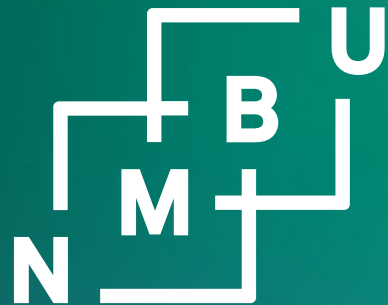
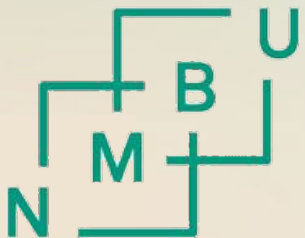




Norges miljø- og
biovitenskapelige
universitet

- With Nathalie Almaas Smogeli, Iryna Shutava, Signa Joensen, Sofia Mikko, Susanne Eriksson and Peer Berg
- EAAP, Session 48, 2nd of September 2024

Genetic Diversity Within and Between Nordic Equine Breeds



NordGen



Introduction

- Small populations
- Origin
- Critically Endangered
- Genetic Diversity
- Breed healthy populations
- Culture historical importance



Data

- 190 samples in 8 Breeds
- Mapped against EquCab3 and a Finn horse genome (Pokharel et al., 2024).
- Plink1.9 and Plink2, bcftools.

Acronyms in the dataset:

