Woody Weed Invaders

Integrated Pest Management for Home Gardeners and Landscape Professionals

For urban residents, the control of weedy or invasive woody species and large perennial grasses, such as bamboo (Figure 1), can be difficult (see Table 1). Although many of these troublesome species are not closely related, they share one very important characteristic: following mechanical removal of shoot material, resprouting can occur rapidly from root crowns, rhizomes, or basal and low-growing stems. In many cases, the resprouting shoots will outnumber the original plants. This increases the difficulty of control.

Some of the species listed below, including poison oak (Figure 2), willow, chamise, cottonwoods (poplars), and certain wild blackberries (Figure 3), are natives and are not considered weedy in natural systems. However, in certain landscapes—for example, in urban settings—these species may become too dense and create a fire hazard or restrict movement of animals or humans through these areas. Poison oak can also be an important health issue.

NON-CHEMICAL CONTROL METHODS

Mechanical Control

Mechanical techniques such as hand-pulling or hoeing are rarely effective by themselves for the control of large shrubs, mature or resprouting trees, or some perennial grasses such as arundo (giant reed, *Arundo donax*) or bamboo species. However, under some conditions, mechanical methods can control smaller shrubs or bunching perennial grasses, such as pampasgrass (Figure 4). For example, hand-pulling, digging, or hoeing can be used to remove small shrubs or roots located in a yard or near houses. Small shrubs or saplings can also be pulled using a weed wrench tool.

These procedures should be done in early spring or late fall when the soil is moist and the roots are easily removed. Digging when the soil is dry and hard usually breaks off the stems, leaving the stem crowns, rhizomes, or roots to resprout. In urban settings, irrigation may be an option to loosen soil prior to digging.

Removing English or Algerian ivy (Figure 5) with a shovel can be very effective if roots and stems are dug out. It is essential to remove all runners. Cutting or mowing English or Algerian ivy followed by an application of glyphosate to the damaged leaves and cut stem tips can also provide effective control. For the ivy species, it is important that gloves be worn, as many people are sensitive to the dermatitis-causing agents in the plant.

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Figure 1. Perennial grasses like this weedy bamboo can escape gardens and become established in natural habitats.

Figure 2. Poison oak leaves and flowers, *Toxicodendron diversilobum*.
Table 1. Difficult-to-control shrubs, trees, and large perennial grasses of urban environments.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Family</th>
<th>Growth Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacias</td>
<td>Acacia spp.</td>
<td>Fabaceae</td>
<td>Shrub, tree</td>
</tr>
<tr>
<td>Algerian ivy</td>
<td>Hedera canariensis</td>
<td>Araliaceae</td>
<td>Shrub, vine, ground cover</td>
</tr>
<tr>
<td>Arundo, giant reed</td>
<td>Arundo donax</td>
<td>Poaceae</td>
<td>Rhizomatous perennial grass</td>
</tr>
<tr>
<td>Bamboo, running bamboo, golden bamboo</td>
<td>Bambusa spp., Phyllostachys aurea, and others</td>
<td>Poaceae</td>
<td>Rhizomatous perennial grass</td>
</tr>
<tr>
<td>Chamise</td>
<td>Adenostoma fasciculatum</td>
<td>Rosaceae</td>
<td>Shrub</td>
</tr>
<tr>
<td>Cottonwood, poplar</td>
<td>Populus spp.</td>
<td>Salicaceae</td>
<td>Tree</td>
</tr>
<tr>
<td>English ivy</td>
<td>Hedera helix</td>
<td>Araliaceae</td>
<td>Shrub, vine, ground cover</td>
</tr>
<tr>
<td>Eucalyptus, gum tree</td>
<td>Eucalyptus spp.</td>
<td>Myrtaceae</td>
<td>Tree</td>
</tr>
<tr>
<td>Pampasgrass, jubatagrass</td>
<td>Cortaderia spp.</td>
<td>Poaceae</td>
<td>Large bunching perennial grass</td>
</tr>
<tr>
<td>Peppertrees</td>
<td>Schinus molle and S. terebinthifolius</td>
<td>Anacardiaceae</td>
<td>Shrub, tree</td>
</tr>
<tr>
<td>Periwinkle</td>
<td>Vinca major</td>
<td>Apocynaceae</td>
<td>Vine, ground cover</td>
</tr>
<tr>
<td>Poison oak</td>
<td>Toxicodendron diversilobum</td>
<td>Anacardiaceae</td>
<td>Shrub, vine</td>
</tr>
<tr>
<td>Privet</td>
<td>Ligustrum spp.</td>
<td>Oleaceae</td>
<td>Shrub, tree</td>
</tr>
<tr>
<td>Tamarisk, salt cedar</td>
<td>Tamarix spp.</td>
<td>Tamaricaceae</td>
<td>Shrub, tree</td>
</tr>
<tr>
<td>Tree-of-heaven</td>
<td>Ailanthus altissima</td>
<td>Simaroubaceae</td>
<td>Tree</td>
</tr>
<tr>
<td>Trumpet creeper</td>
<td>Campsis spp.</td>
<td>Bignoniaceae</td>
<td>Vine</td>
</tr>
<tr>
<td>Wild blackberry</td>
<td>Rubus spp.</td>
<td>Rosaceae</td>
<td>Shrub</td>
</tr>
<tr>
<td>Willow</td>
<td>Salix spp.</td>
<td>Salicaceae</td>
<td>Shrub, tree</td>
</tr>
</tbody>
</table>

