Bioproduct Agroecosystems as a Sustainable Post-Mining Land Use in Appalachia, USA.

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Surface mining has scarred > 2.5 million acres of land in the USA alone. In Appalachia, bioproduct crop production is an especially promising post-mining land use.

Hobet #21 Mine, WV USA

*Miscanthus x giganteus*
Former Alton Mine site, WV
Jenni Kane

Milbrandt et al. 2014
Direct and indirect manipulation of the soil microbiome to increase crop yield and soil carbon

Photo credit: Jenni Kane

Soil Amendments
- Organic (Manure)
- High Inorg. (N-P-K)
- Low Inorg. (N-P-K)

Microbial Amendments
- Commercial “Biofertilizer”
- Microbiome Transplant

Microbial amendments increased Miscanthus root biomass.

Miscanthus Root Biomass (g) vs. Bacillus Relative Abundance

- High Fertility Soil: p = 0.01, R² = 0.48
- Low Fertility Soil: p = 0.66, R² = -0.07
Three years of Miscanthus production on formerly mined soils has produced high yields and increased soil organic matter.

**SOM and microbial C use efficiency increased over 3 years with variable treatment effects**

**Microbial CUE and SOM are linked depending on treatment**

* p < 0.05

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