

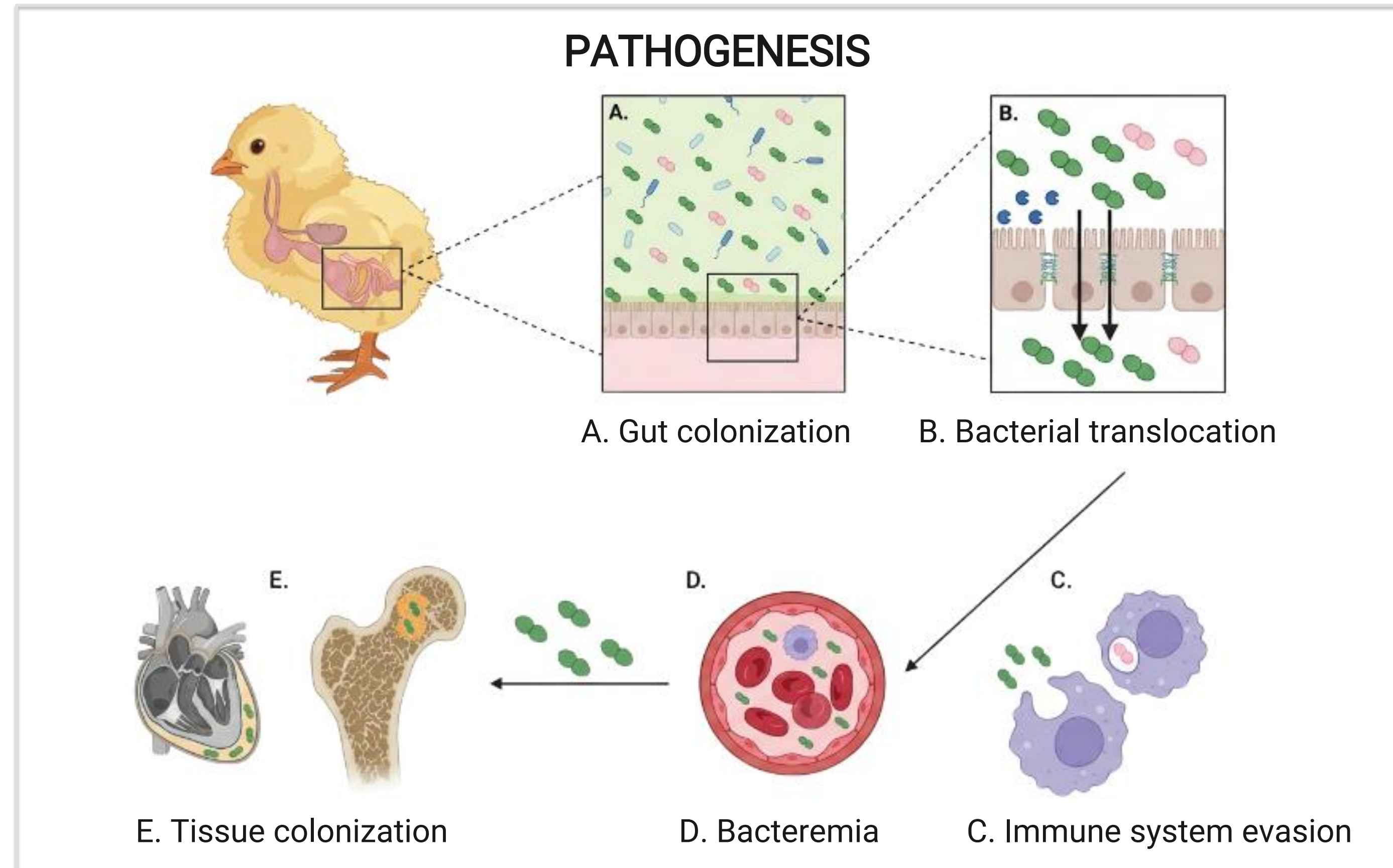
# In Vivo Challenge Model for Evaluation of Systemic Translocation and Skeletal Disease in *Enterococcus cecorum* infected Broilers

