Distribution of the polled allele in Austrian Fleckvieh (Simmental)

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Summary

- **Only one polled sire appears in the list of the best 480 Fleckvieh bulls ranked by total merit index**
- **In the list of the 500 most important ancestors of dual purpose cattle born between 2002 and 2006 two polled sires appear**
- **In the list of the 500 most important ancestors of beef cattle born between 2002 and 2006 15 polled sires appear**
- **Allele frequencies for the P allele in dual purpose and beef groups differ significantly with 0.05% and 0.84%, respectively**

1. Why polled cattle ?

- less severe injury to other cattle
- less physical danger to men
- increased interest due to modern cattle housing systems
- easier handling and transport
- increased animal welfare concerns
- possible alternative to dehorning
- increasing demand for polled cattle

Left: homozygous polled cow (PP).
Right: Cow with scurred horn on the right side (PS).

2. The goal

Finding how many polled animals are already available in the Austrian Fleckvieh population. Estimating the frequency of the polled allele in beef and dual purpose groups.

3. Inheritance of polledness

Locus P

The allele P responsible for polledness is dominant over the allele p, three possible genotypes exist: PP (=polled), Pp (=polled) and pp (=horned).

Locus Sc

The scurred allele (Sc) at a second locus is responsible for scurs, small residual horns loosely attached to the head. Only heterozygote Pp animals might be scurred, but the same genotype (Scsc) leads to different phenotypes depending on the individuals' sex: males are scurred while females are polled.

Locus Ha

The so called African horn gene was detected in Zebu-animals. Up to now never detected in Fleckvieh cattle.

4. Data analysis

Top list according to total merit index

• In a pre-study polled cattle in Austria and Bavaria where identified using Austria's central cattle data base, information from insemination stations and data from VIT.
•The list with polled bulls was compared with the list of the best 100 Fleckvieh bulls in Austria – ranked according to their EBVs.

Reference populations

• Reference populations were defined for further analyses consisting of 109,155 beef type Fleckvieh cattle (Ref BEEF) and 2 892,476 dual purpose Fleckvieh (Ref DUPU) cattle born between 2002 and 2006.

Pedigree analyses

• For both reference populations pedigree analyses were carried out to identify the genetically most important ancestors and to calculate their marginal genetic contributions to the reference populations.
•Polled bulls within this list were identified.

Estimation of allele frequencies

• A software based on the gene dropping approach was developed to estimate the frequency of the P allele in both reference populations. 181 Pp bulls and 58 PP bulls were used in the computer simulation where the alleles were dropped trough the whole pedigrees and the P-alleles where counted in the reference populations. The gene dropping procedure was repeated 1,000 times.

Atos PP source: Genostar Rinderbesamung GmbH - Gleisdorf

5. Results

• One polled bull, named Ralmesbach, occurred in the Austrian TMI top list on rank 56 out of 480.

• Just one polled bull occurred in the list of most important ancestors for Ref DUPU with a marginal genetic contribution of less than 0.1%.

• 15 polled bulls occurred in the list of most important ancestors for Ref BEEF with marginal genetic contributions between 0.1 and 0.3%. The first three polled bulls are Erbhold, Gorm and Empau.

• The estimated frequency of the P allele was 0.05% with a 95% CI from 0.04 to 0.06 in Ref DUPU and 0.84% with a 95% CI from 0.68 to 1.02 in Ref BEEF.