Hvordan gjøre våre storfegener attraktive?

Sverre Bjørnstad
Adm.dir Geno

Det er en økende internasjonal interesse for nordisk genetikk

Sannsynlige årsaker:

=>Synlig negativ effekt av ensidig avl

Negativ utvikling mht fruktbarhet – tildels akutt problem
Økende problem med dødfødsler/svakfødte kalver
Økende utfordring mht innavl

=>Økende anerkjennelse blant internasjonale forskere for en avlsretning som inkluderer funksjonelle egenskaper

=>Avlsselskaper utenom Norden forsøker å inkludere funksjonelle egenskaper

=>Økende dokumentasjon gjennom internasjonale forsøk, på at vårt avlsmateriale duger

Average inbreeding in the U.S.

Birth year	Holstein	Jersey
	(%)	(%)
1988	2.0	2.8
1993	3.2	4.3
1998	4.2	5.7
2003	5.0	7.0

Økende fruktbarhetsproblemer

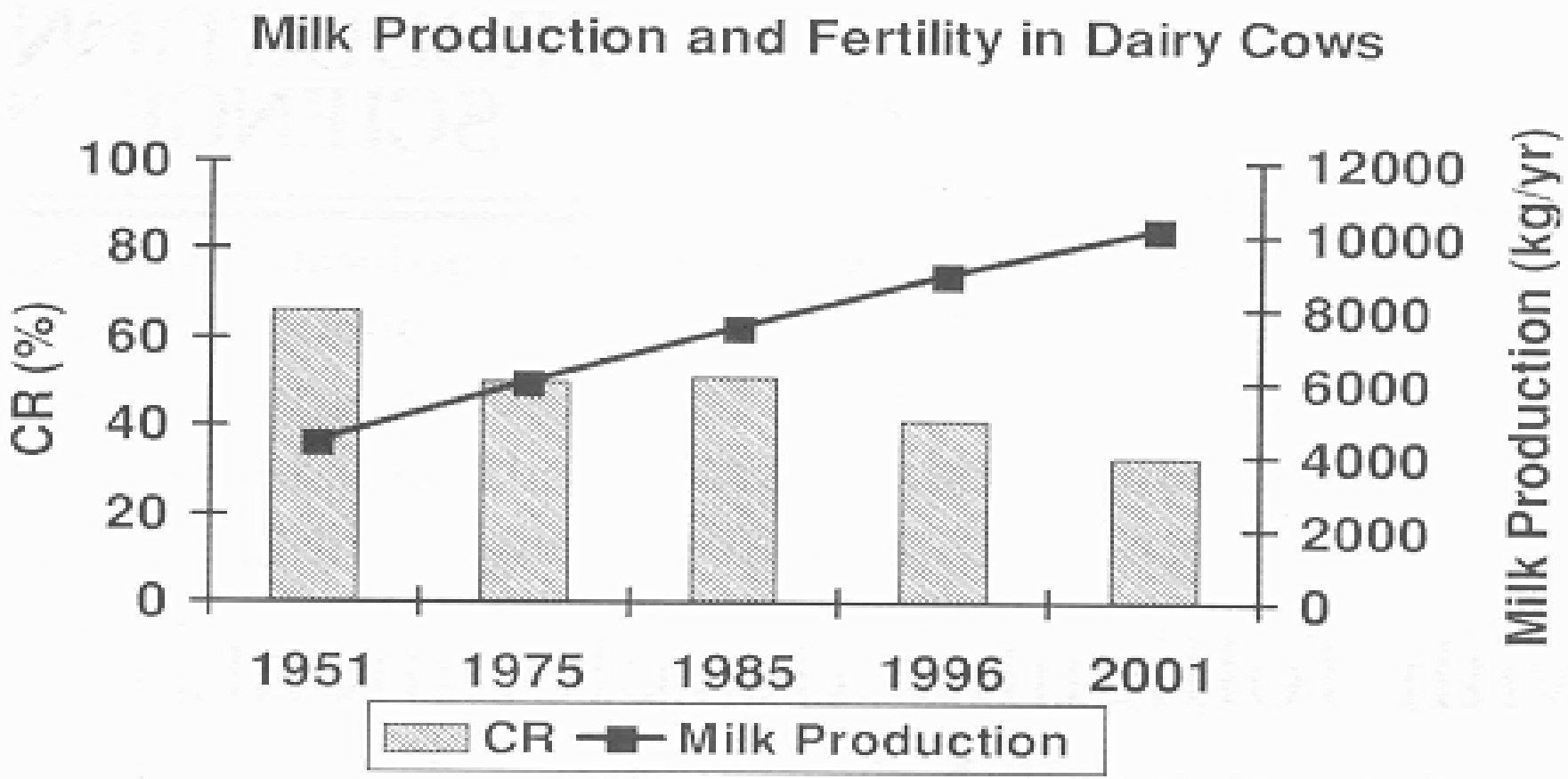


Fig. 1. The inverse relationship between conception rate (CR%) and annual milk production of Holstein dairy cows in New York.

Dødfødsler – et økende problem

Year	Records	Stillbirth (%)[1]
Primiparous cows		
1985	7453	9.5
1986	6980	9.2
1987	9476	9.5
1988	10,879	10.1
1989	13,412	10.2
1990	15,513	10.1
1991	16,572	10.4
1992	18,686	11.7
1993	17,738	11.0
1994	18,053	11.5
1995	17,548	12.4
1996	15,162	13.2
Overall	167,472	11.1
Multiparous cows		
1985	23,664	5.3
1986	24,166	5.2
1987	31,315	5.4
1988	38,616	5.7
1989	46,227	5.4
1990	52,303	5.5
1991	49,113	5.4
1992	52,827	5.8
1993	49,312	5.6
1994	45,879	5.7
1995	46,226	6.3
1996	39,221	6.6
Overall	498,869	5.7

Meyer et al., 2001

Internasjonale forsøk

California: :SRB og NRF i Kryssing med Holstein, resultat fra 7 store besetninger

Nord-Irland :300 NRF-kyr på forskningsstasjon og i besetninger

Irland :400 NRF-Kyr - 400 NRF X Holstein - 400 Holstein på 50 gårder fram til år 2008

Northern Ireland 2003-calving information

20 farms / 230 NRF / 230 HF	NRF	Holstein
Calving temperament (1=very quiet to 4= aggresive)	1,5	1,2
Calving difficulty (1=unassisted to 5 caesarean)	1,4	1,9
Calves born dead %	5,5	14,5
Calves sitting up within 5 minutes of birth %	96	83
Calves with no health problems during week 1 %	92	92
Milking behavior: first 48 hours post calving	2,0	1,7
Milking behavior:3 weeks post calving	1,2	1,1

Northern Ireland 2003 – fertility data

	NRF	Holstein
Maiden heifers:		
Conception to 1st AI (%)	62	54
Animals culled due to infertility	2	3
First lactation animals:		
Conception to 1st AI (%)	50	39
Animals culled due to infertility	6	17

Northern Ireland 2003 – milk yield data

	NRF	Holstein
305 days milk yield	5704	5957
Fat %	3,88	3,82
*Protein %	3,29	3,22
Days in milk	319	316
Full lactation milk yield kg	6084	6317
*Culled	38	63

*Signifikant

SRB og NRF (Scandinavian) i California

	Holstein	**Holstein x Montbeliarde**	**Holstein x Scandinavian**
Antall	294	194	120
Melk (kg)	31,8	31,0	33,3
Fett (kg)	1,10	1,10	1,17
Protein (kg)	0,94	0,95	1,01
Fett + Protein (kg)	2,10	2,00	2,24 (+7 %)
Dødfødte	12 %	3 %	5 %
Kalvingsvansker	1,59	1,26	1,19
SCS	2,13	2,33	1,88

Eksempler på artikler fra internasjonale fagblad

Ted Burnside... 'accurate identification, 200 test-sire daughters, and gene-assisted selection should save the Holstein cow!'

