

# Footrot in Sheep

—Ulf Kintzel



*A footbath with a zinc sulfate solution.*

There are many diseases sheep can catch. Some are very often mentioned in sheep publications or written about by extension agents. OPP (Ovine Progressive Pneumonia) is one of them. CL (Caseous lymphadenitis) is another. Lots was written about Johne's disease in recent years as well. Others are, written about because of how deadly they are but vaccines have been developed to combat them effectively. Overeating disease (Enterotoxemia) and tetanus are among them. All these diseases are real, and I don't belittle any of them. However, many diseases are either manageable by using vaccines or by culling, or cause little economic impact, or are rather rare. Others again are benign, often not worth vaccinating against. I would put orf (sore mouth) in the category of benign ones. It is as common as the

common cold in humans. There are rarely economic losses, and if so, then only with very young lambs.

However, there is one disease that lets me lose sleep. Footrot. My flock is free of footrot (also known as hoof rot) and always has been. However, in the 40 years that I have been in the sheep business, I have gained extensive experience with footrot, starting at the tender age of 17 years. I started my apprenticeship at that age. The cooperative farm had a flock of 700 ewes of the German Blackheaded Muttonsheep and this flock had footrot. Who do you think did most of the dirty work, including the hoof cutting? If you guessed the apprentices, then you are correct. "Lehrjahre sind keine Herrenjahre." (Apprenticeship years are not the years of a master.) So, my start in the sheep business largely included cutting hooves diseased with footrot. After the wall came down and I had moved to West Germany, I again encountered many flocks with footrot where I was employed. It never seemed to end.

Footrot in sheep is a highly contagious disease, caused in tandem by or coexistence of two different bacteria. The first is *Fusobacterium necrophorum*. These bacteria are normally present in the pasture. They alone will not cause footrot, but they may cause foot scald, especially in muddy and rainy conditions when temperatures are above 50 degrees. Foot scald is an inflammation between the cloven hooves and makes sheep limp. It rarely spreads further into the hoof and usually does not cause large cavities in the hoof. If it does, it undermines the horn just a bit. Foot scald is classified as a disease, but for practical purposes, I'd like the reader to look at it as something that is a "condition." That means if you remove the conditions for foot scald, you will eliminate additional cases of foot scald. While affected animals need to be treated, it is not contagious, which is often evident in the fact that one sheep's hoof may be affected but not two or three or even four. A zinc sulfate footbath is the treatment of choice. Sometimes a sheep's hoof needs to be cut back and the cavity, cut out since the bacteria may continue to thrive in that cavity and the zinc sulfate solution may not reach all of the cavity. A solution of zinc sulfate can also be put directly on the infected hoof if a footbath is not a workable solution or only a few sheep are being treated. Copper sulfate does the same as zinc sulfate but perhaps not

Photos by Author

quite as effectively. However, unlike zinc sulfate, copper sulfate stains and is corrosive to metal.

I used some ink in this article to describe foot scald because it can easily be confused with footrot. Note, foot scald does not cause an offensive or strong odor. That is a clear indication that the disease you are dealing with is foot scald and not footrot.

Footrot is caused by the same bacteria (*Fusobacterium necrophorum*) and *Dichelobacter nodosus*. How do you get *Dichelobacter nodosus* onto your farm, onto your pasture, into your barn, and subsequently into your sheep's hooves? Contrary to popular belief, it does not come in by birds or some other airborne means. It comes in by either a purchased animal that was affected (the most common scenario) or an outside source carried affected material onto the farm, e.g., manure on a trailer or on shoes.

Footrot is not nearly as benign as foot scald. It is highly contagious. While there are many different strains, they are all contagious. Very often, a sheep is affected on several hooves, sometimes even on all hooves.

