Anatomical Root Differences in Genetically Distinct Ecotypes of Switchgrass

Panicum vigratum (switchgrass) is a C4, warm-season, long grass species native to North America. It is commonly used for soil conservation, ecological restoration, carbon sequestering, and is a possible source of cellulosic biofuel. Switchgrass has two main ecotypes, lowland and upland, which are genetically and phenotypically distinct. These ecotypes are adapted to different habitats and therefore show differential responses to environmental conditions. Switchgrass roots can grow up to nine feet in length and account for over half of plant biomass. Little research has been done regarding root anatomy and how this differs regarding ecotypes and crosses. Understanding anatomical root differences can assist efforts to breed switchgrass for different purposes. I used roots from a four-way cross of two upland ecotypes (DAC, VS16) and two lowland ecotypes (AP13, WBC) planted in Columbia, Missouri. Roots were stored in FAA, cross-sectioned by hand, and dyed using toluidine blue before being microscopically observed. Cortex distance, average xylem vessel diameter, xylem vessel number, stele diameter, and root diameter were measured for each plant when possible. F0 generation lowland ecotypes were shown to have larger average cortex distances, xylem vessel diameters, and root diameters in comparison to F0 generation upland ecotypes. Genetic mapping will be done using data from F0, F1, and F2 generations in hopes to locate sites associated with these observed differences.