Genomic selection for footrot and mastitis

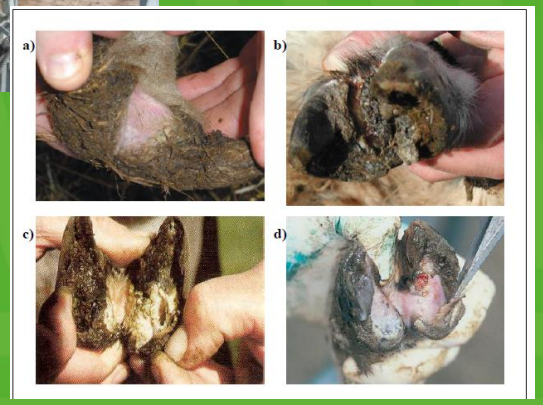
Scottish Sheep Industry Conference
– research to help meet future challenges

Karolina Kaseja

Footrot and mastitis

- Hard to measure health traits
- Great influence on the welfare of the animals
- Can cause significant lost for the industry

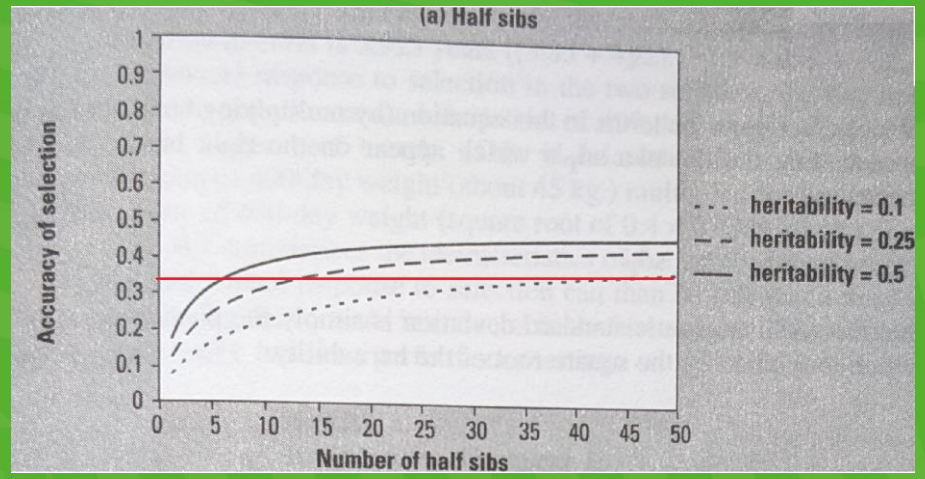
CMT – California Milk Test

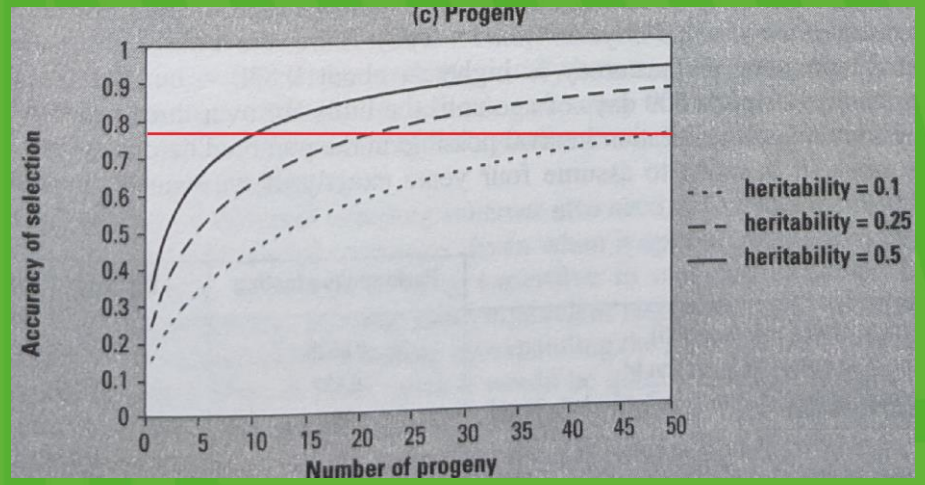


Selection against high footrot and high mastitis

- Conventional genetic prediction:
  - Combines phenotypes with pedigree
  - Estimates breeding values (EBVs) that can be used as guide for selection
  - Estimates **accuracy** along with EBVs

