The Effect of Hatchery Routines on Commercial Leghorn Chickens

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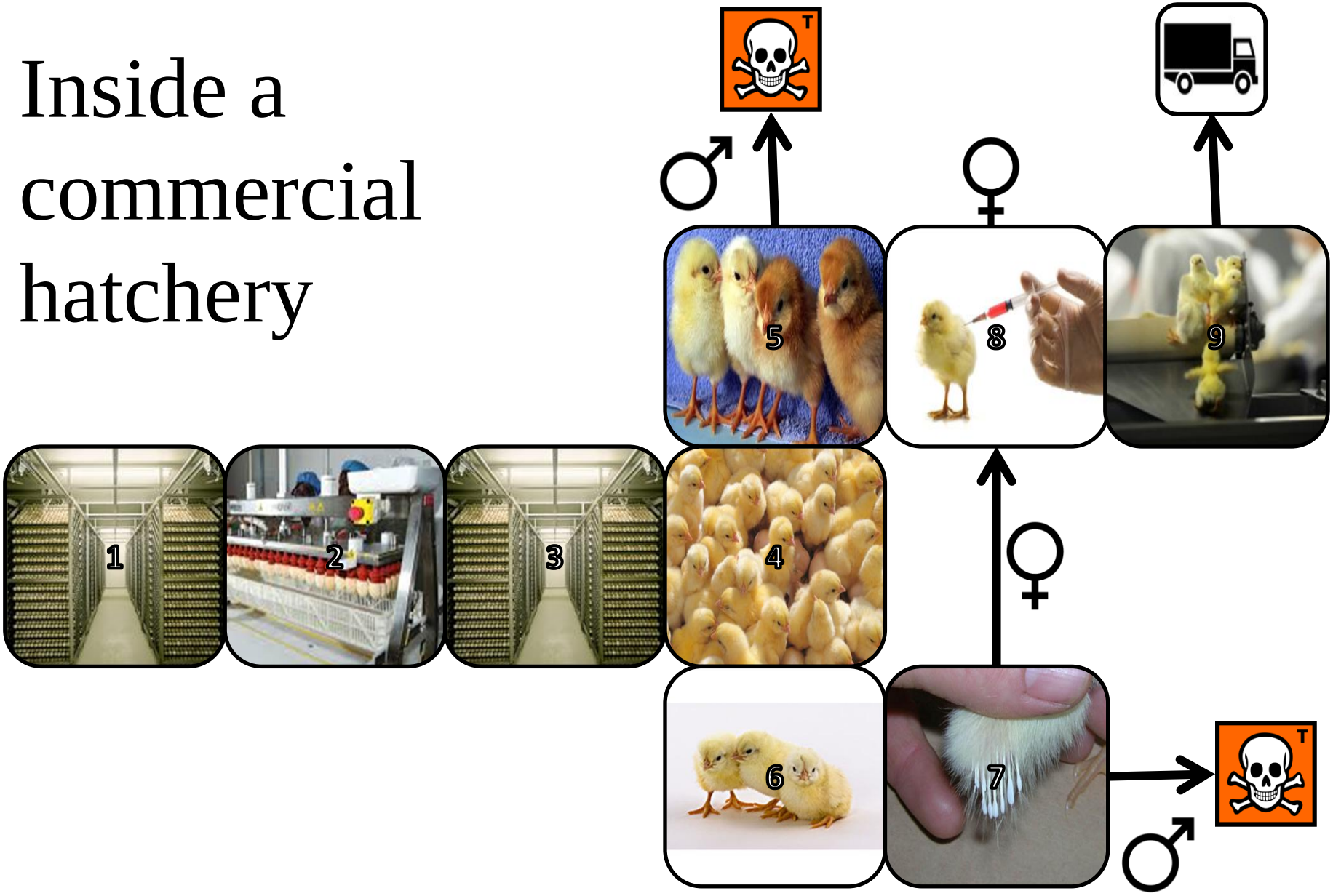
Inside a commercial hatchery



https://blogs.ubc.ca/batterycages/files/2016/03/buffy-021.jpg

Introduction - Stress

What is stress?

