AN "EMERGED" PATHOGEN MYCOPLASMA BOVIS IN BISON

1st International Symposium on Bison Health

June 24-26, 2015 Saskatoon, SK

Presented by: Dr. Pat Burrage BSc., DVM

Agenda for Today

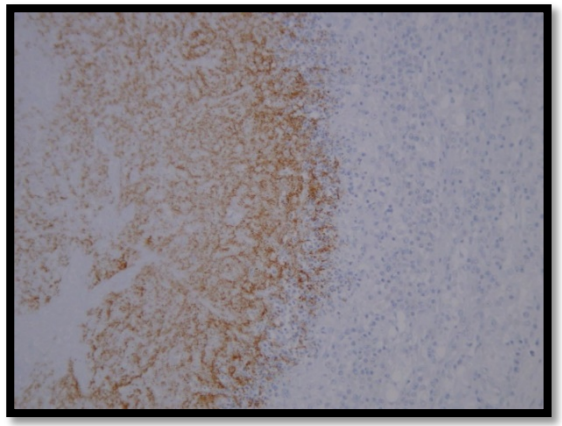
- Mycoplasma bovis
  - What is it
  - What does it cause
  - How to diagnose
  - How to treat
  - How to prevent

What is Mycoplasma bovis?

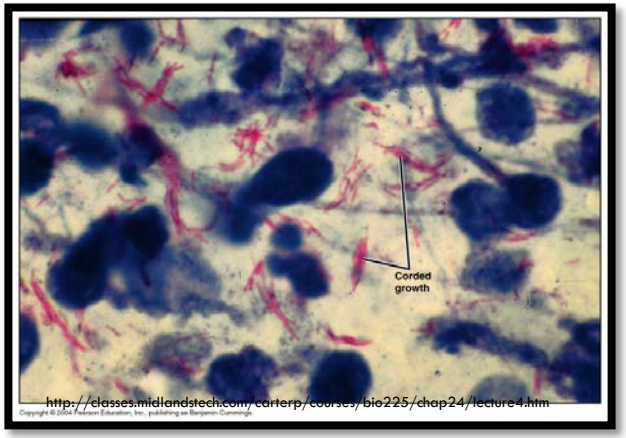
- Simple Bacteria
  - Self replicates
  - Small genome
  - No cell wall → limits antibiotic options
  - Special culture to grow
  - No on-label vaccine
- History: first found in dairy cattle in 1991 and bison in 1999

The TWO M. bovis' out there

- Mycoplasma ≠ Mycobacterium
  - Mycoplasma= What we will talk about today ☺
  - Mycobacterium = Tuberculosis "TB"



Mycoplasma



Mycobacterium

Other Mycoplasmas found in Cattle

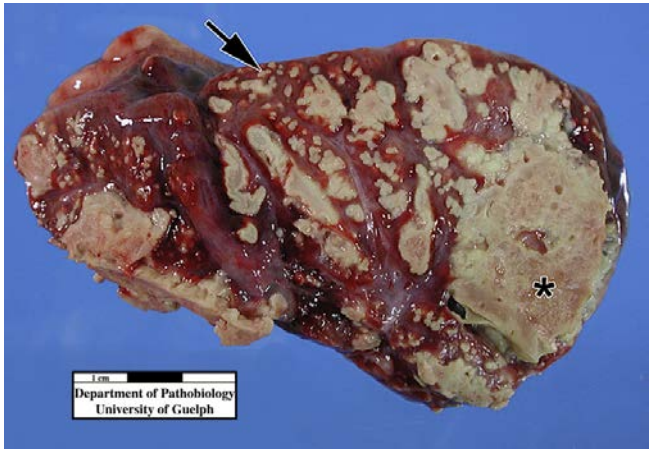
Mycoplasma bovis is the most pathogenic of all!

