

# ESTIMATION OF INBREEDING IN IBERIAN PIGS USING MICROSATELLITES



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## INTRODUCTION

Genetic markers have been proposed as a tool, to estimate inbreeding in the absence of pedigree

- to detect inbred animals
- to study inbreeding depression



## OBJECTIVE

To compare the molecular inbreeding (proportion of homozygous loci) with the genealogical inbreeding in Iberian pigs of two related strains: Guadyerbás and Torbiscal

## MATERIAL AND METHODS

➤ 62 Iberian pigs of two related strains were analysed:

Guadyerbás ⇒ n=32

Torbiscal ⇒ n=30

➤ Molecular inbreeding was based in 49 microsatellites distributed over all the genome

➤ Genealogical inbreeding goes 21 generations back

➤ A gene dropping simulation was run with the actual genealogy and either 49 or 212 loci equally spaced (three alleles at equal frequency in the base population)

## RESULTS

POPULATION	INBREEDING COEFFICIENTE	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM
GUADYERBAS	Pedigree	0.35	0.01	0.37	0.33
	Molecular	0.53	0.05	0.63	0.43
TORBISCAL	Pedigree	0.15	0.02	0.21	0.13
	Molecular	0.44	0.05	0.53	0.27
ALL ANIMALS	Pedigree	0.25	0.10	0.37	0.13
	Molecular	0.48	0.07	0.63	0.27

✧ Molecular inbreeding is higher than the genealogical one as expected.

✧ The variability of the genealogical inbreeding is very different in the three groups but the variability of molecular inbreeding is quite similar among them

✧ This implies that individuals with the same genealogical inbreeding have a wide scatter of molecular inbreeding

POPULATION	REAL PIG DATA	SIMULATION (49 LOCI)		SIMULATION (212 LOCI)	
		Mean	Standard Deviation	Mean	Standard Deviation
GUADYERBAS	-0.32	0.13	0.16	0.25	0.14
TORBISCAL	0.19	0.21	0.18	0.38	0.15
ALL ANIMALS	0.69	0.70	0.11	0.90	0.03

✧ The observed correlations between molecular and genealogical inbreeding are low for the two populations considered

✧ The correlation is only substantial when both populations are considered together because there is a wide range of genealogical inbreeding values

✧ The high and negative value of the Guadyerbás strain probably reflect the action of natural selection as a consequence of inbreeding depression

## REMARKS

The molecular inbreeding is a poor predictor of the genealogical inbreeding unless:

- ✧ the variance of true genealogical inbreeding is high
- ✧ Considerable number of microsatellites are used (>50)