Japanese & Giant Knotweed

NWCA Spring Training, CCC – Hastings Campus, March 29th, 2011

Photo by Mitch Coffin, NDA

Why Worry About Knotweed?

- Originally planted as an ornamental in the United States and Europe but now considered one of the worst invasive plants in riparian habitats
- We have miles and miles of valuable riparian and wetland habitat in Nebraska that are vulnerable to knotweed invasion
- It is one of the most difficult plants to eradicate growing in some of the most sensitive habitats
- Listed as one of the 100 worst weeds in the world
- Japanese Knotweed and some of its cultivars were being sold as ornamentals in Nebraska.

What is Knotweed?

- Tall, robust plants from Asia in the buckwheat family
  - Japanese knotweed (*Fallopia japonica*)
  - Giant knotweed (*Fallopia sachalinenis*)
  - Bohemian knotweed hybrid (*Fallopia bohemica*)
- Other common names:
  - elephant ear bamboo
  - false bamboo
  - Mexican bamboo
  - Fleece flower

DESCRIPTION

Japanese knotweed and Giant knotweed are herbaceous perennials that form large colonies of erect stems that can reach 9 – 15 feet in height. They spread by vigorous rhizomes, seed and plant parts.

DESCRIPTION

Japanese knotweed and Giant knotweed are very similar in appearance and are known to hybridize.

When they cross they become **Bohemian Knotweed**.

The best character for separating them is the shape of the leaf base, those of Japanese knotweed are squared-off at the bottom, while those of giant knotweed are heart-shaped.

General Knotweed Characteristics:

- Large, untoothed leaves, growing alternate on stems
- Small **white** or greenish flowers grow in dense clusters from the leaf joints in July and August

Japanese Knotweed (*Fallopia japonica*)

- Smaller than the others (6 feet usually)
- Most clones in US are female (will have seeds later in season)
- Flower clusters are longer and more ornamental

Stems

The hollow, bamboo-like stems are erect and un-branched or with a few branches toward the tip. Branches develop at the nodes. Despite their size, knotweed stems are annual; they die back to the rhizome at the end of the growing season. New shoots emerge in April and grow rapidly; early in the season they can grow 3–5 inches per day.

Hollow, upright, bamboo like stems often reddish or red-speckled

Plants die back to the ground after hard frosts but hard, dry stems may persist through the winter.

Photos by Mitch Coffin, NDA

Leaves

Leaves are alternate on the stem, simple, 4–6 inches long and almost as wide, and dark green. Japanese knotweed leaves are abruptly squared-off (truncate) at the base; those of giant knotweed have a heart-shaped base. Both narrow to a pointed tip.

Flowers

Flowers - Both Japanese knotweed and giant knotweed have numerous small, greenish-white flowers that are produced in late summer.

Japanese knotweed bears only male or female flowers on a given plant. Most clones in US are female (will have seeds later in season) Flower clusters are longer and more ornamental

Giant knotweed blooms have both male and female parts in the same flower. However, appearances can be difficult to interpret.

Japanese Knotweed flowers

Japanese Knotweed (*Fallopia japonica*)

Growth point at the top of the plant

Japanese Knotweed (*Fallopia japonica*)

- From each node it will first create a leaf, followed by a branch with more leaves that branch off.
- When it flowers each leaf joint will have flowers

JAPANESE KNOTWEED
03/16/2011

JAPANESE KNOTWEED
03/17/2011

03/18/2011

03/21/2011

03/22/2011

03/24/2011

Giant Knotweed (*Fallopia sachalinenis*)

- Tallest species, up to 15 feet
- Leaves very large all with heart shaped bases
- Flower clusters shorter
- Most clones in US are female

Large leaves give giant knotweed its common name elephant ear bamboo

Giant knotweed in early spring with last year’s dead stems

Bohemian Knotweed (*Fallopia bohemica*)

- Naturally occurring hybrid between the other two
- Most common type of knotweed found so far
- Medium tall (8 to 12 feet), mixed leaf shapes
- Introduced as an ornamental separately
- Most clones were male (flower clusters stiffly upright, no seeds)
- Recently females have been showing up with viable seeds

Bohemian Knotweed @ 28th & Q - Lincoln, NE

Typical stand of Bohemian knotweed with stiffly upright male flower clusters

Height - Individual stems are 8 –12 fee tall depending on the vigor of the colony. May be taller.

