



Horse Nutrition

Bulletin 762-00

Poisonous Plants

Poisonous plants can cause serious injury to horses, particularly if animals graze when plants are at an especially dangerous growth stage, when little other forage is available, and when animals are very thirsty. Poisonings can be avoided by proper management of animals, pastures, and hay. Suggestions for preventing poisoning are as follows:

- Know which plants are poisonous and when they are potentially dangerous.
- Inspect pastures to identify and destroy poisonous plants before initiating grazing.
- Be sure animals are neither hungry nor thirsty when put on pasture or fed hay that might have poisonous plants.
- Buy hay locally so that unfamiliar and potentially poisonous plants are not fed and seeds are not introduced to your farm.
- Do not put animals on forage that is too young in springtime.
- Maintain grazing pressure appropriate for the pasture.
- Provide supplemental feed and water to animals during periods of low pasture availability.

Some of the poisonous plants common to Ohio are described here. This is not a complete listing, and other sources should be consulted if you are uncertain as to whether or not a plant could be toxic to your horse.

Herbaceous Plants



BRACKEN FERN (*Pteridium aquilinum*) - Bracken fern is probably the largest (up to six feet) and most common of the ferns in Ohio. It occurs in many habitats, including full sun, partial shade, woods, old pastures, and thickets. Unlike most ferns, bracken is less common in rich, moist, limey areas and thus is an indicator of poor soil. The tall, smooth, grooved stalk supports a large (three-foot long, three-foot wide) leaf equally divided into three parts, one terminal and two opposite. Each leaf blade is triangular, with oblong, pointed leaflets, and tight, narrow, blunt-tipped sub-leaflets. On fertile leaves the underside has a continuous line of sporangia around the leaf edge,



covered by the overlapping margins. Bracken is one of the earliest ferns to appear in spring or after a fire. It sometimes forms large colonies of nearly solid stands, with the dark, green, leathery leaves bending nearly horizontal. In the fall, it is one of the first plants to be killed by frost, leaving large patches of crisp, brown foliage.

Horses eating large quantities of bracken fern show signs of acute poisoning related to vitamin B1 deficiency. Leaves as well as rhizomes are toxic. Poisoning is most common when other grazing is scarce, such as after periods of drought, or when bracken is a contaminant of hay. Symptoms usually appear two to four weeks after continuous grazing. Horses are particularly susceptible to bracken fern poisoning. Affected animals exhibit loss of condition and weight, incoordination, and a crouching position with feet apart and arched back. Bracken fern poisoning may be confused with other disorders, and other plants (field horsetail, turnip) can also induce symptoms related to B1 deficiency. Bracken fern can be suppressed or eliminated from pastures by improved pasture management that includes periodic close grazing or cutting and proper fertilization.



FIELD HORSETAIL (*Equisetum arvense*) – Field horsetail is the most common of several horsetails and it is also the most variable. This is a unique plant with two distinct growth forms (sterile and fertile stems), which often are not found together. The sterile stems are light green, highly branched, resembling a small pine tree. Stems are ascending and appear to be leafless; they may be perennial and evergreen, or annual, dying in autumn after frost. The stem has distinct joints or nodes, which bear tiny, black, scalelike leaves. The fertile stems are singular, tall, dark green, ridged, hollow, tubular, and distinctly jointed. Branches, when present, arise singly or in whorls at nodes. The stem terminates in a cone-shaped spore-bearing strobilus. The stem is rough like sandpaper due to impregnation with silica. The plant reproduces by spores or by deep, creeping rootstocks which sometimes bear tubers.

Field horsetail is found throughout Ohio along railways, field edges, woods, and waste areas. It seems to tolerate poor drainage and sandy or gravelly areas. This weed is difficult to exterminate as it tolerates most herbicides.

Field horsetail causes most trouble in hay fed to horses. Poisoning is similar to bracken fern poisoning; however, horsetail-poisoned animals maintain their appetites even after clinical signs appear. The poisoning is associated with thiaminase activity and thus vitamin B1 deficiency. Affected animals exhibit loss of condition, unthriftiness, excitability, staggering, and emaciation.



TALL FESCUE (*Festuca arundinacea*) – Tall fescue is probably the most widely adapted perennial pasture grass. It is a tall (up to five feet), tufted, deep-rooted plant that forms a coarse sod. Leaves are about one-quarter inch wide, with a ridged surface and fine, sharp, saw-toothed edges. The inflorescence is a compact panicle four- to 10-inches long.

Although fescue poisoning is a condition of cattle, summer fescue toxicosis can affect horses during summer when grazing or fed tall fescue forage or



seed. Toxin is produced in tall fescue forage or seeds contaminated with an endophytic fungus. Affected animals show reduced feed intake and weight gains. Within one or two weeks after fescue feeding has begun, other signs such as fever may appear. Failure to produce or let down milk can be a problem in mares grazing endophyte-infected fescue. The severity of the toxin may vary from field to field, but increases when temperatures exceed 75 to 80°F, and where high rates of nitrogen fertilizer have been applied to the grass. Tall fescue varieties are available that do not contain the endophyte; toxic pastures should be destroyed and planted to nonendophytic fescue varieties.



