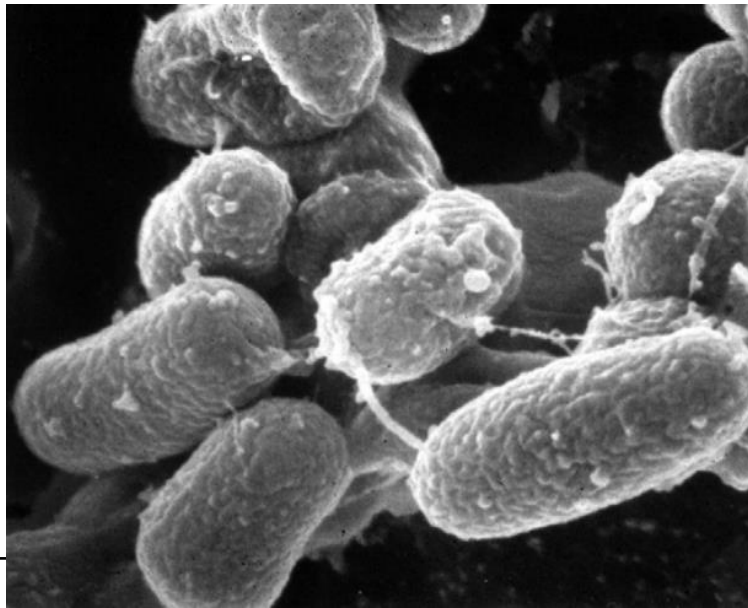


Johne's Disease: A Growing Concern

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Concern

- Impact to production, economics
 - Mortality ranges from 6.2-7.8 (up to 40%), Australia and Iceland flocks
 - 6.4-8.5% gross income margin, Australia
- Public and private lands for grazing contracts
 - Interspecies transmission risk



