

Tree of Heaven

Ailanthus altissima

Fact Sheet

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Common Name: Tree of Heaven

New Hampshire Invasive Species Status: Prohibited (Agr 3800)

Latin Name: *Ailanthus altissima*

Native to: China



Compound leaves (spring)



Tree of heaven – Concord, NH



Compound leaf (summer)



Flowers (spring)



Flowers (spring)



Samaras/seeds (late summer)



Terminal Bud (spring)



Bark (summer)



Leaf-scar (fall)

Description: Deciduous tree up to 60' tall by 40' wide. **Bark:** Grayish, slightly furrowed. **Twigs:** Reddish-brown. **Leaves:** Compound, 18-24" long with 11-41 leaflets arranged alternately on stem, lanceolate, 3-5" long with 2-4 teeth near base. **Flowers:** Panicles, 8-16" long, yellowish-green, mid-June. **Fruit:** Samara. **Zone:** 4-8. **Habitat:** Highly adaptable and pollution tolerant, full sun to partial shade. **Spread:** Seeds are wind dispersed. **Comments:** Very fast growing, dense canopy shades out native species. **Controls:** Remove seedlings and saplings by hand. Larger trees can be mechanically removed or cut. To prevent suckering, if trees are cut, apply herbicide to cut portion of stump.

General Considerations

Ailanthus, also known as tree-of-heaven or Chinese sumac, is a persistent and aggressive weed throughout much of Europe and North America. *Ailanthus* grows quickly and can reach a height of 2.5 m (8 ft) in its first year. *Ailanthus* reproduces from both seed and root sprouts. Seeds are easily windblown and a high percentage are viable. True seedlings are smaller and thinner-stemmed than root sprouts and have trifoliate leaves. Sprouts will have a cluster of leaves with variable numbers of leaflets. When pulled from the ground, seedlings will reveal thin, branching roots while sprouts will be firmly connected to a thick, rope-like root. Sprouts may emerge up to 15 m (50 ft) from the nearest

existing stem. Most stems begin to reproduce at 10-20 years, though two-year old sprouts can produce fruit, and first-year seedlings have been observed flowering. *Ailanthus* is intolerant of shade; in natural stands reproduction is primarily by sprouting. The trees are typically short-lived (30-50 years), though some have survived for over 150 years.

Ailanthus may be confused with other trees having compound leaves and many leaflets; particularly black walnut (*Juglans nigra* L.), butternut (*Juglans cinerea* L.), and some species of sumac (*Rhus* spp.). The leaf margins of these trees have small teeth (except for winged sumac), while those of *ailanthus* are smooth. The gland-tipped leaflet lobes are unique to *ailanthus*, as is the foul odor produced by crushed foliage and scraped bark. In winter *ailanthus* may be distinguished by the stout twigs, large leaf scars with numerous bundle scars, and false end buds.

Ailanthus is adapted to a wide variety of soil conditions. It tolerates drought and rocky conditions to the extent of growing out of pavement cracks. The tree is common in urban areas and disturbed sites throughout its range, and it is a pioneer in succession with limited ability to compete in a closed-canopy forest. It can, however, take advantage of forests defoliated by insects (e.g., spongy moth) or impacted by slides, windstorms, or other natural disasters. *Ailanthus* forms dense, clonal thickets that displace native species. A few trees along a fencerow or forest edge can rapidly invade adjacent meadows. In addition to its prolific vegetative reproduction, *ailanthus* has allelopathic effects on many other tree species and may consequently inhibit succession.

Control Options

See the following control guides: [Integrated Pest Management \(IPM\) for Woody Plants](#); or the [Control of Invasive Species by Numbers](#)

| <i>Ailanthus altissima</i> Tree of heaven | |
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| Plant Type | Tree |
| Habitat Type | Open spaces, urban environments. |
| USDA Hardiness Zone | 4-8 |
| Rooting Structure | Tap |
| Environmental Impacts | Allelopathic ailanthone. Bark and leaves produces a toxin. As it accumulates in the soil, the toxin inhibits the growth of other plants. Root system is aggressive enough to cause damage to sewers and foundations. |
| Wildlife Impacts | |
| Leaf arrangement | Compound |
| NWI Ranking | UPL |
| Soil Type | |
| Soil pH Range | 4.1 to? |
| Light Requirements | Prefers partial to full sun, shade |
| Growing Season | |
| Growth Rate | 3" (76.2cm) per year |
| Mature Height | 18-24m |
| Life Span | 100 years |
| Reproductive Age | 12 years |
| Flowering Period | June |
| Flower Type | Dioecious |
| Pollination | Insects |
| Seed Set | September |
| Seed Per Plant | 350,000 |
| Scarification Required | |
| Cold Stratification | No |
| Seed Longevity | Typically 1-year, possibly 2 |
| Seed Germination Rate | 87% |
| Seedling Density | |
| Other Propagules | Root suckering |
| Dispersal Vectors | Wind & water |

Exposure to the sap *can* cause skin irritation and care should be taken if workers have any open cuts or wounds because it can cause inflammation of the heart muscle (myocarditis). Afflicted personnel experienced fever/chills, chest pain that radiated down both arms, and shortness of breath.

Sources

Mehrhoff, L., 2001. Invasive Plant Atlas of New England, Catalog of Species, *Alliaria petiolata*: http://www.eddmaps.org/ipane/ipanespecies/trees/ailanthus_altissima.htm

USDA Forest Service invasive species website: <http://www.fs.fed.us/database/feis/plants/tree/ailalt/all.html>

Invasives.org: <http://www.invasive.org/browse/subinfo.cfm?sub=3003>