Genomic studies of the old norse sheep

Cathrine Brekke, Nordwool workshop, Faroe islands, 2026

Old norse sheep (Villsau)

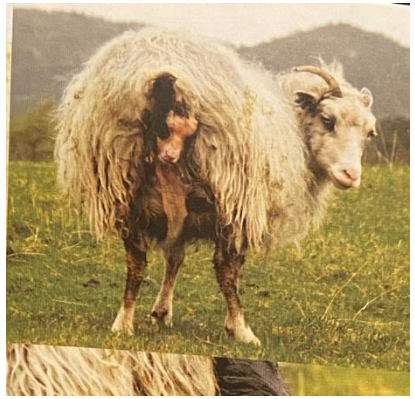
- Descendants of the first sheep in Norway ~4,000–5,000 years ago
- Prior to 19th-century breed classification
- Supposedly introduced from Norway to Iceland and the Faroe Islands during the Viking Age..

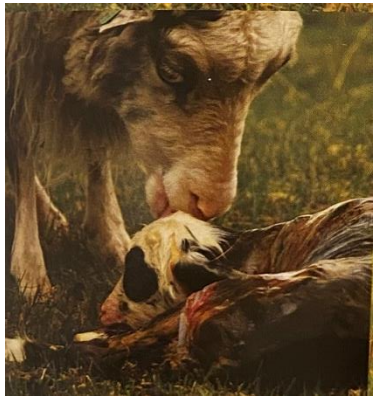
Old norse sheep

- Robust, functional breed
- Easy lambing, strong flocking and maternal instincts
- Double fleece and natural wool shedding
- Key grazing species for maintaining threatened coastal heathland
- Smaller carcasses
- Very fragmented pedigree





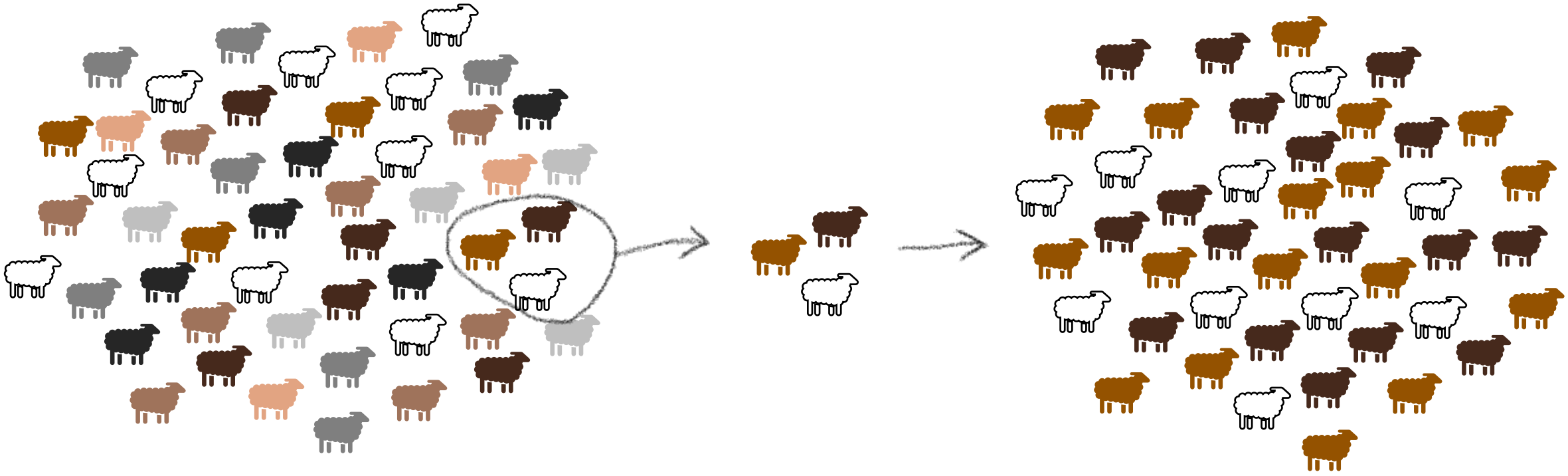




Norsk Villsau is a registered trademark

- Owned by the breed organization
- Breed has to be Old norse sheep
- Grazing on coastal heathland
- Kept outdoors year-round

