

Improvements in the Dutch udder health index

Yvette de Haas, Jack Windig et al.

Animal Breeding & Genomics Centre



Breeding with an index

1. Set your breeding goal
2. Choose (indirect) traits to observe
3. Estimate genetic parameters
 - Between breeding goal and indicator traits
4. Calculate accuracies
 - For young bulls
5. Estimate breeding values

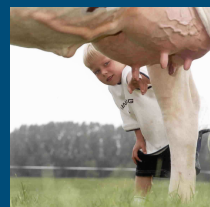


Dutch udder health index

- Breeding for improved udder health
- Current traits
 - Lactation-average SCC
 - Udder conformation traits
 - Milking speed
- Accuracy
 - 0.74

Objective

Creating a new udder health index to breed better against mastitis

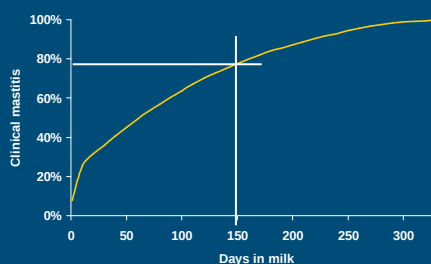


1. Breeding goal

- Udder health
 - Clinical mastitis
 - Subclinical mastitis
 - 50 : 50

2. Optimising cell count trait

Lactation-average SCC
(Bloemhof et al., Vet. Microb., 2008)

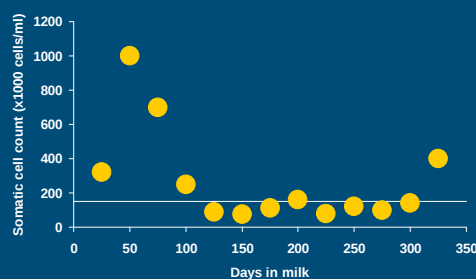


- Whole lactation (5-400d)
- Early lactation (5-150d)
- Late lactation (151-400d)

2. Optimising cell count trait

Dynamics in SCC

(Ten Napel et al., JDS, 2008)

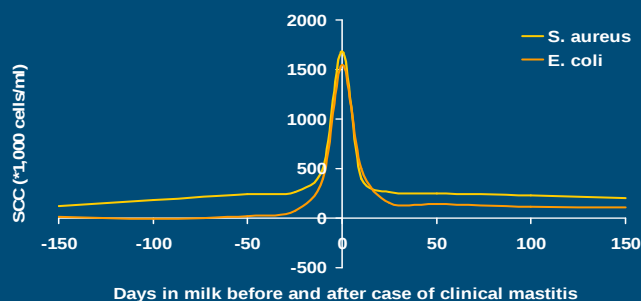


- Absence/Presence of SCC > 150,000 cells/ml 'Suspected'
- Number of SCC > 150,000 cells/ml 'Extent'
- Longest streak of consecutive high cell counts 'Length'
- Absence/Presence of SCC > 250,000 cells/ml 'Severity'

2. Optimising cell count trait

Patterns of peaks (De Haas et al., JDS, 2003)

- Environmental (low-high-low)
- Contagious (low-high-high)



3. Genetic correlation matrix

(De Haas et al., JDS, 2008; Ouweltjes et al., JDS, 2008)



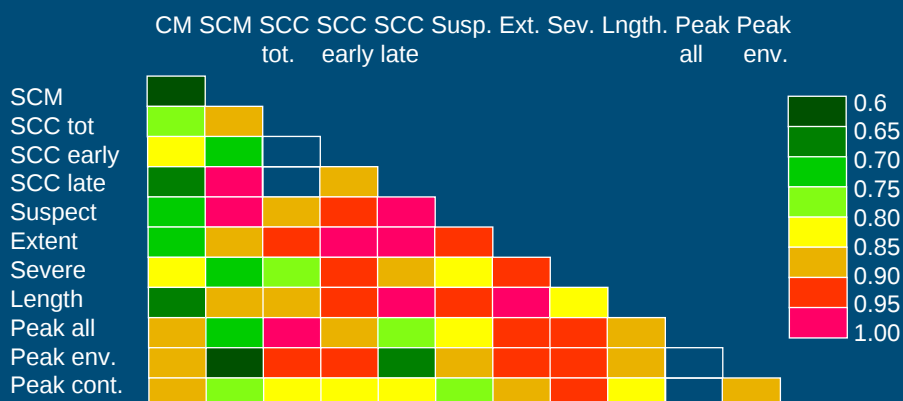
Strongest correlation is different for CM and SCM



ANIMAL SCIENCES GROUP
WAGENINGEN UR



3. Genetic correlation matrix



ANIMAL SCIENCES GROUP
WAGENINGEN UR



4. Accuracy of indices

■ Current index	0.74
■ Combinations	
● 1: SCM	0.65
● 2: Full set	0.93
● 3: 1 + early + late	0.90
● 4: 3 + susp + extent	0.92
● 5: 4 + peaks	0.93

A combination of 6 observed traits
-SCM, early and late SCC, suspect, extent, all peaks-
gives a high accuracy of breeding values



ANIMAL SCIENCES GROUP
WAGENINGEN UR



4. Accuracy with CM observations

Offspring with CM	Accuracy	Gain (relative to no CM)
0%	0.94	-
25%	0.94	0.5%
50%	0.95	0.9%
100%	0.95	1.5%

