

VISUAL INSPECTION AND ULTRASOUND EXAMINATION OF THE REPRODUCTIVE TRACT OF CULLED BREEDING BOARS

Boer Annemarie, Govaere Jan, Depreitere Veerle, Sonalio Karina, Maes Dominiek

AGENDA

- Introduction
 - Objectives
- Materials and Methods
 - Study design
 - Parameters
- Results
- Conclusion



INTRODUCTION

Artificial insemination (AI)

- Crucial in pig production → big role in the fertility of the entire population
- High health status and breeding value → High-quality semen
- High turnover of boars (early culling)
- New methods to assess breeding health and determine reproductive efficiency (Pinho et al., 2017)

Breeding Health Assessment

- Sperm production quality
- Physical examination, including reproductive organs
- **Ultrasound**
 - Fast, safe, and accurate method (Pinho et al., 2017;)



OBJECTIVES OF THIS PILOT STUDY

1) Assessment of fertility efficiency

- Can ultrasound be a useful tool in assessing the fertility efficiency of the male pig to optimize the culling policy of breeding boars at AI centers?

2) Correlation analysis

- Is there a correlation between ultrasound abnormalities and the reason for culling and sperm quality data?

M&M – STUDY DESIGN

- ✓ One AI center
- ✓ 28 boars (slaughtered at 3 time points)
 - Reason for culling
 - Age at culling
 - Different breeds
- ✓ Examination of the reproductive tract
 - Testicles and epididymis
 - Visual, palpation, and with Ultrasound (US)
 - Linear probe and frequency of 7.5 MHz
- ✓ Data analysis



M&M - PARAMETERS

Boar Data

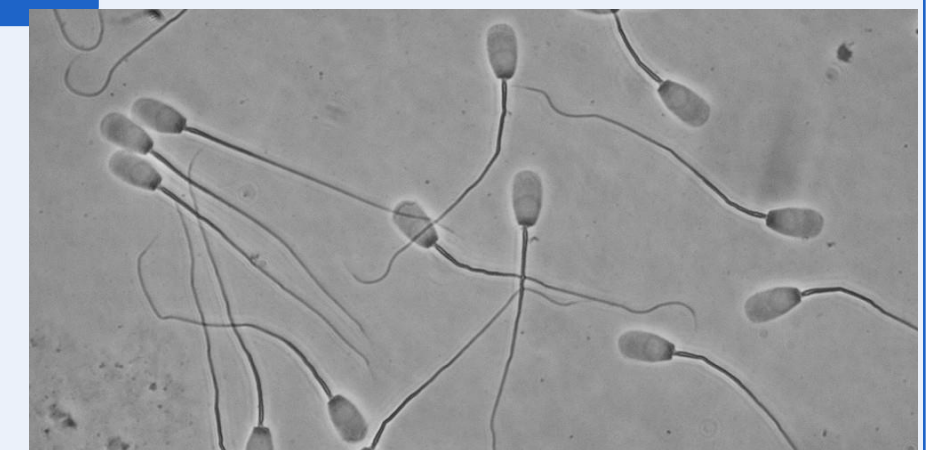
Macroscopic evaluation of testicles and epididymes

Ultrasound examination

Histologic evaluation of visual testicle abnormalities

Sperm Quality Data (15 weeks before culling)

- % of mobility
- % of normal
- % of usable
- Volume of the ejaculate
- Number of doses



RESULTS

✓ Culling mainly related to ...

| Reason for culling | Number of animals (%) |
|----------------------|-----------------------|
| Semen quality | 22 (78.6%) |
| Decreasing | 15 |
| Fluctuating | 3 |
| Insufficient | 4 |
| Breeding value | 5 (17.8%) |
| Blood in the semen | 1 (3.6%) |

