

Colorado Dairy News

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Managing Agricultural Phosphorus to Protect Water Quality

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Concern about agricultural nutrients and water quality is nothing new in Colorado, but in the past most of our attention was focused mainly on impacts from nitrogen. Phosphorus (P) is now receiving attention nationwide as an important surface water pollutant. Surface water that receives P due to soil erosion or nutrient runoff from feedlots, fields or lawns suffers from accelerated eutrophication. Eutrophication is the natural aging of lakes or streams brought on by nutrient enrichment. Eutrophication has been identified by the EPA as the main cause of impaired surface water quality across the country. This decline in water quality restricts use for fishing, recreation, industry, and drinking due to the increased growth of undesirable algae and aquatic weeds and the resulting oxygen shortages caused by their death and decomposition. Recent outbreaks of the dinoflagellate *Pfiesteria piscicida* in the eastern United States, and Chesapeake Bay tributaries in particular, have dramatically increased public awareness of eutrophication and the need for solutions. In Colorado, reservoirs such as Cherry Creek, Dillon, Chatfield, and Barr are known to be impaired from excess P in inflows.

Agriculture is not the only source of P in the aquatic environment. For example, the USGS estimates that of 40,000 tons of P that enter the S. Platte River Basin each year, almost 1,000 tons annually are from municipal waste discharges directly into the river. Manure and fertilizers applied to cropland and lawns make up the bulk of the P load in most river basins and have been identified by the EPA as needing attention.

One of the difficulties in achieving better management of P fertilizer and manure is the disparity between critical lake and soil P concentrations. Lake water concentrations of P above 0.02 ppm generally accelerate eutrophication and these values are an order of magnitude lower than P concentrations in soil solution critical for plant growth (0.2 to 0.3 ppm). Continual long-term application of fertilizer or manure at levels exceeding crop needs will increase soil P levels. Most livestock producers apply manures at rates that meet crop N requirements and avoid ground water quality problems created by leaching of excess N. Nitrogen based management has been advocated by Extension and other crop advisers for many years. The result is a buildup of soil P to excessive levels over time. In many cases we now will need to

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Bulk Tank Culturing

Page Dinsmore,
DVM, ILM-CSU

Dairy producers in Colorado can have their bulk tank cultured monthly without lifting a finger. Samples collected by Dairy Farmers of America (DFA) tanker drivers are selected monthly by DFA laboratory personnel, delivered to the CSU Diagnostic Laboratory, and cultured. Preliminary results are reported in 3-5 days, and final results mailed in 14 days. The program has helped many producers monitor their milk quality and identify problems promptly. Recent problems with *Mycoplasma mastitis* in some herds make this a good time to revisit the objectives, advantages, and limitations of routine monthly bulk tank culture.

Program Objectives

- 1) Screen herd for *Mycoplasma*, *Streptococcus agalactiae*, and *Staphylococcus aureus*, organisms that can be introduced and spread rapidly in herds without appropriate diagnostic and management procedures.
- 2) Identify causes of elevated bacteria counts. Standard Plate Counts performed by milk handlers or processors report only the total number of bacteria present. Bulk tank culture identifies and quanti-

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Important Dates:
Mark Your Calendar

January 23, 2001: Colorado Dairy Nutrition Conference, Greeley, CO. Contact W.R. Wailes, CSU Extension Dairy Specialist @ 970/491-5390.

January 23-25, 2001: Colorado Dairy Days/Farm Show, Island Grove Park, Greeley, CO. Contact WR Wailes, CSU Extension Dairy Specialist, 970/491-5390 or Keith Maxey, Weld County Extension Agent, Greeley, CO, 970/356-4000 ext 4475.

April 5-6, 2001: Western Dairy Management Conference. The Venetian, Las Vegas, Nevada. Contact WR Wailes, CSU Extension Dairy Specialist; 970/491-5390.



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A Message From Your Extension Dairy Specialist.....

This month I would like to bring three things to your attention -

First, the Environmental Protection Agency (EPA) proposed strict new controls on concentrated animal feeding operations (CAFOs) late last month. As many as 39,000 CAFOs could now be required to have enforceable permits, up from the 2500 currently permitted. CAFOs are defined as operations with a thousand or more animal units (700 dairy cows). In addition, small operations would be required to obtain water permits if they are considered a threat to water quality. Copies of the proposal can be obtained from CSU or from various Colorado animal associations. Public comments on this new proposal will be taken during the next 120 days.

Second, the effects of excess phosphorus on water quality have become a hot issue. Reagan Waskom from CSU has been kind enough to write an article on this issue and provide us with the USDA -NRCS phosphorus guidelines. I urge you to keep these handy.

