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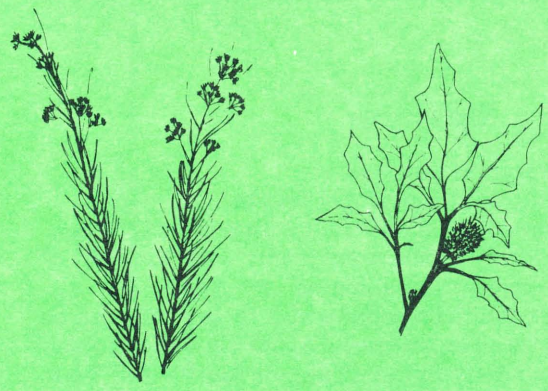
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Pasture Plants Toxic to Livestock in Michigan
Michigan State University Extension Service
Alice E. Marczewski, Center for Environmental Toxicology
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Pasture Plants Toxic to Livestock in Michigan

by Alice E. Marczewski, Center for Environmental Toxicology

Most livestock poisonings from toxic plants occur either in early spring, or during dry periods in summer. In early spring, grasses are often in short supply because they have not had a chance to grow. In summer, drought often leaves few desirable plants to eat. In both instances, a lack of grasses will cause an animal to turn to any green plant for food, usually weeds. Some of these weeds may be poisonous.

Sometimes an animal is poisoned in a pasture that is usually browsed safely. Although pastures of good grass turf are not likely to harbor poisonous plants in open areas, these plants may grow along the pasture margins, especially in fencerows. Animals frequently browse along fencerows and roadsides or in barnyards, fields and waste places, even if they have pastures free of poisonous plants to graze. Since the number and kinds of dangerous plants growing in these areas are greater than in any other area where animals feed, the likelihood of poisoning is correspondingly greater.

Poisoning is more common when animals are new to and unfamiliar with an area; it is generally rare with experienced animals that have adequate pasture. After shipping, animals are hungry, and when introduced to a strange environment, might sample everything. If unaccustomed to the area, they should be fed before turned to pasture.

Poisoning also occurs when animals are fed clippings from ornamental shrubs. This is the most common cause of plant poisonings in Michigan, particularly because of the yew bush.

Poisoning should be suspected if several animals in a herd or flock show acute disorders of the central nervous system or of the digestive tract without fever, but with weakness and rapid loss of weight. However, there are no series of clinical signs for recognizing plant poisoning in animals. Stronger indications of plant poisoning, in general, are a sudden acceleration of the heart rate, stomach and intestinal irritation, general distress, and repeated attempts to void feces. These signs may be followed by extreme weakness, coma, and collapse, and may be accompanied throughout by difficult breathing. In Michigan, however, poisoning is usually sporadic and occurs as "one-at-a-time" type cases.

Signs of plant poisoning may differ considerably in intensity depending upon the kind of plants eaten, the stage of its growth, the soil in which it was grown, the amount eaten, the amount and kind of other feed eaten at the same time or during the time that the poisonous plant was in the animal's digestive tract, and the tolerance of the animal to the poison.

Although other poisonous plants grow in various geographic regions of the United States, the following

discussion deals mainly with those poisonous plants most likely to be found in *Michigan pastures*.

Tables 1 and 2 contain information to help you identify toxic pasture plants as well as certain potentially dangerous crop plants and to help you recognize signs of poisoning.

Preventive Measures

- Do not overgraze pastures.
- Graze pastures at the proper season.
- Fence in areas heavily infested with poisonous plants.
- Learn to identify poisonous plants with the help of your Cooperative Extension Service Agent.
- Learn the conditions under which these plants can be dangerous to your livestock. Avoid allowing animals to graze too early in the spring, or in drought, when weeds are more abundant than desired pasture grasses.
- Do not allow animals that have been under stress or that are overly hungry to graze in areas infested with poisonous plants.
- Develop a grazing plan to improve pastures and prevent poisoning of livestock by plants. Rotational or strip grazing, rather than continuous grazing, allows desirable pasture grasses time for regrowth and recovery.
- Provide adequate clean water for your livestock.
- Control poisonous plants where feasible. (Do not use 2,4-D because it increases palatability of some poisonous plants.)
- If animals become ill, consult your veterinarian to insure proper diagnosis and treatment. If a poisonous plant is involved, identification of the plant is essential for any corrective action.
- If your veterinarian needs help with identification of a plant or treatment when a poisoning is suspected, she/he may contact the Michigan State University Animal Toxicology Hotline (517) 353-5123, 24 hours a day, or the Center for Environmental Toxicology (517) 353-6469, 8:00-5:00, Monday through Friday.

