# Master Gardeners of Ontario Facebook Group

## Invasive Knotweeds–Information and Control

- Invasive knotweeds (KW) are hardy perennials native to eastern Asia including Japan, China and Korea. They were originally introduced through the horticultural trade as ornamental plants. They are among the **world's most challenging invasive species**.
- KWs are now widespread across Canada and have significant social, economic and environmental impacts:
    - The **roots** can damage walls, pavement, human-made structures, drainage systems and flood prevention structures and cause shorelines to erode, increasing flood risk.
    - Dense **stands** can reduce visibility, trap litter and increase vermin, impact recreational activities, cause a fire hazard, and decrease property values.
    - They outcompete native plants, destroy wildlife habitat, and reduce biodiversity.
- KWs are extremely difficult to control and it is important to manage knotweeds in a way that minimizes these negative ecological and socio-economic impacts.
- The following KWs are **restricted** in Ontario which means "*it is illegal to import, deposit, release, breed/**grow**, **buy, sell**, lease or trade" them* (https://www.ontario.ca/page/managing-invasive-species-ontario):
    - Japanese knotweed (*Reynoutria japonica*)
    - Giant knotweed (*Reynoutria sachalinensis*)
    - Bohemian knotweed (*Reynoutria × bohemica*)
    - Himalayan knotweed (*Koenigia polystachya*)
- Gardeners may be unaware of these regulations. If you see invasive knotweeds, seeds or plant parts offered for sale, we recommend you flag or report the ads. Illegal activity can be reported to the ministry at 1-877-847-7667, toll-free anytime or Crime Stoppers anonymously at 1-800-222-TIPS(8477).

**Invasive Knotweed Species Information**

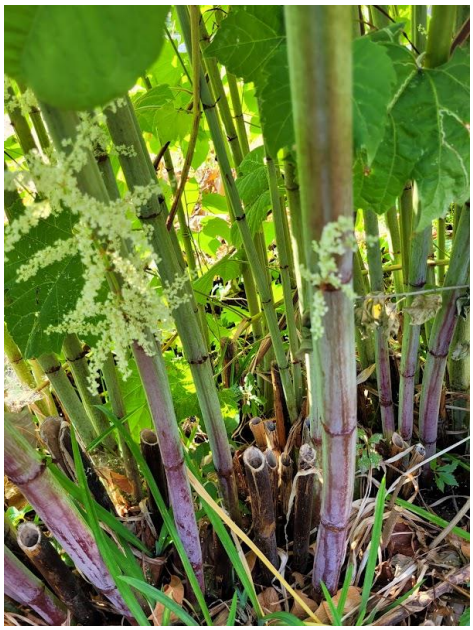
- Cross pollination can occur between Japanese (*Reynoutria japonica*) and giant knotweed (*Reynoutria sachalinensis*). Their offspring are referred to as Bohemian knotweed (*Reynoutria* × *bohemica*).
- Bohemian knotweed is **the most invasive** as it tends to spread faster and produce more seed.
- Continued cross pollination among KWs creates **complex hybrids** that can be difficult to distinguish. Therefore Japanese, giant and Bohemian knotweeds are broadly referred to as the *knotweed complex*.
- Himalayan knotweed (*Koenigia polystachya*) has become a problem in western Canada and is now regulated in British Columbia along with the knotweed complex.
- Read more about the knotweed complex at the end of this factsheet.

**Appearance and identification**

- **Leaves**: Usually heart to triangular/spade shaped; arranged alternately on stems.
- **Flowers**: Bloom July to September; long and drooping, green/white/pink.
- **Stalks**: Bamboo-like; appear in spring as sprouts, often red. Stems are smooth, hollow and green, with reddish splotches; stems dry and remain standing in winter.
- **Roots**: Taproot can be 3 m (10 ft) deep. Horizontal underground stems (rhizomes) appear orange on the inside when cut, spread up to 18 m (60 ft) away, and grow up to 8 cm (3 inches) or more in diameter. Rhizomes may appear as tough, wood-like trunks, which often clump together or collect in larger, densely packed *crowns*. Rhizomes can stay dormant in soils for up to 20 years. You may treat or cut the top growth, but the rhizomes can regrow.

