Organic Land Care
Working with Nature

Program Updates

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Contents:

Welcome!

It's a busy, busy summer. Our Wwoofers have arrived – thank you, thank you! We currently have 4 young people staying with us, performing a variety of mundane tasks (mowing grass, weeding, getting rid of aggressive rhizomatous grasses in the veggie garden) and more interesting tasks (building gabion rock walls, inoculating logs with mushroom spawn, and soon building worm bins and installing yard hydrants etc.). In another week we'll start replacing our worn out and dangerous steps between cabin and house, and the house and veggie garden with a new staircase (what are the ethical and ecological implications of disposing of the previous owner's pressure treated wood vs. reusing it in non-food growing areas?). We're looking forward to the start of an old-fashioned flower and herb garden by the cabin, and some creative use of brick and river rock when we build a new entry path to the cabin later this year. And everybody loves Michael's cooking.

It's another simple issue of our monthly updates. Actually I didn't have anything really interesting until this morning, when I came across 3 bits of great information to share with you. Ivy is a huge problem on our property, where it has engulfed several very large trees, with some of the ivy trunks thicker than my forearm. How does one deal with something like that – without using pesticides? The toxicity of printing ink is another concern as we strive to return as much organic matter as possible to our very depleted soil – including our shredded newspapers.

Enjoy your summer!

Heide

Does ivy damage structures?

An exchange of correspondence between VanDusen Master Gardeners. I could find no research at all to substantiate the claim the ivy "exudes an acid" that damages structures. However during respiration plants release carbondioxide and water, which quickly combine into carbonic acid which is strong enough to leach rocks their minerals. 'Certainly something to consider.

QUESTION:
In our condo, there is some disagreement whether or not hydrangea and ivy damage the mortar or brick in brick walls. Some people say that the newer brick/mortar walls will not be damaged, and others disagree.

Can you help? Diane Colman

ANSWERS:
We have had ivy climbing all over half of our old brick house for years, ripped it off several times to paint the non-brick portions, no damage at all. No damage from our climbing hydrangea, either. Darlene White

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I have seen ivy damage both brick and stucco walls, even getting into windows frames, especially aluminium frames. I have also seen the ivy go up underneath vinyl siding and in between roof and gutters. Any one of these areas create passages for water to get in and when water gets inside the walls or window frames it opens up the building to mold and water seepage problems - neither of which is covered by insurance. If ivy is to be left on the building I'd suggest that it is trimmed to keep it away from windows, doors, eaves & downspouts , and the walls should be periodically checked to make sure the mortar is not cracking.

I haven't seen damage from hydrangea to the same extent but would suspect the same principle applies. Hydrangea is slower growing and can be contained easier.

The building next to my office (stucco) had both ivy and hydrangea growing on lattices attached to the wall. The ivy has been removed while the hydrangea was left, thought severely trimmed.
If your strata wants an 'expert' opinion contact a building inspector.

Cheers, Lynne Chrismas

English Ivy exudes a chemical (an acid) from its attachment points that is capable of dissolving rock, let alone brick and mortar. It will damage any kind of wall known, even metal. I cannot say if climbing hydrangea has the same ability but hydrangea plants do place a lot of weight stress on a wall and provide a haven for insects and fungal growths. I would recommend that you not place a self-attaching vine on a building but showcase them on free-standing structures if you want to have them.

Heather Jespersen

The other damaging factor of climbing plants is the build up of moisture on the surface of the wall. A heavy foliage will more often then not block any air or light from getting to the wall surface causing it to decay much quicker then might otherwise be expected.

Would recommend a removable lattice wall supported away from the building where air can circulate in behind and make it easier to remove for maintenance of the building without having to destroy or severely cut back a plant that has taken a long time to grow (in particular hydrangeas that can take up to 7 years to produce flowers.)

