Johne’s Disease and Beef Cattle

Pepi F. Leids, DVM
NYS Department of Agriculture and Markets
Division of Animal Industry

Johne’s Disease

- Chronic bacterial infection of lower intestinal tract
- Caused by Mycobacterium avium subsp. paratuberculosis
- Affects all ruminants
- Infection takes years to develop
- Disease usually occurs in mature cattle
  - Diarrhea & weight loss, but good appetite
  - Reduced production, unthrifty, bottle jaw, deterioration, death.

What does Johne’s look like?

Regardless of how they look, they are a constant source of new infections
95% of infected cows show no signs

The Johne’s “Bug”

- Mycobacterium avium subsp. paratuberculosis
- Acid fast bacteria
- Persists in the environment for long periods of time (years)
- Killed by heat and drying

Chronic granulomatous infection of the intestinal cells

Johne’s is a chronic granulomatous infection of the intestine cells

What it does to the intestine

- Chronic granulomatous infection of the intestinal cells
Main routes of transmission

Manure
Colostrum & Milk
From Dam to Fetus (in utero)

Johne's is everywhere!

Who is susceptible?

- Everyone!
- Youngest are most susceptible
  - Clinical disease is likely if exposed early
- Older are less susceptible...if exposed
  - Clinical disease less likely
  - Subclinical shedding more common
- Age and dose related
- Health and genetic predisposition

Dose, Shedding & Clinical Disease

The Johne's Iceberg

Clinical Cases
- Infected and Shedding
- Infected, not shedding
- Uninfected
The Johne's Disease Iceberg & Tests

Prevalence in Beef Cattle
- Lower than the dairy industry
- About 8% of all beef herds are thought to be infected
- Prevalence in dairy herds thought to be as high as 60%
- Need to be aware of the disease and how it may affect long term goals, especially sales of valuable stock

Ignorance is NOT bliss!!

Controlling Johne's – First Principle
- Clean and dry
  - Prevent ingestion of manure by all animals
  - Particularly the young ones!

Calving Area Management
- Pasture calving:
  - Clean area of pasture
  - Big enough for single use area – don’t overcrowd
- If inside:
  - Clean and dry
  - Single use
  - Not a sick cow area

Newborn Management
- Colostrum
  - Ensure that calf gets colostrum ASAP
  - Colostrum replacers…not supplements
  - Do not use colostrum from local dairy farm without knowing history of cow
  - Consider dipping navel
Controlling Johne’s – Second Principle

- Identify and remove infectious animals
  - Monitor suspects
    - Cull ASAP
  - Manage positives
    - Maternity pen
    - Manure handling
    - Milk & colostrum
    - Offspring?

Johne’s Disease Testing

NEVER WITHOUT A MANAGEMENT PLAN IN PLACE OR BEING IMPLEMENTED

ALWAYS HAVE A PLAN FOR THE RESULTS before TESTING

Johne’s Testing Strategies

- Clinical suspects (diarrhea and weight loss but still eating)
- Individual fecal PCR; identifies Johne’s DNA
- Pooled fecal culture; identifies Johne’s organism in media; five cows individually sampled and pooled at the laboratory
- Commercial blood Elisa test; detects antibodies to the Johne’s organism

Johne’s Testing Strategies Continued

- Blood Elisa test: best used as a whole herd screening test; not accurate as a test for an individual animal
- Fecal PCR: short turnaround time; detects animals that are shedding the Johne’s organism at the time the sample was taken
- Pooled fecal cultures: used in low prevalence herds; if pool is positive, then the individuals in that pool are sampled with PCR

What to do with the results?

- Shedders can be classified as “light”, “moderate” or “heavy” on the fecal test
- Best to cull heavy shedders ASAP
- Best management practices include segregating all test positive animals in an area away from the test negative animals
- Cattle can be intermittent shedders so a negative test does not mean an animal is NOT infected

Prevention – THE KEY

- Test incoming cattle over two years of age; determine source herd Johne’s status
- Do not use colostrum from unknown sources (i.e. local dairy farm)
- Keep manure in mind
  - Clean calving area
  - Udder as clean as possible
Case Study

- Small registered Angus herd
- Cow-calf operation
- 15 brood cows
- Purchased a 6 year old cow
- Freshened in April, ‘07
- Euthanized after freshening
- Necropsy done; positive for both Johne’s disease and leukosis

Case study continued

-Whole herd tested for Johne’s disease using fecal PCR and for leukosis
-All tested negative for Johne’s and two cow/calf pairs were positive for leukosis
-Recommendation was to sell the entire current calf crop since these young animals would have been most likely to have been infected by the clinical cow

Case study continued

- Individual calving pens used but there was contact between the calves and cows at the time the Johne’s infected animal was present
- Manure was present in the calving area and post-calving housing area
- This in itself was a possible contaminant from a fecal-oral perspective

Eventual Outcome

- Owner sold entire calf crop from 2007
- No animals purchased again
- Continued testing for Johne’s and leukosis on a yearly basis
- No more Johne’s positive animals through 2012
- Leukosis positive animals were culled
- No more positives found through 2012

Success!

