Automated monitoring of broilers from different hatching conditions

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Background

- The early peri-hatching environment has effects on several aspects of the resilience, health and welfare of broiler chickens in later life:

  - Maturation and functioning of the immune system (Panda et al., 2014)

  - Thermoregulatory development (van den Brand et al., 2010)

  - Foodpad dermatitis (de Jong et al., 2019)

  - Fear related behavioural responses (Hollemans et al., 2018)

  - …

- ✓ Optimal early and later life conditions in combination with reliable automated flock monitoring systems will contribute to a reduction in the use of antimicrobials in broiler production.

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Hypotheses

- Recently developed **alternative hatching systems** have positive effects on **the health and welfare** of broiler chickens in early and later life

- These effects can be measured by traditional, manual methods and by **modern sensor technology**

Animals, materials & methods

Experimental design – three hatching environments:

- Conventional hatching
  - No light, feed and water in the hatcher
  - Transport of day-old chickens

- HatchCare (HatchTech, NL)
  - Light, feed and water provided in the hatcher
  - Transport of day-old chickens
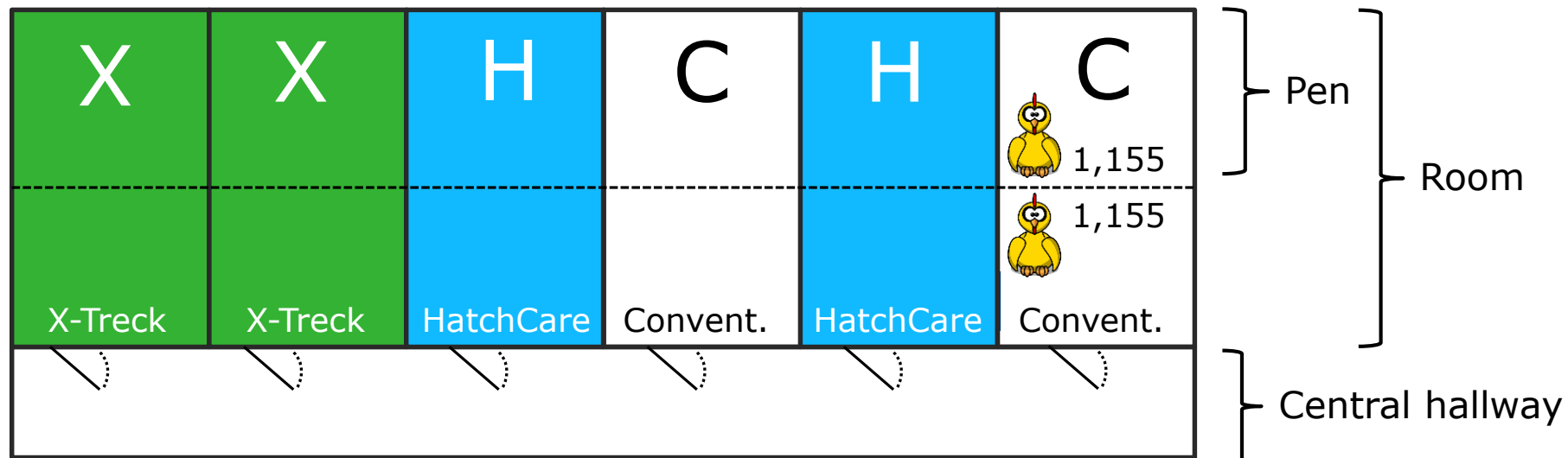
- X-Treck (Vencomatic, NL)
  - On-farm hatching; light, feed and water available
  - Transport of eggs (ED 18)

Animals, materials & methods

Experimental design – Experimental Poultry Centre, Geel (BE):

- Three consecutive batches
  - B 1: 11.05. - 19.06.2019
  - B 2: 12.07. - 20.08.2019
  - B 3: 06.09. - 15.10.2019

