



Guide to Toxic Plants in Forages

*Glenn Nice
Purdue University*

Purdue Extension

Knowledge to Go

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Abbreviations Used in This Guide

- ae** Acid equivalent. The acid equivalent of glyphosate products refers to the basic molecule of glyphosate. Most glyphosate products are in the salt form and list ae in the label's ingredient section.
- ai** Active ingredient. For some products, the application rate is provided as an amount of active ingredient. This is done when there are many different products that contain the same active ingredient in varying amounts. Individual product labels list the amount of each active ingredient the product contains.
- BB** The source for this information comes from the USDA-Natural Resources Conservation Service PLANTS Database/N.L. Britton, and A. Brown's *An Illustrated Flora of the Northern United States, Canada and the British Possessions* (1913). The volume and page number follow. For example, "BB 3:361" is a reference to volume 3, page 361 of this publication. See References (page 23) and Online Resources (page 24) for details.
- IPPLP** The source for this information is Purdue Extension publication WS-9, *Indiana Plants Poisonous to Livestock and Pets*. See References (page 23) and Online Resources (page 24) for details.
- PLANTS** The source for this information comes from the USDA-Natural Resources Conservation Service PLANTS Database. See References (page 23) and Online Resources (page 24) for details.
- v/v** By volume. For application rates, this number describes the concentration of herbicide in a mixture or solution.

Reference to products in this publication is not intended to be an endorsement to the exclusion of others that may be similar. Persons using such products assume responsibility for their use in accordance with current directions of the manufacturer.



In The Field...

Several plants that find their way into our pastures are toxic to horses and cattle. In some cases, the chemicals that make these plants toxic are still at toxic levels after being baled into hay. The best way to assure that forage is as safe as possible is to keep these plants out of your fields and pastures. To do this, proper weed identification is crucial.

...And Around The Field

Not only is it important to identify and rectify problems in the field, but some toxic plants, trees, and shrubs can hang over fences. For example, a black locust tree hanging over a fence can drop its pods into a field being harvested and introduce a toxic element into the harvested hay.

Plants to Look For

There are many plants that are potentially toxic to livestock; however, this guide focuses on toxic plants commonly found in Indiana pastures. These plants include:

- ▶ Cress-leaf Groundsel
- ▶ Carolina Horsenettle
- ▶ Jimsonweed
- ▶ Golden Ragwort
- ▶ Climbing Nightshade
- ▶ Common Milkweed
- ▶ White Snakeroot
- ▶ Black Locust
- ▶ Common Pokeweed
- ▶ Dwarf Larkspur
- ▶ Sundial Lupine
- ▶ Poison Hemlock
- ▶ Creeping Spurge
- ▶ Ohio Buckeye
- ▶ Spotted Spurge
- ▶ Horsetail

This Document

Use this publication to help identify these plants and serve as a basic reference. Each entry includes a picture, a description that includes symptoms livestock may experience from eating the plant, and some control measures.

The References (page 23), Online Resources (page 24), and Glossary of Terms (page 25) sections at the end of this guide provide more information. Other plants toxic to livestock not covered in this guide are listed on page 26.

Remember: Always read and follow pesticide labels when using any pesticide.

For more information about
this publication contact:

Glenn Nice
Purdue Extension Weed Science
Botany & Plant Pathology
(765) 496-2121
gnice@purdue.edu

Cress-leaf Groundsel

Packera glabella

Aster Family

Golden Ragwort

Packera aurea

Aster Family

Comments: Cress-leaf groundsel (also known as butterweed) is very common in Indiana pastures and agricultural lands. Golden ragwort appears to be less common. The largest difference between these two plants is that cress-leaf groundsel is an annual and has a hollow stem, while golden ragwort is a perennial.

Cress-leaf groundsel is replacing the mustards for turning Indiana yellow in the spring. Now part of the genus *Packera*, these plants were formerly in the genus *Senecio*. Although not as toxic as some other *Packera* species, cress-leaf groundsel and golden ragwort still have some of the same toxic properties. These plants maintain toxicity after drying, so they are still toxic in baled hay.



Cress-leaf groundsel.

BB 3:540.



A field infested with cress-leaf groundsel.

Bill Johnson, Purdue University.



Cress-leaf groundsel.

Glenn Nice, Purdue University.



Cress-leaf groundsel flowers.

Merrill A. Ross, Purdue University.

Identification: Plants in this group start as basal rosettes. In golden ragwort, basal leaves can start narrow, with long, slender petioles, then widen into a spoon shape. Golden ragwort's leaves are often purplish. Cress-leaf groundsel's basal leaves do not have long petioles, but are pinnately divided. Some of its segments can be round. Golden ragwort's leaves are 1 to 6 inches long and cress-leaf groundsel's leaves are 2 to 10 inches long. Once cress-leaf groundsel bolts, its stems are hollow. Both plants have yellow, petal-like ray flowers. Cress-leaf groundsel has six to 12 of these ray flowers and golden ragwort has eight to 12.