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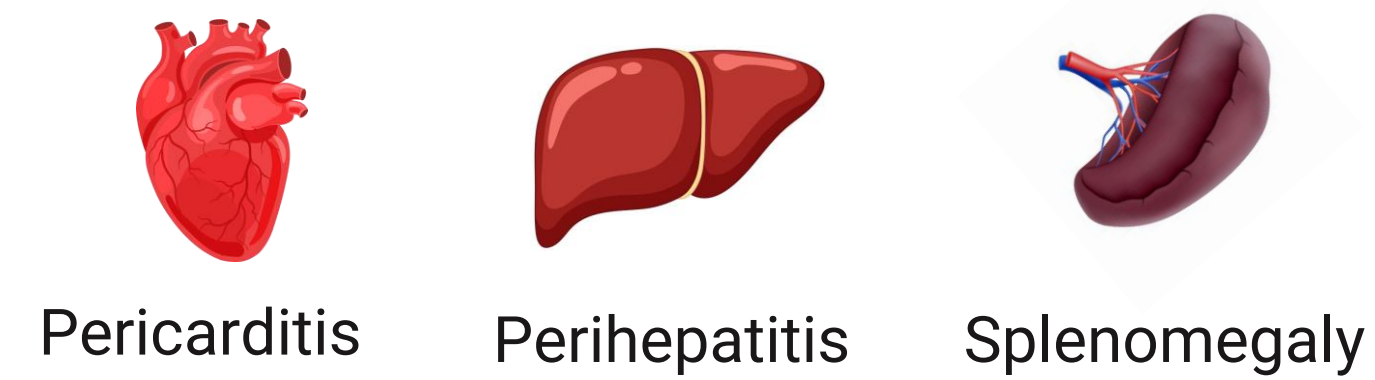
## INTRODUCTION

- Pathogenic strains of *Enterococcus cecorum* have emerged as an important obstacle to the poultry industry over the past 20 years.



### SEPTIC PHASE Weeks 1-3

- Septicemia and early mortality



### SKELETAL PHASE Weeks 4-6

- Enterococcal Spondylitis

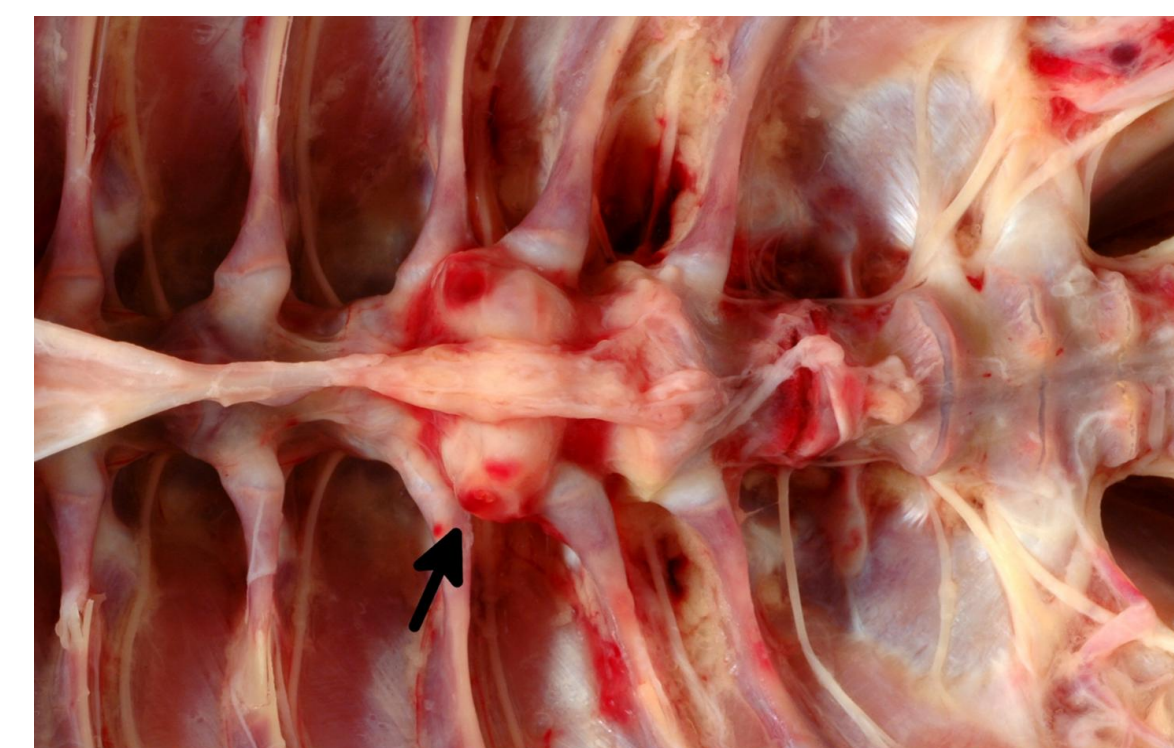


Figure 1: Spinal cord compression due to abscess in the FTV (Borst et al., 2017)

