



Relationship of Soil Health Indicators to Yield and Nitrate-N Loss

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Tile system (left) and maize yield (right) of the researchers' Illinois study field. Image courtesy of

Tile system (left) and maize yield (right) of the researchers' Illinois study field. Image courtesy of Andrew Margenot.

Although soil health is of growing interest to scientists, the relationship of soil health indicators (SHI) to yield and water quality is not well understood. Farmers in the United States Corn Belt use relatively high amounts of nitrogen (N) fertilizer. But it is difficult to predict how much N crops need, and excess can be lost to surface waters through subsurface tile drainage and other pathways.

Researchers in central Illinois evaluated the relationships of maize yield and tile drain nitrate-N losses to SHI. The team evaluated SHI proposed by USDA-NRCS as well as nematode-based indicators with the potential to serve as biological SHI. They applied a range of N rates and gathered data over the growing season.

They found that SHI varied more by sampling time than by location or N rate, underscoring the importance of reporting and standardizing the timing of soil sampling for SHI evaluation. The study also revealed the potential role of nematode indices as biological SHI. Nitrogen application rate did not relate to tile nitrate-N loads. Different SHI were related to variation in maize yield versus nitrate-N loads, providing potential directions for future investigation.

Adapted from Li, N., Bullock, D., Butts-Wilmsmeyer, C., Gentry, L., Goodwin, G., Han, J., ... & Margenot, A.J. 2023. Distinct soil health indicators are associated with variation in maize yield and tile drain nitrate losses. Soil Science Society of America Journal. <https://doi.org/10.1002/saj2.20586>

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