

# Invasive Plants in Pennsylvania

## Russian and Autumn Olive

*Elaeagnus angustifolia* and *E. umbellata*



James H. Miller, USDA Forest Service  
[www.forestryimages.org](http://www.forestryimages.org)

### Background:

Both Russian and autumn olive were introduced into the United States in the 1800s. Prized for their silvery foliage, hardiness and plentiful berries, these shrubs were planted as ornamentals, for erosion control and wind-breaks, and in wildlife food plots.

### Range:

Russian olive, native to Eurasia, can be found scattered throughout the eastern U.S. and is a problem further west. Native to east Asia, autumn olive has naturalized extensively throughout the eastern half of the United States. Autumn olive is the more common of the two species in Pennsylvania.

### Description:

Russian and autumn olive are large, multi-stemmed shrubs that can reach upwards of 20 feet in height. Their most distinctive characteristic is a dusting of silvery scales covering young stems, leaves, flowers and fruit. Small yellow or white flowers become edible fruits in late summer and fall, which are red in autumn olive and orange in Russian olive.



Leslie J. Mehrhoff, U. of Connecticut  
[www.forestryimages.org](http://www.forestryimages.org)

### Habitat:

Both species are found along streams, fields, roadsides, sparse woodlands, disturbed sites and open areas. Russian olive does particularly well in sandy floodplains. Neither species does well in densely forested areas.

### Biology and Spread:

Both species are spread by birds and other wildlife that feed on the fruit. These shrubs grow rapidly and are able to produce fruit as early as three years of age.

### Ecological Threat:

These shrubs are highly competitive against native species, shading out shorter plants. Their nitrogen-fixing capabilities may adversely affect the nitrogen cycle of native communities that depend on infertile soils. Although Russian and autumn olive provide a plentiful source of berries for birds, their fruits are actually quite low in nutrients. Ecologists have found that bird species richness is higher in riparian areas dominated by native vegetation.



Leslie J. Mehrhoff, U. of Connecticut  
[www.forestryimages.org](http://www.forestryimages.org)

## How to Control this Species:

---

### Physical

Young seedlings can be pulled by hand when the soil is moist enough to ensure complete removal of the root system.

Small saplings can be pulled sufficiently with a weed wrench. Larger individuals can be cut at ground level or girdled.

Cutting is an initial control measure and should be followed by herbicidal treatment to prevent re-sprouting.

### Look-A-Likes:

---

Russian and autumn olive may be confused with invasive bush-honeysuckles (*Lonicera* spp.) or native deciduous hollies (*Ilex* spp.)



The Dow Gardens Archive  
[www.forestryimages.org](http://www.forestryimages.org)

### Chemical

Use a systemic herbicide, such as glyphosate or triclopyr.

Herbicide should be applied immediately to cut stumps to prevent regeneration. It can also be applied to girdle wounds or directly to the lower bark using the basal bark method.

Large thickets, where risk to non-target species is minimal, can be controlled by the foliar spray method.

### References:

---

*Global Invasive Species Database*: <http://www.issg.org/database/species/ecology.asp?fr=1&si=262>

*Plant Conservation Alliance's Alien Plant Working Group*:  
<http://www.nps.gov/plants/alien/fact/elan1.htm>

### For More Information:

---

*DCNR Invasive Species Site*: <http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm>

*DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers*:  
[http://www.dcnr.state.pa.us/forestry/invasivetutorial/russian\\_autumn\\_olive.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/russian_autumn_olive.htm)

## Native Alternatives:

---

Many native shrubs are available for re-vegetation projects. Native plants are the best option for wildlife food plots.



Jerry A. Payne, USDA ARS  
[www.forestryimages.org](http://www.forestryimages.org)



The Dow Gardens Archive  
[www.forestryimages.org](http://www.forestryimages.org)

# Invasive Plants in Pennsylvania

## Callery or Bradford Pear

*Pyrus calleryana*



Photo: Dan Tenaglia, MissouriPlants.com, [www.invasive.org](http://www.invasive.org)

### Background:

Callery pear is native to Asia and was brought to Maryland in 1918 as rootstock for cultivated pears. A non-spiny seedling was selected and named "Bradford." This tree became the second most popular tree in America by the 1980s.

### Range:

Reports of this tree as invasive in southeast Pennsylvania are starting to surface, but further south in Maryland, Virginia and beyond they have been dealing with this issue for much longer. These trees can also be found throughout the south and Midwest.

### Description:

This ornamental, deciduous tree can grow up to 40 feet in height. The shiny green leaves are alternate, simple and two to three inches long. Their margins are wavy with a slightly-toothed margin.



Photo: Chuck Barger, U. of Georgia, [www.invasive.org](http://www.invasive.org)

The overall shape of the tree is often described as tear-dropped or spade-like. The bark is scaly and gray-brown in color. Abundant small, malodorous, white flowers appear in spring before the leaves emerge. Fruits are under half an inch in diameter and green to brown in color.

### Habitat:

Typically found along roads, rights-of-way and old fields where they have escaped from landscape plantings. Callery pears will tolerate a wide range of soil conditions and pollution. It prefers full sun but will tolerate partial shade.

### Biology and Spread:

The "Bradford" variety of pear was supposed to produce sterile fruits, but more recent cultivars were created to resist splitting by wind and snow. These trees were able to cross pollinate and produced viable seeds that are spread by wildlife. It also spreads vegetatively.

### Ecological Threat:

Naturalized callery pears compete with native early successional trees in old fields and hedgerows.



Photo: Britt Slattery, US Fish and Wildlife Service, [www.invasive.org](http://www.invasive.org)

## How to Control this Species:

---

### Manual and Mechanical

Seedlings and shallow-rooted trees can be pulled when soil is moist. Small trees will need to be dug up or pulled out with a Weed Wrench tool to ensure removal of all roots.

If cutting down the tree is not possible, it can be girdled during the spring or summer by cutting through the bark all around the trunk, about six inches above the ground.

### Chemical

Cutting the tree, followed by an immediate application of a triclopyr or glyphosate herbicide to the cut stump, is the most practical means of control.

Herbicide can also be applied to a girdled tree if total removal of the tree is not possible.

## References:

---

Center for Invasive Species and Ecosystem Health:

<http://www.invasive.org/browse/subinfo.cfm?sub=10957>

Invasive Exotic Plant Tutorial for Natural Lands Managers:

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/gallery\\_pear.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/gallery_pear.htm)

U.S. Forest Service Weed of the Week: [http://www.na.fs.fed.us/fhp/invasive\\_plants/weeds/gallery\\_pear.pdf](http://www.na.fs.fed.us/fhp/invasive_plants/weeds/gallery_pear.pdf)

## For More Information:

---

Plant Invaders of Mid-Atlantic Natural Areas, National Park Service:

<http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

Invasive Plants Field and Reference Guide, U.S. Forest Service:

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)

USDA PLANTS Database: <http://plants.usda.gov>

## Native Alternatives:

---

There are a variety of native ornamental trees that provide food for wildlife or beauty in landscapes, such as:

### **Allegheny Serviceberry** (*Amelanchier laevis*)



Photo: Dow Gardens, [www.forestryimages.org](http://www.forestryimages.org)

### **White Fringetree** (*Chionanthus virginicus*)

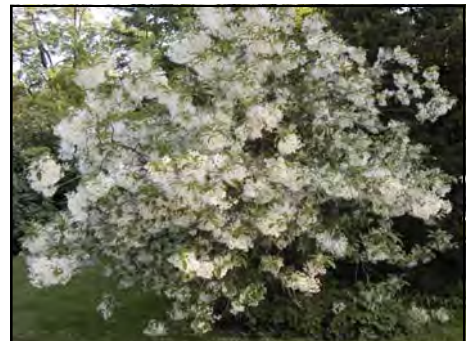


Photo: Dow Gardens, [www.forestryimages.org](http://www.forestryimages.org)

### **Sourwood** (*Oxydendrum arboretum*)



Photo: Richard Webb, [www.forestryimages.org](http://www.forestryimages.org)

# Invasive Plants in Pennsylvania

## Canada Thistle

*Cirsium arvense*



Steve Dewey, Utah State University  
[www.forestryimages.org](http://www.forestryimages.org)

### Description:

Canada thistle is an erect herbaceous perennial with an extensive creeping rootstock. Its leaves are irregularly lobed with spiny, toothed margins. Rose-purple or sometimes white flower heads appear in terminal clusters from June through October. The small seeds have feathery plumes.

### Biology and Spread:

Canada thistle produces an abundance of feathery seeds, which are quickly dispersed in the wind. The seeds can remain viable in the soil for up to 20 years or more. The fibrous taproot is capable of sending out lateral roots, which sprout shoots at frequent intervals.

### Background:

Canada thistle was probably introduced into the United States by accident in the early 1600s. By 1954, it had been declared a noxious weed in 43 states. It is considered one of the most tenacious and economically important agricultural weeds and is becoming increasingly recognized as a problem in natural areas.



Steve Dewey, Utah State University  
[www.forestryimages.org](http://www.forestryimages.org)

### Ecological Threat:

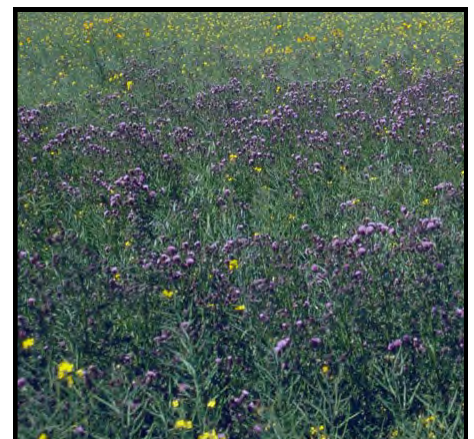
Once established in an area, Canada thistle crowds out and replaces native plants, changing the structure and species composition of plant communities and reducing diversity. This thistle outcompetes native plants through shading, competition for soil resources and possibly through the release of toxic allelochemicals.

