Longevity of Nordic dairy cows can be improved

Most farmers and breeding companies are interested in breeding for longevity, thus selecting cows and bulls that will get daughters with a greater genetic capacity to get pregnant, to stay healthy and, consequently, to live longer. There are several economic benefits of long-lived cows, the most obvious being reduced replacement costs and an increased production level for multiparous cows.

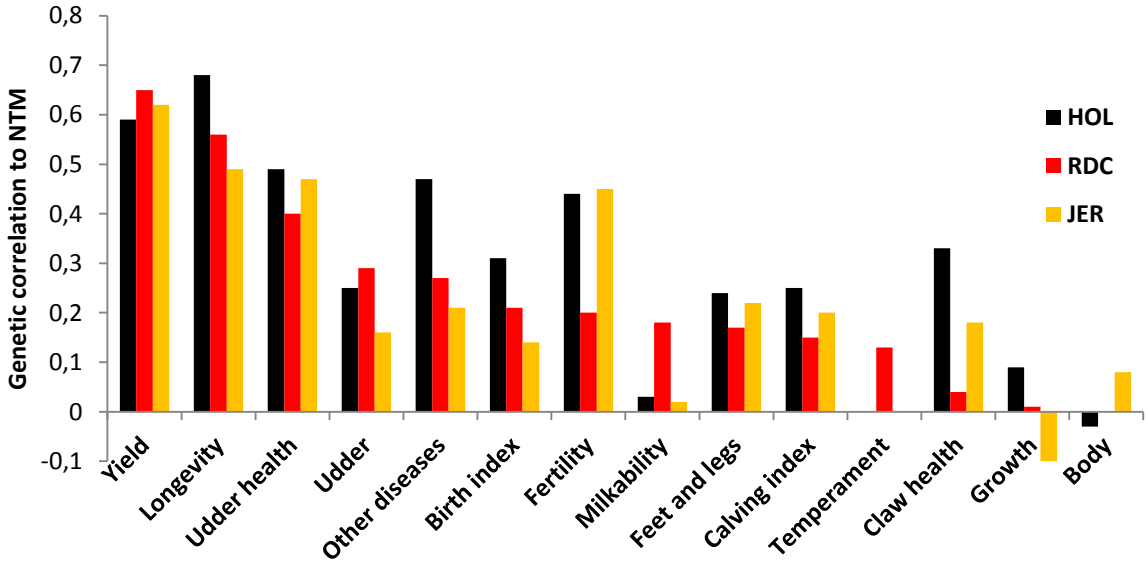
There are many factors affecting cow longevity and genetic differences between animals only explain less than 10 percent of the total variation for this trait. Other herd-related factors such as feeding, management and disease pressure play a larger role. On individual farms, strategic decisions related to an increase or decrease in herd size, prices of live animals and at slaughter as well as access to replacement heifers, also affect how long cows stay in the herd.

Successful breeding for longevity

The Nordic countries have a long tradition of combining production with functional traits, such as fertility, health and longevity, in the breeding goal. Today the advantages of a broader breeding goal has spread and been implemented to a higher extent also in other parts of the word.

Longevity, measured as days from first calving to end of third lactation, is one out of several economically important traits included in the joint Nordic Total Merit index (NTM) that was introduced 2008. There are favorable genetic associations between longevity and most other traits in NTM, the genetic correlations being strongest to udder health, other diseases and fertility. As a result, longevity is the trait in NTM where most genetic progress is achieved for Holstein and second most genetic progress, after production, is achieved for Jersey and Red Dairy Cattle (RDC – Finnish Ayshire, RDM, SRB). The genetic progress expected in different breeds when breeding for NTM is illustrated in Figure 1.

