

YOU CAN HELP CONTROL JAPANESE KNOTWEED!

- ❖ **Learn to identify it** (and other invasive plants):
 - Carry this brochure or a Japanese knotweed Wildcard (WDNR # PUB ER-106V-2003) when you travel.
 - Take a native plant class to discover your area's rich diversity, how to distinguish Japanese knotweed from natives, and what to use to replace it after clone elimination.
 - Get and learn to use a good plant identification guide — it'll be fun...!
- ❖ **Report infestations** in wild areas, especially along watercourses:
 - Use WDNR's Invasive Plant Report Form found at <http://dnr.wi.gov/invasives/futureplants> (under "How you can help") or
 - Email or call Kelly Kearns at kelly.kearns@wisconsin.gov or 608-267-5066.
- ❖ **Help prevent** the spread of Japanese knotweed:
 - Clean footwear when leaving an infested site to slow seed dispersal.
 - Be sure your local highway mowers do not disperse plant fragments.
 - Help curb local use of the plant for landscaping. Avoid moving contaminated fill.
 - Work to get Japanese knotweed on your local noxious weed list, with incentives for prevention of the plant (early removal), and reasonable elimination requirements.
- Work with landowners to remove pioneering plants.
- Dispose of all plant parts properly, especially near moving water.
- ❖ **Teach others** about Japanese knotweed (and other invasive plants):
 - Learn about the many invasive plant species already in Wisconsin and how to help control them at <http://dnr.wi.gov/invasives/plants.htm>
 - Learn about future invasive plants at <http://dnr.wi.gov/invasives/futureplants>
 - Get educational materials from WDNR and UW-Extension to use with other people and groups in your area.
- ❖ **Urge elected officials** to provide adequate funding for biological control research for all invasive plants:
 - Help Wisconsin become part of international efforts to find effective, long-term control insects or plant diseases specific to Japanese knotweed and other invasive plants. These biological controls can help us control invasive plants efficiently, with minimal herbicide use.
- ❖ **Help control** Japanese knotweed in your area by eliminating established clones and working with others to develop your watershed's control plan
 - Be responsible and know and control the plant on your own land first.
 - Always get landowner permission for work on private property.



Jenn Grieser photo, www.invasive.org

Regrowth after early-season cutting.

COVER PHOTO: Japanese Knotweed leaves and flowers (Tom Heutte photo, www.invasive.org).

Websites for more information

dnr.wi.gov/invasives/plants.htm

tncweeds.ucdavis.edu/esadocs/polycusp.html

www.invasiveplants.net/InvasivePlants/Knotweed/Knotweed.asp

www.nps.gov/plants/alien/fact/pocu1.htm

www.invasiveplants.net/InvasivePlants/Knotweed/Knotweed.asp

NOTE: References to pesticide and other products in this publication are for your convenience and are not an endorsement or criticism of one product over similar products. You are responsible for using pesticides according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from pesticide exposure. Failure to do so violates the law.

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Invasive species publications are available at most DNR service centers and can be ordered by DNR publication number. Many are also on WDNR and UWEX web sites.

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Japanese KNOTWEED

Polygonum cuspidatum (Fallopia japonica)



**A NEW THREAT
TO WISCONSIN'S
WATERWAYS,
LAKESHORES, AND
WETLANDS**

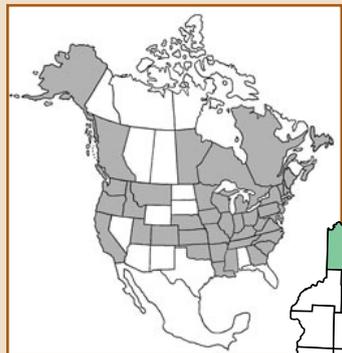
Picture your favorite trout stream or canoeing river lined for miles with a tangle of rigid, bamboo-like stems ten feet tall. These canes confront you like prison bars, and to get through them you have to use a machete to hack your way to the water's edge. Once there, you find that the fish have disappeared and that you can't move up or down the shoreline. You can enter the waterway only where you chopped your way in.

