The background of the slide is a photograph of an incubator's interior. It is filled with numerous white eggs arranged in rows on a dark tray. The entire scene is bathed in a strong green light, which is the subject of the research. Some wires and mechanical parts of the incubator are visible in the background.

Green light during incubation: effects on hatching characteristics in brown and white laying hens

Maëva Manet

Saskia Kliphuis, Henry van den Brand, Rebecca Nordquist, Vivian Goerlich and Bas Rodenburg

PPILOW seminar, WUR, 21-05-2024

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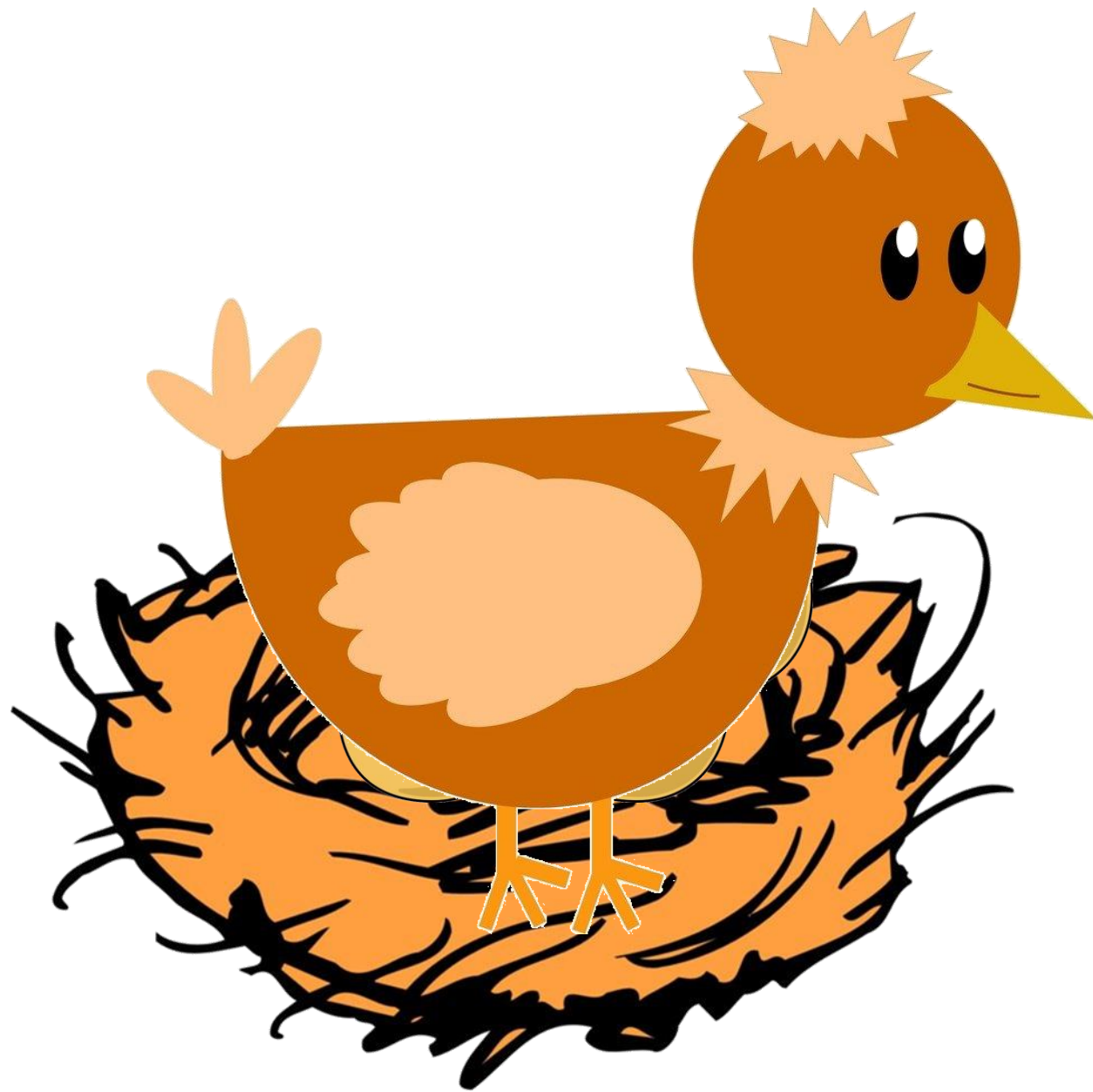


