Common Cattle Diseases of 2010

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Trichomoniasis in Beef Cattle

Trichomonas foetus (Trich)
- Highly contagious venereal disease of cattle

Pathogenesis

Cows
- Infection leads to inflammation, but does not interfere with conception
- Early embryonic death or abortion (avg. 50 – 70 days)
- Impacts 40 – 50% of the cows
- After fetal loss most cows become immune and free of pathogen over 3 cycles (~ 60 days)
- Duration of natural immunity? (< 15 months)

Clinical Signs

Cow herd
- Mild discharge
- Return to estrus
- Impact on pregnancy rate
- Extended calving season

Pathogenesis

Cows
- Unusual outcomes
  - Late term abortions
  - Long term carrier (< 0.5%)
  - Pyometra (≤ 5%)

Cow herd
- Mild discharge
- Return to estrus
- Impact on pregnancy rate
- Extended calving season
Pathogenesis

Bulls
- Organism localizes in secretions of epithelial lining of penis, prepuce and distal urethra
- Chronic carrier state
  - Related to age due to deepening of epithelial crypts (age 3-4 years and older)
  - Most young bulls assumed to be transient carriers only

Clinical Signs

Bulls
- No clinical signs
- Focus of testing

Transmission

- Infected bull breeds a susceptible female
- Susceptible bull breeds infected female
- Passive transmission – non-infected bull transferring organism to uninfected female after mating to a known infected female
  - 10 artificially infected cows and 15 non-exposed cows led to 2 of 15 (13%) becoming infected after service by uninfected bulls (Clark et. al., 1974)
Treatment

• None available in the U.S.

• Managing infected herds
  – Culling bulls and open cows

Economic Impact

• Smaller and less uniform calf crop – reduced pounds of calves for sale

• Cost of replacing culls – males and females

• Higher veterinary costs

• Model of the economic impact
  – 20-40% bull infection rate = 14-50% reduced calf crop; ↓ net return per cow exposed to an infected bull by 5 to 35% (Rae, 1989)

Biosecurity

• Monitor fences

• Isolate and test new bulls

• Be cautious when:
  • Borrowing or leasing bulls
  • Purchasing open or short bred cows from high risk areas

• Communicate with neighbors
  • Maintain accurate records
  • Use a controlled breeding season (<90 days)
  • Maintain a young bull battery
  • Purchase virgin heifers
  • Utilize artificial insemination

Anaplasmosis

Impact

• Estimated to cost the cattle industry $400 million per year

• Estimated cost per infected animal of $400

• Losses
  – Production
  – Abortion
  – Treatment costs
  – Death loss
**Transmission**

- *Anaplasma marginale*: rickettsial parasite of ruminants
- Sometimes called “horse fly disease”
- Ticks are a more effective vector because the organism replicates within the tick
- Blood contaminated equipment can also lead to transmission

**Incubation Period**

- Exposure to the organism occurs probably from the end of May to July
- Organism goes through an incubation period of 3 – 6 weeks or longer
- Majority of clinical outbreaks occur from August - October

**Clinical Period**

- Organism infects red blood cells
- RBC’s are considered foreign to the body and destroyed
- End result is anemia

**Clinical Phase**

- Fever, weakness, depression, constipation, inappetence, nervousness, jaundice, abortion, death
- Impact is greatest in older age cattle

**Recovery Phase**

- Aided by treatment with tetracyclines
- Immune system responds
- Red blood cells regenerate
- Recovery is usually slow
- All animals that survive are chronic carriers and will be a source of infection for other animals

**Chronic Carrier Phase**

- Treating affected animals with tetracyline during the clinical phase will not prevent the carrier phase
- Daily feeding of chlortetracycline at 2mg/lb of body weight for a period of 42 to 60 days has been reported to eliminate the carrier phase
- However, do we want to create an Anaplasmosis free herd?
Prevention

• There are no approved vaccines
• Feed chlortetracycline throughout vector season at 2mg/lb/day; pulse dosing may prevent elimination of carriers
• Clinical cases may still occur due to variability of intakes

Acknowledgement

Dr. David Smith
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Agent Factors

Agent

- Bacteria
  - E. coli, Salmonella
- Viruses
  - Rotavirus, coronavirus
- Protozoa
  - Cryptosporidia

Population perspective on preventing infectious disease

Agent

Disease

Host

Environment
Diarrhea causing organisms are common in cattle populations, including herds without scours.

**Agent**

- Bovine coronavirus
- Cryptosporidia

**Immunity vs. Exposure**

- Immunity
- Exposure Level
- Time

**Host Factors**

**Host: Immunity**

- Antibodies from colostrum
- Active immune response

- Window of vulnerability

- Passive
- Acquired
Host: Immunity

- Scours
- Exposure
- Immunity

Age in Days

Age specificity of calf scours

- Population at-risk for scours: calves 1-3 weeks of age
- Frequency histogram age of calves at death
- Also at-risk for shedding scours agent

Environmental Factors

- Because of
  - MULTIPLIER EFFECT
  - Cows – “low” level of shedding
  - Calves – multiply pathogens to higher and higher levels
  - Increasing ANIMAL DENSITY (crowding and rapid environmental contamination)

- Levels of pathogen exposure increase over TIME within a calving season

Environment

Probability of death from scours by week of birth

Preventing Calf Scours
**Options for Prevention**

- **Agent**
  - Increase resistance
  - Remove the agent

- **Disease**
  - Prevent effective contacts

- **Host**
- **Environment**

**Increase Resistance**

- Vaccinating the dam
- Colostrum supplements

**Biosecurity / Pathogen Containment**

- Prevent effective contacts - decrease the number of contacts that result in transmission.
  - Physical separation
  - Minimize dose-load
  - Minimize contact-time

**Sandhills Calving System**

- The system re-creates the conditions that occur at the start of the calving season by:
  - Moving pregnant cows to new calving pastures each week to minimize dose-load and contact time
  - Segregating calves by age to prevent the multiplier effect
1-2 week old pairs Calving pasture
2 week old pairs 1 week old pairs Calving pasture
2 week old pairs Calving pasture
2 week old pairs 1 week old pairs Calving pasture
2-3 week old pairs 1 week old pairs Calving pasture
2 week old pairs 1 week old pairs Calving pasture
2 week old pairs Calving pasture
2 week old pairs 1 week old pairs 2 week old pairs Calving pasture
Consider the following. Do you currently:
A. Calve in too small of an area
B. Continually feed in the same location during the calving season
C. Have cows that are calving in poor body condition
D. Commonly experience adverse weather during your calving season
E. All of the above

Addressing these issues *may* be enough to avoid scour outbreaks