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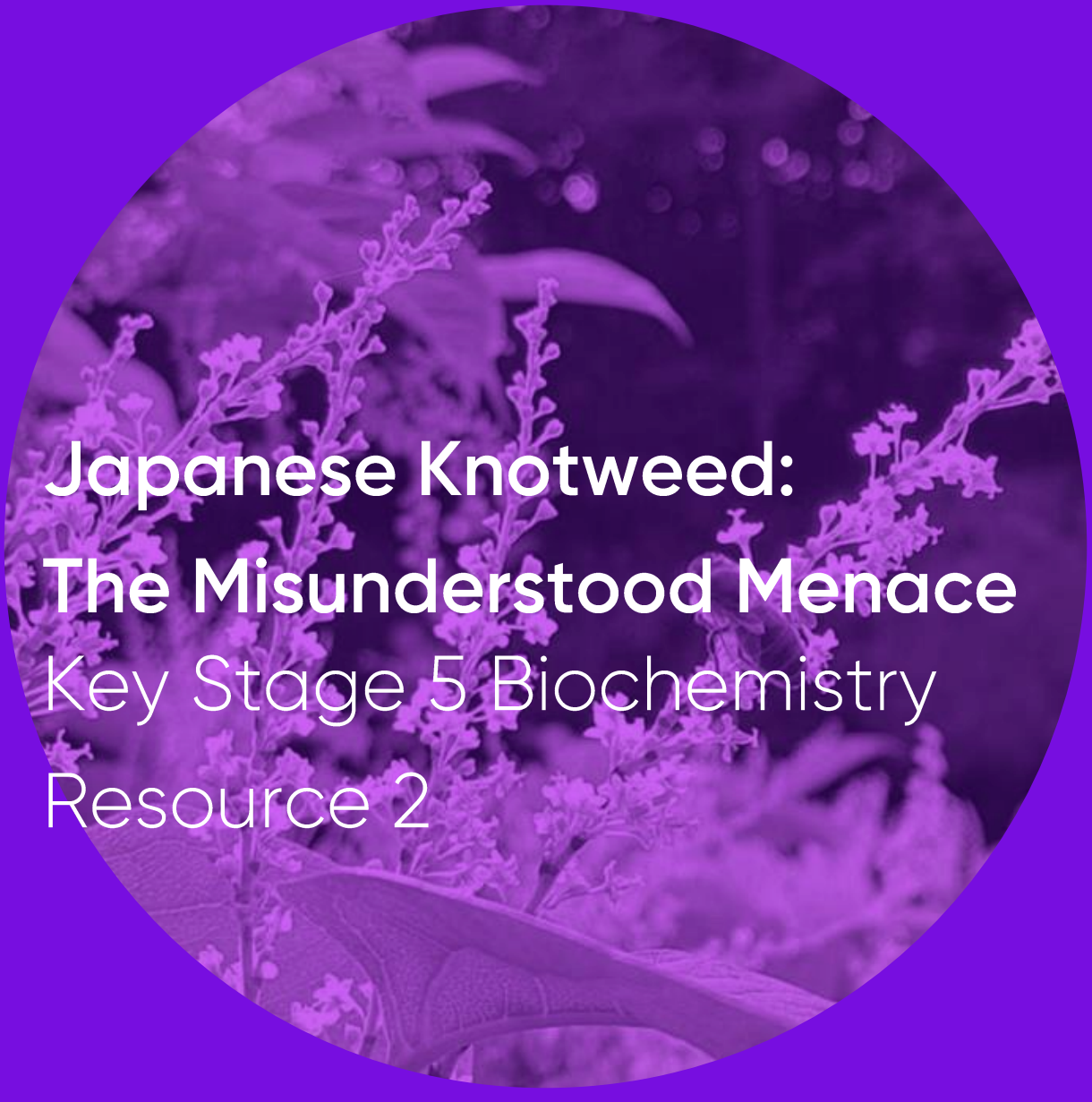

Japanese Knotweed:
The Misunderstood Menace

Key Stage 5 Biochemistry

Resource 2

2019

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Resource Two Overview

Topic	Science in Society: The Socio-economic impact of Japanese Knotweed
A-Level Modules	Science in Society

Objectives

By the end of this resource, you will be able:

- ✓ To understand how public image can be informed by scientific reporting, and change scientific goals.
- ✓ To appreciate how difficult it can be to quantify physical, emotional and financial damage by Japanese knotweed, and how this can be reflected with legislation.
- ✓ To understand how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society

Instructions

1. Read the data source
2. Complete the activities
3. Explore the further reading

Context

As an invasive species, Japanese knotweed can cause negative impacts in its introduced range. As we have seen from Resource 1, invasive species can disrupt the fine balance of ecosystems, causing environmental damage. However, socio-economic damage can also be caused. Resource 2 explores what this means.