### Range:

Despite its name, Canada thistle is native to temperate regions of Eurasia. In North America, it is distributed throughout Canada and the northern United States, from northern California to Maine and south to Virginia.

### Habitat:

This plant does best in open and disturbed upland areas, but also invades wet places with fluctuating water levels, such as stream bank meadows. It is commonly found in barrens, glades, meadows, prairies, fields, pastures and waste places.



Alec McClay, McClay Ecoscience  
[www.forestryimages.org](http://www.forestryimages.org)

## How to Control this Species:

---

Because Canada thistle is a perennial and spreads primarily by its root system, the entire plant must be destroyed for effective control.

Control efforts may be more successful when Canada thistle is under environmental stress, such as during droughts and floods, or after a very severe winter.

Canada thistle is stubborn and difficult to remove. Management practices that limit soil disturbance and encourage diverse native plant communities will help prevent establishment of this species.

## Look-A-Likes:

---

Native species of thistle (*Cirsium* sp.), some of which are rare, could be confused with Canada thistle. Before control is attempted, the thistle species in question should be accurately identified.



Field Thistle

Chris Evans, River to River CWMA  
[www.forestryimages.org](http://www.forestryimages.org)

## Physical

For light infestations, black plastic sheeting can be used to smother this thistle. Repeated and frequent pulling or hand-cutting will eventually starve underground stems. This should be performed at least three times each season.

Mowing does not kill Canada thistle unless repeated monthly for up to four years. This method is not recommended for natural areas.

Late spring burns, between May and June, are detrimental to this invasive.

## Chemical

In areas interspersed with desirable native plants, targeted application of a systemic herbicide, such as glyphosate, works well. For extensive infestations in disturbed areas, a broad application may be more effective. Repeated applications are usually necessary in order to exhaust the seed bank.

Herbicide treatment is best done in late summer or fall when plants are in the rosette stage.

Varying the type of herbicide used will prevent clone colonies from becoming resistant.

## References:

---

*Center for Invasive Species and Ecosystem Health:*

<http://www.invasive.org/browse/subinfo.cfm?sub=2792>

*Plant Conservation Alliance's Alien Plant Working Group:*

<http://www.nps.gov/plants/alien/fact/ciar1.htm>

## For More Information:

---

*DCNR Invasive Species Site:* <http://www.dcnr.state.pa.us/conservation/science/invasivespecies/index.htm>

*DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers:*  
[http://www.dcnr.state.pa.us/forestry/invasivetutorial/canada\\_thistle.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/canada_thistle.htm)

# Invasive Plants in Pennsylvania

## Common Buckthorn

*Rhamnus cathartica*



John M. Randall, The Nature Conservancy  
[www.forestryimages.org](http://www.forestryimages.org)

### Background:

Common buckthorn was introduced into North America as an ornamental shrub in the mid 1800s. Prized for its hardiness and ability to thrive in a variety of soil and light conditions, common buckthorn was planted extensively for use in hedges, farm shelter belts and wildlife habitat. It is no longer available for purchase.

### Range:

Native to Eurasia, common buckthorn can now be found throughout the Northeast and North-central regions of the United States.

### Description:

Common buckthorn is a dioecious shrub or small tree growing up to 22 feet high. Twigs are often tipped with a spine. Cutting the stems reveals distinctive yellow sapwood and pink to orange heartwood. The glossy, dark green leaves remain late into fall, and are broadly oval with up-curved veins and toothed margins. In spring, dense clusters of yellow-green flowers emerge from stems near the bases of leaf stalks. Small black fruits appear in fall.



Paul Wray, Iowa State University  
[www.forestryimages.org](http://www.forestryimages.org)

### Habitat:

Common buckthorn prefers light shade, but is tolerant of many conditions, including full shade. It often invades upland sites, such as open oak woodlands, tree fall gaps and woods edges. It may also be found in prairies and open fields.

### Biology and Spread:

The plentiful fruit, which produce a laxative effect, are eaten by birds and small mammals, allowing for long-range dispersal. Most of the fruit falls directly beneath the parent, creating a dense understory of seedlings characteristic of buckthorn stands.

### Ecological Threat:

Common buckthorn forms dense, even-aged thickets, which crowd out native shrubs and herbs and prevent woody plant regeneration. When open woodlands, savannas and prairies are invaded, fire is suppressed, changing the disturbance regimes of these ecosystems. Invasive shrubs like common buckthorn are population sinks for nesting songbirds due to higher predation rates. Common buckthorn is also an alternate host of oat crown rust, which lowers oat yield and quality.



John M. Randall, The Nature Conservancy  
[www.forestryimages.org](http://www.forestryimages.org)

## How to Control this Species:

---

### Physical

Seedlings less than three feet tall can usually be pulled by hand. Saplings can be removed with a weed wrench, but individuals with a large base diameter are best dealt with by cutting. The resulting stump should be dug out or treated with herbicide. Girdling is also effective.

If enough fuel is present, prescribed burns have a large impact on seedlings and the current year's seeds.

Be sure to remove and dispose of any ripened fruit from the restoration site.

### Look-A-Likes:

---

Common buckthorn may be confused with native buckthorns (*Rhamnus* spp.) and cherries (*Prunus* spp.).



Rob Routledge, Sault College  
[www.forestryimages.org](http://www.forestryimages.org)

### Chemical

Herbicide applications may be done early in the season just after the trees have leafed out, but those conducted in the fall or early winter appear to be most effective.

Use a systemic herbicide, such as glyphosate, in order to destroy the root system.

Brush applications on recently cut stumps, in addition to the basal bark method, often achieve good results.



John M. Randall, The Nature Conservancy  
[www.forestryimages.org](http://www.forestryimages.org)

### References:

---

*Plant Conservation Alliance's Alien Plant Working Group:*  
<http://www.nps.gov/plants/alien/fact/rhca1.htm>

*University of Minnesota:*  
<http://conservancy.umn.edu/bitstream/60097/1/6.5.Gale.pdf>

### For More Information:

---

*DCNR Invasive Species Site:* <http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm>

*DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers:*  
[http://www.dcnr.state.pa.us/forestry/invasivetutorial/common\\_glossy\\_buckthorn.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/common_glossy_buckthorn.htm)



# Invasive Plants in Pennsylvania

## Floating Primrose-willow

*Ludwigia peploides ssp. glabrescens*



Photo: Joan Avise, Natural History of Orange Co., CA, U. of California, Irving

### Range:

Floating primrose-willow is indigenous to the southeastern U.S., ranging from South Carolina out west to Kansas and as far south as Texas and Louisiana. In Pennsylvania it can be found in scattered locations in the southwest and southeast.

### Biology and Spread:

Reproduction occurs mainly through stem fragmentation. Seeds have been proven to be viable in a laboratory setting but no extensive research has been conducted as to the role of sexual reproduction in *L. peploides ssp. glabrescens* population establishment.

### Description:

This is a perennial aquatic plant that is found rooted in the silty substrate of slow-moving bodies of water and has stems and leaves that float on the water surface. Its leaves are alternate, lanceolate-oblong and pinnately veined. Flowers have five bright yellow petals and 10 stamens. The fruit is inferior and elongate.



Photo: KENPEI© [Wikipedia.org](https://www.wikipedia.org)

### Ecological Threat:

Since this plant is not native to Pennsylvania it lacks natural predators that prevent it from getting out of control. Under the right conditions – warm water, plentiful nutrients and lots of sunlight – this species can form a vegetative mat on the water that limits solar penetration into the water. As a result, native submergent plants become starved of sunlight and die, which can harm aquatic life by lowering the amount of dissolved oxygen within the water.

### Habitat:

This invasive plant grows rooted in fine sediments. The stems can float on the water surface and bend upward, or they can be erect and emerge out of the water. Dense mats can form in warm, shallow waters and become a nuisance.



Photo: John Randall, TNC, [www.invasive.org](https://www.invasive.org)

## How to Control this Species:

---

Physical removal of floating primrose-willow is currently the most preferred control method since chemicals can impact desirable native plants.

The use of *Lysathia ludoviciana* (water-primrose flea beetle) has shown potential as a biological control agent for the closely-related *Ludwigia grandiflora* in the southeastern U.S., however more research is needed to discover a control agent that is species-specific to floating primrose-willow.

## Look-A-Likes:

---

*Decodon verticillatus* (water-willow/ swamp loosestrife) is a native emergent perennial that has a similar form as *L. peploides* ssp. *glabrescens* but lacks the floating-stem growth habit, has purple axillary flowers and opposite leaves.



Photo: Robert H. Mohlenbrock, USDA NRCS, <http://plants.usda.gov>

## Native Alternatives:

---

*Caltha palustris* (marsh marigold) also has five-petaled flowers but is distinguished from *Ludwigia peploides* by the lack of sepals and a rosette of ovate leaves with cordate leaf bases. Marsh marigold grows in shallow, slow-moving (if not stagnant) water, much like *L. peploides*, but marsh marigold is a desirable native alternative (see photo below).



Photo: Jasper33© Wikipedia.org

## References:

---

*Plants of Orange County, CA*: <http://nathistoc.bio.uci.edu/plants/Onagraceae/Ludwigia%20peploides.htm>

*Peconic Estuary Program*: [http://peconice.ipower.com/pdf/SCPE\\_v2.pdf](http://peconice.ipower.com/pdf/SCPE_v2.pdf)

*University of Michigan Herbarium*: <http://michiganflora.net/species.aspx?id=1659>

*Center for Invasive Species and Ecosystem Health*: [www.invasive.org](http://www.invasive.org)

## For More Information:

---

*DCNR Invasive Plants Site*: <http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm>

*Plant Invaders of Mid-Atlantic Natural Areas, National Park Service*: <http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

# Invasive Plants in Pennsylvania

## Garlic Mustard

*Alliaria petiolata*



Chris Evans, River to River CWMA

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

### Background:

Garlic mustard was likely introduced into the United States by early European settlers for culinary or medicinal purposes. It was first recorded in Long Island, New York in 1868.



Chris Evans, River to River CWMA

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

### Range:

Native to Europe, garlic mustard now ranges from eastern Canada, south to Georgia and as far west as Oregon.