- **Heritability** estimated
  - 12% footrot
  - 7% mastitis
  - 5% longevity
  - 14% weaning weight
  - 21% scan weight

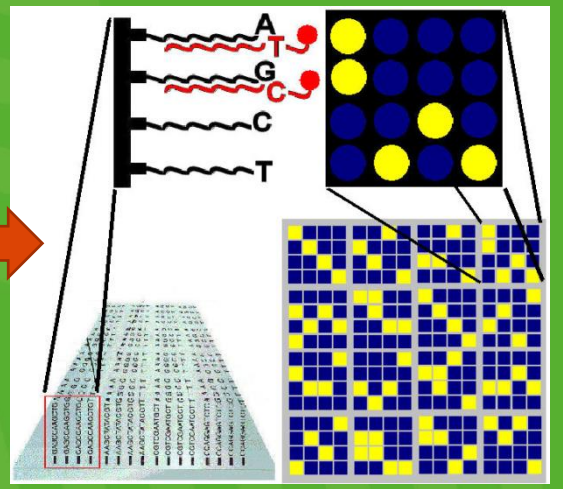




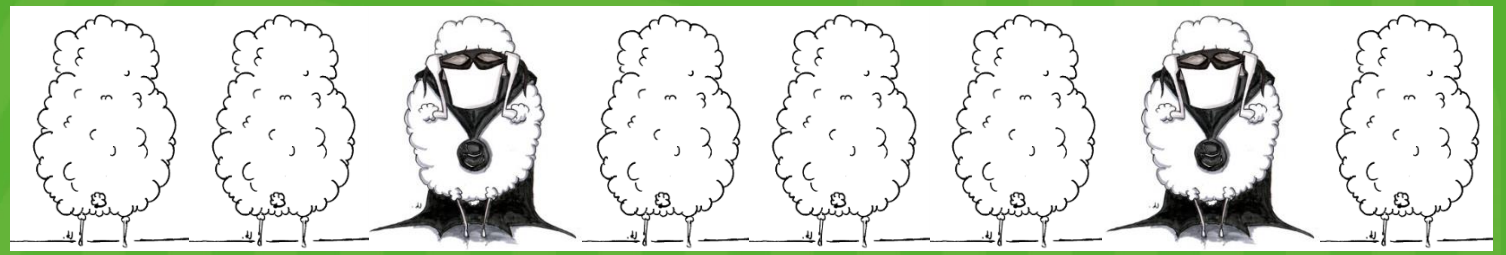
G. Simm 'Genetic Improvement of Cattle and Sheep'

What if…
we add genotypes?

- Can be collected on young animals
- Additionally screening for:
  - Parentage
  - Diseases (scrapie)
  - Desirable genes (wool colour)
- Build **reference population**:



