

Invasive Plants of Wisconsin



Tree-of-Heaven (*Ailanthus altissima*)

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Rapidly-growing tree that can reach 80' tall. Trunk is 1-2' in diameter. Tree-of-heaven has smooth stems with pale gray bark and light brown twigs. Leaves and male flowers have a strong odor reminiscent of rancid peanut butter.

Legal Classification in WI: Restricted.

Leaves: Alternate, pinnately compound, 1-4' long. Composed of 11-25 leaflets. Each leaflet has a smooth margin, except near the base where there is 1 or more teeth with glands on them.

Flowers: Late spring. Small, yellow-green, with 5-6 petals, in dense, terminal inflorescences that are 8-16" long. Male and female flowers are borne on separate plants (dioecious).

Fruits & seeds: Fruit are 1.5" long and green turning pink to tan. The fruit are papery and have two wings extending from a seed at their center. The fruit develop on female plants from late summer to early fall and can remain on the tree through winter.

Roots: The root system is perennial, with an average taproot depth of 6' and lateral roots averaging 6' in length. However, depending on nutrient availability lateral roots can grow up to 90' long.

Similar species: Native sumacs (*Rhus*) and trees like ash (*Fraxinus*), hickory (*Carya*), black walnut, butternut and pecan (*Juglans*) can be distinguished from tree-of-heaven by having completely serrated (toothed) leaf margins. Tree-of-heaven can be further distinguished by the odor of the leaves and male flowers.

Ecological threat:

- Invades fields, forest edges and openings, and disturbed areas such as abandoned lots, roadsides, fencerows, and cracks in pavement. It is especially prevalent in urban areas where it has been planted abundantly.
- Seed can persist in woodland areas and germinate when light levels increase, usually due to disturbance.

CONTROL METHODS:**Non-chemical control**

Removal	Effectiveness In Year: 90-100% Year After: 70-90%
Pulling and digging up seedlings when soil conditions are amenable are effective single plant control. The entire root must be removed as root fragments can resprout. Root suckers and shoots are not good targets for pulling or digging as they are attached to an existing root system and difficult to remove.	
Mowing	Effectiveness In Year: 50-70% Year After: 50-70%
Mowing or cutting is not usually recommended as tree-of-heaven can resprout vigorously from the stump or rhizomes. Mowing or cutting small or young infestations can be effective if repeated for many years in heavily shaded habitats. Cutting female trees before seeds are present can prevent seed production, but additional control is required to reduce population size. Mowing has been most successful when used after chemical treatment of a population. If seeds are present when mowed, avoid movement off-site unless material can be transported without spreading fruit to other locations.	
Prescribed burning	Effectiveness In Year: 50-70% Year After: <50%
Spring burns can kill germinating seedlings and remove above ground growth of established plants depending on fire intensity. After the fire, established plants will quickly resprout; this management method is not recommended unless integrated with other techniques. Fire alone may increase tree-of-heaven populations. A hand-held propane torch can be effective for treating seedlings.	

Chemical control¹

Foliar	
Apply directly to individual plants or broadcast across an infested area. Broadcasted foliar applications are typically the most cost effective treatment in dense infestations. Use lower rates on smaller plants and less dense populations and higher rates on larger plants and denser populations.	
Active Ingredient (A.I.): glyphosate	Rate <i>broadcast:</i> 1.5 - 3 lb a.e./A <i>spot:</i> For a 3 lb a.e./gal product. 1 – 2% (0.03 - 0.06 lb a.e./gal)
Common product name: Roundup	Timing Apply when target species is actively growing and fully leafed out.
Effectiveness: In year: 50-70% Year after: <50%	Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as glyphosate is not selective. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.

