



FOOTHILL ABORTION: The basics...

The History:

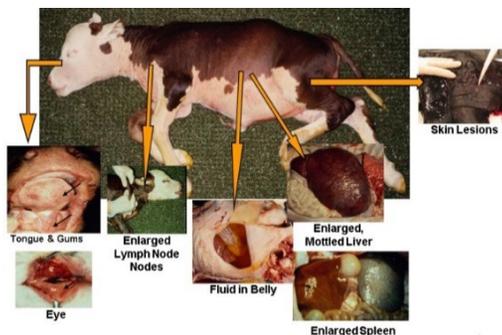
Foothill abortion, also known as Epizootic Bovine Abortion (EBA), is believed to have been recognized in California as early as the 1930's. Foothill appeared to only affect pregnant cattle that were pastured for the first time on the dry, foothill areas of California (both coastal and Sierra Nevada ranges) but has since been documented in Northern and Central Nevada and Southern Oregon.

Fifty years of research has facilitated our understanding of this devastating disease including a better understanding of the disease process, the disease vector (Pajaroello tick), the bacteria responsible (*Pajaroellobacter abortibovis*) and the environmental factors that increase risk of infection. Collectively, this knowledge has assisted producers in developing varied livestock management approaches to reducing Foothill in their herds; success can be variable.

Diagnosing Foothill Abortion

Most producers are no strangers to the variety of things that can cause abortions or lost calves; but how can you be sure it is Foothill that you are dealing with? Until recently, the only way to unequivocally diagnose Foothill was by pathological examination. Since the discovery of the bacteria however, it is now possible to detect the bacteria in infected tissues and/or to obtain a serologic diagnosis by laboratory examination of fetal fluids.

Examination of the aborted fetus can **often** be used to tentatively diagnose classical Foothill. A classical infected fetus/calf will have small mucosal hemorrhages (red or purple pinpoint "spots") around the eyelids, gums and tongue; these may be difficult to see on a dark pigmented calf or one that has been dead for more than a day. Foothill fetuses also typically have enlarged lymph nodes. Some can easily be felt under the skin; the most prominent of these is the prescapular lymph node. To find it, run your hand down the fetal' neck toward the point of shoulder. In front of the point of the shoulder you will feel the enlarged node (firm and may seem to shift under the skin as you apply pressure; see photo composite). The abdomen can (but not always) be distended due to accumulation of fluid; this excess fluid is easily visible upon opening the abdominal cavity. Internal gross lesions often include a swollen and mottled liver, enlarged spleen and hemorrhagic thymus (sweetbreads). The thoracic portion of the thymus (sits above the heart) is the best to observe for pin-point hemorrhagic spots as the cervical thymus (extends up the neck) is often subject to hemorrhage as a result of parturition.



The Tick

The primary, if not only vector of Foothill abortion, is the Pajaroello tick (pa-ha-WAY-lo). The tick was first described in Mexico and is now known to be present throughout California and parts of Nevada and Oregon.

The Pajaroello tick prefers deer and cattle beds in dry, hilly or mountainous areas and it is therefore surmised that deer are an important and historic food source. The tick lives in the soil under a variety of tree types which include juniper, piñon pine, Ponderosa/Jeffries pine, mahogany and oak. These ticks are **not** found in damp areas (meadowlands, irrigated pastures or along banks of streams or creeks below high water mark), but might be found under a tree adjacent to such areas. Recently, ticks have also been trapped under large sage and in sand dune areas. Ticks can be found at a variety of elevations; as low as a few hundred feet in California foothill areas and as high as 8,000-9,000 feet. They are most active during the warm summer months.

