# Improved genetic evaluation for milk traits

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The Nordic genetic evaluation for yield was first introduced in 2006. In 2009 a project was started to improve the current model used to estimate breeding values. New parameters and other model improvements are implemented in routine runs from February 2012. The new model results in better breeding values for yield.

## Small individual changes for most bulls and cows

Implementation of the new model results in some changes for both bulls and cows, but the effect will be largest for cows.

For bulls the correlation between breeding values calculated on the basis of new and previous model are very high (0.98-0.99). This means that bull EBVs for yield will be almost the same as before and little reranking. Results show that most proven bulls change less than 2 index units and only very few bulls change more than 4 index units. This is the case for all breeds in all countries.

For cows the changes are larger. In Denmark and Sweden the correlation between breeding values calculated with new and previous model are only a bit lower than for bulls (0.96), while it is lower in Finland (0.90-0.92). This means that there will be some reranking between cows especially in Finland. In Denmark and Sweden the reranking will be limited.

The largest changes in yield indices are found for cows which have test days with elevated protein- or fat percentages during the lactation. This is because high or low protein or fat percentages on single test days have a smaller influence on indices than previously, which is more reasonable.

Results show that most cows change less than 2 index units for yield. However some cows change more than 5 index units. For the Holstein breed such a large change is observed for 1-2% of all Danish and Swedish cows and for 4-5% of all Finnish cows. Changes in the same magnitude as for Danish and Swedish Holstein will be observed for Danish Jersey cows. For RDC changes of more than 5 index units for yield will be the case for 3-4% of all Danish and Swedish cows, compared to 10-12% of all Finnish cows.

## Effects on cow top list for yield

One important effect of the new model is that the number of cows with high indices from each country is different than previously. Especially more Finnish RDC cows will get high indices– see table 1.

Table 1. Cows in top 1000 with previous and new yield model

|  | RDC | | Holstein | |
|  | Before Feb. 2012 | After Feb. 2012 | Before Feb. 2012 | After Feb. 2012 |
|---|---|---|---|---|
| Denmark | 160 | 175 | 729 | 850 |
| Finland | 390 | 608 | 10 | 28 |
| Sweden | 450 | 217 | 261 | 122 |

## Explanations for the changes

Cow indices have previously not been fairly comparable between counties and the new model adjusts for that by an improved correction for differences in variation within herds. This implies that it

will now be easier to find the genetically good and bad cows in herds where the performance of the cows is very equal. Thus, now variation of cow indices will be much more similar both across countries and across herds. This is the main explanation for the results in table 1, where Swedish cows earlier had much higher variation and thus, easier to get cows on the top list.

New genetic parameters also explain changes in indices for individual cows. In the new model the same parameters are used within breed for all countries. Heritability's are higher, which means that the cows' own yield have a larger influence on the indices. That is another reason why cows changes more than bulls. Further the genetic correlations between traits, lactations and sections within lactation are altered.

Correction for herd-test-day is in the new model done the in the same way for all breeds in all countries. This has most effect on Holstein and Jersey in Denmark and Sweden where this effect was treated differently in the previous model.