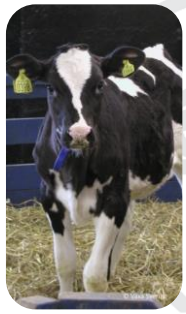
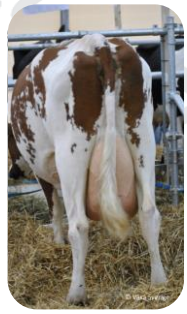
NTM – the improvement process

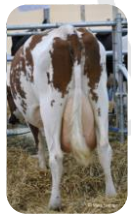




Emma Carlén, Anders Fogh,
Jan-Åke Eriksson, Gert Pedersen Aamand

Process: Youngstock survival and Functional Udder

Sub-index YSS since Nov 2014 Include in NTM and how?

Suggestion: modify Udder to increase progress in health, longevity



2. NAV webinar, Sep 2015
- Increase understanding of topics
- Revised economic values YSS, effect of inclusion in NTM

3. Breed discussions, 2015
- National coordinators

1. NAV workshop, Jan 2015

4. NAV workshop, Jan 2016
- Complementary analyses
- Final recommendations per breed

5. NAV board, March 2016
- Approval of decisions

YSS: Summary

- Has an economic value
- ↑ economic gain of NTM
- No large effect other traits
- Improve genetic trend YSS
- Strengthen ”NTM brand”

General advices:

- Recommended wt
  - Best results with current conditions
- Own sub-index
  - Low correlations other sub-indices
  - Easier to monitor YSS, brand NTM

- Small negative effect on a few other sub-indices

YSS in NTM → more economically optimal breeding goal

YSS: Status and breed requests after webinar

	RDC			HOL			JER
	DNK	FIN	SWE	DNK	FIN	SWE	DNK
Positive to include YSS?	✓	✓	✓	✓	✓	✓	✓
Requested more analyses?	yes			no			no

Request of more info/analysis:

- Survival frequencies in Swedish data?
- Status of including data of male calves from Sweden

RDC

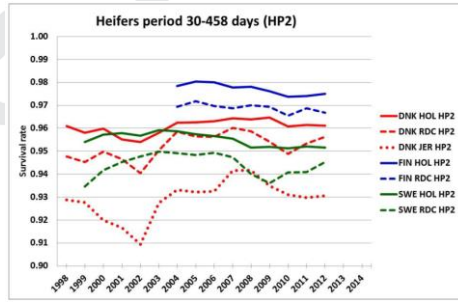
- Economic values from weighted averages based on country population sizes

RDC

- Additional NTM scenarios where YSS wt is as suggested but other wt modified

YSS: Comments on Swedish data

- **Low survival in heifers late period in SWE in general, and lower than expected in RDC compared to HOL?**
  - ➢ Recorded culling codes not well-defined or created for calculating YSS (also changed 2012)
  - ➢ Minor editing improvements will be done in relation to codes ”leaving herds” and ”other culling reasons” - could improve survival with 1% per breed!



- **Data on male calves**
  - ➢ Can get it from Swedish Board of Agriculture but only after permission from individual farmers - project ongoing…

YSS: Economic values from weighted vs. direct averages

- Considering country population sizes → **slight changes in economic values**
- Full results for all breeds in Notes: Youngstock Survival-Final
  - ➢ In summary, value of 1 index unit for
    - **RDC** ↑ (higher value of bull calves and larger populations in FIN and SWE)
    - **HOL** ↓ (lower value of bull calves and larger population in DNK)

Index	RDC	HOL	JER
Yield	8.33	7.61	6.80
Young stock survival (based on direct average)	**2.03**	**1.40**	**0.92**
Young stock survival (based on weighted average)	**2.13**	**1.27**	**0.92**

- ➢ Regardless of average calculation, **high relative weight of YSS in all breeds** (5th highest for RDC and JER and 7th highest for HOL)

Keep suggested wt, since weighted averages has minor effect …

YSS: Additional results for RDC - NTM weight scenarios

Assumed to optimize economic gain but decreases gain in i.e. yield slightly:

A. Current NTM + YSS

4 additional scenarios (B-E), as A but keep genetic progress in…

B. yield
C. yield and udder conformation
D. yield, udder conformation and milking speed
E. yield, udder conformation, milking speed and birth

- Full results in Notes: Youngstock Survival-Final, in summary:

➢ Genetic gain in yield can be retained w/o losing much economic gain in NTM…
…but it will cause slightly reduced genetic gain in other NTM traits

In general: not recommended to change estimated economic wt. Also, NAV plan to revise NTM fully during 2017…

YSS: Questions to decide on in groupwork

1. Include YSS as a sub-index in NTM from 2016?
2. Which weight on YSS?
   a) Recommended wt YSS, no other changes in NTM

	RDC	HOL	JER
Relative weight	23	14	12
Expressed in % of total wt	8	5	5

RDC b) Recommended wt YSS + some changes in other wt in NTM

- Which alternative?

FU: Summary

Should Udder be modified to increase progress in Udder health and Longevity?

