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Conservation tillage rebuilds surface soil organic carbon content

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Planting corn into rye residue under conservation tillage. Photo courtesy of Jeff Novak, USDA-ARS.

Sandy soils in the southeastern U.S. Coastal Plain region have been cultivated for centuries using frequent and intensive tillage practices. Those practices physically mix crop residues into soil, which can increase soil organic carbon (SOC) content but also hastens oxidation, thus reducing SOC and resulting in a general loss in soil quality. In contrast, conservation tillage reduces crop residue incorporation into topsoil, but due to less oxidation, it can rebuild SOC levels. Unfortunately, there are few long-term studies available to quantify either the rate of change or measurable benefits.

A recently published *Agronomy Journal* article reports topsoil SOC concentrations from a long-term study on a sandy, South Carolina Coastal Plain soil where conventional and conservation tillage practices were compared after 37 years using a variety of cropping systems.

The results showed that conservation tillage significantly increased SOC content to a depth of 5 cm, which was attributed to reduced crop residue incorporation. As expected, conventional tillage mixed crop residue into the soil, promoting more rapid decomposition and thus reducing SOC contents.

Despite South Carolina's humidity and hot weather, conservation tillage practices under row crop management can rebuild near-surface SOC levels in sandy Coastal Plain soils.

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Novak, J.M., Watts, D.W, Bauer, P.J., Karlen, D.K., Hunt, P.G., & Mishra, U. (2020). Loamy sand soil approaches organic carbon saturation after 37 years of conservation tillage. *Agronomy Journal*, *112*, 3152–3162.

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