

Task Group 1: Feedstock Production

Identify and demonstrate feasible and cost-effective approaches to soil amendment, vegetation, and plant material for bioproducts.

At a glance: Task Group 1 focused their efforts on researching the productivity and sustainability of willow biomass plantations, biochar applications, and their impacts on soil and ecosystem health. Furthermore, they focused on enhancing biomass production in underutilized lands, assessing soil fertility improvements with biochar, and providing practitioners with valuable data to inform their management practices.

Y4 Accomplishments



7

Project Presentations



5

Students Supported



4

On-going Research



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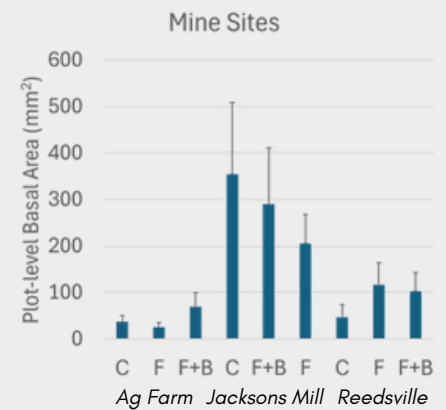
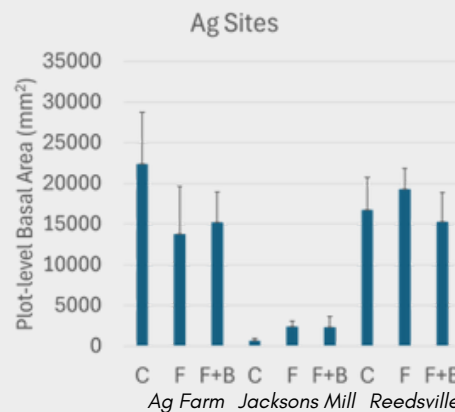
OUTCOMES



Willow Biomass Production & Soil Characterization

Willow Field Trials: Presented initial results at the International Union of Forest Research Organizations (IUFRO) conference. Key findings showed the diversity of available acreages for biomass production across the region. However, sites such as minelands may require greater inputs than agricultural lands to meet productivity targets.

Soil Characterization: Completed comprehensive soil characterizations, aiding modeling efforts and yield predictions for various biomass crops. This will assist in refining sustainability metrics for practitioners.



Year 1 (post-coppice) growth associated with willow associated with biochar and nitrogen fertilization across agricultural and mine sites

Willow Cutting Length Study

Central Hardwoods Conference: Presented findings from a pot study on the impact of cutting length and soil rooting restrictions on plant growth. The study showed that reducing cutting length or limiting root area negatively affects willow biomass production.

Herbicide Trials for Willow Establishment

Over 20 herbicide treatment combinations were tested for establishing willow plantations. This has provided managers with a wider array of herbicide options while highlighting potential effects on target and non-target species.

Further trials are required to fine-tune prescriptions, as state and location restrictions may impact herbicide availability.

Figure 2. Example layout of soil amendment trail at the WVU Agronomy farm showing willow and switchgrass plots



Characterization of biochar and metal uptake associated with various crops

Biochar variability is significant due to site conditions and production processes. Commercial production remains limited, and quality consistency is a challenge. Characterized biochar's fertility and metal uptake with different crops will help growers decide on biochar types and application rates.

Leaching experiments using two biochar types and seven application rates (0–80 tons/acre) across five soil types were conducted. Results showed varying ion retention and chemical characteristics depending on the biochar rate and soil type.

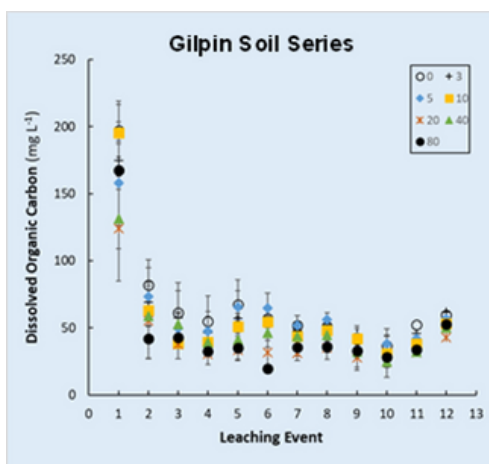


Figure 3. The effect of biochar rates on the leaching of dissolved organic carbon.

Publications & Stakeholder Engagement

Presentations

Initial results were highlighted at international and regional conferences, including IUFRO and the Central Hardwoods Conference.

Publications

Manuscripts in progress include willow biomass productivity and herbicide trials for willow establishment.

Workshops and Engagement

Stakeholder engagement has included discussions on willow field trials and biochar research, with workshops targeting landowners and growers. This has led to increased interest in biochar application and willow biomass production in underutilized lands.

Student Support

Two new graduate students will help quantify biomass estimates for willow and switchgrass trials and soil characterizations/fertility recommendations.

LOOKING AHEAD

- **Expansion of trials to cover more site and soil types.**
- **Fine-tuning herbicide prescriptions for willow management.**
- **Standardizing biochar production for broader commercial use.**

Learn how to get Involved:

*Details about the activities, publication links and seminar videos are available.



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