Danielle Dittrich

Committee chair: Paul DeLaune
P.O. Box 1658
11708 Highway 70
Vernon, TX 76384
940.552.9941 x207

Description of research project:

My masters thesis project will include a nitrate crediting study on cotton under subsurface drip, furrow, and pivot irrigation systems. The study looks at the effect of accounting for irrigation water nitrates in fertilizer applications on nitrogen uptake and partitioning. Contamination of groundwater by nitrates is particularly a problem in the Texas Rolling Plains where the shallow Seymour aquifer is coupled with the region's land use being predominately agricultural production (around 70%). The Seymour aquifer has the highest average nitrate concentrations of all major aquifers in Texas. A study by the Texas Department of Water Resources found that, among the wells distributed throughout the aquifer that have been tested, around 75% exceed the EPA's Drinking Water Standard of 10 ppm NO_3. Crediting irrigation water nitrates towards a crop and basing fertilizer applications around soil test N means that less fertilizer needs to be applied, thereby reducing the amount of nitrogen that has the potential to leach. Irrigation water at our research station in Chillicothe, TX contains about 20 ppm nitrates throughout the summer, meaning that 55 lbs NO_3 is available for every acre-foot of water applied. Predicting that 12 inches of irrigation water will be applied to pivot-irrigated cotton this summer, where three bales per acre are expected, fertilizer N application was reduced by 37%. For each of pivot, drip, and furrow systems, treatments include a control with only irrigation N and four fertilizer application rates based on soil test N & P: N application only, N and P application, N application with crediting for irrigation water N, and N and P application with crediting for irrigation water N. In 2010, there was no significant difference of cotton yields between treatments crediting irrigation nitrates and those not crediting for nitrates. Crediting irrigation water nitrates is important not only for a potential reduction of nitrates leaching to the groundwater but also, in a climate of ever-higher fertilizer prices, substantial cost savings for the farmer.

Undergraduate GPR
GRE Scores

Relevant Coursework:

Brazosport College – Dual Credit – 2006			
University of Houston – 2006 to 2008			
BIO	1---	BIOLOGY 100 LEVEL TRANSFER	
BIO	1---	BIOLOGY 100 LEVEL TRANSFER	
MTH	2---	MATH 200 LEVEL TRANSFER	
MTH	233	CALCULUS I	
MTH	234	CALCULUS II	
PHY	131	MECHANICS & HEAT	
PHY	131L	MECHANICS & HEAT LAB	

CHE	133	GENERAL CHEMISTRY I	
PHY	1---	PHYSICS 100 LEVEL TRANSFER	
BIO	313	GENERAL ECOLOGY	
BIO	370	EVOLUTION	
Stephen F. Austin State University – 2009			
AGN	110	CROP SCIENCE	
AGN	331	SOIL SCIENCE	
AGR	431	AG INTERNSHIP	
CHE	133L	GENERAL CHEMISTRY I LAB	
FOR	152	INTRO WILDLFE MANAGEMENT	
HRT	212	FRUIT AND VEGETABLE PRODUCTION	
BIO	225	LOCAL FLORA	
HRT	325	DESIGN APPLIC. SOFTWARE I CAD	
AEC	451	FARM MANAGEMENT	
AGD	361	AG DEVELOPMENT	
AGN	367	WEED SCIENCE	
AGN	434	SOIL FERTILITY	
ANS	333	ANIMAL NUTRITION	
FOR	349	PRIN FOREST SOILS	
PLS	317	APPLIED AGRICULTURE DATA APPL	
PLS	420	AGRICULTURAL WASTE MANAGEMENT	
		GPA:	**Earned hours:**

Use of funds resulting from TWRI Mills Scholarship:

I intend on using funds from the TWRI Mills Scholarship to pay tuition for Fall 2011 or Spring 2012.

Intended career path:

Beginning Fall 2011, I will at be Texas A&M University, earning a degree in either soil science or agronomy with a strong emphasis on soils. I am very interested in environmental soil science and sustainable agriculture. My studies will enable me to develop further interests and understanding, and to start a career path, in these areas.