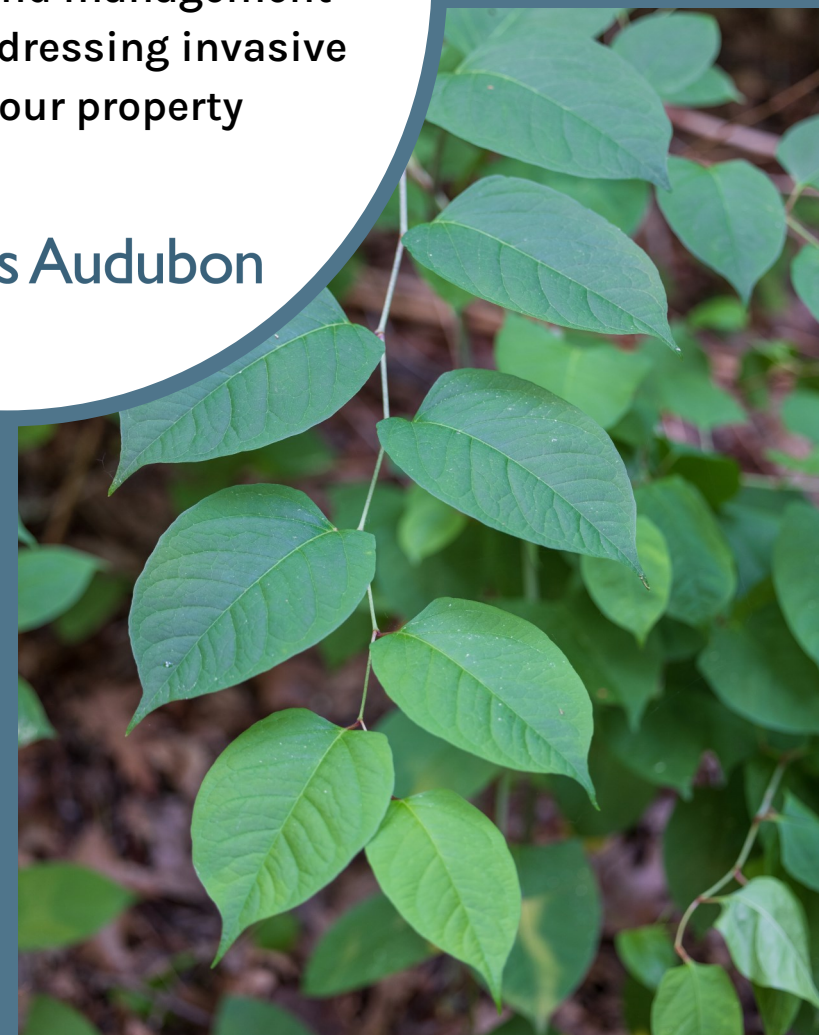
Invasive Plants of Massachusetts

Identification and management resources for addressing invasive plants on your property

Mass Audubon



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Invasive Plants:

The Concern

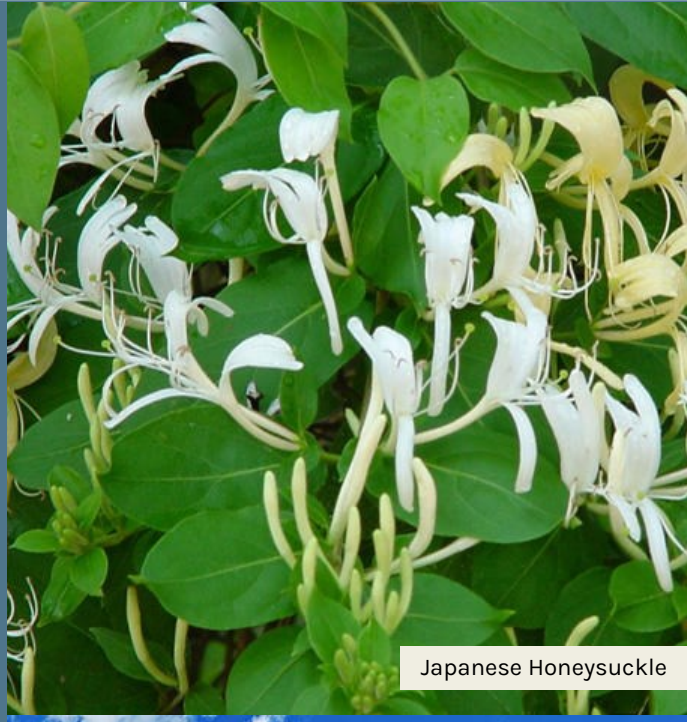
On a basic level, most invasive species are non-native organisms (plants, animals, insects etc.) that have been “introduced” to an environment. Most invasive plants were first introduced to Massachusetts by humans as landscape specimens or, in some cases, accidentally. Because they did not evolve in our region, the natural mechanisms that normally control these species in their home ranges don't exist here. As a result, these non-native plants can out-compete, displace and kill our native species.

Invasive plants are a threat to Massachusetts’ diverse natural communities. After decades of encroachment by barberry, bittersweet, buckthorn and other non-native species, many of Massachusetts’ forests, meadows and wetlands are overrun by invasive species. Vines climb up into the forest canopy, covering leaves and blocking photosynthesis. The weight of these vines under ice and snow is enough to break branches and bring whole trees down. Invasive plants in the understory outcompete native plants on the ground, and prevent native seedlings from regenerating. Invasive plants grow quickly and reproduce vigorously, which alters the structure and composition, and in turn, ecosystem function of the native plant community.

More than 2,200 plants have been documented in Massachusetts, and some 725 of them are non-natives that are considered naturalized (established). Of those, 72 plant species have been categorized by the Massachusetts Invasive Plant Advisory Group (MIPAG) as "Invasive," "Likely Invasive," or "Potentially Invasive." Nearly all of these invasive species have been banned for importation, propagation and sale in Massachusetts by the MA Department of Agricultural Resources.

This guide serves as a tool to identify and manage some of the most common invasive plant species you may encounter on your own property. Mechanical and chemical control guidance is provided for each species, and a glossary of botanical terms and links to additional resources are provided at the end of this guide.

Controlling invasive plants can feel overwhelming and takes extensive time and effort. For additional information on how to manage invasive plants on your property, visit our website at **massaudubon.org**.



Japanese Honeysuckle

Common Reed

Norway Maple

Management Techniques: Mechanical Control

Mechanical control of invasive plants includes hand pulling, cutting, mowing, girdling and more. These techniques may be effective in some situations, especially when dealing with young and relatively small populations. Frequent repetition may be needed for mechanical removal techniques such as hand pulling of species with a long-lived seed bank, or woody species that resprout from roots. Proper disposal of invasive plants removed is also important. Some herbaceous species, such as garlic mustard, may produce seed even if pulled while flowering. Care must also be exercised to avoid spreading invasive plant seeds with management equipment, such as mowers, as seeds of species such as black and pale swallow-wort are easily spread by mowing equipment.

The following are a few methods that you can consider using for mechanical control of invasive plants:

Hand Pulling—This technique focuses on the removal of the entire plant, including its roots. It's important to remove as much of a plant's roots as possible, as a small portion of roots left behind can still grow a new plant. Hand pulling is most effective for small-scale infestations of young plants or herbaceous species. It is best to hand pull plants when the soil is moist, and before plants produce seeds. It is important to note that hand pulling can disturb the soil surface, potentially encouraging dormant invasive plant seeds to sprout .

Cutting and Mowing— Cutting and mowing of invasive plants is most effective in areas that you can visit frequently, as these methods are to be done three to five times a year. The hope with cutting and mowing is to prevent the plant from photosynthesizing by removing as much vegetation as possible. This method often increases a plant's root system, but exhausts the plant's energy reserves over time as it works to send up new growth. Cutting and mowing is best done before a plant flowers to limit the future spread of seeds.

Girdling—This process involves cutting away at the outer and inner bark of a plant to disrupt the living connection between its roots and leaves. Cuts are made around the entire circumference of a branch or trunk of a woody plant. Girdling is most effective for invasive trees that may not be able to be cut down, and also can provide standing snags for future wildlife use.

Weed Wrenching—A weed wrench is a tool that can be effective in removing woody plants. A weed wrench uses a lever to grip and extract larger plants that cannot be hand-pulled. Weed wrenching may also result in substantial soil disturbance, so resprouts will need to be managed over time.

Grazing—Utilizing livestock, particularly goats, has been known to be an effective management tool for controlling invasive plants especially in open meadows and fields. Goats gladly munch on most invasive plants, including those with woody growth and thorns, so they can be a great alternative to cut back invasive plants in an area that you may consider mowing. Although they do need management and care, they are much lower impact than heavy machinery and do not require the use of fossil fuels.

Management Techniques: Chemical Control

Herbicides are a category of pesticides that can be an effective tool for invasive plant management, but must be carefully and thoughtfully used to avoid damage to non-target species and to protect the health and safety of the user, the public and the environment. Use of herbicides requires careful consideration and planning. Nationally, all herbicides are regulated by the federal Environmental Protection Agency. In Massachusetts, herbicides are also regulated by the Massachusetts Department of Agricultural Resources (MDAR). When using herbicides, federal law requires that you follow the directions on the herbicide label. The label provides information on how and where the herbicide may be used. This includes methods of applying herbicides, the timing of herbicide applications and health and safety rules to protect the herbicide applicator and the public. While landowners can apply herbicides on their own property, use of herbicides on other land, even by staff or volunteers of an organization, requires an herbicide applicator license.

