Soil Carbon Sequestration Potential of Conservation Tilllage Systems. (S06-schomberg165003-Poster)

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Abstract:

Two-thirds of the C pool in the terrestrial biosphere is soil organic carbon (SOC). Man's management of cropland affects how much C remains in the terrestrial biosphere and how much is released to the atmosphere. Among the managed components influencing net loss or gain of SOC-C are the production of crop residue and control of crop residue placement/disturbance, through tillage, which influences residue decomposition. A simple three-component model was used to determine whether on not conservation tillage systems had changed cropland from a C source to a C sink. Historic data on grain/oil seed yields and harvest indices indicate a steadily increasing supply of crop residues since 1940, and long-term field experiments indicate SOC storage in no-tillage > non-moldboard tillage> moldboard tillage systems. Adoption of non-moldboard cropping systems since the 1970s has increased the amounts of residue that remain near the soil surface thereby decreasing rates of residue decomposition. Consequently, the model indicates that since about 1980, cropland agriculture has become a C sink. The model projects additional soil and water conservation benefits can be obtained when C credits or payments are used to encourage greater adoption of conservation tillage systems by farmers.

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