

**PASTURE AND RANGE PLANTS  
THAT ENDANGER LIVESTOCK  
IN SOUTHWESTERN IDAHO**



**University of Idaho**  
Extension



# **Pasture and Range Plants That Endanger Livestock in Southwestern Idaho**

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# Foreword

Keeping your livestock safe is your responsibility. It is important that as a livestock owner you have a poisonous plant reference guide available that can help you identify harmful plants on your property. This publication is only a rudimentary guide to some common toxic plants found in southwestern Idaho that appear in pastures and on rangelands. To develop a more complete listing of poisonous plants and their effects on livestock health, supplement this publication with other references.

Plant descriptions in this publication are brief and list only a few unusual or common characteristics to help with identification. Compare a suspect plant with the pictures shown and check the glossary when you don't understand a botanical term. Further assistance with plant identification can be obtained at your local University of Idaho Extension office. Also, a list of websites and other resources can be found at the back of this booklet.

Although care has been taken to be as accurate as possible, the authors cannot be held legally responsible or accept liability for any errors, omissions, or claims arising from a livestock owner's mistaken identification of a plant or livestock symptom. Consult with your veterinarian if you are concerned about livestock symptoms.

The authors would like to extend their thanks to Roger Rosentreter, Bureau of Land Management (BLM) botanist (retired), for his technical knowledge and input. Photo credits can be found at the back of this booklet.

# Introduction

## MANAGEMENT TO PREVENT POISONING

Making your acreage safe and sustainable for livestock is a process of continued pasture or range improvement. Part of this practice involves controlling unwanted plant species, whose ingestion can poison horses and other livestock. Indeed, plant poisonings are on the rise, coinciding with the migration of people to small acreages and native rangelands. Thus it is crucial to learn about the native flora that inhabits your property, especially if you've just acquired it.

Prevention is the key to avoiding accidental poisoning. Because poisonings can occur from plants growing along fence lines, canals, and watering spots, inspect ranges, pastures, corrals, and fence lines frequently for harmful flora. Closely monitor what your livestock are eating or have access to over a fence. Make sure livestock are watered regularly, since thirsty animals will often eat plants they would otherwise avoid.

Overgrazed pastures give weeds and undesirable plants the opportunity to flourish. Early spring is an especially high-risk time for livestock poisonings because many toxic plants sprout or green up before grasses and edible forbs do. Animals, after a long winter of eating dry feed, are hungry for something green and succulent. Other high-risk times are late fall and during dry spells. Fortunately, many toxic plants are not very palatable. However, animals are more likely to eat undesirable plants if they are thirsty or forced to due to scarce feed or an overgrazed pasture.

There are many ways to avoid overgrazing a pasture or range. In large rangeland settings where removal of all undesirable plant species is not feasible, avoid overgrazing by rotating pastures. Other suggested management practices include supplementing livestock diets with other forage after the animals have eaten down the grass and healthy forbs; fencing off areas with large populations of harmful plants; or removing animals from an infested range when the harmful plants' toxicity levels are the most lethal.

Drying poisonous plants may not eliminate toxins, since harmful plants or plant parts can show up in contaminated hay and grains. Groundsel, horsetail, houndstongue, pigweed, poison hemlock, and yellow starthistle are dangerous plants to watch for in hay. Inspect the hay you purchase and reject hay that has a large percentage of unknown broadleaf weeds. A few nonpoisonous weeds in hay like dandelion or plantain, however, should not cause alarm. But moldy feed can cause



colic or founder in horses, or even cause death. Always purchase the best quality hay and feeds available and store them in a dry, well-ventilated place.

Another potential source of plant poisoning comes from high nitrate levels in plant tissues. Normally, plants metabolize nitrates into amino acids that are used in building plant cells. However, under water or heat stress, or during cloudy weather, plants can increase their accumulation of nitrates without metabolizing them. The higher nitrate levels are a beneficial adaptation for some plants since they protect stressed plants from summer-feeding insects.

Common weeds that are known to accumulate nitrates in sufficient enough quantity to kill livestock are Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), kochia (*Bassia scoparia*), redroot pigweed (*Amaranthus retroflexus*), yellow sweet clover (*Melilotus officinalis*), sunflower (*Helianthus annuus*), and the nightshades (*Solanum* sp.). Other plants not addressed in this publication associated with nitrate toxicity include lambsquarter (*Chenopodium album*), Russian thistle (*Kali tragus*), and wild oats (*Avena fatua*). Even field crops can accumulate nitrates to unhealthy levels if nitrogen fertilizer is applied to water- or heat-stressed crops like alfalfa, corn, oats, rye, Sudan grass, sorghum, or wheat. Field crops that can accumulate nitrates, when grown under conditions that favor accumulation, should be checked for high nitrate concentrations prior to feeding.

The poisoning potential of nitrates depends on the amount in a plant and the rate at which livestock consume them. Animals can develop an increased tolerance for higher nitrate levels in their feed if rumen microflora are given sufficient time to adapt. The presence of carbohydrates (high-energy feeds such as corn or molasses) in the rumen can also help to reduce nitrate toxicity problems.

## **OBSERVING SYMPTOMS OF POISONING**

Poisonous plants often, but not always, cause sudden death or illness. With certain plants, it depends on the level of toxicity that has built up in an animal. Some plants must be consumed in large quantities, while others over time build to toxic levels within animals. Consequently, you may not be aware that your animal is slowly being poisoned until it's too late. The quantity of toxin contained in a plant varies due to soil type, climate, the amount of water and sunlight the plant received during growth, and the time of day the plant was ingested. The stage of maturity the plant was in when consumed can also affect its toxicity level.

An animal's death is the most obvious economic loss from poisoning, but poisonings do not have to be fatal to produce a loss of revenue. Plant toxins can affect milk quality in goats and dairy cows. Weight loss in market animals, photosensitivity, decreased reproductive performance from fetal resorption, abortions, infertility, and fetal deformity are also effects of livestock poisonings.

## **WHAT TO DO IF POISONING OCCURS**

An animal may respond differently to a toxin, depending on a number of factors such as animal species, age, weight, general health, and reproductive status. Any abrupt onset of unexplained illness should set off your suspicions, especially if it is accompanied by nervous system disorders or gastrointestinal distress. A sudden collapse may also indicate poisoning.