Here are some of the terms you should know if you are considering using herbicides for invasive plant control:

Active Ingredient— The active ingredient in an herbicide is the chemical that actually kills the plant. Most herbicides include other chemicals that are added to improve the effectiveness of the active ingredient or to dilute the herbicide to the proper concentration for use without mixing. The active ingredient is different from the trade name of the herbicide product. The name and concentration of an active ingredient is listed on the label attached to all pesticide products.

Broad-spectrum (or non-selective) Herbicide— A broad-spectrum herbicide is an herbicide that contains an active ingredient that will kill all or most plants. Glyphosate is a common active ingredient in broad-spectrum herbicides frequently used for invasive plant control.

Broad-leaf Herbicide— A broad-leaf herbicide is an herbicide that will kill most broad leaf plants but will generally not kill grasses and other grass-like plants. Triclopyr is a common active ingredient in broad-leaf herbicides used for invasive plant control. Broad-leaf herbicides are particularly useful for controlling broad-leaf invasive plants in fields where grasses are present.

Cut Stem Treatment—This technique of herbicide application focuses on painting on herbicide using a sponge, paintbrush or spray bottle to cut stems and stumps of invasive plants. Stems should be cut close to the ground. For woody-stemmed species, apply herbicide directly to the cut surface immediately after cutting. For large stumps, herbicide only needs to be applied to the living tissue in the outer layer. Cut-stem treatments are most effective in late summer or fall, when plants are actively moving nutrients into their roots, but it can also be effective during the dormant season. Avoid cut-stem treatments in spring when upward sap flow tends to push herbicide away from cambial tissue.

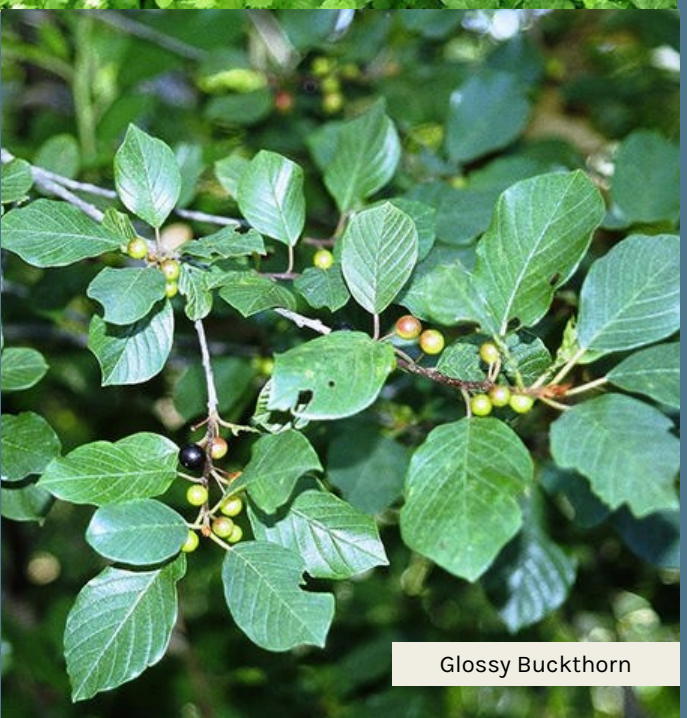
Contact Herbicide— A contact herbicide is a chemical that kills only the portion of the plant it is applied to. Herbicides of this type do not kill the roots of a plant, but may be effective in controlling annual weeds or seedlings that do not have a well developed root system.

Foliar Application—This technique involves applying herbicide directly to a plant's leaves. This method is most effective for large infestations when plants are actively growing, ideally when they are flowering or beginning to form fruit. Foliar application is typically done with a backpack sprayer or boom sprayer, and is best done when there is minimal wind and no rain in the forecast. Foliar application requires lower concentrations of herbicide, however due to the use of a spray, it is more likely to affect non-target species.

Systemic Herbicide— A systemic herbicide is an herbicide that, when applied to the leaves or other portions of a plant, is translocated throughout the plant including the roots. This generally results in the death of the entire plant, rather than just the portions directly treated with herbicide. Many plants can regrow from the roots if only the above ground portion of the plant is destroyed. Systemic herbicides can prevent this by killing the roots. In some invasive species, the root system may be larger than the parts of the plant visible above ground. Such plants will usually regrow vigorously if the roots are not destroyed. Triclopyr is a common active ingredient in systemic herbicides.

Porcelain Berry

Garlic Mustard



Glossy Buckthorn

Common Invasive Plants

This list comprises some of the most common invasive plant species you are likely to find in Massachusetts. The following pages of this guide will help you to identify each species and to learn more about methods for management.

Black Locust

Robina pseudoacacia

Identification

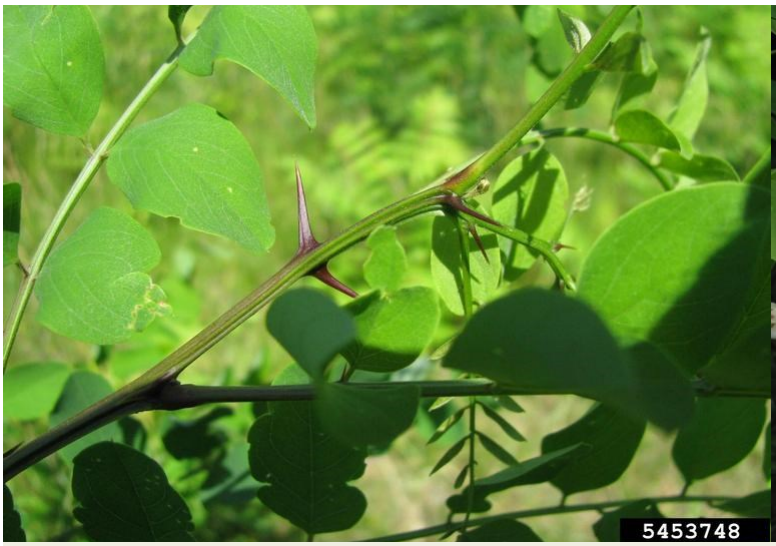
Black locust is a deciduous tree with oppositely-arranged compound leaves. Black Locust can grow up to 40-60 feet tall, and 30 feet wide. The branches and twigs usually have sharp spines. Clusters of fragrant white flowers with yellow centers appear in June; these produce fruit in flat brown pods in the fall, which can persist through winter.

Threat

Black locust is an early successional tree species that colonizes fields and other disturbed areas. It does not generally invade existing forests because it does not survive in shade. Unlike most other plant species classed as invasive in Massachusetts, it is native to North America, occurring naturally as far north as central Pennsylvania. Black locust has the ability to alter soil nutrient conditions in a manner that threatens native plants adapted to grow in low nutrient soils.

Management

Black locust sprouts vigorously from stumps and suckers from roots when cut. Painting of freshly cup stumps with glyphosate-based herbicides or triclopyr-based herbicides is generally effective, but may not entirely eliminate sprouting and suckering. A follow-up treatment with a foliar spray may be needed during the growing season after cutting. Hand pulling or removal of saplings with a Weed Wrench may be effective for small populations, although sprouting and suckering may occur. Annual mowing can prevent black locust from colonizing fields, but regular mowing must occur to limit regrowth.



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Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Norway Maple

Acer platanoides

Identification

Norway maple is a deciduous tree that typically grows to 40 to 60 feet (maximum 100 feet) in height. The leaves are oppositely arranged, and its petioles produce a milky sap when broken. The leaves are typically broader than they are high, with five prominent lobes. Yellow-green flowers appear in April or May, which produce fruits with two winged samaras. Norway maple has been used widely as a landscaping tree, so some cultivars have deep red or purple leaves in the fall.

Threat

Norway maple, which originates from Europe and western Asia, has been widely planted in Massachusetts as a shade tree. Since 2009 it is illegal to import or sell Norway maple in Massachusetts. It produces large numbers of winged seeds, which are efficiently dispersed across the landscape by wind. Norway maple produces deep shade that suppresses competing native species. In natural areas, Norway maple produces dense stands that exclude native plants.

Management

Removal of mature Norway maple trees to eliminate the seed source is an important management measure where possible. Hand pulling of seedlings and other mechanical removal, such as removal of saplings using a Weed Wrench, may be effective for small populations. Girdling can be effective for mature trees. Glyphosate-based herbicides or triclopyr based herbicides are effective when applied to cut stems or girdles. Norway maples stumps sprout vigorously when cut unless herbicide is applied to the freshly cut stump.

Richard Gardner, Bugwood.org

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Tree-of-Heaven

Ailanthus altissima

Identification

Tree-of-heaven is a fast growing deciduous tree that can reach 80 feet in height. It has large, alternately-arranged compound leaves that resemble sumac. Leaves of tree-of-heaven can be distinguished from sumac by the notched base of each leaflet. Large shield-shaped leaf scars are also prevalent on its stems. Clusters of small pale yellow flowers develop above the foliage in spring. Twisted samara fruits appear in late summer to early fall. Foliage turns yellow in the fall, unlike the fall red foliage of the native sumac.

