

# CHARACTERIZATION OF ALLUVIAL SUBSOIL STRATA AS SUITABLE PLANT GROWTH MATERIAL: GREENHOUSE STUDIES<sup>1</sup>

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**Abstract:** Mining of lignite from the Eocene Wilcox formation began in 1998 in Mississippi. Narrow floodplains of the upper coastal plain ecoregion of Mississippi occur within this formation contain colluvial, erosional and alluvial deposits of Holocene and Pleistocene era origin. These materials may provide materials for suitable topsoil replacement during mine reclamation. Subsoil and regolith layers were sampled in increments of 1.2 to 2.4 meters to a depth of up to 12 m through the first lignite seam. Samples were analyzed for pH, exchangeable cations, extractable phosphorus, sulfur forms, and acid base accounting (ABA). Ryegrass (*Lolium multiflorum*) and pearl millet (*Pennisetum glaucum*) were grown in a greenhouse in material collected from each depth interval and in various mixtures. The pH increased with depth below 2-3 m from 5 to 7.5. ABA was positive and increased from 0 to +8 to 7.2 m and to +26 at 9.6 to 12 m. Phosphorus, potassium, calcium and magnesium increased with depth. Pyritic S was associated with layers below 2.4 m containing lignite and ranged from 0.01 to 0.05%. Texture varied from silt loam near the surface 1-2 m to sandy loams throughout the strata. Growth of ryegrass growing in subsoil strata to a depth of 9.6 m was similar to or exceeded growth in topsoil collected to a depth of 0.3 m. Pearl millet growth was similar to or exceeded growth in topsoil to a depth of 4.8 m and declined at deeper depths as pH increased. Mixtures of subsoil strata to a depth of 9.6 m had similar or increased growth of ryegrass and pearl millet compared with topsoil. Mixtures of topsoil and subsoil strata from floodplains of this formation provide a superior reclamation option compared with regulatory requirements of salvaging and re-spreading topsoil.

**Additional Key Words:** Prime Farmland, Topsoil Substitution

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