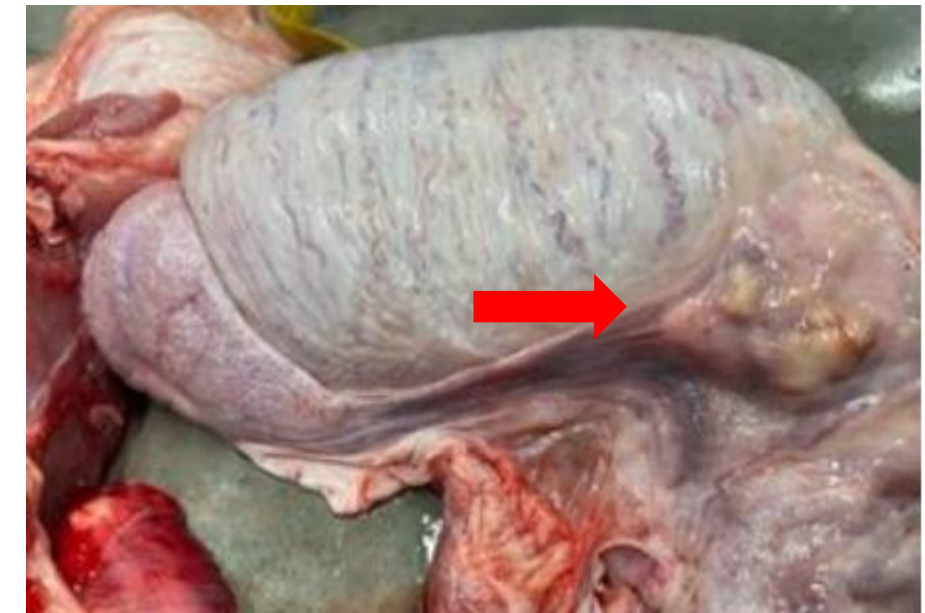
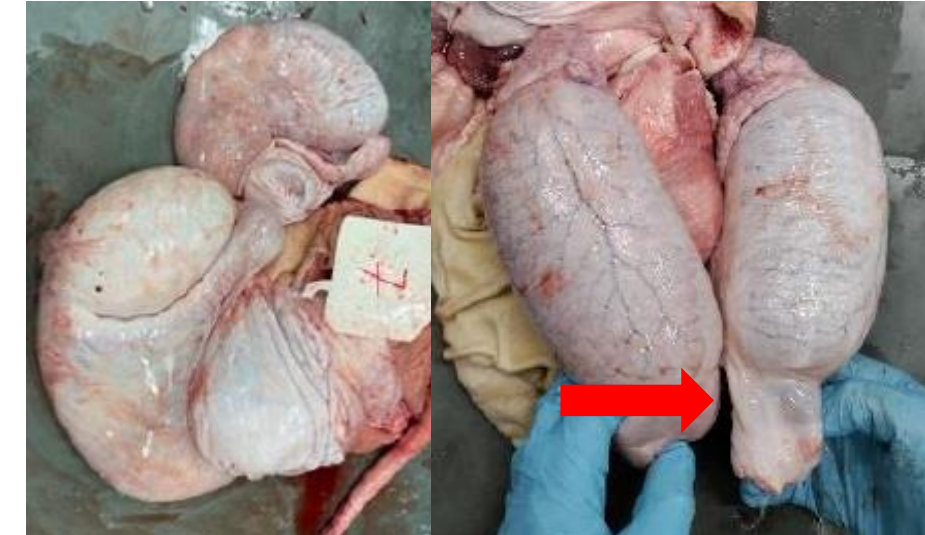
✓ Semen quality data (n=28)

| Parameter | Mean | SD |
|-------------------------------|------|-----|
| Culling age (days) | 878 | 402 |
| Volume ejaculate (ml) | 233 | 64 |
| Number of doses per ejaculate | 25 | 9 |
| % Motility | 85 | 9 |
| % Normal spermatozoa | 67 | 9 |
| % Usable doses | 59 | 11 |

