



Hairy Foot Warts

Guide B-122

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This publication is scheduled to be updated and reissued 3/10.

Hairy foot warts were first reported in the United States more than 23 years ago and have since spread rapidly, becoming a major management concern for dairy producers both in the U.S. and in other parts of the world (Shearer, 1998). Between 1991 and 1994, the frequency of infection on California dairies increased from 31% to 89% (Read and Walker, 1991). In addition to being extremely contagious, hairy foot warts are also a very expensive problem. It is estimated that hairy foot warts cause 20% of all dairy lameness cases, with each incidence of lameness costing \$90 to \$130 (Shearer, 2000). In addition to milk loss, which ranges from 20 to 50% in affected cows, hairy foot warts often lead to reproductive problems and premature cow culling. A study of cows sent to U.S. slaughterhouses revealed that nearly 30% of cows tested had hairy foot warts on the left hind hoof (Brown, Kilgo et al., 2000).

Contrary to what the name implies hairy foot warts are not warts at all. Viruses cause warts; bacteria cause hairy foot warts. The exact causative agent is not known, but evidence suggests that one or more species of spirochete of the genus *Treponema* is responsible. *Treponema* bacteria can be anaerobic or microaerophilic (require O₂ at less than atmospheric levels) and can be parasitic to humans and to animals causing a range of diseases.

Currently, the most effective treatment is the use of topical broad-spectrum antibiotics; however, treatment of hairy foot warts with antibiotics is off-label so consult your veterinarian before use. In addition, topical application of antibiotics is labor-intensive and may not be practical in a large herd situation. One alternative to topical antibiotics is medicated footbaths. Advantages to the use of footbaths are that mass treatment can be achieved

with little direct labor input. Since at any given time approximately 14% of cattle with hairy foot wart lesions will not be lame, treatment of all cattle may reduce future instances of the problem. Although less labor intensive than topical applications, footbaths must be properly managed. Non-antibiotic footbaths usually contain disinfectants of one kind or another, but large amounts of organic matter (manure and dirt) inactivate disinfectants and antibiotics. Therefore, the use of footbaths requires frequent changing of the bath water and/or a pre-rinse; otherwise, footbaths can become an inoculating bath more likely to spread foot warts than cure them. The biggest drawbacks to footbaths are cost and the lack of reliable efficacy data for some treatment methods. The following are some commonly employed footbaths with their advantages and disadvantages.

- **Antibiotics**—These are a popular and effective treatment for hairy foot warts. Several research trials have shown the efficacy of tetracycline and oxytetracycline footbaths. Lincomycin may also be used, but care must be taken because it is toxic to rumen microbes and should not be ingested by cattle. Hairy foot warts may become resistant to treatment with antibiotics over time (Shearer and Hernandez, 2000).
- **Copper sulfate (CuSO₄)**—Have been widely used for a number of years. Despite its use throughout the industry, copper sulfate is not an effective treatment for hairy foot warts. In addition, this compound has recently begun to cause environmental concern about Cu build-up, especially on large dairies and in acidic soils. Despite the relatively low risk of

Cu toxicity in the Southwest's alkaline soils, use of copper sulfate footbaths in the parlor in New Mexico is considered a violation of your wastewater discharge permit. In fact, use of copper sulfate anywhere on the dairy is discouraged.

- **Zinc sulfate (ZnSO₄)**—Limited clinical data exists on its efficacy. A 1990 study reported that 3x footbaths were effective at controlling the spread of hairy foot warts and treating mild lesions, but ineffective against more serious lesions (Nutter and Moffit, 1990). Do not mix solutions containing Cu or Zn with antibiotics, because tetracyclines can be inactivated by these solutions.
- **Formalin (39% formaldehyde)**—Several studies have reported that 5% formalin treatment is effective in controlling hairy foot wart outbreaks. Formalin has a wide range of antibiotic activity, it is non-corrosive, it is biodegradable, and use of formalin is not regulated by the Federal Pasteurized Milk Ordinance. However, footbaths must be replaced frequently because formalin loses its activity quickly when exposed to air. Formalin will not penetrate organic matter so hooves must be cleaned if they are muddy or manure packed. In addition, application of formalin to the lesion can be painful. Perhaps formalin's biggest drawback is toxicity, which can pose a health hazard to employees as well as a risk of contamination of meat or milk. If formalin is to be used for the treatment and control of foot warts, workers should be aware of its hazards and take steps to protect themselves.
- **Acidified Sodium Chlorite (NaCl₂)**—Is a broad spectrum antimicrobial that has recently been approved for use in disinfecting beef and poultry carcasses. It also is effective as a topical disinfectant for treating hairy foot warts when applied 3x for 21 days (Britt Carson et al., 1999). Acidified Na Chlorite is easily inactivated by organic matter so footbaths must remain clean. It is very acidic (pH 2.3-3.2) and can be corrosive to stainless steel, so it may be hard on equipment and cows.
- **Bleach (Sodium hypochlorite)**—Bleach is cheap, broad spectrum and readily available. However, it is also easily deactivated by organic matter, requires a long contact time and

