



# Invasive Plants and Biodiversity:

A Targeted Management Guide for  
New York City Stewards

**Natural Areas**  
Conservancy

# Why manage for biodiversity?

New York City parks are home to many native plants and non-native plants. These plants make up a part of the biodiversity of the park and provide food, homes, and places to hang out for animals. This is called **habitat**.

The plants that are **native** or **indigenous** to New York evolved together over fifteen thousand years ago with the animals native to New York. The different species created relationships with each other and rely on each other for survival here. For example, plants produce flowers with nectar and pollen that native bees, flies, butterflies, and moths recognize as food. Over time, native animals have timed their life cycles to depend on these food sources.

**Non-native** plants, which developed in another part of the world or on the other side of the country, have only been in New York a few hundred years or less. They evolved with a whole other set of plants, animals, diseases, and climate conditions different from New York. Animals here don't recognize them as food, or their life cycles don't match up well. These plants are not as useful to New York's native animals and make their habitat harder to live in.

Some non-native plants have characteristics that help them spread and grow fast, such as making a lot of seeds or growing from broken pieces of their stems. Because the new non-native plants are here without the diseases and pathogens they evolved with, they are able to grow unchecked and can crowd out other plants. These plants can be very successful and are able to take advantage of open spaces in a forest. When plants cause harm by displacing native plants, they also change the habitat so much that native plants and animals cannot thrive. When this happens, the plants are often called **invasive**. Overall, invasive plants cause a loss in biodiversity. Some invasive plants also cause harm to the environment, economy, or human health.

Healthy forests with more native plants and fewer invasive plants offer more ecosystem benefits. Scientists have found that healthy forests in New York City are cooler and store more carbon.



# Invasive Plant Types Addressed in this Guide

## Vines

Invasive vines can blanket the forest floor and take all the space native groundcover plants and tree seedlings need to grow (A). As the invasive vines grow, they sprawl over small trees and shrubs and prevent them from getting sunlight (B). Twining invasive vines coil around trees, and as they grow larger, the vine cuts off the tree's vascular system preventing movement of water and nutrients (girdling) and eventually causing the tree's death (C). Sometimes the excess weight from vines can even cause trees to fall over (D).

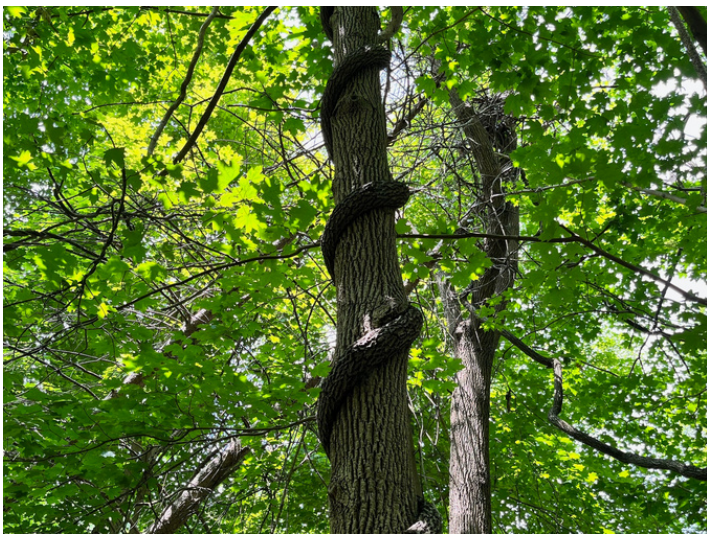
- Porcelain Berry, page 5
- Oriental Bittersweet, page 8
- Japanese Honeysuckle, page 10
- Mile-a-Minute, page 18



A: Mile-a-Minute growing over and smothering native plant life.



B: Porcelain Berry growing over shrubs and trees and blocking out sunlight.



C: Oriental Bittersweet girdles a tree.



D: Excess weight from invasive vines threatens trees.



# Shrubs

Invasive shrubs can dominate the understory beneath forest trees and prevent the germination and growth of new trees (A). These invasive shrubs also create a dense thicket that makes it hard for any other plants to grow (B). The structure and abundance of invasive shrubs in a forest can also decrease songbird breeding success.