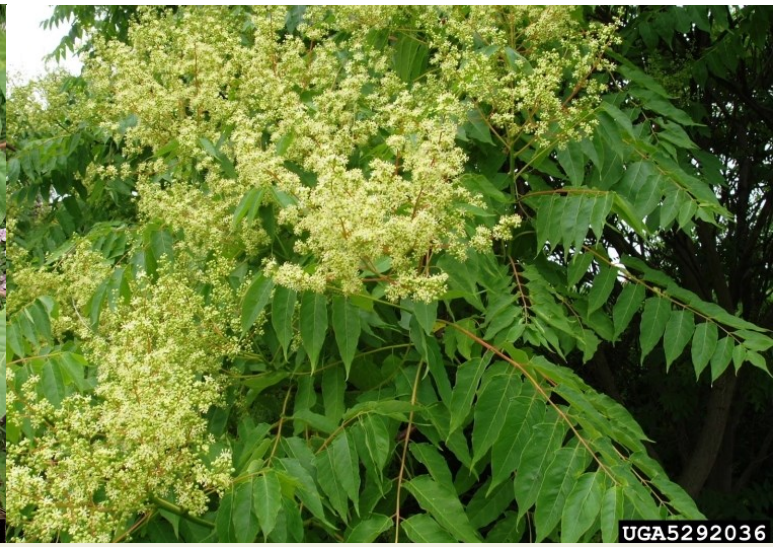
Threat

Originating from China, a single tree-of-heaven can produce several hundred thousand seeds a year. Seeds are effectively dispersed by wind and water. Tree-of-heaven can form dense stands that exclude native species and often becomes established in disturbed areas, and is most commonly found in urban and suburban areas. There is some evidence that tree -of-heaven introduces chemicals into the surrounding soil that inhibit the growth of competing plants.

Management

Tree-of-heaven is difficult to control by mechanical methods, however hand-pulling saplings, cutting trees before they become too large, as well as cutting during the summer when root reserves are low can help control populations. It's important to note that Tree-of-heaven stumps sprout vigorously when cut unless herbicide is applied to the freshly cut stump. Glyphosate-based herbicides or triclopyr-based herbicides are effective.

Richard Gardner, Bugwood.org



Jan Samanek, Phytosanitary Administration, Bugwood.org

Jan Samanek, Phytosanitary Administration, Bugwood.org

Jan Samanek, Phytosanitary Administration, Bugwood.org

Amur Honeysuckle & Morrow's Honeysuckle

Lonicera maackii & Lonicera morrowii

Identification

Shrub honeysuckles, including the amur honeysuckle and Morrow's honeysuckle, are medium to large deciduous shrubs that may grow in excess of 15 feet tall. Leaves of both honeysuckles are oppositely-arranged and ovate. Leaves of the amur honeysuckle are slightly hairy and come to a narrow point. Mature stems of both species are hollow, unlike the native honeysuckle stems which have a white pith. Flowers of both species are white and tubular with five petals, and fade to yellow with age; however, Morrow's honeysuckle flowers are hairy. All shrub honeysuckles flower in late spring or early summer and produce large numbers of red fruit that ripen in mid to late summer. Bell's honeysuckle (Lonicera x bella) and Tatarian honeysuckle (Lonicera tatarica) are two additional invasive species of honeysuckle you may encounter.

Threat

Originating from Europe and Asia, shrub honeysuckles have been widely used for landscaping. They produce large numbers of fruit that are eaten by birds, which then disperse the seeds. Shrub honeysuckles can form large stands that displace native plants in fields, field edges and forests.

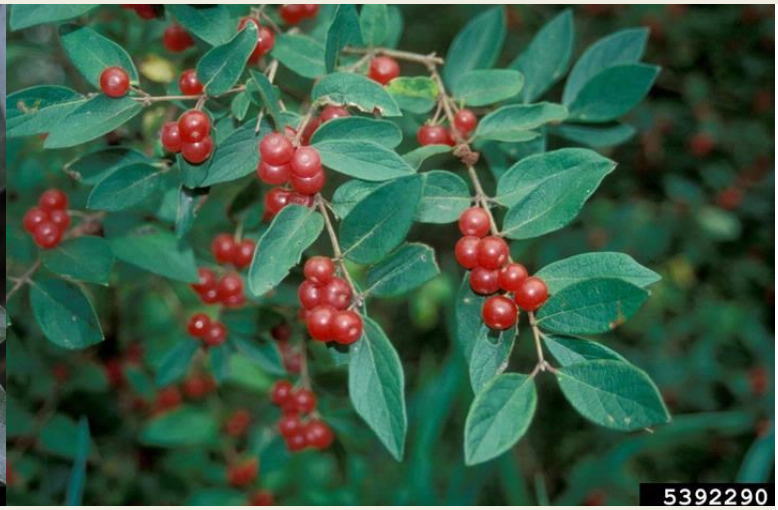
Management

Hand pulling may be effective for small numbers of seedlings. Pulling or digging of large plants that have produced fruit may result in the germination of large numbers of bush honeysuckle seedlings in the disturbed soil. Glyphosate-based herbicides are effective when applied to freshly cut stumps or as a foliar spray. Triclopyr-based herbicides are also effective for cut stump treatment.

Amur honeysuckle: Richard Gardner, Bugwood.org

Morrow's honeysuckle: John M. Randall, The Nature Conservancy, Bugwood.org

Amur honeysuckle: Chris Evans, University of Illinois, Bugwood.org



Morrow's honeysuckle: John M. Randall, The Nature Conservancy, Bugwood.org

Autumn Olive

Elaeagnus umbellata

Identification

A large deciduous shrub that grows to as much as 12 feet in height, and is often nearly as broad as tall. Branches are covered in silvery or rust-colored scales. Leaves are dark green above with smooth margins, and silver in color underneath. Large numbers of tubular, fragrant cream-colored flowers are produced in spring, followed by bright red fruits in fall. The fruits are also finely dotted with silvery scales.

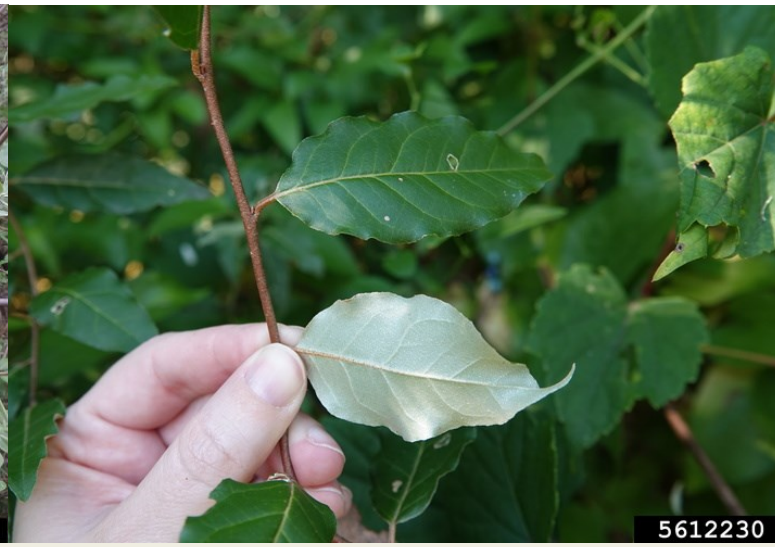
Threat

Autumn olive, which originates from eastern Asia, was widely planted as a wildlife food , as well as a cover and erosion control plant in the mid twentieth century. Autumn olive produces large numbers of fruit that are eaten by birds and small mammals that then disperse the seeds. It invades fields and can outcompete native shrubs in early successional habitats. Autumn olive can also fix nitrogen, which allows it to colonize low nutrient soils.

Management

Seedlings and small saplings may be hand-pulled or cut. Annual mowing may be sufficient to prevent autumn olive from becoming established in fields, although autumn olive plants along field edges often slowly encroach into field areas by restricting mower access. When cut, autumn olive stumps resprout vigorously unless treated with herbicide. Glyphosate-based herbicides and triclopyr-based herbicides provide effective control with cut stump and foliar applications.