### Description:

Garlic mustard is a cool season biennial herb with triangular to heart-shaped leaves. Leaves give off an odor of garlic when crushed. First-year plants appear as a rosette of leaves that remain green through winter, maturing the following spring. Button-like clusters of white flowers give way to erect, slender pods by May. Dead stalks of dry, brown seedpods hold viable seed throughout the summer.



Chris Evans, River to River CWMA

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

### Habitat:

This invasive is frequently found in moist, shaded soil of river floodplains, forests, edges and openings, especially in disturbed areas. Garlic mustard is associated with calcareous soils and does not tolerate high acidity.

### Biology and Spread:

Garlic mustard plants develop rapidly, each individual producing thousands of seeds that scatter nearby. Because white-tailed deer find garlic mustard distasteful, they further its expansion by eliminating native competition, as well as by exposing the soil and seedbed through trampling.

### Ecological Threat:

Highly shade-tolerant, garlic mustard is capable of invading high-quality, mature forests. To the detriment of spring ephemeral wildflowers, garlic mustard quickly forms monocultures by monopolizing resources. Its allelopathic compounds inhibit seed germination of other species.

Toothwort (*Dentaria* sp.), the host plant of the rare West Virginia white butterfly (*Pieris virginianensis*), is one of the spring ephemerals outcompeted by garlic mustard. The butterfly is drawn to lay its eggs on garlic mustard, a fatal mistake for its offspring. Garlic mustard may also disrupt the mutualistic relationship between native trees and mycorrhizal fungi.

## How to Control this Species:

---

### Physical

Because garlic mustard seeds can remain viable in the soil for five years or more, effective management is a long-term commitment. The goal of management is to prevent further seed production and to nip pioneering colonies in the bud.

For small infestations, hand-pulling is extremely effective. Larger infestations may be controlled by cutting. This should be done when the plant is in flower. All plant material should be removed from the site following treatment, since seeds can still develop on cut stems.

### Chemical

For heavy infestations, where the risk to non-target species is minimal, the systemic herbicide glyphosate may be useful.

Herbicide can be applied at any time of the year, including winter (to kill overwintering rosettes) as long as the temperature remains above 50° Fahrenheit, and rain is not expected for at least 8 hours.

Chemical control is best done in late fall when most native plants are dormant.

### Prevention

Infestations may be prevented by monitoring and removing pioneering plants. Disturbances, such as foot traffic, overgrazing and erosion, should be minimized.

A regular burning regime in fire-adapted oak woodlands can also prevent infestations.



Dave Cappaert, Michigan State University  
[www.forestryimages.org](http://www.forestryimages.org)

## Look-A-Likes:

---

Many native white-flowered plants occur alongside garlic mustard, and may be mistaken for it. These include toothworts, sweet cicely (*Osmorhiza claytonia*) and early saxifrage (*Saxifraga virginica*).



Toothwort

Wendy VanDyk Evans  
[www.forestryimages.org](http://www.forestryimages.org)

## References:

---

*Center for Invasive Species and Ecosystem Health:*  
<http://www.invasive.org/browse/subinfo.cfm?sub=3005>

*Plant Conservation Alliance's Alien Plant Working Group:*  
<http://www.nps.gov/plants/alien/fact/alpe1.htm>

## For More Information:

---

*DCNR Invasive Species Site:* <http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm>

*DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers:*  
[http://www.dcnr.state.pa.us/forestry/invasivetutorial/garlic\\_mustard.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/garlic_mustard.htm)

# Invasive Plants in Pennsylvania

## Japanese and Giant Knotweed

*Fallopia japonica* Sieb. & Zucc. and  
*Fallopia sachalinensis* F. Schmidt ex Maxim.



Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.forestryimages.org](http://www.forestryimages.org)

### Background:

Both species of knotweed were introduced into North America for ornamental use and for forage and erosion control in the late 1800s.

### Range:

Both Japanese and giant knotweed come from Japan. They can be found throughout much of the United States and Canada, as well as Europe.

### Habitat:

These plants are found at sites with varying combinations of sun, moist soil and human disturbance, such as stream and river banks, wet meadows, roadsides, railroad and utility rights-of-way, vacant lots and waste places.

### Description:

Both are annual, herbaceous perennials with erect, hollow stems that are light green, smooth, jointed and swollen at the nodes (resembling bamboo).

Early in the season, new shoots can grow three to four inches per day. Knotweed grows three to 12 feet tall. The two species are known to hybridize, so ID can sometimes be difficult. The shape of the leaf base is the best characteristic – Japanese knotweed leaves are squared-off, giant knotweed's are heart-shaped.

The plant's greenish white flowers are functionally unisexual, grow approximately four inches in length and appear from August to October. The fruits are papery and contain a three-sided shiny, brown seed.



Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.forestryimages.org](http://www.forestryimages.org)

### Biology and Spread:

Knotweeds spread primarily by rhizomes. The rhizomes can be dispersed by natural causes, such as flooding and erosion, and also by man-made disturbances to the soil. Cut or broken stems will also root if left on moist soil or put directly into water. It produces only small amounts of viable seed that are dispersed mainly by gravity, wind and water.



Photo: Tom Heutte, USDA FS, [www.invasive.org](http://www.invasive.org)

### Ecological Threat:

Knotweeds are capable of quickly forming dense stands where they can crowd out native vegetation. Thickets can clog small waterways and displace streamside vegetation, increasing bank erosion and lowering the quality of riparian habitat for fish and wildlife. Once established, these stands are very difficult to eradicate.

## How to Control this Species:

---

The key to successful knotweed management is controlling the rhizomes.

### Manual and Mechanical

Mechanical methods alone are largely ineffective. It may be possible to grub or pull single plants if they are not well established and soil conditions allow for complete rhizome removal. Small portions of the rhizome system not removed have the potential to resprout.

The herbaceous stems of knotweed can be cut or mowed quite easily. Cutting alone will not control the plant but when performed after June 1 will significantly reduce the height of the regrowth.

### Chemical

Several herbicides, such as glyphosate, are effective in controlling this species. If the plants grow in a wetland, be sure to use an aquatic approved herbicide. Check label directions and state requirements.

Foliar herbicide applications made after July 1 and before the first killing frost are most effective at injuring the rhizomes. During this time of year carbohydrates produced in the leaves are moved to the rhizomes for growth and storage. Foliar applied herbicides move through the plant with the carbohydrates.

## References:

---

USDA Forest Service Invasive Plants website:

[http://www.na.fs.fed.us/fhp/invasive\\_plants](http://www.na.fs.fed.us/fhp/invasive_plants)

Invasive Exotic Plant Tutorial for Natural Lands Managers:

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/japanese\\_knotweed.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/japanese_knotweed.htm)

## For More Information:

---

*Plant Invaders of Mid-Atlantic Natural Areas, National Park Service:* <http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

*Invasive Plants Field and Reference Guide, U.S. Forest Service:*

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)

## Native Alternatives:

---

Once knotweed is removed, you must plant other vegetation to prevent re-establishment of knotweed. The following are useful native plants:

**Shrubs** - winterberry holly (*Ilex verticillata*), spicebush (*Lindera benzoin*), buttonbush (*Cephalanthus occidentalis*), silky willow (*Salix sericea*), pussy willow (*Salix discolor*)



Buttonbush

Photo: John Byrd, Mississippi State U., [www.forestryimages.org](http://www.forestryimages.org)

**Herbaceous species** - wild-rye (*Elymus villosus*), big bluestem (*Andropogon gerardii*), switch grass (*Panicum virgatum*), wingstem (*Verbesina alternifolia*), joe-pye-weed (*Eupatorium fistulosum*)



Photo: Jessica Sprajcar, DCNR

# Invasive Plants in Pennsylvania

## Japanese Stilt Grass

*Microstegium vimineum*



James H. Miller, USDA Forest Service  
[www.forestryimages.org](http://www.forestryimages.org)

### Background:

Japanese stilt grass was first documented in Tennessee in 1919. Its introduction into the United States was accidental, likely a result of its use as a packing material for porcelain.

### Range:

Native to Asia, this successful invasive has colonized most of the eastern United States, as far west as Texas.

### Description:

Japanese stilt grass is an annual that typically grows one to three feet in height. Despite its branching, sprawling, mat-like manner, it resembles a small, delicate bamboo. Leaves are narrow and lance-shaped with a distinctive, pale, silvery stripe of reflective hairs on the upper surface. Flower spikes appear in September.



James H. Miller & Ted Bodner, SWSS  
[www.forestryimages.org](http://www.forestryimages.org)

### Habitat:

Japanese stilt grass occurs in a variety of habitats, including moist ground of open woods, floodplain forests, wetlands, uplands, fields, thickets, roadsides, and ditches. It readily invades areas subject to regular disturbance. Stilt grass appears to prefer moist, acidic to neutral soils that are high in nitrogen.

### Biology and Spread:

Stilt grass reproduces exclusively by seed. One plant may produce 100 to 1,000 seeds that typically fall close to the parent plant. Seeds may be carried by water during heavy rains or move about in contaminated hay, soil or mud stuck in footwear. Stilt grass seeds remain viable in the soil for five or more years and germinate readily.

### Ecological Threat:

When Japanese stilt grass invades a site, it can quickly crowd out native plant species. Invasions can also change soil nutrient cycling processes, inhibit tree survival and growth, and reduce light availability. After it dies back in late fall, it forms a thick layer of smothering thatch that is slow to decompose. Because stilt grass is relatively unpalatable, it may encourage heavier deer browsing on native plant species.



Chris Evans, River to River CWMA  
[www.forestryimages.org](http://www.forestryimages.org)

## How to Control this Species:

---

### Physical

Japanese stilt grass is quite shallow-rooted and can be easily pulled by hand, especially when the soil is moist. Pulling is easiest in late summer when plants are mature. Stilt grass can also be mowed. Follow up monitoring and treatment will be necessary for years.

Hand pulling and mowing should be done in late summer when the plants are just about to flower. Performing these activities earlier in the summer months encourages flowering and early seed dispersal.

