Organic matter quality and aggregate contributions to carbon storage along a management intensity gradient. (S03-grandy130218-Oral)

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Abstract:

Predicting the impact that future land management will have on soil C storage requires an understanding of the mechanisms controlling organic matter stabilization. We investigated the interacting effects of C quality and physical protection on C cycling in eleven ecosystems in Southwest Michigan. The ecosystems represent a management intensity gradient and have soil C concentrations ranging from 1.01% (conventional agriculture) to 4.64% (late successional forest). Long-term respiration rates of crushed and intact aggregates together with light fraction organic matter isolation were used to infer management intensity effects on the mechanisms controlling carbon cycling. Lower respiration rates of crushed aggregates revealed that organic matter quality limited C losses in no-till and organic management (1000 micrograms C g aggregate C^-1 d^-1) as well as successional ecosystems relative to conventional agriculture (1400 micrograms C g aggregate C^-1 d^-1). Differences in total aggregation and respiration rates among crushed and intact aggregates demonstrated that physical protection of C can be achieved through changes in vegetation and minimizing soil disturbance.

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