

# News - NAV evaluation

## August 11, 2020

### Dairy cattle

The latest NAV official evaluation for yield, fertility, conformation, udder health, general health, calving traits, milkability, temperament, growth, longevity, young stock survival, claw health, saved feed and NTM took place as scheduled. NAV carried out three evaluations per trait group:

*Holstein evaluation*, including data from: Danish Holstein, Swedish Holstein, Finnish Holstein, Finnish Ayrshire and Finncattle.

*Red Dairy Cattle evaluation*, including data from: Danish Red, Swedish Red, Finnish Ayrshire, Finnish Holstein and Finncattle.

*Jersey evaluation*, including data from: Danish Jersey, Swedish Jersey, Finnish Jersey, Norwegian Jersey and French Jersey.

### Extraction dates

Dates for extraction of data from national databases are given in Table 1.

**Table 1.** Dates for extraction of data from the national databases

Trait	Denmark	Finland	Sweden
Yield	22.06.2020	10.06.2020	12.06.2020
Type, milkability and temperament	22.06.2020	10.06.2020	12.06.2020
Fertility	22.06.2020	10.06.2020	13.06.2020
Udder health and other disease	22.06.2020	10.06.2020	13.06.2020
Calving <sup>1)</sup>	22.06.2020	10.06.2020	13.06.2020
Longevity	22.06.2020	10.06.2020	13.06.2020
Growth <sup>1)</sup>	22.06.2020	10.06.2020	13.06.2020
Claw health	22.06.2020	10.06.2020	13.06.2020
Youngstock survival	22.06.2020	10.06.2020	13.06.2020
Saved feed	22.06.2020	10.06.2020	12.06.2020

<sup>1)</sup>Including data for the evaluation of beef bulls used on dairy

### Data used in genomic prediction

Genotypes were extracted from the joint Nordic SNP data base 25<sup>th</sup> June 2020. INTERBULL information from April 2020 was included in the genomic prediction.

### News in relation to NAV dairy genetic evaluation

#### Traditional evaluation

- Updated pedigree file for Jersey
- Jersey data from France, Norway and Finland are included in the NAV Jersey evaluation for yield, fertility, udder health and calving traits
- Saved feed included in NTM

#### Genomic prediction

- No changes

### Updated pedigree file

An upgraded pedigree file has been implemented for the Jersey evaluation. The upgrades include:

- A better handling of international id
- Inclusion of French Jersey and Norwegian Jersey animals
- Updates of some old pedigree information from Sweden and Finland

The upgrade of the pedigree file had hardly any effect on the EBVs but make it possible to include French and Norwegian data and will ensure the use of international IDs can follow international standards in the future.

### Jersey evaluation including data from France and Norway

In the August evaluation phenotypes for yield, fertility, calving, and udder health from Jersey in France, Norway and Finland are included in the NAV Jersey evaluation. For udder health it is SCC data only which are included since the amount of mastitis registration data is very limited. As illustrated in table 2 the number of cows with yield data from the three countries is low compared with Danish Jersey, but especially the France Jersey population has been increasing during the last years.

Table 2. Numbers in the dataset for yield evaluation for Jersey

	France	Norway	Finland	Sweden	Denmark
First year	1987	1998	2006	1995	1990
Lactations included	1-3	1-3	1-3	1-3	1-3
No of cows	28,898	10,978	1,034	15,993	727,209
No of lactations	65,128	22,672	1,895	33,440	1,584,693

The impact of including French, Norwegian and Finnish Jersey phenotypes on the EBV for progeny tested Jersey bulls is limited, but a few bulls mainly foreign bulls having limited daughter information in Denmark and Sweden and many daughters in France change in EBVs. But the changes are in line with expectations when information from more daughters is included.

For Swedish Jersey animals we also observe a bit larger changes for production than expected between two official runs due to an update of the handling of missing parents (phantom parent groups).

NTM is calculated for all France, Norwegian and Finnish Jersey females. For traits where phenotypes are not included yet from the three populations the published EBVs are pedigree indices. NTM is calculated for all females from the three countries like for Jersey females from Sweden and Denmark. In table 3 the genetic level of all Jersey females born 1.1.2015-31.12.2017 is shown per country for selected traits.

Table 3. Genetic level of females born 1.1.2015-31.12.2017

Country	Numbers	Y-index	Fertility	Calving	Udder health	NTM
Denmark	156083	100,3	100,2	100,0	99,4	0,6
Sweden	3590	98,0	99,6	99,8	99,2	-2,0
Finland	2417	97,9	99,6	101,0	98,6	-2,5
France	19121	95,1	99,6	99,6	99,2	-4,9
Norway	3229	98,0	100,7	100,0	100,2	-1,3

In November 2020 phenotypes for conformation (only France) and longevity from the three countries will be included as well in the NAV genetic evaluation.

The genetic base for yield, fertility, calving and udder health for Jersey includes Jersey cows from all five countries which are 3-5 year old at publication.