Terry Villeneuve

Combating the "Ivy Desert": The Invasion of Hedera helix (English Ivy) in the Pacific Northwest United States

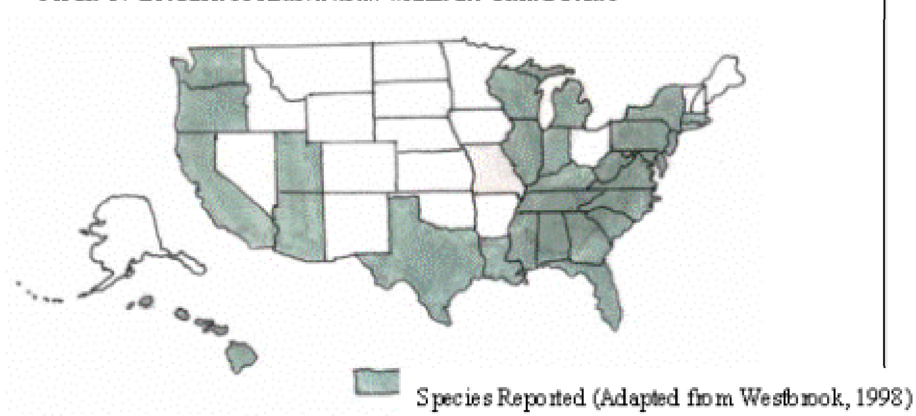
By Anne Okerman
Source: http://horticulture.coafes.umn.edu/vd/h5015/00papers/okerman.htm

Introduction

A plant highly regarded for its decorative value in the landscape, *Hedera helix*, commonly known as English Ivy, was introduced to the United States from Europe in early colonial times (Wyman, 1994; Randall et al., 1996). Since then, *Hedera helix* has been used extensively in many parts of the United States as an ornamental landscape plant. However, in areas where it has been planted as a perennial vine or groundcover, *Hedera helix* has invaded deciduous forests to create what is called an "ivy desert". An "ivy desert" describes a forested area that has a limited number of canopy species with entangling *H. helix* vine wildly climbing up tree trunks and reaching out into the canopy. In an ivy desert, there is an absence of understory and ground cover plants as a result of the dense, thick mat of ivy groundcover (Westbrook, 1998).

Hedera helix has developed into a problem at a global scale in many areas where it has been introduced. It is a common, naturalized plant in Australia, New Zealand, Hawaii, Brazil and North America (Laroque, 1998). Within North America, *H. helix* has been reported as a potential problems in many states in the U.S. and up into Canada (Westbrook, 1998). It is prevalent in forests in the Eastern United States (Thomas, 1998) and has also been found to be a problem from Northern California forests south to the San Francisco peninsula (see Fig. 1.) (Reichard, 2000). *H. helix* is a "serious problem in the coastal Northwest from Portland up into British Columbia" where it is invading forests and riparian zones especially those in close proximity to urban areas (Reichard, 2000).

Figure 1. Location of *Hedera helix* within the United States



In the northwestern United States, *H. helix* grows rapidly in deciduous forests forming a green carpet across the forest floor and blanketing trees and other vegetation. The regal stands of the Northwest deciduous forests, composed of bigleaf maple (*Acer macrophyllum*), Oregon ash (*Fraxinus latifolia*), black cottonwood (*Populus trichocarpa*), Oregon white oak (*Quercus garryana*), snowberry (*Symphoriocarpus alba*), and red alder (*Alnus rubra*), are threatened by the changes evoked on a forest community by an invasion of *H. helix* (Hitchcock, 1973). Though the leaf foliage appears shiny and healthy up close, from a distance, ivy that has taken over a deciduous forest stand appears unruly and tangled. *Hedera helix* clearly dominates over all other understory growth (personal observation, 2000).

While *Hedera helix* thrives in moist, open forests that are predominantly deciduous, it also grows in mixed *Pseudotsuga menziesii* (Douglas Fir) ecosystems, riparian zones and wetlands of the Northwest United States (Laroque, 1998). George Krall (2000), from the Bureau of Environmental Services, said that *H. helix* is likely to grow in rocky, drought tolerant conditions and is becoming an increasing problem along the northwest coast line. It has been found to grow anywhere under 3,000 feet altitude.

