
Journal of Environmental Hydrology

ISSN 1058-3912

Electronic journal of the International Association for Environmental Hydrology

On the World Wide Web at <http://www.hydroweb.com>

JEH Volume 6 (1998), Paper 8, August 1998

Posted August 8, 1998

NITROUS OXIDE FLUXES FROM A CLAYPAN SOIL OVERLYING NITRATE-ENRICHED GLACIAL DRIFT

M.L. Pomes, D.H. Wilkison, and P.B. McMahon

U.S. Geological Survey, Water Resources Division, Independence, Missouri, USA

ABSTRACT

The closed chamber method was used to assess nitrous oxide (N₂O) fluxes from corn (Zea mays, L.) fields during the 1995 growing season. The study area was characterized by a claypan soil overlying a nitrate (NO₃¹⁻)-enriched glacial-drift aquifer. Denitrification produced N₂O fluxes of 0.2-6.9 g ha⁻¹ hr⁻¹ early in the growing season. Fluxes increased with increasing soil temperature, soil water potential, and soil saturation. However, greatly diminished N₂O fluxes (0.001-0.09 g ha⁻¹ hr⁻¹) occurred when soil saturation increased to 94 percent. Losses of N₂O increased linearly during the day and decreased at night, probably because of declining soil temperatures. Declines in soil saturation (less than 80 percent) and soil moisture potential (less than -10 kPa) produced late season N₂O fluxes (0.03-0.8 g ha⁻¹ hr⁻¹) attributable to nitrification. Results indicate that denitrification would not significantly reduce claypan soil NO₃¹⁻ concentrations.

Reference: Pomes, M.L., D.H. Wilkison, and P.B. McMahon; Nitrous Oxide Fluxes From a Claypan Soil Overlying Nitrate-Enriched Glacial Drift, Journal of Environmental Hydrology, Vol. 6, Paper 8, August 1998.

CONTACT:

Donald H. Wilkison

U.S. Geological Survey - WRD

301 W. Lexington, Room 223

Independence, Missouri 64050

USA

[e-mail:wilkison@usgs.gov](mailto:wilkison@usgs.gov)

[HOME](#)