Focal Duodenal Necrosis (FDN) in SK End-of-Lay Hens

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What is FDN?

- Intestinal disease syndrome in laying hens
  - Dark-coloured lesions in the duodenum
What is FDN?

- Poorly understood
  - Causative agent?
    - *Clostridium perfringens*
    - *Clostridium colinum*
  - Multifactorial and complex
    - Observed in all layer strains (brown & white)
    - All housing types
    - Throughout the production cycle

Does my flock have FDN?

- Lack of observable clinical signs
  - No mortality, normal droppings
  - Pale combs?
  - Slow body weight gain?

- Economic indicators
  - Reduced egg weights (2.5 g/egg)
  - Lower production (10%)
  - Shell quality

Does my flock have FDN?

- **Diagnosis**
  - Monitor via routine necropsy
    - 10 birds every 4-8 weeks
  - Completed within 45-60 minutes of euthanasia
    - Lesions slough quickly after death
  - Treatment options available
    - Reoccurs after treatment
FDN Diagnoses in SK

- Newly diagnosed disease in SK layer flocks
  - 1<sup>st</sup> diagnosis – summer 2014
  - Total cases diagnosed = 5
- It’s here... What’s the incidence?
  - Survey end-of-lay flocks in SK
    - 7 flocks: 1 practice flock, 6 flocks with full data sets
    - Despite a lack of clinical signs, FDN lesions observed in ALL of them!
FDN Surveillance

- 100 birds per flock (6)
  - 20 “pale” combs
  - 20 “red” combs
    - Body weight, full and empty gizzard weights, comb colour measurement, noted CRO if present
    - iStat - 3 birds each with pale or red combs
  - 60 birds – quick and dirty
    - Presence or absence of FDN
FDN Lesions

www.usask.ca
FDN Lesions
FDN Lesions
FDN Lesions
FDN Lesions
FDN Depressions
## Preliminary Results

<table>
<thead>
<tr>
<th>Farm</th>
<th>Strain</th>
<th>Feed</th>
<th>FDN</th>
<th>Fdep</th>
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<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>high WW</td>
<td>48%</td>
<td>19%</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>mash</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>mash</td>
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<td>9%</td>
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<tr>
<td>5</td>
<td>C</td>
<td>mash</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>6</td>
<td>C</td>
<td>comm</td>
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<td>6%</td>
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<td>AVG</td>
<td></td>
<td></td>
<td>23.5%</td>
<td>8.0%</td>
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</tbody>
</table>
Further Investigation

1. Pullet(a)-layer(b) project at U of S Poultry Centre

2. Field study with SEP volunteers
   - Funding
     - EFC LOI – full proposals due June 24th
     - SEP letter of request

3. Current IRC laying hen trial
1. Pullet-Layer Project at U of S

- Flock housed at the Poultry Centre
- 1a. Pullet project
  - NSERC IRC summer student – Chantal Krauter

![Image of Chantal Krauter with chicks]
1a. Pullet Project at U of S

- Objectives
  - To determine if FDN lesions are present in pullets
    - 4, 9, 15, 18 and 19 weeks of age
  - To determine if Ca source impacts gizzard size, gut health, feed efficiency and FDN prevalence
  - To compare effects of providing pre-lay ration for 7 vs 28 days on GIT parameters and FDN
1a. Pullet Project at U of S

- Hypotheses
  - Young pullets will not have FDN lesions
  - Feeding Ca in large particle size will moderate Ca release into duodenum and reduce pH
  - Providing a pre-lay ration for 28 days will increase the incidence of FDN
1a. Pullet Project at U of S

- 1,584 Lohmann LSL pullets
  - 2 Ca sources: limestone or grit-mixture
  - 2 pre-lay periods: 7 or 28 days
1a. Pullet Project at U of S

- Data collection
  - Bird weights and feed weigh backs
  - Tissue collections
    - Full & empty GIT weights, plus lengths
    - *In situ* GIT pH measurements
    - Histology samples
    - Looking for FDN lesions
1b. Layer Project at U of S

- Same birds housed in lay barn
- Diets
  - 2 Ca sources: limestone or grit-mixture
  - 2 Ca levels: 3.8 or 4.5 g/h/d
- Data collection
  - Tissues at 31, 44, 57 and 70 weeks of age
  - Egg production and quality
2. Field Study

- **Surveillance throughout production cycle**
  - Objectives:
    - Determine FDN prevalence and its effect on egg production
    - Identify factors associated with FDN
    - Determine if Clostridial organisms are associated with FDN
2. Field Study

- Data collection at 15, 20, 35, 50 & 70 weeks
  - 20 birds/sampling date
  - BW, intestinal tract weights, pH measurements
  - Tissue samples for bacteriology and histopathology
  - Survey: flock size & strain, housing type, feed samples (Ca, P and CP), feeding program & ration formulation, bird weight, feed intake, egg production & egg quality
3. Current IRC Laying Hen Trial

- 1,152 hens housed at U of S Poultry Centre
  - 2 strains
  - 3 protein levels
    - Low (17%), medium (19%), high (21%)
  - 2 protein fractions
    - High or low digestibility
- High mortality, especially Ca-related diagnoses
3. Current IRC Laying Hen Trial

Total Mortality (71 mortalities)

- 61% Cage layer fatigue
- 41% Peritonitis
- 20% Osteoporosis
- 15% Hepatitis
- 8% Hypocalcemia
- 6% Break
- 6% Other

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3. Current IRC Laying Hen Trial

- Final collection day (mid-July)
  - Presence/absence of FDN
Summary

- FDN is present in SK layer flocks
- Poultry extension and IRC in Poultry Nutrition are investigating further
Questions?