



The Milk Lines



October 2001

Phosphorus and Potassium: Movement From the Dairy Back to the Fields

**UCCE Tulare County Auditorium
4437 S. Laspina Street, Tulare
(Across from International Agri-Center)**

**November 16, 2001
10:00 a.m. to 2:00 p.m.**

Recently much needed attention has been given to nutrient management on dairies. The primary focus has been on movement of nitrogen in the dairy cow manure. The purpose of this short course is to focus attention on phosphorus (P) and potassium (K) movements. The presentations will begin as P and K in the dairy cattle feeds enter the dairy, follow their movements through the cows into the wastewater lagoons, and end as they are put on the fields and return back to the dairy cattle feed crops.

Speakers

Topics

Jose Santos
VMTRC, Tulare

Phosphorus and Its Role in Dairy Nutrition

Peter Robinson
Animal Science, UC Davis

Potassium and Its Role in Dairy Nutrition

Marsha Campbell Mathews
UCCE Farm Advisor, Stanislaus County

Phosphorus and Potassium in Manures and Implications for Crop Use

Carol Frate
UCCE Farm Advisor, Tulare County

Phosphorus and Potassium in Soil and Plants

Admission \$10.00 (pay at the door; includes lunch)

Pre-registration requested: (559) 688-1731, VMTRC. Last day to pre-register: November 13.

Sponsored by University of California Cooperative Extension
Tulare County
Stanislaus County
Veterinary Medicine Extension

Anthrax

John Kirk, DVM, MPVM¹, and Heidi Hamlen, DVM, MS, DACVPM²

Anthrax is as old as antiquity. The Bible speaks of “the plague, which caused sudden death in livestock”. The Animal Health Branch – Emergency Disease Programs has historical records dating from 1926 showing 34 anthrax outbreaks in 12 counties of California. During 1984, an anthrax outbreak occurred in the Carrisa Plains that affected 12 general areas and killed 43 cattle and 135 sheep. Since 1991, there have only been 10 known cases of anthrax in California livestock, nine of which occurred in cattle.

With the thoughts of bioterrorism and reported human anthrax cases, this article will review anthrax primarily as it occurs in cattle so that livestock owners may be aware of the signs and risk factors of anthrax in cattle.

The bacteria, *Bacillus anthracis*, cause anthrax. The bacteria are found in two states – the vegetative state and the spore state. The vegetative state is the growing, reproducing form of the bacteria found in infected animals and people. The vegetative form causes the disease anthrax. If untreated the disease in animals is generally fatal. After an animal dies from anthrax, if the carcass is opened by a veterinarian during a necropsy, scavengers or by decay, the vegetative state is exposed to oxygen in the air. When the vegetative state is exposed to oxygen in the air, it forms spores. The spores are highly resistant to disinfectants and remain viable for years in the soil. The spores are found naturally in the soil of California and many western states. When the spores enter another animal, usually through grazing contaminated vegetation or inhaling spores, the bacteria revert to the disease causing vegetative form.

In cattle, a common initial sign is animals found suddenly dead. The disease is usually short at 1-3 days. Once an outbreak begins, animals may be seen with fever, lack of rumination, excitement followed by depression, difficulty breathing, uncoordinated movements, convulsions and death. Bloody discharges from the natural body openings as well as edema in different parts of the body are sometimes observed. Some

animals may be saved if treated very early with penicillin or tetracyclines.

In animals that die, bloody discharges from the body openings are commonly found. Enlargement of the spleen is almost always present. An open, decaying carcass as well as discharges and secretions from the carcass or dying animals will contaminate the ground and protected spores will develop. The vegetative form of the bacteria dies rapidly in unopened carcasses.

Most outbreaks occur in areas where animals have previously died of anthrax, as the spores remain viable for many years. Spores over 35 years old have been able to cause the disease. Often, the outbreaks occur after climatic changes such as heavy rain, flooding, or drought. Climatic changes bring spores to the ground surface and perhaps concentrates the spores in low spots. Working the land may also bring the spores up to the soil surface. Once the animals eat the spores, the vegetative develops, multiplies and is ready to cause anthrax again. In August 2000, an anthrax outbreak in Nevada killed 30 cattle. This outbreak was associated with a recent ditch cleaning, which may have disturbed spores deep in the soil.

