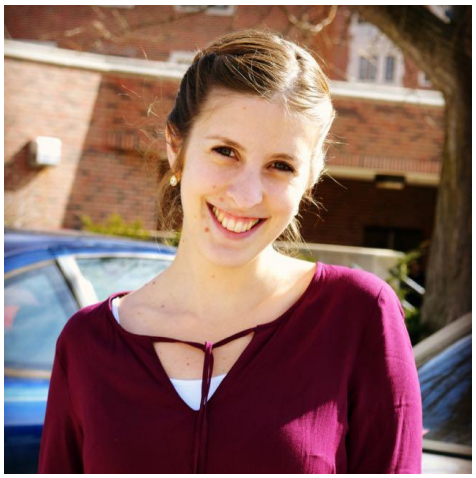

Nutrient Dynamics in Riparian Zones of Agricultural Watersheds

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9:00 AM ABE #301

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Maria Laura was born and raised in Buenos Aires, Argentina, where she pursued a Bachelor in Environmental Science in 2009. After her undergraduate degree, she had almost 6 years of experience working with argentine farmers as an environmental scientist in AACREA (Argentine Association of Regional Consortiums for Agricultural Experimentation). Determined to further her education and have an experience abroad, she applied for different scholarships. In 2015, she won the Fulbright – Bec.Ar Award and joined Purdue University's Interdisciplinary Ecological Sciences and Engineering (ESE) Program and the Department of Agricultural and Biological Engineering (ABE). Interested in water quality, she joined Dr. Sara McMillan's lab group in August 2015 as a MS student. Her interests outside of academia include ballet and photography. After graduation, she plans to spend some time traveling and job hunting.

Agricultural practices can lead to an increased export of nitrogen (N) and phosphorus (P) due to the application of fertilizer. In order to improve local water quality and to avoid a potential pollution of downstream ecosystems, stream restoration is increasingly being used as a strategy to mitigate those impacts. While natural headwater streams and adjacent riparian zones have been identified as hot spots for nutrient removal, the potential for restored systems to achieve similar functions remains unknown. The goal of our research is to analyze the effects of integrated stream and riparian restoration on the removal of dissolved nutrients. To do so, we compared nutrient retention in the riparian zone of four different stream types: a restored agricultural stream/riparian zone (R site), an incised agricultural ditch (U site), an agricultural stream with a narrow riparian buffer (U-MB site) and a stream in a forested section of a primarily agricultural watershed (U-FB site). We measured changes in ammonium (NH_4^+), nitrate (NO_3^-), soluble reactive phosphorus (SRP), total dissolved organic carbon (TOC) and total dissolved nitrogen (TDN) in groundwater from the edge of field to near stream seasonally from Spring 2013 to Fall 2015. Results show a decreasing but variable trend in dissolved nutrients from edge of field to near stream in sites with adjacent agriculture. Results also varied seasonally with highest concentrations observed at the edge of field in spring for all sites. This is likely attributed to fertilization of adjacent and upstream agricultural fields. The greatest change in nutrient concentrations was observed at the incised agricultural ditch site across all seasons. We also developed a statistically based model of nutrient concentrations in riparian groundwater as a function of different explanatory variables, including riparian width, adjacent land use, vegetation cover, crop rotation and precipitation records. These results will improve understanding of stream-riparian interactions in agricultural systems, particularly the role of riparian restoration in improving water quality. We expect our model will also aid managers in implementing management and restoration practices.