

## Status of Genomic Selection in The Netherlands



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## CRV Company

- Breeding programs in New Zealand, Brazil, CZ, NLD
- More than 6 million doses sold world wide
- Invested several millions € in development of Genomic selection



## CRV's history in GS

- 2005 - 2007 : G-Lecture project
  - ▶ Uo Wageningen, ASG Lelystad, Uo Liege, pig/poultry breeders
- October 2006 : First use of GS in breeding program
  - ▶ 3000 SNPs
  - ▶ ~1500 reference bulls, ~1000 calves
- Spring 2007 : Development of custom 60K SNP chip
- October 2007 : First use of GS with 60K SNP
  - ▶ NLD: ~1500 reference bulls, ~2500 selection candidates
  - ▶ NZL: ~1000 reference bulls, ~300 selection candidates



## CRV 60K SNP chip

- Developed with University of Liege
- Illumina Infinium technology
- SNPs from public databases
- Number of SNPs
  - ▶ #SNPs ordered : 57,660
  - ▶ #SNPs on chip : 52,384 (91%)
  - ▶ #SNPs used in GS : 47,557 (91%)



## Model

$$y_i = \mu + u_i + \sum_{j=1}^{50000} \mathbf{z}_{ij} \mathbf{q}_j + e_i$$

- ▶  $y_i$  : progeny EBV ( $n=1500$ )
  - ▶  $u_i$  : random polygenic effect
  - ▶  $\mathbf{z}_{ij}$  : [ 2 0 ], [ 1 1 ], [ 0 2 ]
  - ▶  $\mathbf{q}_j$  : random SNP effect
  - ▶  $e_i$  : residual
- SNP effects ~ mixed distribution
    - ▶ Meuwissen & Goddard (2004)
  - Gibbs sampling with residual updating



## Reliability of genomic EBVs

- Additional reliability
  - ▶ protein production +17%
  - ▶ overall conformation +14%
  - ▶ somatic cell count +11%
- More reference bulls will increase reliability
  - ▶ Autumn 2008



## InSire bulls

- CRV launches 'InSire' bulls per June 1, 2008
- InSire is CRV's brand name for GS selected bulls
- From September 1, only InSire bulls will be progeny tested for breeds Holstein and Jersey



## New Breeding program

- Screen more than 1500 young InSire bulls
- Select 1:5, instead of 1:2 previously
- Screen bulls dams also on genomic information
- towards GEBV within 1 month after birth
  - weekly genotyping & genetic evaluation



## Effects by use of Insire Bulls

- Increased genetic improvement (30-40%)
- Higher genetic level of test sires
- Higher genetic level of Delta embryo's
- Wider portfolio of commercial bulls & higher level
- More outcross; less inbreeding

