

## **News - NAV routine evaluation**

### **15 August 2010**

The latest NAV routine evaluation for yield, fertility, type, udder health, other diseases, calving traits, milk ability, temperament, growth, longevity 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	22.06.2010	20.06.2010	18.06.2010
Type, milk ability and temperament	25.06.2010	20.06.2010	14.06.2010
Fertility	25.06.2010	20.06.2010	19.06.2010
Udder health and other disease	25.06.2010	20.06.2010	19.06.2010
Calving	25.06.2010	20.06.2010	19.06.2010
Growth	25.06.2010	20.06.2010	16.06.2010

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

##### Longevity

NAV published for the first time an EBV for longevity. The joint model is a multi trait linear Animal Model. Denmark and Finland previously used models specially designed for survival traits, while Sweden used a linear model. Further the breeding values for longevity were previously expressed in different ways. In Denmark and Finland functional longevity was published, which implied that longevity was corrected for genetic level for yield. In Sweden longevity was uncorrected, also named productive longevity.

Both types of breeding values were equally good measures of genetic level of longevity – just expressing different parts of longevity. Nevertheless uncorrected longevity is easier to understand, because it directly reflects differences in daughter lifespan between bulls.

The new model is quite similar to the previous Swedish model. Furthermore the published index for longevity is uncorrected for production. The new model has the advantage that it is more flexible in relation to traits included.

The model for longevity is a 5 trait model with the following traits:

- Days from 1<sup>st</sup> calving to end of 1<sup>st</sup> lactation – max 365 days in 1<sup>st</sup> lactation
- Days from 1<sup>st</sup> calving to end of 2<sup>nd</sup> lactation – max 365 days per lactation
- Days from 1<sup>st</sup> calving to end of 3<sup>rd</sup> lactation – max 365 days per lactation
- Days from 1<sup>st</sup> calving to end of 4<sup>th</sup> lactation – max 365 days per lactation
- Days from 1<sup>st</sup> calving to end of 5<sup>th</sup> lactation – max 365 days per lactation

The breeding goal in the index is days from 1<sup>st</sup> calving to end of 3<sup>rd</sup> lactation. The other traits are used as information traits. EBVs for longevity for are published for all bulls with reliability at 50% or higher.

Table 2 Correlations between Longevity EBVs for bulls from the new and the old national model

	Bulls		
	Denmark	Sweden	Finland
RDC	0.80	0.83	0.76
Holstein	0.79	0.85	0.82
Jersey	0.77		

### Udder health

An improved method for estimation of BVs for Udder health has been introduced. Three significant improvements have taken place:

- The new model is an Animal Model – the old model was a Sire Model
- The new model uses single Test day records – the old model used lactation average SCC
- The new model use genetic parameters estimated in 2009 – the old model used genetic parameters estimated in 2006.

The new model include the same traits as the old model

The NAV model treats mastitis as four different traits:

- 15 days before calving until 50 days after calving in first parity (CM11)
- 51 days after calving until 300 days after calving in first parity (CM12)
- 15 days before calving until 150 days after calving in second parity (CM2)
- 15 days before calving until 150 days after calving in third parity (CM3)

An incidence of mastitis in each of these periods is recorded as a binary trait. Linear type classifications for fore udder attachment and udder depth in first parity and somatic cell count test day records in lactation 1 to 3 are used as correlated traits when estimating the EBVs for mastitis resistance.

The EBVs for the four mastitis traits – CM11, CM12, CM2 and CM3 - are weighted together in a mastitis resistance index/udder health index (CM) with a mean of 100 and a STD of 10. The EBVs for the four mastitis traits are weighted together by the following relative weights:

$$CM = 0.25CM11 + 0.25CM12 + 0.3CM2 + 0.2CM3.$$

The three EBVs for SCC are weighted together in an overall EBV for SCC. The relative weights given to the three SCC traits are: 0.5:0.3:0.2. – First lactation is given the largest weight.

Table 3 Correlations between Udder health EBVs from the new and the old model for bulls

	Bulls		
	Denmark	Sweden	Finland
RDC	0.94	0.95	0.96
Holstein	0.94	0.94	0.95
Jersey	0.88		

Correlation for cows between the new and old Udder health index is 0.60-0.70, which is expected since the old index was based on pedigree information only. The correlation to the old Finnish SCC EBV for cows is 0.91-0.92

More information about the mastitis evaluation can be found at

<http://www.nordicebv.info/Publications/English/>

*Combining test day SCS with clinical mastitis and udder type traits: A random regression model for joint genetic evaluation of udder health. 37th ICAR Session and Interbull Open Meeting, Riga, Latvia, 31st May–4th June, 2010 by E. Negussie, M. Lidauer, E. A. Mäntysaari, I. Strandén, J. Pösö, U. S. Nielsen, K. Johansson, J. –Å. Eriksson, G. P. Aamand*

NTM – weight at udder health for cows

By introducing an Animal Model for udder health EBVs for cows include the cows own performance for mastitis, udder type traits and SCC. Earlier cow EBV's for udder health was based on pedigree information only and the missing information about the single cow's mendelian sampling for udder type traits were taken into account indirectly by increasing the weight on udder conformation for cows with own udder conformation records. The correlated information from udder type traits were taken into account by increasing the weight on udder conformation in NTM for cows compared to bulls. By introducing the new model this correction is not valid anymore and the same weights are used for udder health for all animals (Table 4 - table 7).

