Western Beef Resource Committee

Fourth Edition

Cattle Producer's Handbook

Animal Health Section 684

Foothill Abortion: A Western States Problem?

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Epizootic bovine abortion (EBA) is commonly referred to as "foothill abortion" because it was originally recognized as an abortion disease of cattle that occurred after summer grazing in the foothill regions of coastal and central California. In the early 1950s, with the advent of calving 2-year-old heifers, it became a recognizable disease with abortion rates up to 50 percent. EBA is also a phenomenon of summer grazing in the Sierra Nevada Mountains and the Great Basin regions of California, and has been diagnosed in southern Oregon and western Nevada.

Tick-Transmitted Abortion Disease

EBA is a disease that is apparently only transmitted by the bite of a particular soft-bodied tick commonly known as the pajahuello (or pajaroello) (pronounced pa-ha-way'-lo). The scientific name of the tick is *Ornithodoros coriaceus*. Despite several decades of study, the disease agent the tick is transmitting has eluded researchers. Suspected agents have been isolated from aborted fetuses and from the tick, but none has proved to fulfill Koch's postulates for recreating the disease when put back into pregnant cows. Recently, thymus from an aborted fetus has apparently transmitted EBA to a pregnant cow under experimental conditions.

Requirements Needed for EBA to Occur

1. Cattle must be 6 months or less in pregnancy. Experimentally, cattle that were as early as 35 days pregnant when exposed have aborted.
2. Pajahuello ticks must be present and hungry in the range the cattle are using. Ticks don't refeed for about 2 months after exposure to cattle.
3. No previous exposure to the disease means animals have no immunity to it. Immunity can apparently be lost if exposure to the disease has not occurred for 1 to 2 years. Apparently, immunity can only be obtained when an animal is sexually mature (10 months or older).

Adult pajahuello soft-bodied tick.

4. Ambient temperatures must be warm and dry enough to activate the tick's metabolism or incubate the unknown agent within the tick's body (possibly above 70°F), while still staying above freezing at night. In coastal and central California, this weather pattern usually occurs from May through October. In the mountains and high desert regions, the warm months typically are June through October. Unusually warm, dry winters can cause EBA to occur in normally "safe" periods.

After Tick Exposure

If all of the four factors exist at the same time, EBA abortions can be expected to occur 3 to 4 months later. To determine where disease exposure (tick exposure) happened, the cattle producer must be able to identify where cattle were grazing 3 to 4 months before the onset of abortions.

Lifecycle and Habitat

The existence of pajahuello ticks in a pasture can be verified by collecting them. The tick resides in the soil and

organic matter found in deer and cattle bedding areas; this tick does not "quest" nor climb up on brush like most of its hard-bodied cousins. Few people have seen this tick in the field. Its bite on the human is very painful and subsequent bites cause skin necrosis and very swollen areas.

Don't bother looking in irrigated pastures or areas that are subject to flooding. The pajahuello doesn't survive well when submerged or damp. Look above the high water mark when in gulches and arroyos. They have been found in desert dry wash creek beds.

The pajahuello tick detects and locates its host by being extremely sensitive to increased concentrations of gaseous CO_2 in its environment; CO_2 is exhaled in animals' breath. Tick collection is accomplished by placing pieces of dry ice (frozen CO_2) on the ground or in buried pans (traps) underneath trees or brush where there is evidence of deer or cattle bedding.

If ticks are present and if they haven't taken a blood meal in the last month or two, they will crawl out of the ground, locate the source of CO_2, and be picked up as they are seen moving toward the dry ice, or fall in the trap on their way to the bait. If a pasture does not yield ticks to CO_2/dry ice trapping, you may need to repeat it several times. A pasture with any number of ticks is positive, but a pasture without ticks being trapped needs several different trapping attempts before considering it negative.

Unlike hard-bodied ticks that attach to their host for 7 to 10 days, the pajahuello only requires about 20 minutes of attachment in order to completely engorge itself with blood. Once full, the tick drops off the animal and quickly buries itself back in the soil. The exception to this behavior is the larval stage tick that hatches from the egg. These very tiny creatures stay attached for a week or more while they slowly engorge and grow to several times their original size. After the larva leaves the animal, it molts and become a nymph. Thereafter, each time a nymph feeds, it molts and becomes a larger nymph. This process continues through five to seven nymph stages (instars) before the tick becomes an adult.

Adult females are unmistakably larger than adult males. Females will lay about 300 eggs after each blood meal. The life span of the pajahuello is unknown, but experimentally, large females have lived in plastic dishes for 4 years without having a blood meal.

Treatment

No vaccine is available. Until the causative agent is identified, it will be difficult to develop a vaccine to protect animals from EBA abortion. A number of research projects are underway both at University of California-Davis and in collaboration with University of Nevada. Newer molecular biology and biotechnology tools are being applied to this problem.

Many producers have been able to avoid the disease simply by incorporating knowledge of the previously listed four EBA prerequisites into their breeding and range management programs.

Critical Points to Remember

- Exposing sexually mature heifers to known pajahuello pastures during warm weather has often established immunity in many of these animals. Females may lose their protection if removed from tick exposure areas.
- Shifting breeding seasons has avoided the overlapping of susceptible gestation period with warm weather tick exposure.
- Changing pasture rotation schedules has used tick pastures before breeding or after cattle are 6 months pregnant.
- Don't bring pregnant cattle into a known tick area without taking into account the EBA risk and how to avoid it.

Consult a Veterinarian

If EBA is suspected of being the cause of abortion in a herd, a veterinarian should be consulted quickly. The veterinarian will establish a herd history and ask that any fetuses that are found be delivered refrigerated (not frozen) as soon as possible. Small pieces of fresh fetal tissues placed in formalin can be used by a veterinary pathology lab to look for microscopic lesions that are particular to this disease.

Diagnosis of EBA/Foothill Abortion

With a suspicious history, EBA can be grossly diagnosed in about one-third of the fetuses.

The fetus will usually be at least 6 months old (small cat sized), and may have any combination of the following external and internal characteristics, including:

- Enlarged lymph nodes, especially the prescapular nodes that are in front of the shoulder blade at the base of neck on the side.
- A fluid-filled abdomen.
- Pinpoint hemorrhages around the eyes or under the tongue.
- Enlarged liver with a rough discolored surface
- (and/or) pinpoint hemorrhages on the thymus.

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Fourth edition; December 2016 Reprint