

Enemy Underfoot

The bacteria that cause foot rot exist everywhere cattle do. Preventing infections means minimizing ways the bacteria can invade the body.

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Your herd is surrounded by the bacteria that cause foot rot. Bottom line, the germ exists everywhere cattle do. But like any invader, the bacteria that cause foot rot need a point of entry before they can inflict casualties. They only become a problem when they make their way into the body.

Foot rot actually is a disease of the soft tissues of the skin, not of the hoof, explains Dee Whittier, professor of production management medicine and Extension cattle specialist at Virginia Tech. "If you call the line between the hoof wall and the foot the coronary band, it's the tissues that are above that coronary band that are infected when we have foot rot.

"The danger is it can always go into deeper tissues there, so it can get into tendons, tendon sheaths and joints if it's not properly treated," he continues. "Those tissues often don't heal very well, and we can end up with permanent lameness if we don't treat them appropriately."

The organism most often attributed as the cause of foot rot is *Fusobacterium necrophorum*, Whittier says.

"There can be a number of other bacteria that can get into these infections," Whittier says. "But that's kind of the necessary one. It's an organism that lives in the environments where cattle are. You can culture it out of the manure and out of dirt and other farm sources. So what is lacking for a case of foot rot is a wound that allows this bacteria to get in."

Entry of the bacteria can be accomplished in several ways: mechanical injury to the foot, softening and thinning of the interdigital skin by puncture wounds, continuous exposure to wet conditions, or exposure to extremely dry conditions that cause cracks to develop in the skin.

Hard or frozen ground, stones, stubble, nails, wire, and other objects can provide a wound or entryway for infection. However, muddy, wet lots and pens can compound the chances of a foot rot outbreak by softening the skin above the hoof. Conversely, drought-stricken conditions also can cause the skin to become dry and to split open.

No matter how it gains entry, the bacteria spreads quickly once it's inside the body.



Mechanical injuries caused by hard or frozen ground, stones, stubble, nails, wire, or other objects can provide openings in the skin between the toes, which allows the bacteria that cause foot rot an entrance into the body. [PHOTOS BY SHAUNA ROSE HERMEL]

After they find an entrance point, the bacteria kill and damage tissue, causing swelling and pain, Whittier says. The discomfort is the result of the body's reaction to the poisons the bacteria produces once it starts to multiply.

A proper diagnosis

In cases of foot rot, Whittier says, "Lameness is the primary sign, but there are a number of reasons why cows become lame."

If the swelling is just above the hoof wall, particularly in the space between the toes, it's pretty much diagnostic of foot rot, he says. "Sometimes with a real early case, you won't see much swelling, but if swelling is there, it means there's foot rot."

Bob Larson, a beef veterinarian at the University of Missouri, agrees with Whittier about lameness being the first sign of a foot rot case. However, he cautions producers to thoroughly examine their animals to

make sure it's not something else, such as a puncture or an embedded object.

"I do encourage anybody [who] sees their cattle limping to get them in a chute and actually pick up the foot and look at it because you can be fooled," he says. While inspecting the foot, the first thing he tries to do is rule out the presence of a nail or glass, which must be removed first. In the case of an embedded object, he generally treats with antibiotics and moves the animal to a dry area where it can heal, very similar to treating a case of foot rot.

"There are all sorts of injuries to the hooves themselves," Whittier says. "There are cracks, splits and punctures and other injuries that happen to the hoof wall itself. Of course, those are different diseases and need to be treated in a different way."

While it's tempting to treat every case of lameness with antibiotic, that may not be appropriate, Whittier says. "Since antibiotics are very effective against foot rot, that's great in that case. But antibiotics don't treat many other forms of lameness. So I think there are lots of mistakes made. Cows obviously don't get better if they've got a puncture in their hoof and are just treated with antibiotics."

Foot rot outbreaks

It's important to distinguish between an occasional case of foot rot and a real outbreak, Whittier says. It's hard to predict when an occasional case will occur. "Any cow, calf or bull any time can happen to get a case of foot rot," he says. Generally, what happens is that an injury provides an opening for the bacteria to enter the body.

Whittier goes on to say that generally two things are present during a foot rot outbreak. One is conditions that are going to soften the skin between the toes. The other is rough footing that causes damage to the skin between the toes.

"Nearly all of the outbreaks of foot rot can be associated with either wet conditions, where the skin becomes wet and soft, or with footing conditions so that there's injury to the space between the toes. I think that's much, much more common than any nutritional deficiency."

However, Whittier admits there is an ongoing discussion about whether mineral

deficiencies make an animal more susceptible to foot rot.

“For a long while we thought that feeding iodinated salts helped to prevent foot rot, and people thought that that was somehow improving the health of the skin,” he explains. “The other thought was that if iodine passed through in the manure it was kind of a disinfectant to the manure and would decrease the number of organisms that were there. I think that veterinarians generally accept these theories less these days.”

Another preventive management practice is walking cattle through a disinfectant solution (or footbath). Walking cattle through a 3% formalin footbath, a 5% copper sulfate footbath, or mixed powdered copper sulfate and lime twice a day decreases the incidence of foot rot. Zinc methionine also has been recommended for both treatment and prevention.

Although footbaths are often used in the dairy industry, Whittier says their use isn't applicable to most beef operations unless cows are in a drylot situation.