Physical removal of poison oak is not typically recommended, as the majority of the population is sensitive to the urushiol oils in the plant that cause allergenic dermatitis. For guidelines on removing poison oak, see the Pest Notes: Poison Oak at [ipm.ucanr.edu/PMG/PESTNOTES/pn7431.html](http://ipm.ucanr.edu/PMG/PESTNOTES/pn7431.html).

For running or golden bamboo, or arundo, it will be necessary to physically remove all the rhizomes to prevent plants from re-establishing. In general, mowing or cutting alone will not control the species listed in Table 1 unless performed repeatedly. Rhizomes should be discarded in an area away from a water source.

**Cultural Control**

Root barriers can delay or reduce the growth of roots into areas where they are not wanted. A root barrier may consist of a hard wall of thick plastic or of fabric impregnated with herbicide, such as Biobarrier; such products may last four years or more in the landscape. Root barriers may be installed to protect structures, or they can be installed at planting to direct root growth of young plants. In the latter case, a surround-type root barrier can be used, for example, a 15-gallon nursery pot with the bottom cut out.

However, no type of root barrier gives complete control; eventually roots will grow under or through the barrier and upward toward the soil surface.

Although mulches are often used to control annual plants, they are not effective on herbaceous perennial or woody species that resprout from underground parts.

Burning is not effective for controlling
resprouting shrubs, vines, and trees. In many cases, burning can increase the population of these species. In particular, burning is not recommended for poison oak because the smoke creates a serious health hazard.

Grazing by goats can provide control in small areas. Goats have been shown to vigorously feed on resprouting vegetation and shrubs, including poison oak. Overgrazing, however, can also damage desirable vegetation. As with mowing or cutting, grazing would need to be repeated over time to eventually control the resprouting plants.

**Biological Control**

Biological control agents, such as insects or diseases which might attack the root stock of an undesirable plant, are not yet available for the control of any urban woody species. Because some of these plants are desirable ornamentals in many areas, there would be considerable opposition to the introduction of biological control agents.

Furthermore, some of these weedy species, including poison oak, willow, chamise, cottonwoods (poplars), and certain wild blackberries, are natives with natural control agents already present. Consequently, biocontrol is not an option for their management.

**Chemical Control**

In California, residents as well as landscape professionals can purchase the postemergence herbicides glyphosate, triclopyr, fluazifop, and combinations of glyphosate with triclopyr or imazapyr for control of shrubs, mature and resprouting trees, and large perennial grasses, such as arundo, bamboo, jubatagrass, and pampasgrass. Some herbicides, such as imazapyr, can have long residual activity in the soil, so replanting species that are more desirable may have to wait a year or two after treatment until residues have degraded. Depending on the compound, these herbicides can be used as cut-stump treatments, stem injections (frill or hack-and-squirt application), basal bark treatments, foliar sprays, or wick treatments (applied to leaves) (Table 2).

When using herbicides, extra care must be taken to keep the material from contacting desirable plants because some of the active ingredients are non-selective and can cause serious plant injury. Also protect yourself by wearing appropriate protective equipment as stated on the herbicide label. See the Pest Notes: Pesticides: Safe and Effective Use in the Home and Landscape for more information: ipm.ucanr.edu/PMG/PESTNOTES/pn74126.html.

