INVASIVE SPECIES: CHINESE PRIVET

BACKGROUND

Chinese privet is a flowering perennial shrub native to southeast Asia, thought to be introduced to the U.S in the 1800s as an ornamental plant. Privet was often cultivated as a living fence, as it has a tendency to grow in thick, exclusionary hedges up to 30 feet tall that can last up to 40 years. It is often found along these fencelines or on the edges of forested areas. As a shade-tolerant species, privets are known for dominating the shrub layer underneath trees, especially in streamside areas. Chinese (or small-leaf) privet spreads aggressively, both by seed and clonally by rhizomes (also known as "root-sprouting"). Privet often excludes and shades out native shrub layer species that would be more valuable to wildlife and soil health.

IDENTIFICATION

Chinese Privet has smooth, light-gray bark, dotted with small bumps known as lenticels. Its twigs are stout, dense, and almost thorn-like. In the springtime, privet has small clusters of white flowers. Small green berries will develop in the summertime, ripening to a dark purple-brown in the fall. Look for small and elongated oval-shaped leaves with opposite arrangement. These leaves are often quite close together, giving privet its bushy look. Privet is semi-evergreen, so it may keep its leaves into the winter in warmer climates. Privet growing in intense sunlight can be bushy and large, but privet growing in shaded areas often has a more sparse and leggy growth form- so keep that in mind when identifying! Young growth of privet will often grow vertically out of the ground. Common lookalikes include Asian Bush Honeysuckle (Lonicera mackii), Black Haw (Viburnum prunifolium), and Coralberry (Symphoricarpus orbiculatus). Look for the glossy leaves and solid pith of privet to easily distinguish it from these lookalikes.

TREATMENTS FOR CHINESE PRIVET

HAND-PULLING

Hand-pulling can be an effective method for treatment of young privet individuals. Be sure to pull up the entirety of the root system so as to prevent root sprouting.

Use this treatment method year round, January - December

FOLIAR SPRAY

If the privet is below approximately shoulder-height, foliar spray treatment is efficient and efficacious. During the months of August-December, thoroughly wet all leaves with one of the following herbicide solutions in water with a surfactant: Glyphosate mixed at a 3% solution, Imazapyr herbicide mixed at a 1% solution, or Triclopyr 3 mixed at a 3% solution. Be cautious with your spray so as to not affect non-target species, as they may be killed or injured by overspray or root uptake.

Use this treatment method year round, January - December

BASAL BARK & CUT-STEM

If the privet stems are too tall for foliar sprays, or if protecting the surrounding vegetation is of high priority, basal bark or cut-stem treatments may be preferred. These methods can be performed in the dormant seasons. For basal bark treatments, apply a 20% Triclopyr 4 solution in commercially available basal oil, diesel fuel, or kerosene with a penetrant to the bottom 12-24 inches of bark as a basal spray. For cut-stem treatments, sever the stem at the base and treat the stumps and cut stems with a 20% Triclopyr 3 or 50% Glyphosate solution in water. Be sure to not leave the cut stems in the soil or in a wet, fertile area, as they could still re-root.

Use these treatment methods from December - February

CUT-STEM

Photo: Lenny Farlee

BASAL BARK

Photo: Corteva Agriscience

FOLIAR SPRAY

DON'T HAVE A FOLIAR SPRAYER?

Try using a one-gallon handheld sprayer instead!

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INVASIVE SPECIES: TREE OF HEAVEN

BACKGROUND

Tree-of-Heaven is a fast-growing deciduous tree native to China. In 1751 it was mistakenly introduced into France and England based on a misidentification, then introduced in the US as a fast-growing ornamental shade tree in the late 1700s. Tree-of-Heaven became widespread as an exotic ornamental in public gardens and landscapes in the 1900s, and was finally classified as an invasive species in 1998. Mature trees can reach 100' in height and are known for their tendency to spread explosively via seed and root suckers. Sprouts as young as two can produce seed and a mature female tree can produce 300,000 seeds annually. Tree-of-Heaven has a prolific root sucker response to injury, which can spread as far as 50' from the tree. This species is incredibly drought, wind, pollution, and soil quality tolerant which allows it to grow in nearly any environment. It is also allelopathic, meaning it disperses chemicals into the soil that inhibit the growth of other plants in addition to crowding/shading them out.

