

Interlayered Soil Profile Reconstruction in Reclaiming Subsided Land With Coal Gangue¹

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Abstract: Rehabilitation of areas impacted by subsidence following coal mining is a pressing need in eastern China, especially where availability of suitable soil material is limited. A field experiment was established to evaluate performance of varying layered combinations of soil and gangue materials as measured by maize (*Zea mays* L.) growth and yield. Two control treatments and eight experimental treatments were constructed. All treatments had a 30 cm surface layer of topsoil. CK1 consisted of native soil material. CK2 consisted of 50 cm coal gangue covered by topsoil and 40 cm subsoil. Group1 treatments (T1-T3) had a 15 cm layer of subsoil immediately below the topsoil, underlain respectively by progressively thicker gangue layers (20, 30, 40 cm) overlying another 15cm subsoil layer, in turn underlain by gangue. Group 2 (T4-T5) followed the same pattern as Group1 except that the lower subsoil layer was 25 cm thick. Group 3 (T6-T7) differed from Groups 1 and 2 by having a 25 cm upper and 15 cm lower subsoil layer between different thicknesses of gangue. T8 consisted of three 10cm layers of subsoil separating 2 gangue layers and a gangue layer below. Key plant performance indicators, biomass and yield, were significantly better under CK1-2 than in the other treatments (T1-T8). Below the topsoil Eh, pH and total salt content were higher and water content less in T1-T8 than in the CK1-2, reflecting the influence of gangue in the 30-70 cm zone in these treatments. Results indicate that minimizing the adverse impacts of gangue requires a combined top-subsoil cover of at least 70 cm.

Additional Key Words: coal mining subsidence; land reclamation; maize.

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