried out for conformation, and matings were protected against inbreeding. Average production (December 2017) across the herds was 13,587 kg milk, 512 kg fat and 426 kg protein, and each herd surpassed standard benchmarks for the fertility expected of Holsteins.

Professor Les Hansen, who led the research, with the participation of Dr Amy Hazel and Professor Bradley Heins, presented the findings to journalists and dairymen from 11 European countries in July. "The genetic effects contributed by each breed are complementary, each conferring attributes which balance another," he said. "For example, Holsteins bring production and udder traits; Montbeliardes brings fertility, body condition and strength; and VikingReds – itself an amalgam of the Swedish Red, Finnish Ayrshire and Danish Red breeding programmes – bring calving traits, udder health and fertility." ●

ProCROSS driving up profitability

The use of three-way cross breeding in dairy operations is a popular topic at present. With more farmers using the system, the results of adopting this strategy are now starting to bear fruit.



Andy Williamson.

The Williamson family are improving health, fertility and longevity in the herd.



Andy Williamson and his father run a herd of more than 600 cows on a 360-hectare dairy farm (194 hectares owned, and the rest rented) near Nantwich, Cheshire. Williamson is a fourth generation dairy farmer, and his predecessors were one of the first farming families to introduce North American Holstein cows into the area.

Five years ago, health problems were becoming unsustainable. “We were facing problems with feet and legs and high culling rates, which was jeopardising the efficiency of the whole operation,” says Andy.

In their search for more efficient and healthier cows, they were introduced to the only scientifically proven crossbreed, ProCROSS, which is a combination of VikingRed, Montbeliarde and VikingHolstein.

After using ProCROSS, the genetics of 50% of the herd are from three-way crossbreeding and the plan is to extend this to the whole herd.

The Williamsons work closely with VikingGenetics United Kingdom and the family are improving health, fertility and longevity in the herd. “The culling rate was reduced from 34% to 28%”, Andy explains, before adding that they are achieving high in-calf rates with an average production of 9,500 Kg ECM, with 3.9% milkfat and 3.4% protein.

A scientifically proven combination

A 10-year study by the University of Minnesota in the United States, showed that the three-breed cross of Holstein, VikingRed and Montbeliarde produces lifetime profits 33% greater than those from pure Holstein.

The financial advantage of ProCROSS was proven to come from a wide range of factors including greater lifetime weights of fat and protein, better fertility, fewer health treatments, higher calf and cull values, and improved rates of survival. ●

Pioneers

in health traits

It takes innovation and courage to do what others won't

The world has changed, right? The world has woken up to the importance of health and longevity of the dairy cows. We have known the importance of these for more than 40 years already. What others are starting to focus on now, we have been doing for decades. The pioneer spirit keeps on leading our endeavours in modern cattle breeding with our firm focus on health traits and sustainability. VikingGenetics - innovative breeding.

Solid confidence in VikingGenetics is paying off

Hannu Paananen's and Mia Ikäheimo's Kaunisto Farm in Keitele was selected as the 2019 VikingGenetics Herd of the Year in Finland.

By Johanna Aro, Breeding Specialist

This is the first time VikingGenetics has chosen the VikingGenetics herd of the year in Finland. Criteria for the title include good genetics and a focus on the future. Managed by Hannu Paananen and Mia Ikäheimo, Kaunisto Farm is an expanding, evolving farm with high index females, embryo transfers and flushes. They also sell animals for the VikingGenetics breeding programme. Our VikingHolstein bull VH Lol is from Kaunisto farm.

Mia and Hannu say this is the busiest years of their lives. On the day of the interview, an excavator is working behind the barn. The day before, the second silage cut was harvested. "Milk production is our thing, and we want to invest in it, of course, but without forgetting to spend quality time with our two children," says Mia.

Kaunisto farm passed to Hannu from his parents 23 years ago. Mia previously worked as a seminologist and transferred embryos. When it comes to dividing the labour, the couple work on the principle that they should both be able to do everything, although they do play to their individual strengths. Due to her background in Artificial Insemination (AI), Mia tends to manage heat monitoring, fertility issues and breeding. She inseminates the heifers and cows and they have their own semen tank in use at the farm. Hannu takes care of forestry work and most of the heavy machinery work and feeding. A third employee comes every other week and mainly concentrates on barn work.

Three cornerstones of business

Mia and Hannu see three things as key to their dairy business. Investments need to be carefully considered. The low price of milk encourages keeping a close eye on costs. For example,



Hannu Paananen, Mia Ikäheimo and their two children.