### Chemical

For extensive infestations, a systemic herbicide can be used quite effectively. Using an herbicide leaves the plants and soil in place, minimizing the likelihood of additional germination of stilt grass seed.

Grass-specific herbicides, such as quizalofop, limit damage to native plants.

Be careful when treating stilt grass in wetland sites. Make sure you use an herbicide suitable for wetlands.



Chris Evans, River to River CWMA  
[www.forestryimages.org](http://www.forestryimages.org)

### Look-A-Likes:

---

The native perennial Virginia cutgrass (*Leersia virginica*) is quite similar. Japanese stilt grass may also be confused with some smartweeds (*Persicaria* sp.).



Leslie Mehrhoff, U. of Connecticut  
[www.discoverlife.org](http://www.discoverlife.org)

### References:

---

Plant Conservation Alliance's Alien Plant Working Group:  
<http://www.nps.gov/plants/alien/fact/miv11.htm>

Purdue University Cooperative Extension Service: <http://www.btny.purdue.edu/weedscience/2011/Microstegium-01.pdf>

Wisconsin Department of Natural Resources:  
<http://dnr.wi.gov/invasives/fact/japanstgrass.htm>

### For More Information:

---

DCNR Invasive Species Site: <http://www.dcnr.state.pa.us/conservation/science/invasivespecies/index.htm>

DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers:  
[http://www.dcnr.state.pa.us/forestry/invasivetutorial/Japanese\\_stiltgrass.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/Japanese_stiltgrass.htm)



# Invasive Plants in Pennsylvania

## Japanese and European Barberry

*Berberis thunbergii* and *B. vulgaris*



Leslie J. Mehrhoff, U. of Connecticut  
[www.forestryimages.org](http://www.forestryimages.org)

### Background:

Japanese barberry was introduced into the United States as an ornamental plant in 1875. It was promoted as a substitute for European barberry, the latter which was found to be a host for the black stem grain rust. European barberry was originally planted by settlers for hedge-rows, dye and jam-making. Japanese barberry is still widely planted for landscaping and hedges.

### Range:

Japanese and European barberry, native to Japan and Europe respectively, can now be found throughout the northern half of the U.S., particularly the Northeast.

### Description:

Both species are dense, spiny shrubs with oval leaves, which are serrate in European barberry and often red-tinged in Japanese barberry. The spines of European barberry are three-pronged. In mid-spring to early summer, drooping clusters of pale yellow flowers develop, turning into bright red berries.



Leslie J. Mehrhoff, U. of Connecticut  
[www.forestryimages.org](http://www.forestryimages.org)

### Habitat:

Barberry is shade tolerant, drought resistant and adaptable to a variety of wooded habitats, wetlands and disturbed areas. Japanese barberry is a more pressing problem than its European relative.

### Biology and Spread:

Barberry produces a large number of seeds that have a high germination rate. Seeds are dispersed by birds and small mammals, which feed on the berries. Barberry can spread vegetatively by rooting from branches touching the ground.

### Ecological Threat:

Barberry forms dense stands in natural habitats including forests, open woodlands, wetlands and meadows. Once established, it displaces native plants and reduces wildlife habitat and forage, increasing pressure on natives by white-tailed deer. It has been found to alter the pH and biological activity of soil. Barberry is also a human health hazard, not only because it has sharp spines, but also because it acts as a nursery for deer ticks, which can transmit Lyme disease.



Leslie J. Mehrhoff, U. of Connecticut  
[www.forestryimages.org](http://www.forestryimages.org)

## How to Control this Species:

---

### Physical

Barberry is easy to identify in spring because it is one of the first shrubs to leaf out.

Using thick gloves, small plants can be pulled by hand, while larger plants should be dug up. Be sure to remove the entire root system and to bag and dispose of any plant material, including fallen fruits.

Mowing or cutting is not advisable except to make removal easier.

This plant is sensitive to fire; prescribed burns and weed torches are good options.

### Look-A-Likes:

---

American barberry (*Berberis canadensis*), an uncommon plant of open hillside slopes thought to be extirpated from Pennsylvania, could be mistaken for an invasive barberry.



Will Cook, Duke University  
[www.duke.edu](http://www.duke.edu)

### Chemical

Systemic herbicides, such as glyphosate and triclopyr, are effective in managing barberry.

Herbicide can be applied as a basal bark or cut stump application. Late summer during fruiting may be the best time to apply herbicide, but early spring applications may avoid non-target impacts.

Large thickets of barberry can be controlled with foliar spray applications. Triclopyr only targets broadleaf species, but glyphosate is non-selective.

## Native Alternatives:

---

Many attractive native shrubs are available for purchase:



Julie Makin

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



Sally & Andy Wasowski

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



James H. Miller & Ted Bodner, SWSS

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

## References:

---

Global Invasive Species Database: <http://www.issg.org/database/species/ecology.asp?si=592&fr=1&sts=>

Wisconsin Department of Natural Resources:  
<http://dnr.wi.gov/invasives/fact/barberry.htm>

## For More Information:

---

DCNR Invasive Species Site: <http://www.dcnr.state.pa.us/conservation/science/invasivespecies/index.htm>

DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers:  
[http://www.dcnr.state.pa.us/forestry/invasivetutorial/japanese\\_euro\\_barberry.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/japanese_euro_barberry.htm)

# Invasive Plants in Pennsylvania

## Japanese Honeysuckle

*Lonicera japonica* Thunb.



Photo: Chuck Bargeron, U. of Georgia, [www.invasive.org](http://www.invasive.org)

### Description:

This evergreen to semi-evergreen woody vine can grow up to 80 feet in length. It has opposite leaves that are typically oval in shape, although the leaves close to the ground may be lobed (see photo below). Fragrant white to yellow flowers appear from the leaf axils between April and July. Small, shiny black fruits develop in the fall.

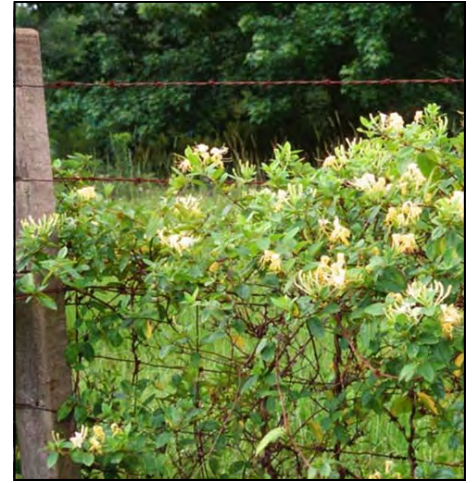


Photo: Charles Bryson, USDA, [www.invasive.org](http://www.invasive.org)

### Background:

Also known as Chinese honeysuckle, this Asian plant was first introduced into Long Island, NY in 1806. It has been planted as an ornamental, for wildlife habitat and for erosion control, especially on farms.

### Range:

Japanese honeysuckle is very common on the eastern third of the U.S. from Southern Maine to Florida. Isolated patches can also be found from Texas west to California, in Washington state and Hawaii.



Photo: James Miller & Ted Bodner, Southern Weed Science Society, [www.invasive.org](http://www.invasive.org)

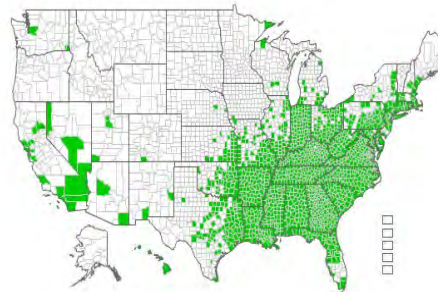


Image courtesy of [EDDMapS](http://EDDMapS)

### Habitat:

This vine can be found in a variety of habitats including forests, wetlands and disturbed habitats like farm fence rows, roadsides and rights-of-way.

### Biology and Spread:

This vine spreads both vegetatively through runners and roots as well as by seeds within the black fruits. Birds and other wildlife readily consume the fruits.

### Ecological Threat:

The vines can girdle and kill small saplings and form dense mats in tree canopies, shading native vegetation below.

## How to Control this Species:

---

### Manual and Mechanical

For small patches, repeated pulling of entire vine and root system may be effective, especially when the soil is moist. Mowing is NOT recommended, as it stimulates growth and leads to denser mats of vegetation.

Prescribed burning will remove the above-ground growth but will not kill the rhizomes, leading to re-sprouts. Grazing by goats has been used in the past but has a similar effect as mowing does, increasing the chance of root sprouts.

### Chemical

There are several systemic herbicides that will work on Japanese honeysuckle including glyphosate and triclopyr. Apply a two percent glyphosate or triclopyr and water mix to the vine's leaves from spring through fall (fall is best). A 25 percent solution of herbicide and water can be applied using the cut stump method.

Regardless of the chosen control method, repeated monitoring and sprout removal may be necessary.

## References:

---

*Center for Invasive Species and Ecosystem Health:*

<http://www.invasive.org/browse/subinfo.cfm?sub=3039>

*Invasive Exotic Plant Tutorial for Natural Lands Managers:*

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/Japanese\\_honeysuckle.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/Japanese_honeysuckle.htm)

*USDA Forest Service Weed of the Week:*

[http://www.na.fs.fed.us/fhp/invasive\\_plants/weeds/japanese\\_honeysuckle.pdf](http://www.na.fs.fed.us/fhp/invasive_plants/weeds/japanese_honeysuckle.pdf)

## For More Information:

---

*Plant Invaders of Mid-Atlantic Natural Areas, National Park Service:*

<http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

*Invasive Plants Field and Reference Guide, U.S. Forest Service:*

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)

## Native Alternatives:

---

Many native vines can be used in place of Japanese honeysuckle:

### **Virginia creeper** (*Parthenocissus quinquefolia*)



Photo: Theodore Webster, USDA,  
[www.forestryimages.org](http://www.forestryimages.org)

### **Cross vine** (*Bignonia capreolata*)



Photo: Rebekah Wallace, U. of Georgia,  
[www.forestryimages.org](http://www.forestryimages.org)

### **Trumpet creeper** (*Campsis radicans*)



Photo: Charles Bryson, USDA,  
[www.forestryimages.org](http://www.forestryimages.org)

# Invasive Plants in Pennsylvania

## Kudzu

*Pueraria montana var. lobata*



Photo: Greg Czarnecki, DCNR

### Background:

Kudzu, referred to as “the vine that ate the South,” is a native to Asia. It was first introduced into the U.S. in 1876 at the Philadelphia Centennial Exposition. It was widely planted throughout the eastern U.S. for erosion control and livestock feed.

