

# TREE-OF-HEAVEN

(AILANTHUS ALTISSIMA)



## Background/ Description

The tree of heaven (*Ailanthus altissima*) is a fast growing invasive deciduous tree native to China and was originally introduced to North America as an ornamental. It grows in many ideal and harsh conditions. It is found in riparian corridors, grasslands, and rangelands and other non-agricultural sites.

Growing 70 feet in height, it also extends its roots below the soil up to 50 feet in any direction. Leaves are large and pinnate-compound, giving off an unpleasant odor when crushed. Since the trees are dioecious (male or female), in the summer, the females produce a winged fruit called a samara, with up to 325,000 seeds per year. This species of plant reproduces both through seed and vegetatively in the roots allowing for higher chances of plant succession. It is thought that the tree possesses the allelopathic capabilities to inhibit the growth of other plants in competition. Tree-of heaven can live 30 to 50 years in a variety of conditions. This species' competitive nature can be damaging to roads, foundations, pavement, and other fixed infrastructures.

## Biological Control

Currently, there are no approved biological control methods to manage the tree-of-heaven.

## Cultural Control

Shaded areas will have a lower establishment rate than those with part to full sunlight.

## Mechanical Control

Hand pulling can improve some effectiveness when the plant is in its seedling stage. Once it has matured beyond this point, this technique will have a more negligible effect as its root system will be more complex and can stimulate growth. Using a weed wrench or other type of plant extracting tool to lift plant and roots from the ground can help extract species the size of a sapling or a smaller-sized tree.

## Chemical Control

Herbicide treatments with systemic applications are effective during the middle of summer to fall or once fall color changes are apparent in the foliage. Any treatments that are made before or after this window of opportunity will only damage aboveground growth. Follow-up treatments may be required as infestations can present themselves even after applications.

Many chemical compounds can control the species, such as triclopyr, glyphosate, imazapyr, and metsulfuron. These compounds can be applied through foliar, basal bark, cut-stem treatments. Cut-stump treatments do not affect plant from root suckering and should not be utilized for this intent but can be used to remove single plant species sparingly.

Since the characteristics of chemicals vary on how it affects the plant, it is suggested that to minimize the risk of mortality of non-target plants, an herbicide that does not move through the roots system or sit in the soil be used. Such herbicides that do not move through the soil include glyphosate and triclopyr.

Foliar applications can be applied to foliage of woody species that are sizable to reach majority of the plant. In heavy, dense areas, this method can be used initially and followed up by a basal bark or hack-and-squirt method. Basal bark treatments are herbicide application sprayed directly onto the stem (bark) of the base of the plant usually if the plant is under 6 inches in diameter. Hack and squirt method is used on larger trees and requires a small cut to the base of the plant followed by an herbicide application to the incision. Monitoring and repeated treatments will be required for established infestations. Persistence is essential to the control of this species. Always follow the label. The Label is the LAW!

HERBICIDE	RATE PER ACRE	APPLICATION TIMING / NOTES
Triclopyr (Garlon 4 Ultra, Garlon 3A)	See Notes	Foliar spot spray—1 to 2 % v/v solution of Garlon 4 Ultra and a Non-ionic surfactant added. Best used when leaves are fully expanded.  Basal cut stump—20 to 25% Garlon 4 Ultra in 80% oil carrier.  Basal bark—20 to 30% Garlon 4 Ultra in a 80% oil carrier.  Stem injection—One cut per 3 inches of stem diameter, and 1 ml of undiluted Garlon 3A added to each stem.  Cut stump, basal bark and stem injection applications can be done anytime, but best in late summer or early fall.
Glyphosate (Rodeo, Round-up, and others)	See Notes	Foliar spot spray—2 to 4% Glyphosate and water plus 0.5% nonionic surfactant. Best after foliage is fully exposed.  Stem injection— One cut per 3 inches of stem diameter, with 1 ml undiluted chemical added to each cut. Best from mid-June to mid-September (Fall color).
Imazapyr (Arsenal, Habitat, Chopper, Stalker)	See Notes	Cut stump—20% Arsenal or Habitat v/v in 80% water carrier.  Stem injection—One cut per 3 inches of stem diameter; 1 ml undiluted chemical (Arsenal or Habitat) to each cut.  Basal bark—20% Chopper or Stalker formulation v/v 80% oil carrier.  These applications are best in late summer to early fall, but before leaves drop.
Metsulfuron (Escort XP)	2 oz.	Foliar application. Once leaves have fully expanded.

### References

DiTomaso, J.M., G.B. Kyser et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California. 544 pp.

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