



First insights in the genetic structure of Cyprus's indigenous cattle

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The protagonist of our story..

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- **Origin:** Asia (India) - Introduction: 5k years ago

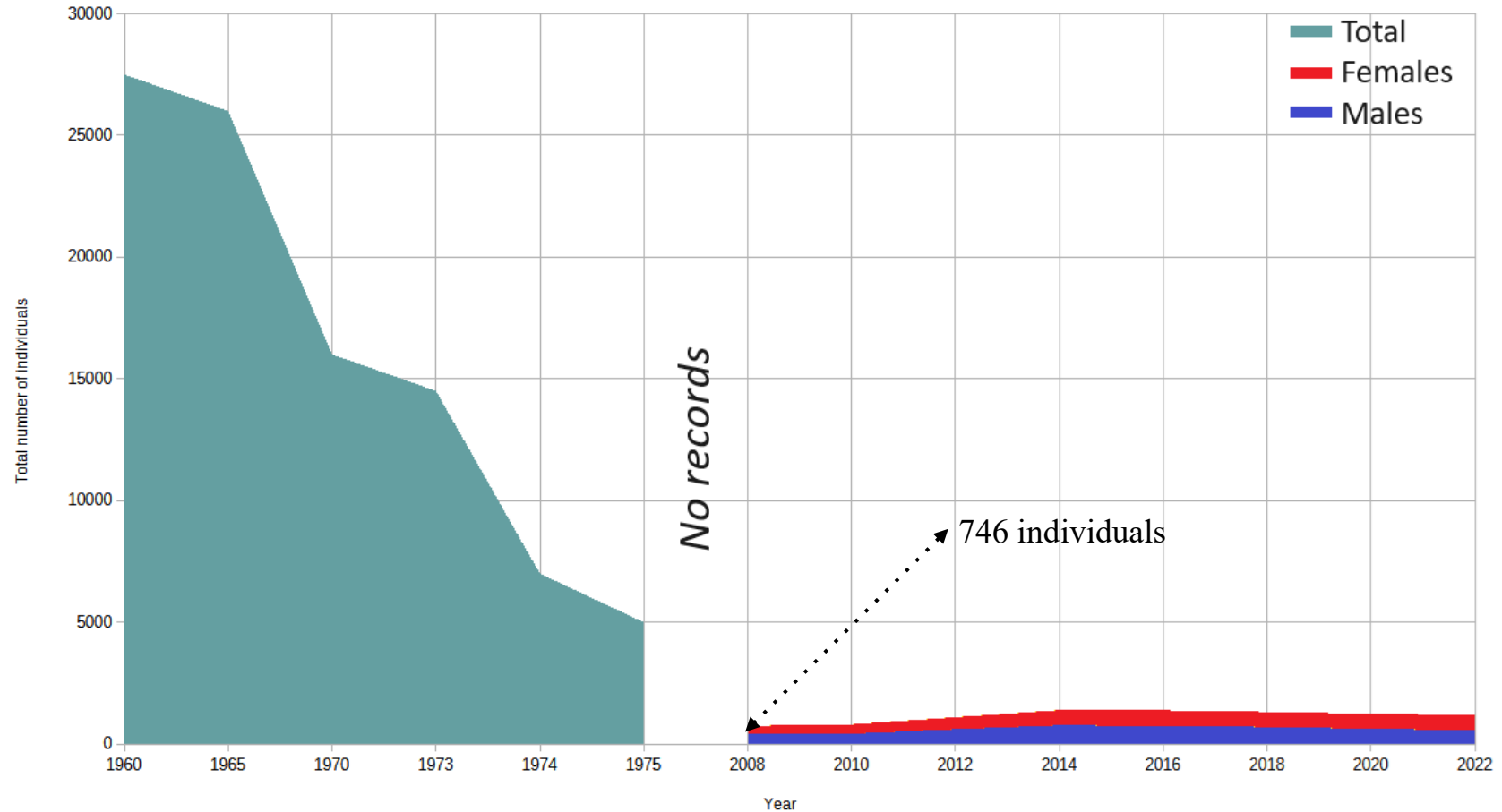


The protagonist of our story..

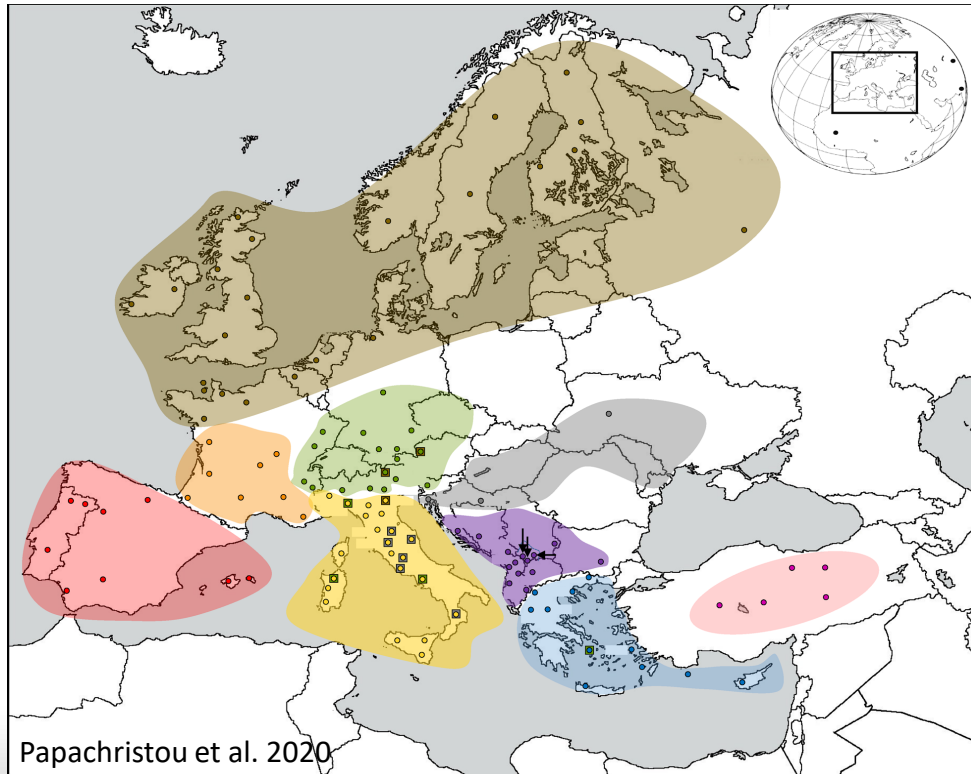
- **Species:** *Bos taurus indicus* (Slight size and colour variation -two main types)
- **Distribution:** Cyprus
- **Origin:** Asia (India) - Introduction: 4th century BC
- **Cultural significance**



Population size through time



Previous studies..