Summary

Recognition of poisonous plants and proper management of animals and pasture will minimize the potential for poisoning of animals from pasture plants. If a poisoning is suspected, consult your veterinarian immediately for proper treatment. In order to aid the animal, the veterinarian must be able to determine the cause of the poisoning. Being able to recognize if poisonous plants have been eaten may be the most valuable aid for proper diagnosis and treatment of a poisoned animal.

Table 1. Common Plants in Michigan Pastures.


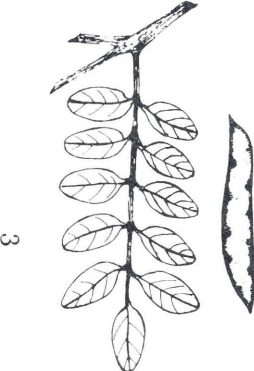




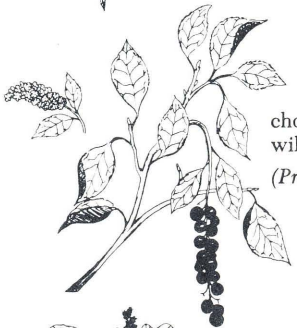

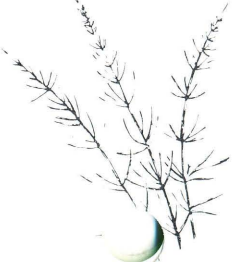
Plant Name	Description of Plant	Dangerous Season	Habitat and Distribution	Affected Animals	Toxic Principles and Effects	
	<p>bitter nightshade (deadly nightshade, bittersweet) (<i>Solanum dulcamara</i>)</p>	<p>Climbing perennial herb that may reach heights of 10 ft., but is usually shorter. Alternately arranged leaves may be simple or deeply lobed. Egg-shaped leaves are smooth on margins. Flower stalks arise between the leaf nodes or opposite the leaves, and support small blue to pale-violet or purple flowers about 1/2" across. Fruits are small, many-seeded yellow, red or black berries.</p>	<p>summer and fall</p>	<p>fence rows, waste areas, grain and hay fields</p>	<p>all</p>	<p>alkaloids—weakness, trembling, labored breathing, nausea, constipation or diarrhea, death</p>
	<p>black locust (<i>Robinia pseudoacacia</i>) (sprouts, pods, seeds, bark, leaves and water in which pods have remained for some time)</p>	<p>Medium-sized tree reaching 60 ft.; 1-2 1/2 ft. in diameter. The pinnately compound, alternately arranged leaves, 8-14" long, have 7-19 nearly sessile leaflets. Flowers appear after leaf emergence in May or June and are borne in drooping racemes 4-5" long. Each flower is about 1" long and very fragrant. Its fruit is a flattened frown pod, 2-4" long and 1/2" wide, that contains 4-8 kidney-shaped, compressed seeds.</p>	<p>all seasons</p>	<p>roadsides, open woods and waste places</p>	<p>cattle and horses</p>	<p>robinine—animals stand with feet spread apart and do not respond to commands; rapid, irregular heart-beat, rapid, shallow respiration, pale mucous membranes, depression, evidence of abdominal pain, diarrhea and periods of nervousness. Death results from cardiac failure</p>
	<p>black nightshade (<i>Solanum americanum</i>)</p>	<p>Erect, much-branched plant, 3-24" tall. Alternately arranged, thin egg-shaped to triangular, long-stalked leaves and small, drooping umbel-like clusters of 2-20 blossoms borne on stalks that arise from the stem between the leaf nodes. Small flowers (1/4" across) have 5 white or pale-violet petals. Fruits are globose black berries that are 1/4-1/2" in diameter when ripe.</p>	<p>summer and fall</p>	<p>fence rows, waste areas, grain and hay fields</p>	<p>all</p>	<p>alkaloids—weakness, trembling, labored breathing, nausea, constipation or diarrhea, death</p>
	<p>bracken fern (<i>Pteridium aquilinum</i>)</p>	<p>Typical fern with large fronds that grow up to 5 ft. Usually grows in colonies; numerous fronds arise from the long, black creeping rootstocks. Leaves triangular, firm, leathery, pinnate.</p>	<p>all seasons</p>	<p>dry, poor soil, open woods, sandy ridges, also dried in hay.</p>	<p>all grazing animals</p>	<ol style="list-style-type: none"> 1. in horses, loss of appetite, "star-gazing" 2. in cattle, cumulative poisoning, at least 1 month, clots of blood in feces, or swelling of throat region in younger animals, anemia

