

**New England Botanical Society  
Graduate Student Research Award  
2022 AWARD WINNER**

**Joseph Jaros**

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New York, NY

**Linking plant soil feedback to population dynamics  
using demographic models of knotweed**

The success of invasive plants can be driven by interactions between plant roots and microbes living in soil. As plants begin to change the composition of bacteria and fungi in their soil over time, it can feedback to increase invasive plant performance (in a process known as plant soil feedbacks) and can make it more difficult to restore the site after invasive removal. The goal of my research is to determine how soil microbes influence the success and control of a common invasive plant in New England, Japanese Knotweed. Managing soil microbes may provide a key tool for restoration. However, predicting the role of soil microbes on plant performance can be difficult, as plants will interact differently with their microbial communities depending on the life stage and age of the plant. I will combine data on soil microbe interactions with knotweed at specific timepoints in its life cycle within a demographic model, integrating all of the differing effects of microbes into one net outcome. Using a modeling approach allows me to make predictions about the success of knotweed populations beyond the scope of the immediate research, which is especially important as knotweed plants can live for many decades. With my completed model that is calibrated from real knotweed populations in central Connecticut, I will answer the following questions: (1) How do soil microbes change the structure of knotweed populations over time? (2) Can soil microbes create a legacy effect that hinders restoration after invasion removal? And (3) How do soil microbes affect the evolution of invasive plants in their introduced ranges?

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The New England Botanical Society offers awards of up to \$3,000 to graduate students to support botanical research. The awards encourage and support botanical research on the New England flora (plants, algae, and fungi), including support for field, lab, and herbarium work, as well as travel to New England by those who would not otherwise be able to work in the region. The awards are made to the graduate student(s) submitting the best research proposal dealing with systematic botany, plant ecology, genetics, plant conservation biology, or related fields pertaining to the New England flora.