JoDaviess County Farm Bureau

Summer 2020 Virtual Field Day

Brought to you by your local community partners:

JoDaviess County FARM BUREAU

ILLINOIS FARM BUREAU® Farm. Family. Food.™

UNIVERSITY OF WISCONSIN PLATTEVILLE

SOIL HEALTH PARTNERSHIP

Agnetic, LLC

Speakers for the Virtual Field Day included:

Lauren Lurkins
Director of Environmental Policy, Illinois Farm Bureau

Greg Thoren
Farm Owner and Host

Art Scheele
Interpreter, Agnetic LLC

John Musser
Certified Crop Advisor, Stephenson Service Company

Dr. Dennis Busch
Research Manager at Pioneer Farm, University of Wisconsin-Platteville

Dr. Andrew Cartmill
Assistant Professor, Soil & Crop Science, University of Wisconsin-Platteville

Will Keast
Researcher, University of Wisconsin-Platteville

Matthew Harper
Researcher, University of Wisconsin-Platteville

Zach Lieb
Student, University of Wisconsin-Platteville

Abigail Peterson
Field Manager, Southern Illinois and Missouri, Soil Health Partnership

Jim Isermann
Field Manager, Northern Illinois and Wisconsin, Soil Health Partnership

JoDaviess County Farm Bureau

The Jo Daviess CFB is a 501(c)5 non-profit organization based in Elizabeth, Illinois serving 2,300 members. The mission of the Jo Daviess CFB is "leaders in a new era of agriculture – promoting the value of agriculture and enhancing the quality of life while preserving our beauty and heritage."

The Jo Daviess CFB received a grant in the amount of $5,100 for their 2020 project that continued to explore the management of cover crops on reducing nutrient losses. In partnership with IFB, the Jo Daviess CFB has spent nearly $30,000 on local Nutrient Loss Reductions Strategy (NLRS) research and education since 2016.

Their multi-faceted NLRS project for 2020 includes comparisons of different cover crop mixes and practices to show the impacts on soil health and nutrient loss. There are also tests on different scenarios of measuring surface water run-off and testing for nitrates, phosphorus and ammonia. This is especially important in the rolling hills of Jo Daviess County.

Illinois Farm Bureau Nutrient Stewardship Efforts

Since 2015, IFB has contributed to an impressive statewide effort, the NLRS. Through leadership and participation from our farmer members across the state, IFB has been able to make meaningful contributions toward water quality improvements in Illinois. From 2016 to present, IFB has committed approximately $1.5 million of its own funding to build and maintain its sustainability programs.

The NLRS is a science-based framework for using research, technology and industry experience to assess and reduce nutrient loss to Illinois waters and to the Gulf of Mexico. The NLRS sets forth a plan to leverage existing programs to optimize nutrient loss reduction while promoting collaboration, research, and innovation among the private sector, academia, non-profits, wastewater treatment agencies, the agricultural sector, and state and local government. The primary goals include reducing nitrate-nitrogen losses by 15% and reducing total phosphorus losses by 25% by the year 2025 from established baseline conditions. The NLRS was released in July of 2015 after multiple years of stakeholder discussions in which IFB actively participated. Since 2015, IFB has continued its participation in NLRS meetings and work groups in order to strategically guide the effort. In addition, IFB created new programs in 2015 to support farmer implementation of best management practices (BMPs) to help Illinois meet the goals of the NLRS.

For the past several years, IFB has made it an organizational priority to lead on environmental issues, most notably, the NLRS. IFB's NLRS efforts focus in four priority areas: 1) education and outreach to farmers, landowners and the general public; 2) supporting research of best management practices to reduce nutrient loss from agricultural fields; 3) supporting farmer implementation efforts across the state; and 4) demonstrating progress toward the long-term goals of the NLRS. The IFB Board of Directors committed significant financial resources and support from staff to accomplish some ambitious goals, allowing IFB to tackle environmental challenges head-on. IFB will continue to prove that voluntary, incentive-based conservation, based on science, will move the needle on water quality improvements in our state.

