



The 75th EAAP Annual Meeting

1/5 September 2024 - Florence, Italy

Relationship between sperm DNA fragmentation and serum mineral concentration of bulls

Benito-Díaz A¹, Sarmiento-García A^{1,2}, Montañés-Foz M¹, Bodas-Rodríguez R¹, José García-García J¹,

¹Instituto Tecnológico Agrario de Castilla y León. Subdirección de Investigación y Tecnología, Valladolid, Spain.

²Área de Producción Animal, Departamento de Construcción y Agronomía, Facultad de Ciencias Agrarias y Ambientales, Universidad de Salamanca. 37007, Salamanca, Spain.

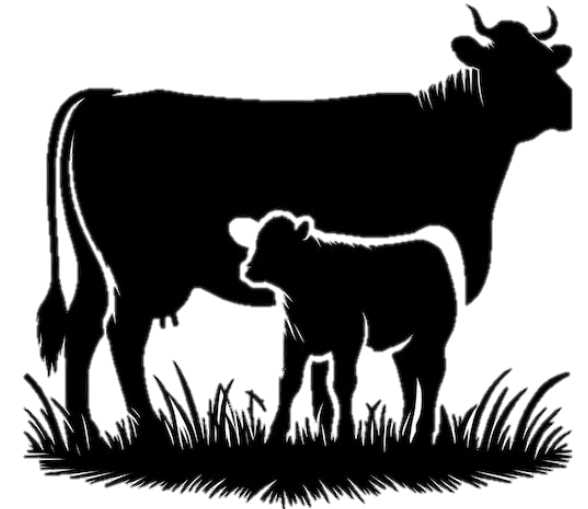
1. Introduction



FERTILITY

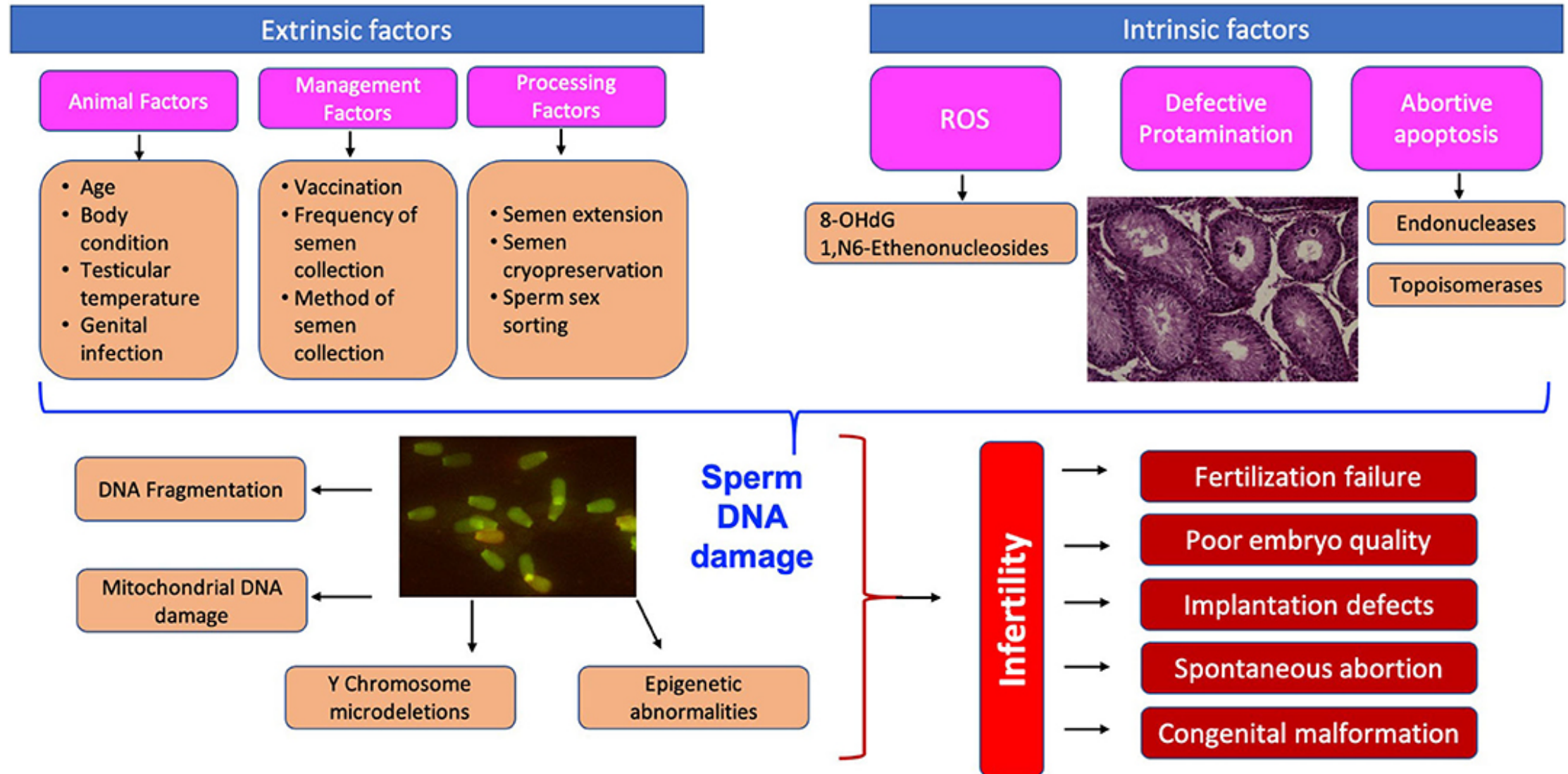


SEMINAL
PLASMA

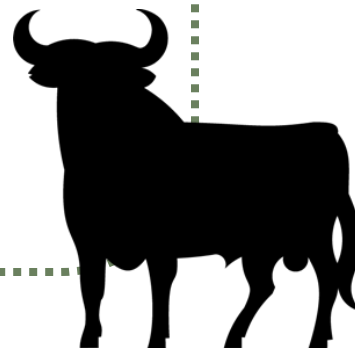
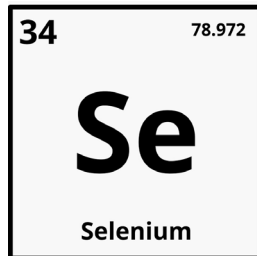
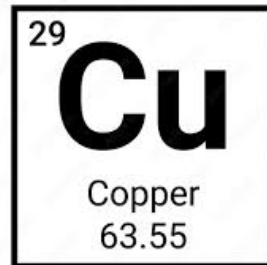
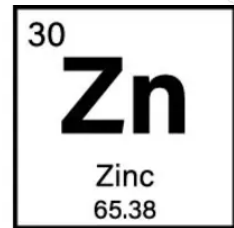
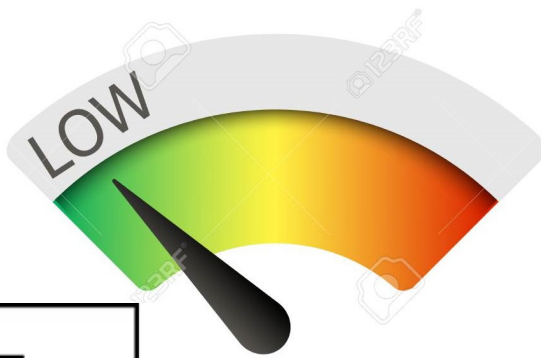


