Current status and future directions

Breeding plans

Lars Nielsen
VikingGenetics

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Genomic Selection in Cattle
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Current breeding plan VG - 2012

< 10 best approved as elite bulls

All born calves in screening

1.800/2.000/500 selected based on NTM, and genomically tested

260/275/65 bought based on GAV-values

175/200/55 approved as young bulls (1500-2000 doses)

25-30/20-25/12-15 used as GenVikPLUS-bulls

Registration of daughters for 4 years = breeding values for the bulls

Effects of genomic selection on VG bulls

- Sampled young bulls per year before and now

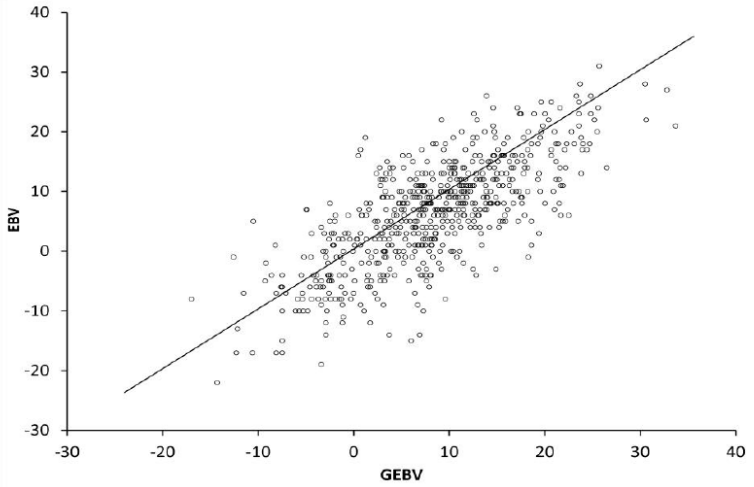
	Before GS	Now
Holstein incl. Red Hol	350	185
VikingRed	225	200
Jersey	55	55
Total	**620**	**440**

Waiting bull strategy

- Waiting bulls with low GEBVs on NTM and limited chance to be used as daughter proven bulls are being slaughtered
  - Decisions taken according to reliabilities in the breed
  - Within year and sire group
  - Risk acording to lower production costs
  - 500-1000 doses kept as safety stock

GenVikPLUS bulls have convinced

- We see good correlation between EBV and GEBV GenVikPLUS
  - Looking forward to including genomic and daughter information in same index to decrease the larger gap when information changes
- Most new top proven bulls have been used as GenVikPLUS



Use of bulls by category in VikingGenetics - fall 2012

Percent	Before GS	VR	HOL	JER
Daughter proven	70	48	24	51
GenVikPLUS	0	20	43	15
Young bulls	30	28	26	22
X-Vik	-	2,6	5	11
Import	-	1,3	2	1

But it is still important to convince farmers to use GVP bulls in batches.

Improved selection of import bulls on Nordic scale.

What have we changed ?

- Genetic progress per year = (i x r_{IA} x dev)/L

- We have improved genetic progress mainly by lowering generational interval
  - GVP bulls as sires of sons
  - Mainly heifers and young cows as bull dams

- By genomic test of almost 4,500 bull calf candidates we have also increased selection intensity

- Decisions related to numbers of candidates and culling strategy taken in close cooperation with partners from University

Optimizing of breeding plans

- Continuos improvements of breeding schemes
  - Close cooperation with universities, scientists & evaluation center
  - Best methods available
  - Fast implementation of new methods
    - Tough competition on quality and price

Further developments

- Utilization of large scale typings by LD chips
  - Females in reference groups
    - Can affect our number of sampled YB per year

- Focus on new traits via genomic information
  - Feed efficiency
  - Emmision
  - Hoof health

- Improved repro technologies
  - Benefits with ET/ OPU (Jarmo Juga)

Further developments

- Increased use of EVA program
  - Inbreeding based on SNP info (Kenneth Byskov)
- How do we handle the small breeds
  - Reliability struggles (Jørn Rind Thomasen)
  - Inbreeding
- So far VG has kept the ”normal” test of young bulls
  - To keep a random test
  - To test semen quality before intensive marketing
- All corners of breeding plan need to be top tuned

Thanks