

## English Ivy *Hedera helix*

**E**nglish ivy is a trailing or climbing vine in the ginseng family, native to Europe and brought to America by early colonists. It is commonly cultivated as a groundcover and is widespread in the Pacific Northwest, where it has invaded many wild and unmanaged areas (Figure 3, next page). It is an aggressive invader that threatens most forest types in the Northwest.

Ivy invades and dominates forest understory vegetation. Climbing vines eventually can kill large overstory trees (Figure 1). Dominant ivy monocultures reduce wildlife habitat and biodiversity. Ivy is particularly a problem in forests near residential areas and other sources of ivy. As a groundcover, ivy can protect soil from erosion, but it lacks the deeper soil stabilization capability of mature trees and shrubs.

### Description

Ivy is an evergreen vine with thick, waxy leaves and distinct immature and mature growth stages. The immature, vegetative stage grows rapidly both along the ground or climbing, in shade or sun. Its leaves are dark green, with three to five



Figure 1.—Ivy can kill large overstory trees.



Figure 2.—Ivy in flower.

lobes that often have white veins. The mature, fruiting stage grows in open sun and has heart-shaped, unlobed leaves on upright stems bearing umbrellalike clusters of greenish white flowers in fall (Figure 2). Dark purple to black, berrylike fruits, with one to three stonelike seeds, develop in spring. Ivy reproduces from rootlike stems, sprouting fragments, or seeds. Seeds are spread by birds. The bird's digestive tract helps scarify seeds, which improves germination. Ivy grows in a wide variety of soils, and it tolerates drought, frost, and deep shade.

### Management options

English ivy can be controlled or eradicated by mechanical and chemical methods or combinations of these, though eradication often requires persistent effort. If ivy mingles with desirable vegetation, careful, selective removal and treatments are beneficial but more labor intensive. Replace large monocultures of ivy with broadcast treatments to kill all ivy, then replant with desirable species.

### Biological control

There are currently no effective biological control agents for English ivy.

### Chemical control

Note: Before you apply herbicide on forest land, you must file a "notification of operations" with the Oregon Department of Forestry at least 15 days in advance. The following information about herbicides is only a brief summary; consult your local Extension agent or Oregon Department of Agriculture representative for specific recommendations for your situation. Read and follow the herbicide label carefully. Before spraying over or around seedlings, ensure the chemicals pose no hazard.

A waxy layer on ivy leaves is a barrier to foliar-applied herbicides, especially in the growing season. Young ivy leaves, which have not formed a thick waxy layer, absorb more than older leaves. Applying pelargonic acid before the herbicide may increase ivy's absorption of herbicide.

Recent tests with foliar application of a 2- to 5-percent solution of either glyphosate or triclopyr on sunny winter

days gave more effective control (up to 95 percent) than growing-season applications. Winter application reduces injury to dormant native plants. Cutting woody stems of ivy vines and applying a 2-percent concentration of 2,4-D or a 25-percent solution of glyphosate to the cut surfaces has also been effective. Both cutting climbing vines and treating cut stems, along with either foliar treatment or pulling up ivy ground cover, can be effective. Careful timing and application are key to effective ivy control while minimizing injury to desired plants.

Any herbicide treatment program should rotate among chemicals to prevent developing herbicide-resistant strains of the weed. For more detailed information on chemical control, refer to the current edition of the *PNW Weed Management Handbook* and to *Herbicide-resistant Weeds and Their Management*, PNW 437. Both are available from OSU Extension <http://extension.oregonstate.edu/catalog/>

### **Mechanical control**

Manual treatments such as cutting, pulling, and digging can be effective. This is expensive in terms of hours or dollars—perhaps 300 to 1,300 hours of effort per acre for complete success.

Key steps are to remove as much ivy stem and root as possible, protect desirable plants, minimize soil disturbance, and thoroughly clear target areas. Cut large vines at the bases of trees. Pull vines from the soil and attempt to remove as much of the root as possible. Follow-up treatments likely will be needed for 1 year or more to pull resprouting ivy. Treatments during winter

### **Use pesticides safely!**

- Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.
- Read the pesticide label—even if you've used the pesticide before. Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply pesticides. Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.

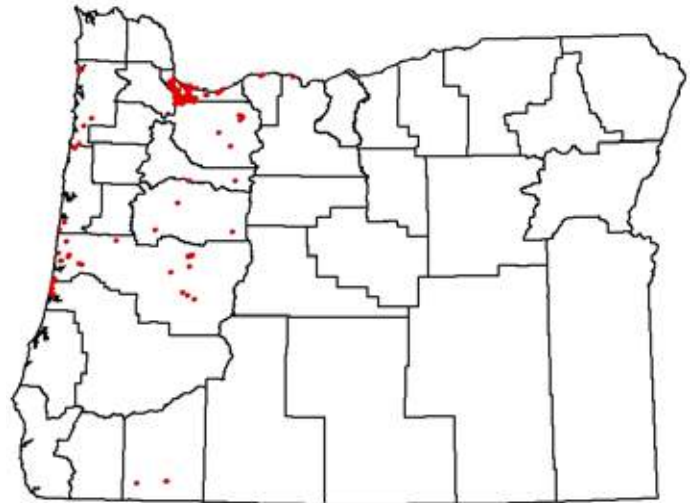


Figure 3.—English ivy distribution in Oregon.  
Map: Weedmapper.

can minimize disturbance to native plants. Dispose of ivy cuttings by transporting off-site for piling, drying, and burning or by carefully scattering pulled ivy to ensure that it dries, which prevents rooting and resprouting.

### **Grazing**

Ivy leaves are somewhat toxic to herbivores. Goats will remove leaves, but the leaves will resprout.

### **For more information**

Oregon Department of Agriculture, Plant Division,  
Noxious Weed Control.

<http://oregon.gov/ODA/PLANT/WEEDS/>

Weedmapper, a collaborative project of Oregon Department of Agriculture, Oregon State University, U.S. Bureau of Land Management, and U.S. Forest Service.

<http://www.weedmapper.org/>

California Department of Food and Agriculture,  
Encyclopedea.

<http://www.cdffa.ca.gov/phpps/ipc/weedinfo/>

Ivy Removal Project, a partnership of Portland Parks and Recreation and Friends of Forest Park.

<http://www.noivyleague.com/index.html>

Nature Conservancy, Global Invasive Species Initiative.

<http://tncweeds.ucdavis.edu/worst.html>

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# Fact Sheet on Ivy Removal in a Home Landscape

**My story.** I moved into a new house in May 2008 that had (perhaps literally) a ton of ivy. It covered the fences to the extent that I couldn't even open the gate without removing some of it. Removing enough ivy to open the fence was my first project. Next, I mowed it back to keep it from spreading further into the yard, until the mower decided it didn't like that anymore.

Then, since we needed some ivy removal pictures at the office, two of us tackled the English ivy on the Douglas fir tree in the back, using the tree life-saver method similar to that used by the parks department in the City of Portland.

**English Ivy** (*Hedera helix*) is a European forest that has become invasive in the US, where it is officially considered to be invasive by most states. Because it is such an effective ground cover, it has been recommended for years as a landscape staple—at least until we began to recognize its full potential as an invasive species. Ivy league schools and ivy-covered brick buildings are icons of a gracious and privileged way of life. Ivy motifs decorate tablecloths, botanical texts, and artwork. In art, at least ivy doesn't produce seeds, but in nature, the spread through seeds is causing serious economic harm. So, it needs to be controlled. Mow it, discourage it, pull it, whack it down, remove it's flowers and fruits, and most importantly, keep it from growing into its mature form (more on that later).

**Note:** Some people are sensitive to English Ivy and develop a rash when they touch it or work with it. Use caution until you know how your skin reacts to it.



Ivy on tree trunk before removal (above). Sign promoting English ivy in the mid-1990's, not so long ago (below)



## **Life-Saver English Ivy Removal from Trees.**

Basically the method is to remove ivy from the base and trunk of the tree to give it some “relief” while more complete ivy removal is in progress. The picture sequence gives some of the details. It took two people about 2 hours to complete this sequence for the one tree shown in the photos. “Life-saver” refers to making a circle 3-5 feet from the tree free of ivy, the life-saver candy—the tree itself is the hole in the middle.

First, cut the ivy “trunks” or vines all the way around the tree at about eye level. Clippers work well for the smaller vines and for exposing the vines themselves. The vines attach to the bark with aerial roots, but with persistence, they can be peeled away. Some of the vines cut more easily with a hand-held pruner, at least once they get to be a half inch or more in diameter. For the larger vines, a small hand saw does the work well. Again, persistence is in order since the growing vines seem to “fuse” with one another when they overlap, creating quite a strong bond as the vines get larger in diameter. For very large vines, I’ve have heard of people getting out their chain saw, but in those cases, the ivy has been growing a very long time indeed!

As you cut the vines, you can sometimes hear a very satisfying “snap” at the tension in the plants vascular system is released. As you cut the vines, begin to peel them downward from the bark, one at a time, or several if they are fused. Then by folding them back, you can sometimes snip off the branches on the bottom of the peeled sections. Just toss the pieces you remove on the ground—clean-up can come later. Work your way down the trunk to the base of the tree and pull back the ivy from the tree at ground level at least 3 to 5 feet.



Taking out section by section (left, above, and below)



Peeling back ivy stems (left) and a sigh of relief for being done for the day (right)

To clear the ground—at least 3-5 feet from the base of the tree, you may need to do some serious pulling. Inevitably, vines will pull away from the roots, but you can try to come back later to get them when they re-sprout. As you remove vines, lay them “roots up” in the cartoon “dead mouse” pose, so the roots dry out and the vine dies. This is sometimes called “sheet composting” and seems to work short-term at least.





### Ivy removal along the fence line

It takes me about 2 hours to clear 2 linear feet from a 7-8 ft tall cedar fence. Because the ivy has been on the fence so long, the fence underneath is in pretty bad shape, but that's another issue. In a few more years, the entire fence would have just toppled over into my yard, ivy and all. So far, I've cleared maybe 14 linear feet and the ground about 6 feet into my yard. With clippers handy, I just started at one end, cutting the ivy vines into about 2-ft lengths and piling them up until the yard waste bin is available again for biweekly pickup. The composting system at the city yard waste depot will almost assuredly finish the process of killing the vines, especially since they have to sit in that pile for up to a month before I even get to the recycling part, and are mostly dead by the time they get into the yard waste bin. I wouldn't recommend this for all invasive species, since many can resprout from even the tiniest fragment, but for ivy, I think it is probably OK. I wish I had taken a "before" picture, but the later pictures give an idea of the magnitude of the problem.

My neighbor on the other side of the fence is helping by lending me an extra yard waste container—he plans to replace the fence once I am done with the hard section and he has a chance to finish cleaning up "his" side of the fence. He has been trying to control the ivy on his side for years, so that won't be as bad as the task still ahead on my side. Nice when neighbors work together on these issues! Guess the word is getting around

I hope this description has been helpful to you. Here are a few other links for more information if you are interested in your own ivy removal project.

No Ivy League (Portland Oregon) <http://www.ivyout.org/ivyremove.html>

Friends of Sligo Creek photos and information <http://www.fosc.org/EI-Removing.htm>

Walama Restoration Project Brochure and Techniques, Eugene, OR <http://www.walamarestoration.org/brochures/englishivybrochure.pdf>

English Ivy Removal in Redwoods National Park <http://www.cal-ipc.org/symposia/archive/pdf/17791.pdf>

Oregon State University News release [http://extension.oregonstate.edu/news/story.php?](http://extension.oregonstate.edu/news/story.php?S_No=969&storyType=garde)

[S\\_No=969&storyType=garde](http://extension.oregonstate.edu/news/story.php?S_No=969&storyType=garde)

Oregon Department of Agriculture Fact Sheet [http://www.oregon.gov/ODA/PLANT/WEEDS/profile\\_englishivy.shtml](http://www.oregon.gov/ODA/PLANT/WEEDS/profile_englishivy.shtml)

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# Controlling English Ivy

(*Hedera helix*)

## in the Pacific Northwest

Although produced by and the responsibility of The Nature Conservancy, this document grew from a workshop co-sponsored by Metro, The City of Portland Parks, Natural Resources Division, The Society for Ecological Restoration, Northwest Chapter and The Nature Conservancy in February 2002. As well as extensive literature review, the data and field experience of more than 20 individuals and organizations (primarily) from northwestern Oregon went into this document. Funding for the production of this guide and the research that supported it was provided by the Northwest Service Academy of the AmeriCorps and the United States Fish and Wildlife Service. In addition, the Oregon Department of Agriculture and the No Ivy League in Portland, Oregon provided friendly review. Thank you all.

*Editors Note:* The discussion in this document is specific to *Hedera helix* (English ivy) and not particular named cultivars. Some cultivars apparently behave ecologically like *H. helix* and are likely to respond similarly to the treatments described here, some apparently do not. Because of the risk that other cultivars will prove invasive, the authors urge caution in the use of any ivy cultivars for landscaping. Please seek out and use other landscaping choices.

### English Ivy Description

English ivy (*Hedera helix*) is a trailing or climbing vine (**photograph 1 and 2**) belonging to the family Araliaceae (ginseng) and is native to Europe. Brought to North America by colonial settlers, *H. helix* is widely cultivated as ornamental/utilitarian groundcover in the Pacific Northwest (PNW).



Photo 1. Ivy ground cover



Photo 2. Ivy leaves and viney stems

Because of its' wide planting, climbing habit, and because seeds are spread by birds, ivy has become widespread in natural areas and unmanaged green/open spaces, where it buries native groundcover vegetation (**photograph 3**) and climbs and kills or topples matures trees (**photograph 4**). Because of its great potential to fundamentally change Pacific Northwest forested habitats, English ivy can fairly be called the kudzu of the Pacific Northwest (**photograph 5**).