PROFITABILITY

1. Introduction

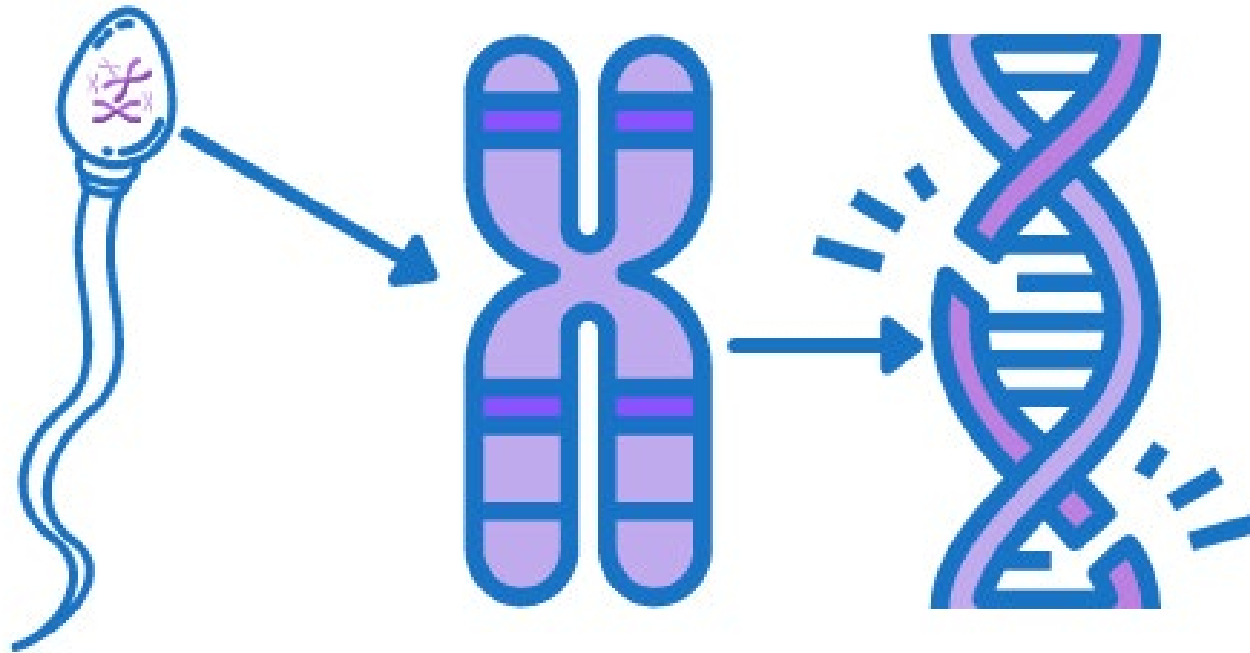


1. Introduction



anormales

Sperm DNA fragmentation



Spermatozoon with genetic material (chromosomes) in its head

One of the chromosomes made up of a long, condensed DNA molecule.

A fragment of the DNA strand affected by breaks (sperm DNA fragmentation)



2. Objective

This research aimed to determine the basal concentrations of four micronutrients (Cu, Se, Zn, and Vitamin E) in **the blood serum of healthy bulls** and ***explore their relationship with sperm quality (including DNA fragmentation)***.

This could provide valuable insight into whether blood micronutrient levels can be used as an additional tool for predicting semen quality.

3. Material and methods



- 18 health bulls
- 2-8 years
- Individually identified
- International and National breeds.

