



Inbreeding and effective population size of Piétrain pigs in Schleswig-Holstein

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Introduction

Since 1980 the number of Piétrain herdbook sows in Schleswig-Holstein decreased from 1,160 to 546 in 2007. Unless unrelated breeding pigs are imported from other populations, inbreeding is expected to increase with detrimental effects, such as inbreeding depression, genetic defects, and loss of usable genetic variability for genetic improvement. The objective of this study was to analyse trends in inbreeding and effective population size (N_e) of Piétrain pigs in Schleswig-Holstein. In addition, consequences of utilizing imported boars to a large extent are discussed.

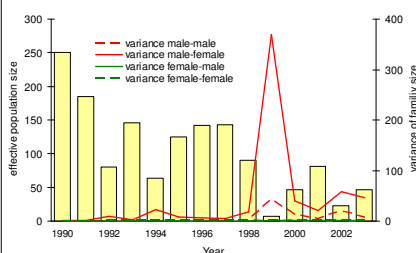
- 15,301 herd book animals born between 1980 and 2006
- only ancestors of pigs born between 2004 and 2006 were used ($n=3,481$)



Different methods for the estimation of N_e

Drift N_e

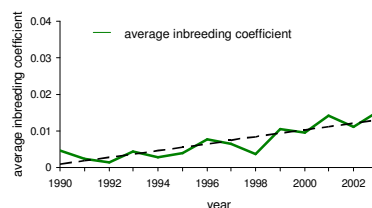
- formula of Hill (1979)
- harmonic mean 1990-2003



N_e (generation) = 44

Inbreeding N_e

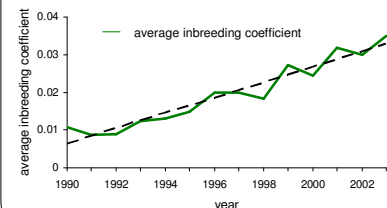
- Numerator-Relationship-Matrix (NRM)
- linear regression from 1990-2003



N_e (generation) = 224

Inbreeding N_e

- Uncertain-Parentage-Matrix (UPM)
→ correction of missing ancestries
- linear regression from 1990-2003



N_e (generation) = 102

Results and Conclusions

- drift N_e declined drastically from 1999 due to an increased variance of family size in the male paths
→ a few boars were mated extensively, resulting in a low drift N_e
- average inbreeding coefficients calculated with the NRM-method were low: in consequence the N_e with 224 was high
→ low average inbreeding in years after boars were imported
- inbreeding N_e calculated with the UPM-method was lower than with the NRM-method
→ indicates that imported boars had a great influence on the population

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References

Hill, W. G. (1979): A note on effective population size with overlapping generations. *Genetics* 92:317-322.

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