

Few important ancestors contribute much of the genetic material: Pedigree analysis of three highly endangered cattle breeds in Austria

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Introduction

Highly endangered cattle breeds of Austria are managed to minimize inbreeding. Natural mating and artificial insemination are implemented. The selection of new insemination bulls best complementing the current population is crucial. Here, we show the genetic structure of three such breeds, based on pedigree analysis.

Breeds and pedigrees

Ennstal Pied Cattle

- Population size of 236 breeding cows (herd book 2011)
- Traits: early mature, good fertility, excellent meat quality and sufficient milk performance.
- Suitable for extensive regions.



Pustertal Spotted Cattle

- Population size of 584 breeding cows (herd book 2011).
- Useful as beef herds in all regions.



Original Austrian Brown Cattle

- Population size of 1601 breeding cows (herd book 2011)
- Traits: milk specialized, strong claws, suitable for the Alps, high vitality and long productive life.
- Special milk ingredients favour the production and quality of cheese.



Most important ancestors for current living population

Name	Birth year	Sex	Marginal genetic contribution (%)
Hans	1991	m	13.67
H1	1975	m	09.73
Sachsa *93	1994	f	09.70
Bacherin/S*9	1987	f	09.15
Gustav	1996	m	07.95

No. of ancestors contributing to the first 50%

5

Name	Birth year	Sex	Marginal genetic contribution (%)
Ortner PSS	1984	m	08.35
Schecke PSS	1988	f	06.64
Rosa PSS	1990	f	06.49
Preuss PSS	1995	m	06.13
Irbis PSR	1982	m	05.30

No. of ancestors

contributing to the first 50%

10

Name	Birth year	Sex	Marginal genetic contribution (%)
Singau *OB	2007	m	06.86
Wenzel *OB	1994	m	05.37
Merlo *OB	1995	m	04.55
Kronos *OB	2007	m	04.52
Siegfried *OB	2005	m	04.23

No. of ancestors

contributing to the first 50%

15

Conclusions

Pedigree analysis is an important tool to examine the gene diversity of populations. The study highlights that the Ennstal Pied Cattle is the genetically smallest population of the three. In contrast Original Austrian Brown Cattle population is more diverse thanks to the use of bulls from Austria, Germany and Switzerland. For future breeding decisions the best choice of young bulls for artificial insemination will be crucial to minimize loss of genetic diversity.