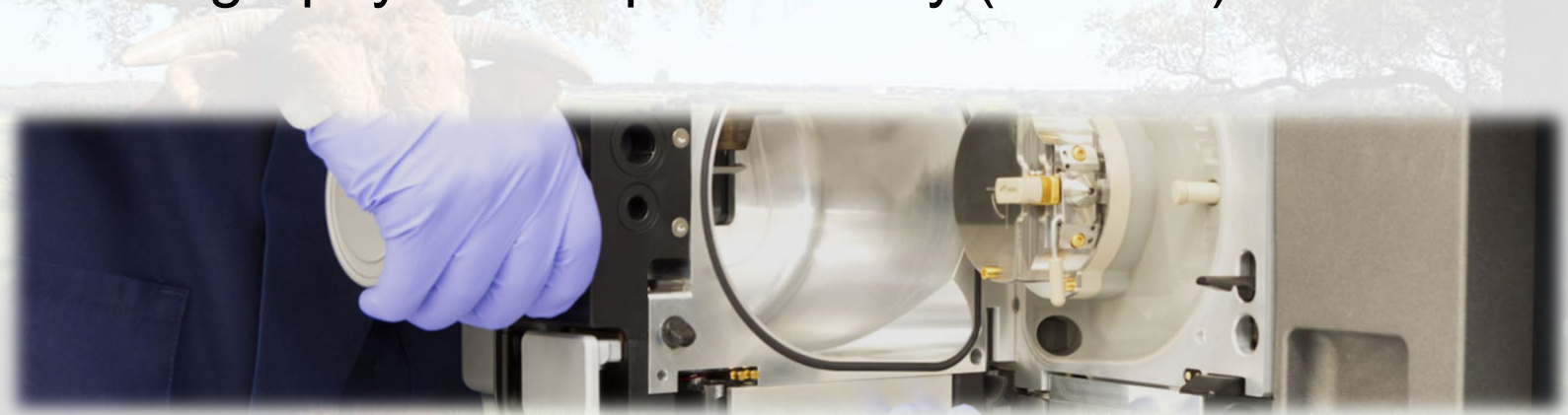


3 Times



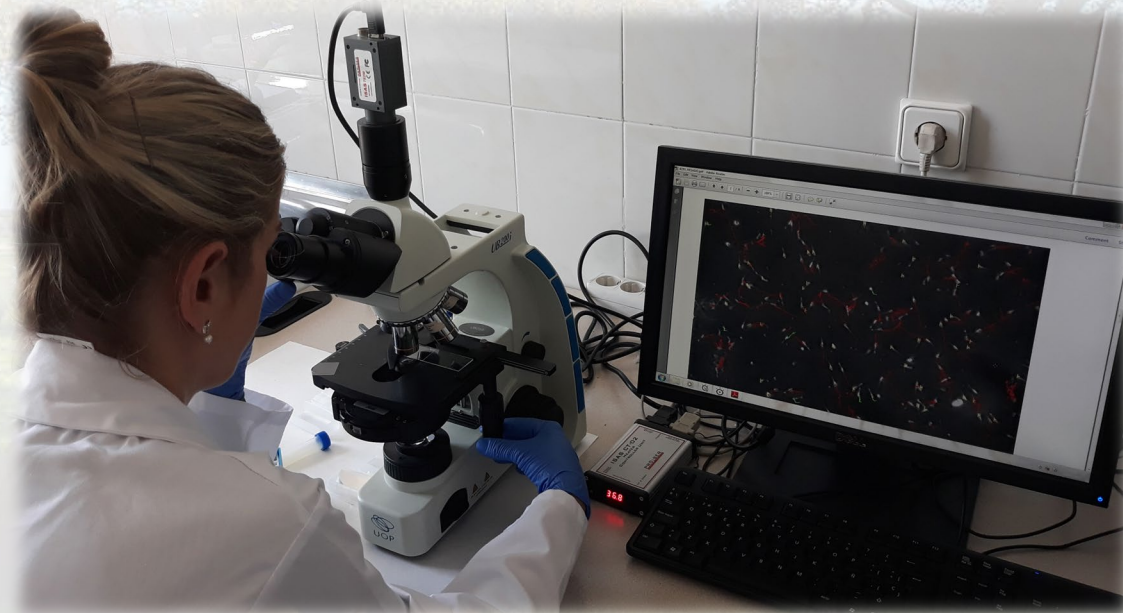
SERUM BLOOD

- Blood samples were drawn from the coccygeal vein, centrifuged, and frozen (-20°C) until they were sent to the laboratory to determine the levels of micronutrients.
- Serum mineral concentration (ng/mL) was determined by inductive coupled plasma tandem mass spectrometry (ICP-MS/MS)
- Serum vitamin concentration (ng/mL) was determined using ultra-high-performance liquid chromatography-mass spectrometry (UHPLC)



