

Footrot in Cattle and Sheep

(“Necrotic pododermatitis”, “Interdigital necrobacillosis”, “Foul foot”)

Introduction:

Footrot is a highly contagious disease affecting the interdigital (between the toes) tissue of ruminants. It is one of the most common causes of lameness in cattle and sheep and can result in serious economic loss. Once present in a herd/flock, footrot can be very difficult to control.

Etiology/Pathogenesis:

Footrot is caused a combination of the bacteria *Fusobacterium necrophorum* and *Dichelobacter* (formally *Bacteroides*) *nodosus* (more common in sheep), and *Bacteroides melaninogenicus* (more common in cattle). *Fusobacterium necrophorum* is a normal inhabitant of the ruminant digestive tract and may survive in soil for up to ten months. It produces a leukocidal exotoxin that reduces the protective white blood cells from ingesting bacteria (phagocytosis) and causes suppurative necrosis. *Bacteroides melaninogenicus* produces proteases that damage the subcutaneous tissue and tendons. *Dichelobacter nodosus* can survive a maximum of two weeks in the environment. It produces an enzyme capable of digesting the connective tissue between the horn and flesh of the hoof, thereby allowing migration to areas under the horn. If footrot is not controlled, it may invade deeper structures of the foot, including joints which may lead to septic arthritis.



Footrot tends to be seasonal, with the highest incidence occurring during the wet seasons. Cuts, bruises, puncture wounds, or severe abrasions of the foot due to sharp rocks, sticks, or frozen mud/ice will damage the skin in the interdigital space and predispose an animal to footrot by allowing bacteria to invade and multiply within the tissue. The bacteria cannot by themselves, gain entry to the skin and cause foot rot.

Clinical Signs:

Lameness is usually the first sign of an infected animal, varying from scarcely noticeable to severe in one or more feet. Lameness is typically followed by reddening of the interdigital tissue and swelling of the foot, causing spreading of the toes. One or more feet may be affected simultaneously. Spreading of the dewclaws due to swelling is a classic sign of foot rot.

Diagnosis:

Footrot is typically diagnosed by the distinctive lesions and odor. Any interdigital



fissures and cracks with a characteristic odor should be treated as footrot. Bacterial culture can be done, but is rarely necessary.

Treatment:

The interdigital tissue should be cleaned, debrided, and disinfected. One antibiotic treatment is usually adequate if administered on the first day of disease. Recovery is generally observed in three to four days. If treatment is not initiated until later in the disease process, multiple treatments may be necessary. Penicillin and oxytetracycline are effective antibiotics if started early in the disease process and given at the recommended dosage. Sulfonamides (either intravenously or as a bolus) work well too. If animals do not respond to treatment within 3 days, it is NOT “just foot rot” and additional action should be taken. These animals often have joint involvement that if addressed quickly can prevent loss of that toe.



Prevention:

“Contagious foot rot” in small ruminants is often a purchased disease. To decrease the chance of introducing footrot into a group of animals, avoid purchasing animals that are lame. New animals should be segregated for two to three weeks and observed for lameness. Feet should be trimmed and soaked in foot baths of zinc sulfate or copper sulfate.

Regular foot trimming (at least one to two times per year) reduces the number of crevices where bacteria can live, removes infected hoof, and exposes the organism to air and various medications. Always disinfect trimming instruments between animals to prevent spreading footrot.

Both cattle and sheep are susceptible to this disease due to interdigital trauma.

Management practices that help reduce interdigital trauma will help decrease the incidence of foot rot. Drainage should be maximized around water tanks and feed bunks to decrease muddy conditions that soften the interdigital space and predispose to footrot. Mounds of soil can be created in feedlots help to help promote drainage and give cattle a dry place to lie. Walk-through foot baths can be used in alleyways where cattle must walk in dairy operations. These are only effective if the feet are not muddy and the medicinal concentration and cleanliness of the bathes are maintained. Caution should be used, as footbath solutions may cause chapping or cracking of the teats if not washed off at milking.

There is a vaccine for *Dichelobacter nodosus*, with users reporting a 60-80% success rate. Vaccination should begin before the start of the wet season, followed by a booster six weeks later, then once every ten to twelve weeks while conditions that promote spread persist (e.g. wet season). Abscesses are common at the injection site, but usually rupture and drain on their own with no negative impact on the animal. However, for this reason, vaccination of show animals or animals that may be going to slaughter soon may not be practical.

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