



## Influence of Soil Protists on Bacteria and Fungi Regulation in Soil Profiles

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### ABOUT THE STUDY

Soil protists are unicellular eukaryotic microorganisms that play an essential role in nutrient cycling, organic matter decomposition, and overall soil health. These organisms are found in diverse soil environments, including both surface and subsurface soil profiles, where they interact with other microorganisms such as bacteria and fungi. Recent studies have shown that soil protists can regulate the abundance and activity of bacteria and fungi, thereby impacting soil biogeochemical processes. In this commentary, we will discuss the effects of soil protists on bacteria and fungi in soil profiles and their top-down regulation.

The presence of soil protists has been shown to have a significant impact on the abundance and diversity of bacteria and fungi in soil profiles. Several studies have shown that the presence of soil protists can enhance bacterial and fungal biomass, potentially by providing nutrients and other resources to these microorganisms. The presence of soil protists was found to enhance bacterial biomass and promote the growth of specific bacterial taxa. Similarly, other studies have shown that soil protists can enhance fungal biomass and diversity, potentially by grazing on bacteria, which reduces competition for resources and allows fungal growth to thrive.

In addition to their positive effects on microbial biomass, soil protists can also play a critical role in the top-down regulation of bacteria and fungi. Top-down regulation refers to the control of microbial populations by higher trophic levels, such as predators or grazers. Soil protists are known to be important top-down regulators of bacteria and fungi, as they can graze on these microorganisms and impact their abundance and activity. For example, studies have shown that the presence of soil protists can reduce bacterial abundance and diversity, potentially by

grazing on specific bacterial taxa. Similarly, soil protists have also been shown to regulate fungal abundance and diversity by grazing on fungal hyphae and spores.

The impact of soil protists on microbial abundance and diversity can have significant implications for soil biogeochemical processes, including nutrient cycling and organic matter decomposition. For example, the activity of soil bacteria and fungi is critical for the breakdown of complex organic matter, which releases nutrients that can be taken up by plants. Soil protists can impact this process by regulating bacterial and fungal abundance, which can impact the overall rate of organic matter decomposition. In addition, soil protists can also impact nutrient cycling by regulating the activity of specific microbial taxa that are involved in nitrogen fixation or other critical biogeochemical processes.

The regulation of bacteria and fungi by soil protists can also have implications for plant growth and productivity. Soil microorganisms play a crucial role in plant-microbe interactions, including nutrient uptake and disease suppression. The presence of soil protists can impact these interactions by regulating the abundance and activity of bacterial and fungal communities in the soil. For example, the presence of soil protists has been shown to increase the availability of certain nutrients, such as nitrogen, which can enhance plant growth. Similarly, soil protists have been shown to regulate the abundance of pathogenic fungi, potentially reducing the incidence of plant diseases.

Despite the significant impact of soil protists on soil microbial communities and biogeochemical processes, these organisms are often understudied compared to bacteria and fungi. This is partly due to the challenges associated with studying soil protists, which are often difficult to identify and quantify using traditional microbiological techniques.

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