PERENNIAL RYEGRASS (*Lolium perenne*) – Perennial ryegrass is a smooth, shiny, short-lived perennial with slightly flattened stems. Leaves have well-developed auricles (on most leaves) and membranous ligules that may be toothed or rounded. It favors moderately moist open ground and is common in Ohio.

Perennial ryegrass infested with an endophytic fungus can be the source of a neurotoxic condition (perennial ryegrass staggers) that occurs only in summer and fall. The fungus occurs in all parts of the plant, especially leaf sheaths, culms, and seeds. Affected animals exhibit fine tremors of the head and nodding movements. Well-grazed, leafy pastures that do not go to seed or are not overgrazed are less likely to be dangerous. Endophyte-free varieties should be used for pasture renovation.



WATER HEMLOCK (*Cicuta maculata*) – Water hemlock is one of the most poisonous plants in Ohio. It occurs in almost all counties on the shores of lakes, ponds, marshes, bogs, and wet ditches. It is an erect perennial growing to eight-feet tall. Stems are smooth, hollow (except at nodes), and streaked with purple lines (not blotched as in the less dangerous poison hemlock, *Conium maculatum*). Water hemlock leaves are divided into three to seven lanceolate leaflets with irregular, coarsely toothed margins. Flowers are borne in an open umbel resembling that of wild carrot. The most distinguishing characteristic is the swollen base of the plant and rootstocks. Splitting open one of these areas reveals crosswise partitions that divide the rootstock into chambers.

The yellow, oily fluid exuding (especially in springtime) from a cut stem base or rootstock contains the toxic alcohol, cicutoxin. All parts of the plant contain the toxin and are considered dangerous. Livestock have been poisoned by drinking water standing in small pools where the plant has been tramped and the roots crushed. Poisoning is most common when the plant is young, somewhat succulent, and growing rapidly. Symptoms range from nausea and colic to violent convulsions and death (especially in cattle).

The appearance of water hemlock is very similar to poison hemlock, page 72.



COMMON POKEWEED (*Phytolacca americana*) – Common pokeweed is a simple, erect, herbaceous perennial that sometimes resembles a small tree, growing up to 10 feet in height. Common pokeweed emerges each year from a large taproot or from seeds. The base of the pokeweed stem is typically deep red-purple in color. The smooth, hairless, hollow, fleshy stem can attain diameters of four inches. The large elliptical leaves range from 12- to 20-inches long. They are about a third as wide as they are long.

The leaves are alternate on the stem and are hairless. Flowers are in dense, drooping clusters with white-green petals that bloom from July through August. Flower clusters occur opposite a leaf. From a distance, the purple fruit resembles a bunch of grapes that hang down from the point of attachment on the plant. Common pokeweed is found throughout Ohio in clearings and open woods and is becoming more abundant in reduced tillage fields.

Pokeweed is a plant that will cause severe poisoning and is one that livestock will not avoid eating. The thick, woody roots of pokeweed are the most poisonous part of the plant and account for most livestock poisonings. The fruit of pokeweed is the least toxic part of the plant, but may be responsible for human deaths. The toxic compound is an alkaloid called phytolaccotoxin. Horses can be poisoned by eating fresh leaves or green fodder. Symptoms of poisoning from pokeweed include burning sensations in the mouth, gastrointestinal cramps, vomiting, and diarrhea.



COMMON COCKLEBUR (*Xanthium strumarium*) – This native annual weed is troublesome in agronomic crops and is especially common on rich, moist soils. The plant is rough in appearance, branched, hairy to nearly smooth, with irregular mottled stems. The mature plant is one- to two-feet tall. The thick, rough leaves are alternate, broadly ovate to triangular, with long petioles. Flowers are relatively inconspicuous, on short axillary branches. The fruit is a bur with strong, hooked spines and two sharp-pointed beaks.

The seeds are toxic but are seldom consumed because of the burs, which are too spiny to ingest. The tender, juicy cotyledons, which are long and narrow, contain carboxyatractyloside, which affects the nervous system. Signs of poisoning include anorexia, depression, and weakened heartbeat.



HEMP DOGBANE (*Apocynum cannabinum*) – Hemp dogbane, Indian hemp, choctaw root, rheumatism weed, and snake's milk are names for this native perennial weed that is common in all counties of Ohio. Hemp dogbane is an erect plant that grows one- to four-feet tall and reproduces by creeping roots and by seeds. The leaves are two- to six-inches long, opposite, oval, and attached to the stem by a short petiole. Leaf edges and upper surface are smooth, while the underside of the leaf is finely hairy. Hemp dogbane branches freely, unlike common milkweed, with which it is often confused. All parts of the plant contain a milky latex. Shoot emergence from roots typically occurs from late-May to mid-June. The flowers of hemp dogbane are



greenish-white, five-petaled, and inconspicuous. Hemp dogbane produces reddish-brown, paired sickle-shaped pods that are four- to eight-inches long and hang from the point of attachment. A related poisonous species, spreading dogbane (*A. androsaemifolium*), has slightly drooping leaves and larger, pink, bell-shaped flowers.