Hedera helix is still being sold in nurseries of the northwestern U.S. and landscaping companies continue to use it in commercial and residential projects. Ivy is frequently used as a roadside planting by the Oregon Department of Transportation because it is low-maintenance, provides a uniform groundcover appearance, and grows in such harsh conditions. The ability of *H. helix* to spread adventitiously and its dispersal from birds causes concern when the plant is used in close proximity to forest or riparian zones.

The impacts of an "Ivy desert" are a loss of biodiversity and decrease in native vegetation. Presently, there is little published information on treatment methods for *Hedera helix* though it is increasingly recognized as a threat to restoration efforts and native plant communities. The Oregon Plan for Salmon and Watersheds lists *H. helix* as a factor for decline of riparian and urban stream habitats (Oregon Plan, 2000). As restoration projects begin in areas where ivy is likely to invade, an understanding of the species and knowledge of control methods is important to study in order to combat the "Ivy desert."

Description of *Hedera helix*

Hedera helix, a part of the family Araliaceae (Ginseng), is a woody, evergreen climber with perennial stems. Ivy grows well in adverse soil conditions, both basic and acidic soils, and it is adaptable to different levels of light (Reichard, 2000). *Hedera helix* is often used as a landscape plant in the Pacific Northwest United States because of its high rate of survival, rapid establishment and persistence in temperate to sub-tropical zones (Wyman, 1994).

Hedera helix can most easily be distinguished from other vine species by its evergreen leaves that are not pubescent and lack tendrils (Reichard, 2000). Interestingly, the most commonly recognized leaf form of *Hedera helix* is, in fact, indicative of one of two distinctive life stages of the plant; *H. helix* has both a juvenile and adult form (see Fig.2) (Dirr, 1998). The leaf form of the juvenile plant is most often recognized by its thinly elongated, 3-5 lobed leaves that are typically a dark, glossy green with whitish veins (Reichard, 2000). During the juvenile or non-reproductive stage, *Hedera helix* is typically a ground cover. The leaves of the adult or reproductive form are usually a lighter green, thick, ovate to rhombic in shape and have less prominent whitish veins. During the adult stage, *H. helix* produces terminal clusters of greenish-white flowers from September to October pollinated by wasps, bees, and flies along the northwest coastline of North America (Reichard, 2000; LaRoque, 1998; Tremolieres et al., 1988). The following spring *Hedera helix* produces a dark, purple fleshy drupe fruit (see Fig. 3) (Dirr, 1998).

Figure 2. Leaf form of *Hedera helix* during both life stages

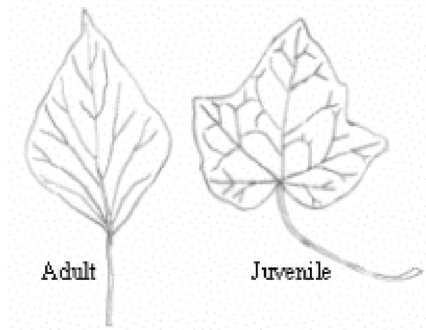


Figure 3. Purple drupe fruit of *Hedera helix*

The life phases of *Hedera helix* are an interesting feature from "an ecological, physiological, and anatomical perspective" (Laroque, 1998). Drastic developmental changes occur in the plant during the juvenile and adult phases. This is believed to be the result of reduced gibberellic acid caused by the absence of abundant roots, which triggers the change to its adult or arborescent form (Lee and Richards, 1991; Laroque, 1998).

In its juvenile form, *Hedera helix* has adventitious rootlets located at the leaf nodes on the stem. The rootlets allow the plant to climb trees, walls, and other vertical structures. The vine attaches to surfaces but does not penetrate through mortar or tree bark, thus it is not considered to be a parasite (Elliott, 1995). In its adult form, on the other hand, *H. helix* has erect, woody, non-climbing stems which result in a shrub-form (Reichard, 2000). Botanists have argued that the thick, woody stem of *H. helix* allows it to be classified as a "liana" as opposed to a "vine" (Gentry, 1991; Laroque, 1998). Lianas are primarily found in tropical forests where they have "evolved their climbing strategies" (Gentry, 1991). Lianas are also represented in South American temperate forests (Laroque, 1998).

