Trophic interactions affect fungal communities to improve plant performance

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Abstract

The soil microbiome is composed of a complex and diverse fungal community, from plant pathogens that reduce plant performance to mutualistic fungal taxa that provide nutrients to plants. One class of mutualists is arbuscular mycorrhizal fungi (AMF), key providers of phosphorus. Although plant hosts and abiotic parameters are known to affect AMF, it remains unknown how fungivorous predators affect AMF communities. A recent study explored the connections between AMF, fungivorous protists and nematodes, and plant performance. In a 17-year field experiment comparing four manure treatments in a low-fertility red soil, researchers found that manure addition increased AMF biomass along with the density of fungivorous nematodes. More AMF was digested by nematodes in high-manure treatments, and network analysis indicated that predation stimulated AMF biomasses and modified community composition. These interactions increased AMF colonization and expression levels of the P transporter gene *ZMPht1;6* in maize roots, enhancing plant productivity. These results highlight the importance of predation in shaping the composition of AMF communities, leading to improved plant performance.