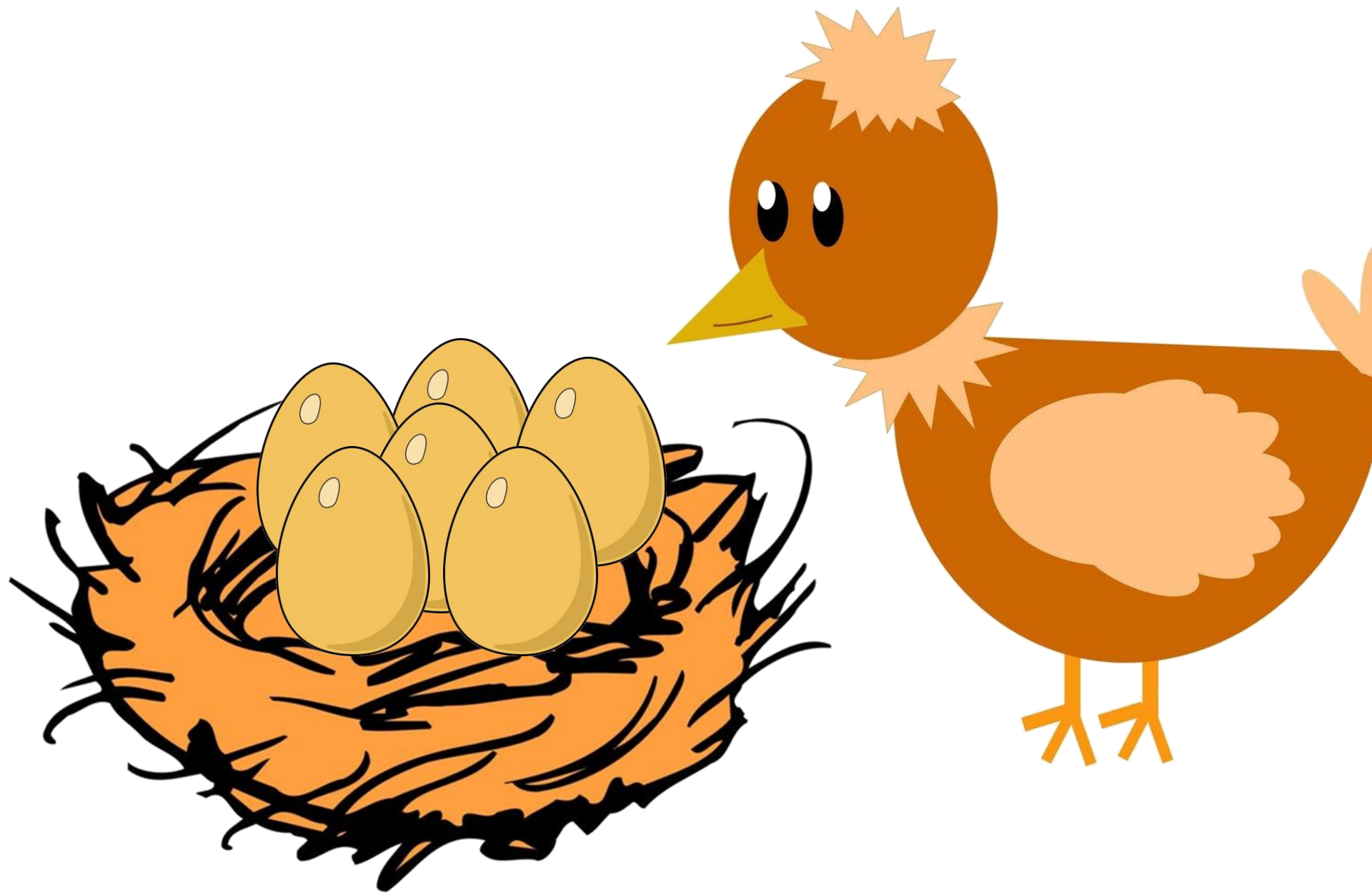
- Serge Alindekon
- Dewi Bouman
- Inge van der Burg
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- Dylan Geerman
- Dagmar Jongenelen
- Marjolein Jongerius
- Elsemieke van der Laan
- Lisette Martens
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- Rosa Schimmel
- Dronika Soedhoe
- Isabelle Spierings
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- Marenne Vis
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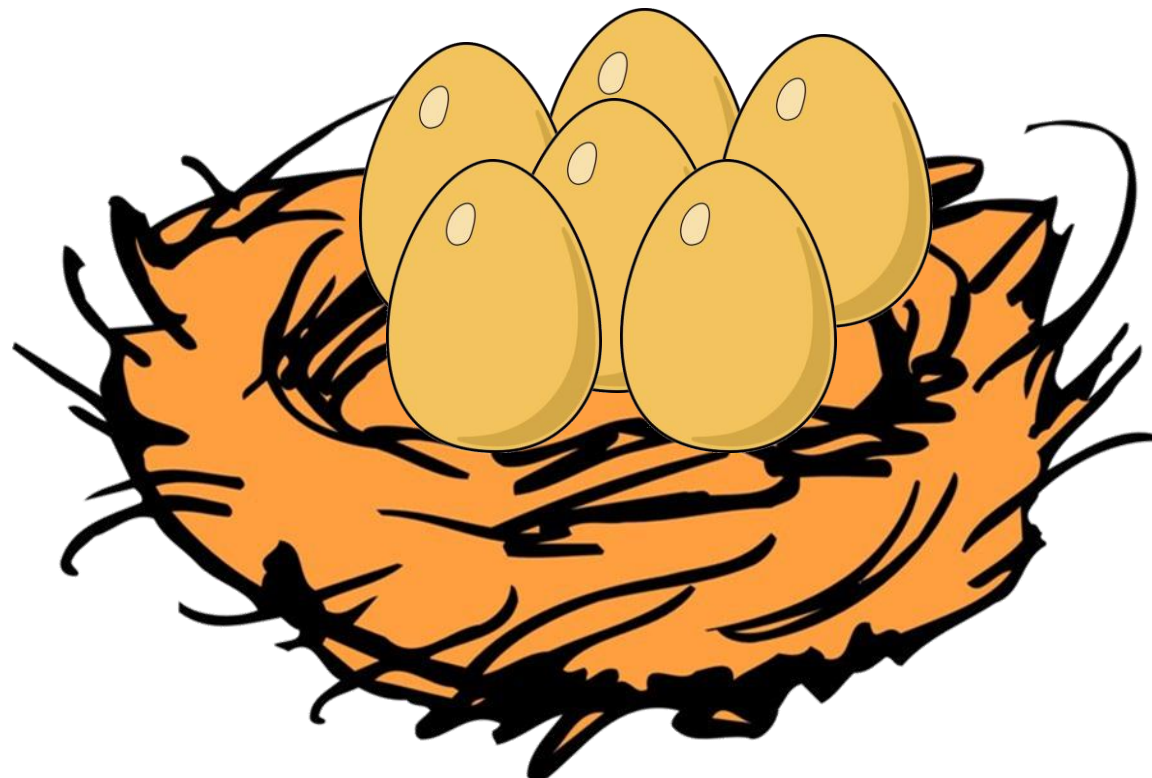


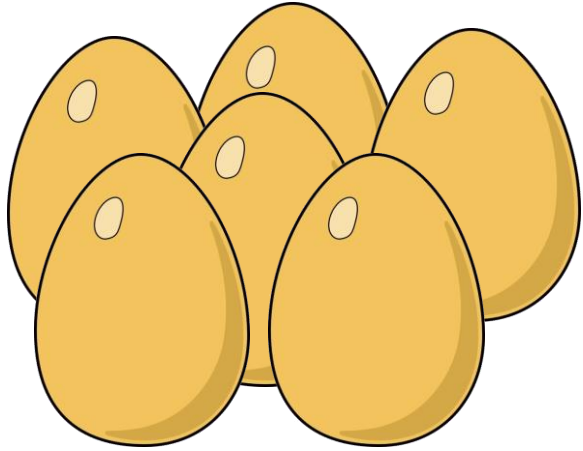
This project receives funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 812777