Vines attach to the bark of trees, brickwork, and other surfaces by way of numerous, small root-like structures, which exude a glue-like substance. Older vines are known to reach a foot in diameter. Leaves are typically dark green, alternate (they alternate sides on the stem) and simple (the leaf is not composed of little leaflets). Juvenile leaves are 3-5 lobed (**photographs 1 and 2**), but mature leaves or leaves in full sun are ovate (roundish) to rhombic (angular but not square)(**photograph 6**).



**Photo 3. Ivy smothering native fern**

Mature plants produce umbrella-like clusters of greenish-white flowers in the fall (**photograph 7**). The black, berry-like fruit (**photograph 8**), containing a few hard, stone like seeds typically mature in the spring.

## **Ecological Threat**

English ivy is an aggressive invader that threatens nearly all forested habitat types in the northwestern U.S. up to at least 3000' in elevation (900 meters). English ivy cover is rapidly reaching catastrophic levels, especially in urban and near urban areas of the Pacific Northwest.



**Photo 4. Ivy toppling native tree**



**Photo 5. Ivy carpet over forest**



**Photo 6. Mature ivy leaves**

Without prompt action, many thousands of trees will be toppled or killed over the next decade in the Portland metro area alone.

Ivy is capable of growing along the ground as well as into the upper forest canopy. The dense growth and abundant leaves, which spring from the stems like small umbrellas, form a thick canopy just above the ground, and prevent sunlight from reaching other plants. Similarly, vines climbing up tree trunks spread out and surround branches and twigs, preventing most of the sunlight from reaching the leaves of the host tree. Loss of host tree vigor, evident within a few years, is followed by death a few years later. Further-

more, the added weight of vines makes infested trees susceptible to blow-over or tip-over, especially during winter storms. English ivy also serves as a reservoir for bacterial leaf scorch (*Xylella fastidiosa*), a plant pathogen that is harmful to native trees such as elms, oaks, and maples.

Once established at a site, English ivy can be expected to move beyond its intended borders into neighboring yards, parks and other lands, either by vegetative means or by seed dispersed by birds.

As habitat for wildlife, a monoculture of ivy is a poor replacement for a diverse native forest understory. Areas dominated by ivy have lower diversity of birds, mammals and amphibians, and appear to be good habitat only for rats. Although some native birds do eat the berries, ivy fruit seems to be preferred mostly by non-native starlings.



**Photo 7. Flowering mature ivy patch**



**Photo 8. Ripe ivy fruit cluster (purple) and unripe (green)**



Despite its propensity for quickly and completely covering the ground, English ivy actually increases erosion problems, especially on steep slopes, since its shallow, sparse root system doesn't provide the deep soil anchoring of mature trees and shrubs.

## Basic Ecology

English ivy grows easily in many types of soil, from full sun to complete shade, and once established, is fairly drought tolerant. In the PNW, ivy grows in elevations up to about 3000 feet. In lower elevations, ivy grows throughout the year, although growth may slow or stop during extended drought or during intense cold periods. Ivy reproduces either vegetatively via stolons (root-like stems) or through seeds (**photograph 9**). Roots form when stem nodes contact moist soil, leading to the formation of a dense mat of vegetation. Ivy roots are vigorous resprouters, meaning that a broken root left in the soil will almost certainly grow a new stem. Ivy fruits can be spread great distances by birds. It is unknown whether the seed requires passage through an animal intestinal tract to germinate.

Ivy has two distinct growth phases, the immature, vegetative stage and the mature, fruiting stage. During the vegetative stage, the plant grows rapidly and tends to sprawl across the ground (or climb any available vertical surface - see below). These characteristics are responsible for both the popularity of the plant as an ornamental ground cover, and unfortunately, its threat as an invasive weed. When a vine hits any upright object (trees, shrubs, houses, power or telephone poles, fences, etc...), it climbs, and can even reach the tops of even mature conifers of 300 feet (90 meters), climbing as much as 30 feet (10 meters) per year.

The fruiting stage typically occurs on climbing plants, but may also occur on prostrate patches of sufficient age, especially in full sunlight (**photograph 7**). Because these patches may form thick mats, the ivy essentially climbs on itself to produce upright, fruiting stems. In either case, flowers are produced in the fall and fruits mature in the spring.

Away from established ivy patches, new occurrences result from birds spreading seeds. Regardless of origin, once established in an area ivy cover gradually increases until it eliminates all other ground cover and reduces tree canopy coverage by killing mature trees through a combination of shading and over-weighting. Following the loss of canopy dominant trees, the increase in sun exposure not only increases ivy's ability to produce fruit, but also may allow other less shade tolerant weed species (especially Himalayan blackberry [*Rubus armeniacus* (*R. procerus*, *R. discolor*)] or traveler's joy - old man's beard [*Clematis vitalba*] in our area) to become established.



**Photo 9. Ivy seedling**

In the end, the results of societal passivity regarding ivy will be extensive loss of shade trees, declines in native flora and fauna, water quality and forest productivity; and increases in erosion, slope failures and landscaping / management costs for private citizens, the forest industry and public agencies alike.

## **Control Summary**

Because there are effective manual/mechanical and chemical control methods, current and future ivy problems are really due to a lack of knowledge, will or money (or all three). Manual options include a variety of approaches to hand-pulling, chopping or digging that, while generally environmentally safe and effective, typically cost from \$2000 to \$8000 per acre even at minimum wage (i.e. 300 to 1300 hours or more of hand removal work per acre). Thus, substantial volunteer work forces are necessary for effective manual control in most situations. There are several effective chemical control options, offering good control 10-20 times less expensive than manual / mechanical methods. Early data suggest that herbicide treatment may slow recovery of native species when compared to manual control, but clearly does not stop it. Currently, there are no effective biological control agents, although goats will defoliate ivy.

## **Manual Approaches**

Manual removal is a safe, effective and generally ecologically friendly but costly method of eradicating local infestations of English ivy. Sampling work conducted by TNC indicates that a carefully executed manual pull can consistently reduce ivy cover from 80% cover or more to 2-6% one year later without follow up treatment, and to 1-2% with a single follow up. Other local groups involved in ivy removal have made similar observations.

Unfortunately, manual control of English ivy is quite expensive (or at least labor intensive). Based on research conducted by The Nature Conservancy (TNC) and The Three Rivers Land Conservancy, as well as more approximate figures reported by other local groups, it typically requires from 300 to well over 1,000 human hours to perform the initial manual clearing on an acre of heavily infested ground. This assumes extensive ivy cover, gently sloped land and moist soil. Lower numbers may result from situations in which there are few or no native plants remaining, or if the ivy cover is not extensive. Higher numbers, sometime substantially higher will result from areas with abundant native vegetation mixed with heavy ivy cover, very steep slopes, dry soil or barriers such as logs and (native or non-native) blackberry. The pulling rate will also be greatly affected by the strength and dedication of the person(s) doing the pulling, root depth and density and soil conditions.

Nearly all sites require at least a second round of clearing to complete the initial restoration, then, annual or bi-annual maintenance to control stubbornly resprouting roots and new seedlings. As mentioned above, the initial pulling usually results in cover values of 2-6% a year after the initial clearing. As a result, depending on your site and the effectiveness of the initial clearing, you should expect the second pulling to still require a substantial commitment of effort or resources. One-percent coverage represents roughly 435 square feet (40 square meters) per acre. Again based on TNC research, follow up treatment will therefore range from 20-60 human hours per acre under typical conditions.

## How to pull ivy

### General

There are nearly as many strategies for manual removal as there are practitioners, ranging from disorganized grabbing and pulling, to meticulous strand-by-strand removal by well-coordinated teams. Most are variations on the simple concept of pulling up the plant by hand and trying to remove as much of the root as possible while minimizing ground disturbance and harm to remnant native plants. The City of Portland's Ivy Removal Project (No Ivy League) lists more than 20 strategies for groups working together to do manual removal ([www.noivyleague.org](http://www.noivyleague.org)). The approach you choose will depend on a number of factors including the density of the ivy, how much native vegetation is mixed in with the ivy, whether you are on a steep slope or a flat surface, and whether you are working alone or with a group. Within a group, the temperament and experience of the group will affect the strategy you choose to employ.

The essential elements to efficient, effective ivy removal and long-term recovery of native vegetation are:

- removing as much of the root system as possible,
- minimizing trampling and churning of the soil,
- protecting native plants that are present,
- clearing an area thoroughly before moving on.

Because ivy is both an aggressive resprouting species (it re-grows easily from root fragments) and it has long, relatively fragile roots, it is important to pull the vine at the spot where the root comes out of the ground to get effective control. Ivy roots or series of connected nodes may be continuous over several meters just below the soil surface, and are capable of resprouting from almost any broken root end. At the same time, in order to minimize trampling it is important to avoid repeated walking across the same area while uprooting the plants. Protecting surviving native plants also requires more careful pulling. Working efficiently combines many of these concepts.

### Case Study Examples

#### 1. *In areas with no remaining native plants:*

In cases with no remnant native plants it may be helpful to use shovels, digging forks or mattocks to loosen the ivy root systems. The No Ivy League recommends a method they term log-rolling, in which the ivy mat is uprooted and rolled up. The "log" of ivy is rolled up ahead until it is too large to move. It is then cut off and disposed of, either as part of a large pile or moved offsite. Alternatively they pull and scatter the fragments on the ground surface.

#### 2. *In areas with significant remaining native plants:*

A basic approach that works well for TNC is having "ivy pullers" work from a kneeling position (wearing rainpants or using a waterproof pad helps keep things comfortable in the winter). Start by grabbing a single vine and uprooting it only as far as you can reach, then set it aside and grab the next one you can reach. Uproot that one as far as you can and set it aside. When you have cleared/uprooted everything you can reach without moving, shift position and start again. Although it may appear slow and methodical, this technique accomplishes several things very well. It minimizes bending over, which conserves energy and helps prevent back pain. It also increases concentration. In addition, kneeling minimizes walking back and forth, which reduces trampling. It also encourages very thorough work and reduces follow up treatment time. Lastly this approach minimizes damage

to remaining native plants, which reduces the need for replanting. When vines do break off, are cut or are fully uprooted, TNC recommends rolling them up into a crude ball because it makes it easier to tell what has been pulled from what hasn't.

### **To bag or not to bag**

Disposing of pulled ivy becomes an important issue when you consider that there can be more than 10 tons per acre. It can be bagged and hauled off, piled on gurneys and hauled off, piled on site, or scattered on site. The No Ivy League recommends scattering the pulled stems, but others report that this makes site assessment difficult and leads to missing some living, rooted ivy. Bagging adds costs and effort, and removes nutrients from the site. Making piles causes dead spots on the ground and can allow some ivy to re-root, if the pile is not turned. For these reasons we recommend removing ivy if the site is easily accessible and making tall narrow piles if it is not. Where ivy cover is not dense, pulled stems and roots can be scattered and left on site without compromising pulling effectiveness.

### **Risks of Manual Control**

Although careful planning and training help to minimize them, manual control has its own unique side effects. There is no available data that precisely documents the effects of hand pulling. However, some degree of trampling, soil churning, and loss of desirable vegetation is inevitable (**photograph 10**). Native vegetation can be uprooted accidentally, and vegetation and duff (organic material, often with ferns) can be stripped off of rocks. The severe soil disturbance can leave a site vulnerable to surface erosion and to invasion by other weed species.



**Photograph 10. Large area of ground manually cleared of English ivy**

More than one reviewer mentioned the importance of timing manual removal to minimize effects on native vegetation and wildlife (especially breeding birds and amphibians). In order to minimize damage to native plants and disturbance of local wildlife, some programs (including TNC and ODFW) focus manual control efforts during winter months (approximately November to February). Although this apparently reduces impacts to native plants and animals, many PNW amphibians are active during this time and care should be taken to minimize impacts on them.

## **Chemical Approaches**

The literature reports mixed, but usually incomplete control with growing season application of various over the counter herbicides including triclopyr (Garlon 3a and in many “shrub-killers”), glyphosate (Round-up, Rodeo, Aquamaster, Gly Star) and 2-4 D (too many to list). The waxy layer on the leaves appears to limit many herbicides, especially hydrophilic compounds such as glyphosate, from effectively permeating the leaves. Local experiments done by TNC, City of Portland and Metro, however, suggest that under some circumstances herbicides can provide safe and effective control of ivy, even when applied during winter.

### **Summary of herbicide literature**

*(For extensive references on published research on chemical control of ivy, please refer to the websites listed at the end of this document, especially [tncweeds.ucdavis.edu](http://tncweeds.ucdavis.edu))*

In container pots, two applications, one month apart, of 2,4-D (Weedar 64) applied at 1.1 kg/ha (1.0 lb/A) provided control of English ivy. Two applications of glyphosate (Roundup) applied at 4.5 kg/ha (4.0 lb/A) effectively inhibited regrowth and provided some control of mature vines. Regrowth with reduced shoot weight was observed with one treatment of 2,4-D and glyphosate at the rates stated above. The same observation was noted for one or two applications of glyphosate applied at a lower rate of 2.2 kg/ha (2.0 lb/A). Regrowth occurred with plants sprayed with one or two applications of Dicamba (Banvel) or triclopyr (Garlon) at the rate of 0.6 kg/ha (0.5 lb/A).

Cutting (using a nylon cord weed-eater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English ivy. Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. A lower rate of glyphosate (2% solution) and cutting provided only slight control. Glyphosate only (2% solution) did not control English ivy. The herbicide triclopyr or mowing alone provided no control. Control evaluations were made 1 year post-treatment.