Leaves and stems of green and dry plants contain a resinoid and a glucoside with cardioactivity. Less than an ounce of green or dry leaves may be enough to kill a horse. Symptoms of poisoning include increased temperature and pulse, sweating, dilated pupils, discolored mouth and nostrils, and refusal to eat or drink. Hemp dogbane can be a threat to livestock in all seasons.



WHITE SNAKEROOT (*Eupatorium rugosum*) – This plant is a common perennial of shady, moist woodlands and wood edges. It often goes unnoticed because flowering does not begin until July or later. Stems are tall and mostly smooth, with opposite, long-petioled leaves. Leaf blades are generally egg-shaped, with sharply toothed margins and three prominent veins. Small white flowers are borne in loose spreading clusters.

The toxic compound, tremetol, is found in the leaves and stems of white snakeroot and is at peak concentrations in summer through fall. Tremetol is unusual in that it is a fat-soluble molecule that becomes concentrated in the milk of lactating animals. Signs of poisoning begin with trembling in the leg muscles. Other symptoms include sweating, labored and rapid breathing, constipation, depression, stiff gait, dilated pupils, and weakness. Death may

be sudden.

Milk sickness, caused by drinking milk produced by animals that have eaten white snakeroot, is of historical significance because this affliction reportedly killed Abraham Lincoln's mother.



YELLOW SWEETCLOVER (*Melilotus officinalis*) and **WHITE SWEETCLOVER** (*Melilotus alba*) – Both species of sweetclover are widely distributed throughout the state, having been introduced in the United States long ago as a hay, pasture, and green manure crop. The sweetclovers are erect, slender, branched biennials that can grow as tall as nine feet. Leaves are clover-like, with three oblong leaflets that are toothed around the entire margin. Flowers are small, white or yellow, and fragrant; they appear in long, slender clusters at branch tips or arising from leaf axils. Fruits are

ovoid, smooth pods with one to four seeds. The plant is commonly found along roadsides, railroad tracks, open fields, and waste areas.

As a forage crop, sweetclovers can be freely grazed, but feeding moldy sweetclover hay or silage is dangerous. Thus, sweetclover poisoning usually occurs in winter and is not apparent until animals have been fed damaged sweetclover hay for two or more weeks. Well-cured hay is not dangerous, but absence of visible spoilage does not necessarily mean the hay is safe to feed.

Poisoning results from the process of spoiling, or molding, wherein harmless natural coumarins

are converted to toxic dicumarol. The most dangerous hay is the outer portion of weathered, large round bales. The main sign of poisoning is hemorrhaging, which results from faulty blood coagulation. The toxic compound crosses the placenta and may affect newborns.



COMMON MILKWEED (*Asclepias syriaca*) – Common milkweed is an erect perennial that reproduces by creeping roots and seeds. Stems, reaching three to six feet in height, are unbranched and covered with short downy hairs. The leaves are oblong, three- to eight-inches long, with a rounded to tapered leaf tip and base. Leaves are opposite and are attached directly to the stem. The underside of the leaves are covered with fine velvet-like hairs. The upper surface, which can be hairless or hairy, shows a prominent white midrib. The secondary veins off the midrib resemble the rungs of a ladder. Young seedlings and emerging vegetative shoots of common milkweed are covered with downy hairs, thus differentiating them from hemp dogbane. The milkweed family is known for a white milky sap that appears when the plant is bruised or cut open. Flowers are borne in a large ball-like cluster and are sweet-smelling, pink-lavender in color, and bloom from June to August. The gray, rough, spiny pods are three- to five-inches long, one-inch wide, and split on one side. The seeds inside of the pod are brown, flat, and oval. They resemble an enclosed horseshoe with an attached downy pappus (silky structure similar to that of dandelion). Common milkweed is native to North America and is found throughout Ohio. It grows best in warm, dry soils with full sunlight and is commonly found growing in clumps or patches on roadsides and in reduced tillage fields.

All parts of the plant, whether green or dry, are poisonous to horses. The toxic principles are steroid glycosides and toxic resinous substances. Livestock generally avoid this plant unless other forage is unavailable. Signs of poisoning include dizziness, loss of muscular control, violent spasms, rapid and weak pulse, respiratory paralysis, and rarely death.



MUSTARDS (*Brassica* spp., (*Raphanus*) spp., and related genera – The mustard family (Cruciferae) comprises a large group of herbaceous plants, most of which are annuals, winter annuals, or biennials. Flowers, with four sepals, four petals, and six stamens (two short and four long) are yellow or white, and arranged in racemes. Fruits are borne in two-chambered, flat-round, or beaked tubular capsules. Basal leaves are generally lobed or coarsely toothed. Mustards are found throughout Ohio along roadsides, waste areas, open fields, and pastures. Seeds of many species live a long time in the soil, and seedlings reappear after many years when soil is disturbed.

Many mustards are harmless when young and are grazed without incident. However, seeds and vegetative parts (fresh and dry) may contain the toxic principle glucosinolate (isothiocyanate). Feeds containing grain screenings with a large number of mustard seeds may be dangerous to horses. Mustard oils, which are released by enzymes when mustard seeds are moistened with cold water before feeding, are strong irritants.

