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College of Natural Sciences
Center for Agriculture, Food, and the Environment

Soil Microbial Community Evolution

Trevor Melusen, DeAngelis Lab
Microbiology
University of Massachusetts Amherst

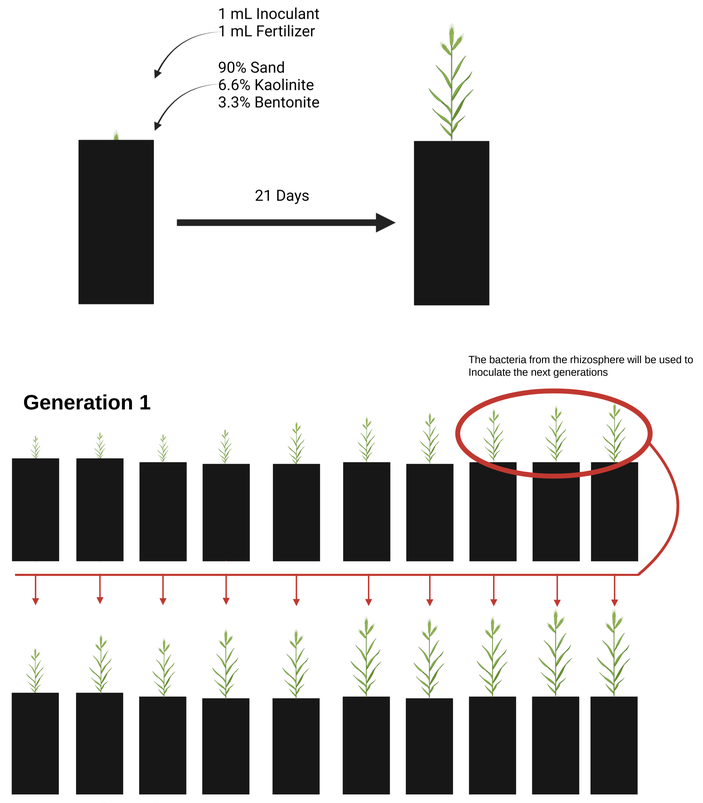
United States Department of Agriculture
National Institute of Food and Agriculture

Introduction

- Soil bacterial communities can influence environmental traits, such as plant growth
- Artificial selection for these traits can happen experimentally
- Experiments to degrade pollutants or create larger plants using soil communities have occurred [1,2]
- These experiments do not control for the composition of the soil
- It is unclear what influences the selected trait most:
  - Shift in species composition
  - Shift in species diversity
  - Shift in types and frequency of genes

Experimental Setup

Methods



Expected Results

The experiment is running through the fall and winter, so all data is hypothetical

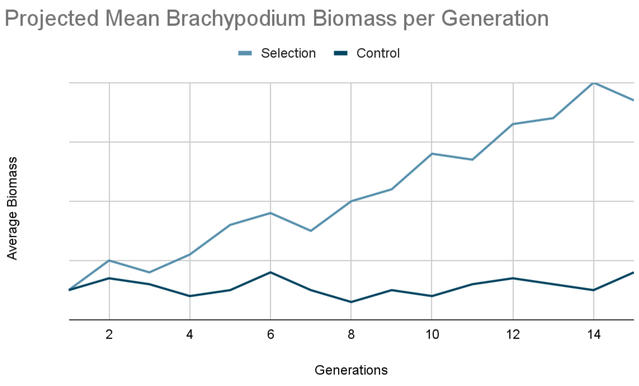


Figure 1. Expected shift in biomass in the selection group of plants

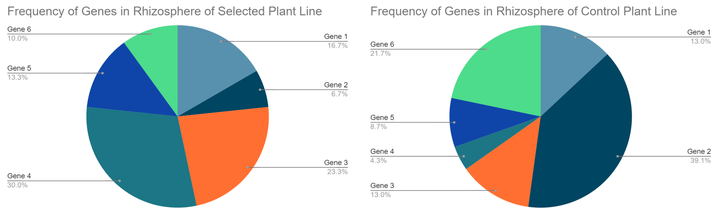


Figure 2. Possible shift in plant growth promoting genes seen between the control and selected rhizosphere communities

References:

1. Mueller, U. G., Juenger, T. E., Kardish, M. R., Carlson, A. L., Burns, K. M., Edwards, J. A., Smith, C. C., Fang, C.-C., & Des Marais, D. L. (2021). Artificial Selection on Microbiomes To Breed Microbiomes That Confer Salt Tolerance to Plants. MSystems, 6(6), e01125-21. https://doi.org/10.1128/mSystems.01125-21
2. Swenson, W., Arendt, J., & Wilson, D. S. (2000). Artificial selection of microbial ecosystems for 3-chloroaniline biodegradation. Environmental Microbiology, 2(5), 564–571. https://doi.org/10.1046/j.1462-2920.2000.00140.x