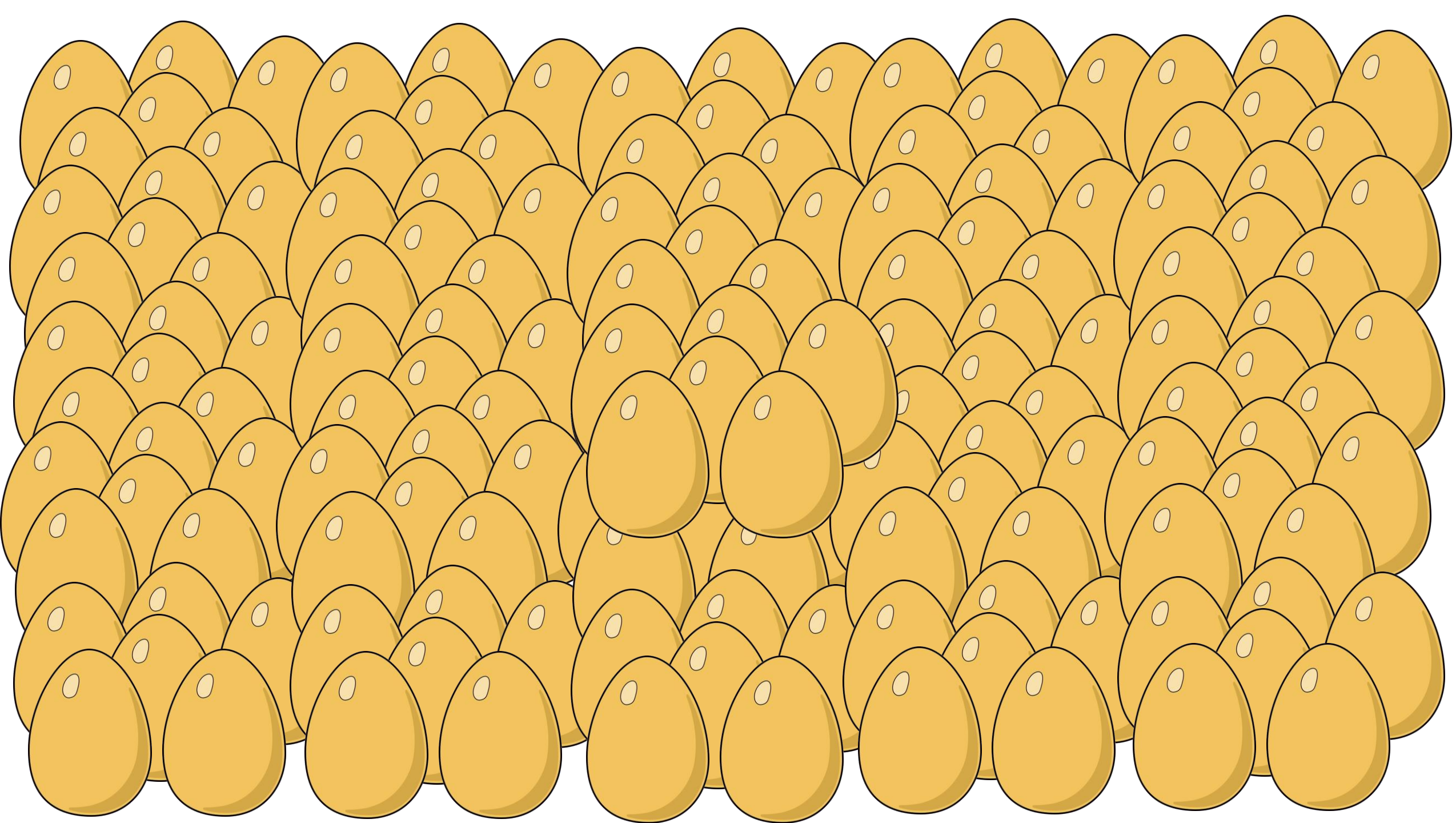


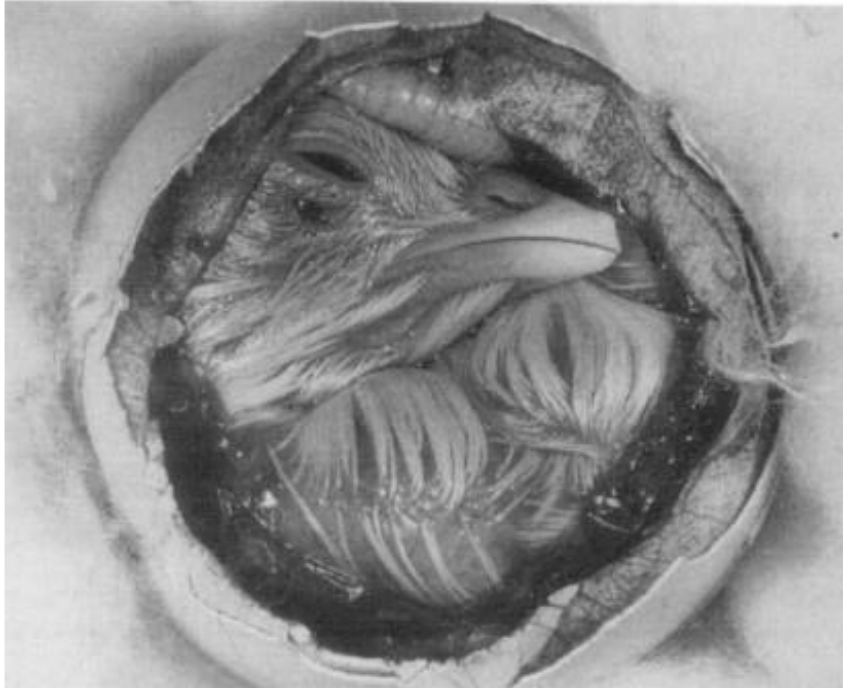




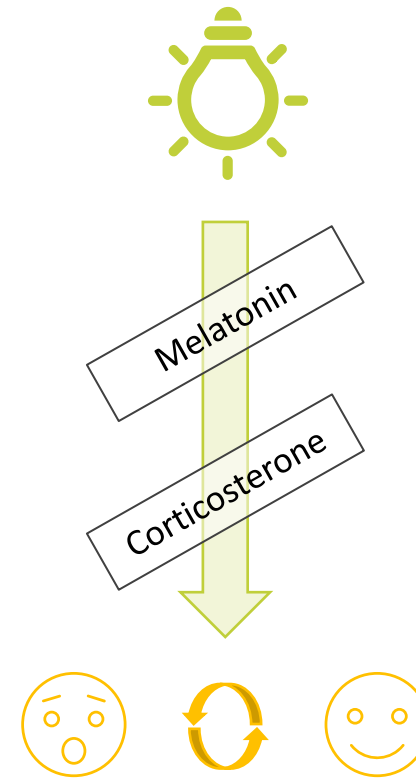








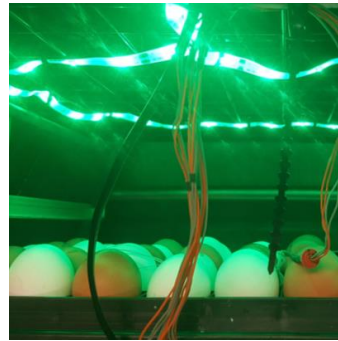
Rogers (1990). *Behavioural brain research*, **38(3)**, 211-221.



Saito et al. (2005). *Behavioural brain research*, **165(2)**, 197-203.



How does green light during incubation influence young laying hen welfare?



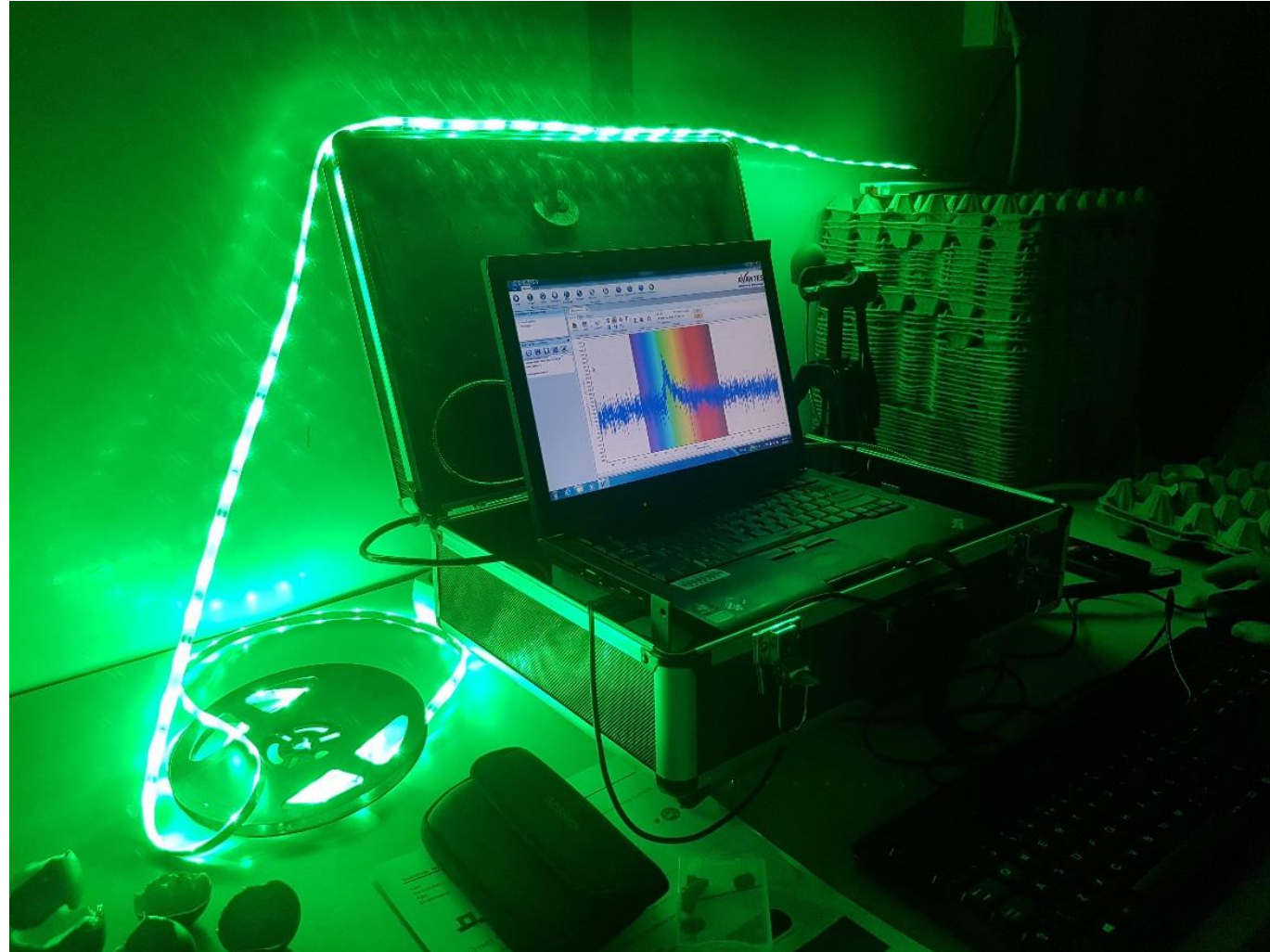
First things first:

- Is there a difference in **light transmission** through white and brown eggshell?
- Does light during incubation influence **hatching productivity**?



