

Knotweeds

Japanese knotweed — *Fallopia japonica*
Giant knotweed — *Fallopia sachalinensis*
Bohemian knotweed — *Fallopia x bohemica*
Himalayan knotweed — *Polygonum polystachyum*

About Knotweeds

Four knotweed species are currently found in British Columbia: Japanese knotweed (*Fallopia japonica*), Giant knotweed (*Fallopia sachalinensis*), Bohemian knotweed (*Fallopia x bohemica*), and Himalayan knotweed (*Polygonum polystachyum*). All four species are similar in appearance, biology, impacts, distribution, and methods of control and will be discussed under the general title of “knotweeds”.

Knotweeds are one of the 100 worst invasive species as identified by the International Union for Conservation of Nature (IUCN) and a top-ten invasive species for control in BC. Its ability to tolerate a range of soil types and climates means that it has the potential to spread much further than it has to date.

Distribution

Knotweeds are native to Asia and were introduced to British Columbia as an ornamental plant. In British Columbia, they are found in the following regions: Vancouver Island, Central Coast, Sunshine Coast, North Coast (Haida Gwaii), Lower Mainland, Nechako, Cariboo, Thompson-Okanagan and the Kootenays.



Bohemian Knotweed Distribution
(June 2016)



Himalayan Knotweed Distribution
(June 2016)



Giant Knotweed Distribution
(June 2016)



Japanese Knotweed Distribution
(June 2016)

Legal Status

Knotweeds are designated as provincially noxious under the *Weed Control Act*. They are also regulated under the *Forest and Range Practices Act* and *Community Charter*.

Identification

A “**Key to Identification of Invasive Knotweeds in BC**” is available online at: www.for.gov.bc.ca/hra/Publications/invasive_plants/Knotweed_key_BC_2007.pdf

Flowers: Small, white/green flowers grow in showy, plume-like, branched clusters along the stem and leaf axils (joints).

Stems: Green stems, or canes, are hollow with varying thicknesses, upright, and bamboo-like with reddish-brown/red speckles. Stems are generally 1-5 m in height and grow in large, dense thickets. Stems may persist through the winter as bare, grey or straw colored hollow stalks.

Rhizomes: At maturity, rhizomes are thick and woody and can spread up to 20m laterally. Rhizomes have reduced leaf scales that span every 2-4 cm. The underside of the rhizomes has adventitious roots that travel into the soil with penetrable force.

Leaves: Predominantly heart- to triangular-shaped on all species except Himalayan, which are elongated and tapered. Leaves on all species, except giant knotweed, are 8-10 cm wide and 15 cm in length. Giant knotweed leaves are generally twice the size of the other 3 species. A distinguishing feature for Japanese knotweed is the zigzag pattern in which leaves are arranged along the plant’s arching stems.

Fruits: Typically dark, glossy, 8 to 9 mm long and three-winged. Not all fruits are fertile.

Similar Native Species: Knotweeds, also referred to as “false bamboo” are often confused with Dogwood (*Cornus spp*)



Japanese Knotweed
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L-R. Giant Knotweed, Japanese Knotweed, Himalayan Knotweed; J. Halworth

and Lilac (*Syringa vulgaris*) as the leaf shape of many woody shrubs and small/young trees can look very similar to knotweed. These species can be differentiated by leaves that grow opposite each other along a woody stems.

Ecological Characteristics

Habitat: Knotweeds are often found in riparian areas stockpiled material (example: soil, aggregate, mulch), derelict land, road and railway right of ways and gardens. They prefer moist soil and full or partial sun.

Reproduction: Both root and stem fragments can regenerate — making knotweeds very easy to spread. The primary mode of reproduction is vegetative. Reproduction can occur from as little as 0.7 grams of stem or root tissue. Buried rhizomes can regenerate from depths up to 1m. Historically, knotweeds in their introduced range spread by vegetative means and from a very small number of initial introductions resulting in many knotweed infestations being clones. However, in British Columbia, knotweeds successfully reproduce vegetatively and by viable seed.

Hybridization: Bohemian knotweed is a hybrid between Japanese and Giant knotweed. Bohemian knotweed possesses higher variability than the parent species. For example, Bohemian knotweed leaves are a blend of both parents- they are slightly longer than wide (about mid way between parents for size) and are typically shallowly cordate at the base. Hybrid plants are able produce large numbers of wind-dispersed viable seeds that germinate at rates approaching 100% in some populations.

Dispersal: Plants are often spread through contaminated equipment and soil, and improper disposal of removed plant material. Plants are also dispersed through wind, wildlife, cutting and mowing, flooding events and through human actions such as selling, purchasing, and trading knotweed plants.



Japanese Knotweed through concrete; CABI

\$3 billion

ESTIMATED ANNUAL CONTROL COST OF JAPANESE KNOTWEED IN THE UK

Impact

Economic: Knotweeds can grow through concrete and asphalt, damaging infrastructure. This results in significant control, management and repair costs. In the UK, the annual control cost of Japanese knotweed, on a national scale, is estimated at \$3 billion (USD). Other impacts include reduction of property values. In the UK, there have been examples where people have been unable to secure a mortgage or insurance on knotweed infested properties.

Ecological: Knotweeds grow rapidly, forming monocultures that limit resources for native plants. Their ability to out-compete native species threatens biodiversity and ecosystem functions. Also, knotweed roots lack the true root hairs necessary to bind to the soil, resulting in erosion and stream sedimentation along banks of creeks and rivers where it has become established.