Ted Burnside is a scientist, internationally renowned for his abilities as a provocative speaker who encourages his listeners to challenge traditional thinking. Born and raised on a Holstein farm at Madoc, in east-central Ontario, Burnside spent 33 years as a professor at Canada's Guelph University, after completing his studies at Guelph and North Carolina. He regards his founding of Canada's Centre for Genetic Improvement of Livestock (CGIL) at Guelph as his greatest achievement. More recently, Burnside spent 4 years with the Nova Scotia Agricultural College, followed by 4 years as Geneticist with Semex. Ted is currently a consulting geneticist working out of his home office in Fergus, Ontario. HI sought Burnside's views on the future of Holstein breeding.

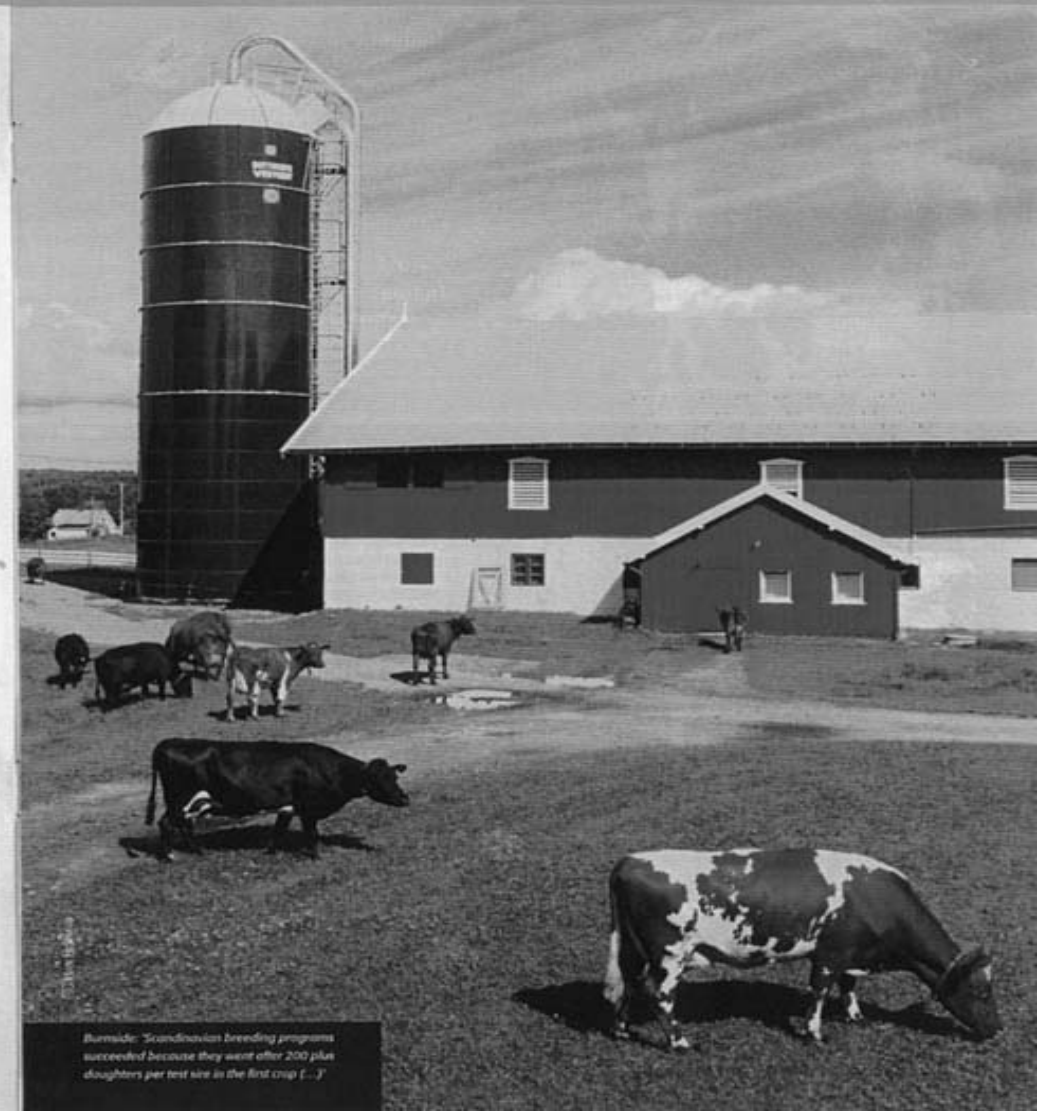
Burnside: 'The Holstein cow is the best dairy machine ever bred. But with her inherent will to milk, combined with inadequate individual care in larger dairy operations, and the negative impacts of inbreeding resulting from intensive selection, she is starting to break down early in life. Inbreeding combined with high production has produced a cow that doesn't conceive easily. And a negative aspect of the show ring is that we have made her taller, sharper and heavier. This places her under physical stress, leading to leg problems and lameness, which contribute to poor heat detection and early culling. Some large herds are over 35% turnover, and are unable to breed enough replacements. Disease resistance is also reduced by the tremendous physical stress of early high production, coupled with her extreme sharpness.'

Question: There has been a world wide trend towards including proofs on longevity and health traits in our selection indexes, but most people working with them point out the severe limitations with such proofs on first crop bulls. In some circles it has even been mentioned that we will have to wait till we get 2nd crop proofs to select effectively for these traits. How do we get past that problem?

Burnside: 'Bull proving programs must be revamped to get an average of 200 daughters per sire in the first crop, so that we can get meaningful proofs for fertility, disease resistance and other components that contribute to herd life. If all 200 daughters of every test sire had a DNA sample taken so that we can carry out marker or gene research it would help lead us to useful genes that could assist us when making choices in young bull selection.'

Many bull studs have only just got their programs to 100 daughters per bull and you are talking about doubling that. Is there solid evidence that this will cure our problems and make up for the genetic gain we loose by halving the number of bulls tested?

