

POLISH GENOMIC SELECTION PROJECT

Joanna Szyda 10.08.2011

1. Project participants

2. Data

3. Model

4. Evaluations

PARTICIPATING ORGANISATIONS

AI STATION BYDGOSZCZ

- funding

UNIVERSITY of OLSZTYN

- molecular analysis
- DNA database



AI STATION KRASNE

- funding
- since 2011

WROCLAW UNIVERSITY of ENVIRONMENTAL AND LIFE SCI.

- data analysis

ANIMAL BREEDING INSTITUTE BALICE

- production data

PRINCIPAL INVESTIGATORS

UNIVERSITY of OLSZTYN

- prof. Stanisław Kamiński
- project coordinator

WROCLAW UNIVERSITY of ENVIRONMENTAL AND LIFE SCI.

- dr. Joanna Szyda

ANIMAL BREEDING INSTITUTE BALICE

- prof. Andrzej Żarnecki



TASKS



DNA preparation

Bank of Bull
DNA

AI Stat Bydgoszcz
Uni Olsztyn

DNA quality

Selection of DNA
for genotyping



Genotyping Lab (Illumina)

AI Stat Bydgoszcz
Uni Olsztyn

EBV/pedigree
database

IZ

SNP genotypes

Reports

Statistical analysis

Uni Wroclaw

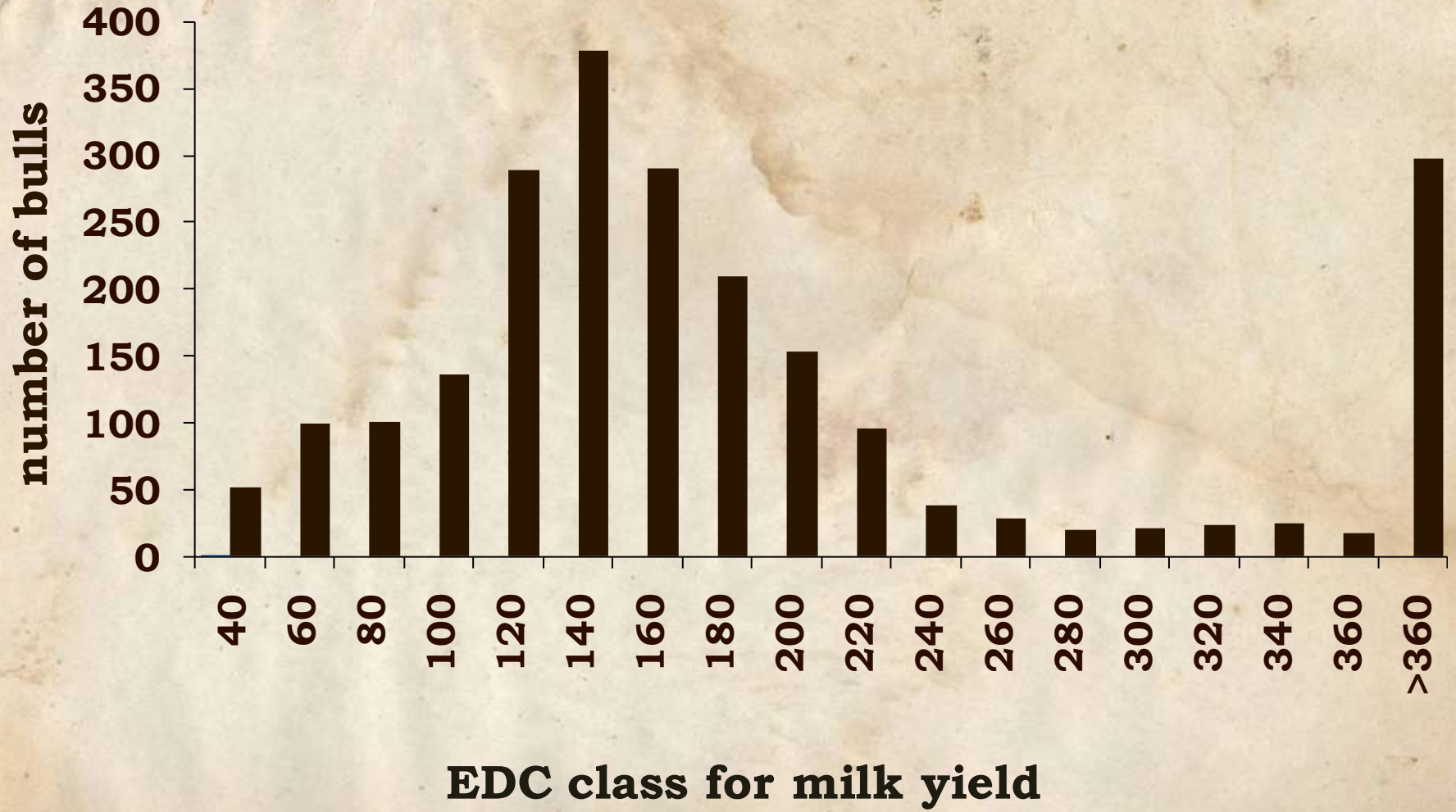
DGV

TRAINING DATA SET - animals



2 269 HF bulls

TRAINING DATA SET - animals



TRAINING DATA SET - traits



- **Production:** 3 (MY, FY, PY)
- **Type:** 21
- **Udder Health:** 1 (SCS)
- **Fertility:** 4

TRAINING DATA SET - genotypes



Illumina bovine snp50 beadchip

- **54 001 SNP (chip v. 1) and 54 609 (chip v. 2)**
- **genotype coding A/B**
- **46 267 tSNPs** (MAF ≥ 0.01 , call rate $\geq 90\%$)
- **average call rate: 99.66%** (all SNPs), **99.75%** (tSNPs)
- **average MAF: 0.23** (all SNPs), **0.26** (tSNPs)

SNP EFFECT ESTIMATION METHOD

$$y = \mu + Zq + e$$

- **y** EBV
- **μ** general mean
- **q** tSNP $\sim N\left(0, I \frac{\sigma_a^2}{N_{SNP}}\right)$
- **Z** $\in \{-1, 0, 1\}$
- **e** residual $\sim N(0, D\sigma_e^2)$

