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Conference Abstract

The enemy of my enemy is my friend? Native nettle and invasive rhododendron allelochemicals impair growth of Japanese knotweed.

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Abstract

Plant invasions are burgeoning worldwide, causing severe ecological and socio-economic impacts alongside sustainable management challenges. Of the many floral invasive species, such as Himalayan balsam and giant hogweed, one species is of particular concern for the western Atlantic, that being Japanese knotweed. Japanese knotweed is a notorious floral invasive species that has spread across much of North America and Europe, with a high reliance on synthetic chemical controls. Conventional herbicides used to manage Japanese knotweed include glyphosate, imazapyr and synthetic auxins, but non-target environmental, human health, and regulatory concerns increasingly require the development of more environmentally sustainable options. This study tested whether extracts from the leaves of native stinging nettles (*Urtica dioica*) and invasive pontic rhododendron (*Rhododendron ponticum*), suspended in both water and isopropanol solvents, impacted various growth and viability metrics in non-native Japanese knotweed above- and belowground material over a 9-week controlled experimental period. We found that shooting plants were significantly impacted by treatments applied, with rhododendron extracts typically more inhibitive than nettles, and 100% concentrations stronger than 50% concentration counterparts. These treatments induced up to an 81% reduction to plant height, alongside reduced numbers of nodes, stems and leaves, as well as heightened necrosis indicating impeded viability.

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Rhizomes, in contrast, were generally not impacted by nettle or rhododendron treatments, but were unexpectedly completely inhibited following the application of isopropanol solvent alone, with no signs of growth and total degradation after solvent applications. These findings suggest that the use of allelochemicals and isopropyl solvents to inhibit the development of Japanese knotweed is viable and allelopathy could be a novel management tool for controlling the spread of this and other invasive plant species.

Keywords

Management, Inhibition, Biochemistry, Allelochemicals, Sustainability

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Ethics and security

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Conflicts of interest

The authors have declared that no competing interests exist.