Kastelorizo



Crete

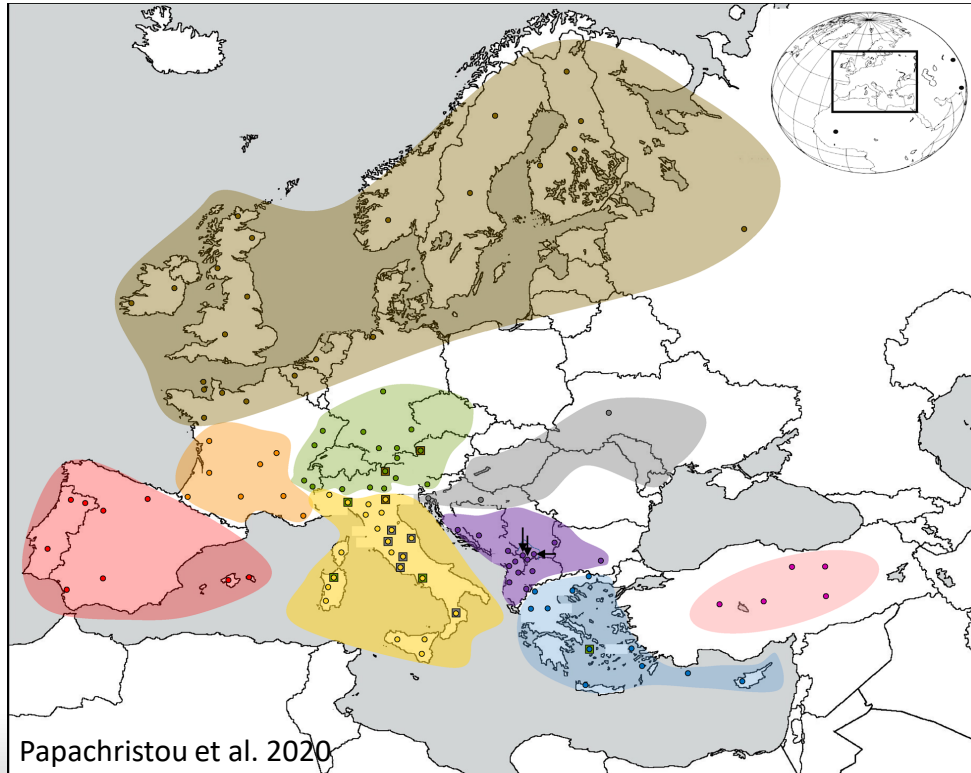


South Greece

Cyprus



Previous studies..