NFH = Norwegian Fjord horse

NL = Nordland/Lyngen horse

NSB = North Swedish horse

KT = Coldblooded Trotter

G = Gotland pony

F = Faroese horse

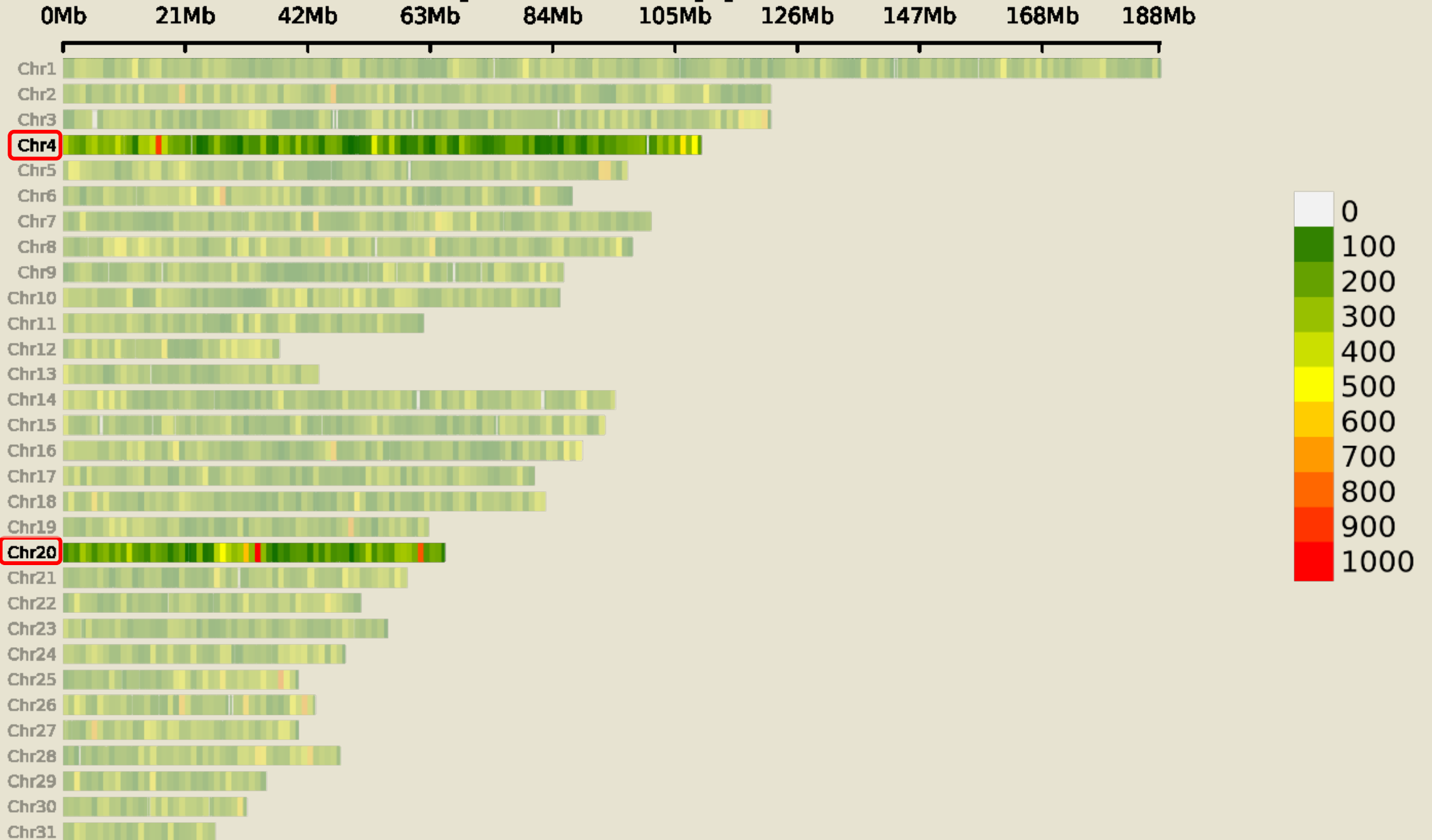
D = Dole horse

A = Swedish Ardennes

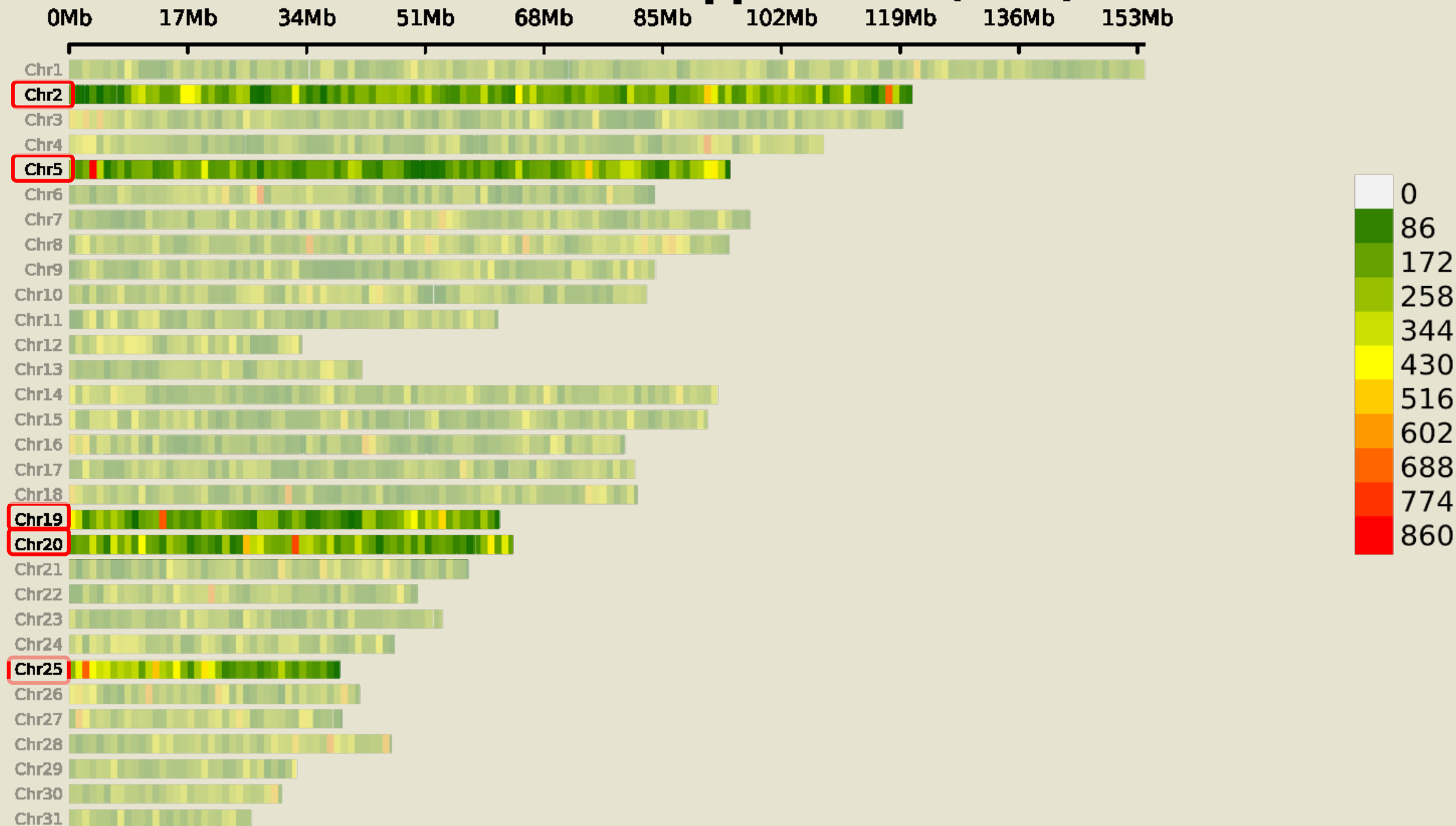