### **Recent herbicide research done in Portland**

Over the past several years, Metro Parks and Greenspaces Program, the City of Portland and The Nature Conservancy have been (independently) testing herbicides for the control of English ivy within the Portland metropolitan region. All have found that glyphosate (in either the Round-up Pro or Rodeo formulation) or triclopyr (Garlon 3a) can be extremely effective against English ivy and reasonably gentle on native species when applied during a sunny period during winter (ideally early-mid January). The herbicide is mixed at 2-5% volume / volume (v/v) with the surfactant Li-700 (for glyphosate or near water) or Hasten (for triclopyr) at 0.5 - 1.0% v/v. Control rates above 95% with a single careful treatment are typical. The fatty acid pelargonic acid (sold under the brand name Scythe) can also be added to the mix at 0.5 - 1% concentration to aid herbicide penetration. Even at

1%, but especially at higher rates, it may increase damage to desirable evergreen plants, because it damages plant tissue by disrupting cell membranes.

Recent discussions with a representative of the herbicide manufacturer Monsanto suggest a 2:1 or greater ratio combination of glyphosate and triclopyr (Garlon 3a, a Dow Agrosiences product), with glyphosate at 2% volume will enhance control of perennial species such as ivy and blackberry compared to glyphosate alone. The same individual points out that Li-700 consistently underperforms other surfactants when used with glyphosate. That said, although several well known and effective surfactants are labeled for aquatic or riparian use, Li-700 is the only surfactant approved by NOAA-Fisheries for use along salmonid bearing waterways, because of its' extremely low toxicity to fish and wildlife. Furthermore, because water may move triclopyr through the soil, it should be used with caution in a broadcast application near surface water when rain is forecast to occur in the near future.

***As always, with any herbicide use carefully read and follow application directions and safety information provided on the herbicide label. The label is the law. When in doubt, please contact your local Soil Water and Conservation District or the Department of Agriculture.***

### **How to use herbicides on English ivy**

Effectively killing ivy without damaging or destroying resident native vegetation depends on two factors, treatment timing and careful application. This approach will help you maximize delivery of herbicide to ivy roots and minimize delivery to native plant leaves and roots.

***Timing*** - Spray late enough in the late fall / early winter to ensure that most native species are dormant, but soon enough that they are not close to bud break. For most Portland area sites this means December to mid- January, with late January - early February as a fall back. This timing also allows time for ivy leaves to reappear after being temporarily buried by fall leaf drop. At the TNC study site (Camassia Natural Area, West Linn, OR) Indian plum and snowberry are the first to break bud, usually sometime between the last week of January and the first week of February. Because herbicides can be absorbed through the stems or buds it is wise not to push the envelope of activity in the spring.

Spot applications of patches missed during the first winter treatment or applications in areas with no remnant native vegetation can be made during the growing season. It is generally preferable to wait until after the period of maximum vegetative growth (or even post flowering) in order to achieve the most effective translocation (movement) of the herbicide into the roots. Balance this goal with trying to spray before new spring leaves have established a thick waxy coating. These same guidelines may be applied to the initial treatment of areas of ivy infestation in which protecting remnant native plants is not a concern.

***Application*** - Spray during a clear day and ideally before another one. If possible, temperatures should be 65 degrees F or above, but that rarely occurs in winter in this region. Settle for clear and above freezing. These circumstances help ensure that the ivy will be actively growing and will have time to fully absorb the herbicide before rain may wash it off. Spray the herbicide so as to contact the upper surface of as many leaves as possible (and bottom where possible), spraying them to "just wet" or less (i.e. avoid dripping). At the same time, carefully avoid getting herbicide on buds, leaves or young stems of evergreen natives, even if it means allowing some ivy leaves to remain unsprayed (a follow up treatment can target those later).

**What to expect** - Winter applications may take a long time to show their effect. At The Nature Conservancy's study site, the full impact of treatments done in late January is not apparent until May (**photograph 11**). Licorice ferns and sword ferns are particularly vulnerable to some herbicides and if their protection is important, special care should be taken to avoid exposing them to herbicide.



**Photo 11. Photograph taken four months after herbicide treatment with 2% Rodeo and Li-700/Scythe solution. Note the native vegetation and spiderwebs within the plot.**

### **Cost**

A careful applicator can treat a typical acre in two to four hours. Depending on ivy density, expect each acre to require 5-25 gallons of herbicide solution as described above. This results in total costs in the range of \$100-\$500 / acre assuming \$25-\$100 / hour for operator cost and \$50 / gallon for chemicals. Contracting the work out, steep slopes or otherwise difficult terrain or a high density of native vegetation may slow application and increase the costs. Metro Parks and Greenspaces reports contracted ivy removal to cost \$229 / acre for manual removal from trees at 4.5 feet above ground and an additional \$309 (including chemical cost) for follow-up spraying as described above.

### **Integrated Approaches**

Manual, mechanical, grazing or mowing methods can be effectively combined with herbicide treatment. For example, herbicides can be used to spot spray resprouting ivy vines following an initial hand clearing, presumably targeting the roots that are most resistant to hand removal, and reducing the total volume of herbicide necessary.

Defoliation (mowing or grazing) followed by allowing the plants to resprout new leaves will raise the ratio of young (thin wax layer on the leaf) to old leaves (thick wax layer) and increase the plants' uptake of herbicides and thus presumably increase treatment effectiveness. This approach will, however, also reduce the total leaf area, thereby reducing the amount of herbicide that can potentially be translocated to the plant roots. Depending on the presence and density of native vegetation, follow-up treatment can be done either as soon as 2-3 leaves form on each stem or the following winter as described above.

Alternatively, hand-pulling can follow herbicide application. This can be especially useful in areas around remnant native vegetation that may not have been sprayed effectively in order to protect the natives from herbicide drift.

## **Best Management Practices**

It can not be over-emphasized; there is no single “best” method. Apply the tools that are available based on your specific ecological goals and the resources you have available. Nevertheless, we have broken the ivy control world down to the following general categories and offer the following as recommended “best practices,” combining ecological and economic concerns.

### **Areas of ivy monoculture:**

Unless there is a particularly strong non-ecological reason for using manual control (i.e. you have a lot of volunteers or a site in which herbicide use is prohibited), areas devoid or nearly devoid of native ground cover should be treated using herbicides or an integrated herbicide - manual approach rather than strictly manual approaches. In this case it is simply difficult to justify the high cost of manual removal when **a)** there is little chance for non-target impacts of the herbicide and **b)** there are so many acres of ivy infested forest that need attention.

If done carefully, an initial winter treatment using either 2-5% v/v solution of triclopyr or glyphosate (or both) as described above can provide 95% control or better in a single treatment with little impact to scattered remnant perennial vegetation. Follow-up treatment can be either a second herbicide application or spot manual removal done at least 6 months but up to a year after the initial treatment. Because the ivy takes several months to die, planting can begin as soon as the first fall after the first treatment. If performed carefully, follow-up “spot” treatment with herbicide or hand removal can be done with negligible impact to any planted native vegetation.

Planting the site as soon as possible with appropriate native vegetation should be strongly considered. If necessary, initial seeding with native grasses to stabilize the soil surface, then planting in later with shrubs and trees is a good strategy.

### **Dense ivy with scattered native vegetation:**

As in the worst-case scenario example above, in these situations an herbicide-based approach can protect most of the remaining native perennial vegetation and effectively control the ivy, while controlling project costs. Integration with manual control by spraying very carefully around individual native plants or patches of more intact vegetation will improve the survival of remnant native vegetation.

In most cases, at least some replanting of native species should be included in the treatment plan (especially on steep slopes), although you may be surprised at how fast remnant native vegetation can increase in cover once the competing ivy is removed (**photograph 11**).

### **Dense ivy patches within substantial native vegetation:**

If an integrated approach is chosen, the balance should be tipped towards manual approaches, with herbicide use limited to careful spot treatment of locally dense infestations of ivy.

Planting should be necessary only on a spot basis in most cases. A very rapid increase in native vegetation following ivy removal where there is substantial native vegetation in place at the time of treatment is typical.



**Light ivy cover within a native matrix:**

This is the ideal time to use an all-manual approach. Because remnant native species will quickly occupy growing space, there should be very little need for replanting. Furthermore, volunteers will be extremely gratified to **a)** clear a large area in a few hours and **b)** leave the area looking really good instead of stripped bare. Winter is a good time for this approach because the ivy's green leaves are more conspicuous when other vegetation is underground or dormant.

**Additional Resources**

[www.noivyleague.org](http://www.noivyleague.org)

The website of the City of Portland's Ivy Control Project (No Ivy League). Full of information on ivy control with a strong focus on community education, manual control and protection of mature trees.

[tncweeds.ucdavis.edu](http://tncweeds.ucdavis.edu)

The home of The Nature Conservancy's Invasive Species Program. Contains an extensive and well-referenced literature review of ivy control methods. Also contains extensive information about herbicides, adjuvants and weed control equipment.

[www.nps.gov](http://www.nps.gov)

Website of the National Park Service, get a national perspective from the federal government.



# WeedWise

A conservation program of the *Clackamas County SWCD*

## BMP: ENGLISH IVY (*Hedera helix*)



English ivy



Tree ivy infestation



English Ivy



English ivy flowers



English ivy berries



English Ivy seedling



English ivy in trees



Massive English Ivy Stem



English ivy after treatment

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## Common names:

English Ivy

Irish ivy or Atlantic ivy

Algerian ivy

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## Scientific Name:

*Hedera helix* (syns. *Hedera helix* L. ssp. *helix*)

*Hedera hibernica* (*Hedera helix* ssp. *hibernica*)

*Hedera canariensis* (*Hedera helix* ssp. *canariensis*)

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## Noxious Weed Listing:

- WeedWise: Maintenance
- State of Oregon: Class B
- Four County CWMA: Class C

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## Description:

## General:

English ivy is an evergreen climbing vine in the *Araliaceae* (Ginseng) family. It has historically been a common garden ornamental and has more than 400 cultivars. It has escaped cultivation to become highly invasive in forests and natural areas throughout the Pacific Northwest. Native to Europe, these plants are characterized by long viny stems reaching up to 30 m in length, with aerial, clinging rootlets. English ivy damages desirable vegetation by shading out and smothering plants. English ivy also covers trees making them more susceptible to wind fall due to the additional weight of the ivy in the trees as well as the additional drag of the evergreen leafy vines. English ivy has two distinct growth forms. A juvenile form, that is characterized by rapid clonal and vegetative growth, and a mature form characterized by flowering and berry production.

The plant commonly referred to as English ivy is actually comprised of three different species. Identification and differentiation between the species is complicated by the broad morphological differences between cultivars amongst the three species. Both *Hedera helix* and *Hedera hibernica* have been commonly sold as English ivy, but can be differentiated by leaf shape and trichomes. These two species can also be differentiated through genetic testing. *H. canariensis* is more distinctive with a three lobed leaf, rounded at the base, and by the presence of reddish stems, making it easily differentiated from the other two species.

## Leaves:

The leaves of mature English ivy are ovate to diamond shaped, dark green with white veins, and waxy. The leathery leaves are simple and up to 15 mm long. Leaves alternate along the viny stems. Juvenile plants have leaves up to 35 mm long, and are palmately shaped with 3-5 lobes. Lobes can be both shallow and deep. On both growth forms, the leaf stalks and lower leaf surfaces can be covered with gray hairs. Leaves can be toxic to humans and cattle if ingested. Leaves can also cause contact dermatitis in sensitive individuals.

## Flowers

English ivy generally will only flower under conditions with adequate light and optimal nutrients. Flowers are only produced high in the tree canopy within infested forests, or along steep slopes. English ivy flowers in the fall and are pollinated by insects. Adult plants flower in clusters. The flowers are five petaled, greenish to white in coloration and are only 3-5 mm long.

## Fruits

Fruits develop as fleshy, dark blue to black berries that ripen in spring. Thousands of fruits can be produced by an adult plant each year. English ivy berries, particularly when underdeveloped, can be toxic to humans and cattle if ingested. These fruits are 5-10 mm in size and hold 1-3 seeds. Approximately 70% of the seeds produced are viable.

## Roots

The juvenile English ivy plants have adventitious roots at their nodes. Roots are generally shallowly rooted, but robust. English ivy also forms aerial, clinging rootlets, allowing it to adhere and climb vertically. Adult English ivy plants form a woody base.

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## Reproduction:

English ivy reproduces both from mature seeds as well as from root-like stems and sprouting fragments. The berries of English ivy are ingested by birds and the seeds can be dispersed great distances from parent plants. New plants can regenerate from stems and fragments from both the mature and juvenile growth forms. Regenerating plants maintain the growth form of their parents, such that plants formed from stem regeneration of adult form plants will keep adult characteristics. Once established juvenile plants can live up to 10 years before reaching maturation. English ivy plants can live up to 100 years or longer with one plant in England being documented at more than 400 years in age.

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## Habitat:

The areas most infested by English ivy are urban natural areas, disturbed forests, woodlands, and along stream corridors. Plants grown in moist soils with summer shade and winter sunlight will flourish. Urban forest and natural areas are especially impacted as a result of repeated reinfestation from garden escapees.

