DIFFERENCES IN COMPOSITION OF SOIL ORGANIC MATTER BETWEEN OAK AND PINE FORESTS

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Oaks are a dominant genus of ectomycorrhizal trees in the Southeastern United States. Ectomycorrhizal trees and their fungal associates drive biogeochemical cycles and can affect the stocks and composition of soil organic matter (SOM). However, it is unclear to what extent observed trends are generalizable across different lineages of ectomycorrhizal trees, such as oaks and pines, which associate with partially distinct fungal communities. Furthermore, both oaks and pines are typically fire-adapted in this region, but it is unknown how the effects of tree and fungal identity on SOM depend on the fire regime. In order to better understand drivers of SOM composition, soils were sampled from 19 pairs of adjacent oak-dominated and pine-dominated forest plots in the Piedmont and Blue Ridge, 10 of which were recently managed with prescribed fire. Soil samples were separated into particulate organic matter and mineral-associated organic matter (MAOM) fractions, and the carbon (C) and nitrogen (N) content of each fraction was measured. A higher proportion of soil C was mineral-associated in oak plots compared to pine plots, reflecting larger stocks of MAOM. However, oak and pine plots did not differ with regard to mineral-associated soil N. Soil C:N was significantly lower in unburned, but not in burned, oak plots compared to their pine-dominated counterparts. Metabarcoding of soil fungi will clarify whether the observed differences are tied to variance in fungal community composition and nutrient acquisition strategies between pine and oak forests.

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