

Arizona Exotic and Native Plants that are Toxic to Animals and Humans

by Anthony Knight¹ Photos by the author unless otherwise noted.

Introduction

A great diversity of native and exotic plants grow in Arizona, some of which if consumed in quantity by horses, livestock, dogs, and even humans can cause a variety of symptoms including vomiting, diarrhea, liver failure, abortion, fetal deformity, and death.

Plants contain a wide variety of chemical compounds many of which evolved to deter herbivores and insects from eating the plant. With few exceptions plant poisoning only occurs when large quantities of the plant are consumed. In other words it is the quantity of the plant consumed that causes poisoning! Frequently poisoning of livestock and horses occurs when pastures or rangelands are overgrazed, when toxic plants are incorporated in hay, or when animals are introduced to plants to which they are unaccustomed.

In this article only those plants, native or exotic to Arizona, and which pose the greatest risk to animals will be listed. Those that are unusual and have unique toxicity will be described in more detail.

The Arizona native plants that are most toxic to cattle and cause the greatest economic loss are larkspurs (*Delphinium* spp.) and locoweeds (*Astragalus* ssp. and *Oxytropis* spp.).

Larkspurs are most prevalent in pine and aspen forests. All larkspur species are toxic, especially the tall larkspur species *Delphinium barbeyi* and *D. glaucum*. Respiratory failure and death in cattle result from the action of neuromuscular-blocking diterpenoid alkaloids like methyllycaconitine that present in all parts of the plant and especially in pre-flowering.

Over 70 species of locoweeds grow in Arizona. Most belong to the genus *Astragalus*, with two species in the genus *Oxytropis*. *Astragalus* is the largest genus of flowering plants in Arizona but not all are poisonous. Those that are poisonous attribute their toxicity to an endophytic fungus growing within the plant that produces the toxic alkaloid swainsonine. Other species of *Astragalus* can accumulate toxic levels of the mineral selenium that is toxic to livestock and horses. Signs of locoism in cattle and horses range from abnormal behavior, abortions, and fetal deformities such as crooked legs in calves and foals born to those dams that graze locoweed during pregnancy.

In times of drought, plants that will cause poisoning in cattle and horses grazing them are Burroweed (*Isocoma tenuisecta*) and Rayless goldenrod (*Isocoma pluriflora*). Interestingly, the toxins (benzofuroketones) in these plants are similar to the tremetone in white snakeroot (*Ageratina altissima*) which

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Native Arizona Poisonous Plants

Common name	Botanical name	Toxin	Animals Affected	Signs of Poisoning
Larkspur	<i>Delphinium</i> ssp.	Alkaloids	Cattle	Muscle weakness, death
Locoweed	<i>Astragalus</i> ssp., <i>Oxytropis</i> spp.	Swainsonine	Horses, cattle	Neurologic signs, abortion, fetal deformity
Rayless goldenrod	<i>Isocoma pluriflora</i>	Tremetone	Horses, cattle	Cardiac degeneration, death
Water hemlock	<i>Cicuta douglasii</i>	Cicutoxin	All	Death
Menzies' fiddle	<i>Amsinckia menziesii</i>	Pyrrrolizidine alkaloids	Horses, cattle, animals	Liver failure, photosensitization
Ragwort	<i>Senecio</i> spp.	Pyrrrolizidine alkaloids	Horses, cattle	Liver failure, photosensitization
Sacred datura	<i>Datura wrightii</i>	Tropane alkaloids	All	Colic, death
Tree tobacco	<i>Nicotiana glauca</i> (naturalized species)	Tropane alkaloids	All	Neurologic signs, death
Milkweeds	<i>Asclepias</i> spp.	Cardiac glycosides	Horses, cattle	Cardiac arrest, death
Oaks	<i>Quercus</i> spp.	Gallotannins	Cattle	Kidney failure



From left: Figure 1. Barberry larkspur (*Delphinium barbeyi*). Figure 2. Spotted locoweed (*Astragalus lentiginosus*). Figure 3. Rayless goldenrod (*Isocoma pluriflora*). Below: Figure 4. Douglas' Water hemlock (*Cicuta douglasii*)

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causes livestock poisoning in the Midwestern United States. Abraham Lincoln's mother, Nancy Hanks Lincoln, died of "Milk Sickness" as a result of drinking milk from cows eating white snakeroot.

The most poisonous of all native Arizona plants is water hemlock (*Cicuta* spp.) that grows in riparian areas at higher altitudes. All parts of the plant are highly toxic and when eaten in small quantities can cause sudden death in all animals including humans who might mistake it for wild carrot (*Daucus carota*). The European or Spotted water hemlock (*Conium maculatum*) was famously used to poison Socrates in 399 BC in Ancient Greece. It is a noxious weed today in Arizona and is poisonous to all animals that eat it.