The population was very small in the beginning of the 1950s



Genomic data from AI rams

- Short-read **WGS** data from **16 rams**
- Ongoing work: **recalibration to optimize variant calling** - potential Nordic collaboration to maximize data quality and comparability?
- Current analyses based on **45K SNPs** selected from a genotyping array

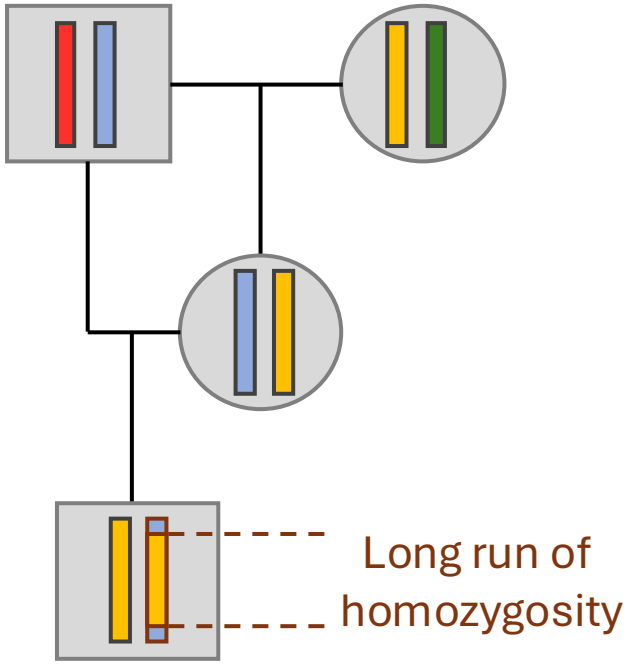

Harley Buarø


Varmyrrampen som 2 åring

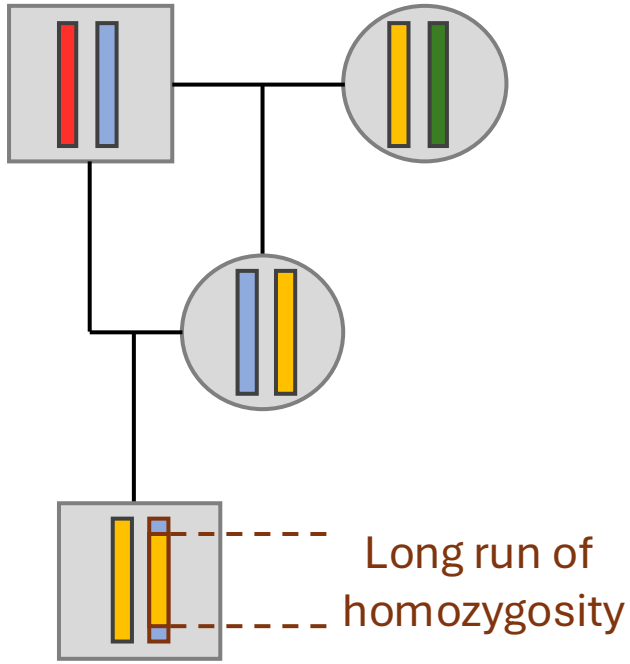

Otterå som risbit

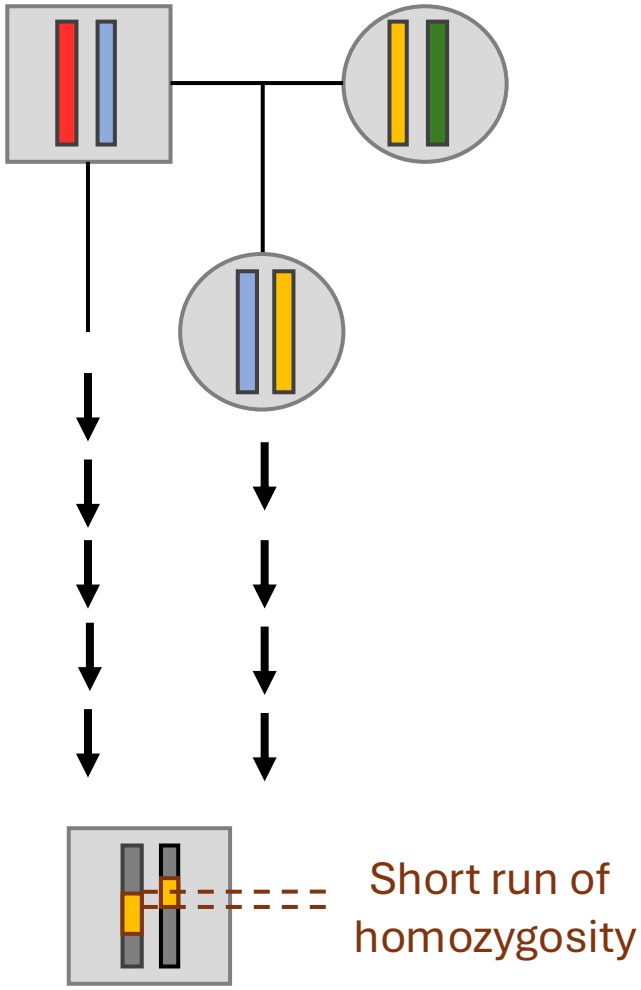

Stolt Birkeland

Runs of homozygosity

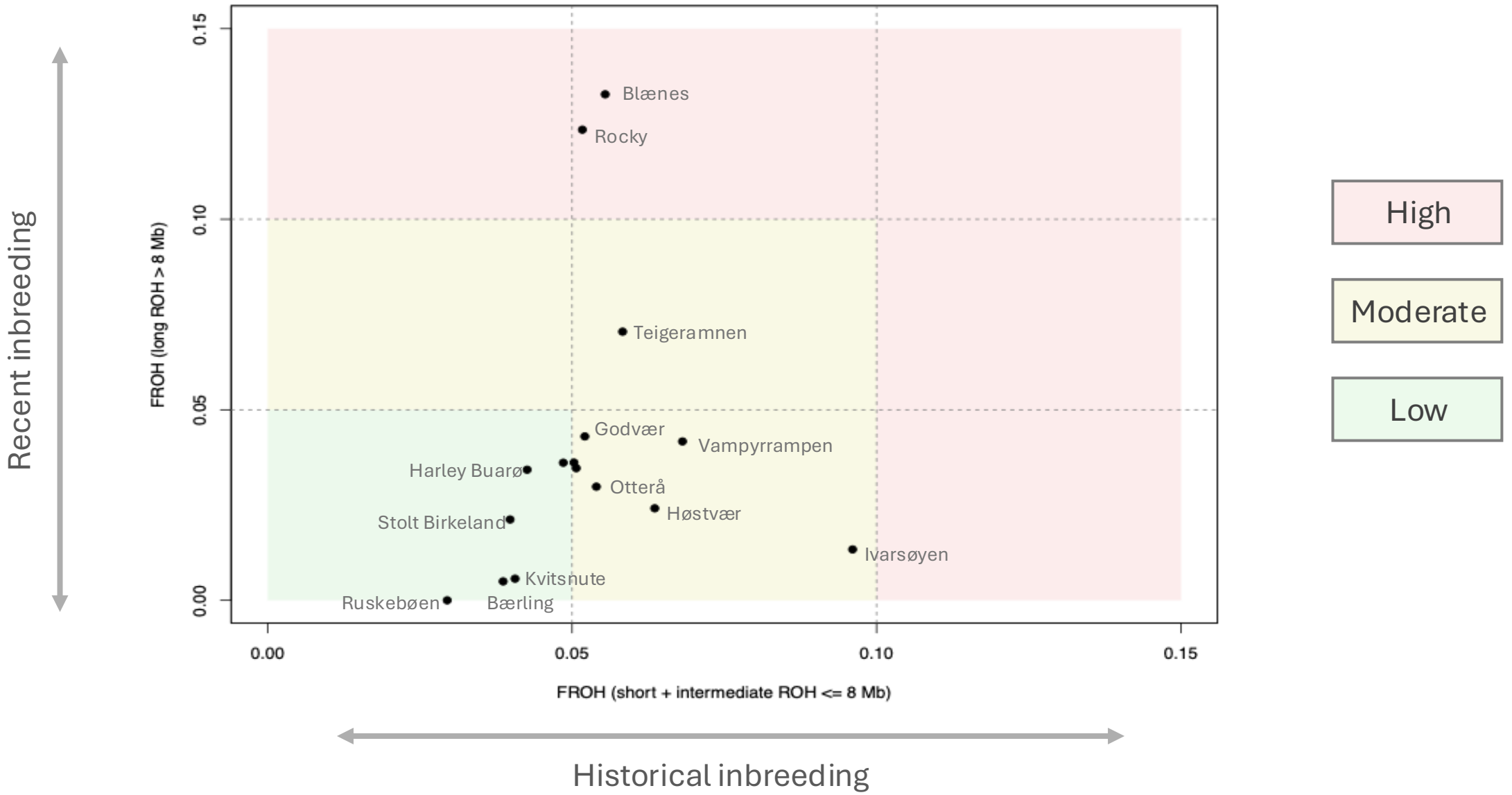


