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Contagious Foot Rot In Sheep

prevention—treatment—eradication



Not an acrobatic sheep ready to perform but one showing typical symptom of contagious foot rot.

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CONTAGIOUS FOOT ROT is potentially one of the most serious diseases of sheep, especially in the large flock. The reason for this is twofold: (1)—the tremendous amount of time and labor required to eradicate the disease, and (2)—the losses in productivity of the breeding flock and market lambs during the treatment and eradication period.

This bulletin will stress the prevention of the disease as being of foremost importance. However, treatment and eradication programs also are suggested.

In order to properly follow the prevention and treatment procedures suggested, it is necessary to understand the nature, cause and symptoms of the disease.

NATURE AND CAUSE

Contagious foot rot as discussed in this bulletin is a specific disease of sheep and goats. It is totally different from, and should not be confused with, foot rot in cattle. It is *not* acquired from contact or association with other species of farm animals. In most all cases the disease is introduced into a flock through the purchase or borrowing of infected animals.

Sheep and goats of all ages, sexes, and breeds are susceptible. Certain breeds have, at times, been claimed to have natural resistance to the disease, but these claims are not substantiated by field observation or research.

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The disease is caused by two distinctly different bacteria. It will not exist if only one of them is present. Both of these organisms are anaerobes; that is, they will live and grow only in the absence of air. This fact is of extreme importance in understanding the prevention and treatment of the disease. Of the two, *Fusiformis nodosus* is the primary cause, but *Spirochaeta penortha* must also be present to produce the disease.

The incubation period for foot rot is from 7 to 14 days. Therefore, purchased or borrowed animals should be kept under quarantine for a 2- to 3-week period before being allowed to mingle with non-infected sheep.

The organisms which cause the disease live, and are carried, in the dead tissue that is trapped in overgrown and neglected feet of the animals. Moist, lowland pastures, which are conducive to rapid overgrowth of the hoof and result in lack of normal hoof wear, are often associated with the disease but will not cause the disease unless the specific bacteria are present.

One or all four feet may be infected. Both claws are usually involved on the affected foot. An injury or wound is usually the point of entry of infection, but this is seldom apparent by the time the disease is recognized.

The disease spreads within a flock as a result of infection picked up on pasture, in wet areas such as around water tanks, water holes, and filthy pens contaminated by the feet of infected sheep. The in-

fection does not survive long in the presence of air. Pastures that have been free of sheep for 2 to 3 weeks may be considered to be clean and safe to use.

Because the organisms which cause the disease live only in the absence of air, it should be very apparent that the first and most vital step in the control and treatment of this disease, is to trim the feet regularly. Remove all dead and abnormal tissue, thus permitting air to get to all parts of the normal foot. The infecting organisms, if present, can no longer survive.

There is no self cure or recovery of untreated sheep. Likewise, sheep that have been treated and are cured are not immune to future infection. However, if an affected flock is thoroughly and adequately treated and the infection eliminated, the disease will not recur unless introduced into the flock by the addition of infected animals.

SYMPTOMS

The first and most obvious symptom is lameness. Any time a flock owner or shepherd notes lameness in his flock, the animal should be caught and examined. If the flock has not had a foot rot problem and there have been no flock additions or outside contacts within the past 10 to 14 days, then the lameness is probably not due to foot rot. However, the possibility (due to unknown or unrealized conditions) should not be overlooked. If the lameness is due to foot rot, neither the foot nor the joints are swollen. This is because it is the horny portion of the hoof that is involved and not the soft tissue above the coronary band. In typical contagious foot rot, there is not an abundance of moist, oozing pus or other discharge.

In the early stages of an outbreak, one or more individuals, if examined closely, will show an area of tenderness, reddening and puffiness between the

toes and on the heels. The foot may feel warmer than normal. These areas of the foot then become grayish, and the infection spreads into the horny hoof and sole of the foot. If the dead tissue is trimmed away, a cheesy, yellow-gray material, which has a characteristic foul odor, will be found. The infection burrows into cracks and pockets, and the sole and horny hoof become separated from the normal soft hoof structures. If both front feet are involved, sheep are often seen eating and moving around on their knees (see cover photo).

Foot rot has been reported in lambs as early as the sixth day. Needless to say, such lambs and sheep will be very unthrifty and subject to malnutrition and disease. There is no usual death loss from foot rot itself, but there is a terrific economic loss, and death losses occur due to complications arising as a result of the initial foot rot problems.

It is fundamental to the success of any control program to realize that just because only a few individuals are lame, *do not attempt to spot treat these individuals. No flock problem will ever be eradicated until the disease is handled on a flock basis. Each and every individual must be involved in the program.* Do not neglect the rams. The procedure for handling the flock will be outlined in detail in this bulletin.

