

Summer 2017

On the Go:

Princeton Nutrient Management Forum and Constructed Wetland Tour

More than 30 participants came out on June 27 to view the constructed wetland in Bureau County, Ill. and to learn updated research results from NREC-funded researchers. A number of farmers were in the audience to learn what they can do to held management nitrogen on their farms. Several NREC Council Members also attended, including Ted Mottaz, Jeff Kirwan, and Cindy Skrukruud.

Starting in the morning, Jill Kostel introduced the constructed

wetland that her group built in 2016 a few miles south-east of Princeton, Illinois. Kostel is with The Wetlands Initiative and receives funding to demonstrate and monitor nutrient removal from the Big Bureau Creek watershed in Northern/Central Illinois. The kidney-shaped constructed wetland is an average of 18 inches deep and considered an “emerging marsh” and is fed by drainage tile from adjacent farmland. A surrounding buffer area is populated with a long list of pollinator plants. The wetland is such a size and depth as to not attract water fowl.



The Forum continued in Princeton and began with Lowell Gentry speaking about cover crops and edge-of-field practices for limiting nutrient loss on tile-drained land. Gentry stressed that farmers have choices on what works best for their individual production system and results from ongoing NREC projects are showing how effective nutrient management practices are at reducing tile nitrate loads.

One research project that Gentry reported noticeable results was the reduction of tile nitrates following a corn-soybean-wheat rotation in conjunction with cover crops. Tile nitrates were below 1 part per million (ppm) after growing a cover crop (radish and turnip) following winter wheat harvest – down from as high as 10 ppm earlier that spring. The following corn yields were down just slightly on the field with the abundant cover crop of radish and turnip and



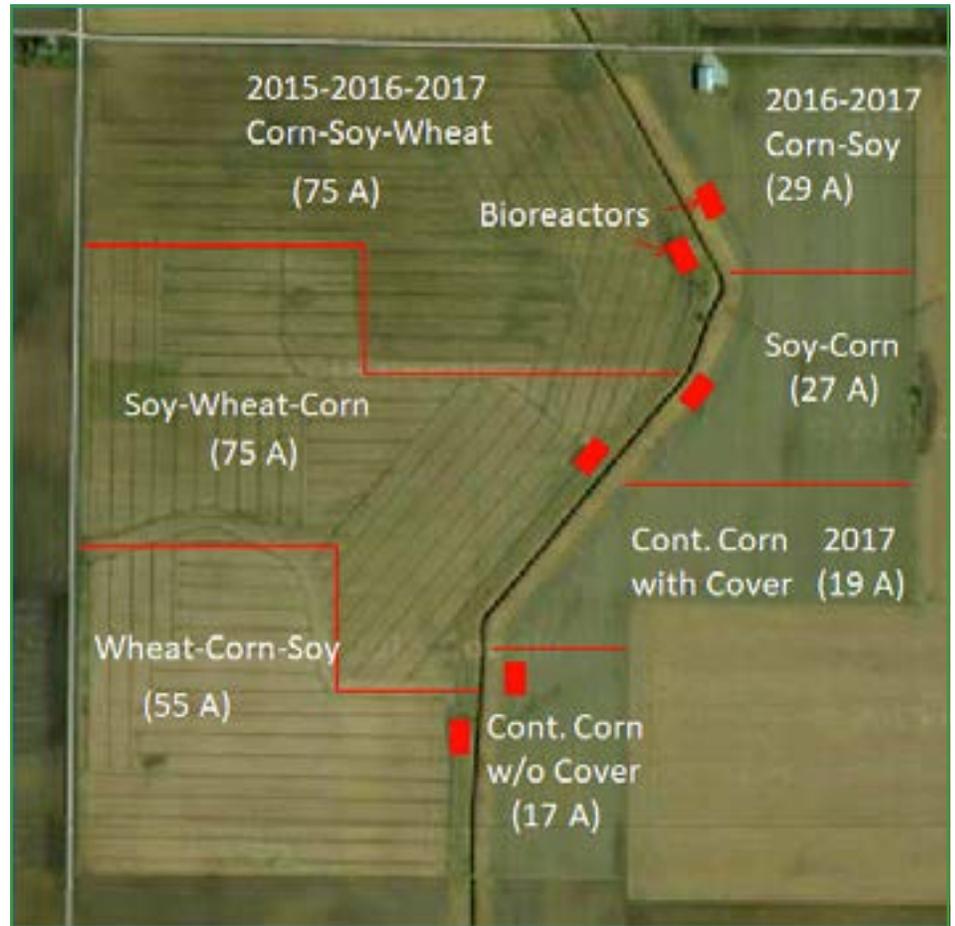
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researchers are looking in to what caused it. Gentry said that it may be possible to have too much of a good thing because the extra time for cover crop growth after wheat really helped produce huge amounts of cover crop biomass.

