

Strategic Management of Anaplasmosis in Kentucky

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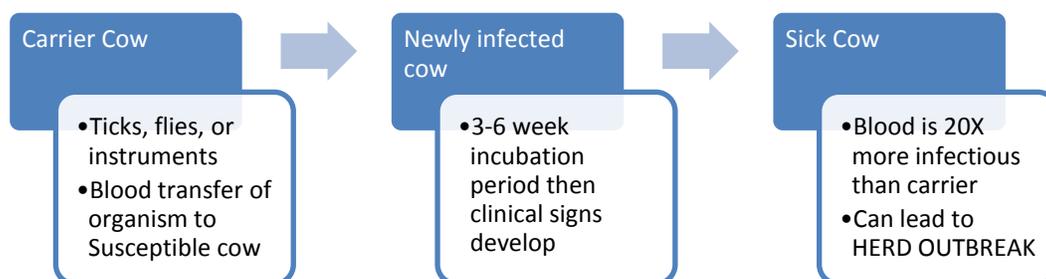
By: Michelle Arnold, DVM

Anaplasmosis is an unusual disease that is diagnosed in late summer and fall in Kentucky. The organism *Anaplasma marginale* lives in red blood cells and is considered “rickettsia-like” which means it depends on ticks for its survival. It is the only major tick-borne disease in the US that impacts cattle production. It is estimated to cost \$400 per case due to lowered weaning weights, reproductive loss, lowered milk production, additional testing to export cattle, death loss, prevention and treatment costs. It is always found in the southern, southeastern and northwestern US where ticks survive year round but, due to interstate movement of cattle, the disease has now been reported in all 48 contiguous states.

Transmission is by transfer of infected red blood cells from infected to susceptible cattle. Ticks (*Dermacentor* spp.) are “biological vectors” and are of great importance because *A. marginale* replicates within the tick and can be maintained there for up to a year. Deer are not currently believed to be carriers of the disease but they may enhance tick populations. *A. marginale* can also be spread mechanically by any transfer of blood including insects and by veterinary instruments. Typically biting insects (mosquitoes, horse flies, stable flies) will cause a few sporadic cases to occur at first then a wave of sick animals 3-6 weeks later while spread via blood contaminated objects (such as needles or palpation sleeves) can cause a large number of cows to show signs 3-6 weeks after vaccinating or pregnancy checking. Recently intrauterine transmission (from cow to calf during pregnancy) was recognized in the 2nd and 3rd trimesters that can lead to fetal death and abortion. More importantly, calves born alive that were infected *in utero* are “persistently infected” and never develop clinical signs yet serve as a source of infection for the herd.

There are generally four phases of disease:

Incubation-This is defined as the time from exposure to the time that *Anaplasma* bodies are detected in blood and may vary from 3-6 weeks (or longer). The organism slowly reproduces in the bloodstream during which time the animal remains healthy. When approximately 1% of the RBCs are infected, there is rapid disease progression as the immune system tries to destroy the parasite and destroys red blood cells simultaneously. Outbreaks of Anaplasmosis in August, September, October, and November in Kentucky are actually associated with infection in June and July.



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Developmental Stage-This is the stage when characteristic clinical signs appear lasting 4-9 days. These include:

- a. Fever- Initial sign. (104-107 degrees)
- b. "Sudden death" in a highly susceptible or immune compromised animal such as a high producing dairy cow.
- c. Aggressive behavior due to lack of oxygen in brain
- d. Anemia-Pale around eyes, muzzle, teats
- e. Increased heart and respiratory rate due to watery/thin blood
- f. Yellow mucous membranes.
- g. Lethargy/Weakness/Lags behind herd (May fall and be unable to stand)
- h. Off feed/Dehydration/Weight Loss
- i. Constipation/No chewing of cud
- j. Dramatic drop in milk production
- k. Reproductive disorders: abortion in cow/infertility in bull
- l. Age Related Signs:

<6 months old: Usually no symptoms

6 months-3 years old: increasingly ill

3 years old and older: 30-50% death rate if untreated

Clinical Case Treatment

Treatment with tetracycline is essential in the clinical stage of disease as well as supportive therapy for the anemia. No injectable antibiotic is formally approved for treatment so any form is extra label and must be used under the direction of a licensed veterinarian. Injectable tetracycline (Oxytetracycline at 5mg/lb. body weight IM or Long acting Oxytetracycline at 9 mg/lb BW IM) can be administered but prolonged milk and meat withholding times must be observed as directed by the prescribing veterinarian.

Exercise caution when forcing an infected animal to move or get excited as quick death may result from lack of oxygen.

Convalescent Stage-This phase lasts until normal blood values return and is characterized by an increase in RBC production. Recovery occurs over a 2-3 month span and cows frequently lose weight and/or abort calves during this time.

Carrier Stage-Animals that recover remain carriers for the rest of their lives unless cleared with long term antibiotics. No clinical signs are associated with this lifelong persistent infection so unidentified carriers are the most common source of infection for future outbreaks.

Diagnosis of clinical cases is based on history (including geographic region), clinical signs, blood test results and post mortem lesions. Blood (serum) testing is the method of choice to detect the organism in carrier animals or those with low parasite numbers (microscopically undetectable). The serum cELISA test is very reliable but it is not considered accurate during the initial 3-6 week incubation period. DNA analysis (real time PCR) gives extremely accurate results including in the first 3 weeks of infection but is relatively expensive. It is important to remember an animal may die from another totally unrelated disease (for example-milk fever) and also test positive to anaplasmosis due to the carrier state. Therefore a positive blood test result for anaplasmosis does not always mean it is the actual cause of disease or death.

Control Program

Control in lactating cows is based on reducing vector transmission by using insecticide sprays, clean (disinfected) medical equipment, and using needles and palpation sleeves only once to decrease transmission between animals. However, once infected, strategies are based on the delicate balance between antibiotics, the cow's immune response and the organism. Consult with your veterinarian for specific methods to treat and control this unique organism.

How the UKVDL can help diagnose Anaplasmosis

If you suspect anaplasmosis in your herd, the UKVDL recommends the cELISA test on serum to detect infection and active carriers. Your veterinarian can collect blood in a red top tube and remove the serum by spinning the collection tube down and transferring the serum to a labeled transfer tube. Specimens should be transported to the lab as soon as possible after collection (overnight ship with cold packs). It is also recommended that a blood sample (purple top tube) be submitted for a CBC with differential in order to identify *A. marginale* and to assess the anemia. The Anaplasmosis cELISA test costs \$8/sample and the CBC with differential is \$10/sample (all fees quoted apply in-state only). An accession fee of \$10 applies each time a batch of samples is submitted (non-Kentucky samples will be assessed an additional processing fee of \$10.00 plus a 50% surcharge). Necropsy of suspicious cases is encouraged and food animal cases are capped at \$20/adult case with a \$10 accession fee for a total final cost of \$30.

Please visit the UKVDL web site for additional information at <http://vdl.uky.edu>