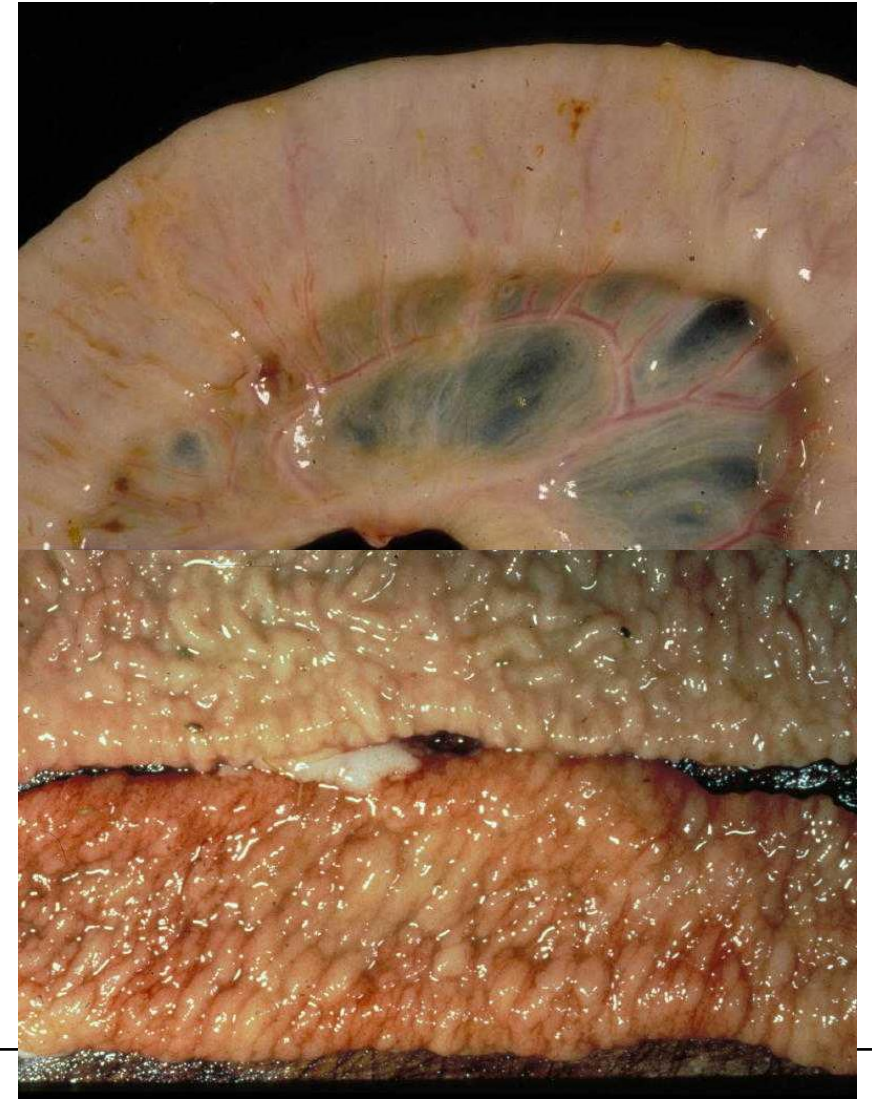
Johne's Disease

- *Mycobacterium avium* spp paratuberculosis
 - Chronic, enteric wasting disease
 - Clinical signs develop within 6-12 months of infection
 - Death by 3-5 years of age
 - +/- edema and diarrhea
 - negative impacts on fertility and milk production
- Strains
 - C type
 - S type (cattle and deer more resistant to this strain)
 - Bison type



Clinical Disease?

- **High bacterial counts** – >10 per macrophage, macrophage dominant infiltrate,
 - Granulomatous enteritis of the terminal ileum with cording of the sub serosal lymphatics
 - Shed hundreds of millions of bacteria per gram feces
 - Likely associated with a Th-2 humoral antibody response
- **Low bacterial counts** – 0-10 per macrophage, lymphocytic infiltrate, few macrophages
 - Cell-mediated immune response
- **Resistant** – no histological lesions, tissue culture negative after experimental infection
 - Th-2 humoral and CMI response



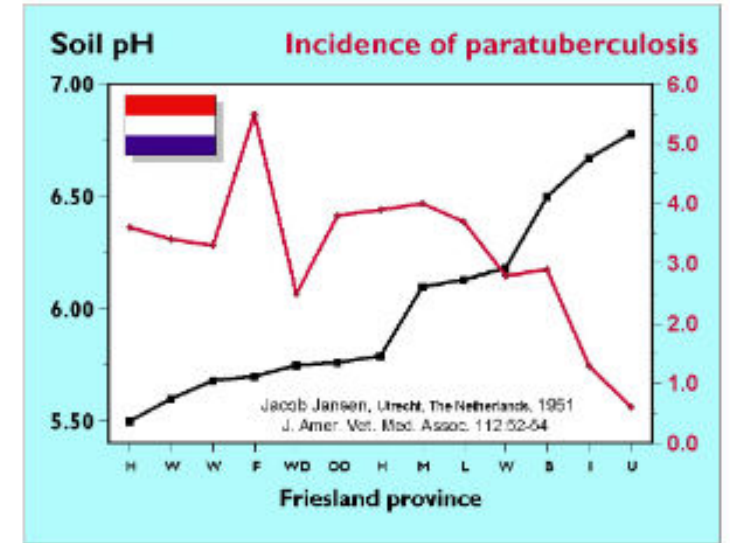
Transmission

- Fecal-oral (manure contaminated pasture, water, hay)
 - Most susceptible animals <1 year old
 - Minor route: contaminated colostrum or milk
 - (Pre-natal in cows – 9% subclinical vs 39% clinical; possibly greater in clinical sheep)

