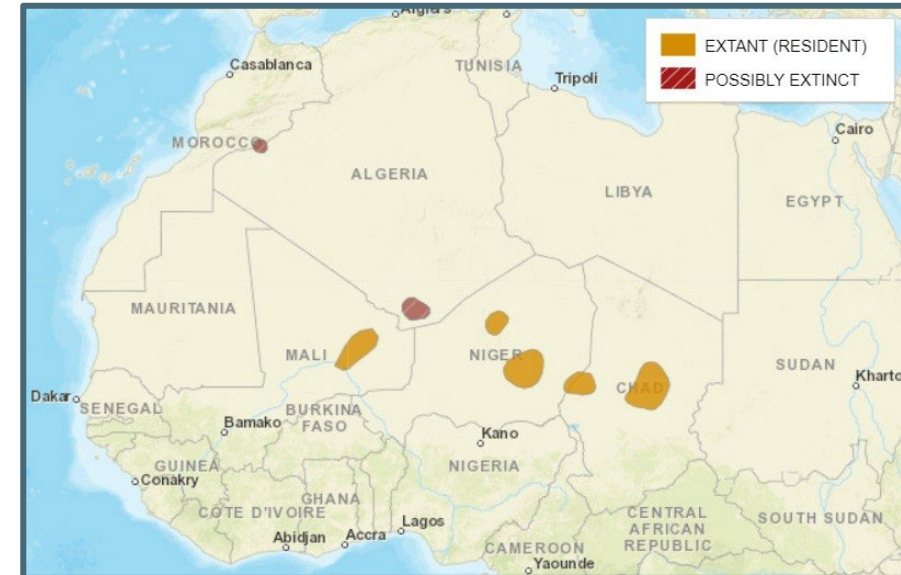


Genetic analysis of calf survival in a critically endangered antelope (*Nanger dama mhorrr*)

Sonia Domínguez, Isabel Cervantes, Eulalia Moreno and Juan Pablo Gutiérrez

1. INTRODUCTION

- **Origin:** North Africa
- **Dama gazelle:** listed as critically endangered on the IUCN Red List
- **Mhorr subspecies:** extinct in the wild
- **Founders of the captive breeding program:** 1 male and 3 females
- **Current captive population:** more than 400 individuals
- **Purpose of the program:** restoration in its natural habitat