- Bacterial Chondronecrosis with Osteomyelitis

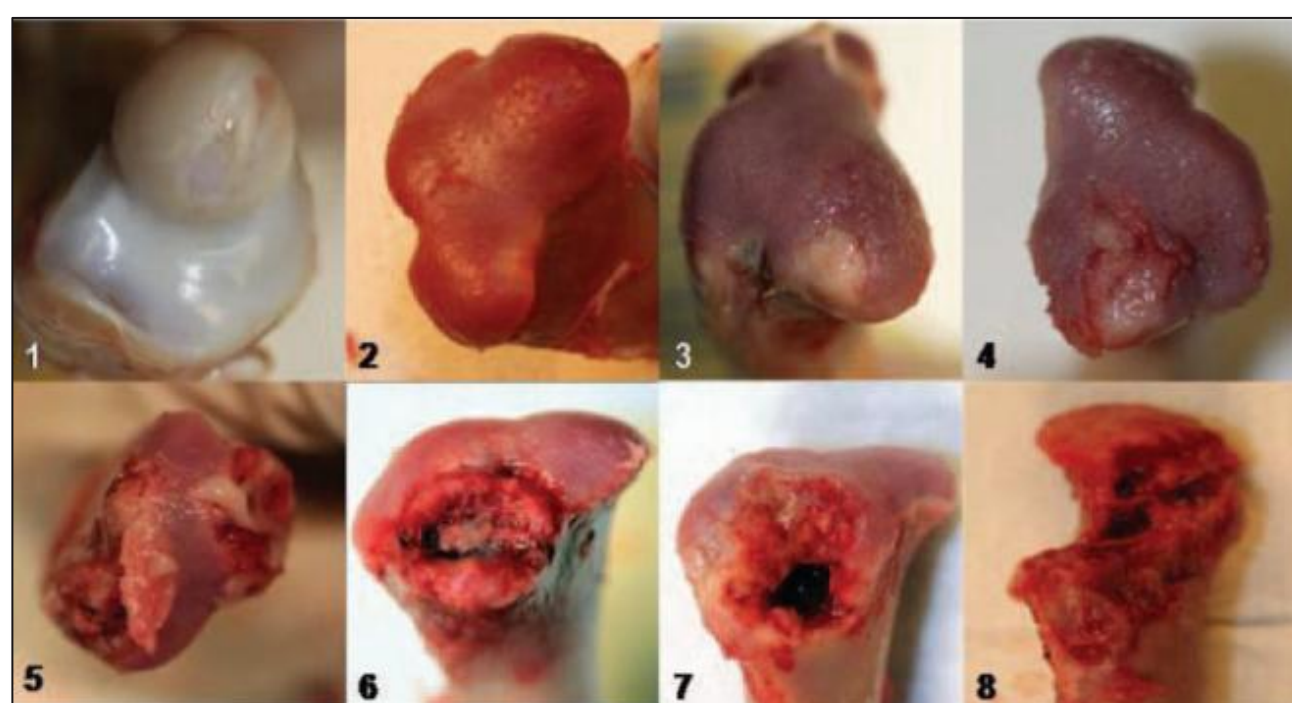


Figure 2: Femoral head lesion scoring system. (Wideman, 2016)

### RESEARCH GAPS

- Most studies focus on isolated disease stages, while *in vivo* models capturing *E. cecorum* progression across the full broiler cycle remain limited
- Further investigation is needed to develop early detection tools, improve mobility assessment methods, and link early infection markers with late disease onset.