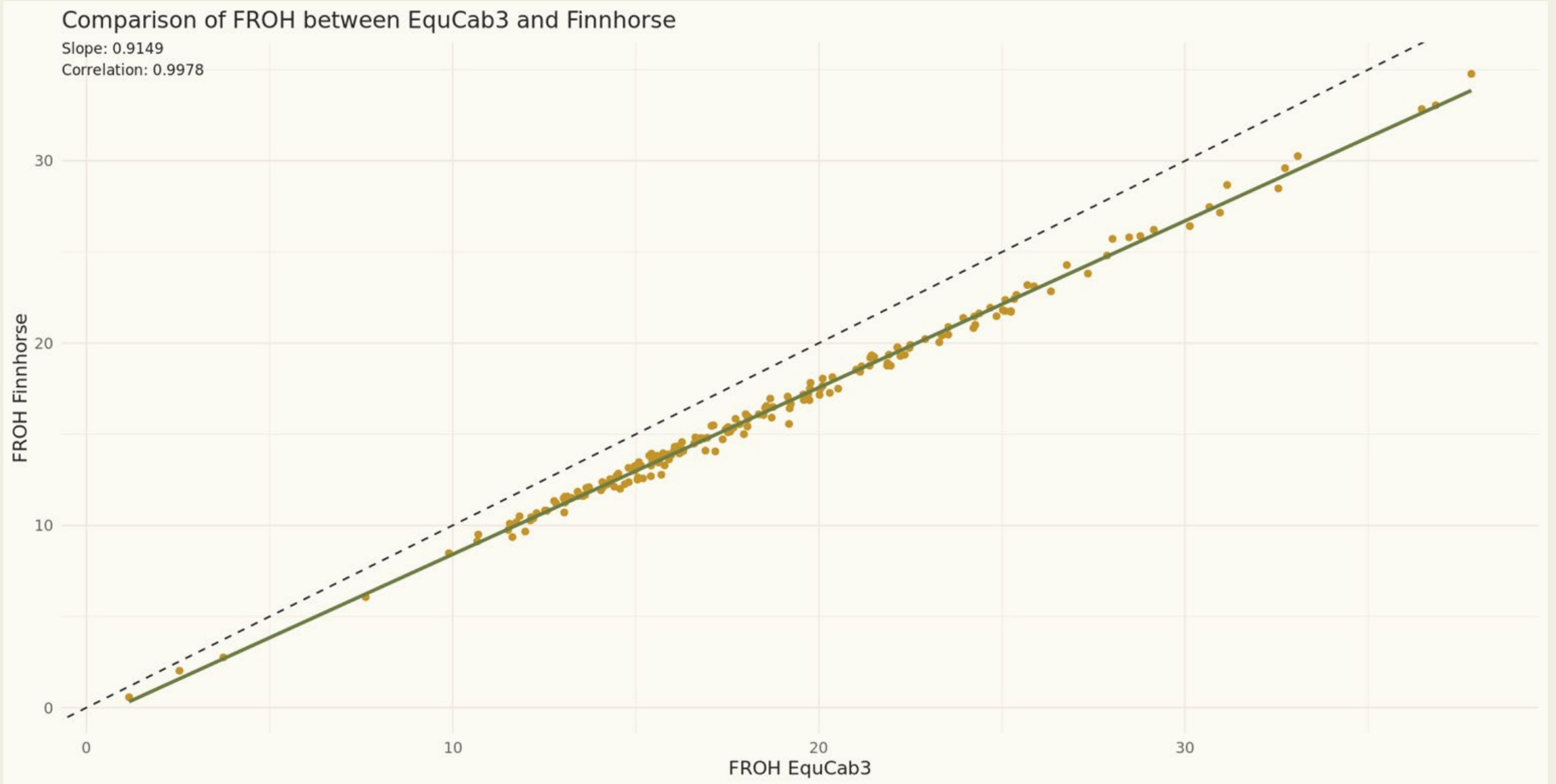
Private Alleles in Equcab3 Mapped data (1Mb) MAF > 0.1