M. Alkalescens	*M. bovoculi*
M. alvi	*M. californicum*
M. arginini	*M. canadense*
M. bovigenitalium	*M. dispar*
M. bovirhinis	*M. mycoides*

Mycoplasma in Cattle

CPPS= Chronic pneumonia polyarthritis syndrome → leading cause of mortality in young feedlot calves

- Pneumonia, Mastitis, Arthritis….
- Can work alone, but often co-infects with other pathogens
- Variable expression
  - Isolated in the lungs of cattle that were not clinically ill



Classic Caseonecrotic Bronchopneumonia → Mycoplasma Pneumonia

Clinical Signs of Mycoplasma bovis

On Distant Exam

- Weight loss
- Coughing
- Difficulty breathing
- Lethargy
- Lameness
- Isolation from herd
- Dead

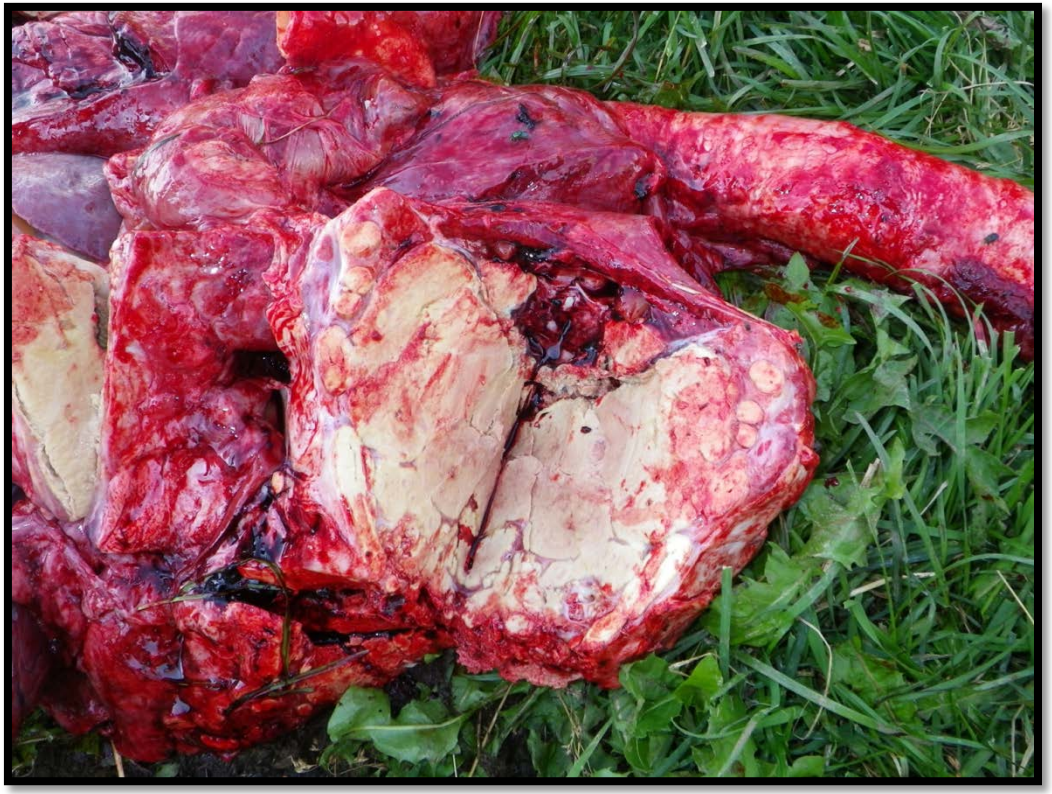
VIDEO

IMG_2590.MOV

On Necropsy

Pneumonia

- Caseonecrotic pneumonia
  - Multi-focal, yellow, coalescing areas of caseous necrosis
  - Raised nodules on lung surface- can resemble abscesses
  - Large portions of the lung can be infected



