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Conservation practices show mixed results on nitrogen losses

May 31, 2022

Side-by-side comparison of no-till research plots in central Iowa that were used in the study, with and without a cereal rye cover crop. Photo by Peter O'Brien.

Croplands with corn and soybean in the central United States are highly productive. However, they pose a risk to the environment when nitrogen (N) is lost as nitrate in subsurface drainage or as nitrous oxide emissions. To meet increasing demand for environmentally sustainable farming, management practices must aim to reduce these impacts without sacrificing yield.

In an article in the *Journal of Environmental Quality*, USDA-ARS researchers in Iowa assess nitrate losses, nitrous oxide emissions, and crop production in systems using two conservation practices: planting cover crops and using no-till management.

The team found that neither tool consistently reduced both nitrate losses and nitrous oxide emissions. No-till management did not affect either one. Cover crops reduced nitrate losses but not nitrous oxide emissions. Rather, nitrous oxide emissions were linked with fertilizer N applications and weather patterns. Overall, the mechanisms regulating nitrate loss and nitrous oxide emissions did not appear linked. The study suggests it may be necessary to combine multiple conservation practices to reduce environmental impacts in these systems.

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O'Brien, P.L., Emmett, B.D., Malone, R.W., Nunes, M.R., Kovar, J.L., Kaspar, T.C., … & Parkin, T.B. (2022). Nitrate losses and nitrous oxide emissions under contrasting tillage and cover crop management. *Journal of Environmental Quality*. **https://doi.org/10.1002/jeq2.20361**

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