- Multiflora Rose, page 13
- Wineberry, page 16



A. A dense understory of Multiflora Rose.



B. Multiflora Rose covers native groundcover.

# Herbaceous Plants

Invasive herbaceous plants can blanket the forest floor and take all the space where native groundcover plants and tree seedlings need to grow. Invasive plants are often inedible or distasteful to native wildlife and reduce native biodiversity and can degrade soil conditions.

- Garlic Mustard, page 19



C. A first-year Garlic Mustard rosette.



D. A patch of second-year Garlic Mustard flowering.



# Invasive Vines

## Porcelain Berry (*Ampelopsis brevipedunculata*)



A. Porcelain Berry vine with lobed leaves and flowering buds.



B. Porcelain Berry vine with fruiting seed pods.

### Plant identification features:

Porcelain Berry is named for its showy lilac, turquoise, pink, and dark blue clusters of fruit produced in late summer. Before the fruits mature, they will be green. The flowers that precede the fruit are greenish, small and in clusters all along the stems. The vine grows by sprawling over shrubs and young trees using sparse tendrils or creating mounds of vegetation over any plant or structure. The simple leaves are arranged alternately and are shallowly- to deeply-lobed with three or five lobes and coarse teeth on the edges. The underside of the leaf is shiny with sparse hairs only on the main veins. Young twigs have fuzzy hairs all over (pubescent). The bark is beige, unpeeling, with lenticels (light-colored dots). If you slice or break open the stem, you will see white pith (center of stem).

### How to manage:

- Carefully but firmly **hand-pull smaller vines** from the ground, making sure to remove as much of the root system as you can.
- Use loppers or hand pruners to **cut larger vines** where they are emerging from the ground or where they are attached to the base of the trees. Make a second cut of the vine at chest height where they are attached to trees.
- If the vine you are cutting has fruit, **cut off the fruit** using pruners and discard them in a bag. Do not add to compost heaps or leave on site: they will germinate and spread the invasive plant.
- If bagging is not possible, pile the cut vines in one place off the soil such as on a large rock, log, or high branch.

# Porcelain Berry

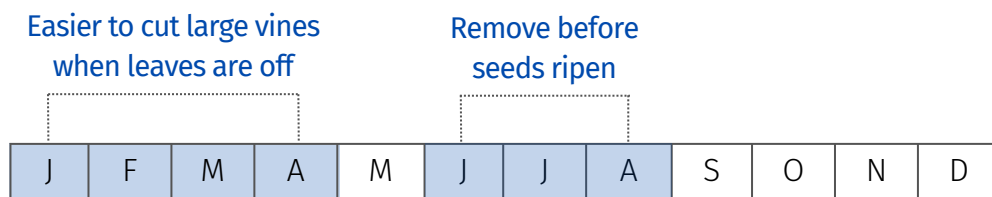
**Do NOT pull vines from tree branches. This can cause broken, dead, or weak branches to dislodge and fall.**  
**Do NOT pull vines that are entwined in small trees or shrubs; this can damage the plant and break its branches.**  
**Use your pruners to cut the vine in multiple points to make it easier to fall off when it dies and dries up.**

## When to manage:

Managing Porcelain Berry at any time of the year is beneficial but especially in the summer **before fruits develop** and spread the plant further. By cutting this plant before it makes seed, you can also leave it on the site. If you cut the plant while it's seeding, you must bag and dispose the fruit so the seeds don't germinate. Winter is a good time to cut larger vines because they are easy to see and there is less plant material to “fight” with.



A. A forest steward uses loppers to cut large Porcelain Berry vines off a tree.



**Confusing look-alikes:** Native Grapes (*Vitis spp.*) and Virginia Creeper (*Parthenocissus quinquefolia*) can look similar to Porcelain Berry but have some key differences. Native vines are hard to distinguish from invasive vines in the winter, so pay close attention to differences in the bark.

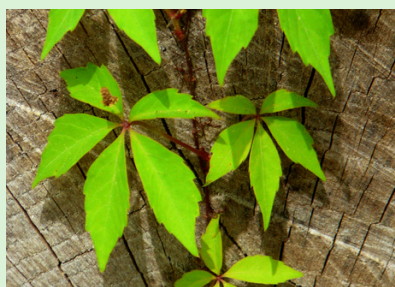
## LEAVES

### Native Grapes (many species)



- Simple leaves (made up of one leaf blade) can have 3-5 lobes depending on the species.
- Undersides of the leaves can be rusty, downy, white, or densely tomentose.

