NTM 2018 sensitivity analyses
Overview of results

Lars Peter Sørensen, Jørn Pedersen, Jukka Pösö, Freddy Fikse

Jan-Åke Eriksson, Morten Kargo, Ulrik S. Nielsen, Gert P. Aamand

Outline

- Sensitivity analyses – what we have done
- Details on:
  - Milk price decreased by 10 %
  - Feed costs increased by 10 %
  - Beef price decreased by 10 %
  - Changing replacement rate
- Conclusion

General remark

Keep in mind that:

Large effects on economic values may not have large impact on expected genetic response

Changing economic assumptions

Overall impact on expected genetic response

- **Milk price: +/-10 % - large impact**
- **Feed costs: +/-10 % - moderate impact**
- **Beef price: +/-10 % - low impact**
- **Veterinary costs: +10 % - low impact**
- **Labor costs: +10 % - low impact**

Changing management assumption

- Use of sexed semen: +/-10 % - low impact
- Lower replacement rate: -5 %-units – low impact except for longevity
- Participation in health agreement schemes: either no herds or 20 % of all herds in basis agreement – low impact
- + a few scenarios special for JER

Milk price -10 % (conv. DNK/SWE: 0.354; FIN: 0.388 – FIN inkl. subsidies)

Effect on economic values

- Value of standard milk decreased 18 % (all breeds)
- Improving ICF and IFL_{cows} → more calvings → more milk - minor negative effects
- Improving traits involving discarded milk – minor negative effects
- Improving longevity – value decrease 13 % (more older cows → more milk)

Expected genetic response using milk price -10 %

Values from proposed conventional NTM added for comparison in small numbers

	HOL	RDC	JER
Yield	**0.55** 0.63	**0.73** 0.80	**0.70** 0.77
Growth	**0.11** 0.13	**0.04** 0.05	**0.08** 0.07
Fertility	**0.50** 0.44	**0.27** 0.21	**0.30** 0.25
Birth, direct	**0.29** 0.26	**0.19** 0.14	**0.08** 0.08
Calving, maternal	**0.35** 0.32	**0.18** 0.16	**0.18** 0.18
Udder health	**0.38** 0.34	**0.20** 0.15	**0.45** 0.38
General health	**0.38** 0.34	**0.19** 0.17	**0.29** 0.27
Frame	**-0.02** 0.01	**-0.01** 0.02	**0.14** 0.15
Feet & legs	**0.19** 0.17	**0.23** 0.20	**0.19** 0.17
Udder	**0.13** 0.11	**0.07** 0.04	**0.22** 0.15
Milking speed	**0.05** 0.04	**0.19** 0.18	**0.08** 0.07
Temperament	**0.08** 0.09	**0.07** 0.09	**-0.01** -0.01
Longevity	**0.53** 0.50	**0.47** 0.45	**0.52** 0.48
Claw health	**0.27** 0.24	**0.17** 0.14	**0.12** 0.09
Young stock survival	**0.26** 0.23	**0.30** 0.25	**0.33** 0.28

NAV

Milk price -10 % - summary

- Economic value of milk drops
- This affects expected response for all traits
  - Yield ↓
  - Functional traits ↑ (fertility, udder health)
  - Conformation ↑ (JER udder)

Feed costs +10 %

- Only affect economic values of traits where improvement either results in more milk or more animals for slaughter
- Largest effect on daily gain
- Also large proportional effect on ICF

Feed costs +10 % - genetic response

- Biggest changes are seen for JER – tendency similar to effect of milk price
- In general small changes for HOL and RDC
  - Largest effect on yield for these breeds

Beef price -10 % (conv. O5: SWE: 3.98, DNK: 3.45, FIN: 3.52)

- Value of daily gain decreased 22-26 %
- Improving survival rate – more cows can be inseminated with beef semen → more calves for slaughter – large negative impact (-15 to -22 %)
- Improving ICF and IFL_{cows} → more calvings → more calves for slaughter – similar negative effects – large impact on ICF
- Improving YSS → more calves for slaughter – large negative impact on all 4 traits (-12 to 23 %)

Expected genetic response using beef price -10 %

Values from proposed conventional NTM added for comparison in small numbers

	HOL	RDC	JER
Yield	**0.65** 0.63	**0.81** 0.80	0.77 0.77
Growth	**0.11** 0.13	0.05 0.05	**0.08** 0.07
Fertility	**0.41** 0.44	**0.19** 0.21	**0.24** 0.25
Birth, direct	**0.24** 0.26	**0.13** 0.14	0.08 0.08
Calving, maternal	**0.30** 0.32	**0.15** 0.16	0.18 0.18
Udder health	0.34 0.34	**0.16** 0.15	0.38 0.38
General health	**0.33** 0.34	**0.15** 0.17	0.27 0.27
Frame	**0.02** 0.01	**0.03** 0.02	0.15 0.15
Feet & legs	0.17 0.17	**0.19** 0.20	0.17 0.17
Udder	**0.12** 0.11	**0.05** 0.04	0.15 0.15
Milking speed	0.04 0.04	0.18 0.18	0.07 0.07
Temperament	0.09 0.09	0.09 0.09	**0.00** -0.01
Longevity	0.50 0.50	0.45 0.45	0.48 0.48
Claw health	0.24 0.24	0.14 0.14	**0.10** 0.09
Young stock survival	**0.22** 0.23	0.25 0.25	**0.26** 0.28

