

SCREENING NATIVE GRASSES FOR BELOWGROUND TRAITS IMPORTANT FOR BIOENERGY PRODUCTION AND SOIL CARBON SEQUESTRATION

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Abstract. Native grasses used for biofuel production also have the potential for the co-benefit of sequestering soil carbon due to their extensive perennial root systems. While current focus is on switchgrass (*Panicum virgatum*), it is important to look at other productive warm season grasses such as big bluestem (*Andropogon gerardii*) due to high productivity. A greenhouse study was set up to compare 18 switchgrass and 15 big bluestem releases (or cultivars) to determine differences in belowground traits and the influence of latitude of origins and soil fertility on these traits. The plant releases originated from the eastern 2/3rds of the United States and selected for a variety of uses including forage, restoration and as local genotype seed. Seedlings were grown in 650 ml containers in soils that varied in Phosphorus and Nitrogen content from high fertility to low fertility. Significant changes ($p \leq 0.05$) occurred between the different releases and soil types in relation to root morphology, root branching, root weight, aboveground biomass and height. While numerous studies have shown latitudinal changes in switchgrass releases in relation to aboveground biomass, this study shows that there are also latitudinal changes in the belowground root system and in the root to shoot ratio based on where the seed originated.