### Range:

Found as far north as Massachusetts and throughout the east coast over to the Midwest. Kudzu can also be found in Hawaii and parts of Oregon.

### Description:

Kudzu is a climbing, deciduous vine that can reach lengths of over 100 feet. Leaves are alternate, compound (with three lobed leaflets), hairy and up to five inches in length. Clusters of purple, fragrant flowers appear in midsummer. Fruits are green to brown, hairy, flat seed pods that are roughly three inches in length and contain three to 10 seeds.

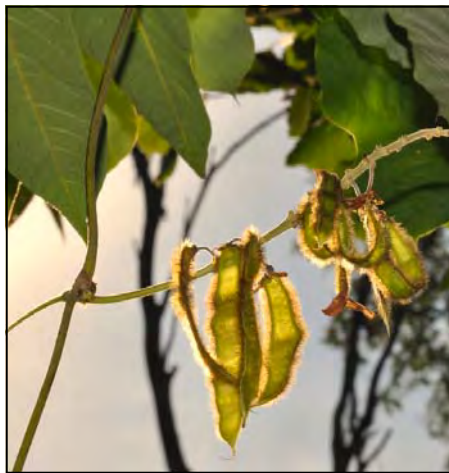


Photo: Greg Czarnecki, DCNR

### Habitat:

This vine prefers open, disturbed areas like roadsides, rights-of-way, forest edges and old fields. In Pennsylvania most of the sites are old homesteads or industrial sites that were planted with kudzu to prevent erosion.

### Biology and Spread:

Kudzu can grow up to a foot a day. Its spread is limited to vegetative means: roots and rhizomes. It is unknown whether the seeds are viable this far north. Kudzu tap roots are substantial in size, some weighing as much as 400 pounds, making their removal difficult. As many as 30 vines may grow from one root crown.

### Ecological Threat:

This vine kills other plants by smothering them, girdling woody stems and trunks, and uprooting entire trees by the force of its weight.

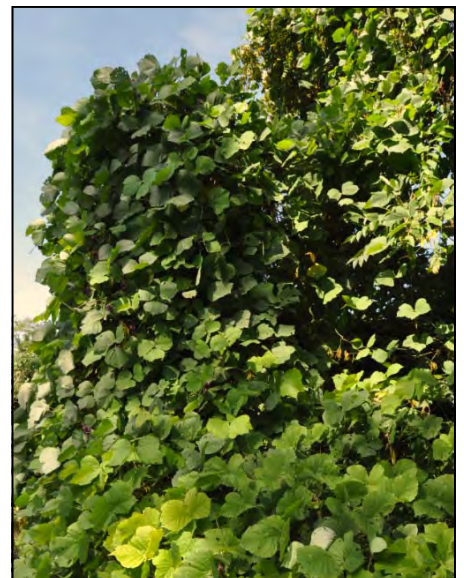


Photo: Greg Czarnecki, DCNR

## How to Control this Species:

---

For successful long-term control of this vine, the extensive root system must be destroyed, which will take many years. Any surviving root crowns can lead to reinfestation.

### Manual and Mechanical

Repeated cutting every month of the growing season may be effective at reducing the stored energy in the roots, but it can take up to 10 years in well-established stands. Cut vines can be fed to livestock or bagged and sent to a landfill. Root removal is not recommended as they may be up to 12 feet deep under ground.

### Chemical

When vines have grown into trees, the cut stump method is suggested. Cut the stem two inches above the ground and immediately apply a 25 percent glyphosate or triclopyr and water solution to the stem.

For large populations of kudzu the foliar spray method is recommended. Apply either a two percent solution of glyphosate or triclopyr and water solution to the leaves. A 0.5 percent non-ionic surfactant added to the herbicide is recommended to help penetrate the leaf surface. Air temperatures should be above 65 degrees F.

## If You Find This Plant:

---

Kudzu is on the Pennsylvania Noxious Weed Control List. It is illegal to sell, plant or transport this species. If you believe that you have found a new population of this plant, please contact Melissa Bravo, PA Dept. of Agriculture, at 717-787-7204.



Photo: Greg Czarnecki, DCNR

## References:

---

*Center for Invasive Species and Ecosystem Health:*

<http://www.invasive.org/browse/subinfo.cfm?sub=2425>

*Invasive Exotic Plant Tutorial for Natural Lands Managers:*

<http://www.dcnr.state.pa.us/forestry/invasivetutorial/kudzu.htm>

## For More Information:

---

To learn more about invasive plants in Pennsylvania and the northeast, here are some useful resources:

*Plant Invaders of Mid-Atlantic Natural Areas, National Park Service:*

<http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

*Invasive Plants Field and Reference Guide, U.S. Forest Service:*

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)



# Invasive Plants in Pennsylvania

## Mile-a-Minute

*Persicaria perfoliata*



Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.invasive.org](http://www.invasive.org)

### Background:

Also known as devil's tear-thumb, mile-a-minute has been introduced into the U.S. from the Philippines several times between the late 1800s and the 1930s. It arrived in Pennsylvania in contaminated nursery stock in York.

### Range:

A native of eastern Asia, this vine is not yet widespread in the U.S. but is very common in the southern two-thirds of Pennsylvania, as well as parts of WV, VA, MD, DE, NJ, NY, CT, MA, RI and NH.

### Description:

This is an herbaceous, annual vine with delicate, highly branched stems that are covered by small, curved spines. The alternate leaves are triangular, light green, one to three inches wide and barbed on the underside. Round leaf-like structures called ocreae surround the stem. It is from there that the inconspicuous flowers and fruits arise. From mid-July through the first frost, green fruits appear, turning a metallic blue color as the season goes on.



Photo: Jessica Sprajcar, DCNR

### Habitat:

This plant readily colonizes disturbed areas along forest edges, wetlands, stream banks and roadsides. It needs regular sunlight to thrive and prefers high soil moisture.

### Biology and Spread:

Its fast growth is one way that the plant spreads, but its seeds are the primary means. Birds and other wildlife eat the fruits and spread the seeds in their droppings. Seeds are also buoyant for up to nine days in water and can be spread by streams and floods.

### Ecological Threat:

Because this plant can grow up to six inches a day, it can quickly smother native vegetation and climb into the tree canopy where it restricts light availability to plants below. It can be a pest plant on tree farms and for horticultural crops where the soil is not regularly tilled.



Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.invasive.org](http://www.invasive.org)

## How to Control this Species:

---

### Manual and Mechanical

Hand-pulling of vines is possible, especially when the soil is wet, but be sure to wear thick gloves. Removal should be done prior to fruit formation. Repeated mowing will prevent the plant from flowering and thus reduce or eliminate fruit and seed production. Monitor the site for several years to ensure no seeds germinate.

### Look-a-Likes:

---

There are several other vines with triangular-shaped leaves that may be confused with mile-a-minute, including halbard-leaved tearthumb (*Polygonum arifolium*), climbing false buckwheat (*Polygonum scandens*), wild morning glory (*Ipomoeae pupurea*) and hedge bindweed (*Calystegia sepium*). The presence of spines and ocreae will let you know that it is indeed mile-a-minute.



Photo: Theodore Webster, USDA,  
[www.forestryimages.org](http://www.forestryimages.org)

### Chemical

A systemic herbicide like glyphosate will work on mile-a-minute, especially when used with a surfactant that will help to penetrate the leaves' waxy coating. Apply the herbicide in the summer, before fruits appear.



*Rhinocominus latipes*

Photo: NJ Dept. of Agriculture

### Biocontrol

A weevil, *Rhinocominus latipes*, is being used on various test plots in Pennsylvania and elsewhere to control mile-a-minute. These small insects feed on the leaves and bore into the stems. While they will not completely eliminate the plant they help keep it in check and reduce fruit production.

### References:

---

Center for Invasive Species and Ecosystem Health:

<http://www.invasive.org/browse/subinfo.cfm?sub=3065>

Invasive Exotic Plant Tutorial for Natural Lands Managers:

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/mile\\_a\\_minute.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/mile_a_minute.htm)

University of Delaware, College of Agriculture & Natural Resources, Biological Control of Mile-a-Minute Weed:

<http://ag.udel.edu/enwc/research/biocontrol/mileaminute.htm>

Massachusetts Introduced Pests Outreach Project:

<http://massnrc.org/pests/mamreport.aspx>

### For More Information:

---

Plant Invaders of Mid-Atlantic Natural Areas, National Park Service:

<http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

Invasive Plants Field and Reference Guide, U.S. Forest Service:

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)



# Invasive Plants in Pennsylvania

## Moneywort

*Lysimachia nummularia* L.



Photo: Richard Old, [www.invasive.org](http://www.invasive.org)

### Background:

This plant goes by many common names including creeping Jenny, creeping Charlie, creeping Joan, running Jenny, wandering Jenny and wandering sailor.

It was introduced from Europe and southwest Asia as an ornamental ground cover.

### Range:

This plant can now be found through much of the U.S. particularly the east and west coasts and the Midwest (see map on right).

### Description:

This herbaceous, low-growing perennial plant is part of the primrose family. It has evergreen to semi-evergreen leaves. The creeping stems can grow up to two feet long and form a mat-like growth. Leaves are opposite and oval in shape, resembling coins, hence its name. Small yellow flowers with small dark red spots bloom from June to August, but may not bloom at all.

### Habitat:

This plant can grow in a variety of habitats but it grows best and poses the biggest threat in moist areas like wet meadows, swamps, stream banks and roadside ditches. It prefers rich, shaded soils.