Expected genetic response using beef price -10 %

Values from proposed conventional NTM added for comparison in small numbers

	HOL	RDC	JER
Yield	**0.65** 0.63	**0.81** 0.80	0.77 0.77
Growth	**0.11** 0.13	0.05 0.05	**0.08** 0.07
Fertility	**0.41** 0.44	**0.19** 0.21	**0.24** 0.25
Birth, direct	**0.24** 0.26	**0.13** 0.14	0.08 0.08
Calving, maternal	**0.30** 0.32	**0.15** 0.16	0.18 0.18
Generally limited effect on responses			
Frame	**0.02** 0.01	**0.03** 0.02	0.15 0.15
Feet & legs	0.17 0.17	**0.19** 0.20	0.17 0.17
Udder	**0.12** 0.11	**0.05** 0.04	0.15 0.15
Milking speed	0.04 0.04	0.18 0.18	0.07 0.07
Temperament	0.09 0.09	0.09 0.09	**0.00** -0.01
Longevity	0.50 0.50	0.45 0.45	0.48 0.48
Claw health	0.24 0.24	0.14 0.14	**0.10** 0.09
Young stock survival	**0.22** 0.23	0.25 0.25	**0.26** 0.28

NAV

Decreasing replacement rate (-5 %)

- More older cows - fewer replacement heifers are needed
- More beef crosses are born
- Fewer purebred heifers and bulls are born
- Survival rate 1st and $IFL_{heifers}$ decrease – expressed fewer times – opposite for survival rate later and IFL_{cows}
- Improving ICF – more calves for slaughter but proportionally less for lower replacement rates; thus value decreases

Replacement rate and longevity

- **Value of longevity decreases 28 % (all breeds)**

SWE HOL	Replacement rate	
	27→26	37→36
Herd life (longevity), days	53	28
Profit per cow per %, €	11.3	11.0
Profit per cow per day, €	**0.219**	**0.402**

- **Value of longevity expressed in profit per day not constant at different replacement rates**

Expected genetic response using replacement rate 27 %

Values from proposed conventional NTM added for comparison in small numbers

	HOL	RDC	JER
Yield	**0.65** 0.63	**0.83** 0.80	**0.80** 0.77
Growth	**0.12** 0.13	**0.07** 0.05	**0.08** 0.07
Fertility	**0.42** 0.44	**0.19** 0.21	**0.22** 0.25
Birth, direct	**0.25** 0.26	**0.13** 0.14	**0.09** 0.08
Calving, maternal	**0.31** 0.32	**0.15** 0.16	**0.19** 0.18
Udder health	**0.32** 0.34	**0.14** 0.15	**0.35** 0.38
General health	**0.32** 0.34	**0.14** 0.17	**0.25** 0.27
Frame	**0.02** 0.01	**0.04** 0.02	**0.16** 0.15
Feet & legs	0.17 0.17	**0.18** 0.20	**0.14** 0.17
Udder	**0.10** 0.11	0.04 0.04	**0.12** 0.15
Milking speed	**0.05** 0.04	**0.17** 0.18	**0.08** 0.07
Temperament	**0.08** 0.09	**0.08** 0.09	**0.01** -0.01
Longevity	**0.48** 0.50	**0.41** 0.45	**0.46** 0.48
Claw health	**0.23** 0.24	**0.12** 0.14	0.09 0.09
Young stock survival	**0.22** 0.23	**0.24** 0.25	**0.26** 0.28

Expected genetic response using replacement rate 27 %

Values from proposed conventional NTM added for comparison in small numbers

	HOL	RDC	JER
Yield	**0.65** 0.63	**0.83** 0.80	**0.80** 0.77
Growth	**0.12** 0.13	**0.07** 0.05	**0.08** 0.07
Fertility	**0.42** 0.44	**0.19** 0.21	**0.22** 0.25
Birth, direct	**0.25** 0.26	**0.13** 0.14	**0.09** 0.08
Calving, maternal	**0.31** 0.32	**0.15** 0.16	**0.19** 0.18

Generally limited effect on responses

Frame	**0.02** 0.01	**0.04** 0.02	**0.16** 0.15
Feet & legs	0.17 0.17	**0.18** 0.20	**0.14** 0.17
Udder	**0.10** 0.11	0.04 0.04	**0.12** 0.15
Milking speed	**0.05** 0.04	**0.17** 0.18	**0.08** 0.07
Temperament	**0.08** 0.09	**0.08** 0.09	**0.01** -0.01
Longevity	**0.48** 0.50	**0.41** 0.45	**0.46** 0.48
Claw health	**0.23** 0.24	**0.12** 0.14	0.09 0.09
Young stock survival	**0.22** 0.23	**0.24** 0.25	**0.26** 0.28

NAV

Conclusive remarks I

- **Economic values**
  - **Milk price – large effect on value of milk (mainly)**
  - **Beef price – large effect on value of daily gain and other traits**
  - **Feed costs – small effects but affects many traits**
- **Only milk price has notable effect on expected genetic response**

Conclusive remarks II

- Feed costs do not have a large impact on expected response
- …but combined with lower milk price the impact on response may be large
- Replacement rate and longevity explained
- Remaing scenarios: minimal impacts on expected genetic response