KW sprouts growing through asphalt in spring.
Image: Japanese Knotweed Eradication (FB)

KW roots can form large, dense woody crowns. Notice the orange colouring in cut stems.
Image: Penn State University



Knotweed forms dense stands. Stems are hollow. Photo: C. Sims

Seed pods of Japanese knotweed are triangular with 3 “wings”.
Image: UMass Amherst

Knotweed flowers can be green, white, pink or cream coloured. Photo: C. Sims

**Comparison of Knotweed Species**

| Name | Leaf | Leaf size | Height | Sex | Flower Colour & Arrangement |
|---|---|---|---|---|---|
| Giant knotweed (*Reynoutria sachalinensis*) |  | 15 to 40 cm<br>2/3 as wide | 4 - 5 m | Perfect* and fertile, usually produces seed | Green-white to cream-white with compact, drooping arrangement |
| Bohemian knotweed (*Reynoutria bohemica*) |  | 12 to 23 cm<br>2/3 as wide | 2 - 4 m | Female or perfect, occasionally produces seed | Green-white to cream-white with erect or loose, drooping arrangement |
| Japanese knotweed (*Reynoutria japonica*) |  | 10 to 17 cm<br>2/3 as wide | 1.5 - 3 m | Female or perfect (rare), occasionally produces seed | Green-white to cream-white with a loose, drooping arrangement |
| Himalayan knotweed (*Koenigia polystachya*) |  | 10 to 20 cm<br>1/2 as wide | 2 - 3 m | Perfect and fertile, usually produces seed | Pinkish-white to pink with a loose, spreading arrangement |

*Perfect flowers contain both male and female parts. Table Information: https://www.ontario.ca/page/invasive-knotweeds

**How Knotweeds Spread**

- KWs spread mainly by rhizomes (roots) and can regenerate from any portion of root or stem left in soil.
- Roots and stems can arrive via contaminated products such as soil, compost and mulch.
- Machinery can spread KWs when plant parts become lodged in them.
- Some KWs produce seeds, which may be further spread by wind, water and animals. Cutting flowers early may help to reduce the spread of pollen and seeds (Note: not all members of the knotweed complex produce viable seed.)

**General Control Information**

- There is **no single best option for all situations**. The size of the infestation, the site conditions (soil type, proximity to water or trees), the knotweed characteristics (size, age of stand, genetic variant), as well as labour, time, and cost should be considered.
- Control efforts should focus on **preventing further spread** of KWs. **For larger infestations, focus on edges first, reversing the invasion front.**
- Research suggests that chemical treatment is most effective for large stands and results in the fewest environmental and economic impacts (Hocking et al., 2023). For those who wish to avoid the use of herbicides, cutting and smothering together may be effective.
- **Property lines**: Removal along a property line is only effective when neighbours work together. Traditional root barriers will not stop KWs from spreading. In the U.K., impenetrable root barriers 3 meters deep are used to stop KWs from moving across property lines. In addition, they are installed at an angle of 45º so any growth is diverted downwards rather than punching through it.
- **Foundations**: KW growing along buildings may spread by rhizome under concrete pads or floors of garden structures. Digging, cutting or mowing KWs may encourage exponential lateral growth of root systems. this spread. Herbicides are permitted in Ontario to prevent damage to the structural integrity of a building or other structures.
- Some municipalities prohibit KWs and require that owners or occupants keep their land free of invasive KWs. Contact your municipality for possible support and information.
- **Timelines**: Be aware that it can take several **years** to control and remove KWs. The older and more established the stand, the more difficult it will be to eradicate. The fact that KWs can potentially remain dormant for up to 20 years makes complete eradication challenging.
- Follow-up **treatments and ongoing monitoring** are required for **multiple years** to keep KWs under control.
- **Soil**: If you have KW in your garden, take care when sharing plants, as root fragments can be present in the soil and spread to the gardens of others. Root washing (rinsing off all soil) is recommended if you do intend to share plants.
- **Disposal**: NEVER dump invasive KWs anywhere other than in the garbage or in designated soil treatment areas at landfills. Any plant parts removed should be bagged and left in the full sun before they are disposed of. Special care needs to be taken when the homeowner lives in an

area where garbage is dumped in a local bin. Plants should be left in plastic bags until all plant parts completely decompose. Please consult your municipality if in doubt.