**Foliar Application**

The effectiveness of foliar-applied herbicides in the control of woody plants or large perennial grasses depends on three factors:

1. **Application at proper growth stage.** Postemergence applications are most effective after the leaves are fully developed and when the plant is actively growing. Late summer or early

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Table 2. Herbicides available from nursery or home improvement stores to control shrubs, vines, trees, and large perennial grasses of urban environments.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Example Trade Name</th>
<th>Plant Group</th>
<th>Application Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluazifop</td>
<td>Ortho Grass-B-Gon Grass Killer for Landscapes</td>
<td>Perennial grasses</td>
<td>Foliar</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>KleenUp Weed &amp; Grass Killer and other products</td>
<td>Perennial grasses</td>
<td>Foliar, cut stem (for bamboo, arundo)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vines, shrubs, resprouting trees</td>
<td>Foliar, cut stem/stump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trees</td>
<td>Cut stump</td>
</tr>
<tr>
<td>Glyphosate + imazapyr</td>
<td>Ortho GroundClear Vegetation Killer</td>
<td>Perennial grasses</td>
<td>Foliar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vines, shrubs, resprouting trees</td>
<td>Foliar (Note: professional applicators can apply these herbicides as cut stump or stem injections treatments on shrubs and trees)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trees</td>
<td>Foliar</td>
</tr>
<tr>
<td>Glyphosate + triclopyr</td>
<td>Roundup Poison Ivy Plus Tough Brush Killer</td>
<td>Vines, shrubs, resprouting trees</td>
<td>Foliar, cut stem/stump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trees</td>
<td>Cut stump, stem injection</td>
</tr>
<tr>
<td>Triclopyr</td>
<td>Brushtox w/ Triclopyr, Stump-Out Stump &amp; Vine Killer, Bayer Advanced Brush Killer Plus, Ortho Max Poison Ivy and Tough Brush Killer Concentrate</td>
<td>Vines, shrubs, resprouting trees</td>
<td>Foliar, basal bark (vines and shrubs), cut stem/stump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trees</td>
<td>Foliar, cut stump, basal bark</td>
</tr>
</tbody>
</table>

*Other products may be available with these active ingredients.*
fall applications are often the most effective, because this is the time when perennial plants start to move nutrients (or herbicides) toward the belowground buds and roots. Avoid making applications too early in the spring or summer, or too late in the fall after the leaves have begun to turn color and senesce (age).

Herbicide applications should always be made to plants that are growing rapidly and are not water-stressed. Water-stressed plants are more difficult to control with herbicides because they grow slower and do not move the herbicides very rapidly to the growing points. Therefore, targeted weeds should be watered before treatment to ensure maximum effectiveness of herbicides.

2. Spray-to-wet coverage. All leaves and stems should be glistening following foliar herbicide application. However, coverage should not be to the point of runoff. In many cases, one application of herbicide does not completely control these species. Re-treatment should be made when new leaves are fully expanded. Treated areas should be watched closely for at least a year and re-treated as necessary.

For plants like pampasgrass and juntagrass, it is possible to use a hand-held wick applicator with one part glyphosate (41% glyphosate concentrate product) in two parts water for a total of 33% dilution. The plants should be wiped at the base, with every tiller (individual stem) contacted. Wick applicators can be found online or at some garden stores.

3. Proper concentration. Generally, a higher rate of herbicide is required to control shrubs, vines, large grasses, and resprouting trees than is required to kill seedlings of herbaceous plants. However, too high a rate may kill the conducting tissues in the plant before the herbicide reaches the belowground buds. This may result in killing the aboveground portion of the plant, but allow recovery of underground reproductive parts such as rhizomes. With most of these herbicides, a solution of 1% to 2% of the concentrated product (41% active ingredient) is appropriate for foliar spray applications for homeowner use (up to 10% for professional applicators) when made during the proper growth stage to plants not under water stress.

The percent of active ingredient can differ depending on the product formulation. This percentage is listed on the product label, and will affect how much water you need to add to make a mix of 1% to 2% concentrated product. For example, for homeowners, a product with 41% glyphosate can be diluted with 50 to 100 parts water per part of product (e.g., 1 ounce of product in 50 ounces of water gives 2% product).

Many herbicides are already diluted to the percentage recommended for direct use and will include the letters ‘RTU’ (ready to use) directly on the container. RTU products include some formulations containing glyphosate, triclopyr, or other mixtures. These products should not be diluted any further.

For plants that produce edible fruit, such as wild blackberries, the timing of herbicide application should typically be after the fruit are gone if there is any possibility of human consumption of the berries. In some situations, there is too high a risk of human ingestion of herbicide when individuals inadvertently pick and eat ripe fruit after applications are made during the earlier developmental stages of the fruit.