'We have to acknowledge the technical leadership of the late Dr. Harald Skjervold of Norway, who with his students developed the very powerful AI progeny testing programs of Scandinavia. Starting with little Shorthorn and Ayrshire type cows in the 60s, and focusing on heavy use of young AI bulls, and mandatory use of AI and milk recording, Skjervold actually did away with the herd books in Norway, going to a genetic breeding program, computed and led by technical people. It had succeeded just as pig-breeding companies succeed today. These programs have now produced smallish cows with excellent protein yield, resistance to disease, and high fertility. They succeeded because they went after 200 plus daughters per test sire in the first crop, reported all disease incidence, AI breedings, fertility and calving ease, and SELECTED with strong intensity for these traits along with protein yield, and lately udders and feet and legs. They wisely left the rest of the cow's conformation to natural selection. They wisely reasoned that cows with very strong wills to milk, resistance to disease, and ability to conceive early in lactation might not all look the same. I brought Dr. Skjervold to Canada in the 60s. When asked if he did not appreciate the importance of good conformation in Holsteins of the day, he said 'All horses that win the Grand National do not look the same! Why should all cows that produce 100,000 kg of milk look the same?' In the meantime, in North America and Western Europe, we ignored the Scandinavian programs and we made great strides with production of the Holstein and changed conformation radically by using BLUP technology very effectively. Unfortunately, BLUP tends to increase inbreeding rates, because the close relatives of the highest ranked animals also rank very high. Now we need to pause and change our milk and herd recording schemes, capture all the disease and sickness incidence data, and with 200 daughters of each test sire, produce meaningful index-



Burnside: 'Scandinavian breeding programs succeeded because they went after 200 plus daughters per test sire in the first crop (...)'

September 2003

Exclusive: the very first results of the Cross-Breeding Trials

The modern-day Holstein has become a finely tuned dairy machine. But the management demands in the areas of fertility problems and calving difficulties have led some large-scale commercial milk producers to question if cross-breeding is (more) appropriate for their operations. Holstein International brings you the preliminary results from cross-breeding trials conducted on 6 large-scale dairy operations in California.

Genetic improvement programs have made dramatic strides in achieving high production from cows with good type and well attached udders. But it seems that for too long we have ignored some of the management traits, traits that are generally antagonistic to that high production. And the intensive selection has narrowed the genetic base of the breed, increasing in-breeding levels, which leads to increased health problems and reduced animal vigor. The latest results from USDA show that for Holsteins born in 2003 in the USA, the in-breeding level has hit the 5% mark. The figures also show that the Jersey breed in the US has now hit the 7% mark! With averages at these levels, a considerable number of animals clearly surpass the 6.25% in-breeding level, which is the upper limit recommended for long-term commercial dairy production.

PRELIMINARY DATA

The goal of the Californian crossbreeding trials is to investigate the potential to improve calving ease and fertility, while evaluating the impact on milk production, components, and general animal health. All data was collected and evaluated at the University of Minnesota, St. Paul, by B.J. Heins, L.B. Hansen, and A.J. Seykora. Results so far must be considered as preliminary as there is as yet insufficient data to do a thorough analysis of such areas as fertility. Across the 6 farms there was a total of 453 Holstein first-lactation animals, 408 Jersey-Holstein crosses, 238 Normande-Holstein crosses, and 54 Scandinavian-Holstein crossbreed animals. The Scandinavian bloodlines were comprised of both the Swedish Red and Norwegian Red. While the number of Scandinavian cross animals is still limited at the time of this evaluation, more animals from this cross will continue to calve out, and further breed crosses will also be added by the time of the next evaluation next summer.

THE WINNERS ARE...

Milk production and Somatic Cell Score were evaluated for the first 150 days of production. While there is as yet insufficient data to do an analysis of the time it takes to get the animals bred back, there was evidence that the crossbreds were going in calf more readily than the Holsteins. Production was analyzed for only the first 150 days of lactation, as results would be impacted by whether or not the animal was pregnant. As can be seen from table 1, the Scandinavian-Holstein crosses were the leaders on production, and had a clear advantage on SCS. It can generally be expected that hybrid vigor should account for about a 6.5% production increase with first cross animals. If we were to take an average half-way between the Jersey and Holstein breeds, and then add the 6.5%, the result would still have been expected to be a minus below the Holstein breed, but this result exceeds that expectation. However, the Jersey breed does appear to have passed on an inferior result for SCS than the pure Holsteins. The cross of the Holsteins with the Normande, the only dual-purpose breed in this trial, was, as it could have been expected, the lowest on absolute milk production, as can be seen in the table. Lactation persistency of the different breeds may be having some impact. It will be interesting to see if 305-day figures adjusted for days open are used as the basis for next year's report on the trials.

When compared to the pure Holsteins, these Scandinavian-Holstein crossbreds had 7% higher production, much better Somatic Cell Scores, fewer calving difficulties, and less than half the number of stillbirths.

→ DOUG SAVAGE

STILLBIRTHS AND DYSTOCIA

A second aspect of the analysis looked at the data for calving problems and stillbirths that had been collected for 1790 calvings from June 2001 to April 2003. In total there were 1365 Holstein heifers calving out with a 12.4% stillbirth rate, 297 Jersey-Holstein cross heifers with 7.1% stillbirths, and 128 Normande-Holstein cross heifers with 7.8% stillbirths. These heifers had been bred to sires representing the Holstein, Jersey, Brown Swiss, Normande, Montbeliarde and Scandinavian (Norwegian and Swedish Red) breeds. For dystocia, the calvings were rated on a scale of 1 to 5, with 1 being a quick delivery, 2 a slower delivery with no assistance, 3 minimum assistance, 4 chains used, and 5 mechanical puller required. Table 2 lists the percentage of stillbirths for each breed of service-sire, and also the average rating for dystocia for each breed. The sex of the calf was a significant factor in both the rating for dystocia and the percentage of stillbirths, with the male calves causing the greater number of problems. The ranking order of the breeds did vary when compared for dystocia and for stillbirths, though in general terms the Holstein and Brown Swiss had the greatest number of problems, while the Scandinavian, Jersey and Normande breeds had much better performance for these 2 traits.

TRAITS TO IMPROVE

From this first assessment of the crossbreeding trials, it can be concluded that the productive performance of the crossbreds was generally in line w expectations. A notable feature was the signific improvement in the SCS by the Scandinav cross. On the score of stillbirths, some breeds l less than half the mortality rate of the Holste and were quite superior on calving ease, cle signifying areas that the breed needs to impr Next summer the 2nd analysis of these cr breeding trials will also include a report card how the Holstein breed compares for fertility. the number of days between calving and get pregnant is unlikely to be a flattering result for Holstein breed.

WAKE-UP CALL

If nothing else, the trials should be seen as a wa up call, highlighting to Holstein breeders the a that they need to concentrate their b improvement efforts on if the breed is to main its dominant force in commercial milk produc world-wide. ●

> *Warning: Large-scale milk producers are looking for an easy-care kind of cow – higher fertility and better calving ease – and unless the Holstein breed starts to supply it, commercial dairymen will start looking elsewhere.*

Table 1 - Average production performance of crossbreds compared to Holsteins

Trait	Holstein	Jersey-Holstein	Normande-Holstein	Scandinavian-Holstein
Cows	453	408	238	54
Milk (kg)	32.6	31.3	30.1	35.0
Fat (kg)	1.14	1.19	1.08	1.23
Protein (kg)	0.96	0.96	0.92	1.01
SCS	2.3	2.6	2.3	1.8
Fat + Protein (kg)	2.10	2.15	2.00	2.24
% of Holstein	-	+2%	-5%	+7%

Table 2- Stillbirths and dystocia

Sex of Calf	% Stillbirths	Dystocia rating
Male	16%	1.70
Female	4%	1.32
Breed of Service Sire		
Holstein	14%	1.65
Jersey	8%	1.22
Brown Swiss	12%	1.68
Montbeliarde	12%	1.51
Normande	5%	1.49
Scandinavian	6%	1.51

United News, Nov. 2003

Evaluation of Norwegian dairy cows

by Conrad Ferris and Adrian McKeague, Agricultural Research Institute of Northern Ireland

Although dairy farming has made excellent progress in recent years with the Holstein-Friesian cow, it is now realised that breeding programmes with a primary focus on yield have inadvertently resulted in increased levels of infertility and reduced health and longevity. For example, a recent AgriSearch/DARD funded research programme on 19 Northern Ireland dairy farms recorded a conception rate to first service of 41%. While some of the problems associated with the Holstein-Friesian breed may be overcome through improved feeding and management regimes, the potential of 'breeding' as an alternative approach to overcoming some of these difficulties must not be ignored.