IDENTIFICATION

Tree-of-Heaven has pinnately compound leaves composed of lance-shaped leaflets 1"-4" in length (as pictured right). These leaflets have smooth margins and short bumps called "glandular teeth" at the base of each leaflet. Also look for young individuals with smooth green bark, turning light brown to gray with a cantaloupe-skin texture as they mature. The stems of Tree-of-Heaven are alternately arranged on the tree and lack a terminal bud. Look for the large heart-shaped leaf scars as well. The most surefire way to identify a Tree-of-Heaven is the "sniff test"! Grab a leaf and crush it in your hands: people often say it smells strongly like rancid peanut-butter! Common lookalikes include Staghorn Sumac (Rhus typhina) and Black Walnut (Juglans negra). Look for Tree-of-Heaven's smooth leaf margins and distinctive foul odor to distinguish easily from these lookalikes.

Photo: Arthur Haines

Photo: Richard Gardner

TREATMENTS FOR TREE OF HEAVEN

Tree-of-Heaven is known for its prolific root systems and aggressive sucker-sprouting response, so cultural control (i.e. repeated site monitoring and additional habitat restoration efforts) and consistent follow-up treatments are a necessary part of integrated pest management of Tree-of-Heaven.

HAND-PULLING

Hand-pulling is an effective method of control of young Tree-of-Heaven seedlings. Be sure to remove the entire root system if possible, as root fragments left behind can resprout. The plant develops a taproot within 3 months, which makes hand-pulling much less effective.

Use this treatment method from July - February

FOLIAR SPRAY & BASAL BARK

If the Tree-of-Heaven is below approximately shoulder-height, foliar spray treatment is efficient and efficacious. From July 1st to the onset of fall colors, most effectively after mid-August, thoroughly wet all leaves with one of the following herbicide solutions in water with a surfactant: Triclopyr 3 mixed at a 3% solution or Glyphosate mixed at a 3% solution. Triclopyr is a more effective herbicide for Tree-of-Heaven, but Glyphosate may be necessary based on site conditions or time of year. Basal bark treatment of Triclopyr can be performed year-round as well. Be cautious with your spray so as to not affect non-target species, as they may be killed or injured by overspray or root uptake.

Use these treatment methods from July - February

HACK-AND-SQUIRT & PARTIAL GIRDLING

Injuring a Tree-of-Heaven can exacerbate the root suckering response and is generally not recommended without extensive follow-up treatments. However, hack-and-squirt treatments with a 50% Triclopyr 3, 10% Imazypyr solution have proven effective. We call this a "partial girdle", where you make hacks into the cambium layer about 6" from the base of the tree. Leave ~2 inch gap between each hack so as to cripple the tree and not trigger the sucker sprout response as intensely. Repeat treatments will be necessary but this has been observed to kill the mature tree while preventing it from sucker sprouting as intensely.

Use these treatment methods from July - February

HACK-AND-SQUIRT

BASAL BARK

DON'T HAVE A FOLIAR SPRAYER?

Try using a one-gallon handheld sprayer instead!

WHAT IS THE CAMBIUM LAYER?

The cambium layer is a thin living layer of a tree, between the wood and the bark, which is responsible for the tree's growth and thickness.

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INVASIVE SPECIES: CHINESE SILVERGRASS


Photo: John Hagstorm

BACKGROUND

Chinese Silvergrass is a hardy perennial grass species introduced to the US from Asia in the 1800s. Today it is found throughout the Eastern US and has been observed in California and Colorado. Identifiable by its characteristic clumping growth form and impressive height of up to 12 feet, Chinese Silvergrass was first introduced for its exotic, ornamental value. This plant's large, tufted flowering stalks can even reach up to 15 feet tall! Chinese Silvergrass thrives in full sun and moist, well-drained soils, making it the perfect candidate to overtake roadsides, abandoned homesites and pasture-land, and forest edges. It often escapes from landscapes or gardens and establishes large colonies in these disturbed areas. Its dense clumping form excludes other early successional species, such as native grasses and forbs, and its extreme flammability drastically increases wildfire risk!