Two plants listed as Arizona noxious weeds, Yellow star thistle (*Centaurea solstitialis*) and Russian knapweed (*Rhaponticum repens*) are unique in that they are only poisonous to horses. Both plants are aggressively invasive with seeds which can pass through the digestive system and

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Poisonous Plants Listed in the Arizona Noxious Weed List: <https://agriculture.az.gov/pestspest-control/agriculture-pests/noxious-weeds>

Common name	Botanical name	Toxin	Animals Affected	Signs of Poisoning
African Rue	<i>Peganum harmala</i>	Alkaloids	Cattle, sheep, horses	Incoordination, death
Halogeton	<i>Halogeton glomeratus</i>	Oxalates	Cattle, sheep	Kidney failure
Russian knapweed	<i>Rhaponticum repens</i>	Sesquiterpene lactones	Horses	"Chewing disease"
Yellow star-thistle	<i>Centaurea solstitialis</i>	Sesquiterpene lactones	Horses	"Chewing disease"
Johnson grass	<i>Sorghum halepense</i>	Cyanide	Cattle	Death
Kochia weed	<i>Kochia scoparia</i>	Nitrates	Cattle	Death



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manure of horses to infect pastures and trails. The plants contain a group of sesquiterpene lactones that if ingested by horses over a period of weeks will induce irreversible damage to specific areas in the brain that control the horse's ability to chew its food. As there is no treatment, affected horses will starve to death and must be euthanized.

An invasive weed of the arid Western States is Halogeton (*Halogeton glomeratus*). It thrives in alkaline soils and contains high levels of oxalates. Cattle and sheep grazing this plant will develop severe kidney failure and die.

Toxic House and Garden Plants in Arizona

A great variety of house and garden plants are toxic and can poison a wide variety of animals including dogs, cats, horses, livestock, and children that chew or eat them. A familiar plant in Arizona landscapes and gardens that is highly poisonous to all animals including humans is Oleander (*Nerium oleander*). All parts of the Oleander plant contain cardiac glycosides that cause heart arrhythmias and death. Even smoke from burning green oleander leaves if inhaled can cause heart abnormalities.

A less well known Arizona garden plant is Carolina jessamine (*Gelsemium sempervirens*). This vine is however highly poisonous to all animals due to its content of toxic strychnine-like alkaloids gelsemine and gelsenicine. Honey bees may also be poisoned by the plant's nectar.

Another plant common in Arizona gardens is the desert rose (*Adenium* spp.). Native to many parts of Africa, *Adenium* species and their hybrids are well adapted to hot dry environments. Valued for their colorful flowers and heat tolerance, the entire plants are poisonous due to the presence of many cardiotoxic glycosides which act in a similar manner to digitalis. Small quantities of *Adenium* glycosides may help stimulate the heart, but higher doses cause cardiac arrest and death.

Zamia integrifolia (*Z. floridana*) also known as cardboard palm or coontie palm is a perennial that is well adapted to southern Arizona gardens. *Zamia* species are members of the primitive Cycad Family (Cycadaceae) and are native to Florida and several Caribbean islands. Similar genera are



From top: Figure 5. Yellow Star thistle (*Centaurea solstitialis*). Figure 6. Russian knapweed (*Rhaponticum repens*), courtesy Wikipedia Commons. Figure 7. Halogeton in Flower (*Halogeton glomeratus*) and closeup (inset) showing succulent leaves with terminal hair.

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From left: Figure 8. Carolina jessamine (*Gelsemium sempervirens*), courtesy Wikipedia Commons. Figure 9. Desert rose (*Adenium obesum*).

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Ceratozamia, *Cycas*, *Dioon*, and *Macrozamia*. The male pollen cones are narrowly cylindrical, while the female seed cones are ovoid, containing orange to red colored fleshy seeds. When ripe the cones split spilling the seeds onto the ground where they are attractive to dogs. The seeds contain various poisonous glycosides that are neurotoxic and cause liver failure leading to death.

Chinaberry tree, Persian lilac, White cedar, Texas umbrella tree, and Pride-of-India are a few of the common names given to *Melia azedarach*. Native to Pakistan, India, Southeast Asia and Australia. Chinaberry trees have been widely planted across the southern States as fast growing heat tolerant trees with lavender colored, fragrant star-shaped flowers. Clusters of yellow/brown berries tend to hang on the tree after the leaves have fallen. All parts of the tree are poisonous but especially the berries. Chinaberry poisoning has been reported in horses, cattle, sheep, goats, pigs, and dogs that eat

the fallen ripe berries. The *Melia* toxins A & B (tetranortriterpenes) cause a variety of symptoms including diarrhea, vomiting, salivation, depression, seizures, and death.

Conclusion

A relatively small but not insignificant number of both native and introduced cultivated Arizona plants contain chemicals that can be toxic to many different animals and humans. A knowledge of the dangers of these species should be widely publicized.

Additional Information Sources on Poisonous Plants

https://csuvth.colostate.edu/poisonous_plants and <https://www.ars.usda.gov/is/np/PoisonousPlants/PoisonousPlants.pdf>.



Figures 10 and 11. Coontie Palm (*Zamia integrifolia*) plant (left) and ripe seed cone (center). Figure 12. Chinaberry (*Melia azedarach*), courtesy Wikipedia Commons.