Brave breeds and brains under the spotlight: how do light during incubation and genetics impact young laying hens stress responsivity?

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Introduction

- What is standard practice:
  - Incubation in complete darkness
  - Same management regardless of the hybrid used
- What research tells us:
  - Light during incubation:
    - Normal brain development through lateralisation[1]
    - Reduced stress in broilers[2]
  - Layers:
    - Brown hybrids: less fearful than white hybrids[3]
    - Level of fear depends on genetics and age[4]

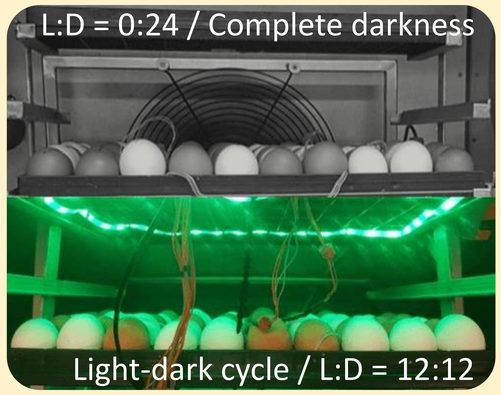
Hypotheses

- Light during incubation will reduce fearfulness in both the tests used
- Brown hybrid chicks will be less fearful than white hybrid chicks, especially in the human fear test
- The effect of light during incubation will be stronger on the white hybrid

Methods

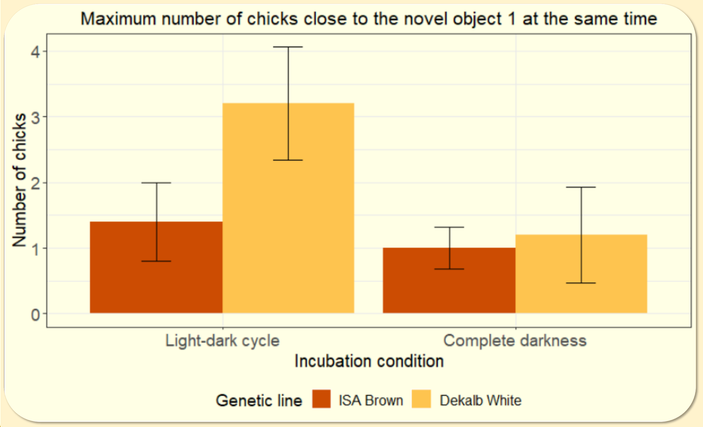
- Experimental design:

ISA Brown and Dekalb White eggs incubated under two light:dark conditions



- 20 pens of 10 chickens, non-mixed treatments
- Behaviour tests:
  - Novel object (NO) tests[5] at 1 and 10 weeks old
  - Voluntary approach (VA) tests[6] at 6 and 16 weeks old

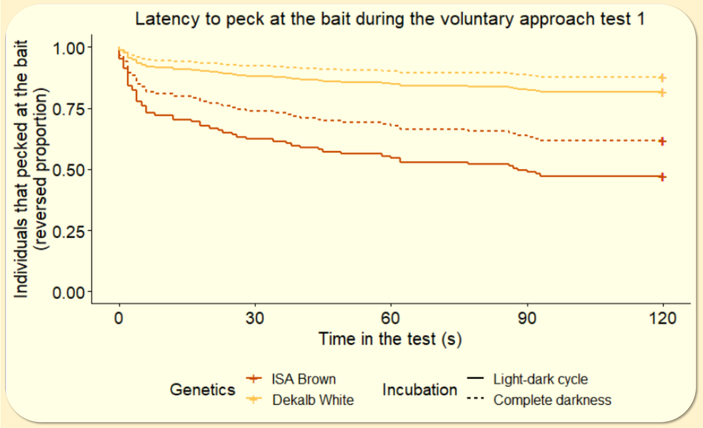
Green light during incubation tends to reduce fear of a novel object in chicks



- NO1 (coloured wooden piece): tendency to have more light-incubated chicks close to the object at the same time (N = 20, p = 0.088)
- NO2 (beer can): tendency gone (N=20, p > 0,05)
- No genetic effect

➢ Same direction as found in broilers[2]
➢ Age is indeed a factor in fearfulness[4]

Brown hybrid fears humans less than white hybrid



- Light-incubated pullets tended to peck at the bait faster than dark-incubated ones in the VA1 (p = 0,0981), but not in VA2 (p > 0,05)
- Brown pullets pecked at the bait (dry mealworms and regular feed) faster than white ones during both tests (N = 188, p < 1,84e-05)

➢ Same direction as found in other fear tests in the literature[3]

Conclusion

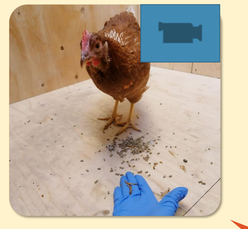
- **Light during incubation seems to decrease fearfulness, and brown hybrids are less fearful than white hybrids. However, that does not seem consistent across different stressors or age.**
- → on-farm improvements should be adapted to the local situation.
- The genetic effects highlight the needs for hybrid-adapted management rather than for a universal solution to improve laying hen welfare.
- An increased sample size is needed to confirm the results: a 2nd round will start in September.
- The chickens underwent lots of handling throughout the rearing phase, which may have hidden interaction effects.

Video material

NO1 (coloured wooden piece)
- Picture: Dekalb White
- Video: ISA Brown

NO2 (beer can)
- Picture: Dekalb White
- Video: Dekalb White (2 pens)

VA1
- Picture: ISA Brown
- Video: ISA Brown, then Dekalb White



VA2
- Picture: ISA Brown
- Video: ISA Brown, then Dekalb White

Wanna know more? The pictures and logos are interactive!

References

1. Rogers, 2008
2. Archer and Mench, 2014
3. Pusch et al. 2018
4. Uitdehaag *et al.* 2008
5. van der Eijk *et al.* 2018
6. Nordquist *et al.* 2011

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