

Genomic Evaluations for Small Populations

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Beef cattle in Sweden

- Breeds included in the beef cattle recording scheme are: Angus, Blonde d'Aquitaine, Charolaise, Hereford, Limousine, Simmental and Highland Cattle
- A relatively large proportion of the purebred animals are in the recording scheme.
- Growth performance testing of 170-180 beef bulls per year
- The AI-bulls are selected among the performance tested
- Little use of AI in beef cattle
- 1-2 new beef bulls started per year and breed in AI
- No organized use of AI-bulls on purebreds with a random use in several herds

Beef cattle recording in Sweden

- Purebred
 - Birth weight (direct and maternal)
 - Weaning gain (direct and maternal)
 - Post weaning gain (direct)
 - Calving ease (direct and MGS)
 - Carcass traits (carcass daily growth rate, fat and conformation classification)
- Dairy breed crosses
 - Calving ease and stillborn calves (cows and heifers)

Beef cattle and genomic selection

- No domestic reference population for beef cattle
- International and foreign reference population
 - Common pedigrees
 - Harmonization of recorded traits
 - International proofs
 - Beef breed specific SNP
 - Trait specific SNP

Genomic Enhanced Breeding Values

- A combination of Direct Genomic Value and Estimated Breeding Value
- Is the pedigree information based on sire and dam information (domestic) or sire and MGS information?
- Is the cow's own performance included in the estimation of GEBV or not? (not available internationally)

Use of foreign genomic tests

- 48 Swedish Angus bulls were tested with Igenity / Geneseek 50 K chip in 2012
- The bulls were AI-bulls and herd bulls with EBVs with high reliability on national proofs
- Genomic proofs were compared with national EBVs
- The mean correlation for 16 different combinations of traits was 0,14, with a maximum of 0,34 and a minimum of -0.08

Growth traits

National trait	Genomic trait	Adjusted reliability
Birth weight	Birth weight	0.01
Weaning gain direct (200 d)	Weaning weight	0.08
Post weaning gain (-365 d)	Yearling weight	0.17
Post weaning gain (-365 d)	Post weaning gain	0.04
Maternal post weaning gain (200 d)	Milk	0.16



Calving traits

National trait	Genomic trait	Adjusted reliability
Calving ease MGS	Calving ease maternal	0.00
Calving ease direct	Calving ease direct	0.01



Carcass traits

National trait	Genomic trait	Adjusted reliability
Conformation score, EUROPE	Rib eye area	0.21
Fat score, EUROPE	Fat	0.04
Fat score, EUROPE	Marbling	0.02
Carcass daily gain	Carcass weight	0.00
Carcass daily gain	Average daily gain	0.01



Conclusion and recommendations

- It is not possible for Sweden to generate 6 beef breed specific reference populations
- Use of GEBV is beneficial due to the low reliability of the proofs
- Frequent update of EBV/DGV/GEBV is needed to make use of all available data
- Upgrading of DNA-profile (imputation) when new DNA-chips are used
- A cross country cooperation in genomic selection requires international proofs for beef cattle or common evaluation of breeding values
- Harmonization of trait definition is also recommended