



Hoof Health

*Identify common foot problems
and treat them accordingly.*

by Heather Smith Thomas

Cattle sometimes suffer foot injuries or diseases, and a lame animal may lose weight if it spends most of its time lying down rather than grazing or going to feed or water.

Assistant professor at Kansas State University's College of Veterinary Medicine and DVM, MS, DACVIM Emily Reppert says environment can play a role in hoof health — whether the weather and pastures are wet or dry.

Foot rot

"This year, here in the Midwest, we've been dealing with more foot rot than other years,

probably because we've had a lot of moisture," Reppert says. "This spring and summer stockmen are having more cases of foot rot than they ordinarily do." Moisture softens up the skin and feet, and these tissues are more readily nicked or scraped, opening the way for pathogens that cause foot rot.

Director of research and veterinary services at Simplot Livestock Co. Randall Raymond says foot rot can be caused by two different bacteria. "These are opportunistic pathogens that require some trauma or break in the skin to enter the foot.

The main one we deal with is *Fusobacterium necrophorum*," he says.

These bacteria are almost always present in the environment. Signs of foot rot include swelling at the heel or between the claws, and the swelling sometimes breaks open and drains.

"The biggest thing in preventing foot rot is managing the environment to reduce risks for foot rot. This means eliminating mud as much as possible, and reducing risks for trauma to the feet especially between the toes. Rocky or frozen conditions in which the skin may be broken by sharp rocks or ice can predispose cattle to foot rot," Raymond says.

"In the feed yard, we try to handle cattle with the least amount of stress possible so they are not scraping their toes on concrete or getting abrasions on the sides of their feet by being jammed and struggling in the alleyways," Raymond explains. "We use wood chips sometimes to improve the footing, and minimize any areas where there might be potential for trauma to the feet. We do everything we can to avoid muddy conditions, keeping pen space as clean as we can. This is a challenge in the winter, but we remove mud and manure as quickly as possible."

Out in pastures, boggy conditions should be addressed, if possible.

"We also try to select for cattle with good feet and leg structure. Just as in other diseases, there is a genetic predisposition for disease resistance. Some cattle have stronger immune response than others, and I don't think foot rot is any different, but good foot and leg structure is also crucial," he says.

"Good husbandry practices and genetic selection that takes us the right direction in foot and leg structure are key factors, along with good nutrition to keep the immune system, skin and feet healthy. A good mineral program is crucial for keeping the immune system healthy. Our biggest issues here are selenium, copper and zinc deficiencies — all of which are needed by the immune system in order to function correctly. Zinc and copper are also important to foot health," he explains.

There is a vaccine for foot rot. "We haven't used it in our operation, but the literature on it is encouraging. One of the herds I work with in our area has used it a lot and the owner feels like it has reduced their incidence of foot rot. They are now treating only one or maybe no cases of foot rot per year, compared with an average of about 20 cases per year before they started using the vaccine," says Raymond.

"The vaccine would be worth looking at, if a person has a

high incidence of foot rot. On the other hand, husbandry and environmental management is a big part of the picture. If environmental issues are causing the problem, I would try to change those things. The vaccine can be a good tool, but should be looked at as just one part of the total management."

For treatment, he advises using an antibiotic with the proper spectrum and durability of activity labeled for foot rot. "LA-200 is an economical and effective choice, especially if you catch it early," he says.

This is the key — catching it early, treating with the proper antibiotic and putting the animal where it's clean and dry.

"Another antibiotic I often use for foot rot is Excede. This factor has a seven-day tissue level. We get a longer duration of activity with just one treatment. This is helpful when treating cattle that may be harder to access for additional treatment, such as out on pasture. Excede is more expensive, so I use this drug when the animal's value is higher, or the condition is more severe, or when I don't think I'll have another opportunity to treat that animal," Raymond says.

There are some complications that can occur with foot rot. In long-standing cases the infection may get into the joints, and the animal may develop septic arthritis or cellulitis if the



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infection gets into the tendon sheath. "If these complications occur we may do additional treatments," he explains.

If the infection gets into the joint or tendon sheath, generally the animal has to be culled.

"In seedstock animals with high individual value that won't be entering the food chain, we may do joint flushes. It's rare that we'd have to get this aggressive, however, because hopefully the producer noticed the condition and treated it before it gets to this point," Raymond says.

