



# Cattle Producer's Handbook

Range and Pasture Section

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## Poisonous Plants: Management and Control Recommendations

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Poisonous plants cause significant losses for the western livestock industry. Losses from livestock death and abortion exceed \$340 million annually in the 17 western states. The total impact of poisonous plants is much higher when other direct and indirect costs are considered (e.g., reduced gains, chronic illness, infertility, increased susceptibility to disease, medical costs, additional labor, herding, fencing, supplemental feed, and loss of opportunities to use forage on infested rangeland and pastures).

Some plants contain toxins that are so potent, or the toxin concentration is extremely high, that livestock are poisoned whenever the plants are grazed. Other plants are less toxic and are commonly grazed. They only cause poisoning when hungry animals are forced to consume large amounts of the plant, or during conditions that increase toxin levels or plant palatability.

### Management to Prevent Poisoning

Few treatments or antidotes are available for livestock poisoned by toxic plants. Prevention lies in restricting access to poisonous plants under conditions when poisoning may occur. The following strategy will prevent most livestock poisoning from plants.

1. Identify the poisonous plants on your range or pasture. Consult your county agent, botany department herbarium, or weed identification books (e.g. "Weeds of the West").
2. Learn the signs and symptoms of poisoning for each poisonous plant.
3. Learn when these plants are most toxic.
4. Know when livestock are most likely to eat these plants.
5. Understand the environmental or management conditions under which poisoning may occur.
6. Devise grazing strategies that will restrict access to plants when they are likely to cause poisoning.

Other general management considerations to reduce the risk of poisoning:

1. Do not turn hungry livestock onto areas infested with poisonous plants. Hunger causes animals to eat plants they will normally avoid.
  - Ensure adequate forage is always available.
  - Do not overgraze a pasture.
  - Remove livestock when properly using the range.
2. Do not turn out too early in the spring. Many poisonous plants start growth early and are consumed before desirable grasses are available.
3. Supplement livestock with salt and minerals to maintain animal health and avoid craving for minerals.
4. Cautiously introduce animals to poisonous plant-infested areas. Feed animals before moving into infested pastures. New, inexperienced animals should be watched closely.
5. Use the range or pasture when poisonous plants are least toxic. Toxin concentration is generally highest in early growth and again when the plant flowers and sets seed.
6. Graze the kind and class of animal that is least affected by particular poisonous plants when possible.
7. Maintain range in good condition to minimize invasion or increase of noxious and poisonous weeds.
8. Control poisonous plants if livestock losses are severe enough to justify the cost of treatment. Selective herbicides are available for control of most poisonous plants. Consult your county agent for state and local recommendations and label requirements. Biological control may be helpful in keeping some exotic poisonous plants in check. Plowing and seeding improved forages may be feasible in suitable areas.
9. Consult with your veterinarian for specific treatment of poisoned animals.

## Important Poisonous Plants in the Western States

### Arrowgrass (*Triglochin maritima*)

Perennial grass-like plant with long, linear, fleshy leaves arising from the base of the plant, and a single seed stalk 1 to 3 feet tall with knobby dull green flowers. It occurs throughout North America in wet meadows and marshes and is often associated with alkaline soils and brackish water. The toxin, hydrocyanic acid, breaks down to cyanide and inhibits oxygen metabolism.

The classical indication of poisoning is a cherry-red blood color. Poisoning is rapid, starting with slobbering, excitement, labored breathing, and staggering; the animal may collapse, go into convulsions, and die.

Other cyanide containing species include: sorghum, sudangrass, Johnson grass, and chokecherry. Hydrocyanic acid increases in plants that have been stunted by frost or drought, and in regrowth foliage after harvest. Animals should be denied access to these plants under these conditions.

Harvested forage containing these plants may retain enough cyanide to cause poisoning if not properly cured. Poisoned animals can be treated with sodium nitrate or sodium thiosulfate. Stress from handling the animals, however, may intensify the problem. Escort will control arrowgrass when applied before seed stalk elongation.

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**Bitterweed (*Hymenoxys odorata*):** disturbed sites throughout the Southwest.