Toxic Parts: The seed, flowers, and leaves. Young plants are more toxic than older plants (IPPLP).

Symptoms: Poor doer, weight loss, unthriftiness, poor hair coat, anorexia, behavioral changes, sunscald, liver failure, jaundice, and death (IPPLP). The toxicity levels of Indiana species are generally considered less than western species. Seneciosis is the name given to chronic symptoms.

Control: Apply 2,4-D at 1 qt/A between late October and early November. Applications are less effective if made after cress-leaf groundsel starts to bolt in the spring. Susceptible legumes will be injured or controlled. A combination of dicamba and 2,4-D (Banvel + 2,4-D[®], Weedmaster[®], Brash[®]) can be applied at 1 to 4 pts/A in the fall.



Golden ragwort.

BB 3:544.



Golden ragwort.

Robert H. Mohlenbrock, PLANTS/USDA SCS. 1989. *Midwest Wetland Flora: Field Office Illustrated Guide to Plant Species*. Midwest National Technical Center, Lincoln.

Comments: White snakeroot is of particular concern for nursing or milk-producing livestock because its toxic component is trematone, which can be passed along in milk, resulting in milk sickness. This plant tends to like shady places, and is highly toxic.

Identification: This herb grows up to 4 feet tall. Stems are branched and usually hairless, but it can have long hairs. Its leaves are oppositely arranged, are ovate with truncate to cordate bases, and have serrated margins. Its flowers are white.

Toxic Parts: Leaves and stems; underground structures are thought to be less toxic.

Symptoms: Trembling, sweating, depression, stiff gait, heart failure, jaundice, toxic milk, and death (which may be sudden) (IPPLP). Livestock can die one to three weeks after eating this plant, and death can be faster in horses, occurring in just one to three days (IPPLP). A dose of 1% to 10% of an animal's body weight over a period of time, or in one feeding, can result in poisoning. The toxin in white snakeroot is excreted in milk, requiring extra caution when feeding lactating animals.

Control: Hand removal is effective when infestations are small enough. Triclopyr + 2,4-D (Crossbow®) at 1 to 2 qts/A will provide 80% control. Dicamba (Banvel®, Clarity®, Oracle®,



White snakeroot.
BB 3:361.



White snakeroot.
Merrill A. Ross, Purdue University.

Sterling®) products provide about 80% control at 1 to 1.5 pts/A. Spot applications of glyphosate at a 2% v/v solution with water can also provide good control.

Dwarf Larkspur*Delphinium tricorne***Buttercup Family**

Comments: Dwarf larkspur is also called staggerweed, perhaps because it causes the staggers in livestock. Larkspurs are a greater problem in western states, but dwarf larkspur can be found in Indiana. This plant is generally found in more woodland areas and may be rare in maintained pastures. Larkspurs are reported to be palatable, but consuming just 1/4 pound of larkspur per 100 pounds of animal body weight can kill cattle (IPPLP). The plant's toxic alkaloids remain toxic when dried, so it is still toxic in baled hay.

Identification: Larkspurs are most readily identified by their unique flowers. The flowers have five sepals, but one of the five is elongated into a spur-like structure. Flowers are 1 to 1.5 inches long and blue or white. Dwarf larkspur is generally 1 to 3 feet tall at maturity. Its leaves are on thin petioles and palmately divided.

Toxic Parts: All parts, particularly seeds and young leaves.

Symptoms: The alkaloids in *Delphinium* species affect muscle coordination. Animals can stagger, lose coordination, and have abnormal heart rates.



Dwarf larkspur.

BB 2:96.



Dwarf larkspur.

Thomas G. Barnes, PLANTS.

Constipation, paralysis, and breathing difficulties also can occur.

Control: Information on dwarf larkspur is limited. In the case of small infestations, hand pulling and removal may suffice. Applying 1.5 to 2 oz/A of metsulfuron-methyl (Escort XP[®], Cimarron[®]) is labeled for control of duncecap and tall larkspur. Duncecap and tall larkspur also appear on the Glyphomax[®] label, which recommends spot applications using a handheld applicator with a 2% v/v mix just before budding.

Creeping Spurge

Euphorbia spp.

Spurge Family

Spotted Spurge, Sandmat

Chamaesyce spp.

Spurge Family

Comments: Several spurges are found in Indiana, including spotted, prostrate, nodding, ground, and cypress species. Most spurge species contain diterpenoids (compounds that can be toxic in large enough doses) in their sap.

Identification: Spurges can be prostrate or erect, depending on the species; however, they all have a milky sap that can be seen when the stems are broken or leaves are pulled. Spurges can have opposite, alternate, or whorled leaves — sometimes all on the same plant — depending on the species. Spotted spurge leaves are opposite and often have a purple blotch at the base of each leaf. Spurge leaves are oval to ovate on some species, but others are linear. All spurges have a three-lobed, chambered fruit.



Creeping spurge, matted sandmat.

BB 2:464.



Creeping spurge.

Pedro Acevedo-Rodriguez, PLANTS.

Toxic Parts: All parts.