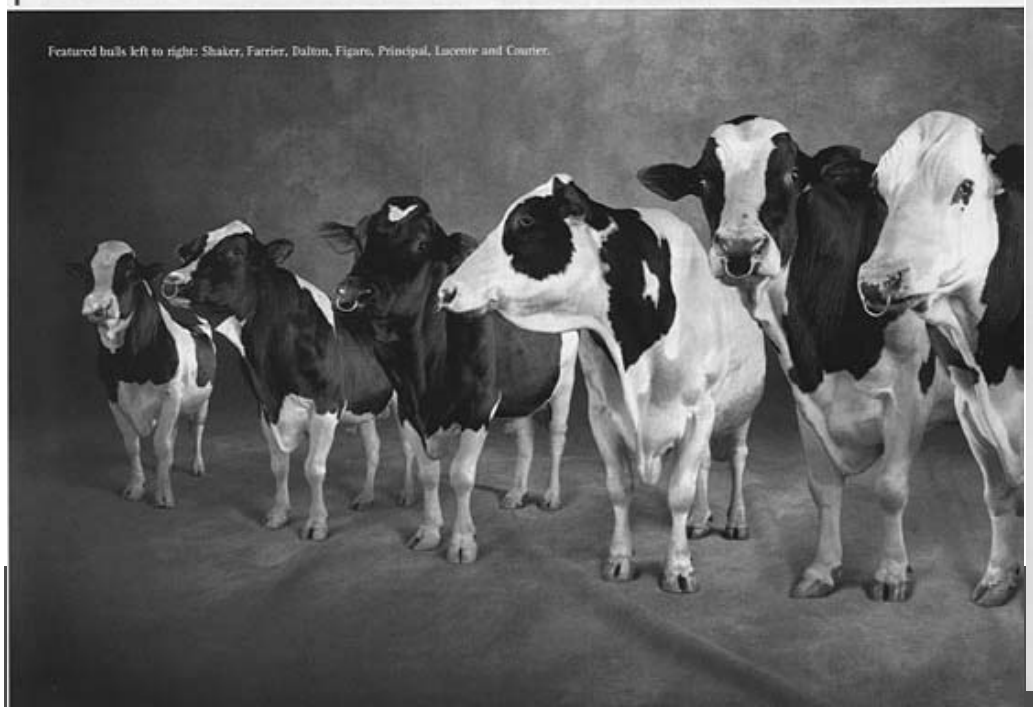
For example, altering breeding goals within a breed, crossbreeding and breed substitution have all been suggested as having a role. The latter two approaches, namely crossbreeding and breed substitution, are currently being examined in research programmes at Hillsborough. This article describes preliminary findings of the breed substitution programme, a programme which involves an evaluation of the Norwegian dairy cattle breed (NRF).

MULTI-TRAIT SELECTION

In contrast to the Holstein-Friesian breed, selection programmes within the NRF breed have been multi-trait in nature for over 20 years. These programmes have placed a major emphasis on functional, as well as type and production traits. For example, current selection programmes in Norway place 22% of their breeding pressure on mastitis resistance, 15% on fertility, 9.0% on growth rate and 24% on milk protein yield. While these breeding programmes appear to have been highly successful within Norway, farming conditions there are very different from those in Northern Ireland. Consequently animals of the NRF breed are currently being evaluated under Northern Ireland conditions.

The study was established in 2000 on 20 dairy farms located across Northern Ireland and involves a total of 230 NRF animals and an equal number of Holstein-Friesian animals. The NRF animals were imported directly from Norway as maiden heifers. These animals were selected from within the top 10-15% of the NRF population in Norway in terms of Total Merit Index (TMI), the Norwegian breeding index, which incorporates functional, type and production traits.

The Holstein-Friesian animals on the study were bred on each of the 20 participating farms, with these animals representing a range of genetic merits. On each of the participating farms, animals are managed according to the farm's normal



Featured bulls left to right: Shaker, Farrier, Dalton, Figaro, Principal, Lucente and Courier.

Crossbreeding shows promise

Preliminary research results show crossbreds can compete with Holsteins and Jerseys

By Jim Dickrell

Though University of Minnesota (U of M) geneticists are still collecting data, early results involving more than 1,200 cows in seven California herds show crossbreds can compete in delivering pounds of protein and fat to the bulk tank.

PHOTO: UNIVERSITY OF MINNESOTA

Results to date, first reported at the American Dairy Science Association meetings in Phoenix in June, compared Holstein and Jersey straightbred cattle to Jersey/Holstein, Normande/Holstein, Scandinavian/Holstein, Montbeliarde/Holstein and Normande/Jersey.

Though these might appear to be exotic, whoever-heard-of-'em, dual-purpose breeds, all have significant cow populations and intense, ongoing breeding programs in Europe.

Montbeliarde and Normande are both French breeds, with 320,000 and 280,000 females enrolled in milk-recording programs. There are more than 400,000 Scandinavian females (Swedish and Norwegian Reds) on test. Compare that to 160,000 U.S. Jerseys enrolled in DHIA programs here.

The preliminary results show that Jersey/Holstein and Scandinavian/Holstein crosses outperform straightbred Holsteins on a pounds-fat plus pounds-protein basis. (see table). And Normande/Jersey crosses are potentially outperforming straightbred Jerseys by 5.5% on a pounds-fat plus pounds-protein basis.

Typically, producers crossbreed for reproduction and health reasons. But this first-of-its-kind, large-scale crossbreeding trial in the United States is starting to show crossbreds can hold their own in milk, fat and protein production as well.

"All of the results we reported are for the first 150 days in milk because we still have a lot of records in progress," says Les Hansen, a U of M geneticist. "Testimonial evidence from the producers is that the crossbreds are breeding back much more quickly than the straightbred Holsteins. Some of the early Normande crosses are breeding back so quickly, they're not going to complete 305-day lactations because they'll have to be dried off before that."

The Scandinavian/Holstein crosses are also high performers when it comes to somatic cell score (SCS). Though there are only 54 such crosses in the data set so far, these animals have an average linear SCS of 1.8—or less than 50,000 cells/ml. The other crosses and straightbreds average about half a linear score higher, though still less than 100,000 cells/ml.

Producers in the study are also tracking stillbirths and calving difficulty. Though not statistically significant, the crossbred cows have a tendency to have fewer calving problems and stillborn calves than do pure Holsteins.

