

BIOMASS PRODUCTION OF FIVE *POPULUS* CLONES, SOIL CARBON AND
SOIL WATER CONTENT IN A CENTRAL MO FLOODPLAIN

Ryan Dowell

Dr. Steve Pallardy, Thesis Supervisor

Abstract

Five *Populus* clones in two short rotation 5 year plantations were tested for biomass production and associated soil C changes in the central Missouri floodplain under climatic conditions of the Midwest. A *Populus deltoides* × *Populus nigra* (Eugenei) hybrid clone was also evaluated for production differences in response to soil moisture conditions across microtopographic changes within a plantation. Destructive harvesting was employed in the successful development of statistical models used in predicting root, shoot, and total dry weights. Major groupings were identified with the two most local *P. deltoides* clones (2059 and 1112), having the greatest production as a result of superior efficiency in converting light energy into biomass. Soil C losses were identified over the course of the rotation, although there were net gains in total C of 32.5 t ha⁻¹ and 15 t ha⁻¹ in Plantations 1 and 2, respectively. Evidence of excessive soil moisture inhibiting growth in the Eugenei clone was also identified.