### Virginia Creeper



- Palmately-compound leaves, divided into 5 serrated leaflets.
- The leaves turn red in the fall.

### Porcelain Berry



- The simple leaf shape varies but usually has 3-5 lobes.
- Sparse hairs are found only on the leaf's underside.
- Underside NOT rusty, downy, white, or densely tomentose.



# Porcelain Berry

## STEM, BARK, ROOTS

Native Grapes (many species)



- Woody vines without lenticels. Shaggy, peeling mature dark gray-red bark.
- Abundant tendrils wrap around small branches for support.
- Pith is tan or brown.

Virginia Creeper



- Young trailing stems can be reddish, older woody vines have gray-brown bark.
- Lenticels are present.
- Adheres to surfaces with disks at the ends of tendrils.

Porcelain Berry



Source: James H. Miller, USDA Forest Service, Bugwood.org

- Young stems are beige and dotted with lenticels.
- Stiff, woody stems that bend rather than snap.
- Tendrils wrap around small branches for support.
- Bright orange roots.
- Pith is white.

## FRUIT



Source: Watts\_photos, Flickr.com

- Green, turning to purple or black juicy grapes.
- Not speckled.
- Native grapes will usually ripen between September and October.



- Clusters of small green fruit turning to dark blue-black mini grape-like, unspeckled berries.



- White, lilac, turquoise, green, pink, and dark blue speckled clusters of berries.



# Oriental Bittersweet (*Celastrus orbiculatus*)



Source: Leonora Enking, Flickr.com

A. Oriental Bittersweet leaf arrangement.



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

B. Oriental Bittersweet flowers in the leaf axils.



C. Large Oriental Bittersweet vines around a tree.

## Plant identification features:

Oriental Bittersweet is a woody twining vine with light colored bark and lenticels. The woody vine can get very large — some have been found in NYC with 6" diameters! As the stem gets larger, it turns from light brown to gray. The leaves are simple, alternate, glossy, round to oval with finely toothed margins. The flowers and fruit develop in clusters in the leaf axils (where the leaves are attached to the stem) all along the stems. The fruit are green in the summer and turn yellow in the fall; later they split open and show the bright orange-red seed all winter.

## How to manage:

- Carefully but firmly **hand-pull smaller vines** from the ground, making sure to remove as much of the root system as you can. Look for the bright orange roots!
- Use loppers or hand pruners to **cut larger vines** where they are emerging from the ground or where they twine around the base of trees.
- Make a second cut of the vine at chest height where they twine around the tree or shrub. Use a handsaw for larger-diameter vines.
- **Bag the cut vines** that have fruit and discard. Do not add fruiting vines to compost heaps or leave on the site: they will germinate and spread the invasive plant.
- If bagging is not possible, **pile the cut vines in one place off the soil** such as on a large rock or log.
- Re-sprouting can be vigorous after the vine's roots are cut or damaged. You will need to revisit the site and repeat management throughout the growing season.

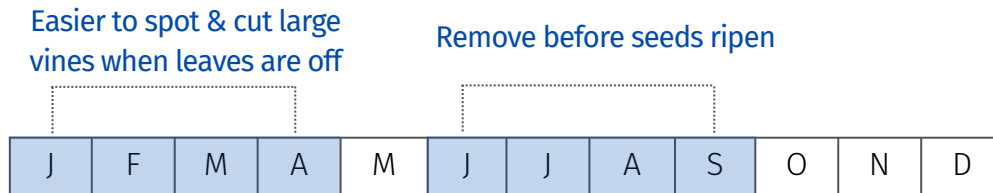
*Do NOT pull vines from tree branches. This can cause broken, dead, or weak branches to dislodge and fall. Do NOT pull vines from small trees or shrubs; this can damage the plant and break its branches. Use your pruners to cut the vine in multiple points if it is twining tightly on a smaller native plant to prevent the remaining vine segments from girdling.*



# Oriental Bittersweet

## When to manage:

Managing Bittersweet at any time of the year is beneficial but especially summer before fruits develop and spread the plant further. By cutting this plant in the summer before it makes viable seed, you can also leave it on the site. If there is a lot of cut material and no fruit, you can remove it to compost. Super-large vines are visible and easier to tackle in winter when there is less plant material to manage.



