

Improved breeding values for general health

Elisenda Rius Vilarrasa (NAV/Växa Sverige), Emma Carlén (NAV/Växa Sverige), Terhi Vahlsten (NAV/Faba) and Anders Fogh (NAV/SEGES)

In May 2019 several improvements were implemented in the NAV genetic evaluation for general health. The most important changes are the addition of Beta-hydroxybutyrate (BHB) and acetone data from Finland, and an improved evaluation model. Additionally, following the upgrade of the NTM in November 2018, economic weights for the included traits in the sub-index for general health were also updated. All together, these changes have an impact on general health breeding values (EBVs) for sires and cows.

Additional information from Finland

High BHB and acetone (ketone bodies) concentration in milk indicates (sub)clinical ketosis. These traits have a genetic correlation to ketosis, but also to other metabolic diseases, and inclusion of data on ketone bodies in the genetic evaluation will therefore give more reliable EBVs for general health traits. Before May, only Danish information on BHB and acetone was used as indicator traits. Now this information is also included from Finnish herds. This increased the reliability of EBVs for ketosis and other metabolic diseases considerably, especially for Finnish cows and for bulls with many daughters having BHB/acetone information added.

Improved model

Disease treatment frequencies differ significantly across countries and years for some traits. These differences are now handled with an improved methodology than in the previous evaluation causing rather large changes in EBVs for all traits in both Holstein and RDC. In the Jersey evaluation, this effect is less notorious as Jersey animals are predominantly from Denmark, therefore data editing only considers differences in disease treatments over time.

Different genetic levels for animals with unknown parents were accounted for by introducing so-called “genetic groups” in the genetic evaluation for all breeds. The effect is that the genetic level of all animals in a population is now more correctly estimated. As a consequence, there are re-ranking of bulls and cows with the largest effect observed for older Finnish bulls, which showed an increased genetic level.

Updated weights

With the revision of the NTM in 2018, new economic weights for single disease traits within general health index (e.g. ketosis and other metabolic diseases), were estimated and these have now been implemented in the general health evaluation. Further, how EBVs for different lactations are weighted together has also been adjusted so that EBVs for 3rd lactation now have more weight than those from 1st lactation. These changes in economic weights and lactation weights had considerable impacts on the EBVs for both bulls and cows in all breeds.

More reliable breeding values

Taking all the above-mentioned changes in the general health evaluation into account the effect is improved breeding values for both bulls and cows of all breeds. The increased reliability of breeding values implies more changes in ranking of animals than at an ordinary update. Compared to the previous evaluation (Feb, 2019) 95%, 90% and 83% of the Swedish, Finnish and Danish RDC cows born between 2009 and 2017 changed less than 3 EBV index units for the general health index, respectively. The proportion of bulls that changed less than 3 EBV index units for the general health index is 78%, 75% and 73%, for Swedish, Finnish and Danish RDC bulls, respectively. The larger impact on the EBVs for the Danish RDC population is mainly due to differences in disease treatment frequencies between Denmark compared to Sweden and Finland. More changes for Finnish animals compared to Swedish animals is mainly related to the addition of new information of BHB and acetone from Finnish herds.

Read more about the new evaluation for general health in NAV newsletter for May 2019 on www.nordicebv.info.