The IFB Nutrient Stewardship Grant Program is one example of the many ways IFB is creating lasting impacts in implementing the NLRS across Illinois. This program funds CFB projects throughout the state focused on improving soil health and water quality. Since 2015, IFB has dedicated over $550,000 to CFBs to complete a wide range of unique projects, including planting test plots of cover crops, watershed planning, water testing, hosting education and outreach activities. For more information on IFB's environmental efforts, see www.ilfb.org/take-action/current-priorities/protecting-our-environment.

Greg Thoren Demonstration Plot: Soil Health and Water Quality Data Summary

Content provided by Dr. Andrew Cartmill, Dr. Dennis Busch, Will Keast, and Matt Harper, University of Wisconsin-Platteville Agroecosystems Research Program

Data collection efforts for this project are supported by a USDA NIFA Non-Land Grant College of Agriculture Grant entitled "Sustainable Intensification of Agro-ecosystems: The Role of Instrumented Farms at the Local, Regional, and Global Scale".

Project Goals

The goals of the grant project are to leverage collaborations with local producer groups (e.g. JoDaviess Soil and Water Health Coalition) to enhance the university's outreach and educational capabilities. We will accomplish these goals by:

1. Developing applied, hands-on, experiential research and educational opportunities for students within the new UW-Systems Freshwater University. Curriculum development will include: Agro-ecosystems Research, Applied Agro-Hydrology, and Short-Term Study Abroad.
2. Establishing the capacity to conduct plot-scale research. This capacity will be used to support outreach activities and the Agro-ecosystems Research class.
3. Conducting on-farm demonstrations with local farmer-led watershed groups. Scientists and students will collaborate on data collection efforts on local farms. Farmers will obtain requested quantitative data on impacts of practices, and students will learn about research and local production systems.
4. Coordinating UW-Platteville data collection efforts between LTAR and GFP networks. Coordinated data collection will allow students to easily compare agroecosystem metrics within different regions of the USA and globally.

Data Collection Methods

Rainfall simulations were conducted according to methods described in the "National Research Project for Simulated Rainfall – Surface Runoff Studies". This rainfall simulation methodology utilizes in-field runoff plots (1.5m x 2m) orientated with the slope to isolate and collect surface-water runoff associated with simulated rainfall events. The simulated events apply 12 cm of rain per hour (4.7 inches/hour). The duration of the rainfall simulation is variable for each site and is dependent on the time require to produce initial runoff. After runoff is observed the simulation is conducted for an additional 30 minutes. All runoff from the simulation is collected and total volume is determined. After conclusion of the simulation the sample is thoroughly mixed and a 1-liter sample is collected for laboratory analyses.

Soil health data was collected using USDA NRCS methods as described in the Soil Quality Test Kit Guide.

Preliminary Results

PLOT 1: INTER-SEEDED CLOVER MIX

Agronomic Data
2020 Growing Season

No-Till Corn (Non-GMO), 60-inch Rows (May 2020)

Rolled Rye (June 2020)

Clover Inter-seeded (June 2020)

2019 Growing Season

Wheat (Non-GMO) (October 2018)

Clover Mix Inter-seeded (August 2019)

Rainfall Simulation Data

Plot Slope: 1.49%

Simulated Rainfall Applied: 2.4 inches

Runoff: 0.5 inches (21%)

Total Solids: 194.6 (lbs./ac.)

Soil Health Data

EC (dS/m): 0.13

pH: 7.2

Infiltration: (in./hr.):1.3

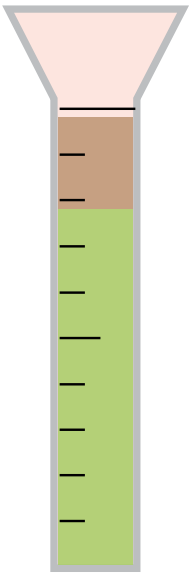
Slake: 6

Bulk Density:(g/cm^3): 1.45

Earthworm: (#/ft^3): 17

Respiration: (lbs. CO2-C/acre/day): 54.2

Inter-Seeded Clover Mix
Runoff versus Infiltration
0.5 inches 1.9 Inches



Each Hash Mark is equal to quarter of an inch

Soil Loss
Inter-seeded Clover Mix 194.6 (lbs./ac.)