- Replant the area as soon as you're sure it is free of KW. *It is highly recommended that you replant with plants native to your area to stop other invasive plants from taking hold.*

## Control Methods

**Digging and Hand Removal** (small contained or new infestations, seedlings, fragments)

- Digging and hand removal may be suitable for new or contained infestations that **do not** originate from underground spread of rhizomes.
- Plants are easier to remove from moist soil, so choose a day after it has rained, or water the area before working in it. Use a **garden fork** to minimize cutting root pieces that will then regrow.
- Inspect the soil for any remnants of roots or stems. Passing the soil through a screen is recommended to remove any plant parts left behind.
- Soil from this area may still contain root fragments, so care needs to be taken not to share plants or move soil from it.
- Monitor the site closely for regrowth and repeat removal.

**Cutting, Digging, Mowing** (special conditions)

- Cutting back stands is not generally recommended but may be needed for safety to control visibility along roads or to prevent further spread by removing seed heads in fertile varieties.
- Ongoing **weekly** cutting/mowing **very close to the base** will prevent the plant from photosynthesizing and can reduce stored carbohydrates, weakening the rhizome system. However, **cutting will also stimulate the plant to send up new shoots further away from the crown and may increase the spread**. (Jones et al., 2020).
- "If mowing/cutting is required, then foliar herbicide treatments or smothering should be integrated as part of the management effort." (Cygan, 2018).
- Equipment should be cleaned before moving off site as there is very high risk to create new KW stands via plant fragments lodged in machinery.
- **Inspect the area** at least once a week and remove any shoots and roots that may have resprouted. Be aware that new plants may germinate from the seed bank in your soil.
- Monitor the site for **at least six years.**

**Smothering** (medium areas, isolated stands)

- **Smothering** uses heavy black plastic/tarps to starve plants of light and water.
- **Smothering is only recommended if you can extend the tarping material 1.5-3 meters (5-10 feet) beyond the limit of the KW in all directions.**
- Smothering may release microplastics and chemicals into the soil.
- Smothering **can take 5 years or more**. Keep in mind that viable seeds may remain in the soil.
- Care should be taken if there are trees or large shrubs in the area as their roots can be affected.
- Smothering can be started any time of year, in sunny or shady locations.

- Carefully follow these guidelines prepared by the New Hampshire Department of Agriculture:
    1. Allow the knotweed to grow in the spring until two or three leaves have developed.
    2. Cut the knotweed at the base and close to the ground.
    3. Pile all of the cut material on an impervious surface (tarp, plastic, pavement) so it can dry. After turning brown, the stems are no longer viable or a threat. Dispose of plant material safely.
    4. Spread at least 3 to 4 inches (5-10 cm) of organic material (grass clippings, mulch) over the cut KWs to help prevent the stems that regrow from puncturing the tarp or plastic.
    5. Cover the entire area with the biggest heavy-duty dark-colored tarp you can find or use large sheets of **thick black plastic** (**7-mil or thicker**). If more than one tarp or sheet of plastic is used, ensure there is a wide overlap to prevent sunlight from penetrating. **Extend the smothering material a few feet (60 cm) beyond the limit of knotweed in all directions**.
    6. Weigh the top of the tarp/plastic down and seal the edges with rocks, sticks, soil, sand, mulch, etc. Do not puncture the tarp/plastic as this can allow knotweed stems to survive. If any tears or holes develop, patch them.
    7. **Place a thick layer of wood chips or bark mulch on top of the barrier.** Mulch also protects the plastic from UV photo-degradation. If it's on a steep slope some method of anchoring will be required to ensure the mulch doesn't slide off.
    8. Lift the tarp/plastic to check for new growth and recut as needed and then re-cover.
    9. After five (5) years and no regrowth, the covering material can be removed, and the area replanted.

Smothering

Photos: Smothering - New Hampshire Department of Agriculture

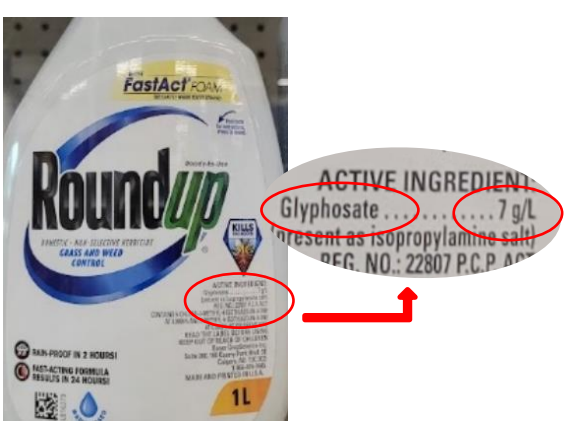
- **Note from Doug Cygan (Sept 2023):** All of the areas, 5 in total, where I've tried smothering have been successful. The key is to make sure that the method which is described above, is followed. I find that most people don't follow the requirement of **putting a thick layer of wood chips or bark mulch on top of the barrier**. **That layer weighs down the membrane to hold it in place and prevents the new shoots, that will develop, from gaining any size. A loose/floppy barrier will fail.**

