

## Breeding for increased size gives less functional cows

***From 12<sup>th</sup> of August 2014 Body index is changing name to Frame for all dairy breeds evaluated in the Nordic cattle genetic evaluation (NAV). The index is identical to the previous Body for RDC (Nordic red breeds) and Jersey, but for Holstein the composition of the index is changed so that Frame for all breeds now gives a description of the expected size of the cow. Higher breeding values are associated with an increased size (height, depth, width) of the cows. Frame is not included in the joint Nordic breeding goal for increased profit of cows (NTM – Nordic Total Merit). The same was true for Body and the reason is that there is no economic benefit of larger cows.***

Neither Frame nor the previous Body index has an economic benefit to the farmer and is therefore not for any of the breeds included in NTM, which describes the genetics giving you the most profitable cows.

The best way to see which effect breeding for increased value for Frame will have on other traits is to study the correlations between Frame and the linear body traits (this and a more thorough description of the index Frame can be found in a separate paper) as well as between Frame and economically important traits.

A positive value of the correlation implies that a high breeding value for one trait is associated with a high breeding value in the other trait and vice versa (low value associated with low value). A negative correlation imply that a high breeding value for one trait is associated with a low breeding value in the other trait and vice versa (low value associated with high value). These correlations can also be interpreted as how much of the maximum genetic progress can be obtained for a trait (i.e. Udder health) by breeding for another trait (Frame) compared to breeding only for the first trait.

When it comes to the correlations between Frame and NTM, these are close to zero or somewhat negative for RDC, Jersey and Holstein. This implies that Frame does not have any, or a somewhat negative, association to NTM (profit) for all breeds. With the negative values for Holstein and Jersey an increased size of the cows will imply that they will be less profitable.

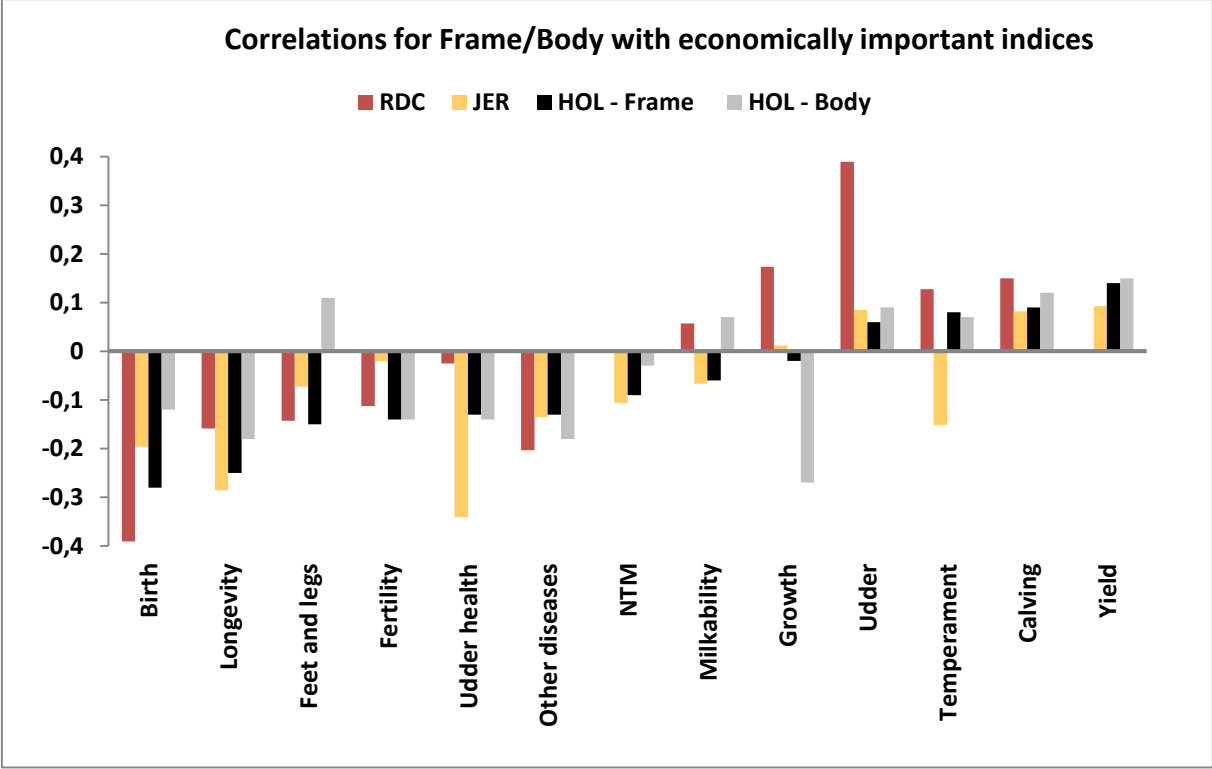
### ***Association between Frame and economically important traits***

In Figure 1 the correlations between bulls breeding values for Frame for RDC, Jersey and Holstein with NTM and its included sub-indices are shown. For a comparison the corresponding correlations for the former Body index for Holstein bulls are shown (for other breeds Frame is not changed compared to Body).

Frame has a negative correlation to NTM (zero for RDC) as well as to the sub-indices for Birth, Longevity, Feet & Legs, Fertility, Udder health and Other diseases. Thus, breeding for increased value for Frame will reduce the genetic progress for NTM and these functional traits. Further Frame has negative correlations to Milkability for Jersey and Holstein and to Temperament for Jersey.

Higher values for Frame are associated with somewhat higher values for i.e. Yield and Calving but the favorable correlations are not very strong (for Holstein 0.14 and 0.09 of a maximum value of 1 for Yield and Calving, respectively). For RDC the pattern looks somewhat different for Udder and Growth where Frame have a more positive association to these traits.

The most important difference between Frame and previous Body is that Frame has more negative correlation to NTM, thus breeding for increased values in Frame is even worse for the economy than it was to breed for increased values in Body. Compared to Body, Frame has less negative correlation to Growth and more negative correlation to Feet & Legs.



**Figure 1.** Correlations between bulls breeding values for the Frame index with NTM and its included sub-indices in RDC, Jersey and Holstein (red, yellow and black bars). For Holstein the corresponding correlations are also shown for the previous Body index (grey bars). The results are based on bulls born between 2004 and 2006/2007.