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# Cereal rye cover crops improve water quality

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*Research assistants taking surface soil samples from research plots.*

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Grain producers face many challenges when trying to maximize cropping system efficiency while minimizing impacts on water quality. Nutrient loss from subsurface drainage systems is a particular concern in the Upper Midwest.

New research published in the *Journal of Environmental Quality* evaluated the effects of tillage, manure application, residue removal, and cereal rye cover crops on subsurface drainage water quality and corn and soybean yields.

The eight-year study found that tillage and no-till systems had similar nitrate N concentrations in drainage water. Partial residue removal in continuous corn did not affect nitrate N concentrations. However, a cereal rye cover crop did reduce nitrate N concentrations in both corn and soybeans. The researchers also measured total reactive phosphorus concentrations and found no differences between any of the cropping systems.

Both no-till and cover crops affected corn yield in the study, likely due to a combination of factors including different soil conditions at planting and the different nutrient cycling, soil moisture, and temperature dynamics in those systems. This study highlights management practices that are more likely to affect downstream water quality and illustrates how different cropping strategies can affect corn and soybean yields. The results can be used to improve management of Midwestern cropping systems.

## **Dig Deeper**

Dougherty, B.W., Pederson, C.H., Mallarino, A.P., Andersen, D.S., Soupir, M.L., Kanwar, R.S., & Helmers, M.J. (2020). Midwestern cropping system effects on drainage

water quality and crop yields. *Journal of Environmental Quality*, 49, 38–49.

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