

Listening Session: Soil and Plant Health

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Soil health

- Organic matter buildup vs. Nutrient release and timing nutrient availability with crop needs.
- Relationship between soil quality and crop management practices/soil quality affected by crop management.
- Low till/no till organic management.
- Tools for rapid measurement of soil health/quality: Coes quality = health?
- Compost science.
- Effect of soil inputs on food value.
- Complexity of soil systems; how do we define soil health? *
- How measure soil health as predictor to plant health? How to measure and what to measure--no reference point for soil health what are the appropriate tools; measure at what scale?
- Some too broad as a measure for soil quality.
- Education/communication between science and farmer.
- Capacity—we are lacking people and funding to do this work.
- More meta-analyses done (Discovery vs. Research).

Microbe/pathogen

- Predicting suppression.
- Cover crops for soil disease suppression.
- Enhance plant/soil microbe communication; microbial/root interactions.
- Nutrient inputs effect on microbial communities.
- Understanding pathogen development/response to suppression; microbes that produce ‘inhibiting’ products/exudates.
- Unique interactions of specific plant cultivars with specific microbes.
- Understanding differences in levels of organic matter.
- Bulk soil vs. Rhizosphere what should we be measuring? Understand rhizosphere ecology.
- Lots of products being sold on inoculation (compost teas...mycorrhizae).
 - What is the mechanism on biostimulants?
 - Need efficacy studies.*
- Understanding pathogen development to enhance disease suppression.

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Pest/weed/disease management

- Novel approaches that can be scaled up or down.
- Relationship between plant health and stress (e.g. Herbivory).
- Innovative approaches to weed management.
- Understanding ecological benefits of weeds.
- Weed-soil-microbe-nutrient interactions: Obtain suppressive soil.
- Strategies reduce weed seed germination.
- Efficacy of biological control, monitoring protocols for beneficials.
 - Equipment
 - Invasive species
- Reduce weed control costs and time to farmers.

Soil-plant-health relationship

- Enhance plant-soil-microbe communication: Make plants more resistant to disease and insects via soil management.
- Provision of ecosystem services.
- Plant quality and soil water availability.
- Optimizing needs and use in organic systems.
- Plant-soil-insect interactions, plant defense.
- Enhance plant resilience; plant response to environment.
- Genetic differences between crops.
- Differences between soil types/locations.
- Standard soil health indicators and plant health indicators—what are baselines/references.
- Complexity of soil-plant-interactions.
- How to get funding for inter-disciplinary research?