A4019

Toxic Plants in Midwest Pastures and Forages

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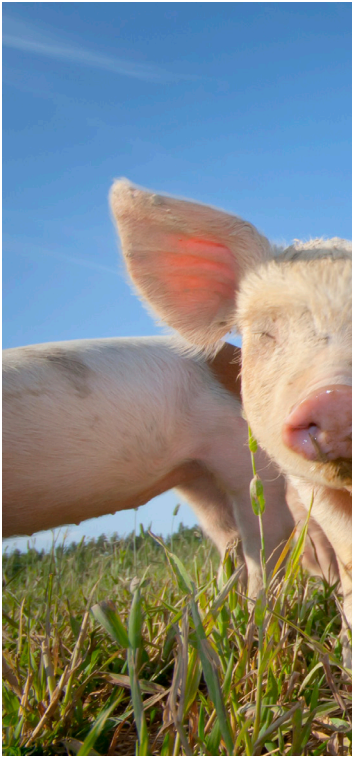
List of Toxic Plants

Resources

While most plants are safe for livestock to consume, a few species can sicken or even kill grazing animals. Recognizing poisonous plants and proper livestock management are important steps in minimizing the potential for poisoning. If plant poisoning is suspected, contact a veterinarian or other specialist immediately — a rapid response may prevent serious injury or death.

Signs of poisoning differ in clinical symptoms and severity depending on the amount of the poisonous plant consumed, livestock species and size, general animal health, and concentration of the toxin in the plant. As these factors can vary considerably, differences in toxicity are often observed in animals over time. Symptoms may range from the inability to perform to fullest potential to more serious manifestations, including slobbering, tremors, a lack of coordination, erratic behavior, convulsions, or even sudden death.

Depending on the plant part (e.g. leaves, stems, roots, fruit, or seeds), the amount of toxic compound present can vary considerably. Variations in toxicity over the growing season also make it difficult to determine the degree of poisoning. And some toxicities result from repeated consumption over time.

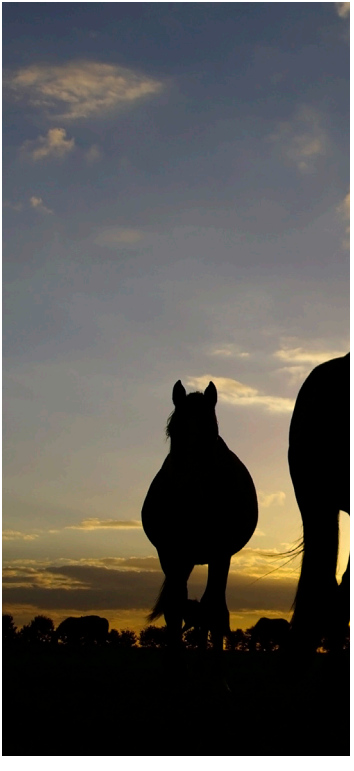


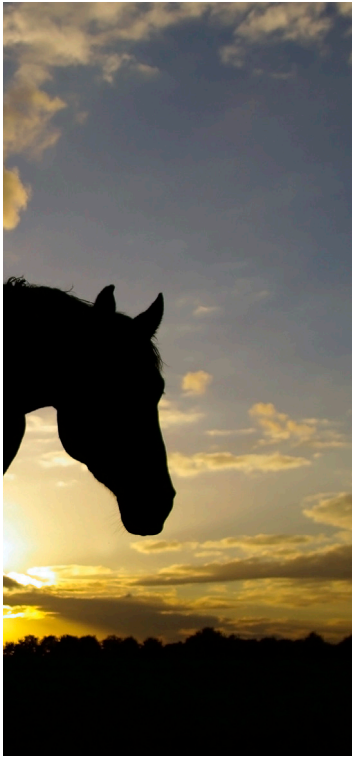
When and where poisoning occurs

Fortunately, plant poisoning is infrequent, and toxicity is often a result of specific situations. Understanding the conditions that may lead to plant toxicity can help reduce the risk of harm or death in susceptible animals. If any of these issues apply to you, consider management practices to eliminate poisonous plants of concern.