Breeding and feeding are the key to success.

machinery purchases are evaluated with care. They also leave most of the field and harvest work to contractors.

Secondly, they make sure they use their time efficiently. They focus on what they are good at and outsource all the accounting, grant applications and budgeting work. Hannu explains that this type of external support is carefully thought through.

Thirdly, as their money comes from milk, they prefer to invest in great animal genetics. To a great extent, this means, preventive care when it comes to animal welfare and health. Breeding and feeding are the key to success. They take their time to ensure they find the best solutions to go with here.

Mia's expertise in action

Breeding is close to Mia's heart. She knows her cows well, and remembers all their names, pedigrees and their special characteristics. When they decided to expand the herd, they used a lot of X-Vik semen. "We are now in a position to actually start choosing animals with stricter criteria, and thanks to this, we can expect the herd to develop even faster towards our goals," Mia expects.



Most of the herd is VikingHolstein and VikingRed is in the minority.

Most of the herd is VikingHolstein and VikingRed is in the minority.

They are very happy about the enormous amount of work and data behind the Nordic index calculations. Even when working as a seminologist Mia provided health data on the animals to the Nordic big data. Finland, Denmark and Sweden have been collecting fertility and health data for longer than any other region. "Using indices is not just about refining numbers. I have seen how the indices work in practice. I have complete trust in the VikingGenetic breeding programme," says Mia.

Facts of the farm

- 140 animals, 20 VikingRed and 120 VikingHolstein
- 305 days milk yield average 12,230 kg, 4.1% fat, 3.5% protein
- ECM 13,007 kg (Energy Corrected Milk)
- Average calving interval 378 days
- 100 ha of fields
- 100 ha of forest

Top genetic material

VikingGenetics is interested in the genetic material of the Kaunisto herd. The herd contains many high NTM cows that are used to breed the next generation of VikingGenetics sires.

Embryo flushing and transfers are also performed at Kaunisto Farm. They are doing contract embryo flushing with VikingGenetics. Most of the embryos they have used on their farm come from these flushes, but some embryos are bought from the VikingEmbryo programme. ●



VikingHolstein international success

VH Brook

- the new number one proven bull is shaking up the rankings in UK

VikingHolstein Brook is making history in the United Kingdom (UK) ranking number one for the daughter-proven Holstein sires and topping both of the new indexes - autumn and spring calving. "At VikingGenetics we are able to offer farmers the highest reliability with our bulls; what we offer is what we deliver to the farmer. We are really happy that our top selling genomic bull in the UK has become also the number one daughter-proven bull", Sara Wiklert Petersson, Chief Sales Officer from VikingGenetics says.

VH Brook is also moving the foundations of cattle breeding in the UK. "In a brand-new ranking dominated by US genetics, the Danish-bred Viking bull, VH Brook, rises to the top, graduating from the young sire genomic ranking with early milking daughters", AHDB states in a press release saying "Viking incursion breachers US stronghold".

VH Brook's Profitable Lifetime Index (PLI) of £794 is the highest of the available proven bulls and reflects the high fat and protein percentages in his Predicted Transmitting Ability (PTA), at +0.23%

and +0.12% respectively. He combines this with breed-leading udder health figures (-40 SCC, -5 Mastitis), reflecting the significant emphasis placed on these traits over many years in the Nordic countries, the communication from the UK Dairy continues.

VH Brook is also at the top of the Across-breed autumn calving list which is clearly dominated by Holsteins.

"At the top of this ranking is the Danish-bred VH Brook, the bull which also leads the way for Profitable Lifetime Index (£PLI) and features in the top

**Genetics that works
no matter where you are**

VH BROOK

#1 in UK in £PLI (Profitable Lifetime Index) of proven bulls.

£PLI is 794.

VH CROWN

shared #2 in Germany in RZG (German total merit index) of genomic bulls.

RZG is 164.

VH SPARKY

shared #10 in Australia in \$BPI index (BPI = Balanced Performance Index).

\$BPI is 331

five for Spring Calving Index (£SCI). With an ACI of £668, Brook is the first of 10 Holsteins to take the top 10 places on this across-breed ranking, designed to pinpoint the sires which transmit economic superiority in a typical autumn block-calving, winter-housed, UK situation”, the AHDB Dairy informs.

Brook features excellent milk solids and outstanding udder health and has the best TB Advantage prediction in the top five ranked on £ACI (the new Autumn Calving Indexes).