Manet et al. (2023a)

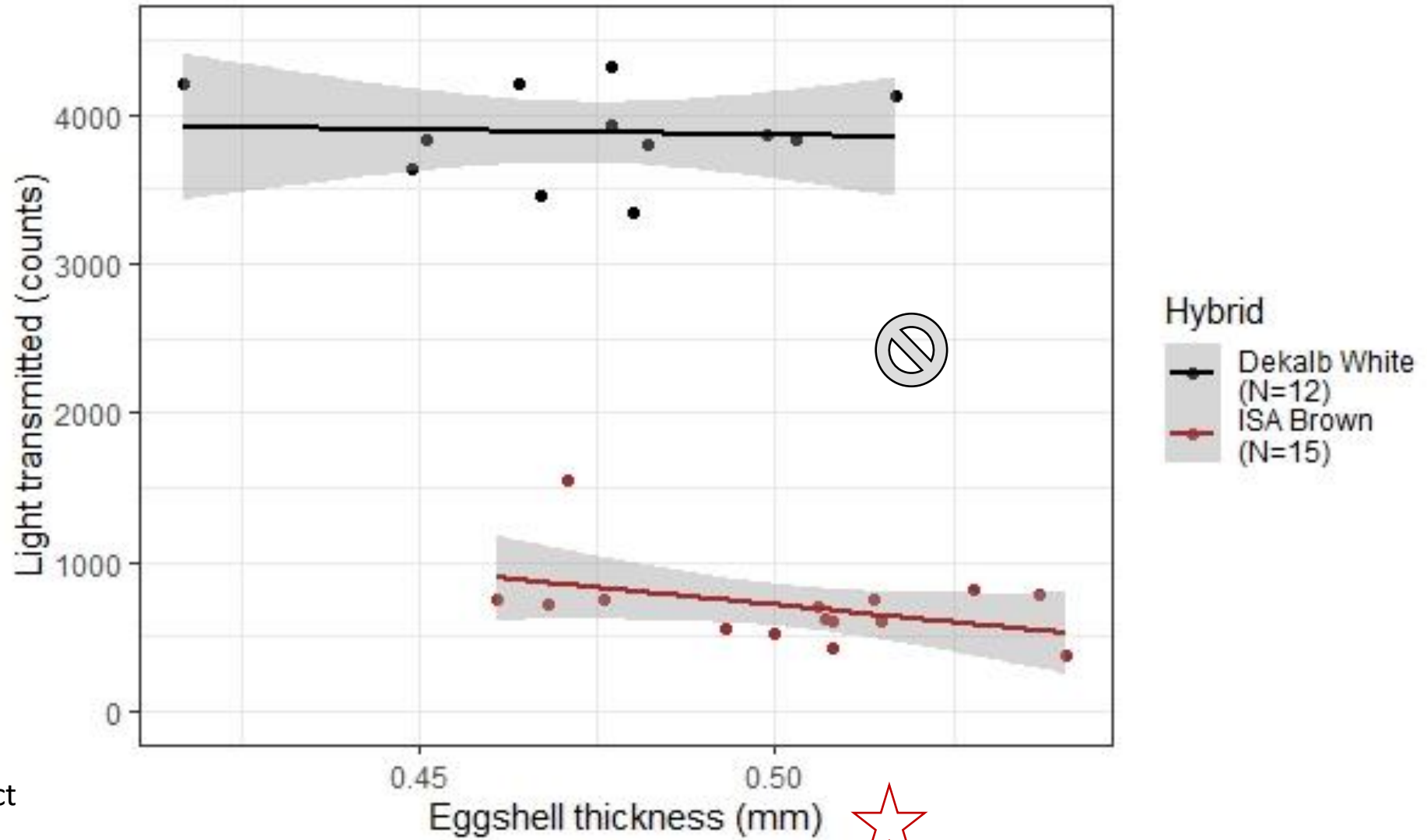
Light transmission Methods



Light transmission Methods




Correlation graphs between light transmitted at control peak and eggshell thickness (per hybrid)



Hybrid
—●— Dekalb White (N=12)
—●— ISA Brown (N=15)

