What efficiency and resilience gains have we actually achieved in the past century or decade?

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1) Viking Genetics
2) Wageningen University and Research
Short answer: almost nothing...
Trait definitions

• Not well defined
• Complex biology
• Longitudinal traits
• Strong GxE
• Limited data
Resilience

Recover from something bad

Bounce back

Bend don't break
A mean management level
A general low management level
A sudden change in management level
A high variation in management
How can we quantify resilience?

• Longevity
• Reproduction
• Health

"Residual Longevity"
Genetic trends
Sum up

• No evidence of improvement of resilience

• Genetic improvement of longevity and reproduction

• Trait definition, model work and data collection is needed

• Will be initiated in GenTORE
Efficiency
Current status

• VERY limited data all over the world

• Almost all Holstein

• Very complex biology

• Huge interest
The genomics revolution

"With genomic selection we will be able to select for scarcely measured traits such as efficiency."
RFI models

Figure 2.6 Pairwise genetic correlations when two traits are measured on the same day from 1 to 324 days in milk (DIM) between 1. dry matter intake and fat and protein corrected milk (DMI-FPCM, SE of median=0.06, of 3\textsuperscript{rd} quartile=0.09), 2. dry matter intake and live weight (DMI-LW, SE of median=0.11, of 3\textsuperscript{rd} quartile=0.10), and 3. fat and protein corrected milk and live weight (FPCM-LW, SE of median=0.12, of 3\textsuperscript{rd} quartile=0.13).

Manzanilla Pech et al., 2016 JDS

Li et al., 2018 JDS
Efficiency

• More data is needed
• Not sure indicators will help
• Biology is hardly adequately described
• How to quantify progress
• Direct measures
Breeding goal

• Total merit is main priority

• No selection for single traits

• Economic value, well defined trait and accuracy is needed
Inbreeding and crossbreeding

• Inbreeding will neither improve resilience nor efficiency

• Crossbreeding will lead to more robust animals
Take home message

• GenTORE will initiate work related to resilience and efficiency

• Not well defined traits

• Doubtfull that any progress has been achieved for the two traits