Photo by Mitch Coffin, NDA

Typical stand of Bohemian knotweed @ 28th & Q – Lincoln, NE

Pink fleece flower

Fallopia japonica, Reynoutria

Variegated fleece flower

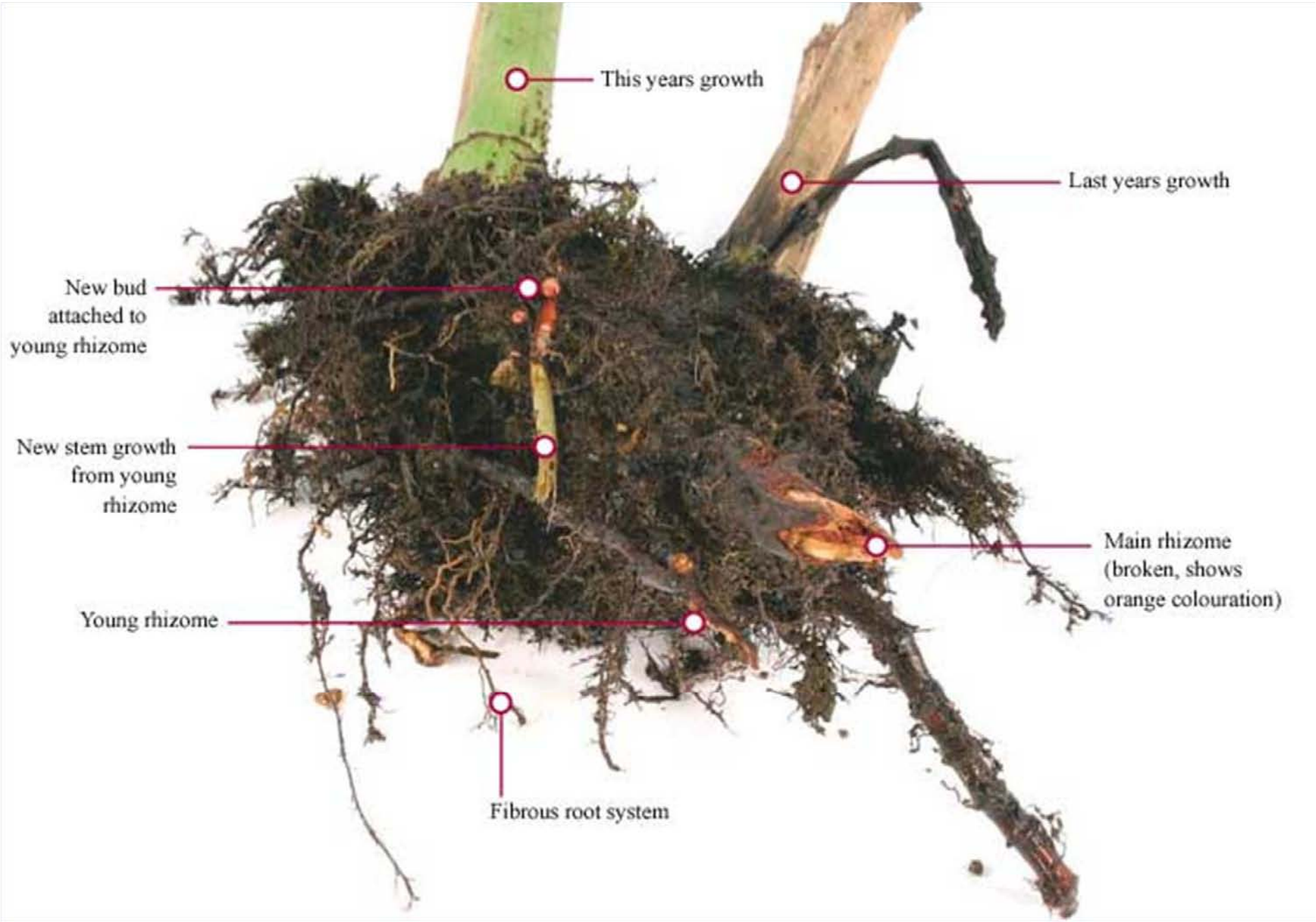
Fallopia japonica, Variegata

Antelope Park – Lincoln, NE

How Knotweed Grows

- Starts growth in April, later in colder areas
- Grows extremely fast during the spring
  - Giant knotweed can reach 15 feet by late June
  - Bohemian knotweed reaches “only” 12 feet or so
- Stems from deeply buried roots may emerge in late summer

