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Conservation Reserve Enhancement Program (CREP)
Technical Assistance Series

Factsheet
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Managing Japanese Knotweed

Japanese knotweed (*Polygonum cuspidatum*) is an imposing herbaceous perennial that is commonly called 'bamboo'. It grows in dense patches to heights of 10 feet, on sites ranging from strip mine spoil to shaded streambanks. It is native to Asia, and was originally introduced to the U.S. as an ornamental in the late 1800's. In CREP plantings, knotweed will overrun riparian buffer tree plantings as well as grassland areas. Knotweed offers little habitat value other than cover, and greatly degrades the wildlife habitat value of your plantings.

Unique Among Weeds

There is no mistaking a well-established stand of Japanese knotweed for any other plant in PA except for its close kin, giant knotweed (*Polygonum sachalinense*). Both knotweeds grow in tall, dense stands that shade out other vegetation. Both have large, hand-sized, heart-shaped leaves, and jointed, hollow stems that look like bamboo. Knotweed is not a true bamboo (a woody, evergreen grass), but is a relative of plants such as buckwheat, smartweed, and the PA Noxious Weed mile-a-minute vine.

Figure 1. The root of the problem - the rhizomatous crown of Japanese knotweed. The primary rhizome is shown extending out of the bottom of the crown and is almost 2 inches in diameter. Several new rhizomes that will extend horizontally and form new crowns are visible. Swollen buds that will become this year's stems are emerging from the mat of fine roots at the base of last year's stems (clipped).

Figure 2. Knotweed will grow almost anywhere, but it is an acute problem in riparian settings. Knotweed prevents establishment of native trees and shrubs, reduces access to the water, and its coarse rhizomes do not stabilize the banks as well as the finer roots of trees or grasses.

Knotweed stems emerge in late-March to mid-April, depending on soil temperatures, and begin a burst of rapid growth. In a warm spring, knotweed can be 6 feet tall before May 1. Flowering usually occurs in July, and the seeds mature in August and September.

As frightening as the above ground growth of knotweed is, it is the rhizome system that is the real problem. A rhizome is an underground stem that gives rise to roots, aerial stems, and more rhizomes (Figure 1). Knotweed rhizomes spread vigorously, expanding the size of the knotweed stand. Rhizomes are also very durable. A very small piece of rhizome that is moved to another site will give rise to a new plant. Knotweed on streambanks spreads downstream as the bank erodes and pieces of rhizome break off and float downstream to take root elsewhere (Figure 2).

Knotweed Control Measures

To control knotweed, you have to control the rhizome system. To bring a knotweed infestation to a manageable level, you need to start with multiple treatments, and it will take at least two years.

The multiple treatment approach relies on depletion of the reserves stored in the rhizomes in the late spring, and

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injury through use of systemic herbicides in the late summer.

A late summer application of the herbicide *glyphosate* is one of the most effective treatments available. Late in the growing season is when the knotweed canopy is sending sugars from photosynthesis to the rhizomes for storage. *Glyphosate* moves through the plant into the rhizomes with these sugars. It also has the advantage of having no soil activity. This reduces the risk of injury to non-target plants through root absorption, particularly in riparian forest buffer plantings. If *glyphosate* contacts the foliage of non-target plants, they will be injured or killed.

There are many *glyphosate* products available. When working in riparian settings, a formulation labeled for aquatic applications is the best choice. The best-known example of this type of *glyphosate* product is 'Rodeo'. There are dozens of products equivalent to 'Rodeo'. There are two features that distinguish 'Rodeo' from products labeled only for terrestrial use, such as 'Roundup Pro'. 'Rodeo' has no surfactant, so you must add one; and 'Rodeo' is 1/3 more concentrated than 'Roundup Pro', so you use only 3/4 the product to achieve the same dose of *glyphosate*. To control knotweed, you would apply 128 oz/acre of 'Roundup Pro', or 96 oz/acre of 'Rodeo'.

By using a *glyphosate* product and surfactant labeled for aquatic settings, you reduce the risk of injury to aquatic organisms if you accidentally spray the water. *Glyphosate* is relatively non-toxic to most aquatic organisms, but the surfactant in the 'old' Roundup (now sold as 'Roundup Original') was highly toxic to aquatic organisms.

Using 'Rodeo' does not permit you to treat weeds in the water or allow you to directly spray the water. In Pennsylvania, an application directed to the water requires a permit from the PA Fish and Boat Commission. Using an aquatic-labeled product *close* to water simply reduces the risk to non-target aquatic organisms.

The late summer *glyphosate* application is much easier if you mow or cut the knotweed around June 1. The regrowth after cutting at this date is much shorter than the original growth - it's 3 to 4 feet tall rather than the 6 to 10 feet of growth that was there at cutting. This shorter canopy is much easier to treat using a backpack sprayer. It's less work, and you can be much more selective in the application if there is desirable vegetation among the knotweed.

If you don't cut the knotweed first, it should be treated with glyphosate in late July, and then spot treat any regrowth or missed stems in early September.

Follow-up treatment in the second year is *essential*. You will probably observe 90 to 95 percent reduction in the stand, but if you don't continue to treat it, it will come back and you will need to start over. Wait until July of the second year for the follow-up treatment. If you treat earlier, there is less translocation of the herbicide to the rhizomes.

Knotweed management is more complex if it's growing among planted trees (CP 3A and CP 22 practices). You will need to cut the knotweed earlier and more often to prevent it from canopying over your tree plantings. As with the single mowing approach, allow at least six weeks after the last mowing before you spot treat the knotweed with glyphosate in the late summer.

You may never eradicate knotweed from your property, but you can definitely keep it at a manageable level so it does not impact the habitat value of your plantings.

Table 1. Successful control of Japanese knotweed requires multiple applications the first season, and multiple seasons of control. A late summer application of glyphosate is the key to maximizing injury to the root system. This application is much easier if you mow or cut the knotweed around June 1 because the regrowth will be much shorter than the 6 to 10 foot canopy you started with.

treatment	product rate (oz/ac)	comments
Rodeo plus added surfactant	96 oz/100 gal	Rodeo is one of many *glyphosate* products that can be used for terrestrial, wetland, or aquatic applications. This mixture is for spot treating knotweed on a spray-to-wet basis. If you are following a June 1 mowing, wait at least six weeks before applying. If you are not going to cut the knotweed first, then plan on spraying twice. Make the first application between mid-July and early-August, then make a follow-up application by mid-September. Knotweed is frost-sensitive, so it is important to make the second application prior to frost. The advantage of mowing first (see below) is that the regrowth will be much shorter. You can easily treat this with a backpack sprayer. If you are treating uncut knotweed, it will be over your head, and require a spray-to-wet application. We don't recommend other herbicides because *glyphosate* is effective, has no soil activity, and is inexpensive. There will be some resprouting the following season. Wait until at least July 1, then spot-treat. After the second season plan on at least one annual application to any knotweed sprouts.
mowing/cutting	- -	Mowing by itself is not a useful control technique. However, mowing around June 1 will eliminate the top growth, deplete energy reserves in the rhizomes, and result in regrowth that is only 3 to 4 feet tall. This shorter regrowth is much easier to treat with herbicides than full-height knotweed. If knotweed is growing among planted trees, you will have to cut it more often, starting earlier in the season to prevent it from growing over the trees. Spot mowing may be necessary in grassland plantings.

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