Overall type traits
- optimally combined udder

NAV workshop

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Den Europæriske Landbrugsfond for Udvikling af Landdistrikterne

Naturerhverv.dk

Danmark og EU investerer i landdistrikterne.

Se "European Agricultural Fund for Rural Development" (EAFRD)

STØTTET AF
mælkeafgiftsfonden

What is a good udder?

- Beautifull
- Work friendly
- Functional (healthy and long lasting)

Current index do probably include all aspects!

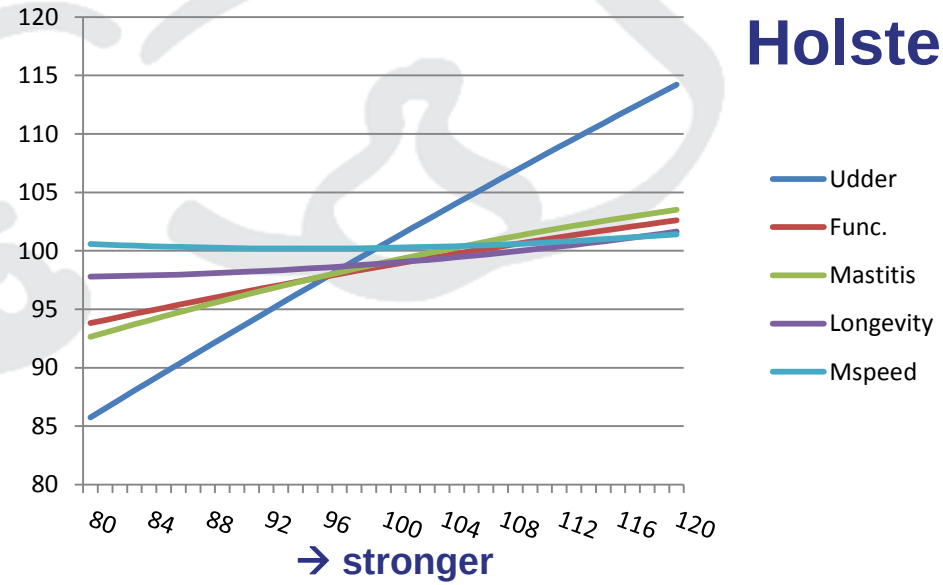
This presentation shows effect of other scenarios

Impact of linear udder traits

- What is the effect of an increase in EBV from 80 to 120 on:
  - Current composite udder
  - Functional trait (0.5 mastitis and 0.5 longevity)
  - Mastitis
  - Longevity
  - Milking speed

Higher index for fore udder attachment

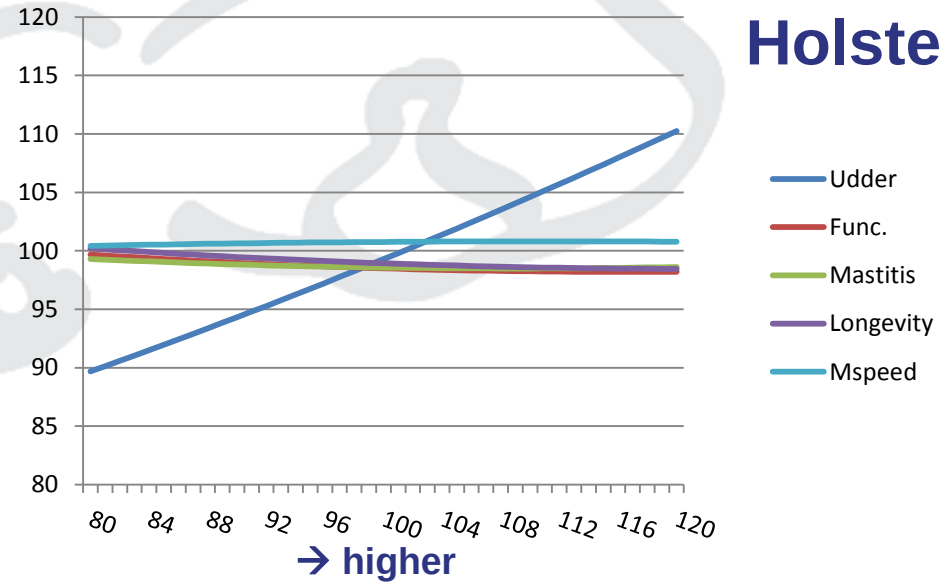
What happens to other traits?



Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	28.5***	8.8***	10.9***	3.8***	0.8
RDC	25.2***	10.0***	10.5***	6.1***	3.1*
Jersey	32.0***	9.6***	9.1***	7.0	2.8

Higher index for rear udder height

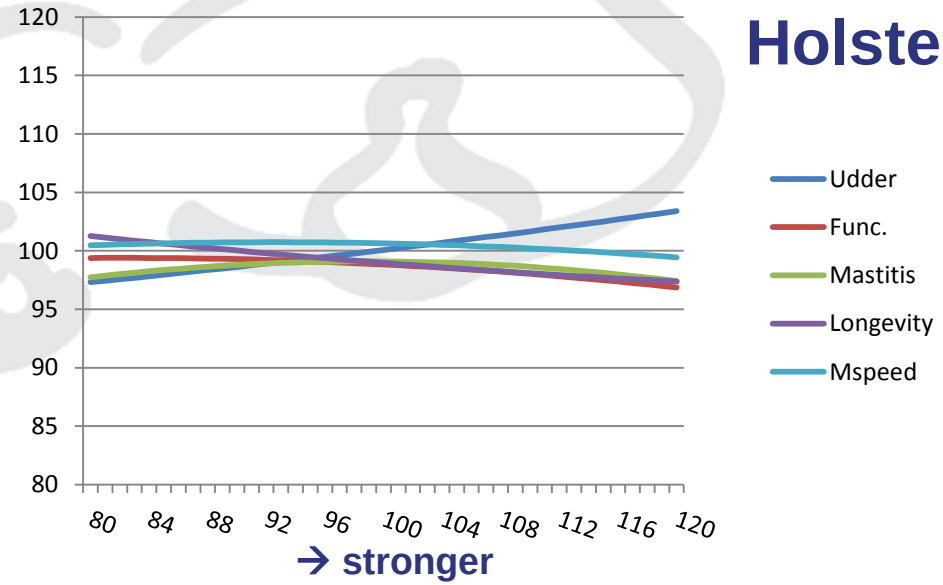
What happens to other traits?



Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	20.6***	-1.5	-0.7	-1.8	0.4
RDC	19.3***	0.2	0.6	2.9	-1.1
Jersey	19.6***	4.8*	4.6*	3.5	3.3

Higher index for udder cleft

What happens to other traits?

