Inbreeding affects the freezing ability in sperm samples of Pura Raza Español stallions

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What we know?

- Semen quality is considered a clear selection objective due to its high relationship with fertility.
- High variability in semen quality among stallions due to both environmental and genetic effects.
- High inbreeding rates can affect the morphology and athletic performance of the horse, as well as semen quality (INBREEDING DEPRESSION).

Objective

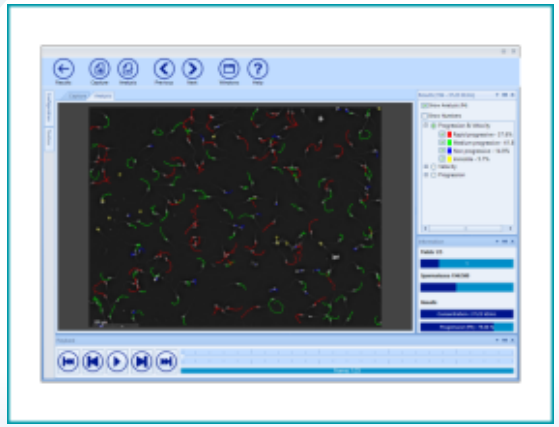
- To analyze the effect of inbreeding on sperm quality and freezing capacity (inbreeding depression) of Pura Raza Español stallions.
- To evaluate the effect of inbreeding using a multivariate mixed model with REML methodology (total motility (MOT) and progressive motility (PROG), VSL, VAP, VCL, ALH and BCF) traits, including age at jumping and year of birth as fixed effects.
- To detect and quantify the negative effect of inbreeding on kinetic parameters and freezing ability in stallions.

The dataset

- 720 ejaculates from 108 PRE individuals collected by natural mating in artificial vagina were evaluated. The samples were centrifuged and diluted. In addition, an aliquot of sperm was frozen following a controlled ramp protocol.

The dataset

The evaluation of kinetic parameters in fresh and frozen-thawed samples was performed at 5' and 60' of incubation using a CASA analyzer.



The **traits**

The effect of inbreeding was evaluated using a multivariate mixed model with REML methodology for the following parameters:

- Total motility
- Progressive motility
- VSL, VAP, VCL, ALH and BCF.

Including age at jumping and year of birth as fixed effects.

The model

- The inbreeding value (F) was included as a linear covariate.
- Variance components were estimated using the BLUPF90 software package.

The tools

BLUPF90 family

MORE THAN JUST BASIC SEMEN ANALYSIS

Genetic Results

- Increasing inbreeding produced higher MOT and PROG, as well as in VSL, VAP, and BCF in fresh samples.

- Estimates for both motilities and BCF after 60 min of incubation were significantly lower.

- No effect on kinetic parameters was detected.

Conclusion

Inbreeding increases the percentage of hyperactivated spermatozoa at early stages, thus decreasing sperm longevity.

Increased inbreeding produced a negative effect on MOT and PROG in frozen-thawed spermatozoa, whose estimates were significantly lower in individuals with higher inbreeding rates.

We detected and quantified a negative effect of inbreeding on kinetic parameters and freezing ability in PRE stallions.

Thank you

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