The growing conditions of lianas are relative to seed dispersal characteristics. Lianas that grow in dry forest conditions have been found to be primarily wind-dispersed (Gentry, 1991). The seeds of *Hedera helix*, and other lianas that grow well in moist forest conditions are typically dispersed by birds and other wildlife (Gentry, 1991). The seeds of *Hedera helix* are 70% viable though they require scarification of the hard seed coat for germination; this occurs when bird species eat the berries, remove the pulp, and pass the seeds through their digestive tracts (Cleargeau, 1992; Reichard, 2000).

The berries of *H. helix* are mildly toxic; concentrations of the toxins change as the seeds ripen (Barnea et al., 1993). The mild toxicity of the seeds discourages consumption of too many berries at fruits at once so that few seeds will be deposited one at a time, thereby resulting in a high dispersal rate (Barnea et al., 1993). Also, the residual time of *H. helix* seeds in the stomach of birds is short enough so that seeds are more viable when they are released (Cleargeau, 1992; Barnea et al, 1993).

Hedera helix thrives in dark, moist forest conditions yet also climbs to heights of 270 meters (90 feet) toward the canopy where greater amounts of light are available (Dirr, 1998). The leaves of the adult form of *H. helix* are adapted to higher levels of light than that of the juvenile plants (Laroque, 1998). The leaves on the juvenile plant, however, are more adapted to lower light levels characteristic of the forest floor which allow it to spread and form a dense vegetative cover that can eventually be 6" thick (Devero, 2000). A high level of adaptability to a range of light conditions enables *H. helix* to more successfully colonize the understories of deciduous woodlands with fluctuating levels of light, thereby facilitating its invasiveness (Laroque, 1998; Bauer and Thoni, 1988).

Origin and Geographic Location

Hedera helix is native to Europe, specifically England, Ireland, the Mediterranean region, and northern Europe west to the Causcaus Mountains (Reichard, 2000). In certain areas of its native zone, *Hedera helix* is considered to be very weedy as an aggressive vine that virtually smothers most seedlings, breaks tree branches, and accelerates the death of trees (Wyman, 1994). In 1939, Queen Elizabeth of England set up "Ivy Squads" devoted to stripping trees and walls where the vigorous vine has the potential of growing to be six inches thick (Elliott, 1995). Her goal from this effort was to protect the walls from destruction and prevent the strangling of trees as a result of being smothered by the ivy. Conversely, others argue in the defense of *Hedera helix*, insisting that it benefits a forest community by protecting the woodland floor from frost, supporting trees structurally, and providing a winter food source for ground foraging birds and mammals, such as starlings (*Sturnus vulgaris*) and elk (*Cervus elaphus)* (Fearnley-Whittingstall, 1992). The disagreement of the character and impact of *H. helix* has resulted in considerable debate regarding the destructive nature of ivy in its native habitat (Elliott, 1995).

H. helix is abundant in the alluvial temperate forests of Europe. In eastern France*, H. helix* favors moist, calcareous, eutrophic soils. In the Rhine forest, ivy is most adaptable to highly fragmented or successional forests that have been disturbed by an increase in light (LaRoque, 1998, Tremolieres, 1988; Schnitzler, 1995). *Hedera helix* has also been found to be invasive in floodplain areas where a flood disturbance has occurred (Thomas, 1998). Though it is most commonly seen growing along forest edges in these areas, seed dispersal is not limited to edge habitat. *Hedera helix,* in its juvenile stage, will grow along a forest floor until a gap in the canopy stimulates its growth up host trees (Laroque, 1998; Schnitzler, 1995).

Many of the species in the genus *Hedera* are widely distributed and adaptable. The species *H. helix* is noted to have over 400 variants or cultivars each numbered and accounted for by the American Ivy Society (AIS) and each with slightly different ecological tolerances (Laroque, 1998; American Ivy Society, 1999). The adaptability of this species or "ecological plasticity" results in its popularity as an ornamental among landscapers and horticulturists as it is adept at filling so many rolls and versatile enough to find a niche in almost any space [or] climate (Wellingham-Jones, 1985). Though *Hedera helix* will grow in variable light conditions, it prefers shade, damp soils, and a moist, cool environment (Morisawa, 1999). *H. helix* is limited by extreme moisture due to high water tables (Schnitzer, 1995; Thomas, 1998). Ivy also requires temperate to subtropical climate where it is able to winter over, accommodated by the climate and conditions of the Northwest United States (Reichard, 2000).