 No significant effect

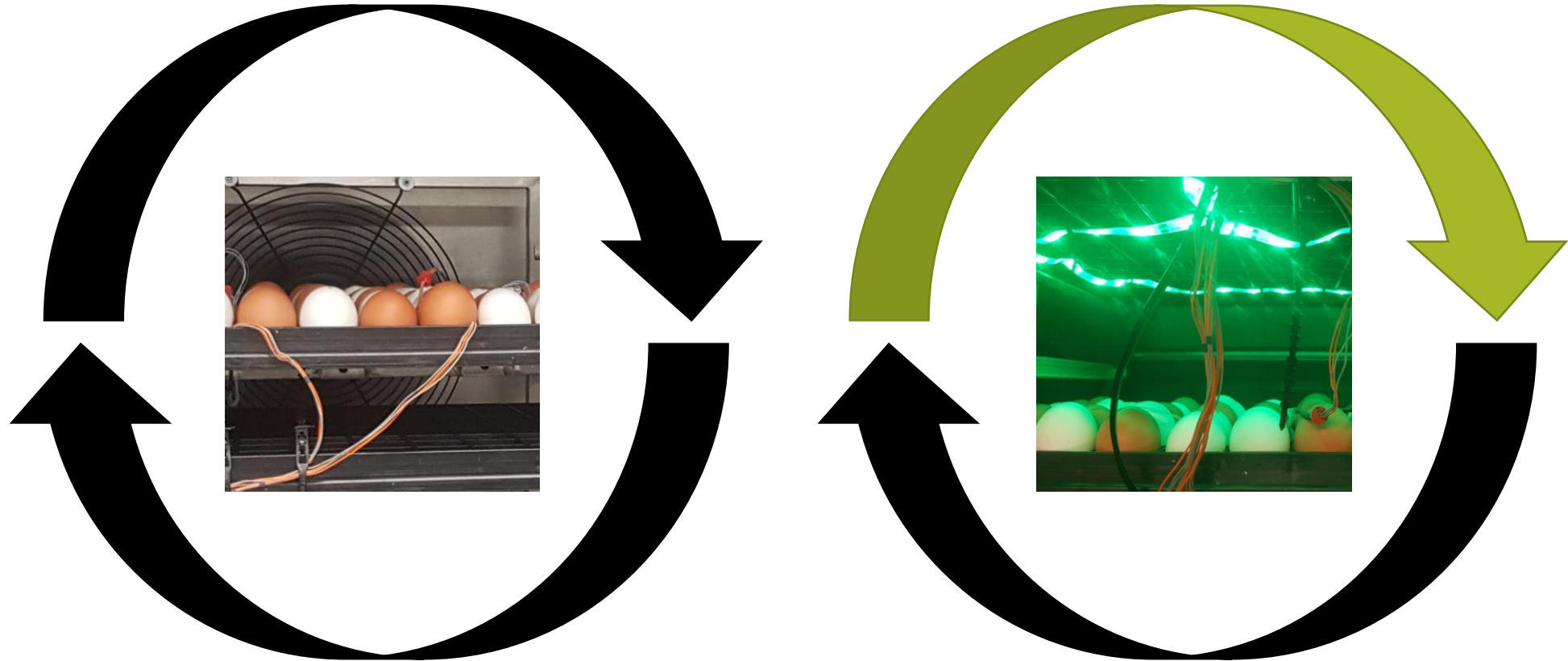
 Significant hybrid effect



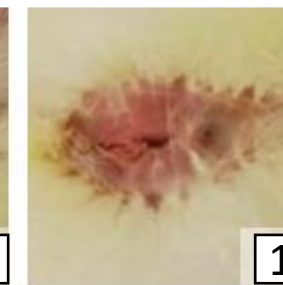
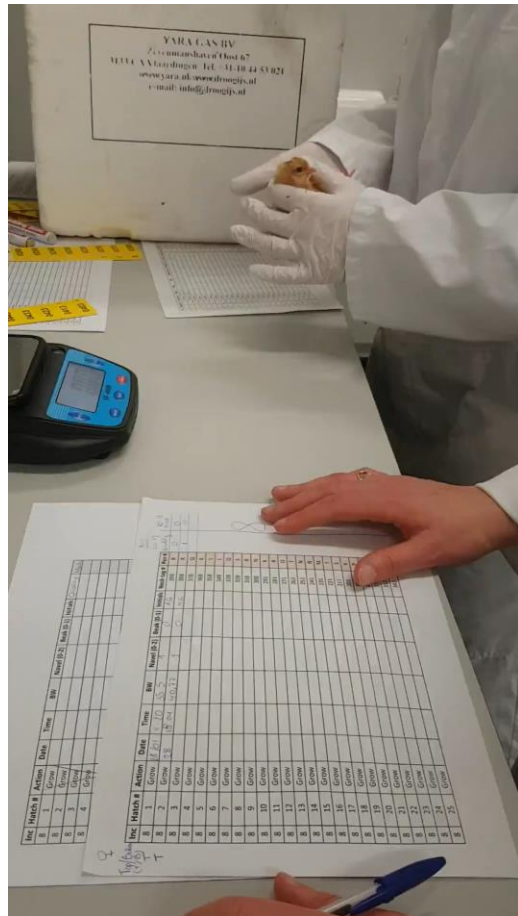
Discussion point

- Light transmission: difference due to eggshell color, or egg characteristics, or genetic background?
- In nature, these things **cannot be untangled** → same light settings for the rest of the experiments
- **Light transmission ≠ light perception**

Hatching productivity Experimental design

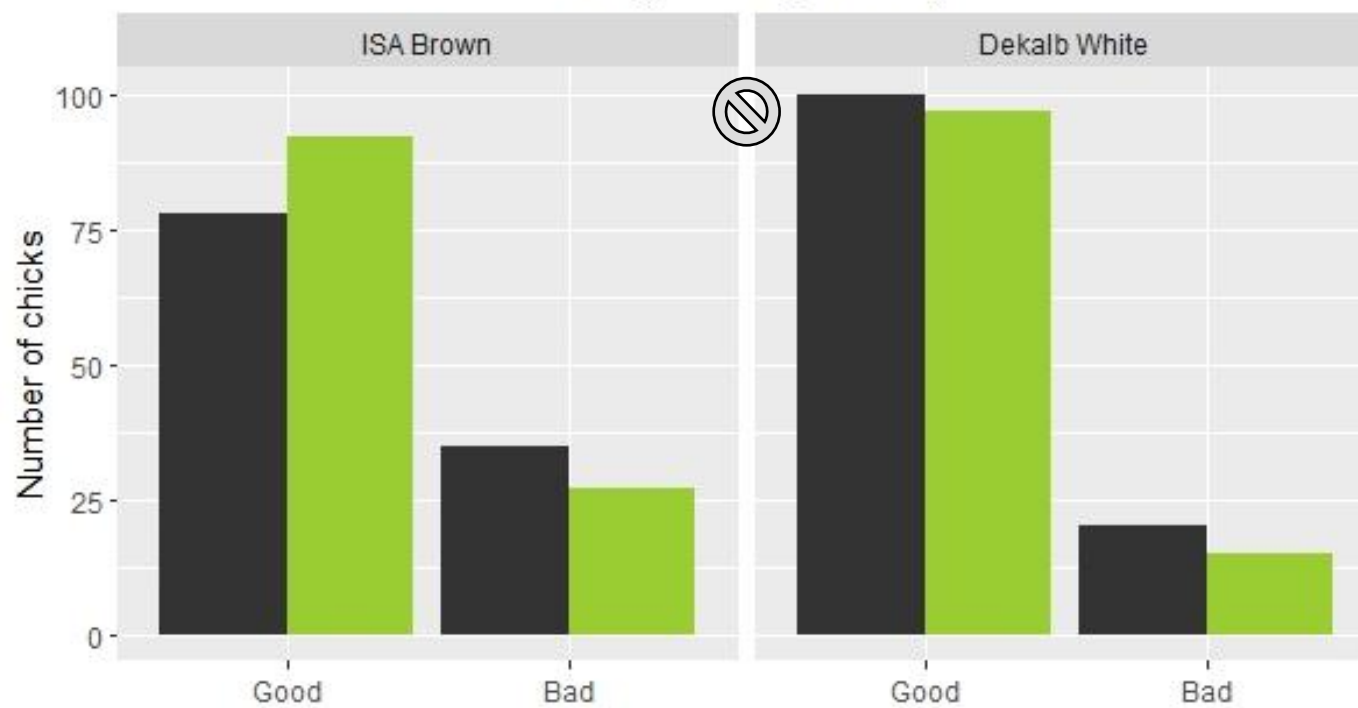


Hatching productivity Methods







Vitality scores (females)



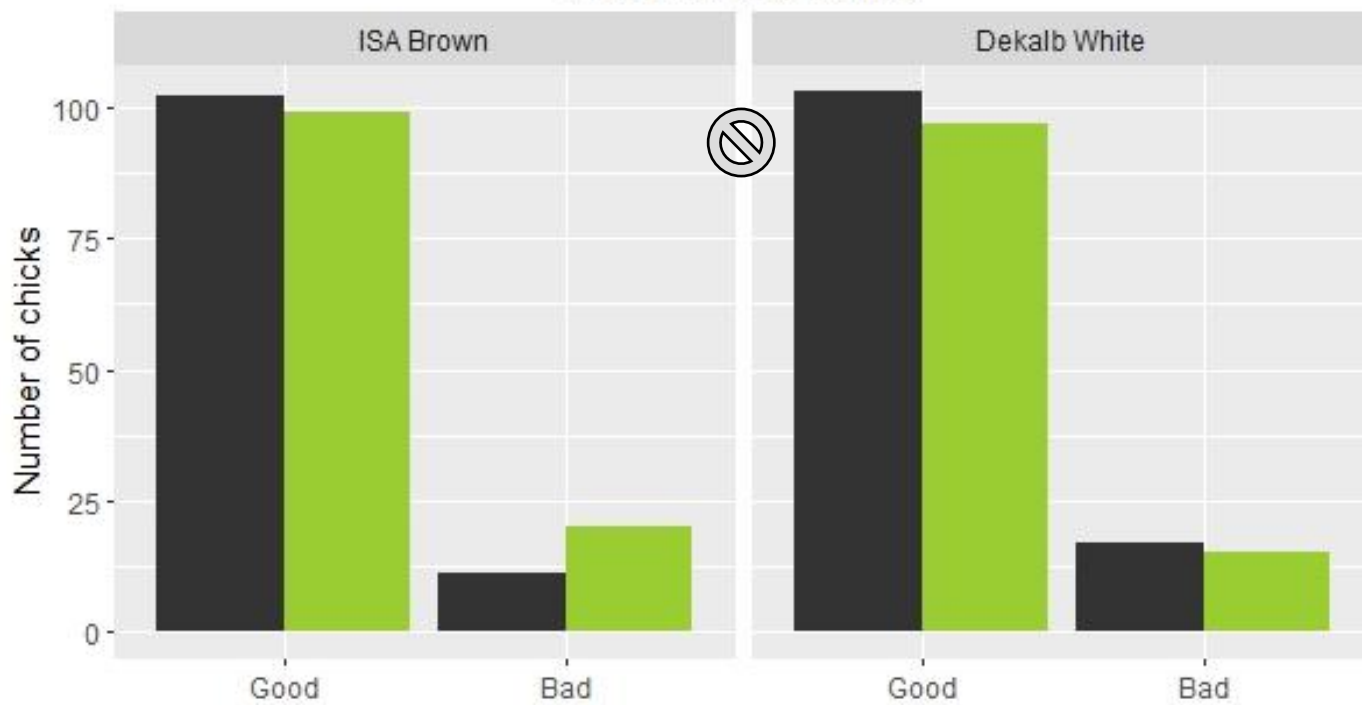
 No significant effect

 Significant hybrid effect


 Significant incubation effect




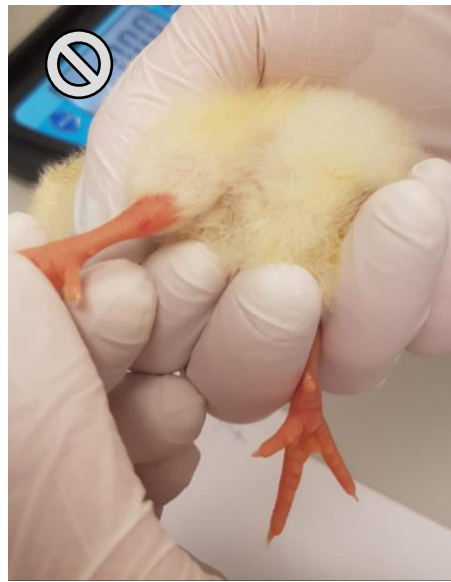
Beak scores (females)



