

# Tree of heaven *Ailanthus altissima*

## About

Tree of heaven (*Ailanthus altissima*) is a significant invasive species in many parts of the world. Native to Asia, it was introduced to British Columbia as an urban tree known for its fast growth and tolerating a wide range of growing conditions. Tree of heaven has multiple modes of reproduction, allowing it to spread prolifically. Tree of heaven is known to be the preferred host of the invasive agricultural and forest pest, Spotted lanternfly (*Lycorma delicatula*).



MB; ISCBC



J. Samanek; Bugwood.org



Glandular teeth  
C. Evans; Bugwood.org

## Legal Status

Currently, *A. altissima* is not listed as a noxious weed in the *BC Weed Control Act*. However, it is listed as an invasive plant according to the Canadian Food Inspection Agency (CFIA) and a species for regional containment and control by the BC Inter-Ministry Invasive Species Working Group.

## Distribution

Tree of heaven's native distribution is throughout northeast and central China and Taiwan. It is now found throughout North America, including British Columbia, Ontario, and Quebec. It has also spread throughout Western Europe, South Africa, Australia, and New Zealand.

## Identification

**Flower:** Large panicles at the end of new stems, up to 50 cm in length; individual flowers small, appear to be white, or yellow to green; five sepals; flowers in late May and June.

**Stem:** May reach 30 m in height. Grey-brown bark that is smooth on young trees and rougher on mature trees.

**Leaves:** Compound leaves; 1 m long, individual leaflets are 5-15 cm long and 2.5-5 cm wide; ovate-lanceolate shaped; dark green with lighter green veins. *Note: A pair of glandular teeth are found at the base of each leaflet.*

**Fruit:** Grow in bright red and brown clusters with hundreds of seeds encased in a samara — a winged variety of a simple dry fruit.

**Similar Species:** Native species such as Staghorn sumac (*Rhus typhina*), Smooth sumac (*Rhus glabra*), and black walnut (*Juglans nigra*) can resemble Tree of heaven. The critical difference is that Tree of heaven does not have toothed edges on its leaflets compared to those three species and a pair of glandular teeth at the base of each leaflet.

## Biology

**Habitat:** *A. altissima* is found in disturbed urban environments, such as abandoned lots, alleys, parking lots, and streets. It can effectively colonize sites with rocky and poor growing conditions.

**Reproduction:** Tree of heaven effectively proliferates through sexual and asexual reproduction. Sexual reproduction through seed production is done by the female, producing as many as 325,000 seeds a year. These seeds are encased in a spapery wing that aids in wind and water dispersal. It is an efficient asexual reproducer through vegetative sprouts and suckers. It aggressively re-sprouts in response to being pruned and will rapidly spread vegetatively through root sprouts.

**Dispersal:** Tree of heaven dispersal was primarily through gardeners and horticulturalists who introduced this species to the East Coast of North America in the late 1700s and the West Coast in the 1800s. It was commonly available in nurseries and valued as a street tree due to its ability to proliferate and tolerate a wide range of soil and air quality.

## Impacts

**Ecological:** When Tree of heaven colonizes an environment, it will outcompete native flora and create a monoculture ecosystem. Tree of heaven is allelopathic, meaning they secrete toxins into the soil, inhibiting the growth of other plants. This can disrupt natural succession cycles and degrade the quality of urban park ecosystems, where Tree of heaven is typically found.

**Economic:** Its aggressive vegetative root sprouting can cause damage to our urban infrastructure. It's capable of breaking through asphalt and cracking through building foundations, walls or even sewers.

## Best Management Practices

**Prevention:** Avoid creating disturbances in infested areas, which promote seed germination.

When vegetating urban areas, use PlantWise horticulture species which can stop active distribution and trading.

Monitor for Tree of heaven in both disturbed and undisturbed sites.

Take special care when controlling Tree of heaven near streams or ditches to prevent downstream movement of plant parts.

Maintain or establish healthy plant communities that are resistant to invasion by invasive plants.

**Mechanical Control:** Pulling or digging up young saplings can be effective as long as the entire plant, roots and fragments are removed to prevent regrowth. Cutting alone won't be effective due to its aggressive suckering ability. However, repeated cutting can potentially exhaust root reserves.

**Chemical Control:** Herbicide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels and other sources of information must be reviewed before applying herbicides.

- » Herbicide treatment is an effective control method through foliar, cut stump or hack and squirt treatment.
- » Glyphosate is an effective herbicide through foliar (leaf), hack and squirt or cut stump treatment.
- » Triclopyr is another effective herbicide option through foliar (leaf), hack and squirt or cut stump treatment.
- » Application of pesticides on Crown Land must be carried out following a confirmed Pest Management Plan (Integrated Pest Management Act) and under the supervision of a certified pesticide applicator. <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/integrated-pest-management>.

## Biocontrol

No approved biological controls are available at this time.

### Homeowners Recommendations for Removal:

- » Young seedlings can be dug out or hand pulled, ensuring the entire root system is removed. This approach does not

work for larger seedlings which can potentially leave root fragments behind that will regrow.

- » Resulting waste should be bagged and disposed of at the landfill or burned to prevent any accidental spread.
- » The area should then be monitored to remove any new seedlings or roots that appear.
- » Cutting isn't an effective method of removal since it will respond by growing stump sprouts and root suckers.
- » For larger trees and more widespread infestations, it may be best to contact a professional since treatment will likely require a multi-step approach including herbicide treatment.
- » If herbicide treatment is used, the most effective treatment window is between mid to late summer.
- » Maintaining a healthy native plant community can prevent Tree of heaven from invading an area. Leaving native plants in place or revegetating a bare area with native plants reduces the opportunity for Tree of heaven to establish.
- » Ensure vehicles and other machinery used in an area with Tree of heaven are free of soil and plant parts prior to leaving the site.

**Education:** Public education and awareness will help identify new or previously unknown Tree of heaven populations. Be PlantWise! Ensure you are planting native or non-invasive horticultural species in urban environments.

## Reporting:

Report Tree of heaven by using the mobile Report-Invasives-BC app for iPhone, iPad and Android platforms, available for download at <https://bcinvasives.ca/take-action/report/>.

## References/Links

E-Flora BC, an Electronic Atlas of the Plants of BC. [www.eflora.bc.ca/](http://www.eflora.bc.ca/).

Global Invasive Species Database (2022). Downloaded from <http://www.iucngisd.org/gisd/search.php> on 06-04-2022.

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U.S. Department of Agriculture (2022). Tree-of-heaven – National Invasive Species Information Center. <https://www.invasivespeciesinfo.gov/terrestrial/plants/tree-heaven>.