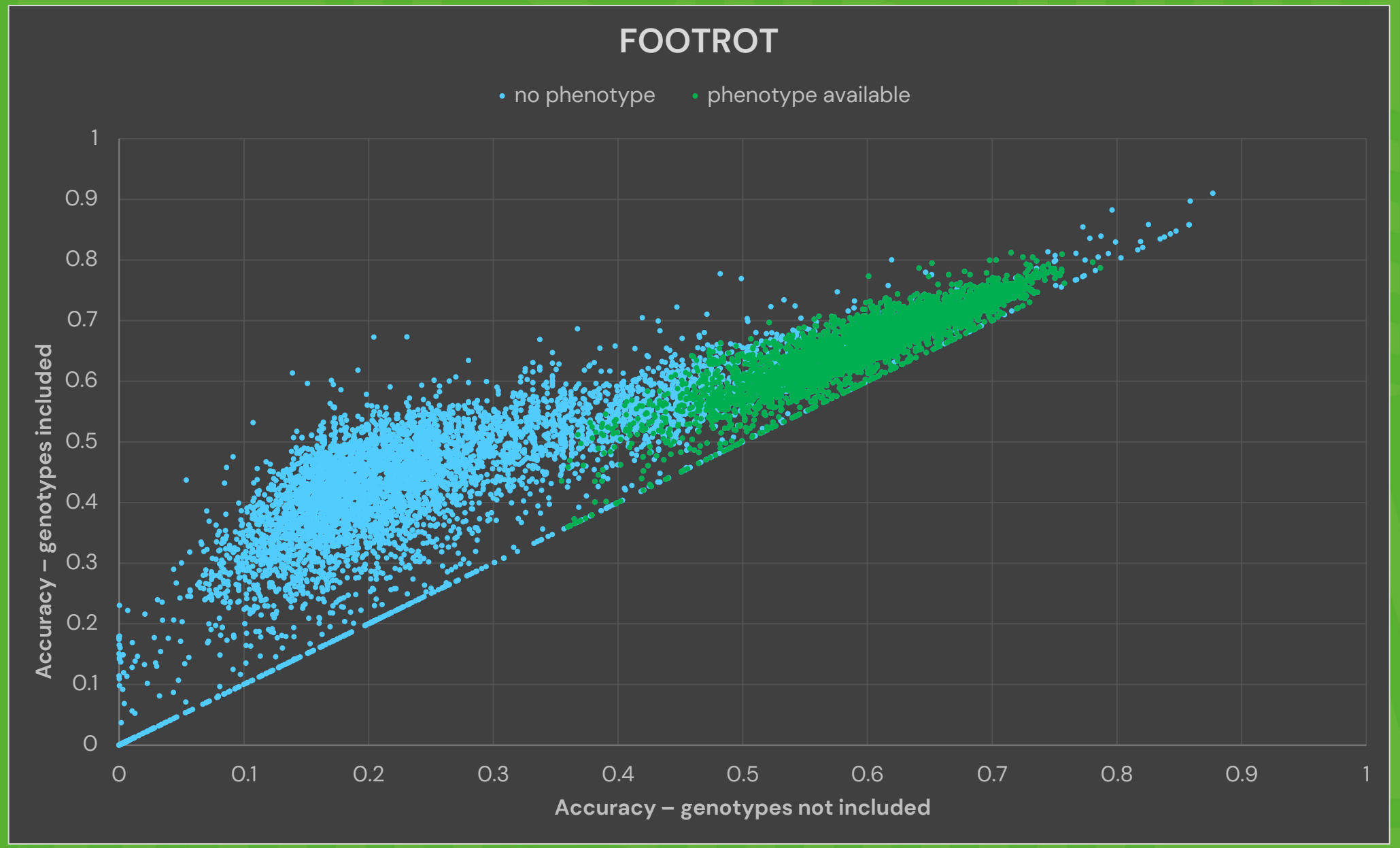
Genotyped and phenotyped animals
connected to the main population



Main population,
most animals only genotyped

What would it change?

- Including DNA: breeding values become **genomic**
- Animals that had no chance to be phenotyped can obtain **higher accuracy** for EBVs…
- …but phenotyped animals also **gain in accuracy**!