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## Impacts:

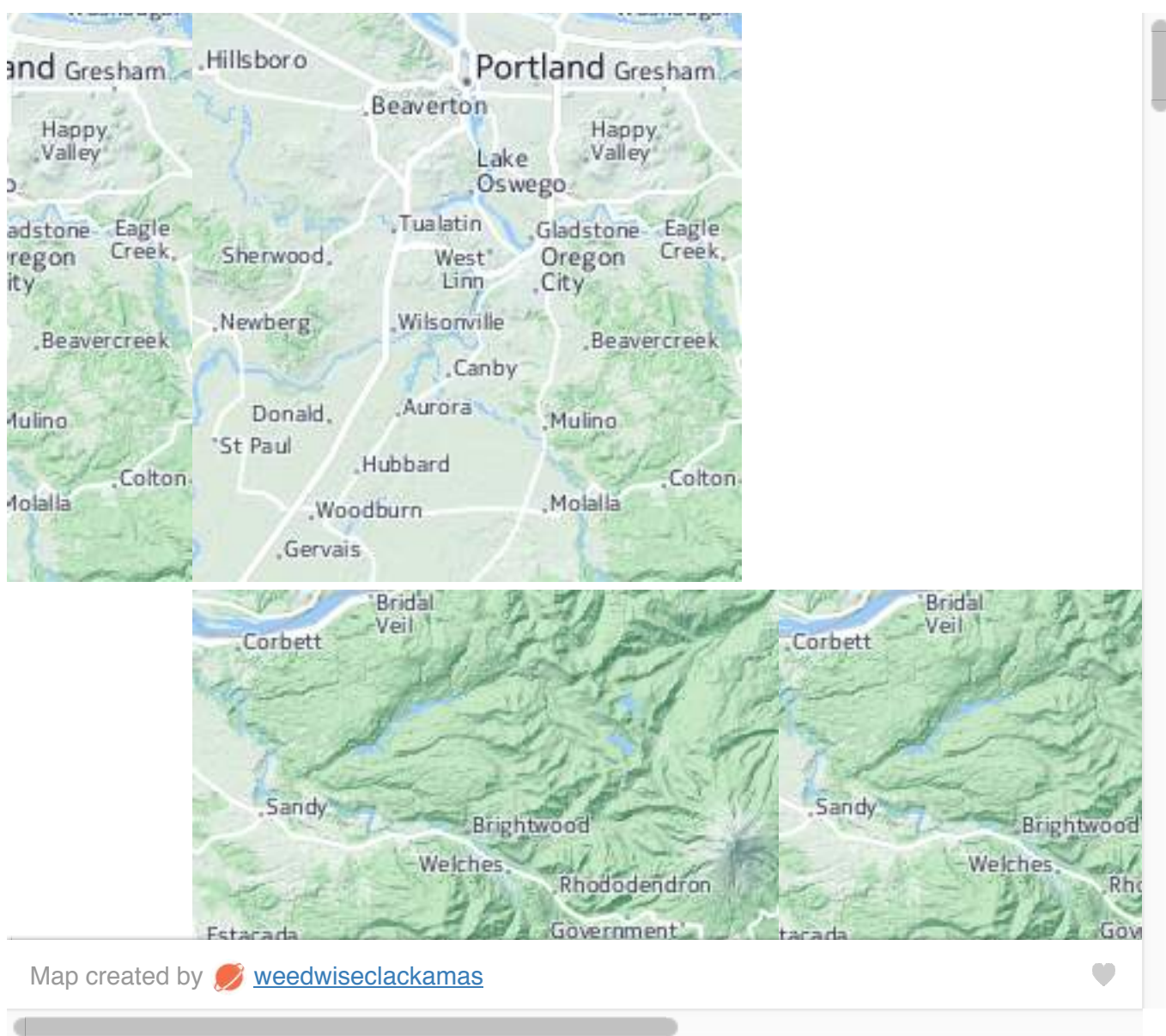
- Weighs down and harms large canopy trees making them more susceptible to wind throw
- Smothers and displaces forest floor vegetation.
- Degrades wildlife habit and reduces the diversity of animals in infested areas.
- Toxic berries and leaves can cause injury.
- Very invasive with rapid and intense vegetative growth, that causes rapid transformation of a site.
- Seeds disperse great distances, making containment of infestations very difficult.
- Can be a reservoir for bacterial leaf scorch harmful to elms, oaks, and maples.
- Vines tangle among native understory making removal difficult.
- Increases erosion due to displacement of native species and a shallow root system.

## Introduction:

The original introduction of English ivy to the United States is believed to have been by European immigrants during colonial times as a garden ornamental. The earliest record of English ivy in North America dates to 1727. Introduction to the Portland area occurred between 1875 and 1899 (Christy *et al.*, 2009).

## Distribution:

### Clackamas County:



English ivy can be found throughout Clackamas County. It is very widespread and directly impacts properties throughout the county. As an ubiquitous weed this is not a species that is actively surveyed and the mapped distributions do not represent the full extent of the English ivy population in Clackamas County.

## State of Oregon:

- [Oregon iMapInvasives](#)
  - [Oregon Weedmapper](#)
  - [Oregon Flora Plant Atlas](#)
- 

## United States:

- [EDDMapS](#)
  - [USDA Plants Database](#)
- 

## Management:

### Strategy:

The management of invasive weeds is best served through a process known as Integrated Pest Management (IPM). IPM is a weed management methodology that utilizes:

- Management thresholds to determine when and if to initiate control,
- The ecology and life history characteristics of the targeted invasive weed,
- Site specific conditions and land use considerations to inform management practices,
- The effectiveness and efficiency of various control methods.

An IPM based strategy ensures the maximum effectiveness of treatment measures. IPM strategies typically use more than one management method to target one or more susceptible life stages. It should be adaptive to site conditions in the field and to the response of a plant to management. The utilization of multiple management tools inherently reduces the use of herbicides in a management plan. The IPM process ultimately provides a framework for the establishment of Best Management Practices (BMP) which outlines the best approach for controlling a weed particular infestation.

### Manual:

English ivy is often best controlled using manual control methods. The waxy leaves of English ivy and its ability to regenerate from stems and fragments, make it resistant to chemical and mechanical control methods. While effective the removal of English ivy can be time consuming and labor intensive. As such, persistence is possibly the most important factor in determining the success of your treatments. It has been suggested that an acre of English ivy dominated forest requires more than 300 man hours for an initial clearing and continued maintenance to restore a site. So restoration efforts should plan their work accordingly

The first step is to choose an area, that can receive repeated control efforts. Prioritize your site. Choose a portion of your management area that is of highest priority, or work from a relatively intact area, and slowly expand your treatments systematically outward. Look at the concentration and location of the ivy, the landscape, soil moisture, abundance of native plants in the area as well as the number and skill of workers assisting. ***Before handling English ivy be sure to wear long sleeves, long pants, and gloves to protect yourself from potential dermatitis.*** Utilize tools such as shovels, rakes, mattocks, and weed wrenches to assist in removal of the roots. Saws, loppers, and hand clippers can be used to cut vines.

In locations where native plants are abundant, the preferred practice is hand removal. Vines growing on trees should be targeted first to prevent flowering and seed set, and to preserve canopy trees on site. Vines on trees should be cut using a saw, loppers or hand clippers around the entire base of the tree and also at a comfortable arm reach then removed from the tree. Leave the remaining ivy above the cut line to dry out and fall down on its own. All ivy should be removed within, a minimum of 3 feet around the trunk to better protect the tree. Flowering or seeding plants should be removed to prevent seeding or regeneration. For ground ivy control should focus on one location, pulling every vine and root up within reaching distance, before moving to a new location. Working systematically from a core area. Manual control of English ivy is best done in the fall and winter, when the ground is soft and plants are not seeding.

When few native plants reside on the property and there is sufficient workers, English ivy can be removed in large mats using a technique called the 'Log Roll'. This technique relies upon first defining a treatment area. The perimeter of the area is cut and a line of workers pull the edge of the mat, rolling vines and roots of the ivy on top of itself. It is important to shake the roots to remove soil. The roll should then be mulched in place to prevent resprouting. Workers should also follow up in the cleared site to remove any missed roots. This practice can be done on both flat ground and on hillsides. Soils with a higher water content allows for an easier pull.

### ***Additional tips to reduce erosion and minimize damage to native plants:***

- Remove as much of the root system as possible by pulling the vine directly where the root comes out of the ground
- Minimize trampling and churning of the soil
- Protect native plants that are present through careful and conscientious pulling and walking
- Be thorough, by completely clearing an area before moving on

## **Mechanical:**

English ivy can be mowed or cut but this is generally *not recommended* due to it's ability to regenerate following cutting.

## **Cultural:**



Grazing has been used to defoliate large infestations of English ivy. Goats and sheep will graze the ivy leaves, but plants will readily resprout following grazing. As such, grazing animals must be rotated repeatedly back onsite to suppress regrowth. English ivy is generally not favored by grazing animals, so co-occurring native are usually grazed more strongly than the ivy itself. As such, grazing is generally considered to be ineffective, or of *limited use*. Mature ivy plants are also generally found growing above the browse line, so manual removal of tree ivy is required in conjunction with any grazing strategy.

English ivy is fire resistant and doesn't carry a fire well. Repeated torching of ivy plants will cause cellular damage and dieback. With persistence this method will exhaust nutrients as the English ivy resprouts, but it is generally inefficient compared to other methods. As such this method is generally *not recommended*.

## Chemical:

An effective chemical control of English ivy is dependent on a few variables including timing, sensible application, and the proper mixture of chemicals. The timing is important to limit damage to native plants. Herbicide application during dry and sunny periods in late winter can be an effective chemical control on English ivy. The ivy is still alive and may still be growing in the winter while most native plants are dormant and protected. Herbicide has shown to be successful when applied directly to cut stems specifically around a tree trunk.

Foliar application of herbicides is deterred by the waxy coating on the leaves. This is especially true for older/mature leaves and application during the growing season. This leads to runoff of herbicide onto nearby native plants. A fatty acid can be applied before or with the herbicide application to increase absorption into the leaves.

Widespread chemical control of English ivy is not suggested and should only to be considered in areas completely dominated by ivy or on difficult sites where manual control methods may be impractical or dangerous.

## ***Before you Start:***

- Before purchasing any herbicide product it is important to read the label. ***The label is the Law.*** Carefully review all parts of the label even if you have used the product before. Select a product that is most appropriate for your site. If you have questions, ask your vendor before purchasing a product.
- When selecting herbicides always use a product appropriately labeled for your site. Follow label recommendations and restrictions at all times. If any information provided here contradicts the label, the label takes precedence. Always follow the label!
- Protect yourself. Always wear the recommended protective clothing identified on your label and shower after use.

- When applying herbicides use spot spray techniques whenever possible to avoid harming non-target plants.
- Do not apply during windy or breezy conditions that may result in drift to non-target plants
- Avoid spraying near water. Hand-pull in these areas, to protect aquatic and riparian plants and wildlife.
- Avoid exposure to pets, pollinators, and wildlife. Remove animals from treatment areas to avoid exposure to herbicides. Follow the reentry instructions on your herbicide label and keep pets out of the area until the herbicides have dried and it is safe to return. Avoid spraying when insects and animals are active. Avoid spraying blooming plants to minimize an effects to bees and other pollinators.
- Be sure to store any chemicals out of the reach of children and pets to keep your family safe.
- Product labels and formulations change regularly. Check the *Pacific Northwest Weed Management Handbook* and the label for current control recommendations.

## Herbicides:

**The mention of any brand name product is not, and should not be construed as an endorsement for that product. They are included here only for educational purposes. Suggested rates are generalized by active ingredient. Specific rates will vary between products. Be sure to review the label before application and use the recommended label rate at all times.**

### Active Ingredients

GLYPHOSATE

TRICLOPYR

PICLORAM

IMAZAPYR

GLYPHOSATE + TRICLOPYR

**Product Names:** Accord, Aquamaster, Rodeo, Roundup, and various others

#### Rate:

*Spot treat:* use 2% to 5% v/v solution in water, with a non-ionic surfactant

*Low volume/thin line:* 10% v/v solutions in water.

*Cut stump:* 25% v/v solutions in water.

**Time:** Apply when actively growing in late summer early fall. Application can also be made on sunny winter days to avoid harming co-occurring natives. Cut stump applications should be made directly after cutting and during dormant season for best results.

**Comments:** Wait four months after foliar treatment before cutting again. For cut stump application, cut stems horizontally or at ground level. Apply solution directly after cut. Treatment controls most reprints. Glyphosate is not selective and will harm grasses. Use care when working around desirable plants to avoid damage. Leaves should be sprayed until wet but not dripping to achieve good control.

## Biological:

There are no effective biological control agents available for English ivy.

## Disposal:

There are many ways to dispose of English ivy when clearing your property. For small infestations, bagging up pulled plants is the best practice if possible. For larger infestations, pile up the debris and let it dry out. Placing a tarp under the pile will help prevent resprouting. Piles can also be covered to speed up drying and decompositions. Large debris piles can create dead spots, so placement of piles should be placed to minimize the impact to desirable vegetation. Under dry conditions, plants can be chopped into a mulch and spread over the area for ground cover and nutrients, but be careful with this method as covering the ground will reduce visibility of missed/live roots.

## Follow-Up:

Diligence is the most important aspect for controlling English Ivy. Ivy plants will readily resprout from any roots left remaining, so repeated follow-up is required. An herbicide application in summer has shown to be the most effective after a treatment. Re-treatment may be required to achieve effective control. The seed may persist in the soil for years following treatment, or arrive on site from adjacent and nearby infestations.

## Best Management Practices:

### Monoculture Infestations:

- Consider the land use practices on site. Identify, any site specific considerations that should be taken into account before initiating control.
- Be sure you can properly identify English ivy. If you are unsure about your weed bring a sample to the Conservation District, and we can help to identify your particular weed.
- Identify any native or desirable plants nearby, and take precautions to minimize and negative impact to them.
- Herbicide application is often the best approach with respect to cost, time, and erosion protection for large ivy infestations with few desirable plants.
- Winter applications have shown to be effective using, while minimizing the impact to native, but spray only during a winter weather is above 55 F, and no precipitation is expected for at least three days. Otherwise plan treatments for late summer.
- Follow-up on site 6-12 months afterward can be a re-treatment of herbicide, spot spray herbicide application or spot manual removal.

- Replant site with site appropriate native vegetation as soon as possible. Grass seed can be spread to stabilize soil in between removal and plantings.
- Continue to monitor the site for regrowth and treat any new infestations.

