

Preventing and Controlling Footrot in Sheep

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Footrot Facts

- Causes producers to leave the business
- One of the most economically significant diseases in small ruminants
- Costly in terms of time and money
- Lowers production
- Takes much effort to control
- Not humane
- Entirely preventable

Footrot Facts

- What causes footrot?
- Presence of two anaerobic bacteria
 - *Fusobacterium necrophorum*
 - *Dichellobacter nodosus*
- Environmental conditions conducive to propagation
 - Warmth and moisture
 - Mud and manure
 - High animal density



What Causes Footrot?

- *Fusobacterium necrophorum*
 - Normally present on the farm, mud, manure
- *Dichlelobacter nodosus*
 - When present causes footrot in combination with *F. necrophorum*
 - Many strains of *D. nodosus*- At least 20, same strains affect both sheep and goats
- Differing in virility
 - Benign
 - Intermediate
 - Severe

- Virulent *D. nodosus* secretes protease enzymes that digest the connective tissue at the horn area of the hoof
 - Causes underrunning of the hoof horn
 - Digestion of hoof keratin
 - Distinct smell
- Benign footrot causes what is commonly referred to as scald
 - Can be caused by just *F. necrophorum* or by less virulent strains of *D. nodosus*
 - May be self limiting
 - May be the early stages of virulent footrot





Prevention of Footrot

- BY FAR, the most common means of footrot introduction is by introducing infected animals
- If *D. nodosus* is not present on a farm then don't introduce it
- *D. nodosus* only lives in environment for about 14 days
- *D. nodosus* can live in sheep & goat feet for extended periods- asymptomatic

Prevention

- Only buy or lease breeding stock from footrot free operations
- Try not to comingle
- Quarantine
- Trim feet, soak in footbath, possibly antibiotic trt
- Don't share trailers and don't bring animals into facilities that have had infected animals for last 14 days

Historically controlled footrot by:

- Foot trimming
- Footbaths- either a run through or a soak (zinc sulfate, copper sulfate, formaldehyde)
- Vaccination
- Culling
- Pasture or facility mgmt.
- Antibiotics- oxytetracycline (LA 200 or 300) has been the drug of choice historically

Treatment of Footrot- Antibiotics

- Oxytetracycline (LA 200 or 300)- very useful
- Can also use an oxytetracycline spray to treat the interdigital area of the hoof (keep hoof dry after application)- more used in Britain
- Newest & most exciting development in control or eradication has been Gamithromycin (Zactran)
- Has been on back order

Gamithromycin

- Strobel et al. reported in The Veterinary Record the results of a series of experiments evaluating Gamithromycin (Zactran) as a possible antibiotic to control footrot
 - Zactran- antibiotic used to treat cattle with respiratory disease
 - Not approved for use in sheep in the U.S. without a Veterinarian script

Gamithromycin

- First project used 10 flocks of sheep in southern Germany and compared Zactran to LA 200
- Reported foot scores as 0-5
 - 0= normal, dry in interdigital area
 - 1= hoof temp elevated, inflammation, hair loss
 - 2= necrosis of interdigital skin, smell
 - 3= underrunning of hoof or sole
 - 4= underrunning of sole to outer hoof edge
 - 5= necrosis to hoof tip, hoof separation

Gamithromycin

- Day 1- sheep inspected, scored, random group treated with either LA 200 or Zactran
- Day 21- feet re-inspected
- Day 42- final foot inspection

Gamithromycin

- Results-
 - Day 21-
 - 79% cure rate for LA 200
 - 93% cure rate for Zactran
 - Sheep with problems retreated
 - Day 42- 99% cure rate with Zactran

Large field study using Zactran on a whole flock basis

- 1 German flock- high prevalence of footrot (20 to 80% affected over a 5 year period)
 - 184 sheep
- Day 1- foot scored, 117 of 184 were 1 or higher, 98 were 3 or higher
 - All sheep treated with Zactran
- Day 23- all sheep re-checked, 8 still lame, those were retreated
- Day 45- rechecked, no lame sheep
- Remained free of footrot for at least 18 months