### Biology and Spread:

This plant spreads vegetatively by its creeping stems, as well as by small seeds that are located within capsular fruits. These fruits are likely dispersed by flood waters and stormwater runoff. How much this plant's seeds are spread by animals is not fully known, but it is likely.



Photo: Les Mehrhoff, IPANE



Map courtesy of USDA PLANTS Database

### Ecological Threat:

Not much is known about its direct impacts to the environment but there is concern that dense mats of this plant may take over habitat for more desirable native plant species.

## How to Control this Species:

---

### Prevention

The easiest way to prevent the spread of this species is to stop planting it, manage existing infestations and minimize disturbance to forests, wetlands and other habitats. When prevention fails, there are two control options:

### Manual

The plant can be hand pulled, but all stems and stem fragments should be removed to prevent the stems from re-rooting . Planting native grasses can help to shade out this plant. Mowing is not effective since moneywort grows so close to the ground.

### Chemical

Several herbicides are effective in controlling moneywort. Because this plant usually grows in or near wetlands, make sure that the herbicide is approved for use in wetlands. Rodeo is one such herbicide that may be effective. Be sure to follow all label directions and state requirements when using any herbicide.

## Reference:

---

*USDA Forest Service: Weed of the Week factsheet for Moneywort:*

[http://www.na.fs.fed.us/fhp/invasive\\_plants/weeds/monewort.pdf](http://www.na.fs.fed.us/fhp/invasive_plants/weeds/monewort.pdf)

## For More Information:

---

To learn more about invasive plants in Pennsylvania and the northeast, here are some useful resources:

*DCNR Invasive Species Site:*

<http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm>

*Plant Invaders of Mid-Atlantic Natural Areas, National*

*Park Service:* <http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

*Invasive Plants Field and Reference Guide, U.S. Forest*

*Service:* [http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)



Photo: Richard Old, [www.invasive.org](http://www.invasive.org)

# Invasive Plants in Pennsylvania

## Multiflora Rose

*Rosa multiflora*



Leslie J. Mehrhoff, U. of Connecticut  
[www.forestryimages.org](http://www.forestryimages.org)

### Background:

Multiflora rose was introduced into the United States as ornamental rootstock from Japan in 1866. Beginning in the 1930s, the U.S. Soil Conservation Service promoted it for use in erosion control and livestock fencing. It was also encouraged in wildlife plantings and as a crash barrier along highways. Recognition of its tenacious and unstoppable growth habit came too late, and it is now considered a noxious weed in many states.

### Range:

Native to Asia, multiflora rose now occurs throughout most of the United States, especially the eastern half.

### Description:

Multiflora rose is a dense, thorny shrub, reaching up to 15 feet in height, with arching canes (stems) that are capable of rambling up trees. Its leaves are pinnately compound, divided into seven to nine leaflets, and finely serrate. Clusters of fragrant white to pink flowers appear in May or June. Small bright red hips (fruit) develop during the summer and remain on the plant through winter.



James H. Miller, USDA Forest Service  
[www.forestryimages.org](http://www.forestryimages.org)

### Habitat:

This invasive shrub has a wide tolerance for various soil, moisture and light conditions. It can be found in dense woods, along stream banks and roadsides, and in open fields and prairies.

### Biology and Spread:

It is estimated that a single plant may produce a million seeds per year, which may remain viable in the soil for up to 20 years. The hips are readily eaten by birds, which are the primary seed dispersers. New plants can also be formed by rooting from the tips of canes touching the ground.

### Ecological Threat:

Multiflora rose forms impenetrable thickets that exclude native plant species. This shrub grows very prolifically in riparian areas, where its inedible leaf litter can change the composition of the aquatic macroinvertebrate community. Its occasional habit of climbing can weigh down trees, making them susceptible to breakage.



James H. Miller, USDA Forest Service  
[www.forestryimages.org](http://www.forestryimages.org)

## How to Control this Species:

---

### Physical

Frequent cutting or mowing, three to six times per growing season, for two to four years, is effective in achieving high mortality. Be careful – the strong thorns have been known to puncture rubber tires.

Scattered populations may be eliminated by complete removal of the plants. Be sure to remove all root material because this shrub readily re-sprouts.

In areas where multiflora rose is detected early, prescribed fire may limit its establishment.

### Chemical

Application of herbicides, such as glyphosate or triclopyr, on freshly cut stems is an effective control method since it destroys the root system and prevents re-sprouting. This may be done during the dormant period, which reduces the likelihood of damaging desirable species.

A foliar spray of fosamine can be used from July through September, but die-back will not be apparent until the following summer. Fosamine will only affect woody species.

### Biological

Biological control is currently under investigation. Rose-rosette disease, a native viral pathogen, is spread by a mite, and is slowly spreading eastward from the west. The European rose chalcid, a seed-infesting wasp, promises to reduce seed viability. Unfortunately, both of these measures have the potential to impact native rose species.



Leslie J. Mehrhoff, U. of Connecticut  
[www.forestryimages.org](http://www.forestryimages.org)

## Look-A-Likes:

---

Multiflora rose could easily be confused with other rose species (both native and non-native), especially when not in bloom. This is a concern, since some native species are of conservation interest.



Catherine Herms, Ohio State University  
[www.forestryimages.org](http://www.forestryimages.org)

## References:

---

*Plant Conservation Alliance's Alien Plant Working Group:*  
<http://www.nps.gov/plants/alien/fact/romu1.htm>

*Wisconsin Department of Natural Resources:*  
<http://dnr.wi.gov/invasives/fact/rose.htm>

## For More Information:

---

*DCNR Invasive Species Site:* <http://www.dcnr.state.pa.us/conservation/science/invasivespecies/index.htm>

*DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers:*  
[http://www.dcnr.state.pa.us/forestry/invasivetutorial/Multiflora\\_rose.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/Multiflora_rose.htm)

# Invasive Plants in Pennsylvania

## Oriental Bittersweet

*Celastrus orbiculatus* Thunb.



Photo: Jessica Sprajcar, DCNR

### Background:

Also known as round-leaved and Asiatic bittersweet, this vine was introduced from China into the U.S. around 1860 as an ornamental.

### Range:

Oriental bittersweet can be found throughout New England and the Mid-Atlantic states, down to Louisiana and up through the Midwest as far north as Wisconsin. It is not known to occur further west than that.

### Description:

Oriental bittersweet is a deciduous, climbing, woody vine that can grow up to 60 feet in length. Vines can grow up to four inches in diameter. The alternate, elliptical leaves are light green in color, finely toothed and two to five inches in length. Fruits are round and yellow, splitting to reveal bright red berries through the fall and winter months.



Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.invasive.org](http://www.invasive.org)

### Habitat:

Commonly found on old home sites, in fields and forest edges, and along roadsides and train tracks. While it prefers open, sunny sites it can tolerate shade.

### Biology and Spread:

Birds and other wildlife readily consume the large number of berries, spreading seeds far and wide. Humans also spread the seed through the use of bittersweet vines and berries for craft projects. The plant also spreads vegetatively through rhizomes and root suckers.

### Ecological Threat:

This vine is able to girdle and kill trees or break their branches off from the weight of the vines. When it grows into the canopy it can shade out natives. Oriental bittersweet has also been shown to hybridize with the American bittersweet, leading to a loss of genetic identity.

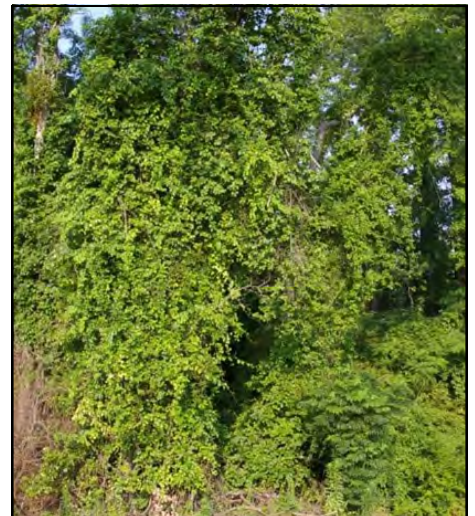


Photo: Nancy Loewenstein, Auburn U.,  
[www.invasive.org](http://www.invasive.org)

## How to Control this Species:

---

### Manual and Mechanical

Because the seeds of bittersweet are so numerous and can remain viable in the soil for several years, all control efforts will require multiple years to be effective.

Small populations, especially of vines not high up in canopy, can be pulled by hand or dug out prior to fruiting. If fruits are present, all material should be bagged and disposed of.

Vines in trees can be cut close to the ground. The vines will re-sprout, however, unless herbicide is immediately applied to the cut stump.

Weekly mowing will prevent the vines from fruiting, but less frequent mowing will promote root sprouts.

### Chemical

Because Oriental bittersweet looks so much like the native American bittersweet, be absolutely sure you have properly identified the species before doing any control work.

Systemic herbicides like glyphosate and triclopyr can successfully manage bittersweet. It is most effective when stems are cut or mowed and the herbicide is applied to the cut area immediately.

For cut stump applications, a 50% solution of glyphosate and water can be applied as long as the air temperature is above 40 degrees F. A 25 percent solution of triclopyr and water can be applied when the air temperature is above 60 degrees F.

For foliar application, a two percent solution of glyphosate or triclopyr and water, plus a 0.5 percent non-ionic surfactant, can be sprayed on the leaves when the air temperature is above 65 degrees F.

### Look-A-Likes:

---

Oriental bittersweet closely resembles the native American bittersweet (*Celastrus scandens*), but American bittersweet has flowers and fruits at the ends of its branches, rather than in the axils of the leaves, like the Oriental variety.

### References:

---

*Center for Invasive Species and Ecosystem Health:*

<http://www.invasive.org/browse/subinfo.cfm?sub=3012>

*Invasive Exotic Plant Tutorial for Natural Lands Managers:*

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/Oriental\\_bittersweet.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/Oriental_bittersweet.htm)

### For More Information:

---

*Plant Invaders of Mid-Atlantic Natural Areas, National Park Service:*

<http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

*Invasive Plants Field and Reference Guide, U.S. Forest Service:*

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)



Photo: Chris Evans, River to River CWMA,  
[www.forestryimages.org](http://www.forestryimages.org)

# Invasive Plants in Pennsylvania

## Porcelain Berry

*Ampelopsis brevipedunculata*



Photo: Jessica Sprajcar, DCNR

### Background:

Also known as amur perppervine, this vine is native to Japan and northern China. It was brought to the U.S. in 1870 as an ornamental and landscaping plant.