¹ Herbicide information is based on label rates and reports by researchers and land managers. Products known to provide effective control or in common use are included. Those that do not provide sufficient control or lack information for effectiveness on target species have been omitted. References to pesticide products in this publication are for your convenience and not an endorsement of one product over a similar product. You are responsible for using pesticides in accordance with the label directions. *Read the label before any application.*

<p>Active Ingredient (A.I.): imazapyr</p> <p>Common product name: Arsenal</p> <p>Effectiveness: In year: 50-70% Year after: 50-70%</p>	<p>Rate <i>broadcast:</i> 64 - 96 fl oz/A (1 – 1.5 lb a.e./A) <i>spot:</i> 0.5 - 1% (0.01 - 0.02 lb a.e./gal)</p> <p>Timing Apply when target species is actively growing and fully leafed out.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as imazapyr is not selective and can remain in the soil for several months to over a year depending on application rate. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.</p>
<p>Active Ingredient (A.I.): picloram + 2,4-D</p> <p>Common product name: Grazon</p> <p>Some products containing picloram are restricted use in Wisconsin.</p> <p>Effectiveness: In year: 50-70% Year after: 50-70%</p>	<p>Rate <i>broadcast:</i> 32–64 fl oz/A (picloram: 0.14–0.3 lb a.e./A + 2,4-D: 0.5–1 lb a.e./A) <i>spot:</i> Equivalent to broadcast rates.</p> <p>Timing Apply when target species is actively growing and fully leafed out.</p> <p>Caution Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Remains in the soil for over one year depending on application rate and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas this product is applied and surface water features. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants as herbicide can persist through composting process.</p>
<p>Active Ingredient (A.I.): triclopyr</p> <p>Common product name: Element 4</p> <p>Effectiveness: In year: 70-90% Year after: 50-70%</p>	<p>Rate <i>broadcast:</i> 128 - 256 fl oz/A (4 - 8 lb a.e./A) <i>spot:</i> 1.5 – 2% (0.06 - 0.08 lb a.e./gal)</p> <p>Timing Apply when target species is actively growing and fully leafed out.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants.</p>

Cut stump Cut a stem of a plant near the base and apply herbicide to the cut surface that remains rooted in the ground. Apply as soon as possible after cutting, but no later than 1 hour after cutting. Do not use this method if there is heavy sap flow or snow covers the cut surface. Use lower rates on smaller plants and higher rates on larger plants.	
Active Ingredient (A.I.): dicamba Common product name: Banvel Effectiveness: In year: 90-100% Year after: 70-90%	Rate 25 – 50% (1 – 2 lb a.e./gal) Timing Apply any time of year. Remarks Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water or oil based carrier (e.g. basal bark oil) or both. Consult the label to determine the appropriate carrier. Caution Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants. Rates > 16oz/A (0.5 lb a.e./A) may cause stunting and discoloration of sensitive grasses, such as smooth brome.
Active Ingredient (A.I.): glyphosate Common product name: Roundup Effectiveness: In year: 90-100% Year after: 70-90%	Rate For a 3 lb a.e./gal product. 20–50% (0.6–1.5 lb a.e./gal) Timing Apply any time of year. Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as glyphosate is not selective. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.

<p>Active Ingredient (A.I.): imazapyr</p> <p>Common product name: Stalker</p> <p>Effectiveness: In year: 90-100% Year after: 70-90%</p>	<p>Rate 6 – 13% in water (0.12 – 0.25 lb a.e./gal)</p> <p>Timing Apply any time of year.</p> <p>Remarks Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water or oil based carrier (e.g. basal bark oil). Consult the label to determine the appropriate carrier.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as imazapyr is not selective and can remain in the soil for several months to over a year depending on application rate. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.</p>
<p>Active Ingredient (A.I.): triclopyr</p> <p>Common product name: Element 4</p> <p>Effectiveness: In year: 90-100% Year after: 70-90%</p>	<p>Rate 20% in oil (0.8 lb a.e./ gal)</p> <p>Timing Apply any time of year.</p> <p>Remarks Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water or oil based carrier (e.g. basal bark oil). Consult the label to determine the appropriate carrier.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants.</p>
<p>Hack-and-squirt Using a hand axe, make cuts every three to four inches around the trunk at 6-18" above the ground at the same level and apply solution into the cut area. Cover cut area with herbicide. Do not use this method if there is heavy sap flow. Use lower rates on smaller plants and higher rates on larger plants. Aqueous herbicide formulations are recommended for hack-and-squirt applications.</p>	