Private Alleles in Finnhorse Mapped data (1Mb) MAF > 0.1



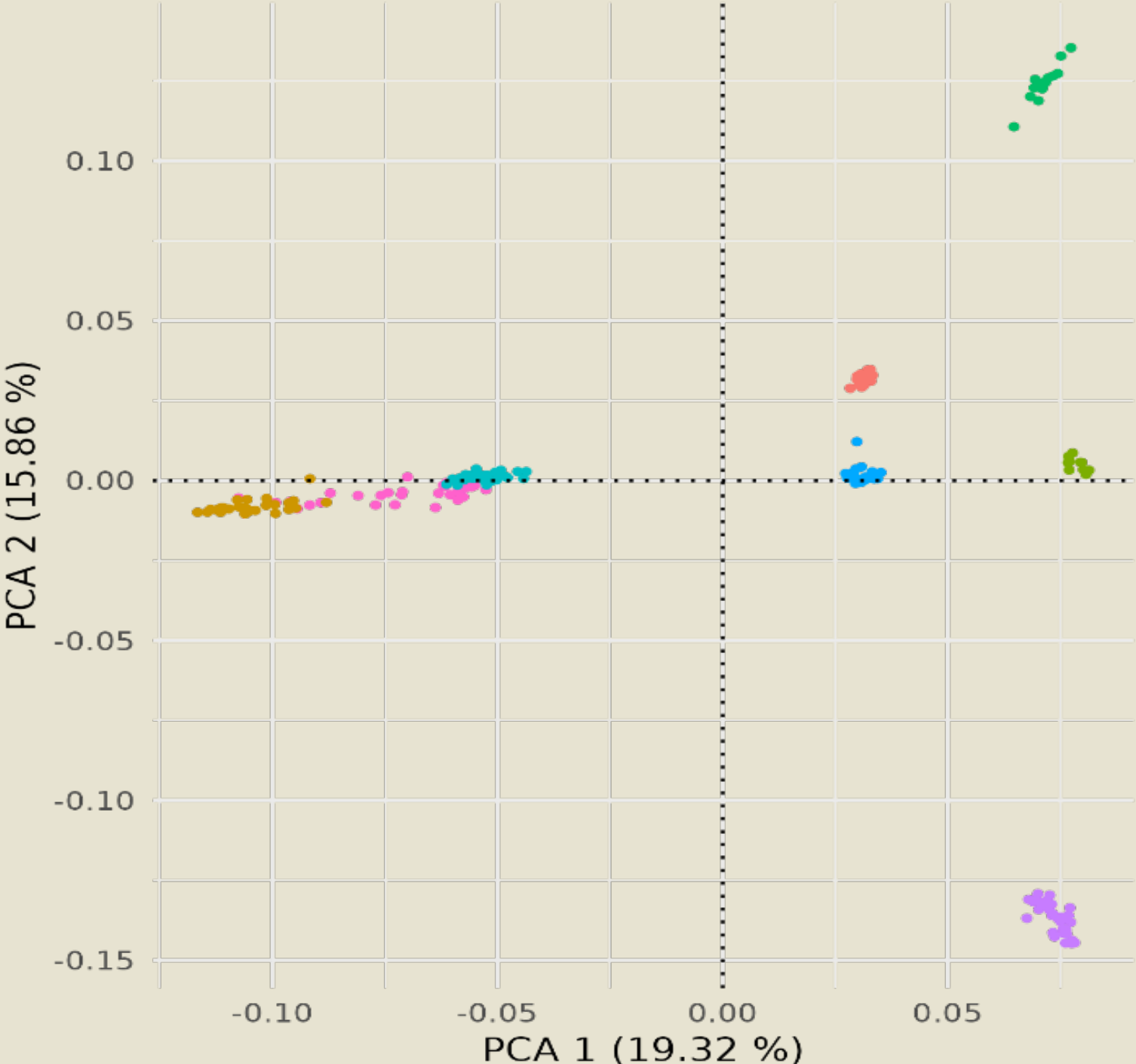
Runs of Homozygosity



PCA – EquCab3

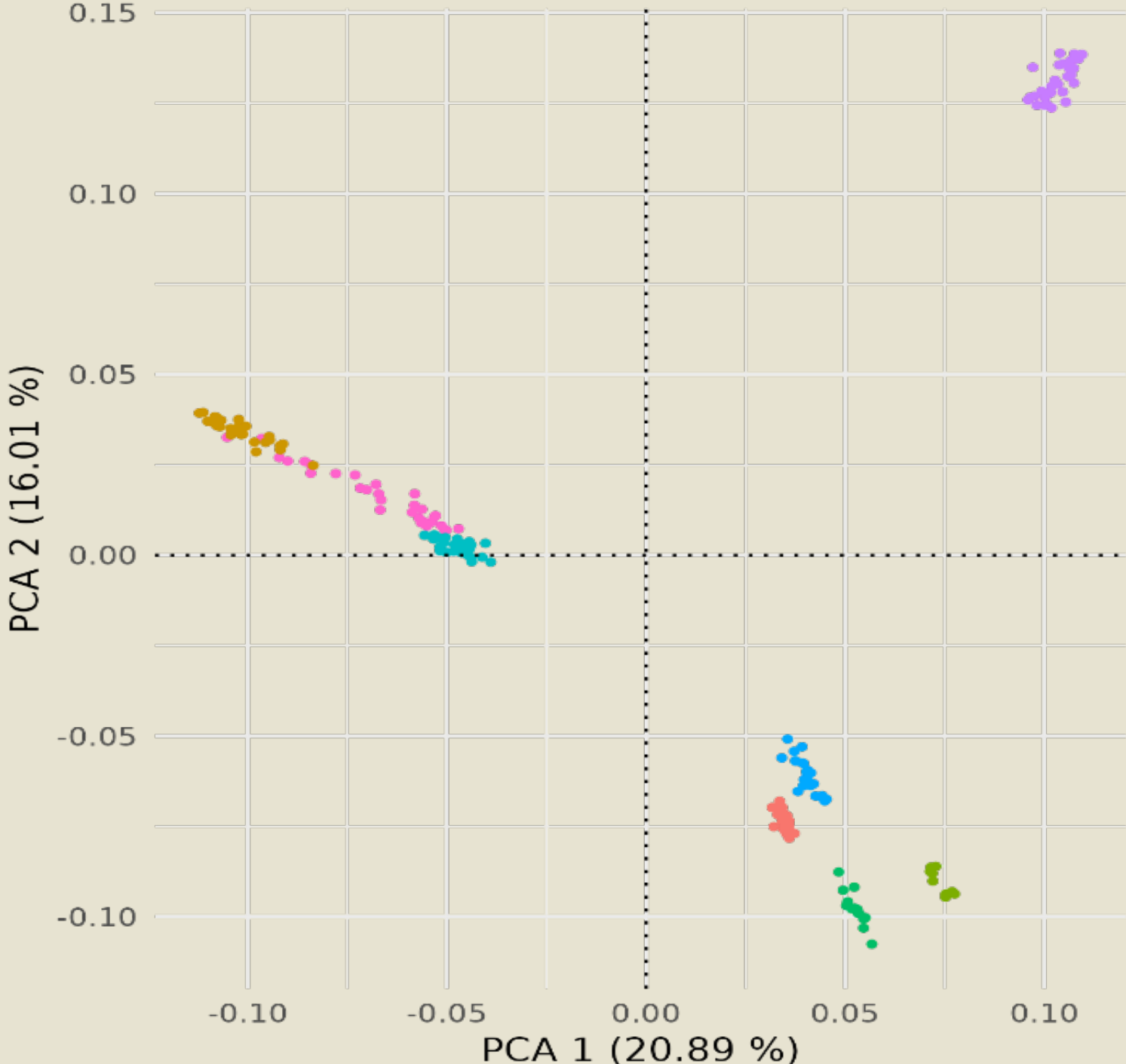
Breeds

- A
- D
- F
- G
- KT
- NFH
- NL
- NSB



PCA - Finnhorse

- Breeds
- A
 - D
 - F
 - G
 - KT
 - NFH
 - NL
 - NSB



Conclusions

- Sensitivity to mapping.
- Inclusion of Nordic breed SNPs into SNPchips

References

Finn Horse Genome: Pokharel, K., Weldenegodguad, M., Reilas, T. and Kantanen, J. (2024), EquCab_Finn: A new reference genome assembly for the domestic horse, Finnhorse. Anim Genet. <https://doi.org/10.1111/age.13463>

Pictures of horses:

Nordland/Lyngen Horses, Slide 3: <https://www.nordgen.org/en/native-breed/nordland-lyngen-horse/>

Fjord Horse, Slide 4: <https://www.visitnorway.com/things-to-do/outdoor-activities/horse-riding/fjord-horse/>

Ardenner, Slide 15: <https://www.pferde-pferderassen.de/pferderasse-ardenner-kaltblut/>

