Science Societies

Split Fertilizer Application With Cover Crop Reduces Tile Nitrate Loads

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Aerial photograph of a tile-drained plot containing a cereal rye cover crop following a 5 cm rainfall in central Illinois. Photo by Jason Solberg.

Tile drainage has enhanced agricultural production on poorly drained soils throughout the Corn Belt. However, tiles transport substantial amounts of nitrate, which can impair water downstream. Improving the synchronization between fertilizer nitrogen (N) availability and plant N requirements may enhance corn yield and reduce tile nitrate loss.

To test this, researchers used a replicated tile drainage study under a corn–soybean rotation to split the full fertilizer N rate across two or three applications to corn in central Illinois. They also included a reduced fertilizer N rate treatment and a cereal rye cover crop in one of the split N treatments. Although tile nitrate trended down, splitting fertilizer N did not significantly lower tile nitrate or increase corn yields. Tile nitrate loss was greater with fall‐applied N than spring‐applied N. Lowering the fertilizer N rate decreased corn yield more than it reduced nitrate loss while including the cover crop with split N application reduced tile nitrate loss without decreasing crop yield.

Moving fall N to the spring and growing cereal rye before soybean may reduce N loss in intensively tile‐drained watersheds of central Illinois.

Adapted from

Gentry, L.E., Green, J.M., Mitchell, C.A., Andino, L.F., Rolf, M.K., Schaefer, D., & Nafziger, E.D. (2024). Split fertilizer nitrogen application with a cereal rye cover crop reduces tile nitrate loads in a corn–soybean rotation. *Journal of Environmental Quality*, *53*, 90–100. https://doi.org/10.1002/jeq2.20530

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