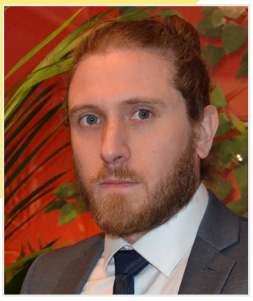
Japanese knotweed: A deep-rooted problem



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Chris Oliver is Operations Manager at Japanese Knotweed Solutions Limited, one of the UK's largest invasive plant specialists, trading UK-wide since 2002. Chris is a registered health and safety professional, qualified pesticides advisor and nominated storekeeper. He also co-wrote the Invasive Non-Native Specialists Association (INNSA) Code of Practice – Managing Japanese Knotweed and takes an active role within the industry, sitting on the Operations Committee of the Amenity Standard, the BASIS* Membership Committee, the Amenity Forum Education and Skills Committee and was appointed chair of the INNSA Technical Standards Committee in 2019.

Japanese knotweed (see Figure 1) is present in almost every square kilometre of England. An estimated £166 million per year was spent on remediation in 2010 – since which time the industry has grown significantly. In response to a freedom of information request by the Times newspaper, it was reported in 2019 that the UK's largest rail infrastructure owner (Network Rail) had received over 11,000 complaints about Japanese knotweed since 2011 with over 6,000 of these about infestations moving onto private property.

So how did we get here? The short answer is through the naïve and misguided industry of a single man, Philipp Von Siebold, a German botanist who brought 12,000 plant specimens from Japan (Figure 2) and disseminated them across Europe. Japanese knotweed was embraced by landscape architects for its ability to establish quickly, provide dense cover and survive in poor soil and inclement conditions.

In springtime, Japanese knotweed sends up green and/or red asparagus-like shoots, which grow up to 3cm per day, developing into thick (but soft) bamboo-like canes with hand-sized, shield-shaped leaves (Figure 3) and characteristic zig-zagging branches (Figure 4). During summer, the plant can reach a height of three metres, with dense, bright-green foliage and clusters of small cream-coloured flowers emerging late in summer. The stems drop their leaves around the end of October and no further leaves will grow from these dead stems – new shoots will emerge the following spring. The canes often remain standing, forming dense thickets of deep reddish-brown colour which may turn to a cream colour over winter as they dry out. Older infestations will form raised "crowns" at ground level where shoots are clumped together, and the underground rhizome "root system" is extensive (Figure 5). Live rhizomes are orange in the centre and will normally snap rather than bend.

Japanese knotweed is frequently described in extreme (and sometimes over-the-top) terms. However, the plant is almost uniquely suited to thrive as an invasive species. A lack of predators in the UK mean it flourishes unchecked by pests and diseases, growing bigger and spreading more quickly in the UK than in its native range. Parts of the plant, particularly the root system (rhizome) can grow into new plants from extremely small pieces. Rhizome fragments weighing less than 1g can regrow and, given that larger remediation projects can remove tonnes of rhizome from a single site, poor management or inadequate works as well as landscaping, gardening and fly tipping can (and do) result in widespread cross-contamination. The viability of such small sections of rhizome means that herbicide treatment is not a quick or simple process and that flooding, movement by animals and transport networks are all contamination pathways. The only silver lining is that all known Japanese knotweed plants in the UK have come from a single female clone and do not spread by seed (although closely related plants do).

Japanese knotweed and railways have a long history, with the plant being used to stabilise railway embankments due to its persistent and quick-spreading root system. While a number of measures can be taken directly on rail land, including targeted herbicide application using handheld equipment (see Figure 6) and blanket spray by "spray trains", a joined-up approach is required to manage infestations across land boundaries and particularly on engineering projects – where the plant has potential to compromise infrastructure or spread to safety-critical areas. In these cases, specialist remediation is strongly recommended, with management of the rhizome being critical. Rhizomes generally extend around four metres from surface growth at a depth of around 500mm, with the roots under the surface growth extending up to 1,500mm downward. Previous studies have found rhizomes extending further than this, but these results are now generally accepted as outliers and the "7m EA zone" is seen as an upper limit, where it was once viewed as a rule of thumb.

Mechanical removal, sometimes involving separation of the rhizome from the soils, is often the optimum approach. Arisings can be sent to landfill or relocated on site, sometimes to specially created burial cells, through the use of specialist membranes known as "root barriers".

Root barriers (Figure 7) can also be used to protect areas or infrastructure where the full extent of the rhizome cannot be removed. In such cases, and where infestations extend off-site, follow-up monitoring and ongoing herbicide treatment are often required to achieve full eradication.

Because few other species share the characteristics of Japanese knotweed's rhizome, for other problem species, particularly buddleia (which causes problems due to its ability to root in building mortar and interfere with overhead power lines) but also rhododendron, giant hogweed and others, remediation tends to rely more on herbicide application or cutting and stump treatment, although excavation can be appropriate in certain cases.

One development that has occurred in the Japanese knotweed industry over recent years is the development of a long-term non-herbicidal remediation method using MeshTech (Figure 8), a product developed in the UK by Dr Eric Donnelly and Japanese Knotweed Solutions Ltd. The product is a grid that is securely fixed over the top of a 'cut back' infestation during the winter period when there is no growth occurring. In springtime, the plant pushes its shoots up through the grid and as they grow further and expand, they constrict and cut themselves off. As the plant tries to send out further shoots, they suffer the same fate and the plant gradually exhausts itself of the carbohydrate store it needs to maintain in its rhizome to enable year-on-year survival and after a period of a few years, will eventually die completely. The method is simple, passive, and environmentally friendly, although obviously it takes some time

Figure 1: A Japanese knotweed infestation

Figure 2: Japanese knotweed in its native range

Figure 3: Japanese knotweed leaf

Figure 5: A Japanese knotweed rhizome system

Figure 6: Hand-held spraying of Japanese knotweed

Figure 7: A root barrier installation

Figure 4: Zig zagging branch of the Japanese knotweed

Figure 8: The MeshTech solution

before the desired result is obtained. Other regulatory, legal and financial measures have developed over the years that are helping to contain the problem. These include the restriction of bank lending against properties affected by Japanese knotweed and the introduction of insurance-backed guarantees to assuage this, the involvement of trade bodies INNSA and Property Care Association (PCA), and the recent court case where Network Rail was found liable for damages for allowing Japanese knotweed to impact neighbouring property.

The key advice for dealing with invasive plant species is to engage an expert at the earliest stages of the process, when effective planning can integrate management into the project from the start, prevent breaches of the law and significantly reduce costs and delays.

*BASIS is an independent organisation committed to raising professional standards across land management and food production. It supports people and businesses with industrial qualifications, professional registers and auditing schemes.

The INNSA Code of Practice – Managing Japanese Knotweed is available online: https://www.innsa.org/wp-content/uploads/2019/06/INNSA-Code-of-Practice.pdf

INNSA – the Invasive Non-Native Specialists Association is a dedicated trade association for the invasive species industry: www.innsa.org

PCA – the Property Care Association operates an Invasive Weed Control Group: https://www.property-care.org/homeowners/invasive-weed-control/

Chris is happy to provide sources if required – email chris.oliver@sltd.co.uk

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