



# Michigan trees toxic to horses, donkeys and mules

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**T**rees are of immense benefit to both the value and the esthetics of a property, but certain trees may be harmful to livestock. A little research before planting trees around your horse pastures and barns will keep your horses safe while providing beautification and shade to the property.

One of the most important considerations in whether a toxic plant will cause problems is what other feeds are available and in what quantity. Toxicities are uncommon in well-fed individuals. Next is the palatability of the tree. Black locust and oak trees, for example, are not very palatable, but red maple leaves seem to be readily ingested if other feedstuffs are in short supply. The quantity of a plant needed to be ingested also affects the likelihood of toxicity. Equines must consume large quantities of oak before signs of toxicity occur. A final consideration is the part(s) of the tree that are toxic. If the entire tree is toxic and palatable and horses are hungry, toxicity is much more likely.

Trees of major concern to horses in Michigan are red maple, black walnut, black locust, cherry and oak. This article will discuss the toxic principles of these trees, the amounts needed to produce toxic signs, and the likelihood that the tree will cause your horse problems.

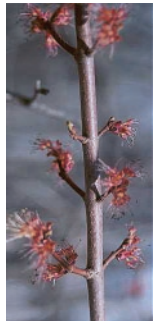
## Red Maple (Swamp Maple)

Probably the most common tree causing problems in Michigan is red maple, which is also called swamp maple.

**Description** – Red maple (*Acer rubrum*) is a tree of medium size. It occurs naturally or may be planted as an ornamental. Young bark is smooth and gray; older bark is dark and broken. Leaves have three to five lobes with shallow notches between lobes. (Leaves of sugar maple

have smooth leaf edges between lobes.) Under-sides of leaves are white. Leaves are green during the growing season and turn red in the fall. Buds, twigs, flowers and petioles are red. The sap is not milky.

**Toxic parts** – Wilted leaves. Older wilted leaves cause poisoning more quickly than wilted leaves of early summer growth. This indicates that the amount of toxin increases in leaves during the summer. Wilted or dry leaves remain toxic for



Red maple  
Source: Kenneth J. Sytsma - <http://wisplants.uwsp.edu>



Red maple  
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about a month. Fresh and undamaged leaves have not been implicated, but ingestion is still not advised. Only equids are known to be affected. A horse needs to ingest about 1.5 pounds for toxicity to be seen. About 3 pounds will kill a horse. The ingestion of wilted or fallen leaves causes massive destruction of red blood cells, and the blood can no longer carry sufficient oxygen.

**Toxic principle** – Gallic acid.

**Situations leading to toxicity** – After storms when branches fall, especially into a paddock or lane without vegetation, equids are likely to eat anything green. In the fall, leaves may blow into the pasture from trees in the pasture or on the fence line.

**Clinical signs** – Clinical signs develop within 1 to 5 days and can include depression, lethargy, increased rate and depth of breathing, increased heart rate, jaundice or brown mucous membranes, dark brown urine, coma and death. If toxicity is present, blood methemoglobin levels will be elevated.

**Treatment** – Remove the horse and keep very quiet. Treatment involves intensive veterinary supportive care, such as IV fluids, blood transfusions, and mineral and charcoal via nasogastric tube. Even with treatment, death may occur. Approximately 50 to 75 percent of affected horses die or are euthanized.

**Prevention** – Do not plant red maple trees in or around paddocks and pastures. If trees are already present, consider the likelihood of toxicity occurring. Remove trees or remove horses from the area during the fall. Do not put red maple leaves in the manure/compost pile if the horses can access the pile.



Black locust

Source: Dennis W. Woodland - <http://wisplants.uwsp.edu>



Black locust

Source: Dennis W. Woodland - <http://wisplants.uwsp.edu>

## Black Locust

**Description** – Black locust (*Robinia pseudoacacia*) is a fast-growing tree that can reach 40 to 100 feet in height at maturity. The bark of young saplings is smooth and green; mature trees can be distinguished by bark that is dark brown and deeply furrowed with flat-topped ridges. Seedlings and sprouts grow rapidly and are easily identified by long, paired thorns. Leaves of black locust alternate along stems and are composed of seven to 21 smaller leaf segments called leaflets. Leaflets are oval to rounded in outline, dark green above and pale beneath. Fragrant, white flowers appear in drooping clusters in May and June and have a yellow blotch on the uppermost petal. The smooth fruit pods are 2 to 4 inches long and contain four to eight seeds. Black locusts are common in well-drained woods, thickets and waste areas, especially in the southeastern part of the state. They are often planted along

highways and fencerows as ornamentals and for erosion control. Two other locusts native to the Appalachians, *Robinia viscosa* (with pink flowers) and *Robinia hispida* (with rose-purple flowers), are used in cultivation and may share black locust's invasive tendencies. The native honey locust (*Gleditsia triacanthos*) appears to be a safe tree.