Breeds of service sires, ranked from best to worst for calving difficulty, sort this way: Jersey, Normande, Scandinavian, Montbeliarde, Holstein and Brown Swiss. DT

Holsteins versus crossbreds

Trait	Holstein	Jersey/ Holstein	Normande/ Holstein	Scandinavian/ Holstein
Cows	453	408	238	54
Milk (lb.)	72	69	66	77
Fat (lb.)	2.5	2.6	2.4	2.7
Protein (lb.)	2.1	2.1	2.0	2.2
SCS	2.3	2.6	2.3	1.8
Fat + protein	4.6	4.7	4.4	4.9
% of Holstein		+2.4	-4.8	+6.7

"Scandinavians" come to the fore in cross breeding trials. Who are they?

Remarkable results were disclosed in HI's December issue of 2003 (pgs. 28-29). From the interim report of the cross breeding trials in California, it was evident that especially the cross of Scandinavian x Holstein is doing remarkably well. This group was compared to three other groups: pure Holstein, Jersey x Holstein, and Normandie x Holstein. In terms of production the cross Scandinavian x Holstein was the highest with +7% over the pure Holsteins, while its somatic cell score (SCS) was clearly the lowest of all groups. To be sure, this pertains to a preliminary outcome based on a limited number of milking animals, but the outcome is remarkable nonetheless. This is sufficient reason for HI to research the background of this cross. What falls under the heading "Scandinavian"? We are dealing with the NRF breed from Norway and the SRB breed from Sweden. Can the Holstein breed learn from their strengths? Here's a short overview of both breeds.

Five animals of the Scandinavian x Holstein crossbreed at one of the test farms in California. Behind the name "Scandinavians" the breeds SRB and NRF are hidden.

JAN BIERMA & BERT WESSELINK

SRB: Red all-rounders from Sweden

SRB IN SWEDEN

Just less than half of the total dairy cattle population in Sweden belongs to the SRB breed. Together with the Holsteins, the SRB is considered one of Sweden's most important breeds. The SRB breed and her predecessors have together dominated the face of Swedish dairy breeding for almost a century already. At the beginning of the 20th century the breed was formed by introducing British Ayrshire and Shorthorn genes into the original Swedish red breeds. In 1928 the SRB Association was founded, and still today it continues to promote the interests of the breed. Since 1928 there has also been a continuing influx of new genetics from abroad. With regularity, use has been made of leading bulls from both the Norse NRF breed (see page on the right) as well as Finnish Ayrshires. In addition, Canadian Ayrshires and bulls from the Danish RDM breed have also been incorporated, although very sparingly. Red Holsteins have consistently not been used. 'From a global perspective, it is important that the SRB breed maintains a unique identity. In addition, the Red Holsteins score poorly on a number of health traits that are critical to the SRB breed. For this reason we keep the SRB free of Red Holstein blood,' explains breeding analyst Lars-Olof Barström from the Swedish breeding organization Svenskavel.

25 YEARS OF EXPERIENCE

Today the SRB is a modern dairy breed in which there is consistent selection for production and where careful attention has been paid to secondary traits for 25 years already. 'The first total index TMI was developed in 1976. At that time, production, calving ease, fertility, and conformation traits were included. A number of years later the index was expanded to include udder health. And since 1999, longevity has also been included as a trait,' explains Barström.

At the same time, the breed is supported by a solid breeding program, in which approximately 100 sires are sampled annually. Approximately 1300 doses are distributed from each bull, and as a result of this, fertility information becomes available based on approximately 200 daughters. Approximately 140 daughters provide information for the production index, while about 70 daughters contribute to the index for type. Sweden has - just like the other Scandinavian countries - extensive data collection for veterinary treatments which enables reliable breeding indexes to be calculated for these traits. In addition, information from slaughter-houses is made available in Sweden, so that a beef index based on offspring can be calculated for every bull.

Barström cites production, calving ease, and fertility as the strengths of the SRB breed. The most important points where the breed requires further improvement are udder, and (to a lesser extent) stature. 'Udders remain important. The production of the SRB cow is high and thus ongoing attention to the udder is important,' explains Barström. When mentioning the strengths and weaknesses, it is immediately clear why the cross with Holsteins has led to such remarkable success: the breeds compliment each other very well for these traits as both the udder and stature are outstanding characteristics of the Holsteins.

The Swedish sires that were used in the cross breeding trial in California were Backgård and Stensjö. This is reason for optimism in Sweden. Because although Backgård is currently known as a successful sire of sons, 'today he is unable to compete with the current Swedish top bulls,' concludes Barström.

NRF IN NORWAY

Norway has 280,000 dairy cattle, of which 98% are NRF! On the foundation of this Norse dairy breed, approximately ten local breeds have been conglomerated into one national population since 1950. In the process, a small amount of Holstein blood was added. The diversity in origins still expresses itself today in the colour patterns of the cows and bulls. Black, red, and speckled: they all fall under the heading NRF. That is not the only the remarkable trait that distinguishes this Norse breed from all other breeds. The breeding strategy is also quite unique. For 30 years already, the Norse breeding-program has selected for fertility and various other health traits. This contrasts with global Holstein breeding where attention has been given to traits other than production and conformation only for the last five years or so. The weightings for the current total index for the NRF are shown on the table.

Table - SRB selection traits

TRAITS	WEIGHTING
Production	30%
Beef Quality	6%
Fertility	10%
Calving Ease Sire	5%
Calving Ease MGS	6%
Mastitis Resistance	12%
Other Diseases	3%
Udder	12%
Feet & legs	6%
Temperament	3%
Longevity	6%
Stature	3%

NRF: 30 years of selection for health traits

UP TO 300 DAUGHTERS

Despite the small-scale nature of dairy farming (average of 15 cows per operation) there are still many Norse dairy farmers involved in breed improvement. The participation in milk testing and AI is very high: 96% and 90% respectively! Here's some other notable figures: approximately 90% of the Norwegian farmers make use of AIB, the mating program of the AI Geno, and 39.5% of inseminations are performed using young sires. 'The mating program includes 40% young sires. But this is only advice. Of course, dairy farmers are free to follow or disregard this advice. The use of young sires in Norway stems from loyalty. Apparently, people are convinced that this is necessary to sustain the breeding program,' says Torstein Steine, the technical breeding manager at Geno. The Norse AI annually samples 125 young sires, which receive between 250 to 300 daughters for milk production from their sampling period. Eight to ten young bulls are annually promoted to proven bull status.