## OBJECTIVES

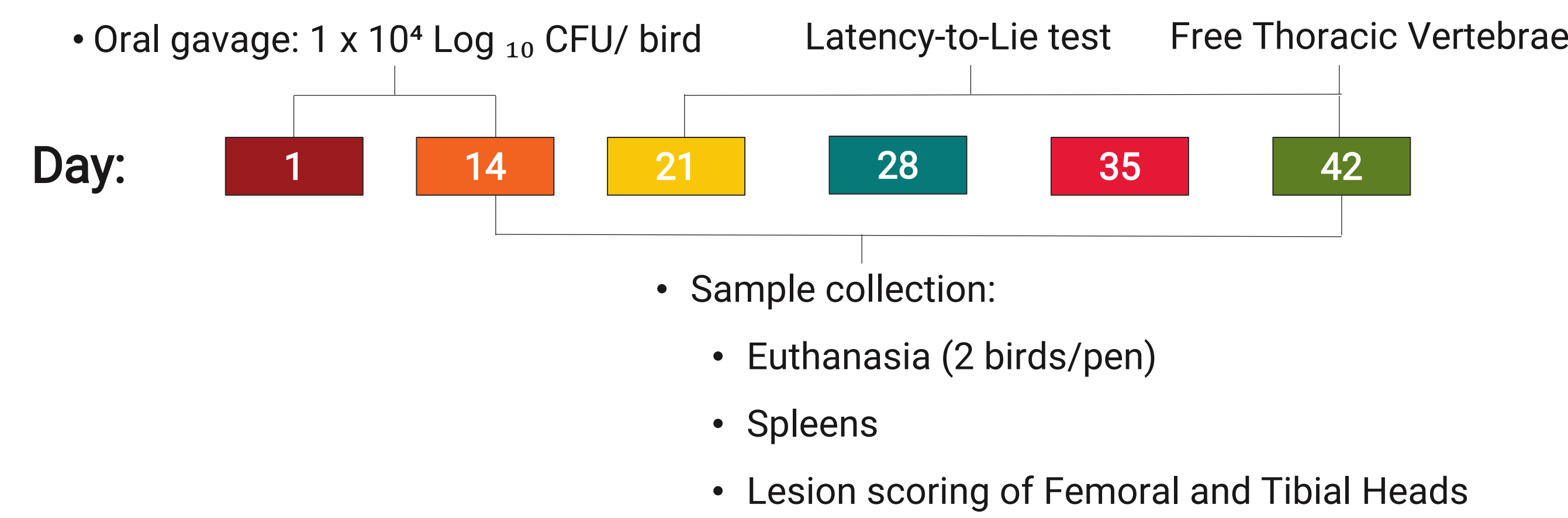
- To refine an *in vivo* *Enterococcus cecorum* challenge model to evaluate early systemic translocation and skeletal lesion development in broilers over a six-week production cycle
- To evaluate whether early markers of systemic infection are associated with late-stage mobility impairment

## MATERIALS AND METHODS

### EXPERIMENTAL DESIGN



### TIMELINE



### PATHOLOGY ASSESSMENTS

- Bacterial Recovery:** Spleens and FTV (D42)
  - Monitor bacterial translocation to extraintestinal sites across infection stages
  - Colony-Forming Units quantification using CHROMagar plates



- Latency-To-Lie (LTL)** (Wurtz et. al, 2025)
  - Evaluate walking ability and leg strength
  - Birds placed in a clear plastic storage tote with a slatted floor
  - Test cut-off time:
    - Birds unable to stand: 0 seconds
    - Maximum standing duration: 300 seconds



- Femoral Head and Tibial Head Lesion Scoring System** (Wideman, 2016)

### STATISTICAL ANALYSIS

- One-way ANOVA and Ordinal Linear Regression ( $p \leq 0.05$ );