Young giant knotweed stems



How knotweed grows and spreads (http://www.knotweed.co.uk)

Young shoots in early spring look similar to red asparagus

Bohemian knotweed shoots emerge from rhizomes. *Photo -April 6th – Sarpy County*

Seedlings April 6th

3’ to 4’ tall on April 22nd

Typical roadside patch of Bohemian Knotweed

How Knotweed Reproduces

- Seedlings occur but are uncommon
- Mostly reproduces by vegetative means
  - Root and stem fragments, as small as 1/2" can form new plant colonies
  - Cut or broken stems and roots will sprout if left on moist soil or put directly into water

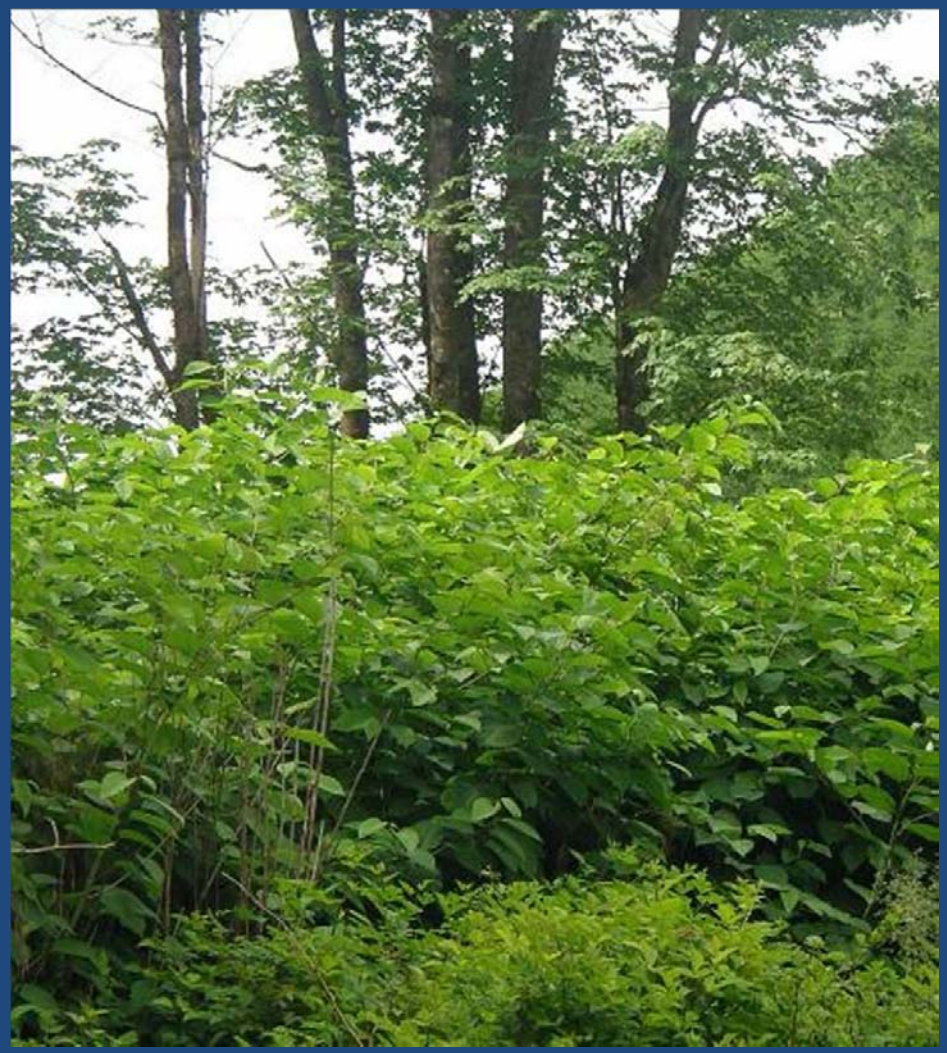
Re-growth from the stem

Put in jug of water 3 or 4 days after brought home.

Photos by Glenn Callaway, Seward County Weed Supt.