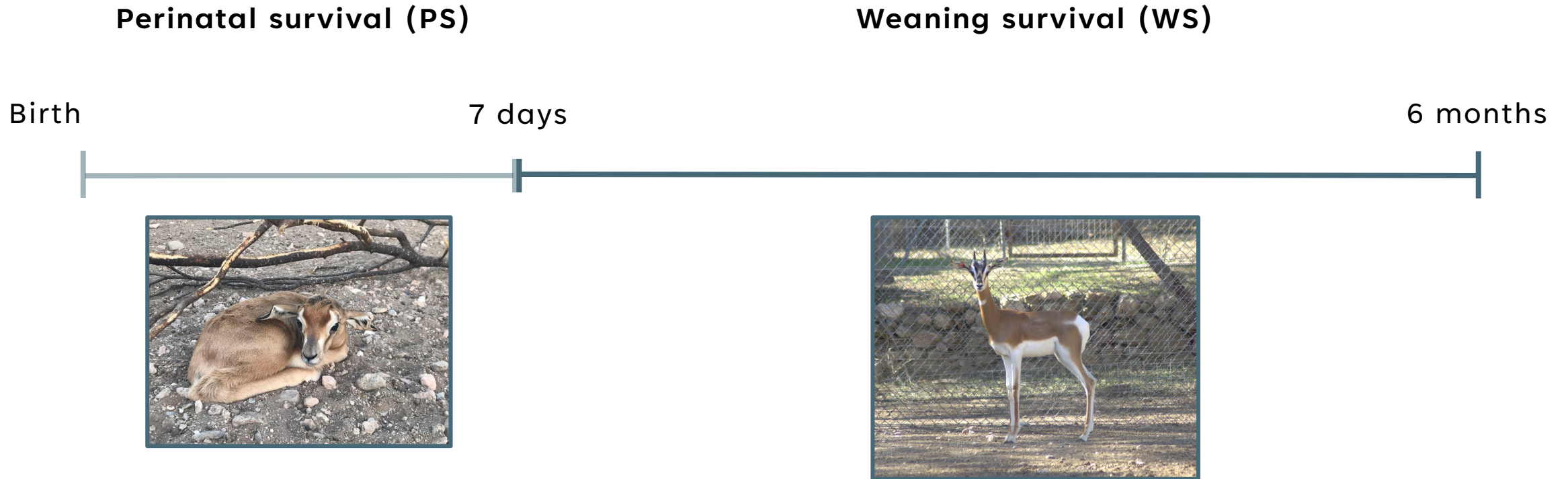


OBJECTIVE

To ascertain the **genetic parameters affecting calf survival** traits of mhorr gazelle and evaluate the **adaptive potential of the captive population** as source for future reintroduction projects.



2. MATERIALS AND METHODS



Mhorr gazelle studbook with 2739 animal records (1971-2021)

Dataset with a total of **2185 calf records** from 478 dams

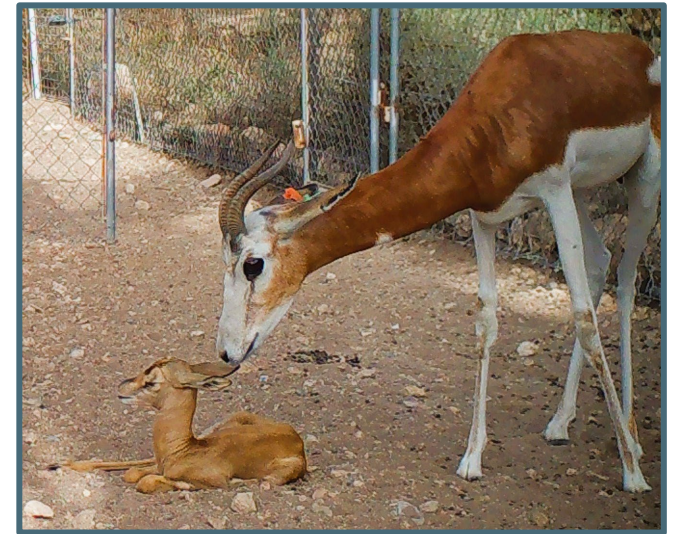
2. MATERIALS AND METHODS

Mixed linear models with Bayesian approach

ENDOG v4.8 (Gutiérrez & Goyache, 2005) and TM (Legarra, 2009) softwares

Systematic effects

- Number of calving
- Year of birth
- Season
- Birth location
- Sex
- Age of the dam at calving (in days)  As linear and quadratic covariate
- Inbreeding coefficient (calf and dam)  As linear covariates



2. MATERIALS AND METHODS

Inbreeding covariate

- Calf and dam
- Calf
- Dam
- None

X

Random effects

- Calf
- Dam
- Calf + dam
- Calf + permanent
- Dam + permanent
- Calf + dam + permanent

X

Statistical approach

- Continuous
- Threshold

= **48 different models** executed for each survival trait

Predictive value compared with logCPO (Pettit & Young, 1990)