Once an animal is poisoned, determining a treatment may be challenging for your veterinarian since there are so many unknowns, like the type of plant eaten, the amount ingested, and over what period of time it was consumed. If you suspect an animal has been poisoned, time is of the essence; seek immediate veterinary assistance. Do not delay; it may be a matter of life and death for your animal. Do not attempt to treat the animal yourself.

Veterinary treatments often prove effective early on, when the initial symptoms of poisoning appear. If you know which toxic plant was eaten by the animal, take it with you to the veterinary clinic, or have it available for your veterinarian to view upon arrival. It is a good idea to wear rubber gloves when handling a plant that is also toxic to humans (e.g., hemlocks and leafy spurge). If you are waiting for the veterinarian to arrive at your farm or ranch, put the animal in a stall and remove any water or feed. If a stall is not available, try to move the animal to a shaded area away from other animals and noise. Avoid stressing the affected animal; it should be moved quietly and calmly. Remove any other livestock from the area where the harmful plant was found.

Note: your local UI Extension office may be able to provide definitive plant identification after the initial poisoning episode.

# Plants

The following plants are listed  
alphabetically by common name.



## **Aster**

*Symphyotrichum* sp.

**Poisonous parts:** Entire plant concentrates and stores selenium taken up from the soil.

**Amount needed to poison:** The maximum selenium level in livestock feed should not exceed 5 mg/kg of feed.

**Symptoms:** Unless there is no other forage available, animals generally will not eat this plant due to its strong smell. Aster may also be consumed in contaminated hay. Chronic selenium poisoning causes loss of mane and tail hair, horizontal cracking of hooves, lameness, stiff joints, rough coat, emaciation, and staggering gait. Death can occur as a result of liver and heart damage.

**Plants with a similar toxin (selenium):** Locoweed and milkvetch.

**Plant characteristics:** Aster is a flowering biennial that can reach 18 in tall or more. It is a spindly plant with sticky glands covering flower heads and leaves. Leaves are narrow with spiny tips and alternately arranged on the stem. Flowers may be purple, white, or pink with many narrow petals. The center disc is yellow or orange. Ornamental asters used in gardens and landscapes are also poisonous to livestock.





## Field Bindweed (Wild Morning Glory)

*Convolvulus arvensis* sp.

**Poisonous parts:** All parts contain tropane alkaloids. Field bindweed is also a nitrate accumulator which can lead to nitrate poisoning.

**Amount needed to poison:** A large quantity of green plant material is needed to poison; but because the seeds are especially toxic, ingesting just a few seeds can cause tropane toxicity.

**Symptoms:** Tropane alkaloids can slow heart rate, dilate pupils, and cause colic in horses. After a toxic dose of nitrates is consumed, death can occur within 2–10 hours. If observed prior to death, symptoms of poisoning include watery eyes, appetite loss, muscle tremors and weakness, staggering gait, increased heart/respiratory rates, and labored breathing. The whites of the eyes may turn bluish, while blood and mucous membranes may turn a chocolate brown color.

**Plants with a similar toxin (nitrate):** Kochia, pigweed, puncturevine, sunflower, and Canada thistle.

**Plant characteristics:** Bindweed is a very common weed. This perennial has an extensive root system that sends up shoots all along its roots to form twining vines or tangled mats on the ground. It can also crawl up fences or nearby plants. Leaves are arrow shaped or an elongated heart shape and arranged alternately on stems. Open, bell-shaped flowers are white to pink and usually an inch in diameter. The showy, larger-flowered annual *Convolvulus* species used in gardens and landscapes is also poisonous to livestock.





## Buffalobur

*Solanum rostratum*

**Poisonous parts:** All parts contain the toxin solanine, a steroidal (tropane) glycoalkaloid. Mechanical injuries are also common due to the long spines.

**Amount needed to poison:** A lethal dose for cattle is considered to be 0.1%–0.3% of their body weight in consumed buffalobur. Sheep and goats are less likely to be poisoned.

**Symptoms:** Buffalobur causes mechanical injury such as mouth or facial sores. The gastrointestinal tract and nervous system are affected by solanine. Symptoms include excess salivation, drowsiness, trembling, intestinal motility, dilated pupils, irregular heart rate, muscle weakness, and paralysis. When large amounts of buffalobur are ingested, cardiac arrest may occur before other symptoms are observed.

**Plants with a similar toxin (solanine):** Nightshade.

**Plant characteristics:** This native, but invasive, annual can reach 2 ft tall. Plants have 2–5 in long, irregularly lobed leaves with spines along the leaf veins. The whole plant is actually covered with spines. The yellow, five-petaled flowers are an inch in diameter and clustered at the top of the plant.





## Buttercup and Bur Buttercup

*Ranunculus* sp. and *Ceratocephala testiculata*

**Poisonous parts:** All buttercup species contain the toxin ranunculin; it is found in all plant parts. Flowering plants are the most toxic, with toxicity decreasing with maturity. Chewing converts the toxin to protoanemonin, which causes oral and intestinal irritation.

**Amount needed to poison:** Small quantity. Sheep are particularly susceptible to bur buttercup poisoning. As little as 1.10 lbs are enough to cause death in adult sheep. In an 800 lb heifer, 9 lbs of consumed bur buttercup can cause death.

**Symptoms:** Symptoms include excessive salivation, watery diarrhea, labored breathing, muscle weakness, and an inability to rise when approached.

**Plant characteristics:** **Bur buttercup** (*Ceratocephala testiculata*) is a low-growing annual, 2–5 in tall, and up to 2–3 in wide. Bur buttercup is found in dry locations like dryland pastures and waste areas. The leaves are very tiny, yellow green in color, and fern-like. Their tiny yellow, 5-petaled flowers are short-lived and develop into stiff, brown burs 1/2–3/4 in long. (See photos, below.) Most of the larger perennial *Ranunculus* buttercups found in landscape and moist areas have showy yellow flowers, deeply lobed leaves (2–6 in), and grow 1–3 ft tall. (See photo, above.)





## **Clover: Yellow Sweet and White Sweet**

*Melilotus* sp.

**Poisonous parts:** Sweet clover itself is not poisonous; however, when sweet clover molds, the fungi produce dicoumarol, a potent anticoagulant. Irrigation can encourage the development of mold on clovers.

