

An optimal breeding strategy in small dairy cattle breeds

J.R. Thomasen, C. Egger-Danner, A. Willam,
B. Guldbrandtsen, M.S. Lund and A. C. Sørensen

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Objective

- Evaluate impact of running a GS breeding scheme compared to a conventional progeny testing program for a small dairy cattle breed
- Evaluate the value of increased genomic information originating from
 - Higher reliability of genomic predictions (ΔR^2)
- Investigate interaction effect
 - Increased value of genomic information and more intensive use of young bulls
- Deterministic simulation study (ZPLAN)

Evaluation criteria's

- Annual monetary genetic gain for the aggregate breeding value
- Discounted profit per cow for an investment period of 15 years
 - Inclusion of variable cost

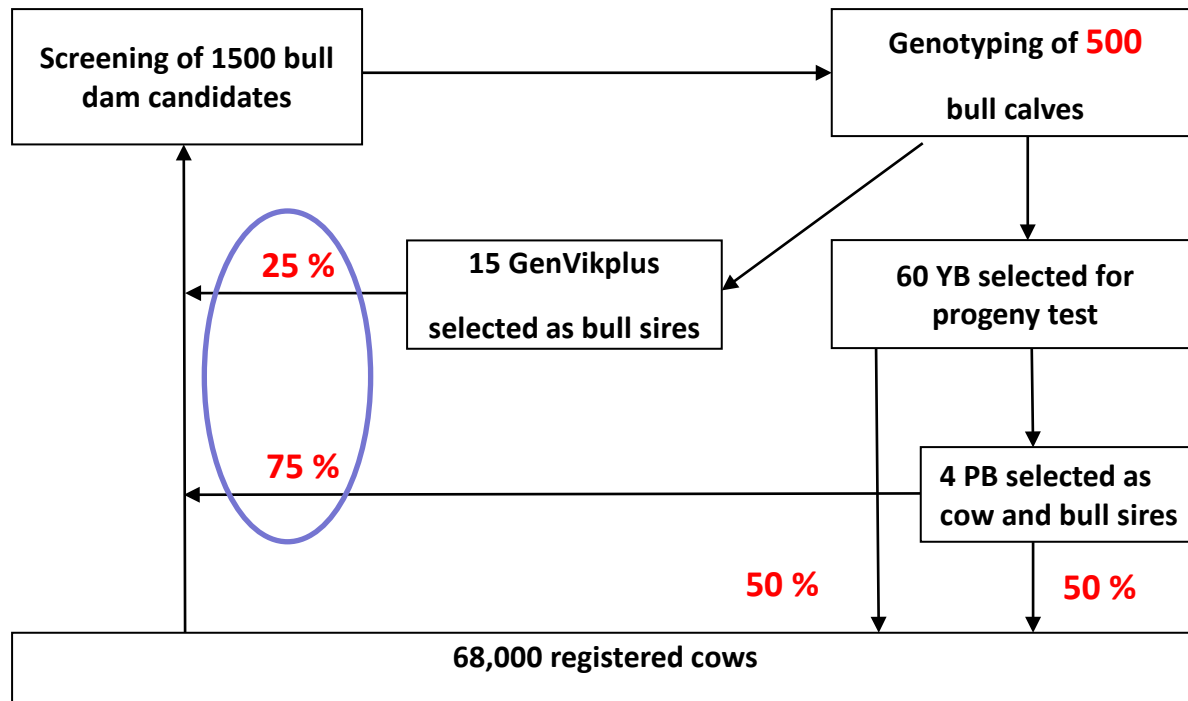
• Traits

- Production trait
 - $h^2=0.30$
 - Economic value: 83 Euro
- Functional trait
 - $h^2=0.04$
 - Economic value: 82 Euro
- Genetic correlation between traits -0.30
- Correlation between the milk production and the breeding goal is the same as in the Nordic total merit index

Breeding Schemes Used to Evaluate Gains

- **Conventional** progeny testing program
 - Reference breeding scheme
 - Danish Jersey breeding scheme up to 2009 before start of GS
- The **Genomic Selection** breeding scheme
 - Reflect the actual Danish Jersey GS breeding scheme
 - Genotyping of bull calves
 - Use of YB as bull sires