**Colorado rubberweed (*Hymenoxys richardsonii*):** semi-desert areas.

**Orange sneezeweed (*Helenium hoopesii*):** mountain meadows.

All three species have showy, yellow, sunflower-like flowers. Bitterweed and Colorado rubberweed have narrow needle-like leaves and grow about 1 foot tall. Orange sneezeweed has wider but linear leaves and grows up to 2 feet. These plants affect mostly sheep. The toxins, sesquiterpene lactones, irritate the GI tract causing diarrhea, vomiting, and frothing at the mouth (referred to as spewing sickness or wasting disease). Animals become dull, stiff, weak, and eventually die from chronic poisoning. Supplementing sheep with cotton seed or soybean meal, which are relatively high in sulphur, may provide some protection.

These plants are not palatable, but sheep will eat them if other forage is limited, or when bunched up and not allowed to graze selectively. Proper grazing management and improved range conditions will reduce the density of bitterweed and orange sneezeweed. Alternate grazing on and off sneezeweed areas allows poisoned animals to recover. Bitterweed and orange sneezeweed can be controlled with 2,4-D if applied before flowering.

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### Bracken fern (*Pteridium aquilinum*)

This is one of the most common ferns in humid, temperate areas worldwide. In non-ruminants such as horses, bracken poisoning causes thiamine deficiency. Poisoned horses become thin and weak, and assume a wide stance and arched back. They may become uncoordinated, slow to move, and eventually develop tremors and convulsions. Poisoning can be treated with thiamine hydrochloride, saline cathartics, and possibly activated charcoal. Cattle are affected by a sesquiterpene glycoside called ptaquiloside, which causes bleeding and damage to the bone marrow.

The disease has a delayed onset; cattle may graze the plant for several weeks, then get sick and die. Poisoned animals seldom recover. If consumed over time, ptaquiloside can also cause cancer in the urinary bladder and GI tract. These tumors often bleed, causing urine (enzootic hematuria or redwater disease). Young shoots are most toxic and are relatively palatable in the early growth stages. Bracken fern can also be toxic when harvested in hay. Grazing should be delayed until adequate desirable forage is available. Bracken fern can be controlled with asulam.

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### Death Camas (*Zigadenus* spp.)

This is a perennial forb of the lily family with V-shaped, grasslike leaves and a showy yellow flower stalk 1 to 2 feet tall. Fifteen species of death camas grow on foothill ranges and meadows throughout the West. They contain several steroidal alkaloids that are concentrated in the bulb-like root, but the leaves and flower stalk are also toxic. Poisoning is rapid with severe congestion and bleeding in the lungs, and death occurs from cardiac arrest.

Death camas is one of the first plants to green up in the spring. To avoid poisoning, delay turn-out until adequate grass is available. Do not drive hungry animals through dense patches because they may indiscriminately graze death camas. There is no treatment for poisoning. Death camas can be controlled with 2,4-D if sprayed during early growth.

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**Threadleaf groundsel (*Senecio longilobis*):** half shrub grows on clay soils.

**Riddell groundsel (*S. riddellii*):** perennial forb grows on sandy soil.

**Tansy ragwort (*S. jacobaea*):** biannual noxious weed in the Northwest.

**Houndstongue (*Cynoglossim officinale*):** noxious weed throughout the West.

*Senecio* species have bright yellow, buttercup-like flowers, while houndstongue has dull red flowers and seeds with velcro-like spines. These plants contain several pyrrolizidine alkaloids of varying toxicity that damage the liver. Horses and cattle are most susceptible to the toxins, while sheep and goats are more resistant.

Poisoned animals waste away and die several weeks to months after eating the plant. Animals that develop clinical signs do not recover. These plants are not generally palatable and will not be grazed if other forage is available. Low-growing rosettes of tansy ragwort, however, may be inadvertently grazed along with grass, and foliage from houndstongue harvested in hay can cause poisoning.

Sheep and goats can be used as a biological tool to graze *Senecio* species before cattle. Tordon will control all species but must be applied to tansy ragwort in the rosette stage and threadleaf groundsel in the fall after flowering. Tansy ragwort can also be biologically suppressed by the cinnabar moth.

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### **Halogeton (*Halogeton glomeratus*)**

This is an alien annual weed that invades disturbed areas of the colder, salt-desert shrub plant community. Stems branch from the base and leaves are fleshy, hotdog-shaped with a spine on the tip. There are no flowers, but seed clusters form along the stems.