Cut-Stump or Stem Application
Cut-stump treatments are most effective during periods of active growth. Stems of shrubs, trees, vines, or bamboo should be cut close to the soil surface. Immediately after cutting, herbicide should be applied with a paint brush or with a plastic squeeze bottle (Figure 6). Delaying application will result in poor control.

For small stumps, completely cover the cut surface. For large stumps, it is only necessary to wet the cambium (the outer ring of wood, next to and including the bark). Once dead, large stumps can either remain in place or be removed by professional arborists. For vines and small-stemmed shrubs, stems can be cut with loppers or clippers and herbicide solution painted or sponged onto the cut ends. When using loppers or clippers in this way, be sure to protect against subsequent injury resulting from the inconspicuous and sharp cut ends of dying stems by marking or covering these areas.

Treatment solutions should contain 25% triclopyr or 50% glyphosate from the high concentrate solutions. If using a brand that has 18% glyphosate listed in the active ingredients, use undiluted product. If the product contains 41% glyphosate, use one part product and one part water.

Regrowth from cut stumps can be sprayed when leaves fully expand. Cut-stump applications of glyphosate, triclopyr, or imazapyr (one part Stalker to three parts water; 25% solution) can sometimes injure non-targeted plants of the same species close to the treated plant. This occurs via herbicide translocation through root grafts. This type of root-grafting damage depends on the species. Rarely, if ever, does
root grafting occur between plants of different species.

For shrubs, vines, and small trees (>6 inches in diameter) commercial applicators can use a low volume basal bark treatment for effective control. In this treatment, an oil-soluble herbicide, such as an ester formulation of triclopyr or imazapyr, is applied in a solution of ~20% concentrated product plus 20 to 100% oil surfactant (typically a seed oil), with the remaining solution being water in the case of triclopyr and 8% solution for imazapyr with 20 to 100% surfactant. The treatment solution should be applied to the basal 18 inches of the stem or stems.

Oil-soluble herbicides will penetrate through the bark with the oil and move to the vascular system, where they will then move throughout the plant. Plants should not be cut for at least a couple of months after treatment to ensure that the herbicide has thoroughly moved to the belowground growing points. Care should be taken to ensure that dead trees do not create hazards should they fall over or drop large, dead branches.

**Stem Injection (Frilling or Hack-and-Squirt)**

A hatchet or machete can be used to cut (hack) partially or completely around the trunk of a tree or the stems of a large shrub, using downward strokes to flare out (frill) the bark and cambium. Apply triclopyr, imazapyr, or glyphosate undiluted into the frill or hack marks. If hacks are used, one hack per 3 inches of stem diameter is generally adequate (Figure 7). As with cut-stump treatments, similar root-grafting injury can occur with stem-injection treatment.

![Figure 7. Use a hatchet to make cuts into the wood at least 4 to 5 inches wide and immediately apply herbicide into the cuts.](image)

**REFERENCES**


WARNING ON THE USE OF PESTICIDES

Pesticides are poisonous. Some pesticides are more toxic than others and present higher risks to people, nontarget organisms, and the environment. A pesticide is any material (natural, organic, or synthetic) used to control, prevent, kill, suppress, or repel pests. “Pesticide” is a broad term that includes insecticides, herbicides (weed or plant killers), fungicides, rodenticides, miticides (mite control), molluscicides (for snails and slugs), and other materials like growth regulators or antimicrobial products such as bleach and sanitary wipes that kill bacteria.

Always read and carefully follow all precautions and directions provided on the container label. The label is the law and failure to follow label instructions is an illegal use of the pesticide. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, and animals. Never place pesticides in food or drink containers. Consult the pesticide label to determine active ingredients, correct locations for use, signal words, and personal protective equipment you should wear to protect yourself from exposure when applying the material.

Pesticides applied in your garden and landscape can move through water or with soil away from where they were applied, resulting in contamination of creeks, lakes, rivers, and the ocean. Confine pesticides to the property being treated and never allow them to get into drains or creeks. Avoid getting pesticide onto neighboring properties (called drift), especially onto gardens containing fruits or vegetables ready to be picked.

Do not place containers with pesticide in the trash or pour pesticides down the sink, toilet, or outside drains. Either use all the pesticide according to the label until the container is empty or take unwanted pesticides to your local Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Follow label directions for disposal of empty containers. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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