**Toxic parts** – Seeds, leaves, bark and twigs of black locust, an introduced species, contain several toxic proteins that can poison all livestock types.

**Toxic principle** – Several toxic components occur in black locust, including the toxic protein robin, the glycoside robinin and the alkaloid robinine. The toxins affect the gastrointestinal tract as well as the nervous system.

**Situations leading to toxicity** – Black locust is typically not a problem in the pasture as long as the horses are well-fed. It may be more of a concern in the spring and fall when horses are looking for something to eat in a pasture.

**Clinical signs** – Problems can occur as soon as 1 hour after consumption and can include depression, poor appetite, generalized weakness to paralysis, abdominal pain, diarrhea (which may be bloody) and abnormalities in the heart rate and/or rhythm. If sufficient amounts are ingested, death may occur within a few days. Black locust is not always lethal. The fact that some animals recover despite showing clinical signs indicates the dose-dependent nature of the toxins.

**Treatment** – If horses are observed eating black locust, remove horses and contact a veterinarian immediately. Emergency measures to rid the gastrointestinal tract of toxin may be implemented. Treat clinical signs symptomatically. Recovery may take days to weeks. Be extra cautious around affected

horses to prevent human injury, and do not ride these horses until all clinical signs have resolved.

**Prevention** – Do not plant black locust trees in pastures or as shade trees outside the pasture – these trees will send shoots into the pasture.

## Black Walnut

**Description** – Black walnut is a large tree often planted for its lumber value or as an ornamental. The bark has characteristic broad, round ridges. The compound leaves are alternate with numerous toothed leaflets. Often there is no terminal leaflet. The twigs have characteristic chambered pith. Black walnut fruits consist of a very rough nut surrounded by a thick husk and do not split open when ripe.

**Toxic parts** – Wood shavings that contain as little as 20 percent black walnut wood (*Juglans nigra*) or butternut wood (*Juglans cinerea*) will cause laminitis (founder) within 24 hours of horses being placed on the bedding. For most of the year, horses and ponies that stand under living walnut trees in pastures usually do not develop symptoms of laminitis. In the springtime, however, pollen from the flowers of black walnut may induce laminitis.

**Toxic principle** – The toxic chemical is juglone, a natural phenolic compound produced by the plant.



Black walnut

Source: Dennis W. Woodland - <http://wisplants.uwsp.edu>

**Situations leading to toxicity** – Juglone is mainly a concern when horse owners use shavings from a small/private sawmill or woodworker that is not aware of the toxicity of the sawdust/shavings to horses.

**Clinical signs** – Horses will demonstrate the classic signs of laminitis. The horses will shift weight to the hind limbs; be reluctant to move, especially when turning; will spend time lying down and may be reluctant to stand; and move very painfully when getting up. Swelling of the lower limbs is also seen. Clinical signs usually resolve when the bedding is removed.

**Treatment** – Remove the bedding (sawdust/shavings). Consult a veterinarian. Routine treatment for the laminitis is with pain medications, sole support and stall rest.

**Prevention** – Purchase shavings or sawdust only from reputable suppliers. If walnut or butternut trees are present in the pasture, consider removing the trees or fencing the trees to prevent horses from standing under them, especially in the spring when they are flowering.

## Oak

### White oak (*Quercus alba*), red oak (*Quercus rubra*) and black oak (*Quercus kelloggii*)

**Description** – Red and black oaks have pointed leaves; white oaks have rounded leaves. Leaves are often grouped at the end of a twig and often remain on the tree, although dead, into the late fall and winter. All varieties produce acorns.

**Toxic parts** – Leaves, twigs and acorns of oak contain tannins that are toxic in large enough doses. Horses are most likely to eat the leaves and young twigs rather than the acorns. Black and red oak are more toxic than white oak.



White oak

Source: Michael Clayton - <http://wisplants.uwsp.edu>



White oak

Source: Steven J. Baskauf - <http://bioimages.vanderbilt.edu/>

**Toxic principle** – The highest concentration of tannins is in the immature leaves and twigs in the spring and the green acorns in the fall.

