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Fertilization histories influence soil organic carbon mineralization

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Corn under different fertilization histories at the National Field Observation and Research Station of Hailun Agroecosystems, Northeast Institute of Geography and Agroecology of the Chinese Academy of Sciences. Photo by Lu-Jun Li.

Fertilizer management is usually centered on nitrogen (N), phosphorus (P), and potassium (K). These macronutrients, along with additional micronutrients, greatly influence not only crop residue decomposition, but also its priming effects on soil organic matter (SOM). Nitrogen, P, and K fertilization, particularly the latter two nutrients, are rarely—if ever—considered in residue and SOM mineralization dynamics.

In a recent article in the *Soil Science Society of America Journal*, researchers investigated residue decomposition and SOM priming with long-term (27 years) fertilized soils in a subtractive design (NPK, NP, NK, PK, and control) to which ^{13}C-labeled corn residue was added to distinguish carbon mineralized from residue and SOM.

The long-term history of N, P, and K combinations showed that coupling N and P fertilization resulted in greater soil organic carbon content. The priming of SOM mineralization with corn leaf addition was reduced with long-term application of mineral fertilizers compared with the unfertilized soil.

The study shows that crop residue decomposition and SOM mineralization in the presence of residue inputs is affected by historical N, P, and K fertilization with long-term complete NPK application favorable to soil carbon sequestration.

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You, M., Li, L., Tian, Q., He, P., & Horwath, W. (2020). Residue decomposition and priming of soil organic carbon following different NPK fertilizer histories. *Soil Science Society of America Journal*, *84*. **https://doi.org/10.1002/saj2.20142**

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