Symptoms: Horses and cattle can develop digestive irritations and weakness. The sap can irritate and inflame the skin and eyes. Continued irritation can lead to blistering and hair loss. Spurges remain toxic whether they are green or dried. Generally, spurges are unpalatable (which reduces consumption), but can still irritate.

Control: Specific control methods for any given spurge species does not necessarily control others. Spot applications of glyphosate at 0.75 lb ae/A for plants 6 inches and smaller, or 1 to 1.5 lbs ae/A for plants larger than 6 inches, can be effective on annual spurges. Glyphosate will injure or control desired grasses and broad-leaf forages. Precise spot applications of 1% v/v solution can be used.



Spotted spurge, sandmat.
BB 2:467.



Spotted spurge, sandmat.
Patrick J. Alexander, PLANTS.

Carolina Horsenettle *Solanum carolinense* Nightshade Family

Climbing Nightshade *Solanum dulcamara* Nightshade Family

Comments: Carolina horsenettle is often found in Indiana pastures and can be difficult to control. Most livestock will not eat these plants in the pasture; however, Carolina horsenettle frequently makes its way into baled hay.

Animals still will try to avoid these plants in hay, but if the feed is processed avoiding it is not possible. Although drying the plant reduces its toxicity, it does not eliminate it.

Identification: These nightshades have five fused petals in a star-shaped flower. Both plants are perennials. Carolina horsenettle has prickles on the stem, petioles, and a mid-rib of leaves. These plants grow 1 to 4 feet tall. Its leaves are alternate, can be 2 to 6 inches long, are oblong or ovate, and have lobed margins. Carolina horsenettle flowers are blue or purple to violet (Stubbendieck et al., 2003). Its fruit is a berry that starts green and turns yellow as it matures.

Bitter nightshade is a climbing or trailing vine that can be 2 to 8 feet long. It does not have prickles, but it may have hairs. Its leaves are teardrop, ovate, or hastate in shape (Stubbendieck et al., 2003). There are two leaf lobes on the petiole. Some lobes are deep enough to give the leaf a three-lobe appearance. Flowers can be blue, purple, or white and can be 0.4 to 0.6 inch wide.



Carolina horsenettle.
BB 3:165.



Carolina horsenettle.
Thomas G. Barnes, PLANTS/T.G. Barnes and S.W. Francis. 2004.
Wildflowers and Ferns of Kentucky. University Press of Kentucky.

Toxic Parts: All parts are potentially toxic, but the berries are more toxic than others.

Symptoms: Nightshade plants cause gastrointestinal tract problems and can affect the central nervous system. Signs of nightshade poisoning include abdominal pain, vomiting, diarrhea, loss of coordination, weakness, depression, apparent hallucinations, convulsions, and possibly death (IPPLP).

Control: For Carolina horsenettle, apply metsulfuron methyl (Cimarron®) at 0.1 to 1 oz plus either 2,4-D or dicamba (Banvel®, Clarity®, Oracle®, Sterling®). Carolina horsenettle also can be suppressed or controlled if triclopyr + 2,4-D (Crossbow®) is applied at 4 qts/A or applied with a handheld, high-volume applicator at 1.5% v/v mix with water.

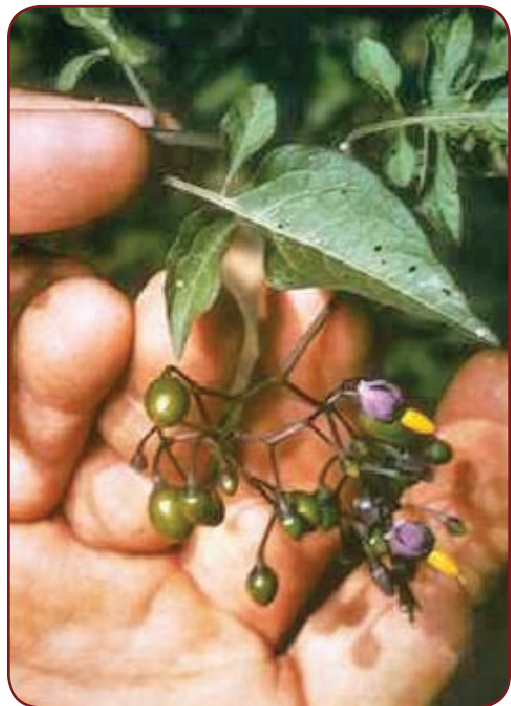
There are few reported bitter nightshade control methods. Those that do exist warn that hand removal often results in resprouting. Remove all stems to avoid resprouting.



Climbing nightshade.
BB 3:167.



Climbing nightshade.
R.A. Howard, PLANTS



Climbing nightshade.
Merrill A. Ross, Purdue University.

Comments: Black locust is a tree native to Indiana that can grow as high as 80 feet. It is often used in landscaping and grows wild. Black locusts growing near pastures can hang over fences and drop seedpods into a pasture that may be bundled in hay. Small seedlings may also appear in pastures when pods or seed are introduced.

