

Blackleg and Other Clostridial Diseases in Cattle

What is blackleg?

Blackleg has been recognized as a disease of livestock since before medieval times. Today we often use the term to describe several diseases caused by organisms in the *Clostridium* class of bacteria. However, there are more than 60 different types of *Clostridium* bacteria, and not all cause disease.

What we commonly call blackleg is a highly fatal infection of muscle caused by *Clostridium chauvoei*. It causes a "gas gangrene" in the muscle of young cattle, usually between 6 months and 2 years old. Blackleg seldom affects cattle older than 2 years, although sporadic cases do occur. Some of the other clostridial diseases are not as restricted to young animals as is blackleg.

What are other clostridial diseases?

Some diseases caused by other clostridial bacteria include "lockjaw" (tetanus), botulism, enterotoxemia, "red water" (bacillary hemoglobinuria), and malignant edema. The type of disease depends on the particular type of *Clostridium* and the type and location of toxins produced.

In tetanus, caused by *Clostridium tetani*, the toxins from bacteria growing in contaminated wounds cause uncontrollable muscle spasms. In botulism, caused by *Clostridium botulinum*, the ingestion of toxins in contaminated food or water causes paralysis, a profound weakness, and death. In enterotoxemia, caused by *Clostridium perfringens*, the organisms in a young animal's gut form toxins which cause severe poisoning and death. In "red water," the spores of *Clostridium hemolyticum* grow in the animal's liver, usually in areas damaged by liver fluke parasites. These spores sometimes cause the animal to pass dark red urine and may cause severe sickness and death. In malignant edema, caused by various clostridial bacteria, muscle or skin is infected with bacteria, toxins are produced, and death can result. Malignant edema is very similar to blackleg.

Different species of animals have different susceptibilities to clostridial disease. Blackleg is probably

the commonest clostridial disease seen in cattle in the southeastern United States, while tetanus is the commonest clostridial disease in horses. Tetanus does occur in cattle, such as in older steers after castration, but it is not very common.

How are clostridial bacteria transmitted?

Clostridial bacteria are found in the soil virtually everywhere that livestock have been kept. They are very resistant to the environment, and organisms are able to lie dormant for years. The source of the infection is almost always the environment, not another animal.

Certain environmental conditions can aid transmission of clostridial bacteria. Animals which die from blackleg or other clostridial diseases can seed the environment with clostridial spores. These animals should be disposed of by burning or burying in deep pits. Flood conditions are often associated with blackleg and clostridial disease. Flooding can cause large amounts of spores, which previously had been buried, to float up.

What are the signs of blackleg in a calf?

A calf with blackleg will often be depressed and have swelling of a muscle or group of muscles. The skin will sometimes be discolored and may "crackle" when it is touched. If the muscle is cut into, it will contain dark areas, hence the name "blackleg." The cut tissue will often contain a foul smelling liquid and gas, which is formed by the clostridial bacteria in the muscles. Sometimes the animal will appear lame on the affected leg before any other sign is noticed. The infection can occur in areas other than leg muscle, such as in the tongue, diaphragm, udder, or brisket. Because the disease develops over a short period of time, calves with blackleg are often found dead without any prior signs of trouble.

How can you tell that blackleg is the cause of disease?

If an animal dies suddenly, your veterinarian should conduct a necropsy to attempt to determine

the cause. With blackleg, an on-farm necropsy will often be enough to establish a diagnosis; however, this is not always true. Muscles such as the tongue and diaphragm may be the site of the infection. If a thorough necropsy exam is not conducted, these muscles may be missed. Laboratory work at the veterinary diagnostic lab, such as microscopic exam of organs, may be necessary to confirm a diagnosis of clostridial disease.

Can blackleg be treated?

Some calves may recover if treated very early in the course of blackleg with appropriate doses of an antibiotic, such as penicillin. However, since blackleg develops so rapidly, most affected animals are not discovered early enough to be treated successfully. The best approach by far is to insure that cattle are vaccinated against the major clostridial diseases which occur in a particular area.

How can you prevent blackleg from becoming a problem in your herd?

It is not possible to prevent clostridial bacteria from being present in the soil, but it is possible to vaccinate animals to prevent the occurrence of the disease. Clostridial vaccines are very effective if given to young, susceptible animals in time for them to raise their resistance before being challenged by the disease. Read and follow the instructions on the label of the vaccine to be sure you give it in to the correct animals, at the correct time, and in the correct manner.

In some cases, a veterinarian may recommend vaccination of newborn calves if blackleg has been a problem on a farm. This is usually not necessary. Up until 3 to 4 months of age, calves are protected if they absorbed adequate colostrum milk from their dams within a few hours after birth. When they are 3 to 4 months old, they become susceptible to the disease.

All calves should be vaccinated for blackleg by 4 months of age. Delaying vaccination until a calf is older can be inviting disaster. Even if a newborn calf was vaccinated for blackleg, it will need to be re-vaccinated at 3 to 4 months of age. A re-vaccination 3 to 4 weeks later when the calf is 4 to 5 months of age is recommended to provide the best protection.

In the southeastern United States all calves should be vaccinated for *Clostridium chauvoei*, *Clostridium septicum*, *Clostridium novyi*, and *Clostridium sordelli*. These are the organisms found in "4-way" blackleg vaccine. Whichever blackleg vaccine you use, make sure that you check the label to be sure that it protects against at least those four types

of clostridial organisms. Do not rely only on a trade name; check the label to be sure.

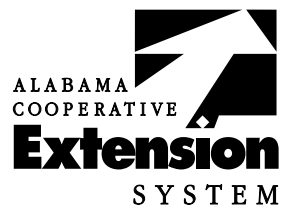
Some "7-way" clostridial vaccines also include types of *Clostridium perfringens*, which can cause fatal intestinal disease in calves. Seven-way vaccines are currently the most commonly used.

Some vaccines may contain *Clostridium hemolyticum*. This is recommended in areas where liver flukes are prevalent. If cattle are brought in from south Florida or parts of Louisiana, vaccination for *Clostridium hemolyticum* may be recommended. Liver flukes are not currently known to be a problem in cattle raised in Alabama. Check with your veterinarian for the best advice.

If vaccines are designed for sheep they may contain *Clostridium tetani* because sheep are quite susceptible to tetanus. Cattle need to be vaccinated for tetanus only in special cases, such as bull calves being castrated with an "elastrator."

Intramuscular injection of clostridial vaccines causes significant damage to muscle. Never inject clostridial vaccines in the top butt. Injection site damage, mainly from intramuscular clostridial vaccines, cost the cattle industry \$46 million in 1991 alone. Clostridial vaccines should be injected SQ (that is, subcutaneously, under the skin). The best injection site is in the neck area. Injection in this area will prevent injection site damage to expensive cuts of meat, such as the top butt. A reaction to an SQ vaccination will not harm muscle and will be removed from the carcass with the hide at slaughter. Intramuscular injections of 7-way vaccines may cause more muscle damage than injections of 4-way vaccines.

Consult with your veterinarian for advice on all vaccinations and treatments in your herd.



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For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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