Signs of poisoning include acute/chronic anorexia, severe gastroenteritis, salivation, diarrhea, paralysis, photosensitization, and hemoglobinuria.



POISON HEMLOCK (*Conium maculatum*) – Poison hemlock is a tall, erect biennial that produces a vegetative rosette the first season of growth and an upright reproductive stem in the second season. Stems are mostly hairless and light gray-green with distinct reddish-purple spots. They are hollow, except at the nodes, and grow to 10-feet tall. Leaves are basal in the rosette stage and alternate on the stem in the reproductive stage. The basal and stem leaves are finely dissected with a lace-like appearance, resembling the nonpoisonous wild carrot. The flower heads at the top of the plant are large, one to three inches in diameter, white, and umbrella-shaped. Flowers develop into a green, deeply ridged fruit with several seeds. The plant has an unmistakable and disagreeable mouse-like odor.

Poison hemlock was introduced from Eurasia as an ornamental plant and is currently found in about half of the counties in Ohio. It grows in waste areas, especially partially shaded, poorly drained sites, stream banks, or edges of cultivated fields. Seeds germinate in autumn, and seedlings grow late into fall. It is one of few green plants in pastures in late winter and is among the first plants to green up in the early spring. This plant is sometimes confused with wild carrot or wild parsnip.

All parts of this plant are poisonous, though roots are more toxic than leaves or stems. Leaves are especially poisonous in the spring, whereas the root becomes more toxic over time. Eight alkaloids are found in this plant, with coniine and conicine being the most common. Livestock can be severely injured by eating the leaves or fruits of poison hemlock. The strong odor usually prevents consumption of the green plant, but animals can be poisoned by eating contaminated fresh hay or silage. Signs of poisoning include dilated pupils, weakness, staggering gait, and respiratory paralysis two to three hours after ingestion.



COMMON ST. JOHNSWORT (*Hypericum perforatum*) – Common St. Johnswort is a creeping perennial that reproduces by seeds and spreading underground roots. This species has hairless, branched reddish stems with a woody base and grows up to three-feet tall. St. Johnswort is characterized by its small (one-half to one-and-one-half inches long) oval, opposite leaves and large stomata that appear as small perforations or holes in the leaves when held up to the light. The leaves are attached directly to the stem. Distinct bright yellow flowers (three-quarters to one inch in diameter) with many stamens are numerous and may have black dots on the edges of the petals. The fruit is a three-celled capsule with many dark brown seeds. When wet, the seeds have a gelatinous coating that sticks them to objects (e.g., animal legs, hooves, machinery).

Common St. Johnswort, also called klamathweed or goatweed, is an introduced species native to Eurasia. It is common in the eastern part of Ohio, but is sporadically distributed in western Ohio.

This species is commonly found in old meadows, pastures, roadsides, waste areas, and in reduced tillage agronomic systems. In total, there are 16 different species of *Hypericum* in Ohio. The name *Hypericum* is from a Greek word meaning "over an apparition," alluding to its ancient use as an herb to protect one from evil spirits. The species name, *perforatum*, refers to the perforated look of the leaves.

Leaves and flowers of common St. Johnswort contain a photodynamic pigment called hypericin, which causes "photosensitization" on white or light-colored skin. Photosensitization is especially prevalent on areas of the body which receive the most sunlight, such as the head, neck, and back. Affected skin becomes swollen, tender, and reddened (erythema), and large areas may peel off. Other signs of poisoning include loss of appetite, severe itching, blindness, convulsions, hypersensitivity to cold water, and coma. The plant is dangerous at all growth stages. Grazing animals may also suffer minor skin irritations that include skin blisters and hair loss. If enough of this plant is ingested, death may result. The toxic properties of St. Johnswort remain when it is a contaminant of hay.



GROUNDSELS (*Senecio*) spp. – There are eight species of *Senecio* recognized in Ohio, the most poisonous being the relatively uncommon cressleaf groundsel (*S. glabellus*), also called butterweed or yellowtop. Cressleaf groundsel is an erect biennial reaching heights of one to three feet. The stem is succulent, smooth, and hollow, and it branches at the top to support flowers. Leaves are alternate, deeply divided, with wide, round-toothed lobes. Basal and lower leaves are up to eight-inches long; upper leaves are smaller but similar in shape. Bright lemon-yellow flowers, up to one inch in diameter, are borne in clusters and bloom from April to June. Cressleaf groundsel occurs in wet woods, swamps, streambanks, wet ditches, and pastures. The weed is uncommon, but is known to spread quickly. The related weedy species, common groundsel (*S. vulgaris*), is more common, and is distinguished by the absence of ray flowers and a solid, shorter stem. Common groundsel is found in fields and waste places.

Groundsel species contain pyrrolizidine alkaloids (e.g., senecionine), which cause irreversible liver damage with prolonged exposure. All parts of common groundsel contain toxins; however, toxin concentrations are greatest in the flowers, and in the leaves just before flowers reach maturity. Obvious signs of poisoning often do not appear until liver damage is severe. Early symptoms include anorexia and depression and are followed by incoordination, diarrhea, presence of hemoglobin in the urine, cirrhosis of the liver, and death.