Cattle out on range, however, may not be seen often enough for the producer to know when the problem started. In some of these animals, there may be extensive damage by the time they are brought in for treatment.

"In those cases, there may be no treatment that will completely cure the problem. We try to get the cow through that season, to wean her calf, and market her later," he says. "Those that we catch early and treat appropriately probably have about a 90% success rate, if it's truly foot rot."

If surgery has to be performed in a severe case to remove a damaged claw, the animal will be impaired and unable to travel normally. "If the animal has high value and genetic merit, however, it could be confined and managed to do all right. This might be the case with a valuable cow in an embryo flush program, or a bull that could be collected for artificial insemination (AI) breeding. We address these on a case-by-case basis, depending on what the owner might want to try. In these cases the success rates are obviously lower," he says.

Interdigital dermatitis and heel warts

"Another thing we are seeing in conjunction with increase in moisture here this year is interdigital dermatitis," Reppert says. "This is probably more common in dairy cattle because of the way they are housed, but we are also seeing some cases in beef cattle. This is not the same thing as heel warts, but is another kind of dermatitis or inflammation of the skin around the heel — often associated with too much moisture. It can be painful, and might be confused with hairy heel warts which is contagious and would be a much more significant problem if identified on the property."

With beef cattle there's a wide spectrum of environmental conditions, from herds on dry pastures in the mountains or desert rangeland, to cattle on irrigated pasture, to cattle in confinement in feedlots or on feed tests or being prepared for the show ring.

"Some of these are confined and housed and might have issues

similar to those of dairy cattle," Reppert says.

Strawberry foot rot/hairy heel warts is caused by a spirochete bacterium, according to Matt Miesner, DVM, MS, DACVIM, and clinical associate professor at the K-State College of Veterinary Medicine.

"It is not necessarily between the toes but more in either the front cleft or the back cleft between the heel bulbs," Miesner says. "It appears as a reddened, roughened, ulcerated, irritated area. It looks granular, like a strawberry, and is very painful. In other stages it may have long hair-like structures that grow out from the heel. This would be something to check for if the animal is very lame, before you assume that you are just treating a routine foot rot."

Miesner adds, "I've seen this condition in bulls that are housed in groups or cattle confined in a feedlot situation. This disease is diagnosed with a biopsy of the lesion; the bacteria can be seen under a microscope."

Treatment is different than for foot rot. "This disease does not respond as well to systemic antibiotics. We usually use formalin foot baths, thoroughly rinsing the feet—an intensive program to try to halt the infection. We may also use a topical oxytetracycline spray, and try to dry the foot. Moisture allows these bacteria to keep going," he explains.

There are vaccines for strawberry foot rot, and these are sometimes used in dairy cattle or in bulls that are housed in preparation for sales. "Whenever there are housed animals in a wet, moist environment there is a chance for this type of infection and it is very contagious. It needs a little help with moisture and disruption of the foot but it can get started pretty quickly and is much harder to treat than foot rot," he says.

"If a lame animal has a lesion between the toes or heel bulbs that looks like foot rot but is not responding to antibiotics, a closer look may reveal its true nature," Miesner says.

White line disease

"Something we see in all regions of the country is white line disease," Reppert says. "It may be partly due to environment such as increased moisture, which leads to softening of the white line, but there is also a nutritional component. The hoof tissue becomes very soft at the white line, the area where the sole meets the hoof wall, and this predisposes the foot to development of abscesses. Manure and dirt gets packed up in there."

Reppert explains, "We see it most commonly when cattle are



Foot rot causes painful swelling between the toes.



being fed a lot of concentrate feeds like bulls on test, show animals that are pushed hard nutritionally, and during times of year when there is a lot of moisture as well."

The earlier cattlemen discover a foot problem, the better. If it's white line disease, it needs to be cleaned out and treated like an abscess. "A good foot trim can help eliminate some of that soft white line and detect any infection," Reppert says. "At that point a good foot trimmer or a veterinarian would be able to identify soft spots or any manure and debris that is packing in along the white line. Those could be pared out. A large part of treatment in many cases will be to alter the diet a little, and change the environment."