- "A state in which an animal is responding to a stressor"
- Activation of HPA-axis increasing glucocorticoid secretion
- Increases blood glucose level for fight/flight
- Corticosterone – chickens

Potential stressors within hatcheries:

- Rough human handling
- Loud noises from machinery
- Maternal deprivation
- Heat/cold stress
- Vibrations transportation

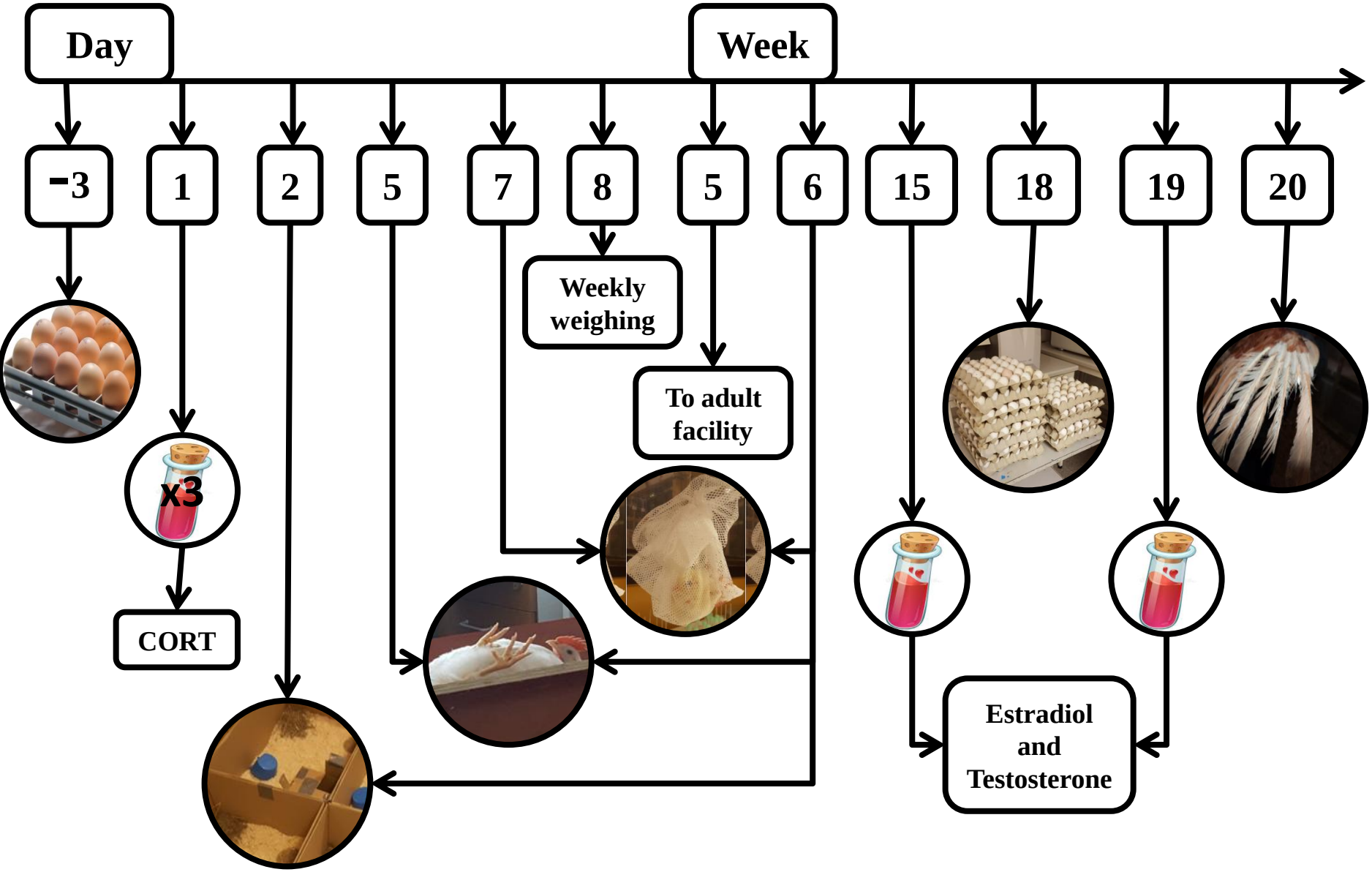
Aims

1. To assess the acute impact of hatchery routine on commerical leghorn chickens
2. To assess the chronic impact of hatchery routine through adolescence and puberty
3. Do male and female chickens react differently to hatchery routines?

