

VME 4103

Livestock Health and Disease Prevention



Bacterial Diseases

- *Histophilus somni* (*Haemophilus somnus*)
- *Mannheimia haemolytica* (*Pasteurella haemolytica*)
- *Pasteurella Multocida*
- *Salmonella*
- Clostridial Diseases
- Leptospirosis
- Brucellosis
- *Mycoplasma*



Associated With Shipping Fever of Cattle (BRD)

- *Mannheimia haemolytica* (*Pasteurella haemolytica*)
 - Usually in Acute cases
- *Pasteurella Multocida*
 - Usually in older cases of respiratory Disease
- *Histophilus Somni*
- *Corynebacterium*
 - Chronic cases



Mannheimia haemolytica

- bacterium most frequently isolated from the lungs of cattle with BRD.
- normal inhabitant of the nasopharynx of cattle
- causes a severe, acute fibrinous pneumonia or Fibrinonecrotic pneumonia
- Two serotypes, (1 and 2) type 1 is associated with pneumonia.

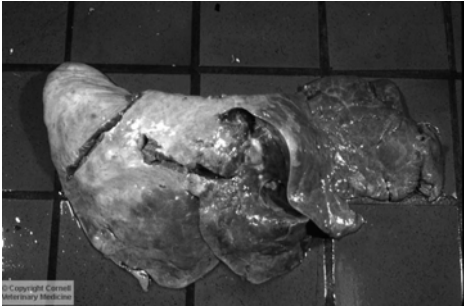
Pasteurella Multocida

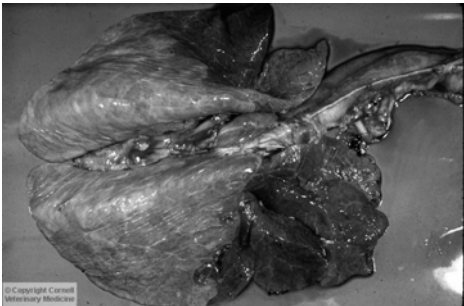
- Although less frequently cultured than *M haemolytica*, *P multocida* is also an important cause of bacterial pneumonia
- AIP????????????
 - Toxin production

Histophilus Somni

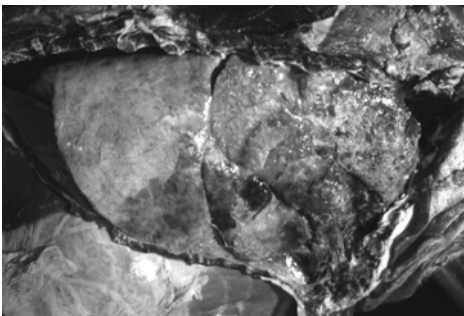
- *Haemophilus somnus*
- Associated with purulent bronchopneumonia that may be followed by septicemia and infection of multiple organs
 - Severe Pleuritis
 - Encephalitis (TEME)
 - Laryngitis
 - Joint Infections
 - Cardiac Abscesses
 - Abortions

Calf Lung

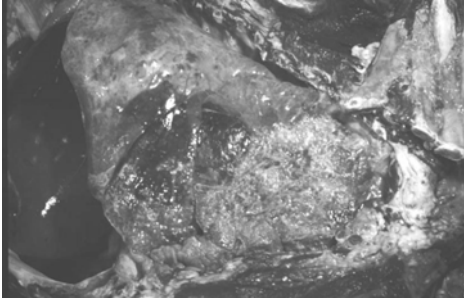




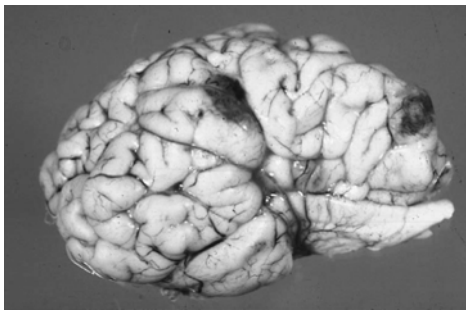
**Acute Bacterial Pneumonia ,
SHIPPING FEVER**



ACUTE BACTERIAL PNEUMONIA, SHIPPING FEVER



Histophilus: Acute hemorrhagic infarctions



Salmonella

- Many Possible serotypes
- Adult cattle can cause acute flaming diarrhea
 - foul smelling,
 - may contain blood clots, fibrin
 - febrile response
 - off feed

Salmonella

- Young calves
 - Septicemia (infection throughout the body, organism is in the blood stream)
 - Blood poisoning
 - diarrhea,
 - pneumonia,
 - death
- This is a zoonotic disease
 - Always practice biosecurity measures
 - Good hygiene

Diagnosis of Bacterial Disease

- Histopathology
- Culture and identification of the organism
 - Gold standard
 - Culture and sensitivity to identify efficacious antibiotics for treatment
 - What do you think the problem is with culture and sensitivity testing of Bacteria.