This is the unfortunate scene on some rivers in the Eastern United States now, and could be along many of Wisconsin's streams and shorelines in the future if Japanese knotweed is allowed to begin colonizing them. Fortunately, we can take action now to ensure that our wild waterways, lakeshores, and wetlands remain open and accessible for future generations.

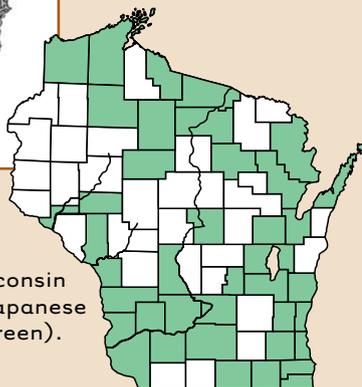
WHERE DID IT COME FROM?

The plant is a large, aggressive perennial from Asia that was exported without the insects and diseases that control it at home. Introduced to Europe by 1800, it has alarmed country after country there with its rapid spread and difficult control.

Japanese Knotweed appeared in the US in the late 1800s and has since spread across the continent from Northeast Canada to South Carolina, and west to the Pacific (see map.) It is now a plant of great concern in most states.



Left — Current North American status of Japanese Knotweed. (L. Seigert map)



Counties in Wisconsin with reported Japanese Knotweed (in green).

SPREAD THROUGH PLANTING

The experiences of other countries and states are being duplicated here and are cause for alarm. Brought to Wisconsin in the mid-1900s, the species is planted in urban areas around the state. However, many landowners now regret having it on their land, as it usurps garden space and encroaches on the rest of their property. One unhappy man in Green Bay has been mowing this plant for forty years, unable to eliminate it from his lawn!

It is now reported from most counties in the state (see state map) Once established,

this plant defies control, with roots that grow as deep as 9 feet and rhizomes (horizontal roots that send up shoots) that grow out to 60 feet. Though it dies to the ground with the first frost, every spring it sends up numerous early shoots along the whole length of these rhizomes.

The rhizomes can also push their way under streets and up through pavement. In Bayfield, rhizomes have grown under streets to infest neighboring properties. A business in the United Kingdom spent over \$600,000 to replace its parking lot after extensive damage from rhizomes, and one Welsh family even found the plant invading its living room as it pushed up from beneath the floor!

Wisconsin is now poised to suffer an explosion of Japanese knotweed in wetlands, along stream banks, and lake shores unless we act to prevent the spread.

Giant knotweed, *Polygonum sachalinense* (*Fallopia sachalinense*), is another similar exotic knotweed now found in several northern Wisconsin counties. This plant grows to 15 feet tall and has larger leaves than Japanese knotweed. Less important than vegetative spread, seed production and fertility in both species is uncertain. Unfortunately, these species hybridize and their offspring can produce viable seeds. Both plants and all hybrids must be eliminated or controlled, especially due to the possibility of increased dispersal from viable seed which could vastly complicate exotic knotweed control. The seeds need open habitat and moist soil to germinate.



Dense stand of 10-foot-tall Japanese Knotweed.



Large roadside stand is also typical along streams.

Tom Heutte photo, www.invasive.org

Tom Heutte photo, www.invasive.org

JAPANESE KNOTWEED IS NOW APPEARING IN WISCONSIN WILD PLACES

- ✓ Appears in such places as shady woods and dry uplands, but of main concern are patches found in valuable open wetland habitats and riparian areas.
- ✓ Grows faster and taller than most native herbs; its long rhizomes quickly form dense thickets up to several acres in size that shade out native plants, reducing site biodiversity.
- ✓ Is food for few native insects or other animals, which contributes to its vigorous growth, but makes its sites of little value to wildlife.
- ✓ Creates bare ground under its clones, which results in faster erosion and more flooding, and makes stream banks more vulnerable to flood damage.
- ✓ Spreads quickly, both filling up its sites and spreading to new ones, especially when stream banks are undercut and fragments of stems and roots fall into the water and are carried downstream.