Prespes



Katerini

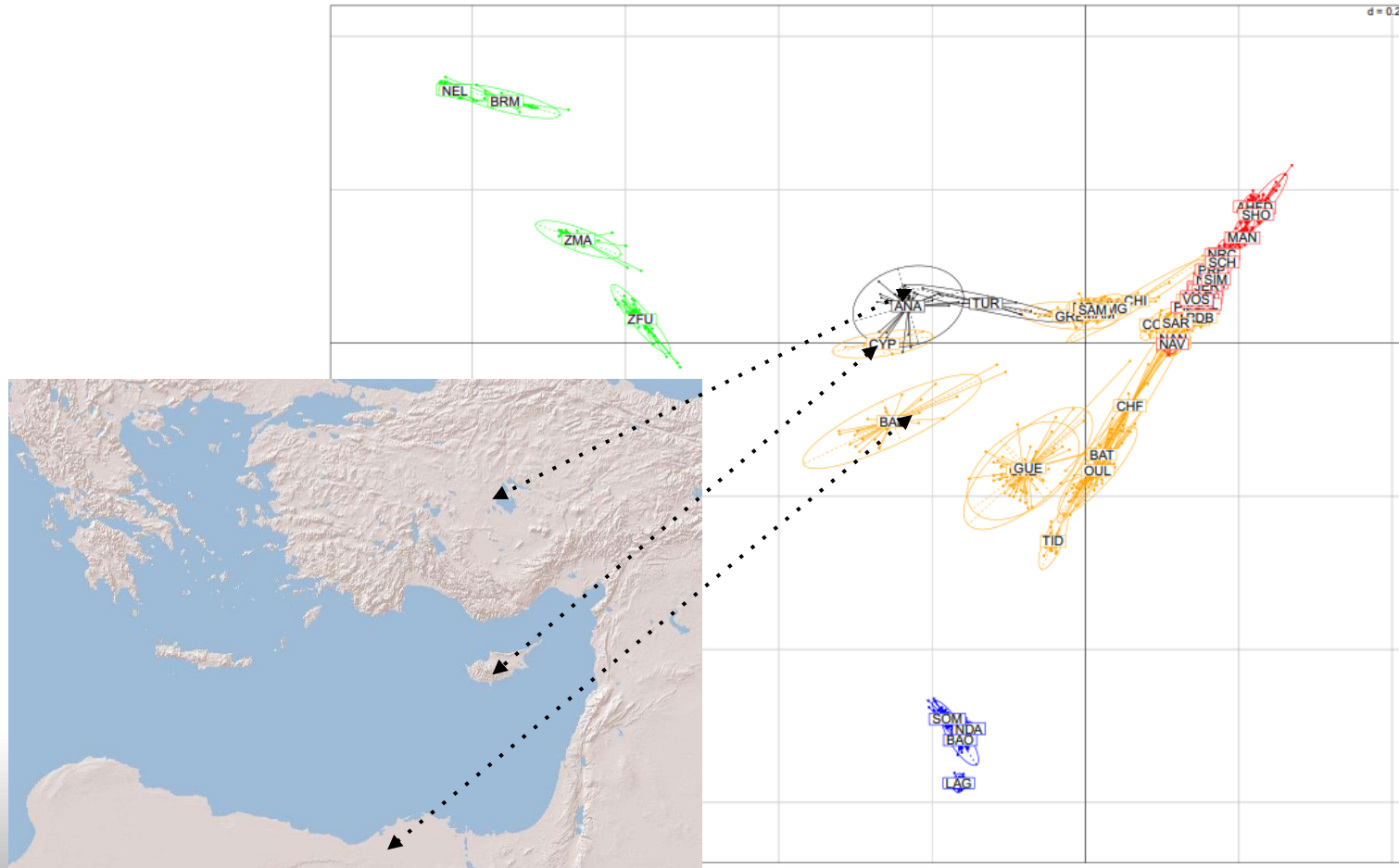


Cyprus

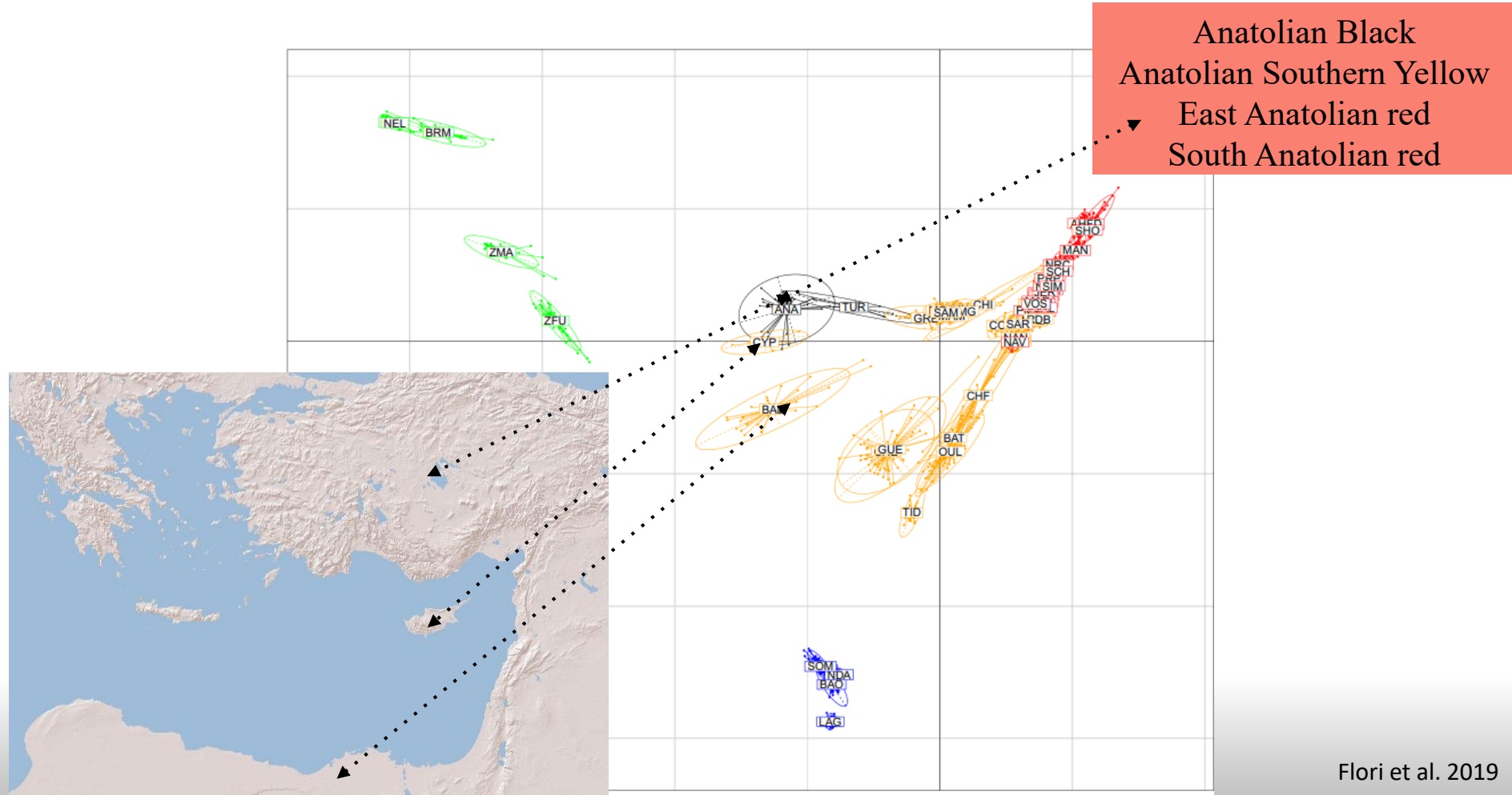


North Greece

Previous studies..



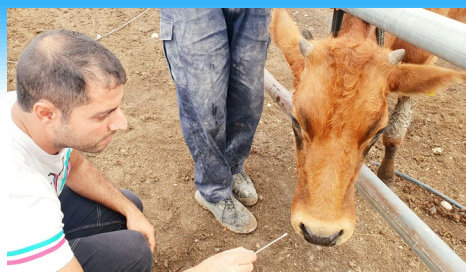
Previous studies..



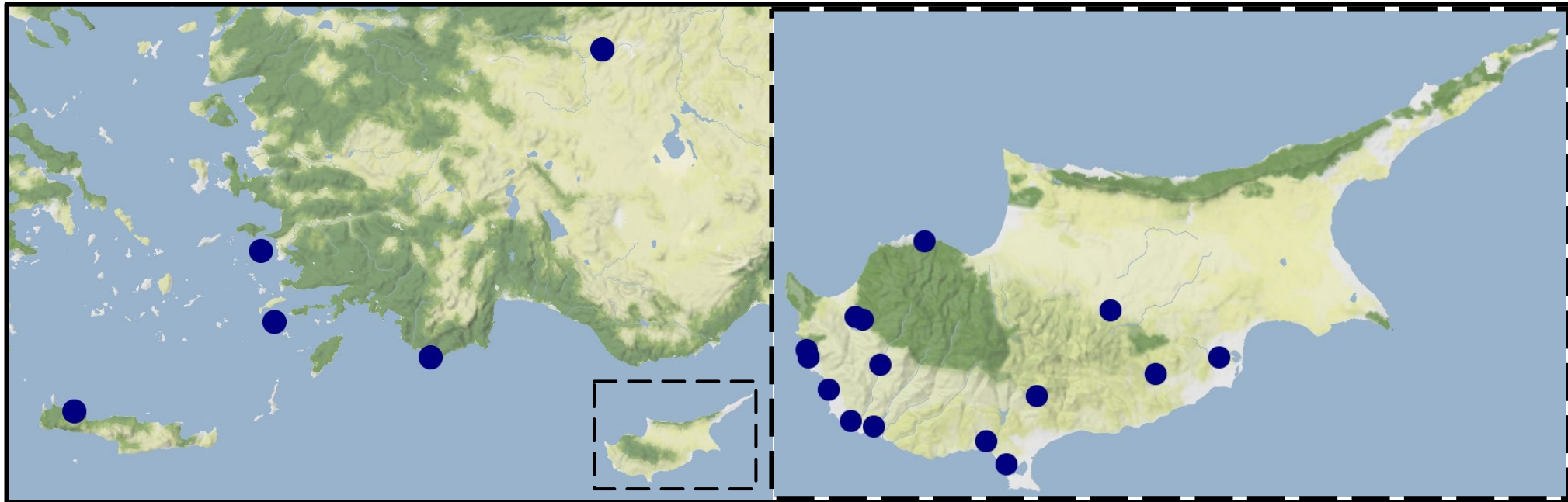
Questions

- Is the indigenous Cypriot breed genetically distinct?
- Gene flow between indigenous and commercial breeds on the island? (effect on phenotype?)
- Does the intra-breed size and colour variation reflect to genetic level?
- What is the genetic affinity with neighbouring breeds (possible sources of introduction)?
- Could conservation actions be facilitated by genetic data?