3. RESULTS AND DISCUSSION

Models with the best predictive value

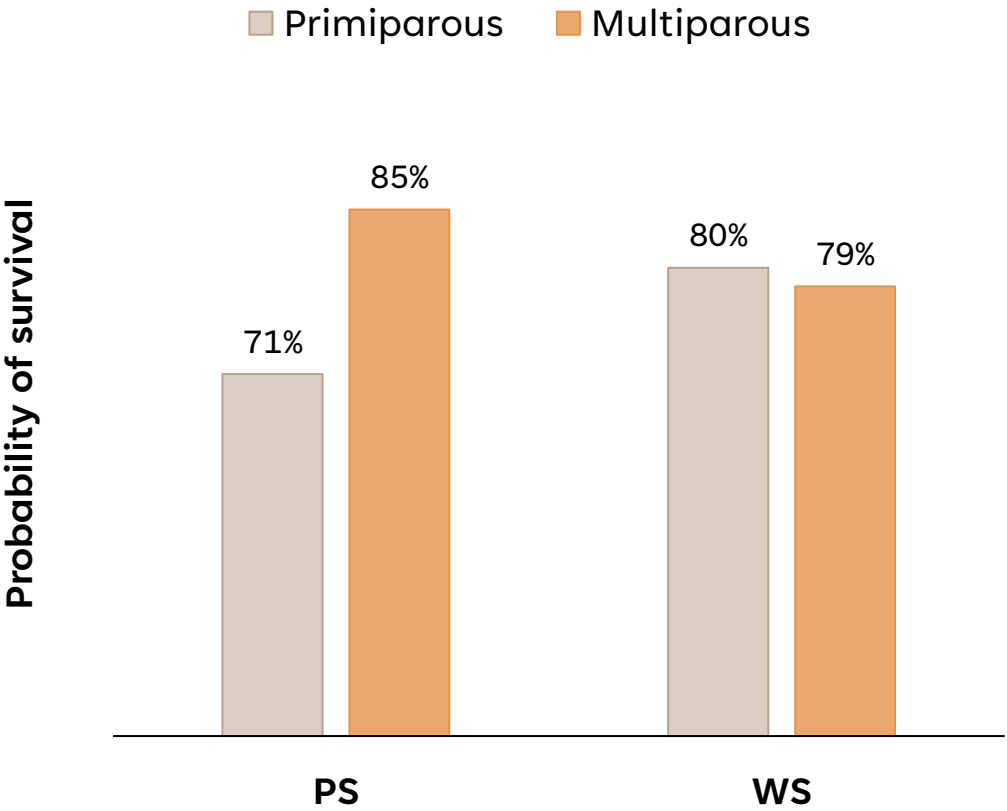
TRAIT	MODEL	INBREEDING COVARIATE	STATISTICAL APPROACH	h^2	c^2
PS	Calf model	Calf	Threshold	0.259 (0.052)	
WS	Calf-permanent model	Dam	Threshold	0.123 (0.047)	0.035 (0.026)

h^2 = heritability for the direct genetic effect

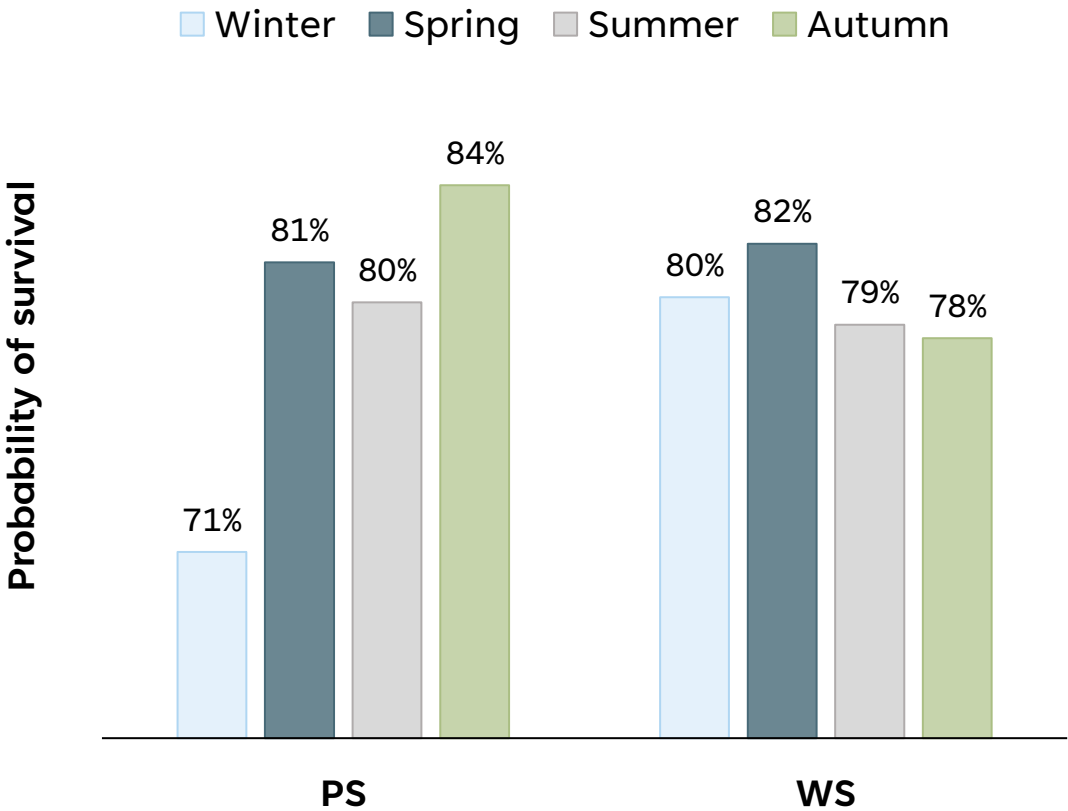
c^2 = ratio of permanent environmental variance to phenotypic variance

