PEDIGREE ANALYSIS OF THE LUSITANO HORSE BREED

Preliminary Results

Session 19 – Poster 22

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INTRODUCTION

- Lusitano is the most important native horse breed in Portugal
- ≈4000 breeding mares registered in the Studbook
- Nearly one-half of population kept in Portugal; the other half is spread throughout the world (Brazil, France, México, Belgium, Great Britain, Germany, etc.)
- Pedigree analysis is fundamental to assess and manage genetic variability of a population

OBJECTIVES

- Estimate demographic parameters of the Lusitano horse population;
- Develop recommendations for management of genetic diversity aiming at conservation, genetic improvement and utilization.

MATERIAL & METHODS

- Pedigree information:
  - Studbook records on 50603 individuals born between 1824 and 2007
  - Data from the national horse data base (maintained by "Fundação Alter Real")
- Computation of demographic parameters by standard procedures.

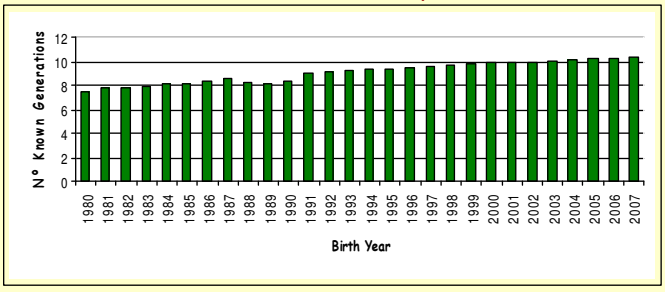
RESULTS

Demographic Parameters

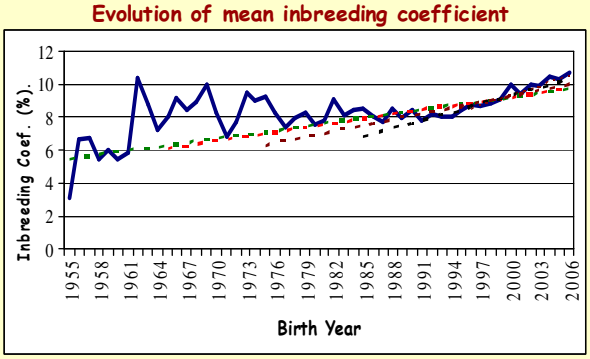
Breeding Stock (until 2007)	Sires	Mares	Total
Approved for the Studbook	4195	11301	15496
Generation Interval (years)	L		L mean
Stallions	11.2		10.4
Mares	9.6		
Sires of Stallions	10.8		
Dams of Stallions	9.8		10.3
Sires of Mares	11.0		
Dams of Mares	9.6		
Average No. Known Generations		10,1	
Degree of pedigree filling (%)[a]	Parents	GP	GGP
Reference population (Animals born between 2000 and 2007)	100.0	99.8	99.7
Inbreeding (%) – Period from:	ΔF/year	ΔF/gen.	N_e[b]
1955-2006	0.083	0.860	58.2
1965-2006	0.088	0.914	54.7
1975-2006	0.118	1.229	40.7
1985-2006	0.164	1.704	29.4
1995-2006	0.197	2.045	24.5
Mean Inbreeding Coefficient (%)[c]		9.91	
Animals with inbreeding ≠ 0 (%)[c]		98.4	
Genetic Contributions[a]	Founders		Ancestors
To 50% of genetic pool	21		7
To 75% of genetic pool	74		23
To 90% of genetic pool	460		73
Effective Number	37.5		13.8

[a] Reference population with animals born between 2000-2007; [b] Effective Population Size; [c] For animals born in 2006

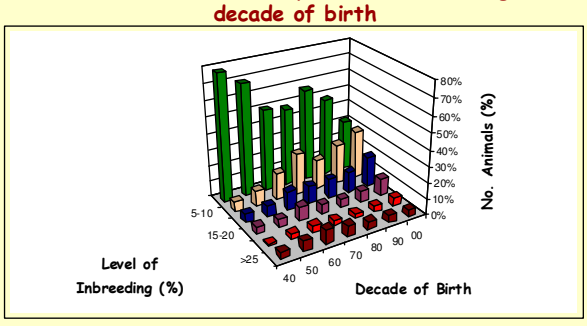
Number of Known Generations by Year of Birth



Evolution of mean inbreeding coefficient

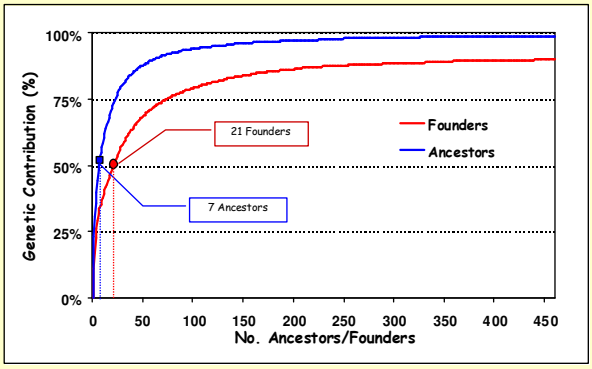


Distribution of records by class of inbreeding and decade of birth



Genetic Contribution of Ancestors and Founders

(Reference population born between 2000-2007)



CONCLUSIONS

- Deep pedigree information in the Lusitano horse;
- Mean inbreeding coefficient relatively stable until 1995; increasing since then;
- Current N_e is about 25;
- Nearly all Lusitano horses are inbred;
- Strong influence of some families in breed structure;
- Need to carefully manage existing genetic diversity.