**Confusing look-alikes:** American Bittersweet (*Celastrus scandens*) is also a twining vine closely related to Oriental Bittersweet. The native American Bittersweet is relatively rare in New York City. While you should be aware of the species, you are most likely to encounter the non-native species.

### LEAVES

American Bittersweet



Source: Donald Cameron. Copyright © 2023 Donald Cameron

- In early spring, leaf edges are rolled up like a scroll.
- Leaves more narrow than the invasive species, as long or longer than wide.
- Sharply-pointed serrations on leaf margins.

Oriental Bittersweet



Source: Leslie J. Mehrhoff, University of Connecticut, Bugwood.org.jpg

- In early spring, leaves are mostly flat or folded in half, opening like a book.
- Leaves are generally more round, nearly as wide as they are long.
- Serrations are usually rounded.

### FRUIT



Source: Peter Gorman, Flickr

- Orange to red capsule around fruit.
- Large terminal clusters are found only at the ends of the branches.



Source: Matthew Beziat, Flickr.com

- Yellow capsule around fruit.
- Fruits are arranged in small clusters in the leaf axils all along the length of the branch.

# Japanese Honeysuckle (*Lonicera japonica*)



A. Japanese Honeysuckle with tubular white flowers that turn yellow with age.



B. Japanese Honeysuckle leaves are oppositely-arranged.

## Plant identification features:

Japanese Honeysuckle is a woody twining vine that is often found climbing over shrubs and small trees up to 30 feet high or more. The young stems are slightly fuzzy, with a reddish to light brown color.

The semi-evergreen leaves of Japanese Honeysuckle are opposite, ovate, and about 1.5 to 3 inches long. Some new leaves can be lobed like an oak leaf! (C).

Japanese Honeysuckle flowers in May through July and the paired flowers will be white and turn yellow as they age. The fruits produced in September through October are hard, glossy black berries.



C. Lobed Japanese Honeysuckle leaves

## How to manage:

- Carefully but firmly **hand-pull smaller vines** from the ground, making sure to remove as much of the root system as you can.
- Use loppers or hand pruners to **cut larger vines** where they are emerging from the ground or where they twine around the base of trees.
- Make a second cut of the vine at chest height where they are attached to trees.
- **Bag the cut vines** that have fruit and discard. Do not add fruiting vines to compost heaps or leave on the site; they will germinate and spread the invasive plant.
- If bagging is not possible, **pile the cut vines in one place** off the soil such as on a large rock or log.

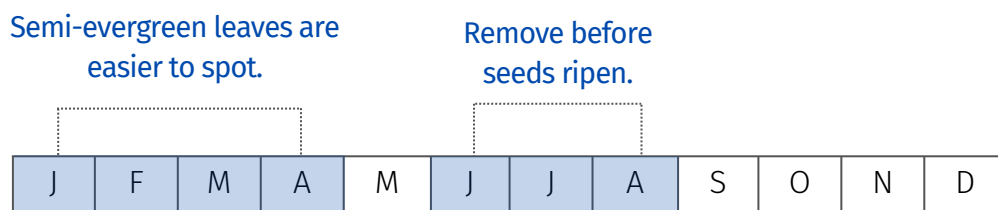


# Japanese Honeysuckle

*Do NOT pull vines from tree branches. This can cause broken, dead, or weak branches to dislodge and fall.*  
*Do NOT pull vines from small trees or shrubs, this can damage the plant and break its branches. Use your pruners to cut the vine in multiple points if it is twining tightly on a smaller native plant.*

## When to manage:

Managing Japanese Honeysuckle at any time of the year is beneficial but especially **in summer** before fruits develop and spread the plant further. By cutting this plant in the summer **before it makes seed** you can also leave it on the site. If there is a lot of cut material without seed, you can remove it to compost. Large vines are visible and easier to tackle in winter because the semi-evergreen leaves stand out from deciduous plants (plants that shed their leaves in autumn).



