Two poplar-associated bacterial isolates induce additive favorable responses in a constructed plant-microbiome system

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Background

- The *Populus* root microbiome is a diverse community that has a high abundance of β- and γ-*Proteobacteria,* both classes include multiple plant-growth promoting representatives.
- To understand the contribution of individual microbiome members in a community, we studied a simplified community consisting of *Pseudomonas* and *Burkholderia* bacterial strains and inoculated them on axenic *Populus* cuttings in controlled laboratory conditions.

Science

- Alone and in combination, *Pseudomonas* GM41 and *Burkholderia* BT03 increase root growth, photosynthetic potential, and activate unique pathways relative to un-inoculated controls.
- Complementary data, including photosynthetic efficiency, whole-transcriptome gene expression and GC-MS metabolite expression data, in individual and mixed inoculated treatments indicate that the molecular effects of these bacterial strains are unique and additive.

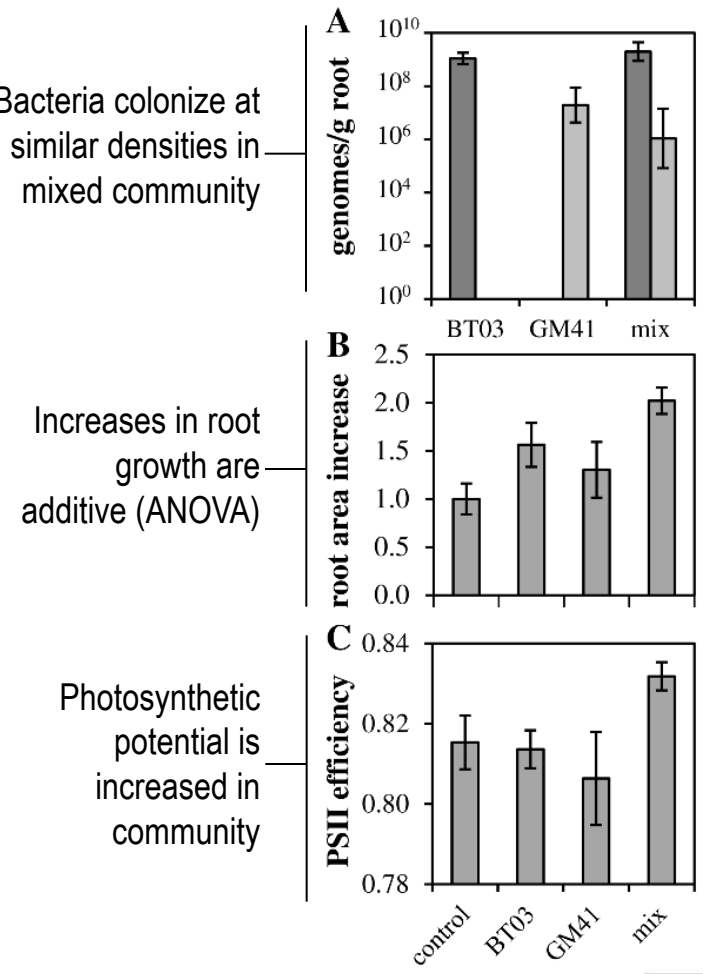
Significance

- First constructed community study to show that bacteria can have additive host effects.
- Microbiome function may be predicted from synergistic effects of individuals.

Bacteria colonize at similar densities in mixed community

Increases in root growth are additive (ANOVA)

Photosynthetic potential is increased in community



Timm CM *et al.* Two poplar-associated bacterial isolates induce additive favorable responses in a constructed plant-microbiome system. Frontiers in Plant Science (2016), 7: 497.

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