Impacts of Nonmycorrhizal Plant Abundance on the Growth Response of Arbuscular Mycorrhizal Plants to Mycorrhizal Networks

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Most plants form symbiotic relationships with arbuscular mycorrhizal (AM) fungi that improve the plant’s ability to acquire soil nutrients, usually improving plant growth. It is uncertain if the abundance of neighbouring nonmycorrhizal plants within a community affects the growth response of mycorrhizal plants to these fungi. We tested whether increasing the proportion of neighbouring nonmycorrhizal plants could increase or decrease the growth response of mycorrhizal plants to AM fungi. To do so, we grew mycorrhizal focal plants Bromus inermis, Plantago lanceolata, and Trifolium pratense in ingrowth cores surrounded by communities consisting of conspecific mycorrhizal plants and varying proportions (20%, 50%, and 90%) of the nonmycorrhizal plant Silene armeria. Access to mycorrhizal networks in half of the focal plants was manipulated by rotating the ingrowth cores to sever hyphal connections. We found that biomass of T. pratense was significantly higher at nonmycorrhizal proportions of 90% compared to 20% or 50%, but plant growth responses to severing treatments did not vary with increasing nonmycorrhizal proportions in any mycorrhizal species. There was no evidence that increasing nonmycorrhizal plant abundance changed mycorrhizal plant responses to AM fungi, as the observed increases in mycorrhizal plant biomass were unrelated to AM fungal network status.