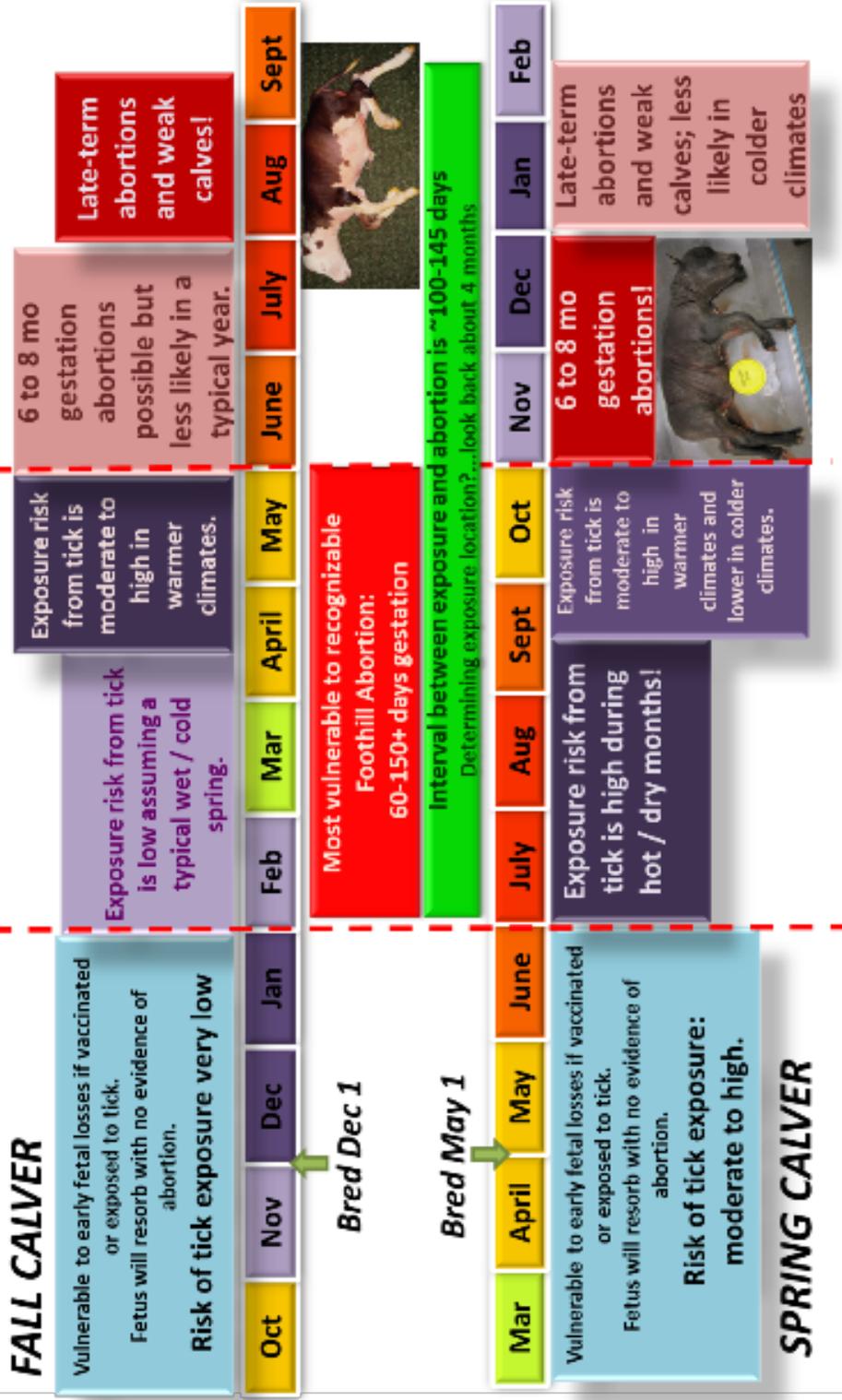
Differing from the more commonly recognized ticks, the Pajaroello tick **does not** embed in the skin to feed. Rather, it penetrates the skin using an auger-like oral probe and feeds for only 10-20 minutes. The tick then drops off the host back into the soil and thus will rarely be observed, if ever.

Tick distribution can be spotty within a localized area of similar vegetation. Hundreds of ticks may be collected under a single tree with a nearby tree producing nothing. Ticks are more prevalent than indicated by trapping because fed ticks (those feeding within the last 2 to 3 months) will not come to the CO₂ (dry ice) bait. The percentage of ticks infected with the bacteria appears to range from <5 to 40% but those with sufficient bacteria in their salivary gland to biologically transmit Foothill is believed to be much lower (possibly <1%).



ASSESSING YOUR RISK

Geographic location of the grazing range will influence both the risk for Foothill, as well as the age of the fetus at the time of abortion. Timing of abortion (i.e. fetal age) is dependent upon the time of breeding (seasonality) and the activity of the tick vector during gestation. Weather patterns (particularly wet or dry years, early spring, etc.) can impact tick activity, and therefore influence infection risk for any given year. A more elusive variable is whether ticks are hungry. After a long winter in hibernation, or after cattle have been kept off range following fires, ticks may be ravenous. Alternatively, they may have recently fed on deer or other cattle and not be feeding. The timelines below offer a general picture of exposure and possible outcomes that can be experienced by fall versus spring breeding.



Which animals are affected?

Foothill abortion has only been recognized in the bovine species and the causative bacterial pathogen only impacts the developing fetus. Mature animals do not show any signs of clinical disease. Any **pregnant** heifer/cow that has never been bitten by an infected Pajaroello tick is at risk. Only a small percentage of ticks are infected with the bacteria, so in areas with low tick exposure, cattle may remain susceptible for several years. Replacement heifers, or replacement cows brought from non-endemic areas, are at the greatest risk for fetal infection in areas endemic for the disease. Cows that have been pastured in non-tick infested areas for several years and then re-exposed to tick-infested pastures may also be susceptible. Once naturally infected, immunity will last for 1-3 years.

Cows exposed to the bacteria (i.e. the tick) in the 1st or early second trimester are the most likely to lose the fetus (resorption, abortion or weak calf). Historically, it was thought that exposure up to the first 60 days of pregnancy was not problematic, but experiments conducted in recent years demonstrates that any exposure of the dam, from **~45 days prior to breeding through 5 to 6 months gestation**, can put the fetus at risk. Abortion is typically noted when fetuses are infected between ~60 to 145 days of gestation. The incubation period for the infection is >100 days, therefore, cows exposed at 6 to 7 months gestation should produce a healthy calf.

Vaccines?

A live vaccine was released onto the commercial market in Sept, 2020. It was developed by researchers at UCD SVM and University of Nevada, Reno, under the direction of Dr. Jeffrey Stott. The vaccine consists of live bacteria in living cryopreserved mouse cells and must be kept under liquid nitrogen conditions until use. Trials conducted in over 60,000 head of cattle demonstrated that the vaccine is both safe and 95+% effective. The vaccine is now being produced and marketed by Hygieia Biological Laboratories of Woodland, CA. Due to the unknown risk to the human fetus and challenges in handling the vaccine properly, it is only available through your veterinarian.

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