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KILLER OAK TREES

The drought of 2007 has been devastating in many ways, some of them obvious like the shortage of feed and water; while others have been more subtle such as the increase in outbreaks of anaplasmosis or foothill abortion. One of things that happened up and down the state was the oak trees responded to the extremely dry conditions by producing prodigious amounts of acorns. This is a natural response of the oak trees to the stress of drought. There are more acorns on the ground and getting ready to fall than we have had for many years. The problem with acorns is that they can be toxic to cattle. Most of our California beef cattle spend at least part of the year in areas where oak trees abound. Disease problems due to ingestion of acorns or oak leaves are 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 toxic materials?

There are more than 50 common species of oak trees in California and all contain some levels 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, and (3) the climate of the year in question. 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 the 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 with the toxins. This results in ulcers, bleeding, and perforation in some cases. So if the cattle live 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. This kidney damage results in renal failure, which can cause more deaths. 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. A day or two after eating 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 course of clinical disease, 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 numbers of acorns or limbs with leaves and buds to

drop so that cattle can gain easy access to these potentially toxic materials. 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 which fall to the ground. The snow also covers the available grass and this leaves the cattle very hungry. This leads to consumption of these very toxic buds and young leaves because it is the only feed available. Likewise, this year with the large acorn crop and dry conditions with very little grass, the consumption of acorns has been very high in some herds.

What is the acorn calf syndrome?

The *acorn calf syndrome* is completely different from the problems seen due to oak toxicity from ingestion of acorns, leaves, and/or buds. *Acorn calves* are congenitally malformed calves. The syndrome is associated with poor feed conditions during the second trimester of pregnancy (3rd -7th month of pregnancy). The exact cause is not known but seems to occur more often following falls with large numbers of acorns. These calves have very short legs, abnormal hooves, and misshapen heads (either short noses or long narrow heads). The *acorn calves* look like dwarfs in most instances. Occasionally, more than 10% of the calves in a herd can be acorn calves.

How do you treat cattle with oak toxicity?

Successful treatment of affected animals usually requires fluid therapy, antibiotics, and supportive care. Your veterinarian should be consulted and a treatment protocol set up to increase the odds of success and to provide the most relief for the cattle. The antibiotics help prevent secondary pneumonia and abscessation of the bowel. Fluid therapy will be necessary for many cattle to survive and must be planned with your veterinarian. Ready access to water and good quality grass hay will be very important parts of providing adequate nursing care.

How can oak toxicity be prevented?

Oak toxicity can be prevented by supplementing the cattle with hay or other supplemental feed when forage conditions are poor and acorns are abundant. Likewise, when late snowstorms cover the grass and knock down oak limbs with large amounts of buds and young leaves, be sure to start hay supplementation immediately. DO NOT wait until cattle get sick or die. A delay of only a day or two can easily result in many more deaths and ill cattle. If cattle are in conditions where toxicity is a longer term possibility the use of calcium hydroxide in a supplement can prevent sickness. The addition of 10% calcium hydroxide (hydrated lime) to a supplement will still be palatable to cattle. Then if the cattle will consume about two (2) pounds of this supplement per day it will prevent many cases of oak toxicity. This supplemental calcium hydroxide has to be consumed before exposure to be effective.

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