### Range:

Found in scattered locations throughout southern New England, the Mid-Atlantic states and parts of the South and Midwest. In Pennsylvania it is mostly found around Philadelphia and Pittsburgh.

### Description:

This deciduous, woody vine can climb to heights of 20 feet or more. The alternate leaves are simple and variable – from heart shaped to palmately lobed (three to five lobes). Leaves have coarsely toothed margins. Inconspicuous flowers appear in mid to late summer. Fruits appear in the fall. They change color from light purple to green to blue to as the season advances.

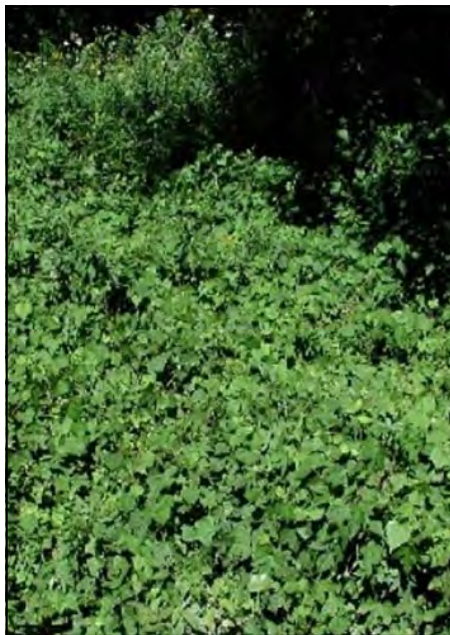


Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.invasive.org](http://www.invasive.org)

### Biology and Spread:

Birds and other wildlife eat the fruits and spread the seeds to new locations. Fruits may also be spread by water.

### Habitat:

Porcelain berry prefers moist, rich soils and full sunlight, although it can tolerate partial shade. It invades stream-banks, forest edges and disturbed areas – anywhere that is not permanently wet.

### Ecological Threat:

This vine grows quickly, forming thick mats that cover native vegetation. It can also climb into the trees and shade out young shrubs and seedlings.



Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.invasive.org](http://www.invasive.org)

## How to Control this Species:

---

Because this plant can grow so quickly and has seeds that may be viable in the soil for several years, monitoring and follow-up are necessary.

Hand pulling the vines in the fall or spring will prevent flower buds from forming the following season. For vines that are too large to pull, cut them near the ground and treat with a systemic herbicide like triclopyr or glyphosate.

From summer to fall, apply a water-based solution of 2.5 percent triclopyr to the leaves or cut vines. If the basal bark method is preferred, apply a 20 to 30 percent solution of triclopyr mixed with a basal oil to the base of the vine in a two to three feet long section.



Photo: Rebekah Wallace, U. of Georgia,  
[www.forestryimages.org](http://www.forestryimages.org)

## Native Alternatives:

---

There are many great native vines that can be used in place of porcelain berry, including cross vine (*Bignonia capreolata*), Virginia creeper (*Parthenocissus quinquefolia*) and trumpet creeper (*Campsis radicans*).



Photo: U. of Georgia Press,  
[www.forestryimages.org](http://www.forestryimages.org)

## Look-A-Likes:

---

Porcelain berry resembles our native grapes. The easiest way to tell them apart is to look at the pith (interior) of the vine. Porcelain berry's pith is white, wild grape's is brown. Grape bark peels or shreds, while porcelain berry bark does not.



Photo: Howard Schwartz, Colorado State U.  
[www.forestryimages.org](http://www.forestryimages.org)

## References:

---

*Center for Invasive Species and Ecosystem Health:*

<http://www.invasive.org/browse/subinfo.cfm?sub=3007>

*Invasive Exotic Plant Tutorial for Natural Lands Managers:*

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/Porcelain\\_berry.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/Porcelain_berry.htm)

## For More Information:

---

*DCNR Invasive Species Site:* <http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm>

*Plant Invaders of Mid-Atlantic Natural Areas, National*

*Park Service:* <http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

*Invasive Plants Field and Reference Guide, U.S. Forest Service:*

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)



# Invasive Plants in Pennsylvania

## Privets (Japanese, Border, Chinese and Common)

*Ligustrum japonicum*, *L. obtusifolium*, *L. sinense* and *L. vulgare*



Photo: Troy Evans, [www.bugwood.org](http://www.bugwood.org)

### Background:

These four species of privets were originally imported for use in landscaping around 1860. They are still often used in hedges and landscaping.

### Range:

The various privets are originally from Japan, China and Europe. They have spread through the eastern United States, from New Hampshire and Michigan in the north to Florida and Texas in the south.

### Description:

Privets are deciduous or semi-evergreen shrubs that often form dense thickets. They have opposite or whorled stems that are brown to gray with slightly rough bark. Privets produce white flowers from April to June, which are followed by green drupes from July to March. These fruit gradually ripen to a dark purple or black color in the winter. It is often difficult to differentiate between the four privets to the species level, particularly when they are not flowering.



Photo: Rebekah Wallace, U. of Georgia, [www.invasive.org](http://www.invasive.org)

### Habitat:

Privets are often found in bottom-land forests, fence-rows, fields and rights-of-way. They seem to prefer disturbed areas with rich soil.

### Biology and Spread:

Privets mainly spread to new areas via their seeds. Often-times, these are distributed by birds, which have eaten the fruit. Once introduced to an area, privet can regenerate from root and stump sprouts, making it difficult to eradicate.

### Ecological Threat:

Privets can form dense thickets, which reduce light and moisture availability for native shrubs and wildflowers. This decreases plant diversity and impacts the animals which depend on them for food and shelter.



Photo: Leslie Mehrhoff, U. of Connecticut, [www.invasive.org](http://www.invasive.org)

## How to Control this Species:

---

Once established in an area, privet can be difficult to control or remove.

With smaller populations, hand removal can be used. However, fragments of root that are left behind in the ground can re-sprout.

Larger areas can also be treated with herbicides such as glyphosate. Herbicide can be applied to the leaves, or painted on cut stems or stumps. Once the herbicide is applied, disturbances to the privet should be avoided for approximately one year, in order for the herbicide to travel through the privet's root systems.

No biological controls are currently known for privet. Studies show that controlled burning does not appear to have a lasting effect on privet populations, so it is not recommended as a control option.

## Look-A-Likes:

---

There are a large variety of shrub-sized, berry-producing, deciduous alternatives to privets for landscaping purposes. These include species such as spicebush (*Lindera benzoin*), dogwoods (*Cornus* spp.) and chokeberry (*Aronia* spp.). These species will all provide food and cover for wildlife.



Photo: Jessica Sprajcar, DCNR



Photo: Chris Vans, River to River CWMA,  
[www.forestryimages.org](http://www.forestryimages.org)



Photo: Richard Webb, [www.forestryimages.org](http://www.forestryimages.org)

## References:

---

USDA Plant Guide:

[http://plants.usda.gov/plantguide/pdf/pg\\_lisi.pdf](http://plants.usda.gov/plantguide/pdf/pg_lisi.pdf)

University of Connecticut Plant Database:

<http://www.hort.uconn.edu/plants/index.htm>

Center for Invasive Species and Ecosystem Health: [www.invasive.org](http://www.invasive.org)

## For More Information:

---

*Plant Invaders of Mid-Atlantic Natural Areas, National Park Service:*

<http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf>

*Invasive Plants Field and Reference Guide, U.S. Forest Service:*

[http://na.fs.fed.us/pubs/misc/ip/ip\\_field\\_guide.pdf](http://na.fs.fed.us/pubs/misc/ip/ip_field_guide.pdf)

# Invasive Plants in Pennsylvania

## Purple Loosestrife

*Lythrum salicaria*



Richard Old, XID Services, Inc.  
[www.forestryimages.org](http://www.forestryimages.org)

### Description:

Purple loosestrife is a perennial herb with square, woody stems, which may grow anywhere from four to 10 feet high, depending on conditions. Its lance-shaped leaves occur in opposite or whorled arrangements. Magenta-colored flower spikes are present throughout much of the summer.



Eric Coombs, Oregon Dept. of Ag.  
[www.forestryimages.org](http://www.forestryimages.org)

### Biology and Spread:

With an extended flowering season, from June to September, and an unusually high number of flowering stems, each purple loosestrife plant is capable of producing two to three million seeds per year. Research has shown that cultivars, advertised as sterile, are capable of producing viable seed. This plant can also reproduce vegetatively by underground stems at a rate of one foot per year.

### Ecological Threat:

An enthusiastic invader of wetlands, purple loosestrife outcompetes native plants, including some federally endangered orchids, forming dense homogeneous stands. These monocultures reduce habitat for waterfowl, clog waterways, disrupt nutrient cycling and collect debris, eventually displacing the entire wetland.



Agriculture and Agri-Food Canada  
[www.forestryimages.org](http://www.forestryimages.org)

### Background:

Purple loosestrife was intentionally introduced into North America in the early 1800s as an ornamental, as well as accidentally by way of discarded ship ballast. It is now banned as a noxious weed in most states.

### Range:

Native to Eurasia, purple loosestrife can now be found throughout much of the United States, especially in the northern and western regions.

### Habitat:

Purple loosestrife prefers open wetlands, and is capable of invading freshwater wet meadows, tidal and non-tidal marshes, river and stream banks, pond edges, reservoirs and ditches. It is a hardy plant that can tolerate a range of soil pH, as well as drought.

## How to Control this Species:

---

### Prevention

Early detection and prevention are the best approaches to managing purple loosestrife. Monitoring watersheds yearly to identify new infestations is critical, and can be most easily conducted in late July and August when the plant is in full bloom.