**Amount needed to poison:** Quantity needed to poison will depend on the amount of dicoumarol present in hay. Poisoning is most likely to occur when dicoumarol exceeds 10 mg/kg of hay and consumption lasts for several weeks. Dilution or rotating clover hay with nontoxic hay will often prevent poisoning.

**Symptoms:** All livestock are susceptible to poisoning, with sheep being the most resistant. Early symptoms are weakness and depression. Other symptoms include sudden bleeding and the appearance of swellings due to hematomas. Fatal hemorrhaging is possible. Even grazing on sweet clover that lacks mold can cause bloating in ruminant animals. Bloat symptoms are distended left abdomen, rapid or difficulty breathing, reluctance to move, and a distressed look.

**Plant characteristics:** These legumes can be annuals or biennials that grow to several feet tall. Their three-leaflet leaves resemble alfalfa, but clover leaves are more serrated along the margins. Numerous racemes (2–4 in long) of tiny, yellow or white flowers ( $\frac{1}{4}$  in diameter) are produced all over the plant. Yellow sweet clover flowers fade to cream, but white sweet clover flowers stay white.







## **Clover: Red, White, and Alsike**

*Trifolium* sp.

**Poisonous parts:** All parts of these plants contribute to toxicity problems under certain conditions. Clovers in their early, rapid growth phase can contain high levels of soluble sugars that may lead to colic or founder. When temperatures are above 80°F and humidity is more than 60%, mold or fungus can grow on the underside of leaves and produce a mycotoxin called slaframine. Irrigation can encourage the development of mold on clovers.

**Amount needed to poison:** Unrestricted grazing of clover pastures (in excess of 2–3 hours/day) can cause digestive issues for horses related to colic and/or founder. Consumption of clover with mold over several days, whether by grazing or in hay, can cause slobbers in horses. Hungry cattle placed on lush clover pasture can bloat.

**Symptoms:** Colic symptoms are rolling or lying down, pawing, kicking or looking at the flank, excessive sweating, loss of appetite, and lack of defecation. Founder symptoms are increased heart rate, hooves that feel hot to the touch, foot lifting, shortened stride, and distorted hoof shape. Bloat symptoms are distended left abdomen, rapid or difficulty breathing, reluctance to move, and a distressed look.

**Plant characteristics:** **Red clover** (*Trifolium pratense*) has hollow, hairy stems that branch. Leaves have a dark crescent-shaped mark on each of the three leaflets and serrated margins. Stem lengths average 18–30 in. Flowers are in compact clusters and rose pink in color. **White clover** (*Trifolium repens*) typically grows prostrate and is stoloniferous. Leaves are composed of three leaflets that may or may not have a crescent shape on the upper surface. The flower heads consist of 40–100 white to pale pink petals. **Alsike clover** (*Trifolium hybridum*) leaves are smooth with finely serrate margins. The compound three-leaflet leaves have no markings on their upper surface. Stems are semi-erect, round, and hairless with alternately arranged leaves. Each flower head has about 30–50 white to pale pink petals.



## Dock and Sheep Sorrel

*Rumex crispus* and *R. acetosella*

**Poisonous parts:** All parts of these two species contain oxalates.

**Amount needed to poison:** A large quantity must be consumed to cause poisoning.

**Symptoms:** Although dock is responsible for very few poisonings, if eaten in large amounts, it can cause kidney failure. Early symptoms include muscle tremors, weakness, tetany, and a reluctance to move.

**Plants with similar toxins (oxalates):** Halogeton, kochia, and pigweed.

**Plant characteristics: Dock** (*Rumex crispus*) is commonly found in irrigated pastures, while sheep sorrel can be found in fields and along roadsides. Dock is a perennial, tap-rooted plant that can reach 2–4 ft tall. Stems are segmented like bamboo and turn red as they mature. The large, lance-shaped leaves are 4–12 in long and have a wavy edge. Most of the leaves are found at the base of the plant. Small, green flowers form a large, dense spike that turns rusty brown at maturity. The seed stalk makes it easy to identify in late summer. (See photos, above and below left.)

**Sheep sorrel** (*R. acetosella*) stems are woody at the base and can reach 2 ft tall. Lower leaves are arrow shaped, while upper leaves are slender; leaves have a sour taste. Seed heads are reddish brown in color, and looser (see two photos, below right) and more delicate looking than seed heads found on dock. Common names can be confusing as both species are referred to as “sorrel” in some popular literature.





## Fiddleneck

*Amsinckia* sp.

**Poisonous parts:** All parts, especially the seeds, contain pyrrolizidine alkaloids. Dried plants are more palatable than green plants, making contaminated hay a concern.

**Amount needed to poison:** Pyrrolizidine alkaloids have a cumulative effect. Animals ingesting small amounts over a number of weeks or months will have consumed a lethal dose.

**Symptoms:** Horses and pigs are highly susceptible to fiddleneck poisoning, whereas cattle, sheep, and goats (ruminants) are more resistant. Younger animals are much more susceptible. Chronic consumption causes irreversible liver damage. Symptoms of liver problems may not appear for several months after consumption of the plant. Animals may survive for six months or longer after consuming a low dose because the toxins are continually circulated in the liver. Other symptoms noted are unthriftiness, photosensitivity, and aimless walking.

**Plants with a similar toxin (pyrrolizidine):** Groundsel and houndstongue.

**Plant characteristics:** Fiddleneck is an erect annual with stiff hairs on stems, leaves, and flower buds. Plants reach 1–2 ft tall. Strap-shaped leaves (1–4 in long) are alternately arranged on the stem. Flowers are tiny, yellow, five-lobed funnels clustered to one side of a tightly curved flower stalk, hence the name fiddleneck.





## Groundsel

*Senecio vulgaris*

**Poisonous parts:** All parts contain pyrrolizidine alkaloids. Dried plants are more palatable than green plants, making contaminated hay a concern.

**Amount needed to poison:** Pyrrolizidine alkaloids have a cumulative effect. Cattle eating 5% or more of their daily diet in mature groundsel over fifteen consecutive days or more will have consumed a lethal dose.

**Symptoms:** Horses and pigs are highly susceptible to groundsel poisoning, whereas cattle, sheep, and goats (ruminants) are more resistant. Younger animals are much more susceptible. Chronic consumption causes irreversible liver damage. Symptoms of liver problems may not appear for several months after consumption of the plant. Animals may survive for six months or longer after consuming a low dose because the toxins are continually circulated in the liver. Other symptoms noted are unthriftiness, photosensitivity, and aimless walking.