JOHNSONGRASS (*Sorghum halepense*) – Johnsongrass is a tall (up to 10 feet) coarse-textured perennial grass that reproduces by rhizomes and seeds. Leaves are rolled in the bud and have a tall membranous ligule with shallow teeth on the top. Leaf blades are long (eight to 24 inches), smooth, and flat, with a thick, prominent white midvein. Leaves are usually bright green, but they may also contain purple pigmented spots. In the vegetative stage, Johnsongrass looks like a narrow-leaved corn plant. The seedhead is



large, purple, and pyramidal in shape, with dark reddish-brown, oval seeds.

Johnson grass was brought to United States from the Mediterranean as a contaminant of crop seeds. It is named for Colonel William Johnson who introduced this species on his farm in Alabama around 1840. Johnson grass is often found in many Ohio counties, especially along irrigated canals, fields, and other areas with rich soils. This species is considered among the world's 10 worst weeds.

Hydrocyanic acid (cyanide) is produced in the leaves and stems of Johnson grass when it is subjected to drought, trampling, frost, herbicide treatment, and even cutting. Toxicity is identical to that of Prunus poisoning and results in hypoxia (deficiency of oxygen reaching the tissues). The first symptoms appear within a few minutes following ingestion. Affected animals exhibit excitement, incoordination, convulsions, rapid and labored breathing, bloating, and coma. Death can occur in less than an hour due to internal asphyxiation.

Toxic levels of nitrates can accumulate in Johnson grass following heavy fertilization or drought and result in toxicosis which may be confused with cyanide poisoning. Common symptoms of nitrate poisoning include stomach and intestinal irritation and may result in hypoxia (deficiency of oxygen reaching the tissues).

Horses are less susceptible to cyanide and nitrate poisoning than are ruminants.

SORGHUMS (*Sorghum vulgare*, *Sorghum vulgare sudanense*) and hybrids – Sorghums are tall (up to eight feet), coarse, annual grasses with large terminal panicles. There are numerous varieties, some of which are cultivated for forage, syrup, broom, or grain production. Under unfavorable conditions, all may be poisonous.

As with Johnson grass, hydrocyanic acid is produced in sorghum in response to drought, trampling, frost, or second growth, and nitrates accumulate with heavy fertilization or drought. Affected animals exhibit signs of hypoxia, including difficulty breathing, bloat, staggering, convulsions, and death. Sorghum poisoning is especially a problem in horses following grazing of sorghum pastures for several weeks to months.

The appearance of sorghums is very similar to Johnson Grass, page 75.



NIGHTSHADE FAMILY

The Solanaceae, or nightshade family, contains several important poisonous plants. The toxic principle is the same for all. The glycoalkaloid, solanine, is produced in leaves, shoots, and unripe berries, and causes gastrointestinal irritation and central nervous system problems. Symptoms of poisoning include acute hemorrhagic gastroenteritis, weakness, incoordination, difficulty breathing, excess salivation, and death.

The most important species in Ohio are eastern black nightshade, bittersweet nightshade, horsenettle, and two species of groundcherry. The common potato can also be dangerous, in that

white sprouts and green parts of the plant, especially green skinned tubers, are poisonous. Identifying features of the weedy species are given here.

Eastern black nightshade is an example of the nightshade family. See page 77.

EASTERN BLACK NIGHTSHADE (*Solanum nigrum*) is an erect annual. Leaves are coarsely and shallowly toothed, with slight pubescence on the undersurface. Flowers are white to purple and are borne in an open cluster. The juicy, many-seeded berries are initially green, ripening to purplish black. Eastern black nightshade is widespread in Ohio and is found along stream banks, thickets, roadsides, row crop fields, and other open, disturbed habitats.



BITTERSWEET NIGHTSHADE (*Solanum dulcamara*) is also known as European bittersweet, poison berry, climbing nightshade, and deadly nightshade. It was introduced from Eurasia as an ornamental and is now distributed throughout Ohio. It is found in hedgerows, ditches, waste areas, and open fields, especially areas that tend to be moist or even waterlogged for a portion of the year. Bittersweet nightshade is a creeping perennial vine that spreads by rhizomes and reproduces by seed. Leaves are arranged alternate on a dark red to black woody stem. The leaves are of two forms – one is simple and ovate and the other is similar with additional basal lobes. Both forms are two to four-and-one-half inches in length, have smooth leaf margins, and are a dark green color with a purple tinge. Leaves may be either with or without hair. Flower clusters branch from the main stem. Flowers are one-half inches in diameter, with five purple petals that join together to form a star-shape with a yellow center. Fruits are oval green (immature) to red (mature) berries and are thin-skinned with many flat, yellow round seeds. Leaves, stems, and berries can be poisonous.