## Small Infestations within native or desirable vegetation:

- Consider the land use practices on site. Identify, any site specific considerations that should be taken into account before initiating control.
  - Be sure you can properly identify English ivy. If you are unsure about your weed bring a sample to the Conservation District, and we can help to identify your particular weed.
  - Identify any native or desirable plants nearby, and take precautions to minimize and negative impact to them.
  - A manual approach is best with limited spot spray application of herbicide in dense patches within native vegetation.
  - Pull plants in winter and spring when the soil is moist and the ivy is prominent.
  - Replanting is not as necessary in small infestations within native vegetation because the natives will expand into open areas. If large gaps are present, additional plantings may be beneficial.
  - Continue to monitor the site for regrowth and treat any new infestations as they occur.
- 

## Fun Facts:

- Juvenile plants can climb as much as 30 ft per year.
  - Leaves and berries used to be ate as an expectorant.
  - A leaf reduction can be used to restore dark fabrics or dye hair and twigs can create yellow and brown dye.
  - Medicinally used since ancient times to treat rheumatism, toothache, bronchitis, and many skin problems including burns, infections and cellulite.
  - Ivy has been long used in England as decorations during the Christmas season.
- 

## Additional Information:

- [Oregon Department of Agriculture: English ivy](#)
- [English ivy is an invasive weed in the Pacific Northwest](#)
- [Oregon State University Extension: Invasive Weed in Forest Land: English ivy](#)
- [Controlling English ivy in the Pacific Northwest](#)
- [Pacific Northwest Weed Management Handbook: English ivy](#)
- [King County Washington: English ivy Weed Bulletin](#)
- [Center for Invasive Species and Ecosystem Health](#)

- No Ivy League

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## The Ivy Files

**MENU** ≡



Ivy climbing a host tree before and after receiving a "lifesaver"

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### Explore The Ivy Files and expand your knowledge of *Hedera hibernica* and *Hedera helix*:

[An Ivy Overview and Why We Remove English Ivy from Natural Areas](#)

Learn the basics of ivy, and its interaction with our natural areas.

[Ivy Removal Methods](#)

Review the techniques of ivy removal. Familiarize yourself with the field-tested techniques developed by the No Ivy League.

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See the mind-boggling totals of ivy removed by the No Ivy League and dedicated volunteers.

[No Ivy League Chapters and Other Ivy Removal Groups](#)

Get in contact with a removal group near you or suggest others to be added to the list.

[Knowledge is Power!](#)

Still hungry for more ivy info? Here you'll find important literature regarding ivy removal, other invasive species, and the No Ivy League.

[Ivy Removal Instructional Video](#)

A handy visual guide to our field-tested techniques, perfect for preparing to remove ivy on your own.

[Community Resources](#)

Learn how you can make a difference, view resources available to citizens who want to remove invasive species from their property or community.

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### [An Ivy Overview and Why We Remove Ivy from Natural Areas](#)

Forest Park is one of America's largest urban forests. (<http://www.portlandoregon.gov/parks/finder/index.cfm?action=ViewPark&ShowResults=yes&PropertyID=127>) Set aside as a natural area within Portland's city limits, its 5,000+ acres are host to over 70 miles of hiking trails and bicycle paths. This natural area provides an unsurpassed opportunities to connect with the forest environment. However, our treasured resource faces a challenge experienced by many natural areas around the globe. Not only are humans changing the physical, chemical, and climactic structure of these ecosystems but we are responsible for the introduction of organisms previously not present. In the Pacific Northwest (PNW) one such organisms is the plant English ivy (*Hedera* spp.)

Members of the *Hedera* genus have long been admired by humans in their historic range throughout Eurasia, Northern Africa, and Macaronesia (<http://en.wikipedia.org/wiki/Macaronesia>). The hardiness of these evergreen plants, their tightly weaved vines and intimate

relationship with trees led them to become a symbol of vitality and fidelity in Western culture. It is because of this rich cultural significance that we humans have taken ivy, and many other organisms, with us to new lands. The prevalence of *Hedera* spp. in the PNW is thought to be primarily due to escape from horticultural uses.

Evidence suggests that modern ivy's relatives have been present throughout regions of Western Eurasia and Northern Africa for more than 1 million years [1 ([http://www.portlandoregon.gov/#Foot\\_1](http://www.portlandoregon.gov/#Foot_1))]. In this time ivy evolved to fill the unique ecological niche of a liana (<http://en.wikipedia.org/wiki/Liana>), a climbing plant dependent on a host for support. Important to these ecosystems, ivy plays a role in nutrient cycling, soil erosion reduction, and animal forage [2 ([http://www.portlandoregon.gov/#Foot\\_2](http://www.portlandoregon.gov/#Foot_2))]. Ivy is highly plastic plant that can grow in a variety of light conditions, soil types and water levels - allowing it to rapidly recolonize disturbed areas as well as succeed in dense forests. The characteristics that make ivy a successful part of its native ecosystems have also made it a successful transplant in the PNW, though its success may be at the cost of our own native species.

English ivy has been observed to dominate the understory of PNW forests, especially in disturbed areas and edge habitat. In these areas the juvenile phase of ivy forms a thick mat of vines and climbs any available surface. This thick mat of vines may prevent significant amounts of light from reaching the forest floor and thus alter the species composition in these areas[3 ([http://www.portlandoregon.gov/#Foot\\_3](http://www.portlandoregon.gov/#Foot_3))]. As the liana climbs it can reach below the crown of its host tree. A physiological change occurs when the juvenile form receives enough light and resources, transitioning to a mature form that spirals outward from the trunk of its host tree. Through this process ivy may further alter the composition of light reaching the forest below and in extreme cases from the host tree itself. The mature form of ivy is able to produce berries and distribute seeds, with the help of birds, expanding across a greater range than by vegetative growth alone.

Recent studies of ivy populations in the PNW have determined that the most prevalent species is *Hedera hibernica* (83% of 119 populations sampled) and not *Hedera helix* as was previously thought [4 ([http://www.portlandoregon.gov/#Foot\\_4](http://www.portlandoregon.gov/#Foot_4))]. These species are closely related but differ in their ploidy (<http://en.wikipedia.org/wiki/Ploidy>), the number of duplicate sets of chromosomes, *H. helix* containing 2 sets (diploid) and *H. hibernica* containing 4 sets (tetraploid) [5 ([http://www.portlandoregon.gov/#Foot\\_5](http://www.portlandoregon.gov/#Foot_5))]. This distinction could be important for understanding why *H. hibernica* has been more successful in the PNW, but has not yet been explored in depth. *H. helix* includes over 400 cultivars (<http://en.wikipedia.org/wiki/Cultivars>) with only a few identified as species of concern in the PNW including *H. helix* "Star", "Pittsburgh", and "California."

The efforts of the No Ivy League focus primarily on removing mature English ivy from trees in Portland's natural areas to reduce seed distribution and prevent possible damage to mature trees. In a number of areas the No Ivy League also removes substantial amounts of ground ivy in conjunction with non-native shrub removal and native plantings. This work aims to restore the plant community present before the introduction of species such as *Hedera* L. The No Ivy League uses hand removal exclusively throughout Forest Park and other natural areas. Though chemical and mechanical removal can be effective in the appropriate situation the No Ivy League uses hand removal techniques to provide the experience of stewardship to a wider audience than other methods would allow.

#### Footnotes and Further Readings

(<http://www.portlandoregon.gov/>)- 1: Grivet D, Petit RJ (2002) Phylogeography of the common ivy (*Hedera* sp.) in Europe: genetic differentiation through space and time. *Molecular Ecology* (2002) 11, 1351 – 1362 (<http://www.portlandoregon.gov/parks/article/393661#Phylogeography>)

(<http://www.portlandoregon.gov/>)- 2: Schnitzler A (1995) Community ecology of arboreal lianas in gallery forests of the Rhine valley, France. *Acta Oecologica*, 16, 219 – 236.

(<http://www.portlandoregon.gov/>)-3: This idea has not been the focus of specific research yet but could be reasonable. Seeds sense the ratio of red and far-red light to determine if they are shaded or not and thus whether they will face competition if they germinate. Notoriously shade tolerant, ivy could be altering the red/far red light ratio found beneath the mat and influencing the germination of the local seed bank. If you are interested in exploring this idea please contact us.

(<http://www.portlandoregon.gov/>)-4: Metcalfe, D.J. (2005) *Hedera helix* L. *Journal of Ecology* 93, 632–648.

(<http://www.portlandoregon.gov/>)-5: Clarke, M.M. Reichard, S.H. & Hamilton, C.W. (2006) Prevalence of different horticultural taxa of ivy (*Hedera* spp. Araliaceae) in invading populations. *Biological Invasions* 8, 149-157.

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Ivy Removal Methods - Simple, field-tested techniques.

Girdle - The most basic technique to stop tree-climbing ivy dead in its tracks.





Once you have located a tree with ivy, use either loppers or a pruning saw to cut through each vine clinging to the tree trunk at shoulder height and at ankle height. This severs the connection between the life sustaining roots and the rest of the ivy. Be sure to cut ALL vines as even one can continue to nourish ivy higher up the tree. Strip the Ivy away from the tree between the two cuts - some vines can be so big that you need to pry them away from the tree - just be careful not to damage the bark. Toss the stripped section of vine or save one or more as a trophy - how will your friends believe that you cut away a vine as big as your arm without the proof? Recheck the 'girdled' area for any thin vines which may have grown under the tree's bark and you're finished. But, after all that work, you don't want to give ivy a head start by leaving it to grow next to the base of the tree.

Full Lifesaver - After girdling the ivy from a tree, work to clear the surrounding ground ivy.



Imagine a 6-foot radius circle around the target tree, begin by peeling back the ivy mat 6 feet from the tree and thoroughly pulling every vine and root from the circle. You may also find it helpful to cut "lines" in the ivy mat within your imaginary circle and rip out ivy like a piece of pie. Cutting "lines" in the dense mat allows for precision removal around delicate plants and immovable obstacles. You will save more time and energy pulling around rather than through these obstacles. If you are working on a slope, pull downhill and let gravity work with you and The keys to an effective Lifesaver are consistency and patience; all vines and roots must be removed.

Log Roll - This method is most effective in areas with extensive ground ivy. When used properly "Log Rolls" can be quite efficient and gratifying.



Begin by designating the area to be log rolled (a hillside or group of infested trees). Mark the top perimeter by cutting a line in the ivy mat, pulling apart each side of the mat as you go. If you are on a slope, cut horizontally across the slope to allow the ivy mat to be pulled downhill. Start to lift the mat and pull the cut edge of the vines downhill, rolling the ivy mat over itself. Let gravity do most of the work but also be aware of your surroundings unless you regularly perform backwards somersaults. Scan for native plants that may make rolling difficult and cut a line in the ivy perpendicular to your pulling edge so that the vine mat can be pulled around; this saves native plants that might otherwise have been uprooted by the thick mat and makes the log roll much more manageable. If you find yourself with a stuck roll, proceed to divide the "log" into several pieces and slice out the remaining perimeter. Once you have accumulated a few large ivy logs they must be mulched to ensure the ivy does not re-root.

Tonchi's Mulching Method- An organized approach to hand mulching pulled ivy.



Transportation of removed ivy away from the removal site is not always practical nor desirable. Mulching ivy and spreading it back onto the removed area seems to be an effective solution but mulching can be time consuming and tiring unless well organized. While removing ivy create manageable piles to be mulched; try not to exceed 2'x2'x1'. Start your piles on areas with no vegetation or recently cleared of ivy to prevent damage to other plants and ensure that no living ivy is buried below the pile. Begin by "cutting a line" through all of the vines about 6" from an edge, detaching a "slice" from the pile. Now cut that slice into smaller pieces by mulching perpendicular to the angle of the slice at intervals of ~3-4". Repeat until the entire pile has been divided then flip the mulched ivy and repeat again. Once the pile has been thoroughly mulched it is time to thinly spread the ivy bits back onto the areas of removal. Target areas most prone to erosion or those that have been most disturbed by ivy removal. Return in a few months to search for any root fragments that are now sprouting or any mulch that has re-rooted.

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#### No Ivy League Project Statistics

Updated 2/26/2013

Since 1994 the No Ivy League has worked tirelessly to remove English ivy from Portland's natural areas. Here are the numbers:

Work Sites Visited - 118

Total Site Visits Across All Sites - 1,803

Workers and Volunteers Involved - 25,377

Ivy Removal Work Hours Logged - 88,537

Full Lifesavers Performed - 16,784 trees

Lifesavers and Girdles Performed - 11,472 trees

Square Feet of Ground Ivy Removed - 4,504,905

Acres of Ground Ivy Removed - 103.42

Simply staggering! Thanks to all the folks who have joined us over the years - we hope that you will continue to come out and make a difference with us!

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Knowledge is Power!

The Know Ivy League (<http://www.portlandoregon.gov/parks/article/393661>) - Expand your horizons with peer-reviewed journal articles on a diversity of topics.

Decennial Monitoring Report:1994-2004 and Appendices - Take a look at the No Ivy League's assessment of ivy removal throughout Forest Park during its first decade. An invaluable resource for those looking to get an inside look at the ivy problem, the report provides a starting point for a multitude of valuable research projects as well. Sit back and enjoy.

The Dirty Thirty - Here is a great presentation aimed at educating you on 30 species of concern.

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Ivy Removal Instructional Video

View our video in glorious High Resolution! (<http://www.portlandoregon.gov//article/338632>)

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FAQ coming soon....

"What can I do about English ivy?"

Learn as much as you can about Hedera; share your knowledge with others and spur dialogue; join our Saturday work parties (<http://www.portlandoregon.gov/parks/article/205050>) for a firsthand look and some awesome hands-on experiences.

Action is needed to truly make a difference. If you have ivy on your property, remove it or trim. Keep the ivy from maturing and spreading its seeds to the surrounding areas. Enjoy our Ivy Removal Instructional Video ([http://www.portlandoregon.gov/#Ivy Removal Instructional Video](http://www.portlandoregon.gov/#Ivy%20Removal%20Instructional%20Video)) to get a better grasp on the techniques we use.

