

Tree of Heaven

Ailanthus altissima



Further
Information
and
References



Photos arranged vertically 1-4,
credits on references page.

Quick Facts: Tree of Heaven (*Ailanthus altissima*) is a fast-growing invasive tree that can reach 60-80 feet in height. It is illegal to buy or sell in many midwestern states, including Indiana and Ohio. Tree of Heaven outcompetes native plants with its quick growth, tendency to produce root sprouts, and allelopathic properties that suppress surrounding vegetation. This allows it to form dense stands of young trees. It is also the preferred host plant of the Spotted Lanternfly, an invasive and economically damaging insect pest that threatens grapes, fruit trees, and hops, often leading to reduced yields, plant dieback, or death. It is also a host to the brown marmorated stink bug. Tree of Heaven is found in disturbed environments and forests, can grow in full sun or in shade, and tolerates poor-quality soils. Due to its robust root system and tendency to resprout, it can be challenging to manage.

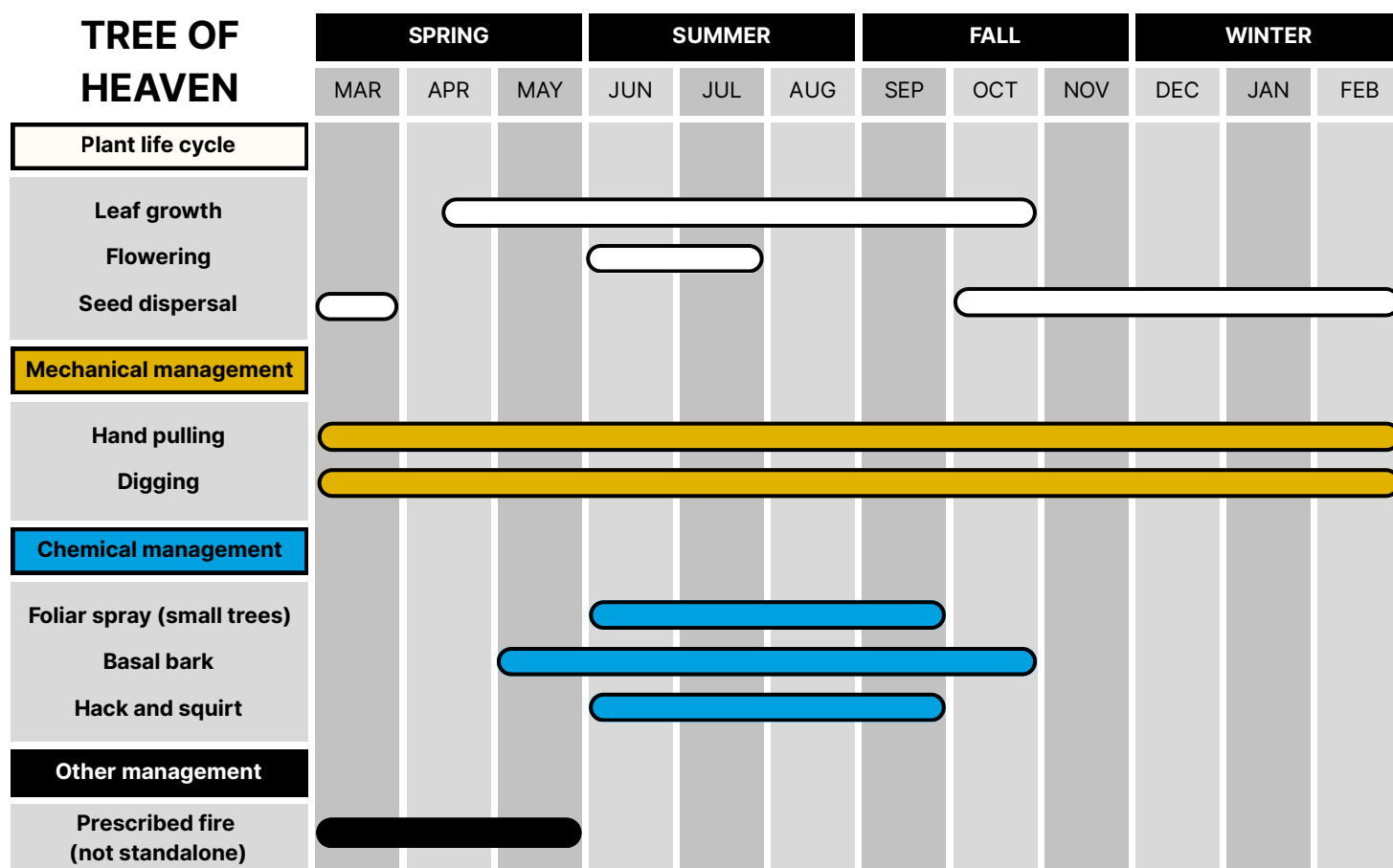
Invasion Strategy: Tree of Heaven reproduces in two ways: via seed and stump or root sprouts. Trees as young as two years old begin producing large quantities of winged seeds, which are distributed long distances by wind. Plants can also produce additional sprouts from their roots, and cut stumps resprout abundantly.