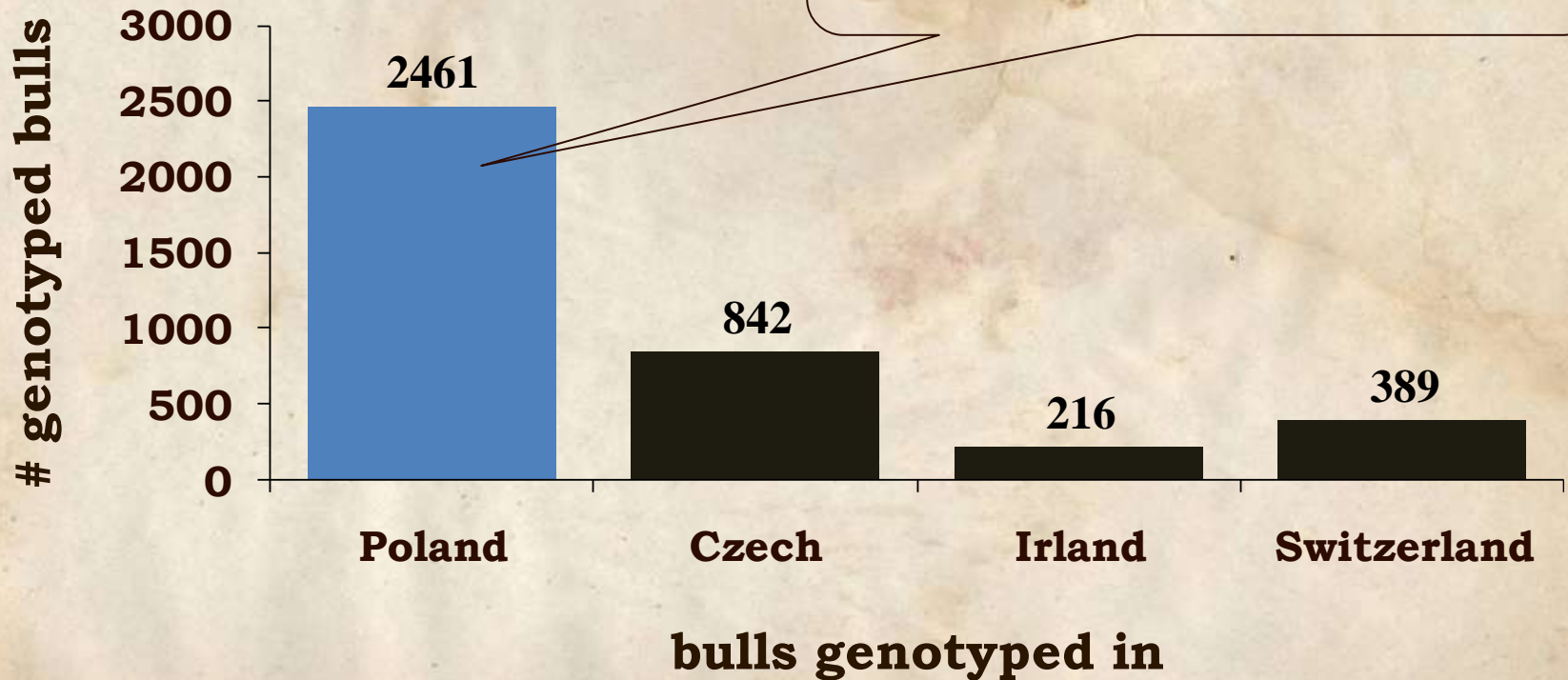
EVALUATIONS - summary

- **first genomic evaluation: 2009**
- **regular genomic evaluations matched to conventional evaluations (Jan, Apr, Aug)**
- **no regular genotyping of young bulls**
- **no regular genotyping of cows**
- **no 3K genotypes available**
- **no 777K genotypes available**
- **genomic evaluation system validated by Interbull in August 2010**

EVALUATIONS - last evaluation

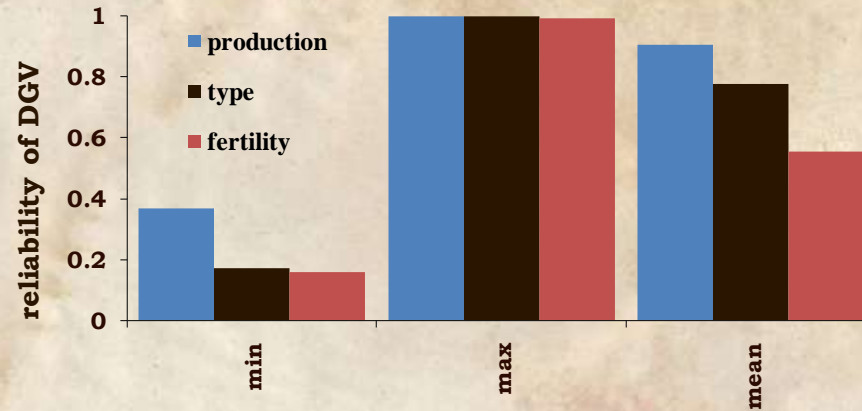
- April 2011
- 3 908 genotyped bulls

available for genotype exchange