When anthrax is suspected, dead animals should not be opened for routine examination, as the discharges and blood are highly infectious to humans and other animals. Your veterinarian can confirm anthrax by taking blood from a peripheral vein (ear or tail) and submitting it to the diagnostic laboratory. Proper carcass disposal is important to prevent surface soil contamination. Vaccines are available to protect animals in endemic areas or when outbreaks occur.

Always keep in mind that anthrax can cause serious disease in humans as well as animals. Three syndromes are recognized in man: skin, respiratory or inhaled and intestinal. For this reason, great care should be taken to protect anyone handling the carcass or live animals suspected to have anthrax. Meat obtained from animals dying of unknown causes, or suspected of having anthrax or another infectious disease, should not be consumed.

In summary, anthrax is caused by bacteria that can exist in two forms. The vegetative form causes disease in

both animals and man but is rapidly killed in unopened carcasses. The spore form lives for years in the soil. When the spores surface, they revert to the vegetative form to cause further disease when eaten by animals. Carcasses of animals dying with anthrax should not be opened as the vegetative form turns to spores when exposed to air. Suspected cases of anthrax should be reported to your veterinarian first and then to state animal health agencies. Animal health officials are available 24 hours a day to assist your veterinarian in managing an outbreak and minimizing losses. Use caution when handling dead animals suspected to have anthrax.

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Boots and Biosecurity

John H. Kirk, DVM, MPVM

There has been a lot of concern focused on the biosecurity issues related to new livestock that are being brought onto dairies. This focus is well placed; however, there are other important aspects to biosecurity. An important area within on-dairy biosecurity is the use and care of boots worn by people working on the dairy. A recent study completed with the help of Tom Shultz, Tulare County; Carol Collar, Kings County; and Jerry Higginbotham, Fresno and Madera Counties, and funded by the Agriculture and Natural Resources highlights the importance of boots.

New rubber boots were worn in hospital pens, fresh pens and calving pens on 27 dairies identified by the UCCE dairy livestock advisors. After about 25 steps, manure was collected off the boots and cultured for salmonella. On 12 dairies (nearly 50%), salmonella was found on the boots. In at least one instance, salmonella was found growing on the boots 48 hours after the boots were washed in the parlor using the drop hoses. Many of these salmonella were resistant to commonly used antibiotics.

This study clearly shows that boots worn on dairies can become contaminated with bacteria that cause live-

stock disease as well as being a human health concern. Furthermore, it shows that casual washing of boots will not remove the bacteria thus allowing these disease agents to move around the dairy to other locations.

Here are some suggestions to prevent the carriage of disease-causing bacteria around the dairy on boots:

1. Before leaving a location on the dairy, the boots should be cleaned and disinfected.
2. Boots should be thoroughly washed (brushed and power-spray washed) until they are free of any visible manure. Be sure to check the ribbing or cleats on the bottom of the boots. Removal of organic matter (manure and dirt) is essential for disinfectants to efficiently kill any remaining bacteria.
3. Soak the boots in properly prepared disinfectant. Most disinfectants require at least a minute of contact time to kill bacteria. When practical, longer contact times will insure greater bacterial killing.
4. Carefully follow the manufacturer's recommendations for dilution of the concentrated disinfectant with water and the proper contact time.

Other suggestions to prevent movement of bacteria on boots are:

1. Wear different boots on different areas of the dairy. Wash and disinfect boots and then leave them for use on only one specific area on the dairy.
2. Use disposal boots in high risk areas (calving, fresh pens, sick pens) and remove them before moving to other locations.

Be sure to require others who work regularly on your dairy to follow the procedures for your dairy workers. These would at least include your veterinarian, nutritionist, heat detectors, calf-ranch drivers and artificial inseminators.

Boots are used to prevent spread of disease; however, if they are not properly cared for, they may be a primary means of disease spread on your dairy. Spraying off boots in parlor or walking through a footbath will not kill the bacteria on the boots. Set up a plan to prevent spread on boots and stick with it.