Pneumonia

Yellow= Fibrin

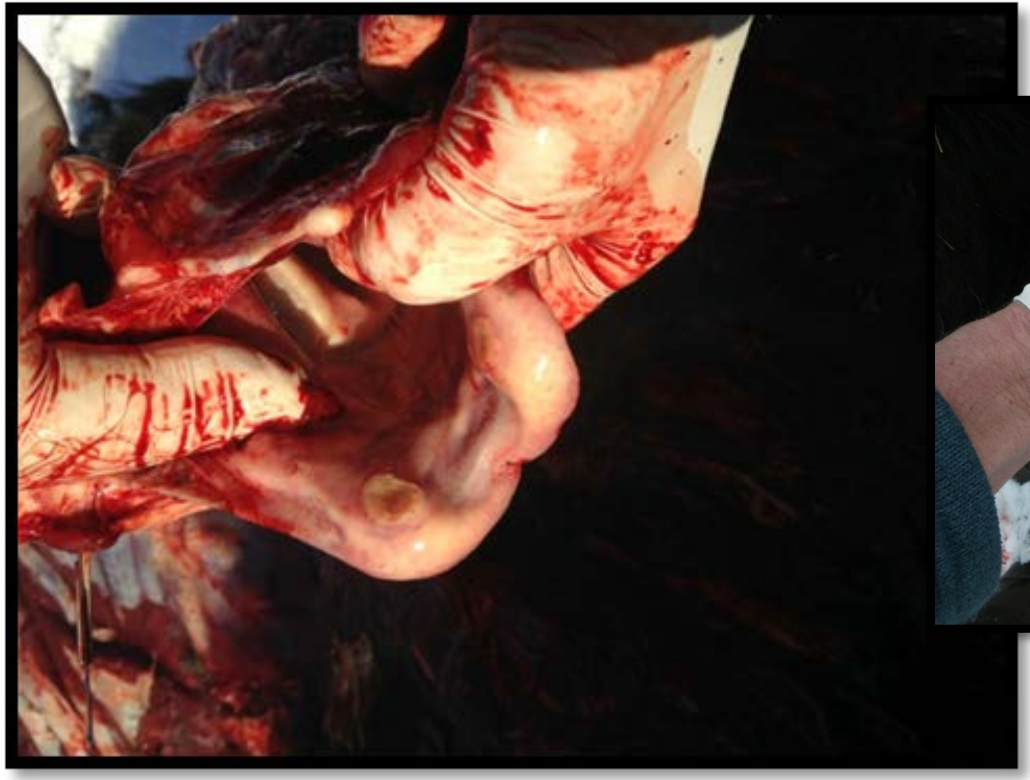
Marbling effect

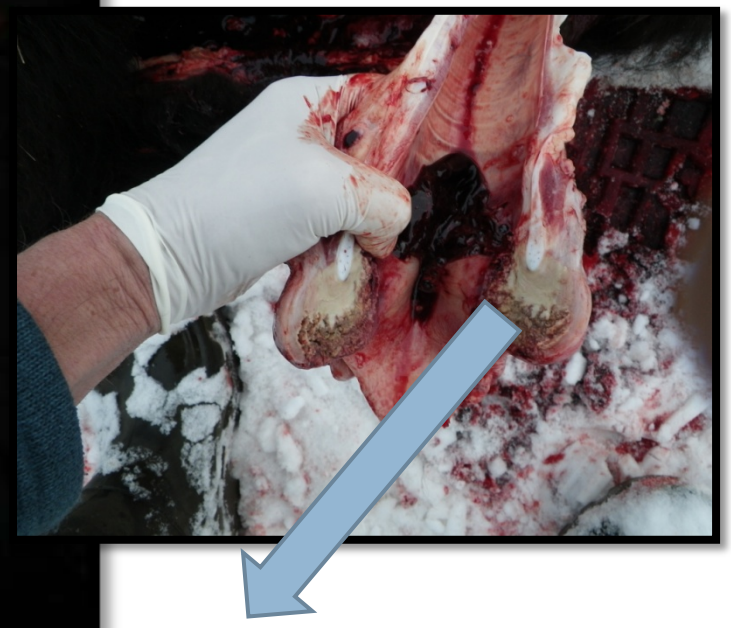
A typical Mannhemia hemolitica lung showing cranial-ventral consolidation, dark red color and extensive fibrin on the pleural surface.

A typical Mannhemia hemolitica lung showing cranial-ventral consolidation, dark red color and extensive fibrin on the pleural surface.