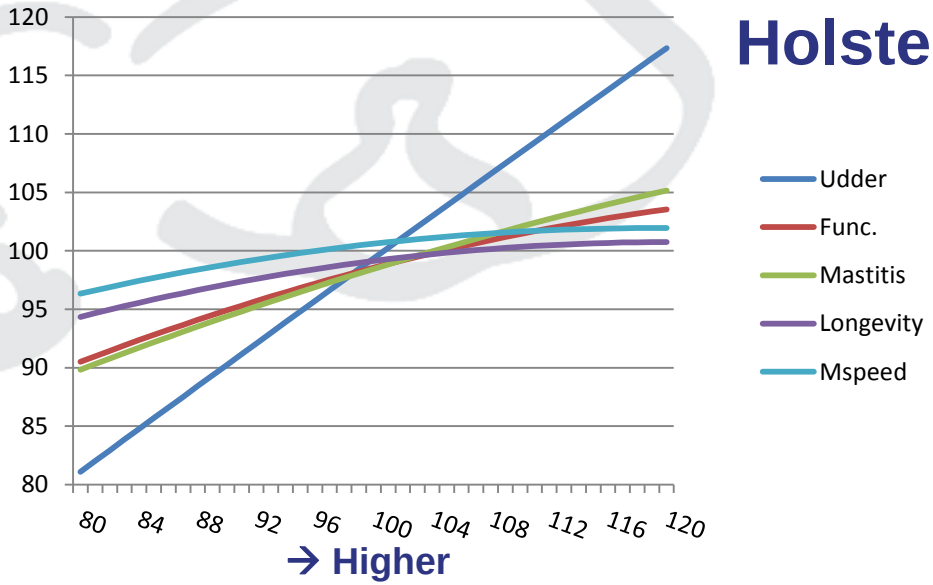


Holstein

Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	6.1***	-2.5*	-0.3	-3.9***	-1.0
RDC	10.0***	2.8	1.9	2.7*	-0.3
Jersey	8.2***	3.3	3.6	2.0	7.5*

Higher index for udder depth

What happens to other traits?

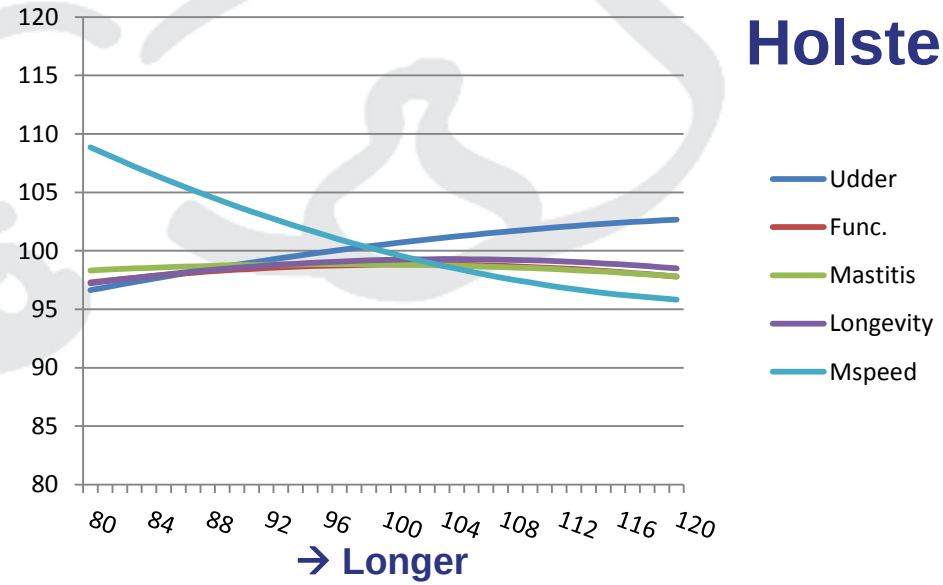


Holstein

Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	36.2***	13.0***	15.3***	6.4***	5.6***
RDC	30.6***	13.8***	14.8***	8.2***	4.6*
Jersey	29.6***	12.3***	12.5***	8.0***	4.4

Higher index for teat length

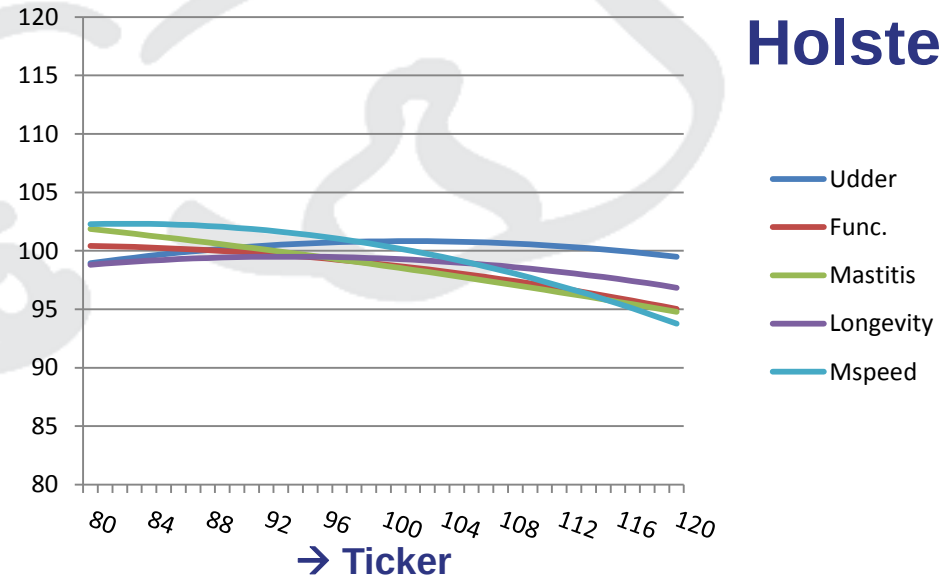
What happens to other traits?



Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	6.0***	0.5	-0.5	1.3	-13.0***
RDC	12.0***	-4.2***	-0.2	-6.8***	-8.2***
Jersey	5.0*	-8.0***	-7.2***	-6.2**	-2.6

Higher index for teat thickness

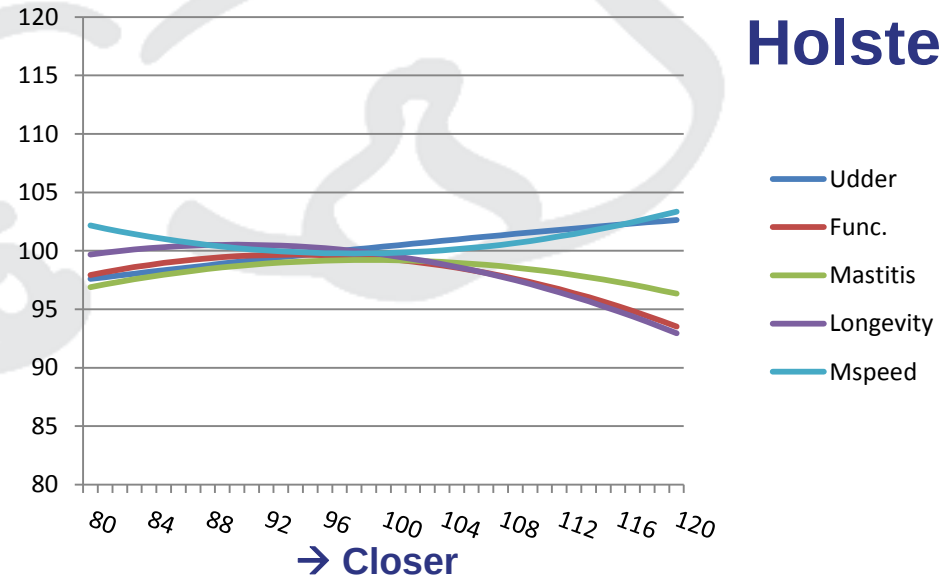
What happens to other traits?



Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	0.6	-5.4***	-7.1***	-2.0	-8.5***
RDC	8.6***	-7.6***	-6.4***	-6.2***	-5.3***
Jersey	2.5	-8.4***	-10.7***	-3.2	-4.8

