

## **News - NAV routine evaluation**

### **14 August 2012**

The latest NAV routine evaluation for yield, fertility, type, udder health, other diseases, calving traits, milk ability, temperament, growth, longevity, claw health and NTM took place as scheduled. NAV carried out three evaluations per trait group:

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

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

*Jersey evaluation*, including data from: Danish Jersey and Swedish Jersey (only yield and type).

#### **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

<b>Trait</b>	<b>Denmark</b>	<b>Finland</b>	<b>Sweden</b>
Yield	21.06.2012	13.06.2012	14.06.2012
Type, milk ability and temperament	28.06.2012	13.06.2012	18.06.2012
Fertility	26.06.2012	13.06.2012	18.06.2012
Udder health and other disease	26.06.2012	13.06.2012	18.06.2012
Calving	26.06.2012	13.06.2012	18.06.2012
Longevity	26.06.2012	13.06.2012	18.06.2012
Growth	26.06.2012	13.06.2012	20.06.2012
Claw health	26.06.2012	13.06.2012	20.06.2012

#### **Data used in genomic prediction**

Genotypes were extracted from the joint Nordic SNP data base 13th July 2012. Interbull information from April 2012 and national information according to extraction dates in table 1 were included in genomic prediction.

#### **News in relation to NAV genetic evaluation**

The method for calculating EDC has been improved for bulls having sons in Nordic countries and Eurogenomic countries. The improvement has a significant effect for a few Holstein bulls having a lot of sons in Eurogenomic countries. The effect is largest for Feet & Legs.

The definition of phantom parent groups in the blending procedure has been modified to be able to do blending for cows having own records. The number of phantom groups is reduced to two. The change has a very minor effect on candidate animals.

Genomic prediction is included for claw health for the first time for RDC and Holstein. The number of reference bulls is about 2,000 per breed significantly lower than for all other traits. Due to quite small reference populations the increase in the reliability by adding the genomic information is limited. For Jersey the number of reference bull is too low to do genomic prediction.

For genotyped cows the genomic information is blended with phenotypic information for cows with own performance. It means that for yield traits, type traits, udder health, milking speed

and temperament the GEBV substitutes the EBV as the official breeding value for genotyped cows. For heifers and all other traits of cows the phenotypic and genomic information has been combined since May 2011. The genomic information increase the reliability significantly for yield, type, mastitis, milking speed and temperament for genotyped cows resulting in significant reranking in EBVs for the six trait groups (table 2-5). The changes are largest for Holstein cows since the genomic information is more reliable for Holstein and smallest for Jersey reflecting the reliability of genomic information is highest for Holstein and lowest for Jersey. Furthermore cow GEBV on average is 1-3 index points lower than the old EBV for genotyped cows. The drop is caused by the fact that the genotyped cows are cows from the bull dam category where many studies have shown problems with an upward bias. Tab

Table 2. Correlations between May EBV and August GEBV for genotyped cows birth year 2007-2009

	Holstein	RDC	Jersey
Yield	0.86	0.91	0.94
Body	0.85	0.84	0.89
Feet and Legs	0.79	0.80	0.87
Udder	0.76	0.86	0.94
Udder health	0.77	0.85	0.86
Milking speed	0.72	0.88	0.93
Temperament	0.77	0.82	0.94

Table 3. Distribution of changes in EBVs for genotyped Holstein cows birth year 2007-2009, %

<b>Change index</b>	<b>Yield</b>	<b>Udder health</b>	<b>Body</b>	<b>Udder</b>	<b>Legs</b>	<b>Milking speed</b>	<b>Temperament</b>
<b>&lt;= -10</b>	2.4	1.7	4.8	6.6	2.8	10.1	3.3
<b>-8 to -9</b>	5.1	3.6	5.3	5.5	3.9	7.4	3.0
<b>-6 to -7</b>	8.8	7.0	8.1	7.7	4.9	7.8	6.3
<b>-4 to -5</b>	14.7	10.7	10.4	10.2	6.0	8.8	9.2
<b>-2 to -3</b>	18.4	15.9	16.9	12.4	10.7	10.9	14.8
<b>-1 to 1</b>	24.7	22.2	24.1	20.4	18.1	15.4	21.0
<b>2 to 3</b>	11.8	14.7	12.0	12.6	14.5	10.6	14.2
<b>4to 5</b>	7.3	11.0	9.4	8.6	11.4	8.6	10.2
<b>6 to 7</b>	4.0	6.9	5.3	6.6	10.5	7.9	9.8
<b>8 to 9</b>	1.8	3.9	2.3	4.0	6.7	4.7	3.9
<b>&gt;= 10</b>	1.0	2.7	1.4	5.3	10.4	7.7	4.2
<b>Number</b>	<b>1735</b>	<b>1733</b>	<b>1321</b>	<b>1321</b>	<b>1321</b>	<b>973</b>	<b>1321</b>

Table 4. Distribution of changes in EBVs for genotyped RDC cows birth year 2007-2009, %

