ORIGIN OF THE CRIOLLO ARGENTINO HORSE THROUGH SNP-BASED GENOMIC CHARACTERIZATION.

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INTRODUCTION

The Criollo Argentino Horse (**CCR**) is one of Argentina's most important breeds, recognized as livestock heritage. Like the Peruano de Paso horse (**CPP**), CCR descends from horses brought by the Spanish conquerors five centuries ago. Known for strength, endurance, alertness, and longevity, CCR was naturally selected under the harsh conditions of the South American pampas.

OBJECTIVE This study aims to genetically characterize a CCR population and compare its origins with other equine breeds: CPP, Polo Argentino (**CPO**, associated with Argentinean Thoroughbreds, **AT**), and Pura Raza Español (**PRE**).

MATERIALS AND METHODS

1. DNA was obtained from hair follicles of individuals registered in their studbook at horse events in 2023 in Argentina, Peru and Spain.
2. Genotyping was performed using the 75K equine GGP SNP-bead chip (Neogen Inc).
3. Data curation (pruning by MAF (0.05) and LD (50, 5, 0.5)) retaining ≈ 55,000 markers per animal.
4. Final dataset included 141 horses: 28 CCR, 29 CPP, 30 CPO, 24 PRE, and 30 AT.
5. Genetic structure analysis was conducted using PLINK v1.9, Admixture, and RStudio packages, employing principal component analysis (PCA), ancestry estimation, F_{ST} index comparison, and AMOVA.



Fig. 1: Morphology competition at Expo FICC 2023 (Buenos Aires, Argentina). Image obtained from @caballoscriollosarg

Fig. 2: Principal component analysis (PCA)

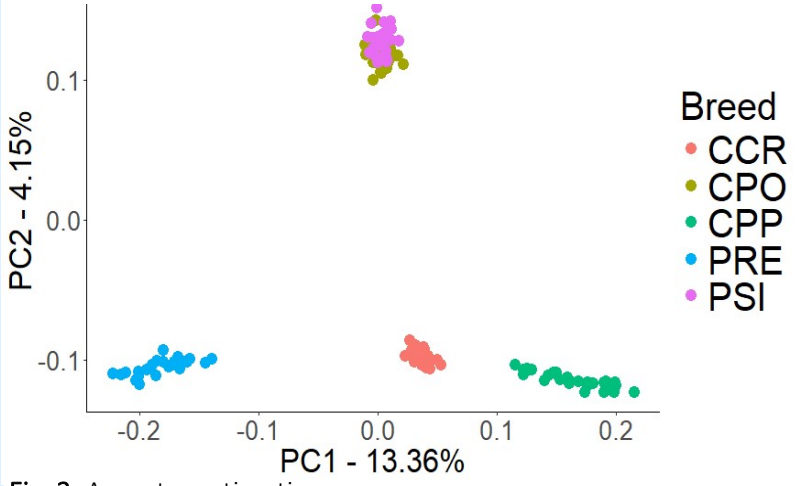
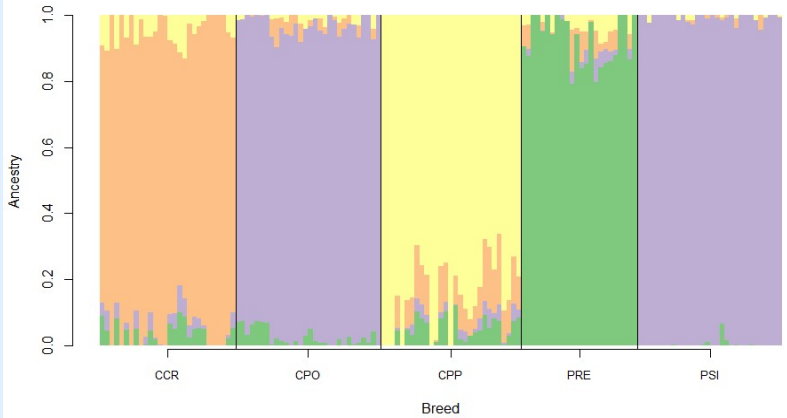


Fig. 3: Ancestry estimation



RESULTS

Table 1. F_{ST} differentiation indexes

	PRE	CPP	CPO	AT
CCR	0.087	0.094	0.146	0.169

CCR-PRE F_{ST} value could explain the origin of the CCR, while CCR-CPP value could be attributed to the fact that both descend from Spanish horses introduced to America.

AMOVA results indicate that the variation between breeds was 13.11%, between individuals within breeds was 1.93% and between individuals was 84.96%.

Admixture results (K=4) suggest that CCR had higher allocation to K3 (89.52%), PRE to K1 (92.29%), CPP to K4 (84.66%), while CPO and AT to K2 (94.30% and 98.87%).

CONCLUSION

For the first time, a CCR population from Argentina was genetically characterized and distinguished from other breeds using advanced genomics, Our results depicts a strong selection pressure applied in CCR breeding. Further studies are needed to validate results.

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