ASSESSMENTS

The NRF breed does not have heavily contracted bull dams. The breeding population is spread out over a large part of the national herd. 'We are not a large breeding country. But due to high participation in the mating program, as far as the breeding goal is concerned, we are generally united. As it were, Norway is one large herd,' says Eiliv Kummen at Geno. The Norse AI annually purchases 400 of the total 2000-2500 young bulls that are submitted, and they especially consider the production (50%), conformation and health of the dam. The 400 bulls subsequently undergo an assessment in which growth is measured and attention is given to possible defects. As a result, bulls are selected (total of 125 sires) on the basis of the growth, conformation, and sperm production of the bulls and the performance of the dam. Throughout this period, the health status of the cow is closely monitored. ●

Table - NRF selection traits

TRAITS	WEIGHTING
Production	24%
Mastitis Resistance	22%
Udder	15%
Fertility	15%
Beef Quality	9%
Feet & Legs	6%
Temperament	4%
Other Diseases	3%
Calving Ease and Still Births	2%

Torstein Steine: 'We have done nothing spectacular in Norway'

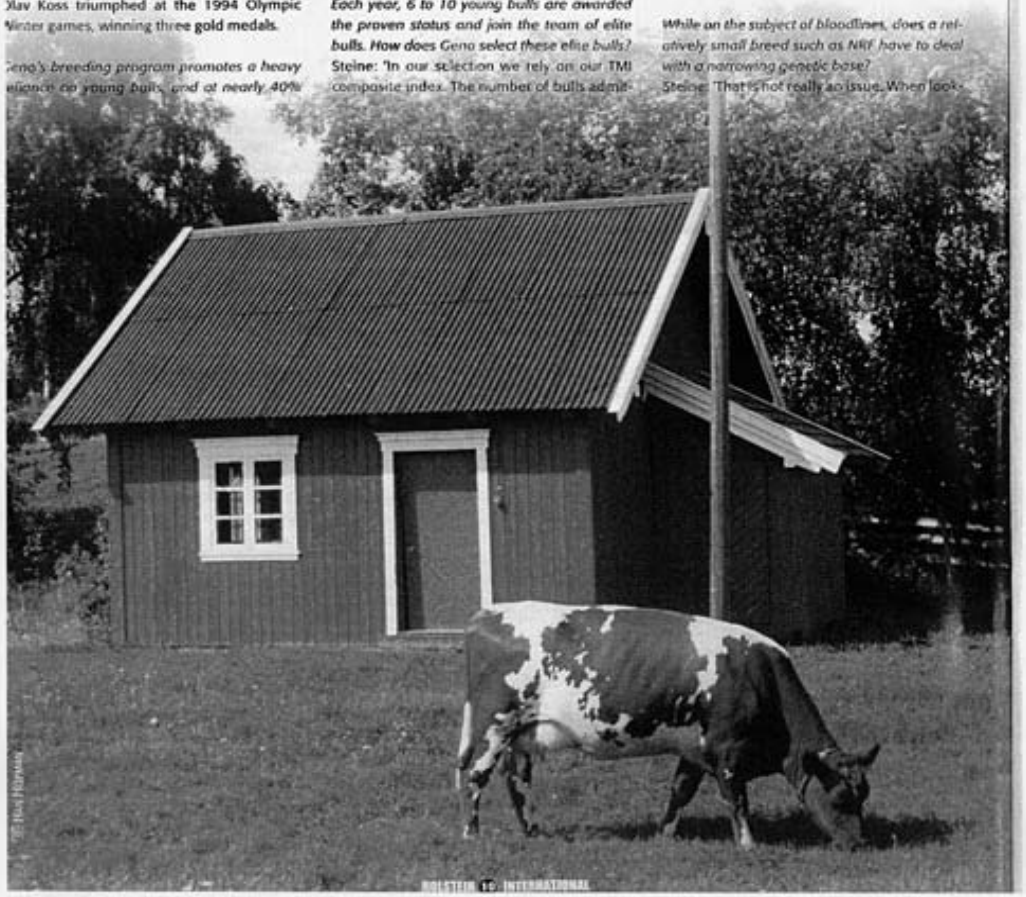
The Scandinavian Red & Whites passed the Californian crossbreeding trials with high marks. HI, curious as to the secret behind the Norwegian breeding methods, interviewed Torstein Steine, the Norwegian architect of one of the Scandinavian breeds, the NRF. In what areas does the NRF breed have the upper hand over Holsteins?

More than thirty years ago Torstein Steine started his career in the field of sheep breeding. As of 1985 he has been involved with the Norwegian dairy breed NRF, and he is currently the chief geneticist at the national breeding organization Geno. We met Steine in the Geno headquarters, located in the south part of the city of Hamar. On one side of the building lies the enormous Mjosa lake, and on the other side you'll find the Vikingskipet, the speed skating stadium where the Norwegian skating hero Johann Olav Koss triumphed at the 1994 Olympic Winter games, winning three gold medals.

Geno's breeding program promotes a heavy reliance on young bulls, and at nearly 40% the utilization of young bulls in Norway is high. Why is this beneficial for Geno?
Steine: 'The reason can be found in the setup of our breeding program. In order to obtain reliable results for traits with low hereditability you need many daughters per young bull (250 to 300). Also, you need to sample sufficient numbers of young bulls in order to make genetic progress. At 40% young bulls we are close to the optimum in terms of genetic progress.'

Each year, 6 to 10 young bulls are awarded the proven status and join the team of elite bulls. How does Geno select these elite bulls?
Steine: 'In our selection we rely on our TMI composite index. The number of bulls admitted to the team of elite bulls depends on the qualities of the particular year. We also pay close attention to ensure that the most important traits, such as yield, fertility, health, and type, are widely available in the sire line-up in order to guarantee dairymen a broad choice. Naturally, we also check that there is sufficient variety in the bloodlines. We like to see as many bloodlines as possible. At the moment we have a team of 14 elite bulls from the last two years. They are the sons of 10 different sires.'

While on the subject of bloodlines, does a relatively small breed such as NRF have to deal with a narrowing genetic base?
Steine: 'That is not really an issue. When looking at the number of unrelated members in the population, the NRF breed has a much broader genetic base than the Holstein breed. The difference amounts to a factor of five. When you focus on one trait for a long time, as was the case with milk yield for Holsteins, you increase the likelihood that in the long term only a limited number of bloodlines remain. As a result several sires' bloodlines obtain a dominant position. Every country is using and sampling the same bloodlines time and time again. The NRF breed is less market-driven, and in the last decades has aimed at improving various traits each carrying roughly the same weight. In the process, a variety of breeding lines surface.'



BERT WESSELDIJK

What course is Geno adopting to safeguard the genetic variety in the NRF breed?
Steine: 'We are more focused on this area than ever before. We have seen what happened to the Holsteins. Inbreeding is a huge problem once you are stuck with it. Geno is taking preventive measures by never using too many sons by one sire (a maximum of 10%). Also, we don't use ET with bull dams, because we regard this as extra costs. Within the population there are plenty of suitable matings to be made. For us it's not as important to have many bulls from just one cow. Furthermore, elite bulls in Norway are, in principle, only marketed for a maximum of two years in order to prevent too many daughters of certain bulls from entering the population.'

Does Geno use Holstein bulls as sires of sons?
Steine: 'Not at the moment. However, if the breeding goal of the Holsteins continues to change, and comes more in the direction of what we are looking for, this could be a possibility in the future. The NRF has an open breeding program. However, introducing another breed does have to add value. At the moment, with Holsteins we stand to lose more than to gain.'

How about the red & white breeds such as Montbéliarde or Normande?
Steine: 'First of all, those breeds are quite heavy and large when compared to NRF. More importantly, we cannot identify the right mates for our breeding goals. Outside of the NRF breed, we currently only make use of SRB from Sweden and Ayrshires from Finland. We're not saying that the other breeds are not good enough, but for the time being we're not able to find the right combinations within other populations. The data collection methodology differs from Norway's, and too few daughters per bull are sampled in order to attain sufficient reliability. Most breeds – with the Holsteins as the prime example – place too much emphasis on milk yield. This focus slows progress when it comes to health traits.'