IDENTIFICATION

Chinese Silvergrass grows in large clumps of drooping leaves that measure ~1 inch across and have a characteristic silver-white midrib. Look for its fan-shaped seedheads, which grow between 4 and 4 inches long and are red in color turning silver/tan. This seedhead can be mistaken for the native Big Bluestem grass (Andropogon gerardii). Unlike Chinese Silvergrass, Big Bluestem's seedhead is sectioned into 3 discrete branches, resembling a turkey's foot. Chinese Silvergrass spread primarily from its vigorous rhizomes and root system, though it may spread via wind or mechanical dispersal of seed as well.


Photo: Krzysztof Ziarnek


Photo: John Hagstorm


Photo: Flower_Garden/ Shutterstock.com

TREATMENTS FOR CHINESE SILVERGRASS

DIGGING

Digging out Chinese Silvergrass in their entirety is an option, though this will require diligent monitoring and follow-up treatments. This method is labor intensive, and should only be done after the plants seedheads are gone to prevent the spread of more Chinese Silvergrass. Cut the stalks and dig out the entire root system, ensuring no pieces are left behind. Use a sharp shovel to dig around the clump and pry plant and roots out.

Use this treatment method from November - July

FOLIAR SPRAY

Foliar spray treatment of Chinese Silvergrass is the most efficient and safe treatment method, as proper application ensures that the plant dies from its root system and there is little chance of rhizomatic spreading. Applications should be made with Glyphosate mixed at a 2% solution in the fall, or with Glyphosate mixed at a 3% solution in the late spring. Lower rates are required in the fall since translocation to the rhizome is occurring at that time.

The best time to use this treatment method is June, but can be treated again in Late August/Early September

MECHANICAL CONTROL

Mechanical control of Chinese Silvergrass is **not** recommended. Incomplete removal of the plant may only encourage rhizomatic spread. Cutting and mowing practices risk spreading rhizome pieces into previously clean areas, making the infestation worse. If mowing is done, it is advised to mow at least three times during the growing season, and only when there are no seedheads.

Use this treatment method anytime the plant does not have seedheads, this is usually January - July

DON'T HAVE A FOLIAR SPRAYER?

Try using a one-gallon handheld sprayer instead!

FOLIAR SPRAY

WHAT IS RHIZOMATIC SPREAD?

Rhizomatic spread is when the a plant clones itself from its root mass to spread underground. This causes the plant to send up new shoots allowing the plant to spread more easily.

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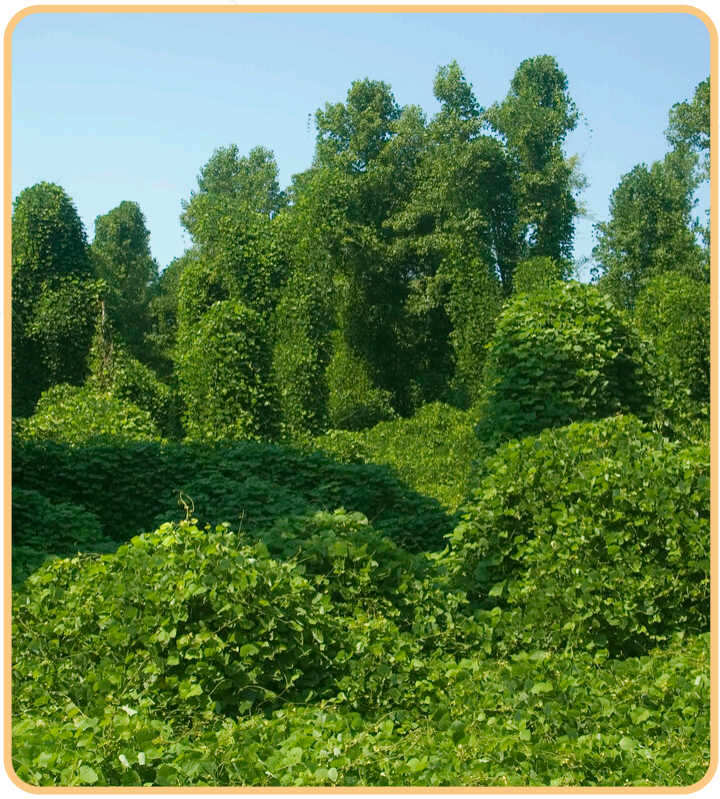
INVASIVE SPECIES: KUDZU