**Plants with a similar toxin (pyrrolizidine):** Fiddleneck and houndstongue.

**Plant characteristics:** Groundsel species can grow as annuals, biennials, or perennials. Annual groundsel grows 6–18 in tall. Leaves are irregularly serrated or lobed and alternate on stems. Basal leaves may have a purplish hue underneath. Numerous, small, barrel-shaped, yellow flowers that lack petals are clustered on terminal stems. At maturity, dried seed heads look like tiny dandelion puffs. Even larger *Senecio* species that are used as ornamental landscape plants (e.g., dusty miller) are poisonous to livestock.





## Halogeton

*Halogeton glomeratus*

**Poisonous parts:** All parts contain sodium oxalate.

**Amount needed to poison:** A lethal dose for sheep is 1.5 lbs of green plant material; 3–5 lbs are a lethal dose for cattle.

**Symptoms:** Unfortunately, this plant is quite palatable to sheep and cattle. Halogeton becomes more toxic as it matures. Initial poisoning symptoms develop within a few hours of ingesting a toxic dose. Symptoms include rapid, shallow breathing; drooling; muscle tremors; weakness; and a reluctance to move. Death may occur within twelve hours.

**Plants with similar toxins (oxalates):** Dock and sheep sorrel, kochia, and pigweed.

**Plant characteristics:** This succulent annual plant grows to 18 in tall with red stems and tiny, fleshy, blue-green leaves (1/12 in long) tipped with small hairs. Stems branch from a central base. In spring, plants are blue green in color with branches spreading low to the ground. As summer approaches, the stems become erect, turn reddish, and later yellow. Flowers are inconspicuous.





## Hemlock: Poison

*Conium maculatum*

**Poisonous parts:** All parts contain toxic alkaloids, with coniine being the most common toxin in mature plants and seeds, and  $\gamma$ -coniceine found predominantly in young growing plants. Poison hemlock is highly toxic to humans; handle with care.

**Amount needed to poison:** Sheep are poisoned after consuming 4–8 oz of poison hemlock; cattle need to consume 10–16 oz. Poisonings can also occur from hay contaminated with poison hemlock.

**Symptoms:** Symptoms of poisoning develop within an hour of eating this plant. Initially, excessive salivation, muscle tremors, and lack of coordination develop followed by difficulty breathing, dilated pupils, weak pulse, and frequent urination and defecation. Nonfatal doses may cause fetal deformities or abortions.

**Plant characteristics:** Often the newly emerged plant is mistaken for parsley or carrot tops. Leaves are lacy with finely pinnate leaflets dissected 3–4 times. Lower leaves clasp the stem. Foliage has a musty or mousy odor. Poison hemlock grows into a large biennial plant 6–8 ft tall. It is commonly found along streams and irrigation ditches. The stout hollow stems have distinct ridges and are green with purple dots or blotches. Flowers are tiny and arranged in multiple white, umbrella-shaped heads. (Note: to distinguish poison hemlock from water hemlock, observe that the leaves of water hemlock are coarser and have serrated edges with leaf veins terminating at the point of each serration.)





## Hemlock: Western Water

*Cicuta douglasii*

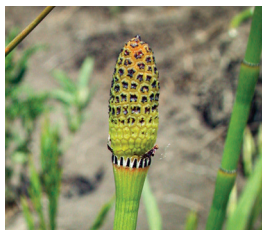
**Poisonous parts:** All parts contain cicutoxin, but the tubers and immature green seeds are especially toxic. This plant is highly toxic to humans; handle with care.

**Amount needed to poison:** As little as 0.05 g or 0.002 oz of tuber (wet weight) will kill an adult sheep. Consuming just one plant will cause poisoning.

**Symptoms:** Water hemlock is one of the most toxic native plants found in North America. All livestock are susceptible to poisoning. Excessive salivation and muscle tremors quickly progress to convulsions and seizures. Symptoms develop within an hour of eating the plant or roots. Death can occur as soon as ninety minutes after consumption.

**Plant characteristics:** Water hemlock is a large perennial plant found in moist areas. The thick, erect stems are 3–7 ft tall with a swollen base. Leaves are pinnately compound; leaflets are 2–3 in long and have sharply serrated edges with leaf veins terminating at the point of each serration. Leaves are alternately arranged on stems. For an exact identification, split the swollen tuberous root lengthwise and look for a series of horizontal, hollow-chambered partitions; these are common to water hemlock. Juice from the roots is extremely poisonous to animals and humans so be very careful when handling this plant. Use rubber gloves and/or wash your hands thoroughly after handling. Other common names are poison parsnip and cowbane.





## Horsetail

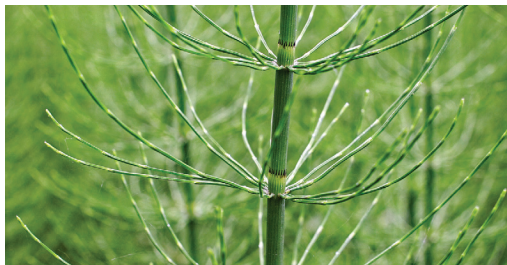
*Equisetum* sp.

**Poisonous parts:** All parts contain alkaloids, silica, and thiaminase (antivitamin).

**Amount needed to poison:** Large quantities consumed over several weeks are needed for poisoning to occur. Horsetail is toxic at all stages of growth, both green and dried; consequently, contaminated hay is a concern. Hay containing 20% or more horsetail fed to horses over two weeks will cause poisoning.

**Symptoms:** Horses are most commonly poisoned, but all grazing animals are susceptible. Young horses are most susceptible. Horses can develop a preference for the plant after initial consumption. The toxins in horsetail disrupt energy metabolism. Weight loss and weakness are the first noticeable symptoms; lack of coordination and diarrhea may also appear. Horses quickly recover with thiamine treatment and removal from hay or pasture containing horsetail.

**Plant characteristics:** These ancient perennial plants have been around since prehistoric times. They produce both fertile and infertile stems. The fertile green stems are upright, hollow, jointed, and banded at each segment. Unusual tan spore cones, instead of seeds, top each fertile stem. Stems can be pulled apart at the segments. The infertile, green vegetative stems grow up to 2 ft tall and resemble miniature, ferny pine trees made up of whorls of slender, jointed branches. Both fertile and infertile stems have a rough feel like fine sandpaper. Horsetail is often found near irrigation ditches and other wet areas. Other common names are jointgrass, snake grass, and scouring rush.