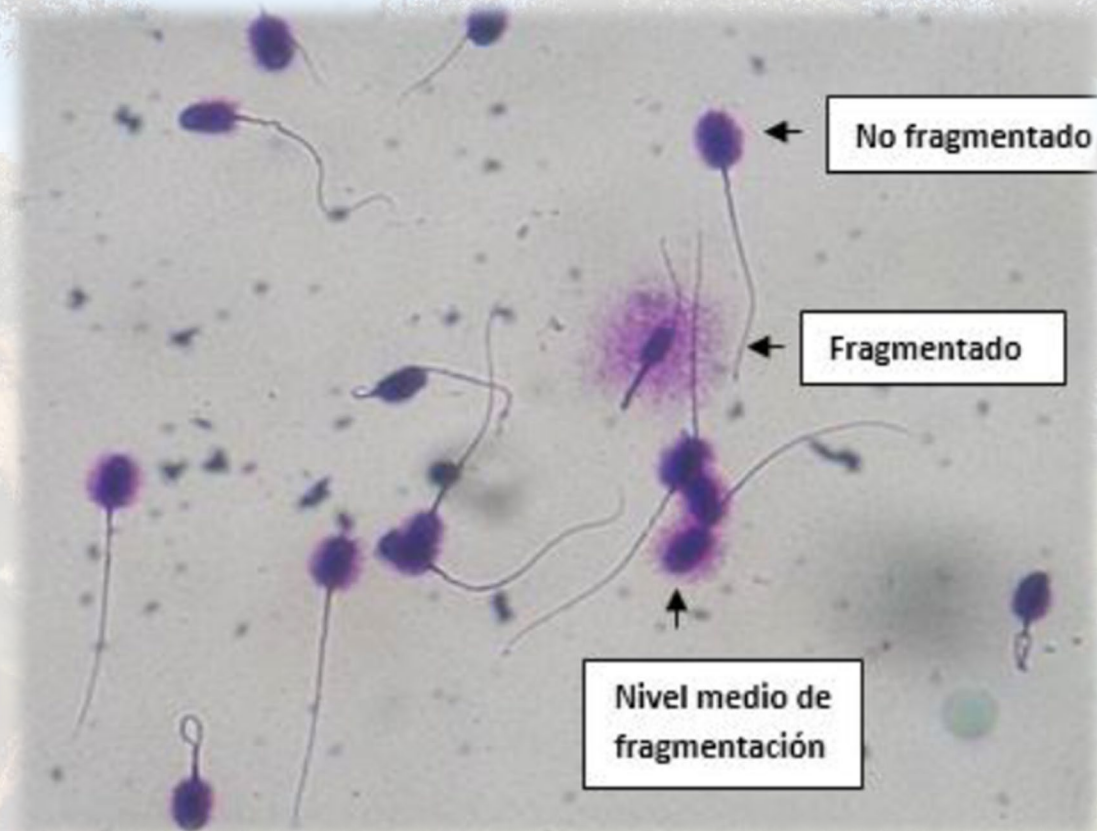
SEMINAL ANALYSIS

- The semen was collected from the electroejaculation procedure.
- Semen samples were analysed within two hours of the collection with CASA instruments.



3. Material and methods

- Sperm DNA fragmentation in bovine ejaculates was evaluated using Sperm-Halomax[®] KIT.

