

Speaker Abstracts - Tuesday 4 December

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Microbial colonization of soils: implications for agriculture and experimental systems

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The ability microorganisms to establish and proliferate in soils is broadly relevant to the biogeography of plant-associated microorganisms. These traits are also of applied importance for phytobiome management, particularly as they impact microbial inoculant survival/activity, and the recolonization of agricultural soils that are cleared to control pests (e.g. through soil disinfestation, fungicide applications). Despite numerous studies on the relationship between abiotic soil parameters and microbiome composition, we know little about soil microbial colonization. I will present data from our lab that shows the impact of modifying soil resources and disturbances on soil microbial colonization. I will also show the impact of microbial source (i.e. forest vs. agricultural soil) on the composition and carbon preferences of early-colonizing microorganisms.

In addition, we are determining how soil microbial colonization can be applied to establish replicable microbiome systems, which allow probing of plant-microbe interactions through time and across labs. In particular, our goals are to A) avoid excluding yet-to-be-cultivated microbes, B) limit the transfer of compounds from parent soils, and C) preserve interactions that have developed over time between microorganisms from a particular soil environment. We have reintroduced microbiomes from a bank of cryopreserved soils into different sterile soil environments, and show how the relationship between microbiome composition in parent soils and recipient soils is impacted by the abiotic parameters of each. Ultimately, we aim to understand how colonization impacts management of agriculturally-relevant microorganisms, and to develop realistic soil microbiome models to enhance investigations of the phytobiome in controlled lab and greenhouse settings.