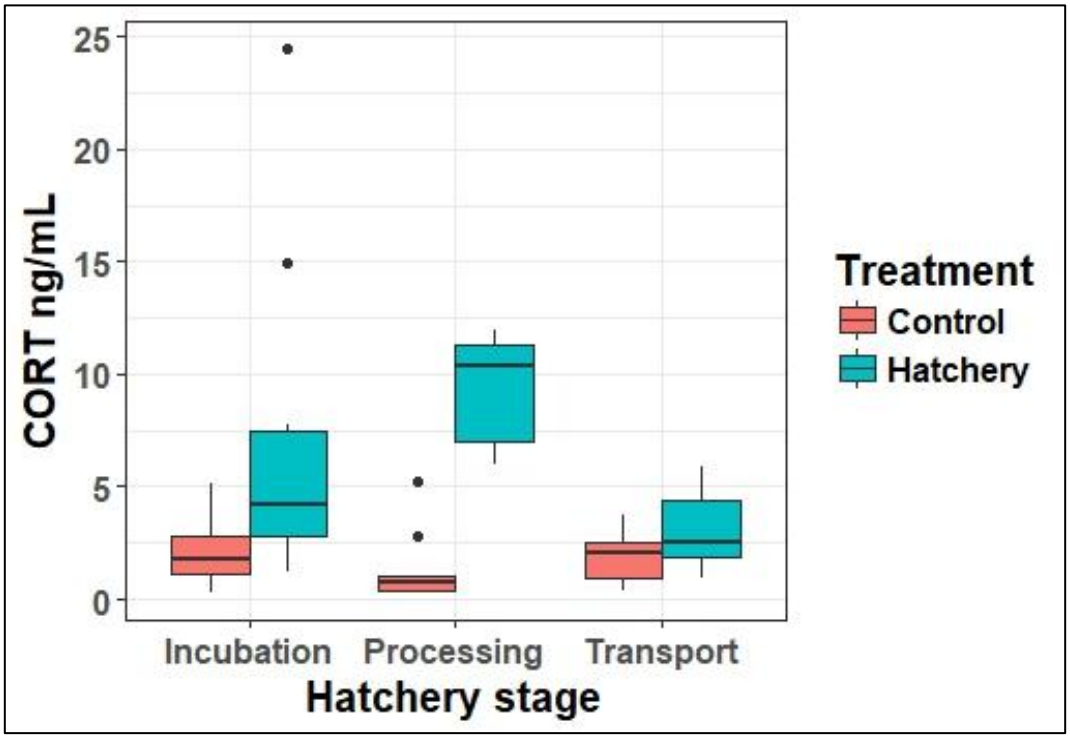
Animals

- 130 eggs and 130 chickens
- “Lohmann Selected Leghorns”
- 30 Control 30 Hatchery – Blood samples on Day 1
- 83 Controls 85 Hatchery – Behavioural testing

Methods


Day
Week
-3
1
2
5
7
8
5
6
15
18
19
20
Weekly weighing
To adult facility
x3
CORT
Estradiol and Testosterone

Results & Discussion – Hatchery



<u>Incubation</u>
W=16.5 p=0.01
High noise in commercial incubator for hatching.
Campo et al., 2005 – high noise group > heterophil:lymphocite

<u>Processing</u>
W=0 p<0.001
Manual handling.
Ericsson and Jensen, 2016 - Handling during hatchery process increases CORT