## Houndstongue

*Cynoglossum officinale*

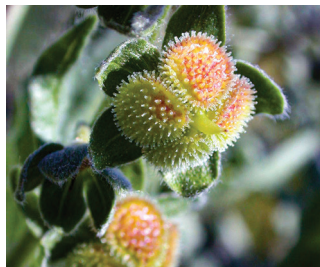
**Poisonous parts:** All parts contain pyrrolizidine alkaloids, with early blooming plants being the most toxic. Dried plants are more palatable than green plants, making contaminated hay a concern.

**Amount needed to poison:** Pyrrolizidine alkaloids have a cumulative effect. Cattle eating 5% or more of their daily diet in mature houndstongue plants over fifteen consecutive days or more will have consumed a lethal dose.

**Symptoms:** Horses and pigs are highly susceptible to houndstongue poisoning, whereas cattle, sheep, and goats (ruminants) are more resistant. Younger animals are much more susceptible. Chronic consumption causes irreversible liver damage. Symptoms of liver problems may not appear for several months after consumption of the plant. Animals may survive for six months or longer after consuming a low dose because the toxins are continually circulated in the liver. Other symptoms noted are unthriftiness, photosensitivity, and aimless walking.

**Plants with a similar toxin (pyrrolizidine):** Fiddleneck and groundsel.

**Plant characteristics:** Houndstongue is a biennial that grows close to the ground the first year. In the second year, it grows up to 4 ft tall, flowers, and goes to seed. Leaves are soft and hairy with smooth edges, 6–12 in long and 3 in wide. Spikes of small, dusky red, bell-shaped flowers appear at the top of the plant. Seeds are four-leaf-clover-shaped discs that can attach to clothing or animal fur. Leaves are shaped like a dog's tongue and the texture of the mature seeds is similar to a dog's tongue, hence the name.





## Russian Knapweed

*Acroptilon repens*

(previously: *Centaurea repens*)

**Poisonous parts:** All parts contain neurotoxins. Only horses are susceptible; no other livestock species are affected.

**Amount needed to poison:** Horses must consume approximately 60% of their body weight over 28–35 days for symptoms to develop.

**Symptoms:** Russian knapweed poisoning results in a condition called “chewing disease,” which manifests as increased contraction and lack of coordination of the jaw and throat muscles. This condition prevents normal grazing, which leads to severe weight loss. Some affected horses will move their lips and mouth like they are chewing or grazing, but they will not be eating. Affected animals eventually must be euthanized.

**Plants with similar toxins:** Yellow starthistle.

**Plant characteristics:** This multibranched, perennial plant forms dense colonies and grows up to 3 ft tall. Upper leaves are narrow without lobes, but lower leaves are deeply lobed. The base of each flower looks like a small, green pine cone with slender, pointed, papery-tipped bracts. A tuft of stringy petals emerges from the top, giving the flower a fuzzy look. The petals can be white, pink, or lavender.





## Kochia

*Kochia scoparia* (syn. *Bassia scoparia*)

**Poisonous parts:** All parts contain nitrates, oxalates, sulfates, saponins, and alkaloids. “The toxicity of [kochia] is poorly understood and appears to be influenced by the conditions in which it is grown” (CSU 2019). Under dry conditions, kochia can be an extreme nitrate accumulator. Hay contaminated with kochia from a water-stressed field is a major concern.

**Amount needed to poison:** Cattle and horses are most affected by kochia. Sheep can consume up to 50% of their total dry matter intake in kochia with no effects. However, fatalities can occur in pigs, horses, cattle, and other ruminants that consume as little as 0.75%–3% of their body weight in kochia.

**Symptoms:** Symptoms include loss of appetite, poor weight gain, mouth ulcers, diarrhea, depression, weakness, jaundice, lack of coordination, and photosensitivity with excessive eye tearing. Ruminants will at times show neurological impairment such as head pressing, blindness, and seizures. (See field bindweed for nitrate poisoning symptoms.)

**Plants with similar toxins:** (Nitrates) bindweed, Canada thistle, pigweed, puncturevine, and sunflower; (oxalates) halogeton, pigweed, dock, and sheep sorrel.

**Plant characteristics:** This common annual plant produces multiple red-tinged branches. The lance-shaped leaves, ½–2 in long, are smooth on the upper surface and covered with soft hairs underneath and along the margins. Kochia can grow up to 6 ft tall. Flowers are inconspicuous. Other common names are Mexican fireweed and burning bush.





## Larkspur

*Delphinium* sp.

**Poisonous parts:** All plant parts contain norditerpenoid alkaloids with the highest concentration found in seedpods.

**Amount needed to poison:** Fatal poisoning occurs mostly in cattle, with young animals being the most susceptible. Establishing the toxic dose for cattle is difficult because toxicity varies with the age, sex, and breed of cattle (Green 2014), and the plant species, season, stage of growth, amount ingested, and duration over which the plant was eaten (Pfister 1994).

**Symptoms:** Larkspur poisoning is due to neuromuscular paralysis. After a toxic dose has been ingested, observable symptoms may include bloating, nervousness, rapid heart rate, respiratory depression, muscle tremors and weakness, staggering gait, recumbency, and death.

**Plant characteristics:** Larkspurs are perennial plants that range in size from 10 in to 5 ft tall, depending on the species. Leaf shape varies with species; generally, they are lobed into 3–5 sections and then lobed again. Leaves are attached alternately on hollow stems. The showy blue, purple, or occasionally white flowers appear on racemes with five petal-like sepals and a distinct spur-like projection pointing backwards from the flower. Seeds develop in upright pods on the stem. The larger-flowered *Delphinium* species used in gardens and landscapes are also poisonous to livestock.





## Locoweed and Milkvetch

*Astragalus* and *Oxytropis* spp.

**Poisonous parts:** All parts of locoweed contain swainsonine, an indolizidine alkaloid, with the highest concentrations found in flowers and seeds; even dry plants retain the toxin. Some *Astragalus* and *Oxytropis* species also contain nitroglycoside compounds and a few species are selenium accumulators. Plants in the genera *Astragalus* and *Oxytropis* that contain swainsonine are considered “true locoweeds” (Fox et al. 2010), while other members of these genera that do not contain swainsonine are called milkvetches.