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(<http://www.portlandoregon.gov/>)Community Resources

The Backyard Habitat Program (<http://audubonportland.org/backyardwildlife/backyardhabitat>)

Works with property owners interested in habitat restoration, they also provide discounts at local nurseries for participants in their programs.

Also check out the Columbia Land Trust certification program for backyard habitats.

City of Portland, Bureau of Environmental Services (<http://www.portlandoregon.gov/bes/>)

BES provides a wealth of information and services regarding watershed and habitat management. Learn more about the City of Portland's Invasive Species Program

Community Watershed Stewardship Grants (<http://www.portlandoregon.gov/Bes/43077>)

Providing up to \$10,000 to schools, churches, businesses, and other community organizations for projects that connect people with

watersheds and protect and enhance watershed health.

The 4 County Cooperative Weed Management Area (<http://4countycwma.org/>)

The Cooperative Weed Management Area exists to create and support collaborative weed management among land managers and owners in and around the greater metropolitan area of Portland, Oregon.

The West Multnomah Soil & Water Conservation District (<http://www.wmswcd.org/>)

Many grant opportunities can be found through the WMSWCD, ranging from community projects to individual homeowners.

The Oregon Invasive Species Council (<http://www.oregon.gov/OISC/>)

A great resource for information about current invasive species threats around Oregon. The invasive species reporting hotline can be reached at 866-468-2337.

PlantNative.org ([http://www.plantnative.org/nd\\_or.htm](http://www.plantnative.org/nd_or.htm))

A complete list of native plant nurseries (including seed, bare root, and potted distributors) in Oregon.

SW Watershed Resource Center ([http://swni.org/southwest\\_watershed\\_resource\\_center](http://swni.org/southwest_watershed_resource_center))

The mission of the WRC is to inspire and support watershed stewardship at the neighborhood level in SW Portland. You can also contact Jen Seamans at [watershed@swni.org](mailto:watershed@swni.org)

No Ivy League Chapters and Other Ivy Removal Groups

Salem, Oregon No-Ivy League Chapter - Visit their website to view contact information for ivy commandos in Salem, OR.

On Facebook

On Blogspot

Do you have an organization you think should be on this list? Tell us about it, visit the Contact Us page.

Are you passionate about the English ivy problem and want to do something about it, but can't find the time to help with efforts towards ivy's eradication? Please help us by donating your hard-earned money to fund our hard-working Summer Youth Crews. They do the most hard-core, gritty ivy removal and are indispensable. Contact Us (<http://www.portlandoregon.gov/parks/article/211115>) if you are interested.



An excellent use of English Ivy vines after removal, Urban Scout from the "rewild camp" program created this bike basket.

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# LEAST WANTED

## English Ivy

*Hedera helix* L.

Ginseng family (Araliaceae)

 [Download PDF version formatted for print](#) (168 KB)



### NATIVE RANGE

Europe, western Asia, and northern Africa

### DESCRIPTION

English ivy is an evergreen climbing vine that attaches to the bark of trees, brickwork, and other surfaces by way of small rootlike structures which exude a sticky substance that helps the vines adhere to various surfaces. Older vines have been reported to reach 1 foot in diameter. Leaves are dark green with white veins, waxy to somewhat leathery, and arranged alternately along the stem. Leaf forms include a 3 to 5-lobed leaf (the most common) and an unlobed rounded leaf often found on mature plants in full sun that are ready to flower. Vines may grow for up to ten years before producing flowers. Under sufficient light conditions, terminal clusters of small, pale yellow-green flowers are produced in the fall. The flowers are attractive to flies and bees in search of late season

nectar sources. The black-purple fruits have a thin fleshy outer covering, contain one to three hard, stone-like seeds and may persist through the winter if not eaten first.

**NOTE: The leaves and berries of English ivy contain the glycoside hederin which could cause toxicosis if ingested. Symptoms include gastrointestinal upset, diarrhea, hyperactivity, breathing difficulty, coma, fever, polydipsia, dilated pupils, muscular weakness, and lack of coordination. This feature also helps ensure effective seed dispersal by birds.**

**Poison ivy may be confused with English ivy in the winter because they both have hairy stems. However, poison ivy is deciduous and has no leaves during the winter time (English ivy has leaves all year round). During the growing season the three-leaved foliage and clusters of whitish berries help to distinguish poison ivy.**

### ECOLOGICAL THREAT

English ivy is a vigorous growing vine that impacts all levels of disturbed and undisturbed forested areas, growing both as a ground cover and a climbing vine. As the ivy climbs in search of increased light, it engulfs and kills branches by blocking light from reaching the host tree's leaves. Branch dieback proceeds from the lower to upper branches, often leaving the tree with just a small green "broccoli head." The host tree eventually succumbs entirely from this insidious and steady weakening. In addition, the added weight of the vines makes infested trees much more susceptible to blow-over during high rain and wind events and heavy snowfalls. Trees heavily draped with ivy can be hazardous if near roads, walkways, homes and other peopled areas. On the ground, English ivy forms dense and extensive monocultures that exclude native plants. English ivy also serves as a reservoir for Bacterial Leaf Scorch (*Xylella fastidiosa*), a plant pathogen that is harmful to elms, oaks, maples and other native plants.



### FACT SHEET LINKS

#### Photographic List

- Complete List
- Aquatics
- Herbaceous Plants
- Shrubs
- Trees
- Vines



## DISTRIBUTION IN THE UNITED STATES

English ivy has been reported to be invasive in natural areas in 18 states and the District of Columbia.

## HABITAT IN THE UNITED STATES

English ivy infests woodlands, forest edges, fields, hedgerows, coastal areas, salt marsh edges, and other upland areas, especially where some soil moisture is present. It does not grow well in extremely wet conditions and tolerates a wide range of soil pH but prefers slightly acid (pH=6.5). English Ivy is often associated with some form of land disturbance, either human-caused or natural.

## BACKGROUND

English ivy was probably first introduced to the U.S. by European immigrants for its ornamental appeal. It persists as a popular plant for homeowners, businesses, landscape designers and others. Cooperative Extension offices continue to recommend English ivy for use as a low maintenance alternative to lawns because it is evergreen, relatively pest free, very cold hardy and fast-growing groundcover that requires little care once established.



## BIOLOGY & SPREAD

English ivy spreads locally through vegetative growth and new plants can grow from cut or broken pieces of stems that are able to root in the soil. It disperses longer distances via seed which is carried to new areas by frugivorous birds including the Cedar Waxwing, Northern Robin, Stellar Jay, Mockingbird, European Starling, and House Sparrow.

## MANAGEMENT OPTIONS

Manual, mechanical and chemical control methods are all effective in removing and killing English ivy. Employing a combination of methods often yields the best results and may reduce potential impacts to native plants, animals and people. The method you select depends on the extent and type of infestation, the amount of native vegetation on the site, and the time, labor and other resources available to you. Whenever possible and especially for vines climbing up trees or buildings, a combination of cutting followed by application of concentrated systemic herbicide to rooted, living cut surfaces is likely to be the most effective approach. For large infestations of ivy spanning extensive areas of ground, a foliar herbicide may be the best choice rather than manual or mechanical means which could result in soil disturbance.

### **Biological**

There are no biological controls currently available for English ivy.

### **Chemical**

Systemic herbicides like triclopyr (e.g., Garlon® 3A and Garlon® 4) and glyphosate (e.g., Accord®, Glypro®, Rodeo®) are absorbed into plant tissues and carried to the roots, killing the entire plant within about a week. The evergreen nature of English ivy means that it continues to grow through the winter months although at a reduced rate. Herbicide applications can be made any time of year as long as temperatures are above 55 or 60 degrees Fahrenheit for several days and rain is not expected for at least 24 hours. Fall and winter applications will avoid or minimize impacts to native plants and animals. Repeated treatments are likely to be needed. Follow-up monitoring should be conducted to ensure effective control. Herbicidal contact with desirable plants should always be avoided. In areas where spring wildflowers or other native plants are interspersed, application of herbicides should be conducted prior to their emergence, or delayed until they have died back. If native grasses are intermingled with the ivy, triclopyr should be used because it is selective for broad-leaved plants and will not harm grasses.



Glyphosate products referred to in this fact sheet are sold under a variety of brand names (Accord®, Rodeo®,



Roundup Pro® Concentrate) and in three concentrations (41.0, 50.2 and 53.8% active ingredient). Other glyphosate products sold at home improvement stores may be too dilute to obtain effective control. Triclopyr comes in two forms – triclopyr amine (e.g., Garlon® 3A, Brush-B-Gone®, Brush Killer®) and triclopyr ester (e.g., Garlon® 4, Pathfinder®, and Vinex®). Because Garlon® 3A is a water-soluble salt that can cause severe eye damage, it is imperative that you wear protective goggles to protect yourself from splashes. Garlon® 4 is soluble in oil or water, is highly volatile and can be extremely toxic to fish and aquatic invertebrates. It should not be used in or near water sources or wetlands and should only be applied under cool, calm conditions.

### *Basal bark application*

Use a string trimmer or hand saw to remove some of the foliage in a band a few feet from the ground at comfortable height. To the exposed stems, apply a 20% solution of triclopyr ester (Garlon® 4) (2.5 quarts per 3-gallon mix) in commercially available basal oil with a penetrant (check with herbicide distributor) to vine stems. As much as possible, avoid application of herbicide to the bark of the host tree. This can be done year-round although efficacy may vary seasonally; temperatures should be above 50 degrees F for several days.

### *Cut stem application*

Cut each vine stem close to the ground or at a comfortable height and cut again a little higher up. Remove cut pieces to make a vine-free band around the tree trunk. The upper portions of cut vines will eventually die, rot and fall off the host tree. To the freshly cut surfaces of the living rooted stems apply a 25% solution of triclopyr amine (Garlon® 3A) or glyphosate (e.g., Accord®) mixed in water. Homeowners can apply products like Brush-B-Gone®, Brush Killer® and Roundup Pro® Concentrate undiluted to cut stems. Using a paint brush or a plastic spray bottle, apply herbicide to the cut surface especially the perimeter inside the bark which is the living portion of plant.

### *Foliar application*

From summer to fall, apply 2 to 5% solution (8 to 20 oz. per 3-gallon mix) of triclopyr ester (Garlon® 4) mixed in water with a non-ionic surfactant to the leaves. Thoroughly wet the foliage but not to the point of runoff. Some control may be achieved with glyphosate as a 2 to 4-percent solution (8 to 16 oz. per 3-gallon mix) mixed in water with a 0.5 to 1.0 % non-ionic surfactant, but repeat applications are likely to be necessary. During foliar applications some of the herbicide is also absorbed through the stem for additional (basal bark) effect. Because English ivy is evergreen, the ideal time to treat it is during mild spells in winter when most native plants are dormant, to avoid affecting non-target species. However, winter treatments may be less effective than summer through fall applications.

### ***Manual and Mechanical***

Vines growing as groundcover can be pulled up by hand, with some difficulty, and left on-site or bagged and disposed of as trash. Always wear gloves and long sleeves to protect your skin from poison ivy and barbed or spined plants. For climbing vines, first cut the vines near the ground at a comfortable height to kill upper portions and relieve the tree canopy. A large screw driver or forked garden tool can be used to pry and snap the vines away from the tree trunks. Vines can be cut using a hand axe or pruning saw for larger vines or a pruning snips for smaller stems. Try to minimize damage to the bark of the host tree. Rooted portions will remain alive and should be pulled, repeatedly cut to the ground or treated with herbicide. Because cutting will likely result in vigorous regrowth, vigilance is required to ensure long term control.

### ***Mulching***

Mulching may be an effective choice for smaller infestations when herbicides are not appropriate. Cover the entire infestation with several inches of mulch. This may include wood chips, grass clippings, hay or similar degradable plant material. Shredded or chipped wood may be the best option since hay and grass may potentially carry weed seeds. Covering the area with cardboard may improve the effectiveness and longevity of this method. The mulch should stay in place for at least two growing seasons and may need to be augmented several times. Mulching can also be done following herbicide treatment.

**USE PESTICIDES WISELY: ALWAYS READ THE ENTIRE PESTICIDE LABEL CAREFULLY, FOLLOW ALL MIXING AND APPLICATION INSTRUCTIONS AND WEAR ALL RECOMMENDED PERSONAL PROTECTIVE GEAR AND CLOTHING. CONTACT YOUR STATE DEPARTMENT OF AGRICULTURE FOR ANY ADDITIONAL PESTICIDE USE REQUIREMENTS, RESTRICTIONS OR RECOMMENDATIONS.**

## CONTACTS

For more information on the management of English ivy, please contact:

- Jil Swearingen, National Park Service, [jil\\_swearingen at nps.gov](mailto:jil_swearingen@nps.gov)
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## SUGGESTED ALTERNATIVE PLANTS

A wide variety of attractive and ecologically adapted and beneficial native plants can be substituted for English ivy. Select plants adapted to the level of light available on the site (i.e., full sun, shade, part-shade). Plants that will eventually spread to cover an area of ground include flowering plants like eastern prickly pear cactus (*Opuntia humifusa*), blue phlox (*Phlox divaricata*), wild ginger (*Asarum canadense*), Allegheny spurge (*Pachysandra procumbens*), and green and gold (*Chrysogonum virginianum*); ferns like Christmas fern (*Polystichum acrostichoides*), northern maidenhair fern (*Adiantum pedatum*), northern lady fern (*Athyrium filix-femina*), sensitive fern (*Onoclea sensibilis*), and cinnamon fern (*Osmunda cinnamomea*); grasses like red fescue (*Festuca rubra*), wild oats (*Chasmanthium latifolium*), bottlebrush grass (*Elymus hystrix*) and switch grass (*Panicum virgatum*); and sedges like Pennsylvania sedge (*Carex pennsylvanica*) and tussock sedge (*Carex stricta*). Native vines that are good replacements for English ivy include trumpet creeper (*Campsis radicans*), Virginia creeper (*Parthenocissus quinquefolia*), passionflower vine (*Passiflora lutea*), Dutchman's pipe (*Aristolochia macrophylla*), and native wisteria (*Wisteria frutescens*)\*.