Table 1. Common Toxic Plants in Michigan Pastures (cont.).

Plant Name	Description of Plant	Dangerous Season	Habitat and Distribution	Affected Animals	Toxic Principles and Effects
 <p>buckeyes (<i>Aesculus spp.</i>)</p>	<p>Medium-sized tree. Oppositely arranged palmately compound leaves have a slender petiole from 4-6" long, and 5 (rarely 7) leaflets. The yellowish-green flowers are borne in large clusters at the ends of the branches, and appear in April or May after the leaves have expanded. The fruits are spiny, globular capsules that contain 1-3 large, glossy, chocolate-colored nuts, each with a white scar.</p>	<p>spring and summer</p>	<p>woods and thickets</p>	<p>all grazing animals</p>	<p>glycoside and others—depression, incoordination, twitching and paralysis</p>
 <p>buttercup (<i>Ranunculus spp.</i>)</p>	<p>Erect plant from 8-24" tall with sparsely hairy, little-branched stems. Leaves are usually 3-cleft to below the middle, clothed with hairs. The flowers have pale-yellow, oblong petals approximately 4" long.</p>	<p>summer</p>	<p>wet areas in meadows, woods; low alluvial ground along streams and in ravines and valleys</p>	<p>all, but particularly cattle</p>	<p>anemonal (volatile oil)—in lactating cows there is a sharp drop in milk production and the milk is bitter and red tinted. Severe poisoning causes abdominal pain, diarrhea, nervousness, twitching of the ears and lips, labored breathing, partial paralysis, and convulsions. Sheep may collapse suddenly; pigs may show paralysis but only minor involvement of the digestive system</p>
 <p>chokecherries, wild cherries (<i>Prunus spp.</i>)</p>	<p>Large shrubs or small trees with oblong to obovate leaves. Leaves are sharply toothed, and the teeth are slender and ascending. White or pink flowers are produced in long, many-flowered clusters. Crushed twigs have strong odor.</p>	<p>all seasons</p>	<p>waste areas, fence rows, woods, orchards, prairies, dry slopes</p>	<p>all grazing animals</p>	<p>prussic acid (cyanide)—slobbering, muscle tremors, increased respiration rate, rapid weak pulse, convulsions, labored breathing, death</p>
 <p>cocklebur (<i>Xanthium spp.</i>)</p>	<p>Erect, rough, branched, coarse annual plant. Leaf surfaces rough to the touch. Leaves joined to stems by long petioles. Flowers born in short axillary clusters. Fruit one solid mass, 2-beaked, with 2 cavities, with hooked spines.</p>	<p>spring (esp. 2-leaf stage)</p>	<p>fields, waste places, exposed shores of ponds or rivers</p>	<p>all animals but more common in swine</p>	<p>hydroquinone—loss of appetite, depression, incoordination, twitching, paralysis</p>
 <p>common horsetail (<i>Equisetum arvense</i>)</p>	<p>Rush-like plants with jointed stems and whorled branches; aerial stems usually less than 3 ft. grow from rhizomes.</p>	<p>summer and when abundant in hay</p>	<p>damp, wet places, roadsides, fields and waste places</p>	<p>sheep, cattle & horses</p>	<p>? — thiaminase activity; unthriftiness, excitability, loss of condition, staggering gait, rapid pulse, difficult breathing, diarrhea and emaciation. Death preceded by convulsions and coma. Lowered milk production in cows, trembling in sheep</p>



corn cockle
(*Agrostemma githago*)