**Situations leading to toxicity** – Oak toxicity is usually a problem when other feeds are lacking because animals are on a dry lot, or in the fall when forage is limited and leaves are falling. Horses will consume enough to develop signs of toxicity only when other sources of feed are lacking. Large amounts must be eaten over several days to a week or more before signs of toxicity are seen.

**Clinical signs** – Colic, constipation and/or diarrhea, anorexia and frequent urination are signs of toxicity. Clinical signs are uncommon in horses but more often seen in ruminants.



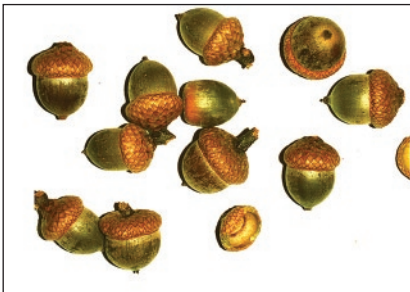
Black oak

Source: Michael Clayton - <http://wisplants.uwsp.edu>



Red oak

Source: Michael Clayton - <http://wisplants.uwsp.edu>



Red oak

Source: Paul Drobot - <http://wisplants.uwsp.edu>

**Treatment** – Provide good quality feed and remove horses from access to the oaks. Provide supportive fluids and electrolytes for intestinal and renal concerns. Several weeks of treatment may be required.

**Prevention** – Provide adequate feed. Fence off trees to prevent horses having access to the low branches or damaging young trees.

## Cherry

**Description** – The black cherry tree has a simple, alternate, often spoon-shaped leaf with a sharp tip, 5½ inches long with teeth on the margin. The leaves have a thin, waxy, dark green color on the upper surface. The flowers are white and bloom early. The fruit is heart-shaped and purplish black to red.

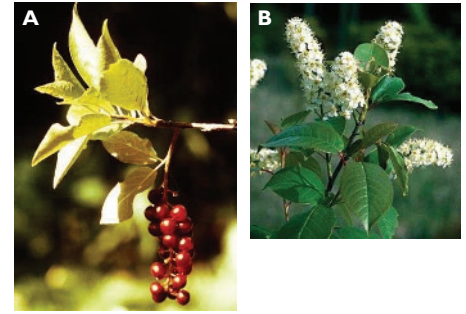
The chokecherry tree is a perennial shrub or small tree with toothed, egg-shaped leaves. Long spikes of flowers bloom in June and fruits appear in August.

**Toxic parts** – Damaged leaves (damaged by frost, trampling, drought or wilting, or blown down from the tree during storms), branches and seeds. Both the black cherry (*Prunus serotina*) and the chokecherry (*Prunus virginiana*) are toxic.

**Toxic principle** – Healthy cherry leaves contain prunasin, a cyanide precursor that in itself is non-toxic. When the leaves are damaged, the prunasin molecule is split and free cyanide (also called prussic acid or hydrocyanic acid) is liberated.

**Situations leading to toxicity** – Most animals can consume small amounts of healthy leaves, bark and fruit safely. Toxicity typically occurs when hungry animals consume large amounts of fresh leaves or small amounts of damaged leaves (as little as 2 ounces).

**Clinical signs** – When poisoning occurs, most affected animals die quickly after the onset of clinical signs. Cyanide prevents the body from being able to utilize



Chokecherry

Source: **A)** Janice Stiefel - <http://wisplants.uwsp.edu> and **B)** Elizabeth Parnis - <http://wisplants.uwsp.edu>

oxygen at the cellular level, so although the animals physically can breathe, their tissues and cells suffocate. Clinical signs may occur within a few minutes but can take up to an hour after ingestion. The animals try to breathe more rapidly and deeply, become anxious and stressed, collapse and die violently from respiratory or cardiac arrest. Attempts to urinate and defecate may be noted. If an affected animal survives for 2 or 3 hours, chances are good that the animal will recover.

**Treatment** – Do not stress the animals – handle only as necessary to protect the handler's safety and to avoid worsening the symptoms. Although methylene blue can be given intravenously as a treatment, it must be given within minutes of clinical signs; death usually occurs before a veterinarian can arrive.

**Prevention** – Remove cherry trees from pastures and fencerows. If trees are not removed, make sure that adequate feed is present at all times, and immediately check for fallen branches and trees after a storm.