The lifetime of *Dichelobacter nodosus* in the soil and manure is limited. On pasture, it will die within no more than two weeks. It may survive longer in muddy spots that remain wet. Some literature suggests even up to several months. However, it is in hooves where the bacteria can survive the longest, up to a few years. Moreover, it is very often that some sheep, seemingly unaffected, are latent carriers that will keep the disease alive during dormancy. When there is a new outbreak, it is helpful to identify those animals that start limping first each and every time there is an outbreak. These animals should be culled, no matter how productive and valuable they may be otherwise. While sheep or goats never develop true resistance or immunity against the disease, there will still be animals that are more resistant than others against the disease. Those too need to be identified. They are the ones that allow a way forward in the attempt to eradicate the disease in a flock of sheep.

The level of infections with footrot in a flock where it is present will go in cycles. Warm and humid weather, muddy conditions, housing in the barn will bring new cases. Dry and cold weather will help to curb the number of new infections. Don't let a downturn in infections during times when the conditions are less favorable for the bacteria fool you. It hasn't gone away by itself. It never does. It will come roaring back when the

conditions are more favorable.

There are many strains of footrot, and not all are equally virulent (meaning harmful or severe). Some strains are considered benign. While I find absolutely nothing about footrot benign, it is true that these strains cause less limping and hoof decay than the virulent ones. In fact, I have seen flocks with footrot present, where fewer sheep limped than I expected but there were still was a considerable number of sheep limping. Again, these strains are labeled benign, and for the sake of this article, I feel compelled to mention it. Yet, "benign" footrot is still footrot.



**Treatment.** The first course of action will be cutting hooves, cutting them back and cutting out and removing all cavities where the disease undermined the hooves and separated the horn from the live flesh. That must be done with surgical precision. You must avoid any bleeding when cutting the hooves because it will then be hard to be sure that the cavity is fully removed. If you don't remove the cavity entirely, the infection may continue, and these sheep can infect all the others again. Infected sheep can then be treated afterwards with a solution of zinc sulfate. Oxytetracycline, either put on the hoof directly or given as a shot, also curbs the infection.

An additional footbath for the entire flock after all hooves of affected sheep have been cut as described is a great tool to heal the diseased hooves and also to control the spread of footrot. The disease will stop in newly affected sheep with just an inflammation in between the hooves and no cavities yet.

I use five plastic footbaths in a tight row in my chute. I purchased them at Premier One Supplies. They are 47" long, and 18" (at the bottom) to 20.5" (at the top) wide. They are made of extremely durable plastic. The width matches the width of my chute. That means there is no room to the left or right of the footbaths, and thus the sheep are forced to go through them and cannot sidestep them to avoid them. Why do I have a need to run my flock at times through a footbath? On occasion, I have a few animals with foot scald and the footbath stops such infection immediately. In addition, it is a great tool to not let footrot take hold in the first place.

There are three possible active ingredients that can

be used for the footbath as treatment of footrot that will kill the bacteria causing footrot:

**1. Zinc sulfate.** Zinc sulfate is in my view the substance of choice to treat footrot. It can be purchased in a 50-pound bag (often labeled as feed grade zinc sulfate) at some local farm or feed stores or, somewhat pricier, as a concentrated liquid form in a gallon jug. There are also some firms offering to ship it. However, shipping is likely to cost as much or more than the bag of zinc sulfate itself. Zinc sulfate has the added benefit of being non-corrosive to metal and does not stain.

