

Invasive Plants in Pennsylvania

Callery or Bradford pear

Pyrus calleryana



Dan Tenaglia, MissouriPlants.com

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.

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.

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.



Chuck Barger, Univ. of Georgia

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.



Britt Slattery, US Fish and Wildlife Service

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.

Ecological Threat:

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

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.

Invasive Plants in Pennsylvania

Shrub honeysuckles

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

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



Chuck Barger, Univ. of Georgia

Background:

Shrub or bush honeysuckles were introduced to North America for use in landscaping, erosion control and wildlife cover.

Range:

The non-native 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.

Habitat:

Non-native bush honeysuckles are relatively shade-intolerant, and often occur in disturbed woods or edges, roadsides and abandoned fields. Morrow's and Bell's honeysuckles are capable of invading bogs, fens, lakeshores and sandplains.

Description:

Non-native 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.



Brett Pifer, DCNR - BOF

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.



Brett Pifer, DCNR - BOF

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, Univ. of Connecticut

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.

PA Native : Bush-honeysuckle (*Diervilla lonicera*)



Brett Pifer, DCNR - BOF



Deric Case, DCNR Bureau of Forestry



Brett Pifer, DCNR - BOF



Brett Pifer, DCNR - BOF

Invasive Plants in Pennsylvania

Japanese and giant knotweed

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



Leslie Mehrhoff, Univ. of Connecticut

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.



Brett Pifer - DCNR BOF

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.

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.



Kelly Stich, DCNR - BOF

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 mgmt. 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.

Japanese knotweed (*Polygonum cuspidatum*)



Japanese knotweed in flower (Photo by Kelly Sitch, DCNR - BOF).



Japanese knotweed sprouts early in growing season

Japanese knotweed (*Polygonum cuspidatum*)



Previous year's Japanese knotweed stems in winter & early spring.

Japanese knotweed Treatment Guidance

Small populations of knotweed (1-5 plants) can be considered for digging and hand removal. Be advised that the taproots of knotweed are very extensive and often branch, exercise caution while digging these plants. Consider an herbicide application to the roots if they break off when pulling or become difficult to remove.

The most effective means to treat knotweed is to cut the plants and treat with glyphosate eight weeks later. Typically this cutting occurs in late May or June and treatment is conducted eight weeks following cutting, this helps to reduce root/rhizomes reserves prior to spraying.

If there is no mowing or cutting, treatments should take place after July 1st and end by mid-September, this should be a high volume application. Depending on the glyphosate formulation, a surfactant may be necessary (Glyphomate 41 does not need an additional surfactant).

Common mugwort (*Artemisia vulgaris*)

By Victoria Wallace, Alyssa Siegel-Miles, and Klaudia Sowizral
UConn Extension

Identifying Features:

- **OVERVIEW:** Perennial. Height 2-5 ft. tall. Aggressive establishment and colonization in roadsides, right-of-way areas, and disturbed and uncultivated areas (Figure 1). Laboratory studies have found the presence of chemicals that could potentially suppress the growth of nearby plants.
- **LEAVES:** Alternate, papery, with large pinnate lobes (Figure 2). **Green on upper surface (Figure 3), while undersides are covered with dense white to gray hairs.** Foliage is **aromatic**, with a chrysanthemum or sage-like odor. Leaves emerging from ground have shallower and broader lobes, whereas leaves on mid and upper portion of the plant have lobes that are more linear and deeper.
- **STEMS:** Purplish-brown, branched, and covered with short hairs.
- **FLOWERS:** Inconspicuous flowers that lack petals. Occur in small terminal clusters (at the tops of stems). Yellowish, 2.5-3 mm long; composed of many disk flowers clustered onto a flat head (Figure 4).
- **FRUIT:** Single seed enclosed in a brown achene. Oblong with a narrow base, with small bristles at the tip.
- **REPRODUCTION/SPREAD:** Spread primarily by **aggressive rhizomes** (horizontal underground stems) (Figure 5), which form large, fast-spreading patches. Can also reproduce by seed. Some seeds will sprout when bare, disturbed ground is available to form new colonies.



Figure 1. Roadside colonization in spring



Figure 2. Growth habit



Figure 3. Foliage



Figure 4. Flowers



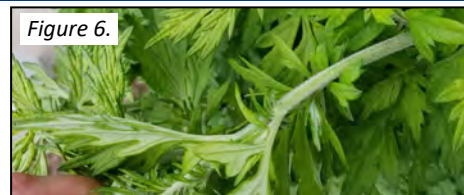
Figure 5. Roots and rhizomes.