Identification: The black locust tree is distinguished by its pinnate leaves that are arranged alternately on the stem with an odd number of leaflets — usually nine to 19. The leaflets are oval to ovate. Stipules at the bases of the leaves turn into thorns as the plant matures.

Its flowers are white or yellow and are on a drooping raceme. The pods are hairless, 2 to 4 inches long, and about 1/2 inch wide. Each pod contains four to seven seeds. These trees have rough bark.

Toxic Parts: Leaves (especially wilted ones), young shoots, pods, seeds, and inner bark.

Symptoms: Heart and breathing problems, upset stomach, dizziness, nervousness, and (in rare cases) death. Symptoms can appear one to two hours after ingestion. Mucous membranes turn yellow, appendages become cold and pupils dilate. Intestinal problems can lead to bloody diarrhea (IPPLP).



Black locust.

BB 2:375.



Black locust.

Patrick J. Alexander, PLANTS.

Control: Don't allow trees to overhang pastures. Cut them back or remove trees that infringe on pastures.

Seedlings and trees less than 5 feet tall can be controlled with a broadcast application of Crossbow® at 1.5 gal/A in 10 to 30 gallons of water per acre. Spot applications can be made with a high volume applicator and a 1% to 1.5% v/v mix. When using high volume applicators, apply to covering foliage and stems until the solution drips. For trees taller than 5 feet, control will be more difficult — use a basal or cut stump application.

Repeated applications of glyphosate products can suppress black locust; however, misapplication may damage desirable forages. If applied in the pasture, you cannot treat more than 10% of an acre using a rate of 2 qts/A. For tree control outside the harvested pasture, use 1.5 to 3 qts/A or 1% to 1.5% v/v mix in a high volume applicator. See Table 1 (page 22) for glyphosate rates.

Dicamba products (Banvel®, Clarity®) can suppress black locust. Using 0.5, 1, or 2 lbs ai/A of dicamba requires waiting periods of 37, 51, or 70 days, respectively (see product label for exact rates and waiting periods). Make girdle or stump cut applications on trees using one part herbicide and one to three parts water.

In girdle applications, make incisions with a hatchet or saw and paint herbicide in the incisions. In cut stump applications, cut down the tree, then paint the herbicide mixture over the exposed stump within a half hour of removal.



Black locust.
Elaine Haug, PLANTS.

Comments: Ohio buckeye is a tree that is not generally found in pastures, but may be found on pasture peripheries hanging over fences. This is one of the first trees to leaf out in the spring, making its young leaves and buds alluring to livestock.

Identification: Ohio buckeye trees can grow up to 75 feet tall. Among its most noticeable characteristics are the five (and, rarely, seven) leaflets originating from a common point. The complete leaf (with leaflets) originates from the stem from a long petiole. Leaves can be up to 6 inches long. This tree's bark is rough and has a distinct unpleasant odor. It has pale yellow flowers that are arranged in a loose panicle, and the flower's four petals are 0.3 to 0.6 inch long. The characteristic fruit of



Ohio buckeye.
BB 2:348.



Ohio buckeye.

D.E. Herman et al., *PLANTS/North Dakota Tree Handbook*. 1996. USDA NRCS ND State Soil Conservation Committee; NDSU Extension and Western Area Power Administration, Bismarck.

the tree is 1 to 1.5 inches in diameter and prickly when young, but becomes smooth as it matures.

Toxic Parts: Buds, nuts, leaves, bark, and seedlings.

Symptoms: Two effects: (1) Gastrointestinal signs can include excessive salivation, gastrointestinal irritation, vomiting (in livestock that can vomit), abdominal pain, and diarrhea. (2) Neurological signs can include staggering, trembling, breathing difficulty, dilated pupils, collapse and paralysis, which can lead to coma and death (IPPLP).

Control: Don't allow trees to overhang pastures. Mechanically cut back or remove trees infringing on pastures.

Dicamba (Banvel[®], Clarity[®], Sterling[®], and Oracle[®]) with 2,4-D can suppress

Sundial Lupine*Lupinus perennis***Pea Family**

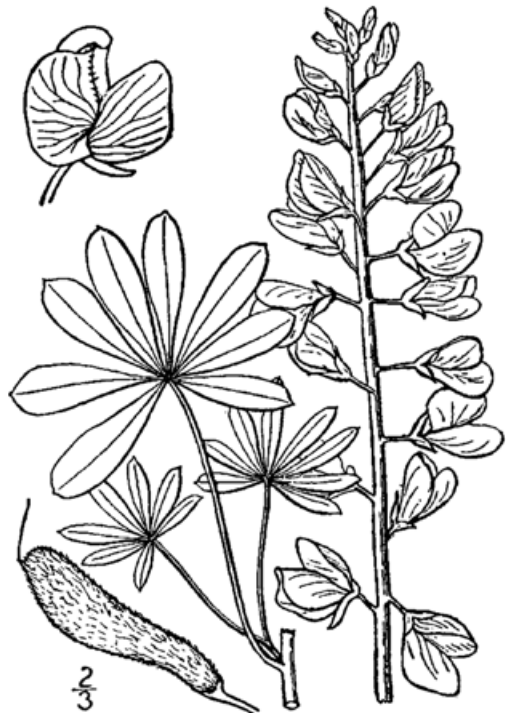
Comments: The group of native plants called lupines are generally found in western states, but sundial lupine can be found in Indiana and bigleaf lupine has been reported in Michigan and Wisconsin. In the West, lupines are a leading cause of live-stock poisoning.

