INBREEDING, EFFECTIVE POPULATION SIZE AND COANCESTRY ON LATXA DAIRY SHEEP BREED

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Framework

- Latxa is a dairy sheep breed native from Basque Country and Navarre (Spain)
- 3 breeds: Latxa Cara Rubia (**LCR**), Latxa Cara Negra from Euskadi (**LCNEUS**) and from Navarre (**LCNNAF**)
- Historical importation of semen from French Manech in LCR breed
- Inbreeding has been managed based on **pedigree** information
- **Genomic marker panels** → alternatives to achieve more precise estimates

Aim

- Assess and compare 3 **inbreeding (F)** estimation methods: pedigree (PED), proportion of homozygous SNP (SNP) and runs of homozygosity (ROH)
- Estimation of **effective population size** as $N_e = \frac{1}{2\Delta F}$
- Analysis of **coancestry** evolution

Materials

Genotypes of artificial insemination rams with Illumina Ovine SNP50 BeadChip

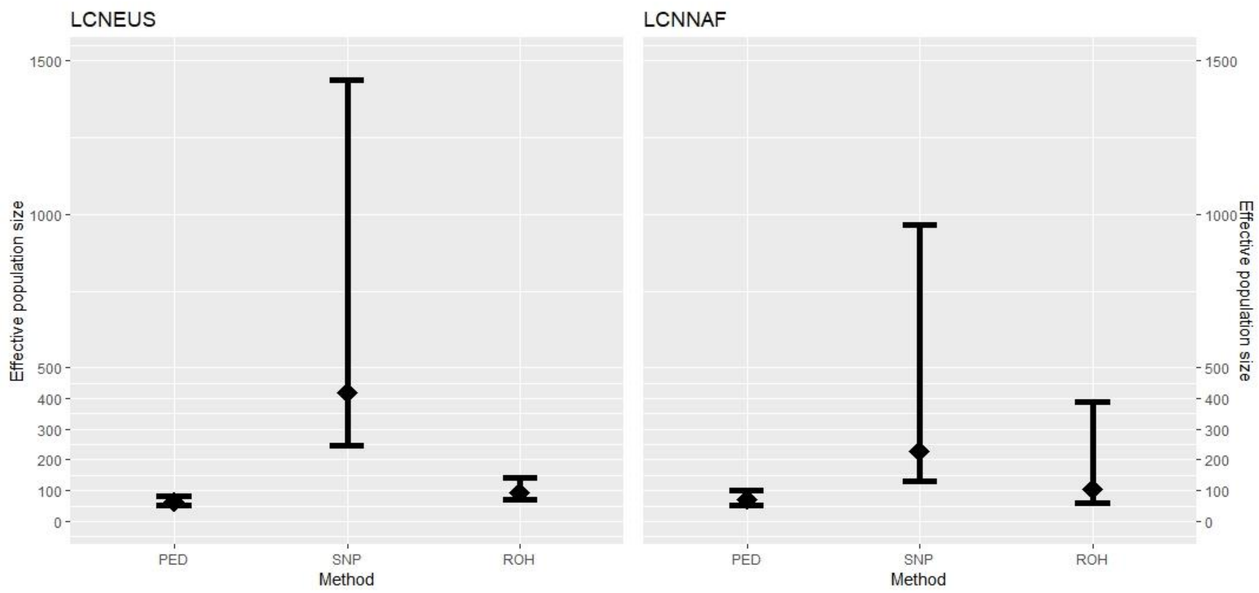
Breed	Nº genotyped	Markers	PED
LCNEUS	353	39159	1803
LCNNAF	192	39373	911
LCR	427	38168	1963

Results

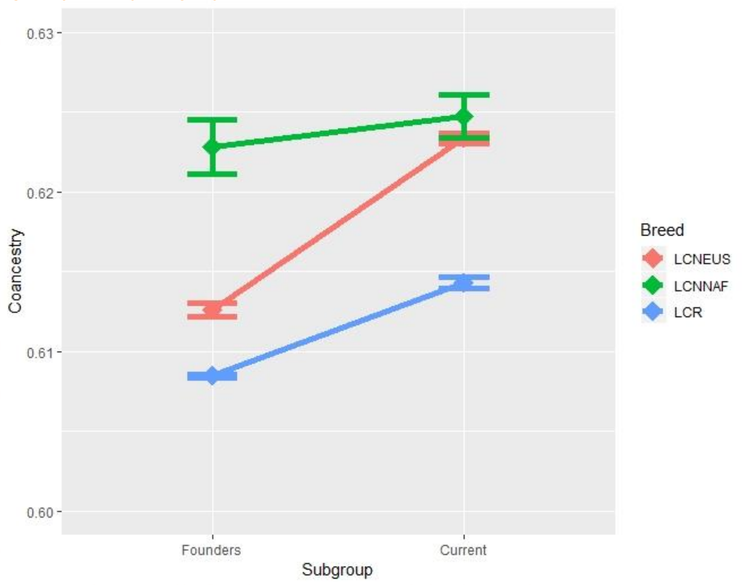
Rate of inbreeding per generation:

Method	Breed		
	LCNEUS	LCNNAF	LCR
ΔF_{PED}	0.0079 ± 0.0009	0.0073± 0.0012	0.0022 ± 0.0004
ΔF_{SNP}	0.0012 ± 0.0004	0.0022 ± 0.0009	-0.0001 ± 0.0004
ΔF_{ROH}	0.0054 ± 0.0010	0.0049 ± 0.0018	0.0007 ± 0.0009

Effective population size:



Molecular coancestry:



Conclusions

- There are differences between ΔF estimates based on pedigree and molecular data
  - As a consequence, we also observe differences between N_e estimates
- ROH estimates are more similar to PED estimates than to SNP estimates
  - SNP methodology is more sensitive when molecular data is limited
- Higher increase in coancestry within LCNEUS

Acknowledgments. To CONFELAC, for providing data.
To the Department of Economic Development and Infrastructure of the Basque Government, for the grant for young researchers and technologists.
To POCTEFA and the European Union Fonds européen de développement régional (FEDER) by funding the ARDI project (EFA208/16).