BACKGROUND

Kudzu is a perennial, semi-woody climbing vine native to China and Japan. It was first introduced to the US for its ornamental appeal, but in the 20th century became a go-to crop for erosion control and bank stabilization, especially along highways. This contributed to Kudzu's rapid spread across much of the southeast. Populations have been documented as far north as West Virginia, Indiana, and Illinois. Kudzu is well known for its prolific ability to spread and smother all native species in its path. Kudzu's robust vines and large leaves allow it to grow up and over nearly anything, swallowing even mature trees and abandoned houses! A single Kudzu plant sprouts as many as 30 individual vines from its root crown, each of which can grow up to 100 feet long with a growth rate as fast as one foot per day! Each vine that makes contact with the soil can then re-root, form a new root crown, and produce another set of vines. Kudzu will also sprout rhizomatically. This is why Kudzu is sometimes referred to as "the vine that ate the south". Keep a close eye out for new Kudzu growth along highways, in fallow fields, or around abandoned structures, as catching an infestation early can save a load of time, money, and effort.



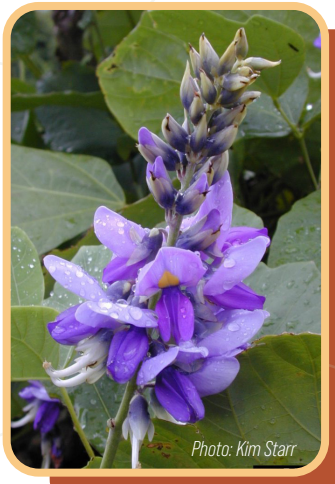


Photo: Kim Starr

IDENTIFICATION

Kudzu stems are light-green and covered in short, dense golden hairs in their adolescence. When mature they take on a semi-woody, ropelike appearance and a light gray to brown color and lose their hairs. Look for alternate leaf arrangement on these vines, with three large leaflets. These leaflets are variable, but often have two deep lobes and hairy margins. Kudzu vines that reach full sun produce purple, clustering flowers from June-September, which do not produce much viable seed. Kudzu relies much more heavily on its vegetative reproduction to proliferate than by seed. When excavated, you will find large ball-like central root crowns wherever the nodes of Kudzu vines have made contact with soil. These root crowns have massive taproot systems, which can burrow as far as 12 feet underground. The small, two-lobed leaves of the native Hog Peanut are easily mistaken for young Kudzu, though Hog Peanut's more limited growth pattern and much shorter vine length distinguish them from the aggressive invasive. The hairy vines of Kudzu can also be mistaken for large Poison Ivy vines, but Poison Ivy's differing coloration and tendency to retain its vine hairs into adulthood are helpful identifying characteristics.

Photo: TravisPhotoWorks

TREATMENTS FOR KUDZU

FOLIAR SPRAY

Herbicide applications can be made whenever the vine is growing, but they are most effective from late summer to early fall, when the plants are drawing nutrients to the roots. Foliar spray applications of Kudzu should be performed with the legume-specific herbicide Clopyralid, mixed at a 0.5% solution, as the nature of Kudzu infestations often leads to a lot of non-target kill. This chemical solution will make spot treatments of small populations of Kudzu and even large-scale broadcast spray treatments more targeted and ecologically friendly.

