

# Comparative analysis of field-grown transgenic switchgrass lines shows stable increases in biofuel yields

## Background

- Switchgrass is a dedicated perennial herbaceous feedstock for the production of biofuels and specialty chemicals.
- Silencing or overexpressing genes in plant biosynthetic or regulatory pathways has been shown to reduce recalcitrance to biological solubilization of sugar polymers for higher fermentation yields.
- Field growth could introduce unknown variability in the phenotype of successful greenhouse transgenic lines.

## Approach

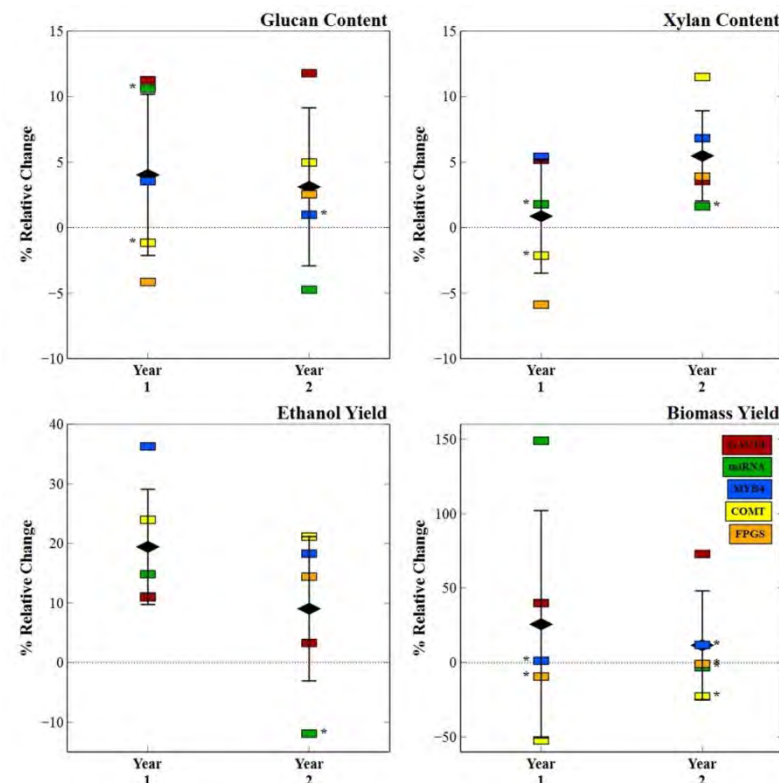
- Clones of plants representing independent transgenic events and their respective non-transgenic control lines were investigated for biomass yield, carbohydrate composition, and recalcitrance to bioconversion via separate hydrolysis and fermentation to ethanol.

## Outcomes

- Over two consecutive field-growth seasons, most transgenic lines maintain higher glucan and xylan yield at similar, or sometimes better, plant biomass.
- Transgenic lines targeting cell wall modifications yielded significantly higher bioconversion to ethanol (up to 36% and 21% in year 1 and year 2, respectively).

## Significance

- This summarizes progress toward generating next-generation biofeedstocks with improved properties for microbial and enzymatic deconstruction.
- It provides a comprehensive quantitative analysis for the bioconversion of multiple plant lines in five transgenic strategies, sampled over two field-growth seasons.



Comparisons of five transgenic switchgrass lines to their parental controls (\* indicates not a statistically significant difference at 95% confidence).