**Confusing look-alikes:** Native (*Lonicera sempervirens*), or Trumpet Honeysuckle, is a closely related woody vine. Consider the characteristics below before making any cuts:

### LEAVES

Trumpet Honeysuckle



- Leaves are always entire.
- Uppermost pair of leaves is always fused, and other leaves are opposite.
- Leaf surface often has a bluish-whitish cast (glaucous).

Japanese Honeysuckle



- Leaves are entire but sometimes lobed in early spring.
- Leaves are opposite.



# Japanese Honeysuckle

## FLOWER

Trumpet Honeysuckle



- Coral pink or orange.
- Two to four flower clusters are produced only at the end of each stem (terminal).

Japanese Honeysuckle



- Sweet-smelling, white flowers turn yellow as they age.
- Flowers produced in the axils of leaf pairs along the length of the vine.

## FRUIT



- Bright red berries.



- Dark black berries.



# Invasive Shrubs

## Multiflora Rose (*Rosa multiflora*)



Source: National Parks Service, Arrie Rosser

A. A patch of Multiflora Rose with white flowers.



B. Multiflora Rose compound leaves have 5-11 leaflets.

### Plant identification features:

Multiflora Rose is a scrambling shrub that forms dense thickets and can reach heights of 10 feet. Stems vary from red to green and have downward facing thorns that are wider at the base, similar to a cat's claw. Some Multiflora Rose plants can climb high into the canopy, acting more like a vine.

Multiflora Rose leaves are compound (made up of leaflets) and are alternately arranged. Each leaf has from five to eleven oval, saw-toothed leaflets per leaf. All roses have a green, leafy structure on the base of the leaf-stem called a stipule. On Multiflora Rose the stipule is prominent and fringed (B). Thornless varieties of Multiflora Rose can be identified by the fringed stipules.

The shrub flowers in May and produces clusters of white flowers, sometimes with a pink tinge. The flowers develop into clusters of small red "rose hips" in September and October that persist through the winter.

### How to manage:

- Individual plants can be **dug or pulled-out** with gloved hands or shovels. Remove all root material to prevent resprouting.
- If you can't bag the pulled-up material, hang the roots in trees or pile in one place, preferably on a rock or off the soil to allow them to dry out and prevent resprouting.
- The plant will resprout from the roots left behind after cutting; for large thickets repeat the process monthly for 3-4 months in the spring and summer.
- When managing, wear thick gloves and protective clothing on arms and legs. Avoid thorns by using your feet to flatten the rose canes away from your body before cutting.



C. A patch of Multiflora Rose along a trail.



# Multiflora Rose

## When to manage:

Managing Multiflora Rose at any time of the year is beneficial but especially in **spring and early summer** before fruits develop and spread the plant further. Patches of Multiflora Rose should be visited and **managed repeatedly** throughout the year.

Easy to spot green stems before other plants have leafed-out. A good time to pull and remove the plants if the ground is not frozen.

Remove before fruits develop.



**Confusing look-alikes:** Native Roses (*Rosa spp.*) are found throughout New York City. You will most likely encounter *Rosa virginiana* and *Rosa caroliniana* in the five boroughs.

### LEAVES

Native Roses



- Stipules (wings at the base of the compound leaf) are not fringed.
- Alternate, compound leaves with serrated edges.
- Five to seven oblong leaflets.

Mutliflora Rose



- Stipules at the base of the leaf have a comb-like fringe on the margins.
- Alternate, compound leaves.
- Five to eleven leaflets.

### FLOWER



- Solitary or few large fragrant flowers per cluster.



Source: Amadej Trnkoczy, Flickr.com

- Clusters of many highly-fragrant, small white flowers per stem.



# Multiflora Rose

## STEM

### Native Roses



- Thorns are straight, not curved.
- May have smaller spines along the stem between larger thorns.

### Multiflora Rose



- Thorns are distinctly curved and have a wide base, like a cat's claw.



A. and B. Stewards removing Multiflora Rose from a forest in Highbridge Park, Manhattan.



# Wineberry (*Rubus phoenicolasius*)



A. Toothed wineberry leaves with 3 leaflets.



Source: Rasbak, Wikipedia

B. Wineberry fruit are bright in color and can be more orange before they ripen.

## Plant Identification Features:

Wineberry is a multi-stemmed shrub that produces arching stems up to 9' feet long. Wineberry is a Rubus—the same genus as raspberries and blackberries, with lots of similarities that can confuse the untrained eye! Wineberry leaves are alternately-arranged with 3 toothed leaflets per leaf with the terminal leaflet being the largest. The leaflet undersides are wooly and white.

