Michigan Bovine Tuberculosis Update

Overview

• Michigan’s Program

• Research

• Future Direction
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Our Five Pillar’s

  o Surveillance
  o Traceability
  o Response to Infection
  o Compliance
  o Wildlife Risk Mitigation
For the first 9 months of 2015:
  o 278 whole herd tests have been done in MAZ
    ▶ 2 infected herds found in MAZ core area as a result of area testing
  o 112 whole herd test in TB Free Zone
    ▶ No infection

Herd # 61

• 600 head dairy in Alpena County
• Area test (March): 39 suspects/462 tested (8%)
  o 32/39 (82%) CFT suspects were infected
• Follow-up test (May): 35 suspects/562 tested (6%)
  o 18/35 (52%) CFT suspects were infected
• Total: 50/74 (68%) CFT suspects were TB positive
Herd # 61

- Prolonged depopulation process
- MDARD has worked with farm to improve their biosecurity
- 46 of 47 trace investigations have been completed
  - 15 herds with 2,400 cattle have been tested – no findings of disease

Herd #62

- Small hobby farm in Alcona County
- Area test (May): 2 suspects/5 tested
  - Both were gamma positive and infected
- Herd depopulated in August
  - 1 additional animal found infected
- Not likely to repopulate
- 1 source herd tested – no disease
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TB Research

• Tuberculin – USDA-VS
• Salt Study – Michigan State University
• Silage Study – Michigan State University
• Cow-side tests – The Ohio State University
• Diagnostics & Prevention – National Wildlife Research Center
• International WGS Study – Cornell University
USDA - VS

• Lelystad
  – Goal: determine if viable option as backup tuberculin
  – 12 month trial in MAZ
  – MI opinion viable option

• New Zealand bio-bead
  – Goal: compare to traditional ppd
  – Used in infected feedlot
  – MI opinion not viable option to use
Summary to Date

- Model for making silage and inoculating with bTB in laboratory system
- Culturable *M. bovis* not recoverable after 4 wks
  - $\downarrow$ pH
  - $\uparrow$ Acids
  - $O_2$ depletion
- Detectable *M. bovis* DNA for length of study
  - Dead bacteria?
  - Dormant bacteria?

Conclusions

1. *M. bovis* can survive on shaded mineral blocks for over 3 days during the winter and still be viable.
2. The sunlight appears to shorten the viability of the *M. bovis* to 48 hrs on mineral blocks.
3. The salt blocks, both sun and shade, have a shorter survivability for the *M. bovis* than the mineral blocks.
**Improved diagnosis of *M. bovis* Infections in Human and Cattle**

**Goal:** To develop a **point-of-care, easy-to-use, field-deployable, rapid, and inexpensive** Bovine-TB diagnostic test for use in the U.S. and low income settings

- Michigan provided Urine and Milk specimens from infected animals from the 2014-2015 Michigan Bovine-TB outbreaks for test’s development
- Two Tests:
  - LAM-Test: Urine and milk dipstick (25 minutes)
  - BTB-CX: Culture and Drug Susceptibility test (14 days)

**Evaluation of Breath Volatile Organic Compounds as a Screening Test to Detect *Mycobacterium bovis* infection**

**Investigators:** P. Nol, H. Haick, N. Shehada, M. McCollum, J. Rhyan

- Collected breath and fecal specimens from 45 cattle, 25 of which were from an *M. bovis*-infected herd.
- Analysis of breath samples by Israeli collaborators showed 5 compounds significantly different between culture positive and negative animals.
- Analysis by an electronic nose correctly classified 92.3% of the samples.

*Seropositive = skin test positive*
**Goal:** Evaluate cattle-wildlife interactions in relation to cattle-related resources

**Investigators:** M. J. Lavelle, K. C. VerCauteren, H. Campa, S. E. Hygnstrom, D. A. Grear, K. M. Pepin, S. L. Kay

**Data from proximity loggers installed on:**
- Cattle
- Cattle-related resources
- Deer
- Opossum
- Raccoons

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**Indirect interactions between species at cattle-related resources before and after fence installment**

**INTEGRATING PHYLOGENETICS, EPIDEMIOLOGY, ECOLOGY, AND ECONOMICS**

- Principal goal: Develop methods to incorporate whole genome sequencing (WGS) phylogenetic data into bacterial transmission models
- Multiscale models of Michigan, Minnesota *M. bovis* will be compared with UK to gain insight into mycobacterial transmission dynamics in livestock/wildlife systems
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TB Review

• USDA-VS conducted an audit of Michigan’s bovine TB Program

• Overall a positive audit

• Michigan will now begin discussions about our next MOU with USDA
New MOU

- 7 MAAZ Counties were moved to TB Free September 2014
- Random TB testing continued in 6 of these counties
- Michigan is proposing all routine TB Program activities in these 6 counties be discontinued in 2016

New MOU

- Propose creating a MAAZ buffer zone
- Same risk based testing be used in MAAZ, as previously used
  - Breeders test annually
  - Feeder test every 2 yrs.
  - Feedlots test every 3 yrs.
Summary

- Progress continues to be made in returning Michigan to TB Free Status
- Actively involved in advancing scientific knowledge
- When appropriate, based on disease risk, further shrinking core area

Questions?

Stay connected with MDARD!

Michigan Department of Agriculture
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