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## **Protists facilitate the establishment of symbiotic bacteria in rhizosphere microbiomes**

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### **Abstract**

Protists are abundant and impactful components of plant microbiomes. These diverse organisms affect plant health through nutrient cycling and selective predation and can shape the bacterial communities in the phytobiome. However, protists carry their own microbiomes, and the impact of protist-associated bacteria on plant microbiomes is unknown. We hypothesized that protist-associated bacteria may become established or enhanced in the rhizosphere when their protist hosts are inoculated onto a plant. In a growth chamber experiment, maize roots were inoculated with an 18-member consortium of protists isolated from field-grown maize, alone or in combination with a protist-free rhizosphere microbiome. Using high-throughput amplicon sequencing, we found that the addition of the bacterial inoculum did not alter the structure of the protist communities. Conversely, protist inoculation shaped the bacterial rhizosphere microbiome by enhancing bacterial taxa not found after inoculation with bacteria alone. These results suggested that protist microbiomes included bacteria that could establish in the rhizosphere. To test for differences in enhanced bacteria between different protist taxa, we next inoculated maize plants with individual protists in combination with a protist-free bacterial microbiome. We identified 15 bacterial taxa that were greatly enhanced in the rhizosphere protist communities by protists. Different protist cultures introduced different bacterial taxa that could be a function of the distinct protist microbiomes. This research demonstrates that inoculating plants with protists may select for plant-colonizing bacteria, and that protists may be a useful tool for delivering specific bacteria to the rhizosphere.