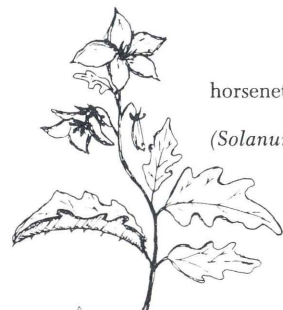
Erect, branched, silky-stemmed, annual herb that grows up to 3 ft. Oppositely arranged, linear or lanceolate leaves are 3-5" long, smooth on the margins and covered with silky hairs. Red flowers are born singly at the ends of the branches.

esp. dry season

weed and grain fields, waste areas; seed contaminant of grain

all

saponin—irritation of mucosa, vomiting, loss of consciousness, diarrhea



horsenettle
(*Solanum spp.*)

Erect, yellow-green, prickly perennial that grows up to 3 ft. Elliptic to ovate leaves are 2-6" long, and have 2-5 large teeth or lobes on each side. The pale violet to white petals form a wheel-shaped blossom about 1" across. The fruit is a smooth, globose yellow berry, about 1/2" across.

summer and fall

fence rows, waste areas, grain and hay fields

all

alkaloids—weakness, trembling, labored breathing, nausea, constipation or diarrhea, death



jimsonweed
(*Datura stramonium*)

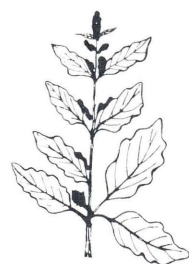
Annual, over 4 ft. Ovate, unevenly toothed, smooth, strongly-scented leaves. White or purplish funnel-shaped flowers, and hard, prickly many-seeded capsules splitting into 4 valves.

summer

fields, barn lots, trampled pastures, and waste places on rich, wet, disturbed soils

all

alkaloids and others—nausea, dizziness, thirst, dilated pupils, convulsions, death



lambsquarter
(*Chenopodium album*)

Erect, green plant, becoming reddish toward base, ranging in height from 1-3 ft. Leaves, with or without basal lobes, either lobed or toothed. Flowers together in small clusters.

all seasons

common in all dry areas

all animals

nitrate and oxalate — salivation, vomiting, diarrhea, labored breathing, incoordination, weak pulse, muscle tremors, prostration, death



larkspur
(*Delphinium spp.*)

Woodland perennial that arises from a cluster of short roots and sends up a stem from 8-16". The stem supports alternately arranged, deeply divided leaves that are mostly near or at the base of the stem. The stem terminates in a flower cluster that is 3-8" long and contains blue or white-spurred flowers, 1-1 1/2" across.





spring

either cultivated or wild, usually in open foothills or meadows

all grazing animals, mostly cattle

alkaloid—straddled stance, repeated falling, nausea, rapid pulse and respiration, constipation and bloating

Table 1. Common Toxic Plants in Michigan Pastures (cont.)

Plant Name	Description of Plant	Dangerous Season	Habitat and Distribution	Affected Animals	Toxic Principles and Effects	
	<p>milkweeds (<i>Asclepias spp.</i>)</p>	<p>Erect, usually unbranched perennial that grows from slender, fibrous roots and reaches heights up to 3 ft. or more. Narrow linear leaves are 1-2½" long. Flowers are greenish-white to white when open. They give rise to narrow spindle-shaped pods from 2-3" long that stand nearly erect and produce numerous seeds. Each seed has a terminal tuft of soft hairs.</p>	<p>spring</p>	<p>dry areas, waste places, roadsides, stream bed</p>	<p>all</p>	<p>resinoid and others—loss of control, spasms, bloating, pulse rapid and weak, rapid breathing, coma, death</p>
	<p>oaks (<i>Quercus spp.</i>)</p>	<p>Mostly deciduous trees, rarely shrubs, with 2-4 leaves clustered at tips of all twigs. Lobed leaves may be rounded or toothed. Acorn born as fruit.</p>	<p>fall (acorns)</p>	<p>in most deciduous woods</p>	<p>all grazing animals</p>	<p>gallotannins—loss of appetite, constipation, dry muzzle, black pelleted feces followed by diarrhea with blood and mucous, frequent urination, weak, rapid pulse</p>
	<p>pigweed (<i>Amaranthus retroflexus</i>)</p>	<p>Erect, branched, stout-stemmed annual herb that grows up to 7 ft. Stems reddish, leaves ovate, margins curled, alternate, long petioles. Flowers in terminal panicles.</p>	<p>all seasons</p>	<p>common in all dry areas</p>	<p>pigs</p>	<p>nitrate and oxalate—rapid onset of weakness, trembling, and incoordination 5-10 days after initial access to the weed, followed by knuckling of the pastern joints and almost complete paralysis of the pelvic limbs. Affected animals usually in sternal recumbency; also show abdominal edema</p>
	<p>pokeweed, poke (<i>Phytolacca spp.</i>)</p>	<p>Erect, branched, smooth perennial with coarse, purplish stems. Short-stalked leaves are alternately arranged, 4-12" long without teeth on margins. Flower clusters from 4-8" long develop at the growing tips of the branches and from the axils of the leaves.</p>	<p>Spring</p>	<p>recent clearings, pastures, waste areas</p>	<p>all animals</p>	<p>many—vomiting, spasms, respiratory paralysis, ulcerative gastritis</p>



