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ANAPLASMOSIS

The activity of ticks and other vectors of anaplasmosis will begin to dramatically increase from now through the summer and this is an excellent time to plan ahead to prevent losses due to this disease. The cause of anaplasmosis is a rickettsial organism (rickettsiae are intermediate in size and biology between viruses and bacteria), called *Anaplasma marginale*. It receives its name because of its location within the parasitized red blood cells of cattle, i.e., on the margin of the cells. Anaplasmosis occurs when *A. marginale* infects a susceptible host of the appropriate age and causes severe anemia due to the destruction of red blood cells. This severe anemia is the cause of death or illness in the animal. Additionally, the anemia can cause sterility in bulls or may cause abortion in cows. Cattle of all ages are susceptible to infection by *A. marginale*. However, the age of the animal infected with *A. marginale* determines the severity of any clinical disease. Young cattle, less than 1 year of age can become infected and will not show any signs of disease, they will become carriers of the organism and develop an immunity which will be protective against the anemia and clinical disease. Cattle between 12 and 24 months of age which become infected are at increasing risk of becoming ill and all cattle over 2 years of age, when infected, become ill and approximately 50% of cattle that are 2 years of age or older will die if not treated. Once infected, the cattle tend to be carriers of *A. marginale* for many years if not life, and these animals can serve as a source of infection for other cattle. These cattle are infected carriers but do not develop signs of disease.

The disease agent is spread by ticks, biting flies, and man. It is spread via blood from a carrier animal that is transmitted to a susceptible animal. This can be done by the use of dehorning instruments, castration instruments, needles, and ear tagging or implanting devices. Biting flies, such as horseflies can carry infected blood from a carrier animal to a susceptible animal and therefore, transmit the disease organism. Ticks are unique biological vectors, in that they carry *A. marginale* in their tissues and can infect cattle when feeding at subsequent molts or stages of their life cycle. Some species of ticks that are common in California can even transmit the organism from one generation of tick to the next via their eggs.

Affected cattle are typically treated with tetracycline antibiotics. Also, use of tetracyclines can clear carrier cattle of *A. marginale*. From 2-5 treatments with LA-200 (long-acting tetracycline injectable product) given at 7 days intervals will clear the anaplasmosis organism from infected carrier cattle. However, these cattle that are cleared will become susceptible and can actually become ill when re-infected.

The amount of disease due to anaplasmosis is dependent on the local geographic area within California. In areas such as the Central Valley, there is very little tick activity and cattle do not become infected. Groups of cattle in such areas do not carry the organism, do not develop disease and are quite susceptible to infection. If adult cattle such as these are taken to a locale where *A. marginale* is common they can become infected and can experience heavy losses due to anaplasmosis. Cattle such as these should be vaccinated with a killed vaccine well before the time they are taken into high risk areas. Certain other areas of California have high rates of infection with *A. marginale*. In these areas, such as the Coast range, almost all cattle are infected early in life, do not develop any signs of disease, and are carriers of *A. marginale* for their natural life. Losses of cattle do not commonly occur in these herds, unless outside, susceptible cattle are brought in. This occurs commonly with purchased bulls or replacement cows and therefore, these introduced cattle should be vaccinated with a killed vaccine well before being shipped into an area with increased risk of exposure, while the resident cattle in these areas do not require routine vaccination. In other areas where there is some tick activity and some level of exposure, a significant number of cattle will reach 2 years of age before they become infected. These susceptible cattle, with some herdmates who are infected carriers, can become infected and will develop the anemic condition that can result in illness or death. In herds such as this, it is common to vaccinate all animals since it is impractical to determine which are susceptible and which are carriers. In herds such as this, older animals are vaccinated with the killed vaccine and/or young animals are vaccinated with a modified live vaccine to prevent losses due to illness or death in the herd.

There are two types of vaccines commonly used to prevent clinical disease due to *A. marginale*. One type is a killed vaccine which contains killed organisms that stimulate an immune response that is adequate to protect against anemia and illness. The other type of vaccine is a modified live *A. marginale* that produces a "controlled infection". The live vaccine uses a modified live organism to infect the animal and the animal becomes immune to disease and also becomes a carrier of the vaccine organism. Because young cattle are not susceptible to the anemic disease that affects adult cattle, they can safely be given the modified live vaccine. However, the modified live vaccine should not be given to adult cattle as it can cause serious illness. It is important to remember that neither vaccine will protect against natural infection with *A. marginale* via ticks or other methods of transmission and that the protection is only against the anemia that causes signs of disease. Therefore, vaccinated animals can become carriers of the naturally-occurring *A. marginale*.

The control of anaplasmosis can be complicated because of the factors outlined above; however, there are a number of options available. There are several important points to keep in mind: (1) vaccination prevents clinical disease, (2) vaccination does not prevent cattle from becoming infected, (3) some states and foreign countries do not allow importation of cattle infected with *Anaplasma*, or in some cases vaccinated cattle, and (4) there is a significant time delay from the time cattle are vaccinated until they are protected. Since prevention of this disease is complicated by many factors, it is important to discuss any decisions with your veterinarian, as he or she will be aware of those local conditions which are so important.

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