Cut section

Pharyngitis/Laryngitis





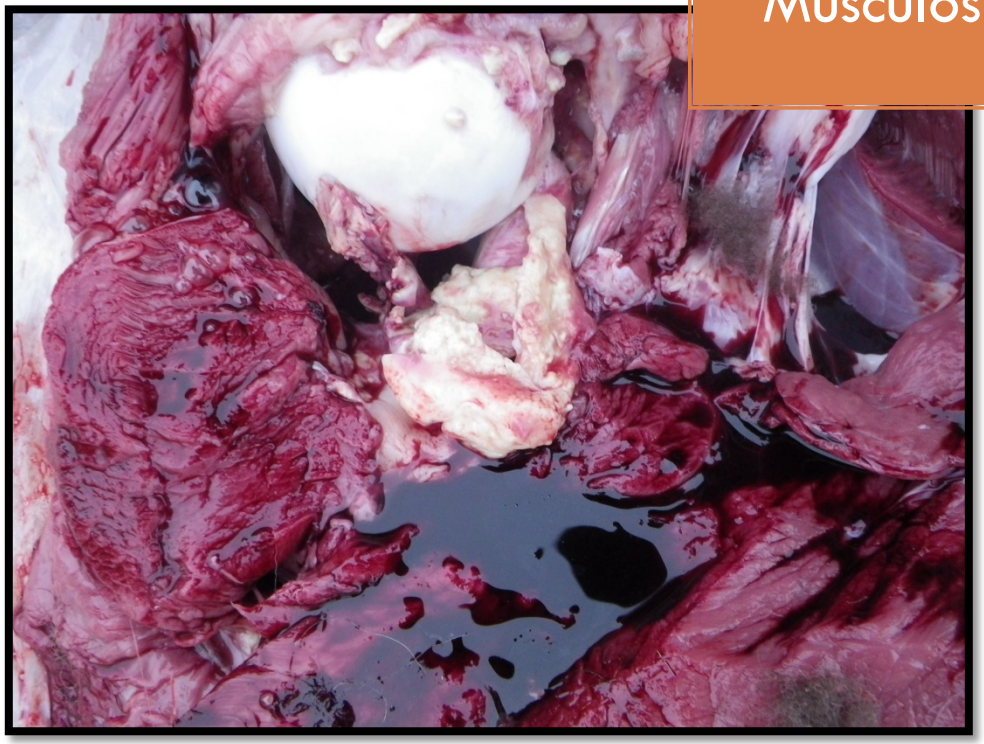
Necrotic laryngitis

Necropsy Findings

Cardiovascular

Necropsy Findings

Musculoskeletal

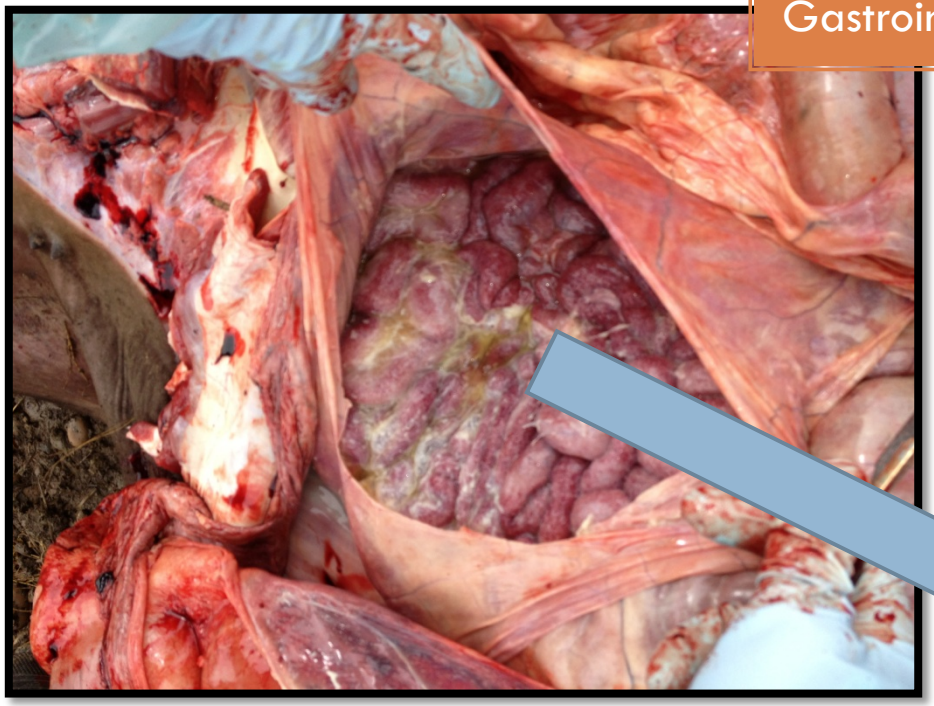


Necropsy Findings

Reproductive

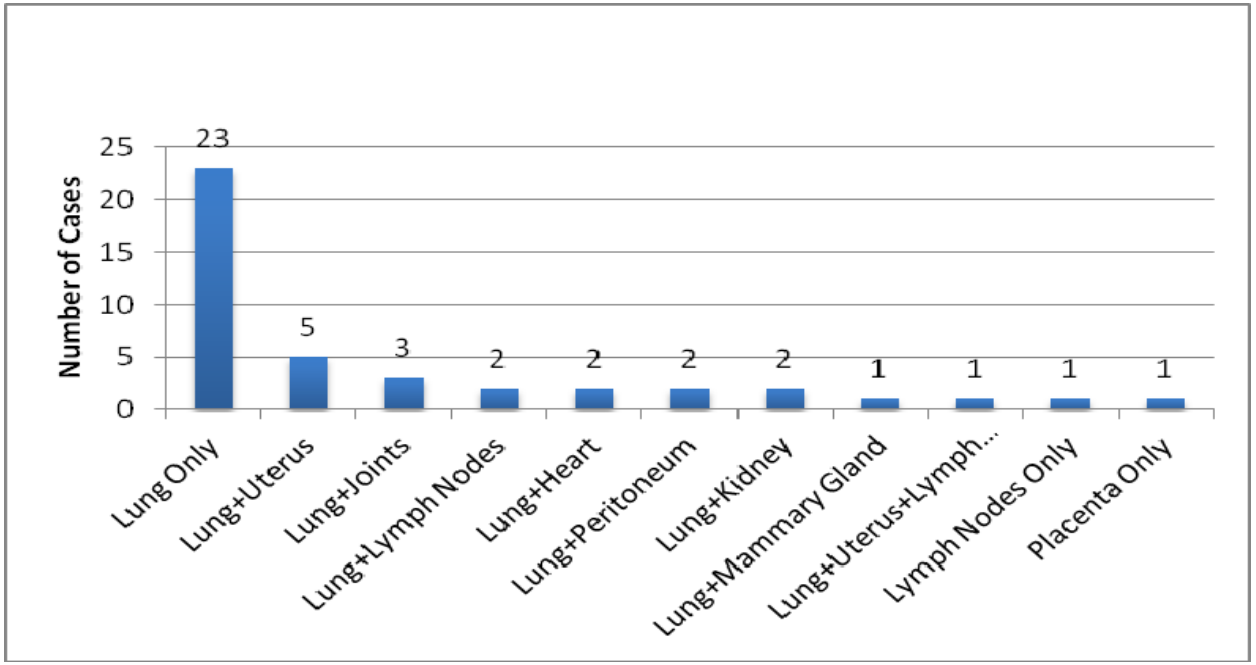
Necropsy Findings

Gastrointesintal



Fibrinous peritonitis

Organ Systems Affected by M. bovis



P. Burrage, R. Lewis, T. Clark, R. Tremblay.
Cause of Mortality in Bison.

Summary of Lesions

M. Bovis can infect nearly every organ system, but the most affected are respiratory, reproductive and musculoskeletal

- Respiratory: Caseonecrotic pneumonia and laryngitis/pharyngitis
- Reproductive: Dystocia, abortions, reduced fertility, mastitis
- Musculoskeletal: (poly)arthritis

Mortality Study in Bison 2012

Cause of Death	Number of Cases	UTM	OTM
Mycoplasma bovis	43	26	17
Trauma	15	12	3
Mannheimia	12	11	1
Open diagnosis	9	5	4
Emaciation	6	5	1
Clinical Parasitism	4	3	1
Chronic Pneumonia/Abscess	3	3	0
Misc	10	6	4
Total	102	71	31