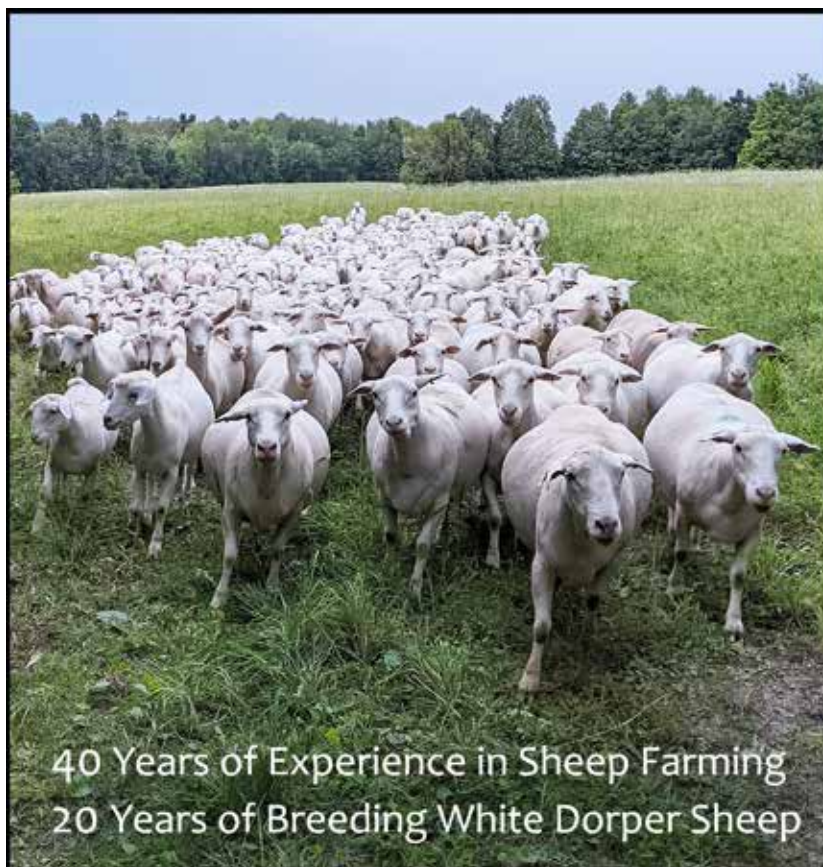
**2. Copper sulfate.** Copper sulfate comes in the form of a blue salt or salt crystals, also available in a 50-pound bag at some farm or feed stores. It had been a choice treatment for many decades. It was the treatment I was accustomed to during my apprenticeship and the years thereafter in the mid-1980s. As aforementioned, the downside of it is that it is corrosive to metal and that it stains wool green (yes, green, not blue).

**3. Formaldehyde.** Formaldehyde known as formalin is a saturated solution of formaldehyde. It is very effective. However, it also hardens the hoof. That makes it harder (pun intended!) to cut hooves again after treatment if the prior cutting was not fully successful. Also, formaldehyde is deadly to fish and must not be

used near open water sources. Extreme care must be taken when using it because it is also potentially harmful to humans. You have to be careful that you don't get it in your eyes when the solution is splashing when sheep enter the footbath. Inhaling the gases developing from it is at a minimum unpleasant but can potentially be harmful as well. I had my share of experiences of using it in West Germany and advise against it when zinc sulfate is available. It is just too cumbersome to use.

Any of the above ingredients will be mixed with water in a footbath. I use a feed scoop or two of zinc sulfate for each footbath. Each of these footbaths holds 25 gallons of water, although I do not fill them to the top, especially if I have small lambs in the flock. I also add some dish soap to aid penetration.

One key to success when using the footbath is the duration of which the sheep stand in the solution. It should be a minimum of a few minutes. Longer is better. That is very doable if you have a handful of sheep. It is a tall order when running hundreds of sheep in your flock. It is even harder to accomplish when you consider that you need to run all the sheep through the footbath frequently to eradicate footrot. Still, take your time when letting the sheep go through the footbath. Don't rush it. And remember that the footbath alone is not going to



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eradicate footrot. You must cut all affected hooves and remove all horn that has separated before you use the footbath.

If by now you have started to wonder how it is even possible to eradicate the disease, especially if you have a sizable flock, then you have gotten to the main problem and the very reason why I am so afraid of it. A friend of mine once took over a flock of several hundred ewes when he was about 40 years old. He eradicated it by being very diligent, cutting hooves, running them through the footbath time and again, and culling ewes, no matter how good they were, that always started first being affected by the disease again. He is the only success story I can tell you. All other cases I know, and I know many, were either not successful with eradicating footrot or were content containing the disease with sporadic outbursts of hoof-cutting and foot baths. A vaccine against it is not available in the US.