Identification: Palmate leaves are one of lupines' most identifiable characteristics. Sundial lupine can have seven to 11 leaflets, and this herbaceous plant is 1 to 2 feet tall at maturity. It is a member of the pea family and its flowers are pea-like and arranged in a terminal raceme. Its flowers are generally blue, but are sometimes pink or white.

Toxic Parts: All parts, especially pods with seeds.

Symptoms: Breathing problems, behavioral changes, trembling, birth defects, coma, and death (IPPLP).

Control: Lupine is on several 2,4-D labels (2,4-D LV 4 Ester, Weedone LV4[®], and 2,4-D 6 Amine). Washington



Sundial lupine.
BB 2:348.

State University reported achieving more than 93% control approximately two months after application when using 0.009 lb ai/A of metsulfuron-methyl (Ally[®], Cimarron[®]) plus 0.4 lb ai/A of 2,4-D (Yenish et al., 2003).

Ohio Buckeye continued

or control buckeye species. Premixes of dicamba plus 2,4-D (Banvel + 2,4-D[®] and Weedmaster[®]) at 1.45 lbs ai/A can be applied when buckeye is fully leafed out. Repeat applications will be necessary.

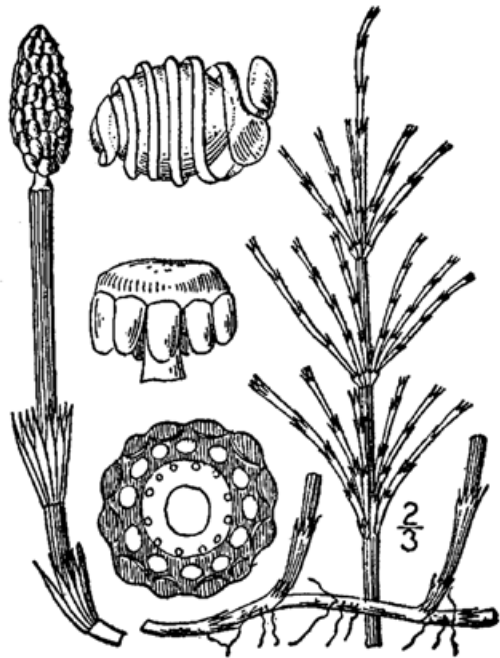
Ohio buckeye.

D.E. Herman et al., *PLANTS/North Dakota Tree Handbook*. 1996.
USDA NRCS ND State Soil Conservation Committee; NDSU Extension and Western Area Power Administration, Bismarck.



Comments: Horsetail — which also has been called monkey grass, snake grass, and scouring rush — is generally found in wetter portions of a field. Horsetail often moves into fields from drainage ditches or creeks along the fields' edges. Well-maintained pastures can compete with horsetail, and mowing can suppress growth. Parts of the plant sometimes find their way into baled hay. This weed most often affects horses, but equisetosis (the condition horsetail causes) typically occurs only after prolonged feeding.

Identification: Horsetail grows in colonies that appear like green straws. Its stems are hollow, can be separated into segments, and are rough to the touch. Its leaves are scale-like and inconspicuous. There are two primary stem types: one is a reproductive stem that generally does not branch, the other is a vegetative stem that has smaller stems radiating from the segmented stem.



Horsetail.
BB 1:39.

Toxic Parts: All parts when dried.

Symptoms: Poisoning from prolonged horsetail feeding can lead to breathing and heart problems. Digestive problems can lead to upset stomach and diarrhea. In some cases,



Horsetail.
Eric Ott, Purdue University.

animals can have convulsions. Young animals can be more susceptible than older ones.

Control: Horsetail control is not easy; the plant has rhizomes that, when cut up by mechanical removal, can distribute the plant to other areas. However, well-maintained pastures can compete well with horsetail. Mowing or cutting can suppress horsetail growth.

Horsetail does not respond to many herbicides. Control results can often be inconsistent and may result in no control or suppression. Michigan State University researchers reported that one month after application, glyphosate controlled field horsetail by 94%, 77%, and 73% at three

locations (Little et al., 2005).

However, control decreased to 67% after three months, 57% after two months, and 60% after four months. Spot treatments in grass pastures will require repeat applications and may result in suppression. The same MSU study also reported 92%, 77%, and 92% control with a combination of clopyralid (Curtail®, Stinger®) + MCPA.

A colony's age, the specific species present, and whether target applications are made on vegetative stems or reproductive stems may all affect control. In Indiana, horsetail colonies are most frequently composed of reproductive stems with very few or no vegetative stems.