Toxicity is due primarily to sodium oxalate, which can accumulate to high levels in the plant. Oxalates precipitate calcium from the blood causing hypocalcemia and shock, oxalate crystals damage the kidneys, and enzymes are inhibited in the citric acid cycle of energy metabolism causing rapid death.

Most cases of poisoning result from management mistakes by allowing hungry animals to feed on dense halogeton infestations. Improved range conditions and a good mix of desirable plants will reduce halogeton poisoning. Herbicide control is not recommended since other desirable vegetation will also be killed.

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### **Poison Hemlock (*Conium maculatum*)**

#### **Water Hemlock (*Cicuta douglasii*)**

These two species grow 3 to 6 feet tall, have showy white umbel flowers, and both grow in moist or marshy habitats or along ditch banks. Leaves of poison hemlock are frilly and finely dissected like carrot leaves, while leaves of water hemlock are entire with ciliate edges.

Even though similar in physical appearance and habitat, signs of poisoning and cause of death are much different. Poison hemlock contains several piperidine alkaloids including coniine and  $\sigma$ -coniceine, which cause birth defects (twisted legs and spine) if the dam consumes small quantities during days 40 to 70 of gestation. Signs of acute poisoning include slobbering, abdominal pain, muscle tremors, weakness, incoordination, recumbency, and respiratory arrest. Exhaled air may have a mousey odor. Poison hemlock may also cause problems if harvested in hay.

Water hemlock causes violent clinical signs in livestock and humans. The toxin, cicutoxin, is a highly saturated alcohol that is concentrated in the tuberous

root, but also occurs in lower concentrations in the foliage. The tubers can be mistaken by humans for wild parsnip. The tops of tubers are often accessible, and exposing the tubers while cleaning ditches makes them available to livestock. Signs of poisoning include slobbering, muscular tremors, painful abdominal spasms, and violent convulsions.

Both plant species are relatively unpalatable, but their high toxicity presents a constant risk of poisoning. Veterinary care is essential for treatment of poisoned animals because the seizures must be controlled and the animals may need assistance to breathe. The plants can be controlled with 2,4-D if sprayed in the early growth stages. Sprayed plants may become more palatable.

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**Tall larkspur (*D. barbeyi*, *D. occidentale*, *D. glaucescens*):** mountains.

**Low larkspur (*Delphinium nelsonii*, *D. bicolor*, *D. nuttallianum*):** foothills.

**Plains larkspur (*D. geyeri*):** eastern Wyoming and north central Colorado.

All the above are perennial forbs having pretty blue or purple flowers with unique spur petals. Larkspurs kill more cattle on foothill and mountain rangeland than any other plant. They contain many diterpenoid alkaloids but methyllycaconitine (MLA) is the principal toxic alkaloid. This alkaloid blocks the junction between nerves and muscle, causing weakness, collapse, and rapid death from respiratory failure. Cattle typically bloat before and rapidly after death.

Tall larkspurs are most toxic early in their growth, but toxicity declines as they mature, and they are relatively safe to graze in the late pod stage. On the other hand, cattle will generally not graze tall larkspur in the early growth stages, but begin eating it in the flower stage and increase consumption in the pod stage. The interaction of toxicity and palatability presents a toxic window—from the early flower to mid pod stage—when larkspur is most dangerous.

Grazing tall larkspur areas early in season may allow cattle to use these highly productive ranges before larkspur flowers, but they should be removed during flowering and early pod, then allowed to graze after the pods mature. Late summer storms, however, may increase plant metabolism and increase the toxic alkaloid concentration. Cattle also eat more tall larkspur during stormy periods.

Several home remedies and treatments have been proposed but their effectiveness has not been proven. If a poisoned cow is found, it is best to minimize stress and control bloat until the toxin is cleared.

Sheep are more resistant to larkspur alkaloids than are cattle, and can be used to graze or trample dense patches of tall larkspur before cattle enter the area. Tall larkspur can be controlled with Tordon throughout

the season, Escort applied in the vegetative stage, and Roundup selectively applied to individual plants in the vegetative or bud stage.

