Session 19

Pedigree analysis of the German Paint Horse

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The Paint Horse

- Second largest horse breed in the US
- Famous for Pinto markings
- registered if parents Paint, Quarter or Thoroughbred
- Stock type conformation, well muscled hindquarters

Data

- Provided by Paint Horse Club Germany
- Total pedigree file: 14,313 horses
- Reference population:
  - born in Germany (years 2000-2009)
  - both parents known
  - 1,661 horses

Objective

- Measuring genetic variability in actual German Paint Horse population

Pedigree analysis

- Software package PEDIG (Boichard 2002)
- Inbreeding coefficients
- Average complete generation equivalent per birth cohort
- Effective number of founders, ancestors and founder genomes
- Marginal genetic contributions of most important ancestors

Summary

- **Average inbreeding in actual German Pain Horses rather low**
- **Rather high genetic variability in the actual German population**
- **Small marginal genetic contributions of the most important ancestors**
- **However, incomplete pedigree information must be considered when interpreting results**

Results

Inbreeding

- Average inbreeding coefficient of inbred animals about 0.9%
- 947 out of 1661 reference animals were inbred
- Average complete generation increased from 4.1 (animals born 2000) to 4.7 (animals born 2009)

Measures of diversity

- Reference population traced back to 4,216 founders
- Effective no. of founders 561
- Effective no. of ancestors 207
- Effective no. of founder genomes 139

Most important ancestors

- 11 % of genetic variability of reference population explained by 5 most important ancestors
- 50 % of genetic variability of reference population explained by 124 most important ancestors
- The first three most important ancestors were a Chestnut colored stallion, a black and a chestnut Tobiano Paint horse

Most important ancestors and their marginal genetic contribution (MGC) to the reference population

	Birth year	Sex	MGC (%)
Doc Bar	1956	M	2.9
Cherokee Blanca	1993	M	2.8
Cats Coco Dancer	1991	M	2.3

Photo sources: www.myhorse.com; www.jbarl.com; www.allbreedpedigree.com/; farm3.static.flickr.com