- **First grazing in the spring.** In early spring, plant tissues are young and more palatable. Livestock may feed on poisonous plants at this time, especially if other desirable forages haven't started to grow. To reduce the risk of animals feeding on poisonous plants, control these plants or limit animal access into areas where they are known to be present until ample desirable forage is present.
- **Limited desirable forage available.** Hungry animals are less selective and more likely to eat plants they would otherwise avoid, especially during drought conditions, in the fall, or when pastures are overgrazed. Make sure adequate forage is always available, especially when poisonous plants are present.

- **After herbicide application.** Many weeds that are not normally palatable to animals may become dramatically more palatable after herbicide application. In general, a 14-day waiting period is recommended following application of herbicides before allowing animals to graze the area. Read the herbicide label for more specific recommendations and always follow all label directions (see table 1).
- **After an application of nitrogen fertilizer.** Fields with an abundance of nitrate-accumulating plant — including pigweeds, lambsquarters, and common ragweed — can become toxic after fields are fertilized or following drought conditions. These weeds take up excessive nitrogen and convert it to nitrate. If animals eat enough of these weeds, nitrate toxicity can result. If these weeds consist of at least 20% of the forage in a fertilized field, they should be controlled before allowing animals to graze.
- **Yard waste/clipping.** Many ornamental shrubs and plants are both palatable and highly toxic to livestock. Avoid feeding or dumping yard waste and clippings into pastures or animal holding areas, as





this is one of the most common scenarios for livestock poisoning in the Upper Midwest.

- **Unfamiliar pastures or other areas.** Animals that have been recently shipped or are being boarded at a new location are often more susceptible to poisoning. When grazing a new area or newly seeded pasture, introduce animals gradually and monitor for any physical changes or changes in behavior.
- **Toxic plants in harvested forages.** It is harder to control poisonous plants that might be present in purchased hay and also harder for animals to avoid dried and broken parts of poisonous plants. If feasible, scout the hay fields where your hay is harvested.

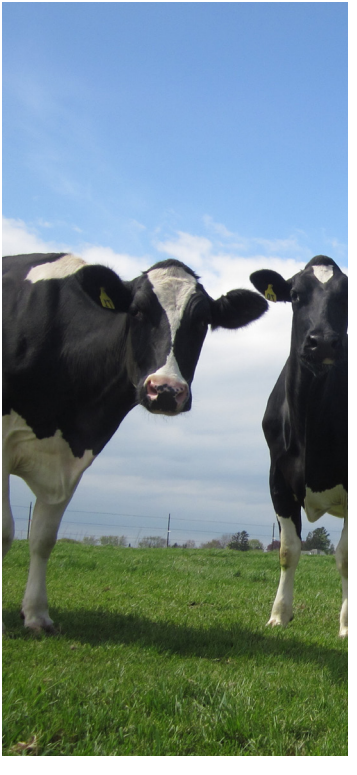
If you suspect plant poisoning

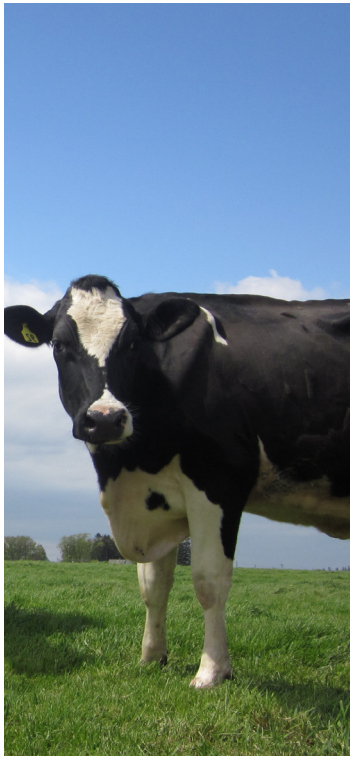
Contact your veterinarian! Get a referral to rule out other potential causes of death or disease and to clarify symptoms of toxicity to help identify potential plant sources. If you know the plant source, remove animals from areas where the plants are present and remove any affected feed or

Table 1. Grazing and harvesting restrictions for herbicides used in pastures.

