

UCD VET VIEWS

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FOOTHILL ABORTION UPDATE PART II: THE CAUSE

Foothill abortion in cattle, also known as Epizootic Bovine Abortion (EBA), has been experimentally reproduced in a consistent manner by allowing Pajaroello (pa-ha-WAY-lo) ticks to feed on susceptible, pregnant cattle. Last month's article detailed much of what we know about this tick, that is the vector of this abortion disease. At the present time, we think the Pajaroello ticks transmit some type of infectious microorganism and that the ticks are not the direct cause of the subsequent abortion disease. It is also likely that not all of the Pajaroello ticks carry and transmit the agent. Most of the experimental work at the University of California-Davis suggests that feeding 100-200 ticks on a single susceptible pregnant cow or heifer is necessary to cause abortion. An important unanswered question has been, "How many infected ticks are necessary to transmit enough of the responsible microorganism to cause abortion?"

Ticks are notorious for transmitting disease agents. A common example of this phenomenon in cattle is *Anaplasma marginale*, the cause of anaplasmosis. The anaplasma organism can be transmitted by hard shell ticks such as *Dermacentor andersoni*. In humans and other mammals the agent of Lyme Disease is also transmitted by ticks. For this and other reasons, it has long been suspected that the cause of EBA is some sort of microorganism that is transmitted by the Pajaroello tick. The types of microorganisms suspected includes viruses, bacteria, and/or rickettsiae. There are many examples in nature where ticks transmit these types of microorganisms to susceptible hosts.

Recently, it has been found that EBA can be experimentally reproduced **without** using Pajaroello ticks fed on susceptible pregnant cows or heifers. Work at the University of California Davis' School of Veterinary Medicine and at the University of Nevada-Reno has shown that using tissue from a fetus that was aborted due to EBA could be used to cause abortion in another susceptible cow. Therefore, ticks were not necessary to reproduce EBA. This was an important step in showing that there is a microorganism involved in foothill abortion (EBA). The tissue from EBA fetuses that has proven to be the most consistent in reproducing EBA experimentally is the **thymus**. The thymus is located in the neck of cattle and is commonly called the sweetbreads. The thymus is one of the tissues most damaged in an EBA fetus; therefore, it is not surprising that the causative organism of EBA might be present in this tissue. The thymus has been used to successfully reproduce EBA in a series of experiments. Now the search can focus on finding the microorganism that causes EBA in the thymus and perhaps other organs related to the thymus.

The disease in cattle behaves very much as an infectious disease. Susceptible pregnant cows and/or heifers that are from 2 to 6 months pregnant are thought to be infected with the causative agent through the bite(s) of the Pajaroello tick(s). Because the fetus at this age of gestation (2-6 months) has not yet developed a functional immune system and the cow/heifer has not "seen" the agent before, it is thought that the agent gains access to the fetus, across the placenta, and initiates a chronic infection in the fetus. This chronic infection in the fetus results in death of the fetus and abortion about 90 to 120 days later. This results in abortion at about 6 to 9 months of gestation (third trimester abortions). If a fetus is infected at 7, 8, or 9 months of gestation, it is more likely to have developed a functional immune system and can either survive the infection or be born weak. Cows or heifers do not show signs of infection other than the loss of the fetus.

The appearance of an EBA fetus tends to be quite characteristic. The fetus has a fluid filled abdomen and a "pot-bellied" appearance. There are often tiny, red hemorrhages around the eyes, nose, and mouth. The lymph nodes are enlarged, especially easy to see is the prescapular lymph node under the skin and just in front of the shoulder blade. The EBA fetuses usually have a fresh appearance. Your veterinarian can perform a post mortem examination and send samples to the California Veterinary Diagnostic Laboratory System to confirm the diagnosis. Occasionally, weak calves will be born due to infection with the EBA agent. With both abortions and weak calves, you should seek to have your veterinarian make sure of the diagnosis as a number of other conditions can result in the same problems.

If cows or heifers are exposed to the ticks and the EBA agent they carry, the cattle tend to develop immunity and are not susceptible to abortion for a considerable period of time. This occurs in the natural setting when a cow or heifer aborts or when they are exposed before becoming pregnant. This phenomenon is important in preventing EBA abortions. Next month we will discuss the methods currently known to prevent or minimize losses due to foothill abortion. Meanwhile, the search to identify and isolate the microorganism that apparently causes EBA goes on and that search has narrowed on the thymus and other tissues of the EBA fetus.

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