Low and plains larkspur start growth early in the spring and retain their toxicity while actively growing. Poisoning generally occurs in a cool, wet spring when grass growth is delayed, or after summer rains when growth accelerates. Plains larkspur can be controlled with Tordon, and low larkspur with 2,4-D.

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### Locoweeds (*Astragalus* and *Oxytropis* spp.)

Locoweeds are the most widespread poisonous plants in the western U.S. They all have pinnately compound leaves and sweetpea-like flowers of various colors. *Astragalus* locoweeds occur in semi-desert areas and have dramatic population cycles: increasing in wet years and dying off during droughts. *Oxytropis* locoweeds occur in the plains and mountains and are more persistent.

Swainsonine is the major toxic alkaloid in locoweeds. It inhibits key enzymes in glycoprotein metabolism, thus affecting all body systems (e.g., neurological disturbances, emaciation and wasting, infertility, birth defects and abortions, and high mountain brisket disease when consumed at high elevations). Signs of poisoning include a dull, rough hair coat, muscular weakness, incoordination and erratic behavior, and difficulty in eating and drinking. Once consumption of locoweed stops, swainsonine is rapidly cleared from the body and animals may partially recover if damage has not been excessive.

Locoweeds are not addictive but are relatively more palatable than other forage at certain seasons. Cattle prefer green-growing locoweed to dormant forage on short-grass prairies in the early spring, but will cease grazing locoweed when it matures and warm-season grasses begin rapid growth. On mountain summer range, cattle prefer the young succulent pods of white locoweed. On desert winter range, cattle graze dry senescent spotted locoweed (which retains the toxin) in proportion to its availability. Livestock should not be allowed to graze locoweed-infested sites when they are likely to eat it. Locoweeds can be controlled with Tordon, Escort, or Curtail.

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*Astragalus* species containing nitro toxins.

**Timber milkvetch** (*A. miser*): Rocky Mountains and grasslands of Canada.

**Redstem peavine** (*A. emoryanus*): West Texas and New Mexico.

About half of the 506 species of *Astragalus* in North America contain nitro toxins. These toxins inhibit cell metabolism resulting in neurologic disease, and oxidize hemoglobin to methemoglobin, which impedes oxygen transport and damages the lungs (emphysema). Clinical signs include labored breathing, respiratory failure, and

death. Chronic poisoning results in demyelination of the spinal cord in the lower back, resulting in muscular weakness, goose stepping, dragging of the hind feet, and clicking of dewclaws (cracker heels).

Avoid grazing infested areas during early growth when nitro toxins are high, and watch cattle closely after rain storms, because increased plant metabolism can increase nitro toxin levels. Toxicity declines as the plants mature.

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*Astragalus* species accumulating selenium.

Some *Astragalus* species can accumulate selenium up to 7,000 ppm. High concentrations of selenium cause plants to be unpalatable. If livestock are forced to graze them, however, or graze associated species that passively accumulate selenium (e.g., western wheatgrass, saltbush), chronic poisoning can occur. Clinical signs of selenium poisoning include suppression of estrus, infertility, loss of weight, lameness and overgrown hooves, dull rough hair coat, and shedding of hair in the mane and tail.

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### Lupines (*Lupinus* spp.)

Lupines have palmately compound leaves radiating out from the petiole, and sweetpea-like flowers. Historically, lupines have been the greatest threat to sheep on western rangelands. Poisoning generally occurs when hungry sheep graze through lupine patches. Lupines contain several quinolizidine alkaloids that cause respiratory paralysis. Signs of poisoning progress from labored breathing to depression, coma, and rapid death. Some species (*L. caudatus*, *L. leucophyllus*, *L. sericea*) contain the alkaloid anagryne, which causes crooked calf disease if the cow consumes lupine during the 40th to 70th day of gestation.

Alkaloid levels in lupine generally peak during the bud stage, decline during flowering, then increase in the pods. The risk of birth defects can be reduced by adjusting the breeding season so that the susceptible period of gestation does not occur when anagryne is highest (during the bud stage and in ripe pods). Lupines can be controlled with 2,4-D.

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### Milkweeds (*Asclepias* spp.)

Species of milkweed vary in their habitat, size, growth form, and shape of leaves, but they all have showy umbel flowers and large, fleshy pods. Milkweeds contain cardiac glycosides that interfere with energy metabolism and cause heart failure. Signs of poisoning include inflammation of the GI tract, bloat, convulsions, coma, and death.

