

Dove, R., E. R. Wolfe, N. U. Stewart, and D. J. Ballhorn. 2020. Ecoregion—Rather Than Sympatric Legumes—Influences Symbiotic *Bradyrhizobium* Associations in Invasive Scotch Broom (*Cytisus scoparius*) in the Pacific Northwest. Northwest Science Vol 94, in press.

## Abstract

Plant-microbe mutualisms can determine the success of invasive plants. Legumes (Fabaceae) are particularly successful invaders in a variety of habitats. This is partly due to their ability to access atmospheric nitrogen through microbial mutualists (rhizobia) in their root systems, which allow them to colonize a wide variety of disturbed or nutrient-poor habitats. While many plant-rhizobia mutualisms are highly species-specific, plant promiscuity with different species of rhizobia can significantly enhance the success of invasive legumes, since the availability of suitable rhizobial mutualists in a new geographic area may serve as a limiting factor. Scotch broom (Fabaceae: *Cytisus scoparius*) is one of the most problematic invasive legumes in the Pacific Northwest (PNW), yet very little is known about the Scotch broom-rhizobia system. We explored the rhizobial communities of root nodules of Scotch broom and sympatrically occurring legumes across three major ecoregions (coast, valley, and mountain) in the western PNW (Washington, Oregon, and California) to better understand the Scotch broom-rhizobia system in nature. We found that bradyrhizobia are the exclusive rhizobial mutualists of Scotch broom but that there is promiscuity at the species level. While there was very little overlap with rhizobial communities of sympatric native and naturalized legumes, ecoregion did influence the species composition of Scotch broom-associated rhizobial communities. Our findings suggest that Scotch broom is not reliant on sympatric legumes to provide a source of suitable rhizobial mutualists, but instead forms spatially variable associations with a range of other bradyrhizobia.

**Keywords:** Plant-microbe interactions, rhizobia, invasion ecology, mutualism, biodiversity

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