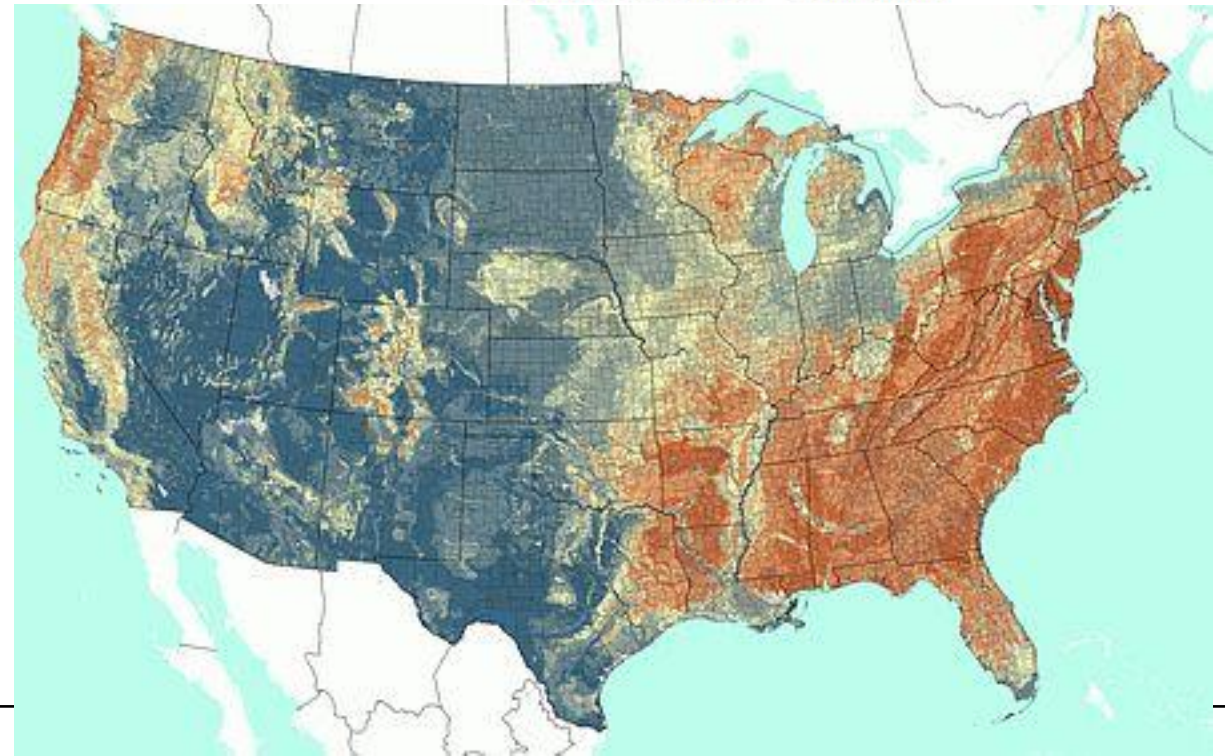


Environment

- Persistence
 - A year with shade (few weeks without shade)
 - Resistant to acidic soils and low temperatures
 - More susceptible to hot and dry climates



Soil pH vs Incidence - Netherlands



Diagnostics

Immunodiagnosics

- AGID
- ELISA (serum, milk)
- Others
 - Lymphocyte proliferation/transformation
 - Intradermal assay
 - IFN- γ , IL-10