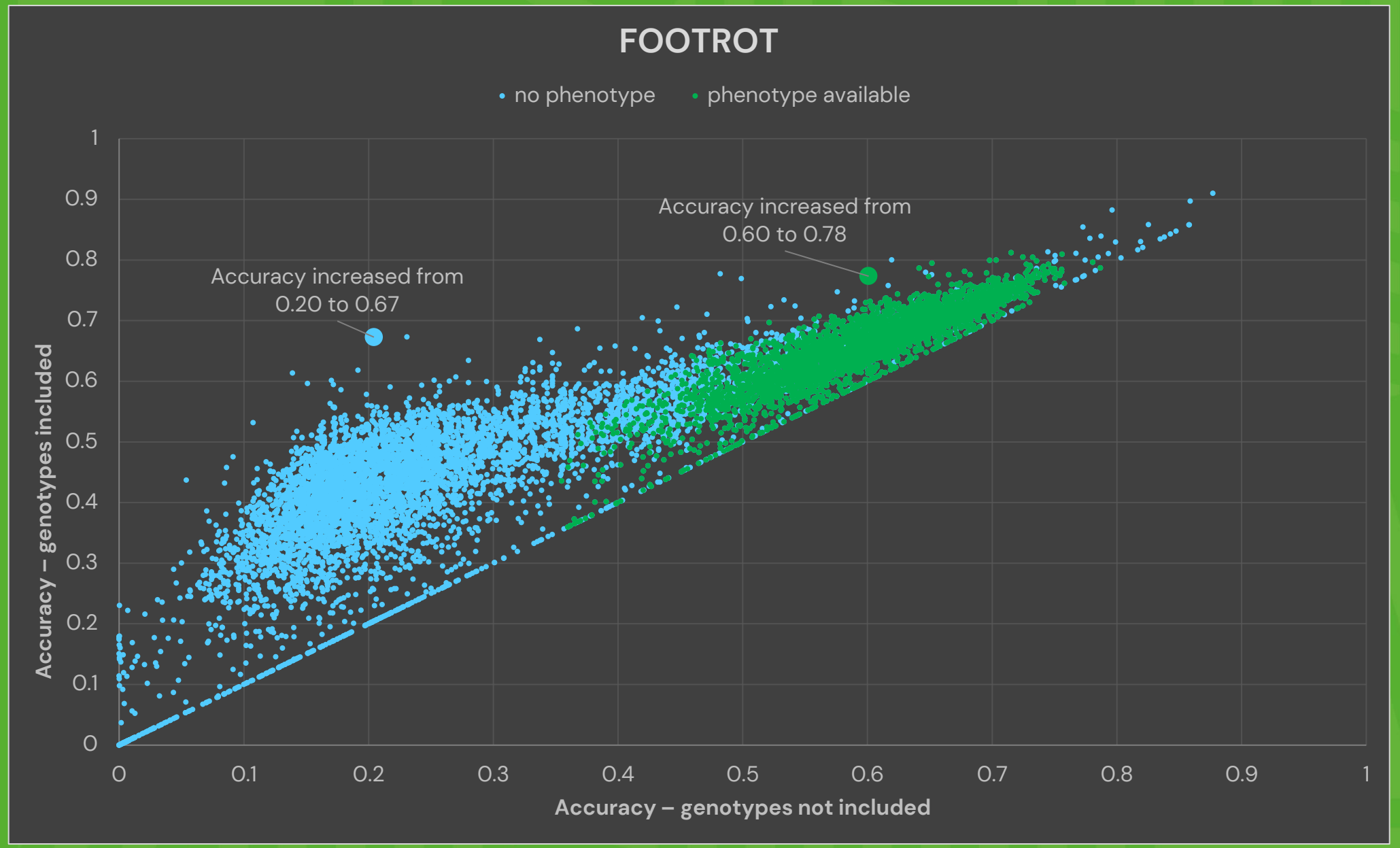
SRUC

Heritability 12%

Max change:

- +0.18 with phenotype
- +0.47 no phenotype

K.Kaseja et al. (2021)



