



WNY PRISM

Partnering to Protect Western New York from Invasive Species

Best Management Practices: Tree of Heaven

Tree of heaven (*Ailanthus altissima*) is a deciduous tree that grows up to 100 feet tall. Its alternate, pinnately compound leaves measure 1-4 feet in length and leave large leaf scars along its twigs. A single leaf has 10-40 leaflets and each leaflet displays small, glandular teeth at its base. Its bark is gray and has a similar texture to cantaloupe. Tree of heaven is dioecious and female trees produce clusters of yellow-green flowers in late spring or early summer that develop into clusters of pink, yellow and green seeds in late summer. Tree of heaven has a pungent odor similar to burnt peanut butter, noticeable when leaves or twigs are broken.

Tree of heaven forms dense clonal stands that can send up root suckers as far as 50 feet away from the parent tree. Damaged trees can send up dozens of root suckers. Female trees produce over 300,000 seeds each year which are dispersed by wind and birds.

Rapid growth, high amounts of seed, effective dispersal and allelopathic chemicals released by the tree's roots limiting competition are all reasons for this species' success. Tree of heaven is often found in urban areas where its root system damages infrastructure including building foundations and pavement. This species is the preferred host for the invasive and highly destructive spotted lanternfly (*Lycorma delicatula*).

Integrated Pest Management (IPM) is an adaptive approach to invasive species management that involves the selection of multiple control methods and appropriate timing to meet the needs of each specific site and species. The goal is to maximize effective control and to minimize and potential negative impacts.

Management efforts should begin with an invasive species survey and site assessment. This allows for the development of a management plan and selection of appropriate removal methods. Management for most well-established species and/or infestations will require dedication over a number of years, often 2-5. Once initial control is achieved, restoration and continued monitoring will be required to maintain success.



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Management

Manual

Seedlings should be hand-pulled when soil is moist to ensure the entire root system is removed as its root fragments are capable of regeneration. Root suckers of adults trees may be confused for seedlings and are not recommended for manual removal.

Mechanical

Mechanical removal is not recommended as it causes epicormic sprouting (vigorous stump sprouts) and root suckers.

Chemical

Systemic herbicides can be applied in a variety of ways. The most effective is basal bark application, recommended for trees with a basal diameter less than 6 inches. Foliar spray is recommended for dense stands of young, short trees. Larger trees may be treated with girdling or frilling, but will cause some root suckering. Cut stump treatments should be limited as this will result in vigorous root suckers. If a tree must be mechanically removed, apply herbicide at least 30 days beforehand to discourage root suckering. Herbicide should be applied in mid-late summer. Chemical treatments will need to be repeated to fully kill the root system of this tree.

Spread Prevention

Prioritize management of female trees to reduce seed sources. Early detection and removal of seedlings prevents further spread of this species. Monitor for new root suckers after the removal of dead trees.

Disposal

When feasible, put plant materials into landfill-bound trash bags to prevent seed dispersal and re-rooting.

Restoration

Creating competition will protect against future infestations. As a highly shade intolerant species, tree of heaven will not reestablish under a closed forest canopy. Allelopathic compounds released by tree of heaven may complicate restoration efforts.

CAUTION: Contact with tree of heaven sap may result in skin irritation as well as rare cases of heart problems, headaches and nausea. Protective clothing and gloves are recommended.

USE PESTICIDES WISELY: Always read the entire pesticide label carefully and follow all instructions. Pesticide regulations can vary widely between regions; please contact local authorities for additional pesticide use requirements, restrictions or recommendations. Mention of pesticide products by WNY PRISM does not constitute endorsement of any material.



Photos Front: Top- tree of heaven leaves and immature seeds; Middle- mature seeds; Bottom (left to right)- flowers (Photo Credit: Jan Samanek, Phytosanitary Administration, Bugwood.org), leaf scar, leaf glands and teeth.

Photos Back: Top- urban tree of heaven; Bottom- bark (Photo Credit: Richard Gardner, Bugwood.org).

Additional Resources:

Penn State Extension

<https://extension.psu.edu/tree-of-heaven>

USDA Tree of Heaven Management in the Southwest

https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410131.pdf



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