

Illinois Report -2019
Midwest Cover Crops Council, Springfield, IL
February 20, 2019

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Research:

University of Illinois Extension & Crop Sciences

Field-scale drainage research, U of I Dudley Smith Farm, Pana, IL. Comparing current nitrogen and crop management with cover crops and no nitrogen check evaluating their impacts on water quality & crop production. (Pittelkow, Christianson, Bhattarai)

Cover cropping, tillage, and buffer strip usage effects on phosphorus movement in the soil. (L. Christianson, R. Christianson, T. Becker)

Novel Microbial Weed Suppression Mechanisms in Conservation Tillage/Cover-Cropping Systems (NIFA-AFRI). (Yannarell)

- 1) Evaluate potential of pathogenic microbes to selectively suppress weed germination in association with cover crops and green manures;
- 2) Evaluate weed-suppressive effects of arbuscular mycorrhizal fungi; and
- 3) Assess the reliability, magnitude, and synergy of these microbial weed-suppression mechanisms.

Micro-managing soil health: leveraging plant-microbe interactions to improve the effectiveness of cover cropping strategies (Ceres Trust Organic Research Initiative). (Yannarell)

- 1) Identify key microbial players in weed suppression and nitrogen cycling,
- 2) Identify cover crop species that can foster and activate these players,
- 3) Identify critical time windows of optimal soil health that favor crop growth over weeds.

Evaluating Conservation Practices for Nutrient Loss Reduction. (Gentry & David)

- 1) Evaluating the impact on cover crops, wood chip bioreactors, in a strip-till/no-till corn – soybean – wheat rotation on nutrient loss through tile drainage.
- 2) Evaluating tile nitrate load reduction using cereal rye after corn and oat/radish after soybean in a corn/soybean rotation for past 3 years
- 3) Evaluating cereal rye in continuous corn under three termination times and 3 N systems differing in the timing of fertilizer N application

Cover Crop and Nutrient Management Research/Demonstration fields (Northern Illinois):
(Solomon)

This is part of a 5 year project with a set of cover crop plots (15-17 different species or mixes) following wheat. Fields then go to corn follow by cereal rye ahead of soybeans. Evaluated for soil nutrient and nutrient tie-up, followed by corn and soybean yield.

Cereal Rye for Weed Management in Soybean. (Johanning)

Cereal Cover Crops in Corn Production.

Evaluation of cereal rye and triticale as cover crops for corn. (Johanning)

Insect Management in Cover Crop Systems (Seiter)

This project will focus on developing initial insect pest management recommendations for systems that include a cover crop. It will take advantage of existing cover crop experiments being funded by NREC, and will look at the effect on insect populations of both long term rotations that incorporate a cover crop and the timing of cover crop termination in corn and soybean. In addition, this project will fund a M.S. student in Crop Sciences.

Pest and Beneficial Insects in Illinois Cover Crops (Seiter)

This project will focus on characterizing the pest and beneficial insect complex in cover crop systems, as well as developing sampling recommendations for producers that utilize a cover crop. Intensive sampling of commercial fields will be combined with in-field workshops and production of a training video with the goal of improving the adoption of insect monitoring in these systems.

Southern Illinois University Carbondale - Dr. Karla Gage, Dr. John Schoonover, Dr. Karl Williard

Fate of ¹⁵N urea fertilizer in a corn/soybean cropping system with a cover crops

Cover crop and tillage impacts on nitrogen leaching and corn/soybean yields from row crop agriculture in southern Illinois

Cover crop and topography effect on nitrogen leaching and corn/soybean yields from row crop agriculture at the watershed scale

Effect of cover crops on soil moisture availability to cash crops and water use by cover crops/mixes

Effect of cover crops on available pools of carbon and nitrogen in corn/soybean rotation.

Fate of phosphorus and sulfur in plant-soil-water pools in corn/soybean rotation with cover crops

Effect of cover crops on stream water quality parameters at the watershed scale in paired watershed setting

Annual Ryegrass Trials (Gage)

Four varieties: Assist, Cold Snap, Fria, and King were fall planted at 2 locations.

- Glyphosate burndown trial, establishment trial (broadcast in standing crop vs. post-harvest), POST herbicide programs for any escape annual

Cereal Rye Trials (Gage)

- A field scale, replicated, multi-year trial has been established to evaluate the contribution of fall planted cereal rye to suppression of glyphosate-resistant waterhemp in the next year's no-till soybean crop.
- Evaluate the contribution of spring planted cereal rye to suppression of glyphosate-resistant waterhemp in the next year's no-till soybean crop including cover crop termination POST in soybean (living mulch).
- Burndown control of volunteer cereal rye following failed termination the previous year (what happens when your cover crop goes to seed?)