Richard Gardner, Bugwood.org



T. Davis Sydnor, The Ohio State University, Bugwood.org

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Common Barberry & Japanese Barberry

Berberis vulgaris & Berberis thunbergii

Identification

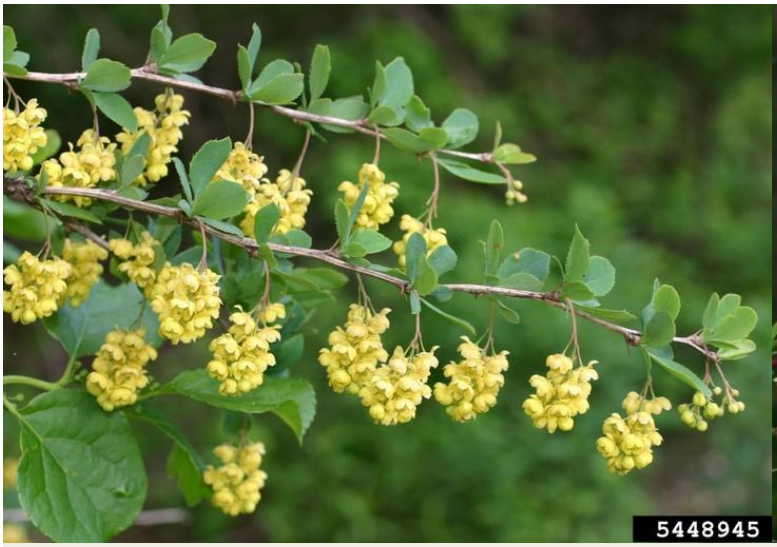
Japanese barberry is a deciduous shrub that grows 2 to 6 feet tall. Common barberry is similar, but grows to 10 feet tall. Both are covered with sharp spines. Japanese barberry spines are usually unbranched while common barberry spines are often three-parted. Japanese barberry has smooth leaf margins, while common barberry leaves are serrated. Common barberry forms yellow flowers that droop from its branches, while Japanese barberry flowers vary from yellow to cream in color. Both common and Japanese barberry produce red oval-shaped fruits in mid-summer and can persist through winter. Both species of barberry have yellow inner bark and roots.

Threat

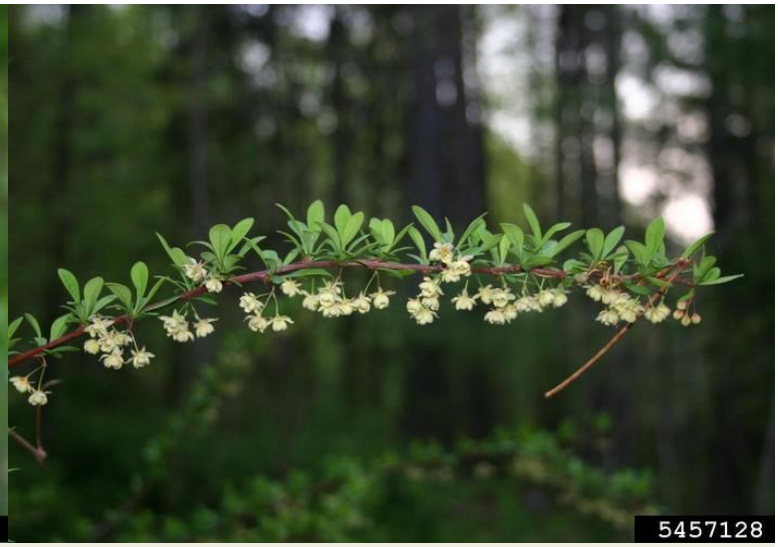
Barberry invades fields, wetlands and forests. Japanese barberry has been widely planted for landscaping and has often spread into adjacent natural areas. The high dominance of Japanese barberry in the forest understory is often a sign of intense herbivory by deer who find barberry to be unpalatable. Both barberry species produce large numbers of fruits that are eaten by birds, which then disperse the seeds. Common barberry is much less common than Japanese barberry.

Management

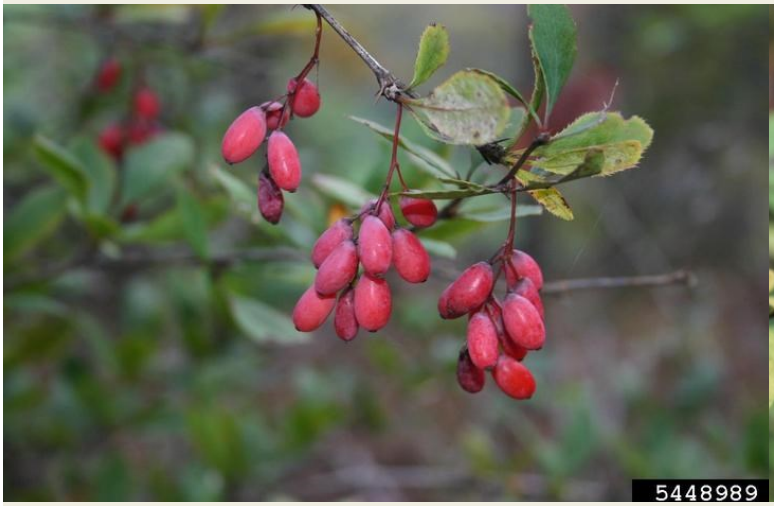
Both species resprout vigorously after cutting so control by cutting requires frequent repetition over several seasons. Annual mowing may be sufficient to prevent barberry from colonizing fields. Japanese barberry can be effectively controlled with a foliar spray of glyphosate-based or triclopyr-based herbicides. Applying herbicide to freshly cut stems may be difficult because most barberry plants have multiple stems.



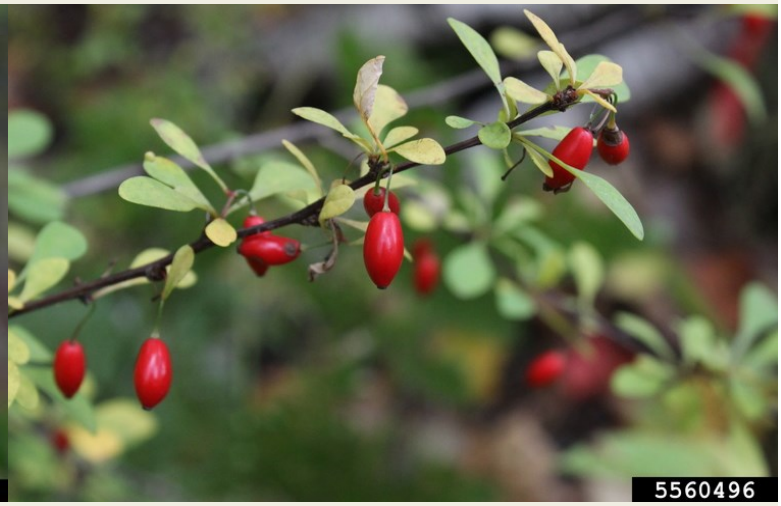
Common Barberry—Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Japanese Barberry—Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Common Barberry—Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Japanese Barberry—Chris Evans, University of Illinois, Bugwood.org

Common Buckthorn

Rhamnus cathartica

Identification

Common buckthorn is a deciduous shrub or small tree, sometimes in excess of 20 feet tall. Leaves are oval with finely-toothed edges, with prominent veins that curve towards the leaf tip. Leaves can be arranged opposite, nearly opposite or alternate. Its twigs are often tipped with a sharp spine. In spring, it produces small four-petal, yellow-green flowers. In fall it produces large numbers of small black or dark purple fruit, that can persist through winter.

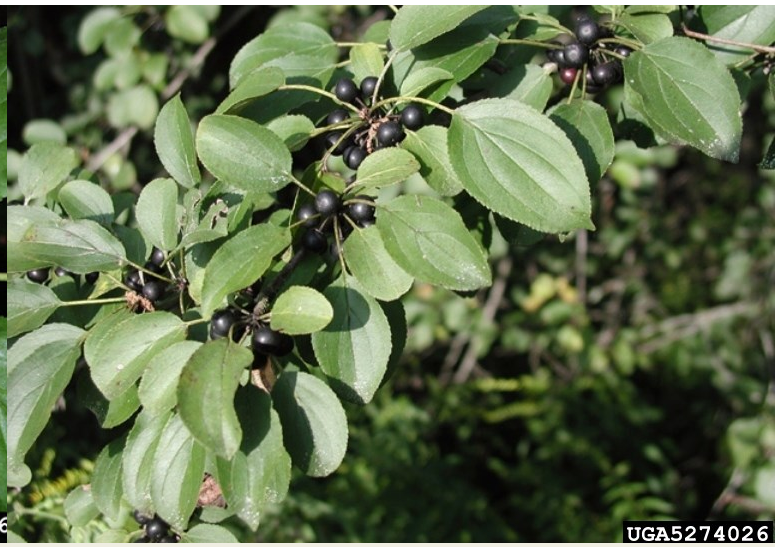
Threat

Native to Europe and western Asia, common buckthorn produces large numbers of fruit that are eaten by birds that then disperse the seeds. It invades fields and field edges and can form dense stands that outcompete native shrubs, especially in soils rich in calcium carbonate.

Management

Common buckthorn is a dioecious plant with male flowers on one plant and female flowers on another plant. Cutting down plants before they flower can be efficient at disrupting the breeding system. Common buckthorn sprouts vigorously when cut unless treated with herbicides. Follow-up treatment may be needed in the growing season after cutting to control stump sprouts and seedlings. Glyphosate-based or triclopyr-based herbicides applied as a foliar spray or directly to fresh cut stumps are effective.

Paul Wray, Iowa State University, Bugwood.org



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Chris Evans, University of Illinois, Bugwood.org

Glossy Buckthorn

Rhamnus frangula

Identification

Glossy buckthorn is a deciduous shrub or small tree that can grow to 20 feet in height. The gray-brown bark is smooth and heavily speckled with lenticels. Leaves are dark green and glossy above, and dull green underneath. Leaves are alternately arranged, although sometimes appear to be opposite . Glossy buckthorn produces small five-petal, yellowish-green flowers in spring and summer, and large numbers of small fruit that ripen from red to black in the fall.