Doela Horse, Slide 16: <https://www.dolehesten.no/>

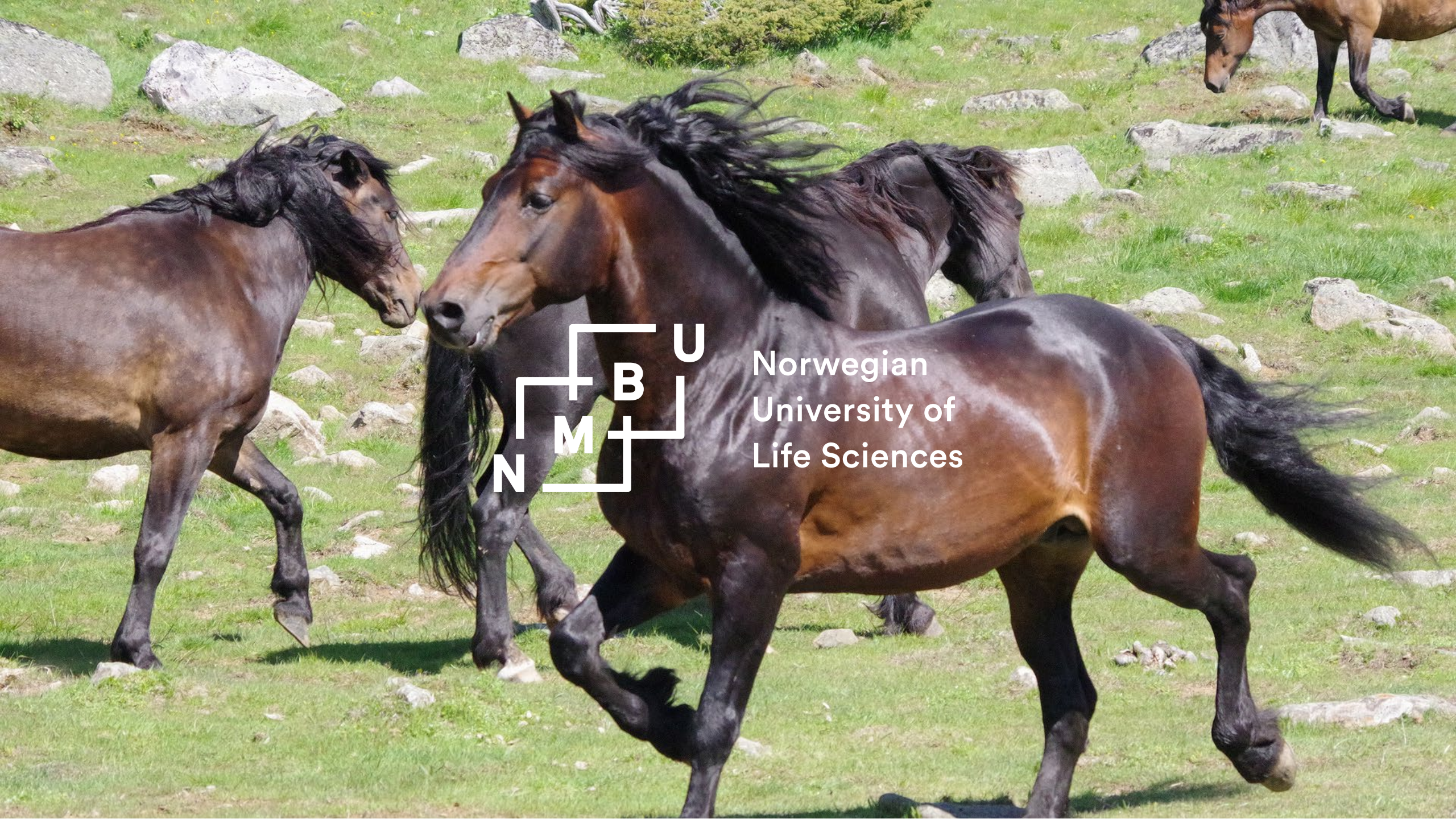
Coldblooded trotter, Slide 17, <https://www.nhest.no/avlsplan-for-kaldblodstraver.6284615-467706.html>

Code will be published on GitHub: NattyandMinnie

Nathalie.almaas.smogeli@nmbu.no

Questions?