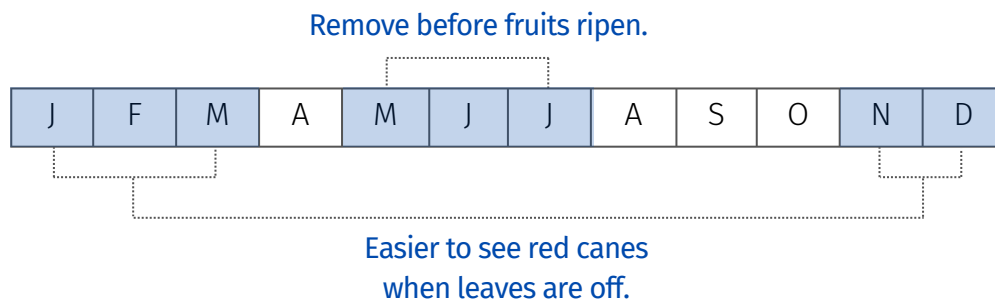
Wineberry canes, or stems, are covered in a dense coat of short, fine, red hairy thorns. The flowers are in clusters and have small white petals surrounded by prominent green sepals covered with sticky red hairs. The shiny red fruits ripen in late summer and early fall and separate from the stem in one piece when picked, similar to raspberries.

## How to Manage:

- Use gloved hands to **pull up the plants** from the soil (easy and satisfying to do!)
- The plant does not have an extensive underground root system and is **easily pulled**.
- Shake off the soil and either **hang the plant** securely in a tree to dry out, or **bag and discard**. If you leave it on the site it can re-root!
- Return visits for a few years will be necessary to remove new plants.

## When to manage:

Any time of year to remove Wineberry is beneficial. Removing Wineberry in late fall through the early spring is easiest because the red fuzzy stems stand out. Removing wineberry when the soil is moist also makes it easier.





# Wineberry

Confusing look-alikes: Native Raspberries and Blackberries (*Rubus* spp.)

## LEAVES

Native *Rubus* (many species)



- Leaves are compound and alternately-arranged.
- Native *Rubus* species have 3 or 5 leaflets per leaf.
- Undersides vary from green to white bloom but will not be furry-white.

Invasive Wineberry



- White, furry underside on leaflets.
- Leaflets occur in 3's, with the terminal leaflet usually the largest.

## FRUIT



- Blackberry fruits are black and the stem comes off with the fruit when picked.
- Raspberries are red or dark red-black and separate from the stem like Wineberry when picked.



- Often larger fruits than Native *Rubus* species.
- Berries are brighter, more orange than native berry species.

## STEM



- Stout thorns that stick straight out and no densely-hairy red stems.
- The burgundy to green colored stems can have a white film or can be ridged with thorns.



- Hairy red stem with sticky, dense, fine thorns.



# Invasive Non-Woody Vines

## Mile-a-Minute (*Persicaria perfoliata*)



A. Triangular alternate leaves on Mile-a-Minute.



Source: Leslie J. Mehrhoff, University of Connecticut, Bugwood.org.jpg

B. Fleshy Mile-a-Minute fruits above the fused leaf base.

### Plant identification features:

Mile-a-Minute is an annual plant. It completes its life— from germinating from a seed, flowering, making seed, and dying — in one year. Mile-a-Minute is an herbaceous, sprawling vine with alternate, light green, triangle-shaped leaves. The leaves just below the flower or fruit stalk are fused and cup-shaped. Mile-a-Minute has hooked barbs along the flexible and ridged stems. Mile-a-Minute flowers are small white and inconspicuous and develop into blue or purplish berries that form in July to late fall. Mile-a-Minute can blanket native plants and form dense, prickly tangles in the landscape.

