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Challenging selection for consistency in the rank of endurance competitions

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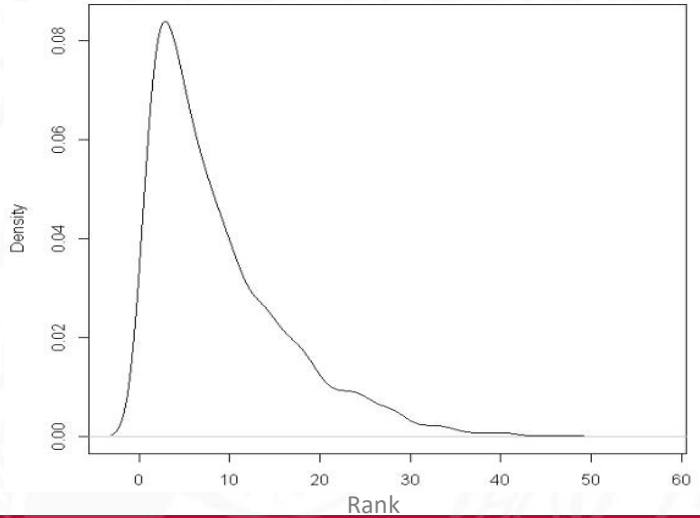
INTRODUCTION

Cross-Country races
Long distances

Veterinary Control

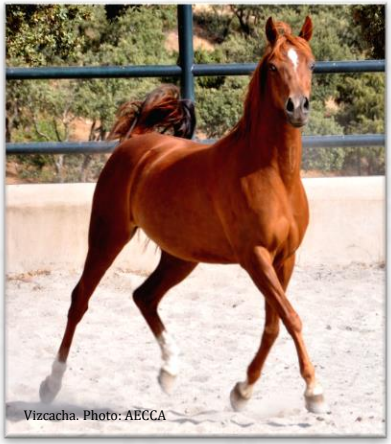
INTRODUCTION

- Ranking is a discontinuous trait.
- Transformations are needed.
- Additional issues:
  - ✓ Not all records are available.
  - ✓ Sometimes there is a lack of the total number of participants.



INTRODUCTION

- Endurance Genetic Evaluation.
- Arab Horse, Anglo-Arab, Spanish Sport Horse and Hispano-Arab.
- Since 2017, Thurstonian model is applied for ranking trait.
- Race time, placing and ranking combined in genetic index.



Vizcacha. Photo: AECCA

Global index= 50% Ranking + 40% Placing + 10% Race time

INTRODUCTION

- Homogeneous animals could be valuable as selection objective.
- It is necessary to explore if there is a genetic basis for the variability of the rank.


Zul-Latz. Photo: AECCA

OBJECTIVE

- The objective of this work was to estimate the genetic parameters useful to select for decreasing the mean of the positions and **reducing the variability of these positions** of a given horse in several endurance races, as well as the genetic correlation between that variability and the position.

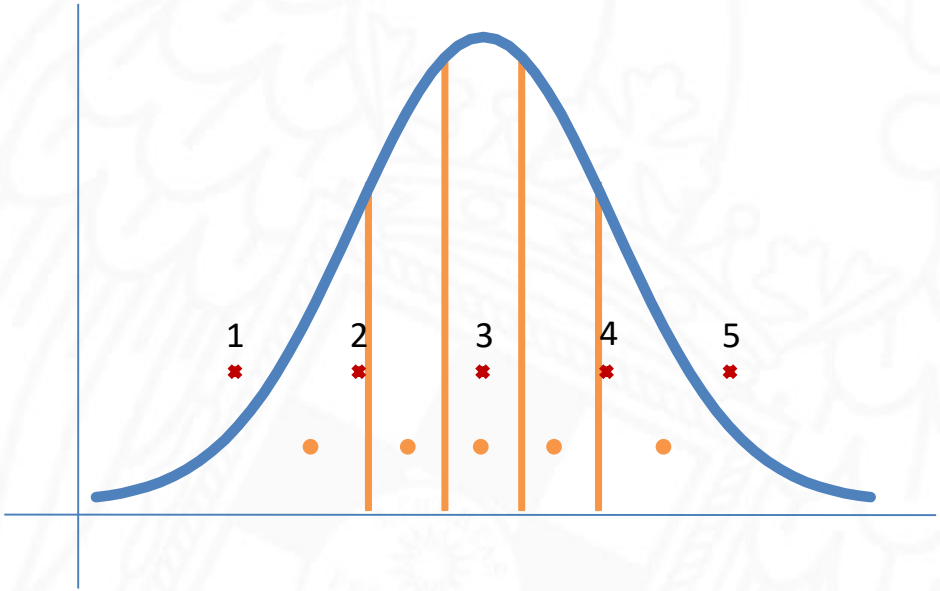
MATERIAL AND METHODS

DATA

- The database contained 2863 records from 621 horses (69% Arab Horses).
- Only horses with more than one record were included.
- The non placed horses were excluded.
- The pedigree contained 9527 animals (49% Arab Horses).