Establishment, Floral Resource, and Weed Suppression of Summer Cover Crops – 2016-2019
Crab Orchard National Wildlife Refuge – Service First Grant – Dept. of Interior.
(Gage, Schoonover, Williard)

- Multiple cover crops evaluated
 - Water Quality
 - Pollinators
 - Weed Suppression

- 1) Horseweed Management: Determine the impact that selective chemical and cultural weed management practices have on suppressing horseweed emergence, development, and growth prior to establishment of a soybean crop under no-till conditions.
- **USDA-NIFA**
 - i. These techniques include fall-sown cover crops and herbicide applications regionally appropriate in no-till corn and soybean rotation.
 - ii. Collaboration with University of Kentucky, University of Missouri, and Kansas State University.
- 2) Cover Crop Interference with Residual Herbicides: Determine Potential for Cover Crop Residue to Interfere with Soil Residual Herbicides in Soybean. - **USB**
 - i. Develop recommendations for the best performing residual herbicides in cover crop systems.
 - ii. Collaboration with University of Missouri, Purdue University, University of Arkansas, Mississippi State, University of Illinois, and University of Tennessee.
- 3) Fomesafen Carryover to Cover Crops and Corn. - **Internal**
 - i. Determine the carryover potential of various rates and application timings of fomesafen to subsequent cover crops and corn following soybean.
- 4) Warrant Herbicide for Control of Early Emerging Summer Annual Weeds in Cover Crops. - **Bayer**

- 5) The Efficacy of Cover Crops for Pollinator Habitat Provisions and Weed Suppression in a Southern Illinois Agroecosystem. -USDA/Dept. of Interior

Extension & Outreach

- Many Cover Crop Field Days and programs throughout the state working with many organization including University of Illinois Extension, SIU, ISU, Local SWCD, NRCS, Illinois Stewardship Alliance, American Farmland Trust, Illinois Sustainable Ag Partnership, SARE, Soil Health Partnership.
- Illinois Department of Agriculture hosted their annual Conservation Cropping Seminars held this past January in 3 locations (Mendota, IL, Springfield, IL, & O'Fallon, IL).

Illinois Sustainable Ag Partnership

- Coordination across several organizations – Illinois Central College, Illinois Corn, Zea Mays, American Farmland Trust, Soil Health Partnership, Extension
- Cover Crop and Soil Health Training for farmers and advisors
- Research and Demonstration plots – herbicide residual trials, planting date trials, species plots, water quality monitoring
- Network of Cover Crop Specialists across the state
- Illinois specific cover crop management guidance documents and resources

Publications (peer-reviewed/Extension):

Post Corn, Going to Soybean: Use Cereal Rye (Illinois Cover Crop Recipe series, MCCC-105), available from www.mccc.msu.edu

Post Soybean, Going to Corn: Use Oats/Radish (Illinois Cover Crop Recipe series, MCCC-106), available from www.mccc.msu.edu

Conservation Cropping System for Corn-Bean No-Till (American Farmland Trust Publication)

Conservation Cropping System for Corn-Bean Till (American Farmland Trust Publication)

Conservation Cropping System for Corn-Bean Livestock (American Farmland Trust Publication)

Conservation Cropping System for Organic Transition (American Farmland Trust Publication)

Adoption of Cover Crops in Illinois

The combined efforts organizations in Illinois in promoting the use of cover crops, has resulted in a significant increase in the adoption of cover crops by farmers in Illinois.

- According to the Illinois 2016 National Agricultural Statistics Service (NASS) Survey, “total cover crop acres in the state nearly doubled between 2011 and 2015, with a 223% increase in the usage of cover crops on tile-drained ground and a 166% increase on non-tiled ground.”
 - Another survey is currently being conducted by NASS to be included in our Illinois Nutrient Loss Reduction Strategy 2019 Biennial Report – will be available in August 2019
- Illinois Corn tracks interest in and adoption of cover crops through an annual member survey. The responses of the more than 700 members who completed the survey showed that in 2013, 23% were using cover crops. By 2015, that percentage had increased to 35% and was up to 40% in the latest survey from 2016.

Contributors:

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