3. RESULTS AND DISCUSSION

Number of calving

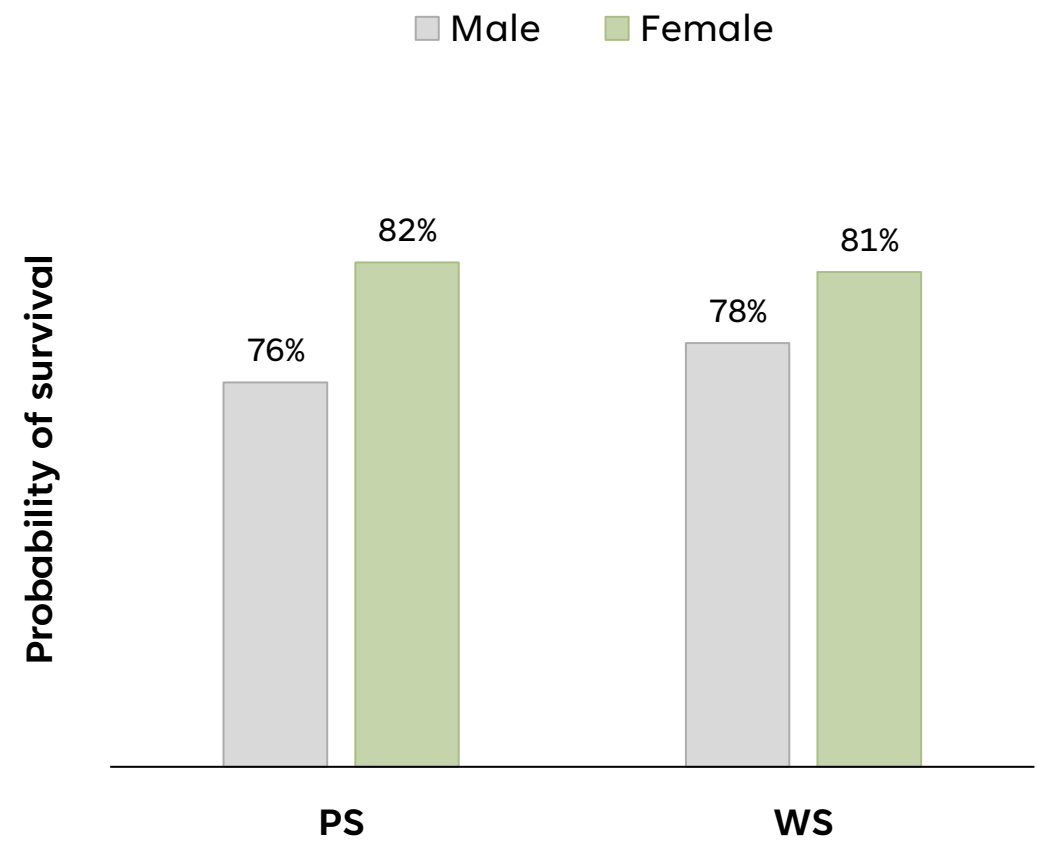


Season of birth

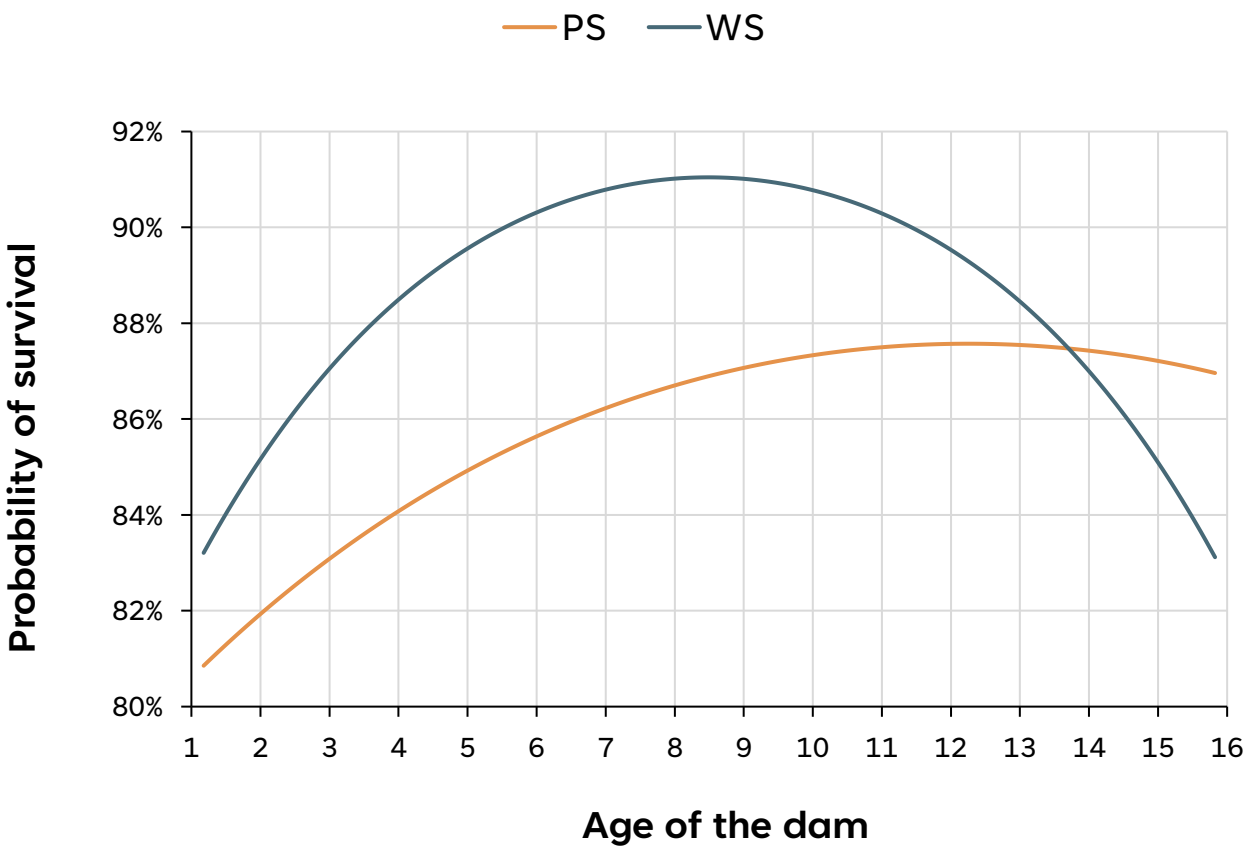


3. RESULTS AND DISCUSSION

Sex

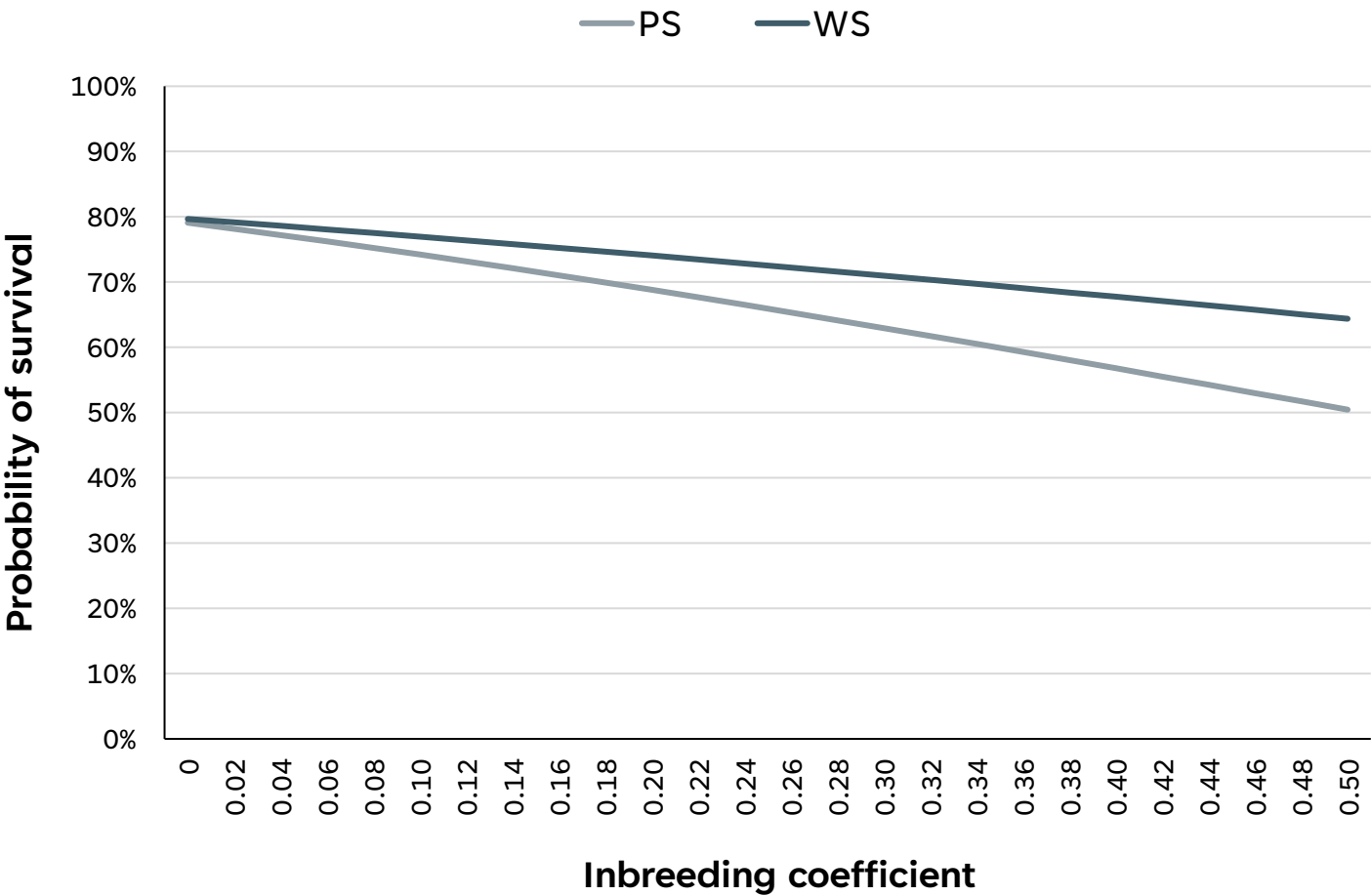


Age of the dam at calving



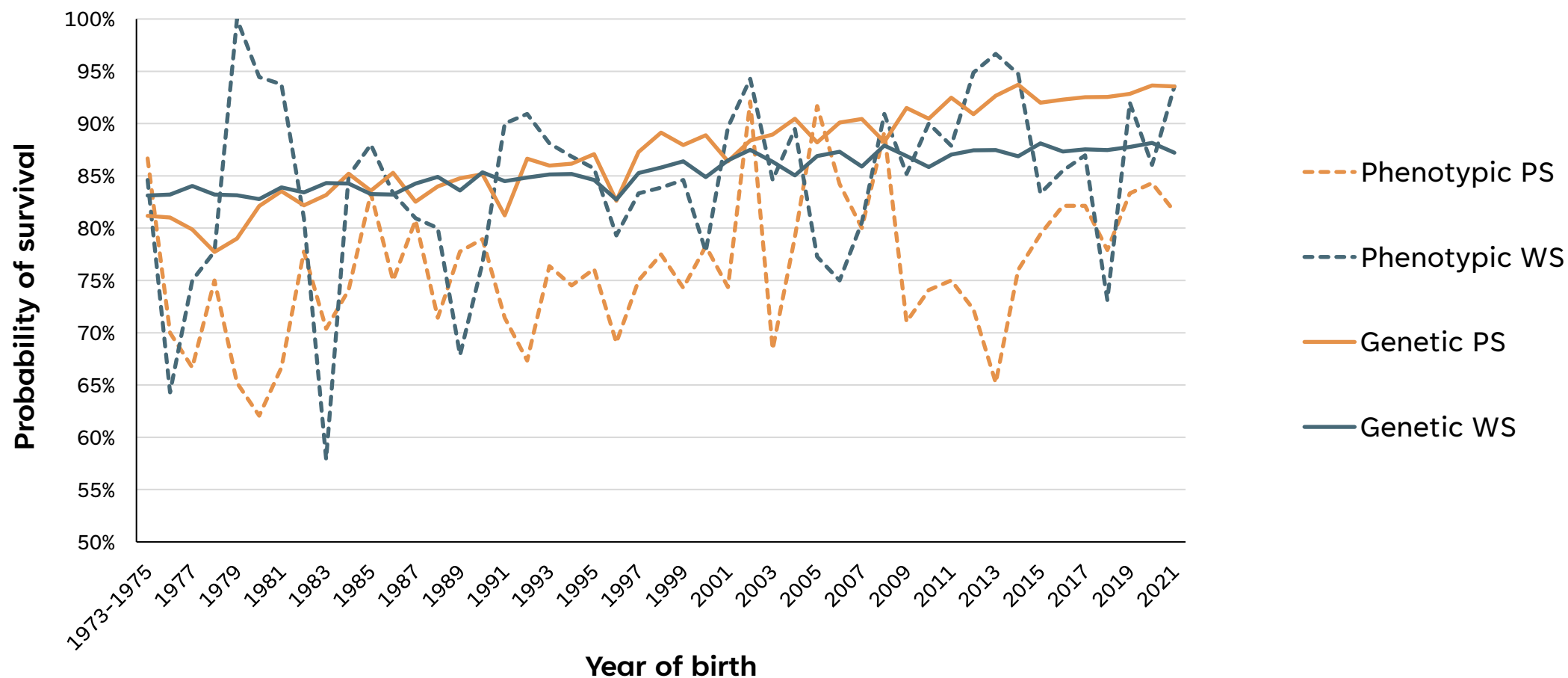
3. RESULTS AND DISCUSSION

Calf and dam inbreeding coefficient



3. RESULTS AND DISCUSSION

Phenotypic and genetic trends



4. CONCLUSIONS

- The heritability values and genetic trends obtained for the PS and WS **evidence the adaptive potential** of this mhorr gazelle captive population.
- According to the models with the best predictive value, **the genetic variance** of these survival traits **depends more on the direct genetic effect** than on the maternal one.
- Individuals with a **higher probability of survival** could be identified and **chosen for reintroduction projects**, enhancing the chances of success.
- **Despite the inbreeding depression** observed, selection and mating strategies lead to a **positive trend in offspring survival** of the population.

THANK YOU!

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