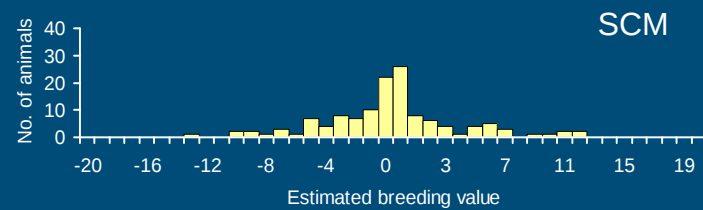
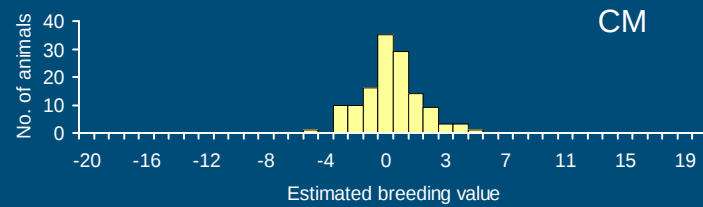
A slight increase in accuracy if direct observations
on CM are used in breeding value estimation



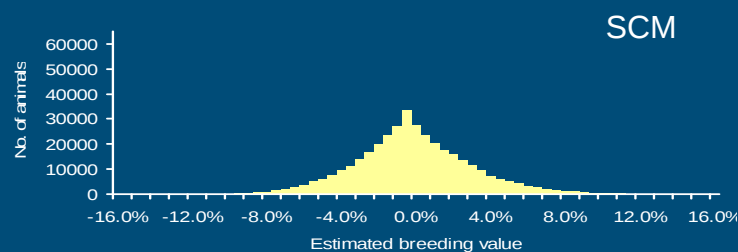
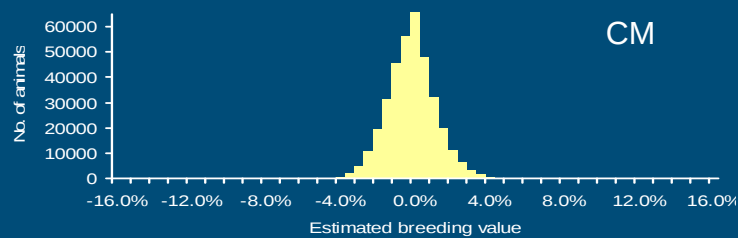
ANIMAL SCIENCES GROUP
WAGENINGEN UR



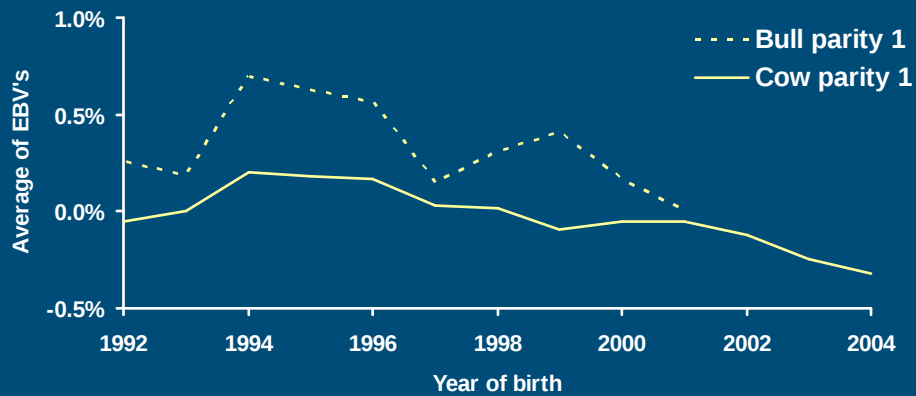
5. Variation in EBV's - sires



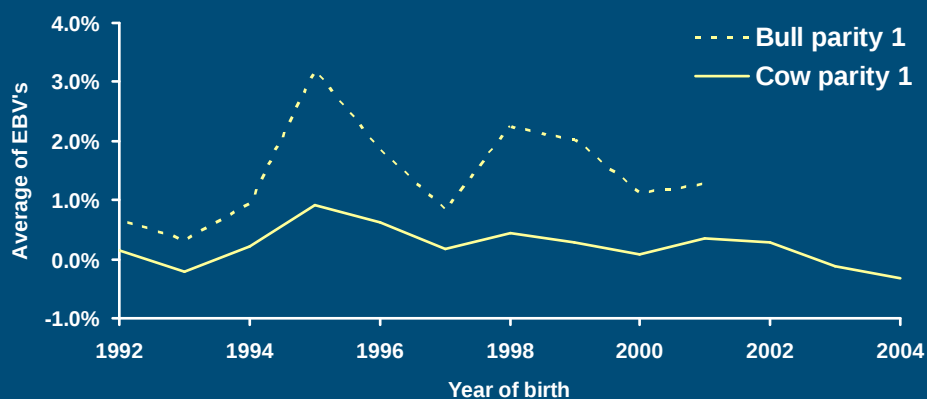
5. Variation in EBV's - cows



5. Genetic trends - CM



5. Genetic trends - SCM



Conclusions

- Udder health can be improved with breeding
- More accurate breeding values for young bulls
 - Better distinction between good and less good sires
- Improvement in genetic trend: better udder health in future
- Not necessary to wait for availability of direct clinical observations



Collaboration

- | | | |
|----------------------|---|--------------------------------|
| ■ Yvette de Haas | - | CRV, Arnhem /
ASG, Lelystad |
| ■ Gerben de Jong | - | CRV, Arnhem |
| ■ Theo Lam | - | GD, Deventer |
| ■ Jan ten Napel | - | ASG, Lelystad |
| ■ Wijbrand Ouweltjes | - | ASG, Lelystad |
| ■ Otlis Sampimon | - | GD, Deventer |
| ■ Roel Veerkamp | - | ASG, Lelystad |
| ■ Jack Windig | - | ASG, Lelystad |



Thank you for your attention



Alger Meekma



Animal Breeding &
Genomics Centre