Narrow leaf and whorled milkweeds are most toxic, requiring as little as 1/4 pound to kill a cow. The common and showy milkweeds are relatively nontoxic. Milkweeds are generally not palatable, and animals are poisoned only when other feed is limited, or if milkweeds are harvested in hay.

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### **Ponderosa Pine (*Pinus ponderosa*)**

These are tall, stately pine trees throughout the western states. Needles and bark contain isocupressic acid, which causes cattle to abort during the last trimester of gestation. After the abortion, cows often retain the placenta, which leads to secondary infection, delayed postpartum estrus, and extended rebreeding intervals. A single ingestion of 4 to 8 pounds of pine needles, or lower consumption over a period of time, may cause a cow to abort in 2 to 15 days. Both green needles and dry needles will cause abortions.

Cattle increase consumption of needles during cold winter weather, and are less likely to eat needles during mild winters. Cattle should be denied access to ponderosa pine trees during the last trimester of gestation.

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**Broom snakeweed (*Gutierrezia sarothrae*):** widely distributed throughout the West.

**Threadleaf snakeweed (*G. microcephala*):** sandy soils in the Southwest.

Both species are short-lived, perennial half shrubs ranging from 6 inches to 2 feet tall. Numerous unbranched, erect stems originate from a woody base resembling the straws of a broom. Flowers are small, yellow, and sunflower shaped. Broom snakeweed is also a threat as a noxious weed because it increases and crowds out desirable vegetation.

The toxin has not been identified, but it can cause abortions in cattle, sheep, and goats. Abortions generally occur in late winter or early spring when broom snakeweed begins growth and warm season grasses are still dormant. Acute poisoning can result in death.

Although broom snakeweed is not very palatable, heavy grazing pressure can force cows to consume it. It is also consumed in winter when snow covers shorter forage. Always ensure that adequate forage is available. Snakeweeds can be controlled by Tordon or Escort when rapidly growing in northern areas, or after flowering in the south.

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**Western false hellebore (*Veratrum californicum*)**

This plant occurs in wet, mountain meadows. Leaves are 3 to 4 inches wide, layered like a cabbage, and unfold as the stock elongates. It may reach a height of 3 to 4 feet. The steroidal alkaloid, cycloamine, causes various birth defects depending on the stage of fetal

development when the mother consumes the plant: facial defects (monkey-faced lambs) when ewes consume the plant on the 14th day of gestation; limb deformities when consumed on days 27 to 32; and collapsed trachea when consumed on days 31 to 33 of gestation. Avoid grazing infested areas during the susceptible periods of gestation. Western false hellebore can be controlled with 2,4-D or Roundup.

## **Noxious Weeds That Are Poisonous**

Control strategies for noxious weeds are contained in state weed control handbooks.

**Leafy spurge (*Euphorbia esula*)**

This plant invades and takes over productive grasslands in the Northern Great Plains. It contains a latex in its milky sap that causes severe irritation of the mouth and GI tract. It causes scours and weakness in cattle and may result in death.

Sheep and goats are less affected by the toxin and will readily graze young plants. Sheep and goats are used as a biological tool to suppress leafy spurge. Cattle will generally not eat leafy spurge and will not graze in heavily infested patches.

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**Yellow starthistle (*Centaurea solstitialis*)**

**Russian knapweed (*C. repens*)** and other knapweeds.

These are serious noxious weeds that rapidly crowd out desirable plants. They cause a neurological condition in horses called chewing disease, which is characterized by sudden inability to eat or drink. There is no known treatment, and animals that develop clinical signs generally die from starvation or dehydration.

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**St. Johnswort or Klamath weed (*Hypericum perforatum*)**

This is an aggressive weed in the Pacific Northwest. The toxin, hypericin, causes primary photosensitization. It is absorbed and circulated in the blood where it reacts with sunlight on exposed skin in lightly pigmented animals. Exposed skin becomes sore, red and swollen, and may slough off.

Affected animals should be removed from the plant, protected from sunlight, and secondary dermatitis should be treated with salves and antibiotics. The Klamath weed beetle (*Chrysolina quadrigemina*) has generally been successful in controlling this plant.