Resource Two
Data Source

Section A

Japanese Knotweed Removal

In its invasive range, steps have been taken to prevent the spread of Japanese knotweed, due to both the negative environmental impacts and the social consequences, such as reduced house prices and a legal liability if nothing is done. Control methods include, manual methods (I.e. digging it all up), biological control, and chemical control. Each method has its advantages and drawbacks, and with a combination of techniques, Japanese knotweed can be managed. However, eradication is difficult, and can take several years of repeated treatment. In fact, a recent study of physiochemical control methods over a three-year period found that no control method provided complete eradication. Even the smallest fragment of rhizome left in the soil can lead to regeneration. The prolific growth of shoots can push through the asphalt in pavements, and the rhizomes can penetrate through weaknesses in pavements, walls, land drainage works, and flood defence structures Locadro, 1973).

Section B

Public Perception

As we have seen from Resource 1, Japanese knotweed is not native to the UK and poses an environmental threat. However, Japanese knotweed also poses a socio-economic problem. Negative hysteria surrounding its invasive success has caused ripples of fear in the property market. A house with Japanese knotweed on its land can be valued at a lower price than the same house if it were knotweed-free. Some banks have gone so far as to refuse to lend mortgages on properties plagued by knotweed. The persistent and vigorous growth of Japanese knotweed's underground rhizome system has provoked fear in the public that their homes will be damaged by the plant. This blight on the reputation of Japanese knotweed is a self-fulfilling prophecy, with increased anxiety caused by the plant leading to a more dramatic response from property surveyors, purchasers, and mortgage lenders, in turn causing more reason to worry.

Resource Two
Data Source

Section C

Economic Impact

Although perhaps misplaced, the implications of this fear and its cost to the UK economy is very real and is estimated, by Williams et al (2011), at £165,609,000 per annum. The breakdown of these costs into country and sector can be seen in Table 1, the data in which was estimated in Williams report based on the figures for 2010.

Table One

Total annual costs of Japanese knotweed (Taken from Table 4.5. of Williams 2011)

Sector	England	Wales	Scotland	GB
Local authorities	£270,000	£66,000	£96,000	£432,000
Research	£319,000	£19,000	£32,000	£370,000
Railways	£1,726,000	£100,000	£174,000	£2,000,000
Roadsides	£3,901,000	£438,000	£757,000	£5,096,000
Riparian	£3,444,000	£469,000	£1,724,000	£5,637,000
House devaluation	£963,000	£56,000	£97,000	£1,116,000
Development	£141,358,000	£7,644,000	£1,508,000	£150,510,000
Householders	£383,000	£23,000	£42,000	£448,000
Total	£152,364,000	£8,815,000	£4,430,000	£165,609,000

The popular property search engine Zoopla advises users that Japanese knotweed on site could reduce a property's value by up to 20%. Williams et all (2011) estimated that the presence of Japanese knotweed increases the loan to value ratio of houses by at least 5%.

Section D

Legal Liability

Due to the damage which invasive species can cause to the environment, many of these are regulated by law. Some invasive species are classed as 'Invasive Alien Species for Union Concern'. These species cannot be imported into the country, and there are special licences required for you to grow them. Although in the European Union Japanese knotweed is not classed on the highest level of regulation 'List of Invasive Alien Species for Union Concern', there are still laws in place to prevent it's spread.

Resource Two
Data Source

Liability means being responsible for something or obligated by law to do something. In this context, land owners are responsible for preventing the spread of Japanese knotweed to other people's property. In the United Kingdom, the Wildlife and Countryside Act (United Kingdom Parliament 1981) made it an offence to actively plant or otherwise cause the species to grow in the wild. A decade later it was classified as controlled waste, meaning it needs to be disposed of at a licenced landfill (United Kingdom Parliament 1990). If you allow Japanese knotweed to spread onto a neighbours' property you have committed a crime under the Anti-Social Behaviour, Crime and Policing Act 2014.