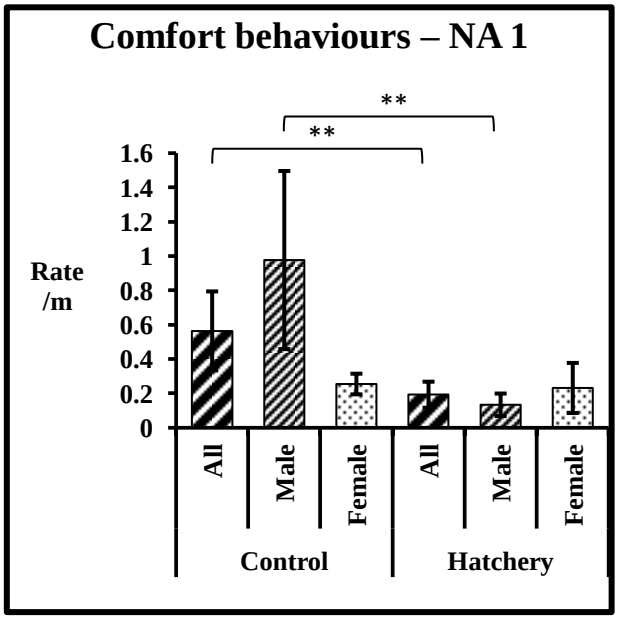
<u>Transport</u>
Habituation to transport box **or** CORT negative feedback loop
Wang et al., 2013 – Homeostasis

Novel Arena

Comfort behaviours are important welfare indicators. High levels of stress decrease the frequency of comfort behaviours.

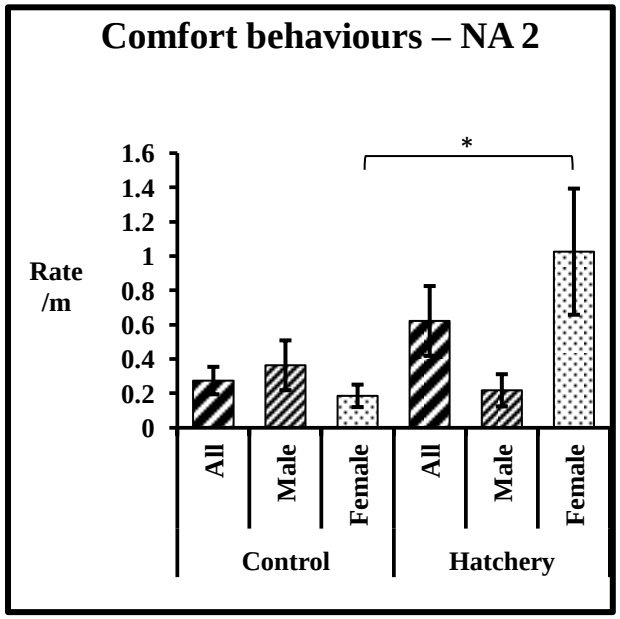
Comfort behaviours include:
- Preening
- Dust bathing
- Feather ruffles
- Body scratching
- Leg and wing stretching