Animals, materials & methods

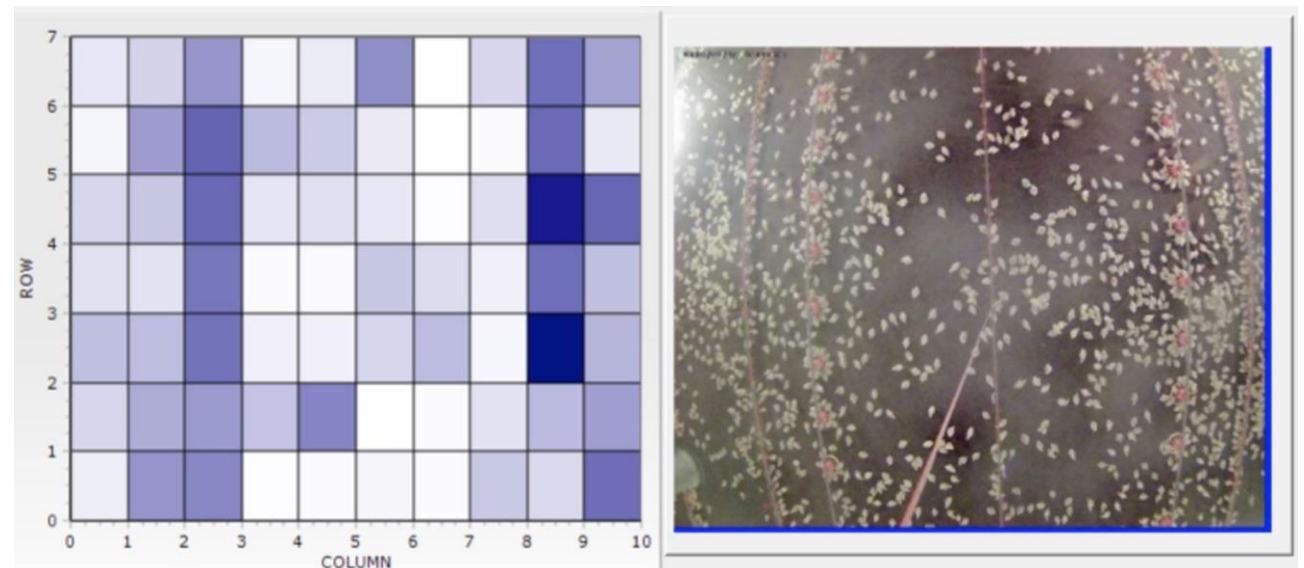Sensor technology – eYeNamic system (Fancom BV, NL):

- One camera/pen, recordings during the light phase

- Automated image analyses (every 2 min):

