News - NAV routine evaluation
6 February 2018

The latest NAV routine evaluation for yield, fertility, type, udder health, general health, calving traits, milkability, temperament, growth, longevity, youngstock survival, claw health 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 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, Swedish Jersey and Finnish 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	19.12.2017	10.12.2017	07.12.2017
Type, milkability and temperament	18.12.2017	10.12.2017	13.12.2017
Fertility	18.12.2017	10.12.2017	08.12.2017
Udder health and other disease	18.12.2017	10.12.2017	08.12.2017
Calving	18.12.2017	10.12.2017	08.12.2017
Longevity	18.12.2017	10.12.2017	08.12.2017
Growth	18.12.2017	10.12.2017	08.12.2017
Claw health	18.12.2017	10.12.2017	08.12.2017
Youngstock survival	18.12.2017	10.12.2017	08.12.2017

Data used in genomic prediction
Genotypes were extracted from the joint Nordic SNP data base 11 January 2018. INTERBULL information from December 2017 was included in the genomic prediction.

News in relation to NAV genetic evaluation
Genomic prediction
- Genomic evaluation for claw health in Jersey
- Females are included in the reference population for fertility, calving traits, claw health, general health, and longevity.
- The procedures used for calculations of deregressed proofs, are slightly improved. Deregressed proofs are calculated from the traditional breeding values and used as inputs for the genomic prediction.

Traditional evaluation
No changes

Females in reference population
In February 2018 genomic breeding values for calving, birth, fertility, general health, claw health, and longevity are improved by adding females in reference population. This has the largest impact for claw health and general health because the bull reference population is relative smallest for those two trait groups.

Table 2 Reference population February 2018

	Reference population	
	Bulls	Cows[d]
Holstein	35,800 [a]	31,600
RDC	8,900 [b]	33,500
Jersey	2,630 [c]	18,200

a) Includes proven bulls from NLD, FRA, DEU, ESP, POL

b) Includes proven bulls from NOR

c) Includes proven bulls from USA

d) Cows having phenotypes

More cows are being genomic tested. This means that more information from cows is available for genomic prediction. Therefore, NAV has improved genomic evaluation by including female information for many traits. In February, it also happens for calving, birth, fertility, claw health, general health, and longevity, and the only remaining trait is youngstock survival.

Largest change for general health and claw health
The effect of adding females to the reference group depends on how much information we had previously. The traits with the lowest amount of information based on bulls alone are claw health and general health. For these traits, the biggest change in breeding values for heifers and young AI bulls is observed. In table 3-5 results for AI-bulls born 2015-2016 is shown. Similar changes can be observed for genotyped heifers.

Table 3. Frequency (%) of changes in breeding values from official run in January to official run in February 2018. 172 Holstein AI bulls born 2015-16.

Change in index (units)	Fertility	Calving	Birth	Claw health	General health	Longevity	NTM
Less than 3	57	88	72	58	75	95	83
3-5	36	12	22	33	23	5	17
More than 5	7	0	6	9	2	0	0

Table 4. Frequency (%) of changes in breeding values from official run in January to official run in February 2018. 197 RDC AI bulls born 2015-16.

Change in index (units)	Fertility	Calving	Birth	Claw health	General health	Longevity	NTM
Less than 3	66	42	58	32	66	57	62
3-5	31	39	30	30	31	40	31
More than 5	3	19	12	28	3	3	7

Table 5. Frequency (%) of changes in breeding values from official run in January to official run in February 2018. 84 Jersey AI bulls born 2015-16.

Change in index (units)	Fertility	Calving	Birth	Claw[a] health	General health	Longevity	NTM
Less than 3	58	39	51	37	55	57	58
3-5	39	35	31	33	33	39	36
More than 5	3	26	18	30	12	4	2

a) January index is a pedigree index

The changes in GEBVs presented in table 3-5 can be explained by inclusion of cows in the reference population, and inclusion of 3 months of new phenotypes. Within each breed the changes are as expected largest for claw health where the bull reference population is relative smallest.

Genomic breeding values for yield for genotyped cows
The improved procedures for deregression cause that GEBV for genotyped cows decrease about 2 Y-index units.

Genomic evaluation for claw health for Jersey
Besides the improvements mentioned above, genomic evaluation for claw health is introduced for Jersey. This means that in the calculation of NTM for genomic tested young animals pedigree indices are substituted by a genomic breeding value.

Reliabilities
NAV has looked at both effect of adding cows in the reference population on the validation reliabilities, and the published reliabilities (model reliabilities). Adding females in the reference population do increase both the validation and the model reliabilities significantly. In table 6 the increases in the published reliabilities are presented. The model reliabilities are high and seem to over predict the real increase in reliabilities by adding females to the reference population for the low heritability traits. NAV will investigate that in more details in the future.

Table 6. Mean model reliabilities from official run in January to official run in February 2018. 172 Holstein, 197 RDC, and 84 JER AI bulls born 2015-16.

		Fertility	Calving	Birth	Claw[a] health	General health	Longevity
Holstein	Jan 18	0.62	0.67	0.76	0.48	0.51	0.65
	Feb 18	0.74	0.71	0.79	0.59	0.62	0.69
RDC	Jan 18	0.43	0.45	0.60	0.34	0.38	0.38
	Feb 18	0.61	0.56	0.68	0.52	0.52	0.51
Jersey	Jan 18	0.50	0.25	0.44	-	0.32	0.37
	Feb 18	0.56	0.43	0.62	0.46	0.46	0.45

a) January index is a pedigree index for Jersey

Genetic base
EBVs for bulls and females are expressed on the same cow base. This genetic evaluation included cows born from 06.02.2013 to 06.02.2015 in the genetic base (average 100).

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 ½(EBVsire-100) +1/4(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 page 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 month 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 page [NAV Interbull Search]().

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 2018 are shown.

Table 7. NAV and Interbull release dates in 2018. EBVs released at NAV dates in bold will be delivered to international genetic evaluation.

Month	NAV Small run[1]	NAV Large runs[2]	Interbull
January 2018	2		
February 2018		6	
March 2018	6		
April 2018	3		3
May 2018		2	
June 2018	6		
July 2018	3		
August 2018		7	7
September 2018	4		
October 2018	2		
November 2018		6	
December 2018	4		4

[1] Genotypes updated; [2] Genotypes and phenotypes updated

You can get more information about the joint Nordic evaluation:
General about Nordic Cattle Genetic Evaluation: [www.nordicebv.info]()
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