Clean seed and plant parts from animals, equipment and clothing before entering wetland areas.

Prevent nearby infestations from going to seed. Use native competitors as barriers.

### Physical

Hand-pulling is only effective for seedlings with small roots.

Mowing is not recommended, but may reduce the production of seeds.

Flooding kills seedlings; established plants must be inundated for weeks. Unfortunately, this also kills desirable vegetation.

The site may need to be replanted with native, competitive vegetation.

### Chemical

Glyphosate is effective against purple loosestrife. Be sure to use an herbicide permitted for wetland use. Herbicides can be applied directly to cut stems to reduce collateral damage.

### Biocontrol

Although they will not eradicate purple loosestrife, biocontrols can reduce the severity of an infestation. Four species of beetles from Europe, which are fairly host-specific on purple loosestrife, are currently available for control efforts.

## Look-A-Likes:

---

From a distance, purple loosestrife may resemble some native flowering plants, such as blazing star (*Liatris* sp.) and obedient plant (*Physostegia virginiana*). These also make great native garden alternatives.



Blazing Star

John D. Byrd, Mississippi State University  
[www.forestryimages.org](http://www.forestryimages.org)

## References:

---

*Center for Invasive Species and Ecosystem Health:*

<http://www.invasive.org/browse/subinfo.cfm?sub=3047>

*Plant Conservation Alliance's Alien Plant Working Group:*

<http://www.nps.gov/plants/alien/fact/lysa1.htm>

*University of Nevada Cooperative Extension:*

<http://www.unce.unr.edu/publications/files/nr/2002/>

## For More Information:

---

*DCNR Invasive Species Site:* <http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm>

*DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers:*

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/Purple\\_loosestrife.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/Purple_loosestrife.htm)

# Invasive Plants in Pennsylvania

## Shrub Honeysuckles

(Amur, Morrow's, Bells, Standish, and Tartarian)

*Lonicera maackii*, *L. morrowii*, *L. x bella*, *L. standishii*, and *L. tatarica*



Chuck Bargeron, University of Georgia,  
[www.bugwood.org](http://www.bugwood.org)

### Background:

Shrub or bush honeysuckles were introduced to North America for use in landscaping, erosion control and wildlife cover. Unfortunately, these plants then spread throughout much of the country.

### Range:

The nonnative bush honeysuckles are native to eastern Asia, Europe and Japan. Currently, they can be found in a variety of habitats from the Great Plains to southern New England, and south to Tennessee.

### Description:

Nonnative bush honeysuckles grow to heights of six to 20 feet. Their stems are thornless with a hollow brown pith. Their leaves are opposite and egg-shaped. Their flowers, which bloom from May to June, are fragrant, tubular and less than an inch long. They range in color from white to yellow to pink to red. The berries are small and red or yellow.



Leslie J. Merhoff, University of Connecticut,  
[www.bugwood.org](http://www.bugwood.org)

### Habitat:

Nonnative bush honeysuckles are relatively shade-intolerant, and often occur in disturbed woods or edges, roadsides and abandoned fields where more light is available. Morrow's and Bell's honeysuckles are capable of invading bogs, fens, lakeshores and sandplains.

### Biology and Spread:

Nonnative bush honeysuckles produce large numbers of small fruits, particularly when growing in open sunlight. These are eaten by birds, which then spread the seeds in their droppings. Once a population establishes, vegetative sprouting continues the spread of these plants.

### Ecological Threat:

These invasive species compete with native plants for sunlight, moisture and pollinators. And while birds eat the fruit, it is poorer in fats and nutrients than fruits from native plants, so the birds do not get enough nutrients to help sustain long flights during migrations.



Leslie J. Merhoff, University of Connecticut,  
[www.bugwood.org](http://www.bugwood.org)

## How to Control this Species:

---

The two main methods of controlling nonnative bush honeysuckles are mechanical and chemical. Smaller populations can be removed by hand, making sure to include the roots. Larger populations should be cut to ground level at least once per year, in either early spring or late fall.

Glyphosate can be sprayed onto the leaves, or could also be applied to cut stems in order to kill the root system.

No biological controls are known that would target solely nonnative bush honeysuckle species. In open areas, prescribed fire may help to eradicate this species. In order to optimize this approach, however, the burn should be conducted prior to late summer in order to prevent seed dispersal.

## Look-A-Likes:

---

Native bush honeysuckles exist throughout North America. The natives generally have solid stems, as opposed to the hollow pith of the invasive ones. Be very cautious when buying so-called “native” honeysuckles from a nursery or online.

## Native Alternatives:

---

There are a large variety of shrub-sized, berry-producing, deciduous alternatives for landscaping purposes. These include species such as spicebush (*Lindera benzoin*), dogwoods (*Cornus* spp.) and chokeberry (*Aronia* spp.). These species will all provide food and cover for wildlife.



Photo: Jessica Sprajcar, DCNR



Photo: Chris Vans, River to River CWMA,  
[www.forestryimages.org](http://www.forestryimages.org)

## References:

---

*Invasive Exotic Plant Tutorial for Natural Lands Managers:*

[http://www.dcnr.state.pa.us/forestry/invasivetutorial/bush\\_honeysuckles.htm](http://www.dcnr.state.pa.us/forestry/invasivetutorial/bush_honeysuckles.htm)

*University of Wisconsin, Invasive Plants of Wisconsin:*

[http://www.uwgb.edu/biodiversity/herbarium/invasive\\_species/lonxbe01.htm](http://www.uwgb.edu/biodiversity/herbarium/invasive_species/lonxbe01.htm)

*Plant Conservation Alliance's Least Wanted List:*

<http://www.nps.gov/plants/alien/fact/loni1.htm>

*University of Connecticut Plant Database:*

<http://www.hort.uconn.edu/plants/index.html>

*Robert W. Freckmann Herbarium:* <http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=LONTAT>



Photo: Richard Webb,  
[www.forestryimages.org](http://www.forestryimages.org)

# Invasive Plants in Pennsylvania

## Tree of Heaven

*Ailanthus altissima*



Photo: Jessica Sprajcar, DCNR

### Background:

Also known as Chinese sumac, stinking sumac and tree of hell, this tree is native to China. It was brought to Philadelphia in 1784 by an amateur gardener. By 1840 it was commonly available from nurseries. *Ailanthus* is the subject of the well known book, "A Tree Grows in Brooklyn," by Betty Smith.

### Range:

Tree of heaven is very common in the northeast and Midwest, through parts of the southeast, southwest and west coast.

### Description:

This rapidly growing tree can reach a height of 80 feet, with up to a six-foot diameter trunk. Leaves are pinnately compound with 10 to 41 leaflets with smooth leaf margins. When crushed, the leaves and other plant parts have a rancid smell like cat urine or burnt peanut butter.



Photo: Chuck Barger, U. Of Georgia,  
[www.invasive.org](http://www.invasive.org)

Flowering occurs in early summer, when large clusters of yellowish flowers develop above the leaves. Fruit produced on the female trees are tan to reddish, single winged, papery seeds, called samaras. They may remain on the tree throughout late fall.

### Habitat:

*Ailanthus* is extremely tolerant of poor soils and will even grow through cracks in pavement. Trees are not shade tolerant. They will quickly colonize forest edges, fields and roadsides.

### Biology and Spread:

Tree of heaven spreads by hundreds of thousands of seeds per tree and through vegetative sprouting. A cut or injured *ailanthus* tree may send up dozens of root suckers and resprouts, creating large clonal colonies.

### Ecological Threat:

This tree produces chemicals in its roots that prevent the establishment of other plant species nearby. Its fast growth limits habitat for other species. Its root system may be extensive and has been known to cause damage to sewer lines and building foundations.



Photo: Leslie Mehrhoff, U. of Connecticut,  
[www.invasive.org](http://www.invasive.org)

## Look-A-Likes:

The native trees most likely to be confused with ailanthus are the sumacs (*Rhus* spp.). One way to tell them apart is the small glands on the underside of ailanthus leaves (see photo below). Staghorn sumac leaves do not have this gland, but have toothed leaf margins, while ailanthus' leaf edges are smooth. Sumac fruits are fuzzy and red.



Photo: James Miller, USDA Forest Service, [www.invasive.org](http://www.invasive.org)

Young ailanthus may also be confused with black walnut (*Juglans nigra*) because of the compound leaves and shield-shaped leaf scars. However, the flowers, seeds and smell of ailanthus should give it away.



Photo: John Cardina, The Ohio State University, [www.forestryimages.org](http://www.forestryimages.org)

## How to Control this Species:

Elimination of this species is difficult and time consuming, due to its abundant seed, high germination rate, and frequent root sprouts.

### Manual and Mechanical

While young seedlings could be pulled or dug up, the chance of getting all root fragments is difficult and can lead to re-sprouts. Seedlings can be confused with root suckers, which would be nearly impossible to remove effectively by hand.

Cutting is not recommended, as the trees will send up large numbers of root sprouts and suckers, creating a bigger problem than before.

### Chemical

The most effective way to treat ailanthus is with herbicides. Foliar application of triclopyr or glyphosate, mixed with water and a non-ionic surfactant, is effective on smaller trees when applied between June and late August.

For larger trees, application of triclopyr or glyphosate with the basal bark, hack and squirt, or injection should work effectively. Cut-stump herbicide application, however, may encourage root suckering. Application rates may vary – see the references below for more specific information. Follow-up monitoring and treatment are very important. Regardless of the control method used, treated areas should be checked one or more times a year.

## References:

*Plant Conservation Alliance's Least Wanted List:*

<http://www.nps.gov/plants/alien/fact/aial1.htm>

*Center for Invasive Species and Ecosystem Health:*

<http://www.invasive.org/browse/subinfo.cfm?sub=3003>

*Virginia Cooperative Extension:*

[http://pubs.ext.vt.edu/420/420-322/420-322\\_pdf.pdf](http://pubs.ext.vt.edu/420/420-322/420-322_pdf.pdf)

## For More Information:

*Penn State University Vegetation Management Publications:*

<http://horticulture.psu.edu/research/labs/vegetative-management/publications>