Use this treatment method from June - September

MECHANICAL CONTROL

Mowing and other mechanical removal options are not particularly effective when it comes to Kudzu, as it will often just resprout from its many root crowns and rhizomes. However, using mechanical removal options in combination with foliar spray applications are an effective treatment method. Cutting the vines that hang off of trees and climb up shrubs or structures can limit the amount of herbicide needed to treat an infestation, as the plants will begin to die about the severance.

Use this treatment method year round, January - December

FOLIAR SPRAY

DON'T HAVE A FOLIAR SPRAYER?

Try using a one-gallon handheld sprayer instead!

MECHANICAL CONTROL

WHAT IS RHIZOMATIC SPREAD?

Rhizomatic spread is when the a plant clones itself from its root mass to spread underground. This causes the plant to send up new shoots allowing the plant to spread more easily.

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INVASIVE SPECIES: ASIATIC BITTERSWEET

BACKGROUND

Asiatic (or "oriental") bittersweet is a deciduous woody vine introduced to the US in 1736 from Eastern Asia. It was introduced for erosion control, and as an ornamental for its showy, red-berried vines that were traditionally collected for winter decor. It is best known for its twining and climbing behavior, which allows the plant to climb, suffocate, and strangle even mature trees. It has been documented along the entire eastern seaboard and as far west as Kansas and Minnesota. Bittersweet is highly adaptable; and while it can thrive in full sun, its seedlings are also extremely shade-tolerant. It is most commonly found in degraded, early successional habitats such as open woodlands, abandoned fields, wooded edges, and roadsides. The vines of Asiatic bittersweet will outcompete other vegetation by twining around and girdling trees. Much like many other problematic vining species, bittersweet can spread via seed, but also vegetatively by spreading underground roots that form new stems. This contributes to its danger as an invasive species.


Photo: Krzysztof Ziarnek

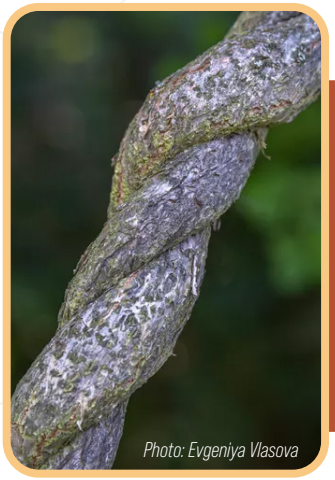
Photo: Evgeniya Vlasova

IDENTIFICATION

Asiatic bittersweet stems are green when young, but mature to tan with deep furrows and obviously raised white corky lenticels. They will grow up to 4 inches in diameter and up to 60 ft. into the canopy. It will climb and twine around anything to get into the canopy, including itself! The leaves of bittersweet are alternately arranged and elliptical to circular in shape. They have slightly toothed leaf margins and will sometimes have a pointed tip. They are a vibrant green turning yellow in the fall. In May-June, look for many small inconspicuous green to orange-yellow five-petaled flowers. These flowers grow among the leaves at leaf-axils, which help to distinguish them from the native Bittersweet's flowers, which are only found at twig tips. In the winter, these clusters will harden to tan then split into small fleshy scarlet fruits that persist through the season.


Photo: Linda Haugen


Photo: Chris Evans

TREATMENTS FOR ASIATIC BITTERSWEET

MECHANICAL CONTROL

Seedlings and young plants are easily pulled and removed when the soil is moist. Pull steadily and slowly to minimize soil disturbance. This is a consistent way to monitor for and treat seedling emergence when done routinely. For mature plants, the deep root system makes hand-pulling impractical as it will only stimulate the roots to resprout and intensify the infestation. Repeatedly cutting the bittersweet at 1-2ft. Above the soil line is a better alternative, as it will encourage the plant to resprout above the soil, rather than below the soil line. Repeat this process until the plant's energy reserves are exhausted.