  - Distribution index

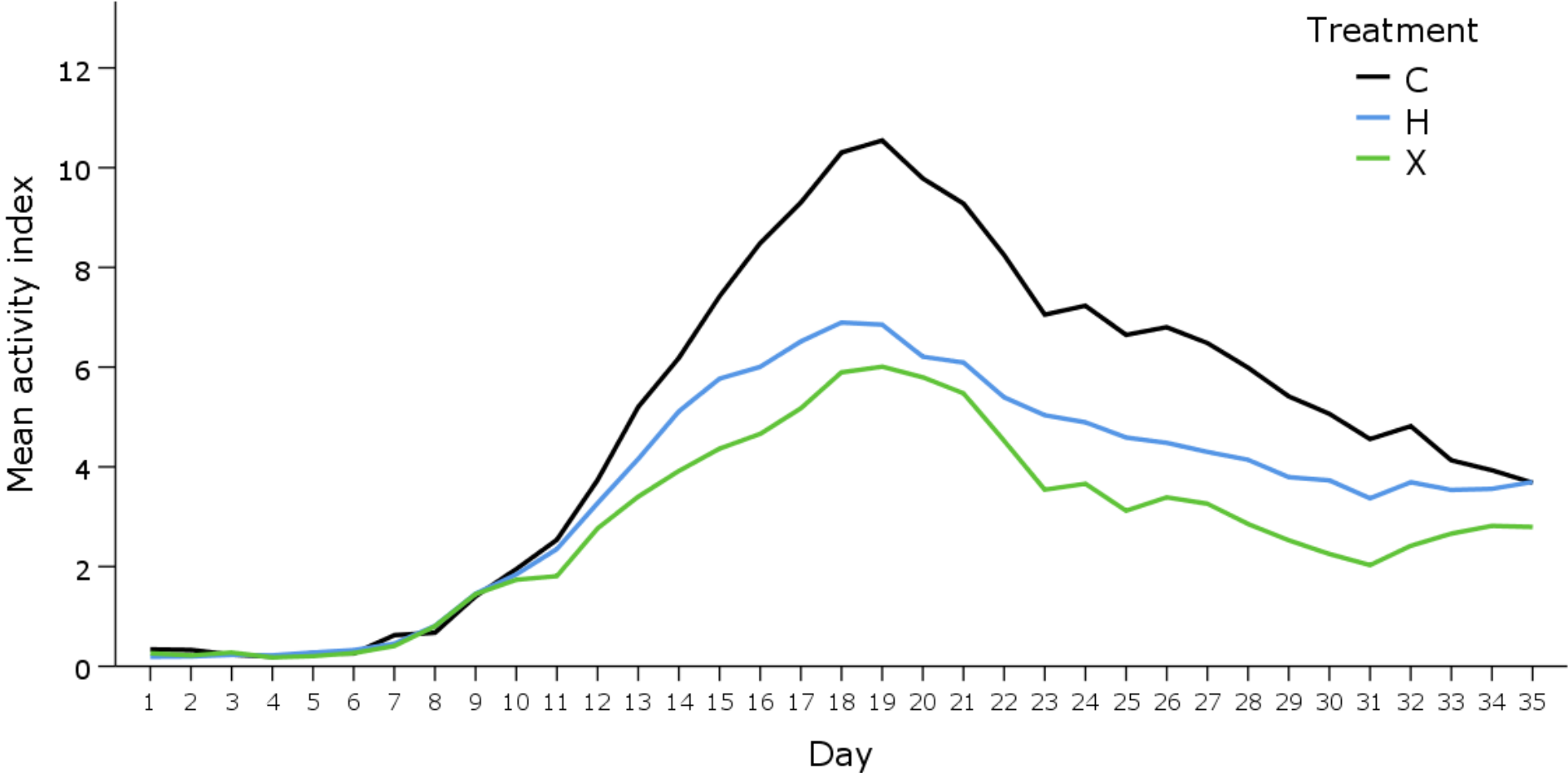 - Activity index: $\dfrac{moved\ pixels\ in\ image\ frame}{total\ pixels\ in\ image\ frame} \times 100$

- Statistical analyses (SPSS)

  - Preliminary

  - Daily mean values for activity indices

  - GENLINMIXED

https://www.fancom.com/uploads/images/8/a/8adf1a0a2f225540172c72dc232c0d731ba72e27/large/eyenamic-activity.jpg

