

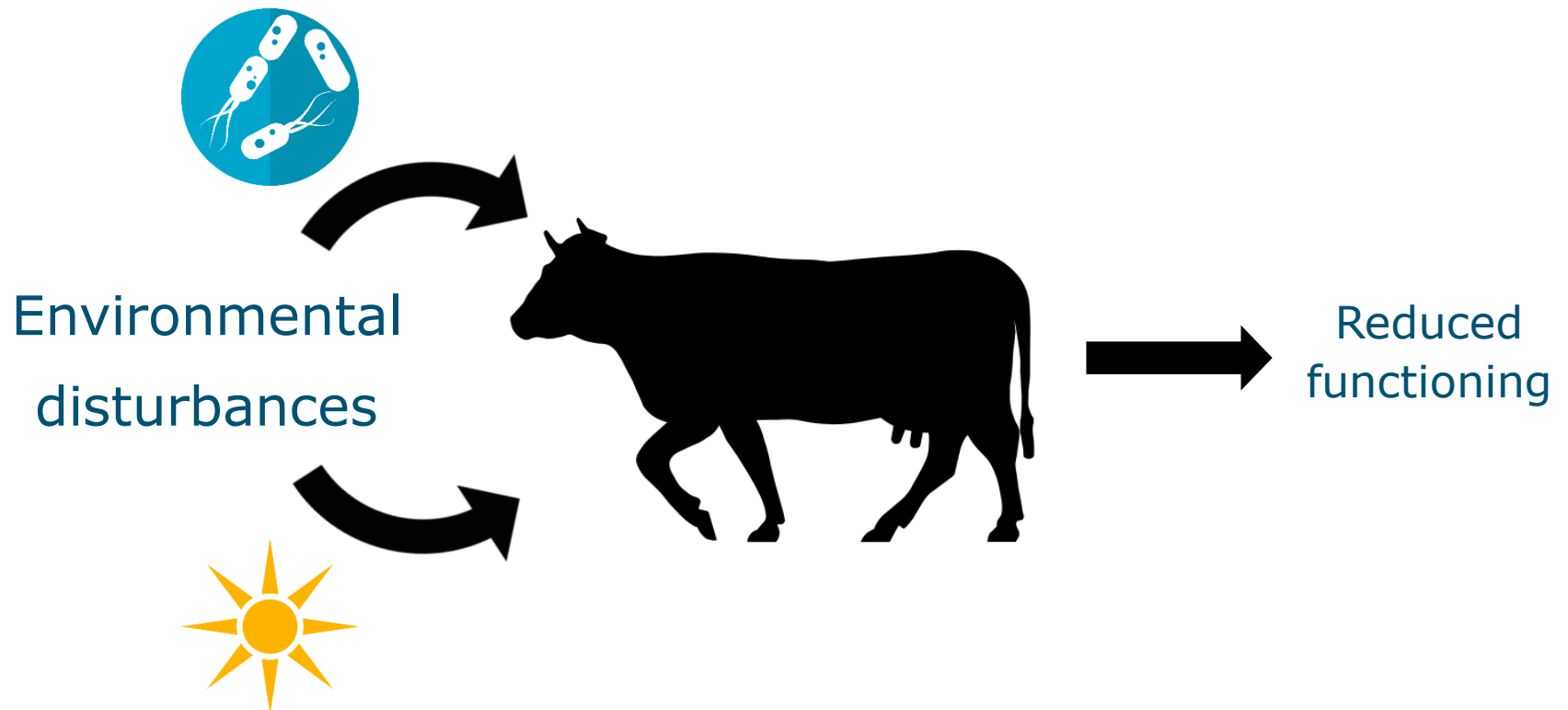
Between-herd variation in cow resilience

Marieke Poppe, Han Mulder, Claudia Kamphuis, Roel Veerkamp

Wageningen University & Research



Resilience



Influence of herd management on resilience

- Herd management expected to influence:
 - Resilience of cows
 - Resistance
 - Tolerance
 - Recovery
 - Disturbances