- Current wt Udder: 2x original estimate (based only on workload)
- Suggestion: Modify composition to get out more value by improving udder health and longevity?
  - Increasing wt
  - Decreasing wt
  - Removing wt
  - Changing sign of wt

Examples	RDC	HOL
Udder depth	↑	↑
Fore udder attachment	↓	↓
RUH, RUW, TPF…	0	0
Teat length, -thickness	0 or -	0

➢ Improved progress in udder health, longevity
(but already in NTM, and also udder conformation in Udder health index)

➢ Less or opposite progress compared to breeding goal for some traits (→ i.e. smaller teats RDC)

NAV

Nordisk Avlsværdi Vurdering • Nordic Cattle Genetic Evaluation

FU: Status and breed requests after webinar

	RDC			HOL			JER
	DNK	FIN	SWE	DNK	FIN	SWE	DNK
Positive to functional udder?	-	-	-	?	-	-	Implemented
Requested more analyses?	no			yes			-

Request of more info/analysis, some examples:

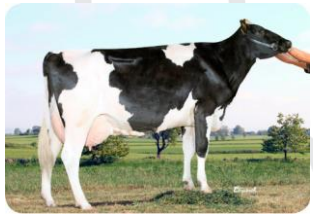
- Genetic trends for single traits for current (and alternative) Udder indices
- Current optimum values vs. Linear scores with lowest culling rate?
- (Relation between udder depth and milk production?)
- Corrective mating to avoid extreme conformation scores

NAV

Nordisk Avlsværdi Vurdering • Nordic Cattle Genetic Evaluation

FU: Additional comments and results (HOL)

- Results in Notes: Functional Udder-Final
- **Genetic trends for single udder traits for current Udder index**
- In summary, + 3 NTM/yr and correlation NTM-Udder 0.3
  - ➢ Slow rate of genetic change in linear traits (i.e FUA +0.28 linear scale)
  - ➢ Most traits move towards optimum (small change opposite direction for few traits)



- **Current optimum values- will it have an effect to decrease it for UD from 9 to 6-7?**
  - ➢ No, since breed mean is still far from optimimum no animals will in practice exceed it…
- **Corrective mating** (mating good-bad parent) can reduce extremes in offspring but their result also largely influenced by environment and Mendelian sampling (individual level)

FU: Questions to decide on in groupwork

1. Keep current Udder in NTM for now instead of changing to Functional udder?

2. Continue discussion on other aspects of Udder after this workshop?
   - *Modify weight of Udder in NTM?*
   - *Modify optimums and weight w/n Udder?*
   - *New possibilities with AMS data…*
   - *…*

This items are for future discussions…

A question of efficiency…

Traits important for efficient animals…

- NTM captures many of these: milk production, fertility, health…
- Feed efficiency is a trait of major importance
  - Feed is the largest variable cost
  - Great improvement in feed conversion for chicken and pigs, also indirectly for cattle
  - For genetic selection, individual feed registrations needed

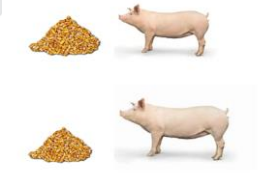


Figure 2. **Improvements in feed conversion ratio.** Feed requirements moved from 836 lbs to produce a 220 market hog in 1972 to 715 lbs of feed in 2007 to produce a 275 lb market hog. (Adapted from Graham Plastow, 2012)

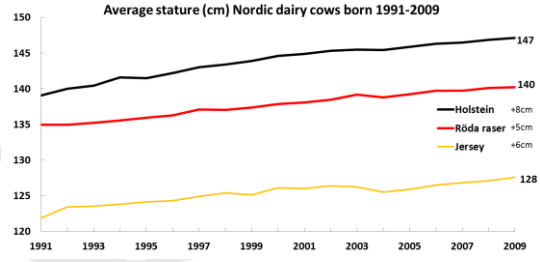
- Meanwhile: important that we not move in undesirable direction...
- Can body size/conformation be used to predict efficiency? How?

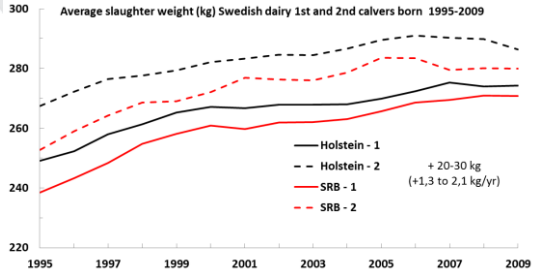
Does body size reflects efficiency?

	HOL	RDC	JER
Stature (cm)	147	140	128
Slaughter weight (kg)	283	277	186
Fat + prot. (kg)	728	693	664
Fat + prot. (kg) per 50 kg slaughter wt	129	125	178

Cows are getting taller… →

… and heavier ↓

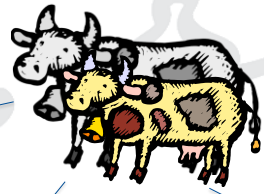




- Size has no wt in NTM
- Still, genetics account for ≈2/3 of increase in stature
- Direct and indirect selection

Is increased size desirable?

- Breed organizations, experts, average dairy farmers might have a different view….



Animal protection and welfare?

Building requirements and costs?

Feed intake vs. feed efficiency and production

Relation to economically important traits

What is your opinion?

After deciding on final recommendations for YSS and F.U – we want you to discuss this "open" in smaller groups…. Suggestions of questions below:

1. Is it desirable that cows are getting larger? Why/why not?
2. Could size of cows be used as predictor of an efficient cow?
3. Can you think of other measures to improve cow efficency?
   - Now and in the future, respectively
4. Suggestions of analyses that NAV could do in relation to breeding for more efficient cows?

Thanks for your attention!

Time for you to be active…

NAV

Nordisk Avlsværdi Vurdering • Nordic Cattle Genetic Evaluation