Horsetail.
Eric Ott, Purdue University.

Comments: Jimsonweed is a greater problem in row crop agriculture than pastures. However, it is occasionally found in neglected or unused pastures. Most animals avoid it.

Identification: One quick identifier is to rub the leaves, then smell your fingers. Jimsonweed's unique scent makes it easy to confirm identification. Jimsonweed can grow up to 5 feet tall. Its stems are green to purple. Leaves are ovate in outline, but coarsely toothed. Flowers are tubular and white or violet. The fruit is a capsule armed with prickles.

Toxic Parts: All parts, including seeds.

Symptoms: Symptoms can appear quickly. Poisoning increases cattle's pulse and respiration. As the pulse increases, respiration can slow. Animals can appear blind and develop digestive problems such as nausea and diarrhea. Pupils will often dilate.

Control: Most growth regulator herbicides provide excellent jimsonweed control. Dicamba (Banvel[®], Clarity[®], Sterling[®], and Oracle[®]) can be



Jimsonweed.

BB 3:169.

applied at 0.5 to 1.5 pts/A. Clopyralid (Stinger[®]) at a rate of 0.25 to 0.5 pt/A can be used on jimsonweed that has five or fewer leaves.

Spot applications of glyphosate at 2% v/v mix with water will control jimsonweed, but can injure desirable forages, so make spot applications precise.



Partially open jimsonweed flower.

Glenn Nice, Purdue University.



Jimsonweed fruit.

Patrick J. Alexander, PLANTS.

Common Milkweed*Asclepias syriaca***Milkweed Family**

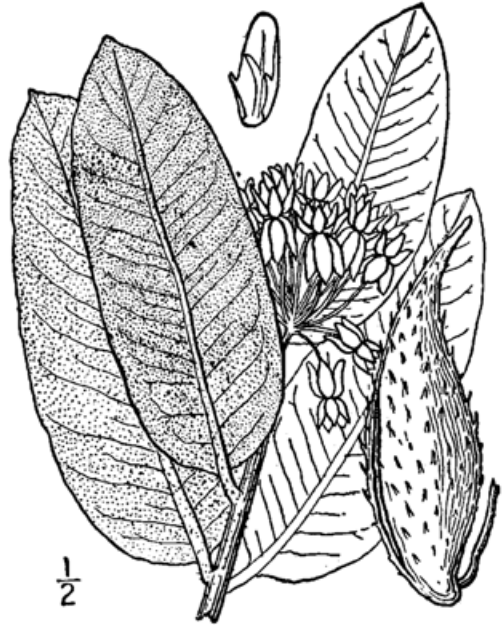
Comments: Several milkweeds can be found in Indiana and common milkweed often is promoted for monarch butterfly habitats. However, this plant sometimes can encroach on pastures used for hay, and can be toxic in dried hay.

Identification: Milkweeds often have a milky sap, hence the name. In common milkweed and some other milkweed species, the stems are thick and don't branch. Damaged common milkweed (by mowing, cutting, and so on) can sometimes split into two or more stems.

All milkweeds in Indiana form pods. Most common milkweed plants are 3 feet tall or less; however, they can grow up to 5 feet tall. Its leaves are oblong to oval, 4 to 9 inches long, 2 to 4.5 inches wide, and usually opposite. Leaves have fine hairs on the bottoms. Flowers are arranged in an umbel and can range in color, including pink, purple, orange, or white.



Common milkweed.
Merrill A. Ross, Purdue University.



Common milkweed.
BB 3:30.

Toxic Parts: Stems, leaves, and roots.

Symptoms: Gastrointestinal irritation (primarily vomiting and diarrhea), loss of coordination, tremors, heart problems, respiratory difficulty, and death (IPPLP).

Control: Spot or wiper applications of glyphosate provide good common milkweed control. Use a 2% solution or 2.25 lbs ae/A as a broadcast application. Be aware that glyphosate also will damage desired grasses and forages, so most glyphosate labels restrict applications to spot treatments covering 1/10 or less of the pasture. Glyphosate at 1.5 lbs ae/A plus 2,4-D at 0.75 lb ai/A also can provide good common milkweed control.

Common Pokeweed *Phytolacca americana* Pokeweed Family

Comments: Common pokeweed is very common in Indiana. Birds that eat its berries can disperse its seeds. Although still toxic, IPPLP considers pokeweed's toxicity to be low.

Identification: Reddish stems are commonly pokeweed's most identifiable characteristic. Common pokeweed can grow up to 10 feet tall. Its simple, alternate leaves are oblong to lanceolate with pointed tips. Leaves have smooth margins, are 4 to 12 inches long, and 1.5 to 4 inches wide. Flowers are white or greenish, and arranged in racemes that are 4 to 7.8 inches long. Once fertilized, the flowers become dark purple berries.

Toxic Parts: All parts, particularly roots and seeds.

Symptoms: Gastrointestinal irritation (colic or diarrhea, which may be bloody). In rare cases, anemia or



Ripening common pokeweed fruit.
Glenn Nice, Purdue University.