Threat

Native to Europe, glossy buckthorn invades fields, forests and wetlands. It can form dense stands in all of these habitats and outcompete native plants. Glossy buckthorn produces large numbers of fruit that are eaten by birds, which then disperse the seeds. When mature glossy buckthorn shrubs are removed, large numbers of seedlings typically emerge the following growing season in the area formerly shaded by the mature plant.

Management

Small populations can be controlled by hand pulling or removal using a Weed Wrench. Mowing generally results in coppicing. Glyphosate-based and triclopyr-based herbicides are effective as foliar sprays or when applied directly to freshly cut stems.

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Rob Routledge, Sault College, Bugwood.org

Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

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Multiflora Rose

Rosa multiflora

Identification

A deciduous shrub with long, arching thorny branches that are green to red in color. It may grow up to 15 feet tall, but is typically under 10 feet and often wider than tall. Leaves are pinnately compound with 7-9 leaflets, and its fringed leaf petioles help to distinguish it from most other rose species. In May and June it produces large numbers of fragrant white (sometimes slightly pink) flowers, followed by small red fruit that become leathery with age and persist through winter.

Threat

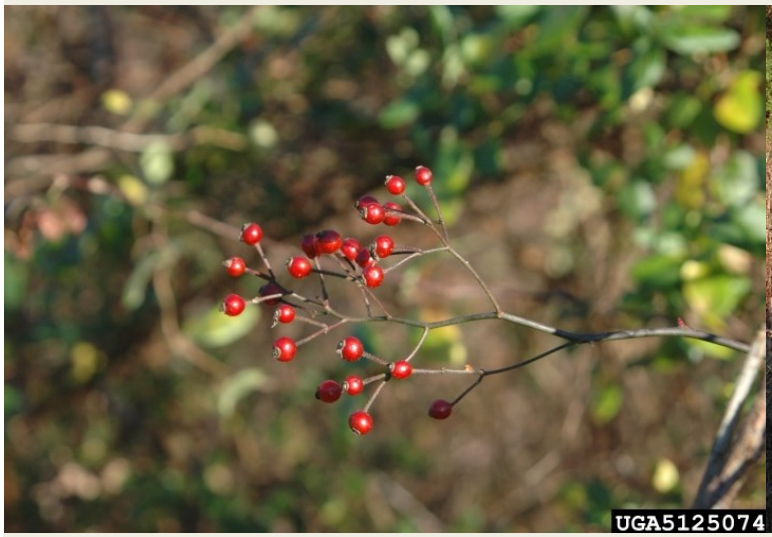
Originating from eastern Asia, multiflora rose produces large numbers of fruit that are eaten by birds, which then disperse the seeds. Seeds can remain viable in the soil for up to 20 years. Multiflora rose invades fields, field edges, forests and wet woodlands, and may form dense thickets that displace native species.

Management

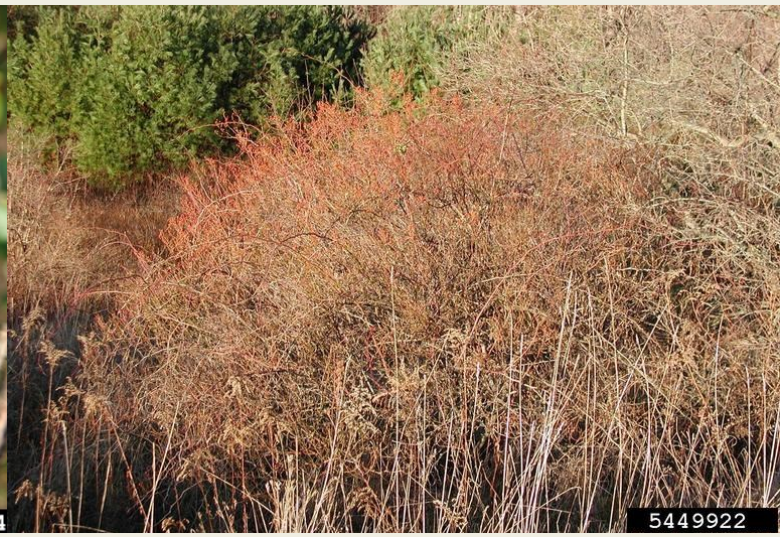
Annual mowing will suppress but not eradicate multiflora rose in fields. Mowing six times a year for several years has been demonstrated to result in high multiflora rose mortality, but is not practical for fields maintained as wildlife habitat. Manual control of even small populations by digging is difficult due to the sharp thorns on its stems. Foliar applications of glyphosate-based or triclopyr-based herbicides are effective. Triclopyr-based herbicides are recommended for control of multiflora rose in fields where it grows intermixed with grasses. In much of the introduced range in North America, multiflora rose has been controlled by rose rosette disease, which does not impact native roses.

Rob Routledge, Sault College, Bugwood.org

Rob Routledge, Sault College, Bugwood.org



Richard Chris Evans, University of Illinois, Bugwood.org



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Winged Euonymus (Burning Bush)

Euonymus alatus

Identification

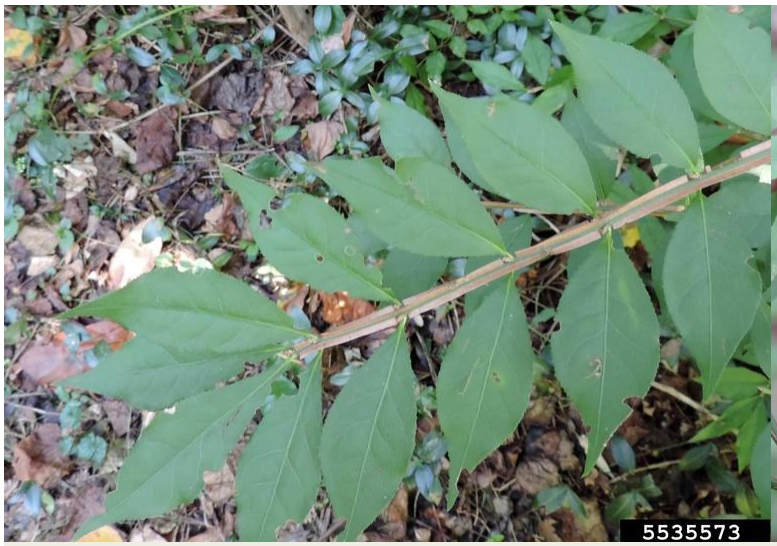
Winged euonymus is a medium to large shrub that grows 5 to 10 feet tall and often as wide as tall. Corky wings on the stems are usually present and diagnostic. Its leaves are oppositely arranged, and are tapered at the tips. Winged euonymus is also known as burning bush due to its brilliant autumn color. When growing in the wild, its autumn color is typically a muted pink. Four-petaled, greenish yellow flowers form in spring, and its fruits appear in fall as red capsules that split to reveal orange fleshy seeds.

Threat

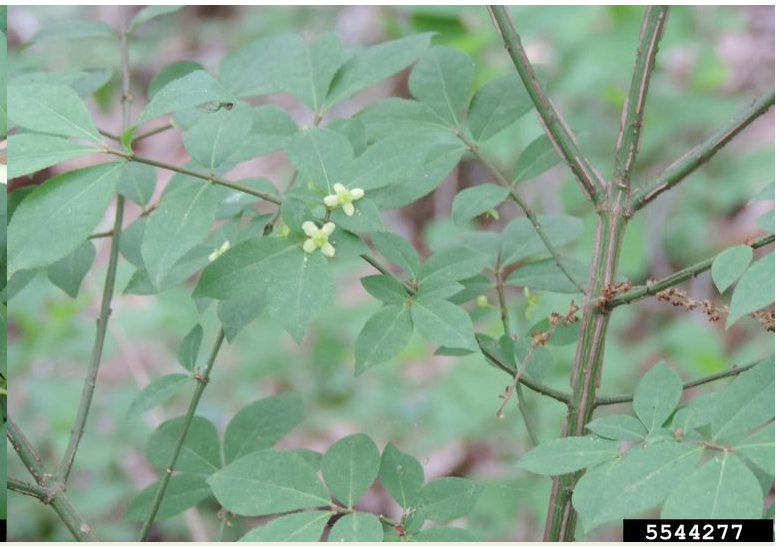
Originating from eastern Asia, winged euonymus has been widely planted for landscaping. Although banned for importation, propagation and sale in Massachusetts since 2009, the presence of numerous fruit-bearing plants in developed areas makes control difficult. Winged euonymus produces large numbers of fruit that are eaten by birds which then disperse the seeds. It can colonize fields and forest understories, and outcompete native shrubs.

Management

Hand pulling may be successful for controlling small populations. Cutting results in resprouting unless herbicides are used. Glyphosate-based or triclopyr-based herbicides applied as a foliar spray or directly to freshly cut stumps appear to be most effective.