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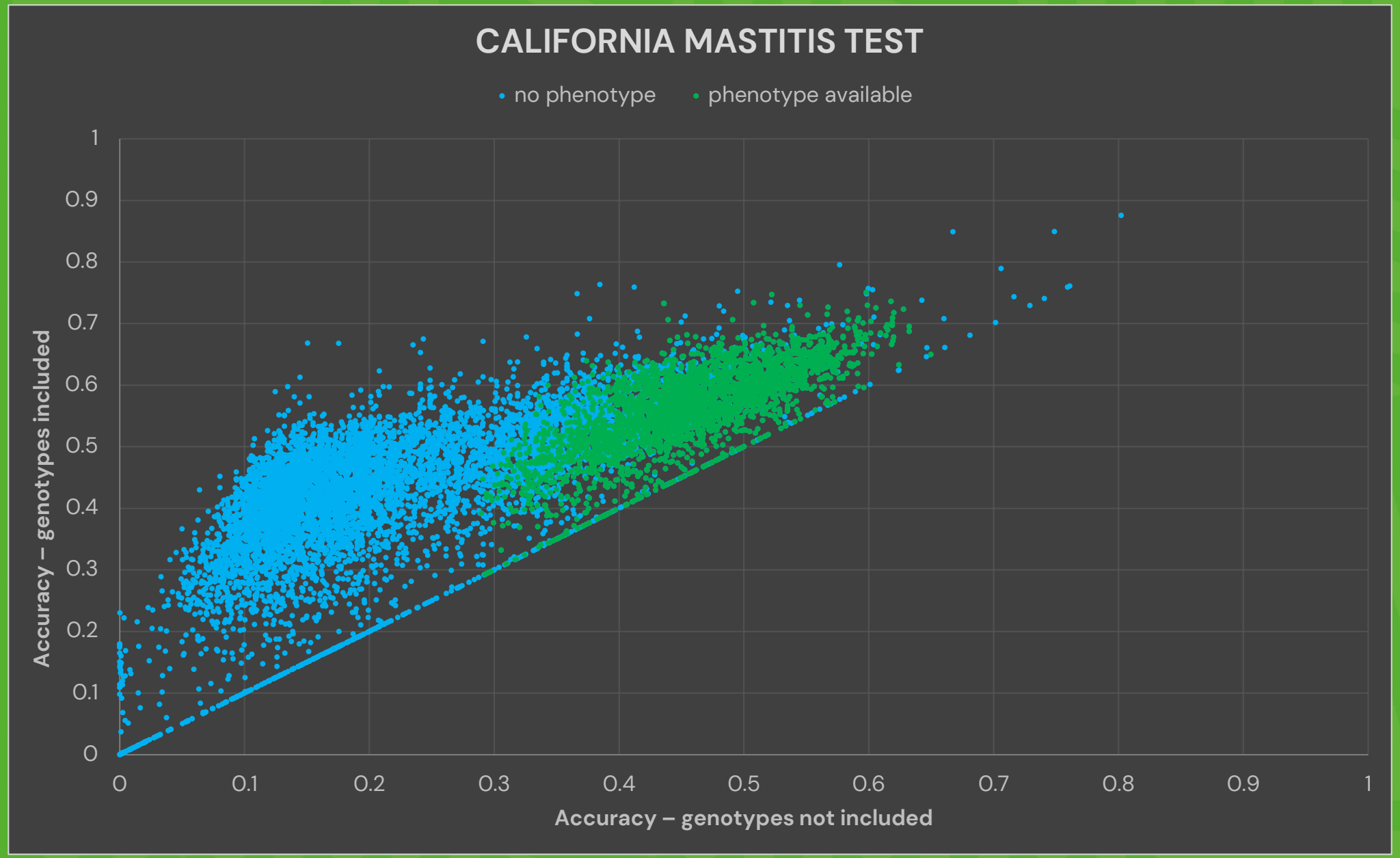