Use this treatment method year round, January - December

CUT-STEM

Cut-stem treatments are the most practical and effective ways of managing low to moderately severe infestations of Asiatic bittersweet. A 50% solution of a systemic herbicide, such as Glyphosate or Triclopyr, can be painted on cut stems to kill the plant's root system. This treatment will be most effective in late summer while plants are fully leafed, but can be performed year round. Glyphosate and Triclopyr can also be applied as a foliar spray at a 3% solution. Care should be taken to avoid injury to native plants when non-selective foliar sprays are used.

Use this treatment method ideally in late summer, but can be treated year round

MECHANICAL CONTROL

CUT-STEM

Photo: Lenny Farlee

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INVASIVE SPECIES: MULTIFLORA ROSE

BACKGROUND

Multiflora rose (also known as Baby rose, Japanese rose, or Rambler rose) is an invasive woody shrub with sharp thorns that forms impenetrable thickets. Multiflora rose was introduced for a number of uses beginning in the 1860s. Since its introduction, it has been frequently used as a "living fence" and source of cover/containment for livestock. Rose breeding programs have used it as root stock and the USDA even touted it as a method of erosion control. It has spread and colonized as far south as Texas and Georgia, and as far north as Maine and Michigan. Multiflora rose reproduces prolifically by seed, of which a single plant can produce 500,000 each year, and by its stems which can reroot. Plants are often found invading new forests, field and wooded edges, pastures, and right-of-ways.

IDENTIFICATION

Multiflora rose forms impenetrable thickets, with each plant growing 10-15 ft. tall and 9-13 ft. wide. It often exhibits an arching or climbing growth form, assisted by its stout recurved thorns. These thorns populate the length of Multiflora rose stems, which are green with red thorns when young and mature to brittle and brown. The arching habit assists with the plant's ability to take root and form new plants when they reach the soil's surface. The leaves of Multiflora rose are odd-pinnately compound, with 7-9 smooth and dark green leaflets. These leaflets have short hairs on the underside. The easiest way to distinguish the invasive Multiflora rose from the native roses (such as Carolina rose R. carolina and Swamp Rose R. palustris) is to look for the trademark "eyelashes" at the base of each leaf stalk. In reality, these are a pair of fringed stipules that appear like small green/pinkish hairs at the base of each leaf. This plant also has red rosehips that form in clusters after its summertime white flowers bloom. These hips persist on the plant through the winter.

Photo: Ken Chamberlain

Photo: R.A. Nonenmacher

TREATMENTS FOR MULTIFLORA ROSE

HAND-PULLING

Hand-pulling is recommeded for young plants (with stems shorter than a foot) that have not been established for very long. This is because much older plants will have a more robust root system making them harder to pull. Hand pulling of young plants is best done after a fresh rain so that the soil is more loose and the best time of the year would spring/summer after the plant has leafed out and the sap is actively flowing to the roots, but before the plant has produced seed.

Use this treatment method from March - September

MECHANICAL CONTROL

If the use of herbicide is not part of the control plan, repeated mowing can be used to keep the plants from producing seed. It is recommended to repeat mowing monthly, doing so will weaken the plant over a long period of time and may eventually deplete the root system. Cutting large plants at the base in the fall and then applying an herbicide directly to the stump will result in the best control because the plant will be actively transporting sugars (energy) to their root systems as they prepare for dormancy, thus they will also carry system herbicide more readily down to the root system at this time.

Use this treatment method from October - April

FOLIAR SPRAY

Prior to chemical treatment, cutting or mowing is recommended, as the stress these methods cause the plants will increase future herbicide effectiveness. A 50% solution of a systemic herbicide, such as Glyphosate or Triclopyr, can be painted on cut stems to kill the plant's root system. This treatment will be most effective from July-September, while plants are fully leafed, but can be performed year round. Glyphosate and Triclopyr can also be applied as a foliar spray at a 3% solution from July-September as well. This method of treatment is best done after the plant has regrown to 2-3 ft. after the initial mowing. Care should be taken to avoid injury to native plants when non-selective foliar sprays are used.

Use this treatment method from July - September

DON'T HAVE A FOLIAR SPRAYER?

Try using a one-gallon handheld sprayer instead!