Microsoft Excel



JMP Pro 18 Student Edition

## RESULTS AND DISCUSSION

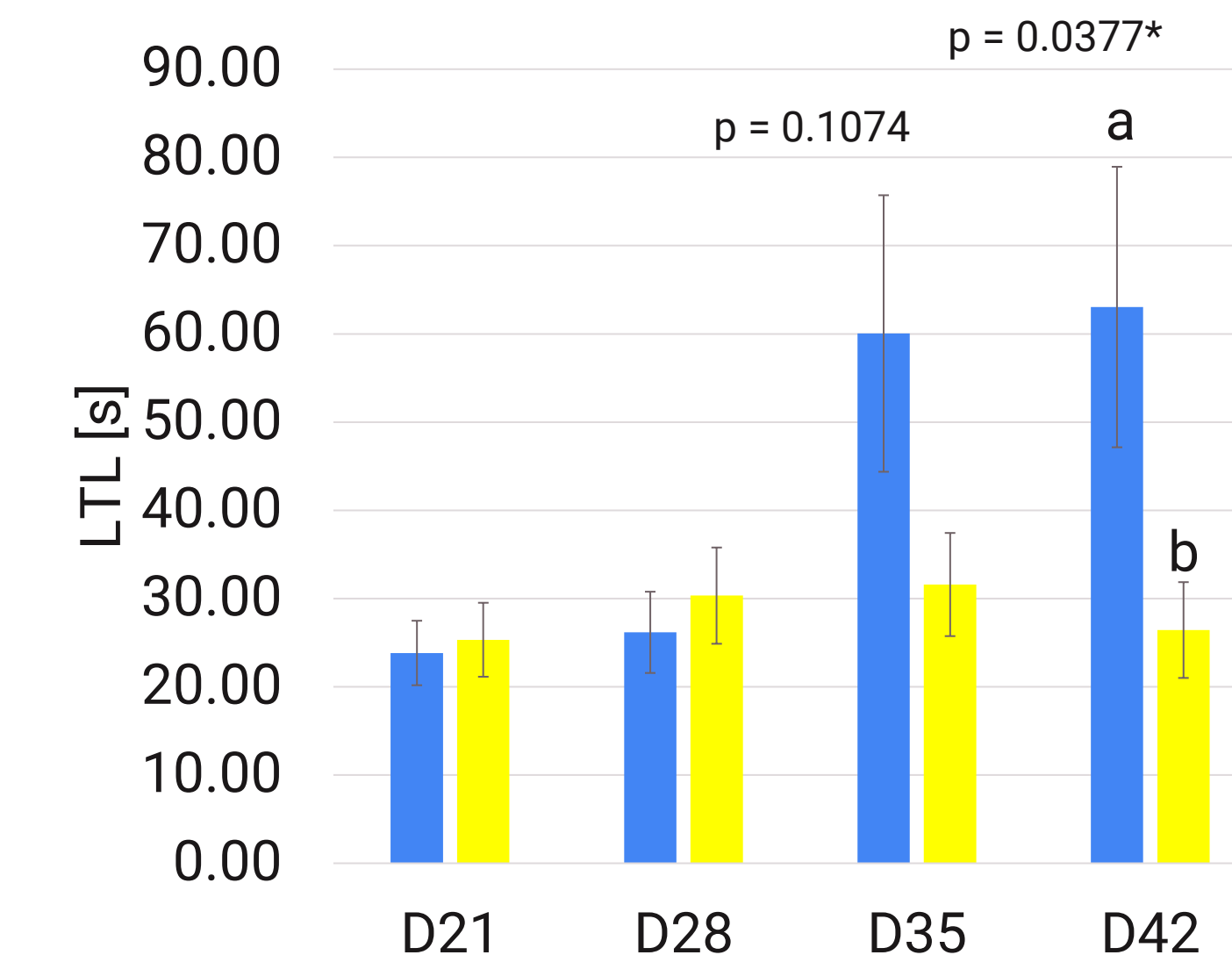


Figure 3. Latency to lie (LTL) of birds by treatment at each sampling day.

