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*
  • *Dichlelobacter 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
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?