### Saved feed adds more value to NTM

Saved feed is introduced in NTM in the evaluation in August 2020. This is another important piece in the puzzle that makes NTM the most efficient tool for Nordic farmers in selecting for the most profitable cow. NTM is a total merit index that hold traits with an economic importance for Nordic dairy farmers. The number of traits has increased over years due to new registrations being available. Feed efficiency is an important trait that has so far been difficult to include in NTM because of lack of registrations. This will change gradually, and first step is that NAV include Saved feed in NTM in August 2020 based on maintenance efficiency. The plan is to include also metabolic efficiency in Saved feed in November 2020.

The weight factors (table 4) given to Saved feed in NTM are approved by the NAV board following recommendations from the representatives for each breed.

**Table 4.** Relative weights for each sub-index in NTM for Holstein, RDC and Jersey. Previous weight factors (Prev NTM) and weight factors when including Saved feed (New NTM)

	Holstein		RDC		Jersey	
	Prev NTM	New NTM	Prev NTM	New NTM	Prev NTM	New NTM
Yield	0.90	0.90	1.02	1.02	0.83	0.83
Growth	0.08	0.08	0.10	0.10	0.00	0.00
Fertility	0.36	0.36	0.36	0.36	0.26	0.26
Birth	0.14	0.14	0.11	0.11	0.04	0.04
Calving	0.14	0.14	0.10	0.10	0.07	0.07
Udder health	0.30	0.30	0.26	0.26	0.44	0.44
General health	0.14	0.14	0.11	0.11	0.14	0.14
Frame	0.00	0.00	0.00	0.00	0.00	0.00
Feet & legs	0.05	0.05	0.06	0.06	0.07	0.07
Udder	0.18	0.18	0.26	0.26	0.15	0.15
Milkability	0.09	0.09	0.11	0.11	0.09	0.09
Temperament	0.04	0.04	0.03	0.03	0.03	0.03
Longevity	0.06	0.06	0.06	0.06	0.09	0.09
Claw health	0.10	0.10	0.07	0.07	0.04	0.04
Young stock surv.	0.13	0.13	0.19	0.19	0.10	0.10
Saved Feed		<b>0.08</b>		<b>0.13</b>		<b>0.18</b>

Expected genetic response can be assessed by calculating the correlation between each sub-trait index and the NTM index. For example, a value of 0.40 for a trait means that 40 % genetic progress can be expected compared to selection for that trait only. Table 5 shows the expected genetic response for each NTM sub-trait using the new relative NTM weights. Expected responses based on the previous relative NTM weights are shown for comparison.

With the inclusion of Saved feed in NTM, correlations between NTM and other traits change. The correlation to yield and udder conformation will be resulting in a slightly lower, but still considerable favorable, genetic trend. Frame will be the most affected trait and the genetic trend will be change in direction of unchanged size to slightly smaller cows. The correlation between NTM and functional traits as health and longevity will be higher, resulting in a more favorable genetic trend for these traits. For Saved feed itself, having a weight in NTM means that there will be a favorable genetic trend.

**Table 5.** Expected genetic response for the new NTM including Saved feed based on genotyped Nordic Holstein, RDC, and Jersey bulls born 2017-2018. Expected genetic response for the previous (Prev) NTM is shown for comparison.

	Holstein		RDC		Jersey	
	Prev NTM	New NTM	Prev NTM	New NTM	Prev NTM	New NTM
Yield	0.70	0.69	0.73	0.70	0.70	0.65
Growth	0.08	0.07	0.00	-0.05	0.12	0.14
Fertility	0.23	0.24	0.19	0.20	0.02	0.06
Birth	0.16	0.18	0.18	0.26	0.03	0.05
Calving	0.21	0.20	0.19	0.18	0.14	0.14
Udder health	0.30	0.30	0.31	0.30	0.42	0.42
General health	0.24	0.26	0.20	0.21	0.22	0.24
Frame	0.09	0.02	0.00	-0.13	0.15	0.01
Feet & legs	0.18	0.20	0.21	0.27	0.11	0.17
Udder	0.20	0.19	0.23	0.18	0.19	0.16
Milkability	0.05	0.05	0.12	0.12	0.15	0.15
Temperament	0.09	0.08	0.08	0.07	0.05	0.05
Longevity	0.35	0.37	0.46	0.47	0.35	0.39
Claw health	0.14	0.16	0.19	0.23	-0.02	0.02
Young stock surv.	0.18	0.20	0.24	0.28		
Saved Feed	-0.09	-0.01	0.01	0.17	-0.12	0.06
NTM prev		0.99		0.98		0.98
Number of bulls	6049		5101		904	

In table 6 distribution of differences between previous and new NTM for Holstein, RDC and Jersey are shown.

**Table 6.** Distribution of differences between new NTM and previous NTM. Based on 6049, 5101 and 984 genotyped bull calves born in 2017 and 2018.

Change in NTM	Distribution of changes, %		
	HOL	RDC	JER
-4		0.1	1.1
-3	0.0	1.3	3.8
-2	1.8	7.4	15.0
-1	22.8	20.7	23.9
0	52.5	33.6	31.6
1	21.1	25.4	17.0
2	1.7	9.6	6.2
3		1.6	0.8
4		0.2	0.6

### Genetic base

EBVs for bulls and females are expressed on the same cow base. This genetic evaluation included cows born from 11.08.2015 to 11.08.2017 in the genetic base (average 100). The genetic base for Jersey includes now also Jersey cows from France and Norway which are 3-5 year old at publication.