How Knotweed Takes Over

- Colonizes flood-scoured shores and islands and other exposed areas
- Emerges early in the season and quickly out-grows and shades out other plants
  - inhibits even trees such as alder and willow
  - understory of knotweed is usually bare of any other plants



Knotweed Control Issues

- It's possible but takes dedication and commitment
  - Eradication is likely to take several years and multiple treatments
- Landscape level control requires long term planning and follow up
  - Need to work from the top of the waterway down including tributaries
  - Landscape level projects and large sites will almost certainly require integrating herbicide use into a control strategy

Prevent new infestations by blocking invasion pathways

- Small segments of the plant are able to regenerate into new plants.
- These plant segments are commonly transported by water and regenerate new plants on the banks of streams.
- These plant segments may be transported to new sites by foot traffic, equipment, mowing and improper disposal of vegetation.
- Sexual reproduction is also possible in the US as evidenced by viable seeds ranging from 13% to 46 % collected from three Japanese knotweed sites in Lincoln.
- The seeds move easily by water and wind.

Knotweed Control Methods

- Manual
- Mechanical
- Shade
- Chemical
- Combination

When To Use Manual Methods

- Easy site access
- Patches are small (50 stems or less)
- You can commit to following an intensive control regiment
- You don’t intend to use stem injection method since repeated cutting tends to produce numerous small stems, too small to inject

Manual Control Issues

- Cutting and pulling stimulates shoot growth and depletes the roots
- The more shoots there are per linear foot of root, the more likely you will be able to physically pull the roots out, exhaust them by depriving them of energy (i.e. by cutting the shoot off) or finish them off with an herbicide treatment

Digging

- Dig up as much root as possible in August over at least three consecutive years
- Reported to work for small, isolated patches
- Be sure to carefully dry or dispose of the roots
- Do not put roots in a compost pile
  - In England, soil contaminated with knotweed roots is considered an environmental contaminant and needs to be buried 10 feet deep
- Be sure to search at least 20 feet away from the original patch center

Digging knotweed up is possible but roots may go down 7 feet deep and extend out 20 feet and re-sprouting is likely

Repeated Cutting

- Cut stems close to the ground TWICE A MONTH OR MORE between April and August
- And then cut once a month or more until the first frost
- Repeat treatment every year for about 5 years
- Try to keep plants from growing taller than 6 inches
- Using a mower/weed-eater is an option if set close to the ground
- Rake and pile up the cut stems where they will dry out, because stem fragments can root at the nodes
- Do not allow cut, mowed or pulled vegetation to enter waterways

