TRANSMISSION OF SEED MICROBIOTA AND IMPACTS ON SEEDLING PHENOTYPE

#SEED PHYSIOLOGY #PHYTOPATHOLOGY

Background

The **SUCSEED** project is one of the 10 projects funded by the Priority Research Program "Cultiver et Protéger Autrement" (PPR-CPA). SUCSEED aims to make the seed a central player in plant health management by focusing on two major plant health problems: (i) seed-borne pathogens and (ii) damping-off. To reinforce the multi-disciplinary nature of this project we propose to recruit a cohort of five PhD students.

Summary

Despite the crucial role of seeds for food production and maintenance of plant biodiversity, studies on seed microbiota are still scarce. As a consequence, many knowledge gaps remain regarding the role of seed microbiota during the early life stage of plants, especially during germination and emergence. Seeds can harbor a diversified microbiome but the causal relationships between the composition of seed microbiota and seedling phenotypes have not been established. Developing a better understanding of the dynamics and influence of this microbiota during crop establishment is particularly timely as the seed industry is preparing for a major revolution in seed treatments associated with the reduction of pesticide usage. In this context, this PhD project proposes to use synthetic ecology approaches to study the dynamics of a microbiota of known composition (synthetic community) and its impact on the host phenotype in a controlled manner. In particular, the first part of this project will focus on the study of the transmission of the microbiota from seeds to seedlings, in order to determine which fraction really constitutes the "primary inoculum" of the plant. In a second part, the effect of this microbiota on various plant traits will be evaluated via high-throughput phenotyping by digital imaging, and characterization of the seedling metabolome. The last part of this work will consist in identifying the strains / consortia and microbial functions involved in the modification of the phenotype of the seedling via targeted reconstructions of synthetic communities and comparative genomics.

Informations

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Starting date: October 2021 (Deadline: April 18)