Soil-Water-Plant Nexus: Controlling the Fate of Carbon Sequestration through Microbiome Engineering

Marie Kroeger, PhD
Scientist
Bioenergy and Biome Sciences
April 5, 2022
LA-UR-22-22207
Soil Erosion Driving Carbon Loss and Land Use Change

Water Stress is Increasing

Soil Water Repellency – a Wrench in Carbon Sequestration and Water Use Efficiency Under Bioenergy Crops

Goebel et al. 2011. *Glob Chang Biol*

Vegetation Type

Climate and Soil Texture
Microbiome Control of Soil-Water-Plant Interactions

Respiration by Community over Time

Water Repellency Group
- hydrophilic
- hydrophobic
- moderate

Cumulative CO2 (mg/g litter)

Phylum
- Acidobacteria
- Actinobacteria
- Ascomycota
- Bacteroidetes
- Chloroflexi
- Cyanobacteria
- Firmicutes
- Other
- Proteobacteria

Non-Polar

Polar

Time
Hydrophobicity

1421
261
285

258
231
434

Hydrophilic
Hydrophobic

SWR Community Diversity

Time Point
- D45
- D89