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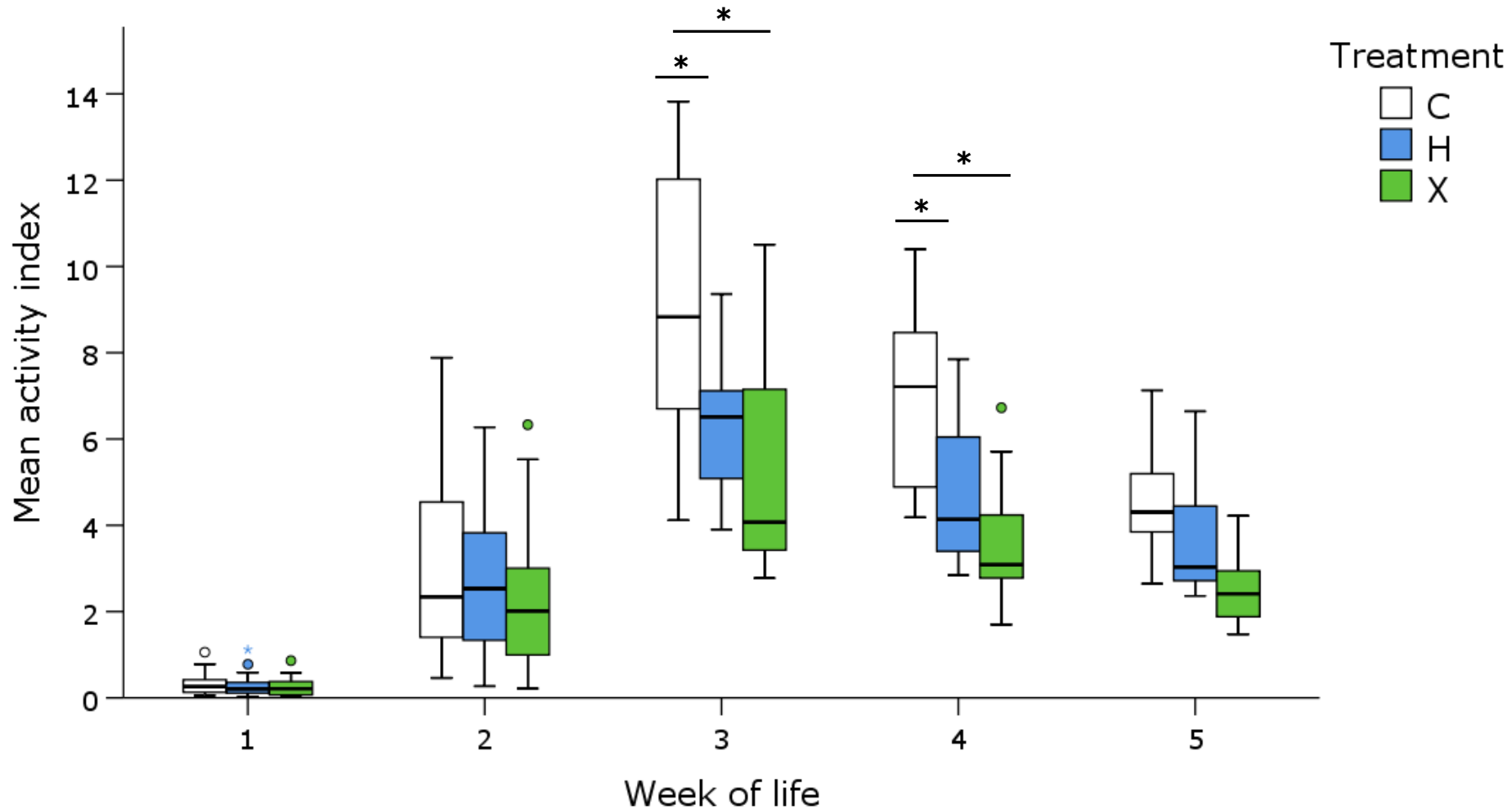
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Results – Activity level in the pen

