The Role of Roots and Litter In Maintaining Forest Soil Carbon.

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The potential sources of carbon that result in soil organic matter (SOM) originate from above and below ground plant detritus. This study focuses on a managed pine forest ecosystem on sandy soils that are common in the southeast US and attempts to estimate the relative contribution of above ground litter and fine roots to soil organic carbon (SOC). Its purpose is to provide insight into the functions that drive soil carbon dynamics and the potential to manage for soil carbon sequestration. In order to better understand the inputs, transformations and stability of carbon into forest soil, field treatments to restrict addition of organic matter from litter and root sources were implemented in a 6 yr old loblolly pine stand in north Florida. Field treatments were comprised of (1) normal input of above ground litter, (2) exclusion of above ground litter, and (3) exclusion of above ground litter and below ground live root growth. The treatments were established for a total of 31 months, litter fall rates were periodically measured and soil was sampled at the 0-10 cm depth and 10-20 cm depth initially and then during months 12 and 31. To document the location and transformation of carbon over time, the soil organic matter was measured on whole soil and five size fractions (>2mm, 2000-250um, 250-150um and <53um) for months 12 and 31. The initial soil sampled (month 0) was used as covariate in the soil organic matter analysis. Mineralizability of carbon in the mineral soil found in the size fractions was measured over 162 days in a laboratory incubation at 30¢ªC and the stability of soil micro-aggregates affected by 31 months of field treatment were examined to reveal the susceptibility to decomposition.