We recommend a 14-day waiting period after herbicide application, even if not required by the label. Consult the label for specific restrictions, as interval is often dependent on the animal, herbicide rate, or use pattern.

Herbicide	Grazing/harvesting restrictions
Chaparral	0 days
Clarity	7–40 days, depending on rate
Crossbow	14 days to entire season
Curtail	0–14 days
Escort	0 days
Forefront	0–7 days
Glyphosate	0–7 days
Milestone	0 days
Stinger	0 days
2,4-D	3–7 days





forage. In the case of photosensitizing agents, get the animal into shade and treat any secondary infections.

If you don't know the plant source, survey the area where the animals have been recently located to identify any plants that may be a potential source of toxicity. Don't forget to include fencerows and areas where animals may have access to nearby trees and shrubs.

Learn to identify poisonous plants:

- Use a digital camera to take pictures of unknown plants
- Compare the images with online identification databases or published references
- Submit the images to your county extension to confirm their identity (see Resources)

If taking plant samples for identification, observe basic safety precautions: avoid direct contact with plant materials by using gloves and clean your sampling tools after use. Label and refrigerate samples until they can be identified.

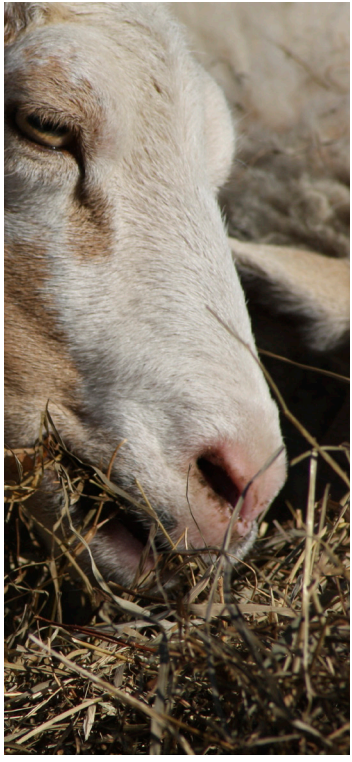
Analyze the general environment, including the source and availability of water, salt, and minerals and the presence of other materials, such as tree trimmings, old building materials, or any other items within the animals' reach that might also be a potential source of toxic compounds.

Consider recent weather conditions — such as frost or drought — and what role they may play in elevating toxicity in some plants.

Prevention is the best course of action

As is often the case, prevention is the best way to avoid toxicity problems in forages. Learn to identify poisonous plants and the conditions under which they can be dangerous to your livestock. Scout your pastures on a regular basis; be sure to check fence lines and several feet beyond, waste areas, and ditches. Control poisonous plants where feasible. Pest Management in Wisconsin Field Crops (A3646) is a good reference for herbicides that are labeled for use in pastures. Be sure to follow all label instructions when using pesticides.

Good pasture management is key! Develop a grazing plan that includes soil testing (see Resources), with fertilization and liming as



recommended. Don't overgraze pastures. A healthy and well-managed pasture is the best way to prevent weed infestations.

List of Toxic Plants

Plants in this section are categorized by level of toxicity:

HIGHLY TOXIC

< 5% of feed can result in serious injury or death.

MODERATELY TOXIC

5 to 25% of feed can result in injury/death.

MILDLY TOXIC

Under certain environmental or management conditions, these plants can be toxic.