Runs of homozygosity

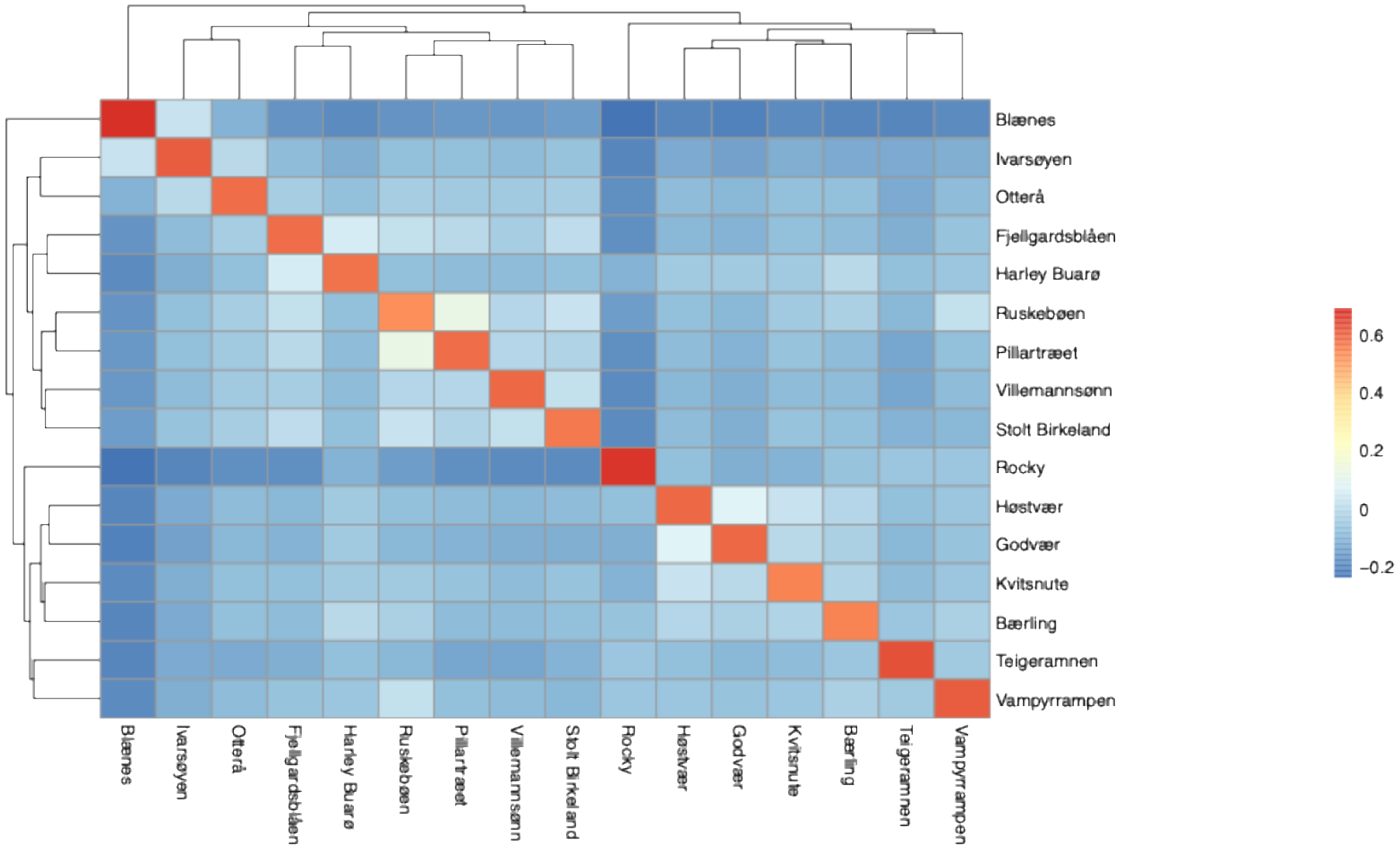




Historical and recent inbreeding in Villsau



Low genomic relationship between rams



Ongoing and future work

- **Applying for more money….**

- **Mutation load**
  Assess whether historical bottlenecks have led to an accumulation of deleterious variation, and whether this differs between short and long ROHs.

- **Genomic regions with low variation**
  Identify parts of the genome with consistently low diversity, which may reflect past selection, drift, or functional constraint.

- **Comparative analyses with North Atlantic sheep**