Common pokeweed.

BB 2:26.

death. Birth defects and tumors also may be possible (IPPLP). Vomiting (in livestock that can vomit) may occur shortly after consumption, sometimes followed by bloody diarrhea. In most cases, poisoning is mild and the animal will recover within 24 to 48 hours (IPPLP).

Control: Apply clopiralid + 2,4-D (Curtail®) at 2 to 4 qts/A. Triclopyr + 2,4-D (Crossbow®) at 4 qts/A or at 1.5% v/v solution also controls pokeweed. Glyphosate (0.75 lb ae/A) plus 2,4-D (0.5 to 0.75 lb ai/A) also can be used to control pokeweed. Glyphosate applications should be made in late September or early October. Glyphosate may injure or kill desired grasses and legumes. Clopiralid + 2,4-D and triclopyr + 2,4-D will injure or kill any legumes in the pasture.

Poison Hemlock*Conium maculatum***Carrot Family**

Comments: Poison hemlock populations appear to be on the rise in Indiana. This biennial is most often noticed during its second year of growth when it bolts and can reach heights of 6 feet.

Identification: Poison hemlock is a biennial. In the first year, the plant is a low-lying herb. In the second year, it bolts and can grow to 3 to 8 feet tall. Its leaves are alternate, sheathed at the stem, and finally divided. Many small white flowers are arranged in an umbel inflorescence. Poison hemlock stems have purple blotches, a characteristic that distinguishes it from wild carrot (queen Ann's lace). Also, poison hemlock's leaves are more angular than those of wild carrot.

Toxic Parts: All parts, especially in young plants.

Symptoms: Nervousness, trembling, loss of coordination, depression, coma, death, and birth defects (IPPLP).

Control: Apply triclopyr + 2,4-D (Crossbow[®]) at a 1.5% v/v solution



First-year poison hemlock growth.
Glenn Nice, Purdue University.



Poison hemlock.
IPPLP.

with water or a 2 to 4 qts/A application in the first year of growth. Control may be inconsistent once bolting occurs. Dicamba (Banvel[®], Clarity[®]) also is effective on poison hemlock, as are metsulfuron methyl (Cimarron[®]) at 0.5 to 1 oz/A and metsulfuron methyl (Escort XP[®]) at 1 to 2 oz/A. Metsulfuron methyl + dicamba (Cimarron Max[®]) and clopyralid + 2,4-D (Curtail[®]) provide about 80% poison hemlock control. Control decreases as the plant nears blooming stage.

Glyphosate also can control or suppress poison hemlock. Most glyphosate labels recommend applying 1% to 1.5% v/v solution with water to the plants until they are wet using handheld equipment. The optimum application times are from bud to full bloom. Complete coverage is crucial.

Table 1. Glyphosate Products Glossary¹

This table lists a number of commercial products that contain glyphosate. The table includes formulations, surfactant recommendations, and manufacturers. Please note: other glyphosate products may be available. Always read a product's label to determine if it is approved for postemergence use on Roundup Ready[®] crops.

Product	Salt ²	Active Ingredient ³ (lbs/gallon)		Rate Equivalent to Quart of Roundup Original ⁴	Surfactant Needed? ⁴	Manufacturer
		Acid	Salt			
Buccaneer [®]	IPA	3	4	32 oz	Yes	Tenkoz, Inc
Buccaneer Plus [®]	IPA	3	4	32 oz	No	Tenkoz, Inc
Clearout 41 plus [®]	IPA	3	4	32 oz	No	Chemical Products Tech.
Cornerstone [®]	IPA	3	4	32 oz	Yes	Agrilience LLC
Cornerstone Plus [®]	IPA	3	4	32 oz	No	Agrilience LLC
Credit [®]	IPA	3	4	32 oz	Yes	Nufarm
Credit Extra [®]	IPA	3	4	32 oz	No	Nufarm
Durango [®]	IPA	4	4.5	24 oz	No	Dow AgroSciences
Extra Credit 5 [®]	IPA	3.75	5	26 oz	No	Nufarm
Gly Star Original [®]	IPA	3	4	32 oz	Yes	Albaugh
Gly Star Plus [®]	IPA	3	4	32 oz	No	Albaugh
Gly Star 5 [®]	IPA	4	4.5	24 oz	Yes	Albaugh
Gly-4 [®]	IPA	3	4	32 oz	Yes	Universal Crop Protection
Gly-4 Plus [®]	IPA	3	4	32 oz	No	Universal Crop Protection
Gly-Flo [®]	IPA	3	4	32 oz	Yes	MicroFlo
Glyphosate Original [®]	IPA	3	4	32 oz	Yes	Griffin
Glyfos [®]	IPA	3	4	32 oz	Yes	Chemi Nova
Glyfos X-tra [®]	IPA	3	4	32 oz	No	Chemi Nova
Glyphogan [®]	IPA	3	4	32 oz	No	Makhteshim
Glyphomax XRT [®]	IPA	4	5.4	24 oz	No	Dow AgroSciences
Helosate Plus [®]	IPA	3	4	32 oz	No	Helm Agro US
Honcho [®]	IPA	3	4	32 oz	Yes	Monsanto
Honcho Plus [®]	IPA	3	4	32 oz	No	Monsanto
Mirage [®]	IPA	3	4	32 oz	Yes	UAP/Platte
Mirage Plus [®]	IPA	3	4	32 oz	No	UAP/Platte
Rattler [®]	IPA	3	4	32 oz	Yes	Helena
Rattler Plus [®]	IPA	3	4	32 oz	No	Helena
Roundup Original [®]	IPA	3	4	32 oz	Yes	Monsanto
Roundup Original Max [®]	IPA	3	4	32 oz	Yes	Monsanto
Roundup Original Max [®]	K	4.5	6	22 oz	No	Monsanto
Roundup WeatherMax [®]	K	4.5	6	22 oz	No	Monsanto
Touchdown HiTech [®]	K	5	6.7	20 oz	Yes	Syngenta
Touchdown Total [®]	K	4.17	5.6	24 oz	No	Syngenta