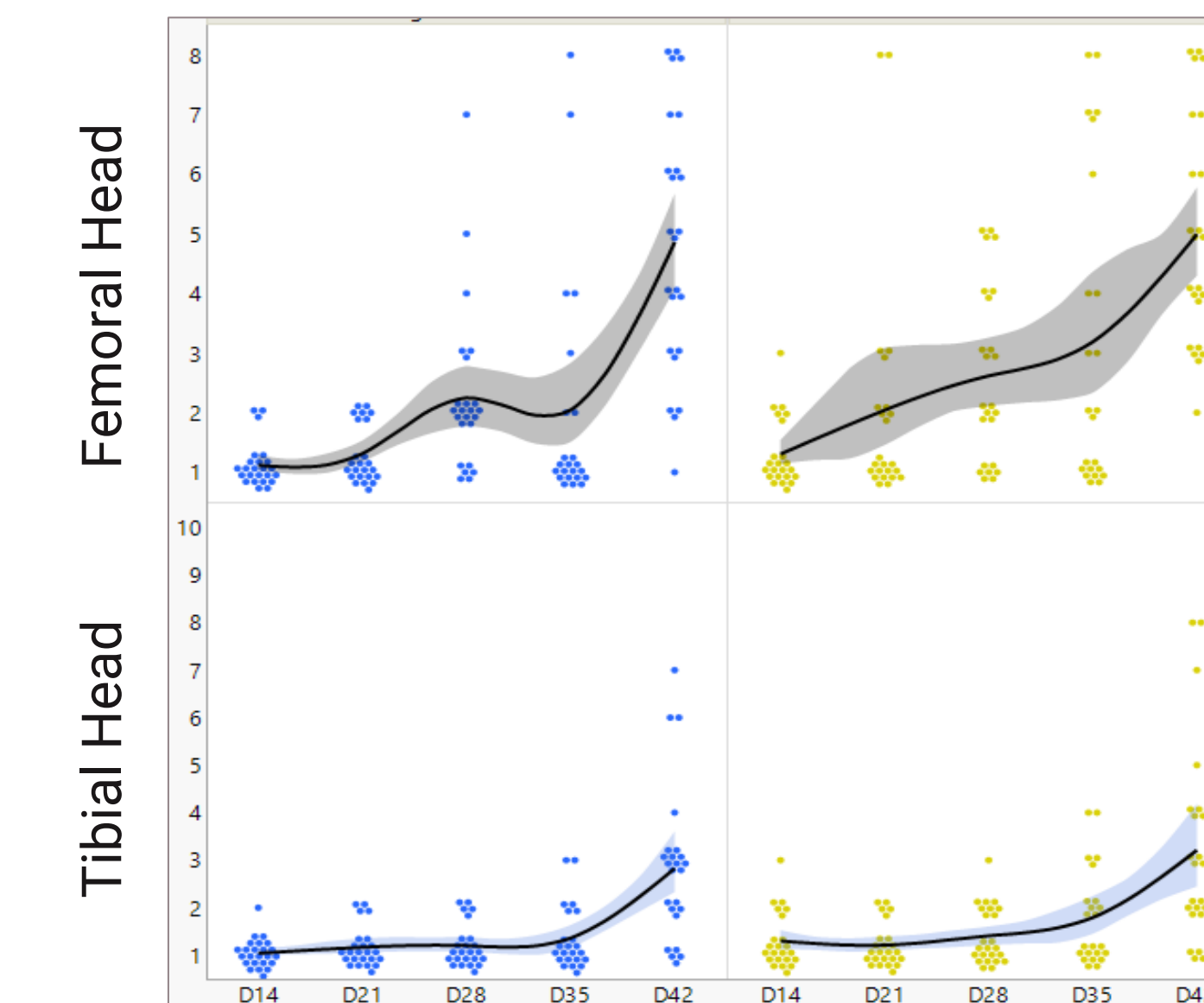


Figure 5. Femoral head (FH, top) and tibial head (TH, bottom) lesion scores of broilers by treatment and sampling day.