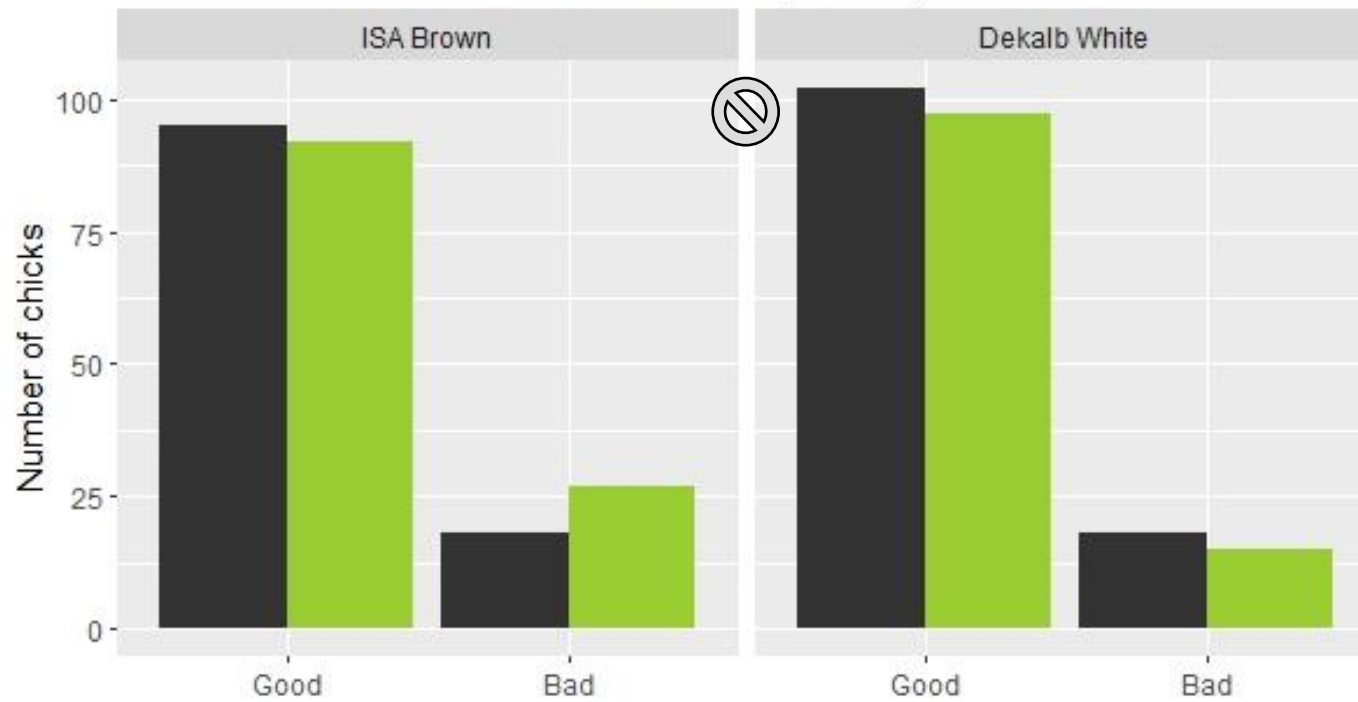
 No significant effect

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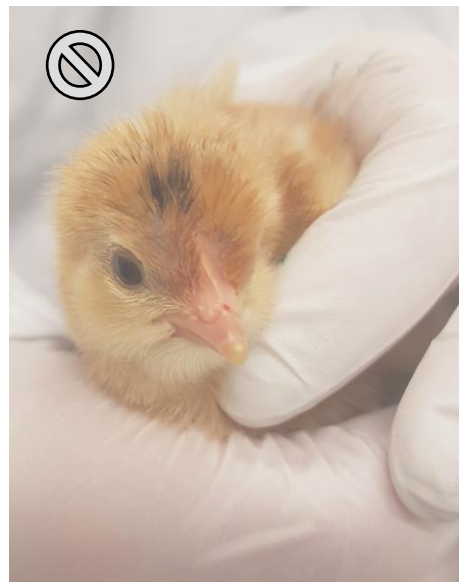
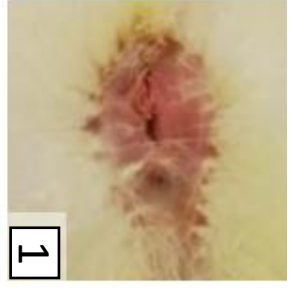
Hock scores (females)



