

# LIVESTOCK NEWS

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## **BOVINE TUBERCULOSIS**

BY DR. JOHN MAAS, U.C.C.E. VETERINARIAN

### **What is Bovine Tuberculosis?**

It is an infection in cattle caused by *Mycobacterium bovis*. This bacterial agent is closely related to *Mycobacterium tuberculosis* and both agents can cause tuberculosis in humans. The agent of Bovine Tuberculosis (TB) can infect many other mammalian species in addition to cattle and humans. The infection in cattle mainly affects the respiratory system and can be easily spread by a number of methods.

### **What is the current status of Bovine TB?**

There has been an ongoing eradication program for Bovine TB in the U.S. for many years and currently all states are free of Bovine TB except certain zones within Texas and Michigan. The discovery of TB in wildlife in Michigan has been a major setback for the TB eradication program.

### **Where is the infection in Michigan?**

For the most part, bovine TB has been found in the northeastern portion of the Lower Peninsula of Michigan. As far back as 1975, a wild white-tailed deer from Alcona County was found to be infected with Bovine TB. Since 1995, about 35,000 deer in Michigan have been tested for TB and 281 have been confirmed posi-

tive. Bovine TB has also been found in coyotes, raccoons, a black bear, a red fox, and a bobcat. Most recently, deer infected with Bovine TB have been found outside the known infected area.

### **What is Michigan doing?**

The Michigan Department of Agriculture (MDA) has been testing all livestock in the area where TB had been identified in deer. They have tested more than 50,000 cattle and goats on about 1,100 farms. Four beef herds and one captive deer herd that were positive have been depopulated. A dairy herd has just been confirmed positive and another beef herd is awaiting final results. The area affected with Bovine TB has been quarantined.

Surveillance by the MDA and other agencies such as the USDA continues in livestock, white-tailed deer, and other wildlife in Michigan.

### **What is California doing?**

The USDA declared California free of Bovine TB in October 1999 (no evidence of TB during the previous 5 years). The California Department of Food and Agriculture (CDFA) has been very concerned about the Bovine TB in Michigan since 1995 when the disease was found to be endemic in wild white-tailed deer.

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# Trees, Grass, and Cows?

ADAPTED FROM "WORKING TREES FOR LIVESTOCK" AND "AGROFORESTRY: SILVOPASTURE IN THE SOUTHEAST"

*Can you produce forage, beef, and trees on the same land at the same time?*

Tradition says you can't. Cows and trees don't mix! Grass won't grow under trees! So, livestock and forage production are incompatible with trees, right? Not necessarily!!

**Modern agricultural practices are showing that livestock and forage can not only co-exist with trees, they can provide additional sources of income farmland formerly used to produce a single product. "Silvopasture" is the term used to describe systems where livestock uses overlap with tree production. The concept of silvopasture provides for production of trees, forage, and livestock simultaneously.**

*Planting income-producing trees or shrubs interspersed with grasses and other forages can provide landowners with multiple sources of income and other benefits from the same acreage. Trees can provide income from timber; pulpwood, mulch, fruits, or nuts. They provide wildlife habitat, natural beauty, and add diversity to the landscape. Grasses and other forages can be used for livestock grazing or hay production as additional sources of income.*

## ADDING TREES TO PASTURE

Trees can be established into pasture systems and maintain normal forage production while adding a long term tree crop. Row spacing must be wide enough to allow adequate sunlight penetration for forage production.

In years preceding timber harvest, straw can be



sold for mulch and landscaping, selective thinning and pulpwood cuttings can be an ongoing source of income. A wide variety of commercially important fruit, nut and berry trees can also be used as a source of income in these systems. Many more species of wildlife are attracted to pastures where there are trees.

## ADDING FORAGES TO WOODLANDS

Incorporating grazing or forage production into a forested area can increase cash flow to the enterprise and possibly increase timber production.

Canopy closure reduces forage production as trees mature. In many ecosystems, when tree canopy exceeds 30 to 50%, forage production declines to the point that livestock grazing is not economically feasible. Selective thinning to maintain desired canopy will allow enough sunlight to reach the soil to allow forage growth under the tree canopy. Remaining trees should then grow faster and have increased value.

Shaded and sheltered forest pasture environments provide protected grazing and reduce environmental stress on the animals. Forages not grazed by livestock can be harvested as a hay or seed crop for additional income. Excess forage can be leased to others for grazing. A forested area with a diverse forage under story is more attractive to wildfire than an area with trees only.

When livestock grazing is a part of the operation, a planned grazing management system is needed to assure proper management of the forage, trees, and wildlife habitat. Silvopasture systems can benefit the landowner, the land, and the livestock all at the same time.

