



Tree-of-heaven (*Ailanthus altissima*)- or, The Tree that Ate Perry County

Tree-of-heaven (*ailanthus*) is a fast growing, weak-wooded, root-suckering tree native to East Asia. It was introduced into the U.S. in the late 1700's in Philadelphia as a garden specimen, and then used as a city tree in the heavily polluted conditions of the Industrial Revolution.

Ailanthus tolerates poor, dry soils, and exudes chemicals from its roots that suppress other species. *Ailanthus* is well suited to colonize the heavily disturbed soils that result from road construction. The interstate highways built between Northeastern US cities have served to move *ailanthus* out of the cities and into the countryside.

Perry County's proximity to Harrisburg and the construction of the limited-access SR 22 in the 1960's makes it an ideal location for *ailanthus* to invade. The Route 22 corridor is a veritable *ailanthus* garden - it features extensive cut and fill sections, creating poor, disturbed sites and difficult-to-maintain areas (Figure 1).

PENNDOT's Bureau of Maintenance and Penn State's Department of Horticulture initiated a pilot project in 2001 find the best system to eliminate extensive infestations of *ailanthus*, using the Route 22 corridor as the test case.

The basic approach is a two-phase program, dividing the task into a control phase and a maintenance phase. During the control phase the existing *ailanthus* is largely eliminated, reducing the population to the point where periodic

maintenance operations will keep it in check and prevent further spread.

Highway rights-of-way border many properties. Long-term success in managing *ailanthus* in infested areas will require the efforts of both PENNDOT and the adjacent property owners. The right-of-way has served as a breeding ground for *ailanthus* to establish on neighboring properties. Private properties often serve as the source of *ailanthus* infesting or re-infesting the right-of-way. Controlling *ailanthus* on your property now is the best way to prevent further spread.

Before you begin controlling *ailanthus*, you need to be sure you have it. *Ailanthus* is very similar in appearance and growth habit to the native sumacs. *Ailanthus* and sumac grow in clumps, producing new shoots off of their root system. Both species have large, compound, palm-like leaves with many leaflets (Figure 2). However, sumac, whether staghorn (*Rhus typhina*) or smooth (*Rhus glabra*) typically grows to a height of 10 to 15 feet at the most, while *ailanthus* will easily reach heights of 40 to 60 feet (Figure 3).

Smell is another distinguishing feature. Crushed *ailanthus* leaves are often described as smelling like rancid peanut butter.



Figure 1. The disturbed, infertile soil along highways is an ideal location for *ailanthus* to invade. This fast growing, weak wooded tree reduces sight distance and creates collision hazards.



Figure 2. Up close, *ailanthus* and our native sumacs can look quite similar, especially during the first years of growth. They both feature large, compound leaves arising from mostly unbranched stems. Sumac (left) can be distinguished from *ailanthus* (right) by the teeth along the edge of the leaflets.

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Figure 3. Yméne Foulé of Penn State's Department of Horticulture stands in a patch of staghorn sumac (right), next to a stand of ailanthus (left). Sumac and ailanthus are similar in form, but not scale.

To successfully control ailanthus, you need to control the root system. Cutting down the stems accomplishes little except providing a lot of exercise. The most effective approach to controlling ailanthus is to apply a systemic herbicide late in the growing season. This is the time of year that the energy being captured in the leaves is sent as sugars to the root system for next year's growth. The herbicide moves into the roots with these sugars.

Here are a few key points to ailanthus control:

- Ailanthus control will take more than one treatment.
- It is better to treat ailanthus *before* you cut it.
- Work later in the season-August and September - when the herbicide is more likely to injure the roots.

If you are dealing with a significant infestation of ailanthus, we recommend the Penn State publication *Managing Tree-of-heaven (Ailanthus altissima) on Roadsides*, which you can download at http://rvm.cas.psu.edu/Publications/FS_3_AILAL_v2.pdf

A small infestation of ailanthus can be managed with a squirt bottle and a hatchet, using the herbicide glyphosate. Glyphosate is effective, inexpensive, easy to find, and is less likely to lead to unintended non-target impacts than other herbicides.

Glyphosate products commonly come in three common formulations - ready-to-use, an 18 percent concentration, and a 41 percent formulation. To control ailanthus, you need the 18 or 41 percent product.

You must follow the directions on the product label.

Small stems of ailanthus can be effectively controlled by treating the foliage. Follow the mixing directions for 'hard to control weeds' or 'woody brush' on the product label, and apply the solution to the foliage of the stems that are short enough for you to cover the top of the canopy.

When you can't reach the top of the canopy, you can use a technique called 'hack and squirt'. All you need is a hatchet, or similar cutting tool, and some concentrated glyphosate solution (undiluted 18 percent product, or a 1:1, herbicide:water mixture of the 41 percent glyphosate product). Use a hatchet to make shallow, downward cuts around the ailanthus stem. The cuts only need to be deep enough to penetrate the outer bark. Space the centers of each cut 3 to 4 inches apart, and make sure there is intact bark between the cuts. Using a squirt bottle, treat each cut with enough concentrated glyphosate solution to wet the cut (Figure 4). With a late season treatment, you may not see significant effects on the foliage before the leaves drop.

If you want to cut down the stems, wait until the leaves have fallen. This will insure that the herbicide has a chance to get to the roots.

You will probably see some ailanthus resprouts next season, but a lot less than you started with. A little effort each season will guarantee you less work the following year.



Figure 4. Ailanthus stems that are too tall to spray can be treated using the 'hack and squirt' technique. Spaced cuts (leave intact bark between cuts) from a hatchet are treated with a concentrated mixture of the herbicide glyphosate. Results are best when this is done in the fall, before the leaves change color.

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