

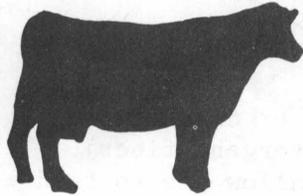
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dairy guidelines

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FOOT PROBLEMS AND NUTRITION

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BLACKSBURG, VIRGINIA

During the last four to five years, rolling herd averages for milk have risen to new highs. Much of this increase was due to better genetic capabilities and higher concentrate feeding. At the same time, larger herds have tended to confine cows on concrete surfaces. During this time there has been a tremendous increase in the amount of bovine laminitis or founder. The resulting sole ulcers, hoof wall-sole separation, abscesses, sole bruising and penetration, heel erosion, and hoof over-growth have affected 10-75% of the cows in some herds.

Laminitis and its Causes

Laminitis is characterized by a softening of the sole horn and the development of sole ulcers. Soft sole horns often are associated with free-stalls. During acidosis, the oxygen supply to the sole is reduced. The tissue can be bruised easily by prolonged standing on hard surfaces, and the damaged tissue is very susceptible to bacterial infection.

A soft sole horn can be caused by overfeeding concentrates. Excessive carbohydrates are broken down in the rumen to lactic acid. The increased ruminal acidity and decreased ruminal pH cause a decrease in blood pH, which is accompanied by dehydration and increased concentrations of acety/histamine. These conditions reduce blood flow in the foot and a soft sole develops. The bruises are followed by blister-like separations of the sensitive and insensitive lamina of the sole and blood accumulates. A subsolar abscess develops when bacteria invade the fluid pockets.

Manure and urine erode the soft heel tissue and bacteria then penetrate under the sole. This alkaline slurry (pH 8.5-9.0) denatures the protein in the soft heel and gives it an appearance of being worm or moth eaten. Gravel and other foreign materials easily penetrate the soft eroded tissue, and bacterial infections follow.

Once an animal has been foundered, the hoof that is subsequently laid down is soft and fast growing. The long toes cause stretching of the leg's posterior ligaments. The process seems to be irreversible.

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There is good evidence that cattle with dark or black colored feet have harder, tougher hoof walls and are more resistant to foot problems than cattle with white feet. This may become a trait worth considering in future breeding plans.

Prevention of Foot Problems

Foot problems can be minimized by proper feeding. The crude fiber content of the total ration dry matter should be at least 17% (21% acid detergent fiber). Complete rations maintain the desired level of fiber and still allow one to feed a ration with reasonably high levels of concentrate. Sulfur seems to be important in forming the keratin bonds in the hoof wall. Sulfur or zinc deficiencies exaggerate the condition. The ration dry matter should contain 70 ppm zinc and 0.20% sulfur, preferably 0.25%.

At least six hours of access to a grassy pasture lot helps circulation in the foot and relieves the pressure from hard concrete surfaces. Grass also cleans manure and filth from the cracks and holes in the hoof.

Cows need access to a clean, dry environment for 12-14 hours per day. Free stalls should have at least six inches of clean, dry bedding and should be maintained so that cows will want to lie down. During hot weather, string an air tube over the free stalls so cows will have to get out of the aisle to get into the moving air.

Low fiber rations or rations comprised of finely chopped corn silage are improperly buffered by the cow. Long hay causes the cow to chew her cud and saliva is a natural buffer. Sodium bicarbonate or magnesium oxide are buffering agents that can be added to the ration.

Other aids for foot problems include hoof trimming and foot baths. Properly trim feet that need trimming every four months to reduce ligament stretching and to remove excessive hoof and sole growth. A foot bath of 5% copper sulfate or 3% formalin is useful if cows' feet are washed off before they leave the barn. The solution should be replenished daily and kept as clean as possible. It is essential that these precautions be followed, or the foot bath will become another source of filth.

Handling Cows with Foot Problems

Cows with sole abscesses, etc., should be treated with antibiotics or sulfas. Pain in the affected claw may be relieved by placing a wooden block under the other claw, if it is sound. Healing occurs rapidly. The cow may be able to rejoin her herdmates within a day or two. Where both claws on the same foot are affected, clean and bandage the foot, dry the cow off, and place her in a dry stall or grass lot. Most cows affected in this manner will not return to a profitable level of production during this lactation.

Conclusions

Foot problems, especially laminitis, are often caused by feeding problems. Avoid overfeeding energy and protein. Provide adequate fiber. Keep free stalls clean and dry. Allow cows an opportunity to exercise off concrete surfaces.