

# News - NAV evaluation

## 2 May 2023

### 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, Norwegian 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 for the latest official evaluations are given in Table 1.

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

Trait	Denmark	Finland	Sweden
Yield	16.03.2023	07.03.2023	04.03.2023
Type, milkability and temperament	16.03.2023	07.03.2023	03.03.2023
Fertility	16.03.2023	07.03.2023	04.03.2023
Udder health and other disease	16.03.2023	07.03.2023	04.03.2023
Calving <sup>1)</sup>	16.03.2023	07.03.2023	04.03.2023
Longevity	16.03.2023	07.03.2023	04.03.2023
Growth <sup>1)</sup>	16.03.2023	07.03.2023	04.03.2023
Claw health	16.03.2023	07.03.2023	04.03.2023
Youngstock survival	16.03.2023	07.03.2023	04.03.2023
Saved feed	16.03.2023	07.03.2023	03.03.2023
Pure beef cattle	04.04.2023	03.04.2023	30.03.2023

<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 5 April 2023. INTERBULL information from April 2023 was included in the genomic prediction.

## News in relation to NAV dairy genetic evaluation

### Dairy

#### Traditional evaluation

- No changes in the procedures, but a minor problem with mastitis data has been observed causing that some data is missing in the evaluation. The data problem has a very minor impact on the breeding values. The problem will be solved for the August run.

#### Genomic prediction

- No changes

## BeefxDairy

- Gestation length is included as a new trait in the genetic evaluation of beef bulls used in dairy herds.

## Beef pure

- Latest run April 20232

## Metabolic efficiency – data included.

Metabolic efficiency is based on feed intake data. The core trait for metabolic efficiency is residual feed intake, which is the observed feed intake minus the expected feed intake. The expected feed intake is calculated by use of information about yield and metabolic body weight change.

In Table 2 the amount of feed intake data available for the May 2023 run is shown for all three breeds. The amount of feed intake data has increased significantly during the last year. CFIT data is in May 2023 included from in total 19 herds and close to 8,000 cows.

Table 2 Feed intake data for genetic evaluation of metabolic efficiency in February 2023

	Holstein			RDC		Jersey
	CFIT data	Danish research farm data	Abroad research farm data <sup>a)</sup>	CFIT data	Finnish research farm data	CFIT data
Cows with feed intake phenotypes	3070	1227	1581	2703	769	2117
Cows with feed intake phenotypes and genotypes	2378	819	1450	2380	416	1768
Lactations included	1-6	1-3	1-6	1-6	1	1-6
Number of herds	7	1	a)	6	4	6

a) Research farm data from Canada, US and Australia

## GEBVs for dairyxdairy crossbreeds

Joint Nordic GEBVs for dairyxdairy crossbreed females were published for the first time 7<sup>th</sup> December 2021. The procedures for calculating GEBVs have not been changed since the introduction, but for a few animals it has been observed that the changes in GEBVs between two subsequent evaluations are significantly larger than expected. NAV has investigated what is causing these unexpected large changes and expect to be able to improve the procedures in June 2023.

## Genetic base

EBVs for bulls and females are expressed on the same cow base. This genetic evaluation included cows born from 02.05.2018 to 02.05.2020 in the genetic base (average 100).

The GEBVs for crossbred are expressed on a genetic base of 1-7 year old crossbreeds.

## 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 official evaluation for AI beef bulls based on their crossbred offspring from dairy cows for birth, youngstock survival 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 6), and EBVs are published at [NAV Beef Search](#).

### **Gestation length included in the BeefxDairy evaluation.**

Gestation length is an important trait when managing calving patterns on a dairy farm and given that it varies between breeds, it becomes even more important for dairy farmers who are engaged in a beef on dairy program. NAV has added gestation length to the list of the traits available for beef bulls used in dairy herds and starting from May 2023, official breeding values for gestation length based on later parities are published.

Data collected from all three countries showed very similar statistics across country within breed. All data combined, gestation length is about two days shorter on average for heifers (282 days) compared to cows (284 days) and about one day on average shorter for female calves (283 days) compared to male calves (284 days). Heritability estimates (table 3) were quite high (0.56 and 0.57 for first parity and later parities respectively) and the genetic correlation between the two traits was estimated at 0.99 indicating that we are dealing with the same trait. Thus, the decision to publish only one trait, gestation length based on later parities.

Gestation length is what we call an optimum trait. It is not recommended to select for shorter neither longer duration but rather opt for intermediate values which were found by many studies to be optimal for other traits like productive life and calving ease. Therefore, NAV has no plans to include it in the NBDI. Therefore, and unlike the other traits, gestation length breeding values are not standardized to a mean of 100 and standard deviation of 10. They are rather expressed in days and as a deviation from a standard dairy gestation length mean fixed at 280 days. This is to make them easier to interpret and use by the dairy farmers – the EBV express the expected gestation length in days compared to an average dairy bull.

Breeding values for Gestation length are published if the beef bull has got an official EBV for calving traits and reliability for gestation length higher than 50%.

Table 3. Heritability for gestation length

Trait	Heritability	Genetic correlation
Gestation Length heifers	0.56	0.99
Gestation Length cows	0.57	

Table 4 show breed means for bull born since 2014 getting official EBV for gestation length. The results are based on a limited number of bulls and cover a significant within breed variation. 4,7 days for Simmental means that expected gestation length on average will be 284,7 days or 4,7 days longer than if the calf had a dairy sire.

Table 4. EBV breed mean for Gestation length for beef bulls born since 2014. Deviation from 280 days

Sire breed	Number of bulls	Mean EBV gestation length cows, days
Simmental	21	4.7
Angus	52	0.9
Herford	14	2.6
Blonde Aquitaine	10	8.1
Charolais	17	3.9
Limousine	16	6.9
Blue Cattle	71	1.6

### 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 was 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 1,300 euro per bull should be paid

More information about the genetic evaluation and the publication criteria can be found at [NAV homepage](#).

### Genetic evaluation for Purebred Beef animals

The latest genetic evaluation of purebred beef animals took place 18 April 2023. NAV publish EBVs for calving, growth and carcass traits based on phenotypes from purebred beef Angus, Charolais, Simmental, Hereford, and Limousine cattle. Extraction date for the data used in the April evaluation can be found in Table 1. Breeding values for pure beef cattle are estimated four times per year (table 6), and EBVs are published at [NAV Beef Search](#).

### NAV – frequency and timing of official runs

NAV has 4 large dairy evaluations per year, which include updated phenotypic and genomic data, and additional eight small runs including updated genotypes. In Table 6 the NAV and INTERBULL release dates for 2023 are shown. The beef evaluation based on beef x dairy crossbreeds take place along with the large NAV dairy runs 4 times a year. The NAV pure beef evaluation has its own time schedule

Table 6. NAV and INTERBULL release dates in 2023. EBVs released at NAV dates in bold will be delivered to international genetic evaluation.

Month	Dairy Cattle			Beef Cattle	
	NAV Small run <sup>1)</sup>	NAV Large runs <sup>2)3)</sup>	INTERBULL	NAV Pure Beef	INTERBEEF
January 2023	3				
February 2023		7			
March 2023	7			7	3
April 2023	4		4	18	
May 2023		2			
June 2023	6			6	
July 2023	4				
August 2023		8	8		
September 2023	5				
October 2023	3				20
November 2023		7		7	
December 2023	5		5		

<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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