Social: Knotweeds are a nuisance to anglers, boaters and other aquatic recreationalist as infestations impede access to the waterbody. They also affect homeowners as knotweed rhizomes and stems can push through asphalt, building foundations, concrete retaining walls and drains causing significant damage. Due to their rapid growth, knotweeds can impact sightlines and block signs along highways, affecting the safety of motorists. They have also been known to reduce the stability and integrity of the rail bed and compromise train safety.

Integrated Pest Management

IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatment, and monitoring.

Because knotweeds have the ability to reproduce vegetatively through root and stem tissues, management options must be carefully evaluated on a site by site basis to avoid further spread and complications. Eradication of this plant typically requires a dedicated, multi-year, planned approach.

A. Prevention

- » Report infestations:
 - **Regional Invasive Species Committees:** www.bcinvasives.ca/about/partners/bc-stakeholders/regional-committee-map
 - **Online:** www.gov.bc.ca/invasive-species
 - **Toll Free: 1-888-933-3722**
- » Do not purchase, trade, or grow knotweed. Instead, grow regional native plants as they are naturally adapted to the local environment and are non-invasive. For a list of non-invasive alternative plants, please see the Invasive Species Council of BC's Grow Me Instead booklet: (www.bcinvasives.ca).
- » Maintain or establish healthy plant communities that are resistant to invasion by invasive plants.
- » Remove plants, plant parts, and seeds from personal gear, clothing, pets, vehicles, and equipment before leaving the infested area.
- » Ensure soil, gravel, and other fill material are not contaminated with knotweed.
- » Take special care when controlling knotweed near streams, or ditch lines, to prevent the movement of plant parts downstream.
- » Bag or tarp plants, plant parts, and seeds before transporting to a designated disposal site (e.g. landfill).



Japanese Knotweed rootball; W. Tyrrell

B. Biocontrol

Biological Control or biocontrol is the use of an invasive plant's natural enemies (chiefly insects, parasites and pathogens) — to reduce its population below a desired level.

A sap sucker psyllid, *Aphalara itadori*, has been studied as a potential biological control in the Pacific north-west. *A. itadori* feeds on the sap in the phloem cells of the leaves and stems resulting in twisted and deformed leaves and, more importantly, damage to the meristems and reduced biomass.

In 2012, host range screening was completed for *A. itadori* and a permit to import the psyllid into Canada was submitted to the Canadian Food Inspection Agency in October 2012. The agent has been permitted for release and Agriculture and Agri-Food Canada is at a very early research stage of trying to identify the conditions required for establishment. For the current availability of *A. itadori*, please visit: www.for.gov.bc.ca/hra/Plants/biocontrolHome.htm.

C. Chemical Control

Herbicide recommendations and use must first consider site characteristics and be prescribed based on site goals and objectives. Individual herbicide labels should be reviewed, prior to use, for specific site and directions for use. Herbicides should be applied by certified pesticide applicators.

- » There are many targeted techniques available to selectively apply systemic herbicides to knotweed, such as, hand spraying, back pack spraying, and wipe on applications.
- » Effective herbicides include: imazapyr, glyphosate, triclopyr and aminopyralid.

D. Mechanical Control

Important: *Mechanical control on its own is not an effective management tool. Manual control is only recommended under specific circumstances and should be carried out with extreme caution due to the likelihood of spread through root and stem fragments. Mechanical control is a time consuming treatment option that will require dedication of frequent removal over numerous years. All removed plant material should be disposed of properly (see disposal section).*

- » **Mowing** can deplete root reserves over time so the plant is less successful at regenerating after cutting. However, in most cases, repeated frequent mowing fails to eradicate even small patches of knotweed unless carried out over numerous years.
- » **Digging** has shown to be effective on very small and recently established populations if done thoroughly (i.e. all root and shoot tissue are successfully removed) and followed by restoration of native plant communities.
- » **Burning** is not recommended as the plants contain high water content and all plant tissue, particularly the rhizomes, may not burn.
- » **Grazing** may result in short term reduction of above-

ground plant matter. Grazing must be done by trained animals continuously throughout the growing season for numerous years.

- » **Cutting** may be effective for small populations if repeated several times a year with constant monitoring. Cutting should be repeated until root reserves are depleted (usually several years). Cutting is most effective when followed up with herbicide application.

Recommended Control Strategy

Chemical control with a systemic herbicide is the recommended treatment strategy for knotweeds due to their extensive root structure and aggressive growth and reproduction. This treatment method is the easiest, most cost effective, and successful treatment method. Knotweeds typically require treatment with herbicide for 3-5 years.

For control of knotweed species on crown land, please review the **2016 Herbicide Guidelines For Control Of Knotweed Species On Crown Lands**, available at: www.for.gov.bc.ca/hra/plants/publications/2016_Herbicide_Summary_for_Control_of_Knotweeds_on_Crown_Lands.pdf

Disposal

Disposal of invasive plants varies by regions within BC. If you would like specific information on how to dispose your invasive plants, please contact your local government or regional invasive species organization.

- » Chemically treated knotweed canes can be left on site to compost.
- » Manually removed knotweed plants, plant parts and seeds must be bagged or tarped before transporting to a designated disposal site (e.g. landfill or transfer station). Note: It is recommended that transfer stations provide disposal bins intended solely for invasive plants. This will ensure the plant matter within the container is transported in a sealed unit and properly disposed of at the landfill. All cut plant parts should undergo deep burial (at least 5m deep) at a landfill.
- » Burning at home is not recommended as extreme temperatures are required to completely desiccate the plant.
- » Do not compost knotweed. Home composting is likely to increase the spread of this species.
- » Soil contaminated with knotweed plant material or seed should be handled carefully and either under go deep

burial or disposed of at a suitable disposal site. Disposal sites should be far enough away from water and drinking wells to enable herbicide treatment. Disposal sites should be monitored and treated as needed.

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