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## USE OF ISOTOPICALLY LABELED FERTILIZER TO TRACE NITROGEN FERTILIZER CONTRIBUTIONS TO SURFACE, SOIL, AND GROUND WATER

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### ABSTRACT

*The fate and transport of a single N fertilizer application through plants, soil, runoff, and the unsaturated and saturated zones was determined for four years at a field site under continuous corn (*Zea mays* L.) management. Claypan soils, which underlie the site, were hypothesized to restrict the movement of agrichemicals from the soil surface to ground water. However, N fertilizer moved rapidly through preferential flow paths in the soil and into the underlying glacial till aquifer. Most N transport occurred during the fall and winter when crops were not available to use excess N. Forty months after application, 33 percent of the fertilizer had been removed by grain harvests, 30 percent had been transpired to the atmosphere, and 33 percent had migrated to ground water. Although runoff volumes were 50 percent greater than infiltration, less than 2 percent of the fertilizer was lost to runoff. Small measured denitrification rates and large measured dissolved oxygen concentrations in ground water favor the long-term stability of  $\text{NO}_3^-$  in ground water. Successive fertilizer applications, in areas that lack the ability to moderate N concentrations through consumptive N reactions, risk the potential of N-saturated ecosystems.*

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*Reference: Wilkison, D.H., D.W. Blevins and S.R. Silva; Use of Isotopically Labeled Fertilizer to Trace Nitrogen Fertilizer Contributions to Surface, Soil, and Ground Water, Journal of Environmental Hydrology, Vol. 8, Paper 6, March 2000.*

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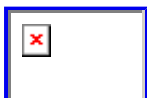
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