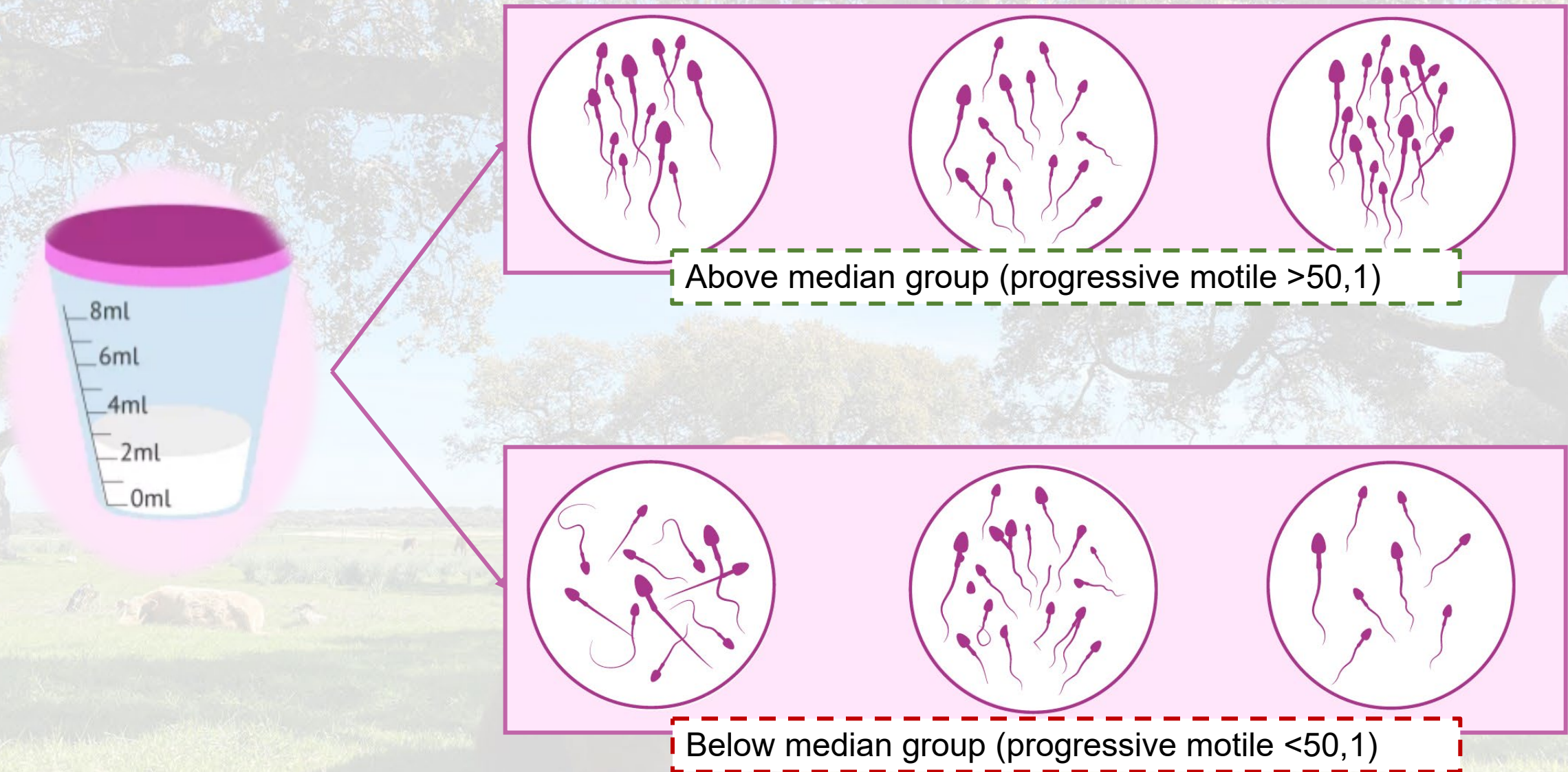


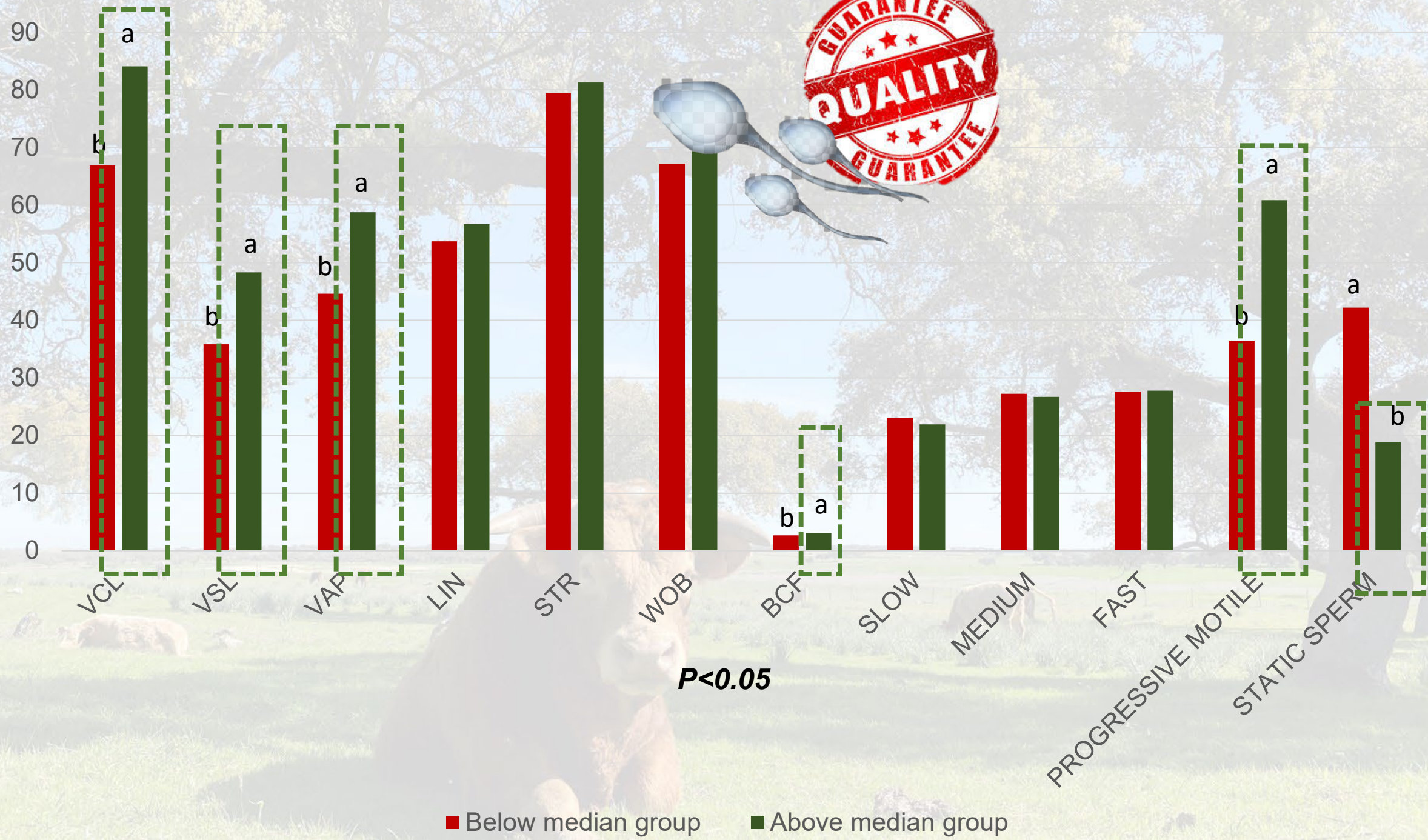
4. Results



- ❑ *Pearson's Test* → correlation
- ❑ *Shapiro-Wilk Test* → normality

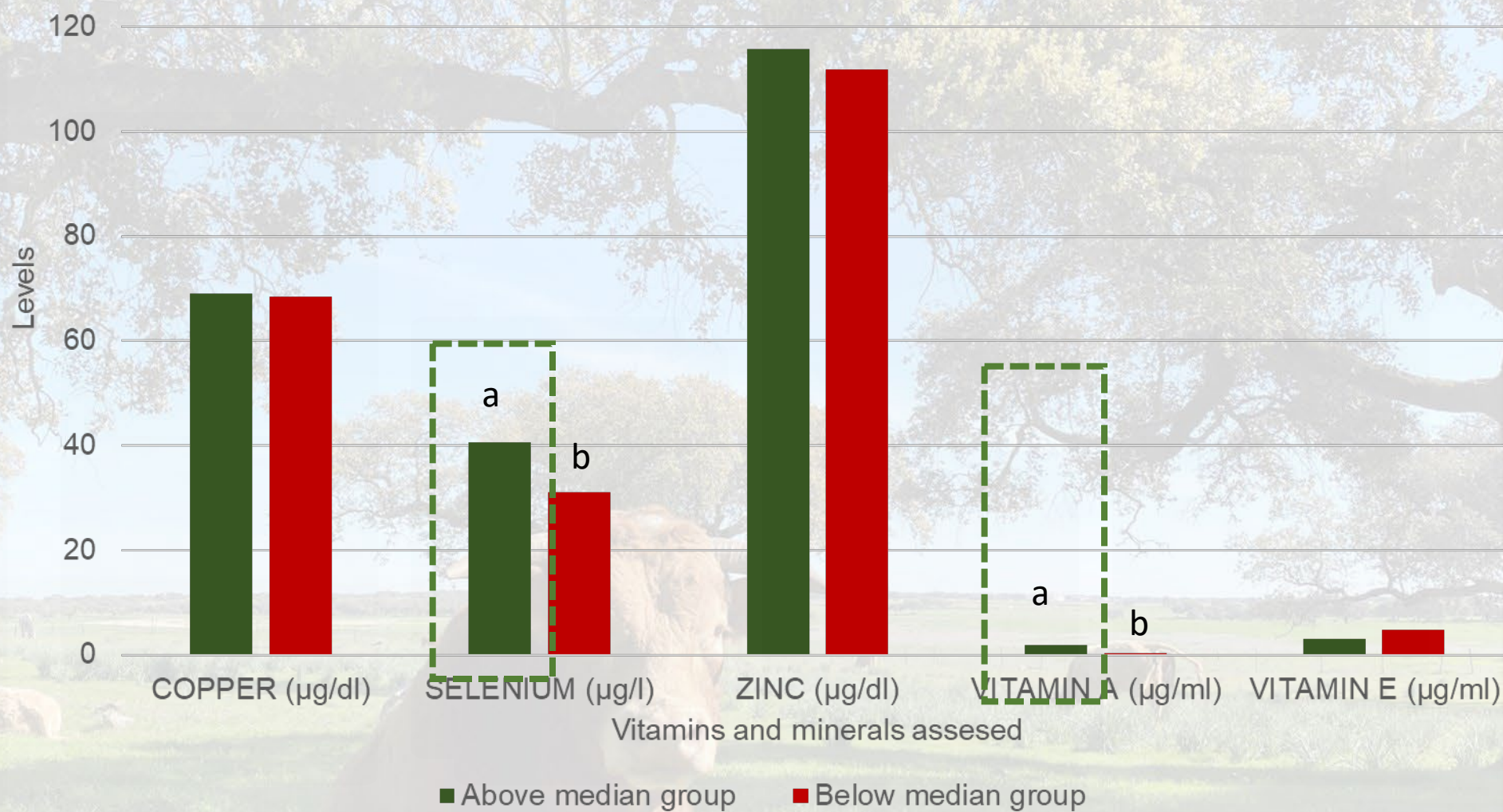
4. Results





4. Results

$P < 0.05$



Blood samples & semen quality



- **Natural Nutrient Levels and Semen Quality:** This suggests that these nutrients play a significant role in reproductive health even without external supplementation.
- **Potential Biomarkers: Selenium and vitamin A** could serve as potential biomarkers for assessing semen quality in bulls.
- **Implications for Breeding Management:** Understanding the natural influence of selenium and vitamin A on semen quality can guide breeding management practices. I
- **Contribution to Existing Research:** This study builds on previous research by confirming the importance of selenium and vitamin A in reproductive health, but it also offers a novel perspective by showing these effects under natural conditions, without supplementation

THANK YOU

Benito-Díaz A¹, Sarmiento-García A^{1,2}, Montañés-Foz M ¹, Bodas-Rodríguez R¹, José García-García J ¹,

¹Instituto Tecnológico Agrario de Castilla y León. Subdirección de Investigación y Tecnología, Valladolid, Spain.

²Área de Producción Animal, Departamento de Construcción y Agronomía, Facultad de Ciencias Agrarias y Ambientales, Universidad de Salamanca.
37007, Salamanca, Spain.