

Japanese Knotweed

Japanese knotweed (*Fallopia japonica*) is an invasive perennial and noxious weed in PA. This article will assist with identification and provides recommendations for control, including a management calendar and treatment and timing table.

Updated: February 24, 2020



Photo credit: Dave Jackson

Background

Japanese knotweed (*Fallopia japonica* syn. *Polygonum cuspidatum*), an herbaceous perennial member of the buckwheat family, was introduced from East Asia in the late 1800s as an ornamental and to stabilize streambanks. Knotweed is a highly successful invader of wetlands, stream corridors, forest edges, and drainage ditches across the country. Its close relative, giant knotweed (*Fallopia sachalinensis*), is very similar in appearance and ecology, and the two species form the hybrid bohemian knotweed (*Fallopia* × *bohemica*).

Description

Size

Growing up to 11 feet tall, knotweed can spread horizontally via an extensive network of underground rhizomes, along which many shoots will sprout.

Stems

Superficially resembling bamboo, its jointed, hollow stem has many red or purple nodes where the leaves are attached. The stems are otherwise smooth, bright green, and often covered with darker spots or streaks. Portions of the stem bearing leaves appear to zigzag from node to node and form dense thickets.

Leaves

Many alternately arranged, spade- or heart-shaped leaves emerge from nodes along the stem, though lower leaves are often shed as the plant grows. Japanese knotweed leaves can be up to 6 inches long and have a squared leaf base. Giant or hybrid knotweed leaves will grow much larger, up to 1 foot long, and have a rounded leaf base.

Ask Tilva

Flowers

In late summer, white or pale green flower clusters sprout from the nodes. The fingerlike clusters are 3 to 4 inches long and consist of several dozen five-petaled, aromatic flowers.

New shoots

Emerging in early spring, the young growth is especially bright red or purple and tipped with many furled leaves that are distinctly triangular.



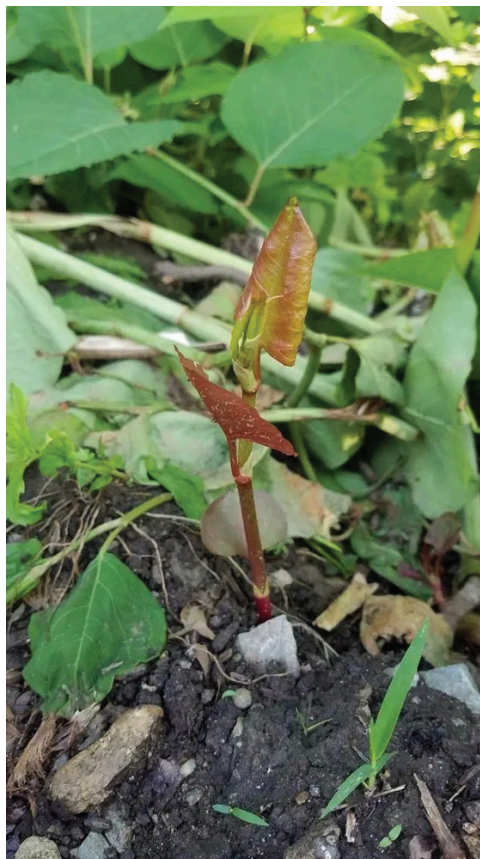
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Flowers. Photo by Dave Jackson



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Japanese knotweed leaf shape showing squared base and zigzag stem growth. Photo by Dave Jackson



Young knotweed sprout. Photo by Dave Jackson



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Monoculture forming on streamside. Photo by Dave Jackson

Look-alikes

Knotweed is often confused with bamboo (subfamily Bambusoideae), another invasive plant. Unlike knotweed, bamboo has slender, papery leaves that persist year-round. In cross-section, bamboo stems are also jointed, but much woodier, while living knotweed stems are herbaceous and will be visibly wet upon cutting. Another nonnative but not aggressively invasive species, broad-leaved dock (*Rumex obtusifolius*), could also be confused with young knotweed shoots, but broad-leaved dock consists of a rosette of many basal leaves emerging from a central taproot, differentiating it from Japanese knotweed's many single, rapidly elongating stems.

Dispersal

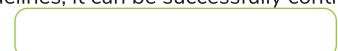
The key to Japanese knotweed's success is its ability to spread vegetatively through its root system. While some populations also reproduce via seed, colonies of knotweed are usually formed from an interconnected, underground system of horizontal roots called "rhizomes." These rhizomes are prone to splitting when disturbed and each fragment is capable of forming a fully functional clone of the parent plant. Fragments can be dispersed along waterways during flooding events or by the movement of soil containing root fragments. Additionally, if stems are cut, both the still-rooted stem and the trimmed portion are capable of regrowing into new plants if in contact with moist soil. Due to these traits, knotweed stands are extremely persistent even after multiple removal attempts.

