JOHNE’S DISEASE

- Also known as Paratuberculosis
- Caused by *Mycobacterium avium* subspecies *paratuberculosis* (MAP)
- Capable of causing disease in all ruminants
- Can also be found in several wild and captive exotic species
- Survives for extended periods in soil, water, and manure
- Resistant to many common disinfectants
- Can be killed by cresylic acid compounds and sodium orthopehylphenol.
MODES OF TRANSMISSION

• Most common: manure of infected adult animals.
• Lambs typically become infected when they swallow water, milk, or feed that has been contaminated by manure from infected animals.
• Older animals are more resistant to infection and development of disease.
SYMPTOMS

- Emaciation (wasting disease)
- Unresponsive to dewormers and antibiotics
- Appetite is often good, in spite of weight loss, until the animal is near death
- Normal stool even in clinically diseased animals with occasional diarrhea
  - Profuse watery diarrhea seen in cattle is not a common feature of the disease in sheep and goats
- Low-grade fever may be observed
- Intermandibular edema (bottle jaw), lethargy, and depression are sometimes seen.
The disease may be confused with intestinal parasitism, chronic malnutrition, caseous lymphadenitis, ovine progressive pneumonia (OPP), environmental toxins, and cancer.
PATHOGENESIS

• Once organisms enter the small intestine, they are engulfed by macrophages (located in the intestinal wall)
  • Generally macrophages cannot kill bacteria
  • Bacteria multiply inside the macrophage which eventually dies
• The body’s immune response to the intracellular bacteria create the typical thickening and microscopic distortion of the intestinal wall.
• Hypersensitivity reactions may increase the cellular response.
EXAMPLES OF SI THICKENING

Small Intestine from a Sheep with Johne’s disease showing the classic thickening.

Another sample of SI from a different sheep shows relatively little thickening. The apparent ridges and thickening are a shrinkage artifact.
EXAMPLES OF SI THICKENING
DIAGNOSTIC TESTS

- Culture of feces (manure) and tissue
  - Gold Standard (unreliable in sheep)
  - Requires 8-24 weeks of incubation for colonies to be observed
- Gross and microscopic examination of tissues taken from dead animals
  - Very reliable in sheep
  - Animal is already dead
  - Large amount of variation can exist between SI lesions seen
- Blood tests, ELISA tests, and Acid-fast staining of intestinal mucosa can be used but are not as effective in sheep as they are in cattle
CONTROL IN INFECTED FLOCKS

- Difficult because of lack of live animal tests that reliably detect animals that are not shedding MAP
  - Necropsy
  - AGID (Agar Gel Immunodiffusion)
- Maintain sanitary environment
- Clean udders on dams before nursing
- Move to “clean” pasture
- Vaccinations (in everyone except the US)
PREVENTION

- Maintain a closed flock if possible
- Be cautious when using cow colostrum for newborn lambs or kids.
- Do not graze sheep on contaminated pasture
- There is no vaccine in the US for MAP.
  - Because there is no vaccine and no cure, prevention is the key to control.
BIBLIOGRAPHY


• Pictures Provided by Above Works