Cocklebur

Xanthium spp.

toxins	Glycosides
species	Cattle, pigs, sheep, horses
habitat	Cultivated fields, pastures, especially sandy soils; seeds sprouting in wet areas very dangerous
symptoms	Convulsions, depression, reluctance to move, hunched back, blindness, recumbency, and death
amount necessary for poisoning/ comments	0.75% to 3% of body weight eaten when plants are seeds or seedlings can result in death. Lesser amounts can also poison animals. Mature plants are not poisonous.

Cocklebur seed pods

Cocklebur seedling

HIGHLY TOXIC

Jimsonweed flower

Jimsonweed plant

Jimsonweed

Datura spp.

toxins	Atropine, scopolamine
species	Cattle, pigs, sheep, horses
habitat	Barnyards, feeding areas and corrals, cultivated fields, sandy pastureland
symptoms	Decreased respiratory and heart rate, muscle weakness, dilated pupils
amount necessary for poisoning/ comments	0.1%-0.3% of body weight eaten in green plants results in poisoning. Larger amounts can be fatal.

HIGHLY TOXIC

Milkweeds

Asclepias spp.

toxins	Galitoxin, glucosides & alkaloids
species	Cattle, sheep, horses
habitat	Pastures (horses are affected more than animals that can vomit)
symptoms	Depression, slowed respiratory rate, pain, inability to stand, tremors, staggering gate, weak and rapid pulse, colic, and dilated pupils.
amount necessary for poisoning/ comments	When plants are green, eating 0.05 to 5% of body weight can be fatal. Toxicity varies with species, but all have the potential to be fatal.

Milkweed plant

Milkweed flowers

HIGHLY TOXIC

Nightshade berries

Nightshade flowers

Nightshades

Solanum spp.

toxins	Solanine & other glycoalkaloids
species	Cattle, pigs, sheep, horses
habitat	Fence rows and waste areas; hay fields
symptoms	Depression, decreased heart and respiratory rate, muscle weakness, watery diarrhea, paralysis of hind legs ("sitting dog")
amount necessary for poisoning/ comments	Toxicity varies with plant parts, but is concentrated in leaves and green berries. Can range from 1 to 3 days of illness to sudden death.

HIGHLY TOXIC

Poison hemlock

Conium maculatum	
toxins	Alkaloids
species	Cattle, pigs, sheep, horses
habitat	Roadside ditches, damp waste areas
symptoms	Salivation, abdominal pain, muscle tremors, incoordination, labored breathing, weak pulse, and frequent evacuation.
amount necessary for poisoning/ comments	Eating as little as 0.5% of body weight of green hemlock can be fatal. Can cause skeletal defects in fetal calves if grazed by pregnant cows.

Poison hemlock stems

Poison hemlock flowers

HIGHLY TOXIC

Young red maple leaves

Red maple leaves

Red maple

Acer rubrum

toxins	Gallic acid
species	Horses
habitat	Ornamental tree (avoid)
symptoms	Weakness, increased respiratory and heart rates, red-brown colored urine, fever, and death. Mares may abort even without symptoms of anemia.
amount necessary for poisoning/ comments	As little as 3 lbs. of dried or wilted leaves eaten over 1 to 5 days can be fatal. The bark is also poisonous.

HIGHLY TOXIC

Spotted water hemlock

Cicuta maculata L.

toxins	Cicutoxin
species	Cattle, pigs, sheep, horses
habitat	Wet areas, including ditches, pond edges, swamps
symptoms	Initial symptoms include salivation and muscle twitching that can progress to seizures and even death.
amount necessary for poisoning/ comments	All plant parts contain the toxin, but the leaves and stems lose most of their toxicity as they mature. Roots, tubers, and seed heads are always toxic. Ingesting as little as 8 oz. ingested can result in death within hours.

