

EFFECTS OF THE NUMBER OF LATERAL ROOTS ON FIRST-YEAR SURVIVAL OF RED OAK SEEDLINGS ON STRIP-MINE SPOIL

Alban-Snyder, T. A. and Wacker, S. E. (Foresters, Pennsylvania Bureau of Forestry). Red oak (Quercus rubra) seedlings from the Pennsylvania Bureau of Forestry nurseries were graded into three treatment levels by the number of lateral roots 1 mm in diameter or greater. Those in the "low" level had 0 - 5 lateral roots, "medium" had 6 - 11 roots, and "high" had 12 or more lateral roots. Seedlings from the three treatment levels were randomly selected, planted, and identified with a permanent metal tag. The experiment was replicated on reclaimed strip-mine sites in Indiana and Westmoreland Counties, PA. Three blocks were established at each site using 225 trees/block. Survival, height, and stem caliper were measured 1 year later and found to be significantly different for the three treatment levels on both sites. The Westmoreland site had heavy grass cover, and 35% of the seedlings were chewed by rodents. "High" seedlings survived the damage better than "low" or "medium" seedlings. Twenty-one percent of the seedlings at the Indiana County site were frost-heaved. Seedlings with a "high" number of lateral roots were less likely to be frost-heaved and more likely to survive heaving, than "low" or "medium" seedlings. It appears from this study that seedlings with more lateral roots survive and recover better from damaging conditions than those with fewer lateral roots.

Additional Key Words: red oak, strip-mine spoil, lateral roots, bareroot seedlings, grading, frost-heave, rodents.

TREE PLANTING AND MONITORING ACTIVITIES OF THE REGION OF SUDBURY LAND RECLAMATION PROGRAMME, CANADA

Beckett, P. J. (Assistant Professor, Biology Department, Laurentian University, Sudbury, Ontario, Canada; Chairman, Tree Planting Subcommittee, Vegetation Enhancement Technical Advisory Committee, Region of Sudbury). During the past 10 years the Region of Sudbury Land Reclamation Programme has reclaimed 2,700 ha of acid, metal-contaminated land. First, designated areas are treated with surface application of limestone, fertilizer, and a grass-legume seed mixture. Subsequently, the grass areas are planted with trees at a low rate of stocking. Prime consideration is given to increasing species diversity, attracting wildlife, and creating an aesthetically pleasing landscape. Preference in species selection is given to native species of central Ontario; approximately 20 species have been utilized. Jack Pine (Pinus banksiana Lamb.), Red Pine (Pinus resinosa Ait.), and White Pine (Pinus strobus L.) account for more than half of the 0.75 million trees planted since 1979. A monitoring programme has indicated that Red and Jack Pines have similar growth rates to trees sampled in forest regeneration areas near Sudbury. White Pine is surviving in sites close to the Sudbury smelters, an indication of the improved environmental conditions. Among the hardwood, Red Oak (Quercus rubra L.) shows the best overall performance, and Black Locust (Robinia pseudoacacia L.) increases biomass at a rapid rate in spite of being north of its natural range. Although there is metal uptake into the trees, the levels of Cu, Ni, and Al do not appear to be toxic.

Additional Key Words: revegetation, ecosystem development, habitat creation.

BLAST FURNACE SLAG AS A LIMING MATERIAL FOR MINE RECLAMATION

Beeghly, J. H. (Manager of Product Development, The Standard Slag Company, Youngstown, OH). Blast furnace slag, a byproduct of making iron, has been used as a liming product since the 1920s. Research and practice have been mostly with the granulated type, which no longer is available. Current research demonstrates that the more common air-cooled type of blast furnace slag can be an effective liming material. Thousands of tons of slag fines are produced annually in the Ohio River Valley coal-producing area. Blast furnace slag comes from the use of limestone and dolomite as a flux in the reduction of iron ore. Air-cooled blast furnace slag has been found to be similar to limestone in terms of calcium carbonate equivalency. Current specifications in Pennsylvania make it impossible to use slag fines, which even when screened as fine as possible, are still too coarse in size gradation. Because pulverizing the slag fines is not cost effective, this rules out the economical use of slag fines in Pennsylvania. The states of Ohio and West Virginia make allowances for the use of coarser lime materials; the proposed interstate uniform agricultural liming law will permit the use of coarser liming materials. The slag has been used on several abandoned mine reclamation projects sponsored by the Office of Surface Mining Reclamation and Enforcement of the U.S. Department of Interior. A coarser liming material would be advantageous for mine reclamation if additional tonnage is applied, as is allowed in Ohio. The coarser graded material provides a time release effect for neutralizing future production of acid as new pyritic materials are exposed in the reclamation process.

Additional Key Words: agricultural lime, acid soil, blast furnace slag fines.