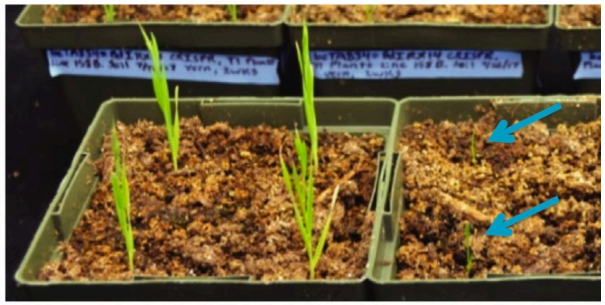
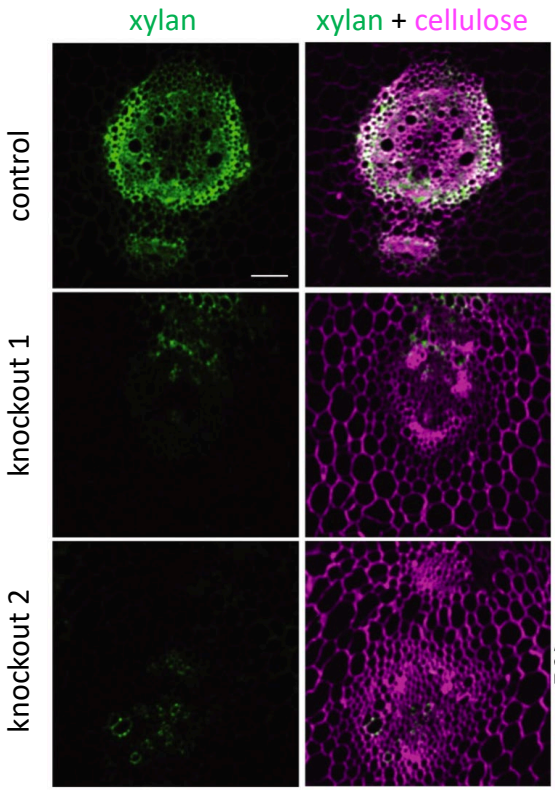
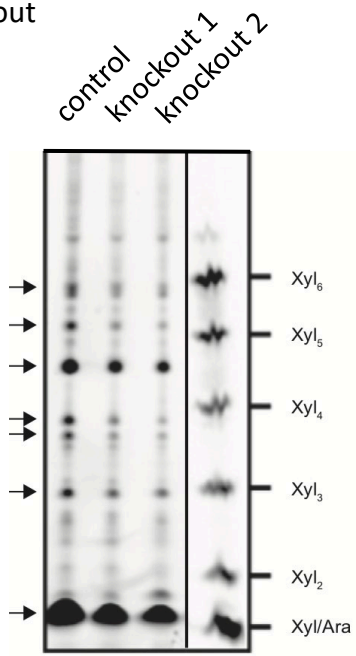
Testing the Functional Importance of Xylans in Grass Cell Walls







Petrik DL, Tryfona T, Dupree P, Anderson CT. BdGT43B2 functions in xylan biosynthesis and is essential for seedling survival in *Brachypodium distachyon*. *Plant Direct* 2020;4(4):e00216. doi:10.1002/pld3.216.

Work carried out at Penn State and University of Cambridge

Significance and Impact

The polysaccharide xylan is abundant in the cell walls of grasses, which include bioenergy crops, but how xylan functions in wall assembly in grasses is unclear. We knocked out a xylan synthesis gene in the grass *Brachypodium distachyon*, finding that loss of this gene causes early plant death and abnormal wall structure. These results add insights into how xylan helps assemble the grass cell wall.

Scientific Results

- **Loss of *BdGT43B2* results in stunting and early plant death**
- **Knockout plants have smaller cells, less xylan immunolabeling, and abnormal anatomy**
- **Xylan fingerprinting experiments show reduced abundance of specific digestion products in knockout plants**

Research Details

CRISPR/Cas9 genome editing was used to knock out *BdGT43B2*, a gene predicted to synthesize the backbone of xylan, the most abundant hemicellulose in grass cell walls. Knockouts for other xylan biosynthetic genes are being analyzed by the CLSF to determine how xylans interact with cellulose and other cell wall components in grasses.

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