

# GROUND COVER SPECIES EFFECTS ON OAK SEEDLINGS GROWN IN MINESOIL<sup>1</sup>

Jennifer Franklin<sup>2</sup>, David Buckley, Elizabeth Aubuchon, and Adam Klobucar

**Abstract:** Herbaceous cover crops are usually seeded on newly reclaimed mine sites to stabilize soil. Research clearly shows that ground cover density is related to the growth of trees planted on these sites, with high density ground cover being clearly detrimental. However, it is unclear to what extent the species of seeded herbaceous cover inhibits tree growth, independent of density. To test the possible below-ground competitive effects of different ground cover treatments, on northern red oak (*Quercus rubra*) seedlings were grown in mine soil in a greenhouse, with different species of herbaceous cover. The objective was to compare the growth and physiological response of oak seedlings to three species of herbaceous cover at 100% density or a bare-ground control, as well as the influence of these cover crops on soil moisture. Forty-eight two-year-old seedlings were planted in pots with one of four different ground cover treatments; annual rye (*Lolium multiflorum*), alfalfa (*Medicago sativa*), switchgrass (*Panicum virgatum*), and a bare ground control. After two months of growth, a series of two dry-down periods were implemented to mimic drought. During these periods soil moisture and foliar transpiration were measured. After the second dry-down period the trees were harvested and shoot weight, leaf area, and fine root mass were measured. Fine root mass was significantly different between of the ground cover treatments; trees grown in annual rye treated trees had lowest fine root mass, while bare ground and alfalfa had the highest. Specific leaf area was reduced only in the rye treatment, which also had the greatest impact on soil moisture, resulting in rapid reductions in the transpiration rate of oak leaves when water was withheld. Annual rye is not recommended as a herbaceous cover for areas in which hardwood seedlings will be planted.

**Additional key words:** hardwoods, competition, grass

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<sup>2</sup> Jennifer Franklin, Associate Professor, and David Buckley, Professor, Department of Forestry, Wildlife and Fisheries, University of Tennessee, Knoxville, TN 37996; Elizabeth Aubuchon, Graduate Research Assistant, Department of Forestry, Wildlife and Fisheries, University of Tennessee, Knoxville, TN 37996; Adam Klobucar, Graduate Research Assistant, Department of Forestry, Wildlife and Fisheries, University of Tennessee, Knoxville, TN 37996