'If you want to make real progress for health traits you have to be willing to give up a little on milk yield'

If we're correctly interpreting what you're saying, then we should not expect improvements for health traits in the near future for the Holstein breed?
Steine: 'If you want to make real progress for health traits you have to be willing to give up some milk yield. This seems difficult to do in the Holstein world. There is a lot of comparing going on, and the competition is fierce. Those who sell the semen are the ones that stay in business. In other words, there is a lot of commercial pressure. We've done nothing spectacular in Norway. We have simply done what it says in the books: Stick to your breeding goal and make your selections accordingly. Our breeding goal has changed over the years, but it's still pointing in the same direction.'

Due to fertility and health problems, crossbreeding Holsteins with other breeds is on the rise. In California a crossbreeding trial was started, and it turns out that the Scandinavian breeds NRF and SRB receive high marks. The question is: What should you do after crossbreeding for the first time? What is your practical advice to dairymen?
Steine: 'That's a very interesting question! The idea in California is to introduce a third breed in the cross. However, in practice I think this will lead to too much variety within the breed, and it will become too complicated. I personally see more merit in rotating the two breeds. A dairyman who is satisfied with crossbreeding the Holstein with another breed, NRF for example, can decide after the first cross (F1) whether he wants to breed with Holsteins again, or whether he crossbreeds once more with NRF depending on the desired traits. In addition, I see room in the future for the creation of new (composite) breeds, so that cross-bred cows can be mated to cross-breed sires. Time will tell what the best solution is.' ●

NRF – THE NATIONAL NORWEGIAN DAIRY BREED

In the article on the crossbreed tests in California (HI Dec 03, pg. 28-29), the cross Scandinavian red & white x Holstein was noted as doing remarkably well. The Scandinavian breed includes NRF from Norway and SRB from Sweden. A brief overview of both breeds can be found in this year's January issue, on pages 54-55. NRF composes 98% of the 280,000 dairy cows in Norway, and is rightfully the national dairy breed. The Norwegian breeding organization Geno annually samples 125 young bulls, and for the last 30 years has selected for fertility and health traits. The current composite TMI index is composed as follows:

Milk yield	24%
Resistance to Mastitis	22%
Udders	15%
Fertility	15%
Beef production	9%
Feet & Legs	6%
Temperament	4%
Other diseases	3%
Calving ease and number of stillborns	2%

Dairy trends

”In ten years, a majority of Holstein calves will be crossbreds.The cattle most likely to be used will be popular European dairy breeds”.

Leslie B. Hansen

Norden – på vei til å bli Storfeavlens sentrum

–Vi ser en dreining fra at forskere, fagblad og produsenter har fokusert på det som skjer i USA og Holland, til at de nå i økende grad er opptatt av det som skjer på avlsfronten i Norden

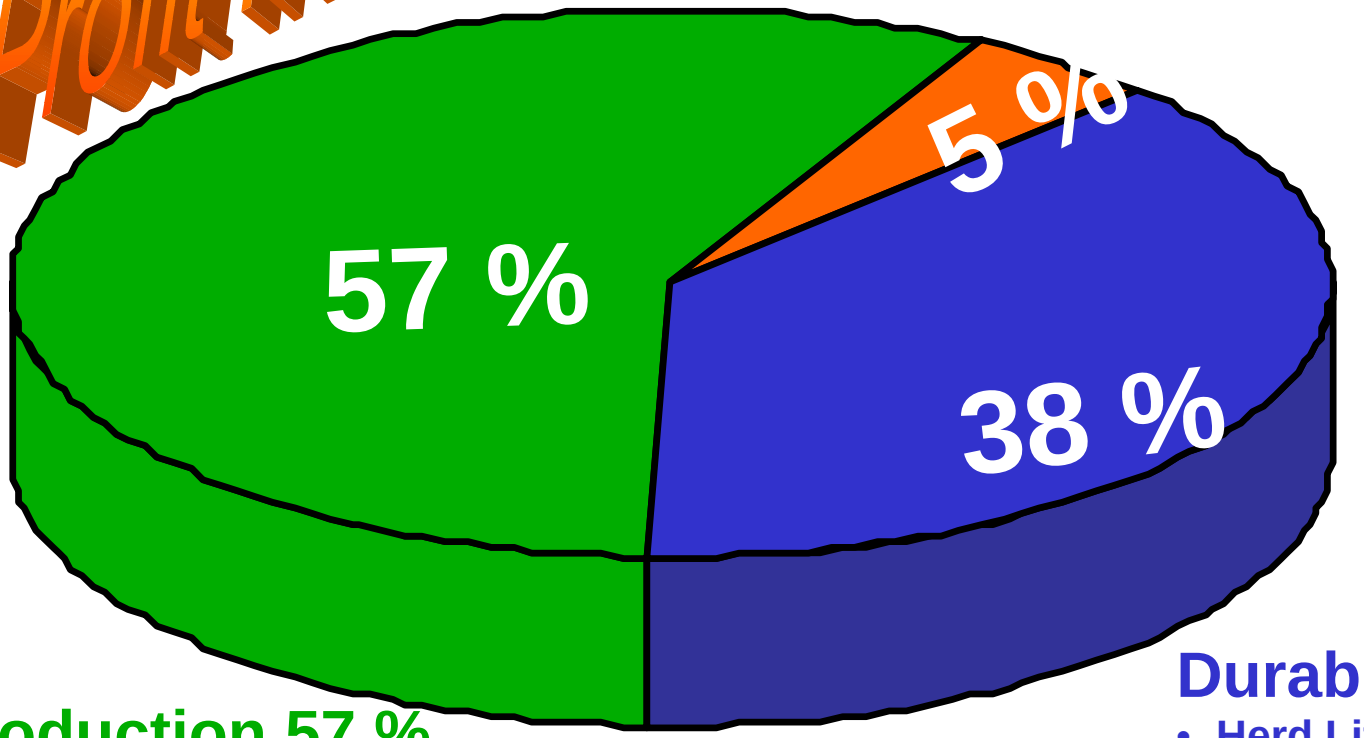
Innføring av "en viss" vektlegging på helse og fruktbarhet:

Frankrike etter år	2000
Tyskland etter år	2000
Holland etter år	2002
USA etter år	2003

Lifetime Profit Index

Health 5%

- Somatic Cell Score 60 %
- Udder Depth 30 %
- Milking Speed 10 %



Canadian Holstein

Durability 38 %

- Herd Life 20 %
- Mam. System 40 %
- Feet & Legs 30 %
- Capacity 10 %

Production 57 %

- Protein Yield 75 %
- Fat Yield 25 %

Hva kan gi oss internasjonal konkurransekraft ?