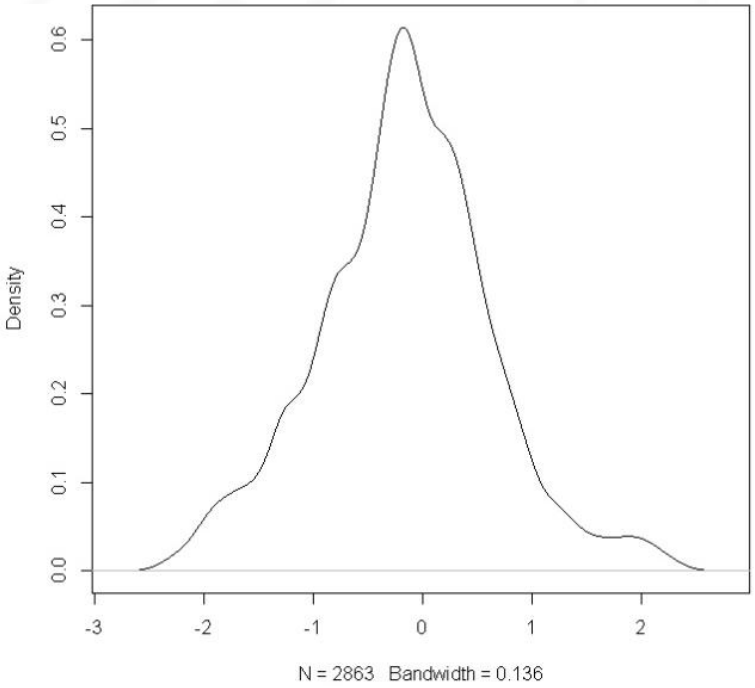
MATERIAL AND METHODS

TRAIT TRANSFORMATION



MATERIAL AND METHODS

TRAIT TRANSFORMATION



MATERIAL AND METHODS

MODEL

$$y_i = \mathbf{x}_i\mathbf{b} + \mathbf{z}_i\mathbf{u} + \mathbf{w}_i\mathbf{r} + e^{\frac{1}{2}(\mathbf{x}_i\mathbf{b}^* + \mathbf{z}_i\mathbf{u}^* + \mathbf{w}_i\mathbf{r}^*)}\varepsilon_i$$

(SanCristobal-Gaudy et al., 1998)

- Fixed effects: **sex** (male, female and gelding), **age** (≤6, 7, …, 14 and ≥ 15 years old).
- **Number of participants** as covariate.
- Additional random effects:
  - ✓ **Rider** (612)
  - ✓ **Rider-horse** interaction (1196)
  - ✓ **Environmental permanent effect** (621)
- Double Hierarchical generalized linear model (Felleki et al., 2012)
- ASReml v4.1 program (Gilmour et al., 2015).

RESULTS AND DISCUSSION

GENETIC PARAMETERS

Model with rider-horse interaction

σ^2_u	σ^2_{u*}	$\rho_{u,u*}$	σ^2_{rh}	σ^2_{rh*}
0.10 (0.02)	0.08 (0.04)	0.00 (0.02)	0.04 (0.02)	0.07 (0.05)

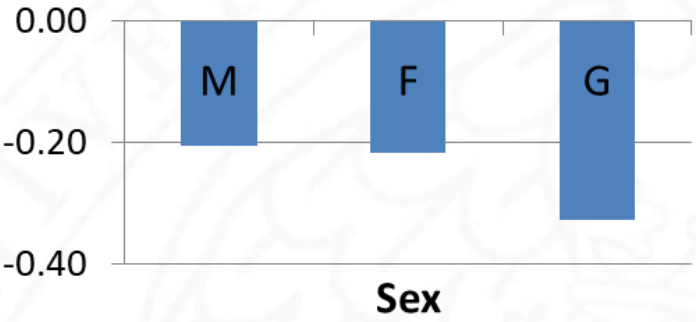
σ^2_u and σ^2_{u*} are the additive genetic variance affecting the rank mean and its variation.