## Trees, Grass, and Cows?

*Cont.*

### Benefits

**Working trees in silvopasture systems can:**

- Improve overall economic performance of an agricultural enterprise through diversification.
- Maintain or increase tree growth and timber production.
- Improve cool-season forage production.
- Allow warm-season forage production with careful canopy management.
- Provide shade and windbreaks for livestock.
- Produce by-products such as pulpwood and mulch for additional income.
- Aid in erosion control.
- Enhance wildlife habitat and increase wildlife populations.
- Improve water quality.
- Increase recreation opportunities.
- Enhance aesthetics and property values.

For best results, select forage species and management opportunities that are compatible. Some forage species are more shade tolerant than others. Selection of forage species/varieties and trees that are well-suited to silvopasture is essential.

## RESEARCH SHOWS CATTLE ARE INFECTED WITH E. COLI MOSTLY IN SUMMER

ADAPTED FROM U.C.C.E. TUOLUMNE & STANISLAUS COUNTIES LIVESTOCK LINES

In late summer, up to 28 percent of cattle entering processing plants may carry with them strains of the E. coli bacterium that cause food poisoning in humans, according to an Agricultural Research Service study.

Improved laboratory methods allowed the scientists to ferret out the microbe and detect this prevalence level, which is higher than previously reported. But the research also showed that intervening measures at processing plants could reduce the incidence of E. coli 0157:H7 on beef carcasses to less than 2 percent even in the peak contamination season of July and August.

The study, conducted by scientists at the ARS Meat Animal Research Center (MARC), Clay Center, Nebraska, included examination of E. coli shed in the feces of live cattle as well as microbes on beef carcasses in commercial processing plants.

During the summer E. coli peak, 28 percent of the live cattle entering the processing plants were actively shedding E. coli 0157:H7 in their feces and 43 percent of 341 carcasses were initially contaminated with the bacterium. Eleven percent of hide surfaces were also contaminated with the bacterium. After processing was complete, only six of 330 carcasses, or 1.8 percent, showed some level of contamination.

### Bovine TB cont.

Because infected wildlife may have exposed livestock to TB outside the quarantine area in Michigan, CDFA is tracing all breeding cattle imported into California from Michigan over the last two years and is testing these animals for Bovine TB. CDFA will require future shipments of cattle, bison, goats, and captive deer species from Michigan to be from herds tested negative for Bovine TB. Imported animals will also require a negative TB

test within 30 days before their arrival in California and will be re-tested within 60-120 days after arrival (90-120 days for captive deer species). This plan will help protect California livestock from the introduction of Bovine TB. For additional information you can call the California Cattlemen's Association headquarters (916-444-0845), or the Animal Health Branch of the CDFA (916-654-1447).

# NITRATE POISONING IN LIVESTOCK

ADAPTED FROM U.C.C.E. CALAVERAS COUNTY

Farmers and ranchers depend on the successful combination of livestock and crops. Forage crops, in particular, are important to the producer, but they should be monitored due to plant toxicants that can be a problem. One toxicosis of concern is nitrate toxicity.

Nitrate toxicity of cattle was noted as early as 1895 with corn-stalk poisoning. However, at that time nitrate was not recognized as the principle toxicant. In the late 1930s, after an outbreak of oat-hay poisoning in the high plains region, an indictment of nitrate was finally made. The term "Nitrate Toxicity" should actually be "Nitrite Toxicity". When nitrate is ingested by a ruminant animal, it undergoes a chemical reduction action to nitrite. This reduction is accomplished by rumen microorganisms. Nitrite is readily absorbed into the bloodstream where it oxidizes the ferrous iron of the red blood pigment hemoglobin to ferric iron producing a modified red blood pigment called methemoglobin. Methemoglobin is incapable of transporting oxygen to various body tissues so the animal exhibits a characteristic chocolate brown blood color prior to and during death which is caused by asphyxiation. Ruminant animals affected in this manner by high nitrate feeds are said to be suffering from methemoglobinemia. Simple stomached animals such as swine and poultry do not have the microorganisms which can make this rapid conversion and are not as susceptible to nitrate toxicity.

## Plant Factors in Nitrate Accumulation

Practically all plants contain detectable amounts of nitrates. Excessive nitrate accumulation occurs when the uptake of nitrate exceeds its utilization in plants for protein synthesis. The following factors are related to nitrate accumulation in plants:

1. Plant species vary in their ability to accumulate nitrate. Even common barnyard weeds can cause problems.

2. Stalks are highest in nitrate content, followed in order by leaves and grain in decreasing amounts.
3. Immature or young plants have a greater potential for nitrate accumulation than older plants (such as those with seed in the hard dough stage). Management: Be cautious when turning livestock in on a field that is still immature in growth. Hungry livestock are not as likely to selectively graze leaves over stems so allow them to feed before releasing them on a field. Always test fields of concern prior to releasing livestock on them.
4. Any weather condition which reduces plant growth may increase nitrate accumulation. This includes drought and sometimes cool, cloudy weather.
5. Excessive use of nitrogen fertilizer may contribute to the problem.