The illustration on this page shows the field design and crop rotation for three crop years and the position of 6 woodchip bioreactors. On this one farm, researchers are simultaneously evaluating 4 production systems: corn-soybean-wheat with cover crops; conventional corn-soybean; and continuous corn with and without a cover crop.

Laura Christianson continued with the Forum talking about the use of edge-of-field bioreactors and explaining how bioreactors work to remove nitrates from fields. Tile water is routed through the bioreactor; woodchips inside convert nitrogen in tile water to benign nitrogen

This study provides proof of concept that tile nitrate loads can be greatly reduced with a longer rotation and cover crop and nearly eliminated when cover crops are combined with a bioreactor.



gas. Woodchips are preferred since carbon is readily available. Bioreactors on half of all tile-drained acres are estimated to reduce nitrate losses by 25-percent at a cost of \$2.20 per pound of nitrogen saved.

The day concluded with a presentation from Shalamar Armstrong on the timing of nitrogen application and a lively question and answer period.

Outreach: NRCS Douglas County Field Day – July 12

Nearly 45 were in Douglas County, Illinois for a meeting in the NRCS office. NREC-funded researchers Lowell Gentry of University of Illinois and Dan Schaefer with the Illinois Fertilizer and Chemical Association made presentations about their ongoing in-field trials on nutrient management and water quality. Jason Bleich, a biologist with Illinois Pheasants Forever, talked about the importance of pollinators.

Schaeffer brought along an implement that would be used in the spring to freshen the seed bed in the strips made by the NH3 tool bar in the previous fall. Instead of running full-width tillage (like a field cultivator) it helps promote strip-till rather than field cultivation ahead of the planter. It can also be used cover crops and for 30" row soybeans for strip till.



Gentry said: "We had a great turnout for the presentations and a lot of interest, but the rain and heat kept us from going to the field in the afternoon to see the tile monitoring equipment and the plot design. The main thing was that I was able to show the audience that a cover crop of cereal rye after corn reduced the tile nitrate load by 40% and had no negative impact on the subsequent soybean yield. This amount of tile nitrate reduction is pretty close to the overall goal of 45% as suggested in the Illinois Nutrient Loss Reduction Strategy."

The 2016 Illinois NREC Annual Report can be downloaded from the web site. You can find the report under Resources.

Research Results – Producers and retailers have new numbers to consider

Dr. Maria Villamil and Dr. Emerson Nafziger in the Crop Science Department at the University of Illinois collected some 2,300 corn and 2,600 soybean grain samples over the 2014 through 2016 seasons in Illinois in order to see if the crop removal numbers have changed since the currently-used numbers were generated some decades ago.

As expected, they found a considerable amount of variability in grain P and K content, with the highest values as much as double the lowest values. In order to reduce the chances of having the number too low for a given field, they decided to use the 75th percentile – the number that is higher than 75% (and lower than 25%) of the values they found.

The new numbers for grain removal for corn are 0.37 lb P_2O_5 and 0.24 lb K_2O per bushel. These compare to the old values of 0.43 and 0.28 for P_2O_5 and K_2O , so the new numbers are about 15% lower than the older ones. For soybean, the new numbers are 0.75 lb P_2O_5 and 1.17 lb K_2O per bushel. These are 10 and 12 percent lower than the old numbers of 0.85 and 1.30, respectively.