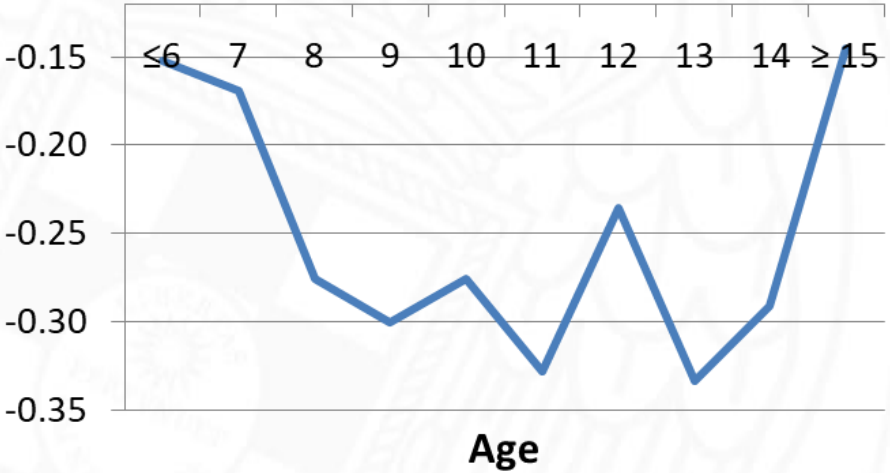
$\rho_{u,u*}$ is the coefficient of genetic correlation between the rank mean and its variation.

σ^2_{rh} and σ^2_{rh*} are the rider-horse effect variances affecting the rank mean and its variation.

