

An antibiotic is important for managing anaplasmosis

Robert Fears for *Progressive Cattleman*

Bovine anaplasmosis is an infectious disease of cattle that causes destruction of red blood cells and is initiated by the bacteria *Anaplasma marginale*. Bacteria are controlled with antibiotics, and one type, tetracycline, is used in feed or mineral mixes to reduce *Anaplasma marginale* populations in infected cattle.

The disease is found worldwide and has been reported in at least 40 states. It is a common disease in the southeastern U.S., Gulf Coast, lower Plains and Western states. In Texas, the

disease appears to be most prevalent in the Edwards Plateau and Rolling Plains areas. Strains of *A. marginale* and their vectors vary with different regions of the U.S.

Research from Texas and California suggests that costs of a clinical (recognizable) case of anaplasmosis average more than \$400 per animal. If anaplasmosis infects a previously uninfected herd, the following effects are expected: Calf crop reduced by 3.6 percent, 30 percent increase in cull rate, and 30 percent

of adult cattle showing signs of the disease will die.

"Other economic losses due to anaplasmosis are from decreased milk production, severe weight loss and poor reproductive ability," says Gerald Buening, DVM, University of Missouri Extension. "The American National Cattlemen's Association in the past has referred to anaplasmosis as the second major disease problem. Annual losses in the U.S. are currently estimated to be 300 million dollars."

"After infection, the animals may

become very ill," says Tom Hairgrove, DVM, Texas A&M AgriLife Extension Service. "Symptoms include anemia, jaundice, abortion, sudden weight loss and often death. Anemic cattle are weak, have difficulty breathing and behave more aggressively. In jaundiced animals, eyes and gums are yellowish."

Transmission

"*Anaplasma marginale* can be transmitted two different ways," says Dee Whittier, DVM, Virginia Tech. "First, it can be transmitted mechanically when red blood cells infected with *A. marginale* are inoculated into susceptible cattle. This can occur through needles, dehorning, ear taggers, castrating knives or other surgical tools, and tattoo instruments."

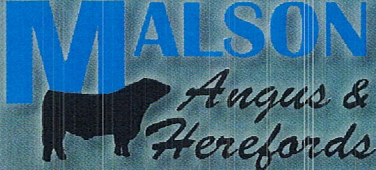
"Mechanical transmission can also occur through the mouthparts of biting insects, such as horseflies and stable flies. Face flies, houseflies and other non-biting insects do not transmit the disease. Horn flies, although they bite, typically do not go from animal to animal, so they are not thought to spread *Anaplasma*. Mechanical transmission of infected red blood cells must occur within a few minutes of the blood leaving the infected animal, as the blood parasite does not survive more than a few minutes outside the animal."

"During mechanical transmission, the bacteria are transferred without increasing in numbers," says Hairgrove. "For example, only the blood contained on the mouthparts of biting flies is infective. Mechanical transmission must occur within a short period before the bacteria die."

"Horseflies are often the major mechanical vector," says Buening. "Recent studies at Mississippi State University show that anaplasmosis can be transmitted from infected calves to non-infected calves with as few as 10 horsefly bites, and horseflies can transmit the disease for at least 60 minutes after a blood meal."

"Second, *Anaplasma* can be transmitted through its biological vector," Whittier continues. "The parasite receives nourishment from, and may even multiply in, the biological vector. The biological vector for anaplasmosis is ticks. Once in the tick, the parasite can remain active throughout the life cycle of the tick and can be transmitted several months later."

"When susceptible cattle are infected with *Anaplasma*, the organism multiplies in the bloodstream and attaches to the animal's red blood cells. The animal's immune system destroys the infected red blood cells in an attempt to fight off the infection. Unfortunately, uninfected blood cells are also destroyed. When the number of blood cells being destroyed exceeds the number of blood cells that the body can produce, the animal becomes



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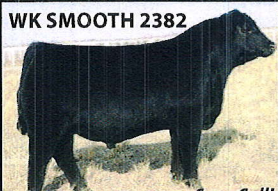
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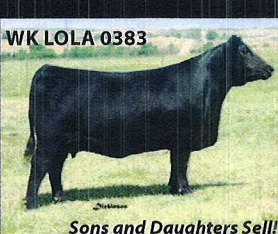
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anemic. It takes three to six weeks for clinical signs to appear after the animal is infected."