Claus Langdahl, VikingGenetics’ Senior Holstein Breeding Manager says that VH Brook is an example of how long term selection for health and fertility as well as good components shows outstanding genetics that provides profitable cows for farmers all over the world. “High ranking genomic bulls show their worth – measured on milking daughters, and our selection philosophy works for the UK system”, he says. ●

Bull dams also in the **spotlight**

To be among the few selected bulls that get to become the sires of the next generation, males need to match many requirements. Even though genomic testing is crucial and highly reliable for a bull to be selected, VikingGenetics always makes a visual examination of a dam before making the final decision to purchase.

By Claus Langdahl, Senior Holstein Breeding Manager

Most of our purchased bulls are from heifers that may not have calved themselves yet and as such, we will not have had the opportunity to see the phenotypes of the bull dam. But it is important to emphasise that the performance of the bull dam itself is also part of the selection focus.

When we look at the dams of bulls purchased between 1 January 2017 and 1 July 2018 –90 bulls in total – we can see that these bull dams have produced almost 11,000 kg milk with 4.27% fat and 3.62% protein.

Please note that 80% of these dams are 1st calf cows so this is a very high production level.

In comparison, in table 2 we can see the average classification of the bull dams with 83 for frame, 84 for feet and legs and 85 for mammary.

As mentioned, it takes quite something to be among the selected bulls at VikingGenetics – including that the bull dam performs well in production and conformation. ●

Table 1: Average production of bull dams

	Milk	Fat%	Protein%
Dams of VikingHolstein bulls	10,886	4.27	3.62

Table 2. Average classification of bull dams

	Frame	Feet & legs	Mammary
Dams of VikingHolstein bulls	83	84	85

An extraordinary red cow

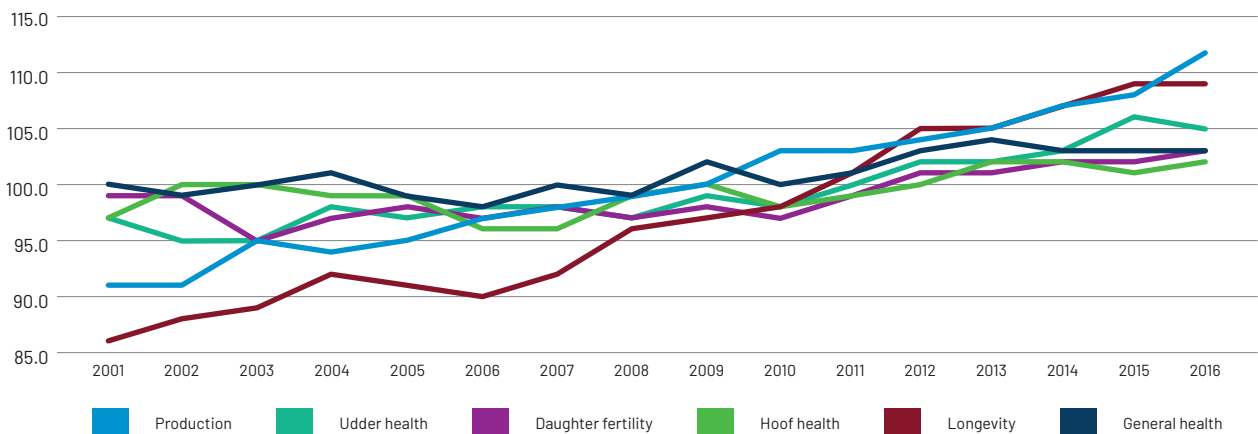
With VikingRed, you can enhance the efficiency of your herd and boost your profitability. Choosing VikingRed sires makes your cows more resistant to diseases, improves their calving abilities and milk productivity, all at the same time. Our red cows are renowned for their ex-

traordinary health, easy calvings, good fertility, functional conformation and high production. Choose VikingRed sires to optimise your herd for commercial dairy production.

