

A photograph of a farm scene. In the foreground, a stone wall runs across the frame. Behind it, several cows are visible. One brown and white cow stands on the left. In the center, a white cow with brown spots is lying down. To the right, a black cow with a white face is also lying down. In the background, there are two red barns with dark roofs. The sky is overcast.

Genetic evaluation for type traits is improved

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Aim

- Bulls and cows evaluated in the same model
- Use multiple trait evaluations within lactation
- Investigate the effect of later lactations

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The data

Total number of cows in thousands

Breed	Lactation	Holstein	RDC	Jersey
Denmark	1	996	177	180
	2	254	26	19
	3	160	32	21
Finland	1	97	204	
	2	35	68	
	3	21	50	
Sweden	1	222	215	2
	2	4	2	
	3	13	7	

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Genetic Parameters

Trait group	Heritability	Highest
Body	0,30	Stature=0,6
Feet and legs	0,20	-
Udder	0,25	Udder Depth=0,40

Genetic correlations between lactations

0,87-0,999

Environmental correlations between lactations

0,10 – 0,60

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Correlations between lactations

Breed	Trait group	Genetic correlation	Environmental correlation
Holstein	Body	0,91 - 0,999	0,07 - 0,38
RDC		0,92 - 0,999	0,31 - 0,64
Jersey		0,92 - 0,999	0,10 - 0,55
Holstein	Feet and legs	0,97 - 0,999	0,09 - 0,18
RDC		0,96 - 0,999	0,40 - 0,53
Jersey		0,94 - 0,999	0,09 - 0,20
Holstein	Udder	0,88 - 0,99	0,16 - 0,40
RDC		0,91 - 0,999	0,38 - 0,57
Jersey		0,91 - 0,99	0,18 - 0,36

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Genetic correlations within lactation

Trait group

Body

Feet and legs

Genetic correlation

0,33 - 0,91

-0,18 - 0,37

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Genetic correlations within lactation

TRAIT GROUP	Correlation
<i>Udder group1</i>	
U. attachment, U. depth, Rear U. width, Rear U. height and U. balance	0,06 - 0,69
<i>Udder group 2</i>	
U. cleft, T. length, T. thickness, T.plac. front, T. plac. back	-0,13 - 0,70

Trait

Genetic correlations

Environmental correlations

Udder attachment

0,93

0,29

Udder depth

0,96

0,30

Udder cleft

0,95

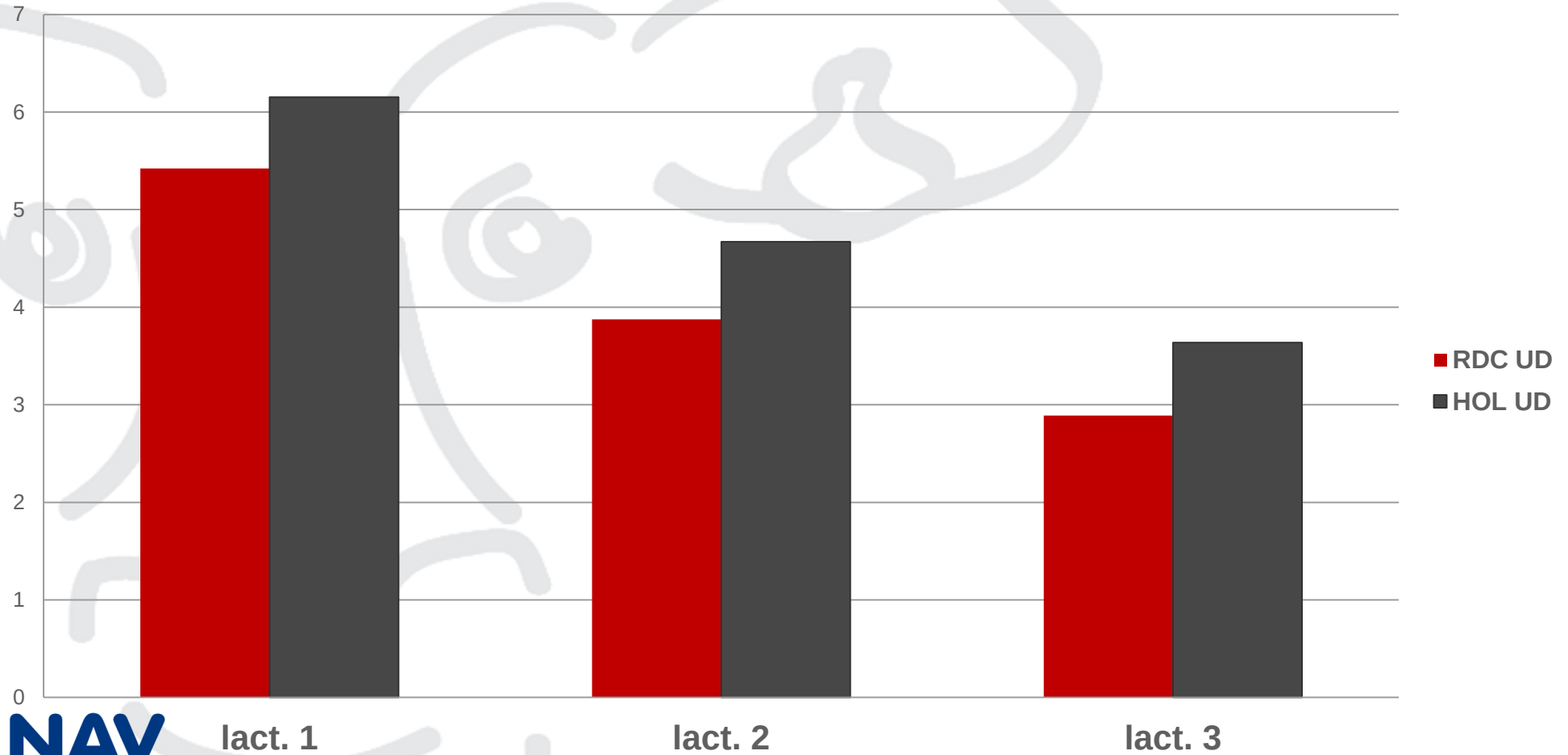
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Means of Udder Depth



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Where do the results lead us?

- Selection on first lactation improves later lactations
- Records from later lactations are valuable:
- They will improve accuracy of evaluation

Improvements in evaluation

3 lactations:

Multiple trait analysis within and between lactations in 3 trait groups

Body

Feet and legs

Udder

Data and model harmonized over countries

The same animal model used for both sires and dams

=>efficient use of data

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Model

Herd*time period (5 year of classification)	Fixed
Herd*year	Random
Year * month of calving	Fixed
Calving age (months)	Fixed
Lactation stage (weeks)	Fixed
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	0,95	0,97	0,97
RDC	Bulls	0.96	0.96	0,96
Jersey	Bulls	0,97	0,95	0,97
Holstein	Cows	0,91	0,92	0,94
RDC	Cows	0,91	0,90	0,94
Jersey	Cows	0,92	0,91	0,96

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RDC	Bulls	0,96	0,92	0,96
Jersey	Bulls	0,97	0,95	0,97
Holstein	Cows	0,91	0,92	0,94
RDC	Cows	0,91	0,90	0,94
Jersey	Cows	0,92	0,91	0,96

Summary

- Data harmonized
- The same effects in the model for all countries
- Breeding values for sires and cows from the same analysis
- Correlations between traits
- Data from 3 lactations: high correlations between them

Summary

Reliabilities have increased: Selection will be more effective

There will be considerable changes in rank order of dams
Less changes for sires



Thank You!

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