Higher index for teat placement, front

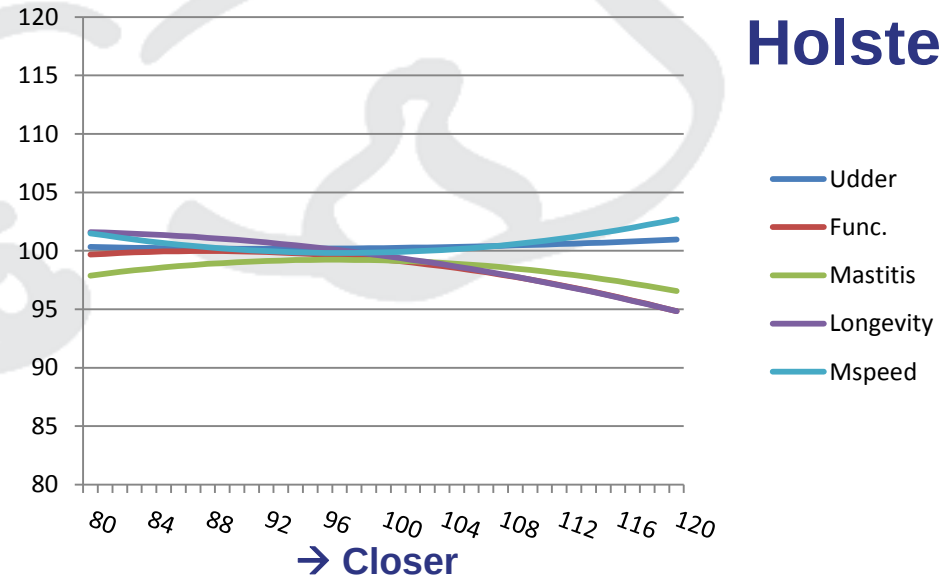
What happens to other traits?



Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	5.0***	-4.4***	-0.6	-6.7***	1.2
RDC	12.6***	5.1***	5.3***	3.2*	3.1
Jersey	12.4***	0.4	1.2	-0.4	-3.6

Higher index for teat placement, back

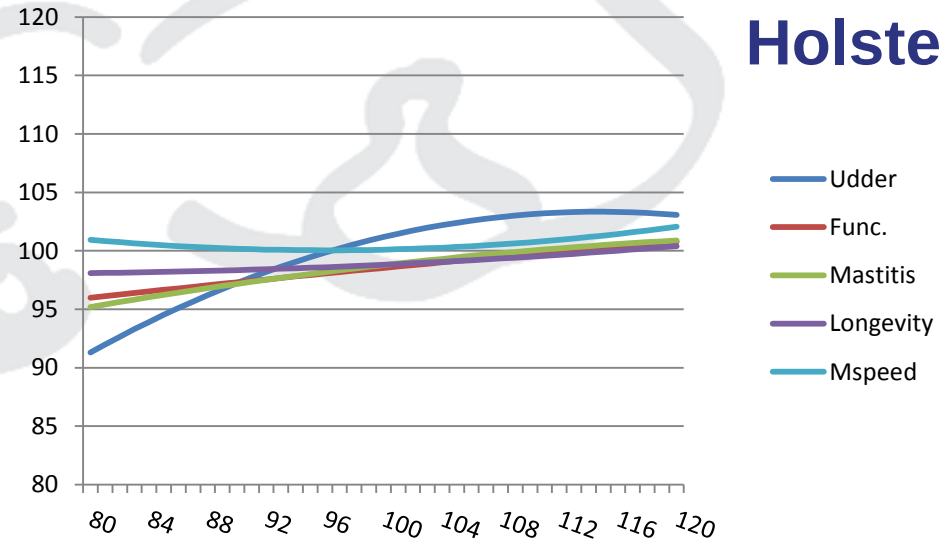
What happens to other traits?



Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	0.6	-4.8***	-1.3	-6.8***	1.2
RDC	8.0***	3.5*	3.5*	2.3	2.4
Jersey	10.0***	-0.7	-0.7	-0.2	-1.4

Higher index for udder balance

What happens to other traits?



Holstein

Index units	Udder	Func.	Mastitis	Longevity	Mspeed
Holstein	11.8***	4.8***	5.7***	2.3	1.1
RDC	15.7***	1.9	3.6	-0.5	3.8*
Jersey	14.4***	-0.8	0.5	-1.7	10.4***

Consequences of different scenarioes

- Current udder index: **weight factors used today**
- Strict udder index: **Maximal correlation with combined udder health/longevity index**
- Customized strict udder index: **as above but few political consideration**

