

UCD VET VIEWS
CALIFORNIA CATTLEMAN, JANUARY 2001

OAK TOXICITY

Recently, I have had a number of questions regarding the toxicity of oak trees (leaves and buds) or acorns for cattle. Most of our cattle in California spend at least part of the year in areas where oak trees abound. Health problems due to ingestion of oak leaves or acorns are certainly not an everyday problem; however, when problems do occur they can be catastrophic. Several years ago, in a few northern California counties, about 2,700 cattle died due to oak toxicity.

Do all oak trees contain the toxins?

There are more than 50 common species of oak trees in California and all contain some level of the chemicals that can cause problems in cattle. **The buds, young leaves and fresh acorns have the highest level of toxins.** There is considerable variation in the concentration of toxins in the plant tissues and is dependent on (1) the species of oak trees, (2) the season of the year, (3) the year in question, depending on climatic conditions. The chemical toxins in question are tannins and phenols, which are naturally contained in the plant material, but vary in concentration based on the variables listed above.

How do the toxins affect cattle?

The oak toxins (tannins and phenols) attack the proteins they contact. Thus, the gastrointestinal tract (mouth, esophagus, rumen, and intestines) is damaged by direct contact. This results in ulcers, bleeding, and perforation in some cases. So if the cattle survive long enough, bloody diarrhea or dark diarrhea is seen. Also, in the rumen, some of the tannins are converted to other chemicals (gallic acid and pyrogallols) that are absorbed into the blood stream, travel to the kidneys where they cause severe damage to the kidneys. This damage to the kidneys results in renal failure, which can cause death in many cases. The younger cattle (less than 400 pounds) are usually more severely affected than older cattle.

What do the affected cattle look like?

Symptoms usually appear shortly after cattle eat 50% or more of their diet as oak (leaves, buds, acorns). Some animals may simply be found dead. Others may appear weak and listless, without an appetite. A day or two after eating the oak leaves or buds, bloody or dark diarrhea may be noticed. As kidney failure progresses, fluid may accumulate around the anus or vulva. Throughout, the cattle appear weak, listless, and have no appetite.

What are the most important risk factors that can lead to oak toxicity?

The presence of large numbers of acorns when forage is scarce is one of the main risks. Wind, hail, or snowstorms can cause large number of acorns or limbs from oak trees to drop so that cattle can gain easy access. California outbreaks have been worse in the late winter and early spring when oak buds and small leaves are present in large numbers and a wet snowstorm occurs. The wet snow breaks branches and limbs and the snow also covers the available grass and leaves the cattle very hungry. This leads to consumption of these very toxic buds and leaves because it is the only feed available.

What is the acorn calf syndrome?

The *acorn calf syndrome* is completely different from the typical oak toxicity problems seen in cattle. *Acorn calves* are congenitally malformed calves born to cows that have ingested large numbers of acorns under very poor forage conditions during the second trimester of pregnancy (3-7 months of pregnancy). The cause appears to be a combination of poor nutrition and exposure to acorns. The calves have very short legs, abnormal hooves, and misshapen heads (either short noses or long narrow heads). These calves look like dwarves in most instances. Occasionally, more than 10% of the calves in a herd will be acorn calves.

How can these problems be prevented?

Oak toxicity can be prevented by supplementing the cattle with hay when forage conditions are poor and acorns are abundant. Likewise, when late snowstorms cover the forage and knock down oak limbs with large amounts of buds and young leaves, be sure to start hay supplementation immediately. A delay of only a day or two could result in many deaths. Prevention of acorn calves is also a matter of being sure adequate forage is available or supplementing with hay or other forage when running the cattle in oak areas.

John Maas, DVM, MS
Diplomate, ACVN & ACVIM
Extension Veterinarian
School of Veterinary Medicine
University of California, Davis

[Home](#) | [Beef Cattle Programs](#) | [FAQ/Beef](#) | [INFO/Beef](#) | [Top](#)

Your support of the School of Veterinary Medicine makes a difference



[Contact us](#) | [Animal Health Inquiries](#) | [Check us out on Facebook, Twitter, & YouTube](#) | [Online Donation Form](#) | [Site Map](#)

UC Davis School of Veterinary Medicine • One Shields Avenue • Davis, CA 95616

Copyright © The Regents of the University of California, Davis campus. All Rights Reserved.