PLOT 2: NO COVER, NO-TILL PRACTICE

Agronomic Data
2020 Growing Season

No-Till Corn (Non-GMO), 60-inch rows (May 2020)

2019 Growing Season

No-Till Corn (Non-GMO), 60-inch rows (May 2019)

Rainfall Simulation Data

Plot Slope: 1.79%

Simulated Rainfall Applied: 2.5 inches

Runoff: 0.8 inches (31%)

Total Solids: 279 (lbs./ac.)

Soil Health Data

EC (dS/m): 0.31
pH: 6.5

Infiltration: (in./hr.): 0.25

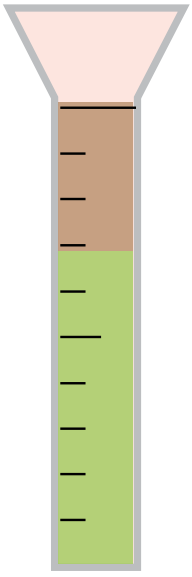
Slake:5.1

Bulk Density:(g/cm^3): 1.46

Earthworm: (#/ft^3): 39

Respiration: (lbs. CO2-C/acre/day): 21.9

No Clover (Control)
Runoff versus Infiltration
0.8 inches 1.7 Inches



Each Hash Mark is equal to quarter of an inch

Soil Loss
No Cover (Control) 279 (lbs./ac.)

PLOT 3: INTER-SEEDED BLACK MEDIC INTO ROLLED RYE

Agronomic Data
2020 Growing Season

No-Till Corn (Non-GMO), 60-inch rows (May 2020)

Black Medic Inter-seeded (June 2020)

Rolled Rye (June 2020) (Thinner Stand)

2019 Growing Season

No-Till Corn (Non-GMO), 60-inch Rows (May 2019)

Rainfall Simulation Data

Plot Slope: 2.13%

Simulated Rainfall Applied: 2.5 inches

Runoff: 0.4 inches (17%)

Total Solids: 290.2 (lbs./ac.)

Soil Health Data

EC (dS/m): 0.33

pH: 6.5

Infiltration(in./hr.): 1.3

Slake: 5.1

Bulk Density(g/cm^3): 1.43

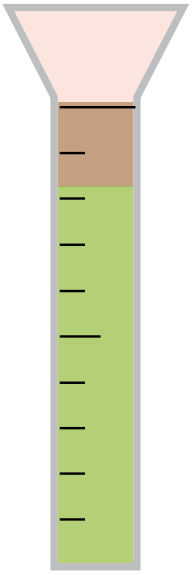
Earthworm: (#/ft^3): 25

Respiration: (lbs. CO2-C/acre/day): 31.4

Inter-seeded Black Medic

Runoff versus Infiltration

0.4 inches 2.1 Inches



Each Hash Mark is equal to quarter of an inch

Soil Loss
Inter-seeded Black Medic 290.2 (lbs./ac.)

PLOT 4: ROLLED RYE

Agronomic Data
2020 Growing Season

No-Till Corn (Non-GMO), 60-inch rows (May 2020)

Rolled Rye (June 2020)

2019 Growing Season

No-Till Corn (Non-GMO), 60-inch rows (May 2019)

Rainfall Simulation Data

Plot Slope: 1.79%

Simulated Rainfall Applied: 2.5 inches

Runoff: 0.5 inches (20%)

Total Solids: 86.82 (lbs./ac.)