HIGHLY TOXIC

Spotted water hemlock flowers

Spotted water hemlock leaves

White snakeroot flowers

Young snakeroot plants

White snakeroot

Eupatorium rugosum	
toxins	Tremetol
species	Cattle, sheep, horses
habitat	Woods; cleared areas; moist, rich soils
symptoms	Listlessness, depression, lethargy, hesitation to move and muscle tremors (especially common in cattle)
amount necessary for poisoning/ comments	Eating 0.5 to 1.5% of body weight as green plants. If livestock show "trembles," death is likely. Toxin secreted in milk; can poison calves and humans.

HIGHLY TOXIC

Yew

Taxus spp.	
toxins	Taxine
species	Cattle, sheep, horses
habitat	Ornamental; poisoning from clippings
symptoms	Irregular heart rates, gastric distress, diarrhea, vomiting, tremors, and convulsions. Death is often so rapid that symptoms do not appear.
amount necessary for poisoning/ comments	1% of body weight eaten of leaves, flowers, or fruit can be fatal. Palatability of leaves and fruit are low unless limbs have been cut and placed in pasture, or after a frost.

Yew berries

Nightshade leaves and fruit

HIGHLY TOXIC

Black locust seedpods

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Small black locust plants

Black locust

Robinia pseudocacia	
toxins	Robinine
species	Cattle, sheep, horses
habitat	Roadsides, open woods, fence rows
symptoms	Irregular heart rate, pale mucous membranes, light breathing, depression, abdominal pain, and diarrhea. Death is not uncommon.
amount necessary for poisoning/ comments	As little as 0.1% of body weight eaten in bark can poison horses. Cattle are less susceptible. Bark and seed are most poisonous, but all parts can be toxic.

MODERATELY TOXIC

Bracken fern

Pteridium aquilinum

toxins	Thiaminase
species	Cattle, pigs, sheep, horses
habitat	Woods and open areas
symptoms	Hemorrhaging from nose, mouth, or other mucous membrane; blood in urine or feces; high temperature; cancer
amount necessary for poisoning/ comments	Cattle need to eat their body weight over several months. Young plants ("fiddle heads") are up to five times as poisonous as mature plants. Cattle will select this plant over other forage species. All parts are poisonous.

MODERATELY TOXIC

Braken fern plant

Braken fern leaf detail

Hoary alyssum flowers

Hoary alyssum plant

Hoary alyssum

Berteroa incana

toxins	Unknown
species	Horses
habitat	Pastures
symptoms	Lameness, stiffness, limb swelling, fever, diarrhea, abortion
amount necessary for poisoning/ comments	<20% of forage consisting of hoary alyssum. All parts toxic, green and dried.

MODERATELY TOXIC

Horsenettle

Solanum spp.

toxins	Solanine, other glycoalkaloids
species	Cattle, pigs, sheep, horses
habitat	Fence rows and waste areas; hay fields
symptoms	Depression, decreased heart and respiratory rate, muscle weakness, watery diarrhea, paralysis of hind legs ("sitting dog")
amount necessary for poisoning/ comments	Toxicity varies with plant parts, but is concentrated in tissue in the fall and in berries. Can range from 1 to 3 days of illness to sudden death.

Horsenettle flowers

Horsenettle berries

MODERATELY TOXIC

Horsetail plants

Horsetail stem

Horsetail

Equisetum spp.

toxins	Thiaminase
species	Sheep, horses
habitat	Wet or dry areas of pastures and roadsides
symptoms	Diarrhea, weight loss, hind leg incoordination, decrease in milk production
amount necessary for poisoning/ comments	Hay that is 20% horsetail can cause symptoms. Continued ingestion for 1 to 2 months can cause death.

MODERATELY TOXIC

Oaks

Quercus spp.

toxins	Gallotannins
species	Cattle, pigs, sheep, horses
habitat	Deciduous woods and fencerows; pastures
symptoms	Reduced appetite, depression, abdominal pain (evidenced by teeth grinding and hunched back), black and tarry diarrhea, liver and kidney damage, death in some cases.
amount necessary for poisoning/ comments	Large quantities ingested over time cause poisoning, though some cases report death after only hours of ingestion. All parts of plant are toxic, but the toxin is concentrated in young leaves and green acorns. Calves born to cows feeding on acorns can experience defects. Lactating cattle may have reduced milk production.

