Geophysical Research Abstracts
Vol. 14, EGU2012-10894, 2012
EGU General Assembly 2012

Understanding mycorrhizal symbiosis in boreal forest

O Franklin (1), T Näsholm (2,4), P Högberg (2), D Metcalfe (2), S G Keel (3,2), C Campbell (4), V Hurry (5), S Linder (6), and M N Högberg (2)

(1) iiasa, Austria (franklin@iiasa.ac.at), (2) Department of Forest Ecology and Management, Swedish University of Agricultural Sciences (SLU), SE-901 83 Umeå, Sweden, (3) Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ 08544, USA, (4) Department of Forest Genetics and Plant Physiology, Umeå Plant Science Centre, SLU, SE-901 85, Umeå, Sweden, (5) Department of Plant Physiology, Umeå Plant Science Centre, Umeå University, SE-901 87 Umeå, Sweden, (6) Southern Swedish Forest Research Centre, SLU, P.O. Box 49, Alnarp, SE-230 53, Sweden

Symbioses between plant roots and mycorrhizal fungi are thought to enhance plant uptake of soil nutrients through a favorable exchange for carbon from photosynthesis. Ectomycorrhizal fungi are considered to play this vital role for trees in the nitrogen-limited temperate and boreal forests dominating the northern landmasses. However, it is not well understood how the symbiotic interaction between trees and mycorrhizal fungi will affect forests under changing environmental conditions, such as nitrogen deposition and elevated CO_2. To better understand the role of mycorrhizal symbiosis in forests we have developed a model based on ecological principles, combined with a unique data-set on nitrogen and carbon fluxes measured using isotope tracers in large-scale field-experiments subject to nitrogen additions. The model reveals how the behavior of trees and mycorrhizal fungi may have unexpected but profound implications for the boreal forest under changing environmental conditions.