Sequestering carbon in soil organic matter under nitrogen fertilization: are residue-carbon and residue-nitrogen truly linked? (S03-moran041839-Poster)

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Abstract:

Many nutrient cycling models for agroecosystems assume that crop residue decomposition is controlled by the C to N ratio, and therefore residue-C and -N are considered closely linked. Recent studies suggest that under N-fertilization, inorganic N, as a more available source of N, may preferentially be used in the formation of stable soil organic matter compared to residue-N. We conducted a study to determine if residue quality, with and without the addition of fertilizer, affects the cycling of C and N from the soil microbial biomass. The microbial biomass of a rice soil was labeled with 13C and 15N isotopes; amended with unlabeled urea, rice straw residue, and urea with residue; and incubated for 40 days. 13C-CO2 gas sampling during the incubation revealed no significant differences in 13C respired for the treatments, suggesting that original microbial biomass was unaffected by differences in residue quality and/or inorganic N addition. However, increased total CO2 respiration in soils with residue and inorganic N amendments suggest the formation of new microbial biomass. The greatest increase was observed when soil was amended with inorganic N and with low C:N ratio residue.

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