RESULTS

✓ Macroscopic evaluation

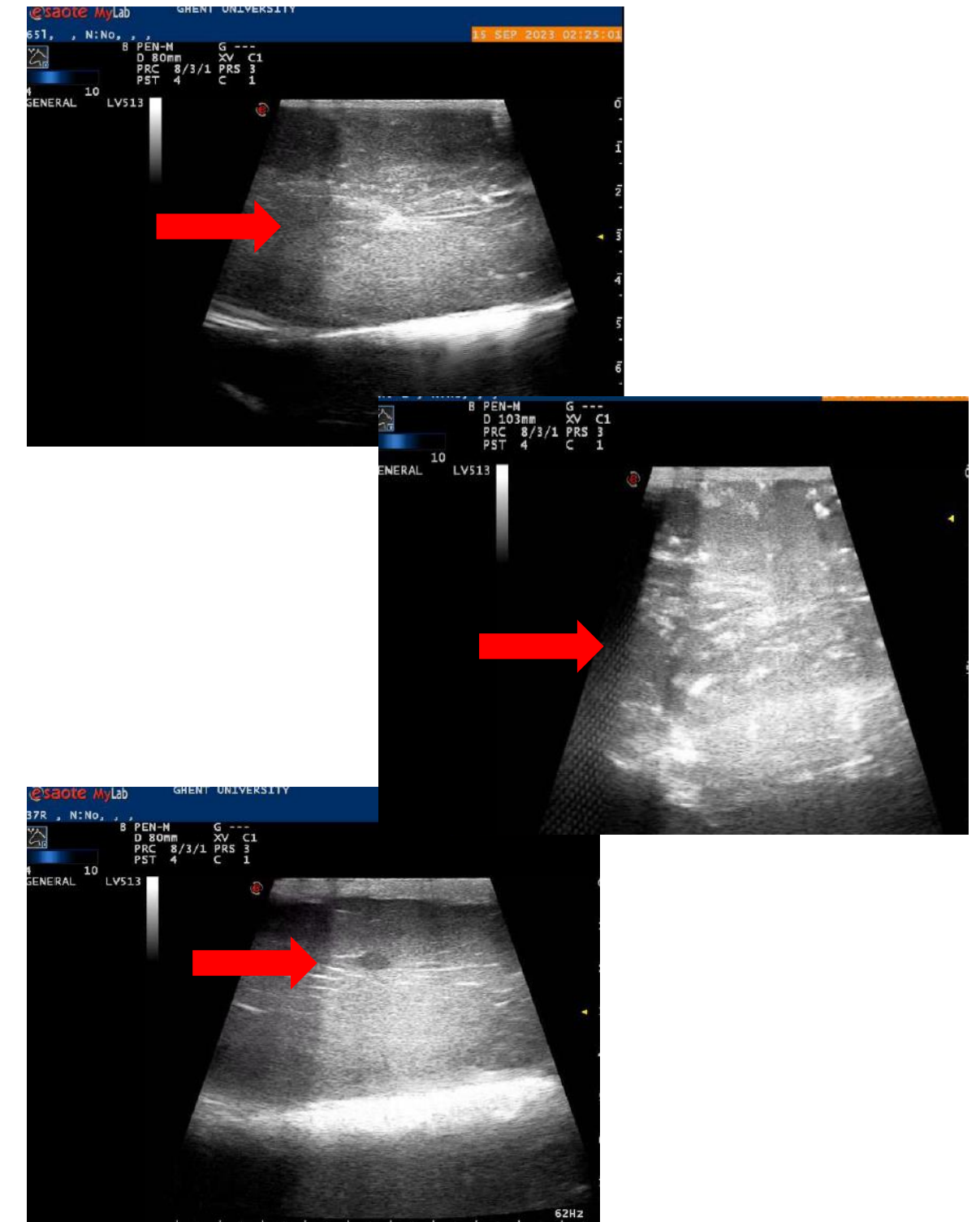
- Abnormalities in 8 boars (10 testicles)
 - Edematous testicle
 - Enlarged caput epididymis
 - Cyst on testis or epididymis
 - Adhesions between epididymis and testis
 - Hypotonic testicle
 - Visual absence of corpus epididymis
 - Calcifications
 - After incision: white zones in the parenchyma, caseous areas, and pale parenchyma