Soil Health Data

EC (dS/m): 0.32

pH: 6.6

Infiltration(in./hr.): 1

Slake: 5.2

Bulk Density(g/cm^3): 1.25

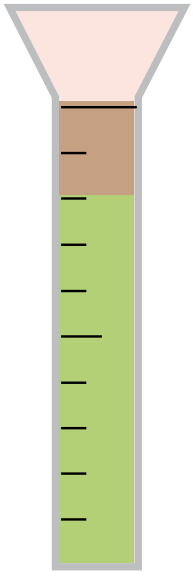
Earthworm: (#/ft^3): 22

Respiration: (lbs. CO2-C/acre/day): 44

Rolled Rye

Runoff versus Infiltration

0.5 inches 2.0 Inches



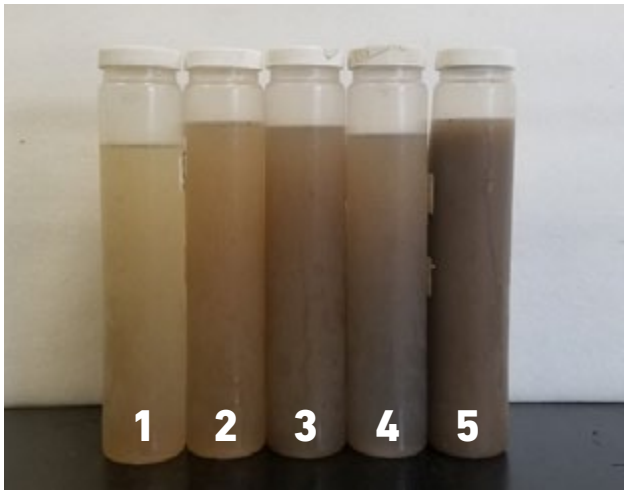
Each Hash Mark is equal to quarter of an inch

Soil Loss
Rolled Rye 86.82 (lbs./ac.)

Summary and Discussion

Data collected from the demonstration plots at the Greg Thoren Farm imply that agronomic practices (e.g. cover crops, no-till, etc.) utilized result in good soil health. According to NRCS guidelines soil respiration levels indicate medium and ideal soil activity, infiltration rates and soil bulk density indicate lack of soil compaction, soil slake test data shows stable soil fragments, and the earthworm populations (>20/ ft^3) exceed populations generally observed in cultivated systems.

Runoff data from rainfall simulations indicate that runoff volume and soil loss is relatively low on these demonstration plots as well, perhaps due to soil heath and agronomic practices employed. Percentage of rainfall that left the plots as surface-water runoff was 17% to 31% and soil loss was approximately 86 to 290 pounds per acre for the demonstration plot. In comparison, rainfall simulations conducted on conventionally tilled corn acres at the Univ. of WI-Platteville resulted in much higher runoff rates (69%) and soil loss (1,100 pounds/acre). The photograph to the right visually illustrates soil loss from rainfall simulation plots.



1. *Thoren, No-Till Corn, Inter-seeded into Clover Mix*
2. *Thoren, No-Till Corn, No Cover Crop*
3. *Thoren, No-Till Corn, Inter-seeded Black Medic*
4. *Thoren, No-Till Corn, Rolled Rye Cover Crop*
5. *UW Platteville, Conventionally Tilled Corn*

Future data collection at the Thoren farm will utilize replicated plots and allow for the statistical analysis of data required to determine which agronomic practices are significantly impacting soil health and water quality.

Economic Analyses of Conservation Cropping Systems

Content provided by Zach Lieb, Student at University of Wisconsin-Platteville and Greg Thoren, Farm Owner-Operator and Host

- This spreadsheet will show different treatments and ways crops will be grown along with expenses on each field down to the acre.
- With that, we can compare side by side our numbers with our different cover cropping techniques to the average conventional style farming system.
- We believe with cover crops, we can eliminate fertilizer and herbicide costs down to little or nothing in some cases.
- With this style of farming, we focus on the phrase "return on your investment." In the long run, our cover crops will provide us with nutrients such as nitrogen and carbon, and will also help with many other issues, such as retaining moisture and preventing soil erosion. Over time we will save time and money in the field, giving us a higher return at the end of the year.
- Economic analyses will continue this winter and will be shared next year. See an example of the values being tracked across four different conservation cropping systems in Table 1.

Table 1

Field	Acres	Crop	Notes/Date Planted	Population	Units	Cover Crop	Rate	CC Cost	Date Planted	Fertilizer With Planter	Rate
Morseville	83.3	Corn(rx10-36)	30 inch rows	35,000	36.34	NA					
			5/4/2020								
Home N of House	29.6	Corn (m05-72)	30 inch rows into rye	35,000	12.99	Rye	92	TBD	Fall '19	Proven N	16 OZ
			start rows 13-24 w ProveN to 8.8 A								
SE Shop	44.4	Corn (m96-30)	outside rd 33,000 pop/ Rd and Buildings 35,000 pop	35,000	17.36						
			N of poles 60" row	33,000		Black Medic	8	TBD	6/1/2020		
			S of poles 30" row			Red Mix					
			5/26/2020								
E. Golf Rd	16.1	Corn (M06-39)	30 inch rows with raw source on outside round into Rye	34,000	6.78	Black Medic	10	TBD	6/9/2020	Raw Source	0.7 OZ
			6/7/2020			Kester Soybean				Ag Zyme	10 OZ
						Rye	92		Fall '19		
			*Note Rates are per Acre								