Day 2



- Controls higher rate comfort behaviours

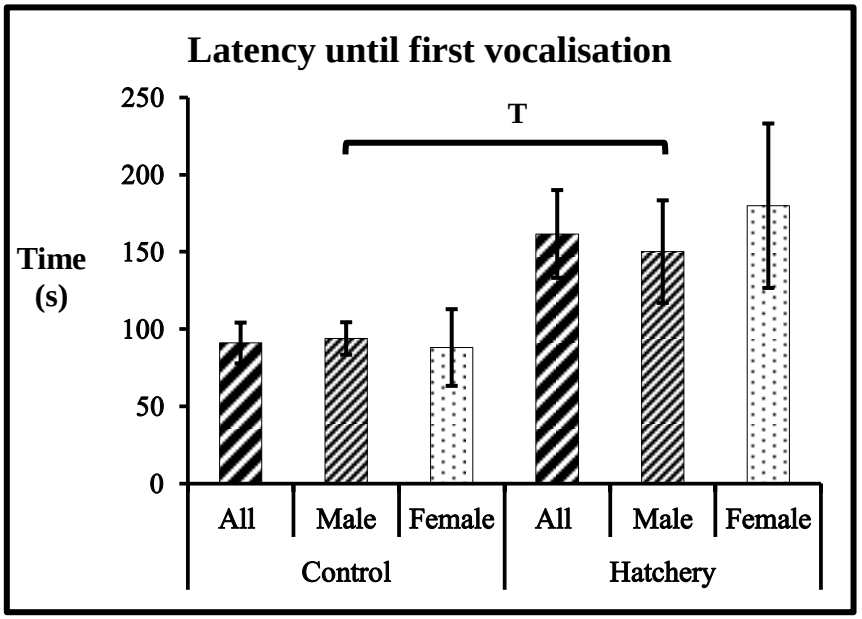
Week 6



- Hatchery higher rate comfort behaviours
- Hatchery females higher rate than males

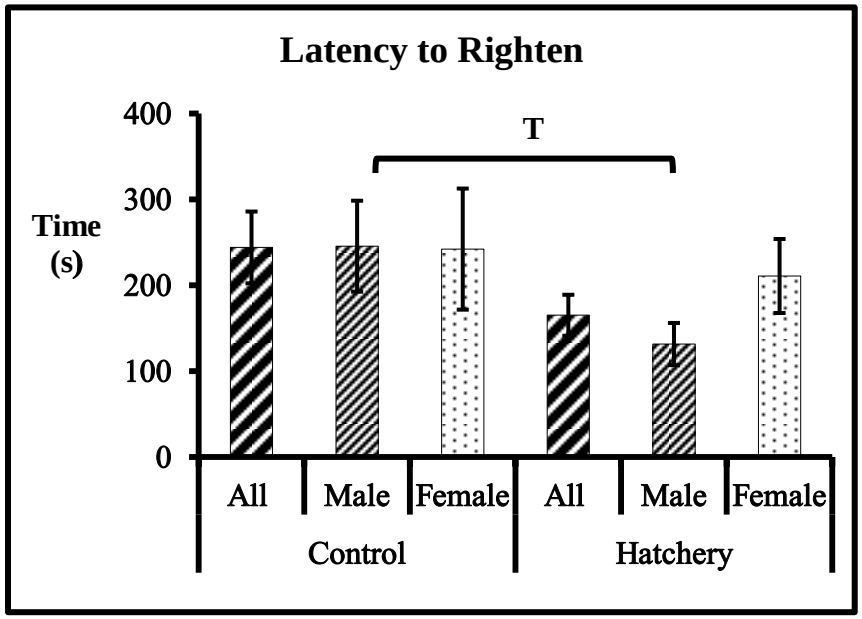
Tonic Immobility

Day 5



- Hatchery begin to wake from TI later than control
- Hatchery greater response to acute stress
- Ericsson et al. (2016) and Elfwing et al. (2015) early stress shorter TI