RESULTS AND DISCUSSION

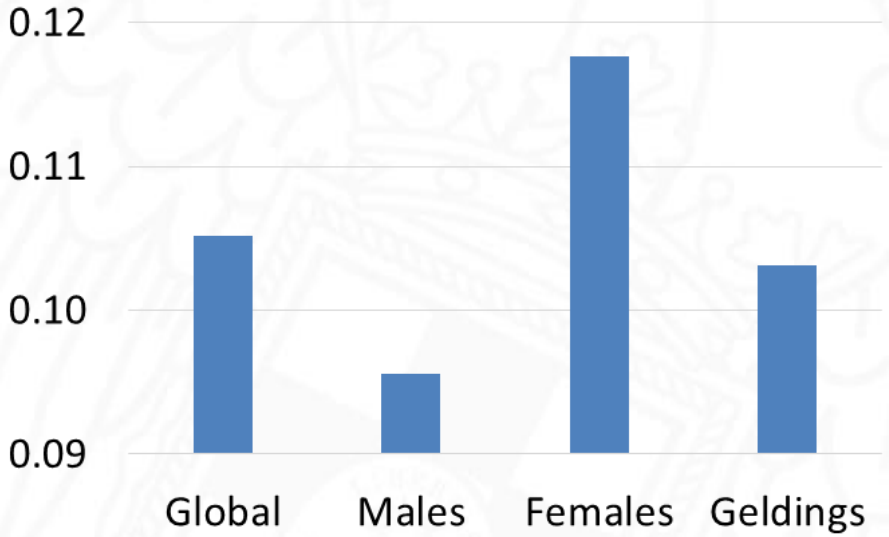
PHENOTYPIC MEAN OF THE TRAIT





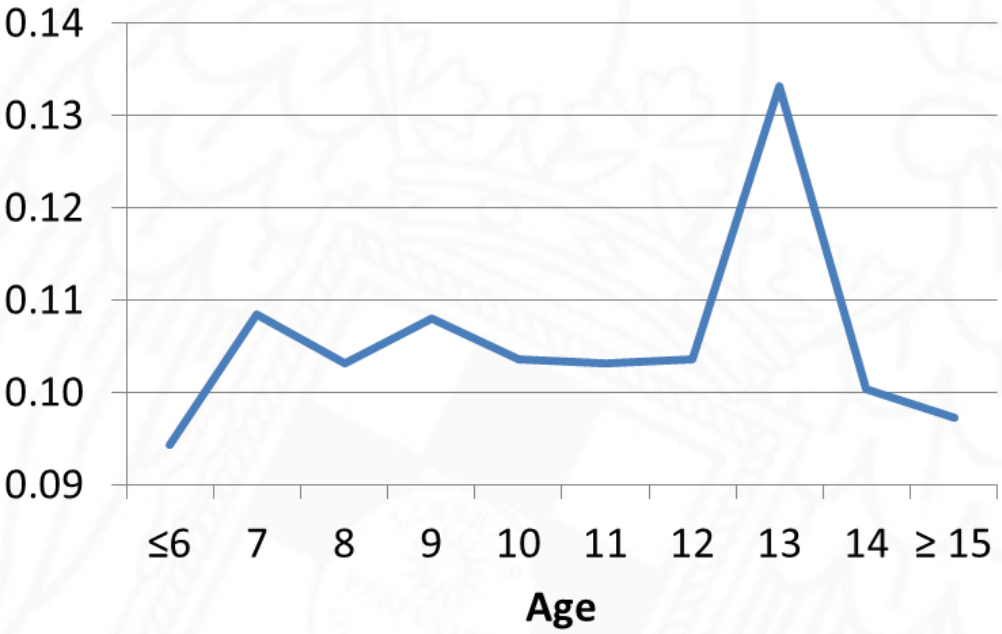
RESULTS AND DISCUSSION

HERITABILITIES



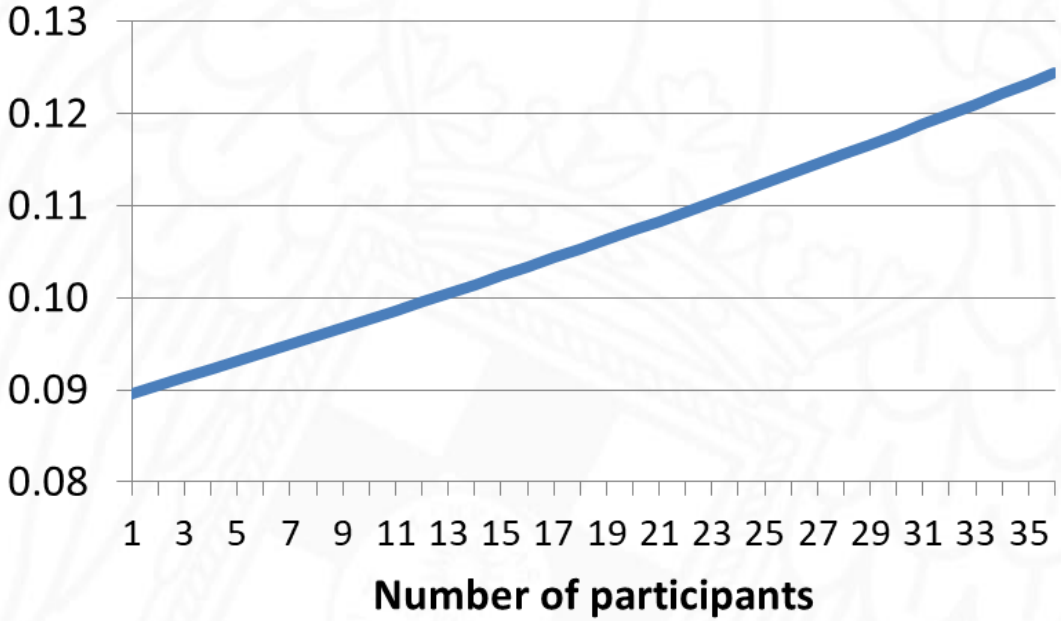
RESULTS AND DISCUSSION

HERITABILITIES



RESULTS AND DISCUSSION

HERITABILITIES

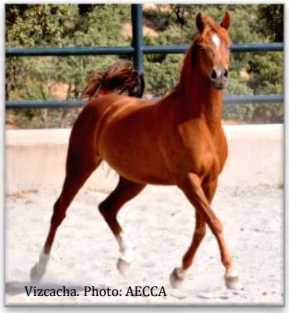


CONCLUSIONS

- ✓ The nature of ranking trait requires transformations to develop this complex models.
- ✓ The genetic environmental variance for the rank trait showed values in the range found in the literature.
- ✓ A null genetic correlation between the trait level and the variability suggests the possibility of selecting to reduce the variability of the position.

Thank you


Zul-Latz. Photo: AECCA


Vizcacha. Photo: AECCA


Licersi. Photo: AECCA

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