Chemical	Rate	Nitrogen	Rate	Date	Chemical Cost	Rolling Date	Notes
2-4D	6 OZ	Liquid 32%	30 G/ 105#	4/26/2020	90.36		Planted at 2"/ Beans to Corn Rotation
Accuron	3 QT	Liquid 32%	15 G / 52.5#	5/7/2020	2961		
Event	14.08 OZ			7/7/2020	357.41		
Status	5 OZ				1302		
				Nitrogen	53.375		
				Custom Application	840		
		Total N	152.5 #	Total $	5604.145		
2-4D	6 OZ	Liquid 32%	46 G/ 161 #	4/26/2020	32.27	6/4/2020	Corn on Corn Rotation
Gramoxzone	1 QT			6/1/2020	135		
				Nitrogen	56.35		
				Custom Application	296		
				Total	519.62		
Round Up Power Max	2 QT	NA		5/13/2020	488.4		
AMS	2.6#				30.01		
Water	15 G				0		
Round Up Power Max	2 QT	NA		5/27/2020	488.4		
2-4D	8.5 OZ				67.67		
AMS	2.6#				30.01		
Water	15 G				0		
Accent	.9 OZ	NA		6/5/2020	878.32		
Status	5 OZ				688.2		
FBN AMS	19.2OZ				33.3		
Premier 90	4 OZ				49.81		
Water	30 G				0		
(spot spray by biuldings and tailers)		4 Acres					
Brox 2EC	1.5 Pt	NA		6/6/2020	247.46		
Water	18.8 G				0		
(spot spray over hill to S)							
		Urea	2.925 TN	6/11/2020	1009.13		
		Factor	1.4 G		179.97		
				Custom Application + tax	452.73		
					4643.41		
Accent	.9 OZ			6/2/2020	316.51		Full Manure Application
Status	3 OZ				148.8		
N-Tense	15.2 OZ				65.42		
Premier 90	4 OZ				17.95		
Brox 2EC	1.5 Pt			6/6/2020	89.175		
Water	22 G				0		
N-Tense	6.4 OZ			6/22/2020	27.54		
Round Up Power Max	5.5 G				121		
				Custom Application	160		
				TOTAL	**786.395**		

Soil Health Partnership

Content provided by Abigail Peterson, Field Manager, Southern Illinois and Missouri, and Jim Isermann, Field Manager, Northern Illinois and Wisconsin

Founded in 2014, the Soil Health Partnership (SHP) was developed by a diverse group of organizations that had a shared vision of developing a farmer-led research network to measure the impacts of implementing soil health practices on working farms. The Nature Conservancy (TNC), Bayer, and the Environmental Defense Fund (EDF) – alongside the National Corn Growers Association (NCGA) – came together to see this vision through. The SHP network spans across 16 states and includes partner organizations at the federal, state and county levels. SHP has grown from 17 research sites in 2014 to a network of 200+ research sites and represents over 7,000 acres. SHP currently has a team of eleven regional field managers that work alongside farmers to design and implement experiments in fields across North America.

In Illinois, SHP has over 20 research sites that are designed to show the economic and environmental impacts of best management practices. The leading field trial of no-till cover crop implementation has been conducted on some fields for over 5 years. Specifically, field managers Jim Isermann and Abigail Peterson are comparing the weather, soil type, soil health, agronomic, and economic influences of what it takes to make a successful adaption of a cover crop system across Illinois fields. Within the program, farmers range in experience from advanced to just beginning. The wealth of regional agronomic decision making information that has been recorded on these sites is what makes the SHP an exciting program for all farmers wanting to learn more about cover crop adoption.

Contact Abigail Peterson at peterson@ncga.com and Jim Isermann at isermann @ncga.com

Contact Information

You can contact the JoDaviess CFB at:

815-858-2235

To learn more about all other IFB Nutrient Stewardship Virtual Field Days, visit: www.ilfb.org/FieldDays

Brought to you by your local community partners:

Jo Daviess County Farm Bureau

Illinois Farm Bureau. Farm. Family. Food.™

University of Wisconsin Platteville

Soil Health Partnership

Agnetic, LLC