Methods

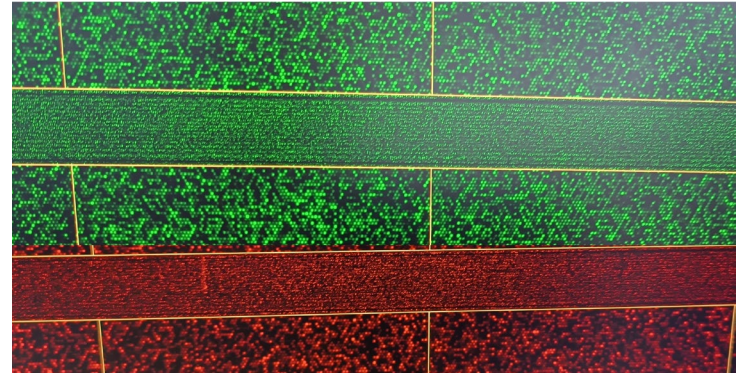


- Sampling (>120 individuals)



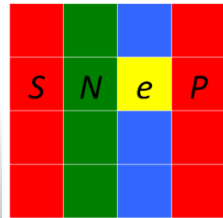
Methods

- Sampling (>120 individuals)
- Genotyping using Microarrays (Illumina 777K bovine array)

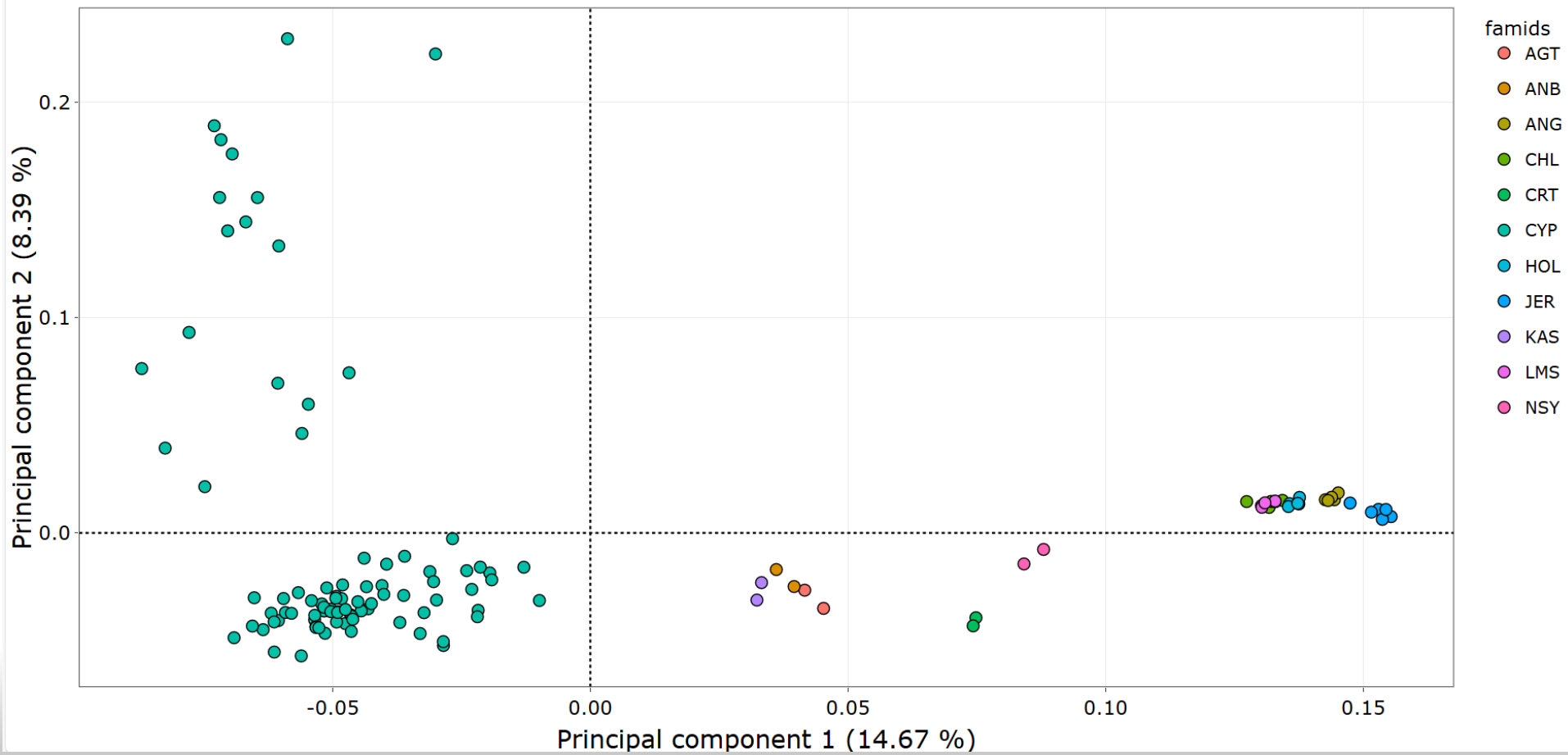


Methods

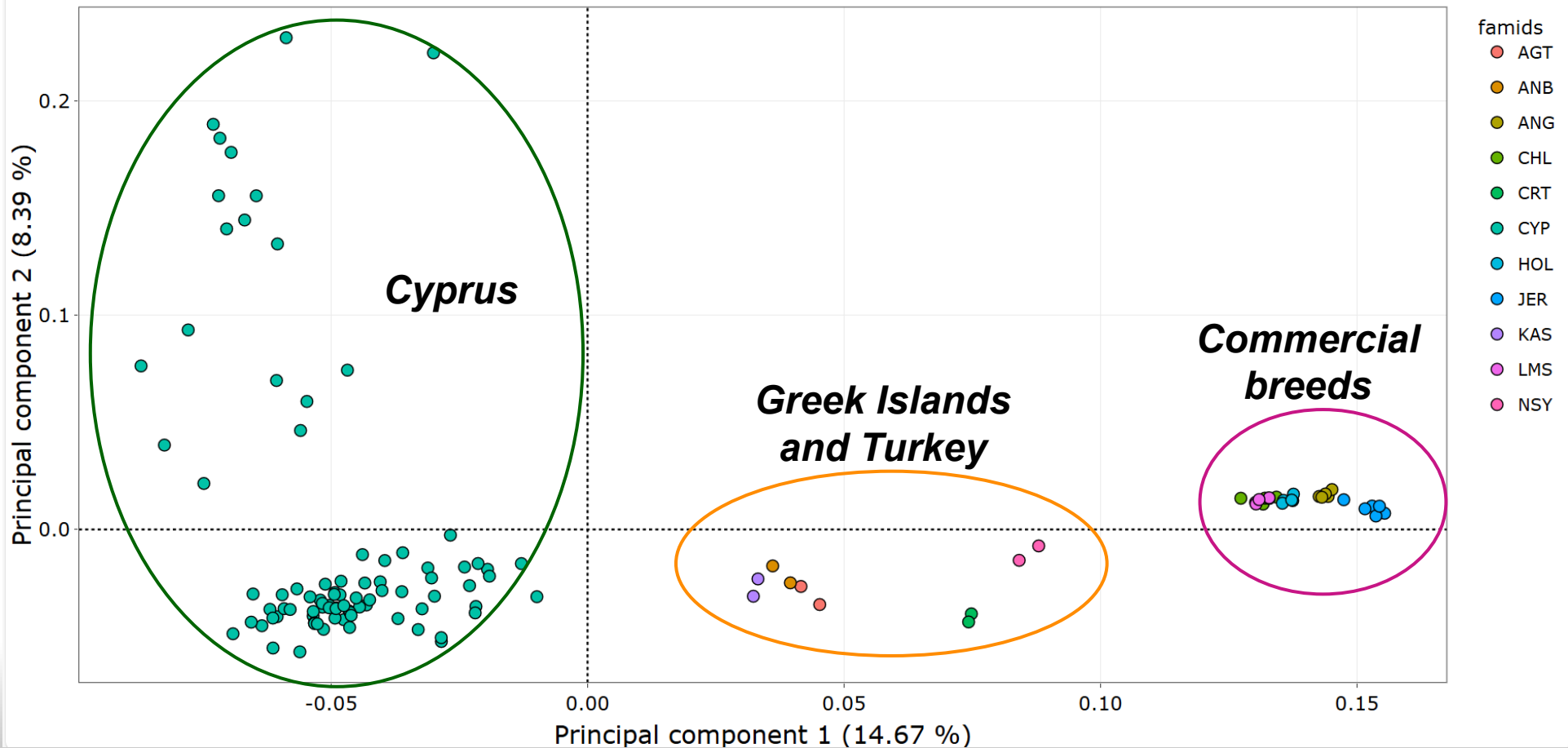
- Sampling (>120 individuals)
- Genotyping using Microarrays (Illumina 777K bovine array)
