



What are the changes that GS generated for the EuroGenomics Countries?

“With examples from VikingGenetics”

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• EuroGenomics - establishment



Genomika Polska



EuroGenomics is the joined effort of 7 European farmer owned breeding partners in nine countries.

Aim is to enhance results of Genomic Selection within Holstein breed

• EuroGenomics – Focus in partnership

- **Motivation for cooperation:**

- Increase reliabilities on GEBV's for existing and new traits by
 - extending reference population within Holstein breed

- **Final goal:**

- Increase profitability of our dairy farmers
- Obtain better tools for breeding companies to compete in the global market with respect for six different methodology and breeding goal



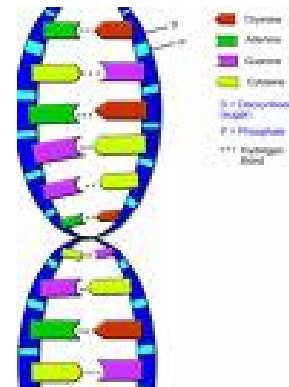
• EuroGenomics – Main results

- Reference population - To put together genotypes
- Develop the routine exchange
- Development of imputation know-how: 2009: 2 diff 54K chips
- Same price advantages whatever the engagement – cost efficiency
- More than 12,000 bulls genotyped yearly and 1500 bulls marketed as genomic bulls – high pressure of selection
- Test for females for management and breeding purposes: 100,000 animals genotyped in 2012



• EuroGenomics – Research partnership

- Improvement of reliable and innovative cattle breeding since 2009 together with scientific partners:
 - INIA, Spain
 - INRA, France
 - Liege University, Belgium
 - Aarhus University, Denmark
 - Nordic Genetic Cattle Evaluation, NAV, DFS
 - National Research Institute of Animal Production, Poland
- Build up a technical and scientific network and platform with the aim of:
 - Develop better calculation methods with
 - Exchange of ideas and methods
 - Ambition to keep up speed of innovation