Figures 1-3 and 5-6 by Alyssa Siegel-Miles; Figure 4 by Radio Tonreg,
[North Carolina Extension](#).

Habitat:

Mugwort does well in partial to full sun and moderately dry to mid-moisture soils. It does not persist in wet soils, as it is susceptible to root rot. The plant is frequently found in high elevation areas, disturbed habitats, meadows, valleys, and roadsides.

Common mugwort (*Artemisia vulgaris*)



Control:

MECHANICAL CONTROL:

- To prevent seed dispersal, **mow from early summer to mid-September**, before seedhead production or before seed has matured. The first two weeks of September are the best time to mow. Cut immature seeds will not mature into viable seed. Mowing after seed has matured, from mid-fall through winter, is not recommended, as it would disperse mature, viable seed. If mowing after the second week in September, collect and bag mugwort cuttings, if possible.
- When possible, **hand pulling very young plants** in spring or early summer, before formation of rhizomes, may keep spread of populations in check and prevent establishment of new colonies. Scouting and prompt removal is essential.
- A heavy-duty landscape fabric or other impenetrable mulch can be used to smother mugwort. May require combination with other control methods to be successful.
- Since mugwort seeds sprout wherever there is exposed bare ground, **stabilization and re-seeding of bare soil on roadsides** with a grass cover will reduce establishment of mugwort populations.

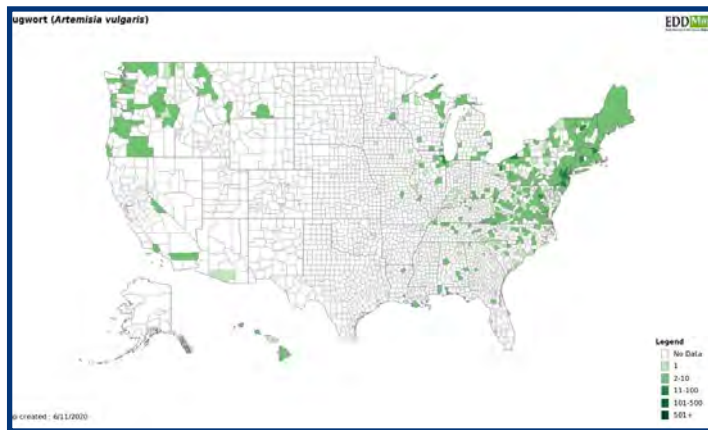
CHEMICAL CONTROL: Follow label direction when using all chemical treatments.

- Timing of any chemical control is critical. Follow label instructions.** The dense hairs on the mugwort leaf (Figure 6) make herbicide penetration difficult. A surfactant may be needed.
- Foliar spray** of glyphosate applied in late summer or early fall will suppress mugwort the following year, but not necessarily eradicate it. More selective herbicides, such as triclopyr and clopyralid, effectively control mugwort.
- Consulting with or hiring a licensed pesticide applicator is recommended.

Refer to [CIPWG's Invasive Plant Management Calendar](#) for more information.

Distribution:

Common mugwort is found throughout much of the northeast, extending west to Minnesota and south to scattered areas in Florida. Many counties in Oregon and Washington have also reported large populations.



EDDMapS. 2020. Early Detection & Distribution Mapping System. The University of Georgia - Center for Invasive Species and Ecosystem Health. Available online at <http://www.eddmaps.org>.

Other Facts and Background:

Common mugwort is native to Europe and Eastern Asia. Mugwort was brought into North America as early as the 1600's for medicinal purposes. It spread throughout the Northeastern U.S. as a contaminant on ships and nurseries. Mugwort pollen is a common cause of allergies and hay fever, wherever abundant. The plant is a common ingredient in many products, including insect repellents.

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United States Department of Agriculture
National Institute of Food and Agriculture

SOURCES: cipwg.uconn.edu; [CIPWG poster](#); nyis.info; [West Virginia Extension](#); missouribotanicalgarden.org

Invasive Plants in Pennsylvania

Multiflora rose

Rosa multiflora

PA Noxious Weed



Deric Case, DCNR - BOF

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 habitat 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.



Deric Case, DCNR - BOF

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

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 habitat of climbing can weigh down trees, making them susceptible to breakage.



Deric Case, DCNR - BOF

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.

