Jonathan Witter

Project Title

Rainfall pH Effects on Phosphorus Loss

Biography

Jon Witter is an Assistant Professor in the Agricultural and Engineering Technologies Division at Ohio State Agricultural Technical Institute (ATI) in Wooster, Ohio. His education includes training in land development and surveying, civil engineering, and agricultural engineering with a specialization in soil and water conservation. Before moving to Ohio State ATI, Jon was employed by the Department of Food, Agricultural and Biological Engineering as a research faculty working on drainage issues and evaluating best management practices for their effects on water quality, productivity, and economics. Jon grew up on a farm near Tiro, Ohio.

Project Description

For centuries, human activities (e.g. power generation from coal combustion) have increased gaseous emissions to the atmosphere. As emissions increased, scientists were able to link degradation of natural resources to acidification of the environment as sulfur dioxide and nitric oxide gases interacted with rainfall to form sulfuric and nitric acids. In response, federal regulations (e.g. Clean Air Act Amendments) were enacted to control and reduce point source emissions. Through time, monitoring programs have revealed significant increases in rainfall pH, particularly in the midwestern and northeastern US. In the Midwest, recent trends of increasing rainfall pH seem to correlate well with increased rates of soluble reactive phosphorus being released to surface waters and rising soluble phosphorus levels have been linked to harmful algal blooms. It is well known that phosphorus is more soluble as pH goes to neutral than at more acidic pHs; however, we have little knowledge as to whether shifting rainfall chemistry could result in higher levels of soluble reactive phosphorus in runoff and drainage waters. The overall hypothesis of the proposed research is that atmospheric deposition trends are influencing phosphorus dynamics in agricultural fields. Understanding whether or not shifting atmospheric deposition trends are influencing soluble phosphorus dynamics will inform the development of best management practices to mitigate losses of soluble phosphorus to the environment.

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