The soil microbiome as a driver of plant communities and vegetation

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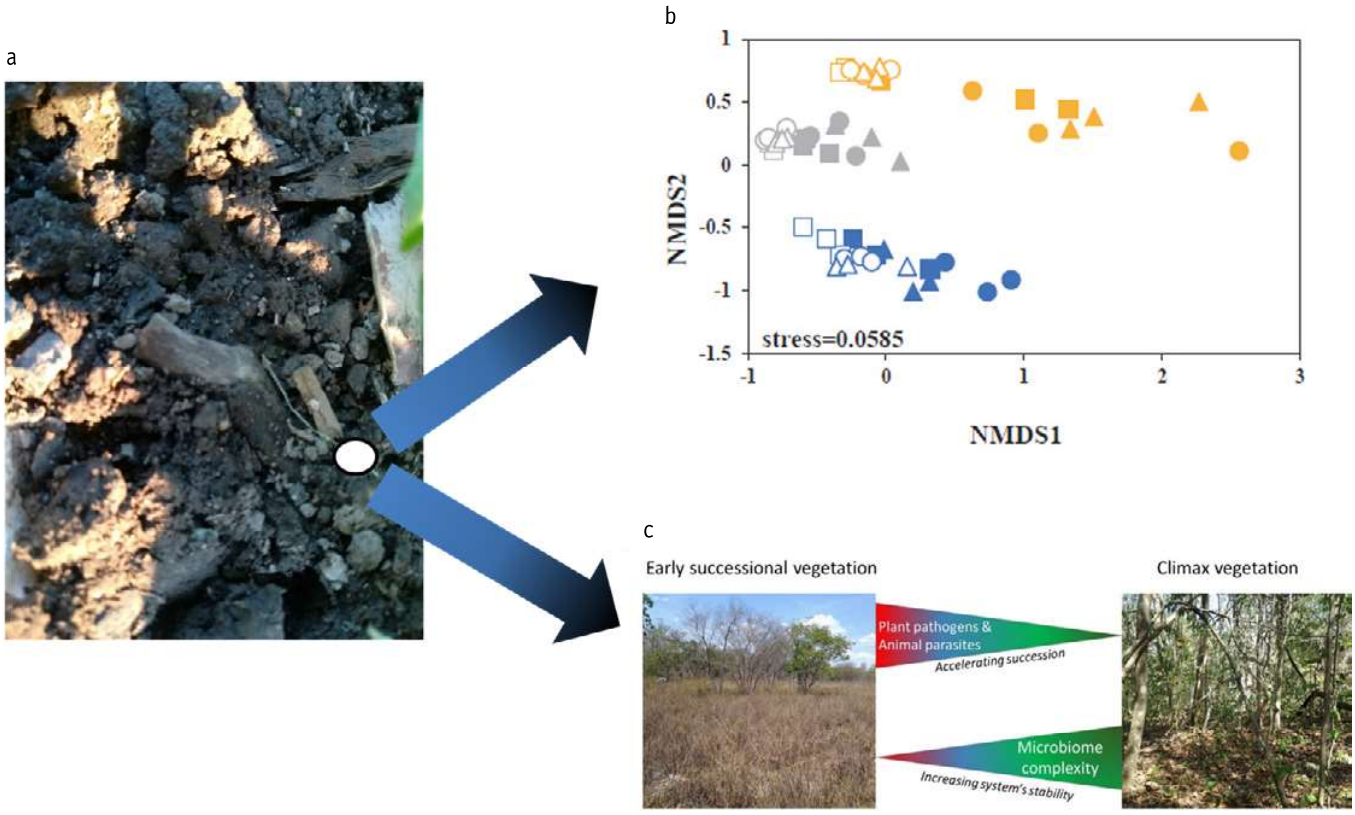
Soils host the vast majority of biodiversity on the planet. Soil organisms are key for ecosystem functioning by controlling nutrient fluxes and plant performance. These roles are fundamentally influenced by protists, the smallest microbial predators. However, the diversity and more importantly function of protists as potential microbiome engineers is largely unknown.

Due to methodological developments, particularly in high-throughput sequencing, we have begun to uncover an enormous taxonomical diversity of soil protists. These recent findings have also started to shift our perspective of the functional importance of protists in soils that is much wider than previously assumed and include key roles influencing ecosystem functioning. The importance of protists within microbiomes and for ecosystem functions are revealed in several examples. For instance, recent studies have confirmed protists as (1) the most sensible bio-indicators in a field scale fertilization study across China and as (2) key microbiome hubs shaping plant vegetation in the Brasilian Cerrado.

Together, protists are key biota in shaping soil microbiome composition that has immediate consequences for plant performance and consequently vegetation dynamics. In turn, anthropogenic influences such as induced by climate change or through fertilization affects protists most strongly among all soil microbiome members, which could directly affect ecosystem functioning.

Together, I will use protists to exemplify that it is essential to take a more ecological perspective on soil biodiversity including predators to increase our understanding on soil biodiversity-driven ecosystem functions rather than focusing on single, commonly studied groups within the soil microbiome.



Protists as part of the soil microbiome (a) that are the most susceptible microorganisms to fertilization (b) and might drive changes in plant vegetation (c).