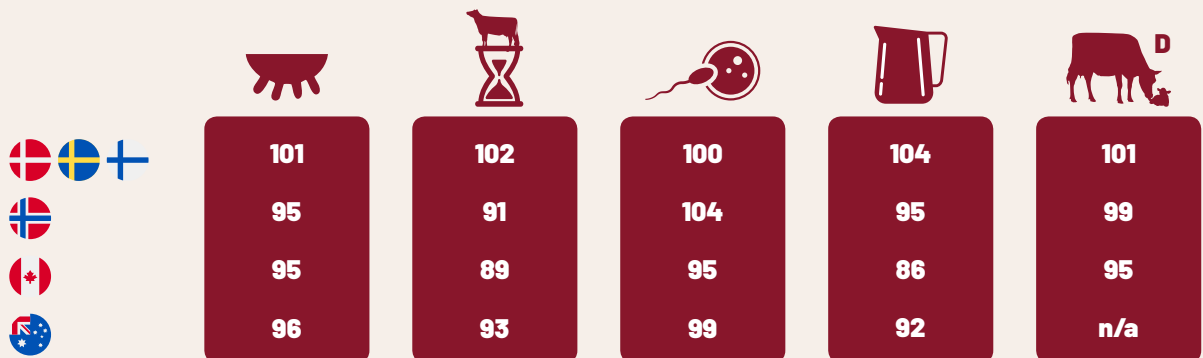
Our red sires will help you drive genetic progress for all the traits that are important for the profitability of

your dairy business. You will achieve a high genetic level for health and reproduction traits, without compromising on production. VikingRed is a naturally healthy breed, which is why it has a greater weighting in the Production index in NTM (The Nordic Total Merit index).

Figure 1: Genetic trends for VikingRed bulls 2001-2016.



Red bull's genetic levels for selected traits.



Source: Interbull 2019.

VikingRed bulls rank high in international top lists, and they are prominent in the pedigrees of many top bulls around the world. A high proportion of semen from VikingRed sires is used in the ProCROSS concept, the only scientifically proven cross breeding programme in the world. ●



VikingRed 2019	
No. cows	200,000 (DNK, SWE, FIN)
Fat + Protein kg	757 kg
Fat %	4.4 %
Protein %	3.5 %
Fat kg	419 kg
Protein kg	338 kg
Milk (305 days)	9,627 kg

NAV January 2019



102

89

99

n/a

Bull dams are excellent cows

When it comes to genomic selection and breeding by indices, we're sometimes asked the question: Are you sure it works? This is a very good question as it is always necessary to evaluate if theory also works in practice.

By Jakob Lykke Voergaard, Breeding Manager VikingRed

As most breeding is for heifers today, it's difficult to say if the heifer will become a good cow before buying bulls. To maintain a high quality of bulls, all dams of the bought bulls are inspected. VikingGenetics has made a statistical analysis of bulls bought in the period 1.1 2017 to 1.7 2018.

The statistics contain 88 VikingRed bulls. Only five of the dams do not have a classification and two dams do not have production data. As many of the dams have not yet milked for 305 days it is difficult to evaluate the kg of production, however the percentages are great so far with 4.61 in fat and 3.76 in protein.



Dam to VR Uday that is one of the bulls in the analysis

When looking at classification, the averages are 81 for body, 82 for feet and legs and 83 for udder. ●



VikingRed is the leader in the UK

Farmers in the UK looking for Ayrshire semen with good PLI, should consider VikingRed. PLI is the total economic index in the UK. Of the list of proven Ayrshire bulls, VikingGenetics has five of top six, which is very impressive.

With a PLI of 644, VR Faabeli is number one with good production, good fertility and low cell count. He also does very well on the Viking home market

where he is number six at the list of proven red bulls with +25 in the NTM. The two next bulls on the list are very close with VR Vimpula a PLI of 507 in PLI and VR Gobel with a PLI of 505.

VR Vimpula offers great production while VR Gobel delivers low cell count and very good fertility. They both have +17 in NTM. The old bull Pell Pers is number five on the list sharing the ranking with VR Feton both with a PLI of 473. ●

Strategic alliances to strengthen VikingJersey

VikingJersey is expanding its breeding programme through cooperation agreements with strong partners in the United Kingdom, Norway and France.

Closer cooperation between major Jersey populations in Europe will strengthen the VikingJersey breeding programme, for the benefit of breeders that support and follow the breeding goal reflected in the Nordic Total Merit (NTM) which focuses on balancing health, fertility and production.

Over the last year, three important agreements have been signed with relevant Jersey associations and the breeding procedures to get the most beneficial results have started in the populations concerned.

The main goals:

- increasing genetic progress for the Jersey breed
- identifying more potential breeding animals
- increasing the pedigree diversity
- lowering inbreeding levels
- creating more interest in breeding among members of the Jersey associations concerned.