- Genetic diversification explored through:
 - Model-based Bayesian clustering - STRUCTURE v.2.3.4
 - Non-model based PCA, DAPC - R packages adegenet v2.0.0 and tidyverse v.2.0.0
- Estimation of effective population size – SNeP v 1.1
- Evaluation of inbreeding – RoH estimation (Plink 1.9/ - R package detectRUNS v. 0.9.6)



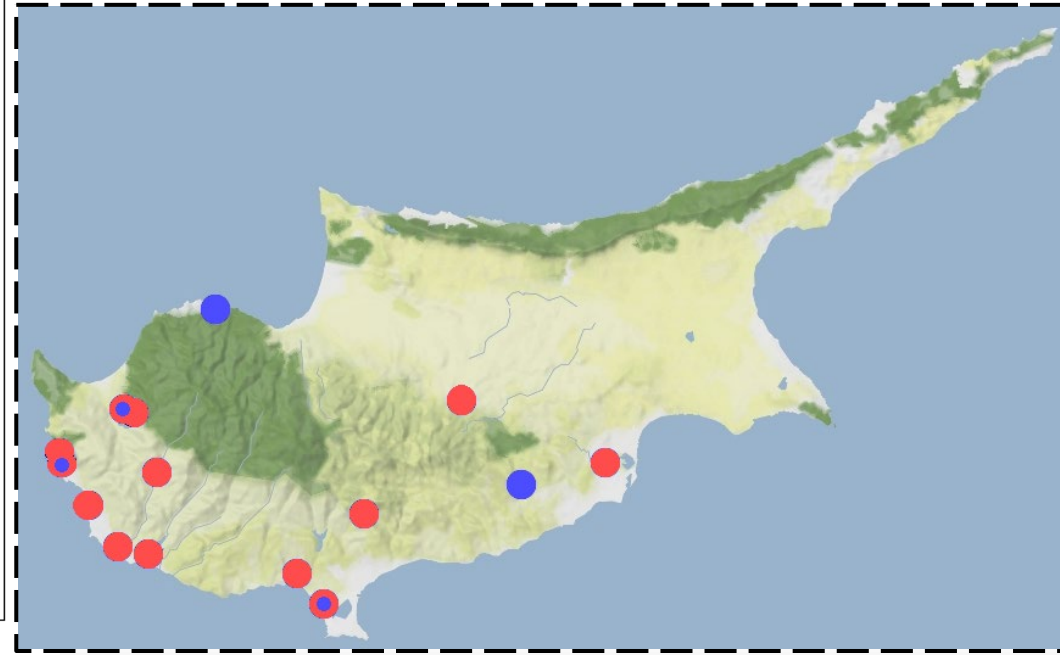
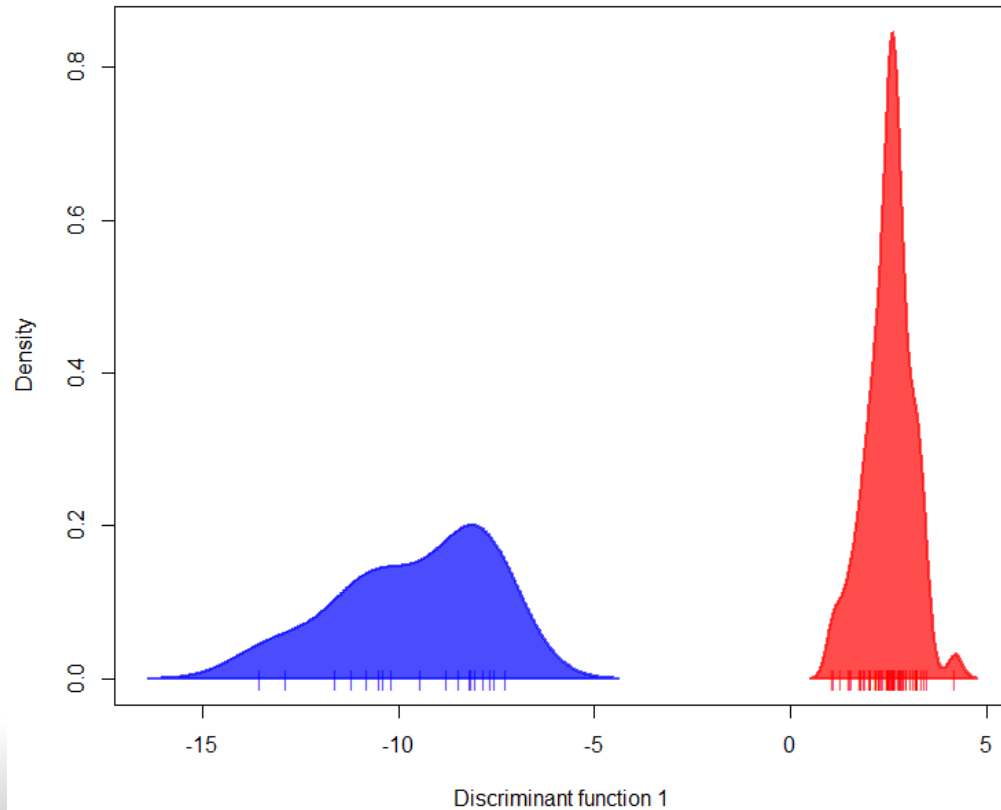
Results: PCA



