Public Abstract
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Mutualisms, beneficial interactions between two species, often vary in strength in persistence over space and time. To better understand what determines whether mutualisms persist or vanish and how they impact ecological communities, I studied mycorrhizal associations, a type of mutualism involving plants and root-colonizing fungi. An estimated 80% of plant species form mycorrhizal associations, providing their fungal partners with carbon in return for soil resources. First, I examined the distribution, diversity, and composition of mycorrhizal fungi colonizing four plant species that grow at treeline in the southern Rocky Mountains. Results indicate that mycorrhizal associations vary among host plant species and habitats. Next, I identified environmental factors that cause mycorrhizal associations to vary across treeline habitats. Results indicate that resource availability and the presence of other plant and fungal competitors influence the abundance of mycorrhizae in open meadow and willow understory habitats. Finally, I evaluated the implications of mycorrhizal associations for plant populations and communities. Results indicate that mycorrhizae can impact plant invasion, reproductive fitness, and the evolution of plant traits. Overall, my research advances our understanding of mutualisms and mycorrhizal associations, in particular. More specifically, my research highlights the inherent complexity of these interactions and their importance to ecological and evolutionary processes.