**Solarizing** (not recommended)

- Solarizing uses **clear** plastic, the **heat** of the sun and moisture to "cook" invasive plants and kill seeds in the soil.
- Solarizing will kill seeds and may kill some top growth, **but the heat cannot penetrate the soil enough to kill the deep roots of knotweed** (up to 3 m/10 ft).

**Herbicides** (All size infestations, new or established)

- Herbicide has been proven to be the most effective way of dealing with KWs (Hocking., 2023).
- Herbicide may be the only viable option where KW is growing in an area where it cannot be cut or removed, such as between the slats of a fence.
- **Be sure to read all product information carefully and follow all recommended precautions, including wearing appropriate protective clothing.**
- Glyphosate and imazapyr are the most-recommended herbicides (Jones et al. 2018) for knotweed control.
    - Imazapyr is a restricted product that can only be used by those with a pesticide applicator certificate or license recognized by the provincial/territorial pesticide regulatory authority where the application is to occur.
    - Glyphosate is available to the public in two concentrations. They are labelled as either 7 g/L or 14 g/L. **At these concentrations**, KW control is most effective when **sprayed at least twice over a few days**. Make sure you check labels and ensure that the **active ingredient is actually glyphosate**. You may need to explain to the vendor that you are spraying because of a threat to safety (sightlines at a road) or to a building or structure.
    - Pesticides can be used without a permit where there is a threat to health and safety—blocked visibility at a road/intersection, potential threat to human health, fire hazard, threat to building structural integrity (ONTARIO REGULATION 63/09, Herbicide Use and Regulations in Ontario.) For more information, contact your regional Ministry of Natural Resource office or your closest district or area office of the Ministry of the Environment, Conservation and Parks.




"Blue" Roundup is a 7g/L concentration of glyphosate


"Yellow" Roundup is a stronger 14g/L concentration of glyphosate

"Be sure to check the ACTIVE INGREDIENT list for "glyphosate".

**When and How to Apply Herbicides**

- **Herbicides are most effective when used during the late season fall window**. (See below.)
- Herbicides can be sprayed or applied on leaves with a bristle or sponge brush. Apply to both sides of leaves until wet, but not dripping. Take care not to spray over your head to prevent spray falling back on you. When possible, walk backwards out of the treatment area to reduce exposure to the herbicide.
- Choose a day when the air is dry and still, so the herbicide is not carried in the wind.
- If pollinators are present, avoid spraying flowers or spray in the early morning or evening when it is cooler and they may be less active.
- Non-target plants can be protected by using a barrier to block the spray, for example, garbage bags, cardboard.
- Start by working on edges, reversing the invasion front.
- **Small stands** (<300 stems): Work around the outside of the stand, spraying the **top and underside of leaves**. **Large stands** (300+ stems): Target foliage around the outside of the stand first to reduce your exposure. After treated foliage has died back, return for a second treatment. Spray foliage that was not treated during the first treatment, and tackle the next layer during later treatments. Repeat until all foliage has been sprayed. https://metrovancouver.org/services/regional-planning/Documents/knotweeds-best-management-practices.pdf
- **Tall KW stands:** Cutting back KWs in early summer/June may be useful to keep the height of taller knotweeds shorter and easier to spray in the fall window. *Cutting will stimulate new growth which can then be sprayed to further weaken the plant* (Cygan, 2018).
- **Late season fall window**: In the fall, knotweeds begin to draw nutrients and carbohydrates into their roots to store for winter. They will also draw herbicides into their rhizome network, making it optimal for applying glyphosate. The ideal date is **after flowering** and **4 to 6 weeks before the first fall frost**. At least **two weeks before frost are needed for glyphosate to make it to the roots.** You can find your first frost date at this link: https://www.plantmaps.com/interactive-ontario-first-frost-date-map.php
- If your knotweed is not producing flowers, use the first fall frost dates in your area to time application.
- **Post treatment**: You can expect your KW to start yellowing within a few days to a week.
- **Following year**: After spraying, KWs will regrow in the following year, but will appear stunted or smaller.
- **Bonsai knotweed**: KW can appear in a stunted 'bonsai' form in the season after spraying: *Bonsai knotweed is characterised by tiny red or green pointy leaves, and straggly deformed stems. It often grows in small clumps, low to the ground, and would be easy to overlook as knotweed. Stunted knotweed often isn't large enough to take in the required volume of herbicide to kill the rhizome beneath the ground, therefore the best course of treatment is to excavate it to ensure there is no trace of viable rhizome remaining in the ground.* You can spray stunted KW earlier in the fall window, as it tends to die back earlier. https://www.environetuk.com/japanese-knotweed/identification#top
- **Repeated yearly spraying in the fall window is needed until no more sprouts pop up**. This may take 3-5 years or longer depending on the knotweed variant, the age of the stand, and the size of the underground storage system.