Ecological Impacts

A dominance of *Hedera helix* significantly changes the structure of a forest community. It outcompetes many native plant communities of grasses, herbs, and trees, reduces animal feeding habitats, and creates general competition for light, nutrients, and soil (Morisawa, 1999) (Randall et. al., 1996). In an "ivy desert," previous generations of ivy that have died out on the forest floor create a thick blanket of vegetative mass that prevent the regeneration of understory trees, shrubs, and perennial groundcovers. This has an effect at the local scale for ground flora, tree sprouts, and other vegetation (Devero, 2000; Reichard, 2000). By suppressing the regeneration of a diverse forest community, the long-term persistence of a forest is also jeopardized (Reichard, 2000).

As an evergreen vine, *Hedera helix* has an advantage of being able to photosynthesize during the winter months in temperate to sub-tropical climates while deciduous trees are dormant. The increased light that is available to *H. helix* by the absence of deciduous leaves allow it to grow more rapidly up the trunk of the host tree (Thomas, 1980). The evergreen leaves of the plant also inhibit the leaves of the deciduous tree thereby suppressing the growth of the host tree (Reichard, 2000). The increased openness of the tree crown further stimulates the growth of the vine (Reichard, 2000; Thomas, 1980). As *H. helix* grows up a host tree to reach the canopy, the density of the vine as well as the weight of water and ice on the leaves increases the weight of trees. The added weight increases the susceptibilty of tree branches to snap and break during moderate to high wind storms (Devero, 2000).

Devero (2000), the manager of Tryon Creek State Park in Portland, Oregon, stated that *Hedera helix* provides minimal habitat value where it is dominant in a forest. *Hedera helix* provides little coverage for wildlife because the foliage of the canopy vines and on the ground is so dense. *H. helix* also provides very little to almost no subsurface habitat. Devero also speculated that *H. helix* provides little nutrition for the birds and wildlife that consume its berries (2000).

Other major concerns, voiced by M.G. Devero as well as George Krall of the Bureau of Environmental Services in Portland, Oregon, are that an increase in exotics are establishing within ivy deserts (2000). Exotics such as *Clematis vitalba*, another worrisome invasive, are able to compete with *Hedera helix* (Krall, 2000).

Methods of Control

The adaptability of *Hedera helix* to different light and soil conditions as well as its long season of active growth, rapid growth rate, and ability to root along the stem enables the H. helix to become an invasive and undesirable plant in deciduous forest ecosystems (Derr, 1993). In California, Oregon, and Washington, efforts are being made at this time to list it as a noxious weed, though it has not yet happened (Krall, 2000). *H. helix* is recognized as a serious threat to forest longevity and to beginning restoration projects (Laroque, 1998). At this time, restorationists consider site preparation, maintenance, and treating adjacent *H. helix* infestations as necessary factors to prevent an "ivy desert." Methods are being tested at this time to control *Hedera helix* and some have proven effective. However, there is not yet a guaranteed approach (Krall, 2000).

Herbicide application

The waxy cuticle of H. helix allows the plant to have a high resistance to herbicide uptake, thereby, creating great complication during attempts to treat the plant (Morisawa, 1999; Derr, 1993). Studies prove that H. helix is tolerant of preemergence herbicides (Derr, 1993). Multiple applications of postemergence herbicides have proven to be more effective though success varies according to the age or maturity level of the plant (Derr, 1993). Herbicides absorption is greater in newer shoots compared to older, more mature leaves (Derr, 1993). Round-up (glyphosate) applications of 3.0 kg/ha (2.7lb/Acre) on younger plants proved most effective when applied during spring months (Derr, 1993; Reichard, 2000). Application of Round-up (glyphosate) on mature plants retarded growth up to 60% though proved ineffective to completely destroy H. helix even with a higher concentration, a second application, or use of a non-ionic surfactant (Reichard, 2000; Derr, 1993)). Weedar 64 (2,4-d) applied at a rate of 1.1kg/ha (1lb/A) did control H. helix when applied twice (Derr, 1993). In some of the treatment plots, however, ivy was reestablished after two years from advances of adjacent populations that were untreated (Reichard, 2000).