Large field study using Zactran on a whole flock basis

- 48 Danish flocks totaling 9,000 sheep with an average footrot prevalence of 32%
- Whole flock treatment with Zactran
- Re-inspected at 1 month and 6 months
- 44 of the 48 flocks remained free of footrot for more than a year later and again at 2 years
- *Authors concluded that Gamithromycin could be used to eradicate footrot*

Gamithromycin

- Zactran is expensive and is on back order
- Best used as an eradication tool, not as a routine treatment
 - Limit use of antibiotics for resistance and human health significance
 - Expensive
- Time drug use to eradicate at a point in production cycle when sheep numbers are at their lowest

Footbaths

- Solution of a drying agent:
 - Zinc sulfate
 - Copper sulfate
 - Formaldehyde
- Use some type of soap or detergent to help keep it in suspension
- Most effectively used with scald, mild cases of footrot, or early in the disease
- Not as effective in severe cases as it can't penetrate deeply into hoof tissue

Footbaths

- Soaking is much more effective than running them through
- More penetrance in interdigital area
- 2-3 times per week- at least 10 minutes per soak
- Put sheep in a dry area after foot soaking



Foot Trimming

- Used to be recommended to pare hoofs aggressively in cases of footrot
- Open things up so more air and less mud and manure in hoof area
- More recently, animal health experts recommend not trimming
 - Can spread footrot
 - Damages integrity of hoof increasing complications
 - Delays healing from antibiotic trt and footbathing

Foot Trimming

- Somewhere between no trimming and aggressive trimming lies a reasonable approach
 - Trim carefully a week after antibiotic treatment
 - Just trim the excessive growth
 - Leaving hoof wall and sole intact
 - Disinfect hoof shears between sheep



Photo courtesy of Fias Co Farms

Figure 4. Newly trimmed goat hoof

Controlling footrot

- Based on antibiotic trt and foot soaking
- Use oxytetracycline until gamithromycin becomes available
- Judicious foot trimming
- Foot soaking
- Culling

Eradication of Footrot

- Until Zactran becomes available again- old methods
- If small flock/herd may want to consider depopulating, waiting 2 to 3 weeks and restocking with clean stock
- If not feasible- check feet on all animals in the herd
- Separate any animal with footrot or scald
- Run the “clean” animals through footbath and segregate to a pasture that has been empty for 14 days

Eradication of Footrot

- Any “clean” animal that starts to show symptoms- move in with infected group
- Infected group- treat with antibiotics, keep feet trimmed, foot soak
- Soak in Zn Sulfate 2 to 3 times per week for 10-20 minutes
- As animals in the infected group become asymptomatic remove them to a 3rd location that has been vacant for 14 days

Eradication of Footrot

- Often, there will be a few that don't respond to treatment
- Cull
- Lot of work, lot of expense to eradicate, prevention still best path

Eradication of Footrot

- When Zactran becomes available
- Whole flock treatment with Zactran
- Still inspect all sheep
- Segregate sheep- footbath clean, foot soak affected
- Move to clean pasture

Eradication of Footrot

- Re-inspect sheep 21 days later
- Retreat any active cases
- Re-inspect at day 42
- Any still affected- cull (be aware of withdrawal dates)

Eradication of Footrot

- Have to work with a Veterinarian on a script, dosage, and withdrawal of Zactran
- Treat when sheep numbers on the farm are at the low point (lambs sold)
- After treating try to put on a clean pasture or area to prevent reinfection due to premise contamination
- Prevent reintroduction of *D. nodosus*

Genetic Susceptibility

- Some animals are more susceptible to footrot and some more resistant. May also affect response to treatment
- Known breed affects- Merino derived breeds more susceptible
- Heritability of .1-.3. depending on source- probably differs by breed
- Keep records

Summary

- Footrot is costly disease
- Prevent if at all possible- don't buy it
- Quarantine new animals- *D. nodosus* lives in cracks of hooves
- Treat introduced animals like they have footrot
- Keep feet trimmed and area dry
- Foot soaking is better than footbathing

Summary

- Eradication is easier through the use of Zactran
- Genetic propensity to footrot
- Don't sell footrot exposed animals to other breeders

- Questions?