UNKNOTTING CANADA’S KNOTWEED PROBLEM

Locations
Canada, Japan, United Kingdom

Dates
01/04/2007 - Ongoing

Summary
Originally from Japan, Japanese knotweed is a fast-growing plant species that is causing a great deal of damage in Europe and North America. This herbaceous plant forms dense, impenetrable thickets and its impacts are varied. Our scientists have already carried out a considerable amount of research in Europe and found both an insect and rust fungus that controls the plant here, so will adapt our research and ensure any native or important species in Canada are not affected.
The problem

Native to the east Asian region, Japanese knotweed (*Fallopia japonica*), giant knotweed (*F. sachalinensis*) and their hybrid Bohemian knotweed (*F. x bohemica*) are fast-growing herbaceous plant species. These knotweeds can cause considerable ecological and economic damage in Europe and North America due to their ability to form impenetrable thickets with stalks up to 3-4m tall.

Originally imported as ornamental plants from Japan, they soon escaped from gardens and have since spread rapidly, threatening native species and ecosystems along the way. They are also costly; damaging man-made structures by pushing through concrete, tarmac and foundations. They are widespread in regions of high rainfall, while in drier regions knotweed is mainly found in ecologically sensitive riverbanks and low-lying wetlands.

In their native Asian range these plant species have evolved with an array of specialized natural enemies, from fungal diseases to insects, which help to control their growth and spread. In the USA and Canada however, none of these damaging specialists are present, meaning these non-native invasive knotweeds are literally out of control.

Since conventional control methods are costly and/or impractical, classical biological control could offer a more economical, sustainable and environmentally-friendly approach.

What we are doing

Our scientists have carried out extensive research into the biocontrol potential of an insect and a fungal pathogen which initially focussed on Europe. Research was subsequently widened to include Canada and assess the suitability of the agents for this geographic region.

The project is building on a considerable amount of research already undertaken by CABI scientists to find insects or fungal agents to control Japanese knotweed in the UK. Extensive survey work in Japan and host-range testing in the UK identified a psyllid, *Aphalara itadori*, and a leaf spot fungus, *Mycosphaerella polygoni-cuspidati*, as the most suitable classical biocontrol candidates. The psyllid was approved for release in the UK in 2010 followed by mass releases during subsequent years.

Research for British Columbia’s Ministry of Forests, Lands and Natural Resource Operations, as well as for the United States Department of Agriculture (USDA), has been running in parallel. The main objective is to evaluate the suitability of the two promising biocontrol agents that could manage the invasive non-native knotweeds in North America. Our scientists expanded our testing to include critical non-target species relevant to this continent. Initially this research was almost exclusively restricted to the psyllid *A. itadori*, but later extended to include also the leafspot fungus.
Results so far

Additional host-range testing conducted with native and economically important North American plant species showed that the psyllid poses no risk to these non-target species. Consequently since 2016, the insect has been released at several sites in British Columbia (Canada) and its spread and impact has been closely monitored.

The strain of the insect that was released is known as the ‘southern strain’. Future research will look at its impact and development versus a hybrid of this culture and one associated with giant knotweed known as the ‘northern strain’. If the hybrid is found to exert more impact on both non-native knotweeds, its safety will need to be tested before any field releases can be made.

For the leafspot fungus, the virulence of two distinct strains was compared. The team assessed Canada’s most prominent biotypes of Japanese knotweed, giant knotweed and Bohemian knotweed and found that Japanese knotweed was the most susceptible. In addition, we are assessing if non-target species of importance to the region are susceptible. These include *Fallopia cilinodis*, *F. scandens*, selected Canadian varieties of buckwheat (*Fagopyrum esculentum*) and a North American native *Polygonum* species. Based on these results, we will be able to evaluate the suitability of the pathogen for Canada.

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