George Krall of the Bureau of Environmental Services in Portland, Oregon (2000) also mentioned the combination technique of using Scythe (pelargonic acid) with Round-up (glyphosate). Scythe is a non-selective herbicide that effectively burns through the leaf cuticle, killing active leaf tissue; it is appropriately named after the Grim Reaper's tool (Thomson, 1997; Gilman, 2000). It is assumed that once the pelargonic acid has been applied, Round-up (glyphosate) will be able to penetrate through the leaf cuticle more successfully and then be absorbed by the plant through transpiration (Krall, 2000). This method is being used in riparian zones, wetlands, and upland forests throughout Portland.

There is speculation that the method of combining pelargonic acid and glyphosate may not be very effective. Round-up (glyphosate), a systemic herbicide, needs active tissues to enable transportation to the roots of a plant for it to be effective (Gilman, 2000). Applying Scythe (pelargonic acid) will destroy leaf tissue resulting in a "reduced effect" of the Round-up (glyphosate). Gilman (2000) suggested researching an alternative method of using Round-up (glyphosate) with a controlled droplet application or electrostatic sprayer. This treatment system would charge the ions of Round-up (glyphosate) so that herbicides will more successfully adhere to stomates on the underside of the plant, avoiding its waxy cuticle and resulting in increased uptake (Gilman,2000). Studies have examined this method and determined that it allows for a more accurate application of herbicides and increased effectiveness (Gebhardt, 1984).

Physical Removal

Persistent cutting of H. helix is a method that is being used in many parks and nature areas within the Northwest United States (Morisawa, 1999). Cutting with a pruners and then pulling the plants from trees and the forest floor may be the most effective technique (Reichard, 2000). Tryon Creek State Park in Portland, Oregon has an official Ivy Removal Day on a monthly basis; volunteers visit the park and cut H. helix from the infested areas (Devero, pers. comm., 2000). In these areas, it is most effective to separate the climbing ivy from its roots by cutting a 3-foot swatch around the host tree (Devero, 2000). H. helix vines begin to die after 2 weeks during drier summer months and within a month during the early spring or early fall (Devero, 2000). If vines are too thick to cut, one can strip back the bark, notch the exposed section, and apply a diluted herbicide such as Round-up (glyphosate) (Morisawa, 1999). Other programs in state parks include "Adopt-a-Plot" where volunteers visit the park and remove ivy in a specific place and then routinely visit for two years to check for new shoots (Devero, 2000).

Other physical removal methods include using an edger/trimmer (manufacture's name: weed eater) to cut the woody stems of *H. helix*, exposing the inner bark. An application of an herbicide such as Round-up (glyphosate) or Garlon (2,4-d) on cut stems and leaves can then effectively penetrate into the plant (Reichard, 2000). In one case where a string trimmer was used in combination with herbicide application, the treatment successfully killed the plants though the area was invaded soon after by adjacent populations of *H. helix* (Reichard, 2000).

Another more drastic method has been to use a blow-torch to repeatedly blast the plant with a hot flame. By repeatedly exposing the plant to high heat, this method is intended to exhaust the *H. helix* of its energy so that it is unable to multiply or produce berries for reproduction (Reichard, 2000). For the physical removal strategies, care must be taken to not disturb the soil which might encourage invasion of other exotics. Immediately after *H. helix* removal, native plants should be planted to replace vegetation and for soil stabilization (Reichard, 2000).

Biological Control

Presently, biological control of ivy has not been attempted. A fungus (Phoma hedericola) has been damaging a population of H. helix in Italy and may be a potential candidate as an introduced biological control (Franco et al., 1992). Extensive research is necessary, however, before considering this as an optional treatment method. It has also been speculated that it will take considerable persuasion to be able to introduce a biological control for H. helix (Krall, 2000). Some argue that introducing a biological control is extremely unlikely due to the importance of Hedera helix as a landscape plant and support it receives from the American Ivy Society (Reichard, 2000).