<b>Change index</b>	<b>Yield</b>	<b>Udder health</b>	<b>Body</b>	<b>Udder</b>	<b>Legs</b>	<b>Milking speed</b>	<b>Temperament</b>
<b>&lt;= -10</b>	0.3	0.4	1.5	0.7	3.6	3.1	1.5
<b>-8 to -9</b>	1.4	1.4	1.6	2.4	3.3	3.6	3.3
<b>-6 to -7</b>	8.3	5.8	5.2	5.0	6.8	8.3	5.9
<b>-4 to -5</b>	17.7	10.3	12.2	12.7	9.9	9.6	13.0
<b>-2 to -3</b>	26.8	14.5	21.8	20.0	15.0	16.1	20.0
<b>-1 to 1</b>	30.0	32.7	30.1	35.0	23.7	21.3	28.5
<b>2 to 3</b>	11.1	17.0	13.3	14.6	11.9	16.1	11.7
<b>4to 5</b>	3.1	10.5	9.4	6.5	13.7	10.0	9.6
<b>6 to 7</b>	1.0	4.5	3.4	1.8	7.2	7.3	5.0
<b>8 to 9</b>	0.3	1.9	1.1	1.3	2.6	2.9	0.7
<b>&gt;= 10</b>	0.1	1.0	0.3	0.0	2.4	1.7	1.0
<b>Number</b>	<b>736</b>	<b>736</b>	<b>615</b>	<b>615</b>	<b>615</b>	<b>521</b>	<b>615</b>

Table 5. Distribution of changes in EBVs for genotyped Jersey cows birth year 2007-2009, %

<b>Change index</b>	<b>Yield</b>	<b>Udder health</b>	<b>Body</b>	<b>Udder</b>	<b>Legs</b>	<b>Milking speed</b>	<b>Temperament</b>
<b>&lt;= -10</b>	0.0	0.0	1.6	0.4	0.4	0.0	0.0
<b>-8 to -9</b>	0.0	2.9	3.1	1.9	1.2	2.0	1.3
<b>-6 to -7</b>	2.3	4.2	7.8	3.9	4.7	3.4	3.4
<b>-4 to -5</b>	10.7	12.0	14.0	12.5	12.5	12.7	8.1
<b>-2 to -3</b>	25.3	19.2	16.7	23.3	18.7	14.7	10.3
<b>-1 to 1</b>	43.8	36.4	29.2	37.0	33.9	31.9	36.3
<b>2 to 3</b>	11.7	15.3	15.2	14.4	14.4	17.6	19.7
<b>4to 5</b>	4.2	6.8	7.4	5.4	8.6	9.8	12.8
<b>6 to 7</b>	1.9	2.6	4.3	1.2	3.9	4.4	5.1
<b>8 to 9</b>	0.0	0.3	0.8	0.0	1.6	2.9	3.0
<b>&gt;= 10</b>	0.0	0.3	0.0	0.0	0.4	0.5	0.0
<b>Number</b>	<b>308</b>	<b>308</b>	<b>257</b>	<b>257</b>	<b>257</b>	<b>204</b>	<b>234</b>

### Genetic base

EBVs for bulls and females are expressed on the same cow base. This genetic evaluation included cows born from 14.08.2007 to 14.08.2009 in the genetic base (average 100).

### Genomic EBVs (GEBVs)

GEBVs combine genomic and phenotypic information. GEBVs are estimated for all combined traits in NTM, single type traits, and NTM. Table 6 describes how different categories of genotyped animals are handled in the evaluation. All non genotyped animals get traditional EBVs.

Table 6 Publication of Genomic breeding values (GEBVs) for different categories of animals

Category of animals		Status	Published Breeding value
Genotyped males	Bulls without a progeny test	Culled	None
		AI bulls with a Nordic herd book number	<b>GEBV</b> when at least 20 month old at publication date
	Bulls with a Nordic or a progeny test abroad	AI bulls with a Nordic progeny test	EBV
		Foreign AI bulls with a Nordic herd book number and a progeny test abroad	IB EBV for all international traits available. <b>GEBV</b> for traits with pedigree information only
Genotyped females	Heifers & cows		<b>GEBV</b>

- EBV=Estimated breeding value based on phenotypic data only
- IB EBV = Interbull breeding value based on phenotypic data only
- GEBV=Genomic Enhanced breeding value – based on phenotypic data and genomic information

For animals having a GEBVs the GEBV is published as the official index instead of the EBV

#### Reliabilities

The reliability of genomic information varies between traits and breeds. Table 7 give a general picture of the reliability of the genomic information used when weighting genomic information and phenotypic information together in GEBV.

Table 7 Reliability of genomic information

	Reliability genomic information
RDC	0.30-0.40
Holstein	0.40-0.50
Jersey	0.20-0.30

#### Publication of NTM for Nordic and foreign bulls

A NTM is published if the bull has official EBVs (NAV 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 estimates EBVs for the single bull. EBVs are used in the following priority NAV EBVs, IB EBVs and Pedigree index. For traits without a NAV EBV or an IB 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.

#### NAV – frequency and timing of routine runs

NAV has 4 evaluations per year including all phenotypic data. In Table 8 the future NAV and INTERBULL release dates are shown. NAV does four extra genomic predictions to get GEBVs based on the newest information for all genotyped bull calves and females. The extra runs take place 15.3, 15.6, 15.9 and 15.12. After the extra runs GEBVs for females are published on national data bases

Table 8. NAV and INTERBULL release dates in 2012. EBVs released at NAV dates in bold will be delivered to international genetic evaluation.

Month	2012	
	NAV	INTERBULL
January 2012		
February 2012	<b>2</b>	
March 2012		
April 2012		3
May 2012	2	
August 2012	<b>14</b>	14
September 2012		
October 2012		
November 2012	<b>2</b>	
December 2012		4

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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**Denmark:** [www.landscentret.dk/nav](http://www.landscentret.dk/nav)

Contact person: Ulrik Sander Nielsen, Danish Cattle, Ph. +45 87405289, [usn@vfl.dk](mailto:usn@vfl.dk)

**Sweden:** [www.sweebv.info](http://www.sweebv.info), [www.svenskmjolk.se](http://www.svenskmjolk.se)

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