RESULTS

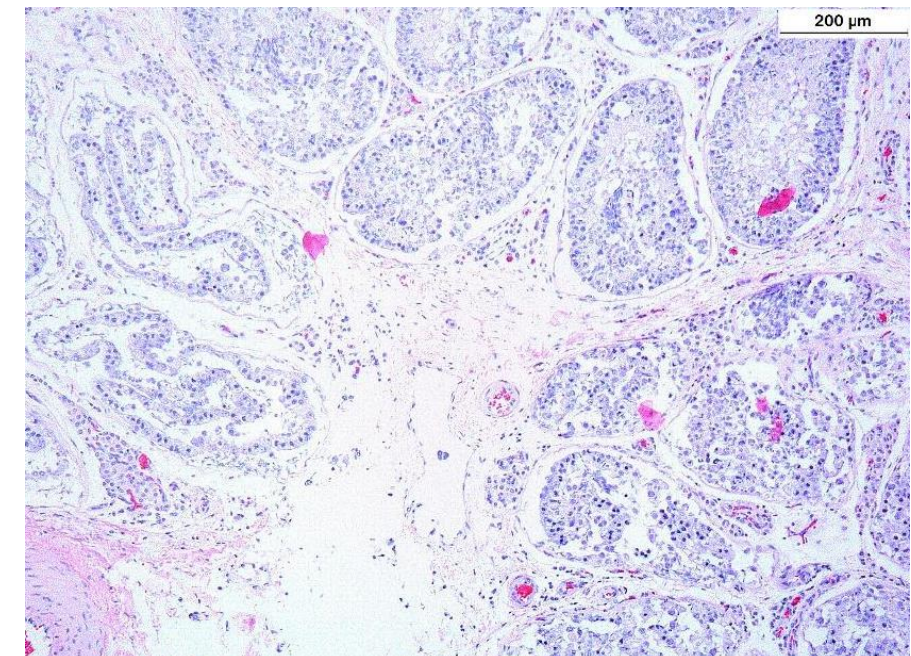
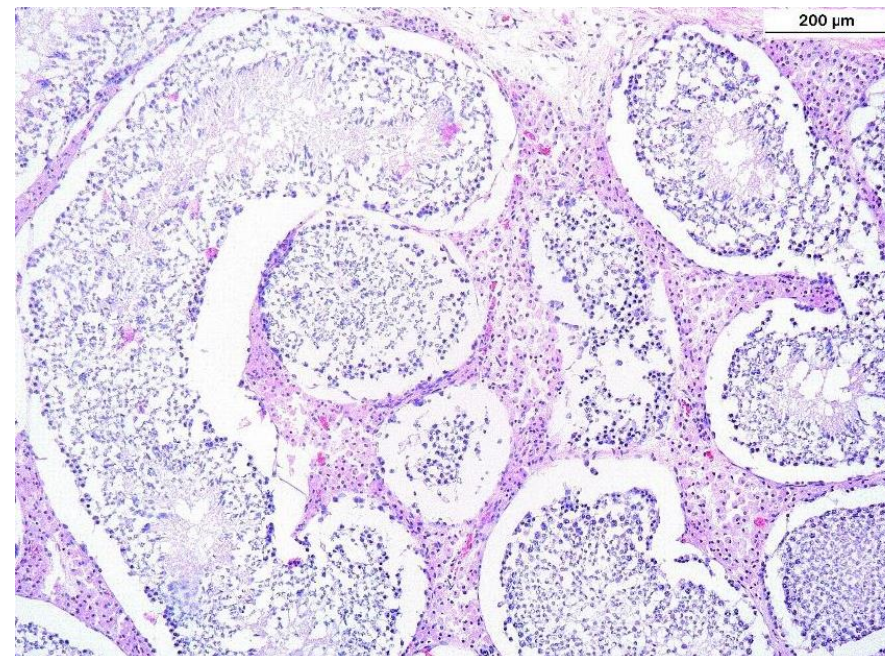
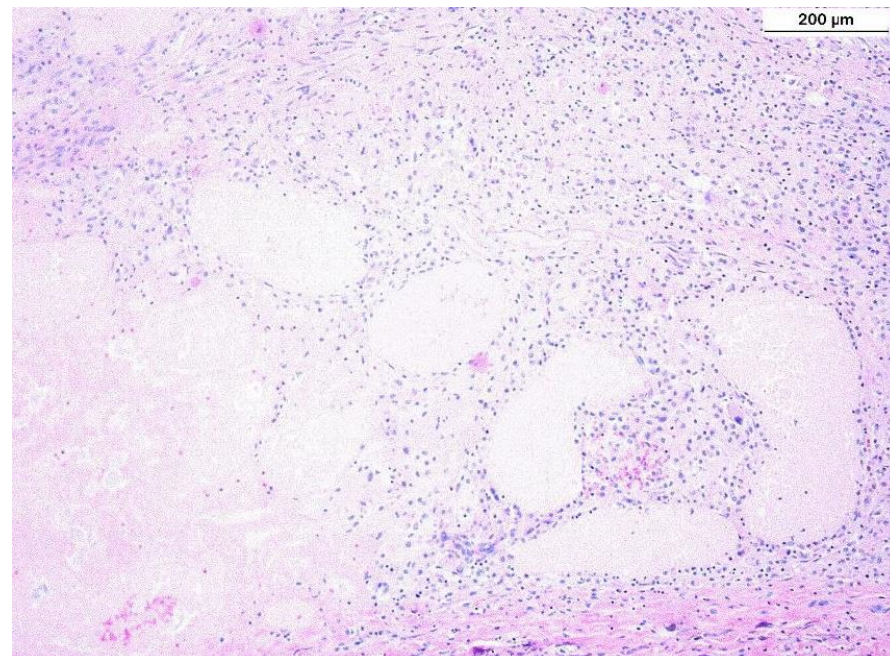
✓ Ultrasound evaluation