Brush cutters often the first step in tackling a large stand of knotweed

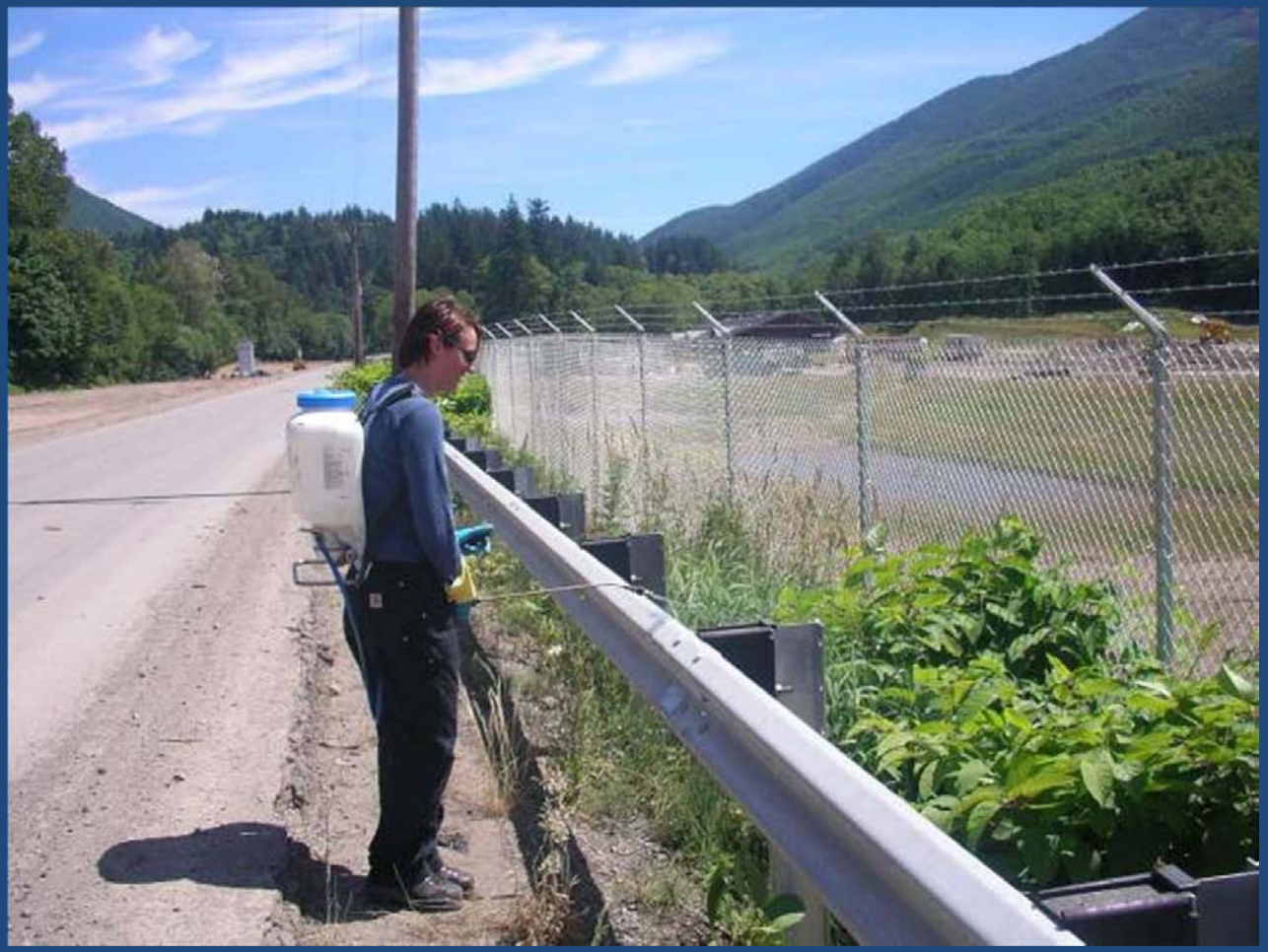
The Four T’s of Manual Control

- If you do try and control knotweed manually or mechanically, be sure you practice the four T’s:
  - be Timely
  - Tenacious
  - Tough and
  - Thorough

Knotweed Control: Shade Cloth

Landscape fabric installed after cutting knotweed, staked and roped to secure. Note new sprouts coming up through holes.

Chemical Control



Foliar Application

- Can use backpack sprayer or large volume sprayer
- Risk of drift onto desirable vegetation and into water, soil
- Easiest and fastest method
- May be appropriate for roadside and large infestations where other methods aren’t possible
- Expect some survival; repeat treatment for at least one to two years, possibly longer

Herbicide Types

- **For small sites and ornamental plantings**
- Treat from July 1 to first killing frost when carbohydrates produced in the leaves are moved to the rhizomes for growth and storage. Foliar applied herbicides move through the plant with the carbohydrates.
- Cut the stems about 2 inches above ground level. Immediately apply a 25% solution of glyphosate (e.g., Roundup®, or use Rodeo® if applying in or near wetland areas and water) to the cross-section of the stem.

For larger sites

- 1. Apply 2 qt/a of imazapyr (e.g., Arsenal®, or use Habitat® if applying in or near wetland areas), use non-ionic surfactants or MSO (consult label) or,
- 2. Apply 2 qt/a of Garlon 3A, use non-ionic surfactants (consult label) or,
- 3. Apply 1 qt/a of glyphosate (e.g., Roundup®, or use Rodeo® if applying in or near wetland areas), use non-ionic surfactants (consult label).

Combo Method

- In spring or summer, spray or cut stems followed by fall foliar spray
- Sets plants back so they can be sprayed at the appropriate growth stage and at the best height
- Cutting first instead of spraying will reduce overall herbicide input into the watershed and is probably more labor efficient
  - can use volunteers or crews without pesticide licenses for cutting

Other methods

- Cut Stem/Pour Application
- Stem injection
- Wick wipe method

Knotweed Control: Stem Injection

Injecting herbicide directly into the stems of knotweed

Resveratrol

- Resveratrol Supplement is made from Japanese knotweed which is claimed to be the highest known source of resveratrol containing 1,000 times the resveratrol content of grapes.
- Resveratrol is a popular natural health product because of its ability to act as a powerful antioxidant for the support of health, longevity and weight management.

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