Finally, as you know, I believe strongly that the more dairy producers know about marketing products and futures trading, the better equipped they will be to face some of the challenges of our industry. Low milk prices necessitate better business skills, cash flow management, and careful attention to market information. As a helpful source I recommend the Daily Dairy Report, a market information update provided by Mary Ledman and Allen Levitt and distributed courtesy of Chicago Mercantile Exchange Incorporated. It is available online <subscribe@dailydairyreport.com>.

Hope to see you later this month at the Nutrition Conference and Dairy Days in Greeley.

Commodity Price Quotes

By-Product Feeds	Price/Ton Spot Loads	Price/Ton Feb-Mar
Bakery Waste	\$98.00	NQ
Blood Meal	\$480.00	\$480.00
Corn Gluten Feed	\$103.00	\$100.00
Corn Gluten Meal	\$320.00	\$320.00
Corn Hominy	\$95.00	\$95.00
Flaked Corn	\$107.60	NQ
Whole Corn	\$88.00	\$88.00
Cotton Seed Meal	\$230.00	\$230.00
Whole Cotton Seed	\$190.00	\$190.00
Distillers Grains	\$125.00	\$120.00
Pork - Meat & Bone Meal	\$258.00	NQ
Tallow	\$0.14/lb	NQ
SBM - 48%	\$215.00	\$215.00
Wheat Middlings	\$105.00	\$90.00
Soybean Hulls; Meals/Pellets	\$105/110.00	\$105/110.00
Canola Meal	\$158.00	\$158.00

These price quotes are delivery, Greeley, Co

Malignant Catarrhal Fever in Northern Colorado Dairies

*Drs Jenny Powers and Rob Callan
Department of Clinical Sciences, CSU*

Malignant catarrhal fever (MCF) is a disease that is rarely considered a threat to dairy cattle throughout the United States. Recently, however, this fatal disease has become more prevalent in Colorado dairies. MCF is caused by a virus carried by sheep called Ovine Herpesvirus type 2 (OHV2). OHV2 can be found in nearly all sheep across the nation. The virus does not affect sheep clinically. In cattle, bison, and other domestic as well as wild ruminants, the virus causes a widespread vasculitis (inflammation of the blood vessels) and nearly always leads to death.

The vasculitis can manifest itself in many ways. The most common form of the disease in Colorado involves primarily the head and eyes along with other mucous membranes. Often the first sign of illness is cloudy eyes or what is called "corneal opacities". The opacity starts at the periphery of the eye and then moves to cover the whole cornea. At this stage, the eyes will begin to look cloudy or white. Blindness often follows the visible changes in the eyes. Affected cattle can also have some or all of the following signs: excessive salivation, discharge from the eyes or nose, sloughing or erosions of the lining of the nose or mouth, erosions along the teats or coronary bands of the feet, enlarged lymph nodes, or bloody urine. The vulva may be red and the mucosa falling off. Cattles are likely to be depressed, off feed, and have a fever of 103-107 degrees F. There are two other forms of the disease, which are the gastrointestinal form, with a major clinical sign of diarrhea, and pulmonary form, which looks clinically like severe pneumonia. By the time clinical signs are seen the disease is in its final stages and there is no effective treatment for the animal.

Diagnosing MCF is most accurately performed by examining tissues from the animal after it has died or been euthanized. There are two blood tests for the diagnosis of OHV2 infection. The first is an enzyme-linked immunosorbent assay (ELISA) that looks for antibodies to OHV2. This test only tells if the animal has been exposed to the virus and mounted an immune response. It doesn't tell if there is currently virus in the blood. The other more widely used test is a polymerase chain reaction (PCR) which identifies the viral DNA in infected cells within the blood. OHV2 is a gammaherpes virus which infects lymphocytes. Herpesviruses tend to hide latently in tissue reservoirs and express themselves during times of stress. Therefore, an animal can be infected with OHV2 without showing clinical signs of MCF. If an animal is showing clinical signs of MCF and is OHV2 PCR positive, however, there is a very high likelihood that the animal has this disease. With this confirmation euthanasia is recommended.

Since MCF is caused by a viral pathogen it is unresponsive to antibiotics. Other than supportive care there is no treatment for the disease. Therefore, the management emphasis should be on identifying risk factors, correctly diagnosing the disease, and culling affected members of the herd. Proximity to sheep, the known carriers of OHV2, is the biggest risk factor for disease. Aerosol transmission from sheep can occur over a distance of at least 70 meters. No direct contact is needed between sheep and cattle for transmission to occur. It is currently believed that cattle do not transfer the disease amongst themselves. Recent research, however, suggests that cattle to cattle transmission either through the colostrum of an infected dam or direct

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fies the bacteria, helping determine the source of elevated bacteria counts.
3) Provide a report card of quality milk production. Producers can track milk quality, monitor trends in numbers and types of bacteria, and take corrective action when needed.