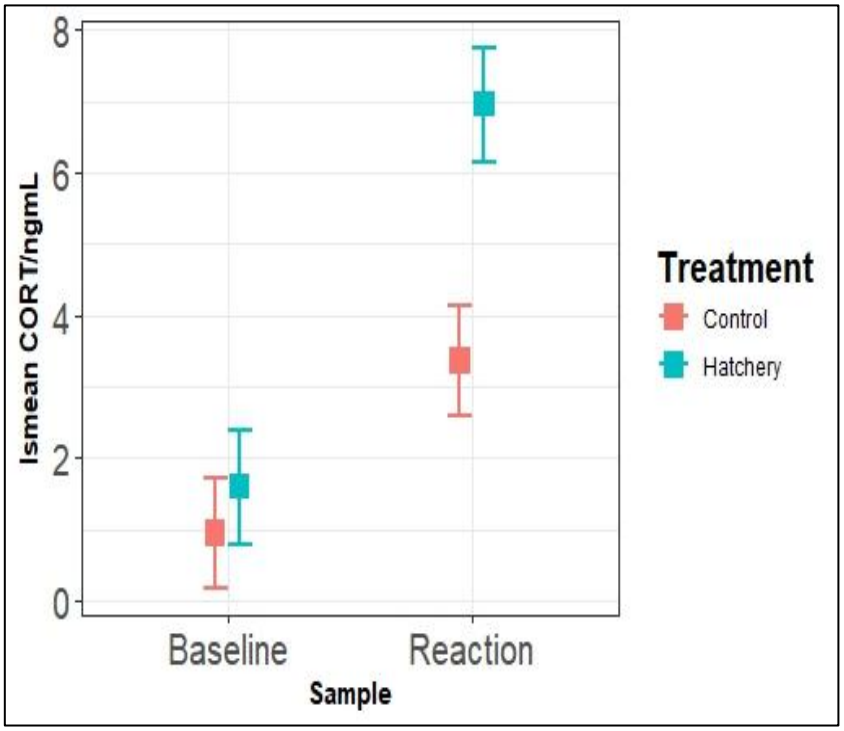
Week 6



- Control longer latency to righten
- Control greater response to acute stress
- Conditioning hormesis, exposure to early stress improves ability to cope with stress later – Constantini, 2014