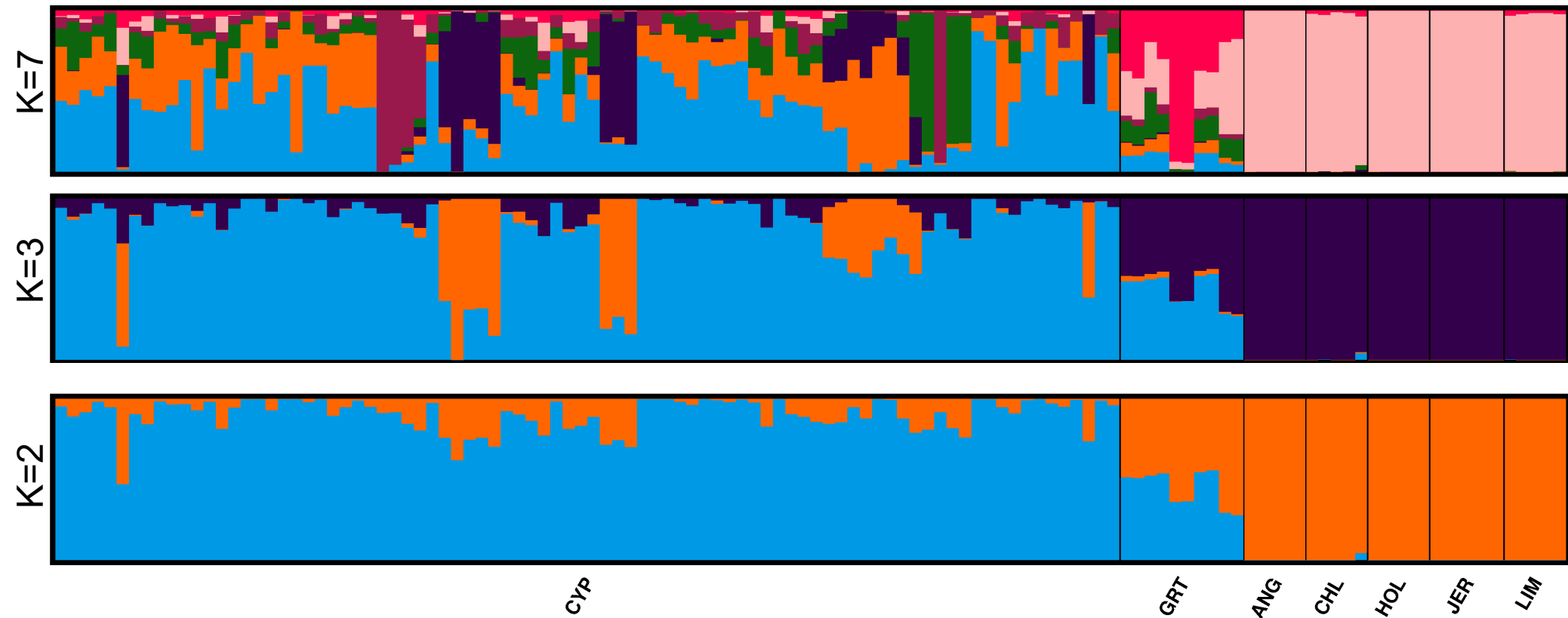
Results: PCA



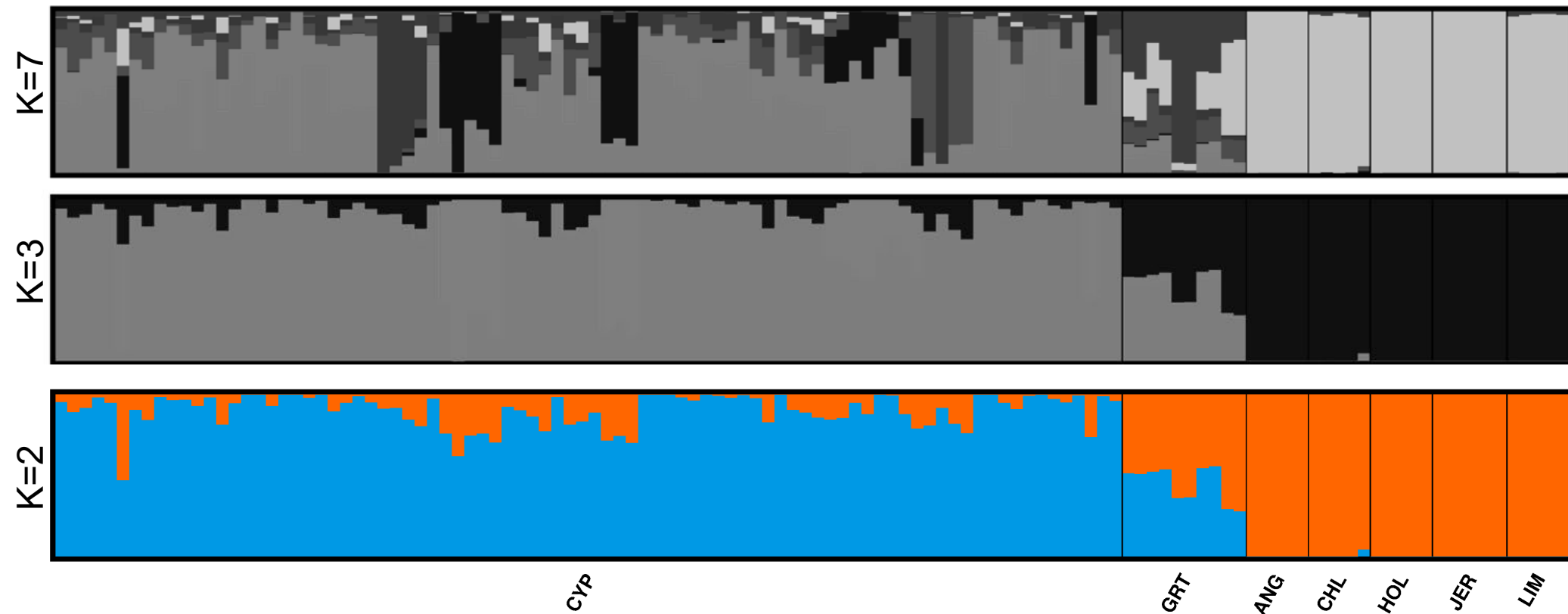
Results: DAPC for Cyprus indigenous breed