**More about Knotweeds**

**The Knotweed Complex**

- Scientific names for knotweeds have undergone many changes in the last several years. This has created confusion and hampered information sharing. Japanese, giant and Bohemian knotweeds are now in the genus *Reynoutria* but are commonly listed as *Fallopia* and previously as *Polygonum*.
    - Japanese knotweed [*Reynoutria japonica* Houtt.; syn. *Fallopia japonica* (Houtt.) Ronse Decr.; syn.: *Polygonum cuspidatum* Siebold & Zucc. See KEW POWO for more]
    - A dwarf-type Japanese knotweed [*Reynoutria compacta* (Hook.f.) Nakai syn *Fallopia japonica* var. *compacta* (Hook.f.) J.P. Bailey. See KEW POWO for more]
    - Giant knotweed [*Reynoutria sachalinensis* (F.Schmidt) Nakai syn *Fallopia sachalinensis* (F. Schmidt) Ronse Decr.; syn. *Polygonum sachalinense* F. Schmidt ex Maxim . See KEW POWO for more]
    - Bohemian knotweed [*Reynoutria* × *bohemica* Chrtek & Chrtková, syn. *Fallopia* × *bohemica* (Chrtek and Chrtková) J.P. Bailey; syn.: *Polygonum* × *bohemica* (J. Chrtek & Chrtková) Zika & Jacobson. See KEW POWO for more].
- *Reynoutria japonica* can produce seed after pollination by the related species Bukhara fleece flower (*Fallopia baldschuanica* Regel; syn.: *Polygonum baldschuanicum* Regel), which is popular in the nursery trade. The hybrid seed rarely becomes established, but introducing new genetics poses future risks (Bailey 2013).
- *The hybrids produce large numbers of wind-dispersed viable seeds that germinate at rates approaching 100% in some populations.* Gillies, S., Clements, D., & Grenz, J. (2016). Knotweed (Fallopia spp.) Invasion of North America Utilizes Hybridization, Epigenetics, Seed Dispersal (Unexpectedly), and an Arsenal of Physiological Tactics. Invasive Plant Science and Management, 9(1), 71-80. doi:10.1614/IPSM-D-15-00039.1
- *Knotweed produces prolific seed, with a study of F. japonica and F. sachalinensis in Pennsylvania reporting 50,000 to 150,000 seeds annually per stem* (Niewinski 1998). Drazan, D., Smith, A., Anderson, N., Becker, R., & Clark, M. (2021). History of knotweed (Fallopia spp.) invasiveness. Weed Science, 69(6), 617-623. doi:10.1017/wsc.2021.62

**A Brief History of Japanese Knotweed (JKW)**

Philipp Franz von Siebold (1796-1866), a German doctor and botanist, was presented with a single Japanese knotweed plant when he visited Japan in the 1820s. In their native range, JKWs can have bisexual flowers (perfect and fertile) with male and female floral parts or they can have only female parts and be sterile. The plant that von Seibold brought back was female, so on its own, it could not produce seeds but it could be spread by division. It became an instant hit all over Europe and was especially loved by Victorians in the 1900s. It was initially intentionally spread by people, but unintentional spread continued when fragments of rhizomes broke off in waterways or were transported with soil or by machinery. *In England, Japanese knotweed is sterile and is considered a*

*single, large female clone. In terms of biomass, it is the largest individual female on Earth.* (Japanese Knotweed: Invasion of the Clones?).

