IANR NebGuide
University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources
Know how. Know now.

G1948

Minimizing Livestock Plant Poisoning On Western Nebraska Rangelands

Scott E. Cotton, Extension Educator

Annually, Nebraska producers lose livestock to plant poisonings. Understanding which plants are toxic and strategically managing grazing can help minimize losses.

A review of scientific research, including 37 grazing studies, indicates that between 2 and 5 percent of livestock losses in the United States each year are attributed to plant poisonings. According to the data, Nebraska experiences similar losses.

Poisonous plants, whether a native or introduced species, are a component of most Nebraska plant communities. Poisonings vary according to management approaches, climatic conditions, and location, but livestock producers should be aware of significant impacts and correlations that exist.

Although the most profound impact of plant poisoning is livestock death, research shows that other impacts can have a more widespread economic effect on livestock operations. These impacts include reduced fertility, reduced conception rates, weight loss, and reduced milk production. In addition, "ghost poisonings" lead to undocumented abortions. The Colorado State University Diagnostic Laboratory reported in 2005 that over 72 percent of infertility and abortion evaluated there were directly related to plant poisonings, most by the locoweed (*Oxytropis* spp.) and crazyweed (*Astragalus* spp.) plants.

In western Nebraska, a number of poisonous plants are found on native rangelands, including larkspur, milkvetch, licorice, crazyweed, lupine, deathcamas, nightshade, and hemlock. Considering that livestock in this region are constantly exposed to these plants, why aren't poisonings consistent?

Factors Affecting Toxicity to Livestock

Livestock have a number of physiological reactions to toxic and poisonous plants that may help condition them to avoid such poisoning. In other cases, animals die because toxicity is acute (requires extremely small amounts of plant matter) or the animal ingests the plant as a large percentage of its diet in a brief period.

Plant toxicity can vary depending on the animal species, animal condition, growth form of the plant, plant subspecies, plant age, whether the toxin accumulates as a residue, inherent toxin potency, what percentage of the animal's diet was made up of the plant, and whether other toxins were also consumed.

Other factors that play into whether livestock are poisoned include novelty, forage availability, water availability, grazing intensity, and introduced feeds. When understood, these factors will allow managers to implement Best Management Practices to minimize poisonings in most situations.

Location and Plant Novelty

Livestock adjust to specific regions and plant communities, often developing grazing preferences that minimize plant poisonings under "normal" conditions.

When livestock are abruptly moved to a grazing area with plant communities significantly different than what they are accustomed to, there is the potential that they may consume a higher level of toxic plants due to unfamiliarity and the lack of time for their "negative feedback" functions to work.

Poisonings following moves to new locations can be worsened if there are plants with acute toxin levels, the livestock are hungry when moved, or forage is limited at the new site. In one instance in southwestern Wyoming in 1987, a flock of 10,000 sheep was unexpectedly moved to a new grazing allotment on federal rangelands. Within two weeks the death loss was over 3,000 head. Investigations of the site documented a heavy percentage of *Halogeton* which had not been an issue when a prior grazer had pastured cattle.

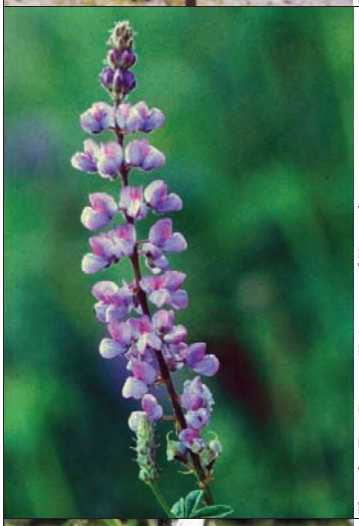
Forage Shortages

Livestock usually develop and maintain forage preferences that make them productive, healthy, and safe. However, when the desirable, healthy forages are not available in the amounts they want, livestock start to consume higher percentages of less desirable forages and begin to experiment with eating plants they find undesirable. For these reasons the likelihood of poisoning can increase when grazing occurs prior to significant growth of desirable plants, on overutilized segments of pasture or overgrazed plant communities, and during periods of drought. It's common to see documented incidents of poisoning increase during early spring and during drought.

Table I. Common poisonous plants in western Nebraska. (This list does not include all poisonous plants in western Nebraska.)

Poisonous Plant		*Symptoms*	*Mode of Action*	*Location Found*
 Photo copyright Al Schneider *www.swcoloradowildflowers.com*	Woolly or Purple Locoweed (*Astragalus mollisimus*)	Weakness, convulsions, frequent urination, lack of coordination, abortions, labored breathing, coma	Swainsonine alkaloid and indolizidine alkaloids tie up cellular hemoglobin, starving the animal for oxygen	Nebraska Panhandle and western Sandhills
 Photo by W.L. Wagner, courtesy of Smithsonian Institution	White Locoweed (*Oxytropis sericea*)	See Woolly or Purple Locoweed	See Woolly or Purple Locoweed	Western edge of Nebraska
 Photo by Clarence A. Rechenthin at USDA-NRCS PLANTS Database	Broom Snakeweed (*Gutierrezia sarothrae*)	Anorexia, rough hair, weight loss and abortions in cattle	Strong detergent foaming action in rumen disrupts digestive process and diet	Various western Nebraska range sites
 Photo by Clarence A. Rechenthin at USDA-NRCS PLANTS Database	Riddell's Groundsel (*Senecio riddellii*)	Lethargy, listlessness, abdomen fills with fluid, wobbling, dragging hind feet, some death	Pyrrolidizine alkaloid destroys liver, toxins buildup in body	Southern and central Nebraska Panhandle
 Photo by Clarence A. Rechenthin at USDA-NRCS PLANTS Database	Common Cocklebur (*Xanthium strumarium*)	Liver damage; lethal if 0.75 of body weight is consumed	Various toxins damage liver	Drainages and disturbed areas
 Photo by Jack Dykinga	Geyer's Larkspur (*Delphinium geyeri*)	Uneasiness, bloating, face downhill, death	Polycyclic diterpene alkaloids block neuromuscular signals	Shortgrass prairie, brush, sagebrush southwest Panhandle