Bovine Repro diseases



Venereal Disease of Cattle

- The widespread use of AI has made it possible to breed cattle with minimal risk of transmitting specific venereal pathogens
- STD (Sexually Transmitted Diseases) are still common wherever natural service is practiced.

Natural Service in the US

- 80 to 95% of the commercial beef cattle herds in North America
 - Probably closer to 95% natural service in beef herds in the United States
 - Numerous time and management considerations for beef cattle
- 40% of all dairy females in the United States

STD

- The best known bovine STDs are insidious the etiological agents do not cause overt disease in the male or female, but rather cause occult pregnancy loss, usually early in gestation.
- In commercial cow-calf operations the result is that a significant portion of a season's calf crop is lost without anyone noticing something amiss.

Campylobacter and Tritrichomonas

	Camp	Trich
Tentative Diagnosis	Positive culture and phenotyping	Positive Culture
Confirm DX	PCR Of positive culture	PCR Of positive culture
Serology vaginal mucus	Useful but not performed	Useful in early abortions
Carrier state female	Up to 6 months	1-3 months rarely longer
Carrier State male	The rule in bulls > 3 yrs	The rule in bulls > 3 yrs
Vaccine efficacy female	Very good with proper adjuvant	Fair to good, used as labeled
Vaccine efficacy male	Good to VG with proper adjuvant	No data available

Infection with Trich or Vibrio

- Occurs only at coitus
 - Both organisms susceptible to desiccation and ultraviolet light so longevity on hair of bull is short.
 - Vibrio
 - Can occur through contaminated semen or equipment used in AI
 - Freezing process destroys the Trich organism

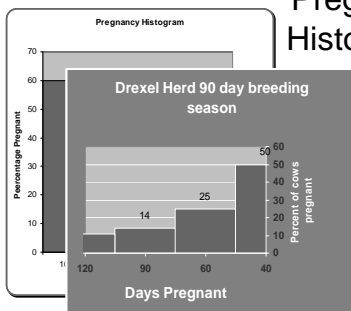
Infection

- Heterosexual transmission rates of 30 to 70 % when infected bulls breed susceptible females.
- For both organisms the bulk of pregnancy loss is technically fetal (>42 days of gestation) and not embryonic. Conceptus deaths peak at 50 to 70 days.

Clinical Signs Vibriosis/Trichomoniasis

- Increased time between Estrus Cycles
- Increased services per conception
- Abortions occurring between 4-7 months of gestation
- Infected bulls show no clinical signs and remain as asymptomatic shedding carriers

Pregnancy Histograms



Consequences of infection

- Abortion
- Pyometra
- Extended calving seasons if have a long breeding season
- Short calf crops with a 90 day breeding season

Diagnosis

■ Diagnosis

- Usually at pregnancy check time.
- When have a lower overall pregnancy rate
- Physical findings in the females essentially none at pregnancy check time.
- Physical findings in male - none

Pathology

■ In male

- no observable gross pathology with histological changes subtle,
- accumulation of neutrophils below the epithelium of the Penis

■ Female

- Inflammation from the vagina to the oviducts.
- Pyometra
- Vaginitis

Immunity

■ Male

- No effective acquired immunity for Trichomoniasis
- Acquired immunity to Campylobacter
 - Vaccinate the bulls develop a protective or clearing immune response

■ Female

- T foetus IgG and IgA immunoglobulins
 - Immunity following natural clearance is short lived. (females susceptible within a year)
- Campylobacter The cow immune for up to two years following clearance of carrier state.