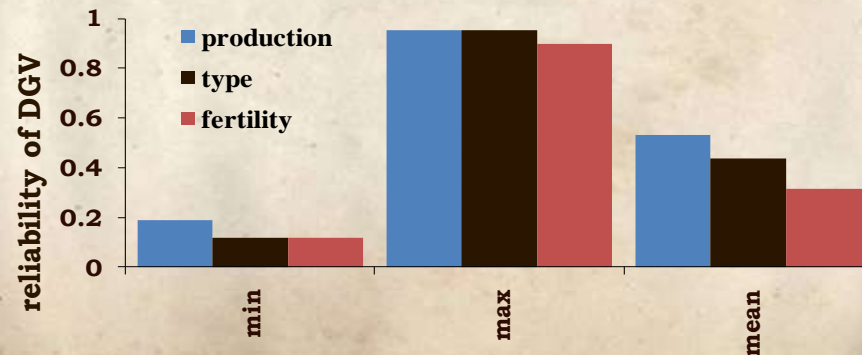


EVALUATIONS - last evaluation

- **training bulls (with EBV)**



- **test bulls (without EBV)**



EVALUATIONS - links

- **Polish "geno" file by Interbull**

http://www.interbull.org/images/stories/Form_GE_GENOM_POL.pdf

- **Project website**

<http://masinbull.nstrefa.pl/>

- **Published paper in the Polish genetic evaluation project** *Journal of Applied Genetics (2011) 52:363-366*

<http://www.springerlink.com/content/c0856461qq5q5138/fulltext.pdf>
no 3K genotypes available