Table I. Continued

Poisonous Plant		*Symptoms*	*Mode of Action*	*Location Found*
 Photo by Susan McDougall at USDA-NRCS PLANTS Database	Ponderosa Pine (*Pinus ponderosa*)	Abortions of fetus 14-16 days after consumption	Labdane resin acids (ICA) decrease placental blood and oxygen flow	Western Nebraska and windbreaks
 Photo by Tom Barnes, University of Kentucky	Silver Lupine (*Lupinus argentus*)	Respiratory difficulty and paralysis in sheep	Quinolizidine alkaloid inhibits cellular respiration	Western Nebraska and Sandhills
 Photo by Susan McDougall at USDA-NRCS PLANTS Database	Silky Lupine (*Lupinus sericeus*)	Crooked calf syndrome in cattle when consumed 40-70 days during pregnancy	Anagyrene alkaloid in seed pods deforms fetus	Western Nebraska rangelands
 Photo by Larry Allain at USDA-NRCS PLANTS Database	Lambert Crazyweed (*Oxytropis lambertii*)	Weakness, convulsions, frequent urination, labored breathing, and coma	Indolizidine alkaloids tie up cellular hemoglobin, starving the animal for oxygen and other factors	Dense clay areas like the White River and Toadstool regions of western Nebraska

Water Shortages

When livestock have limited access to water they will seek out succulent plants but will specifically search areas where water was present at one time, such as dried reservoirs and streambeds, and will tend to consume more plants near those areas. One of the plants often in these areas is poison suckleya, which is toxic and usually lethal when ingested in small amounts.

Economic Stress Periods

Drought results in less forage on rangeland and often pushes rangeland managers toward using the resources in a manner that reduces the plant selection available to livestock. During drought, the economic feasibility of a landowner conducting selective weed control (chemical or mechanical) of poisonous plants or other undesirable plants is often diminished.

If a manager does not adjust stocking rates to reflect the inhibited forage production during drought, forage shortages, water shortages, and grazing intensity can compound the risk of poisoning.

Intensive Grazing

Intensive grazing is often defined as grazing more livestock per acre for shorter than normal grazing. Research shows if stocking rates are comparable, neither rotational grazing nor season-long grazing changes the poisoning rates. However, the presence of acutely toxic plants such as some milkweeds, locoweeds, and larkspurs may significantly increase losses during intense grazing because very little consumption is required.

Introduced Feeds

During "normal" years, livestock producers usually buy feedstuffs to supplement forage demands of livestock. During years when factors such as drought, competition, forage shortages, or extended winter occur, producers may reach farther afield for supplemental forage. The risk of poisoning increases simply to due to the potential for introducing unknown or unexpected poisonous plants that have been harvested with the purchased feed.

A common scenario is to buy large bales of hay which have picked up showy or whorled milkweed. Whorled milkweed, which has an acute toxin that retains potency when dry, requires as little as 2 to 3 percent of diet composition to cause death. In one instance the plants were consumed in hay by horses which had no familiarity and no aversion to the milkweed plants in hay. After postmortem toxin screening identified the poison, the supplier admitted that the milkweed was common around his hay field but it was of no concern because he fed only cattle which were accustomed to and avoided the milkweed plants.

Toxic Habits (Shared — Herd Effect)

Livestock tend to follow experienced lead animals to the choicest forage locations. In the same manner, lead animals compensating for forage shortage, poor management techniques, or drought conditions can lead less experienced animals into higher levels of poisonous plant consumption.

Suggested Best Management Practices to Reduce Poisonings

Identify Poisonous Plants

- Learn and understand risks associated with the poisonous plants that normally occur on your grazing areas.
- Investigate and learn the risks associated with poisonous plants on new grazing areas, including leased and emergency grazing areas.
- Learn to recognize when new or different poisonous or toxic plants have increased on any grazing areas.

Learn Which Toxins Are Your Risks

- Understand how different poisonous plants affect your livestock specie(s), including the related symptoms *(Table I)*.
- Conduct investigations and analysis when you have deaths.
- Consider starting a plant specimen or photograph collection that could help you and others in your operation recognize risk plants.

Manage Your Livestock to Reduce Risk

- Avoid placing livestock in grazing areas where poisonous plants are a large part of the plant community.
- Time grazing to periods when there is much desirable forage and toxin levels of poisonous plants are reduced.
- Always carefully evaluate the plant communities in the pasture to be used next, and closely inspect feedstuffs from new sources. If in doubt, delay the move.
- Graze at stocking rates which propagate the desirable species and prevent overgrazing.
- Distribute livestock effectively so that overutilization of "easy" areas does not increase the poisoning risk.
- Adjust livestock numbers and grazing patterns to prevent forage and water shortages, and to adjust to drought or other climatic conditions.

This publication has been peer reviewed.

UNL Extension publications are available online at *http://extension.unl.edu/publications.*

Index: Animals, General Management

Issued July 2009