

Competition among understory plants varies depending on reclamation soil and fertilization¹

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Abstract: Following oil sands mining, the main land management goal is to establish a functioning boreal forest ecosystem, including the understory plant community. One of the challenges with restoring the understory is the presence of invasive species that compete with desirable native species for resources. In a greenhouse study, we looked at the growth of 2 native understory species (*Galium boreale* and *Vicia americana*) and an invasive species (*Matricaria perforata*). These species were grown with either intra or interspecific neighbors across 3 common land reclamation soils (upland forest, peat based, and a layering of the two) and a nitrogen fertilizer treatment (with and without). When grown by itself *V. americana* growth did not differ among soil or fertilizer treatments, likely due to its ability to fix nitrogen. However, growth of *M. perforata* was directly related to soil nitrogen with the greatest growth on the upland soil and with fertilization. Growth of *G. boreale* was less than the other species and it also had the highest mortality in the nitrogen poor peat soil. When grown with interspecific competition, the proportion of *M. perforata* to *V. americana* biomass increased with soil nitrogen. Overall, nitrogen fertilization had the biggest impact on *M. perforata*, an invasive species, which had the largest increase in above ground biomass with fertilization and shifted the competition balance of nitrogen rich soils from favoring *V. americana* to *M. perforata*. Operationally, care should be taken when applying fertilizer to reclamation areas, as it may have an unwanted positive effect on growth for invasive plants at the expense of native species. This work will help in the development of site and soil specific fertilization and seeding prescriptions which help to meet the goal of establishing a native understory plant community.

Additional Key Words: *Matricaria perforata*, *Galium boreale*, *Vicia americana*, forest floor-mineral mix, peat- mineral mix.

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