- Herd is currently on the national Johne’s certification program at level 5
- Yearly testing of herd to advance to the highest level of 6+
- Use of AI to introduce new genetics to the herd
- Separate needles for all injections to prevent spread of leukosis

Questions?
Beef cow/calf BVD

with thanks to Dr. Belinda Thompson, AHDC

BVD Disease

- Fever
- Off Feed
- Severe diarrhea
- Pneumonia
- Ulcers (muzzle, mouth, GI tract, Feet)
- Death
- Immune suppression
- Abortions
- Congenital Defects

Subclinical infection

- Virus may multiply briefly with no illness
- If cow/heifer is pregnant, virus may cross placenta
- Virus may be shed to environment or other cattle
- Some persistently infected animals show no ill effects, so they are considered subclinical infections

Outcome Expected for Fetus

- Early Embryonic Death
- Persistently Infected calf without visible congenital defects
- Persistently Infected calf with visible congenital defects
- Congenital defects but no persistent infection
- Normal calf

Results of BVD Infections

Early Embryonic Death
Abortion

Courtesy Dr. John King
Congenital Cataracts and Neurologic Signs

Acute vs. Persistent Infection

- Acute infections
  - All infections after about 125 days gestation in utero. (Congenital acute infections)
  - PLUS, all new infections to animal that are already born, from birth to old age. Acute infections may result in illness or not

- Persistent Infections
  - Infections of the fetus between ~60 and ~120 Days gestation ONLY

Acute vs. Persistent Infection

- Persistent Infections - Animal may or may not appear healthy
- Animal is ALWAYS shedding BVD virus and ALWAYS WILL

How does the virus spread?

Getting BVD out

- Test all animals for BVD-PI status
- CULL ALL BVD-PI ANIMALS (before starting next breeding season!) – only to slaughter
- Ear notch ACE ideal for cow/calf
  - Sample everybody
  - Freeze dam samples
  - Test calf and animals without calves
  - Retrieve frozen samples from dams of PIs
- Active breeding season may require testing next year, too.
- Maintain a strong vaccination program
Taking ear notch samples

Keeping BVD out
- Good Vaccination program
- Closed herd
- If purchases are made:
  - Quarantine for 3 weeks
  - Test for BVD-PI status – remember bulls!
  - Appropriate vaccination
- Fair and exhibitions
- Visitors to farm

Purchased Non-Pregnant Replacements
- Home herd already free of BVD
- Isolate/quarantine for 3 weeks for all disease control
- Test all replacements – Prior to arrival
- Appropriate test for age of animal
- If can’t test before arrival, test while in quarantine
- If PI animal removed, quarantine for additional 3 weeks

Purchased Pregnant Replacements
- Home herd already free of BVD
- Test pregnant herd additions – as described in previous slide
- Test negative animals may be carrying a PI fetus!!!!!!
- Test newborn calves of these pregnant additions, all aborted fetuses of same, plus aborted fetuses from pen or herd mates

Fairs and Cattle Shows
- Pregnant animals traveling between 60 and 120 days gestation can return home carrying a PI fetus.
- All traveling animals can be temporarily exposed and shed virus for a few days after returning home.
- Handle these animals as if they are PI test-negative purchased pregnant additions from unknown sources.

Bovine Leukosis
- Caused by Bovine Leukosis Virus
- Blood borne disease – virus survives in white blood cells
- Primary sign of clinical disease is tumors
  - Uterus, abomasum, heart, spinal cord, lymphoid tissue behind eye
- Only 5% develop clinical disease
Bovine Leukosis

- Blood borne disease spread through:
  - NEEDLES!!
  - ob sleeves
  - Dehorners
  - tattoo pliers
  - ear taggers
  - hoof knives, etc.

Other Ways to Spread

- Colostrum/whole milk
- In utero (3-20%)
- Biting insects
- Calves having access to infectious placentas

Top Three Prevention Strategies

1. Single use needles
2. Single use needles
3. Single use needles

Other control strategies

- Change OB sleeve when palpating cows
- Wash and disinfect instruments – tattoo equipment, ear taggers, hoof knives, castrating instruments
- Institute insect control program – biting flies, mites, lice
- Clean up placenta soon after calving

Questions?