OTHER CAUSES OF LAMENESS

Any condition which interferes with the normal gait of the animal or causes pain to a portion of the foot, leg, or related structures can cause lameness.

Simple bruises (as in dipping procedures), sprains as may occur from rough handling during shearing, cuts and scratches, puncture wounds, stones or dried mud,



LEFT — Foot abscess condition. Note the break and pus oozing from spot indicated by arrow. CENTER — Typical infected foot before trimming. RIGHT — Partially trimmed foot, showing separation of infected horny hoof from the underlying soft foot tissue.

wedged between the toes, and any other mechanical injury may cause lameness.

In lambs, diseases such as tetanus, white muscle disease, arthritis, and navel infection must be kept in mind. Foot rot does not usually start in the lambs. It is a *ewe flock* problem that subsequently spreads to the lambs.

Founder occurs occasionally in show stock but is not often confused with any other problem. Most causes of abnormal tenderness of the feet, as seen following a long drive on a hard surface, or as occasionally seen on sheep coming off wet, irrigated pastures (foot scald), usually present no confusion in arriving at a diagnosis.

All sheep have an interungulate or biflex gland between the toes on each foot. If this gland becomes plugged, infected, injured, or otherwise irritated, it may be the cause of lameness. The ability to squeeze a grayish, cheesy mass of material from this gland should not be confused with contagious foot rot. It is perfectly *normal*.

Foot Abscess (see photo) is a condition caused by *Spherophorus necrophorus* (this is the same organism found in foot rot of cattle). This infection involves soft tissue and causes severe lameness and swelling above the hoof. Joints often become involved. Noticeable abscesses will form and "break". The typical separation of sole and hoof wall from soft tissue, as seen in true contagious foot rot, will not be noted. Foot abscess cases have much more pus and drainage. Often only one foot or one claw on a foot may be involved. It is not too difficult to distinguish from true contagious foot rot. Foot abscess, if treated prior to joint involvement, will respond to antibiotics, thereby further distinguishing it from contagious foot rot.

Foot lesions occur in several infectious diseases, such as lip and leg ulcer (ulcerative dermatosis), blue tongue, contagious ecthyma, and foot and mouth disease. These diseases have sufficient symptoms besides the foot involvement so that they present no real problem in a differential diagnosis.

Can Contagious Foot Rot Be Eradicated?

Yes, but it is not easy. There is no simple way, no "shots", no quick cures, no self recovery.

Trimming feet is 90 to 99% of the job. This must be done thoroughly and completely on each and every individual on the farm or in the flock. Thoroughly follow and trim out all pickets, cracks, and crevices. Get down to healthy tissue, expose it to the air. Once this is done, any good disinfectant will accomplish the remainder of the task. This is no place for the

"faint of heart" or the "whiz bang". Trimming requires time if a good, complete job is to be done.

A STEP-BY-STEP ERADICATION PROCEDURE

1. Assemble all sheep and lambs in an area where they can be safely held for several hours or days, depending upon the size of the flock. A clean, hard surface or a well-bedded pen is desirable. Provide hay and water. The chemicals used in treatment would be deadly if consumed by thirsty sheep. Shade is desirable in hot weather.
2. Arrange gates to make a catching pen so that sheep can be easily caught and handled.
3. Set up each sheep. Carefully trim all four feet. Look for any signs of infection. Excited sheep may not appear lame. Trimming will disclose the true evidence. Do a thorough and complete job of following out all pockets of infection.
4. It is desirable to have a bucket of disinfectant available to clean trimming equipment in between sheep so as to minimize the possibility of spread during the trimming operation.
5. As each individual is examined and the feet trimmed, divide the flock into a "clean" or "infected" group. Pen each group separately. Keep them separated and walk the clean flock through the foot bath first. As soon as they have been through the foot bath, turn the clean flock on a clean pasture or lot, one which has had no sheep for 2 to 3 weeks.
6. The infected sheep should stand 3 to 4 minutes or longer in the foot bath solution. In construction of the foot bath, be sure there is no ledge on which the sheep can walk or keep a foot up out of the solution. Provide adequate depth of solution so that the entire hoof is submerged. See that each individual gets all four feet adequately treated.
7. Closely observe the clean flock daily on pasture. Catch and re-examine the feet on any lame individuals. If sign of infection exists, trim and retreat and place with the infected group.
8. Pen the infected sheep in a dry, well-drained area or pasture close to the barn so that they can be walked through the foot bath every 3 days for two weeks.