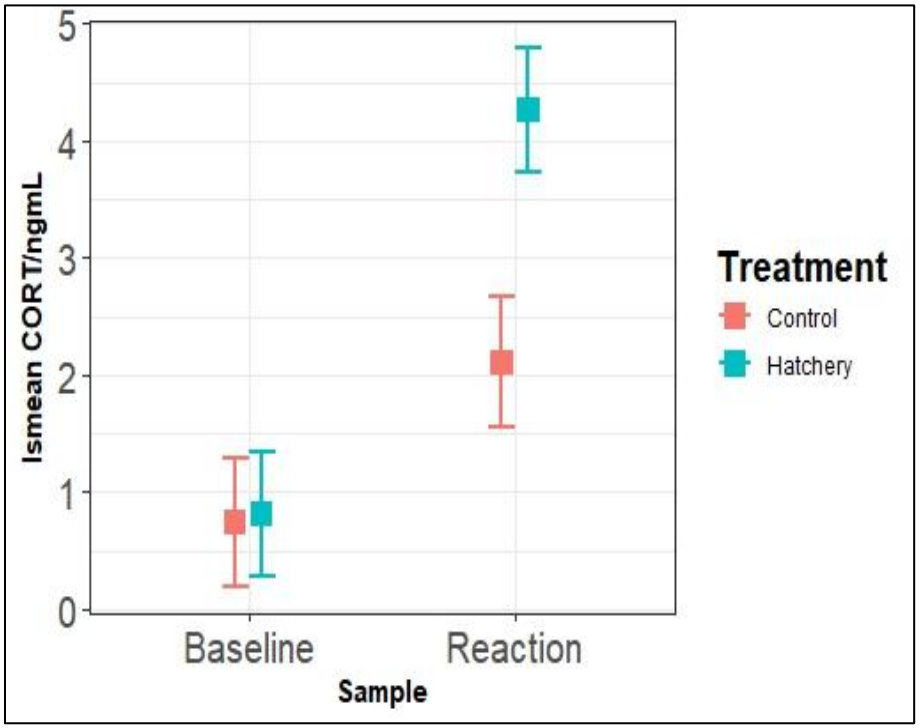
Restraint test

Day 7



- Baseline levels are similar
- Hatchery much higher levels of circulatory CORT

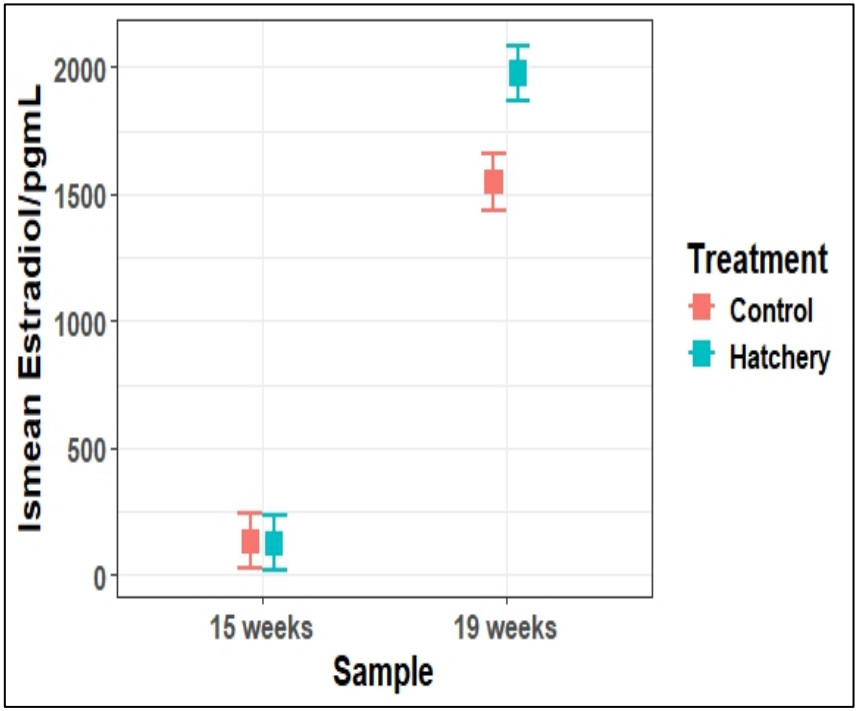
Week 6



- Almost identical results
- Either hatchery group produce more CORT or have fewer binding sites
- Exposure to early CORT can alter gene expression (Wang et al., 2015)