MODERATELY TOXIC

White oak acorns

Oak leaves

Typical prunus species flowers

Typical prunus species leaves

Prunus species

Prunus spp.	
toxins	Prussic acid (cyanide)
species	Cattle, pigs, sheep, horses
habitat	Fence rows, woods, waste areas
symptoms	Sudden death after 1 to 2 hours of rapid breathing, frothing at the mouth, dilated pupils, tremors, and convulsions.
amount necessary for poisoning/ comments	One of the most common species that cause poisoning in Wisconsin pastures. Ruminants that eat 0.25% of their body weight in green leaves are likely to die. Very toxic when green leaves are frosted and/or wilted (drought).

MODERATELY TOXIC

Alsike clover (crop)

Trifolium hybridum

toxins	Salicylic acid and glucosides
species	Primarily horses, but other livestock species may exhibit photosensitivity
habitat	Pastures or waste areas, especially acidic soils, **often grown as a crop**
symptoms	Severe sunburn (photosensitivity) including reddening of the white skin areas on exposure to sunlight. Inflammation about the muzzle can extend into the mouth and tongue, resulting in ulcerations. A general swelling about the head may also occur.
amount necessary for poisoning	Toxic dose is not known. Alsike clover should not make up more than 5% of feed.

MILDLY TOXIC

Aslike clover flowers

Aslike clover plants

Buttercup plant

Buttercup flowers

Buttercups

Ranunculus spp.

toxins	Protoanemonin
species	Cattle, pigs, sheep, horses
habitat	Pastures, especially wet areas
symptoms	Reddening of oral mucous membrane, salivation, and diarrhea. Bitter milk or blood in milk.
amount necessary for poisoning/ comments	Variable toxicity in plants. Can be fatal in sheep.

MILDLY TOXIC

Lambsquarters

Chenopodium album

toxins	Nitrate
species	Cattle, pigs
habitat	Common weed, especially in dry areas
symptoms	Perennial edema (kidney damage), drowsiness, weakness, muscular tremors, staggering gate, recumbency, abortion, sudden death (with enough nitrate present)
amount necessary for poisoning/ comments	Dose dependent on nitrate level. Results from ingesting plants that uptake nitrate from nitrate fertilizers or are treated with herbicides. Stems are most poisonous.

Young lambsquarter plant

Lambsquarter flowers

MILDLY TOXIC

Young pigweed plant

Pigweed seedheads

Pigweed

Amaranthus spp.

toxins	Protoanemonin
species	Cattle, pigs, sheep, horses
habitat	Common weed; very toxic due to nephrotoxin and oxalates
symptoms	Perennial edema (kidney damage), drowsiness, weakness, muscular tremors, staggering gate, recumbency, abortion, sudden death (with enough nitrate present)
amount necessary for poisoning/ comments	Dose dependent on nitrate level. Results from ingesting plants that uptake nitrate from nitrate fertilizers or are treated with herbicides. Stems are most poisonous.

MILDLY TOXIC

Sorghum, sudangrass (crop)

Sorghum spp.

toxins	Cyanide and/or excess nitrates
species	Cattle, sheep, horses
habitat	**This crop is grown primarily as an annual forage.**
symptoms	Excessive salivation, difficulty in breathing, and a rapid and weak pulse are common. These can lead to convulsions and coma/death within 10 of 20 minutes of onset of symptoms.
amount necessary for poisoning/ comments	As little as 5 lbs. for cattle and 1 lb. for sheep. Avoid grazing the top 2 feet of forage, especially for the 14 days after a drought or frost. Certain varieties contain lower levels of cyanide and are recommended to avoid toxicity.