Relation between udder and ”functional index” for Holstein

- Current $R^2 = 0.09$
- Strict $R^2 = 0.20$
- Strict, but not teats $R^2 = 0.19$
- Strict, but not teats and against expectation $R^2 = 0.15$

Only significant traits without teats

- .08 · fore udder + .3 · depth – .19 · plac. b. $R^2 = 0.15$

Political wish about udder cleft:

- .15 · fore udder + .15 · cleft + .46 · depth – .24 plac. b. $R^2 = 0.14$

Optimal combined udder

Includes fewer traits because:

- **Not all traits have a positive effect on functionality**
- **Some trait are strongly correlated**

Udder depth

(Correlations in brackets)

Higher udders:

- Stronger fore udders (0.5 - 0.65)
- Higher rear udders (0.3 - 0.45)
- Wider rear udders (0.1 - 0.2)
- Deeper front udder (0.25 - 0.35)

Fore udder attachment

Stronger fore udders:

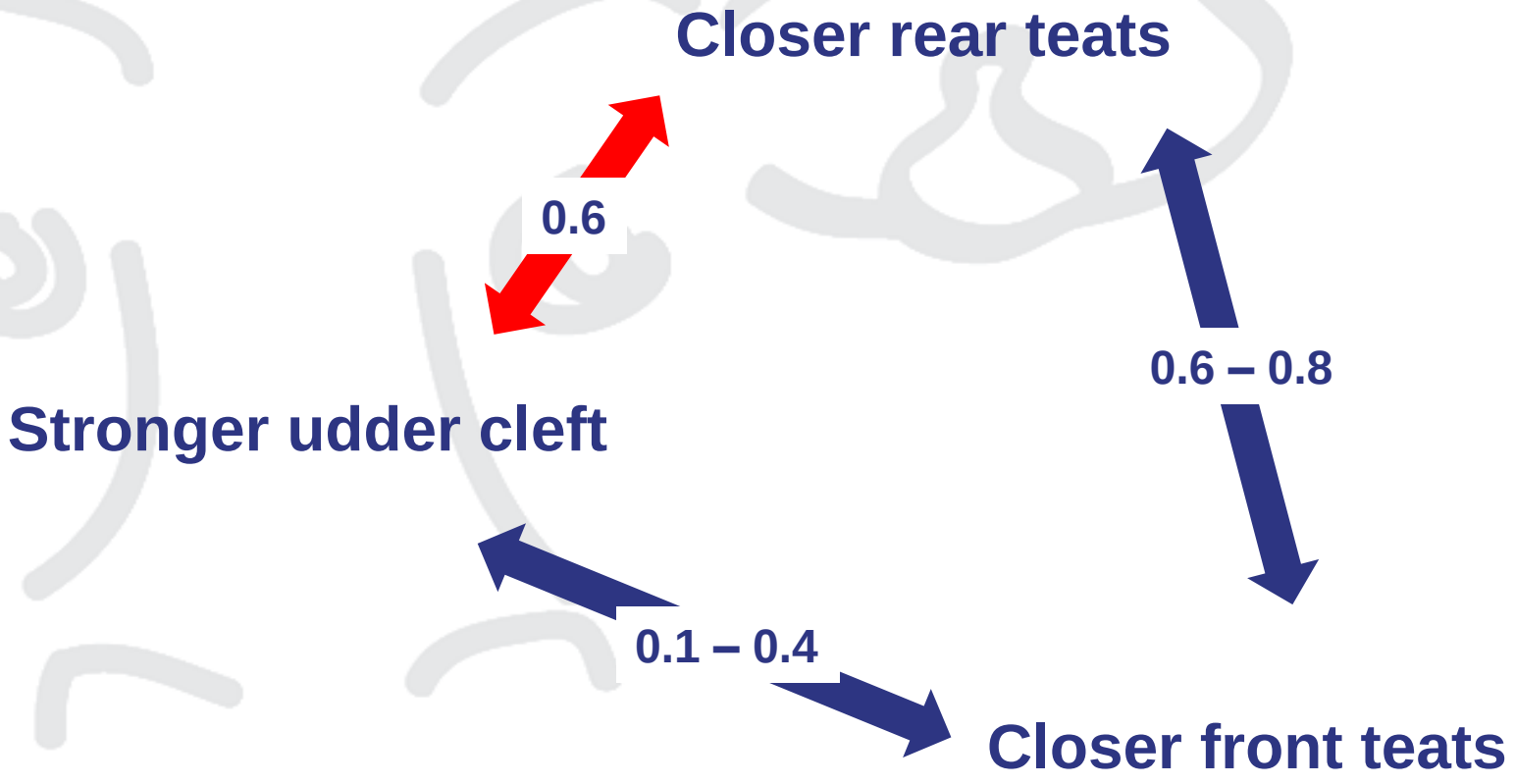
- **Higher rear udders (0.2 - 0.5)**
- **Wider rear udders (0.2 - 0.5)**
- **Higher udders (0.5 - 0.65)**
- **Deeper front udder (0.2 - 0.5)**