Dispersion of streamside Japanese Knotweed, caused by high water.

- ✓ Begins new clones in many open streamside and shoreline sites because root and stem fragments as small as ½ inch can sprout new roots.

The widespread planting of Japanese knotweed, its ability to spread easily to new sites, and its increasing frequency in wild places suggest it is starting to follow a trajectory similar to other serious invasive plant species. It is likely to begin expanding at an alarming rate if nothing is done to prevent it from doing so.

Manual, mechanical, and chemical control methods described below can slow the spread of the plant, but have proven inadequate to stop its spread in Europe, as is likely here as well.

European workers are now banking on biological control as the critical long-term control method.

IDENTIFICATION

How to identify Japanese knotweed:

- ✿ Upright, semi-woody, shrub-like herb that can grow 10 feet tall
- ✿ Stems: resemble bamboo, smooth and hollow between swollen joints that have a membranous sheath, often tinged with red, with few branches
- ✿ Winter stems: usually stout, persistent, rust-colored and appear very numerous
- ✿ Leaves: variable, normally about 6 inches long by 3 to 4 inches broad, heart shaped to somewhat triangular with a pointed tip
- ✿ Flowers: very small, greenish-white, arranged in attractive, branched sprays in late summer
- ✿ Fruits: small and winged, with tiny, triangular, shiny seeds
- ✿ Grows in dense stands that often line high light areas such as stream banks and moist roadsides, and may be up to several acres in size
- ✿ Sprouts very early in spring and grows fast, quickly towering over other plants



Japanese knotweed leaves and flowers.



Winter is a good time to look for Japanese Knotweed.



Stems resemble bamboo.

CONTROL METHODS

At this time eradication of Japanese knotweed from the landscape is unlikely since it grows in so many locations and its clones are so difficult to eliminate. Thus, control on a watershed scale should be considered. Highest priority should be given to sites where it has established along water courses, starting at the top of the watershed. High priority should also go to eliminating any plants producing seeds, regardless of location.

Control of clones Control is possible, though not easy because large clones are usually a single plant with an extensive root system. Find and destroy such plants before they become large clones! Eradication of even small patches rarely takes less than a year, even with multiple attempts. The methods you choose will depend on patch location, resources available, etc. Most control measures result in vigorous re-sprouting from rhizomes, so whatever method you use, watch the area 2 to 7 yards out from the obvious infestation edge to be sure rhizomes are not sending up new shoots outside of the controlled area. All removed plant material must be dried, removed from the site and burned, or put into a capped landfill.

Manual/Mechanical In many cases continual cutting of Japanese knotweed has failed to eliminate clones of the plant, though in some small infestations cutting

the whole clone at least twice a month in the growing season for two to three consecutive years has eliminated it. If cutting works, it may be the only method available for very sensitive areas where herbicides are unwelcome. Easy site access is necessary for frequent cutting work, and the labor involved usually relegates the cutting to small sites. Hand cutting works in sensitive sites, but mowing or other mechanical cutting is much easier. Cut as close to the ground as possible. Re-examine these sites for several years to be sure the clone does not return. Cutting plant tops as flowering begins can eliminate seed production for the season.

Digging and pulling roots may also eliminate young, small clones, especially in loose soil, though root fragment usually remain to produce new plants. Tilling the soil will not control knotweed, but does cause re-sprouting that can help drain the roots of energy. It can be combined with a number of other later control measures, including herbicides. Covering the soil surface to eliminate light to the plant has not been very successful or economically viable, though it may work for smaller, isolated patches when done carefully. Coverage through a whole growing season might be required.