Program Advantages

- 1) The program is automatic—after initial sign-up, no more action is needed.
- 2) Results reviewed by diagnostic lab and VTH mastitis experts. We can consult your records to provide current advice for producers and veterinarians.
- 3) Researchers at CSU Diagnostic Lab recently developed a sensitive and rapid test (PCR) for Mycoplasma in milk. The test is labor intensive and more expensive, but can be applied in certain circumstances for rapid identification.

Program Limitations

- 1) DFA lab personnel are conscientious and careful, but they may not know which samples are representative of all cows in the herd.
- 2) Monthly sampling will not detect introduction of contagious mastitis pathogens introduced after the sample was selected. A full month may elapse before the next sample finds the organism.
- 3) Bulk tank sampling may not be sufficiently sensitive to detect a few infected cows in a herd of 500 or more. Dilution of organisms may prevent detection.

These limitations may explain why some bulk tank cultures could fail to identify Mycoplasma when infected cows were present in the herd, allowing the organism to spread further before it was identified. We are currently reviewing the sampling and culturing procedures to maintain the best program possible. We will make specific recommendations for more aggressive culturing for herds in active expansion. **Please note that any herd finding Mycoplasma after the introduction of new cows has neglected a much more important and reliable aspect of herd biosecurity—culturing cows before their introduction to the herd!!**

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recommend P based management, significantly increasing the number of acres needed to accommodate all of the manure produced.

The example calculation below shows that manure rate can change from 20 tons per acre to 7 tons per acre when going from an N to a P based recommendation. Dairy operations in specific are going to need to evaluate their annual manure production and the land base available for safely accommodating the nutrients in the waste. In some cases, altering feed rations may be the best way to improve manure management.

Example of how P based nutrient management could change the recommended manure application rate at a hypothetical dairy*.

Manure Nutrient	Nitrogen	Phosphorus
Available in 1st Year(lbs/ton)	10	12
Corn fertilizer requirement(lbs/acre)	200	80
Recommended manure rate (tons/acre)	20 (N-based)	7 (P-based)
Supplemental N fertilizer needed (lbs/acre)	0	130

*Based upon table values for manure on a wet weight basis and a 200-bu corn yield goal.

The Colorado USDA-NRCS has just adopted a new nutrient management standard that includes an evaluation of P runoff risk on operations that utilize manures or other organic wastes. This risk assessment is designed to identify potential water quality problems associated with adding P fertilizer or manure to agricultural fields. The P Index ranks fields from "low risk" to "very high risk" and is intended to help producers protect water quality. At the present time, P based manure management is voluntary for dairy operations. However, be aware that the EPA and the Colorado Department of Health and Environment are considering the need for P based manure management in future permitting requirements.

For more information on the Colorado P Index, contact:

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Need information ?

Check the Archives of the Colorado Dairy News on the web: <www.cvmbs.colostate.edu/ilm>

NAHMS 1996 report summary on Salmonella: July and September 1998 issues.

Dr Page Dinsmore on Bulk Tank Culturing : November 1995 and September 1998 issues.

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transmission from airborne viral particles.

Accurately diagnosing the disease can be difficult since the organism has never actually been isolated and grown. MCF can look like other more common cattle disease especially pinkeye (Moraxella bovis), infectious bovine rhinotracheitis (IBR), or Bovine Virus Diarrhea (BVD). Pinkeye lesions generally start in the center of the cornea and work toward the periphery of the eye as they progress. Cattle with pinkeye generally respond to antibiotic therapy. In contrast, MCF lesions starts peripherally, move to the center of the eye, and do not respond to treatment with antibiotics. IBR ocular lesions resemble MCF lesions, but the ocular form of IBR is rarely seen in Colorado and IBR is rarely fatal. Virus isolation can be performed on ocular swabs, and antibodies can be detected in the blood for diagnosis of IBR. Bovine virus diarrhea (BVD) can cause oral ulcers, increased salivation, and diarrhea as MCF does but it does not cause eye lesions. There are PCR, ELISA, virus isolation, and serological tests to diagnose BVD.

MCF is a possible diagnosis if there is an outbreak or isolated incidence of blindness, cloudy eyes, fever, and/or increased salivation in your cattle. Since the disease is untreatable it is important to protect your cattle by maintaining distance between them and neighboring sheep. Early diagnosis and culling may help prevent spread to other animals. Ovine herpesvirus type 2, the presumed causative agent, can be identified by PCR. This test is offered by both the Colorado and Wyoming State Diagnostics Laboratories. Your local veterinarian can take a blood sample from animals on the farm and have results within a week.

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Colorado Dairy Nutrition Conference /Dairy Days January 23-25th

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