The Siebold clone arrived in North America via the nursery trade along with other fertile knotweeds collected in Japan in the late 19th century. The original female JKW clones are now being fertilized by giant knotweed (*Fallopia sachalinensis*) and other *Fallopia* species. The threat of knotweeds in Canada is now much worse because it can spread via fragments and seeds. It is critical to stop this spread in order to prevent the serious ecological, economic, and societal harms knotweeds can cause.

The War on Japanese Knotweed is an interesting article to learn more about knotweeds in the U.K. It includes information about Dan Jones who authored a well-known paper on eradicating JKW in 2018. (Optimising physiochemical control of invasive Japanese knotweed.)

**Annotated References**


- Bailey, J. The Japanese knotweed invasion viewed as a vast unintentional hybridisation experiment. *Heredity* **110**, 105–110 (2013).
- British Columbia Ministry of Forests. Victoria Lake – Invasive Knotweed Treatment FAQ.
    - *Manual control is only recommended under specific circumstances, for small, newly established sites and should be carried out with extreme caution due to the likelihood of spread. Material must be properly disposed of to prevent regrowth and spread.*
- Clements, D., Larsen, T., & Grenz, J. (2016). Knotweed Management Strategies in North America with the Advent of Widespread Hybrid Bohemian Knotweed, Regional Differences, and the Potential for Biocontrol Via the Psyllid Aphalara itadori Shinji. Invasive Plant Science and Management, 9(1), 60-70. doi:10.1614/IPSM-D-15-00047.1
- Cygan, D. (). Control Methods for Japanese knotweed - Tarping. New Hampshire Dept. of Agric., Markets & Food
    - *There are two effective methods for controlling Japanese knotweed (*Polygonum cuspidatum*), henceforth referred to as knotweed. It is advised that you evaluate the site conditions where the knotweed occurs to determine which method is best suited for control. One involves smothering and the other uses herbicide.*
- Cygan, D. (2018) Preventing the Spread of Japanese knotweed *Reynoutria japonica* (AKA: *Fallopia japonica, Polygonum cuspidatum*) New Hampshire Department of Agriculture, Markets & Food
    - *Mowing/cutting does nothing to manage or reduce knotweed populations. In fact, these types of impacts typically break dormancy of lateral buds along the rhizomes thus expanding the outer limits of the population. Mowing/cutting should only be done if safety is an issue and the equipment is cleaned before moving off site. If mowing/cutting is required, then foliar herbicide treatments or smothering should be integrated as part of the management effort.*
    - *Japanese knotweed is unlike most plants in that the flow of nutrients/carbohydrates is in one direction. Nutrients/carbohydrates move upward during the growing season until flowering and then the process reverses to deliver the nutrients/carbs back down to the*

*rhizome system for overwintering. Therefore, time the application so it occurs just after flowering up until the first killing frost (September – November). This greatly improves the efficacy of the treatment (early season applications will have little effect on the plant other than foliage burn).* ***Another reason for waiting until after flowering is to avoid impacts to foraging honeybees and other pollinators****. Understanding the timing for chemical control is the key to success.*

- *A strategy to increase efficacy of chemical control is to cut and remove the aboveground portion of the Japanese knotweed in early June, allowing the stalks to regenerate before treating. Cutting the aboveground portion of the plant automatically stimulates regrowth. This process requires energy stored in the rhizome to be used for new shoot development and thus weakens the rhizome system. Apply the chemical treatment as described above. An added benefit to doing a pretreatment cutting is that the shoots will be shorter at the time of treatment.*