Many hoof problems, with the exception of things like foot rot or an abscess caused by infection, are usually not a quick fix. "It may take several months before you see a response to your changes/treatments, especially something like white line disease where you have to change the nutrition," Reppert says.

Hoof cracks

Hoof cracks will also take time to correct, since the hoof has to grow out in order to regrow healthy horn. "I hesitate to say that sometimes the tendency to cracking is hereditary because we don't really know, but it seems like conformation and genetics does play a role," Reppert says.

"Some people believe that the so-called sand cracks are due to sandy soil that gets into grooves of the hoof and works its way in and starts the cracking. Often we see vertical wall cracks in the animals that have a really long toe. When the toes are overgrown it puts more strain and pressure on the vertical hoof wall, and with this kind of stress there is more risk for cracking," she says.

Cracks are a perfect place for manure and debris to pack in. "It's not uncommon to have an animal lame, not only because of the packed debris putting pressure on the sensitive part of the hoof, but

they may also develop an abscess in the crack if it is very deep," Reppert explains. "These animals need a hoof trim, to get the toe as short as possible and relieve pressure on the hoof wall."

Professor and extension veterinarian at Iowa State University Jan Shearer says vertical wall cracks are more common in beef cattle than dairy cattle, but horizontal cracks are common in all cattle. These cracks run parallel to the coronary band and often represent a benign physiological change that creates mild disruption of hoof horn formation. They can result in severe lameness, however, if they are deep.

Rings around the hoof are common because the hoof wall grows at different rates during various seasons and also for physiological reasons, creating growth rings which may occasionally become cracks.

"Every time the cow calves she goes through a period where hoof wall growth slows greatly or stops, due to a major physiological change affected by her hormones and metabolism as she goes from a non-lactating to a lactating stage," Shearer explains. "There's an interruption of hoof horn growth that creates a horizontal groove, or a growth arrest line — which is associated with calving," he says.

If a cow has horns, this same change occurs in horn growth. "The rings on her horns signify when each calf was born. If a cow has had eight calves, there

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Pictured is an example of a full-length vertical crack.

will be eight rings on her horn. She doesn't get an annual ring; the change occurs with calving," Shearer says. These growth rings are consistently found in both beef and dairy cattle.

Seasonal changes are another factor in hoof growth rate. This factor may be partly nutritional (time of year when feed is more plentiful, with green grass) or due to longer hours of daylight. "Growth rate is affected by physiological factors and may not have as much to do with availability of nutrients as it does with number of hours of daylight. Some of these things are not well understood, but people need to realize that not all horizontal rings are indicative of disease," he explains.

"Some rings are associated with disease situations or extreme changes in nutrient level or balance or availability. We sometimes see an extremely deep horizontal groove — and we tend to associate this with something beyond the normal physiological changes, such as disease," he says.

When hoof horn formation resumes, a full-thickness crack sometimes develops. These severe disruptions in hoof horn

formation create distinct ridges and grooves.

"In the most extreme cases where the fissure is deep enough to create a full thickness defect in the wall, this lesion is called a thimble," Shearer says.

When a deep crack gets down to the level of the corium, the sensitive "quick" underneath, it goes all the way through the horn. "The fragment below the crack may become separated from the hoof wall above it. As it grows down the foot and wears away, a deep crack may become painful because every time that fragment moves, it pinches the underlying corium tissues," Shearer says.

Vertical cracks are often called sandcracks. "Less than 1% of dairy cows develop vertical wall cracks, but up to 64.5% of beef cows get vertical cracks. More than 80% of these cracks occur on the outside claw of a front foot. The front feet carry a more weight than the hind feet. The inside claw is slightly larger, and bears most of the weight," Shearer says, but there may be more movement and strain on the outer claw.

"Some people have thought that cracks are related to dryness, or the fact that front feet have a



Horizontal cracks can create what are called "thimbles," separating from the rest of the hoof.

steeper angle than the hind foot and are thus subjected to more stress," he says. Beef cattle travel on earthen surfaces (and rocks, and often very rough terrain), and in some cases, the feet may be drying out too much.

"But dairy cows are standing on concrete all day and rarely get vertical cracks. Based on the numbers, there seems to be a breed predisposition to wall cracks," he says. Some family lines, in any breed, also have more tendency to cracking. In a certain herd, often the cows that develop vertical wall cracks are related.