HORSENETTLE (*Solanum carolinense*) is sometimes called bull nettle, devil's potato, or wild tomato. It is an erect creeping perennial weed that spreads by rhizomes and reproduces by seeds. Horsenettle is characterized by hard sharp yellowish spines found on the stems and leaves. Leaves are alternate, finely hairy on both surfaces, egg-shaped (one-and-one-half to five-and-one-half inches long and three-quarters to two-and-one-half inches wide), with very coarsely toothed margins, resembling a poinsettia leaf. Flowers are star-shaped with five white to violet petals with bright yellow anthers. Fruits are green when young and turn to yellow-orange and wrinkle as they mature. Berries contain many round, flat, yellow to orange seeds. Horsenettle is native to the southeastern United States but is distributed throughout all Ohio counties. It is commonly found in pastures because most animals will avoid eating it; it is also found in waste areas and open fields. All parts of the plant are poisonous, with the level of solanine highest in the fall.



GROUNDCHERRIES include seven species of the genus *Physalis* which have been found in Ohio, the most common being smooth



groundcherry (*P. longifolia* var. *subglabrata*) and clammy groundcherry (*P. heterophylla*). The main difference between the two species is that the former is smooth and the latter is densely hairy. Both species are found in almost all counties of Ohio and are sometimes called hog-plum, husk-tomato, or wild-pompion. They are commonly found in cultivated and reduced tillage agronomic fields, as well as in pastures, along roadsides, and in waste areas. Both groundcherry species are erect perennials growing one to three-feet in height. They reproduce by seed and vegetatively by creeping roots. Stems are ridged and hollow, with spreading branches. Leaves (two- to four-inches long and three-quarters to one-and-one-half-inches wide) are alternate, unevenly toothed, and approximately diamond-shaped, tapering towards the petioles. Flowers are bell-shaped with a yellow corolla (one-half inches in diameter) that may have a violet-spotted center. A five-sided lanternlike pod hangs from the plant and encloses a berry or groundcherry. The fruit is a green to purple fleshy berry approximately one-half inch in diameter, with many kidney-shaped seeds. Leaves and unripe fruit are poisonous.



JIMSONWEED (*Datura stramonium*) is a foul-smelling coarse annual. Stems are erect, up to four feet tall, smooth to slightly pubescent, and green to purple. The leaf shape resembles that of poinsettia, with irregular, coarsely toothed to shallowly lobed margins. Flowers are borne singly on short stalks in the axils of branches. The flower is a white to purple five-angled tube with a spreading, toothed, plaited border. The funnel-shaped flower is two- to five-inches long and one to two inches across. The fruit is a distinctive, hard, prickly, many-seeded capsule splitting into four sections.

The plant is native to the tropics but is naturalized throughout Ohio. It is common around barnyards, feedlots (especially hog lots), cultivated fields, roadsides, and other disturbed habitats. Other names for this weed are thorn-apple and jamestown-weed.

All parts of the plant, and seeds in particular, contain tropane alkaloids (atropine, scopolamine, hyoscyamine). Because of the strong odor and taste, animals seldom consume enough of the green plant to be affected, but poisonings result from eating the dry plant in hay or silage, or from seeds mixed with grain. Affected animals may exhibit a weak, rapid pulse, dilated pupils, dry mouth, incoordination, diarrhea, convulsions, coma, and sometimes death.

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Trees and Shrubs



OAKS (*Quercus* spp.) – Oak species are commonly recognized by their leaves, thick bark, and cupped fruit (acorns). Leaves of many species are characteristically lobed while some have toothed leaves, except for the shingle and willow oaks, whose leaves are entire rather than lobed or toothed. Oaks are common in woodlands throughout Ohio.

Most species of oak contain toxic phenolic compounds (tannins). Large quantities of young leaves and sprouts are toxic when

consumed in spring as are green acorns in the fall. Poisoning occurs when over half the diet is oak buds and young leaves, or acorns, for a period of time. Livestock have also been poisoned by drinking water in which oak leaves have soaked. Plant tannins or their metabolites cause gastrointestinal and renal dysfunction. Symptoms appear several days after the period of consumption and include abdominal pains, weakness, anorexia, colic, constipation, depression, diarrhea, presence of blood in urine, and jaundice. Death may result. Horses are less susceptible than ruminants. Oak poisoning resembles pigweed poisoning.



BUCKEYE (*Aesculus* spp.) – Several species of buckeye can be found in Ohio and are distinguished by opposite palmately-compound leaves (with five- to seven-toothed leaflets per leaf) and large glossy brown seeds with a whitish scar. Two species are native woodland trees, the Ohio buckeye (*A. glabra*) and sweet (or yellow) buckeye (*A. octandra*). The Ohio buckeye is widely distributed throughout the state, while sweet buckeye is confined to southern Ohio. Other buckeye tree and shrub species can be found in cultivation, including horse chestnut (*A. hippocastanum*).

Toxicity of buckeye is attributed to glycosides (e.g., aesculin, fraxin), saponin (aescin), and possibly alkaloids. Sprouts and leaves produced in early spring and seeds are especially

poisonous. However, experimental feedings have shown that poisoning does not always follow buckeye consumption. Affected animals exhibit depression, incoordination, twitching, paralysis, inflammation of mucous membranes, and vomiting. Colic has also been reported in poisoned horses. Treated animals usually survive.