- **Distribusjon?**
  - Vi har en ulempe pga lang avstand og små volum
- **Pris?**
  - Nordisk kostnadsnivå er ingen fordel
- **Markedsføring?**
  - Pr i dag et konkurransehandikap
- **Produkt?**
  - **Mulighet til å utvikle unike produkt pga registreringer, dokumentasjon og forsprang mht funksjonelle egenskaper**

GENO

Hvordan lykkes på lang sikt

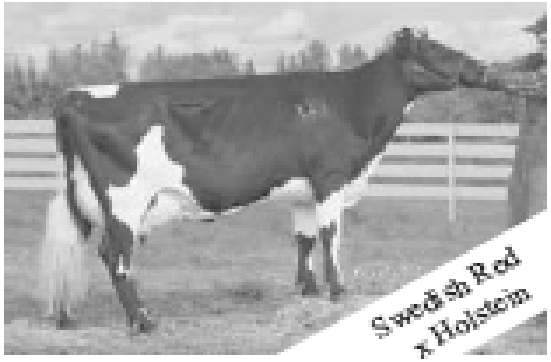
- **Videreutvikle det unike – beholde forspranget**
  - Kombinasjonen funksjonalitet – produksjon
- **Fokusere på avlsmessig framgang iht avlsmålet**
  - Avlsmål, vektlegging, metodikk, ungoksebruk, gjennomføring av avlsarbeidet, Nordisk samarbeid
- **Skape entusiasme og sikre oppslutning om eget avlsarbeid**
- **Ankre opp med de tyngste internasjonale FoU-sentra**
  - Dra internasjonal FoU i retning våre data, men beholde kontroll

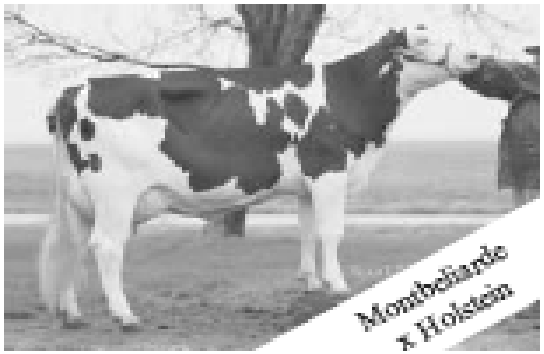
GENO

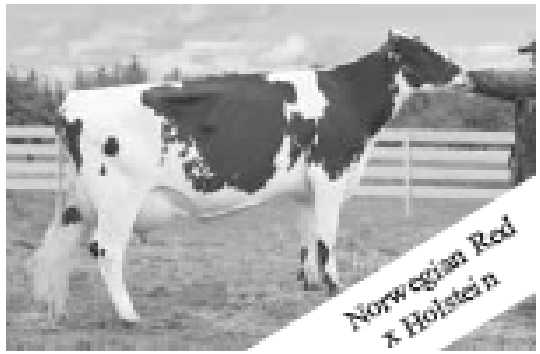
Utfordringer

- Andre aktører markedsfører samme avlsprofil, men nesten uten reelt innhold
- Ny teknologi *kan* gjøre at vårt forsprang reduseres
- Mister kontroll på eget avlsmateriale – mister IPR
- Kryssingsopplegget blir en internasjonal suksess, men kan komme som en bumerang som vanskeliggjør avlsarbeidet i våre rene populasjoner
- Frigjøre ressurser til å kunne arbeide internasjonalt

Cows that can eat grass, keep body condition, and milk all at the same time!







"THE LEADER IN CROSS BRED GENETICS"

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Call: 800-640-BULL (2855)
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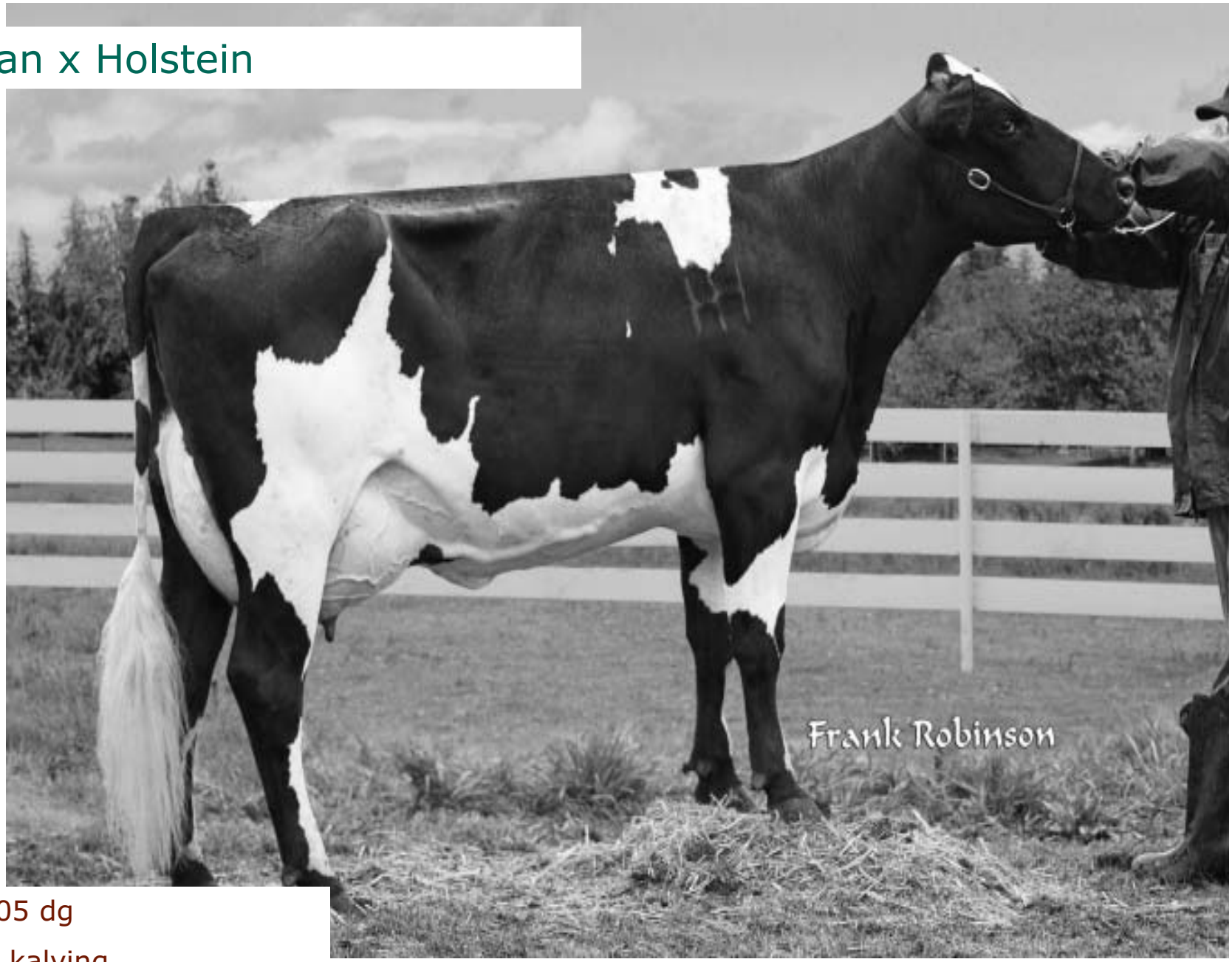
e-mail: cgofca@sbcglobal.net

Scandinavian x Holstein



14.953 kg på 305 dg

Drektig 95 dg e kalving

50.000 lavere celletall enn besetningsmiddelet

GENO

Konklusjon

- Nordisk avlsmateriale har økende internasjonal attraktivitet

- Redselen for redusert framgang på melk, gjør at det vil ta lang tid før andre får framgang for funksjonelle egenskaper

- Dagens utfordringer er å sikre det faglige forspranget og å utvikle forretningsmodeller som gir langsiktig avkastning tilbake til organisasjonene og medlemmene