Prevention and management of anaplasmosis

Take precautions to reduce risk of disease when introducing replacement cattle into an existing herd. Hairgrove says if you live in an area where the disease is prevalent, be careful when introducing non-infected cattle. If the disease is not prevalent in your area, take precautions when introducing cattle from regions where the disease is more common.

Diagnostic tests can determine whether cattle are infected. Use test results when analyzing risks of commingling infected and uninfected cattle. It can be just as disastrous to bring uninfected animals into a herd of diseased cattle as it is to introduce diseased animals into an uninfected herd.

Cattle are at greatest risk when *A. marginale* is spread to susceptible cattle during husbandry practices such as dehorning, ear tagging and vaccinating. A large percentage of the herd can be infected at one time during these procedures. About 40 days later, many animals may die.

To limit disease transmission during routine husbandry practices:

- ◆ Remove blood from dehorning, ear taggers and surgical instruments and disinfect them between animals.
- ◆ Change needles between animals.

Control horseflies and deer flies in spring and summer. Anaplasmosis is also spread mechanically by horseflies and deer flies, which are difficult to control. Because symptoms take two to seven weeks to appear, and biting flies usually transfer *A. marginale* in the spring and summer, anaplasmosis appears most often in late summer and fall.

Manage grazing where anaplasmosis is more likely to be spread by biting flies. If possible, use pastures with low fly pressure in late spring and summer, and rotate into higher-pressure pastures in the winter. Symptoms of anaplasmosis, introduced by biting flies, should occur in the summer.

Control winter ticks from late fall to early spring. Anaplasmosis is spread biologically by winter ticks. Tick control practices when ticks are active will reduce but not eliminate the spread of disease. Producers should be vigilant for symptoms of anaplasmosis from January through May.

Continuously incorporate tetracycline into mineral or feed supplements. This practice will not prevent infections; however, it

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Stages of anaplasmosis

Incubation

The incubation stage begins with the original infection of *A. marginale* and lasts until 1 percent of the animal's red blood cells are infected. After gaining entry into a susceptible animal, the anaplasma parasite slowly reproduces in the animal's blood. During this period, the animal remains healthy and shows no signs of being infected. Finally, after the parasite has reproduced many times and established itself in the red blood cells, the body attempts to destroy the parasite.

Developmental

Clinical (observable) signs begin to be expressed about halfway through this phase. As the infected animal's body destroys the parasite, red blood cells are destroyed as well. When a substantial loss of red blood cells has occurred, the animal will show signs of clinical anemia. Body temperature will rise to a point of 104 to 107° Fahrenheit, and a rapid decrease in milk production will occur in lactating cows.

Convalescent

Cattle that survive the clinical disease lose weight, abort calves and recover slowly over a two- or three-month period. This stage lasts until normal blood values return. The convalescent state is differentiated from the developmental stage by an increase in the production of red blood cells. Death losses normally occur during the late development stage or early convalescent stage.

Carrier

Cattle that recover from anaplasmosis remain reservoirs (carriers) of the disease for the rest of their lives. During the carrier stage, an animal will not exhibit any clinical signs associated with the persistent low-level *A. marginale* infection; nevertheless, the blood from these recovered animals will cause anaplasmosis if introduced into susceptible cattle. Carriers very rarely become ill with anaplasmosis a second time. Unidentified carriers in a herd are the most likely source of infection for future outbreaks of the disease.

—Taken from the 59th Annual Texas A&M Beef Cattle Short Course proceedings



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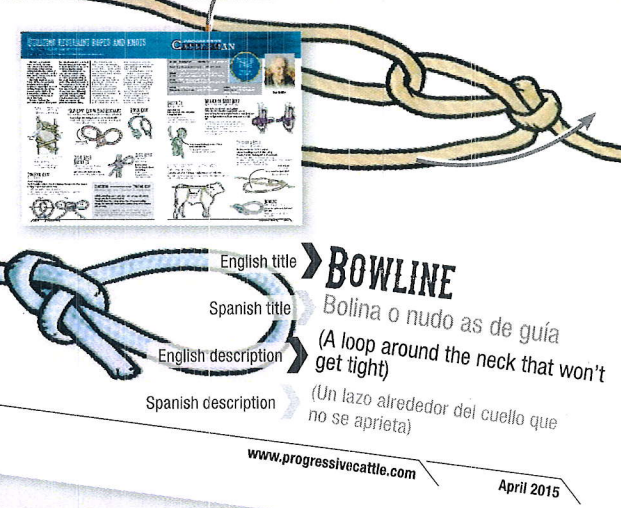
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Anaplasmosis transmission can occur through needles, dehorners, ear taggers, castrating knives and tattoo instruments. Photo by Robert Fears.