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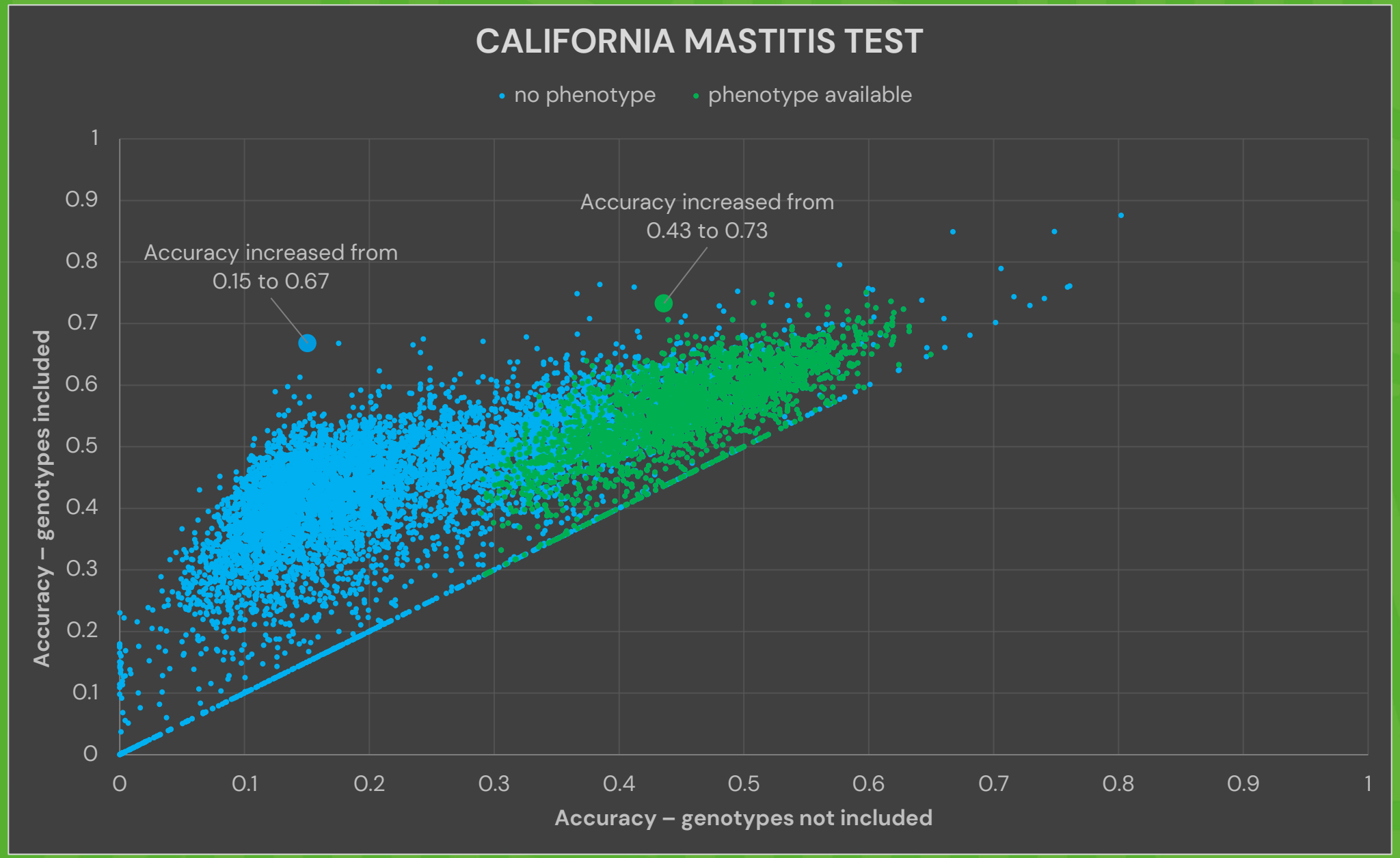

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In a nutshell:

- Footrot and mastitis can do harm to the flock…
- …but animals can be selected for breeding against it.

- If animals are phenotyped and genotyped, then we can estimate breeding value that is closer to the true breeding value.

- **#phenotypeisking**
- **#genotypeisalsoimportant**

Acknowledgement

SRUC

TEXEL SHEEP SOCIETY

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