GENETIC VARIATION IN PINES INFLUENCING ECTOMYCORRHIZAL SYMBIOSIS: POTENTIAL IMPLICATIONS FOR GENOTYPE SELECTION AND SOIL CARBON SEQUESTRATION

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Ectomycorrhizal (ECM) fungi provide one of the main pathways for carbon (C) from pines into soils, where these fungi make significant contributions to microbial biomass and soil respiration. However, ECM fungal species vary significantly in traits that likely influence C sequestration, such that forest C sequestration potential may be driven in part by the community composition of ECM fungi. In three recent experiments we found evidence for genetic variation in *Pinus* species controlling ECM fungal community composition, suggesting the potential to influence ECM community composition through pine genotype selection. A bishop pine (*P. muricata*) population in California was shown to harbor significant genetic variation for compatibility with one common ECM fungal species exhibiting a high-biomass exploration strategy, *Rhizopogon occidentalis*. Native populations of Monterey pine (*P. radiata*) were shown to exhibit significant differences in compatibility with three different ECM fungal species in the family Pyronemataceae. A loblolly pine (*P. taeda*) common garden pedigree population exhibited substantial narrow-sense heritability for compatibility with several ECM fungal species, and negative genetic correlations among fungal species differing in exploration biomass. Altogether, these results suggest that selection of particular *Pinus* genotypes could alter the community composition of symbiotic ECM fungi in managed southern pine forests, potentially influencing soil C sequestration.