Carrier States

■ *Tritrichomonas*:

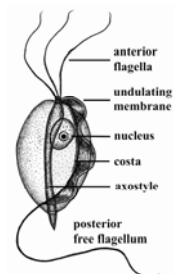
- Usually cleared between 6 and 12 weeks following infection.
- There is less than 1% of infected cows that will maintain infection throughout pregnancy and into the next breeding season thus a carrier animal. (Source of infection for the herd)

Carrier States

■ *Campylobacter*:

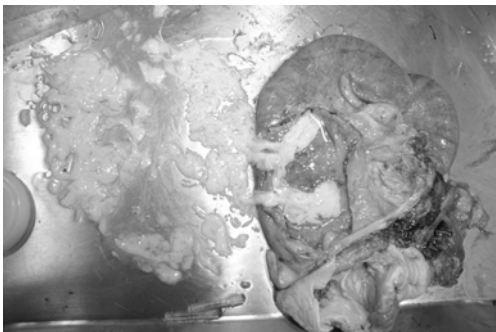
- clearance about 6-12 wks following infection.
- however females can remain vaginally infected for several months and be a risk to the herd, susceptible bulls and thus to the other females in the herd.

Tritrichomonas foetus

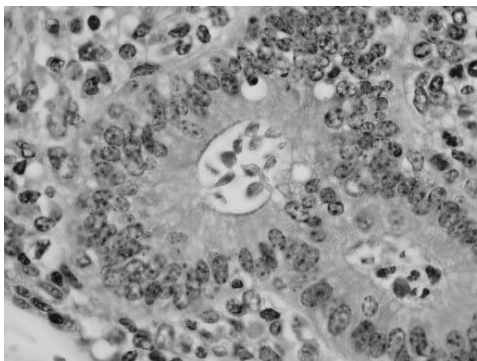


Trichomonas vaginalis

Trichomoniasis: *Tritrichomonas foetus* (x 6)



Trichomoniasis: *Tritrichomonas foetus* in uterine glands



Diagnosis female

- Campylobacter culture from vaginal mucous.
 - PCR
- Trichomoniasis, vaginal aspirate
 - Culture to identify a organism present
 - PCR for a definitive diagnosis

Diagnosis male

- Aspirate smegma from prepuce and culture. Use a scraping technique.
- Lavage the prepuce
- PCR of cultured trichomonads.
 - Utilize history and Clinical signs

Culture the organism



Treatment Males

- **Campylobacter**
 - Vaccination Two doses one month apart.
 - Very effective and can eradicate organism
 - Old therapy was the use to Streptomycin
- **Trichomonas**
 - None that is legal.(nitrofurans, substituted imidazoles)
 - Vaccine no efficacy in bulls
 - Cull and slaughter

Herd Treatment Herd Treatment

■ Tritrichomonas

- artificial insemination with heat detection
 - Cull all open cows
- With Trich can go back to natural service after 6 months but must replace the bull battery with virgin bulls.

■ Campylobacter

- Vaccination two injections one month apart
- Both females and males, very effective
 - Immunity thought to be short lived

Leptospirosis

■ Two significant serovars of Hardjo

- First identified in the Us in 1960
- 1. L. interrogans serovar Hardjo (hardjoprajitno)
 - present in the UK
- 2. L. borgpetersenii serovar Hardjo (hardjoprajitno):
 - Present in the US
 - Most common serovar in Canada

Syndromes

- Abortions
- Stillbirths'
- Weak calves
- infertility

Maintenance of infection within a herd

■ Chronic carriers.

- Localizes in the kidneys or reprot tracts of both males and females
- Shed directly to other animals via
 - Urine
 - Semen or
 - Uterine discharges

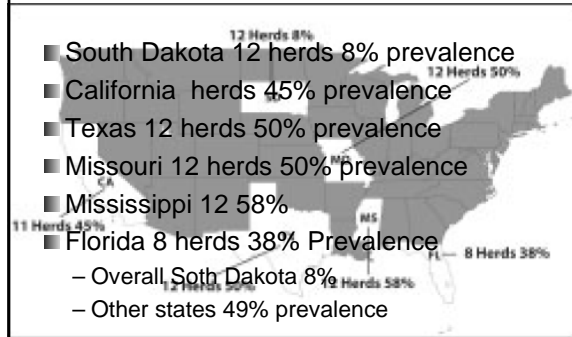
Exposure via

- Abrasions in the skin
- Contact of the organism with mucous membranes
 - Conjunctiva
- Ingestions
- Venereal transmission not the primary route but does occur
- Urinary excretion of the organism
 - Can survive in the enviroment for more that a year.
 - Get heavy contamination of the enviroment.