Although footbaths aren't usually practical, he says they can help in a couple of ways. “We put things in those footbaths that will harden or toughen up the skin, and then we also put disinfectants in there that will kill the organisms that are present on the foot. So if there is a little injury, they're a lot less likely to end up with a foot rot infection.”

“I think that, in most cases, we can just change the footing and get cattle out of pastures or areas where it's really wet or where there's potential for a lot of injury,” Whittier says, adding that may be easier than walking them through a footbath.

Losses

“I think that any animal that gets a case of the disease is going to experience some loss,” Whittier says. “They don't eat. They don't walk around. They probably don't drink normally.” The result is a loss in weight and condition.

“Of course, real disasters occur if outbreaks occur during the breeding season and you've got bulls that are not breeding cows,” he adds. “Likewise, the cows are a lot less likely to get pregnant if they have a case of foot rot.”

Usually, if caught in its early stages, a case of foot rot can be healed rapidly and successfully.

“I see cows that have a very swollen foot and a lot of dead tissue. We give them an antibiotic and maybe go the extra step of picking their foot up and cleaning the dead tissue out of there. In just two or three days, they're essentially back to normal. I'm impressed at how quickly they can respond.”



Continuous exposure to wet conditions is another factor in foot rot cases. Outbreaks may occur in areas where cattle are standing constantly in wet, muddy areas. To decrease the chance of an outbreak, producers should try to keep areas around bunks and troughs well-drained.

If left untreated, foot rot can lead to more-serious problems if it spreads to the deeper tissues of the foot.

“As a veterinarian, I get called for a cow that has foot rot that won't get better. When I examine the cow, I find out she actually has infection in the bone or joint of the foot,” Whittier says. “Whether that started with an injury or with foot rot, that's hard for me to figure out. But I'm sure that a percentage of them start with foot rots that are not picked up early enough.”

“The complications are that we get into tissues (tendons, tendon sheaths, bones and joints) that don't heal as quickly as the skin and subcutaneous tissues,” he continues.

“Most animals [do] recover very well,” Larson says. “Once in a while, if the joint above the hoof becomes infected, we have to use a surgical procedure to remove one of the claws to allow that to heal. That is considered a salvage procedure, and those animals are intended to get well, and then take them to slaughter. You wouldn't keep a one-toed animal around very long.”

Treatment

“I believe that every cow, calf or bull that's diagnosed with a case of foot rot deserves careful examination of that foot,” Whittier says. “Sometimes there's a foreign body — that stick or stone, or whatever, that started it — still stuck between the toes. Those cows don't get better until you get rid of the foreign body that's there. In every case we should examine them enough to at least be sure.”

To go the extra mile during the examination, Whittier recommends *debriding* (or removing) any dead tissues. An easy way to do this is to take a piece of burlap or old

Fescue foot

When an animal becomes lame, it's not always a case of foot rot. There is a plethora of other things that can cause an animal to limp. One example is fescue foot.

“Most of the fescue grown is in the southeastern part of the United States,” says Bob Larson, a beef veterinarian at the University of Missouri. “So cattle coming on those pastures or coming off of those pastures, particularly if they're not acclimated, can have some lameness and hoof problems because of that.”

Fescue foot can result when cattle consume fescue infected with a fungus that does not harm the plant but produces a substance that, when eaten by cattle, causes constriction of the blood vessels around the foot.

“In cold weather, you can actually have cases where the blood flow is completely shut off to the hoof,” he says. “You can lose the hoof.” The animal will appear lame and there will be swelling in that foot. The animal may show other symptoms of fescue toxicosis, such as a rough hair coat and a high body temperature.

A close inspection of the foot won't reveal a lesion like you'd find in the case of foot rot, Larson explains. “It's really a blood-flow problem to the foot.”

“If it's a fescue foot problem, then the antibiotics we use for foot rot are not going to be helpful,” Larson says. “So it's good to know as you're going into it. For almost any cut or foot rot, we're going to treat with antibiotics and try to get the animal into as clean and dry [a] place as we can.”

Larson says there really isn't a treatment for fescue foot, other than getting the animals off the contaminated hay or pasture.

“If it's mild, they'll return to production, but they may have trouble catching up with their peers,” he says.

rope and “floss the toe,” he says.

“It’s kind of equivalent to using dental floss between your teeth. You just pull that rough material back and forth between the toes,” he says. “You don’t want to be so ruthless that you damage other tissue, but you want to be firm enough so that you do get the dead tissue.”

In order to help in the healing process, the dead tissue needs to be removed, he says. You may see a little blood from the live tissue when you floss the toe, he adds. To go the extra mile, stand them in some sort of disinfectant footbath or a bucket with disinfectant in it, Whittier suggests.

“Back in the old days before we had antibiotics that we could give and still sell the milk from dairy cows, we often tried to treat cows solely with foot soaks,” he says. “Essentially we were killing the bacteria locally instead of killing it with an antibiotic.

“In beef cows, unless we are going to slaughter them in the next few days, we don’t have that concern,” Whittier says. “Any time we give antibiotics to cows, we always ask ourselves the question ‘now is this cow going to go to slaughter?’ And we need to observe proper withdrawal times so that we don’t end up contaminating the food supply with antibiotics.”

Whittier says penicillin in its various forms, the sulfa drugs, florfenicol and the tetracyclines all have been used successfully to treat the disease.

Although a vaccine has been approved for foot rot prevention, Larson and Whittier agree that the best way to prevent foot rot is to minimize the environmental factors that can lead to hoof injury.

