



Invasive Species Leaflet



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Ailanthus altissima (Tree-of-Heaven)



Initial Introduction and Expansion in Range

Native to China, *Ailanthus altissima* was brought to the United States in 1784 by a Philadelphia gardener. Its rapid growth rate and ability to grow in harsh conditions with little care made this tree a popular horticultural plant relatively quickly in the east. It was spread to the west by Chinese miners during the California gold rush who cultivated the seeds for medicinal purposes. In North Carolina, *A. altissima* is most prevalent in the piedmont and mountain regions but can also be found on the coastal plain.

An individual *A. altissima* tree can produce several hundred thousand seeds per year, and the light winged seeds can be carried great distances from the parent plant. It grows vigorously and establishes dense, clonal thickets that can displace native vegetation. The ability of *A. altissima* to tolerate poor soils and atmospheric pollution make it a common colonizer in urban areas. Roadways provide the perfect migration routes for this tree.

Description and Biology

- Small to medium sized deciduous tree up to more than 80 feet in height.
- Alternate, compound leaves composed of 10 to 40 leaflets arranged along the leaf stem with a terminal leaflet. Leaflets are lanceolate and not always directly opposite. Each leaflet has 1 to 3 teeth on each side close to the base. When crushed, leaves produce a distinctive unpleasant odor described as "burnt peanut butter."
- Smooth gray bark that cracks with age.
- Young twigs are light brown and stout with fine hairs.
- Flowers in July and August with flowers occurring in panicles (much branched flower clusters) at the end of branches. Greenish-yellow flower has 5 sepals and 5 petals.
- Seeds encased in papery wing-like sheath called a samara. Samaras are slightly twisted or curled.
- Often confused with *Rhus* spp. (sumac) and *Juglans nigra* (black walnut).



Habitats Susceptible to Invasion

Although *A. altissima* is most common in urban areas, it poses an environmental threat because of its invasiveness in cultivated fields and natural areas. Seedlings can establish a deep taproot within 3 months from germination allowing the plant to grow quickly and out-compete native species for sunlight and space. It thrives in full sun but also exhibits shade tolerance. In addition, this plant produces an allelopathic chemical that prevents other plants from growing in its vicinity. Roadsides throughout the piedmont and mountains are infested with *A. altissima* providing the ideal habitat and conduit for spread of this plant.

Prevention and Control

Large female fruit bearing trees should be targeted for control to help reduce the spread of this plant by seeds. Hand-pulling young seedlings (no more than 0.5 inch in diameter) is possible when the soil is moist. Care must be taken to remove the entire plant since root fragments can re-grow.

For thickets of *A. altissima*, apply a foliar solution of 4 percent glyphosate plus a 0.5 percent non-ionic surfactant. The most successful chemical control can be achieved with a foliar solution of 1.0 oz metsulfuron/100 gallons water plus a 0.5 percent non-ionic surfactant. This solution will treat an area approximately the size of an acre.

For larger trees, cut them within 6 inches of the ground and immediately spray the freshly cut stump surface and sides with a solution of 50 percent triclopyr. It is best to apply the herbicide between summer and early fall while the plant is translocating nutrients to the roots.

The hack-and-squirt method is effective for controlling *A. altissima* particularly when conducted in the summer. Use an ax to make downward-angled cuts into sapwood around the tree trunk as close to the ground as possible. Immediately squirt a 50 percent solution of triclopyr into the cuts so that the bottom of the cut is covered, but liquid does not run out. Space the cuts so that about 1 to 2 inches of uncut living tissue remains between the cuts since a continuous line may cause an emergency response in the plant resulting in basal sprouts and root suckers.

Basal bark application of herbicide is one of the easiest methods of control for trees up to 6 inches in diameter. This method should be used judiciously since it takes a lot of chemical and can result in overspray. It has been used successfully in situations where no other technique is easy such as cliff faces or other exposed sites. Apply a solution of 25 percent triclopyr and 75 percent mineral oil to the basal parts of the tree to a height of 12 to 16 inches from the ground during the late winter/early spring or summer. All treatments should be followed up the next year to monitor and control basal sprouts and root suckers.

THE LABEL IS THE LAW! WHEN USING ANY PESTICIDE, FOLLOW ALL LABEL INSTRUCTIONS

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Ailanthus altissima photography by James H. Miller, USDA Forest Service, Bugwood.org (left) and Leslie J. Mehrhoff, University of Connecticut, Bugwood.org (right).

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