**Amount needed to poison:** Amount needed will depend on the plant species, growth stage, and growing conditions. Swainsonine is potent and can cause permanent brain damage in livestock. Swainsonine passes through the milk, increasing the alkaloid dose a suckling animal absorbs. Animals must consume locoweed for at least 5–7 days before poisoning occurs.

**Symptoms:** Horses are most susceptible to the swainsonine toxin and may never recover after showing clinical signs, yet all grazing animals can be poisoned by locoweed. Cattle gain weight more slowly and often have reproductive problems. In sheep and goats, embryonic death

(continued on next page)



*(Locoweed and Milkvetch continued)*

and abortions are common. Any pregnant animal may have behaviorally and physically impaired offspring; adult males can become infertile. Other symptoms include weight loss or poor growth rates, circling, staggering gait, lack of coordination, and unpredictable behavior when excited or stressed. Once locoweed is tasted, animals seem to become addicted to it and seek it out, even when other forage is available. Early turnout in native rangeland before the grass has begun to grow encourages consumption of locoweed.

Nitroglycoside compounds cause poisoning mainly in cattle, but horses and sheep are also affected. Symptoms associated with nitrotoxins are peripheral nerve degeneration and respiratory problems. “Other symptoms include general body weakness, labored noisy breathing and loss of motor control, especially in the hindquarters. Severely poisoned animals may collapse and die shortly after consuming plants [containing nitro glycoside compounds]” (Fox et al. 2010). (See **Aster** for selenium poisoning symptoms.)

**Plants with a similar toxin (selenium):** Aster.

**Plant characteristics:** Locoweed and milkvetch are perennial legumes that grow in mounds 2–12 in tall. Leaves are made up of 11–30 green leaflets paired opposite each other (pinnately compound). The most common species found in southwestern Idaho are covered with fine hairs, giving the plant a white or gray appearance. Locoweed and milkvetch have many small pea blossoms that can be pink, blue, purple, yellow, or white, depending on the species. The plants produce short, hairy, kidney-shaped seedpods.





## Lupine

*Lupinus* sp.

**Poisonous parts:** Not all lupine species are toxic and toxicity can vary greatly depending on location. In lupine species that are toxic, all parts, including the seeds, contain piperidine and the quinolizidine alkaloids ammodendrine and anagyrene. Lupine can also contaminate hay.

**Amount needed to poison:** Poisoning can occur in sheep ingesting less than 0.25 lbs of lupine, while cattle can eat 1–12 lbs before poisoning occurs. Smaller amounts will cause poisoning if eaten daily for several days. Avoid bedding sheep down overnight in lupine meadows.

**Symptoms:** Symptoms of poisoning include nervousness, muscle tremors, labored breathing, reluctance to move, convulsions, and death. Anagyrene is responsible for causing birth defects. Cattle ingesting lupines during early gestation (days 40–100) birth calves with a defect called “crooked calf syndrome.” Calves may also have cleft palates or other skeletal deformities.

**Plant characteristics:** Depending on the species, lupine can grow 1–3 ft tall. Leaves are palmately compound with 6–8 leaflets radiating from a central point. Leaflets and stems are covered with fine hairs. The showy flower spikes can be purple, pink, yellow, white, or even bicolored. The seedpods look like hairy, flat peapods, and spiral twist apart to release seeds.





## Milkweed

*Asclepias* sp.

**Poisonous parts:** All parts contain deadly cardiac glycosides with the highest concentrations found in the milky sap. Milkweed is most toxic during periods of rapid growth but retains its toxicity even when dried, making contaminated hay a concern.

**Amount needed to poison:** The amount needed varies from one ounce to 0.05%–5% of an animal's body weight, depending on the milkweed species.

**Symptoms:** Symptoms of poisoning usually begin within 8–10 hours after consumption. Labored breathing, inability to stand, muscle tremors, a weak and rapid pulse, bloat in ruminants followed by tetany, and chewing movements may appear. Animals can also be found dead without prior indications of poisoning.

**Plant characteristics:** Leaf shape varies with species; both leaves and stems will exude a white, milky sap when cut. These perennial plants have erect stems with oppositely arranged leaves. Their height varies, depending on species, from one to several feet tall. Roots are spreading, allowing plants to generate large colonies. Flowers are globe- to umbrella-shaped heads with multiple white or pink blossoms. Seedpods can be narrow to wide, and open to show seeds tufted with soft, white hairs for wind dispersal. Ornamental milkweeds used in landscapes can have flowers that are yellow, orange, or red.







## Nightshade

*Solanum* sp.

**Poisonous parts:** All parts contain steroidal (tropane) glycoalkaloids, with the most common ones being solanine, hyoscyine (scopolamine), and hyoscyamine (atropine). The leaves and unripe berries contain the highest concentrations. Nightshades are not palatable; however, in overgrazed areas or when feed is sparse, livestock are more likely to eat them. Most often, nightshades are introduced in contaminated hay, silage, or grain.

**Amount needed to poison:** All livestock are susceptible to nightshade poisoning, especially cattle. Poisoning can occur when as little as 0.1%–0.3% of an animal's body weight in green nightshade plants is ingested.

**Symptoms:** The gastrointestinal tract and nervous system are affected. Symptoms include excess salivation, drowsiness, trembling, intestinal motility, dilated pupils, irregular heart rate, muscle weakness, and paralysis. When large amounts of nightshade are ingested, cardiac arrest may occur before gastrointestinal symptoms are observed.

**Plants with a similar toxin (solanine):** Buffalobur.

**Plant characteristics:** Nightshades are commonly found in field crops, pastures, and gardens; they vary in form from upright-growing annuals or perennials to vines. Depending on type, they can grow 6 in–3 ft tall. Leaves are arranged alternately and have a foul odor when bruised. Flowers are star shaped, looking like a tomato or potato flower. They have five white or purple petals with a pointed, yellow center. The fruit are small, round berries that are red, orange, or black, with many small seeds. The entire Solanaceae family is toxic, including eggplant, pepper, potato, and tomato. Never feed these plants to livestock.





## Pigweed

*Amaranthus retroflexus*

**Poisonous parts:** All parts can accumulate nitrates under certain growing conditions. Nitrate levels are highest just before the plant blooms or when the plant has been water stressed. Plants also contain elevated levels of oxalic acid.