### How to manage:

- Small vines can be easily **pulled up by hand**; wear gloves and long-sleeves to avoid scratches from the sharp barbs. The vines sit “on top” of other plant life rather than twining or knotting around them.
- **Locate the base of the plant** and sever the whole vine from the ground. Since this is an annual plant, don't worry about removing the root. It will not resprout.
- Mile-a-Minute seeds can survive in the soil for up to 6 years, so removing the plant before the fruits drop will keep the plant from spreading.
- Before fruiting you can pull the plants and leave them on-site. If the fruit is formed, pull the plants and bag. Do not compost the bagged plants.

### When to manage:

It is beneficial to remove Mile-a-Minute at any time but removing the vine before it fruits in late summer to early fall is critical to prevent regrowth.

Remove before  
fruits ripen.





# Invasive Groundcover

## Garlic Mustard (*Alliaria petiolata*)



A. First-year Garlic Mustard seedlings



B. Second-year Garlic Mustard flowering stem



C. Garlic Mustard fruit

### Plant identification features:

Garlic Mustard is a biennial plant— it lives for 2 years. In the first year the seed germinates and sends up a small rosette of leaves (A). You might see hundreds of these tiny plants! The next year it “bolts”: grows larger and sends up a flowering stalk (B). First-year leaves (A) grow as a single or pair of **heart or kidney-shaped leaves** with toothed edges. Second-year (B) plants have alternately-arranged stem leaves that are simple and heart-shaped with toothed edges. Only second-year Garlic Mustard plants will form **white flowers** with 4 petals in the shape of a cross.



D. A patch of flowering, second-year Garlic Mustard.

### How to manage:

- **Hand-pull or cut** the flowering stalk (second-year) **while the flowers are present** and before the seeds ripen. This prevents the next generation from growing. Pulling second-year Garlic Mustard is easier than pulling first-year rosettes – it also disturbs the soil less.
- You will need to **revisit the site** over several years to manage an infestation; there are often many seeds already in the soil (a “seed bank”) — one plant can produce over 600 seeds.
- Plants **must be bagged and destroyed** — sometimes the fruit will continue to develop even on pulled-up plants!
- If you are unable to bag and remove the plants, consolidate the pulled Garlic Mustard into a pile somewhere off the ground.
- Live Garlic Mustard also produces biochemicals that reduce the germination and growth of surrounding plants.



# Garlic Mustard

## When to manage:

It is easiest to remove Garlic Mustard in its **second year, while flowers are present or just before**. Cutting the plant in its second year is also less disturbing to the soil.

Remove in second-year  
when flowers are present.



**Confusing look-alikes:** Native Violets (*Viola spp.*) are herbaceous plants that can be found throughout New York City. When flowering, they are easily distinguished by their purple, white, purple and white, or yellow, irregular flowers. Without flowers, their kidney shaped leaves are somewhat similar to first-year Garlic Mustard plants.

LEAVES

Violets (*Viola spp.*) Native & Introduced species



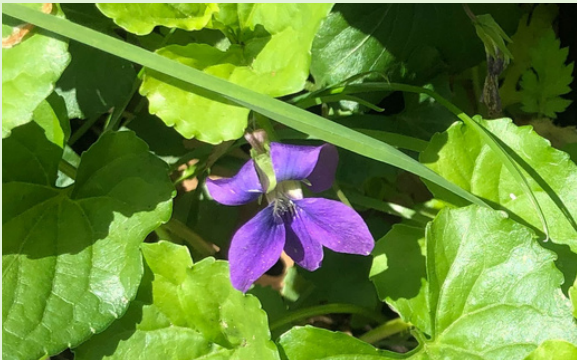
- Leaves are unscented when crushed.
- The violet leaves most confused with Garlic Mustard will be heart-shaped. Look for a more elongated and pointed-tipped shape.

Garlic Mustard



- Leaves smell like garlic when crushed.
- First-year leaves are rounded to kidney-shaped with scalloped edges.
- Second-year leaves are more triangular and heart-shaped, with toothed edges.

FLOWER



- Purple, white, yellow, or purple and white, irregular flowers with 5 petals.



- Small white, 4-petaled flowers in its second year.
- No flowers produced in the first-year.

STEM

- Ground cover plant, 3-8 inches tall.

- First-year Garlic Mustard rosettes cover the ground, less than 6 inches tall.
- Second-year stems grow 2-3 feet tall.



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## CONTACT US

For more information about the Natural Areas Conservancy, visit:  
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