CONTROLLING INVASIVE PLANTS
Effectively & Safely with Herbicides

Treating nonnative invasive plants with herbicides is often the most effective and quickest way to rid your land of these noxious weeds. It may also be the least expensive way. How you apply the herbicide depends upon which invasives you are treating, how bad the infestations are, and the time of year you are working, among other factors. *See the PRISM factsheet titled* Herbicide Basics *to learn about different types of herbicides and how they are labeled and rated for safety.*

Herbicides can be applied several ways:

- ***Foliar Spray:*** sprayed onto green leaves
- ***Wick/sponge*:** wiped onto green leaves
- ***Cut Stump:*** sprayed or painted onto cut stumps
- ***Basal Bark:*** sprayed or painted onto lower trunks
- ***Hack & Squirt:*** squirted into cuts in trunks

Foliar Applications

Using a ***backpack sprayer*** to apply herbicide to a plant's leaves is the most frequently used method of controlling invasive plants. You can adjust the sprayer's nozzle to ***spot-spray*** individual plants or to ***broadcast-spray*** large infestations or colonies. Several brands and models of sprayers are available – choose one with waist and/or chest straps that fits you comfortably. These usually hold 3 gallons, so the filled sprayer weighs over 30 lbs. If weight is a problem, you can fill it with 1 ½ or 2 gallons. When spraying an extensive infestation, you'll be able to empty the backpack in under an hour. Patrolling for scattered invasives, it may take several hours per backpack.

A backpack sprayer filled with herbicide and dye allows you to search for and spot spray invasives.

Contractors often use a ***boom sprayer*** *or* ***wide-spreading nozzle,*** mounted to an ATV to treat entire fields. This allows the contractor to rapidly and inexpensively treat large areas, because it reduces labor costs. Correct alignment and aim of the nozzles is needed to prevent the spray from drifting onto bordering areas of nontarget plants. Sometimes a *wick* mounted on an arm attached to an ATV or tractor is used to kill tall invasive plants in a native meadow, pasture or hayfield. The wick contains a foliar herbicide that wipes the treatment onto the tallest plants as the vehicle moves up and down the field. This method is useful for Johnson grass about three weeks after mowing, and for invasive thistles, which tower above other plants in the field in mid- to late summer.

Where invasives grow close to desirable native plants, you might try hand methods other than spraying to avoid collateral damage in high-quality sites. You can purchase various forms of ***wick applicators*** or you can make your own with a sponge or wick mounted on a long handle. ***Paint sticks*** and ***stain sticks*** sold at hardware stores also make handy wick applicators. Some paint sticks have a reservoir in the handle meant for paint that could be used to hold herbicide. This method eliminates the possibility of spray drifting onto non-target plants.

Wearing waterproof gloves, dip the sponge end into a container of herbicide, then wipe off excess solution. Brush or wipe the sponge or wick across the surface of the leaves of the target plant. Be careful to avoid neighboring plants. To avoid tipping the container of herbicide, carry and stabilize it in a well-balanced bucket or basket.

Cut-Stump Method

Felling an invasive tree or cutting an invasive shrub to the ground may get rid of it temporarily and prevent it from flowering and spreading its seeds. However, invariably it will send up suckers (new stems) from its roots. Prevent resprouting by applying herbicide to the cut stump right after cutting it. A concentrated, water-soluble, herbicide mixed with dye works well applied from a **hand-held squirt bottle** or a **paintbrush**; be sure to label the bottle with its contents. You can also use a ready-to-use (RTU) product designed to kill stumps.

Painting or spraying a concentrated herbicide onto the outer edge of a cut stump kills the root system and prevents resprouting.

Cut the tree's trunk with a ***handsaw*** or ***power saw*** at a comfortable height close to the ground. If cut-stumping a shrub, be sure to cut every stem that emerges from the ground. Apply the concentrated herbicide right after making the cut. For small stems, apply the herbicide to the entire cut surface, but for large stems and trunks, herbicide only needs to be applied to the outer one inch of the stump; this the location of the live plant tissue that will move the herbicide down into the root system, which ought to kill the roots and thus the tree.

Text and photos by Susan A. Roth

Follow all herbicide label directions.

