

Native tree seedling interactions with variations in edaphic properties in upland boreal forest

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Abstract

The boreal forest is a vast circumpolar ecosystem covering approximately 11 % of terrestrial land globally. The Canadian boreal forest is rich in natural resources such as lumber, minerals, and oil, and therefore is heavily managed by humans in some regions. Surface mining for oil sands deposits in northern Alberta requires active forest reclamation which presents a unique challenge given the severity of this type of disturbance. I investigated the influence of organic- and mineral-dominated reclamation soils on native tree seedling establishment. Specifically I determined (1) the community recovery of important belowground mutualists, ectomycorrhizal fungi, and their influence on seedling growth in these soils using outplanted seedlings of *Populus tremuloides*, *Pinus banksiana*, and *Picea glauca*. In addition, I examined (2) the influence of low soil temperature during budflush for seedlings of *Populus tremuloides*. I found (1) the species of tree seedling was more important in determining ectomycorrhizal fungal community composition rather than reclamation soil type, and that (2) low soil temperature during budflush of *Populus tremuloides* seedlings results in lower growth. Based on these results I suggest that using a diversity of tree seedlings for outplanting onto reclamation areas may recover a more diverse ectomycorrhizal fungal community, and that efforts should be made to monitor the peat content and depth of reclamation soils to prevent the creation of low spring soil temperatures that may be detrimental to the establishment and growth of *Populus tremuloides* seedlings.