

Biosynthetic potential of the *Populus* microbiome



Contact: Dale Pelletier (pelletierda@ornl.gov; 865.576.2857)

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Background

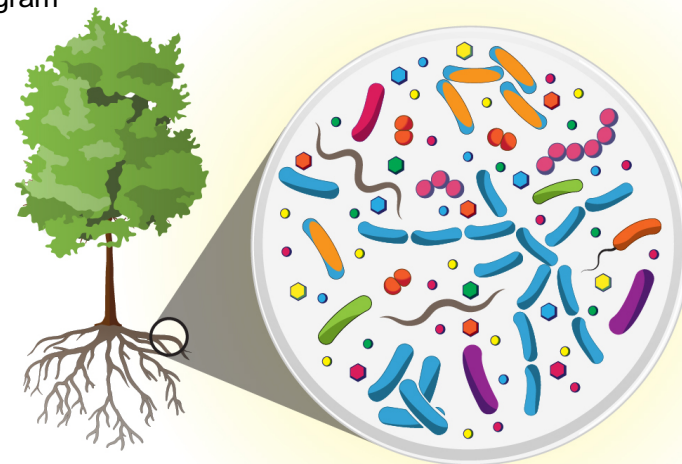
- The *Populus* root microbiome is an incredibly diverse community, comprised of taxonomically varied bacteria and other microorganisms.
- Bacteria contribute to plant health and survival through the production of complex natural products that act as signaling molecules, antibiotics, antifungals, and phytohormones.

Science

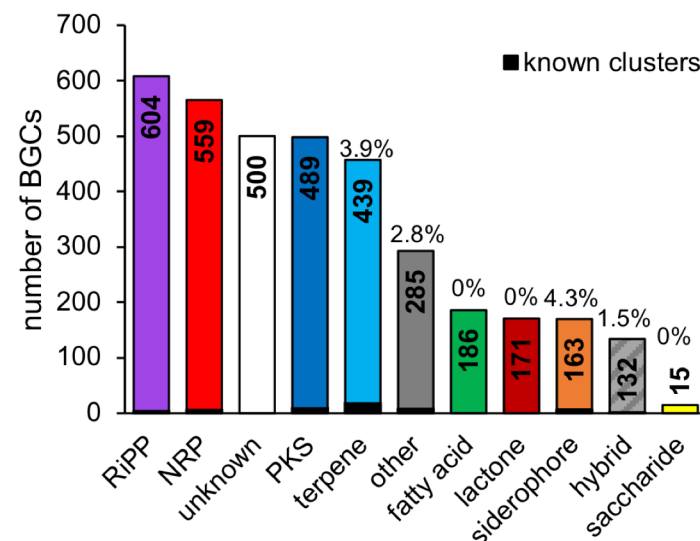
- We identified more than 3400 individual gene clusters identified in 339 fully genome-sequenced bacterial isolates from the *Populus* root microbiome, including 173 newly sequenced organisms
- Only about 1% of all clusters from sequenced isolates were positively matched to a previously-characterized gene cluster, suggesting a great opportunity for the discovery of novel natural products (NPs) involved in communication and control in the *Populus* root microbiome

Significance

- The *Populus* microbiome bacterial component is capable of producing many novel natural products which likely play key roles in community dynamics and plant health
- Bacterially-produced complex natural products with antibiotic or antifungal activity often have applications in agriculture and medicine.



Diverse communities of microbes in and around poplar tree roots produce a variety of unique natural products.



NP gene clusters from the PMI bacterial collection. Black bars represent number of clusters from each class that have already been characterized (% of all clusters in each class listed above the bar).



Office of Science Blair, P. M., Land, M. L., Piatek, M. J., Lu, T-Y.S., Doktycz, M. J., and Pelletier, D. A. (2018). Exploration of the biosynthetic potential of the *Populus* microbiome. *mSystems*, accepted.