Diagnosis

- Culture
- Serum samples and test for antibodies
 - Other serovars
 - Grippotyphosa
 - Hardjo
 - Icterhaemorrhagiae
 - Pomona
- FA urine
- Culture

Herd Prevalance



Treatment and Control

- Treatment
 - Antibiotics Tetracycline
- Vaccination Program
 - REPLACEMENT HEIFERS
 - Cows Annual booster
 - Bulls with an annual booster
 - Eliminate carrier animals
 - Control contaminated water

Other agents Sexually transmitted

- Haemophilus somnus
- Ureaplasma
- Other Mycoplasmas
- Brucella abortus.
- BVD/IBR

Zoonotic Diseases from Cattle

- | | |
|------------------------------------|--|
| ■ <i>Actinomyces pyogenes</i> | ■ Leptospirosis |
| ■ Anthrax | ■ <i>Mycobacterium bovis</i> |
| ■ Brucellosis | ■ Pseudocowpox |
| ■ Campylobacteriosis | ■ Q-fever |
| ■ Cowpox | ■ Rabies |
| ■ Cryptosporidiosis | ■ Salmonellosis |
| ■ <i>Escherichia coli</i> O157:H7 | ■ Slow virus variant (?!? controversial) |
| ■ European tick-borne encephalitis | ■ <i>Streptococcus zooepidemicus</i> |
| ■ Foot and mouth disease | ■ <i>Taenia saginata</i> |
| ■ Giardiasis | ■ <i>Yersinia enterocolitica</i> |

Emerging Diseases

- Neospora
 - Asymptomatic infections
 - Associated with abortions, decreased milk production and premature culling
 - Animals infected for their life
 - Transmitted congenitally from an infected dam to her fetus.
 - Primary host is the dog.

Emerging Diseases

- Johne's
 - Chronic diarrhea
 - Calves infected shortly after birth
 - Difficult to diagnose
 - Infected for life
 - Association with Crohn's disease in humans???????

Biosecurity

- isolate new additions (How long)
- know history of new animals
- control visitor access (where have they been in the last few day)
- neighbors herd
- disinfect livestock trailers prior to hauling animals
- Test new arrivals
 - BVD IHC
 - Virus isolation
 - Serology ?????? Value depending on the agent

Animals on Operation

Animals	Percent Operations	Percent of the Beef Cow inv. on these operations
Pigs	9.3	11.1
Sheep	4.5	6.6
Goats	5.1	4.9
Dairy Cattle	4.1	3.2
Chickens	15.1	15.1

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Animals on Operation

Animals	Percent Operations	Percent beef Cows
Horses or other equine	35.5	54.7
Exotic Species (camelids, llamas, Alpacas)	1.8	1.9
Dogs	70.8	78.9
Cats	57.3	62.3
Any of the Above	85.1	90.4

Animals brought on % of operations

Class	<50	50-99	100-299	300 or >	all
Unweaned calves	5.6	6.7	6.3	7.5	5.8
Beef heifers open	6.5	11.3	12.5	11.1	7.9
Bred Beef heifers	2.7	6.4	10.0	9.8	4.1
Beef cows	12.5	17.1	16.0	15.5	13.6
<i>Bulls</i>	<i>17.1</i>	<i>28.5</i>	<i>42.2</i>	<i>56.2</i>	<i>21.8</i>
Steers	3.7	4.3	5.2	10.0	4.1
Dairy heifers or cows	0.5	1.1	0.4	2.2	0.6
Any cattle or calves	32.9	48.7	62.1	74.5	38.7

For operations that bought the following and quarantined or separated new cattle

Class	All	Some	None
Unweaned calves	53.5	0.0	46.5
Open beef heifers	49.3	1.0	49.7
Bred heifers	43.6	1.9	54.5
Beef cows	33.8	0.4	65.8
Weaned bulls	26.8	0.2	73.0
Weaned steers	56.5	1.6	41.9
Dairy heifers and cows	43.0	0.0	57.0
Any cattle or calves	32.7	6.2	61.1

Movement of Cattle within the United States

