

90<sup>th</sup> Annual ESA Meeting

Monday, August 8, 1:30 PM - 5:00 PM, Meeting Room 518 C, Level 5, Palais des congrès de Montréal

**Nitrogen form affects ectomycorrhizal fungal colonization and growth.**

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ABSTRACT- Nitrogen deposition affects ectomycorrhizal community structure, shifting relative abundances of nitrophilic and nitrophobic species. Although community structure may be altered and ecosystem processes ultimately affected, functional differences between the fungi are not clearly understood. To investigate functional differences, 32 mature pitch pine trees (*Pinus rigida*) were selected at random in the New Jersey Pine Barrens. Within  $\frac{1}{2}$  m from the base of the pitch pine, two seedlings, pitch pine and black oak (*Quercus velutina*), were planted. Nitrogen was added weekly for eight weeks at a rate equivalent to 35 kg/ha yr, in one of three forms, ammonium chloride, sodium nitrate, and glutamic acid sodium salt hydrate, or diH<sub>2</sub>O control. Oak seedlings receiving the nitrate treatment were larger than seedlings receiving the ammonium treatment; pine growth did not significantly vary between treatments. Pine growth did not significantly vary between treatments. Mycorrhizal abundance was at least 30% higher on oaks receiving glutamic acid relative to other treatments. Specific mycorrhizal morphotypes responded strongly to the different N treatments, in some cases, doubling in abundance when exposed to glutamic acid or nitrate, though some responses varied with host species. For instance, *Cenococcum* spp. had opposite responses on pine than on oak to both nitrate and glutamic acid. To further clarify how forms of N affect mycorrhizal growth, pure cultures were grown with ammonium, nitrate, glutamic acid, or glycine as the N source. Species responded strongest to the ammonium, and varied in their tolerance of nitrate, glutamic acid and glycine. Expression of ammonium transporter 1 was examined to link ectomycorrhizal responses to N sources at the molecular level. These results suggest that ectomycorrhizal fungi differ in their capacity to utilize specific forms of nitrogen, and that these differences are affected by the associated host tree.

Key words: ectomycorrhizae, nitrogen deposition, pine barrens