- Drazan, D., Smith, A., Anderson, N., Becker, R., & Clark, M. (2021). History of knotweed (Fallopia spp.) invasiveness. Weed Science, 69(6), 617-623. doi:10.1017/wsc.2021.62 .
- Gillies, S.L., Japanese Knotweed: Invasion of the Clones? University of the Fraser Valley.
- Grevstad, F.S., J.E. Andreas, R.S. Bourchier, and R. Shaw. 2022. Knotweeds (Fallopia spp.): History and Ecology in North America. In: R.L. Winston, Ed. Biological Control of Weeds in North America. North American Invasive Species Management Association, Milwaukee, WI. NAISMA-BCW-2022-19-KNOTWEEDS-P.
- Grevstad, F.S., J.E. Andreas, R.S. Bourchier, and R. Shaw. 2022. Knotweed Biocontrol Agents: History and Ecology in North America. In: R.L. Winston, Ed. Biological Control of Weeds in North America. North American Invasive Species Management Association, Milwaukee, WI. NAISMA-BCW-2022-19-KNOTWEEDS-A.
- Hocking, S., Toop, T., Jones, D. et al. (2023). Assessing the relative impacts and economic costs of Japanese knotweed management methods. Sci Rep 13, 3872
    - *Biological control has also been researched extensively as an environmentally friendly option, albeit with limited evidence of success to-date25.*
    - Aphalara itadori, a sapsucking psyllid, is undergoing research for use in controlling JKW however is not yet available for distribution.
- Invasive Species Council Metro Vancouver. (2021). BEST MANAGEMENT PRACTICES FOR Knotweed Species in the Metro Vancouver Region
    - *Due to the extensive rhizome system, chemical control with a systemic herbicide is the most effective treatment method for all four species of knotweeds.*
    - *Sites observed in BC where smothering materials were in place for over 10 years have not been successful (Chadburn 2018, McLean 2018).*
    - *Mowing is not recommended as repeated frequent mowing causes an acceleration of new shoot development leading to lateral spread (Drinkwater 2017). It is suspected that plant fragments spread by mowing are one of the main vectors of spread for knotweeds in Metro Vancouver and other regions.*

- Jones D, Fowler MS, Hocking S, & Eastwood D (2020a) Please don't mow the Japanese knot-weed! NeoBiota 60: 19–23.

- *…we strongly disagree that mowing should be recommended for the landscape management of invasive knotweeds on the grounds of limited efficacy, practicality and environmental and economic sustainability.*

- Jones D, Bruce G, Fowler MS, Law-Cooper R, Graham I, Abel A, Street-Perrott FA, & Eastwood D (2018) Optimising physiochemical control of invasive Japanese knotweed. Biol. Invasions 20: 2091–2105.
  - *When designing management strategies, effective control of F. japonica may be achieved by biannual (summer and autumn) foliar glyphosate applications at 2.16 kg AE ha−1, or by annual application of glyphosate in autumn using stem injection at 65.00 kg AE ha−1 or foliar spray at 3.60 kg AE ha−1. Addition of other herbicides or physical treatment methods does not improve control.*

- Martin, François-Marie & Dommanget, Fanny & Evette, André. (2020). Improving the management of Japanese knotweed s.l.: a response to Jones and colleagues. NeoBiota. 63. 147-153. 10.3897/neobiota.63.58918.
  - *…we worked on young establishing clones, our observations are more relevant for the Early Detection and Rapid Response (EDRR) or for the control of small knotweed stands than for large scale management. Incidentally, we fully agree that a management strategy at the landscape scale, based only on mowing, would be very ineffective to control a knotweed invasion.*
  - *It is true that the eradication of established knotweed stands through mowing/cutting alone is extremely unlikely, but it is also true for almost any other control options tested so far (Child and Wade 2000; Kabat et al. 2006; McHugh 2006; Bashtanova et al. 2009; Gerber et al. 2010; Delbart et al. 2012; Jones et al. 2018; Lavoie 2019). Therefore, mowing/cutting may be viewed as "ineffective" as any other method. However, labelling any method as ineffective because it fails to kill mature knotweed stands supposes that the eradication of mature stands is the only objective sought by managers….For instance, if you need to maintain the accessibility or visibility along a transport infrastructure for security reasons (Boyer et al. 2018) or if you want to reduce the vigour of knotweeds to favour the restoration of a competitive cover of native plants (e.g. Dommanget et al. 2015), mowing/cutting can be an effective solution.*

- Natural Plant Heritage. (2023). *Fallopia sachalinensis* — giant winged-knotweed
- Anderson, Hayley. (2012). Invasive Japanese Knotweed (Fallopia japonica (Houtt.)) Best Management Practices in Ontario. Ontario Invasive Plant Council, Peterborough, ON.
  - Note: This document seems to be mainly for land managers, not gardeners.
  - Cutting, mowing and grazing were discussed but were deemed *best used in tandem with another control method (i.e., chemical).*
  - *Many established Japanese Knotweed stands have required 5-10 years of active control to achieve eradication.*

- Robinson, Beth & Inger, Richard & Crowley, Sarah & Gaston, Kevin. (2016). Weeds on the web: Conflicting management advice about an invasive non-native plant. Journal of Applied Ecology. 54. 10.1111/1365-2664.12712.