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Loblolly Pine Survival and Growth on a Mineral Sands Mine

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Mineral sands mining in southeastern Virginia results in compacted, variably textured soils with low fertility and pH. Loblolly pine (*Pinus taeda*) is a common timber species in the southeastern United States that is well-adapted to these conditions and tolerates periodic poor drainage. Loblolly pine plantations generally require minimal inputs by landowners and may be a favored post-mining land use. In 2013, we initiated a study on a reclaimed mine in SE Virginia to assess the effects of fertilizer (F), weed control (WC), and fertilizer+weed control (WCF) treatments on *P. taeda* growth and survival. Seedlings were planted in January 2013 and treatments were applied the first two growing seasons (GS). Trees in F/WCF treatments were fertilized in March 2013 and June 2014 with 56 kg/ha N as urea, 12.3 kg/ha N as DAP, 28 kg/ha P as DAP, and 56 kg/ha K as potash. Fertilized trees also received 114.3 kg/ha granulated trace minerals in June 2014. In March and June 2013, and June 2014, 1% glyphosate was applied to WC/WCF treatments. Trees were thinned after the 10th GS. After ten GS, overall mean survival was 75.4%, and mean survival excluding thinned trees was 68.3%. Survival was highest in the check (C) treatment (82.7%) and lowest in the F treatment (46.7%; $p = 0.013$). Trees in the WCF treatment had the greatest ten-year mean height (13.3 ± 2.4 cm), ground line diameter (GLD, 25.5 ± 4.4 cm), and diameter at breast height (DBH, 18.4 ± 2.9 cm). While not significant, basal area (11.3 ± 3.3 m²/plot) and tree volume (62.2 ± 10.3 m³/plot) were both nominally highest in the WCF treatment. Growth was initially slow, but by the eighth GS, height had exceeded that of comparable loblolly pines on undisturbed southeastern Virginia soils. Our findings show that the combination of weed control and fertilizer was the most effective treatment for *P. taeda* growth and this crop could be an economic option for landowners.

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