Richard Gardner, Bugwood.org



Richard Gardner, Bugwood.org

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Black Swallow-Wort & Pale Swallow-Wort

Cynachum louiseae & Cynachum rossicum

Identification

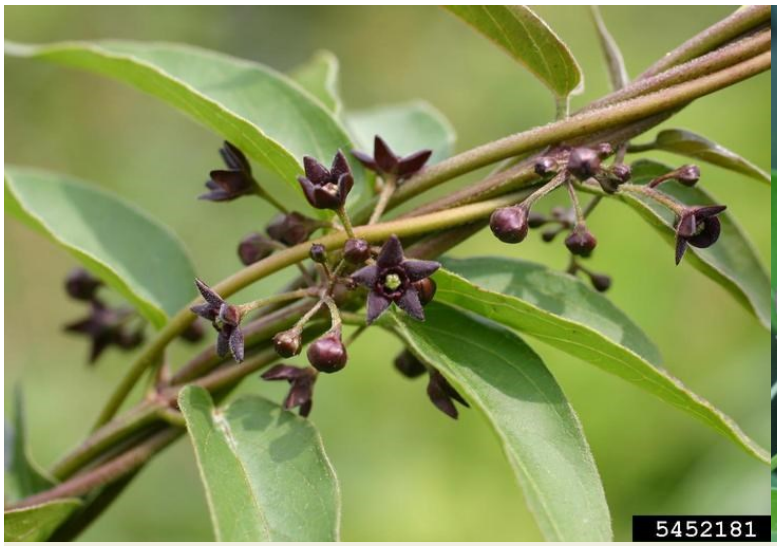
Black and pale swallow-wort are herbaceous perennial vines with oppositely arranged leaves. These species are very similar and are best differentiated by their flowers. Black swallow-wort flowers have a five-parted corolla with black-purple triangular lobes. Pale swallow-wort flowers have a pale pink or yellow corolla with longer and often slightly twisted lobes. Fruits form in slender pods, that split to reveal small seeds with white tufts.

Threat

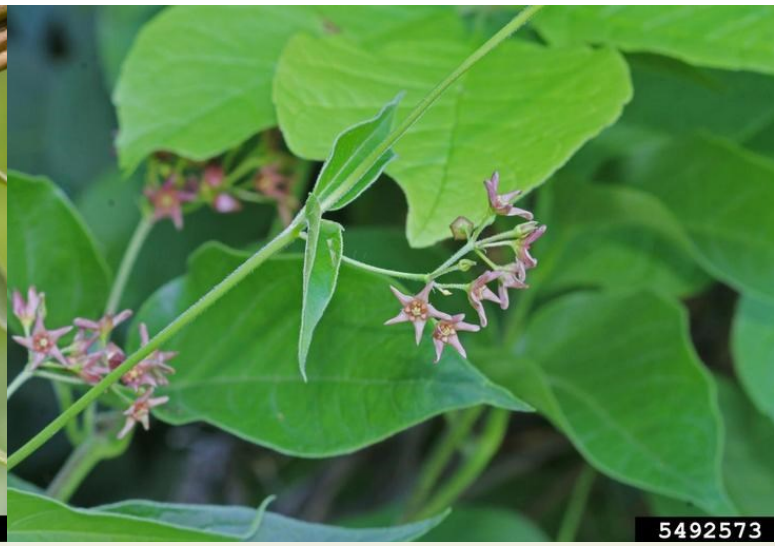
Originating from Europe, black and pale swallow-wort invade fields, field edges and forests. Both species produce large numbers of wind-dispersed seeds, similar to those produced by common milkweed. The swallow-worts are closely related to common milkweed and may interfere with the life cycle of monarch butterflies.

Management

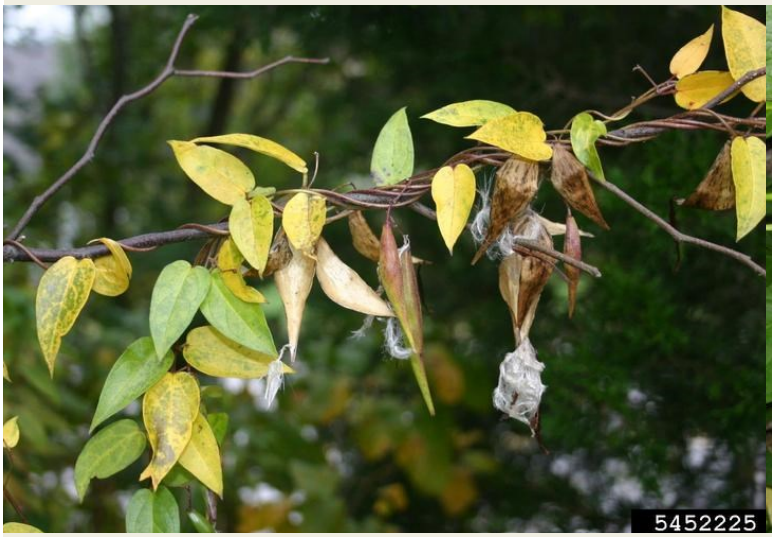
Hand digging or pulling may be possible with small populations. Established plants have large root crowns that will resprout if not removed. Mowing prior to seed production may be helpful in preventing the spread of swallow-wort, but swallow-wort appears capable of surviving even in lawns that are mowed weekly. Glyphosate-based and triclopyr-based herbicides applied as a foliar spray are effective, but the treated plants often survive for the remainder of the growing season. Herbicide treatment should be performed before July 1st to prevent seed production. Follow-up treatments may be needed for several years to control seedlings.



Black swallow-wort—Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Pale swallow-wort—Rob Routledge, Sault College, Bugwood.org



Black swallow-wort—Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Pale swallow-wort—Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Hardy Kiwi

Actinidia arguta

Identification

Hardy kiwi is a deciduous woody vine that can grow more than 20 feet per year. Its mature bark is gray and flaky. Leaves are alternately-arranged, oval-shaped with fine teeth along the edges. Its leaves also have distinctive red petioles or stalks. Leaves stay green until the autumn, when they turn yellow .Clusters of fragrant, white flowers bloom in mid-summer. Hardy kiwi produces green, grape-sized fruits which contain many seeds.

Threat

Originating from East Asia, hardy kiwi can readily germinate under a closed canopy and vigorously climbs and smothers surrounding vegetation. The weight of the vines can cause mature trees to snap, especially in the winter with the added weight of snow and ice. Its fruits are eaten by various mammals and birds, who then disperse the seeds.

Management

Hardy kiwi seedlings and small vines can be controlled by hand pulling. Larger plants can be controlled through the use of a systemic herbicide, applied either as a foliar spray or directly to the freshly cut stump of the vine. For plants growing high into trees, cutting the vine after leaf fall and treating the stump with herbicide and leaving the vine to decay in the tree minimizes damage to the tree.

Mass Audubon

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Mass Audubon

Mass Audubon

Japanese Honeysuckle

Lonicera japonica

Identification

Japanese honeysuckle is a semi-deciduous woody vine that can grow up to 30 feet long. Leaves are oppositely-arranged and oblong to oval in shape. Leaves and stems are covered in fine hairs. Showy, white to cream colored, fragrant flowers are borne in pairs in leaf axils along the stem in spring to early fall. Japanese honeysuckle produces white flowers in summer and small black or purple fruit in late summer and early fall.

Threat

Japanese honeysuckle invades fields, field edges, open woodlands and floodplains. It outcompetes other plants and can smother trees and shrubs. Japanese honeysuckle reproduces both vegetatively and by seed. Japanese honeysuckle occurs throughout Massachusetts but is most common and has the greatest impact in the southeast portions of the state. Japanese honeysuckle also may grow in or adjacent to wetlands.

Management

Hand pulling can be effective for small populations. Mowing is generally only effective if combined with herbicide treatments. Glyphosate-based or triclopyr-based herbicides are effective as a foliar spray or when applied directly to freshly cut stems.

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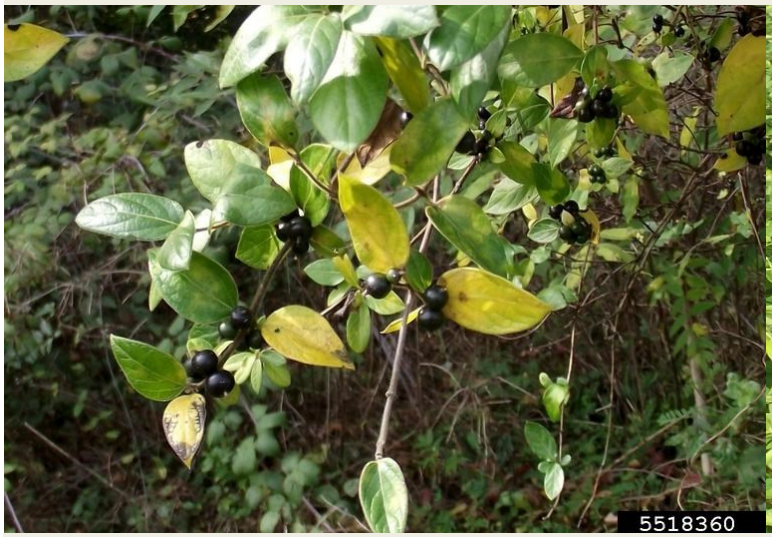
William M. Ciesla, Forest Health Management International, Bugwood.org



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Porcelain-Berry

Ampelopsis brevipedunculata

Identification

Porcelain-berry is a woody deciduous vine that grows up to 20 feet long. It resembles native wild grapes and Virginia creeper. Porcelain-berry leaves are alternately arranged, and typically have three to five deep lobes; however leaves can vary from slightly lobed to deeply dissected. Porcelain-berry stems have non-adhesive tendrils, and its bark is ridged and furrowed, compared to the shredded bark of the native grape. Inconspicuous greenish to white flowers form in clusters in mid-summer. Porcelain-berry fruits change from green to lilac to blue, and are somewhat similar to grapes in appearance.