Identifying Features:

- Long, pinnately compound leaves are arranged alternately along the stems.
- Each compound leaf has up to 25 long and tapered leaflets with mostly smooth edges.
- Leaflets have several lobes or teeth at the base, each with a glandular tooth on the underside. This feature helps distinguish it from native lookalike species.
- Tree bark is mostly smooth and gray with lighter vertical streaks developing over time.
- Young stems have visible, light-colored lenticels (small dots) along the stem.
- Twigs are stout with large, heart-shaped leaf scars.
- Flowers are grouped in large spiky clusters at the end of stems.
- Individual flowers are small and greenish-yellow.
- Flowers develop into fruits with a single seed in the middle of a samara (a flat, twisted wing).
- Young fruits are green to bright red, turning brown with age. They can be retained on the tree long into wintertime.
- All parts of the plant have a strong unpleasant odor, sometimes described as "rotting peanut butter".
- Has native lookalike species (see additional information).

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This chart is based on USDA plant hardiness zone 6. Plant growth and treatment times vary by region.

Management methods:

Mechanical - Seedlings can be dug out by hand. Root fragments can resprout and should be fully removed. Mechanical control alone is not effective for large trees.

Chemical - Foliar sprays can be applied to short trees that are leafed out. Basal bark applications of herbicide can be effective from late summer to winter. Large trees respond well to hack and squirt methods, and timing depends on product choice.

Other - Prescribed fire in early spring can be combined with herbicide applications.

Disclaimer - Selecting the best management method for this plant can be site and context-specific. Check with your local USDA Service Center or University Extension agent to explore your options and determine what is most appropriate for your location and situation.

Management information: The sap can cause skin irritation; gloves and long sleeves are recommended. Personal protective equipment is recommended when removing any invasive species, and especially when using herbicides. Always follow label instructions when using herbicide.



[Blue box] Species present

[Grey box] Absent

Look-Alike Species:

- Sumac, *Rhus* spp.
- These native species have leaves that look similar to tree of heaven. Sumac leaf shape varies by species, but all species will either have leaflets are toothed along the entirety of the margin (supplemental photo 1) or have a winged rachis (central stem on the compound leaf - supplemental photo 2). Sumacs do not have glandular teeth, which sets them apart from Tree of Heaven.



Look-Alike Species:

- Black walnut, *Juglans nigra* and Butternut, *Juglans cinerea*
- These native trees also have compound leaves that look similar to Tree of Heaven. Leaflets are toothed to finely serrated along the entire margin, unlike Tree of Heaven (supplemental photos 3 and 4). These trees produce nuts, rather than samaras.



Look-Alike Species:

- Various other native species, including Hickory (*Carya* spp.), Ash (*Fraxinus* spp.), Locust (*Gleditsia* and *Robinia* spp.) and Boxelder (*Acer negundo*).
- Many native tree species have compound leaves that can appear similar to Tree of Heaven; however, unlike Tree of Heaven, none of them have glandular teeth.

References and Additional Reading:

- Indiana Department of Natural Resources. [Terrestrial Plant Rule](#). [State law prohibiting sale].
- Ohio Department of Agriculture. [Invasive Plants](#). [State law prohibiting sale].
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- Purdue University Extension. 2023. [Invasive Plant Series: Tree of Heaven, Ailanthus altissima](#). [Identification, mechanical, chemical control information, lookalikes].
- State of Indiana Cooperative for Invasives Management. 2024. [Calendar of Control](#). [Chemical control information].
- The Ohio State University Extension. 2009. [Controlling Non-Native Invasive Plants in Ohio Forests: Ailanthus](#). [Identification, mechanical, and chemical control information].
- University of California. [Invasive Pest Spotlight: Tree-of-Heaven](#). 2025. [Pest information].
- Woody Invasives of the Great Lakes. 2025. [Tree-of-heaven](#). [Lookalike plant information].

Photo Credits: Photos 1, 3, 4: USDA PLANTS Database, Doug Goldman; Photo 2: USDA PLANTS Database, Patrick J. Alexander; Range map: USDA PLANTS Database; Supplemental photo 1: iNaturalist, Alex; Supplemental photos 2, 3, 4: Purdue University, Lenny Farlee.

Resources:

- Find your local [University Extension Program](#)
- Find your local [USDA NRCS Service Center](#)
- Find your local [Soil and Water Conservation District](#)
- Check out [Management and Control of Woody Invasive Species](#)
- Check out [Purdue University Extension's Woody Encroachment and Woody Invasives fact sheet](#)
- Check out other [invasive plant fact sheets](#)

- **Acknowledgements:** fact sheets created by Sophia Sorboro, Ella Stroh, Kaleigh Obrock, and Amber Barnes with edits provided by Ohio NRCS, Indiana NRCS, and Indiana DNR.