9. After two weeks, if the clean flock has shown no new cases, they can be considered free of contagious foot rot. It may be advisable to walk them through a clean, fresh batch of solution again as an added precautionary measure. This is optional.
10. After two weeks, examine and retrim all sheep in the infected lot. Animals with severe deformity of the feet and poor or slow response to treatment should be penned separately and consigned *directly* to slaughter. Such sheep should not be sold where they will contact other sheep, contaminate pens to be used by other sheep, or under any condition be sold to go back onto another farm.
11. Send the remainder of the "infected" group through the foot bath again. If possible, pasture separately for another 2 to 3 weeks away from the "clean" flock. Keep all groups under close observation. Under no circumstance should lame and non-responsive cases be turned with clean sheep. If they are incurable, *cull them*. To retain incurables leaves a source of reinfection that can undo all the effort and expense heretofore expended.
12. If the flock shows any evidence of residual infection or reinfection occurs, repeat the entire procedure.

Foot Bath Solutions

Copper sulfate — 30% solution. Dissolve 3 pounds of commercial blue vitrol (copper sulfate, or CuSO_4),



Treatment of individual foot. This treatment can be taken when new stock are brought in.

per gallon of water. Warm water works best. This chemical is very corrosive to metal. Wooden troughs and earthenware containers must be used. This solution will kill sheep if they drink it. Provide drinking water in holding pens so sheep will not be thirsty when they get to the foot bath.

Advantages

Easy to work with.
Blue stain on skin of sheep's legs identifies animals treated.

Disadvantages

Costly.
Corrosive.
Dries out hoof severely.
Strength deteriorates when contaminated with bedding and filth.
Poisonous if consumed.

Formalin — purchased as 36% commercial formaldehyde. For hand treatment of individuals or for use when time interval in foot bath is short (less than 3 to 4 minutes) use:

1 gallon 36% formaldehyde to each 3 gallons of water. Provide good ventilation. It is very irritating to eyes and human skin.

If sheep can stand longer periods of time in the trough (8 to 10 minutes), the concentration can be reduced (1 gallon 36% formaldehyde per 9 gallons of water).

Advantages

Cheap.
Relatively non-corrosive.
Does not deteriorate rapidly.
No stain left on skin.

Disadvantages

Disagreeable to work with.
Must provide good ventilation.
Toxic if consumed.



Suggested arrangement and procedure for walking sheep through a foot bath.



Suggested equipment for treating contagious foot rot in sheep.

SUMMARY

Contagious foot rot poses a serious threat to both the small and large flocks. Most outbreaks are bought and paid for through the purchase of infected animals. With a proper understanding of the nature and cause of the disease, it can be prevented and eradicated. However, because of the tremendous amount of labor involved in an eradication procedure, every effort should be directed toward prevention.

Prevention

Trim the feet on the entire flock at least twice per year. This practice removes potential areas in which the disease can develop.

Quarantine all purchased or borrowed animals for 2 to 3 weeks. This applies to animals returned to the farm from shows and exhibitions. Trim the feet on all such individuals and walk them through a foot bath or dip the feet individually (see photo). This is also a good time to check for external parasites and other potential health problems.

Don't forget the rams. Trim their feet regularly.

Practice quarantine measures as outlined above. Buy replacements sufficiently in advance of breeding season to permit the quarantine period.

Transport animals in clean trucks.

Insofar as practical, keep areas around water tanks and salt boxes from becoming mud holes. Several loads of course sand in such areas can be a very cheap investment.

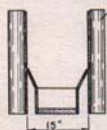
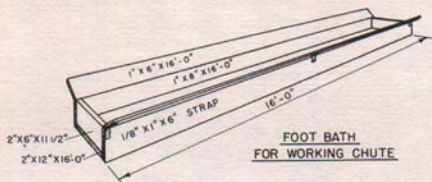
Control and Eradication

The complete control and eventual eradication of foot rot in sheep depends upon an accurate diagnosis, prompt and complete compliance with the recommended procedures, cooperation between sheepmen, veterinarians, livestock people, sales yards, truckers, and railroads. This disease cannot be eradicated by complacency, hiding the disease, or selling flocks to some unsuspecting person. Complete cooperation could eradicate this disease and thus eliminate this menace to the sheep industry of Michigan and the United States.

This plan is available in "Sheep Equipment Plans, MWPS-3 (\$1.00) at County Extension Offices and from the Agricultural Engineering Dept., MSU, East Lansing

FOOT BATHS

ITEM NO.	DESCRIPTION
A	2" X 12" X 16'-0"
B	1" X 8" X 16'-0"
C	2" X 6" X 11 1/2'-0"
D	1" X 10" X 16'-0"
E	2" X 4" X 6'-0"
F	2" X 4" X 4'
G	2" X 4" X 3'-7"
H	2" X 4" X 3'-3"
I	6" 4" STRAP HINGES
J	3/8" X 3 1/2" BOLTS



PROVIDE GATE AT EXIT END OF ALL FOOT BATHS, SO SHEEP CAN BE HELD IN SOLUTION.

