Greenhouse Gas Balance for No-Tillage compared to Conventional Tillage. (S03-six161521-Oral)

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Abstract:
No-tillage practices have been identified as one of the options to mitigate global change. Much research has been done on C sequestration potential under no-tillage. Even though, it has often been pointed out that a full accounting of all greenhouse gases (GHG) is necessary, only few studies have included nitrous oxide and methane fluxes. In this study, we calculated the GHG-balance of no-tillage compared to conventional tillage based on literature values. On average, an increase in C levels of 325 +- 113 kg C ha-1 yr-1 was observed under no-tillage compared to conventional tillage. Compared to conventional tillage, CH4 uptake increased by 0.42 +- 0.10 kg C-CH4 ha-1 yr-1 and N2O emissions increased by 1.95 +- 0.45 kg N- N2O ha-1 yr-1 under no-tillage. These increased N2O emissions result in an average reduction of 45 percent in the potential mitigation by C sequestration and methane uptake. However, the GHG balance drastically differs between farming systems in different climatic regions. In conclusion, more research is needed to investigate interactive effects between tillage, fertilizer application methodology and crop rotation on C sequestration, CH4 uptake and N2O emissions.

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