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Basal Bark Application

No cutting involved here. You spray or paint concentrated herbicide directly onto the invasive tree's or shrub's bark. Basal bark treatment works only on woody plants whose bark is still smooth. (Use cut stump or hack & squirt for trunks larger than six inches in diameter or those with rough bark.) This technique uses an oil soluble (ester-based) herbicide mixed with an oil carrier rather than with water. The oil is better at penetrating the bark. Oil carriers are referred to as ***horticultural oils*** and are either mineral- or vegetable-based. Diesel oil was used as the carrier in the past, but it is bad for the environment, especially wherever water is nearby. Do not use diesel as the carrier oil even if you see it recommended.

You'll need to apply an herbicide to the trunk at a higher concentration than required for a foliar application. Ester formulations, as opposed to salt formulations, of herbicide are used because esters pass more readily through the bark and are oil soluble, not water soluble. *Esters are highly volatile, so make basal bark treatments only on cool, windless days.*

Kill young invasive trees by applying concentrated ester-based herbicide mixed with horticultural oil to the lower trunk.

Use a backpack sprayer when treating large numbers of plants and a hand-held spray bottle, wick or paintbrush when treating small numbers. Clearly mark all bottles and containers with their contents.

Spray a band around the entire trunk from ground level up to 6 to 18 inches. The larger the trunk, the higher it should be treated. When treating multiple trunks on a multi-stem plant, such as autumn olive or privet, treat all stems, but only up to about 8 inches high.

Hack & Squirt & Injection Methods

Also called ***frill girdling***, hack & squirt treatment is used to kill mature trees without having to cut them down. Using a machete or hatchet, hack pockets at a 30° angle spaced 2 inches apart around the tree at about waist height. Then immediately apply concentrated herbicide into the cut, using a handheld spray bottle, drip bottle, or backpack sprayer. (Label hand-held sprayers and bottles with the name of the herbicide.) Use full-strength concentrated herbicide.

Kill large invasive trees by hacking into the bark and applying a concentrated herbicide into the cuts.

Spaces need to be left between hacks so the herbicide moves efficiently into the plant's vascular system and down into the roots to kill the tree. If no spaces are left the tree is girdled and vascular movement stops; the herbicide won't be carried to the roots to do its damage and the tree will go into survival mode and sprout numerous shoots from the roots. This makes the invasive problem worse. Use hack & squirt any time of year except spring, when woody plants are leafing out and vascular movement is upward from the roots.

Foresters and contractors use a specialized tool called a ***hypo-hatchet*** for hack & squirt. This tool cuts and injects herbicide with one movement. The hatchet is connected by a hose to a backpack tank and the herbicide is automatically injected into the trunk with each hack. These tools are costly but make quick work of killing a grove of tree-of-heaven for instance.

Herbicide Cautions

Be sure to use the concentration recommended on the label or check the Virginia Department of Forestry chart *Non-Native Invasive Plant Species Control Treatments,* which you can download from the PRISM website. Using a higher concentration is illegal and a bad idea; it will not kill the plant faster or better. Rather, a higher concentration may be *less* effective. It can burn leaves and prevent the herbicide from being absorbed. Using a lower concentration for highly sensitive plants does make sense. If an herbicide works on a particular plant at a lower concentration than recommended for general use, the VDOF chart lists it.

Take care when spraying that the herbicide does not drift onto nearby desirable plants. Spray only on calm days. Even a small amount of herbicide on leaves of a nontarget plant may kill or disfigure it, although a few drops are usually of no concern. High air temperatures can cause herbicides to evaporate and the vapor can harm nontarget plants. It is best to limit spraying to times when it is cooler than 90°F. Herbicides work best when the target plant is actively growing; drought- or heat stressed plants may be less susceptible. Check your product's label to see how long after application it is rain-fast; this is usually one hour, but varies.

Mixing Herbicides in a Backpack Sprayer

Although you can purchase RTU herbicides, if you are attacking a lot of invasive plants, you'll save money by purchasing concentrated herbicides and diluting them with water. This mixing must be done carefully.

USE EXTREME CAUTION WHEN MIXING HERBICIDES!
If you get concentrated herbicide on your skin, that may be the equivalent of working an entire day in a treated field.
Before mixing any herbicide, READ THE LABEL

- Work in a well-ventilated place.
- Have on hand: heavy plastic garbage bags, a shovel, and kitty litter to clean up leaks and spills.
- Label measuring equipment to avoid confusion with equipment used for measuring food.
- Wash all utensils before storage to prevent contaminating future mixes.
- Fill the sprayer half-full of clean water or horticultural oil; add a surfactant if the product does not have one; then add a dye; finally, carefully measure and add the herbicide.
- Rinse the measuring equipment three times and add the rinsate to the tank solution. Top up to 3-gallons.