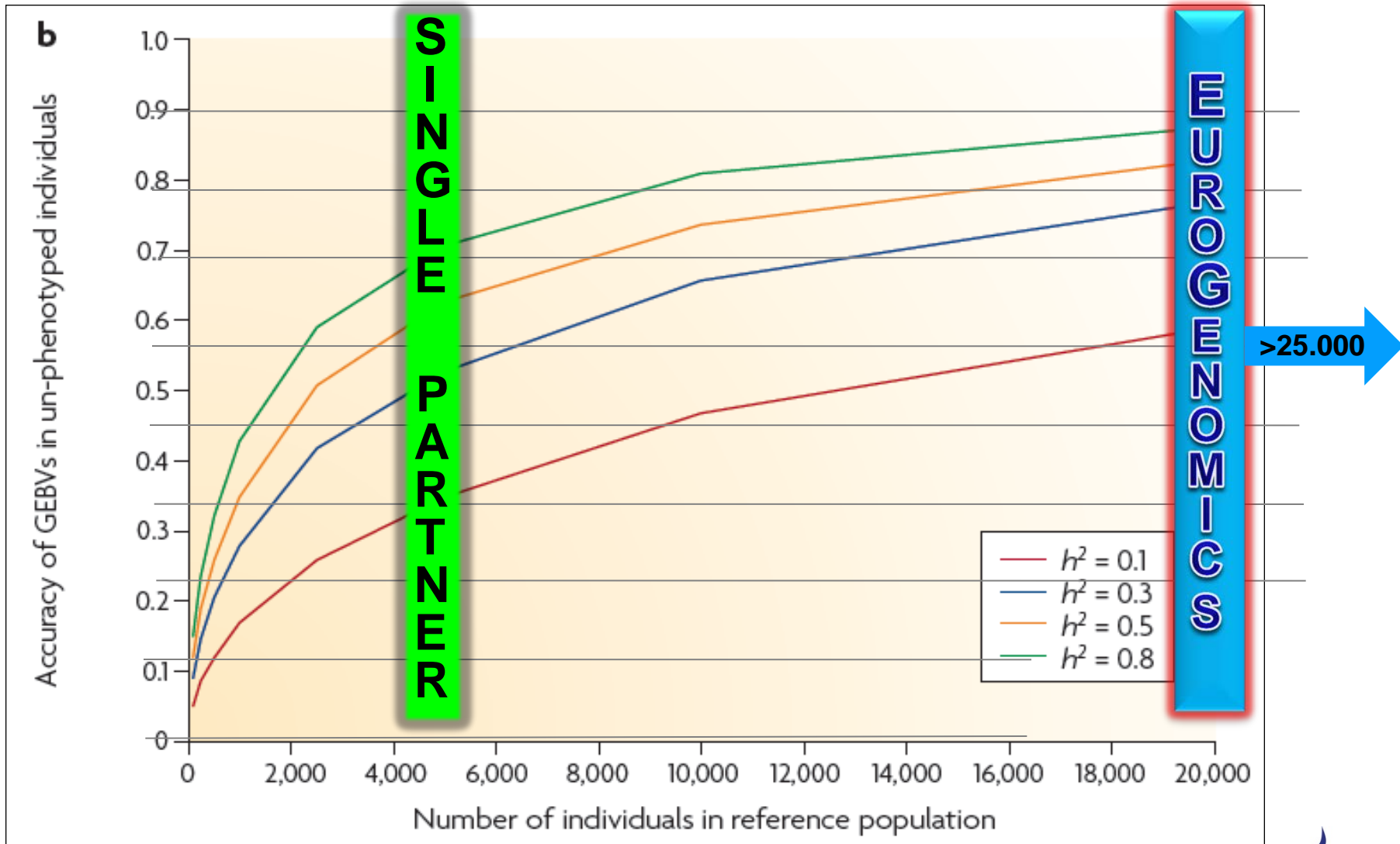


• Close research partnership by example

- **Development of customized chips with 3 objectives:**
 1. **Development of economic tool for the management of herd:**
 - **Use of sexed semen in combination with beef segment**
 - **Production of next generation female on top pedigree animals**
 - **Production of beef crosses on low pedigree animals**
 - **Replacement strategy – buy and sell animals**
 2. **Validation of scientific assumption:**
 - **Update reference population**
 - **Implementation of results from sequencing**
 - **Causal mutations**
 3. **Breeding purposes**



Reliability and size of reference population



Goddard & Hayes, 2008

• Results with Genomic Selection

- **Higher reliabilities (11%) due to EuroGenomics collaboration**
- **Shorter generation interval due to use of younger breeding animals**
- **Higher selection intensity due to pre-selection of test bulls based on GEBV**
- **Higher reliability due to use of improved methodology developed by scientific partners**
- **More sustainable breeding due to increased genetic progress for functional traits**



Reliabilities Breeding values

Holstein


Trait	Proven bull, 5 years (Traditional Breeding Scheme)	Genomically tested bull calves (Gain compared to PA)
Yield	91	55 (+32)
Udder Health	68	45 (+31)
Fertility	60	46 (+28)

Validation reliabilities,
Nov 2013

GS favoring reliabilities for functional traits

Effect use of Genomic Selection in VG

- Number of tested Young bulls today and before GS



	Before GS	Today
Holstein	350	185
VikingRed	225	200
Jersey	55	55
Total	620	440

Reliability
Level GS:

High

Medium

Low

“Biggest change in breeding plan with highest reliability on GEBV”

• Breeding plan example Holstein VG

1. Screening all born calves in population
2. 2,100 selected based on NTM, and genomic tested
3. 240 calves bought based on GEBV's
4. 185 approved as young bulls
5. 25-30 bulls selected and used as GenVikPLUS Bulls:



6. Registration of daughters for 4 years
= breeding values for the bulls
7. < 10 best bulls approved as elite bulls



• Use of bulls on categories in VG

Percent	Before GS	Holstein	VikingRed	Jersey
Elite bulls	70	26	50	56
GenVikPLUS	0	51	26	19
Young bulls	30	23	24	25

Reliability level GS High Medium Low

“Lower number of proven bulls with GS”

EuroGenomics – Developments together with scientific partners

- Harmonization of registration and key traits
- Implementation of new traits like Claw Health, Paratuberculosis, Feed Efficiency
- Development of technology, methodology and comparison of calculation methods
- Expand reference population with females
- Implement output from sequence data
- Breeding plans and long term consequences



• EuroGenomics as a facilitator for

- European actors of European improvement in Holstein
- Engagement to accelerate implementation of GS
- More adapted tools like customized LD chip (EuroG10 K)
- Making tools more affordable for a large number of users



• Thank you for your attention!

