

TOXIC PLANTS TO LIVESTOCK

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Livestock deaths and poor performance due to toxic exposures are a common presentation to large animal veterinarians. A recent estimate puts annual cattle and sheep losses in the western states at 1% and 3.5% respectively. This represents a \$250 million loss to agriculture. In some instances, toxins ingested by food animals present a significant food safety issue to humans due to residues in milk, meat and eggs.

Plant toxins are the result of a plant's defense strategy to avoid being consumed by insects and other plant eaters. Still, large numbers of toxins exist for which a purpose has yet to be discovered. Plant toxins are of diverse chemical nature including alkaloids, glycosides, acids, phenolics, alcohols, proteins and terpenes.

Plant poisonings are often multi factorial which makes their diagnosis that much more difficult. Production class, animal species, animal age, exposure duration, plant maturity and palatability are some of the factors to consider. As with any toxin, total amount ingested and species sensitivity will ultimately determine the outcome of an exposure event. Establishing a diagnosis is made more difficult however, because many signs of toxicity can be vague and may not develop until weeks to months after initial exposure. An example of the difficulty in making a determination can be found in a retrospective review of submissions to the California Animal Health and Food Safety Lab at UC Davis from 2000 to 2011, in which Varga and Puschner indicated only 13.5% of 1,199 submissions successfully identified a toxin's presence.

Tools and advice to keep close at hand and in mind when suspecting a toxic event include your cell phone and plenty of gallon sized plastic bags. A cell phone with contacts for the local county agriculture agent as well as your state's diagnostic laboratory can be very helpful. Contact with a veterinary toxicologist early in the course of an investigation can aid in proper sample collection, personnel safety and assessment of residues in animal- derived food products. Similarly, the phone's camera can be very important to others involved in determining plant species. Submitting whole plants (roots, stems, leaves and seed) as well as ingesta are critical towards a successful diagnosis. The internet can be used to access online publications with pictures and text describing many toxic plants. Collecting and submitting multiple samples is very important as often times an offending plant may not be evenly distributed within forage. Gallon sized plastic bags are inexpensive and perfect for storage of samples refrigerated (not frozen) until they reach the diagnostic lab.

Most plant poisonings have no specific treatments and thus are best prevented by avoiding exposure to the toxic plants in the first place. Hay and feed should be carefully inspected for contamination with potentially toxic weeds before the first feeding and owners should establish excellent working relationships with suppliers and growers. Producers and farm managers, along

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with veterinarians and diagnosticians play important roles, and all contribute information that may be important to a poisoning case. Once all the information is available, all evidence is collected and proper sampling of specimens has occurred, a summary of findings can be provided and will be instrumental in preventing reoccurrences.