The new breeding agreements have been initiated with the following associations:

UK Jerseys

- Has the second largest Jersey population in Europe and very interesting pedigree combinations in the population.
- All breeding programme procedures will be as in VikingGenetics countries.
- Starting to screen and test the best animals in October 2019.

Norwegian Jersey

- Has a long tradition of using Danish Jersey/Viking Jersey bulls.
- All breeding programme procedures will be as in VikingGenetics countries.
- Breeding value estimates will be done in the Nordic evaluation system (NAV).
- Herds are using the VikMate breeding programme.

Evolution (French Jerseys)

- Cooperation started in June 2018, with all breeding programme procedures as in VikingGenetics countries.
- Classification with Danish software. ●

International top rankings

VikingJersey bulls are doing extremely well worldwide. Here is an update of their outstanding performance:



USA

VJ Gislev #1 among pure bred daughter proven bulls for JPI

- 8 out of 10 best bulls for fertility
- 8 out of 10 best bulls for percentages
- 7 out of 10 best bulls for somatic cells



UK

VJ Link #1 among daughter proven bulls for PLI

VJ Hays #1 among genomic bulls gPLI

- 7 out of 10 best bulls for PLI
- 8 out of 10 best bulls for fertility and cell count



South Africa

VJ Garant #1 for SAINET

- 4 out of 10 best bulls for SAINET
- 10 out of 10 best bulls for Cheese merit
- 5 out of 10 best bulls for functional udder

Fewer bull calves in future

More than 60% of the Jersey semen used in VikingGenetics countries is sexed, - and the ratio of sexed semen is increasing rapidly. The main reasons are to increase genetic gain, when combining genomic test and using sexed semen on the best 30% of females, and to

avoid unwanted pure-bred Jersey bull calves. Added to which, organic dairy farmers are no longer permitted to cull new born Jersey bull calves and from 1 January 2022, there will be a total ban on culling.

There is also growing interest in using beef semen with lowest ranking Jersey

females. This figure is 12.5% today and is expected to increase to 50% or more for the poorest genetics in herds. Interest in using Y-Vik, sexed Beef semen for bull calves, is also increasing, and several trials and studies are being done to identify the best Beef breeds to combine with Jerseys. ●

Tremendous success in South African Jersey Herd competition

By Peter Larsson, Breeding Manager VikingJersey



Willie van Niekerk and son Wimpy, in back row, with their team and trophies, after great success with their VJ Husky daughters.

Herd competitions are organised annually by the different Jersey Clubs in South Africa and this year, the Overberg region competition in the Southern Cape, was held in September with eleven herds participating.

Every farmer was invited to select a group of 20% of his first, second and Third lactation and older cows. Three cows older than eight years as well as a mother and her two daughters were two more groups. A sire group of at least five daughters in milk, was the 6th group that was judged.

This year Willie van Niekerk from "Van Niekerk Boerdery" in the Caledon did exceptionally well and won the overall competition. His first and second

lactation group took the honours. Furthermore, his sire group, a group of VJ Husky daughters in their first and second lactations, came first as well.

Willie and his son Wimpy manage the dairy farm. They milk 380 Jerseys and the average daily production is 23 kg of milk per cow with a butter fat percentage of 5.6% and 4.1% protein. They have been clients of VikingGenetics distributor, Genimex, since 1997 and have made heavy use of Viking Jersey bulls throughout these years.

"I use the NTM from Viking as my breeding strategy and have had huge success especially with my solids and udder health," says Willie. "The Huskies are an example of what we want in the

herd, strong deep bodied cows with very functional udders and excellent protein production," he adds. ●



VJ Husky daughters from Willie van Niekerk, winning a Herds competition in South Africa.



First class Genetics in East Africa – Gogar Farm

Many large commercial herds in Kenya can be found in the western part of the country. Gogar Farm is one of them. This is a cattle breeding leader farm situated 200km from the Kenyan capital Nairobi, in Nakuru County. The herd is owned by Hamish Grant, whose grandfather emigrated to Kenya from Great Britain many years ago.

Unlike many other farms, milk is only a by-product for Grant's enterprise. He is primarily interested in the breeding side of the business, as the farm makes most of its income from selling in-calf heifers around all East Africa. The high genetic level of the heifers, along with Grant's good understanding of the business has truly put him on the map.

There are around 1,200 cattle on the farm of which 400 are currently milking. The reason for the high number of heifers is because the farm almost exclusively uses sexed semen from VikingGenetics. Gogar Farm always maintains a high number of genetically superior heifers ready for sale on the East African market.