**Amount needed to poison:** Large quantities are required to cause toxicity.

**Symptoms:** If eaten in large amounts, oxalic acid can cause kidney failure and perirenal edema, which manifests as weakness and posterior incoordination. Early symptoms include muscle tremors, tetany, and a reluctance to move. Pigweed remains toxic when dried and can contaminate hay. (See **Field bindweed** for nitrate poisoning symptoms.)

**Plants with similar toxins:** (Nitrates) field bindweed, kochia, puncturevine, sunflower, and Canada thistle; (oxalates) halogeton, kochia, dock, and sheep sorrel.

**Plant characteristics:** This common weed is found in pastures and waste areas. It grows as an erect, tap-rooted plant up to 3 ft tall with alternately arranged leaves. Leaves have prominent veins and long petioles. The lower stem is reddish pink or red striped, hence its other name, red stem or redroot pigweed. The flower spike is dense with numerous tiny flowers and stiff, spine-like scales, giving it a worn bottle-brush look.





## Puncturevine

*Tribulus terrestris*

**Poisonous parts:** This plant contains steroidal sapogenins. It can also contribute to nitrate poisoning.

**Amount needed to poison:** Even a mouthful can cause physical harm from the spiny seed heads. A large quantity is required to cause nitrate toxicity.

**Symptoms:** When puncturevine is ingested, steroidal sapogenins form an insoluble crystalloid substance in the bile ducts of the liver resulting in liver damage and photosensitivity. With chronic consumption of puncturevine, hind-leg weakness is observed in sheep, goats, and cattle. Puncturevine can cause skin lesions and swelling of ears and lips on sheep. Other toxic symptoms include blindness, necrosis of skin, loss of lips and ears, and death in young animals. (See **Field bindweed** for nitrate poisoning symptoms.)

**Plants with a similar toxin (nitrate):** Field bindweed, kochia, pigweed, sunflower, and Canada thistle.

**Plant characteristics:** Puncturevine is an annual plant with trailing stems that can form large prostrate mats 2–20 ft in diameter. Leaves are pinnately compound with 4–8 pairs of tiny leaflets  $\frac{1}{4}$ – $\frac{1}{2}$  in long. The small, five-petaled, yellow flowers are  $\frac{1}{3}$ – $\frac{1}{2}$  in wide. The seeds are the most distinguishing feature on this plant; they are spiny, circular burs that break into sections with two large spines per section. These “tacks” are often found embedded in tires and in shoes. Other common names for this plant are goat head, road tacks, and Texas sandbur.





## Sorghum-Sudan Grass

*Sorghum bicolor* ssp. *drummondii*

**Poisonous parts:** Sorghum-Sudan grass is often fed to cattle, but care must be taken as all parts can contain prussic acid, a form of cyanide. Levels of prussic acid are highest in new growth and regrowth, but especially high immediately following a killing frost, after which the levels dissipate. Concentrations of prussic acid are much lower in hay as it is a volatile compound.

**Amount needed to poison:** Ingesting 50–70 mg/kg of feed containing prussic acid is considered highly dangerous to livestock.

**Symptoms:** Clinical symptoms of poisoning occur in rapid succession—bright red blood, excessive salivation, rapid or labored breathing, nervousness, convulsions, and death. Symptoms of prussic acid poisoning may be confused with nitrate toxicity symptoms. (See **Field bindweed** for nitrate poisoning symptoms.)

**Plant characteristics:** Sorghum-Sudan grass resembles a narrow-leaved, multistemmed corn plant. This coarse grass can reach up to 15 ft tall. Round seeds are produced in large, tight panicles clustered above the blades.





## Leafy Spurge

*Euphorbia* sp.

**Poisonous parts:** All parts exude a milky latex containing diterpene ingenol and other compounds that cause severe skin irritation.

**Amount needed to poison:** Any skin, eye, or mouth contact with the latex will cause a reaction. Small amounts in cattle feed will cause diarrhea. Goats and sheep can consume this plant but require adequate water to flush the toxins out of their system.

**Symptoms:** The latex can produce blisters and dermatitis in cattle and horses. Severe irritation of the mouth and digestive tract in cattle can result in death. If the latex comes into contact with an animal's eyes, it can cause temporary to permanent blindness. Humans have the same eye sensitivity; handle this plant with care.

**Plant characteristics:** This invasive perennial weed reaches 2–3 ft tall. Leaves are very narrow, alternately arranged on stems and are 1–4 in long. Stems grow in a thick cluster. Leaves and stems exude white latex when cut. A pair of heart-shaped, yellow-green bracts ( $\frac{1}{2}$  in diameter), make the tiny, yellow flowers noticeable. Flowers are arranged in clusters at the top of the plant. After flowering, seed capsules develop above the bracts. (See photo, below right.)





## St. Johnswort

*Hypericum* sp.

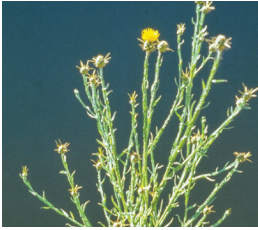
**Poisonous parts:** The toxic principle is the plant pigment hypericin. The young plants are as toxic as mature plants and even more palatable to livestock. Hypericin is stable even when dried, making contaminated hay a concern.

**Amount needed to poison:** Animals consuming an amount equal to approximately 1% of their body weight, and then exposed to sunlight for 2–5 days, will show poisoning symptoms.

**Symptoms:** Elevated temperature, increased heart rate, diarrhea, and sensitivity to cold water are some of the symptoms. After ingestion, the toxin is carried through the bloodstream to the skin where, under sunlight, it causes photosensitivity in nonpigmented skin. White-skinned animals are highly susceptible and may rub spots raw or cast themselves to find relief from the intense skin irritation.

**Plant characteristics:** There are many different species of St. Johnswort. They range from a foot to several feet tall, depending on species. Elliptical leaves, oppositely arranged, can grow to 4 in long. The species *H. perforatum* has transparent dots in the leaves that are visible when held up to light. (See photo, below left.) The bright, yellow flowers have five petals and many stamens. Flowers of wild *Hypericum* species are one inch in diameter, while flowers of *Hypericum* species used in ornamental landscapes are showier, reaching several inches in diameter. All species are toxic to livestock.