Table 4. Weights factors for bulls and cows in NTM for Holstein

Trait	NTM weight	NTM cow weights considering approx Multi Trait	
		Cow with own yield records	Cow with yield records and own udder conformation records
	<b>Bulls</b>		
Yield index	0.75	<b>0.68</b>	<b>0.68</b>
Growth	0.06	0.06	0.06
Fertility	0.31	0.31	0.31
Birth index	0.15	0.15	0.15
Calving index	0.17	0.17	0.17
Udder health	0.35	0.35	0.35
Other disease	0.12	0.12	0.12
Body	0.00	0.00	0.00
Feet & legs	0.15	0.15	0.15
Udder	0.18	0.18	<b>0.18</b>
Milk ability	0.08	0.08	0.08
Temperament	0.03	0.03	0.03
Longevity	0.11	0.11	0.11

Table 5. Weights factors for bulls and cows in NTM for RDC

Trait	NTM weight	NTM cow weights considering approx Multi Trait	
		Cow with own yield records	Cow with yield records and own udder conformation records
	<b>Bulls</b>		
Yield index	0.92	<b>0.84</b>	<b>0.84</b>
Growth	0.00	0.00	0.00
Fertility	0.26	0.26	0.26
Birth index	0.14	0.14	0.14
Calving index	0.12	0.12	0.12
Udder health	0.32	0.32	0.32
Other disease	0.12	0.12	0.12
Body	0.00	0.00	0.00
Feet & legs	0.09	0.09	0.09
Udder	0.32	0.32	<b>0.32</b>
Milk ability	0.06	0.06	0.06
Temperament	0.03	0.03	0.03
Longevity	0.08	0.08	0.08

Table 6. Weights factors for bulls and cows in NTM for Jersey

Trait	NTM weight	NTM cow weights considering approx Multi Trait	
		Cow with own yield records	Cow with yield records and own udder conformation records
	<b>Bulls</b>		
Yield index	0.87	<b>0.78</b>	<b>0.78</b>
Growth	0.00	0.00	0.00
Fertility	0.26	0.26	0.26
Birth index	0.06	0.06	0.06
Calving index	0.06	0.06	0.06
Udder health	0.49	0.49	0.49
Other disease	0.04	0.04	0.04
Body	0.00	0.00	0.00
Feet & legs	0.05	0.05	0.05
Udder	0.15	0.15	<b>0.15</b>
Milk ability	0.10	0.10	0.10
Temperament	0.03	0.03	0.03
Longevity	0.12	0.12	0.12

Table 7. Weights factors for bulls and cows in NTM for Red Holstein

Trait	NTM weight	NTM cow weights considering approx Multi Trait	
		Cow with own yield records	Cow with yield records and own udder conformation records
	<b>Bulls</b>		
Yield index	0.75	<b>0.68</b>	<b>0.68</b>
Growth	0.11	0.11	0.11
Fertility	0.23	0.23	0.23
Birth index	0.17	0.17	0.17
Calving index	0.17	0.17	0.17
Udder health	0.35	0.35	0.35
Other disease	0.12	0.12	0.12
Body	0.00	0.00	0.00
Feet & legs	0.15	0.15	0.15
Udder	0.24	0.24	<b>0.24</b>
Milk ability	0.08	0.08	0.08
Temperament	0.03	0.03	0.03
Longevity	0.11	0.11	0.11

### Genetic base

EBVs for bulls and females are expressed on the same cow base. This genetic evaluation included cows born from 15.08.2005 to 15.08.2007 in the genetic base (average 100).

By the introduction of an Animal Model for longevity and udder health the definition of genetic base has been changed from a bull base to and cow base. The cow base has a higher genetic level than the previous base, which means that the indices drop for all animals - see table 8.

Table 8. Change in longevity, udder health and NTM from previous to current genetic evaluation

	Longevity	Udder health	NTM
RDC	-2.0	-1.8	-0,7
Holstein	-6.5	-5.8	-2.7
Jersey	-5.7	-4,3	-2.8

For fertility, calving and resistance against other diseases functional traits, sire models are used and EBVs for cows are not estimated. For these traits, the genetic base includes bulls, which are sires of present cows – see table 9.

Table 9. Definition of genetic base for cows and bulls

Trait	Genetic base
Yield, type, milk ability, temperament, longevity, mastitis resistance and growth*	Cows born 15.08.2005 - 15.08.2007
Fertility, calving and resistance against other diseases	Bulls born 15.08.2001 - 15.08.2003

\*Bull calves born in the same period

### 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 so far performed 6 evaluations per year for all traits. Starting in August 2010 NAV will have 4 evaluations per year. Interbull change the timing of international evaluations in the autumn 2010. In Table 10, the future NAV and INTERBULL release dates are shown.

Table 10. NAV and INTERBULL release dates in 2010/2011. EBVs released at NAV dates in bold will be delivered to international genetic evaluation.

Month	2010/2011	
	NAV	INTERBULL
May 2010	17	
June 2010		
July 2010		
August 2010	<b>17</b>	17
September 2010		
October 2010		
November 2010	<b>2</b>	
December 2010		7
January 2011		
February 2011	<b>2</b>	
March 2011		
April 2011		5
May 2011	2	
August 2011	<b>9</b>	9
September 2011		
October 2011		
November 2011	<b>2</b>	
December 2011		6

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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