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## ANAPLASMOSIS: OLD DISEASE, NEW PROBLEM

What is Anaplasmosis? This is a disease of cattle caused by an organism called *Anaplasma marginale*. This organism is a rickettsia, half way between a virus and a bacteria. It is susceptible to tetracyclines, but cannot be grown in the laboratory. The disease, anaplasmosis, is caused with the body of infected cattle reacts to remove the infected red blood cells and causes a severe anemia.

Which cattle are susceptible to infection with *A. marginale*? All cattle are susceptible to infection by *A. marginale*. Also, deer, elk, and other ruminants are susceptible to becoming infected.

Recently, you may have attempted to purchase vaccines to prevent Anaplasmosis and discovered they are no longer available. Since the first of the year, the two U.S. companies that manufactured and marketed vaccines for the prevention of anaplasmosis nationwide have decided not to continue making these vaccines. The first anaplasmosis vaccine manufactured for cattle in the United States was that made by Fort Dodge and called Anaplaz®. More recently, Mallinkrodt (later Schering-Plough) marketed a vaccine called Plazvax®. Both of these vaccines protect against Anaplasmosis by similar mechanisms. The vaccines contain the organism, *Anaplasma marginale*, which had been harvested from infected cattle. The organism is killed and processed to make an effective vaccine. When the cattle are vaccinated, their immune system responds to the vaccine antigen. The cattle develop enough immunity to prevent illness when they become infected. The vaccines do not prevent against infection by the anaplasma organism. When the vaccinated cattle are infected by the *Anaplasma marginale* organism under field conditions, they go through a normal incubation period of about 45-90 days, have a slight drop in their red blood cell count, and remain normal in appearance. These vaccinated cattle do not become ill; but, they do carry the Anaplasma organism after they become infected. Most infected cattle then carry the organism for their entire life. They are "immune carriers." That is to say, they are "immune" to becoming sick from the agent; but, are carriers of the agent. If you were to take a small amount of blood from one of these "immune carriers" and put it into a susceptible cow, that cow would become infected and sick.

How do cattle naturally become infected with the anaplasmosis agent? A number of ruminant animals such as cattle, deer, and elk can be carriers of the anaplasmosis agent. These species can carry the agent most or all of their lives. They serve as a reservoir for infection of other animals and in this way, the organism perpetuates itself. The transfer of the agent from a carrier animal to a susceptible animal can occur by a number of routes. One common way is via ticks. In California, we have a number of ticks that transmit the anaplasma agent. All of these ticks pass the agent from one life stage to the next (most tick species have four life stages). Some of our common ticks pass the agent to the next generation of ticks via the egg (transovarial transmission). So these ticks are extremely effective at passing the agent to new, susceptible hosts. Additionally, any transmission of a small amount of blood from a carrier animal to a susceptible animal can transmit anaplasmosis. So insects such as horse flies, are also capable of transmission. An even larger culprit in this type of transmission is man. Ear-tagging instruments, tattoo tools, needles, ear implant tools, castrating instruments, dehorning instruments, etc. can all easily transmit the agent. So humans are important in the spread of this disease.

What happens when a susceptible animal becomes infected? If the animal is a calf under the age of 12 months, virtually nothing is noticed. The calf undergoes an incubation period of about 45 to 90 days, has a very mild illness, which is rarely noticed, and becomes a carrier for life. Cattle that become infected between 1 and 2 years of age become ill after the incubation period, with severity increasing with age. Cattle over 2 years of age become very ill and approximately 50% die unless treated. The older the animal and the better shape they are in—the sicker they get! Usually, once the cattle become infected, they stay infected for life. They are "immune carriers"—they do not get sick, but act as a reservoir for other susceptible animals.

When does anaplasmosis cause problems? The short answer is, "When older (more than 2 years of age) cattle become infected." However, for cattle raised in the central California valley on permanent pasture, with no ticks, no deer and no carrier cattle, there is essentially no risk of Anaplasmosis. These cattle are free of the disease, have no immunity (unless vaccinated), and are totally susceptible. If these cattle are introduced to foothill pastures, especially during a bad tick year, such as this one, they are very much at risk for becoming infected and becoming ill or dying. When cattle are raised in the coastal foothills or the mountains of California, they often become infected early in life, have no clinical disease, and are "immune carriers." If new, susceptible cattle come into these areas, they are definitely at risk. If these carrier cattle go to the valley pastures, they may act as sources of infection—especially via blood transfer (dehorning instruments, ear taggers, horse fly transmission, etc.). Many cattle herds are between these two extremes and it is common for a few to many cattle to become infected and become ill every year. These are the herds that need to vaccinate routinely to prevent losses. It is

common for bulls that come from anaplasmosis-free areas to be very susceptible when introduced into herds where Anaplasmosis is common.

It is easy to see why these two vaccines were very important for many ranches. Without killed vaccines, many operations may have to "let nature take its course." This may get a little costly! In California, we do have another alternative. We have a vaccine called Anavac®. This vaccine is a modified live vaccine. It is safe and effective when given to young cattle. They become infected with the vaccine strain of Anaplasma and are "immune carriers." This method of preventing disease is basically a controlled infection. If this vaccine (Anavac®) is given to adult cattle, they will become sick and could die, just as with the natural disease. Therefore, use of this vaccine cannot be undertaken lightly.

As you can see from this brief discussion, Anaplasmosis is a very complicated disease and the need to vaccinate will vary from herd to herd. Particularly important is the protection of susceptible cattle coming into an "Anaplasmosis area." This is doubly important for bulls, because if they get sick and don't die, they can be sterile for up to a year. Vaccination of mature bulls with Anavac® can cause tremendous losses. Hopefully, one or both of these companies will begin to produce vaccine again, and by the time you read this article the problem will be solved. If not, talk this problem over with your veterinarian in detail. You won't make any small mistakes when dealing with this disease in California!

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