Anaplasmosis, cont'd from page 45

does help control anaplasmosis by decreasing the number of bacteria in infected animals and reducing bacterial reproduction in newly infected animals. Tetracycline treatment for *A. marginale* reduction should be timed to coincide with vector activity periods, which vary by geographical regions.

Use of antimicrobials, including tetracycline, in feed requires a veterinarian to prepare a veterinary feed directive (VFD), and a veterinary-client-patient (VCPR) relationship must be in place before the VFD can be issued. This FDA regulation is expected to become effective on Jan. 1, 2017.

The FDA addressed antimicrobial resistance concerns with two overarching policies. One policy assures that antimicrobials in feed will not be used for growth promotion or feed efficiency and that antimicrobials will be used only for treatment, control or prevention of disease. The second policy is that antibiotics can only be used in feed under the direction of a veterinarian. It is important to note that extra-label use of antibiotics in feed is prohibited and it is illegal for a veterinarian, feed mill or producer to alter the label dose.

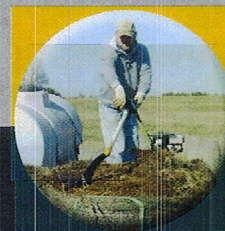
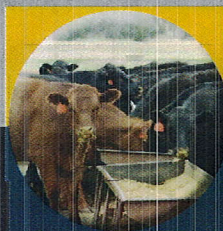
It is very difficult to clear persistently infected animals of *A. marginale* organisms using tetracycline. Although long-acting



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injectable oxytetracycline was previously thought to be effective, current studies show that it is unlikely to eliminate a persistent infection. Clearing a persistent animal can be detrimental because it will be susceptible to becoming reinfected and suffering clinical disease.

Regulatory concerns

No FDA-licensed vaccine is available to control bovine anaplasmosis. To reduce spread of this disease, producers must manage persistently infected cattle properly and attempt to reduce populations of insects that transmit the bacteria. Feeding tetracycline in mineral or feed is also a very important control measure, and it is important that producers retain the right to use the antibiotic in this manner.

"The VFD arose from concerns by consumers and public health interest groups about development of antibiotic-resistant bacteria in food animals that can become a human health problem," says Virginia Fajt, DVM, Texas A&M University. Antibiotic-resistant bacteria could theoretically be transferred to humans. There are several hypothetical steps required for the transfer, and a few of them have been documented through observation and epidemiology studies.

"Because of the theoretical risk, activists say that use of antibiotics in livestock should be limited. The animal industry states that there is a demonstrated risk to animal health if antibiotics are not available. A compromise between the two groups is the proposed FDA directive that continues to permit use of antibiotics in feed but only with veterinarian oversight."

The VFD should be a workable solution to allow mixing tetracycline with feed, as long as veterinarians are

left the freedom to write VFDs that are appropriate for individual situations. Due to several strains of *A. marginale* and movement of cattle across the country, anaplasmosis does not behave the same way in every case. The treatment for one producer may not work for the next one. Anaplasmosis is a complicated disease and cannot be kept under control with simple solutions.

Robert Fears is a freelance writer based in Texas.



A blood sample may be obtained from the tail vein of the animal to be tested for anaplasmosis. Photo by Robert Fears.

Definitions used by the FDA

♦ **Veterinary feed directive (VFD)** – Defined as a written statement issued by a licensed veterinarian authorizing the use of a VFD drug in or on animal feed.

♦ **VFD drug** – A drug intended for use in or on animal feed which is limited to use under professional supervision of a licensed veterinarian.

♦ **Combination VFD drug** – An approved combination of new animal drugs intended for use in or on animal feed under the professional supervision of a licensed veterinarian, and at least one is a VFD drug.

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