

# POISONOUS PLANTS ON ARIZONA RANGELANDS

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Poisonous plants can be grouped according to their primary type of poison. The better understood types of poisoning include:

1. alkaloids;
2. glycosides
3. organic acids;
4. resins;
5. phytotoxins; and
6. various minerals.

Additionally, poisonous plants are lumped into a miscellaneous category attributed to unknown poisons.

## ALKALOIDS

Alkaloids are complex compounds containing Nitrogen (N) that form salts with acids. In most cases poisonous alkaloids produce a strong physiological reaction in animals, primarily through the nervous system. These poisons may produce violent acute or chronic reactions. Alkaloids are found in a wide variety of plants, including **desert tobacco**. Nicotine is the poisonous principle in this plant and although it is unpalatable to livestock a lethal dose is about 2% of the animal's weight and poisonings do occur.

**Astragalus** or **locoweed** is another plant containing poisonous alkaloids which cause the typical loco poisoning. This is a complex genera; nearly 100 different species occur in Arizona.

Locos are toxic in all stages of growth, even when dry. Consumption of loco by cattle, depending on the species, can cause immediate death or chronic poisoning leading to general unthriftiness and eventual death.

**Senecio** or **threadleaf groundsel** also poisons animals with a number of alkaloids. Cattle and horses are sensitive to senecio poisoning while sheep and goats are not. Often, a vitamin A-fortified supplement will cut down consumption of the plant.

## GLYCOSIDES

Toxic glycosides yield a number of compounds. Hydrocyanic acid is the most common. Animals poisoned by HCN die of asphyxiation because HCN blocks the release of oxygen from red blood cells to tissue cells. Cattle are most susceptible and upon absorption of toxic amounts of HCN death follows in a few minutes to an hour or so.

Important hydrocyanic-acid producing plants in Arizona include **Johnson-grass**. Danger from HCN poisoning in Johnsongrass is greatest when plants have been exposed to drought or have been frosted. Periods of rapid plant growth can also cause problems.

## ORGANIC ACIDS

Oxalic acid is the most common poison in the organic acid group. This acid often produces colic, depression, coma and eventually death due to kidney failure. High calcium diets seems to prevent oxalic acid poisoning. **Grease-wood** and **Russian thistle** contain oxalic acid. Losses are greatest in sheep and problems occur mainly when the diet is almost exclusively made up of these plants.

Many of the oaks including **Gambel oak** contain a related organic acid—

tannic acid which is also poisonous, but probably creates the most economic losses through reducing general herd productivity.

### **RESINS**

Resins and resinoids affect both nerve and muscular tissues. The symptoms of resin poisoning are varied. The **milkweeds** are good examples of poisonous plants containing toxic resins.

**Whorled milkweed** contains toxic glycosides and resins which are partially retained in the plant after it is dry. This makes milkweed poisonous at all stages of growth, even after maturity, and when put up in hay. Whorled milkweed leaves are long and narrow and occur in whorls around the stem.

### **MINERALS**

A number of minerals cause poisoning in livestock through plant consumption. In Arizona, probably only nitrogen and selenium are of real concern.

### **NITRATES**

High nitrate levels in plants commonly poison livestock on both range and cropland. Losses most frequently occur during drought, after heavy application of N fertilizer and on soils high in N. Horses are less likely than ruminants to be poisoned by plants high in nitrate. Cattle are more frequently poisoned than other animals. Death is relatively rapid once enough plant material with high nitrate content is consumed.

Species that may accumulate toxic concentrations of nitrate are numerous and include **carelessweed** or **pigweed**, and **Russian thistle**. **Filaree**, which is

a valuable forage plant, occasionally develops high concentration of nitrates during the flush period of growth.

### **SELENIUM**

Plants growing on soils containing over 2 ppm of selenium may accumulate toxic levels of this element. Consumption of these plants by livestock can produce either acute or chronic poisoning.

Plants that accumulate selenium are of two type-species. Obligate species are those plants which require selenium for growth and therefore are indicators of selenium-bearing soils. Facultative selenium absorbers are plants that will accumulate selenium but are not limited to growing in soils containing selenium..

Some species of **locoweed** are obligate indicator plants meaning they require soils high in selenium. Secondary selenium absorbers include the **asters** and the **saltbushes**.

Again, consumption of plants containing toxic amounts of selenium produce either acute or chronic poisoning. The acute form is rare however.

Chronic selenium intoxication occurs in one or two forms, blind staggers or alkali disease. Blind staggers is caused by selenium consumption while grazing plants containing less than 200 ppm of selenium for one or two weeks. Alkali disease develops after consumption of usually cultivated plants containing 5 to 40 ppm of selenium for periods of up to a month or longer.

### **MISCELLANEOUS POISONOUS PRINCIPLES**

Numerous other toxic substances have been and are being discovered in plants. Tremetol, an alcohol found in

**burroweed** is an example of a miscellaneous poison. All parts of the burroweed plant is poisonous. These plants may also cause milk sickness in humans and calves from drinking the milk of cows grazing them.

### **GRASS TETANY**

Grass tetany or grass staggers is a nutritional disease resulting from low blood magnesium levels and can be an important cause of losses among grazing cattle and sheep. The most

common occurrence is during the first two weeks of spring green-up. Grass tetany generally affects the mature cow and is most common in the ten-week period after calving.

The immediate cause of grass tetany in animals on spring pasture is the rapid decrease in serum magnesium (MG), although the reasons for this decline are not clearly understood. Tetany can be prevented by providing additional magnesium like dolomitic limestone or magnesium oxide. Treatment of affected animals by injection of magnesium salts can prevent death loss.

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