Site

This plant thrives on most sites that are at least seasonally wet. However, it can tolerate a wide variety of growing conditions, including acidic mine spoils, saline soils adjacent to roads, and fertile riverbanks. Though somewhat intolerant of shade, it can persist along forest edges or in the shade of bridges and road structures. The dense, low canopy formed by a thicket of tangled stems and large leaves creates a monoculture, excluding nearly all other vegetation. In comparison to native streamside vegetation, Japanese knotweed provides poor erosion control, and its presence gradually degrades aquatic habitat and water quality.

Control

The primary objective in controlling Japanese knotweed is eliminating the rhizome system. Rhizomes are creeping underground stems that give rise to new shoots and roots. As long as you are willing to invest the effort and follow a few key timing guidelines, it can be successfully controlled.



There are two phases of knotweed management: initial control and maintenance. The control phase for knotweed takes at least two seasons and consists of either two applications of herbicide or a cutting with a follow up of herbicide. Late season application of herbicide in the control phase is especially effective because this is when the foliage is sending sugars produced through photosynthesis to the roots and rhizomes; systemic herbicides move through the plant with those sugars. After initial control efforts have nearly eliminated the knotweed, you will need to periodically monitor the site and treat any new growth to prevent reinfestation.

Cutting alone is not an effective suppression approach. However, cutting prior to an herbicide application can be very helpful. Cut in June and wait at least eight weeks after cutting to treat the resprouting plants with herbicide; knotweed regrowth will be much shorter than if it had not been cut, and the rhizomes will be forced to redirect their energy reserves toward resprouting instead of expanding their underground network. Typically, knotweed regrows to 2 to 5 feet tall during the eight-week window after cutting, but this waiting period is critical—if you apply herbicide too soon after cutting, the herbicide will not be effectively translocated to the rhizomes. Cutting is also useful when knotweed is growing near water because it is easier to treat the shorter regrowth without inadvertently spraying herbicides into the water during follow-up treatments. Treating intact knotweed towering over your head can be difficult, but cutting may be even more work. As long as you are able to effectively spray all the foliage, cutting is not critical. Wait at least eight weeks after cutting before applying herbicide.

We recommend glyphosate, a nonselective herbicide available as aquatic-labeled products for use in or near water. Glyphosate is effective, has low toxicity to nontarget organisms, has no soil activity, and is relatively inexpensive. The herbicide imazapyr (e.g., Polaris, Habitat) is also effective against knotweed, but it has considerable soil activity and can injure nearby trees through root uptake. Broadleaf herbicides such as triclopyr or 2,4-D provide significant foliar injury but have limited effect on the rhizome system. Mixing glyphosate with other herbicides makes sense if knotweed is not your only target during spray operations. Combinations with triclopyr or imazapyr provide a broader species spectrum and do not reduce activity against knotweed.

Management Calendar

The management calendar for knotweed emphasizes late season applications of the herbicide glyphosate to maximize injury to the rhizomes and waiting at least eight weeks after cutting to apply herbicide.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Growth Initiation												
Flowering and Seed Ripening												
Preherbicide Cutting												
Postcutting Herbicide												
Biannual Foliar Herbicide on Uncut Plants												

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Treatment and Timing

Prescriptions for controlling knotweed stress proper timing of operations to maximize injury to rhizomes. Improper timing will result in treatments that provide "topkill" (shoot injury) but little net effect. Product names reflect the current Pennsylvania state herbicide contract; additional brands with the same active ingredients are available.

Treatment	Timing	Herbicide	Product Rate	Comments

Preherbicide cutting	June	N/A	N/A	Cutting in June results in shortened regrowth (2 to 5 feet) and elimination of persistent stems from the previous season. This is a particular advantage in riparian settings, where full-size knotweed will hang over the water, making it impossible to treat without contacting the water with herbicide solution.
Foliar	At least eight weeks after cutting as a follow-up treatment or after late spring frosts for a treatment plan without cutting	Aquaneat or Glyphomate 41 (glyphosate)	3 quarts/acre or 4.3 quarts/acre	Use any of these glyphosate formulations to treat knotweed foliage, waiting eight weeks after cutting or a late frost to treat. The product rates differ because the glyphosate concentration differs between products. Applications of Aquaneat will require an additional surfactant (e.g., CWC 90). No additional surfactant is needed with Glyphomate 41. If you work at the early end of the operational window, you can make a touch-up application later in the season before a killing frost. Use this treatment for both initial control and follow-up maintenance applications. For high-volume (spray-to-wet) applications, mix on a 100 gallon-per-acre basis (e.g., Aquaneat would be 96 ounces per 100 gallons, or 0.75 percent by volume). For all treatments, be sure to calibrate your sprayer.

Human Use

All species of knotweed found in the United States produce edible young shoots in spring. Knotweed honey is a popular monoculture honey, as its fragrant, nectar-rich blossoms are a favorite of our nonnative honey bee (*Apis mellifera*). In its native Asia, knotweed has many applications in traditional herbal medicine. While these human uses are often raised in argument against controlling Japanese and other knotweeds, none outweigh the consequences of unchecked knotweed infestation. Knotweed infestations result in decreased biodiversity in both plant and animal communities, degraded water quality, and damage to human infrastructure such as road and bridge foundations. These widespread and highly negative effects should be considered alongside any argument for its overall value.

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