

# In Situ Thermal Treatment of Japanese Knotweed, a Solution to Recover Infested Soils

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**Background/Objectives:** Invasive species are non-native organisms that can disrupt ecosystems, economies, and human health in the regions they invade. Their presence often results in economic losses, ecological damage, and the degradation of affected landscapes. Efforts are underway to address the colonization of invasive plants and restore impacted areas.

One such invasive species, prevalent in Europe, is Japanese Knotweed (*Fallopia japonica*). Originally introduced for ornamental, forage, and honey plant purposes in the 19th century, this Eastern Asian plant now ranks among the world's 100 most problematic invasive species, as listed in the Global Invasive Species Database. Japanese Knotweed's competitive advantage in displacing native species and reducing biodiversity is attributed to several factors, including its ability to establish in wetlands, rapid vegetative spread via rhizomes, shading characteristics of its dense foliage, and the production of allelopathic substances that harm neighboring plants.

**Approach/Activities:** Various control methods have been employed to manage invasive plants like Japanese Knotweed, primarily targeting the aboveground biomass through methods such as mowing, shading with opaque tarps, thermal weeding, and biological control. However, these techniques have not always proven highly effective due to the plant's regenerative capabilities from its root and rhizome system.

An alternative control method is heat treatment, as underground parts of invasive plants are susceptible to high temperatures. Research has established that specific temperature-time combinations, such as 50°C for 3 days or 80°C for 1 day, are lethal to Japanese Knotweed rhizomes.

Haemers Technologies, in collaboration with Katholieke Universiteit Leuven (KUL), has conducted laboratory tests and a pilot project aimed at controlling Japanese Knotweed. This study presents a system for eradicating invasive plants by applying heat to their underground components, preventing vegetative and sexual reproduction. Thermal remediation ensures the eradication of the Japanese Knotweed, and it is a vital step in the nature-based restoration of the site once it has been cleared from this invasive plant.

**Results/Lessons Learned:** A pilot project was executed in Heerlen, Netherlands, where a 26m<sup>2</sup> area infested with Japanese Knotweed was treated to a depth of 3.5 meters. Soil temperature was monitored at six key points, ensuring that the target temperature of 50°C was reached and maintained for at least 3 days. Following the thermal treatment, soil samples were collected, and sprouting tests on treated rhizome fragments were conducted to assess the treatment's effectiveness in preventing Japanese Knotweed regrowth.

The results of the study revealed no re-growth of Japanese Knotweed either on-site or under laboratory conditions, indicating the efficacy of thermal treatment in eradicating this invasive species.