Survival and Growth of Woody Plants on Four Reclaimed Mine Sites

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Abstract: Reforestation plantings usually include tree species that dominate the forest canopy, namely, oaks, maples, cherry, poplars, and pines. Planting of understory woody species, however, is less common in reforestation efforts despite their importance in forest ecosystems. In this study, the survival, health, and growth of 20 species of mast- and fruit-producing shrubs and small trees were evaluated to better understand their suitability for reclamation plantings. Seedlings were planted in graded overburden material between 2008 and 2010 on four reclaimed surface coal mines in WV. The selected sites were reclaimed using conventional methods. The experiment was a completely randomized block design with four replications per site. At each site, four blocks measuring 4,160 m^2, two east-facing and two west-facing, were established. Each block was comprised of 20 plots (one plot per species), and within each plot 25 individuals of the selected species were planted on 2.4 x 2.4 m spacing. Initial data on survival, growth, and health of these species was collected in 2008 on two sites and 2010 on two other sites. Survival, growth, and health of these species were measured again in 2015 and 2016 to determine individual species performance over time. Overall, shrub species had higher survival percentages than tree species. Species that performed well with ≥50% survival were Washington hawthorn (*Crataegus phaenopyrum,* 62% survival and 1 m avg. height), black chokeberry (*Aronia melanocarpa,* 59% survival and 0.8 m avg. height), nannyberry (*Viburnum lentago,* 56% survival and 0.9 m avg. height), black cherry (*Prunus serotina,* 55% survival and 2.5 m avg. height), and gray dogwood (*Cornus racemosa,* 54% survival and 1 m avg. height). These species would be good candidates for inclusion in reforestation plantings on reclaimed mines. Species that did not perform well in this study included pawpaw (*Asimina triloba,* 9% survival and 0.06 m avg. height), flowering dogwood (*Cornus florida,* 10% survival and 0.1 m avg. height), blueberry (*Vaccinium corymbosum,* 27% survival, 0.2 m avg. height), elderberry (*Sambucus canadensis,* 30% survival and 1 m avg. height), and persimmon (*Diospyros virginiana,* 38% survival and 0.5 m avg. height). Due to the ≤50% survival percentages achieved by these species in this study, they are less suited for reclamation.

Additional Key Words: shrubs, small trees, West Virginia

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