Discussion of Control Methods

The success of the control methods for *Hedera helix* may be dependent upon the size and scale of the restoration project. For small scale projects, such as a backyard or small forest, herbicide applications and physical removal strategies, described previously, can be most effective with constant monitoring and repetitive application. Large scale projects might also be treated with these methods although they are incredibly time and labor intensive and not always a "satisfactory treatment" (Krall, 2000). For chemical, physical, and biocontrol methods, there are many factors to consider when selecting a proper treatment to make it the least harmful to other species and most efficient in terms of time and energy.

As stated previously, *Hedera helix* invasions are more likely to occur in close proximity to highly developed areas, therefore, close to human habitation. Considering the effect of herbicide application is necessary so that it does not have the potential of threatening human health as well as other species through groundwater or airborne movement. Physical removal strategies are most successful with repetitious treatments to prevent *H. helix* from encroaching from other areas. Physical removal methods may be most successful when used on small scale restoration sites or when there is a large group of committed people to frequently visit and manage the area. A biological control method may be an answer to dealing with the widespread invasion of *Hedera helix*. Before considering the introduction of a biological control method, however, it is important to consider the long-term consequence of introducing a non-native species through research.

Prevention in Restoration Areas

As restoration projects are considered in regions where *Hedera helix* is present, methods for controlling this invasive species need to be considered and further explored. The efforts to protect restoration areas from *Hedera helix* include eliminating the existing plants, reducing the seedbank, and controlling adjacent populations of ivy (Krall, 2000). Constant monitoring is necessary and may require physical cutting and pulling of new shoots of *H. helix* in addition to applying herbicides (Krall, 2000). Considering a biological control may be a method to address the larger landscape.

In the case of *Hedera helix* (English ivy), community education and involvement is necessary. Action at the local government level would enable establishment of restrictions for general use of this plant. *Hedera helix* continues to be sold in nurseries in the Northwest and landscaping companies continue to use *H. helix* in projects. The ability of *H. helix* to spread adventitiously and its dispersal from birds causes concern when the plant is used in close proximity to forest or riparian zones. As urban areas grow and the landscape is fragmented, there is an increased opportunity for *Hedera helix* to invade susceptible ecosystems expanding the "Ivy desert".

Invasive plants, such as *Hedera helix* (English Ivy), are encouraged by human activity when they are used in residential and roadside planting (Laroque, 1998). The human use of English ivy as an ornamental plant has a great potential to alter natural ecosystems (Laroque, 1998). Awareness can be increased through educational programs of *H. helix's* long-term effects that threaten native plant communities, increase other exotic plant populations, and decrease habitat for bird, invertebrate, and wildlife populations.

Those working in Portland, Oregon speculate that because of its "ecological plasticity," the invasion of *H. helix* has the potential to increase its severity in the future, comparable to *Pueraria lobata* (Kudzu) in the southern United States (Krall, 2000; Kimpo, 2000). There is a great need to recognize *Hedera helix* as a species that has serious potential for altering ecosystems for the long-term in the Northwestern United States. Natural ecosystems as well as ornamental landscapes are amenities for humans and a balance must be achieved for both (Laroque, 1998). The repercussions of introduced species that invade indigenous ecosystems is a serious problem that is often overlooked. The global issue of invasive species is a critical and underestimated problem that has the potential to significantly change all remaining "wild" areas, thereby insisting that action begins to restore ecosystems and control exotic species.

Are printing inks toxic?

The following is an exchange of messages from the USDA composting forum, July 18, 2005

I have read that using newspapers that have color pictures is not advisable in compost or in the garden. Does that still hold true? It was the chemicals in the colors that contaminate the soil rather then feed it. We are vegetable farmers and find newspaper an excellent method to control weeds and grasses, especially Bermuda grass, but don't want to put anything in the soil that does not meet organic standards. Thank in advance for sharing your composting wisdom.