Rear udder height

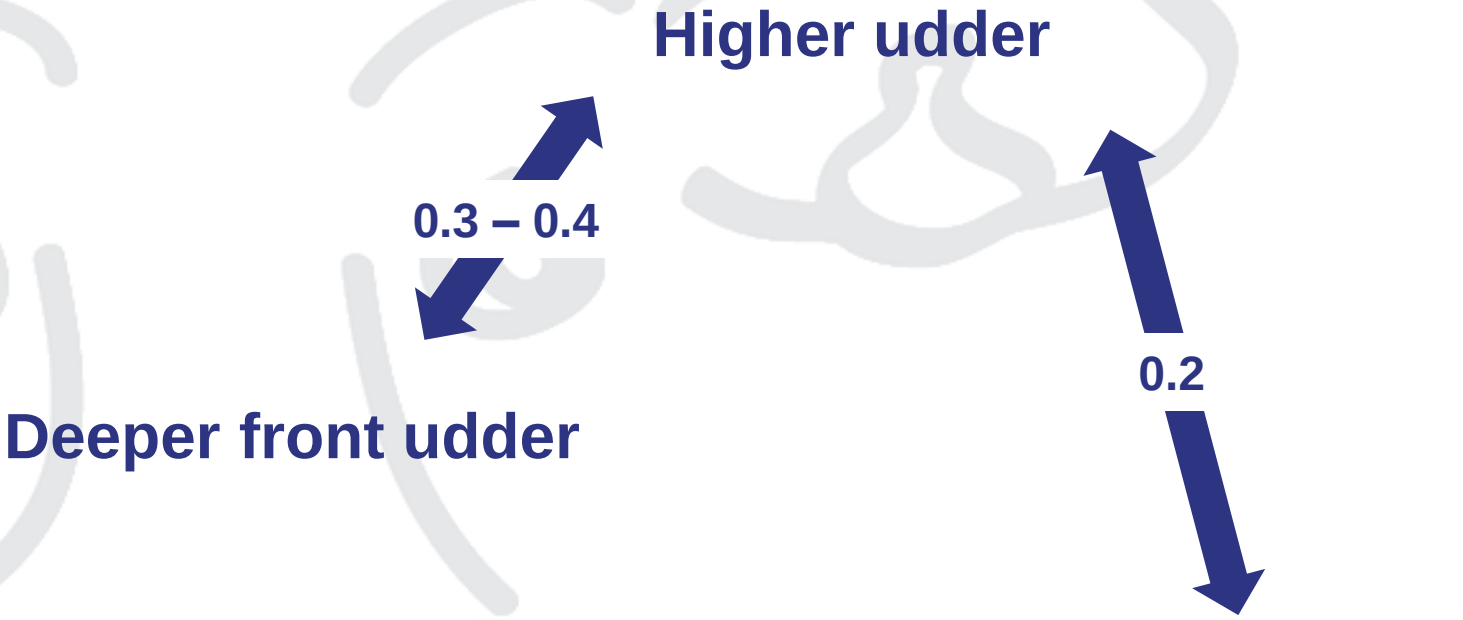
Higher rear udders:

- Wider rear udders (0.5 - 0.7)
- Stronger udder cleft (0.1 - 0.4)
- Higher udders (0.3 - 0,45)
- Closer teat placement back (0.2)
- Deeper front udder (0.3 - 0.35)

Teat placement and udder cleft



Udder depth


Higher udder
0.3 – 0.4
Deeper front udder
0.2
Closer front teats
(only RDC)

Teat thickness and length

Longer teats ⟵ 0.5 – 0.7 ⟶ Thicker teats

Holstein

Correlation between udder traits and 3 alternatives

	Current	Strict	Customized strict
Fore udder attachment	0.69	0.58	0.64
Rear udder height	0.54	0.30	0.38
Udder cleft	0.16	-0.23	0.09
Udder depth	0.89	0.86	0.93
Teat length	0.14	0.04	0.04
Teat thickness	0.02	-0.07	-0.10
Teat placement, front	0.11	-0.25	-0.09
Teat placement, back	0.02	-0.38	-0.13
Udder balance	0.27	0.30	0.33
Functionality	0.29	0.39	0.37
Udder health	0.34	0.40	0.41
Longevity	0.15	0.25	0.20
Milking speed	0.03	0.07	0.07
NTM	0.29	0.35	0.33

Relation between udder and ”functional index” for RDC

- Current $R^2 = 0.06$
- Strict $R^2 = 0.18$
- Strict, but not teats $R^2 = 0.16$
- Strict, but not teats and ….. $R^2 = 0.15$

Only significant traits

- .1 · fore udder + .3 · depth – .1 · balance $R^2 = 0.15$

Udder balance not included:

- .1 * fore udder + .3 * depth R2 = 0.15

RDC

Correlation between udder traits and 3 alternatives

	Current	Strict	Customized strict
Fore udder attachment	0.72	0.73	0.74
Rear udder height	0.50	0.23	0.29
Udder cleft	0.26	0.11	0.08
Udder depth	0.77	0.93	0.97
Teat length	0.31	-0.09	-0.07
Teat thickness	0.26	-0.16	-0.14
Teat placement, front	0.31	0.23	0.26
Teat placement, back	0.22	0.12	0.14
Udder balance	0.38	0.09	0.34
Functionality	0.24	0.38	0.38
Udder health	0.28	0.38	0.38
Longevity	0.11	0.24	0.23
Milking speed	0.00	0.08	0.10
NTM	0.29	0.33	0.32

Relation between udder and ”functional index” for Jersey

- Current $R^2 = 0.07$
- Strict $R^2 = 0.24$
- Strict, but not teats $R^2 = 0.19$
- Strict, but not teats and ….. $R^2 = 0.18$

Only significant traits

- .13 · fore udder + .15 · cleft + .25 · depth
  – .1 · plac. b. - 0.14 · balance $R^2 = 0.18$

Without udder balance $R2 = 0.18$

Jersey

Correlation between udder traits and 3 alternatives

	Current	Strict	Customized strict
Fore udder attachment	0.85	0.67	0.78
Rear udder height	0.54	0.45	0.56
Udder cleft	0.25	0.32	0.38
Udder depth	0.83	0.89	0.91
Teat length	0.15	-0,06	-0.01
Teat thickness	0.07	-0.21	-0.19
Teat placement, front	0.34	-0.08	-0.04
Teat placement, back	0.28	-0.03	0.09
Udder balance	0.40	0.03	0.39
Functionality	0.27	0.42	0.39
Udder health	0.28	0.42	0.39
Longevity	0.20	0.33	0.28
Milking speed	0.05	0.09	0.15
NTM	0.13	0.18	0.18

Summary

- **Current udder index include many aspect – show, workability, functionality**
- **Possible to ”construct” a simpler udder index with higher relation to functionality**