Paratuberculosis prevalence in New Zealand pastoral livestock
(Preliminary results)

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Introduction

• Prevalence estimation,
  – starting point for any control program
• Multi-species approach.
• Few studies of transmission on multi-species farms
  – Possible cross-species strain types
Objective

• Estimate distribution and prevalence of PTb in NZ
  – Farms
  – Mobs/species within farms
    • Sheep, beef cattle and deer
Material and Methods (sampling frame)

- 2008-09, postal survey (~8,000 farmers)
- 2009-10, sampling (300 farms)
  - randomly selected based on previous PTb history and species-composition.

<table>
<thead>
<tr>
<th>Commercial farm activity.</th>
<th>Previous PTb status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>SHP</td>
<td></td>
</tr>
<tr>
<td>BEE</td>
<td></td>
</tr>
<tr>
<td>DEE</td>
<td></td>
</tr>
<tr>
<td>SHP+BEE</td>
<td></td>
</tr>
<tr>
<td>SHP+DEE</td>
<td></td>
</tr>
<tr>
<td>BEE+DEE</td>
<td></td>
</tr>
<tr>
<td>ALL sp.</td>
<td></td>
</tr>
</tbody>
</table>
Material and Methods (sampling)

- Veterinary practices
- Blood and faeces from 20 animals/species
- Faeces samples pooled:
  - Sheep 1x20
  - Beef cattle 2x10
  - Deer 2x10
- PTb culture
- Individual serum and faeces stored (-80C)
Material and Methods (analysis)

- Species-strata prevalence estimated using a logistic regression model
  - Prevalence adjusted by island effect

• Positive

- PFC

• Positive

- ELISA / Paralisa

• Negative
Results: sampling

- Target 300 farms
  - Actual 237 (to date)
  - ~ 8,000 animals

- Results
  - 216 farms
  - North Island: 119 farms
  - South Island: 97 farms
  - Sheep: 150 flocks
  - Beef cattle: 102 mobs
  - Deer: 91 mobs
Results: Farm status

PTb. herd status (any species positive)

- ~60% present at least one (+) mob/flock
  - North Island: 61%
  - South Island: 58%
- 10% of farms had > 1 (+) mobs/flocks
- By mob specie
  - Sheep: 65%
  - Beef cattle: 27%
  - Deer: 32%
Results: Deer

Deer farm PTb. status

- ~31% farms PFC (+).
  - NI: 12.1%
  - SI: 46.8%*
    - (under-estimate)

- Previous PTb (sus + conf):
  - 45.9% (+)

- No previous PTb
  - 20.9% (+)
Deer mob prevalence across species strata

<table>
<thead>
<tr>
<th>Strata</th>
<th>North Island</th>
<th>South Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEE</td>
<td>0.07</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>(0.02 – 0.23)</td>
<td>(0.18 – 0.58)</td>
</tr>
<tr>
<td>BEE+DEE</td>
<td>0.34</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>(0.08 – 0.75)</td>
<td>(0.41 – 0.96)</td>
</tr>
<tr>
<td>SHP+BEE+DEE</td>
<td>0.15</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>(0.05 – 0.40)</td>
<td>(0.33 – 0.81)</td>
</tr>
<tr>
<td>SHP+DEE</td>
<td>0.08</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>(0.02 – 0.28)</td>
<td>(0.21 – 0.68)</td>
</tr>
</tbody>
</table>
Deer mob odds ratio across species strata

<table>
<thead>
<tr>
<th>Strata</th>
<th>OR</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEE</td>
<td>Ref</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BEE+DEE</td>
<td>7.2</td>
<td>(1.16 - 56.4)</td>
<td>0.042</td>
</tr>
<tr>
<td>SHP+BEE+DEE</td>
<td>2.6</td>
<td>(0.67 – 10.6)</td>
<td>0.173</td>
</tr>
<tr>
<td>SHP+DEE</td>
<td>1.4</td>
<td>(0.34 – 5.39)</td>
<td>0.665</td>
</tr>
</tbody>
</table>
Discussion

• PTb is well spread across NZ
• Deer Ptb appears associated with beef
• Preliminary outcome, crude estimations
  – Research on-going
• Sampling design and bias
Acknowledgments

• JDRC and funding partners

• All veterinary practices across New Zealand
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Questions?