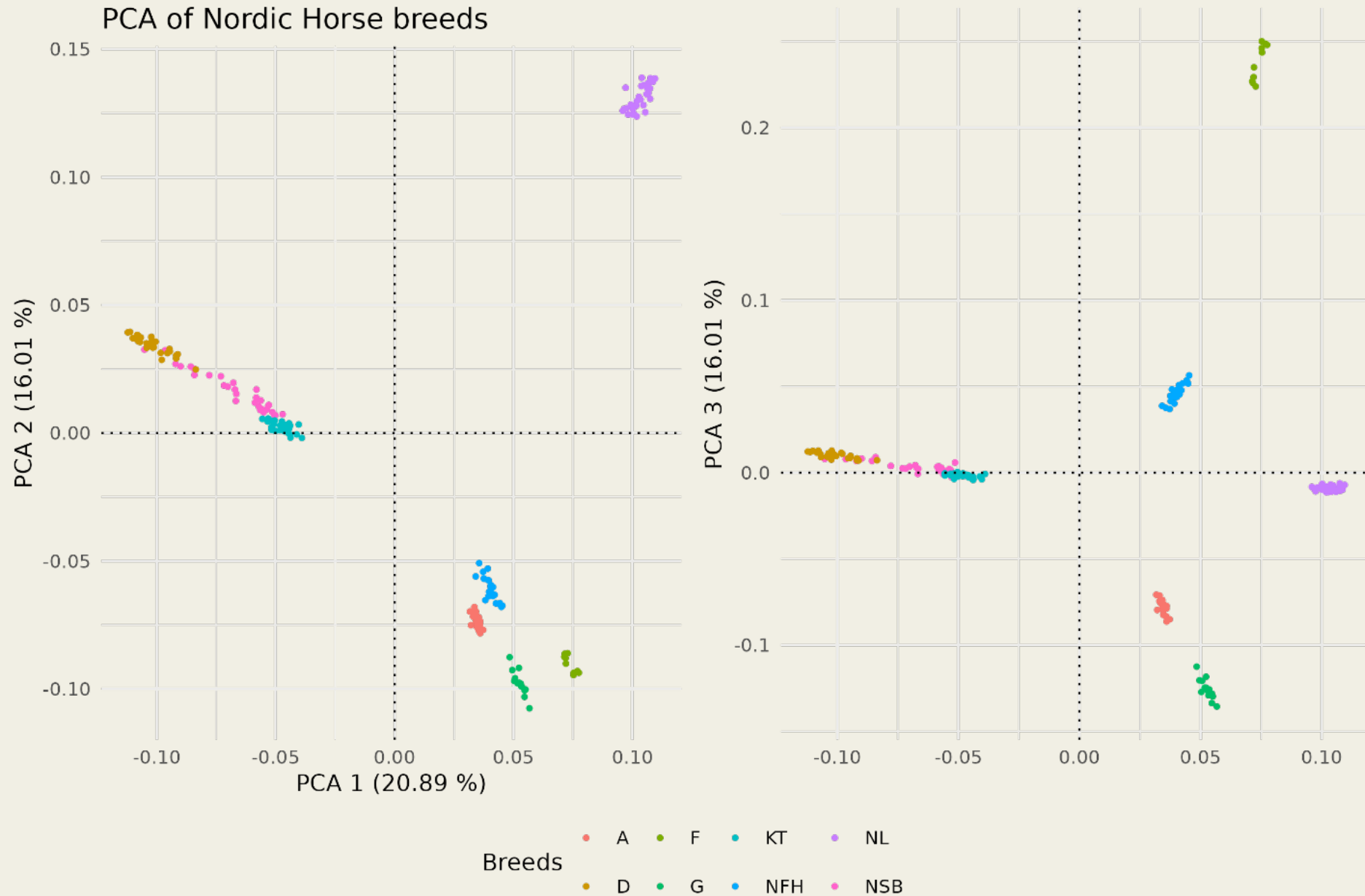


Norwegian
University of
Life Sciences

Runs of Homozygosity – Finnhorse table

Breed	Min	Mean	Max
A	9	12	17
NFH	3	13	17
KT	2	14	19
NSB	1	14	23
NL	13	19	24
G	16	21	24
D	6	21	28
F	27	31	37

PCA 1,2/3 for Finnhorse



PCA 1,2/3 for Equcab