MILDLY TOXIC

Sorghum plants

Sorghum seedheads

St. Johnswort flowers

St. Johnswort stems & leaves (note: black dots)

St. Johnswort

Hypericum perforatum

toxins	Hypericin (a photosensitizer)
species	Cattle, pigs, sheep, horses
habitat	Dry soils, roadsides, pastures
symptoms	Photosensitivity (blisters, edema, scabs, redness, peeling), intense itching, swollen eyelids, blindness, starvation, fever, increased heart rate and respiration, diarrhea, shade seeking.
amount necessary for poisoning/ comments	Toxic dose not determined. All parts of the plant that bear the black dots are poisonous. Death is unlikely unless by secondary infection.

MILDLY TOXIC

Sweetclover (crop)

Melilotus spp.

toxins	Fungi that grow on sweetclover can create dicoumaral, the principle toxin
species	Cattle
habitat	Roadsides and waste areas; pastures
symptoms	Signs of poisoning may not appear for up to 3 weeks after feeding moldy sweetclover hay. Animal may be dull and stiff, reluctant to move, with marked swellings; mucous membranes are pale; pulse and respiration rapid. Death may occur suddenly or after several days.
amount necessary for poisoning/ comments	Level of poisoning depends on the amount of toxin produced by the fungi and the duration of feeding. Avoid feeding and spoiled (moldy) sweetclover to animals for more than 2 weeks. Symptoms can occur within 10 to 21 days.

MILDLY TOXIC

Sweetclover flowers

Sweetclover plants

Tall fescue plants

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Tall fescue seedhead

Tall fescue (crop)

Festuca arundinacea

toxins	Ergot alkaloids from the fungal endophyte
species	Cattle, horses
habitat	Common forage grass, especially in the mid-Southern states
symptoms	Restricted blood flow resulting in higher body temperature, reduced feeding. Severe cases will result in lameness, hoof loss, and a failure to shed the winter coat. Weight loss is also common.
amount necessary for poisoning/ comments	Feed that contains as little as 10% of endophyte-infected tall fescue causes toxicity in horses. Avoid feeding seed heads as they contain the highest amount of the toxin. Poisoning can occur anywhere from 8 days to 6 months after ingestion. Horses are most severely affected. Endophyte-free and –safe varieties are available.

MILDLY TOXIC

Wild parsnip

Pastinaca sativa

toxins	Furanocoumarin
species	Horses, cattle
habitat	Roadside ditches, pastures
symptoms	Severe sunburn (photosensitivity)
amount necessary for poisoning/ comments	Toxic dose not yet determined, but large amounts need to be ingested to cause a response. Most palatable prior to flowering, but toxic any time the plants are green.

Wild parsnip flowers

Young wild parsnip plant

MILDLY TOXIC

Resources

Publications

A Guide to Plant Poisoning of Animals in North America
A. P. Knight and R. G. Walter, Teton NewMedia, 2001

Poisonous Plants of Pennsylvania
Robert J. Hill; Commonwealth of Pennsylvania Department of Agriculture, 1986

Poisonous Plants of the Central United States
H. A. Stephens, University Press of Kansas, 1980
http://www.kansaspress.ku.edu/order.html

Pasture Plants Toxic to Livestock in Michigan (E-1725)
Alice Marczewski, Cooperative Extension Service, Michigan State University, 1983

Sampling Soils for Testing (A2100)
University of Wisconsin Extension, Cooperative Extension
http://learningstore.uwex.edu/Sampling-Soils-for-Testing-P183.aspx

Websites

Extension offices (to find your local office)
http://www.csrees.usda.gov/Extension

Guide to Poisonous Plants, Colorado State University
http://www.vth.colostate.edu/poisonous_plants/

Harmful Plant Gallery, Rutgers Cooperative Extension
www.rce.rutgers.edu/harmfulplants/default.asp

Plants Poisonous to Livestock, Cornell University
http://www.ansci.corness.edu/plants.comlist.html

Toxic Plants by Degree of Toxicity, Purdue University
http://vet.vet.purdue.edu/toxic/bytox1.htm

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