A MULTI-DIMENSIONAL INVESTIGATION INTO THE EFFECTS OF FLOODING ON THE PHYSICAL, CHEMICAL, AND BIOTIC PROPERTIES OF RIPARIAN SOILS

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ABSTRACT

Understanding soil abiotic and biotic influences on ecosystem processes will enhance success of riparian restoration efforts. The goal of this research was to characterize changes in soil chemical and microbial community properties with periodic flooding. Simulated floods were created under greenhouse and field laboratory settings to assess these changes as well as the effect of soil chemistry changes on germination and seedling growth. In addition, riparian forests in northwest Missouri were examined to determine how flooding and microtopography affect soil chemistry and vegetation patterns across floodplains. Flood treatments did not affect soil TOC or TN; however, anoxic conditions developed and NH_4-N and total soluble polyphenolics (TSP) accumulated in soils with flooding. Germination and seedling growth were negatively correlated with soil TSP levels. Microbial community structure changed with flooding under greenhouse but not field conditions. Microbial biomass, the response of microbial groups and enzyme activity decreased under stagnant flood conditions; while stress indicators increased. In riparian forests, herbaceous and woody understory vegetation were negatively correlated and responded differently to microtopographical variables as well as TN. Site differences contribute to these results. Changes in microbial community structure and function as well as the accumulation of TSP with flooding may affect nutrient availability and thus have negative implications for plant species post-flood.