FOLIAR SPRAY

CUTTING & MOWING

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INVASIVE SPECIES: JAPANESE KNOTWEED


Photo: Philip Precey

BACKGROUND

Japanese knotweed is an herbaceous perennial plant native to east Asia. It evolved to thrive in disturbed areas such as river edges and even in volcanic ash. It can tolerate heavy metals and poor quality soils, allowing it to flourish in degraded environments. It was first brought to the United States in the late 19th century for use as cattle fodder and for its ornamental value. Outside of its native range, it is regarded as one of the worst invasive species on the planet due to its incredible ability to regenerate and spread from tiny pieces of stem. While it can reproduce from seed, it more often will spread clonally in its non-native range. The root systems of knotweed can be expansive and powerful, with many reports of knotweed roots cracking asphalt and destroying house foundations. In western North Carolina, it is most often found along streambanks in both urban and rural areas.

IDENTIFICATION

Japanese knotweed is a very unmistakable plant with few if any native look-alikes. Its stems resemble bamboo when mature, although they are fleshy, and will easily snap with a "pop!" when bent. Young shoots can look like purple-green asparagus, but knotweed will quickly grow (up to 8cm a day!) until it reaches heights upwards of 10 feet tall. Knotweed can form dense thickets with many stems emerging from one clump. The leaves are somewhat heart-shaped, with a slightly rounded or sometimes flat edge near the stem and a pointed tip. The stems are hollow and light green to red-purple, and often bear red-purple splotches. It will have distinct dark-colored nodes from which branches or leaves will emanate. White flower spikes emerge mid-summer. After first frost, the plant will wilt and light tan stems will persist through winter.


Photo: Liz West

TREATMENTS FOR JAPANESE KNOTWEED

FOLIAR SPRAY

Foliar spray treatment of Japanese Knotweed is the most efficient and safe treatment method, as proper application ensures that the plant dies from its root system and there is little chance of clonal spreading. Applications are most effective when the leaves are present and still green, and should be made with Glyphosate mixed at a 3% in water. Earlier treatments can be made if the goal is to prevent seed production.

Use this treatment method from May - October

MECHANICAL CONTROL

Due to it's robust root system and quick re-sprouting response after mowing/cutting, mechanical control alone is not recommended for long-term control when it comes to Japanese Knotweed. That said, coupling mowing practices with a well timed foliar spray treatment, 4-8 weeks after the initial mowing is very effective and safer for the herbicide applicator. Cut down all tall stalks and bag them up or burn them on site - a new plant can resprout from a left behind root fragment or from a node located on the stalks - then wait 4-8 weeks but monitor growth rate and height during this time. Follow up with a foliar spray treatment once the plants have reached a height of 1-3 feet and leaves have formed and expanded once again. You'll want plenty of leaf surface area before you foliar spray treat the sprouted plants.

If coupling mowing practices with an herbicide treatment is not an option for you, then implementing dedicated mowing practices of a minimum of 5 times per growing season will at least keep the plants from forming new flowers and seeds but will not offer long-term control. As always monitor for growth in order to inform you of how frequently and when you should mow. It is very important to be mindful that cutting and mowing practices risk spreading root and stalk fragments into previously clean areas.

Use this treatment method from October - July

CUT-STEM

For added control efforts after a mowing and prior to waiting for resprouting before a foliar spray application, a cut-stem application with an herbicide treatment is an option, but it is again recommended that all cut fragments be collected and properly disposed of before a 50% solution of an aquatic safe herbicide is applied to the stump. A chemical cut-stump treatment will weaken the root system but there will likely still be some level of sprouting, resulting in the need for a foliar spray treatment.

Use this treatment method from October - July

DIGGING

Digging out young plants in their entirety is an option, though this will require diligent monitoring and follow-up treatments. Digging out mature infestations is not recommended due to the the interconnected, large root masses that would could involve the need for heavy equipment or intense physical labor.

Use this treatment method year round, January - December

FOLIAR SPRAY

DON'T HAVE A FOLIAR SPRAYER?

Try using a one-gallon handheld sprayer instead!

CUT-STEM

Photo: Lenny Farlee

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