¹Source: Purdue Extension publication WS-16 and Ohio State University Extension publication Bulletin 789, *Weed Control Guide for Ohio and Indiana*, www.btny.purdue.edu/Pubs/WS/WS-16/WS-16.pdf.

²Salts: IPA=isopropylamine; K=potassium.

³Active ingredient: acid=pounds of active glyphosate per gallon; salt=pounds of final formulated product per gallon.

⁴Surfactants: For products that allow or require nonionic surfactants, the typical rate is 0.25% v/v (or, 1 quart per 100 gallons of spray).

Table 2. Grazing and Harvest Intervals

This table shows the time one must wait after applying a particular herbicide before animals can graze there again or the pasture can be harvested.

Herbicide	Grazing	Harvest
Ally®	none	none
Banvel®	7 days	37 days
Cimarron®	none	none
Cimarron Max®	7 days for lactating animals; none for others	37 days
Clarity®	7 days	37 days
Crossbow®	next season for lactating animals; none for others	14 days
Curtail®	14 days for lactating animals; none for others	30 days
Escort XP®	none	none
Stinger®	none	none
Glyphosate products	7 days	14 days
Weedmaster®	7 days for lactating animals; none for others	37 days

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Online Resources

Purdue Extension *Indiana Plants Poisonous to Pets and Livestock*

www.vet.purdue.edu/depts/addl/toxic/cover1.htm

Cornell University Poisonous Plants Database

www.ansci.cornell.edu/plants/index.html

USDA-Natural Resources and Conservation Service PLANTS Database

<http://plants.usda.gov>



www.btny.purdue.edu/weedscience

Glossary of Terms

anemia	A decrease in hemoglobin and red blood cells taxing the body's ability to transport oxygen. Symptoms include weakness, lack of vigor, shortness of breath, and muscle pain.
cordate	A leaf that is heart-shaped with a notch at the base.
diterpenoids	A large and diverse group of organic compounds often found in plants. Often important in traditional medicine, they can be toxic in the wrong dose.
gait	The manner in which an animal walks, runs, or moves.
jaundice	A yellow discoloration of the skin and is often prevalent as a yellowing of the whites of the eyes. Generally caused by a build up of bile pigments in the blood, often from a decrease in liver function.
lanceolate	A leaf that is in the shape of a lance, longer than wide.
ovate	A leaf that is egg-shaped.
palminate	Leaflets that are arranged, lobed, or veined in a palm-like manner, originating from a common point.
panicle	A branched raceme-like inflorescence where flowers mature from the bottom up.
petiole	A leaf stalk.
pinnate	A compound leaf that contains more than three leaflets arranged on opposite sides of an axis.
raceme	An unbranched, elongated inflorescence with flowers maturing from the bottom up.
staggers	A condition when an animal walks or stands unsteadily.
stipules	Leaf-like appendages found at the base of a petiole.

Glossary sources: www.dictionary.com and *Plant Identification Terminology: An Illustrated Glossary* (James G. Harris and Melinda Woolf Harris).

Other Plants Toxic to Livestock

This guide does not describe every possible plant that could be toxic to livestock. Other toxic plants include:

Azalea, Rhododendron	Johnsongrass
Black Walnut	Red Maple
Bouncing Bet	Marijuana
Brackenfern	Milkweed
Common Burdock	Mustards
Buttercup	Stinging Nettle
Castorbean	Red Oak
Catnip	Oleander
Cherry	Pigweed
Christmas Plant (Poinsettia)	Rhubarb
Cocklebur	Rosary Pea
Dumbcane (Aroids)	St. Johnswort
Dutchman's Breeches	Star of Bethlehem
Easter Lily	Tansy
English Ivy	Tobacco
Foxtail Barley	Water Hemlock
Green False Hellebore	Yellow and White Sweetclover
Jack-in-the-Pulpit	Yew

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Cress-leaf groundsel

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