## Yellow Starthistle

*Centaurea solstitialis*

**Poisonous parts:** All parts contain neurotoxins that cause permanent brain damage. This plant is only a threat to horses. Sheep and goats have been used as bioagents to control this weed without any toxic problems.

**Amount needed to poison:** Horses will voluntarily consume yellow starthistle, even when the plant is mature and spiny. For poisoning symptoms to appear, horses must consume a large quantity, equal to their body weight, for 30–60 days.

**Symptoms:** Yellow starthistle poisoning results in a condition called “chewing disease,” which manifests as increased contraction and lack of coordination of the jaw and throat muscles. This condition prevents normal grazing that leads to severe weight loss. Some affected horses will move their lips and mouth like they are chewing or grazing, but they will not be eating. Affected animals eventually must be euthanized.

**Plants with similar toxins:** Russian knapweed.

**Plant characteristics:** The flower head is the most identifying feature of this plant as the bracts below the narrow, yellow petals have sharp, straw-colored spines extending outwards up to  $\frac{3}{4}$  in long. This annual plant grows to 3 ft tall from a rosette of deeply lobed leaves; upper leaves are not lobed. Leaves grow up to 6 in long. The plant is rigidly branched with stems covered in cottony hairs and fringe-like extensions.





## Sunflower

*Helianthus annuus*

**Poisonous parts:** Toxic levels of nitrates can accumulate throughout the plant during rapid growth.

**Amount needed to poison:** Consuming as little as 0.5% of an animal's body weight in sunflower is considered lethal. Ruminant animals such as cattle, sheep, and goats are most likely to develop nitrate poisoning.

**Symptoms:** After a toxic dose of nitrates is consumed, death can occur within 2–10 hours. If observed prior to death, symptoms of poisoning include watery eyes, appetite loss, muscle tremors and weakness, staggering gait, increased heart/respiratory rates, and labored breathing. The whites of the eyes may turn bluish, while blood and mucous membranes may turn a chocolate brown color.

**Plants with a similar toxin (nitrate):** Field bindweed, kochia, pigweed, puncturevine, and Canada thistle.

**Plant characteristics:** There are many varieties of annual sunflower with different-sized heads and heights. The yellow, many-petaled flowers with brown to yellow centers are easy to identify. Their rough, sandpapery leaves have a shape similar to the ace of spades in a deck of cards.







## Canada Thistle

*Cirsium arvense*

**Poisonous parts:** Toxic levels of nitrates can accumulate in all parts.

**Amount needed to poison:** Large quantities are required to cause toxicity. The quantity needed depends on the concentration of accumulated nitrates in the plant.

**Symptoms:** After a toxic dose of nitrates is consumed, death can occur within 2–10 hours. If observed prior to death, symptoms of poisoning include watery eyes, appetite loss, muscle tremors and weakness, staggering gait, increased heart/respiratory rates, and labored breathing. The whites of the eyes may turn bluish, while blood and mucous membranes may turn a chocolate brown color.

**Plants with a similar toxin (nitrate):** Field bindweed, kochia, pigweed, puncturevine, and sunflower.

**Plant characteristics:** Canada thistle can reach up to 5 ft tall. It forms colonies due to an extensive rhizomatous root system. Leaves are alternate and attached directly to stems without petioles. Leaves are oblong but irregularly lobed with a spine at the tip of each pointed lobe. Flowers are urn shaped at their base with tufts of stringy petals ranging in color from lavender to white. This plant has male and female flowers, with only the female flowers forming seed.



# Glossary

**alternate.** Leaves on each side of a stem growing at a definite angular distance from another leaf.

**annual.** A plant completing its life cycle within one year.

**biennial.** A plant completing its life cycle in 2 years. The first-year leaves emerge close to the ground. The second year, a flower stalk and seeds are produced and then it dies.

**bract.** A modified leaf often associated with a flower.

**compound leaf.** A single leaf that is composed of two or more leaflets.

**floret.** A small flower, part of a composite flower head.

**gastroenteritis.** Inflammation of the stomach and intestines, causing vomiting and diarrhea.

**hematoma.** A collection of blood under the skin or muscle caused by trauma to an area of the body, often indicated by a dark lump.

**inflorescence.** Pertaining to a plant's flowers.

**laminitis.** Inflammation of the sensitive laminae in the hoof of a horse.

**leaflet.** One of several leaf blades making up a compound leaf.

**legume.** Any plant in the Fabaceae (Pea) family.

**lobed.** A rounded or pointed projection of a leaf.

**motility (intestinal motility).** The power to move food through the intestines spontaneously.

**opposite.** Leaves situated on a stem diametrically opposed to each other.

**palmate.** A leaf divided into leaflets that fan out from a common point.

**panicle.** A branched raceme.

**perennial.** A plant that lives three years or more.

**petiole.** The slender stalk that attaches a leaf to a stem.

**photosensitivity.** A condition in which the skin becomes overreactive to sunlight due to ingested compounds.

**pinnate.** Leaflets arranged opposite each other along a common stem.

**raceme.** An unbranched inflorescence bearing flowers attached by stems along a central axis.

**rhizomes (rhizomatous).** Underground stems coming off the main root, growing horizontally underground.

Produces both roots and shoots along its length.

**sepal.** One division of the calyx or outer part of a flower.

**serrated.** A toothed or saw-edged leaf margin.

**spike.** An unbranched inflorescence bearing flowers attached directly to a central axis.

**stamen.** The male portion of a flower, responsible for producing pollen. The pistil is the female portion of a flower that produces seed.

**stolon (stoloniferous).** A stem growing above the ground that roots and can produce plantlets or shoots along its length.

**terminal.** Endpoint on a stem.

**tetany.** A series of muscle tremors and/or convulsions due to low-bloom calcium or magnesium.

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## Keep Your Livestock Safe and Healthy

This publication is a basic guide to thirty-five common toxic plants found in southwestern Idaho pastures and rangelands. Concise plant descriptions, paired with stunning photography, will help you to identify any suspect plants on your property. Individual entries provide information about each plant's main characteristics, its poisonous parts, and the toxic dose. The most at-risk animal species and the typical symptoms of a stricken animal are also addressed. This handy primer is a must-have for Idaho ranchers and landowners in general, a resource to refer to multiple times to protect your family and your livestock.



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**BUL 960**