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Improved breeding values for Fertility

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Two years ago, in 2022, the new Single Step method for calculating breeding values was introduced. So far, indices for eight traits are calculated with the new method. The turn has now come to Fertility, for which indices were calculated for the first time using the new method in November. In general, the changes in indices for fertility are minor with the new model.

Index for **Fertility** describes genetic potential to start or resume heat cycle after calving, to show estrous and to conceive at insemination. The higher the breeding value the better the fertility. The fertility index includes breeding values for interval from first to last insemination (heifers and cows), interval from calving to first insemination (cows) and number of inseminations (heifers and cows)

For all breeds, there is in general a small increase in the index level for genotyped animals, while proven sires and none-genotyped animals show a slight decrease. Across many of the animal groups within the three breeds, there is a small positive increase in the trend for fertility, indicating that younger animals will become slightly better compared to older animals. The correlation between the old and new model is high, meaning that reranking among animals born in the same year is small. The introduction of the new single step model offers some improvements compared to the old two step model. More information about the single step model is provided in the article New method to calculate breeding values for Dairy breeds.

Changes in fertility will affect NTM

Fertility has a high weight in NTM for Holstein and RDC, at 0.36. For both breeds fertility has the second highest weight in NTM with only yield having a higher weight. For Jersey, the weight on fertility is 0.26, making it the third highest weight in NTM, following yield and udder health. The change in fertility due to the new calculation model will therefore impact the NTM in the November index round.

Most animals have a small change in fertility, which has a minor effect on NTM. For Holstein and RDC, a change of 3 index units in fertility will result in a 1-unit change in NTM. However, few animals will change a lot with up to 20 index units. For a Holstein animal with a 20-index unit change in fertility, the NTM will change with 7 index units, which is a substantial difference.

Good stability for proven sires

All breeds show high stability for the proven sires, and the reranking between the bulls born in the same year is minor. For all breeds, the index level will decrease slightly, though Holstein and RDC will have a small positive increase in the trend, meaning that younger animals will become slightly better compared to older ones. For the proven sires born after 2009, 75 percent of the bulls across all breeds will change by no more than 3 index units. For Holstein around 10 percent of the bulls will drop by more than 5 index units, for Jersey and RDC, the figure is around 5 percent.

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Reasonable results for genomic bulls

For all three breeds, the average index level for genomic bulls will increase, with Holstein showing the largest increase of 2-3 index units. The reranking for the genomic bulls born in the same year will be slightly larger compared to the proven sires, as the reliability for genomic bulls is lower. The trend is similar for Holstein and RDC, while Jersey shows a small positive increase, indicating that younger animals will be slightly better compared to the older ones.

For Holstein and Jersey, around half of the bulls change by a maximum of 3 index units, while for RDC, this figure is 75 percent. In Holstein, 70 percent of the bulls change by no more than 5 index units and around 25 percent increase more than 5 index units. For Jersey, 75 percent of the animals change by a maximum of 5 index units, while for RDC, this is close to 85 percent. For both RDC and Jersey, 15 percent of the animals increase by more than 5 index units.

None-genotyped females are again most stable

For all traits that has changed to the single step method, none-genotyped females show the greatest stability, and fertility follows this trend. Across all three breeds, there is minimal reranking between the animals born in the same year. For Holstein and RDC, the index level has slightly decreased while the trend has become more positive, indicating that young animals become slightly better compared to older ones. For Jersey, the index level has increased slightly, while the trend remains unchanged. In all breeds, close to 85 percent of the animals will change by a maximum of 2 index units, with only 1-2 percent changing by more than 5 index units.

Smaller changes for genotyped females

For all three breeds the index level for genomic tested females without phenotypes shows a small increase, and the trend shows a positive change, meaning that younger animals become better compared to older ones. For genotyped animals with phenotypes, the increase in index level is smaller, with only Holstein and RDC showing a small positive increase in the trend.

RDC is the most stable breed, with 65 percent of the animals changing by a maximum of 3 index units, compared to 55 percent for Jersey and 50 percent for Holstein. Only 15 percent of RDC animals change by more than 5 index units, while the figure is 25 percent for Jersey and 30 percent for Holstein. The small increase in index level means that most of the animals that change more than 5 index units will show an increase in the fertility index.