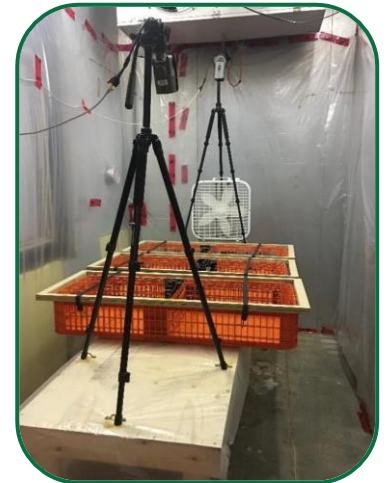


# The Effects of Simulated Transportation on White-Feathered End-of-Cycle Laying Hens

## PURPOSE OF STUDY

Transport plays a significant role in the table egg industry. However, it can subject the birds to a variety of stressors including fasting, catching and handling, and potentially thermal stress. Transporting end-of-cycle hens (EOCH) is particularly challenging because their minimal body weight could lead to metabolic exhaustion, there is a possibility of reduced feather cover making thermoregulation difficult, and there is potential for a longer transport journey to reach specialized slaughter plants. Past research has focused on the impacts of transport on meat-type birds due to their high economic value but little is known about the effects of transport on EPOCH.

The aim of this study was to examine and assess the stress responses exhibited by well-feathered and poorly-feathered white strain EPOCH when exposed to hot, neutral, and cold temperature/relative humidity combinations, for specific durations by evaluating behaviour, physiology, and meat quality.



Simulated chamber

## METHODS

### Birds

- 630 white feathered EPOCH from 3 commercial farms

### Treatments

- Temperature/Relative Humidity (T/RH):
  - 10°C uncontrolled RH (-10)
  - +21°C 30% RH (21/30)
  - +21°C 80% RH (21/80)
  - +30°C 30% RH (30/30)
  - +30°C 80% RH (30/80)
- Duration of exposure (D): 4, 8, or 12 hours (h)
- Feather Cover (FC): Well (WF; >50%) or Poor (PF; ≤50%)

### Data Collection

- Hens were placed in drawers (53 kg/m<sup>2</sup>) and positioned in environmental chambers
- Parameters evaluated included: mortality, core body temperature (CBT), behaviour, blood physiology (glucose, sodium, blood gases, acid base, hematocrit, hemoglobin and heterophil/lymphocyte ratios), and meat quality (live shrink, pH, colour, drip loss, thaw loss, and cook loss)



Left side: Well-feathered hen;  
Right side: Poorly-feathered hen

# FINDINGS

## Behaviour

Hens exposed to -10 spent more time shivering to generate heat. More time was spent motionless for WF hens in the -10, PF hens in 30/30, and both FC in the 21/30 and 21/80 compared to WF hens in the 30/30 and 30/80. WF hens in the 30/80 and 30/30 and PF hens in the 30/80 spent more time panting compared to both FC in the -10, 21/30, and 21/80 demonstrating heat dissipation.

## Physiology

Mortality occurred for EOCH exposed to -10 indicating an inability to cope (particularly for PF hens). CBT increased for hens exposed for 12h across all T/RH compared to birds exposed for 4h to the 21/30 and 21/80 which had a small decrease, followed by EOCH exposed for 4h to the -10 which had a larger decrease. Glucose had a larger decrease for EOCH exposed for 4 or 12h to the -10 compared to birds exposed for all durations in 21/80, 30/30, and 30/80, and 21/30 at the 4h D which had a smaller decrease. Hens developed metabolic alkalosis (higher acid base values) when exposed to -10. Signs of dehydration were exhibited by increased sodium in hot and neutral T/RH and by increased hematocrit and hemoglobin in the -10 PF hens. Stress levels were elevated in the -10 PF 8h treatment compared to all other treatments except 4 and 12h -10 PF hens.

## CONCLUSIONS

- Longer exposure to -10 and 30/80 resulted in thermoregulatory behaviours and metabolic stress for hens of both FC
- PF hens with long exposure to -10 ante-mortem resulted in significant impacts on CBT and meat quality
- There were minimal impacts on meat quality for EOCH exposed to 30/30 or 30/80 regardless of D or FC

## Meat Quality

Live shrink (%) increased with exposure D. Breast (final) and thigh muscle pH (initial and final) was highest for birds exposed to -10 for 12h. Breast and thigh muscle (both FC) lightness was lowest for birds exposed to -10, while redness was highest in this treatment. Thigh muscle redness was also highest in PF hens. Breast muscle thaw loss was lowest for birds exposed to -10 for all D compared to birds exposed to 30/30 for 12h. Breast muscle cook loss was lowest for hens exposed to -10 for 12h compared to all other treatments except for the -10 4h treatment. PF hens exposed to the -10 also demonstrated the lowest cook loss compared to WF hens in the -10, followed by the EOCH of both FC in the 21/80.

## ABOUT US



**Carley Frerichs** completed her MSc. under Dr. Karen Schwean-Lardner at the University of Saskatchewan. This research was conducted for her MSc Thesis.



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