Davis Farms
701 Hortman Mill Road
Roberta GA 31078
478-836-4564

Dear USCC folks:

The question raised is fairly common even if the information has been reported previously.

For about 20 years, newspapers have ceased using metal containing pigments/colors in printing. Many have switched to soybean oil as the ink vehicle rather than other solvents which used less easily degraded/metabolized solvents. When I was asked by Organic Gardening to respond to this question so long ago that I have forgotten exactly when it was, I reviewed the literature and eventually talked with the environmental specialist with the Newspaper Publishers Association and from the Washington Post.

The story is interesting because it illustrates some of the major changes which have added environmental and worker protection benefits in the US. First, worker unions and EPA and others sought assurance that workers would be protected from printing methods and materials that could cause risks. Before that time, some color pigments contained metals, and others may have been carcinogenic. At the same time, national advertizing groups wanted to achieve better uniformity of color in ads placed in different newspapers. If the newspapers used different compounds to give particular colors, ads would have different appearance. Thus the industry moved to adopt a uniform set of ink pigments to produce color in normal newspaper pages. The pigments do not contain metals (some older compounds included CdS colors, Pb-chromate yellows, copper blues, etc.). And the pigments now used are not carcinogenic and are reasonably rapidly biodegraded in aerobic environments.

Thus, the color pages in "newspapers" can be used in composting and mulching without concern about the presence of color containing pages. Using such cellulosic carbon sources to help preserve some of the N in feedstocks is one way to limit N emissions and improve the nutrient density of compost products.

Many similar changes toward "green chemistry" have occurred in products that we don't commonly hear about if the product works pretty much the same as before. Some of these changes are recorded by EPA and industry to teach that "Pollution Prevention Pays". One of the best examples I have read about is 3M scotch tape and its change from use of chlorinated hydrocarbon solvents and Pb to make the sticky of their tape. They looked at the increasing cost of using the chlorinated hydrocarbon solvents, cost of disposal, tighter limits on levels in workplace air, etc., and decided they needed to switch to a water based manufacturing method. At the same time, they used to use a Pb catalyst in making the tape (but which did not contaminate the tape), so their "on site" wastewater treatment generated a Pb-rich sludge which had to go to a controlled landfill. And if they switched to the water based manufacturing system, they no longer needed the Pb. Disposal of the Pb-rich sludge was considerably more expensive than the same sludge if it did not have high levels of Pb. So 3M's R&D shop looked into a cost-effective alternative which did not release chlorinated solvents into the air, and did not use persistent toxic metals. I think we all know that their tapes stick just as well today as 30 years ago. But the present products are much more environmentally friendly ("green").

Is there any color printing left which contains metal pigments? Yes, but not newspapers. Expensive printing, and some cheap wrapping paper, and some industrial marking inks still contain metal pigments. The some Cu pigment used in marking wooden shipping containers with a weather resistant label have not yet been replaced as far as I know. But the amount of Cu in the wood is not very high.

But wood containing CCA (chrome-copper-arsenic) preservative has ceased production because of environmental concerns about the disposal of wastes, the common pollution at wood treatment factories, and the potential soil contamination in playgrounds and homes where the lumber was used. For the composting industry, we have a significant need to see that when the CCA wood presently in use is disposed, it does not go to composting sites. The wood as sold contains 3000 ppm arsenic, and similar levels of chromate and copper. If regulatory agencies are seeking no increase in soil As, composts with much higher As than natural soils will eventually be regulated/prohibited. Similarly, painted wood with Pb pigments and some others need to be kept out of compost feedstocks. It is not always easy to identify this wood, so small amounts will enter the municipal solid waste stream. State and local regulations need to prevent disposal of CCA wood, and pentachlorophenol treated wood (rich in dioxins) disposal in compost feedstock streams.

This issue has been especially significant in Florida where regulatory authorities want soils to be no higher in As than background levels before humans impacted the land. Compost sale has been limited by As concentration when the level was pretty much average for composts. Some regulatory effort to limit soil As is unwarranted, but the composting industry needs to stand firm against allowing CCA or pentachlorophenol treated wood from being delivered for composting.

Regards,

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