## Livestock Factors Related to Nitrate Poisoning

Despite a producer's best efforts to avoid growing forages that contain dangerous concentrations of nitrate, occasionally, drought-stricken pastures of hay crops produce feeds that test high in nitrates. There may be methods of handling the high nitrate hays or pastures that reduce the risk of death or production losses. However, if the forage has extremely high concentrations of nitrate, such as 25,000 ppm, then the risk to livestock health is very great even when all known management techniques are employed. Burning, or burying that forage may be the only safe alternative. Knowledge of the following livestock factors will aid in a producer's decision on how to either prevent or manage the effect of high nitrate feed sources.

1. Thin cattle in poor health or those suffering from respiratory disease are more susceptible to nitrate poisoning.
2. Allow hungry cattle to fill prior to release. If cattle are hungry, take time (1 to 3 days) to make sure they are consuming a significant quantity of a

## Nitrate Poisoning cont.

bulky forage such as good quality grass hay. Then, release the cattle in the afternoon when they are not as hungry.

3. Adapt cattle to nitrate. The objective is to give the ruminal microorganisms the opportunity to adapt to high nitrate intake. With high nitrate hay, this can be accomplished by blending with low nitrate feeds such as grass hay or concentrates. Grain feeding has the additional benefit of providing ruminal energy to stimulate the conversion of nitrate to nontoxic nitrogen compounds. With grazed high nitrate forages, palatable, low nitrate hay or concentrates can be used. Another alternative with grazed forage is to limit grazing for the first 6 to 8 days by increasing the grazing time each day. For example, cattle might be allowed to graze high nitrate forage for 2 hours on the first day and increase by 2 hours each day for 6 days after which cattle could be released full time onto the high nitrate forage. Another strategy with grazed forage would be to feed the animals several times a day (3 to 5 times) to disrupt grazing periods and provide ruminal fill to decrease the rate and extent of consumption of the high nitrate feed.

4. Dilute high nitrate feeds with low nitrate feeds. Dilution is one method that can be used to help ruminal microorganisms adapt to high nitrate feeds. But, it may also be the only practical method that can be used to feed high nitrate forage (less than 10,000 ppm). Dilution is most effective when the low nitrate feed can be blended or mixed directly with the high nitrate feed.

5. Release cattle in the afternoon when night-time nitrate accumulations have subsided. In addition, avoid grazing shortly after a drought-ending rain.

6. Stock lightly so animals can choose lower nitrate leaves over higher nitrate stems.

7. Provide large quantities of fresh drinking water. Water dilutes nitrate concentrations in the rumen and reduces the potential of toxicity.

8. Do not allow livestock to have direct access to fertilizer materials containing nitrates. Losses have occurred because cattle had access to storage areas,

fertilizer spreaders, broken bags of fertilizer, or fertilizer spills in pastures.

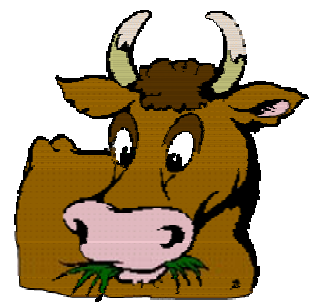
9. Cattle in cold or inclement weather are more susceptible to nitrates and are more likely to consume stalks which contain more nitrate.

### Treatment for Nitrate Poisoning

Due to the acute nature of this toxicity, for treatment to be successful it should be done immediately when symptoms are observed. Also, due to the fact that the oxygen transport system of blood is compromised, death by suffocation will occur, sometimes within minutes of observing symptoms especially if the animal becomes excited or exerted. This toxicity may be distinguished by the chocolate color of the venous blood. The treatment recommended is methylene blue. This product is not readily available either commercially or over the counter for sale to producers. You should make plans with your veterinarian to have some material on hand in case of any emergency. The product is difficult to find and may have to be compounded by the practitioner. A well thought out and pre-planned emergency plan with your veterinarian could save thousands of dollars in losses if an emergency should occur.

### Summary

Careful use of nitrogen fertilizer, an awareness of plant factors, the effect of weather, and cattle management can help reduce losses from nitrate poisoning. Diagnostic techniques are available to determine nitrate levels in forages. Hay which has potentially toxic levels of nitrate should be fed only as a part of the total diet.



# CALENDAR OF EVENTS



July 27-30, 2000 Amador County Fair  
Amador County Fairgrounds  
Plymouth, CA  
For more info call (209) 245-6921

October 5-8, 2000 Stockdog Day / Training Clinic  
Calaveras County Fairgrounds  
Cost of the workshop is \$50 / day with a dog.  
Advanced registration in required by Sept. 22, 2000.  
Make checks payable to UC Regents and send to  
UCCE Calaveras County, 891 Mountain Ranch Road,  
San Andreas, CA 95249. For more information call  
Valerie Young at (209) 754-6477

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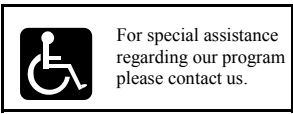
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