If You Find This Plant:

Multiflora rose is on the Pennsylvania Noxious Weed Control List. It is illegal to sell, transport, plant or otherwise propagate this species. If you believe that you have found a new population of this plant, please contact:

Botany/Weed Specialist
Pennsylvania Dept of Agriculture
Phone 717-787-7204

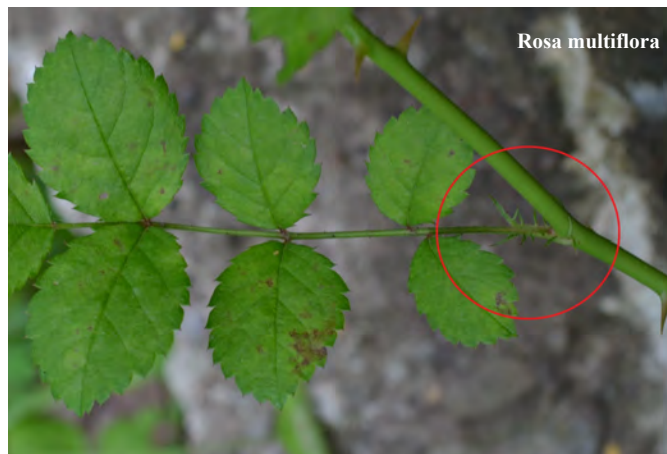
Look-A-Likes:

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.

PA native rose species: *Rosa virginiana*



Brett Pifer, DCNR - BOF



Multiflora rose has stipules that are conspicuously fringed (as shown in the photo to the left).



photos to the left by:
Brett Pifer, DCNR -
BOF

PA native rose species have stipules with entire margins or with sessile or stipitate glands, but are not fringed (as shown in the picture to the left).

Invasive Plants in Pennsylvania

Oriental bittersweet

Celastrus orbiculatus Thunb.



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.



Leslie Mehrhoff, Univ. of Connecticut

Habitat:

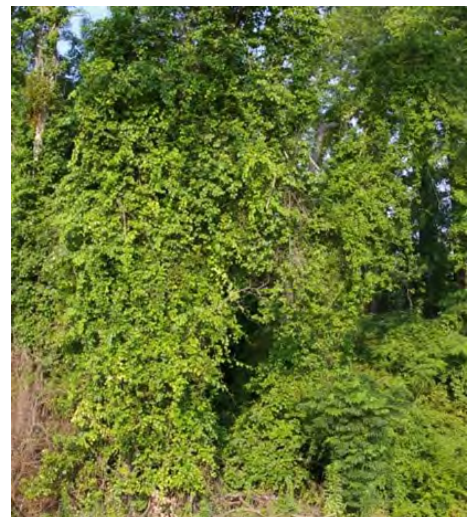
Commonly found on old home sites, in fields and forest edges, and along roadsides and train tracks. While it prefers open, sunny sites it can tolerate shade.

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.



Nancy Loewenstein, Auburn Univ.

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.



Celastrus scandens

Brett Pifer, DCNR - BOF



Oriental bittersweet along state forest road: Deric Case, DCNR - BOF

Invasive Plants in Pennsylvania

Porcelain berry

Ampelopsis brevipedunculata



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.



Brett Pifer, DCNR - BOF

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 as the season advances.



Brett Pifer, DCNR - BOF

Biology & 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.

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.

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.

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.



Brett Pifer, DCNR - BOF



Invasive Plants in Pennsylvania

Privets

(Japanese, Border, Chinese and Common)

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



Troy Evans, 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.



Rebekah Wallace, Univ. of Georgia

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 wild-flowers. This decreases plant diversity and impacts the animals which depend on them for food and shelter.



Deric Case, DCNR - BOF

How to Control this Species:

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

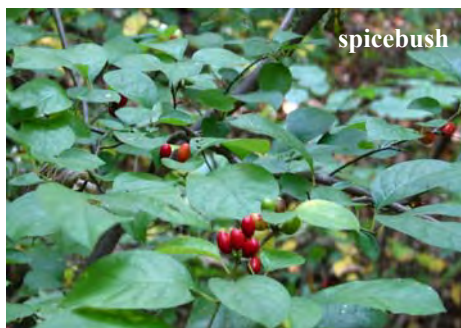
With smaller populations, hand removal can be used. However, fragments of root that are left behind in the ground can re-sprout.

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*), chokeberry (*Photinia* spp.) and dogwoods (*Cornus* spp.). These species will all provide higher quality food and cover for wildlife.



Jessica Sprajcar, DCNR



Chris Vans, River to River CWMA



Deric Case, DCNR - BOF

privet berries



Brett Pifer, DCNR - BOF

privet flower cluster



Deric Case, DCNR - BOF

Invasive Plants in Pennsylvania

Tree-of-heaven

Ailanthus altissima



Leslie Mehrhoff, Univ. of Connecticut

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.



Kelly Sitch, DCNR - BOF

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.

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.

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.

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.

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.



James Miller, USDA Forest Service

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.



