

## Contributions to the November newsletter

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## Anthrax

Recent events in the world certainly have drawn attention to this disease. Whether it was the earlier concern about vaccinating soldiers in the US military or most recently bioterrorism using our mail system, Anthrax has been a major news item. In light of this attention, the following information from Dr. John Kirk, Veterinary Medicine Extension, UC Davis, and Dr. Heidi Hamlen, CDFA, Sacramento, is an excellent description of the disease and

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 (*this article was written prior to the recent incident of October, 2001, in Santa Clara County where 21 head of cattle died from Anthrax*).

Anthrax has recently been the topic of several news articles and naturally occurring disease outbreaks in cattle. For instance, following sudden cattle deaths, anthrax has been diagnosed on five farms in Manitoba with about 25 deaths, on two farms in Minnesota with about 15 deaths and in 17 North Dakota herds with approximately 100 deaths. Other deaths have been recently reported in South Dakota and Nebraska.

While deaths from anthrax occur sporadically every year, these outbreaks in the Midwest are somewhat unusual. The purpose of this article will be to 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 is the state that 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, the most initial sign of anthrax is animals found suddenly dead. The course of 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. Decomposition is more rapid than in other conditions and the carcasses become bloated with gases. Rigor mortis or stiffening is not complete. When necropsied, hemorrhages are found in the internal organs. 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.

Scavengers or well-meaning veterinarians seeking to learn the cause of death may also open the carcass. Carrion-feeding animals may carry the infection to other distant locations. 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 concentrate 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 suspect, dead animals should not be opened for routine examination, as the discharges and blood are highly infectious to humans and other animals. As previously stated, open carcasses will deposit enormous quantities of bacteria on the ground that will sporulate to the long lasting, protected state. Your veterinarian can confirm anthrax by taking blood from a peripheral vein (ear or tail) and submitting it to the diagnostic laboratory. The bacteria can be seen in the blood when properly smeared and stained on a glass slide.

In many states, anthrax is a reportable disease meaning that your veterinarian will have to inform the state agency when cases of anthrax are suspected. Quarantine of the premises and animals may be necessary. To prevent spread of an outbreak, where possible, dead animals should be burned where they are found dead. An alternative is to bury them at a depth of 10 feet and cover the carcass with lime. The 1984 Carrisa Plains outbreak was associated with movement of an infected band of sheep and dumping the carcasses from this band in several locations. Your state animal health agency can provide helpful advice on disposal of carcasses. 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. The cutaneous (skin) form is usually seen in people who work with animal carcasses, wool, hides or fur. The infections are seen as large, local abscesses often on the hand or finger. These skin infections can spread to the blood stream and cause serious illness or death. Inhaling the bacteria causes the pulmonary form. Most lung infections result in rapid death. The intestinal form results from eating the bacteria and is seen as violent intestinal pain with vomiting and bloody stools. A high mortality rate is seen with the intestinal form of

anthrax. 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. For more information, call the CDFA, Animal Branch in your area.

## **BIOSECURITY CONSIDERATIONS FOR RANCHES**

John Maas, Extension Veterinarian, UC Davis and Jason Storm, third year student at the School of Veterinary Medicine, UC Davis, prepared this information which discusses a topic that probably is not given much thought by producers. In light of recent events such as the Foot and Mouth Disease problems that are continuing in Britain, parts of Europe, and other regions of the world, maybe we need to think more seriously about biosecurity.

What can we build in to our own operations that will help prevent devastating disease problems at home? The following are Dr. Maas and Jason's ideas on this topic and also information on common disinfectants that will be good information for you to keep. For additional in-depth information, some web sites are also included. Dr. Maas reminds that you should also remember your veterinarian can be a tremendous resource for information on this topic.

**The first step in biosecurity is to maintain healthy animals within your herd. These are standard preventive medicine measures.**

- Vaccinate the herd against all endemic disease (BVD, Clostridial diseases, Lepto. etc.).
- Decrease stress by using low stress management for movement and processing. Provide ample feed, water, and shade.
- Isolate all sick animals.
- Minimize fence line contact with neighboring animals.
- Do not place cattle of different ages in the same pen.
- Keep records of all disease occurrences.
- Maintain a closed herd, if possible.

**Be careful with purchasing and managing replacement animals.**

- Quarantine all new animals for 30-60 days.
- Test new animals for important diseases (Johnes, Trichomoniasis, etc.).
- Purchase animals from healthy and reputable herds.
- Purchase feeds from reputable sources.

*Prevent introduction of disease agents and pests.*

- Provide foot baths at entrances and exits of confinement facilities.
- Provide timely manure and dead animal removal.
- Keep grounds and feed bunks as dry as possible.
- Have an insect control program in practice (insects can be vectors for diseases such as anaplasmosis and bluetongue).
- Have a rodent control program.

**Use disinfectants when necessary. See Table 1 for more information.**

- Clean and remove as much organic material as possible, before disinfecting.
- Choose a disinfectant that will work against the pathogen you are trying to control.
- Be aware of any toxic, harmful or corrosive effects of the disinfectant.
- Follow the label on the disinfectant package.

**Manage visitors.**

- Minimize the number of visitors.
- Be sure all visitors have clean clothing/coveralls, boots, and hands.
- Minimize visitors' contact with animals.
- Be sure all equipment brought onto the farm is disinfected or that disposable equipment is used.
- Be sure all vehicles brought to the farm are clean and have disinfected tires.
- Do not allow foreign visitors on the farm until they have been in the country for 5 days.
- Do not allow foreign visitors to bring any clothing, foods, or accessories they have had in another country onto the farm.

**Educate your employees.**

- Be sure all employees understand and follow the biosecurity protocol.
- Realize that employee owned animals can be a possible source of contamination to your facility.

**Websites for additional information.**

<http://www.kla.org/membership/Biosecurity.htm>

<http://www.cvm.umn.edu/anhltf/foodsafety/biosecurity.html>

<http://www.vetsci.sdstate.edu/xnews/BCBPPA.htm>



