

Reclamation of Acidic, Denuded Copper Basin Land: Revegetation Performance of Phosphate Rock VS Other Nutrient Sources. J. M. Soileau, F. J. Sikora, J. J. Maddox, and J. J. Kelsoe.

Abstract: Open pit smelting of Copper ore about 100 years ago resulted in approximately 9,300 ha of severely eroded, very acidic (pH 4.0 to 5.0) soils at Copper Basin, Tennessee. Along with other essential nutrients, phosphorus (P) amendments are critical for long-term productivity and sustainability of vegetation on this depleted soil. A field study was conducted (1992-1995) to compare revegetation from surface-applied North Carolina phosphate rock (PR) and triple superphosphate (TSP) at 20, 59, and 295 kg P ha⁻¹, and to determine benefits of starter NPK tree tablets. The experimental design consisted of 7.3 x 9.1 m replicated plots, each planted to 20 loblolly pine seedlings and aurally seeded with a mixture of grasses and legumes. Tree survivability was high from all treatments. Through the third year, tree height and diameter increased with increasing P to 59 kg P ha⁻¹, without fertilizer tablets. There were no pine growth differences between PR and TSP. Weeping lovegrass has been the dominant cover crop through 1995, with increased stimulation to tree tablets and surface P. Tall fescue (KY 31), sericea lespedeza, and black locust responded more to PR than to TSP. Surface soil pH increased, and 0.01 M SrCl₂ extractable Al decreased, with increasing rate of PR. For future loblolly pine plantings in the Copper Basin, this study suggests there is no benefit to applying both tree tablets and surface P at rates above 59 kg P ha⁻¹. For reclaiming land with high acidity and low P fertility, PR has significant benefits. In reclaiming steep, gullied land, there is great potential for aerial application of PR and/or pelletized liming agents.

Additional Key Words: land restoration, P fertilization.