Genetic control of natural wool shedding in Villsau

- Project arised from meeting in the **Nordwool** network. Colaboration with Anna Johansson
- Old norse sheep shed the wool, but it **varies when and how much they shed**
- The breeders select individuals that “shed well”, but most sheep are sheared

- Wool that is naturally shed is **“closed in both ends”**
  - Softer (no cut edge)
  - Repels water better (?)

- Quantify genetic variation in natural wool shedding
- Identify genomic regions underlying the trait

International interest for wool shedding

- Economic interest
  - No shearing
  - Trait crossed into more productive breeds
- Previous studies (British):
  - high heritability 0.5 – 0.8 (pedigree based)
  - a single/major gene for shedding/no shedding
  - Timing and how much is shed is more complex and under polygenic control

EasyCare
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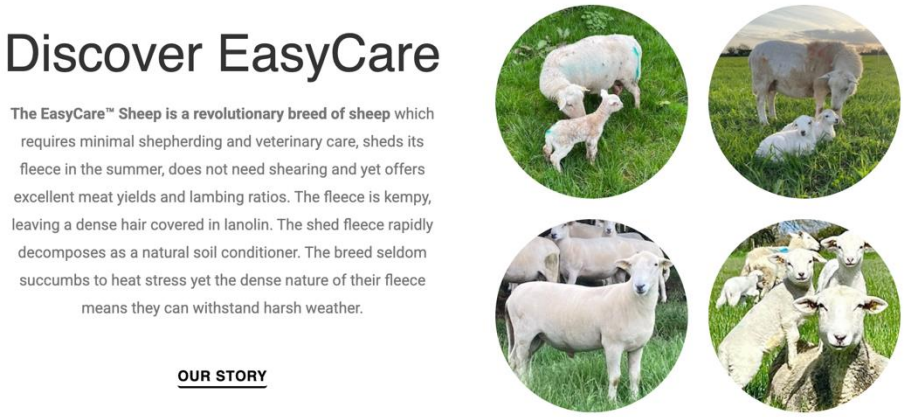

Why it is important to understand the genetic control of (wool) traits

- Better conservation and potential development of traits
- Conserve genetics despite potential changing management practices
- Genetic correlation to other traits