Genetic evaluation for type traits

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Copenhagen

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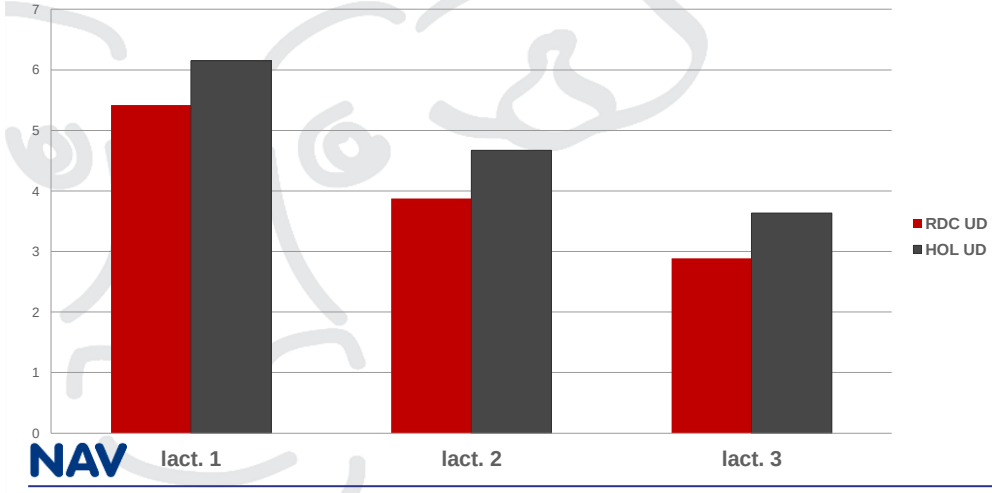
Means of Udder Depth



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Aim

- Incorporate later lactations
- Bulls and cows evaluated in the same model
- Investigate the effect of type records in later lactations

The data

Number of cows in thousands

Breed	Lactation	Holstein	RDC	Jersey
Denmark	1	1071	189	189
	2	264	28	22
	3	167	34	24
Finland	1	107	221	
	2	40	78	
	3	24	58	
Sweden	1	247	226	2
	2	5	4	
	3	17	9	

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Genetic Parameters

Trait group	Heritability	Highest
Body	0.30	Stature=0.77
Feet and legs	0.20	-
Udder	0.25	Udder Depth=0.40

Genetic correlations between lactations
0.87-0.99
Environmental correlations between lactations
0.10 – 0.60

Where do the results lead us?

BULLs
- **Selection based on first lactation type records improves even later lactations**

COWs
- **Type recording in first lactation increases accuracy compared to pedigree index**
- **Records from later lactations increases accuracy even more**

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Estimated breeding values, EBVs

EBVs per lactation
7 body, 5 feet, 10 udder EBVs

+ temperament only in first lactation

EBVs from each lactation are weighted using
0.5:0.3:0.2 for 1st, 2nd and 3rd lactation to
22 overall EBVs
and
3 combined EBVs, Body, Feet, Udder

Improvements in evaluation

3 lactations:
Multiple trait analysis for 3 lactations
Single trait within lactations

Data and model harmonized over countries
The same animal model used for both sires and dams

=>efficient use of data

Effects in the model

Herd*time period (5 year of classification)	Fixed
Herd*year	Random
Country*Year * month of calving	Fixed
Country*Calving age (months)	Fixed
Country*Lactation stage (weeks)	Fixed
Country*Time of visit	Fixed
Classifier*year	Fixed
Animal	Random

Do breeding values change a lot?

-correlations between current and new breeding values

Breed	Correlations for	Body index	Feet and legs index	Udder index
Holstein	Bulls	**0.97**	**0.97**	**0.97**
RDC	Bulls	**0.98**	**0.97**	**0.98**
Jersey	Bulls	**0.97**	**0.97**	**0.98**
Holstein	Cows	0.97	0.96	0.95
RDC	Cows	0.95	0.94	0.97
Jersey	Cows	0.97	0.97	0.98

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Jersey	Cows	**0.98**	**0.97**	**0.98**

Standard deviation of EBVs RDC cows, Finland

	Pedigree	One record	Two records	One / Pedigree	Two / one
Stature	**5.2**	**7.9**	**8.6**	1.53	1.08
Leg side view	**4.8**	**5.8**	**6.3**	1.20	1.09
Attachment	**6.3**	**7.8**	**8.6**	1.24	1.11
Depth	**5.6**	**7.1**	**7.5**	1.27	1.06
Body	**5.1**	**6.7**	**7.1**	1.33	1.06
Feet	**5.6**	**7.2**	**7.6**	1.29	1.05
Udder	**5.2**	**6.7**	**7.3**	1.29	1.10

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Udder	5.2	6.7	7.3	**1.29**	**1.10**

Increase in standard deviation of cow EBVs

	Holstein		RDC		Jersey	
	One/ped	Two/one	One/ped	Two/one	One/ped	Two/one
Stature	**1.31**	**1.06**	**1.45**	**1.02**	**1.24**	**1.13**
Leg side view	**1.25**	**1.10**	**1.18**	**1.04**	**1.15**	**1.06**
Attachment	**1.22**	**1.12**	**1.21**	**1.03**	**1.14**	**1.07**
Depth	**1.32**	**1.08**	**1.26**	**1.02**	**1.22**	**1.11**
Body	**1.18**	**1.08**	**1.32**	**1.02**	**1.18**	**1.13**
Feet	**1.12**	**1.06**	**1.29**	**1.02**	**1.15**	**1.05**
Udder	**1.26**	**1.08**	**1.23**	**1.03**	**1.19**	**1.09**
Mean	**1.24**	**1.08**	**1.28**	**1.03**	**1.18**	**1.09**

Absolut value for one index unit

	Jersey		RDC		Holstein	
	Absolute value	Corresponds to	Absolute value	Corresponds to	Absolute value	Corresponds to
Stature	**0.15**	**0.15 cm**	**0.28**	**0.28 cm**	**0.21**	**0.21 cm**
Legs side view	**0.024**	**-**	**0.043**	**-**	**0.029**	**-**
Udder depth	**0.050**	**0.15 cm**	**0.058**	**0.17 cm**	**0.055**	**0.17 cm**
Teat length	**0.060**	**0.3 mm**	**0.071**	**0.36 mm**	**0.068**	**0.34 mm**
Teat thickness	**0.060**	**0.12 mm**	**0.053**	**0.11 mm**	**0.050**	**0.10 mm**

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***Figures within brackets are translations using the instruction sheet**

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How to use the new evaluation

Bulls

- Raise accuracy by more daughters or more later lactations

Cows

- Raise accuracy by more lactations

Summary

- Harmonization
- Breeding values for bulls and cows from the same analysis
- Data from 3 lactations: high correlations
- Accuracy is increased by type recording in later lactations
- Validation to Interbull: January 14

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Summary

There will be minor changes for bulls
There will be more changes in rank order of cows

Thank You!

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