Effect of Soil Fertility on Physically Fractionated Soil C and N Pools of Sandy Soils Exposed to Elevated Atmospheric CO2. (S03-jastrow161704-Poster)

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Abstract:

The effects of rising atmospheric CO2 on soil organic matter will depend on many factors including changes in plant inputs, soil capacity to protect organic matter from decomposition, and nutrient availability. We used physical fractionation techniques to evaluate soil C and N pools at the conclusion of a two-year, open-top chamber study comparing the responses to CO2 enrichment of aspen and maple saplings grown on sandy soils with contrasting fertility levels. In the high fertility soil, we saw trends suggesting that soil C and N might decrease under elevated CO2 for aspen but might increase for maple, which is slower-growing and more shade tolerant. In the low fertility soil, however, we found significantly lower C and N in coarse particulate organic matter (POM), fine POM, and the silt-sized fraction for both species. In addition, the C:N ratio of coarse POM increased under elevated CO2. These results suggest that increased plant/microbial demand for N and/or increased availability of C to soil microbes under elevated CO2 conditions may stimulate mineralization of the relatively unprotected organic matter of these sandy soils, particularly when nutrients are limiting.

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