"Other factors associated with vertical cracks include vitamin and trace mineral deficiencies. Some people have suggested that laminitis may play a role. Some of the reasons remain unknown, however," Shearer says.

"Body condition may be a predisposing factor; heavy, overweight cattle may be more at risk. Age may also be a factor, since older cattle tend to have more sand cracks. Selenium, either too much or too little, can have an adverse effect on hoof wall strength and growth. There are many possible causes for cracks," he says.

To treat a crack, sometimes the affected animal's movement needs to be limited so it doesn't have to walk very far to feed and water. "If one side of the foot is a little better than the other, we may try to thin the horn or stabilize it in some way, and take the weight off the claw where the fragment is less stable. We may glue or nail a wood block under the healthy claw, to leave the cracked claw off the ground so it doesn't bear weight. If we get the weight off, the corium won't continue to be traumatized, and will hopefully heal and start to produce new horn. Once it does that, it will self-correct," Shearer says.

"The main objectives in therapy are to stabilize the two portions of the wall that are loose and moving or pinching. Sometimes the two fragments can be wired together, or stabilized by other means, including surgeries. Only a small percent of hoof wall cracks actually cause lameness and need

treatment. But if cracks cause lameness, they can be complicated to manage — especially the vertical wall cracks," he says.

"If the foot is overlong, we trim it back, and sometimes we can remove the fragment, or a portion of it, by trimming. Sometimes we can trim it enough that it won't be flexing so much. Depending on how far down the foot it is, sometimes trimming alone can provide some relief until the foot can grow out. It's the movement and pinching that causes pain."

Injuries

"There are also occasional traumatic injuries to the foot. In this part of the country sometimes we have flint rocks that migrate through the hoof and damage inner tissues," Reppert says.

"Thorns from a variety of trees can also become a penetrating foreign body. Often those animals are lame but don't have a lot of swelling, unless it gets into the joint. They are very lame but generally don't respond to antibiotic treatment."

If there is something stuck in the foot, like a thorn or a nail, the foot should be examined and the object found and removed.

Freak accidents can also damage the foot, like getting the hoof caught in a cattle guard, chute, tilt table, etc. A caught hoof may end up with the hoof horn pulled/sliced off on one or both toes. "I've dealt with that on multiple occasions," Reppert says. The animal has to grow a new horn shell but you may need to keep the foot clean and bandaged to protect it while the new horn grows.

"All the important internal structures of the foot are close together, so if one gets infected, often the others do, as well," Reppert says. A calf with a lost horn shell is easier to deal with and treat than a heavy adult that has to put a lot of weight on the foot.

"Here at the university we have the luxury of having a tilt chute where we can lie the animal down for treatment. It's more difficult if you have to lift the foot up to clean and treat it." **HW**

An accurate diagnosis

Many lame animals are simply assumed to have foot rot, but it's wise to have a proper diagnosis. "If you think the animal has foot rot, and you treat it with an antibiotic that is ordinarily very effective against foot rot, and it is still lame, you should have that animal evaluated," says Emily Reppert, DVM, MS, DACVIM and assistant professor at Kansas State University's College of Veterinary Medicine.

"Either it has a super-resistant pathogen causing the infection, or it is not foot rot. If it's something else, it may be something significant that needs attention. It is crucial to have an accurate diagnosis, as early as possible," she says.

Once what is actually going on with the foot is understood, the problem can be treated properly. "The joint capsule and joint space are very close to the hoof wall, in the bovine hoof. Any unresolved infection in one part of the hoof can rapidly lead to infection in the joint. These complications, though not always career-ending, are definitely more serious than simple foot rot," she says.

Swelling and lameness may be due to a snakebite, puncture wound, sole abscess, sprain or fracture, or some other injury. It is always wise to restrain the animal and examine the foot — especially the bottom of the foot — to make sure it's not a sole abscess or a nail in the foot. If it's something besides foot rot, it may need additional treatment and not just antibiotics.

Sometimes even a simple foot rot that is neglected and not treated may end up resulting in extensive infection that may end up in the joint. Lameness should not be neglected. Its cause should be discovered and the problem should be treated appropriately. **HW**

