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

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.

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

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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.

Figure 3. Himalaya blackberry, *Rubus armeniacus*, fruit and whitish color on back of leaflet.

Figure 4. Pampasgrass, *Cortaderia selloana*.

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.

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.

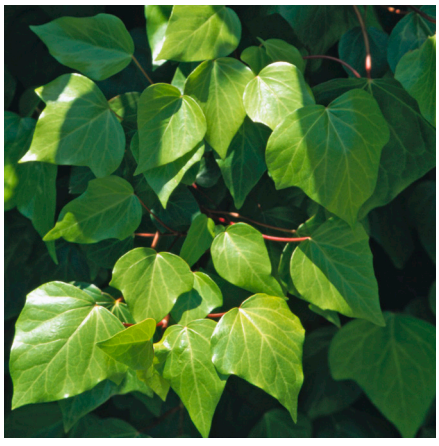

Figure 5. Algerian ivy leaves, *Hedera canariensis*.

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 nonselective 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 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

Table 2. Herbicides available to control shrubs, vines, trees, and large perennial grasses of urban environments.

Common Name	Example Trade Name[1]	Plant Group	Application Technique
Fluazifop	Ortho Grass-B-Gon Grass Killer for Landscapes	Perennial grasses	Foliar
Glyphosate	KleenUp Weed & Grass Killer and other products	Perennial grasses	Foliar, cut stem (for bamboo & arundo)
		Vines, shrubs, resprouting trees	Foliar, cut stem/stump
		Trees	Cut stump
Glyphosate + imazapyr	Ortho GroundClear Complete Vegetation Killer	Perennial grasses	Foliar
		Vines, shrubs, resprouting trees	Foliar (Note: professional applicators can apply these herbicides as cut stump or stem injections treatments on shrubs and trees)
		Trees	Foliar
Glyphosate + triclopyr	Roundup Poison Ivy Plus Tough Brush Killer	Vines, shrubs, resprouting trees	Foliar, cut stem/stump
		Trees	Cut stump, stem injection
Triclopyr	Brushtox w/ Triclopyr, Stump-Out Stump & Vine Killer, Bayer Advanced Brush Killer Plus, Ortho Max Poison Ivy and Tough Brush Killer Concentrate	Vines, shrubs, resprouting trees	Foliar, basal bark (vines and shrubs), cut stem/stump
		Trees	Foliar, cut stump, basal bark

[1]**Other products may be available with these active ingredients.**

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 jubatagrass, 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.

Figure 6. A paint brush is used to apply herbicide to the cut stump of poison oak, *Toxicodendron diversilobum*.

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

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.

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.

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