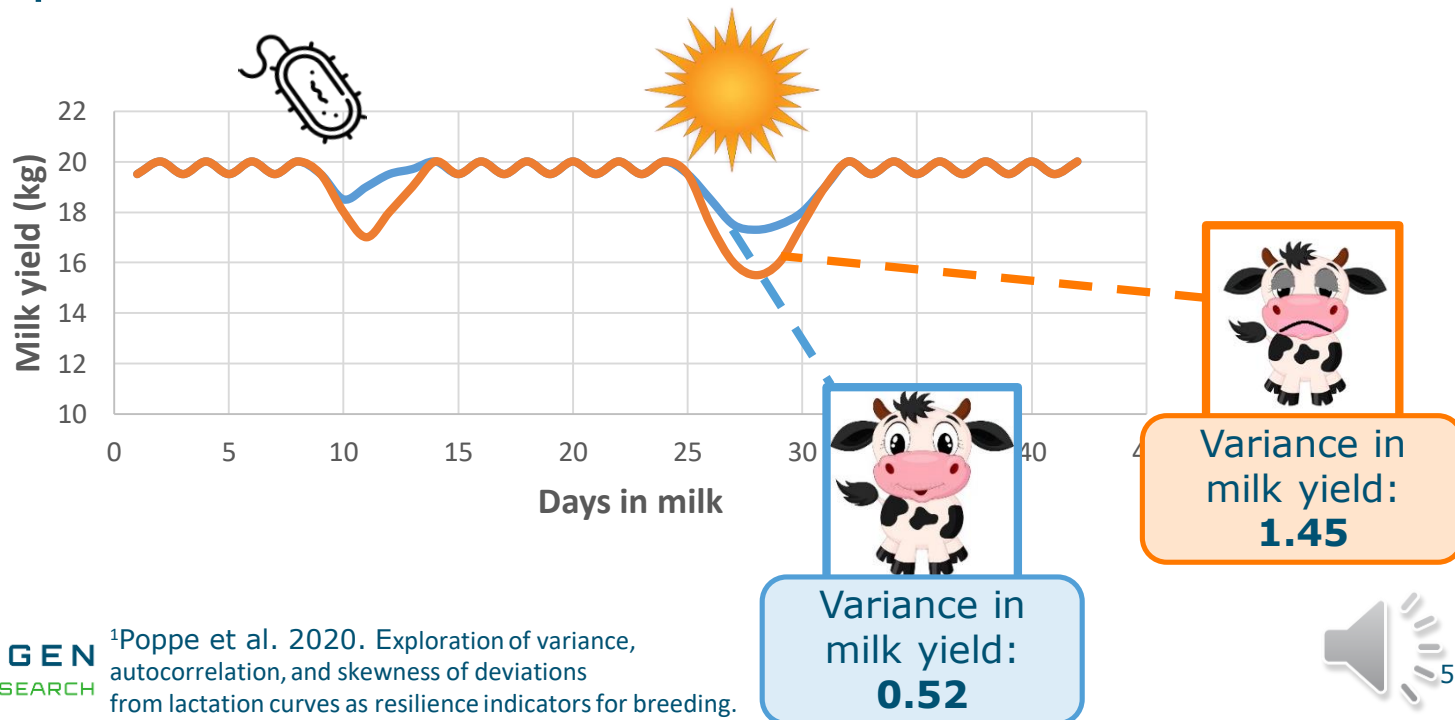
Herd resilience = The ability of herd management to control resilience of the cows and the number and severity of disturbances

Objectives


1. Investigate extent of variation of herd resilience between herds
2. Explain differences between herds by indicators of herd performance and management

Resilience indicator

- VARIANCE of milk yield deviations
- Low VARIANCE genetically associated with
 - Good health and longevity¹
 - Shallow drops after disturbances
- Averaged per herd: indicator of herd resilience



Materials & methods

- 227,655 primiparous cows
 - 2,644 herds
 - Years 2011-2017
- 
- 9,917 herd-year combinations

