~Outline

Frontiers in Environmental Science | Soil Processes (or the sustainable part of Frontiers)

~ Experiment performed with the intention of characterizing the microbial community and plant available nitrogen of soils amended with fertilizers available for use in organic agriculture. Understanding the bacterial community structure during decomposition and nutrient release of organic plant materials and compost and the associated soil nutrient profile will provide bacterial targets to be used as biological soil amendments intended to improve nutrient cycling in organic production systems.

We want to leverage an abundant natural resource (soil and bacteria) to improve crop production and ecosystem services/health in agroecosystems. We will do this first by characterizing the microbial (bacterial) community of agricultural soils under sustainable (organic) management. We will utilize bacterial characteristics to design biostimulants and bioaugmentations for soils that will improve soil fertility management in sustainable agroecosytems.

Introduction (4 – 10 paragraphs)

* Drawbacks of mineral fertilizers in agroecosystems
  + Water quality
  + Climate change (fossil fuel use)
* Green manures and compost (organic amendments) as alternative fertilizers
* Challenge facing: timing of nutrient release, microbial mediated component particularly not well characterized
  + C:N ratio impact on microbial response and nutrient release
  + C:N ratios below 25:1 (mineralization)
* Understanding nutrient release from organic amendments over time and the coupled bacterial community dynamics will improve our understanding of soil ecology in organic agroecosystems as well as contribute to the development of biological soil amendments
* ~~Ecological classification (slow vs. fast growers) who is likely to be responding to each amendment? Linked to treatment or time? (See Fierer et al. 2007, “Toward and ecological classification of soil bacteria”)~~ (better in discussion)
* Do OTUs transfer from amendment to soil and persist? (little available research)

Materials & Methods

* Highlight: controlled, replicated, broad (analyses)

Results

* # OTUs from alfalfa and/or compost that persist
* OTUs that increase in relative abundance through time
  + (LFC contrast previous day and reference soils)
* Phylogenic distribution of species in different treatments and days and their dynamics over time

Discussion

* ecological class: slow (oligotrophic) and fast (copiotrophic) growing bacteria, differences between treatments? Time?
* C:N ratio, relation to above
* Response groups and responders
* persistors from amendment into incubated soils

Conclusion