Herbicides Herbicides are currently the most effective control option for Japanese knotweed. Many different chemicals have been tried with varying results; all have advantages and disadvantages. Be sure to use herbicides in accordance with their label instructions to ensure safety and efficacy. Different methods and rates of application available for each herbicide will help dictate how and when it is used. More herbicide is not always better; too much active ingredient may kill plant tissue before translocation to its roots, rendering it useless in killing the plant. Always try to use the least amount of herbicide that will do the job. Field test your chosen herbicide and rate of delivery to ensure best results. Apply them only on sites listed on the label, and take extra care using chemicals over or very near water. Herbicide use in these areas in Wisconsin always requires a permit

from your regional WDNR Aquatic Plant Manager.

- *Injecting hollow Japanese knotweed stems* with glyphosate or triclopyr herbicides is a new type of application that promises to be the most effective and environmentally sound, especially in wet sites since there is little chance of chemical water contamination. It may also be the method of choice for hard to reach places since it might kill a clone in just one or two applications if all stems are treated. A new injection tool (~\$200) is available that delivers a precise amount of herbicide; 5 ml. being the optimal amount per stem for both glyphosate and triclopyr. Label restrictions on rates must be followed that might dictate how many stems can be treated in an area. For example, a maximum of 1,420 stems per acre can be treated in this way with 5 ml. of Rodeo per stem. The minimum stem diameter for injection is ½ inch.

- *Foliar spraying* is a common way to apply herbicides, though it carries a risk of damaging other plants from overspray of non-selective chemicals, unless done carefully and in still wind conditions. Many herbicides have been effective, including glyphosate (Rodeo, Aquamaster, and Round-Up, among others), triclopyr (Garlon 3a, etc.), 2,4-D, picloram (Tordon), and Imazapyr (Arsenal). Consult with your local DNR or UW Extension agent, web sites listed below, and manufacturers for advice on choosing the best for your site and application. Be sure to use a legal adjuvant for increased effectiveness.

A variety of different rates of spray application have been used and reported on the web sites listed below. Most work has been done with glyphosate and triclopyr at rates of from ¼% (for Garlon) to 8% concentration for both glyphosate and triclopyr. Unfortunately, reported results vary, making exact recommendations difficult.

- *Timing is important* in foliar applications, with flower bud stage being the best for deep rooted perennials. The most practical time for Japanese knotweed, however, is when it is only 3 to 6 feet tall and easy to

spray, but this is too early in summer for the herbicide to be most effective. Instead, consider cutting all the stems once or twice to retard their growth in height in order to apply the herbicide at the clone's best developmental stage late in summer, but on short, conveniently sized stems.

- *Herbicides may also be applied* directly on all stems in a clone cut just above ground late in summer. Sometimes stems are cut just below the second joint above the ground and herbicide is poured into the hollow stem below. Follow label instructions. In each case, follow-up foliar spraying might be necessary.

Integrating methods Combining methods, such as early cutting and later herbicide use as suggested above, allows more options and flexibility. Digging, pulling, or tilling before spraying might also increase the effectiveness of herbicides. Stems too small to inject might have to be spot sprayed.

Biological Control Surveys in Japan of insect and fungal pests of Japanese knotweed have found many insect species and a number of fungal pathogens that are promising biocontrol organisms because they appear to feed exclusively on the plant. These reduce the plant to an innocuous member of the flora there and could do the same elsewhere. The research on the safety and efficacy of biocontrol organisms for Japanese knotweed in Europe is underway and focusing on *Lixus* weevils. More than 700 European plants have been tested so far with no crossover feeding by the insects. More than 70 plants have also been successfully tested with another insect species and more than 50 plants with a leafspot fungus.

Testing should also be started as soon as possible on North American plants to bring us badly needed control help as well. Carefully researched biocontrol insect species have helped immensely with the control of purple loosestrife, leafy spurge, and other pest plants here. Given the difficulty of controlling Japanese knotweed with conventional means, biocontrol may be our only hope for keeping the plant in check.