

# Metabolic efficiency will improve Saved feed

Trine Andersen (NAV/SEGES), Emma Carlén (NAV/Växa) and Terhi Vahlsten (NAV/Faba)

*In the genetic evaluation in November 2020, NAV will for the first time publish breeding values for metabolic efficiency. This is a measure of how efficient the cow utilizes the feed consumed. The sub-index Saved feed will be improved since metabolic efficiency will be included, in addition to maintenance efficiency. Saved feed will give you as a dairy farmer an even better opportunity to breed for cows that are more feed efficient.*

## Reduced energy loss with metabolic efficiency

Metabolic efficiency captures how well the feed is utilized in the cow. An efficient cow will convert a larger part of the energy consumed into milk and meat, while a smaller part is lost in the digestion process to production of e.g. manure and heat.

To secure a well-functioning cow when selecting for an efficient cow, we take all the major processes that use energy in the cow into account. That is also why we have two separate traits included in Saved feed: energy required for maintenance and how efficient the consumed feed is utilized by the cow. Metabolic efficiency is defined as the difference between the actual feed intake and the expected feed intake. The expected feed intake is calculated based on the actual weight and milk production of the cow. Cows that eat less feed than expected will be more efficient. In other words, if you compare two cows with the same weight and milk production, the cow which eats less feed is a more efficient cow.

## Timeline in introduction of Saved feed

November 2019: First Saved feed EBVs, only maintenance efficiency

August 2020: Saved Feed in NTM

November 2020: Saved feed contains both maintenance and metabolic efficiency

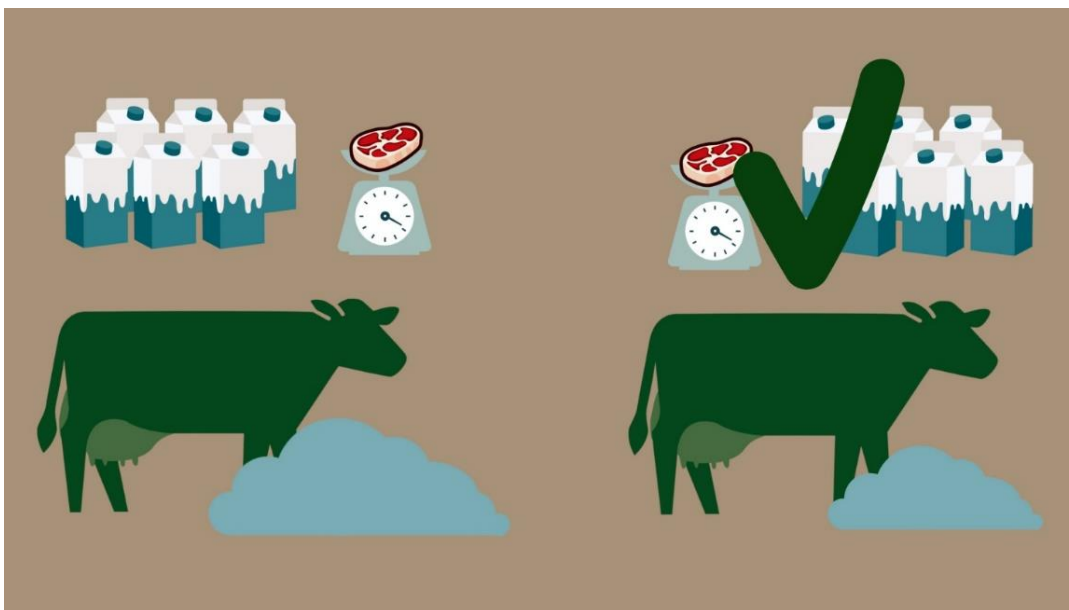


Figure 1: The most efficient cow eats less feed but produces the same amount of milk and meat.

## **Cooperation and new technology are the basis**

Breeding for feed efficiency in dairy cows has not been possible until recently because of the need for registration of feed intake on individual cows in large scale. However, there is an increasing focus on efficiency around the world, and new methods to measure feed intake are being developed.

One way of measuring individual feed intake is by installing feed boxes. This is very expensive and has only been done in research herds around the world. Thus, the number of cows with records within each country is limited. However, by cooperating with universities from several countries (Denmark, Finland, Canada, USA and Australian) we get records for more cows – but still not in a scale that gives basis for breeding values with high enough reliability.

Many companies are trying to get cheap and precise registrations of feed intake in production herds using different technologies, but it is not an easy task. Therefore, it is a game changer that VikingGenetics has developed an alternative way using video technology, called Cattle Feed Intake (CFIT). In the barn, feed bunks are scanned by video, and the visual image of the feed is converted to an amount of feed. The images are also used to recognize the ID of the cows eating the feed. This is based on the distinct pattern of colors and body shape of each cow. By continuously scanning the feed bunks, the amount of feed removed by different cows are estimated. In this way we get measures of individual feed intake. This is valuable data for both management and breeding.

## **A low reliability - initially**

Metabolic efficiency is published and included in the Saved feed index in November 2020. But because of the - so far - limited amount of feed intake data available, the reliability of metabolic efficiency is low compared to other breeding values in NTM. More data will be added continuously, when CFIT is used in more herds. Today two Jersey herds have CFIT installed. Already in 2021, four Jersey herds, one Holstein herd and one RDC herd are expected to deliver data on individual feed intake using CFIT technology. When more data are available, the reliability of the breeding values will gradually increase. However, until then, there will be a low variation of breeding values for metabolic efficiency. Therefore, more than 99% of the bulls born in 2017 or 2018 have breeding values for metabolic efficiency in the range of 95-105 (table 1).

Table 1. Distribution of breeding values for Holstein, RDC and Jersey bulls born in 2017-2018

Breeding values	Number of bulls		
	HOL	RDC	JER
94		3	
95		1	
96	4	2	1
97	16	12	1
98	30	24	9
99	33	30	12
100	39	54	15
101	40	28	18
102	16	20	4
103	4	7	4
104	3	3	1
105	1	2	1
106			
107	1		
Sum	187	186	66

**Limited effect on Saved feed index**

Inclusion of metabolic efficiency in the Saved feed index will give some changes in both Saved feed and NTM values, and therefor cause some reranking of AI bulls and cows. It is a consequence of improving NTM, since the genetically most efficient cows and bulls get higher NTM and vice versa. Due to the low variation in metabolic efficiency the changes in Saved feed and in NTM are however small and there will be no changes bigger than 1 unit. For cows there will also be changes but they will be even smaller.

Even if the effect of the new breeding values is limited initially, this should be seen as a start of a very important journey. All efforts made within breeding and management that strive to make our dairy cows more profitable and climate-friendly are of great importance.