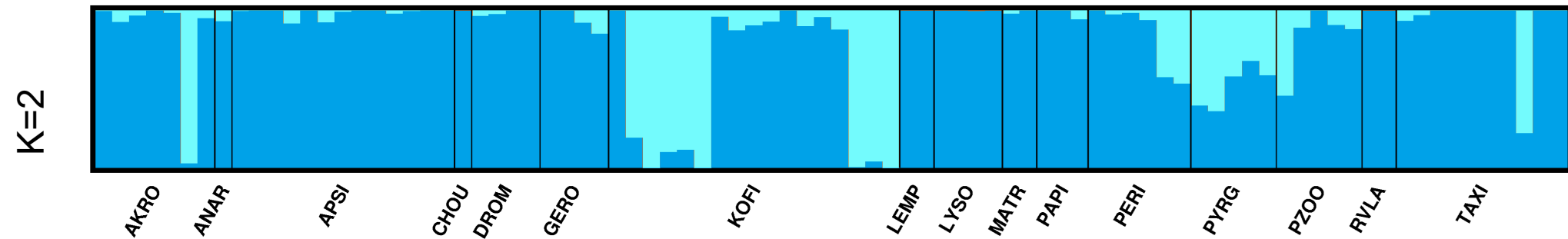
Results: Structure clustering (1st level)



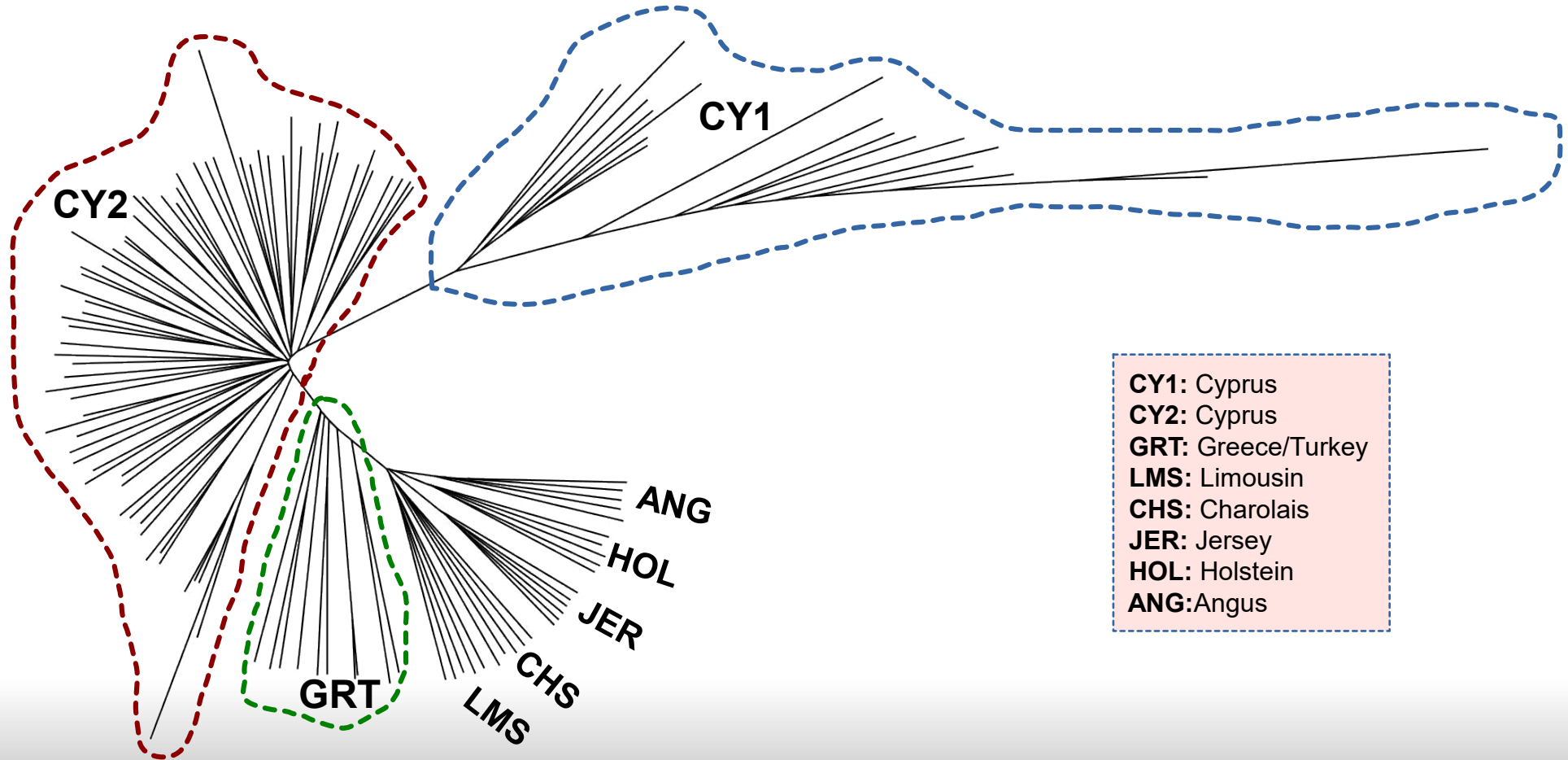
Results: Structure clustering (1st level)