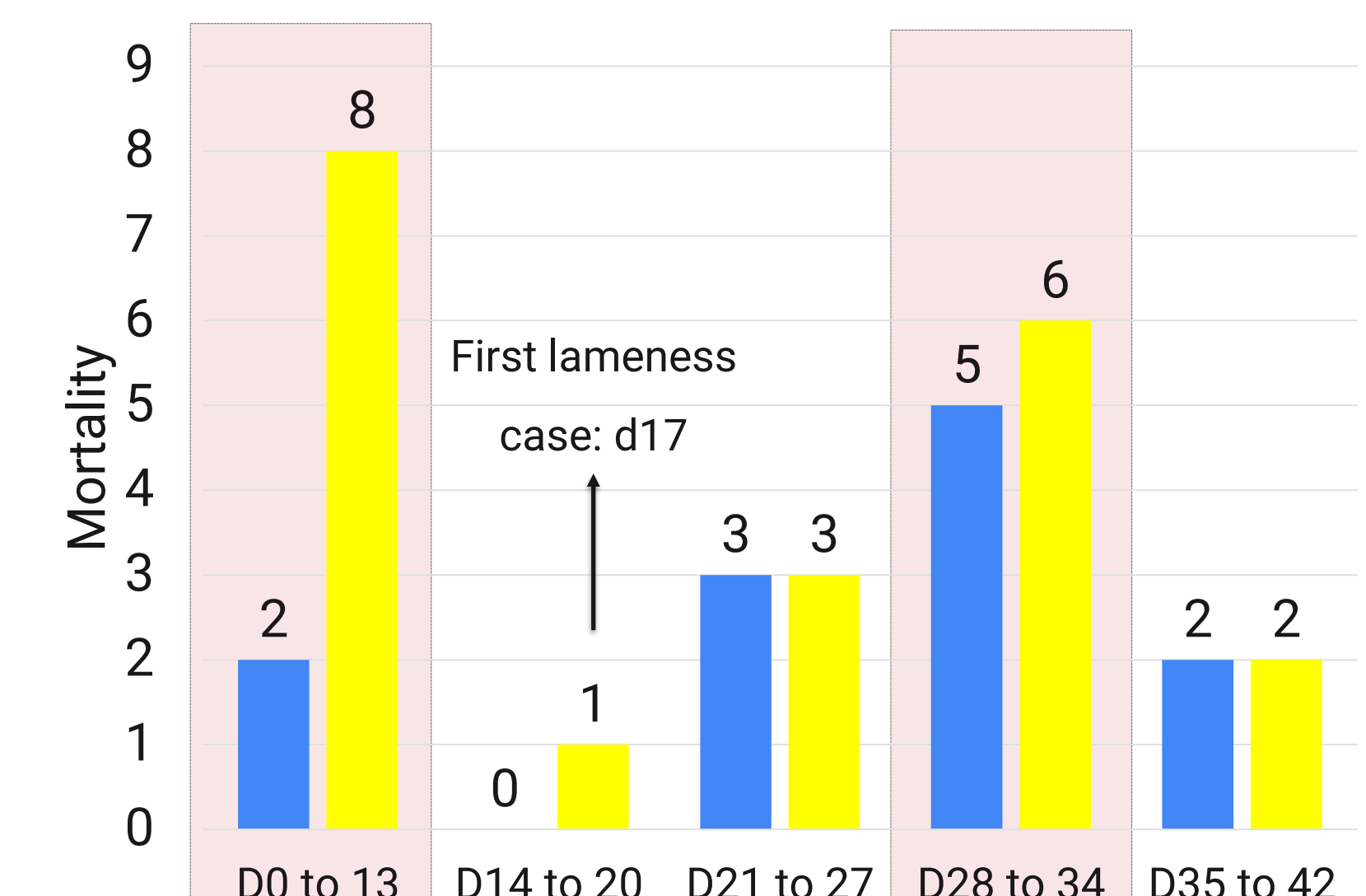


Figure 4. Mortalities and culls due to lameness by period.