In the spring, while waiting for other forage to become available, animals should not be allowed to graze in woodland pastures where there are buckeye sprouts.



RED MAPLE (*Acer rubrum*) – Red maple is a large native tree found in moist woodlands and swamps throughout Ohio. Leaves are opposite, generally triangular with three or five lobes, coarsely toothed, and silvery white beneath.

Poisonings result from consumption of wilted leaves and have only been reported for horses. Toxicity is most prevalent from June through October, but may be greatest in autumn foliage. Dried leaves are reported to remain toxic for 30 days. The cause of toxicity is not known. Primary effects are acute hemolytic anemia, methemoglobinemia, and Heinz body formation in the red blood cells. Symptoms develop three to four days after ingestion of leaves and include rapid breathing and heart rate, weakness, depression, jaundice, cyanosis, brownish discoloration of blood and urine, coma, and death.



BLACK LOCUST (*Robinia pseudoacacia*) – Black locust is a naturalized species that grows as a tree or shrub in open woods, waste places, and along fence rows throughout Ohio. Leaves are alternate and are pinnately compound, with more than 10 leaflets per leaf. A pair of spines occurs at the base of each leaf. White flowers appear in loose drooping clusters in May or June and later form long flattened brown seedpods.

Several toxic compounds are found in black locust sprouts, leaves, bark, flowers, and seed pods, including a glycoside (robitin) and phytotoxins (robin and phasin). Of grazing animals, horses are most susceptible to the effects of black locust. Poisoning and death have been reported for horses consuming bark, leaves, or sprouts. Livestock have also been poisoned by drinking water in which seedpods have soaked. Affected animals often stand with feet spread apart. Other signs include depression (often extreme), diarrhea, anorexia, weakness, posterior paralysis, colic, pupil dilation, coldness of extremities, laminitis, weak pulse, and rapid, irregular heartbeat. In severe cases, death can result from cardiac failure.



BLACK WALNUT (*Juglans nigra*) – Black walnut is a large tree growing in rich forest soils throughout Ohio. Leaves are alternate and are pinnately compound with numerous toothed leaflets. The twigs have a characteristic chambered pith. Black walnut fruits consist of a nut surrounded by a thick husk and do not split open when ripe.



The toxic phenolic compound, juglone, is found in the bark, wood, nuts, and roots of black walnut. Horses are primarily affected when exposed to shavings that contain black walnut wood. Shavings contaminated with less than 20% black walnut can cause poisoning in 24 hrs. Affected horses exhibit depression, lethargy, laminitis, distal limb edema, and increased temperature, pulse, respiration rate, abdominal sounds, digital pulse, and hoof temperature. Consumption of the shavings may also cause signs of mild colic. Symptoms usually disappear within a few days after shavings are removed.

Horses on pasture may show mild respiratory signs from pollen or fallen leaves.



YEWS (*Taxus* spp.) – Yews are evergreen shrubs characterized by linear leaves that are glossy dark-green above and yellowish-green below with a distinct mid rib, and by fruit consisting of a single seed within a bright red fleshy cup-shaped structure resembling a berry. Leaves are alternate and are spirally arranged along the twig, although they appear to be in two rows. One native species of yew grows in Ohio, the Canada yew (or ground-hemlock) (*T. canadensis*). It is patchily distributed throughout the state and is most common in the northeast. Many cultivated species are used as ornamentals, including Japanese yew (*T. cuspidata*) and English yew (*T. baccata*).

Leaves, bark, and seeds (but not the fleshy pulp) of yews contain alkaloids (taxine) that affect the nervous system and are toxic whether green or dry. In small quantities, yew may be harmless. Canada yew is heavily browsed by deer. But when large quantities are eaten, death may follow rapidly due to cardiac failure, with few preceding symptoms. Poisoning often occurs when clippings are placed where they are accessible to animals. Symptoms include gaseous distress, diarrhea, vomiting, tremors and convulsions, dilated pupils, respiratory difficulty, weakness, collapse, slowed heart rate, circulatory failure, coma, and death.



MOUNTAIN LAUREL (*Kalmia latifolia*) – Mountain laurel is an evergreen shrub characterized by glossy leathery dark-green leaves and showy white to pink flowers formed in dense terminal clusters. The shrub occurs mostly in the southeastern portion of Ohio, where it grows in hillside woodlands and pastures.

All parts of mountain laurel, including leaves, twigs, flowers, and nectar (as well as honey made from it), contain a toxic resinoid (andromedotoxin); leaves and twigs also contain a cardiac glycoside (arbutin). Affected animals may exhibit incoordination; watering of the eyes, nose, and mouth; irregular breathing; vomiting; bloat; weakness; convulsions; coma; and death. Poisonings occur most often in winter or early spring when other green forage is not available. Horses are susceptible to poisoning; however, sheep poisonings are reported more frequently, since mountain laurel grows on land more suited for sheep.



PRIVET (*Ligustrum* spp.) – Privet species are introduced semievergreen or evergreen shrubs commonly used as ornamental shrubs or hedges. They are characterized by small opposite leaves, white flowers, and hard black berrylike fruits that persist through winter. One privet species (*L. vulgare*) frequently escapes cultivation in Ohio and is well scattered throughout the state. It may be found in woods and bottomlands, at abandoned home sites, and along fence rows.