\* If you wish to plant wisteria, make certain that it is the native species. Two commonly planted ornamental wisterias, [Chinese wisteria](#) (*Wisteria sinensis*) and [Japanese wisteria](#) (*Wisteria floribunda*), are exotic and aggressive invaders. Please consult the native plant society in your state for more information on species native to your particular area.

## OTHER LINKS

- [Photos at invasive.org](http://photos.invasive.org)
- [Photos by Forest & Kim Starr \(USGS\)](http://photos.byforest.com)

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This WEED REPORT does not constitute a formal recommendation. When using herbicides always read the label, and when in doubt consult your farm advisor or county agent.

This WEED REPORT is an excerpt from the book *Weed Control in Natural Areas in the Western United States* and is available wholesale through the UC Weed Research & Information Center ([wric.ucdavis.edu](http://wric.ucdavis.edu)) or retail through the Western Society of Weed Science ([wsweedsociety.org](http://wsweedsociety.org)) or the California Invasive Species Council ([cal-ipc.org](http://cal-ipc.org)).

*Hedera helix* L.; English ivy

*Hedera canariensis* Willd.; Algerian ivy

(= *H. helix* L. ssp. *canariensis* (Willd.) Cout.)

*Hedera hibernica* (G. Kirchn.) Bean; Irish or Atlantic ivy

## English, Algerian and Atlantic ivy



**Family:** Araliaceae

**Range:** Many western states, including Washington, Oregon, California, Idaho, Arizona, and Utah.

**Habitat:** Riparian corridors, moist woodlands, forest margins, coastal habitats, and disturbed sites such as cleared forests, urban waste places, and old homesteads. Requires some moisture year-round. Tolerates deep shade, but thrives where plants receive some summer shade and direct winter sun.

**Origin:** Native to Europe and introduced to the United States as an ornamental. English ivy is still a common landscape ornamental of which there are numerous cultivars.

**Impacts:** Under favorable conditions, plants spread invasively and can develop a dense cover that outcompetes other vegetation in natural areas. Infestations around old homesteads have been present for many years and serve as nursery sites for further spread. It has escaped from cultivation in many places, especially near the coast and along riparian corridors. English ivy grows over the natural vegetation in an area, including trees, and eventually kills most resident plants by shading them out with its dense canopy of foliage. It thrives in deciduous trees, which allow plants to receive more light and to continue upward growth during winter months. Trees covered with ivy are more susceptible to wind damage from the extra weight. English ivy berries and leaves can be toxic to humans and cattle when ingested in quantity, and the sap can cause contact dermatitis in sensitive individuals, which includes about 10% of the population.

**Western states listed as Noxious Weed:** *H. helix*, Oregon, Washington; *H. canariensis* and *H. hibernica*, Washington

**California Invasive Plant Council (Cal-IPC) Inventory:** High Invasiveness

English ivy and other closely related *Hedera* species are fast growing, perennial, evergreen vines that vigorously climb other vegetation and on structures. Plants have two growth forms. The juvenile form has viny stems to about 12 inches long with leaves that are usually three-lobed. The adult reproductive form has erect shrubby stems with ovate to diamond-shaped leaves. Juvenile stems are vine-like, growing both on the ground and vertically into canopies. Juvenile stems develop adventitious roots along the ground and aerial root-like structures that enable stems to cling to objects such as trees and buildings. Juvenile leaves are palmately three to five lobed and vary in size, up to 12 inches long. Adult reproductive stems are erect, shrubby, lack aerial roots, and are non-climbing. Adult leaves are ovate to diamond-shaped and up to 6 inches long. Leaves of both forms have smooth upper surfaces, often slightly glossy, and usually dark green. Leaf stalks and lower leaf surfaces are sometimes glabrous but usually covered with grayish star-shaped hairs.

Unlike most plants in the region that flower in spring or summer, ivy flowers in fall. The shrubby adult form develops flowers in racemes or panicles of simple umbels. The juvenile stage may last for 10 years or more before reproducing by seed. Fruits are berrylike, dark blue to black, about 4 to 8 mm wide. Fruits mature in spring with an individual plant producing tens of thousands of fruit each year. Fruits are consumed and dispersed primarily by birds. English ivy also reproduces vegetatively from juvenile stems. Stem fragments of juvenile and adult plants left in contact with moist soil can regenerate into a new plant. Plants can live 100 years or more.

**NON-CHEMICAL CONTROL**

<p><b>Mechanical</b> (pulling, cutting, disking)</p>	<p>When the plant carpets the forest floor, individual stems can be readily pulled off the ground; however, it is essential to remove all runners. If off-site removal is not possible, all plant parts must be placed off the ground in such a way that they can dry out. Repeated removal efforts over multiple years may allow desirable vegetation to colonize the area. Because ivy can resprout and establish from stem fragments, mowing or cutting is not recommended. Small or young ivy plants can be pulled off supporting structures or trees, and roots dug out. The roots of young plants can be easily dug out, particularly when the soil is moist, from the ground around the base of infested trees. Older individuals generally do not resprout. Gloves should be worn as many people are sensitive to the dermatitis-causing agents in the plant.</p> <p>Cutting ivy off before it flowers will reduce seed production and deplete the plant's energy reserves. Resprouts are common after treatment. Cutting should be combined with an herbicide treatment or with multiple cuttings over a period of years. Cut ivy at ground level with power or manual saws, and then pry the vines from the tree or structure. Once the vines are cut they will eventually die and fall from the tree, usually after the first extended hot and dry period. Occasionally vines will be embedded in the trunk of the tree, which makes control by both hand and chemicals very difficult.</p>
<p><b>Cultural</b></p>	<p>Grazing and burning are not considered effective control options. The leaves and fruit can be toxic to livestock. Deer have been shown to feed on ivy in its native range.</p> <p>Although prescribed burning is not an effective control option, the use of a blowtorch can be successful. To be successful, plants and resprouts must be repeatedly burned until the plant's resources are exhausted.</p>
<p><b>Biological</b></p>	<p>Because <i>Hedera</i> species are still widely used as ground covers and ornamentals, there is no biological control program established for their management.</p>

**CHEMICAL CONTROL**

The following specific use information is based on published papers and reports by researchers and land managers. Other trade names may be available, and other compounds also are labeled for this weed. Directions for use may vary between brands; see label before use. Herbicides are listed by mode of action and then alphabetically. The order of herbicide listing is not reflective of the order of efficacy or preference.

<p><b>GROWTH REGULATORS</b></p>	
<p>Picloram <i>Tordon 22K</i></p>	<p><b>Rate:</b> Broadcast foliar treatment: 3 to 4 pt product/acre (0.75 to 1 lb a.e./acre) plus 0.25 to 0.5% v/v surfactant to thoroughly wet all leaves</p> <p><b>Timing:</b> Postemergence foliar treatments are best when plants are growing rapidly at or beyond early to full bloom stage.</p> <p><b>Remarks:</b> High levels of picloram can give long-term soil activity for broadleaves. Picloram has proved successful in Australia. Picloram is a restricted use herbicide. It is not registered for use in California. Do not apply near trees, or damage may occur through root uptake.</p>
<p>Triclopyr <i>Garlon 3A, Garlon 4 Ultra, Pathfinder II</i></p>	<p><b>Rate:</b> Spot treatment: 2 to 5% v/v solution of <i>Garlon 4 Ultra</i> and water plus 0.25 to 0.5% v/v surfactant to thoroughly wet all leaves. Low volume/thinline treatment: 10% v/v solution of <i>Garlon 4 Ultra</i> plus a 20% v/v basal oil concentrate in water. Basal cut stump treatment: 20% v/v <i>Garlon 4 Ultra</i> in water. Cut stump treatment: undiluted <i>Garlon 3A</i> or 33% <i>Garlon 3A</i> in water. Stem injection treatment: drill and fill the stem of large mature plants that are climbing up other trees with 100% <i>Garlon 3A</i> or <i>4 Ultra</i>. Basal bark treatment: 20% v/v <i>Garlon 4 Ultra</i> in 20% v/v basal oil and water, or <i>Pathfinder II</i> as a ready-to-use formulation.</p> <p><b>Timing:</b> Postemergence when plants are growing rapidly. Cut stump and basal bark treatments can be applied anytime as long as the ground is not frozen.</p> <p><b>Remarks:</b> Triclopyr is a selective herbicide for broadleaf species. In areas where desirable grasses are growing under or around ivy, triclopyr can be used without non-target damage. For cut stump treatments, cut stems horizontally at or near ground level. Apply herbicide solution immediately after the stump is cut. Suckering from the roots typically occurs after cutting, but the treatment should control most resprouts. Basal bark treatment: spray the lower trunk, including the root collar, to a height of 12 to 15 inches from the ground; the spray should thoroughly wet the lower stem but not to the point of runoff. When making bark treatments, be careful not to get the spray solution on the bark of desirable trees. Plants should not be cut for at least one month after basal bark treatments. Spraying triclopyr immediately after the removal of most leaves and young shoots with a string trimmer has also proved successful.</p>

**AROMATIC AMINO ACID INHIBITORS**

<p>Glyphosate <i>Roundup, Accord XRT II,</i> and others</p>	<p><b>Rate:</b> Spot treatment: 2 to 4% v/v solution of <i>Roundup ProMax</i> (or other trade name with similar concentration of glyphosate) in water to thoroughly wet all leaves. Low volume/thinline treatment: 10% v/v solution of <i>Roundup</i> (or other trade name) in water. Cut stump treatment: 25% v/v <i>Roundup</i> (or other trade name) in water.</p> <p><b>Timing:</b> Postemergence when plants are growing rapidly. Foliar treatments should be made in late summer or early fall. For cut stump treatment, application in late summer, early fall or dormant season provides best control. Treatment should occur immediately after cutting.</p> <p><b>Remarks:</b> Glyphosate is a nonselective systemic herbicide with no soil activity. It gives good control with some resprouts. Plants should not be cut for at least 4 months after foliar treatments. Cut stump applications are made as described for triclopyr. Glyphosate has also proved successful in Australia.</p>
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**BRANCHED-CHAIN AMINO ACID INHIBITORS**

<p>Imazapyr <i>Arsenal, Habitat, Stalker,</i> <i>Chopper, Polaris</i></p>	<p><b>Rate:</b> Spot treatment: 1 to 2% v/v solution of <i>Stalker</i> plus 0.25 to 0.5% surfactant v/v in water to thoroughly wet all leaves. Low volume/thinline treatment: 10% v/v solution of <i>Stalker</i> plus a 20% v/v ethylated crop oil in water. Cut stump treatment: 20% v/v solution of <i>Stalker</i> plus a 20% v/v ethylated crop oil in water or 20% <i>Habitat</i> v/v in 80% water carrier. Basal bark treatment: 20% v/v solution of <i>Stalker</i> plus a 20% v/v ethylated crop oil in water.</p> <p><b>Timing:</b> Postemergence when plants are growing rapidly. Best when used in late summer to early fall.</p> <p><b>Remarks:</b> Imazapyr is a soil residual herbicide and may result in bare ground around plants for some time after treatment. Cut stump and basal bark applications are made as described for triclopyr. Plants should not be cut for at least 4 months after basal bark treatment. Another ALS inhibitor, metsulfuron, has proved successful in Australia.</p>
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**RECOMMENDED CITATION:** DiTomaso, J.M., G.B. Kyser et al. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. 544 pp.

Cal-IPC > Invasive Plants > Invasive Plant Management > Invasive Plants of California's Wildlands > **Invasive Plants of California's Wildland**

## Invasive Plants of California's Wildland

### Hedera helix

**Scientific name** *Hedera helix*

**Additional name information:** L.

**Common name** English ivy

**Synonymous scientific names** none known

**Closely related California natives** 0

**Closely related California non-natives:** 0

**Listed** CalEPPC List A-1, CDFA nl

**By:** Sarah Reichard

#### **Distribution**



#### **HOW DO I RECOGNIZE IT?**

##### **Distinctive features:**

English ivy (*Hedera helix*) is the familiar vining plant often allowed to grow up building walls. It has two forms: an evergreen woody vine and an evergreen shrub. Both forms have deep green, glossy, leathery leaves. Vining plants do not produce flowers or fruits, and their leaves have lighter-colored veins and three to five lobes. Upright shrubby plants may produce flowers and fruits, and their leaves are ovate rather than lobed. In both forms the leaves may have a strong odor when crushed. The white flowers are in clusters on the ends of stems produced in fall, and the fruits are dark blue or purplish drupes. English ivy may be distinguished from grape vines (*Vitis* sp.) and *Ampelopsis* species by its evergreen leaves, which are not hairy or fuzzy (pubescent), and by vines that have no tendrils. It differs from cape ivy (*Delairea odorata*) in having leaves that are evergreen in all climates, with a deep cleft at the leaf base that makes the lower lobes appear larger than the others. Cape ivy may also be distinguished from this species by its small, yellow composite flowers.

