CALF FACILITY EVALUATION

K.M. Morrill, and E. Chittenden
Cornell University

Why? 

Outline

• Why did we do this project?
• What were our objectives?
• How did we evaluate facilities?
• What did we observe?
• Moving forward

Introduction

• Respiratory disease is a great challenge
  – 12.4% of preweaned calves
    • 93.4% of respiratory challenges are treated with antibiotics
  – 66.7% of dairy operations use antibiotics
  – 31.9% of U.S. dairy operations had no respiratory challenges

USDA, 2007

• Impact of housing
  – Type of housing
  – Type of ventilation system
Introduction

• Providing calves with the best environment (housing & ventilation) and developing management protocols are key aspects to managing heifer rearing costs.

• In order for this to occur, current calf environments in NNY need to be evaluated on how they impact calf health, specifically rates of respiratory illness.

Objectives

• Evaluate rate of respiratory disease on NNY dairies

• Evaluate air quality
  – Temperature, humidity, air flow, airborne microbial concentration and ammonia levels

• Impact of housing, ventilation and air quality on calf health

Objectives

• What are we dealing with?
  – Current facilities
  – Current management practices
  – Current health challenges

• What can we do to help?

Materials & Methods

• Farm selection
  – Convenience sample of barns
    • Location
    • Referral
    • No disease outbreaks/major management changes

• One day snapshot in time
  – Environmental & health score
Material & Methods

- Evaluate:
  - Types of housing
    - Hutches, individual pens, group pens
  - Environment & potential stressors
    - Temperature, humidity, NH₃, airborne bacterial counts, bedding bacterial counts, pen size, calves/pen
  - Calf health
    - Calf health scoring
  - Management strategies
    - Survey

June, 2015

- 29 facilities
  - Hutches (n = 9)
  - Individual pens (n = 11)
  - Group pens (n = 9)
- Ventilation of barns
  - Natural (n = 8)
  - Natural + fan (n = 7)
  - Natural + tube (n = 5)
- 437 calves evaluated

Results

LOTS OF DATA

TODAY:
- Environmental evaluation
- Airborne bacteria
- Calf health scores

Also have data on...
- Stocking density
- Bedding bacteria counts
- Management practices

Environmental Assessment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°F)</td>
<td>75.57</td>
<td>7.22</td>
<td>60</td>
<td>87</td>
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<tr>
<td>Humidity (%)</td>
<td>45.68</td>
<td>18.85</td>
<td>10</td>
<td>78</td>
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<tr>
<td>Heat Index</td>
<td>70.64</td>
<td>11.39</td>
<td>43.0</td>
<td>87.7</td>
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Environmental Assessment

<table>
<thead>
<tr>
<th>Housing</th>
<th>Ventilation</th>
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<tbody>
<tr>
<td></td>
<td>Hutch</td>
</tr>
<tr>
<td>Temp. (°F)</td>
<td>74.43&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Humidity (%)</td>
<td>57.68&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Heat index</td>
<td>68.87</td>
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</table>

What about ammonia?

Airborne Bacterial Counts

<table>
<thead>
<tr>
<th>Item&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Housing</th>
<th>Ventilation</th>
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<tbody>
<tr>
<td></td>
<td>Hutch</td>
<td>Individual</td>
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<tr>
<td>Total Bacteria Count</td>
<td>4.77&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.62&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Gram Negative Bacterial Count</td>
<td>3.24&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.75&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>2</sup>Means within row with different superscript letter differ (P < 0.05).
<sup>3</sup> All data presented in Log10 format and CFU/m³

- No difference (TBC & GNBC) by bedding type utilized in facility

Airborne Bacterial Counts

Gram negative bacteria by temperature range

\[ y = -0.424x + 4.8671 \]
\[ R^2 = 0.9909 \]

- No relationship between TBC and temperature range or airflow.

Calf Health

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<th>SD</th>
<th>Min</th>
<th>Max</th>
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<td>1.701</td>
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Calf Health

Nationally
- 12.4% of preweaner heifer calves had a respiratory disease.
- 93.4% of these calves were treated with antibiotics. "USDA, 2007"

Calf Health

Number of farms by prevalence of respiratory disease in calves

Nationally
- Two-thirds of operations (66.7%) used an antibiotic to treat respiratory disease in preweaner heifers.
- One-third (31.9%) had no respiratory disease in preweaner heifers.

Calf Health

Relationship between respiratory score and pen temperature

- No difference in respiratory score by:
  - Housing type
  - Bedding source
  - Ventilation system
  - Relative humidity
  - Pen airflow
  - Airborne bacterial counts

Calf Health

Conclusion
- 63% of farms in NNY are dealing with respiratory challenges in pre-weaned calves
  - Minimal impact from environmental factors
  - Calf pen temperature
- Need to focus on what is causing these challenges
  - Evaluate management practices
Moving forward

- Evaluate management practice
- Evaluate respiratory disease rates in winter
- Work with producers to evaluate current calf facilities and management practices

What type of facility should I build?

- What do you have experience with?
- What can I manage?
- What changes am I will to make?

Questions???