Threat

Porcelain-berry invades open and wooded areas. It grows rapidly and smothers other vegetation. Porcelain-berry is most commonly found in southeastern Massachusetts, but also occurs in the greater Boston area and western Massachusetts.

Management

Manual control by hand pulling may be successful for small populations. Mowing before the fruit matures can be effective to prevent spread of existing populations in fields. Glyphosate-based and triclopyr-based herbicides applied as a foliar spray are effective.

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Round Leaf Bittersweet

Celastrus orbiculatus

Identification

Round leaf bittersweet is a deciduous, climbing vine that can grow 60 or more feet long with a stem up to 6 inches in diameter. Leaves are elliptical to circular with fine teeth on the margins. Small greenish-white flowers appear on the leaf axils in spring. In the fall, it produces large numbers of colorful red fruit that begin as green, ripen to yellow and split to reveal scarlet berries that can persist into winter.

Threat

Originating from China and Japan, round leaf bittersweet invades fields, field edges and forest openings. Round leaf bittersweet often grows into and over shrubs and trees, forming large, dense mounds of vegetation. It produces large numbers of fruit that are eaten by birds, which disperse the seeds. Although it grows best in bright light, round leaf bittersweet seeds can germinate under a forest canopy. Should an opening in the canopy result in increased light levels, round leaf bittersweet responds with rapid growth.

Management

Hand pulling of seedlings can be successful with small populations, although care must be taken to pull the entire root, which might otherwise resprout. Larger vines are best controlled by cutting and painting the freshly cut stems with glyphosate-based or triclopyr-based herbicides. Application of herbicides on the bark of larger vines can also be effective and eliminates the need for cutting. Foliar application of triclopyr-based herbicides may also be effective on small plants.

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Garlic Mustard

Alliaria petiolata

Identification

Garlic mustard is a biennial herb. In its first year, it forms a low-growing vegetative rosette with heart-shaped leaves that become more triangular and sharply-toothed as it matures. The foliage smells like garlic when crushed. In its second year, garlic mustard produces flower stalks in early spring bearing large numbers of small, four-petaled white flowers that can reach three feet in height. Slender, erect green pods containing shiny black seeds form in summer to early fall.

Threat

Originating from Europe, garlic mustard produces large numbers of seeds (up to 3,000 per plant) that are spread by wind and water. Garlic mustard forms dense stands that exclude native species and can dominate fields and open forest understories. There is also evidence that garlic mustard alters soil microorganism communities in a manner disadvantageous to native plant species.

Management

Small populations of garlic mustard can be removed by hand pulling; however once it is established, control measures must be repeated until the seed bank is exhausted. Repeated mowing to prevent seed production may also be effective. Herbicides applied as a foliar spray can be effective. Glyphosate-based herbicides appear to be more effective than triclopyr -based herbicides, although triclopyr-based herbicides may be preferable in situations where garlic mustard grows interspersed with grasses.

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Goutweed

Aegopodium podagraria

Identification

Goutweed is a perennial herb that spreads by rhizomes to form dense mats. It typically grows 8 to 15 inches tall. Its basal and lower leaves have long petioles, and typically have 9 leaflets, while its upper leaflets are typically smaller with three leaflets. Leaves may be variegated in color or solid green, with small teeth and pointed tips. In late spring and summer it produces small white flowers on inflorescences that may grow to a height of several feet. Seeds are small, brown and flat.

Threat

Originating from Asia, goutweed forms dense mats that outcompete native plants. It grows well in shade and can dominate forest understories. It reproduces by seed and vegetatively by rhizomes. It generally invades natural areas from adjacent developed areas where it has been planted as an ornamental ground cover.

Management

Hand pulling does not tend to be effective due to the plant's extensive rhizomes. Frequent mowing can be effective, which you can do either repeatedly throughout the growing season, or in spring followed by a covering of black plastic for the remainder of the season. Glyphosate-based herbicides applied as a foliar spray or by swabbing on leaves provides effective control.

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Japanese Knotweed

Reynoutria japonica

Identification

Japanese knotweed is a perennial herb that grows up to 10 feet tall and forms dense stands. Its bamboo-like stems are hollow, and young shoots are often covered in red speckles. Leaves are alternately arranged and broadly-ovate. Flowers appear in late summer, with elongated clusters of small white flowers. It produces small-winged fruits, containing shiny triangular seeds. The dead stems of Japanese knotweed typically remain standing in winter.

Threat

Japanese knotweed forms dense stands that displace native vegetation. Japanese knotweed spreads primarily by rhizome fragments and often grows in areas of recent soil disturbance; for example, rhizomes are often accidentally moved with fill during construction work. Rhizomes may spread 50 feet or more laterally and may penetrate many feet deep into the soil. Japanese knotweed often invades riparian habitats as rhizomes are scoured from stream banks and carried downstream. To start new colonies on exposed banks and bars.

Management

Hand pulling is generally unsuccessful due to the ability of rhizome fragments to resprout. Herbicides can be successful but also require repeated applications. Herbicides can be applied as a foliar spray or to freshly cut stems in late summer and early fall. Stem injection of herbicides has been highly successful in some instances but requires specialized equipment and is extremely time and labor intensive.

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Purple Loosestrife

Lythrum salicaria

Identification

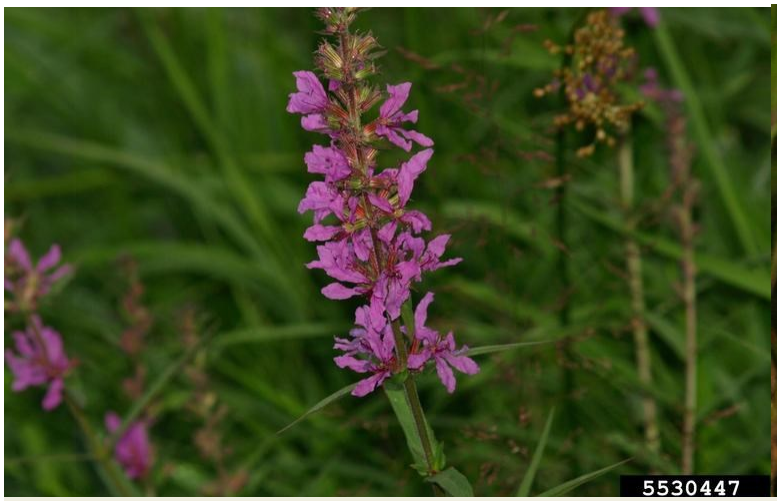
Purple loosestrife is a multi-stemmed perennial herb that grows up to 6 feet tall. Its leaves are opposite or whorled, and lance-shaped. Purple loosestrife produces inflorescences covered in bright magenta flowers in July and August. Flowers have five to seven petals. Fruits are produced as capsules and contain several reddish brown seeds. Individual plants can produce more than a million seeds in a single growing season.

Threat

Originating in Europe and Asia, purple loosestrife invades wetlands and can displace native plant species. Control of purple loosestrife is especially important before and during construction projects that impact wetlands as it thrives in disturbed wetland areas.

Management

Small populations may be controlled by hand pulling or repeated cutting, which must be performed before seed production to be successful. Herbicides registered for use in wetlands are effective but may be difficult to apply since purple loosestrife often grows intermixed with desirable vegetation. Biocontrol measures have been demonstrated effective in suppressing purple loosestrife populations and the Massachusetts Wetlands Restoration Program is currently coordinating purple loosestrife biocontrol efforts in Massachusetts. In areas where water level manipulation is an option, maintaining high summer water levels may prevent germination of purple loosestrife seeds and suppress established plant populations.



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Jennifer Andreas, Washington State University, Bugwood.org

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Yellow Iris

Iris pseudacorus

Identification

A perennial herb with grass-like leaves that are stiff and erect. Yellow iris typically grows 1.5 to 4 feet tall. Flower stalks produce yellow flowers in late spring and early summer. Yellow iris is the only yellow-flowered iris naturalized in Massachusetts. Fruits appear as long capsules that can contain up to 120 seeds each. Yellow iris has thick, branching rhizomes that form dense mats and are pink inside.

Threat

Originating from Europe, western Asia and northern Africa, yellow iris forms dense colonies that displace native plant species in freshwater and brackish wetlands.

Management

Manual removal or repeated cutting may be an option for very small infestations. Herbicides are recommended for larger colonies. A herbicide registered for use in wetlands, such as Rodeo must be used. Herbicide application can be done by cutting yellow iris and applying herbicide directly to freshly cut stems, swabbing leaves using a sponge or as a spray. For treatment of yellow iris, permitting under the Massachusetts Wetlands Protection Act is necessary. The local conservation commission should be contacted and necessary permits and approvals obtained before implementing management measures.