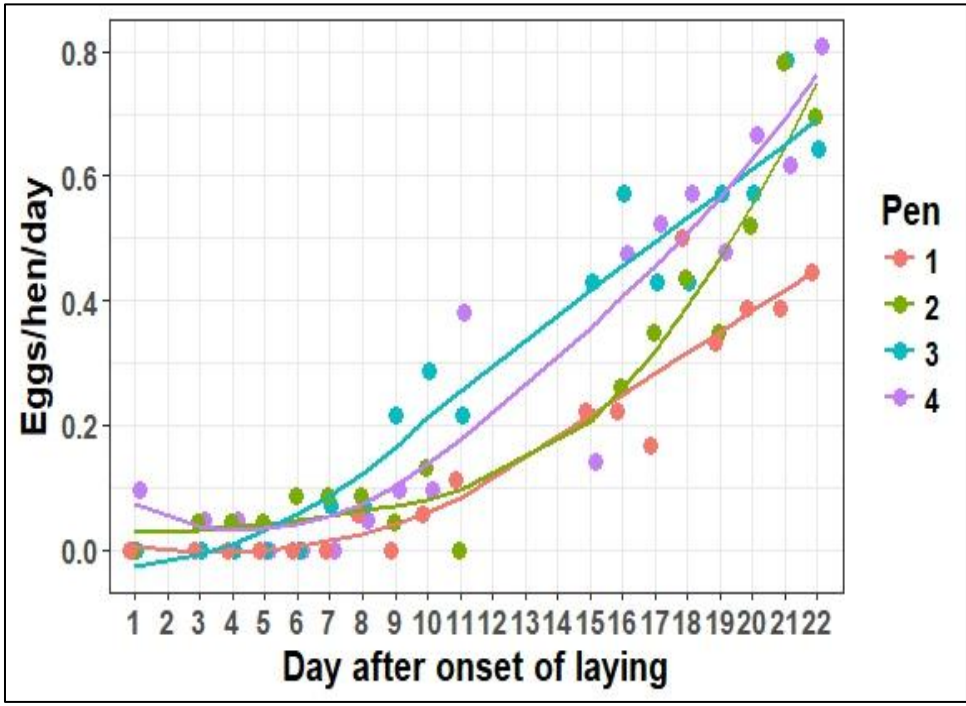
Production measures

Estradiol



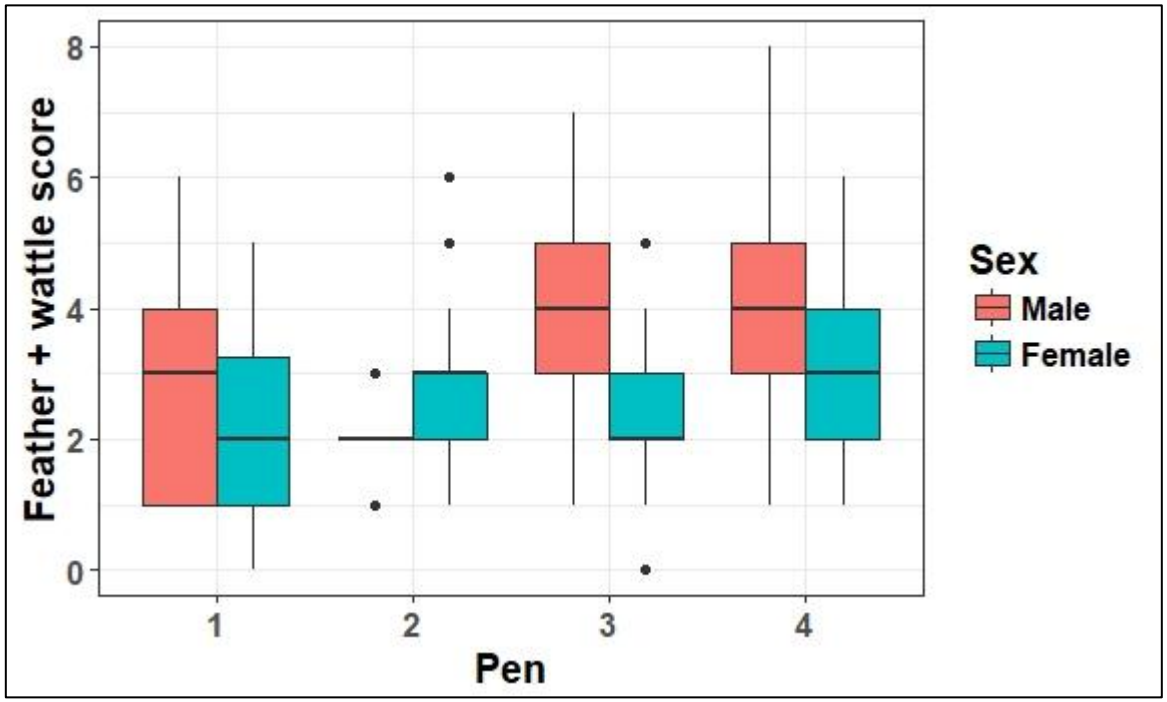
- Similar levels at 15 weeks
- Hatchery higher at 19 weeks
- Helps explain egg numbers

Number of eggs/day/hen



- Hatchery (pen 3+4) faster uptake of laying
- Control pen 1 significantly less
- Contrasts other studies – Dei (2014), high stress decreases egg production

Feather damage



- Hatchery (pens 3 + 4) higher feather damage
- Links between high CORT and increased feather pecking (El-Lethy et al., 2001)
- Males higher feather damage, contradicts findings by Jensen et al., 2005

Conclusions

- Hatchery exposes individuals to high stress which may impact behaviour in later life
- Hatchery individuals more stressed at 1 week of age. Higher CORT, less comfort and explorative behaviours.
- Hatchery processes may cause a hormetic effect in later life. However, had higher CORT and feather damage.
- Males more susceptible to hatchery stress

Take home message

Hatchery processes may have immediate negative effects on behaviours but it may prime individuals to cope with further stressors in later life. However there are still negatives.

Acknowledgments

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Thank you for listening!