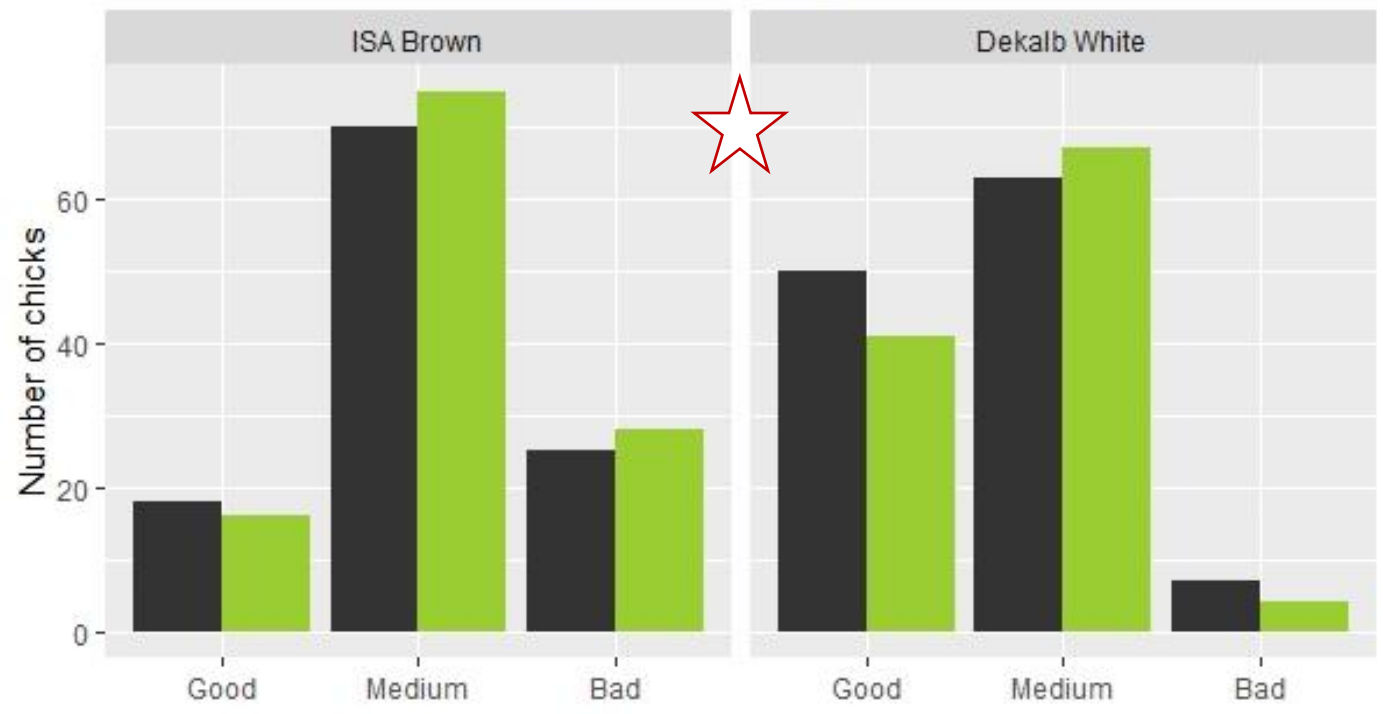
⊘ No significant effect

★ Significant hybrid effect


★ Significant incubation effect




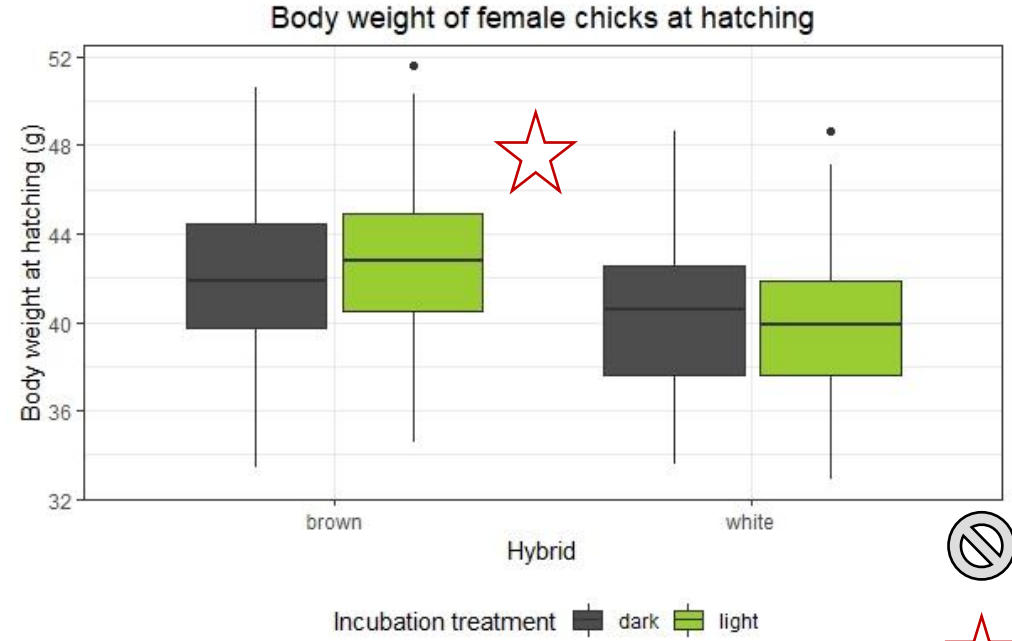
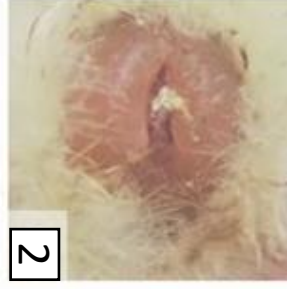
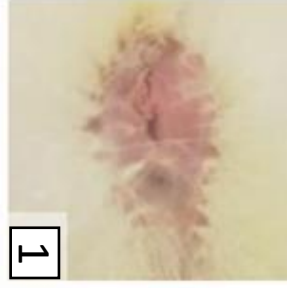
Navel scores (females)



 No significant effect

 Significant hybrid effect

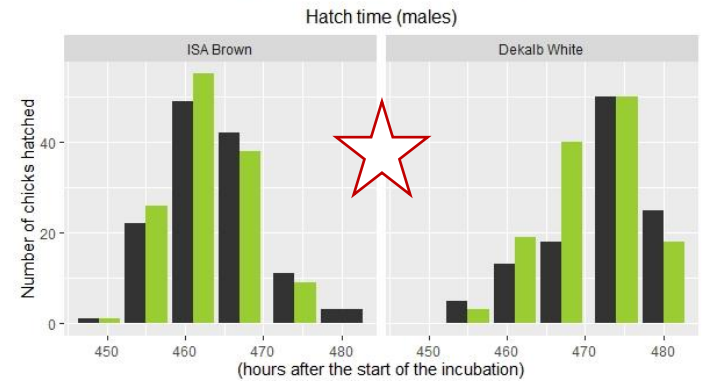
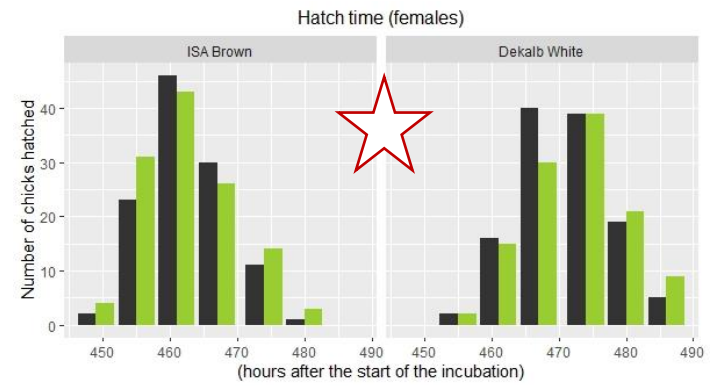
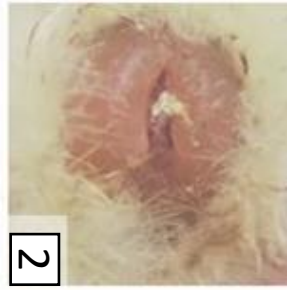
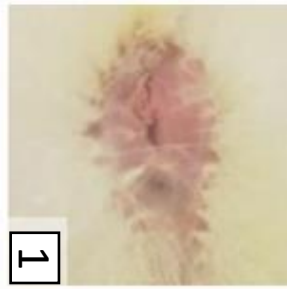
 Significant incubation effect



No significant effect

Significant hybrid effect

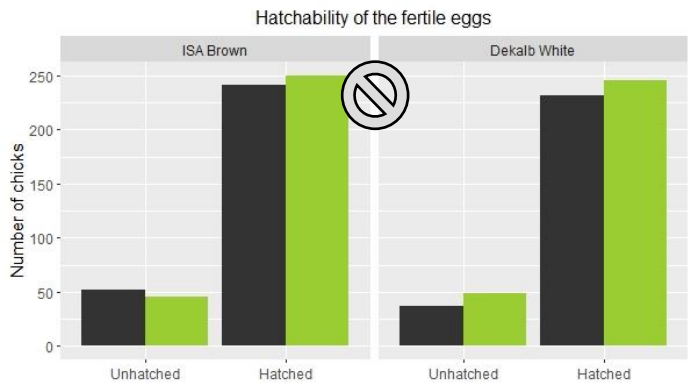
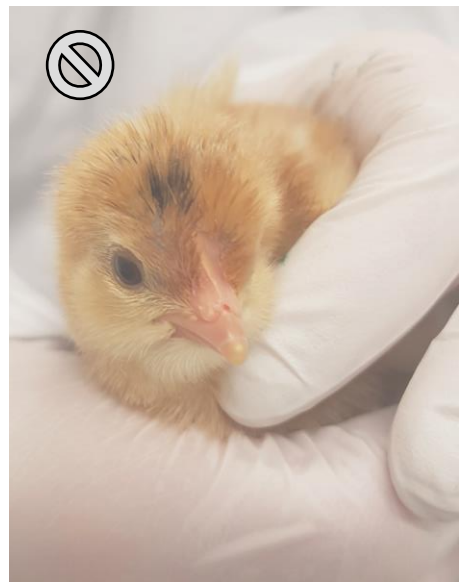
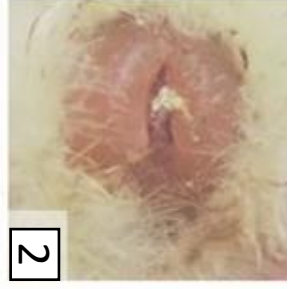
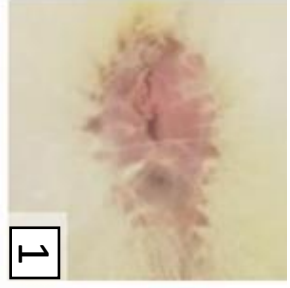
Significant incubation effect