They also gathered wheat grain samples and are collecting some more of those in 2017. Wheat samples collected so far show values that are considerably lower for P and a little lower for K than the older numbers.

The new numbers for grain removal of P and K provide new guidance in calculating removal based on yield. They are only moderately lower than the older numbers, so calculated removal won't change by a lot, but over time it will help us balance crop needs with the supply of these nutrients.

Nutrient	No. of samples	Average value	Range, percentile		Book value	% change BV to 75th%
			25th	75th		
-----lb P/K (oxide) per bushel-----						
Corn P	2,334	0.34	0.31	0.37	0.43	14
Corn K	2,334	0.23	0.22	0.24	0.28	15
Soybean P	2,620	0.71	0.66	0.75	0.85	12
Soybean K	2,620	1.11	1.06	1.17	1.30	10
Wheat P	625	0.42	0.36	0.47	0.60	22
Wheat K	625	0.26	0.23	0.28	0.30	8

Number of samples and estimates of P_2O_5 and K_2O removal per bushel of corn, soybean, and wheat from all nine Illinois crop reporting districts for 2014, 2015, and 2016. Only a few samples of wheat were collected during the first year, so estimates of removal are not included for 2014.

On the Go:

August 15: NREC Annual Meeting – Noon at Illinois Department of Agriculture building on the Illinois State Fairgrounds.

August 16: Iroquois County-Cover Crop Field Day. *Dr. Shalamar Armstrong* will be making a presentation on his research at the Tom Roselius and Mark Redeker farms. More information is available by calling 815-432-3946, Extension 3. There is a \$5.00 registration fee by August 14.

August 17: Illinois NREC at Agronomy Day at University of Illinois.

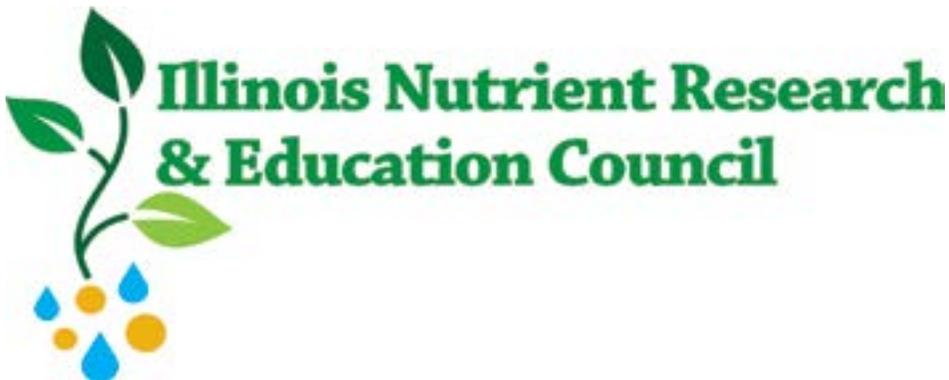
August 22, 8:30 a.m.: Mercer County Farm Bureau bioreactor field day, Jeff Kirwan farm, New Windsor. University of Illinois Professor Laura Christianson to speak. Organized by Mercer County Farm Bureau, supported by an Illinois Farm Bureau nutrient stewardship grant, with support from Mercer County Soil and Water Conservation District and U of I Extension. Register by August 18 by calling the Mercer County Farm Bureau at 309-582-5116.

August 25, 10:00 a.m. - Noon: Lunch and Learn with Adams Co. SWCD. Dan Schaefer with IFCA will provide an update on the Illinois NLRs. Register by calling 217-224-9306 Ext 3.

August 30: NLRs Biennial Report: Press event at Farm Progress Show – 9:30 a.m. in media tent on FPS Site. This will be the official report on the progress that Illinois has made towards meeting the goals set out in the Nutrient Loss Reduction Strategy.

September 12: 4R Field Day – Tuscola, IL – IFCA event. Register by emailing Jean Payne at jeanp@ifca.com

Illinois agriculture's investment in the safe, efficient use of crop nutrients.



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