

New Nordic Total Merit index with continued focus on profitable dairy cows

In October 2008 a new joint total merit index named Nordic Total Merit (NTM) for the Nordic Red breeds, Holstein and Jersey in Sweden, Finland and Denmark will be published for the first time. The NTM-index was enabled by the development of joint Nordic EBV's for the different traits groups and was driven by the formation of Viking Genetics across Denmark and Sweden at the beginning of this year. This means that all bulls and cows in Sweden, Finland and Denmark will have the same total merit index in all three countries. In that way, it will be possible to compare all bull from these countries in relation to genetic superiority for economic performance.

Total merit indices

The idea of a total merit index that includes all traits of economic importance has been practised in the Nordic countries for many years and has now been adopted in many other countries. Studies show that the present total merit indices in the Nordic countries are more or less similar. However, there are some minor differences between countries and breeds.

In the recent years Nordic Cattle Genetic Evaluation (NCGE) has developed joint EBV's for the different trait groups. This means that most traits are evaluated on a Nordic basis and the last ones will follow in the near future. Thus, a joint Nordic total merit index is a logical next step.

Solid calculations and political considerations

The development has been a two step procedure. During 2007 the economic basis for the NTM-index was calculated, and in January 2008 results were presented for farmer representatives in Sweden, Finland and Denmark. During winter and spring 2008 the results have been evaluated from the perspectives of animal welfare, ethical views, environmental considerations and expectations to future production circumstances. In June 2008 the results were discussed once again, and the final composition of the NTM-index within Holstein, the Nordic Red breeds and Jersey was decided.

The basis for the calculations was the observed level for the different traits and prices on input factors and dairy products at the beginning of 2007. The reason for staying with that period was that prices have been very fluctuating and unstable since then.

The index weights given to the sub indices in the NTM-index are primarily based on the economic value of each single trait. The economic value is the marginal value of genetic improvement of that trait – keeping the remaining traits constant. As an example the value allocated to protein yield was calculated as the economic profit of improving yield with one kg of milk protein from the present level. The most important factors determining this profit are of course feed prices, price of milk and marginal feed utilization. The same type of calculation was done for all other important traits, e.g. udder health, fertility, calving ease, conformation, meat production, other health traits and longevity.

The ratio between costs and income influences the economic values. For instance, increased feed prices compared to milk prices mean a lower economic weight on yield in the breeding goal and shift the balance from production traits towards functional traits.

Economic values were calculated for all breeds within the different production environments. This means that biological assumptions were defined for each breed within each country. Four production environments were defined (Danish-, Swedish-, Southern- and Northern Finnish

environments). The economic values within breed groups across production environments were with exception from Northern Finnish production circumstances quite equal. It was therefore decided to construct the joint NTM-index. This index is based on average economic values (Danish, Swedish and Southern Finnish production circumstances).

Weights in the new NTM-index

The process including political considerations where expected changes in production circumstances, animal welfare, ethical views and environmental considerations were taken into account, ended up in the index weights for the NTM-index given in table 1.

Table 1. Index weights to be used in the NTM-index from October 2008 and onwards

Trait	Holstein NTM	RDC NTM	Jersey NTM
Yield index	0.75	0.92	0.87
Growth	0.06	-	-
Fertility	0.31	0.26	0.26
Birth index	0.15	0.14	0.06
Calving index	0.17	0.12	0.06
Udder health	0.35	0.32	0.49
Other disease	0.12	0.12	0.04
Body conf.	-	-	-
Feet&Legs	0.15	0.09	0.05
Udder conf.	0.18	0.32	0.15
Milk ability	0.08	0.06	0.10
Temperament	0.03	0.03	0.03
Longevity	0.11	0.08	0.12

The overall aim for all breeds in Finland, Sweden and Denmark is still high yielding cows with improved genetic level for functional traits resulting in improved economic profit for the dairy farmer. The new NTM-index is not a revolution compared to the present national TMI indices, but it is an update based on solid theoretical calculations and expectations for the future. The breeding goals for the national Nordic cattle breeds have been on right track for many years. The new index can therefore be seen as a valuable adjustment. However, the most important change is that it is a joint Nordic index.

Changes in published EBV

In the future the average total merit index in the base population will be 0. This is normal practice in Finland and Sweden, whereas the average has previously been 100 in Denmark. The standard deviation will be kept at 10. Of course these changes do not affect ranking of bulls and cows, and total merit indices can be used as usually.