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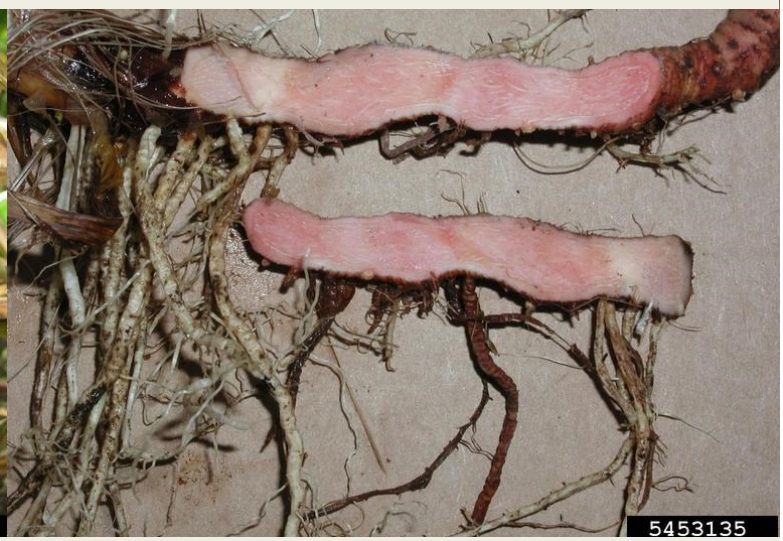

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Common Reed

Phragmites austraalis ssp. australis

Identification

A tall perennial grass that often grows to a height of 12-15 feet forming dense stands. Leaves are broad and pointed and form on thick vertical stalks. Large, fluffy purplish inflorescences up to 15 inches long develop at the top of the stems from July to September. Seeds are brown and lightweight. The dead stems and inflorescences usually remain standing in winter. Common reed spreads by fast growing rhizomes, which makes treating only part of a stand ineffective.

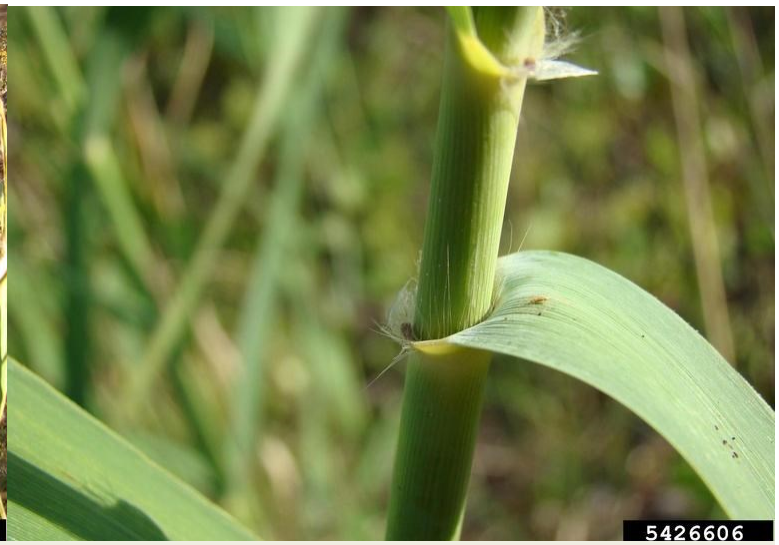
Threat

Originating from Europe and Asia, common reed forms dense colonies that displace native plant species in freshwater and brackish wetlands. Common reed invasion is often a symptom of eutrophication, which implies that addressing the source of nitrogen pollution could make the wetland more resistant to re-invasion.

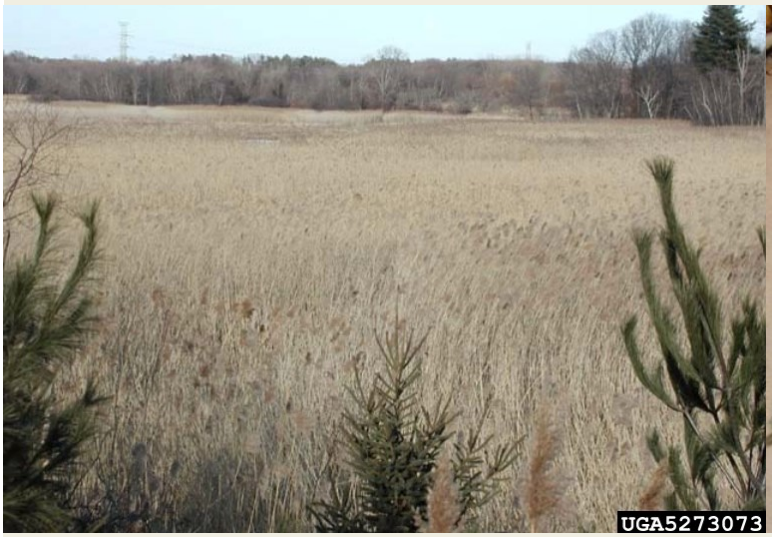
Management

Repeated hand pulling or cutting may be effective for small infestations. Hand pulling or cutting should be repeated several times during the growing season. Where water level manipulation is an option, increasing water levels may be effective, particularly if combined with cutting, pulling or herbicide treatment. For larger infestations, a glyphosate-based herbicide applied in late summer or early fall after flowering is highly effective. In coastal areas where common reed has become established in wetlands where tidal flooding has been restricted by obstructions, restoration of tidal flow may be effective in controlling common reed.

Caleb Slemmons, National Ecological Observatory Network, Buggwood.org



Rebekah D. Wallace, University of Georgia, Bugwood.org



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Japanese Stilt-Grass

Microstegium vimineum

Identification

Japanese stilt-grass is an annual grass that typically forms dense, low mats but can grow from 16 to 40 inches tall. Leaves are lance-shaped, and between one and three inches in length. A silvery stripe runs to the length of each leaf. Stems are thin and wiry, and can be green, purple or brown in color. Flower spikes , one to two inches in length, appear in late summer which mature to carry small red to yellow seeds. Roots are shallow and fibrous. When Japanese stilt-grass dies back in winter, it forms a thick layer of tannish thatch.

Threat

Originating from Asia, Japanese stilt-grass forms dense monocultures that displace native plants. The seeds are highly persistent in soils, making eradication difficult. Japanese stilt-grass often invades successional forests, fields and floodplains.

Management

Hand pulling may be feasible for small infestations. Mowing may also be effective if done before seeds are set. Glyphosate-based herbicides are effective for eradication. Since the seeds of Japanese stilt-grass persist in the soil for a number of years, infestation sites should be inspected annually for several years after control measures have been implemented.

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Glossary of Botanical Terms

- **Alternate Leaves**—leaves that are single at each node and alternate to each other
- **Axil**— the angle between the upper side of a leaf or stem and the supporting stem or branch
- **Axis**—the main stem of a whole plant or inflorescence; the line along which this stem extends
- **Broad-Leaved**—a plant with wide, flat leaves
- **Cambium**—a layer of tissue between the inner park and the wood that is responsible for secondary growth in plants and forming the annual rings of wood
- **Compound Leaf**—a leaf of a plant consisting of several distinct parts (leaflets) joined to a single stem
- **Corolla**—the petals of a flower, typically forming a whorl within the sepals and enclosing the reproductive organs
- **Deciduous**—shedding foliage at the end of a growing season
- **Dioecious**— having male reproductive organs in one individual and female in another.
- **Dissected Leaves**— cut deeply into fine lobes
- **Inflorescence**— a cluster of flowers on a branch or a system of branches
- **Lance-Shaped**—tapering to a point at the apex and sometimes at the base
- **Leaflet**—each of the leaflike structures that together make up a compound leaf
- **Lenticel**—one of many raised pores in the stem of a woody plant that allows gas exchange between the atmosphere and the internal tissues
- **Opposite Leaves**—leaves that are paired at the node and opposite to each other
- **Ovate**— shaped like an egg in outline with the base wider than the end
- **Petiole**—the stalk that joins a leaf to a stem
- **Pith**—a continuous central strand of spongy tissue in the stems of vascular plants
- **Rhizomes**— a horizontal underground stem that sends out both shoots and roots
- **Samara**—a winged nut containing one seed, as in ash and maple
- **Seed Bank**— the reservoir of viable seeds present in a plant community
- **Whorled leaves** — circular arrangement that is extended from a single point and wraps around the stem

Additional Resources

Center for Invasive Species and Ecosystem Health: A comprehensive resource identifying invasive and exotic species of North America including a searchable database of species photos and identification information.

https://www.invasive.org/

Invasive Plant Atlas of New England: A comprehensive web-accessible database of invasive and potentially invasive plants in New England.

https://www.eddmaps.org/ipane/

Massachusetts Invasive Plant Advisory Group: A voluntary collaborative of organizations and professionals charged by the Massachusetts Executive Office of Environmental Affairs to provide recommendations to the Commonwealth regarding which plants are invasive and steps to manage these species.

https://www.massnrc.org/mipag/

MassWildlife Natural Heritage & Endangered Species Program: Resources provided by the State to identify and manage the most problematic plant species.

https://www.mass.gov/service-details/invasive-plants:

Wild Plants I Have Known…and Eaten
Written by Russ Cohen, illustrations by Stephanie Letendre
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http://identifythatplant.com/foraging-resources/russ-cohen/