

Japanese Knotweed

(*Reynoutria japonica*)

Photo Credit: Francine MacDonald

Best Management Practices Technical Document for Land Managers

November 2024

- DISCLAIMER -

Disclaimer: This document conveys information recommended by leading professionals across Ontario. It contains the most up-to-date information available at the time of publication. It is not intended to provide legal advice. It is subject to change as new information emerges, tools and techniques evolve or as legislation or permitting requirements change. Tailor the timing of control to your region.

The prevention and early detection of Japanese knotweed are essential for an effective plant management strategy. Use this document after you have assessed your site(s) to help identify appropriate control options. An Integrated Pest Management approach is strongly encouraged - which involves using a combination of control tactics (e.g., herbicide application, cutting, and prescribed burns). However, experience across the world by professionals over many decades indicates that knotweeds cannot be effectively controlled without the use of herbicides. For more information on the biology and life cycle of this invasive plant, please refer to the Ontario Invasive Plant Council's Best Management Practices. Japanese knotweed is regulated under the *Ontario Invasive Species Act* as a restricted species. In addition to Japanese knotweed, Ontario has regulated Bohemian knotweed, giant knotweed and Himalayan knotweed as restricted invasive species under the *Invasive Species Act, 2015*.

Strategy and Cautions

- > Japanese knotweed reproduces mainly via rhizomes, which accounts for two thirds of the plants total mass and can extend more than 14 m to 18m long and 2 m deep.
- > The goal of controlling Japanese knotweed is to eliminate the rhizome system. Even a 1 cm root fragment can reproduce. If using manual control, it is crucial that the entire root mass is removed. If using chemical control, ensure the death of the root mass.
- > Remove the outlying populations (isolated plants or satellite populations) first to prevent further spread.
- > Small and recently established populations (≤ 15 plants), where roots are not deep can be removed by digging. It is not recommended to dig larger populations as this will encourage resprouting. Manual removal may be the only option in areas where systemic herbicides cannot be applied (i.e., near water).
- > Large populations (> 15 plants) are most effectively controlled using a systemic herbicide.

Caution: Other manual control methods including mowing or cutting, unless combined with chemical control, may increase densities by stimulating growth. These methods are very labour intensive and not effective for long-term control. Make sure that boots, clothing, and all equipment is cleaned at the site to ensure seeds or root fragments are not transported from the site. See the [Ontario Invasive Plant Council's Clean Equipment Protocol](#) for more details.

Management of Small and Recently Established Populations (≤ 15 plants)

Using a shovel or similar digging tool may aid in the removal of smaller plants but it is essential to remove the entire plant, including all roots. This means digging out and sifting through the soil after the main stem is removed. Any portions of the root system not removed can re-sprout. Dig as much as you can at the site throughout the spring when the plant is at the beginning of its growing season and after a rain when the soil is most pliable. Revisit the site 2-3 times during the growing season to remove or chemically treat re-sprouts.

Management of Large Populations (>15 plants)

When manual control is no longer an option, chemical control is the most effective method for managing large populations. Foliar spray or stem injections using a systemic herbicide are the most effective means of control. A foliar application is considered more effective because it provides a larger surface area coverage. Stem injections work best on larger stems, or adjacent to sensitive habitats, as thin stems can split and cause the herbicide to leak out. Herbicide applications must be applied during the growing season. Single treatments are usually insufficient for complete control. At least two treatments per season are recommended; one as soon as the leaves are fully extended (May-June) and another later in the summer (July-August). This must be repeated over multiple growing seasons. Older infestations will require more follow-up treatments than younger infestations. Pesticide drift may prohibit pesticide use near water. If cutting the plant prior to herbicide application, wait eight weeks before applying herbicide to ensure that it will effectively translocate to the rhizomes, or cut it high enough that there is a substantial amount of stem remaining to absorb the herbicide.

Legislation and Permitting Requirements for Japanese Knotweed Management

Depending on the location, timing of work, and the type of management activity being used, permits, approvals or authorizations may be required from municipal, provincial or federal agencies before Japanese knotweed control may be initiated. Land/vegetation managers are responsible for ensuring that any permits are obtained prior to proceeding with control. Additionally, if protected species or habitats are present, an assessment of the potential effects of the control project and authorization could be required. Depending on the species and its location, applications should be directed to the appropriate authorities.

The management of pesticides is a joint responsibility of the federal and provincial governments. The federal government's Pest Management Regulatory Agency (PMRA) is responsible for approving the registration of pesticides across Canada under the Pest Control Products Act (PCPA). **The PCPA requires the user to ensure Canadian registered pest control products are being used according to the most up-to-date label requirements.**

Ontario regulates the sale, use, storage, transportation and disposal of pesticides including issuing licenses and permits under the Pesticides Act and Ontario Regulation 63/09. Federally registered pesticide products are assigned one of four product class designations (i.e., Manufacturing, Restricted, Commercial or Domestic). The pesticide class determines who can sell or use the product and the restrictions on its use (e.g., requires a license and/or permit). All invasive species control programs require licensed exterminators to apply pesticides. The use of pesticides on land is subject to the Ontario Cosmetic Pesticides Ban. Unless they are certain biopesticides and low-risk pesticides on Ontario's "Allowable List", pesticides can only be used if they are permitted under an exception to the ban. Depending on the specifics of the extermination, invasive plant control may be permitted in accordance with exceptions for forestry, agriculture, public health and safety (e.g., plants poisonous to humans by touch and plants that affect public works and other buildings and structures) and compliance with other legislation (e.g., control of noxious weeds where required by the Weed Control Act). There is also an exception for the management, protection, establishment or restoration of a natural resource that may be considered if other exceptions do not apply. Ontario Regulation 63/09 specifies requirements for pesticide use under each exception and may include conditions such as a letter from the relevant Ministry (MNRF or MECP) and/or others. The licensed exterminator can provide guidance on applicable extermination requirements. **For information on obtaining a license or a permit refer to the Ministry of the Environment, Conservation and Parks website at www.ontario.ca/page/pesticide-licences-and-permits.**

Table 1: Exceptions to the Ontario Cosmetic Pesticides Ban which may be applicable for control of Japanese knotweed in terrestrial environments.