In the United Kingdom, two home owners, Stephen Williams and Robin Waistell, became the first members of the public to receive compensation from Network Rail for allowing Japanese knotweed to spread into their land. In the UK, Japanese knotweed spreads by vegetative reproduction rather than by seed. This means that fragments of rhizome or stem from the Japanese knotweed on Network Rail's land could have started a new patch of Japanese knotweed in the home owner's land. Additionally, rhizomes can spread laterally underground moving outwards and away from the central 'mother' patch, this can form a new 'daughter' patch elsewhere. The connection to a larger rhizome network means that the above-ground shoots can use energy from this larger more established storage organ to grow. Network Rail's treatment of the knotweed was deemed inadequate, unreasonable, and in breach of its duty as a landowner. In July 2018, Network Rail became the first company to be successfully sued for allowing Japanese knotweed to spread onto another person's land. This ruling could set a new precedent for home owners seeking compensation from Network Rail, local authorities, and other major landowners.

Resource Two
Data Source

Section E

Can science calm the storm?

Trade Bodies such as the Property Care Association are keen to help quench some of the fear surrounding Japanese knotweed, and recent research led by Dr Mark Fennell and Professor Max Wade of AECOM, together with Dr Karen Bacon of the University of Leeds aims to do just this. Stephen Hodgson, chief executive of the PCA, commented on the research saying that

"although the invasive weed is a fast growing and highly invasive species perfectly capable of causing disturbance to areas such as paths, patios, driveways and garden walls, it is an herbaceous perennial, which lacks the potential to cause significant disturbance to normal building foundations."

Following this research, regulations have been changed to allow the plant to grow closer to a house, without posing a risk to the foundations.

Studies like research led by Dr Mark Fennell and Professor Max Wade of AECOM ,which give information about the damage caused by Japanese knotweed are important to inform legislation. Punishments for people who allow knotweed to spread onto other people's land need to be appropriate for the level of damage caused. Harder to quantify than the physical damage, however, is the emotional stress caused and the devaluation of property, as these can both fluctuate along with public perception.

Resource Two Activities

Activities

1. What socio-economic problems are caused by Japanese knotweed?
2. Using table 1, find the following information:
    a) In 2010, how much money was spent on Japanese knotweed research in Scotland?
    b) In 2010, how much was spent on Japanese knotweed removal from riparian areas in Wales?
    c) In 2010, how much money was lost due to the devaluation of houses in England?
    d) What was the total cost of Japanese knotweed to the UK economy as a whole in 2010?
3. How does Japanese knotweed spread in the UK?
4. Explain the term 'legal liability' in your own words. Use terminology from the source.
5. How justified is the public fear that Japanese knotweed can damage their homes? Explain your answer.
6. Discuss the importance of using scientific evidence to inform the public, and decide on legislation. Use examples from the data source to inform your argument.

Resource Two
Further Reading

Explore

Scientific Reporting in Mainstream News Sources

Recently, a peer-reviewed paper has been published comparing different treatment techniques to tackle Japanese knotweed. This study was reported in newspapers to inform the general public of the group's findings. Read the original scientific report, and compare with the journalists interpretations from mainstream news sources. Do you agree with the way their conclusions were represented?

Original peer-reviewed paper:
Jones, Daniel & Bruce, Gareth & Street-Perrott, F & Graham, Ian & Abel, Alan & Eastwood, Daniel. (2014). Optimising Physiochemical Japanese Knotweed Control in the UK. 10.6084/m9.figshare.1180114.
https://link.springer.com/article/10.1007/s10530-018-1684-5

Article by two authors of the above paper, Dan Jones and Daniel Eastwood:
https://theconversation.com/weve-found-the-best-way-to-control-japanese-knotweed-95320

News reports:
Daily Mail: 'Japanese knotweed 'cannot be killed off': Scientists fail to destroy the invasive weed after 19 attempts'
https://www.dailymail.co.uk/sciencetech/article-5656799/Killer-Japanese-notweed-destroy-UK-gardens.html/
Telegraph: 'Japanese knotweed cannot be cured, major study which tried 19 methods finds'
https://www.telegraph.co.uk/news/2018/04/25/japanese-knotweedcannot-cured-major-study-tried-19-methods-finds/
BBC: 'Knotweed 'cannot be eradicated', Swansea Uni trial shows'
https://www.bbc.co.uk/news/uk-wales-south-west-wales-43882916

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@_AccessEd

hello@access-ed.ngo

100 Black Prince Road
London, SE1 7SJ

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