poison hemlock
(*Conium maculatum*)

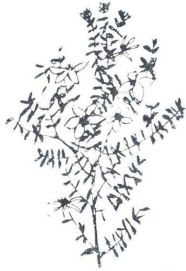
Purple-spotted hollow stem, up to 10 ft.; leaves resemble parsley, parsnip odor when crushed; tap root; white flowers in umbels; broadly ovoid fruits with pale-brown ribs develop from the flowers.

esp. dry season

roadside ditches, damp waste areas, especially northward

all

alkaloids—loss of appetite, salivation, bloating, feeble pulse, paralysis; birth defects



St. Johnswort
(*Hypericum perforatum*)

Erect, much-branched perennial with woody stem from 1-3 ft. The oppositely arranged leaves are narrowly oblong, from 1/2-1 1/2" long on the main stem, and smaller on the shoots. Numerous black-dotted yellow flowers, 1/2-1" across, in clusters at the top of the plant.

esp. dry season

dry soil, roadsides, pastures, ranges

sheep, cattle, horses, goats

primary photosensitizer—skin lesions in white skin, itching, blindness, convulsions, death



water hemlock
(*Cicuta spp.*)

White flowers in umbels. Veins or leaflets ending in notches. Stems hollow, except at nodes. Tuberous roots from chambered rootstock.

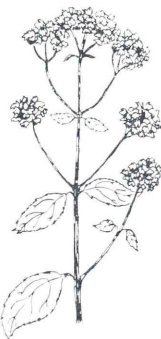
all seasons

open, moist to wet areas

all, especially swine

resinoid—excessive salivation, violent convulsions, dilation of pupils, diaphragm contractions, pain

7



white snakeroot
(*Eupatorium rugosum*)

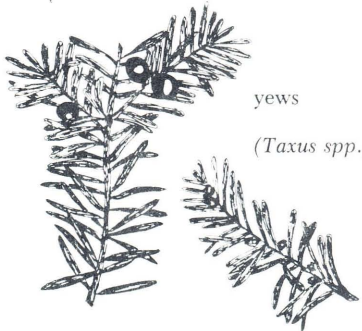
Erect, branched, fibrous-rooted perennial, 1-5 ft., with rough stems, oppositely arranged, stalked, 3-veined, taper-pointed leaves; small white flowers that appear in August.

summer and fall

woods, cleared areas, waste places, usually the more moist and rich soils

cattle and sheep

tremetol—trembling, depression, vomiting, labored breathing, death ("milk sickness" in humans)



yews
(*Taxus spp.*)

Evergreen shrub with needles about 1" long, pointed, green on both sides. Needles stalked with stalks following down twig for distance below the needle. Twigs smooth. On female plants, fruits juicy, red, berry-like, 1/2" in diameter.

all seasons

ornamental shrub; *Not a pasture problem but the most common plant poisoning from clippings being fed to livestock or animals feeding on shrubs

all livestock

taxine—sudden onset of bradycardia, nervousness, trembling, dyspnea, incoordination and collapse. Gastroenteritis may be present in subacute cases. Death results from cardiac failure

Table 2. Crop plants that may be a problem.

