138. Cell Walls and the Developmental Anatomy of *Brachypodium distachyon* Stem Biomass

Dominick A. Matos[1], Ian P. Whitney[1,*] (iwhitney@umass.edu), Michael J. Harrington[1], **Samuel P. Hazen[1]**

[1]Biology Department, University of Massachusetts Amherst

Project Goals: To understand the spatial and temporal deposition of cell wall polymers within stem tissue.

While many aspects of plant cell wall polymer structure are known, their spatial and temporal distribution within the stem are not well understood. Here, we studied vascular system and fiber development, which has implication for both biofuel feedstock conversion efficiency and crop yield. The subject of this study, *Brachypodium distachyon*, has emerged as a grass model for food and energy crop research. Here, we conducted our investigation using *B. distachyon* by applying various histological approaches and Fourier transform infrared spectroscopy to the stem internode from three key developmental stages. While vascular bundle size and number did not change over time, the size of the interfascicular region increased dramatically, as did cell wall thickness. We also describe internal stem internode anatomy and demonstrate that lignin deposition continues after crystalline cellulose and xylan accumulation ceases. The vascular bundle anatomy of *B. distachyon* appears to be highly similar to domesticated grasses. While the arrangement of bundles within the stem is highly variable across grasses, *B. distachyon* appears to be a suitable model for the rind of large C_4 grass crops. A better understanding of growth and various anatomical and cell wall features of *B. distachyon* will further our understanding of plant biomass accumulation processes.

This work was supported by the Office of Science, Office of Biological and Environmental Research of the U.S. Department of Energy grants DE-FG02-08ER64700DE and DE- SC0006621.