### Publication of NTM for Nordic and foreign bulls

NTM is published if the bull has official EBVs (NAV (G)EBV or international EBV) for Yield, Mastitis and Type. By official means for NAV EBVs that the NAV thresholds are met, and for international

EBVs (IB EBVs) that Interbull EBVs for the single bull exist. For traits without a NAV (G)EBV or an IB (G)EBV a NAV pedigree index is calculated.

For bulls with a Nordic herd book number the pedigree index follows the principles described in the October 2008 routine information. For foreign bulls without a Nordic herd book number the pedigree index is calculated in as  $\frac{1}{2}(\text{EBVsire}-100) + \frac{1}{4}(\text{EBVmgs}-100) + 100$ . If EBVsire or EBVmgs is not official NAV EBVs then 100 is used.

### **Publication of EBVs/GEBVs**

Official EBVs/GEBVs for bulls used for AI in Denmark, Finland or Sweden are published at the [NAV Bull Search](#).

Official NAV GEBVs for foreign AI bulls not used for AI in Denmark, Finland and Sweden are published at [NAV homepage](#). The excel sheets also include GEBVs for bulls used for AI in Denmark, Finland and Sweden. The excel sheets include AI bulls that are 10 months to 5 years old at the date of publication and is mainly useful for foreign AI-companies.

Interbull EBVs/GEBVs are published at the [NAV Interbull Search](#).

### **Genetic evaluation of beef bulls used in dairy herds**

The latest NAV routine evaluation for AI beef bulls based on their crossbred offspring from dairy cows for birth and carcass traits took place as scheduled. Extraction date for the data can be found in table 1.

Breeding values for AI beef bulls are estimated four times per year, in connection to the NAV routine genetic evaluation for dairy breeds (table 7), and EBVs are published at [NAV Beef Search](#).

### **News in relation to NAV genetic evaluation of beef bulls used in dairy herds**

- Updated pedigree file

#### **Updated pedigree file**

An upgraded pedigree file has been implemented for the BXD evaluation. The upgrade includes:

- A better handling of international id
- Systematic coding of all Simmental animals as SIM – earlier also BSM was used

A better handling of international id makes it easier to identify the same bulls in more countries

For Simmental (Fleckvieh) there is a genetic overlap between the beef type and dairy type. Earlier single Fleckvieh bulls used in Danish dairy herds were excluded from the evaluation, but since the recording of the dairy and beef type of Simmental is not uniform across Sweden, Finland and Sweden it has been decided to include all Simmental bulls in the BXD evaluation. The upgrade of the pedigree file had otherwise no effect on the EBVs.

### **Genetic base**

The genetic base for beef bulls evaluated based on dairy crosses is defined as relative breeding values with a mean of 100 and standard deviation of 10. The genetic base animals for beef bulls evaluated based on dairy crosses constitutes of 2-5 year old crossbreds born after beef breeds which can be used in all 3 countries.

### Fee for EBV of beef bulls based on beef x dairy crossbred offspring

Nordic Cattle Genetic Evaluation (NAV) conducts a genetic evaluation of AI beef bulls based on beef x dairy crossbred offspring for calving and carcass traits. A fee system is introduced 1.1.2020 for the service. It means a fee must be paid for all bulls getting publishable EBVs for the first time after 1.1.2020. No fee needs to be paid for bulls already having official EBVs before 1.1.2020. To get published EBVs the following criteria should be fulfilled for each bull:

- The EBV should meet the criteria for publication
- A one-time fee of currently 1,000 euro per bull should be paid

More information about the genetic evaluation and the publication criteria can be found at <https://www.nordicebv.info/beef-cattle/beef-x-dairy-publication/>

### NAV – frequency and timing of routine runs

NAV has 4 large evaluations per year, which include updated phenotypic and genomic data, and additional eight small runs including updated genotypes. In Table 7 the NAV and INTERBULL release dates for 2020 are shown. The beef evaluation based on beef x dairy crossbreeds takes place along with the large NAV runs 4 times a year.

Table 7. NAV and INTERBULL release dates in 2020. EBVs released at NAV dates in bold will be delivered to international genetic evaluation.

Month	NAV Small run <sup>1)</sup>	NAV Large runs <sup>2)3)</sup>	INTERBULL
January 2020	7		
February 2020		4	
March 2020	3		
April 2020	7		7
May 2020		5	
June 2020	2		
July 2020	7		
August 2020		11	11
September 2020	1		
October 2020	6		
November 2020		3	
December 2020	1		1

<sup>1)</sup> Genotypes updated; <sup>2)</sup> Genotypes and phenotypes updated; <sup>3)</sup> Beef x dairy evaluation

You can get more information about the joint Nordic evaluation:

General about Nordic Cattle Genetic Evaluation: [www.nordicebv.info](http://www.nordicebv.info)

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