Session 19

Pedigree analysis of the German Icelandic Horse

R. Baumung, M. Geng and B. Fuerst-Waltl
University of Natural Resources and Applied Life Sciences (BOKU) Vienna, Austria
birgit.fuerst-waltl@boku.ac.at

University of Natural Resources and Applied Life Sciences Vienna

The Icelandic Horse

- Originating from Iceland
- Hardy and robust
- Adapted to harsh environments
- Five natural gaits

Data

- Provided by World Fengur
- Total pedigree file: 325,044 horses
- Reference population:
  - born in Germany (years 2000-2009)
  - both parents known
  - 10,839 horses

Objective

- Measuring genetic variability in actual German Icelandic Horses

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 Icelandic Horses rather low**
- **As expected, genetic variability was lost due unequal founder contributions and bottlenecks**
- **All important ancestors born in Iceland**

Results

Inbreeding

- Average inbreeding coefficient of inbred animals about 2.9%
- 10,764 out of 10,839 reference animals were inbred
- Average complete generation increased from 6.9 (animals born 2000) to 7.7 (animals born 2009)

Measures of diversity

- Reference population traced back to 5,692 founders
- Effective no. of founders 143
- Effective no. of ancestors 44
- Effective no. of founder genomes 22

Most important ancestors

- All 10 most important ancestors born in Iceland, 8 of them stallions, 7 black
- 40 % of genetic variability of reference population explained by 10 most important ancestors
- 50 % of genetic variability of reference population explained by 19 most important ancestors

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

	Birth year	Sex	MGC (%)
Hrafn frà Holtsmùla	1968	M	7.6
Sörli frà Sauðarkroki	1964	M	7.2
Sörli frà Svaðastöðum	1916	M	6.1

Photo sources: http://www.stormhestar.de; http://mwsu-bio101.ning.com/photo/; www.ihsgb.co.uk/icelandichorse.jpg


Sörli frà Sauðarkroki


Hrafn frà Holtsmùla