Higher NTM leads to higher lifetime production for RDC cows

By Rasmus S. Stephansen, Terhi Vahlsten, Freddy Fikse and Anders Fogh

The best half of RDC cows within herd ranked by NTM, produced 200 kg fat+protein more in their lifetime compared to cows with a lower NTM. Furthermore, the group with high NTM were superior in both functional and production traits.

NTM

Nordic Total Merit (NTM) is the common breeding goal for RDC cows in the Nordic countries Denmark, Sweden and Finland. Selection based on NTM provides Nordic farmers with the most profitable cows by improving production and functional traits. In this article, we have analyzed the effect of NTM by dividing cows into two halves (high and low group) within herd based on NTM at birth. In that way, we show how NTM works in practice. Results are shown for the individual countries in table 1.

Higher production

In Sweden, Finland and Denmark, the cows in the high NTM group were approximately 7 NTM units superior compared to the low NTM group. Looking at 305 days milk production, the high NTM group produced 6-19 and 18-25 kg fat+protein more in first and second parity, respectively; however, the difference is considerably smaller for Danish cows in 1. lactation. Accordingly, the difference in yield indices between the NTM groups were larger in Sweden and Finland compared to Denmark.

Expected effect of fertility

In general, the effect of NTM on fertility is small, but significant effects of fertility were not expected since production has higher weight in NTM compared to fertility, and they are unfavorably correlated.The difference in genetic level between the high and low NTM groups for fertility traits was therefore low. Heifers in the high NTM group had 3-4 fewer days from birth to first insemination, but this difference was not significant. Danish cows in the high NTM group had 1 and 2 fewer days from calving to first insemination in first and second

lactation, respectively. The high NTM group also gave birth to more live born calves and had easier calving's compared to the low NTM group.

Better health in Denmark

The effect of mastitis is presented as percent point, where 1%-unit will correspond to one case less per 100 cows in a lactation. The difference between the high and low NTM groups was greatest in Denmark with 2.5 and 1.6%fewer cows with mastitis in first and second lactation, respectively. For Sweden and Finland there were no differences in mastitis cases between the high and low NTM group. This can be caused by the higher difference in production level and lower difference in genetic level for mastitis in Sweden and Finland compared to Denmark.

For general health, there is a favorable difference of 1 to 2%-unit for early reproductive disorders in Danish cows. No significant differences between general health traits in Sweden and Finland were found. Furthermore, the differences in genetic level for general health were smaller in Sweden and Finland compared to Denmark.

Higher lifetime production

RDC cows in the high NTM group had a longer lifespan of 1.4 to 2.7 months from first calving to culling compared to the low NTM group. The higher longevity combined with a higher production within lactation gave a higher lifetime production for cows in the high NTM group. The high NTM group produced approximately 200 kg of fat+protein and 1,800-2,500 kg milk more in their lifetime in Denmark and Finland. Results for lifetime production in Sweden were not available; however, we would expect a favorable difference on lifetime production in Sweden. In addition, the high NTM group were classified 0,5-1 unit higher for udder in Denmark and Sweden, where the difference in genetic level also were highest.

The results show that NTM works in practice and provides the Scandinavian farmers with an increased profit per cow through improved production, fertility and health. Consequently, NTM also improves lifetime production.

Fact box

The RDC cows included in this article were born from 2007-2008 from herds with at least 30 cows born in the period for Danish herds and 15 cows for Swedish and Finnish herds. The cows where ranked into the highest and lowest half based on their parent average NTM, when they were born.

Table 1. Phenotypic performance differences between the best and lowest half PA NTM RDC cows, born from 2007-2008 in Denmark, Sweden and Finland. Lifetime production were not available from the Swedish cattle database. PA=parent average.

	Denmark		***Sweden***		***Finland***	
	1. parity	2. parity	1. parity	2. parity	1. parity	2. parity
NTM	7.1*		7.3*		7.2*	
305 day Milk production, n[1]	*201*	*197*	*1,218*	*1,194*	*994*	*975*
• *Milk, kg*	7	174	150*	161*	175*	212*
• *Fat, kg*	4	10	9*	9*	10*	13*
• *Protein, kg*	2	8	9*	10*	9*	12*
Calving traits, n[1]	*191*	*190*	*1,197*	*1,186*	*697*	*663*
• *Survival at birth, %-unit*	0.6	0.3	0.2	0.3	1.1*	0.0
• *Calving ease, 1-4 scale*	-0.04	-0.04	0.0	0.0	-0.1*	-0.03*
Fertility. heifers, n[1]	*196*		*1,082*		*918*	
• *Birth to first ins., days*	-4.3		-3.4		-3.5	
• *First to last ins., days*	0.3		-0.6		1.2	
• *Number of ins.*	0.0		-0.01		0.02	
Fertility. Cows, n[1]	*200*	*199*	*1,211*	*1,196*	*1,002*	*998*
• *Calving to first ins., days*	-0.7	-2.2	0.6	-0.8	0.3	-0.1
• *First to last ins., days*	1.4	-0.8	-0.4	-1.0	0.0	3.0*
• *Number of ins.*	0.06	0.0	0.02	0.04	0.0	0.07*
Udder health, n[1]	*191*	*190*	*1.218*	*1,211*	*990*	*985*
• *Mastitis, %-unit*	-2.5*	-1.6	-0.2	-0.2	0.2	0.4
General health, n[1]	*191*	*190*	*1,156*	*1,112*	*979*	*974*
• *Early repro. disord., %-unit*	-1.1	-2.3	0.0	-0.2	-0.6	-0.2
• *Late repro. disord., %-unit*	0.0	-0.1	0.1	-0.1	0.4	0.2
• *Metabolic disord., %-unit*	0.3	0.3	0.2	-0.5	0.0	-0.3
• *Ketosis, %-unit*	0.4	0.2	-0.1	0.2	-0.1	0.0
• *Feet and leg disord., %-unit*	0.2	-0.2	0.1	-0.2	0.4	0.3
Longevity, n[1]	*186*		*1,181*		*994*	
• *First calving to culling, months*	2.7*		2.0*		1.4*	
• *Lifetime milk production, kg*	2494*		-		1778*	
• *Lifetime fat+prt production, kg*	211*		-		167*	
Conformation, n[1]	*164*		*489*		*246*	
• *Body, classification scale*	0.3		-0.1		0.2	
• *Legs, classification scale*	0.4		0.0		-0.2	
• *Udder, classification scale*	0.9*		0.4*		0.2	
• *Conformation, classification scale*	0.7*		0.1		0.1	
Indices						
• *Yield*	3.4*		5.7*		5.9*	
• *Fertility*	2.1*		0.9*		0.8*	
• *Mastitis*	3.9*		1.3*		1.6*	
• *General health*	3.2*		2.3*		1.0*	
• *Longevity*	4.2*		3.3*		1.0*	
• *Udder*	3.4*		1.8*		1.1*	

[1]Number of herds included in calculations

* P <0,05 (significant results)