- Normal images in 37 testicles (out of 56)
- Abnormalities in 19 testicles (12 boars)
 - edema
 - mediastinum not visible
 - echo-dense areas
 - hyperechogenic structures
 - striation of parenchyma
 - anechogenic structures
 - cyst on or in testis or epididymis
 - heterogeneous structure of parenchyma



RESULTS

- ✓ Histological evaluation of visual abnormalities
 - interstitial fibrosis in testicles with echo-dense areas
 - mild atrophy
 - degeneration
 - edema in testicles with hyperechogenic scattered areas



RESULTS

There was no significant correlation between semen quality and ultrasonographic abnormalities of the testicle and/or epididymis, consistent with Paschoal et al. (2019)

A significant correlation (rho: 0.57) between age at culling and mean weight of testis and epididymis.

DISCUSSION

Ultrasound use in boars

- Fast and accurate method to evaluate boar reproductive organs.
- It detects abnormalities like hyperechoic zones, heterogeneity, and cystic dilations in testicles and epididymides.

Culling reasons and semen quality

- Reasons like breeding value or blood in semen often had high semen quality, suggesting these factors do not negatively impact fertility.
- Most boars in this study (78%) were culled for poor semen quality.

Findings in testicles and epididymis

- 2.86% of testicles showed abnormal ultrasound features, higher than in previous studies.
- Many testicular abnormalities were not visible macroscopically.
- Epididymal cystic dilations were frequent but considered incidental.

DISCUSSION

- ✓ Ultrasound allowed differentiation between testicles with normal and abnormal parenchyma, such as hyperechoic zones, increased heterogeneity, and cystic dilations.
- ✓ Macroscopic and histological examination provided a better understanding of the pathological processes underlying various ultrasonographic findings.
- ✓ Future studies:
 - Larger sample sizes and standardized ultrasound parameters (e.g., lesion size)
 - Gray-scale analysis systems and early ultrasound in young boars could improve the detection of severe pathologies.

Ultrasound allows detecting abnormalities in testicles that appear normal by visual inspection and palpation.

Thank you!

Questions?

