

BioFPR Journal Cover “Economic impact of yield and composition variation in bioenergy crops: *Populus trichocarpa*”



U.S. DEPARTMENT OF

ENERGY

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Science



A highlight of this publication was previously submitted (September 2020) and is recognized here for a journal cover

Approach

- Improved HTP compositional analytics provided the full range of natural variation of *P. trichocarpa* linked to tree size. A poplar supply chain simulation model was used to estimate the cost of poplar based on tree size delivered to the biorefinery.
- Technoeconomic sensitivity in an ASPEN biorefinery model was performed on representative sample of 204 poplar clones from a GWAS population with respect to biomass yield and carbohydrate composition.

Outcome

- Biomass yield (as DBH7) was the strongest influence on economics due to high variation and feedstock costs.
- Yield impacted tons/acre while composition impacted gal/ton.
- Among high biomass yield lines, composition (i.e., feedstock quality) becomes an equally important parameter on Minimum Fuel Selling Price.

Significance

- Understanding the range of biofeedstock phenotypic characteristics and how variation in both physical and compositional phenotypes impact overall feedstock quality and economic metrics will be important when selecting economically advantageous genotypes for domestication in an optimized supply chain.

Happs, RM, et al., “Economic Impact of Yield and Composition Variation in Bioenergy Drops: *Populus trichocarpa*”, *Biofuels, Bioproducts and Biorefining*, 15:1, 2021. doi:10.1002/bbb.2148



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