Leaves and fruit of privet contain several toxic glycosides (e.g., ligustrin, syringin) which are primarily gastrointestinal irritants. Poisonings have been reported for horses eating privet leaves. Symptoms include diarrhea, abdominal pain, incoordination, partial paralysis, weak pulse, hypothermia, convulsions, and sometimes death.



WILD BLACK CHERRY, CHOKE CHERRY, AND PEACH (*Prunus* spp.) – Many species of cherry and peach are poisonous. These species are characterized by alternate toothed leaves, white or pink flowers, and fleshy fruits (cherries or peaches). Crushed twigs and leaves yield a strong cyanide odor. Two native species of cherry are common in Ohio. Wild black cherry (*P. serotina*) is a large tree that is distributed widely throughout the state in woodlands, old fields, and along fence rows. Choke cherry (*P. virginiana*) grows as a large shrub or small tree and is scattered throughout Ohio in a variety of habitats, though it is more frequent northward. Peach (*P. persica*) is a small introduced tree that occasionally escapes from orchard cultivation through seed.

Seeds, twigs, bark, and leaves contain a glycoside (amygdalin) that quickly breaks down by hydrolysis (from bruising, wilting, frost damage) to form the highly toxic compound hydrocyanic (prussic) acid (or cyanide). Poisonings occur most frequently when wilted leaves are eaten, but have also been reported when leaves are consumed directly from the tree, or sprouts, or in dried hay. The amount of hydrocyanic acid formed once the plant material is ingested is affected by the type of stomach juices and the kind of feed the animal had previously consumed. Ruminant animals appear to be more susceptible to poisoning than horses.

Cyanide poisoning results in hypoxia (deficiency of oxygen reaching the tissues). The first symptoms appear within a few minutes following consumption of plant material. Affected animals exhibit excitement, incoordination, convulsions, rapid and labored breathing, bloating, and coma. Death can occur in less than an hour due to internal asphyxiation.

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Horse Nutrition

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Landscape and Ornamental Plants

Many plants in and around gardens and landscaped areas can be poisonous to horses. These include lupines, foxglove, English holly, European holly, daffodils, hyacinths, philodendron, azalea, rhododendron, and yews. In addition, many common garden weeds can be poisonous, including those that accumulate nitrates, such as pigweeds, lambsquarters, thistles, fireweed (Kochia), smartweeds, docks, and others described in detail earlier in this publication.

Cultural practices and grazing management should be the first approach to protection against poisonous weeds. In part, this is because animal-health problems can result from exposure to excessive quantities of herbicides used to control weeds. Problems are most likely to result when herbicides or their containers are used improperly.

Annoying Plants



FOXTAILS (*Setaria* spp.) are common summer annuals that occur throughout Ohio. Giant foxtail (*S. faberi*) is most common, with densely pubescent upper leaf blades and distinctly nodding seed heads. Green foxtail (*S. viridis*) has smooth leaf blades, hairs along the sheath margins, and loosely erect seed heads. Yellow foxtail (*S. glauca*) is short (one to two feet), with flat stems, erect culms, and long, sparse hairs at the base of the leaf blade. Although not poisonous, bristles on the panicles stick to skin and have caused abscesses.



STINGING NETTLE (*Urtica dioica*) is a bristly, stinging, erect perennial that reproduces by seeds and creeping rootstocks. Stems and leaves are covered with numerous stinging hairs, the sting resembling that of a bee. Plants grow up to six feet in height, with slender, rigid stems branching mostly at the top. Leaves are opposite, three- to six-inches long, pointed with saw-toothed margins, sometimes rounded at the base. Flowers are green to white and



arranged on branched spikes arising from leaf axils. The plant is found throughout Ohio, especially along roadsides, fencerows, ditchbanks, shady or moist wood edges. Contact with the plant can cause inflammation and welts may form.



POISON IVY (*Toxicodendron radicans*) is a native plant that is found throughout Ohio, on roadsides, forest edges, and waste areas. Poison ivy is a creeping perennial vine or bush that reproduces by seed and vegetatively by roots. Woody stems grow along the ground and can climb on a permanent structure (e.g., walls, trees, utility poles, or fenceposts). Once it begins to climb, adventitious roots appear from the stem that hold it in place, giving the stem a fuzzy appearance. The leaves of poison ivy are

alternate, with three leaflets, and often shiny with a reddish hue. The shape of the leaflets can be variable (elliptic to egg-shaped), as can the amount and position of hairs. Leaf margins may be either smooth, toothed, or lobed. The green-yellow-white flowers have five petals and bloom in June and July. The small white berries (about one-eighth inch in diameter) are round and hard. All parts of this plant contain an oily resin (3-pentadecylcatechol) that can cause allergic reactions. Virtually anything that comes in contact with the oily resin (e.g., animals, clothes, gloves, tools) can carry the resin and cause dermatitis. Smoke of burning poison ivy plants can be extremely dangerous.

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