

### ***CLOSTRIDIAL VACCINES: WHY WE USE THEM***

The Clostridial vaccines are the ones we commonly refer to as “7-way” or “8-way” vaccines. These are the same vaccines that can cause a lump or reaction at the injection site. We all use these vaccines—but why? That is the question we will explore this month.

#### ***Which diseases are we trying to prevent with these vaccines?***

There are three main Clostridial disease problems we are trying to prevent in beef cattle in California. These are Blackleg, Malignant Edema, and Redwater.

#### ***Why is prevention of these diseases so important?***

All of these diseases result in the rapid death of affected cattle. Most often the cattle are not observed to be sick. They are simply found dead. They were normal yesterday and dead today. Even if the animals are observed to be ill, treatment is often unsuccessful.

#### ***What are the causes of these diseases?***

The causes of these diseases are bacteria of the *Clostridium* genus that includes the organisms that cause tetanus and botulism. This entire group of bacteria produces potent toxins that cause disease in cattle, man, and other mammals.

**Blackleg** (emphysematous gangrene) is caused by *Clostridium chauvoei* (sometimes called *C. fesei*). However, Blackleg can also be caused by *C. septicum*, *C. novyi*, and *C. sordelli*. These agents are common in California soil and probably gain access to the cattle while they are grazing. Blackleg most commonly occurs in young cattle, usually between 4 months to 2 years of age. Most cases occur in the hot months of the year. The cattle are usually found dead; however, if observed prior to death they are very lame with muscle swelling in the upper part of the affected leg. Treatment of sick animals is often unsuccessful. Your veterinarian can diagnosis the problem by post mortem exam and submission of samples from the affected muscle.

**Malignant Edema** is most commonly caused by *C. septicum*; however, *C. chauvoei*, *C. sordelli*, *C. perfringens*, or *C. novyi* can also cause the problem. Again, these bacteria are all common in the soil in California. With Malignant Edema, a wound of some type usually initiates the infection. The infection can occur in the skin, subcutaneous tissue, or the muscle. Cuts, puncture wounds, surgical procedures such as castration, and needle contamination can all start the infection. Therefore, hygiene is important to help prevent infections. Malignant Edema is also more common in the warm months. This type of infection is the same as seen in people with “gas gangrene”

in battlefield situations. Your veterinarian can diagnosis this disease in the same manner as appropriate for Blackleg.

**Redwater** (Bacillary Hemoglobinuria) is caused by *Clostridium hemolyticum*, which colonizes in the liver of susceptible cattle and produces protein toxins that in turn destroy the body's red blood cells, damages other organ systems and rapidly causes death. Redwater is uncommon in cattle less than one year of age and while young cattle have a certain resistance to *C. hemolyticum*, they can be affected and die also. The most commonly affected cattle are adults in good condition. Redwater can affect cattle at any time of the year; however, it is most common in the late spring, summer, and autumn. Redwater is most common in the western United States and the first cases were reported in California in 1916. The organism that causes Redwater is common in areas with alkaline soils, water with a pH of 8, and in pastures that are not well drained. The organism is often present in the feces of normal cattle and has been isolated from the liver and kidneys of healthy cattle. It causes disease when it establishes itself in the liver in an area of low oxygen tension (in anaerobic areas). These anaerobic areas in the liver can be due to a number of common conditions, the most common of which is damage caused by migrating liver flukes. In addition, liver damage caused by liver biopsies can set up conditions to allow the Redwater organism to multiply and cause disease. Thus, if your veterinarian does liver biopsies to diagnosis copper deficiency, he/she will always give penicillin or a similar product to prevent this problem.

Redwater has a short incubation period and the vast majority of affected cattle are usually found dead and bloated. If clinical signs are observed, the most common ones are anemia, rapid breathing, high fever (104-106), and urine that is dark red and foamy in appearance. The red urine is due to the presence of large amounts of hemoglobin from the destroyed red blood cells. The affected animals are weak, depressed and usually die within 12 hours of the time the first signs appear. Treatment consists of antitoxin and antibiotics; however treatment is invariably unsuccessful even if the animals are seen prior to death. The course of the disease is rapid and most all cattle with Redwater are simply found dead and bloated. Your veterinarian can easily identify Redwater as the cause of death because of the characteristic damage seen in the liver. Prevention of liver fluke infestation and establishing better drainage in problem pastures will aid in the prevention of Redwater. However, the most important means of prevention is the routine use of vaccines (bacterins) to increase the immunity of the cattle against this disease.

### ***When is the best time of the year to vaccinate?***

All of these diseases are common in California and are most common in the warm months of the year. The organisms live in the soil and the areas that animals inhabit. An excellent time to vaccinate or to booster is in the late spring or early summer. In areas of high exposure cattle may have to be vaccinated twice per year. The vaccines used to prevent Redwater do not provide long-term protection and exposure to a large number of organisms seems to override the protection provided by a yearly booster. Therefore, in areas of high Redwater exposure, cattle may have to be vaccinated every 6 months or in

some instances, every 3 months. Your veterinarian can give you excellent advise about vaccine timing and frequency that works best in your locale.

***Which vaccines are the best?***

The vaccines for calves should contain the following at a minimum: *C. chauvoei*, *C. septicum*, *C. novyi*, *C. sordelli*, and *C. perfringens*. The vaccines for older cattle should contain the above plus *C. hemolyticum* (the cause of Redwater). The best vaccines are bacterin/toxoid combinations. The subcutaneous vaccines are the best to use as they can be irritating to tissue (such as muscle). Again, your veterinarian can give you excellent advice regarding vaccine products.

These Clostridial vaccines have improved quite a bit of the years and they are reasonably priced. The diseases caused by the Clostridial agents are not going to disappear and that is the primary reason we routinely use the Clostridial vaccines. Also, it is very important that all animals that die suddenly be examined to determine the cause of death. For example, Redwater is very common and can easily be confused with conditions such as bloat.

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