

## **REDUCING PHOSPHORUS LOSS IN TILE WATER WITH MANAGED DRAINAGE IN A CLAYPLAN SOIL**

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### **Overview**

Installing subsurface tile drain systems in poorly drained claypan soils to improve corn (*Zea mays* L.) yields could potentially increase environmental phosphorus (P) loss through the tile drainage system. The objectives of the study were to: 1) quantify the average concentration and loss of ortho-P in tile drain water from a claypan soil, and 2) determine whether managed subsurface drainage (MD) could reduce ortho-P loss in tile water compared to free subsurface drainage (FD). Flow-weighted ortho-P concentration in the tile water was significantly lower with MD (0.09 ppm) compared to that of FD (0.15 ppm). Ortho-P loss in the tile water of this study was reduced with MD (0.03 lbs P/acre) by 80% compared to FD (0.16 lbs P/acre). Contrary to previous research, reduced ortho-P loss observed over the four-year study was not solely due to the reduced amount of water drained annually (63%) with MD compared to FD. During the spring period when flow was similar between MD and FD, the concentration of ortho-P in the tile water generally was lower with MD compared to FD, which resulted in significantly less ortho-P loss with MD. We speculate that MD's ability to conserve water during the dry summer months increased corn's uptake of water and P, and so reduced the amount of P available for leaching loss in the subsequent springs.

Please see the Journal of Environmental Quality (JEQ) special edition on phosphorus loss from agriculture systems for more details. The complete research can be found online at the JEQ website (<https://www.agronomy.org/publications/jeq>).