<p>Active Ingredient (A.I.): dicamba</p> <p>Common product name: Banvel</p> <p>Effectiveness: In year: 50-70% Year after: 70-90%</p>	<p>Rate 25 – 50% in water (1 – 2 lb a.e./gal)</p> <p>Timing Apply any time of year.</p> <p>Remarks Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water or oil based carrier (e.g. basal bark oil). Consult the label to determine the appropriate carrier.</p> <p>Caution Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants. Rates > 16oz/A (0.5 lb a.e./A) may cause stunting and discoloration of sensitive grasses, such as smooth brome.</p>
<p>Active Ingredient (A.I.): glyphosate</p> <p>Common product name: Roundup</p> <p>Effectiveness: In year: 70-90% Year after: 70-90%</p>	<p>Rate For a 3 lb a.e./gal product. 50–100% (1.5–3 lb a.e./gal)</p> <p>Timing Apply any time of year.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as glyphosate is not selective. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.</p>

<p>Active Ingredient (A.I.): imazapyr</p> <p>Common product name: Arsenal</p> <p>Effectiveness: In year: 50-70% Year after: 70-90%</p>	<p>Rate 6 - 9% in water (0.12 - 0.2 lb a.e./gal)</p> <p>Timing Apply any time of year.</p> <p>Remarks Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water or oil based carrier (e.g. basal bark oil). Consult the label to determine the appropriate carrier.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as imazapyr is not selective and can remain in the soil for several months to over a year depending on application rate. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.</p>
<p>Active Ingredient (A.I.): picloram</p> <p>Common product name: Tordon K</p> <p>Some products containing picloram are restricted use in Wisconsin.</p> <p>Effectiveness: In year: 50-70% Year after: 70-90%</p>	<p>Rate 50% (1 lb a.e./gal)</p> <p>Timing Apply any time of year, except during drought conditions.</p> <p>Caution Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Remains in the soil for over one year depending on application rate and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas picloram is applied and surface water features. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants as herbicide can persist through composting process.</p>

<p>Active Ingredient (A.I.): triclopyr</p> <p>Common product name: Element 3A</p> <p>Effectiveness: In year: 50-70% Year after: 70-90%</p>	<p>Rate 100% (4 lb a.e./gal)</p> <p>Timing Apply any time of year.</p> <p>Remarks Use 0.5 mL of undiluted product per cut.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants.</p>
<p>Basal bark Apply herbicide in a ring around the entire stem. Applications should be made at least 6" wide (6-18") to the base of a woody stem. Ideal for stems ≤ 6" in diameter. Do not use this method if there is heavy sap flow or snow or other vegetation obstruct the target area. Use lower rates on smaller plants and higher rates on larger plants. Oil-based herbicide formulations are recommended for basal bark applications.</p>	
<p>Active Ingredient (A.I.): imazapyr</p> <p>Common product name: Stalker</p> <p>Effectiveness: In year: 70-90% Year after: 70-90%</p>	<p>Rate 6 - 9% in oil (0.12 - 0.2 lb a.e./gal)</p> <p>Timing Apply any time of year.</p> <p>Remarks Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water or oil based carrier (e.g. basal bark oil). Consult the label to determine the appropriate carrier.</p> <p>Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as imazapyr is not selective and can remain in the soil for several months to over a year depending on application rate. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.</p>

Active Ingredient (A.I.): triclopyr	Rate 20-30% in oil (0.8 - 1.2 lb a.e./ gal)
Common product name: Element 4	Timing Apply any time of year.
Effectiveness: In year: 70-90% Year after: 90-100%	Remarks Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water or oil based carrier (e.g. basal bark oil). Consult the label to determine the appropriate carrier.
	Caution Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants.

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