Grant always uses VikingGenetics top bulls based on the Nordic Total Merit (NTM) index. The farm has mainly Holstein today, but began with mostly Ayrshires 100 years ago. However, Jersey and Ayrshire breeds can still be found on the farm today. ●



Hamish Grant owns a 1,200 head herd in Kenya, and almost exclusively uses sexed semen.





Greg and Bernadette Fitzpatrick.

» The health and fertility traits of Viking Genetics sires have been very beneficial in our herd. **Antibiotic usage is very low and calving problems are a rarity.** Calf vitality is a notable difference. With VikingGenetics, the calves just grow so well «

says Bernadette Fitzpatrick. Bernadette and her husband Greg, have a farm in Northern Victoria, Australia.

» I simply do not check my cows at night anymore, we certainly do **enjoy a better life.** The cows are nearly 'invisible'. «

Adrian Buykx , Muckatah Northern Victoria Australia.

Adrian and Leanne Buykx have been using almost 100% VikingGenetics sires for twelve years. Adrian says that all the health traits offered by the Viking sires have definitely improved his herd health. Mastitis treatments, metabolic disorders and feet trouble are all at a minimum. Herd fertility has increased, and Adrian says the real stand out area has been calving ease. ●



Adrian Buykx.



“We want to increase production and keep the components high”

Leo Hansen is the Danish herd manager in charge of 1,050 cows at Härjanurme in Estonia. Most of the cows are Holsteins, but there are also some red and crossbred animals in the herd. Average production is about 12,000 kg milk / cow / year, 4.20% fat and 3.45% protein.

By Seppo Niskanen, Export Manager



One of the three Sadala barns.



Leo Hansen, Mads Fjordside and general manager Jairus of Sadala Agro. 1,100 dairy cows, 600 beef cows.



Leo Hansen and Mads Fjordside view the results of the Härjanurme herd. The farm is Danish owned and has 1,000 cows.

Leo, who also spent a short period at the VikingGenetics bull station, has been working on the farm for four years, so he has seen the first generation of the daughters of the bulls he has selected for breeding in production.

Härjanurme Farm has been in Danish ownership since 2006. “The first generation already looks good. The plan is to gain a harmonious herd with high production, health and conformation. The next generation will be always better than the previous one,” says Danish breeding advisor Mads Fjordside. He has helped Hansen select good bulls for the herd. “It is important to find the most suitable bulls for this

kind of big herd. Usually I recommend using 5-6 bulls for 5-6 months, then we change the bulls,” says Fjordside.

Leo has also used sexed semen in the herd with good results. In addition to sexed semen, beef semen is used for the lowest end.

VikingHolstein and VikingRed perform at their best in a farm in Estonia

Sadala Agro is located in East Estonia close to Tartu. They milk about 1,100 cows today, half Holstein and half Red. The average yearling milk production is about 12,000 milk / cow. In addition to dairy cows, the farm has also 600 beef cows.

Managing director and herd manager Tonis Jairus wants to develop the herd with two breeds. "Both breeds are good and work well. We keep both breeds together in the same groups, so it can make for some challenges now and again with feeding systems," he says.

The farm has three different barns, built in different years and each new barn has been an improvement on the previous one. "Animal welfare is important for us," Jairus says. "The calves have to get enough milk to grow well and be good cows in the future. Plus, the cows have to have enough space to lie down in the barn and cubicles," he adds.

The main breeding goals are high production, good health and conformation. Feet and legs must be good enough such that the cows can produce enough. Jairus has plenty of plans. They want to use sexed semen to get more heifers for sale, and to start using embryos to improve the herd level. ●



VH Monty P daughters show their polledness at Härjanurme farm.

VikingAcademy

- Sustainable Genetics for the Future



The 5th VikingAcademy was held in Tuusula, Finland 23.-25.9.2019. This is a bi-annual event held for our distributors around the

world and this time we had participants from 14 different countries. The topic for the conference was "Sustainable Genetics for The Future". ●



The Viking family meeting up at the 5th VikingAcademy.

Supporters

of a sustainable future



It takes innovation to reduce the carbon footprint

The world has put dairy farmers and cows under a magnifying glass. How our food is being produced has never been under so much scrutiny from governments, media and consumers. We are providing genetic solutions for dairy farmers to succeed with the demands of sustainable dairy farming. Our new Saved Feed Index is a tool to breed climate-friendly cows with reduced methane emissions. VikingGenetics - innovative breeding.