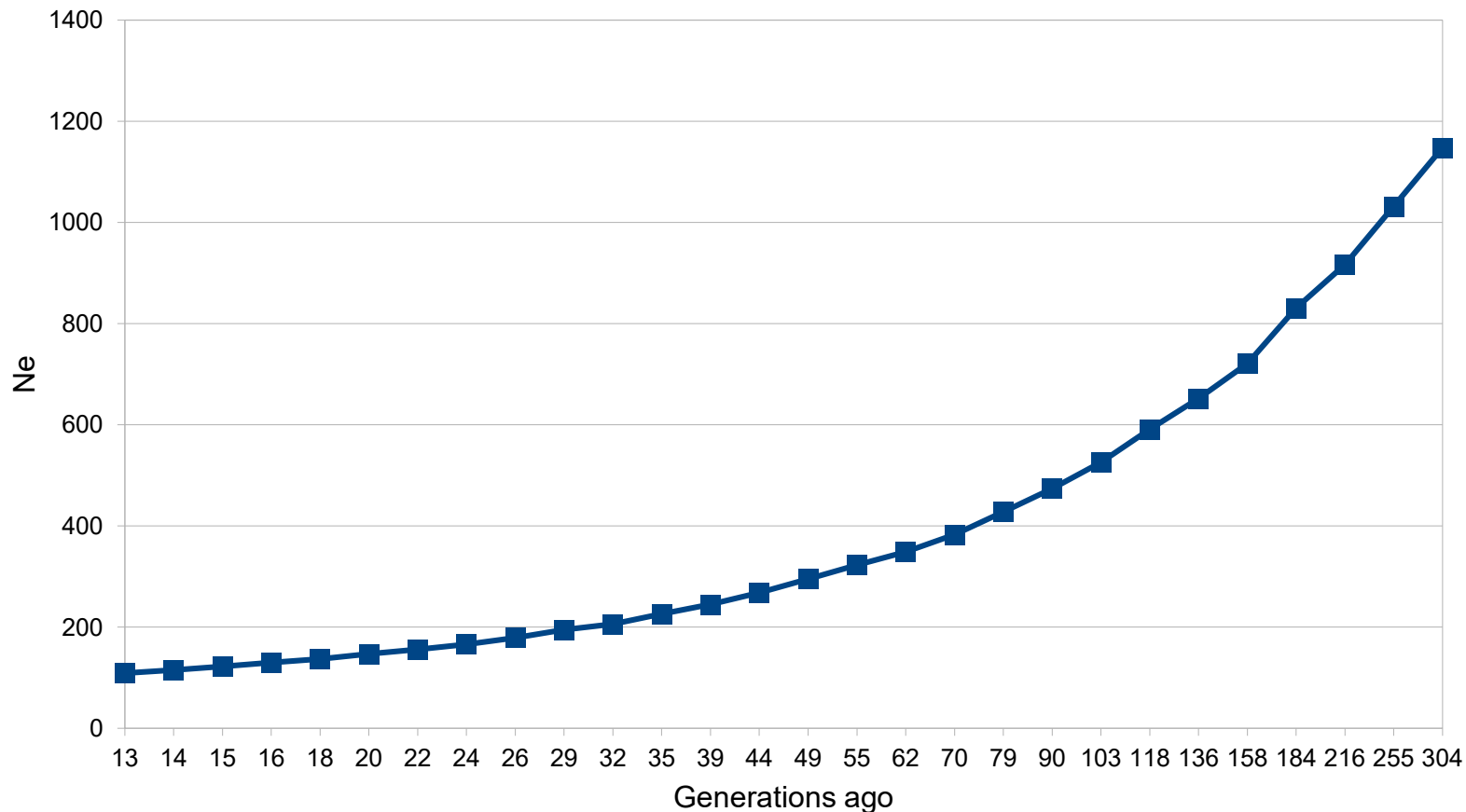
Results: Structure clustering (2nd level)



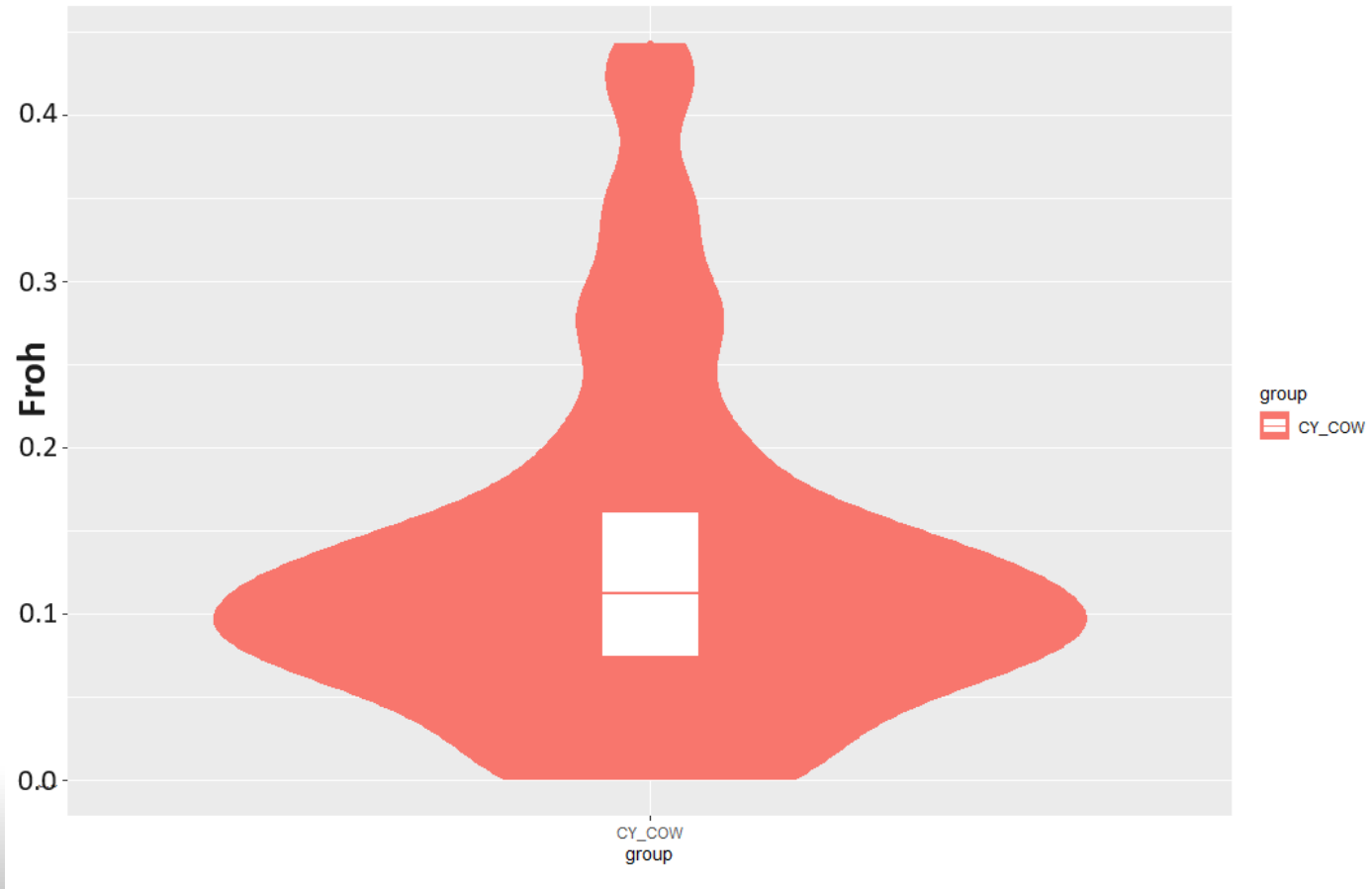
Results: Phylogeny



Results: Effective population size (N_e)



Results: F_{RoH} - Indbreeding



Conclusions

- No gene flow was detected between commercial and local indigenous breeds
- The Cyprus Cow breed is genetically distinct from neighbouring breeds
- Two genetic subpopulations within Cyprus – Geographic pattern?
- Effective population size is relatively high considering current population size
- Relatively high inbreeding
- Conservation should take into account revealed population structure



Aknowledgements

- *Prof. Ivica Medugorac*
- *Phoebe Vayanou*
- *Nicolas Loukas*
- *George Papageorgiou*
- *Savanna Andreou*
- *Prof. S. Sfenthouakis - UCY – access to HPC*
- *Local cow breeders*