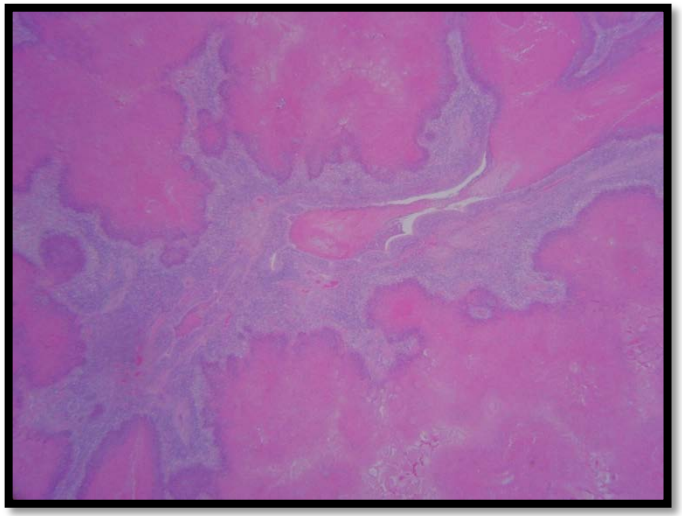
Mortality Study in Bison 2012

Bison (n=43) Dying with a Diagnosis of Mycoplasmosis by Age, Sex and Season of Death				
		All Ages	UTM*	OTM*
Season of Death	Winter 2010	3	2	1
	Spring 2011	13	8	5
	Summer 2011	22	12	10
	Autumn 2011	5	4	1
Sex	Male	20	18	2
	Female	22	7	15

* UTM = Under 30 Months, OTM = Over 30 Months
One animal's sex was not available (fetus)

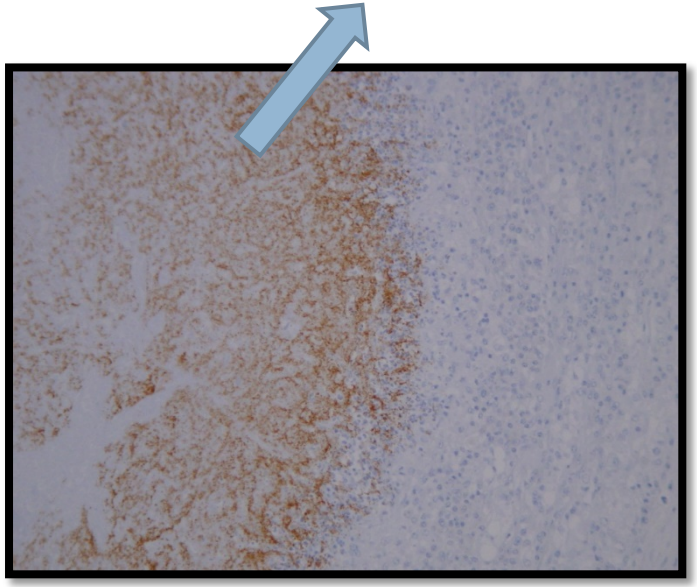
How is M. bovis Diagnosed?

- PCR → Swabs, lung or joint
- Histopathology



Mycoplasma bovis H&E stain

Brown stain= M. bovis



Mycoplasma bovis IHC

How is M. bovis Transmitted?

- Respiratory Secretions
  - Aerosol
  - Nose-to-nose
  - Feed, water, dirt
  - Fomites
- Stress Hypothesis
  - Predisposing factor for infection??

Transmission and Spread

- Contact with subclinical bison
- Initial outbreak delayed
- Rapid spread
- Shedding- intermittent to chronic

http://kids-myshot.nationalgeographic.com/photos/view/23320/bison-tongue-shot-by-i-3swimming

How to Treat M. bovis

- Antibiotics usually ineffective
  - Relapses common
- Chronic disease
- Prey species → conceal illness until disease is advanced

http://hoeggerfarmyard.com/xcart/Procaine-Penicillin-G-100-cc.html

Prevention of M. bovis *** KEY

- Reduce Stress
- Autogenous vaccine
- Control parasites
- Closed herds
- Quarantine

THE END

- Thanks for listening
- Any questions??
- My Contact information:
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  - bvs@albertahighspeed.net