Afforestation of old industrial disturbances: evaluation of aspen seedling characteristics for competitive sites

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Abstract

Trembling aspen (*Populus tremuloides* Michx.) is one of the most common deciduous tree species in Alberta and given its rapid reproduction, it can serve as an important tool for revegetation of boreal sites disturbed by industrial activity. On older reclamation sites where preexisting vegetation can prevent germination from seed or suckering from adjacent stands, aspen seedlings can be planted to better facilitate the development of a closed tree canopy. Seedlings planted on reclamation sites are subject to a wide variety of environmental stresses, therefore successful establishment can depend largely on the development of seedlings with the morphological characteristics needed to promote growth and survival. By examining the performance of nine aspen stock types that have been developed, the objectives of this project are to 1) determine what characteristics improve seedling performance in competitive environments, and 2) assess how competition affects aspen seedlings above and belowground. Results show that seedlings planted in highly competitive environments with higher root-to-shoot (R:S) ratios had increased height growth two years after planting. The presence of competition encouraged belowground development, as R:S ratios were found to increase with higher amounts of competition; however, the root architecture of aspen seedlings was altered with competition, as root development was often restricted to the plugs in which they were contained. To improve reforestation efforts on highly competitive reclamation sites, these results indicate the importance in developing seedlings with higher R:S ratios.

Keywords: competition, aspen, reclamation, reforestation

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