

## **News NAV evaluation**

### **7 December 2021**

The latest Nordic Cattle Genetic Evaluation (NAV) routine genomic prediction took place as scheduled. NAV carried out genomic prediction for Holstein, RDC and Jersey:

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

Genotypes were extracted from the joint Nordic SNP data base 15 November 2021. INTERBULL information from August 2021 and national information from 2 November 2021 run were included in the genomic prediction.

#### **Publication of GEBVs**

GEBVs for bulls and females are published monthly. Nordic phenotypic information is updated 4 times a year (February, May, August and November), and is used in the reference population for genomic prediction. The GEBVs for pure breed animals are expressed on the same cow base as in the November evaluation; cows born from 02.11.2016 to 02.11.2018. The GEBVs for crossbred animals are expressed on a slightly different genetic base; females born from 02.12.2013 to 02.12.2020.

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

#### **GEBVs for dairyxdairy crossbreds**

Joint Nordic GEBVs for dairyxdairy crossbreed females are published for the first time 7<sup>th</sup> December. The research behind the published GEBVs for crossbreds has taken place in a Danish GUDP project involving Aarhus University, Viking Genetics, Viking Denmark and Seges.

NAV calculates GEBVs for crossbreed females having RDC, Holstein and Jersey genes. Requirements for crossbreds to be included:

- The sire of the crossbred animals must be HOL, JER or RDC
- The maternal grandsire of the crossbred animals must be HOL, JER or RDC.

GEBVs are calculated for NTM, and all overall indices in NTM except young stock survival. Furthermore, GEBVs are calculated for milk, fat, protein and all conformation traits. Young stock survival is not included because GEBVs for young stock survival are not calculated for Jersey.

The method for calculating GEBV for crossbreds is built on the following principles:

- From the genotype from each crossbred animal, it is detected which SNPs originate from which breed (RDC, Holstein or Jersey)
- SNP solutions per trait from the genomic prediction for pure breed RDC, Jersey and Holstein animals are used to predict GEBVs for crossbreds
- Breed means per traits for Jersey, RDC and Holstein are considered
- All overall traits in NTM are considered, but with approximation since breed means cannot be directly estimated for combined traits e.g., fertility based on the trait “days from first to last insemination”
- For weighting of traits in the NTM for crossbreds the standardisation factors applied for Holstein are used
- The GEBVs for crossbred are expressed on a genetic base of 1-7 year old crossbreds, meaning that GEBV for crossbreds can be compared with each other, but not with

GEBVs for pure breed RDC, Holstein and Jersey animals, and existing Danish EBVs for crossbreed animals

The variation in GEBV among crossbreed vary from trait to trait depending on breed proportions since there are large breed differences for some traits e.g., claw health is significantly better in Jersey than Holstein, whereas milk yield (M-index), and stature is significantly higher for Holstein than for Jersey.

It is not possible to calculate reliabilities for GEBVs for crossbreeds, but in the development work, it has been proven that GEBVs for crossbreeds are more reliable than pedigree information.

In the future it is also the aim to calculate GEBVs for crossbreeds having Montbeliarde genes. However, that requires NAV to get access to genotypes from Montbeliarde animals so it can be detected from the genotypes if a SNP comes from the Montbeliarde breed.

#### **Publication of NAV EBVs on search pages**

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

Interbull EBVs/GEBVs are published at the [NAV Interbull Search](#) page. The Nordic total merit index (NTM) is not calculated based on GMACE GEBVs, since Interbull regulations do not require member countries to calculate total Merit Indices based on Interbull GEBVs, and internationally it is not a common practice.

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