Science Societies

Benefits of continuous cropping to reduce greenhouse gas emissions and sustain crop yields

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Greenhouse gas sampling under dryland spring wheat using a static chamber. Photo by Upendra Sainju.

The traditional dryland cropping systems in the U.S. northern Great Plains involves a biannual conventional tillage crop–fallow rotation. Such a system has not only reduced soil organic matter and annualized crop yields, but has also increased greenhouse gas emissions that contribute to global warming and climate change. Improved management strategies are needed to reduce greenhouse gas emissions while sustaining crop yields in dryland cropping systems.

Scientists at the USDA-ARS Northern Plains Agricultural Research Laboratory in Sidney, MT evaluated the effect of long-term no-till continuous cropping and conventional till crop–fallow systems on greenhouse gas emissions, soil carbon sequestration, and crop yields. They found that no-till continuous spring wheat and a no-till spring wheat–pea rotation reduced greenhouse gas emissions, enhanced carbon sequestration, and increased annualized crop yields compared with a conventional till spring wheat–fallow rotation. Although no-till continuous spring wheat reduced greenhouse gas emissions and increased carbon sequestration, crop yields were lower due to increased weed and pest infestations compared with a no-till spring wheat–pea rotation.

Producers can employ a no-till spring wheat–pea rotation to mitigate greenhouse gas emissions, increase soil carbon sequestration, and sustain dryland crop yields in the U.S. northern Great Plains.

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Sainju, U. M., Allen, B. L., & Jabro, J. D. (2024). Long-term continuous cropping reduces greenhouse gas emissions while sustaining crop yields. *Journal of Environmental Quality, 53,* 1073–1085. https://doi.org/10.1002/jeq2.20627
