

Kranabetter, J.M., Friesen, J., Gamiet S., and Kroeger, P. 2009. *Epigeous fruiting bodies of ectomycorrhizal fungi as indicators of soil fertility and associated nitrogen status of boreal forests*. Mycorrhiza, in review.

Abstract

Soil fertility and associated nitrogen (N) status is a key ecosystem attribute, and surveys of ectomycorrhizal fungal (EMF) communities via epigeous fruiting bodies could provide an effective biotic indicator of forest soil productivity. We explored the utility of aboveground EMF communities in this regard by surveying sporocarps over a three year period from contrasting plant associations of southern old-growth boreal forests of British Columbia (Canada). Cumulative richness ranged from 39 to 89 EMF species per plot, and followed a skewed parabolic correlation with foliar N concentrations and soil N availability. EMF species composition was consistently distinct in ordinations and strongly correlated to the increasing rates of N mineralization aligned with soil productivity. Approximately 40 EMF species collectively indicated oligotrophic, mesotrophic, and eutrophic nutrient regimes. Besides these specialist fungi, other EMF species were characterized as broadly tolerant (distributed over 100% of the N gradient), partially intolerant (approx. 70%), and satellites (rare). The functional organization of EMF communities reflected in the extent of species distributions could help define the ecological integrity of forests. Epigeous fruiting bodies provided a disparate yet complementary view to the belowground assessment of EMF communities that was valuable in identifying indicators for ecosystem monitoring.