The Genomic Selection Scheme



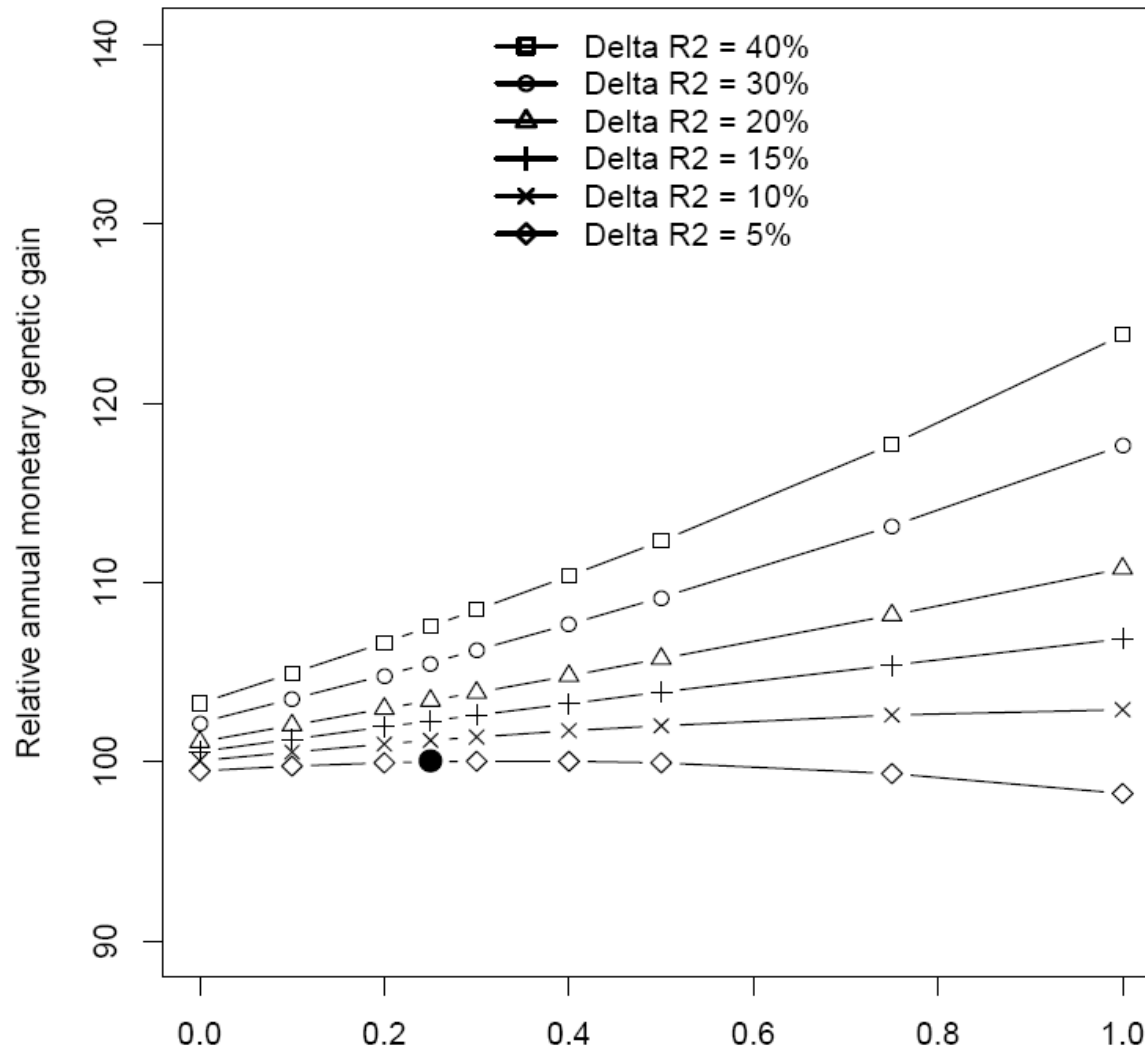
Increase in reliability due to genomic information: + 5%

Main results for comparisons of breeding schemes

	Conventional	GS*
Genetic Gain	93.2	100
Discounted Profit	88.7	100
Generation interval	4.14	3.58

* Relative values, GS scheme set to 100

Positive interaction between increase in reliability and more intensive use of young bulls



⇒ -1.8%

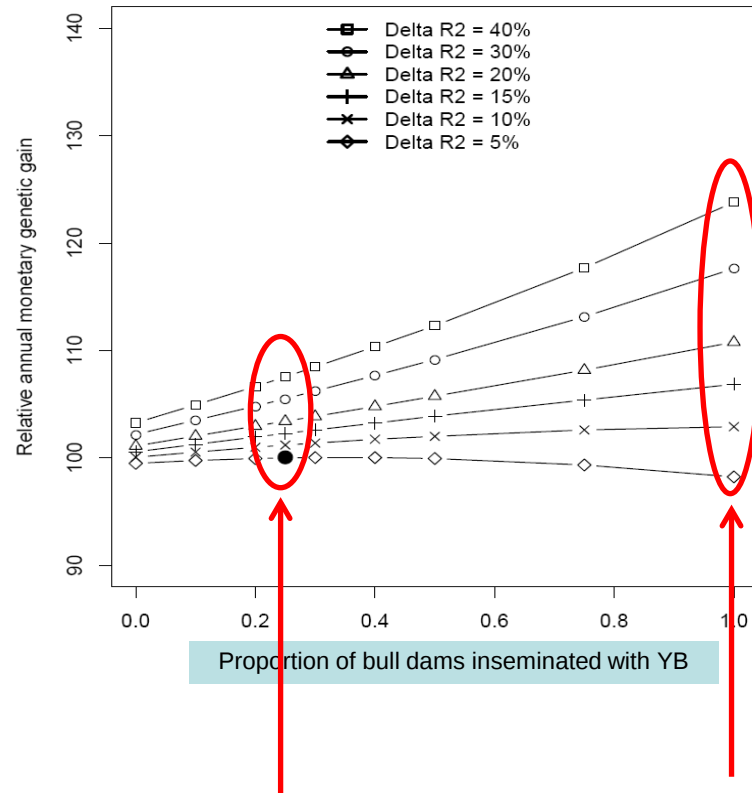
Proportion of bull dams inseminated with GenVikPlus bulls

• Take home messages

- An optimal breeding strategy in small dairy cattle breeds still involves progeny testing
- Increased reliabilities of GEBV is the key driver for running a more valuable breeding scheme with more intensive use of YB
- The value of increased reliability of GEBV is limited if important breeding parameters are not optimized

Future Directions

Evaluate value of increased reliability originating from genotyping of females



Stochastic simulation study in ADAM