Materials & methods

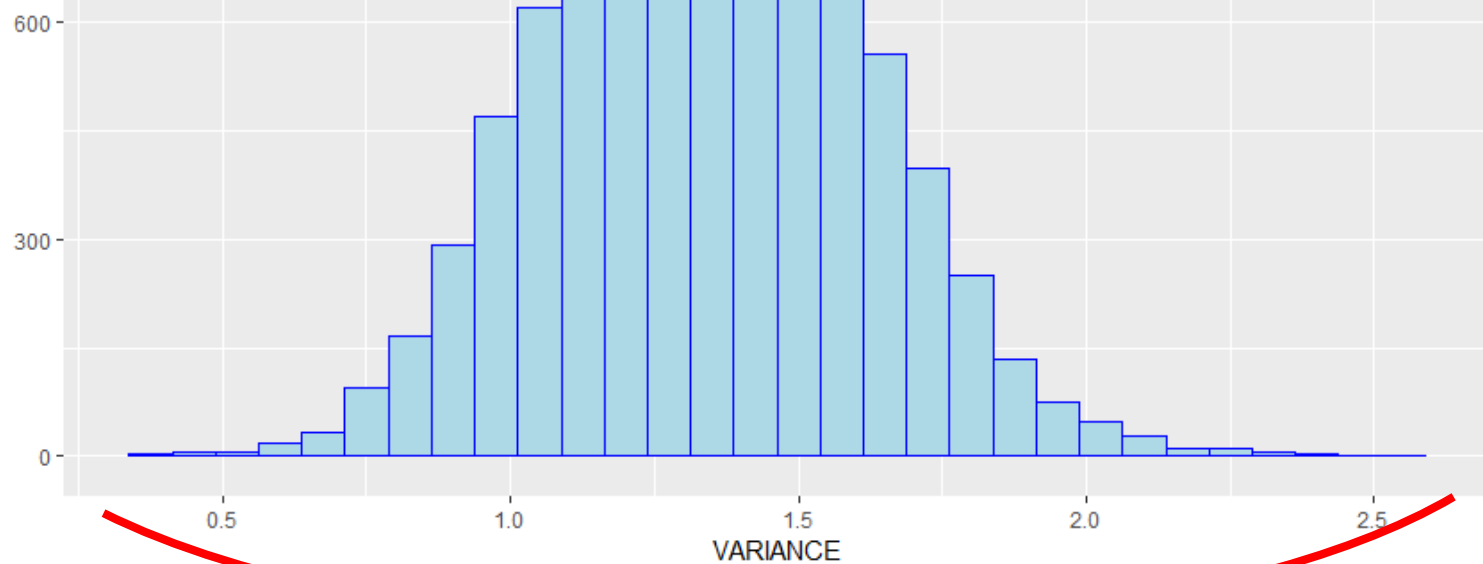
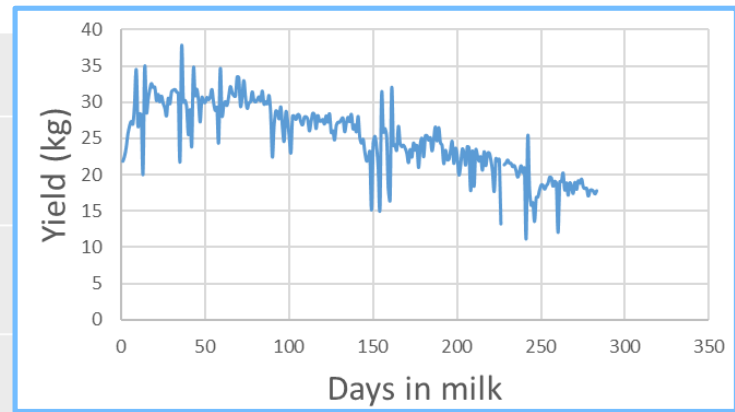
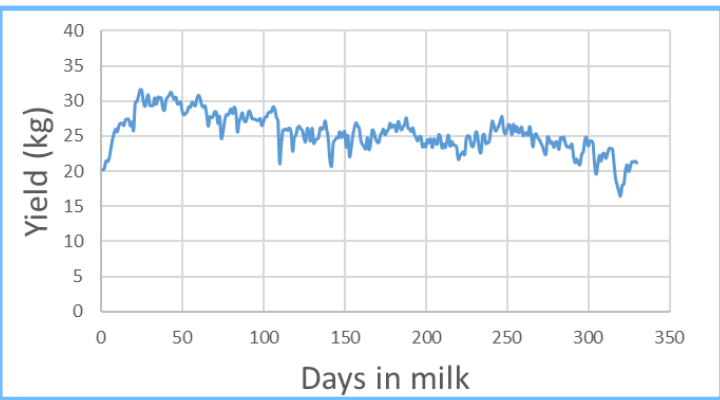
- For each herd-year:
 - **Variance** of individual cows
 - Effect of herd-year on **Variance**, corrected for genetic and year-season effects

$$\mathbf{Variance} = \text{herd-year} + \text{year-season} + \underline{\text{animal}} + \underline{e}$$

- Indicators of management and performance from milk production recording:
 - Milk yield
 - Somatic cell count, ketosis, rumen acidosis
 - Survival to 2nd lactation

Results

Variation in **Variance** between herd-years



6.7x

Correlations between **Variance** and herd management & performance

	VARIANCE
Somatic cell score	0.19
% cows with acidosis indication	0.31
% cows with ketosis indication	0.03
% survival to 2nd lactation	-0.13
Calving interval	0.14
Milk yield	0.10

- Herds with poor herd resilience → low health and fertility
- Rumen acidosis most important → feed management?
- Milk yield level affects **Variance** only little



Conclusions

- Average **Variance** greatly differs between herds → herd management has effect on resilience
- High average **Variance** indicates reduced resilience or increased number of disturbances
 - Related with somatic cell score, rumen acidosis, and survival
- Average herd-year variance as benchmark for herd resilience

marieke.poppe@wur.nl




J. Dairy Sci. TBC:1–12
<https://doi.org/10.3168/jds.2020-18525>

© TBC American Dairy Science Association®. Published by Elsevier Inc. and Fass Inc. All rights reserved.

Between-herd variation in resilience and relations to herd performance

M. Poppe,*  **H. A. Mulder,**  **C. Kamphuis,**  and **R. F. Veerkamp** 

Wageningen University & Research  Animal Breeding and Genomics, PO Box 338, 6700 AH Wageningen, the Netherlands



Conclusions

- Average **Variance** greatly differs between herds → herd management has effect on resilience
- High average **Variance** indicates reduced resilience or increased number of disturbances
 - Related with somatic cell score, rumen acidosis, and survival
- Average herd-year variance as benchmark for herd resilience

marieke.poppe@wur.nl