

The Biological Control of Japanese Knotweed Science Summary SC010100/SS2

A sap sucking insect and a fungal disease could form the basis for a highly effective and environmentally friendly way to control an invasive plant known as Japanese knotweed, according to a new study. Funded and managed by a variety of different organisations, including Defra, Welsh Assembly Government, South West Regional Development Agency, the Environment Agency, Network Rail, CABI Bioscience UK and British Waterways, the study investigated the potential for using a safe and sustainable natural pest or pathogen to debilitate knotweed and lessen the current environmental and economic problems associated with it.

Japanese knotweed (*Fallopia japonica*) is a large, vigorous weed that is native to Japan, Taiwan and China. It was introduced into the UK in the early 19th century as an ornamental plant, but is now abundant in the wild. It is regarded as a pest in many parts of the country because of its quick growth, which allows it to dominate habitats and exclude other plants. In Japan, the plant is held in check by natural enemies, but these enemies are not naturally found in the UK

This dense weed also poses a risk to flood management. This is both because it can damage river banks when it dies off in the autumn and because the dead stems can fall into a watercourse, reducing its capacity to carry flood water. In addition, Japanese knotweed can cause damage by growing into concrete or other materials making up flood defences. This all means that land must be cleared completely of the weed prior to building a flood defence scheme, creating huge costs for the Environment Agency.

Current methods for controlling Japanese knotweed involve applying chemicals (herbicides) and physically removing the weed (cutting stems and grazing by cattle). Both methods have major drawbacks. Chemical control can be detrimental to sensitive, non-target plants, while, for complete control, herbicides need to be sprayed repeatedly over a period of years, making this an expensive option. Even then, there is still a potential for the weed to spread.



Japanese Knotweed

Cutting and cattle grazing do not eradicate the plant, which will continue to grow if grazing stops.

To try to find more effective control methods, a team of scientists looked into the possibility of using biological control methods to limit the growth of Japanese knotweed in the UK. Using living organisms to control pests in this way is known as biological or natural control. The main advantage of this form of control is that, once recognised, an effective natural enemy provides control of the pest indefinitely, without further cost or intervention.

The scientists began by visiting Japan to examine the plant in its native area. They found that Japanese knotweed is much less of a pest in Japan than in the UK, because it is controlled by native natural enemies. So they brought samples of these enemies, including insects and fungi, back to the UK for testing under quarantine.

At the same time, they conducted a literature review on all information relating to Japanese knotweed and its natural enemies, as well as undertaking further studies in Japan.

In the UK, investigations addressed whether the insects and fungi brought back from Japan were specific to Japanese knotweed, to ensure that they wouldn't attack native UK plants. To do this, they first identified 70 UK

plant species that are closely-related to Japanese knotweed. These 70 species included all UK species in the same family as the Japanese knotweed. This included ornamental species, rare species and important crops. They then tested these species under quarantine to see whether they were attacked by the natural enemies.

From these tests, the scientists identified a highly specialist sap sucking insect, *Aphalara itadori*, and a leaf spot fungus, *Mycosphaerella polygoni-cuspidati*, as potential control agents, with the data suggesting that they would not pose a threat to non-target, native plants.

The scientists are now looking to test these two natural control agents on other native UK plant species. They also intend to conduct more in-depth studies on the interaction between the leafspot fungus and the plants *Persicaria vivipara* and *Polygonum aviculare* to establish the extent of its development and reproductive ability.

But the scientists are confident that they have found a new method for controlling Japanese knotweed and approval is currently being sought to release *Aphalara itadori*. This has been approved by the Advisory Committee for Releases into the Environment and will now undergo a period of public consultation prior to consideration by the Minister for the Environment for approval to release.

This summary relates to information from Science Project [SC010100], reported in detail in the following output(s):-

Science Report: SC010100/SR2

Title: The Biological Control of Japanese knotweed

<http://www.cabi.org/japaneseknotweedalliance/Default.aspx?site=139&page=463>

Internal Status: Released to all regions

External Status: Publicly available

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February 2009

Summary Product Code: SCHO0209BPHY-E-E