Figure 1. Expected genetic progress by breeding for NTM

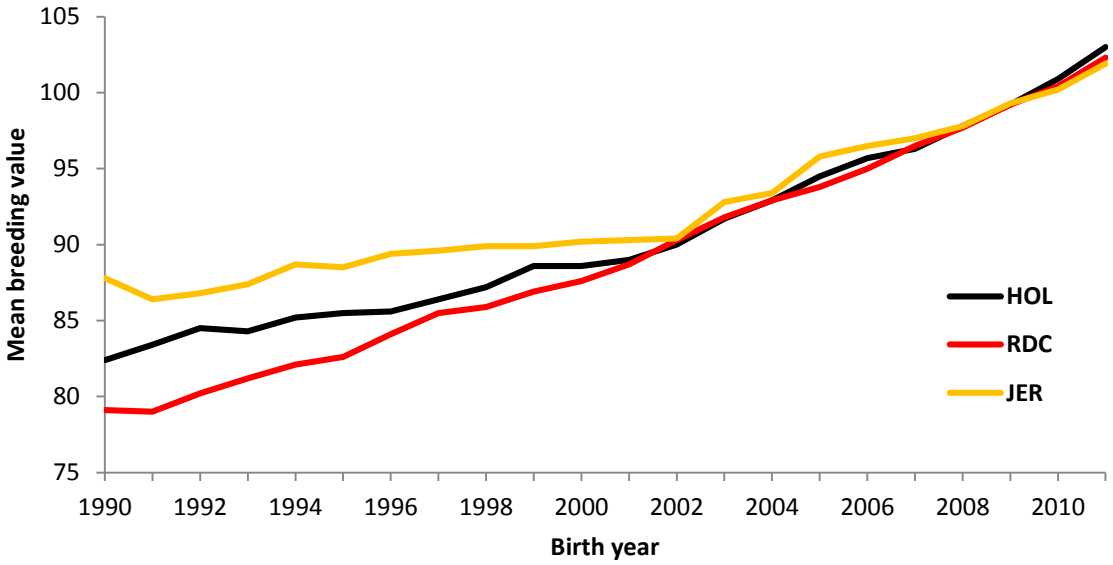


The genetic progress for longevity over time has been positive for all three breeds (see Figure 2), but the strongest trend can be seen for RDC. It is important to remember that the level of the trends as

well as breeding values should never be compared across breeds since the average breeding value (100) equals a different level for each of the breeds.

The progress between years 1990 and 2010 is about 21, 18 and 12 breeding value units for RDC, Holstein and Jersey, respectively. One unit corresponds to about 7 days longer life regardless of breed so the genetic capacity during this time period has improved with about 5, 4 and 3 months for RDC, Holstein and Jersey, respectively. Thus, genetically we could expect cows born in 2010 to produce some months longer than cows born in 1990.

Figure 1. Gentetic progress for longevity of Nordic dairy cows



Not fully reflected in life-time of cows

Is the improvement in genetic capacity for longevity reflected in how long the Nordic cows actually stay in the herd?

Unfortunately, this seems not to be the case. The average cow of these Nordic breeds does not produce milk for more than about 2,5 lactations before she is being culled. There are only slight differences between breeds and countries. Whereas this average of productive life-time has been rather constant in Finland and Sweden during the last decades, there has been a positive development for Danish Holstein and RDM up to this level during the same time period.

This average time at culling corresponds to a replacement rate of about 37 percent, thus out of 100 cows in a herd 37 of these are being replaced by heifers every year.

Worth to notice is that economical calculations from the Swedish dairy association (today Växa Sweden) shows that under average circumstances 2,5 lactations is roughly the time-point where the cow has paid back her on raising period and starts to bring income to the farmer. The break-point is affected mainly by raising costs of the heifer, age at first calving and production level once the cow starts producing milk.

Another way to illustrate longevity is to look at the proportion of the cows that have calved once and also have a second, or a second and a third calving. In a study of all Swedish SRB and Holstein heifers

born from year 2000 to 2007, 75 and 50 % of the cows with first calving survived to second and third calving, respectively, and this measure was stable over the studied time period.

The most common reasons for culling in all three countries are poor fertility and poor udder health. Since Nordic countries have successfully bred for these traits for a long time and generally are considered to have a good health status, it might seem strange that the average cow of today does not stay in the herd for more than 2,5 lactations. The positive genetic progress for longevity is important but has not been fully reflected in the actual life-time of the Nordic cows.

At some farms the explanation for this can be that farm-related factors such as feeding, housing and management are not optimal for the cows to stay healthy or become pregnant, and thus prevent the cows to show their full potential for longevity. At other farms it can be a surplus of heifers affecting when older cows leave the herd. Alternatively, it can be explained by strategic decisions, such as farm-specific replacement policies.

Reasons to improve cow longevity

There are many potential benefits of reducing the replacement rate and thus, keep the cows longer in the herd. Economically, as already mentioned, this is associated with lower replacement costs and higher average herd production (due to a higher proportion of older cows). Multiparous cows also have increased milk flow, easier calvings and fewer stillbirths. An often mentioned disadvantage of multiparous cows compared to primiparous cows is the increased incidence of diseases, especially mastitis. The costs related to the increased incidence of diseases should however be counteracted by the economic benefits mentioned above.

Further, new calculations made by geneticists at Växa Sverige shows that the best genetic progress in NTM for an average herd is achieved with a replacement rate of around 30 percent where only the best females are selected to produce replacement heifers.

Thus from a breeding perspective, this was found to be an optimum level. The reason for this is that the progress in the herd is affected by both the genetic quality of the sires (higher with a high replacement rate since young females in general are after genetically better bulls) and the genetic quality of the dams (higher with a low replacement rate with selection also on females).

From an overall economic perspective however, it is possible that the optimal replacement rate could be even lower.

A positive side effect of more long-lived cow is probably also an increased consumer confidence because long-lived cows indicate good care for the animals and lower the environmental impact from milk production.

What can be done from a breeding perspective?

In some farms there might not be enough replacement heifers. This can be either because too many cows are being culled or because too few female calves are being born or survive up to calving. Measures to improve the environmental surrounding of young stock and cows are of course very important if the reasons for this is related to poor hygiene, housing, feeding or care of the animals.

Farms without any major management-related problem often have enough, or even a surplus of, replacement heifers. A sound breeding strategy is then to inseminate the genetically best females

with high quality bulls (possibly using sexed semen) to produce replacement heifers, whereas the genetically worst females are inseminated with beef semen. This will reduce replacement rate and associated costs, produce more income from both milk production and from crossbreds for slaughter. This strategy will also diminish a potential surplus of replacement heifers that might be difficult to sell.