Common Name and Scientific Name	Usual Purpose	Conditions of Poisoning	Control	Affected Animals	Toxic Principles and Effects
Alsike clover (<i>Trifolium hybridum</i>)	Forage plant	When dew-covered or wet.	Animals should not be grazed on alsike clover when it is dew-covered or wet.	All grazing animals	Salicylic acid and glucosides—photosensitization, edema, nervousness and digestive disorders associated with liver damage. Inflammation and ulceration of muzzle, mouth and tongue; opacity of cornea and swollen eyelids. "Bighead" in sheep. "Trifoliosis" in light-skinned animals.
red clover and white clover (<i>Trifolium pratense</i> , <i>Trifolium repens</i>)	Forage plant	Animals fed for long periods on clovers with hairy stems, leaves and flowers.	Do not allow animals to graze clovers for long periods of time. Alternate with other forages.	All grazing animals	Formation of hairballs in the animals' stomach.
white sweet clover (<i>Melilotus alba</i>)	Forage plant	Spoiled sweet clover hay or silage (not necessarily visible evidence of spoilage). During spoilage, natural, harmless coumarins converted to toxic dicoumarol. Poisoning usually occurs in winter.	Moldy sweet clover hay or silage should be fed with other kinds of hay, alternating sweet clover and other hay at two-week intervals.	Mainly cattle—also horses, sheep and pigs	Coumarin converted to dicoumarol—poisoned animal dull, stiff, reluctant to move, doughy swellings containing blood in hip, shoulder, neck and chest regions. Faulty blood coagulation resulting in severe hemorrhage, hematomas, nosebleeds, gastrointestinal bleeding.
Johnsongrass (<i>Sorghum halapense</i>)	Forage plant	Any stressful condition to the plant such as drought, frost, wilting, trampling or heavy nitrate fertilization increases cyanogenic glycoside content that releases prussic acid during digestion. Especially young, rapidly growing plants, or dark green second growth.	Do not allow grazing of Johnsongrass or sorghum during drought or after plants have frosted or wilted from any cause. Avoid grazing on very young plants or second growth. Silage should remain in silo six weeks before use.	All animals—especially ruminants	Prussic acid (cyanide)—slobbering, increased respiration rate, labored breathing, rapid weak pulse, convulsions, death
Sorghum (<i>Sorghum vulgare</i>)	Forage and crop plant	Any stressful condition to the plant such as drought, frost, wilting, trampling or heavy nitrate fertilization increases cyanogenic glycoside content that releases prussic acid during digestion. Especially young, rapidly growing plants, or dark green second growth.	Do not allow grazing of Johnsongrass or sorghum during drought or after plants have frosted or wilted from any cause. Avoid grazing on very young plants or second growth. Silage should remain in silo six weeks before use.	All animals—especially ruminants	Prussic acid (cyanide)—slobbering, increased respiration rate, labored breathing, rapid weak pulse, convulsions death.
Millet (<i>Panicum spp.</i>)	Seed crop	Young, rapidly growing plants.	Do not allow animals to graze young growth.	All grazing animals	Hepatotoxic substances — liver damage, jaundice and other signs of liver insufficiency, especially photosensitive dermatitis.
NITRATE ACCUMULATORS	Crop or forage plants	Under certain conditions many plants have the ability to accumulate high quantities of nitrates from the soil. —Cereal crops grown on summer fallow have much higher nitrate content than crops grown on land in continuous production. —Corn growing under hot, dry conditions may concentrate nitrate in the lower part of the stalk. —Grass hay after moistened by rain, snow or excessive dampness has high nitrate content. —Low temperatures, limited sunlight, acid soil, poor mineral sources such as phosphorus, and application of plant hormone herbicides contribute to increased nitrate levels.	Be aware of the conditions listed and the potential problem. Try to avoid these conditions whenever possible.	All animals—swine most susceptible	Nitrate and nitrite—direct irritant action causes salivation, vomiting, diarrhea. Interferes with oxygen carrying capacity of the blood—labored breathing, lowered body temperature, blue mucous membranes, weak pulse, muscle tremors, weakness, incoordination, severe gastroenteritis, convulsions, death. Pregnant females abort following recovery from poisoning
Oats, barley, rye, wheat, corn, sorghum					