has a limited shelf life after dilution in water. In addition, bleach can be damaging to tissues and can emit harmful gases. In general, its use is not recommended.

- **Iodine products**—Teat dips and other iodine products have been used by dairy farms to control foot warts. However, any claims of effectiveness of these products are anecdotal. While iodine is readily available on the dairy and works well in teat dips, it may be less effective as a footbath product. Iodine is easily inactivated by organic matter and like bleach requires a long contact time and products without emollient can be irritating to the skin.
- **Peroxides**—Peroxides disrupt the cellular mechanisms of anaerobic bacteria. However, in high concentrations peroxides are very damaging to all cells. Products such as hydrogen peroxides are not stable and quickly lose their effectiveness when exposed to air or organic matter. However, stabilized peroxide compounds are available, which have a longer-lasting antimicrobial effect.

Non-antibiotic footbaths act as disinfectant to kill the bacteria that causes hairy foot wart. When using a disinfectant for any purpose, four factors have to be considered:

- The disinfectant must kill the bacteria you are trying to eliminate.
- The bacteria must be exposed to the disinfectant for a sufficient amount of time.
- The correct concentration must be used to get effective kill.
- The disinfectant must remain active in the situation where you will use it (i.e. changed frequently and free of contaminates).

Because of the problems associated with footbaths and topical treatments, several researchers have investigated the use of systemic antibiotics to treat hairy foot warts; the results again have been somewhat mixed. Read and Walker reported that all cattle injected with penicillin G twice a day for three days had healed lesions within 21 days; however, no data were presented on reoccurrence of these lesions. In addition, use of injectable antibiotics has meat and milk withdrawal issues. Vaccines have also been developed against the bacteria that cause hairy foot

warts. Good data still do not exist on whether these vaccines are effective. The biggest problem with treatment of hairy foot warts is a high rate of recurrence. Therefore, often one must talk about control of outbreaks rather than cure.

Larger dairies have higher incidences of hairy foot warts than smaller dairy farms. This can be attributed to cattle coming into the dairy from a large number of sources. Incoming cattle are more likely to introduce, as well as contract, new diseases. New, young, and highly stressed animals, such as incoming freshening heifers, are more susceptible to hairy foot warts. Older and previously exposed cattle may develop a certain degree of immunity. A southern California case study reported that it was four times more likely for a dairy to have a high incidence of hairy foot warts if replacement heifers were brought into the dairy. Therefore, it may pay to quarantine incoming animals for several weeks, treating them topically for any lesions. However, the same study reported that dairies were 20x more likely to have large numbers of cases if corrals were muddy (Brown, Kilgo, et al., 2000). While treatment of hairy foot warts may be a management challenge, prevention is always the best cure. Because hairy foot warts are bacterial, good management practices can reduce the spread of the disease.

- Reduce the number of cows with hoof insults. An injury to the hoof predisposes a cow to infection with *Treponema*, so make sure that cows have proper footing and do not have to spend a lot of time standing or walking on concrete.
- Provide a clean dry housing area. Bacteria need moisture, deprive them of moisture and you can reduce exposure.
- Pay special attention to areas that do not receive maximum sunlight. In a feedlot dairy, most of the corral space receives maximum sunlight exposure. However, cows tend to congregate under the shades, especially in the summer. These areas often get wet and muddy and can become a breeding ground for disease.
- Condition corrals if you do not scrape frequently. *Treponema* bacteria are microaero-

philic; therefore, subsurface soils are a perfect environment for them. By frequently exposing these areas to sunlight and air, you can reduce the number of bacteria present.

Options for controlling hairy foot warts on the dairy include: management strategies, vaccination, systemic or topical antibiotics, and mass treatment strategies such as footbaths. Talk to your veterinarian and university Extension personnel about treatment and prevention options that might be right for your dairy.

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