Diagnostics

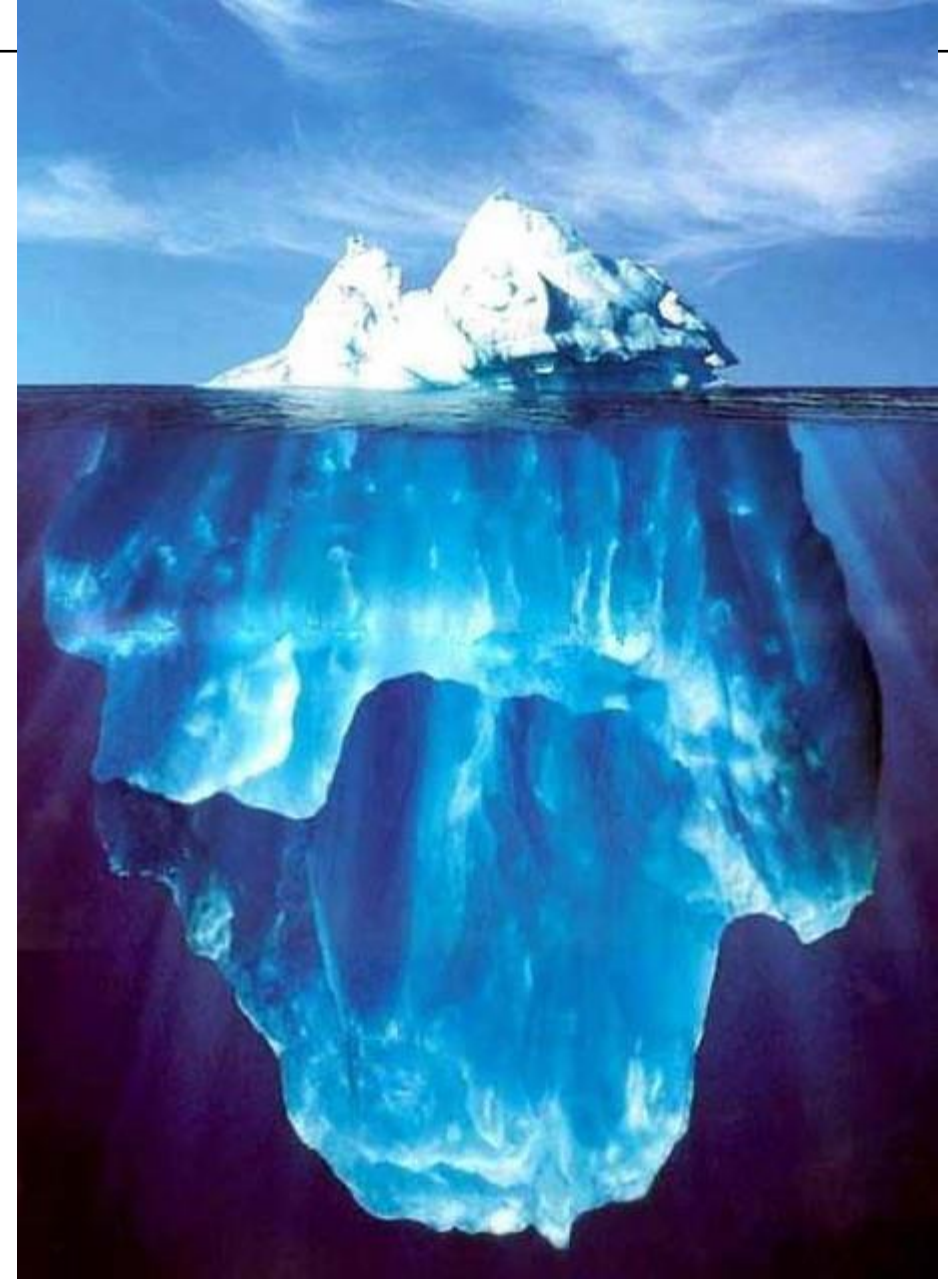
Microbial detection

- Culture – expensive, long turn around (~8 weeks)
- PCR – Se 30-60%, Sp 96.4%
- Pooled fecal samples for surveillance
- Tissue on necropsy



Epidemiology

- OJD is estimated to be present on 4.7% of sheep operations in the USA (APHIS, 2004), causing an estimated 4% increase in mortality in the affected flocks (Topp and Bailey, 2001).



Control

- Management
 - Test and cull have limited application due to cost of testing and value of individual animals
 - Culling ewes before high risk shedding occurs at lambing
 - Stocking rate in lambing paddocks
- Vaccine
 - Reduces clinical cases and bacteria shedding
 - With biosecurity and risk management
 - Injection site lesions (animals and human)
 - Cross react with tuberculin test
 - No DIVA for immunodiagnostic tests



Discussion...