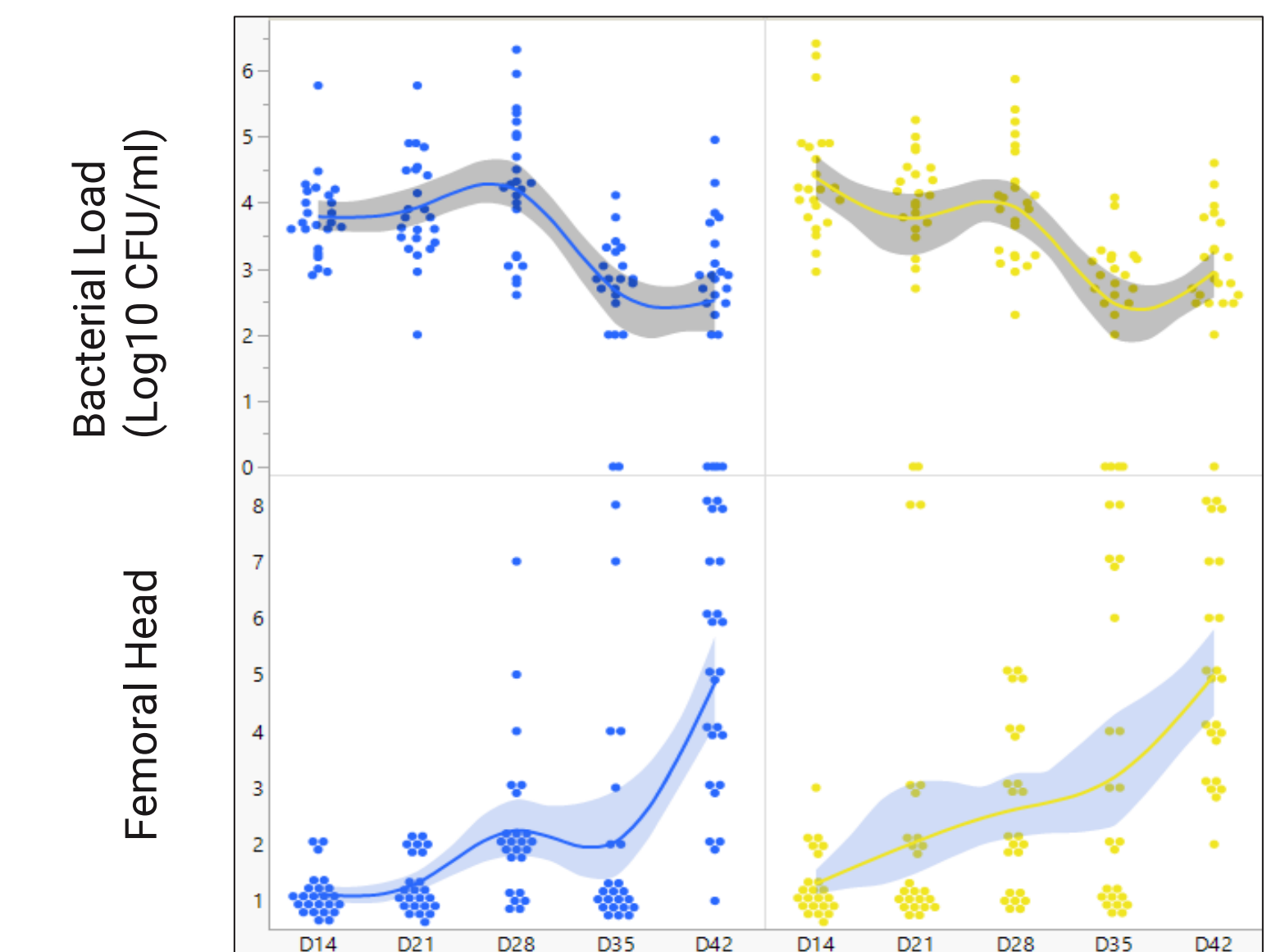
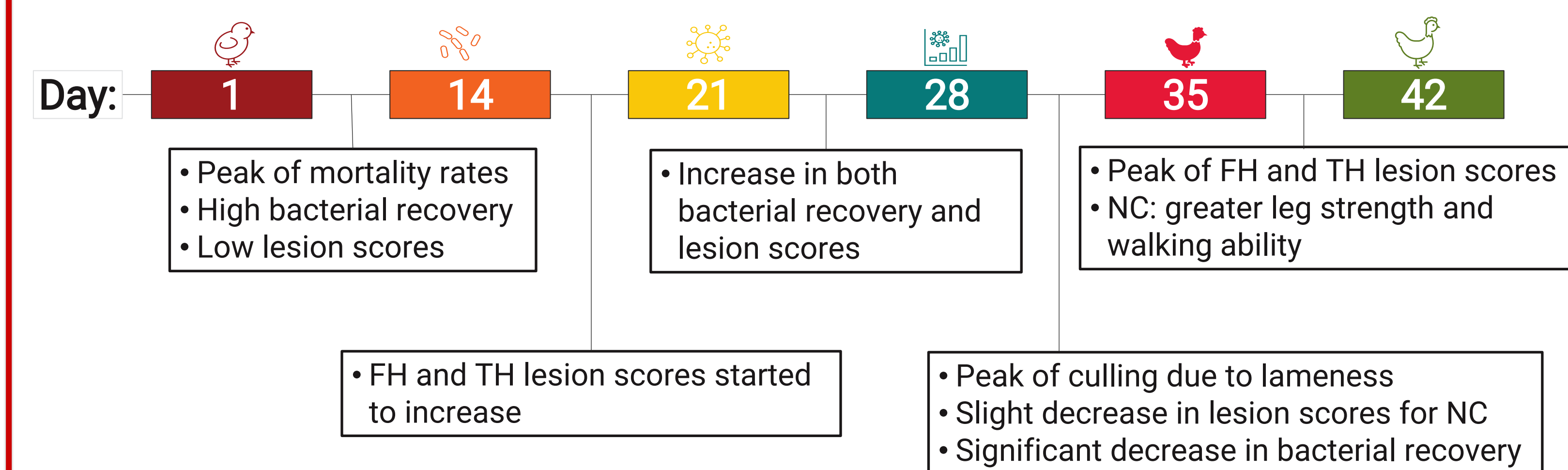


Figure 6. Log<sub>10</sub> CFU/ml (top) bacterial count and Femoral Head (bottom) lesion scores by treatment and sampling day.

## CONCLUSION



### Negative control:

- High bacterial recovery likely due to horizontal transmission
- Future research will focus on mitigating bacterial spread

### Positive control:

- Higher mortality rates, musculoskeletal impairment, and reduced leg strength on d42

### Latency-to-lie test:

- Practical and accurate tool to assess infection severity
- LTL test with a layer of water may discourage birds from lying down

Early high bacterial recovery from blood and spleen may serve as a potential predictor of late onset lameness

### REFERENCES