Average daily activity indices (pen level) per treatment

Results – Activity level in the pen

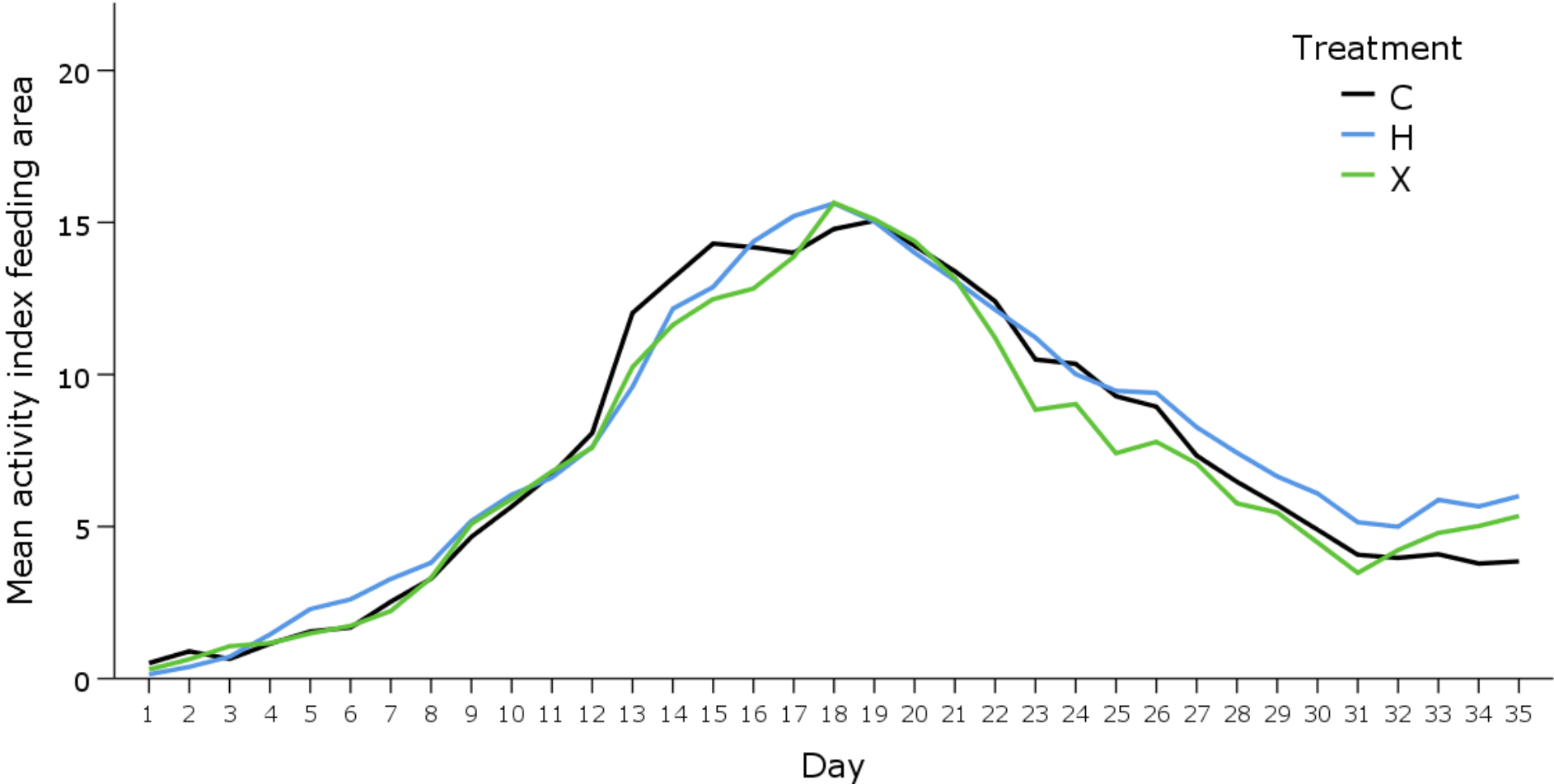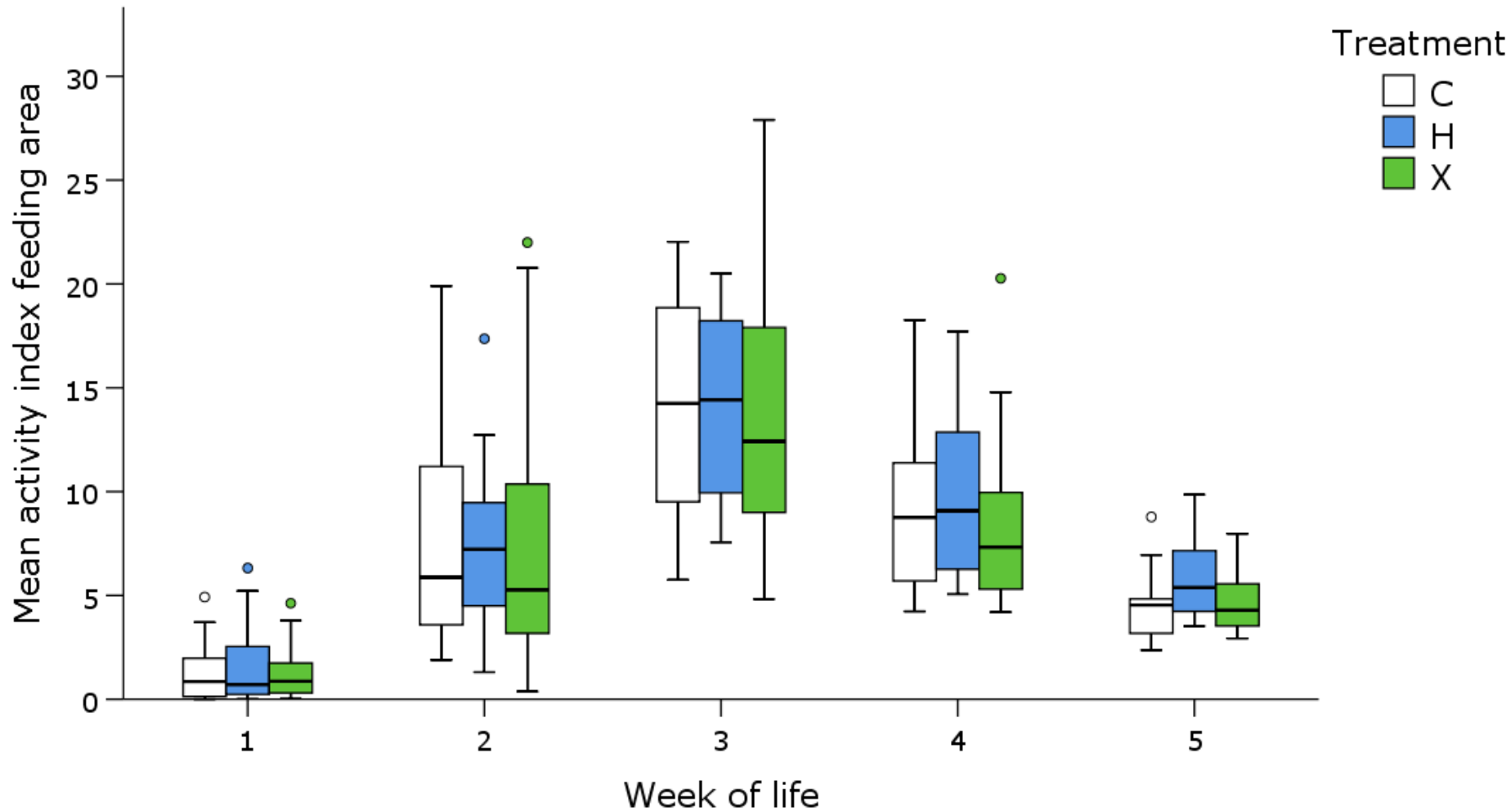Average activity indices (pen level) per treatment and week (*$p<0.05$, GENLINMIXED)

Results – Activity level in the feeding area

Average daily activity indices (feeding area) per treatment

Results – Activity level in the feeding area

Average activity indices (feeding area) per treatment and week

Discussion

- Observed in chickens from all hatching environments:

    - Peak in activity levels between d 18 & 19

    - Decrease in activity levels with age

    - Similar activity levels in the feeding area

- Interpretation of lower activity levels in the H & X treatment at 3 & 4 weeks of life?

    - Differences in average body weight (week 3):

        - C: 982 g; H: 1017 g; X: 1042 g

    - Biological connotation of higher/lower activity levels?

Outlook

- Biological connotation of higher/lower activity levels?

  - Relating the results of manual welfare and behaviour assessments to the tracked activity levels → exercise or unrest?

- Preview:

  - Similar activity levels at d 35

  - Average gait score (0-4) at d 35:

    - C: 2.53; H: 2.56; X: 2.53

- Confirm the present findings by adding data from batch 2 & 3 to the analyses

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Thank you!

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Questions?

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