

# **REDUCING NITROGEN LOSS IN SUBSURFACE TILE DRAINAGE WATER WITH MANAGED DRAINAGE AND POLYMER-COATED UREA IN A RIVER BOTTOM SOIL**

---

**Patrick Nash**

Research Technician

**Peter Motavalli**

Professor

**Kelly Nelson**

Research Agronomist

## **Overview**

Poorly-drained, river bottom soils can be high corn (*Zea mays* L.) yielding environments, but saturated soil conditions often reduce corn yields. Wabash soils located in river bottoms in Northeast Missouri have not been traditionally tile drained due to high clay content which requires narrow tile drain spacings. Increased land prices in the region have increased interest in tile draining poorly-drained bottom land soils to increase corn yields which could have a deleterious effect on water quality. The objectives of the three-year study were to determine whether use of managed subsurface drainage (MD) in combination with a controlled release N fertilizer could reduce the annual amount of nitrate-N loss through tile drainage water compared to free subsurface drainage (FD) with a non-coated urea application. Annual nitrate-N loss through tile drainage water with FD ranged from 25 to 80 lbs/acre. Nitrogen fertilizer source did not affect nitrate-N loss through tile drainage water, which was likely due to limited corn uptake over the three-year study due to adverse weather conditions. Averaged over three years, MD reduced tile water drained 52% and nitrate-N loss 29% compared to FD. Reduction in nitrate-N loss through tile drainage water with MD compared to FD was due to reduced tile flow during the non-cropping period. Annual flow-weighted mean concentration of nitrate-N in the tile water was 5.8 ppm with FD and 8.1 ppm with MD. Tile draining river bottom soils at this location for continuous corn production may not pose a health risk over the evaluated duration.

Please see the Journal of Water Resource and Protection special edition on drainage water management for more details. This is an open access, peer-reviewed scientific journal and the complete report can be found at <http://www.scirp.org/journal/jwarp>.