Improved quality of genomic breeding values for RDC and Jersey

From July 2014 females are included in the reference population for RDC and Jersey, which is used for calculating genomic breeding values (GEBV). Inclusion of females gives higher reliabilities on GEBV. Also some other improvements have been implemented in the calculations of GEBV for these two breeds, which also improves the quality of GEBV (the previous problem with underestimation of some categories of animals is now solved). This means that farmers can more easily identify the best females for breeding and AI companies can more easily identify the best males for AI. The increased reference population will have an influence on GEBV's for females in June and bulls in August.

The limited size of the reference population has been the main problem for RDC and especially for Jersey since the start of calculation of breeding values with genomic information. Holstein has much larger reference population than RDC and Jersey because the Holstein population in Denmark, Finland and Sweden is considerably bigger and also because proven bulls from other countries (through the EuroGenomics cooperation) are also included. The possibilities to cooperate with other populations are rather limited for RDC and Jersey and therefore the best option was to increase the reference population by including females. At the moment Jersey is however also exchanging genotypes with US Jersey and RDC is exchanging with NRF (Norwegian Red Breed).

The need for genomically tested females to be included in the reference population was the reason why VikingGenetics started a project in cooperation with RDC and Jersey farmers already in 2012. In the project a large number of herds in Denmark, Sweden and Finland have tested all females of a certain age. This has increased the number of tested females considerably and now when these are included in the estimations, positive results are achieved.

In addition to adding females to the reference population when estimating GEBV for RDC and Jersey, NAV has also improved the genetic models and methods used for estimations. This also improves the quality of GEBV considerably for these breeds and removes the underestimation of genetic level that has previously been observed in RDC and Jersey. For RDC and Jersey the genotyped young bulls and heifers increase on average 4 and 2 index point for NTM.

Using females in the reference population together with the other changes done increases the reliability on GEBV for yield, udder health, conformation, temperament and milking speed. Thus, for traits where the breeding values of females are affected by cows own performance. The increase in reliabilities for RDC is on average about 5% and for Jersey about 8 % depending on trait and breed compared to only having bulls in the reference population. This means that reliabilities are closer to what we see for Holstein.

The improved GEBV makes it possible to identify the genetically best animals more accurately. However it also means that some reranking will occur among the already tested bulls and females since GEBV can change. Results show, that the correlation between breeding values with or without females in the reference population is around 0.90 for both bulls and females. For yield this means that for about 20% of the cows the breeding value changes 5 or more index units.

Inclusion of females in the reference population for Holstein will be done at a later stage.