Staghorn Sumac

John Cardina, The Ohio State Univ.

Tree-of-heaven (*Ailanthus altissima*)



Tree-of-heaven sprout (Photo by Brett Pifer, DCNR - BOF)



Tree-of-heaven in flower.

Tree-of-heaven (*Ailanthus altissima*)



Tree-of-heaven seeds (Photo by Kelly Sitch)

Tree-of-heaven Treatment Guidance

Unless the seedling is extremely small (less than 6-8 inches tall), cutting or breaking of *Ailanthus* stems should **not** be considered an effective treatment for an infestation.

Herbicide applications should take place from July 1st until *Ailanthus* leaves turn colors in the fall. One potential treatment method is basal bark application of triclopyr and oil (pre-mixed sold as Pathfinder II).

Hack and squirt can also be effective, given that each stem is not entirely girdled or damaged (a small portion should be left intact) while treating.

A native biocontrol measure developed from a *Verticillium* fungus is currently being field tested and may soon be available. Initial results indicate that this control is extremely effective at controlling tree-of-heaven.



Invasive Plants in Pennsylvania

White Mulberry

Morus alba



John M. Randall, The Nature Conservancy
www.forestryimages.org

Background:

White mulberry was introduced into the United States during colonial times in a failed attempt to establish a silkworm industry in the New World. Although the climate was not conducive to silkworm operations, the white mulberry tree thrived and spread throughout much of North America. Today, cultivars still exist in horticulture.

Range:

A native of northern China, white mulberry now ranges from southern Canada south throughout the contiguous United States. It occurs in every state except for Nevada.

Description:

White mulberry is a small deciduous tree with low branches and a wide spreading crown. Its roots are a distinctive, obnoxious orange, a color that is lightly reflected in its ridged, brown bark. A glossy sheen is obvious on the upper surface of its variably-lobed leaves. White mulberry flowers are green-yellow and occur in dense spikes. The aggregate fruits, which ripen from May to August, turn from green to white to red to black.



Ohio State Weed Lab Archive
www.forestryimages.org

Habitat:

White mulberry is most common in disturbed, sunny areas such as fields, forest edges and roadsides, although it tolerates part shade. It is adaptable to a variety of soil types, and can handle flooding and droughty conditions.

Biology and Spread:

The fruit is relished by wildlife, which spread white mulberry to new locations. This tree can also expand locally through root sprouting.

Ecological Threat:

A quick-growing species, white mulberry easily outcompetes native plants, especially in disturbed locations. The most dire threat posed by white mulberry is the hybridization and possible replacement of our native red mulberry (*Morus rubra*). To add insult to injury, it may also transmit a harmful root disease to its native relative.



Chris Evans, River to River CWMA
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How to Control this Species:

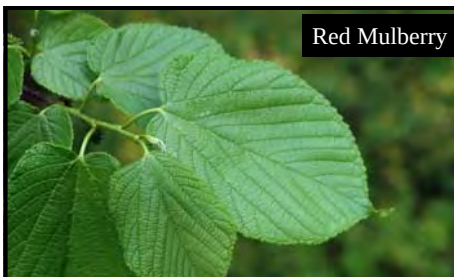
Physical

White mulberry seedlings can be easily pulled by hand, especially when the soil is moist.

Trees can be controlled through cutting and herbicide applications. During the growing season, trees should be cut near ground level, followed by an immediate application of herbicide to the stump in order to destroy the root system.

Look-A-Likes:

White mulberry may be confused with the exotic paper mulberry (*Broussonetia papyrifera*), as well as our native red mulberry, an issue complicated by the presence of hybrids between the two species.



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Chemical

Apply a 25 percent solution of glyphosate mixed with water to cut stumps or girdle wounds.

If cutting is not feasible and the tree is less than six inches in diameter, herbicide may be applied to the lower trunk. From late winter to late summer, a solution of 20 percent triclopyr mixed in oil may be applied in a 12-inch band around the base of the tree.

Foliar applications of two percent glyphosate mixed with water may be considered in areas where the risk to non-target species is minimal.

References:

Center for Invasive Species and Ecosystem Health:

<http://www.invasive.org/browse/subinfo.cfm?sub=6050>

The Nature Conservancy: <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/journeywithnature/white-mulberry.xml>

USDA Forest Service: http://www.invasive.org/weedcd/pdfs/wow/white_mulberry.pdf

For More Information:

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

Native Alternatives:

There are many native trees that make great alternatives. Some include red maple (*Acer rubrum*), hackberry (*Celtis occidentalis*), black gum (*Nyssa sylvatica*) and sassafras (*Sassafras albidum*).



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