Note: Japanese knotweed is regulated as a restricted invasive plant, under the *Invasive Species Act*. Prohibitions that apply to Japanese knotweed include import, deposit, release, breed/grow, buy/sell, lease or trade in Ontario. Under Section 22 of Ontario Regulation 354, there is an exception for deposit/release of restricted invasive plants to enable activities such as “control” to do so without an authorization from the Ministry, if reasonable precautions are taken to prevent the spread of the restricted invasive species outside the immediate area where the activity is taking place.

Public health or safety, including public works:	This plant can significantly damage infrastructure.
Forestry:	This plant can grow in heavily shaded areas, creating a monoculture, outcompeting understory native vegetation and preventing regeneration of trees and shrubs. This exception therefore applies to treed areas greater than 1 hectare.
Natural resource:	This plant can negatively impact the environment, reduces biodiversity and degrades the quality of wetland and riparian habitats.

For more information on these exceptions and applicable procedures, please refer to the Ontario Invasive Plant Council’s Best Management Practices document for this species.

Herbicide Selection and Application

Pesticide applications can be an effective method for Japanese knotweed management when used as part of an integrated pest management program and in consideration of Japanese knotweed biology and site-specific information. Pesticides must be applied in accordance with the federal *Pest Control Products Act*, *Ontario’s Pesticides Act*, *Ontario Regulation 63/09* and all label directions. Most invasive species control programs using a pesticide will require an appropriately licensed exterminator. The availability of pesticides to control Japanese knotweed may change over time, as may the label directions on how to use the pesticide so that it does not endanger human health or the environment.

Before using any pesticide, ensure you have the most current label. Pesticide labels can be accessed using the [PMRA’s label search tool](#), which can be found by searching “PMRA label search” in any major search engine. Always read and follow all directions on the label. The label is a legal document that must be followed exactly, including any applicable buffer zones. Using a pesticide to treat a species not listed on the label, or in a manner other than that specified on the label violates the *Pest Control Products Act* and may incur penalties.

Professionals consulted at the time this document was written recommend using a glyphosate-based herbicide for several years. If results are poor after this, switch to an aminopyralid-based herbicide. Ensure that the use of these herbicides is approved by the pest control product label. Some herbicide products have been found to kill the plant too quickly, killing off the foliage preventing the chemical from being transported to the rhizomes and therefore not killing the plant entirely. Professionals consulted recommend staying away from dichlorprop/2,4-D-based and triclopyr-based herbicides for this reason.

Table 2: Chemical control techniques recommended by experts for Japanese knotweed at the time this document was written.

Chemical Control Method	Chemical	Timing and Application
Foliar	Glyphosate	First application when leaves are fully extended, from late May until end of June; second application mid-summer and, where necessary, a late summer application for new growth. Best for large patches and re-sprouts.
	Aminopyralid	First application when leaves are fully extended, from late May until end of June; second application mid-summer and, where necessary, a late summer application for new growth. Use if glyphosate is ineffective after three years.
Stem Injection	Glyphosate	Mid-summer to early autumn (until first frost) when cane is ½ inch or more in width. Inject near the bottom (up to 4th node) at the top of the node to ensure that the herbicide is translocated to the roots. New shoots may split when the needle is pushed in, or the needle may go straight through. Thus, it is important to only inject wider stems.

Please read the most up to date label in full before use. Some of the product labels belonging to these active ingredients may not currently be approved for the referenced use and/or may not be approved moving forward if label is amended.

Japanese Knotweed Treatment Times

Digging	J	F	M	A	M	J	J	A	S	O	N	D
Chemical (Foliar)	J	F	M	A	M	J	J	A	S	O	N	D
Chemical (Stem Injection)	J	F	M	A	M	J	J	A	S	O	N	D

No Treatment

Optimal Treatment Times

Suboptimal Treatment Times

Note: The above treatment times for herbicide application must consider weather conditions.

Disposal

Do not compost viable plant material (fruits, seeds and roots) at home or send to landfill. Viable plant material must be solarized before disposal by placing in sealed black plastic bags and leaving them in direct sunlight for 1 – 3 weeks. Plant material can be sent to large-scale municipal composting facilities where the compost pile reaches temperatures high enough to kill living plant material. Ontario composting facilities are required to routinely monitor the compost process and meet strict, provincially regulated time-temperature parameters for pathogen kill. Consult your local municipality to determine if this is an appropriate course of action. Alternatively, dried stems (without seeds) can be safely incinerated, for example in burn barrels or fire pits, where local bylaws permit.

Rehabilitation and Monitoring

Control is much more successful when heavily infested areas are re-planted densely with native trees and shrubs that are able to compete with new knotweed growth such that the entire site becomes heavily shaded. Plantings of herbs alone will not be successful and should not be considered. See Ontario Invasive Plant Council's Best Management Practices document for details. Invasive knotweeds, once established, are extremely persistent and complete eradication is difficult. Follow-up monitoring is crucial for at least the following 5 years to ensure the rhizome is depleted.