⊘ No significant effect


★ Significant hybrid effect

★ Significant incubation effect



 No significant effect

 Significant hybrid effect

 Significant incubation effect



⊘ No significant effect

★ Significant hybrid effect

★ Significant incubation effect

Discussion points

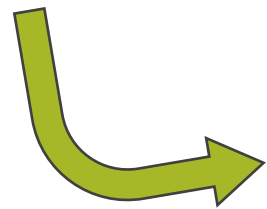
- Hatching productivity:
 - No effect of the incubation, unlike other studies, because of light schedule & properties, or incubators used, or hybrids used?
 - No incubation-hybrid interaction because of no incubation difference, or hybrids' biology?
- Hybrid differences: due to hybrid, or non-hybrid flock differences?

Conclusion

- **More light** transmitted through white eggshells: **stronger effects** on **white laying hens**?
- Light during incubation has **no negative effects on hatching productivity**.
- A **follow-up** on the effects of light during incubation on **laying productivity** would be welcome.
- Light during incubation can be investigated as a potential intervention to **improve animal welfare...**

Conclusion

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... which we did!

Sneak peak: welfare results

- **Reduced fear of humans** until 6 weeks old, but not from 6-17 weeks



Sneak peak: welfare results

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- **No effect** on **corticosterone** (feathers, blood), brain **plasticity** (calbindin, NeuN, DCX) or **dopamine production** (TH) (1 day old)



Manet et al. (2023b)



Kliphuis et al. (2023a)

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Manet et al. (2023b)



Kliphuis et al. (2023a)



Sneak peak: welfare results

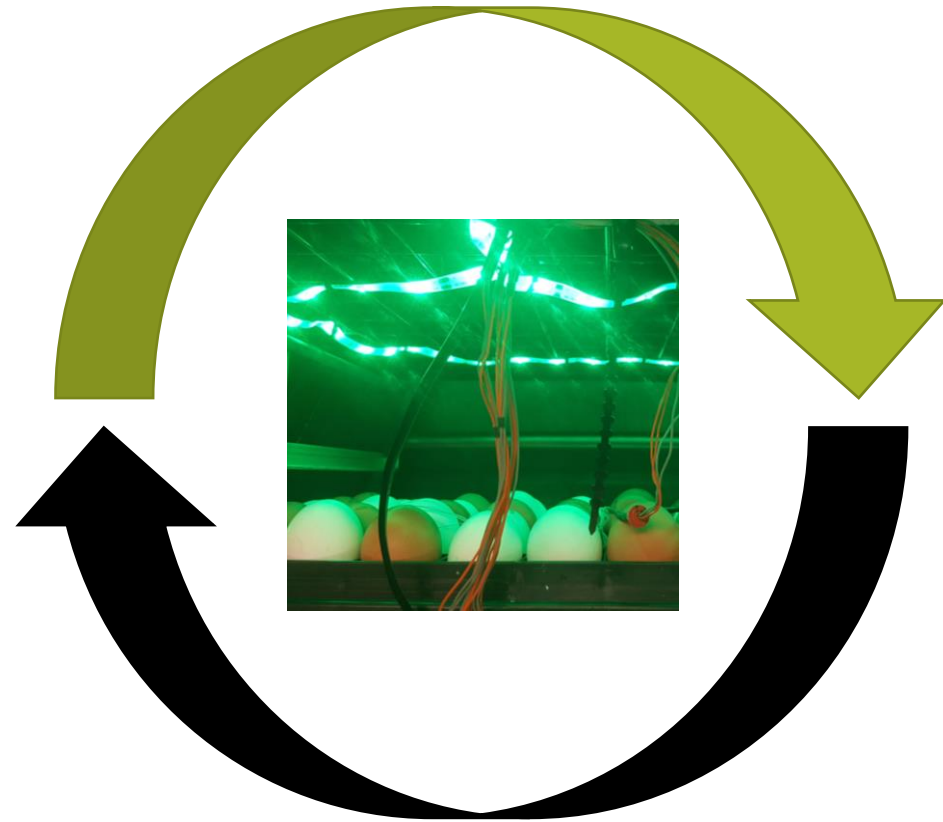
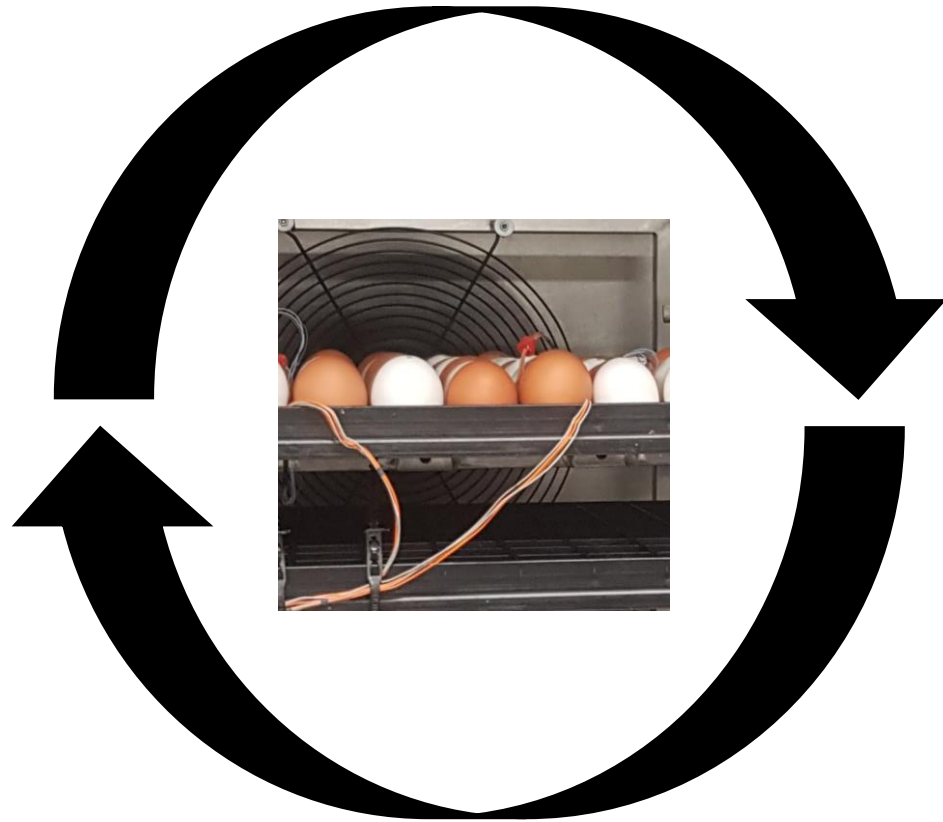
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- **Increased lateralization** in detour test (3-4 weeks)
- **Inconsistent effects** on **cognition** during laying phase



Manet et al. (2023b)



Kliphuis et al. (2023a)



To know more about light during incubation & laying hen welfare



- New strategies to improve welfare of low-input outdoor and organic laying hens – **Saskia Kliphuis**



- Effects of early life strategies and free-range enrichment on the behaviour and welfare of hens – **Michael Plante-Ajah**



Manet et al. (2023b)



Kliphuis et al. (2023a)



Kliphuis et al. (2023b)



Thank you
for your
attention



Manet et al. (2023a)