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**Description:** Araliaceae. Perennial, evergreen woody vine to 99 ft (30 m) (juvenile plant) or

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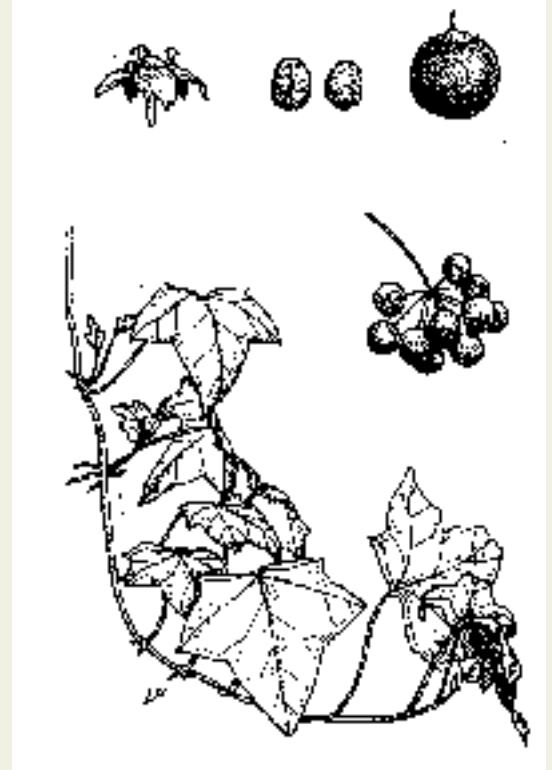
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shrub (adult plant). Stems: creeping juvenile stems have roots at leaf nodes with adventitious rootlets that allow the plant to climb vertical surfaces by adhering to, but not penetrating, bark and brick. Adult flowering stems erect and non-climbing. Leaves: leathery, simple, and alternate. On juvenile plants leaves have 3-5 lobes and are 1.6-4 in (4-10 cm) long and about as wide. Terminal lobe about as broad as long; the two basal lobes may be reduced or absent. Lobes often more pronounced on leaves of climbing stems.



Leaf base cordate and veins markedly lighter in color. Leaves on flowering stems mostly unlobed, ovate to rhombic, base shallowly cordate to cuneate, and veins slightly lighter in color. Petioles on both forms about as long as the leaf. Young shoots, leaves, and peduncles covered with stellate hairs and scales; older shoots and leaves glabrous. Inflorescence: a raceme that appears umbellate. Flowers: bisexual, radial, usually 0.2-0.3 in (5-7 mm) across, with 5 sepals fused at the base and persistent but small. There are 5 separate white to yellowish green petals; stamens usually 5 and alternate with petals; 1 style with 5-lobed stigma; ovary inferior. Fruits: berry-like drupe about 0.24-0.36 in (6-9 mm) in diameter containing 4-5 seeds; drupe usually dark blue to black, lighter on some cultivated varieties. English ivy flowers in fall, and fruits are produced the following spring in April and May (Putz and Mooney 1991).

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#### **WHERE WOULD I FIND IT?**

English ivy is found in northern California forests south to at least Santa Cruz. It has also been observed in Shasta and Butte counties and along the south coast from Santa Barbara County to San Diego. It is a serious problem in the coastal Pacific Northwest from central Oregon into British Columbia. On the eastern seaboard it also spreads into woods, particularly from Virginia north to New York. English ivy is generally found in open forests, especially those with a deciduous component, from sea level to 3,300 feet (1,000 m) elevation. It is especially common in forests near urban areas. It climbs up tree trunks and along branches into the canopy and may also cover the ground. English ivy will invade riparian zones where flooding has disturbed the soil, but it does not grow well in areas where the water table is high and soil is waterlogged (Thomas 1980). It grows well in acid and basic soils.

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#### **WHERE DID IT COME FROM AND HOW IS IT SPREAD?**

English ivy is native to England, Ireland, the Mediterranean region, and northern Europe west to the Caucasus Mountains. In its native range English ivy is widespread and usually found in woods and along rocky areas. It is often considered a weedy pest in its native range (Wyman 1954). It was introduced into North America in early colonial times as an ornamental (Wyman 1969). English ivy has been planted to control soil erosion in many parts of the United States because of its habit of rooting at the leaf nodes along the stem. It is perhaps the best known of all evergreen vines in cultivation. Birds disseminate the seeds. Once established, it spreads quickly by vegetative means.

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## WHAT PROBLEMS DOES IT CAUSE?

English ivy can alter natural succession patterns in forests. It forms "ivy deserts" of vigorous vines in forests where nothing else seems able to compete. It inhibits regeneration of understory plants, including forest wildflowers and new trees and shrubs (Thomas 1980). By blocking regeneration in forests, it jeopardizes their long-term persistence. English ivy also kills trees in the understory and overstory by shading them out (Thomas 1980). It tends to grow up tree trunks into branches, especially those of deciduous trees. The increased winter light under deciduous trees apparently allows this evergreen vine to grow rapidly upward in winter (Thomas 1980). Once in the canopy, English ivy can shade out deciduous foliage during summer months, suppressing the growth of the tree that supports it. As the tree dies back, its increasingly open crown allows the vine to grow even more (Thomas 1980). In addition to shading, the additional weight of water and/or ice on the evergreen ivy leaves may increase storm damage to trees, especially in the presence of high winds. This effect has been observed in trees infested with *Vitis* sp. in Connecticut (Siccama et al. 1976).

English ivy may replace species used by native wildlife. Its leaf litter adds nitrogen to the soil, which may disadvantage native species that compete best under lower nutrient levels (Tremolieres et al. 1988). The sap can cause dermatitis in some people, and both berries and leaves are toxic (Hickman 1993).

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## HOW DOES IT GROW AND REPRODUCE?

While vegetative reproduction is a key to the success of English ivy, the plant also reproduces prolifically by seed. English ivy flowers in fall, and fruits are produced the following spring in April and May. The juvenile period is long, often ten years or more, but when it becomes reproductive, it produces large numbers of bisexual flowers in fall that are attractive to pollinating bees. Seeds ripen the following year, and on average about 70 percent are viable (Dirr and Heuser 1987). English ivy seed has a hard coat that must be scarified before it can germinate, a condition easily met as the seed passes through the digestive systems of birds that disperse the fruits. The fruits are eaten by several species of birds. English ivy reproduces vegetatively by adventitious roots along the stem and may regenerate from stem fragments if they remain in contact with the soil. The vines can persist a long time; there have been reports of a vine that was 433 years old (Putz and Mooney 1991).



English ivy grows as a woody vine when young, becoming increasingly shrubby as the plant becomes reproductive. Because its leaves are evergreen, it can

(click on photos to view larger image)

photosynthesize year-round and will grow rapidly if unchecked. Its ability to climb structures using adventitious roots suggests that it is well adapted to establishment in late successional forests (Carter and Teramura 1988).



The root system is shallow. Growth in the adult shrub form is slower. English ivy tolerates shade, but its growth is stimulated by light. Thomas (1980) found that in heavy shade (4 to 7 percent of full sunlight) English ivy survived but began to slowly decline, while under 65 to 68 percent of full sunlight the plant flourished.

#### **HOW CAN I GET RID OF IT?**

Control of English ivy has not received sufficient attention or research. Research in the past has focused on establishing new cultivars rather than on controlling or eliminating the plant.

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##### ***Physical control:***

Manual/mechanical: The best method for controlling English ivy may be hand removal of vines using pruners to cut the vines and then pulling the plants up from the forest floor and down from the trees. Removing and killing vines that spread up into trees is especially important because the fertile branches grow primarily on upright portions of the vine. If vines are cut at the base of the tree the upper portions will die quickly but may persist on the tree for some time; vines on the ground around the tree should also be removed to prevent regrowth up the tree. Care should be taken to minimize disturbance during removal. If the forest floor becomes disrupted, appropriate native species should be planted on the site to inhibit reinfestation by English ivy or another invader (Humphries et al. 1991).

Prescribed burning: An extreme method that has been used with some success is to burn ivy plants and resprouts with a blow torch at regular intervals; the energy used by the plant to regrow will eventually be depleted. Obviously, this approach requires considerable caution. No other attempts to use fire to control English ivy have been reported.

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##### ***Biological control:***

Insects and fungi: There have been no attempts to introduce biological control agents, and it is extremely unlikely that such agents will ever be used. English ivy is an important landscape plant and has strong support from the horticultural community, including a society dedicated to its study and promotion (the American Ivy Society).

Grazing: The palatability of English ivy to grazing animals is unrecorded.

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##### ***Chemical control:***

English ivy is tolerant of preemergence herbicides (Derr 1992). Its waxy leaves make effective application of post-emergent herbicides difficult, even when a surfactant is added. Glyphosate (as Round-up®) applied at a rate of 2.7 lb/acre effectively controlled young plants, especially in early spring (Neal and Skroch 1985), but tests on more mature plants suggested that adult upright English ivy is tolerant of this herbicide. This was true even when surfactants, high application rates (4 lb/acre), and second applications were used (Derr 1993), although growth may be retarded as much as 60 percent.

Workers at the Washington Park Arboretum in Seattle have had some success using a string trimmer to remove most of the leaves and young

# HydroMechanical Obliteration (H\_M\_O<sup>sm</sup>) in the Golden Gate National Recreation Area

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## Abstract

We are reporting on the use of a new control technique: Hydro-Mechanical Obliteration (H\_M\_O<sup>sm</sup>), on six invasive plant species in Marin County, California at the Golden Gate National Recreation Area (GGNRA). Data collection consisted of a combination of before and after plots while others were recorded with photo-documentation. H\_M\_O involves the use of small amounts of water at 3500-7000 PSI to remove woody and herbaceous perennial plants. The result is a leave-in-place mulch with herbaceous plants or in the case of French Broom (*Genista monspessulana*) mature plants were removed and piled. For Cape-ivy (*Delairea odorata*) and English ivy (*Hedera sp.*) significant reductions in both species were achieved with a single treatment. For Hardwing grass (*Phalaris aquatica*) multiple treatments over time were required. We had great success with Cape-ivy and panic veldt grass (*Ehrharta erecta*) control as a follow-up to our initial mechanical removal of Cape-ivy conducted two years previously. On jubata grass (*Cortaderia jubata*) only small plants were removed with one treatment, larger plants have taken 3-4 treatments over 12 months and French broom (*Genista monspessulana*) growing among compacted rock along Bolinas Lagoon removal was also successful. We found H\_M\_O to be a beneficial and cost-effective addition to our IPM toolbox.

## Method and Materials

Hydro-Mechanical Obliteration<sup>sm</sup> uses low volume water at very high pressure to micro-minimize vegetative matter in-situ.

H\_M\_O<sup>sm</sup> is a highly targetable growth control process. It works well on reducing light weedy vegetation and frustrating plant growth.

Woody materials are subjected to three possible scenarios:  
 •controlled defoliation of green vegetation and dead biomass and around the living plant to reduce fuel.  
 •removing plant by root via liquefaction.  
 •or girdling the plant by killing by removing outer bark around the tree/plant.

Since all materials are left in place the nutrients are recycled back to the soil in which they came.

The H\_M\_O application works in any interface, urban weed control, wild land, and water.



## Results of Additional Applications

H\_M\_O has been used as an invasive plant removal technique in the GGNRA on French broom (*Genista monspessulana*), Hardwing Grass (*Phalaris aquatica*), Panic Veldt Grass (*Ehrharta erecta*), Jubata (*Cortaderia jubata*) and Fennel (*Foeniculum vulgare*).

### FRENCH BROOM:

H\_M\_O was able to rapidly cut plants at the soil level and be collected into piles.



Before

After

### HARDING GRASS:

Four treatments of H\_M\_O applied over 18 months resulted in 100% reduction in seed head production.



Before

After

### JUBATA:

50% of the smaller plants were removed after one treatment; larger plants needed three to four treatments over 12 months.



Before

After

### FENNEL:

One treatment was able to successfully remove all but two fennel plants. Only small portions of those two plants remained and there was no need to retreat the sites.



Before

After

H\_M\_O was used successfully as a follow-up to a prior mechanical removal for Cape-ivy and panic veldt grass.

## Advantages of H\_M\_O

### •FAST:

- Time spent hauling herbaceous biomass from site is eliminated.
- "Bare Ground" initial treatments for species like cape-ivy are completed in significantly less time than traditional manual methods.
- One applicator can obliterate one quarter to one acre of vegetation in one day (depending on species type).

### •CLEAN:

- Eliminates the exposure to Herbicides and other Chemicals
- Avoids use of engine driven cutters which pollute and can cause fires.
- Can be used with reclaimed water

### •MINIMALLY DISRUPTIVE:

- Does not cause erosion
- Recycles nutrients from the obliterated vegetation back to the soil.
- Allows the applicator to be incredibly specific in obliterating the target species
- Leaves canopy layer undisturbed.

### OTHER BENEFITS

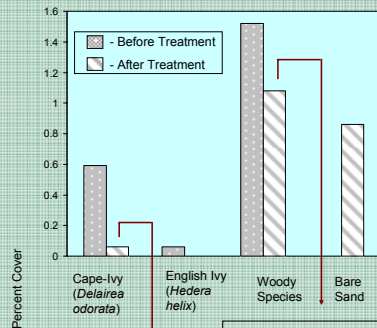
- Systems can be mobilized for certain applications where access and target species are deep in impassable vegetation.
- Systems are built to suit a wide range of tasks.

## Case Study: Cape-ivy removal at Stinson Beach

**Objective:** Determine the effectiveness of H\_M\_O to control Cape-ivy in sandy soil.

**Methods:** Sampling: Point-intercept sampling of vegetation cover was collected before treatment and six weeks after treatment. 30 points in a 9 x 10 meter square.

**Treatment:** The plot was entirely cleared of visible Cape-ivy using the H\_M\_O technique and 150 gallons of water. No limbing of willows occurred.



**Result:** H\_M\_O significantly decreases Cape-ivy and English-ivy cover without removing canopy species.

## Limitations

### •REVISITATION

- Hydro-Mechanical Obliteration often requires multiple treatments, especially when removing aggressive plants.
- It can unintentionally girdle trees and shrubs when used sub-soil.

### •PROXIMITY

- Systems are limited by hose: 400 feet max line.

### •TRAINING

- Applicators must be trained and maintain certification.

## Future Studies

To better understand the capabilities and limitations of H\_M\_O more studies must be performed investigating:

- Long term invasive control
- Seed mortality/obliteration
- Seasonality considerations and constrictions
- Effectiveness on other invasive species

## Acknowledgements

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