What is the solution when you don't have the skill to cut hooves properly, meaning removing all cavities almost surgically and you have a virulent strain of footrot? Is there an easier way to rid your farm of footrot? There is. If your flock is small or not all that valuable and you don't mind starting over, cull your flock. Let the farm and barns rest for a certain while, at least a few weeks, a full season if possible. Remove all manure in the barn. Leave no wet or moist or muddy spots in place. Spread lime in the barn, barnyard, and places that could contain bacteria. Then, if you still want to raise sheep, start over. However, when you purchase a new flock, let one of the first questions be if the flock is free of footrot. Any flock owner, who is certain that their flock is free of it will gladly and loudly proclaim that fact like me.

**Prevention.** If you have a good flock and wish to not bring footrot to your farm in the first place, here are some tips to avoid it: Infected animals purchased from someone else are the main source for getting footrot into one's flock. No other possible reason comes close to it. Therefore, one of your first questions when purchasing new breeding stock is if the flock of origin is free of footrot. If you can, get it in writing in your purchase agreement. Don't be tempted to buy breeding stock at the sales barn. I have heard that story far too often that footrot was brought into an existing flock by buying animals there and introducing them to the home flock. Newly purchased animals from a breeder should be quarantined for a considerable while so that a possible outbreak can be contained and will not spread throughout your flock.


When you hire a livestock hauler to take along

breeding stock for you, ask for the trailer to be cleaned after the last transport and inquire what other sheep might be and may recently have been on the trailer. I have experienced some livestock haulers reacting rather defensively when I asked to come with a clean trailer. In fact, I had truckers coming with thick layers of manure in their trailers, and I put a hard stop to that years ago since infected animals being transported on a layer of manure is an almost sure way to transfer the disease to the next group of sheep on that trailer.

Other ways of transfer are footwear, albeit not as likely. When other people come to my farm, I require clean clothing and in particular clean shoes since manure picked up on one's shoes, when leaving the home farm can be the cause for bringing footrot to my flock. (The clean clothes, are more because of external parasites like sheep lice, which don't affect humans but can be transferred by pants and jackets.) When that protocol of clean boots is not adhered to, I have people step in a footbath with bleach to kill any bacteria.

All these biosecurity requirements I have enacted have not always made me popular with all of my customers. On the other hand, others have appreciated it because they felt they can rest assured that I do my best to avoid the spread of disease in general and footrot in particular. Since I can't please all my customers all the time anyway, I will stick to what I think is the right thing to do to avoid catching footrot.

I put this protocol in place over time. I didn't start out by being this "difficult." But after seeing wet manure falling off the trailer when opened, people arriving with dirty boots and clothing that seemingly hadn't seen a cleaning in months, and folks entering the barn without permission, wanting to inspect every inch of it before I arrived, I gradually added more and more rules to my "biosecurity protocol." Granted, I have many dozens of people coming to my farm every year, and you, the reader, may not face that kind of scenario. However, it may be a prudent thing to think about the place of origin of your next ram or ewes, the transportation of new animals, who is entering your pastures and barn, and things like these.

As far as most other sheep diseases are concerned, I am far more at ease in handling them. Yes, I think footrot is that bad of a disease. 

*Ulf owns and operates White Clover Sheep Farm and breeds and raises grass-fed White Dorper sheep without any grain feeding and offers breeding stock suitable for grazing. He is a native of Germany and lives in the US since 1995. He farms in the Finger Lakes area in upstate New York. His website address is [www.whitecloversheepfarm.com](http://www.whitecloversheepfarm.com). He can be reached by e-mail at [ulf@whitecloversheepfarm.com](mailto:ulf@whitecloversheepfarm.com) or by phone during "calling hour" indicated on the answering machine at 585-554-3313.*