



From Peer-Reviewed Science to BMP's for On-Farm Adoption

1

Illinois NREC Research Funding



Solicit proposals that
focus on

Improved nutrient efficiency
Enhanced crop production
Protect water quality



Council, Research Committee, and Independent
Peer Review Team review applications



Projects are ranked on merit and availability of
funds

2

Funding and Progress to Date

- Since 2013
 - Over \$26M invested in research projects
 - Four NREC publications: Turf Guide, Cover Crop Guide 1.0, Guide to MRTN, and Cover Crop 2.0
 - Annual Reports, Investment Insights, Field Notes, and videos, Research Forum
 - More than a dozen papers published in Professional Journals written by NREC-funded researchers
 - Many opportunities for collaboration on research and outreach projects

3

The screenshot displays the NREC Publications website. The header includes the Illinois NREC logo and navigation links: About, Funded Projects, Resources, Investment Insight LIVE, News, and Contact Us. The main heading is "NREC Publications". Below this, a search bar is visible. A table lists publications with columns for Principal Investigator and Author(s) / Publication.

Principal Investigator	Author(s) / Publication
Arai	Xu, S., Gentry, L., Chen, K. and Arai, Y. 2020. Intensive agricultural management induced subsurface accumulation of labile phosphorus in tile line dominated Midwestern agricultural soils. Soil Science Society of America Journal https://doi/full/10.1002/saj2.20089
Armstrong	Armstrong, S.D., R. Roth, and C. Lacey. 2017. Do Conventional Comparative Cost Efficiency Analyses Adequately Value Nitrogen Loss reduction best management practices? Agriculture Research & Technology. https://doi.org/10.19080/ARTOAJ.2017.12.555861
Armstrong	Roth, R., M.D. Ruffatti, P.D. O'Rourke, and S.D. Armstrong. 2018. A cost analysis approach to valuating cover crop environmental and nitrogen cycling benefits: A central Illinois on-farm case study. Agricultural Systems, Agricultural Systems 159:67-77
Armstrong	Ruffatti, M.D., R. Roth, C. Lacey, and S.D. Armstrong. 2019. Impacts of nitrogen application timing and cover crop inclusion on subsurface drainage water quality. Agricultural Water Management 211:81-88. https://www.sciencedirect.com/science/article/pii/S0378377418313738?via%3Dihub

4

2020/21 Research Priorities

- Continue studies testing the impact of N management systems on efficiency of N use.
 - Maintain statewide distribution of work on optimum N rate to meet the needs of the MRTN.
 - Evaluate the efficacy of combinations of (4R's) source, place, rate and time of application on N efficiency.
- Cover Crops: Evaluate the economics, feasibility, water quality impacts and best management practices of growing cover crops to address nitrogen and phosphorus loss as well as crop productivity. Proposals should address all aspects of cover crops from crop selection, seeding and grazing through crop termination and subsequent mineralization and nutrient release.
 - Cover Crop systems following soybeans and ahead of corn to maximize corn production and minimize nutrient losses.
 - Engineered cover crops/Cover crop options beyond cereal rye.
- Evaluate the agronomic and environmental benefits of reduced tillage/strip till/erosion control and the placement and timing of nutrient applications throughout the entire state
- Phosphorus – Continue studies testing the impact of Phosphorus management systems on efficient Phosphorus usage, the role of legacy Phosphorus, as well as placement and timing of Phosphorous applications in corn and wheat.
- Investigate the cause(s) of increased nutrient loads in the Illinois and/or Rock River watersheds identified in the latest NLRs Biennial Report.
- NREC is also very interested in research projects that go beyond the “known” into more innovative (novel, inventive, original) and forward-looking research.

5

2021 Research

- \$3.9 Million in research awards
- 33 total projects
 - 24 ongoing
 - 9 new
- Grants recipients:
 - University of Illinois
 - Southern Illinois University – Carbondale
 - Purdue
 - Western Illinois University
 - IFCA

6

4R NUTRIENT MANAGEMENT

7

4R Nutrient Management

- Ongoing N-rate trials to support the MRTN
- Impact of timing on tile nitrate levels
- The role of mineralization and nitrate loss from 0 nitrogen trials
- 4R Nutrient research focus is both agronomic, economic and environmental
- Precision Ag for N-Management
- N placement
- Using stable isotopes to understand sources and cycling of nitrates



RIGHT SOURCE
Matches fertilizer type to crop needs.



RIGHT RATE
Matches amount of fertilizer type crop needs.



RIGHT TIME
Makes nutrients available when crops need them.



RIGHT PLACE
Keep nutrients where crops can use them.

8



COVER CROPS

9

Cover Crop Research

- Long-term paired watershed research
- N application timing and cover crops impact on Fate and Availability of N Fertilizer
- Extended rotation with cover crops
- Insect management in cover crop systems
- Utilizing cover crops in Southern Illinois for P and N loss
- Modeling projects to evaluate the suitability and benefits of cover crops
- Integrating grazing into cover crop systems

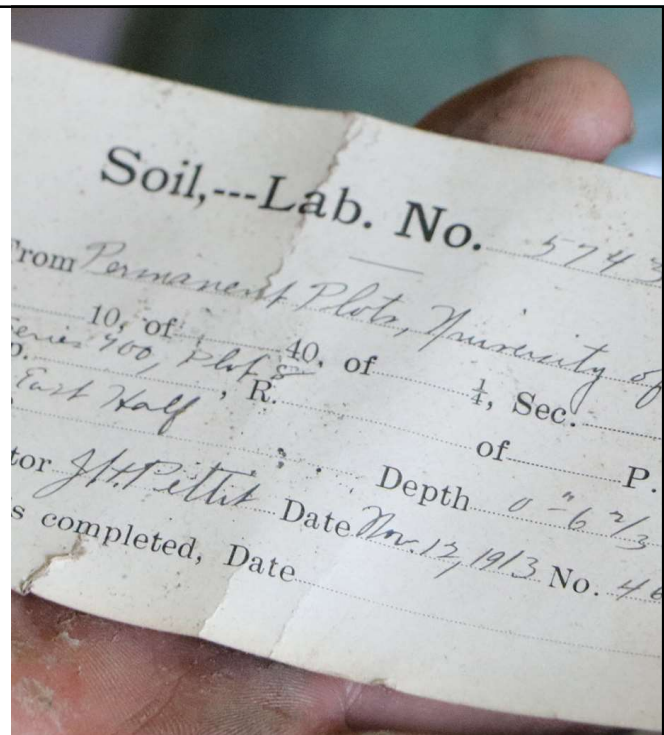
10

PHOSPHORUS RESEARCH

11

Phosphorus Research

- Struvite made from recycled P from wastewater treatment facilities as an alternative P Source
- Edge of Field P Filters:
- Freeze/Thaw Cycle Impact on P Loss in Cover Crops
- Designer BioChar for P removal
- The role of legacy P and utilizing 150 years of soil samples
- Evaluation of WASCOP's P Removal Potential
- Role of Gypsum in managing P losses

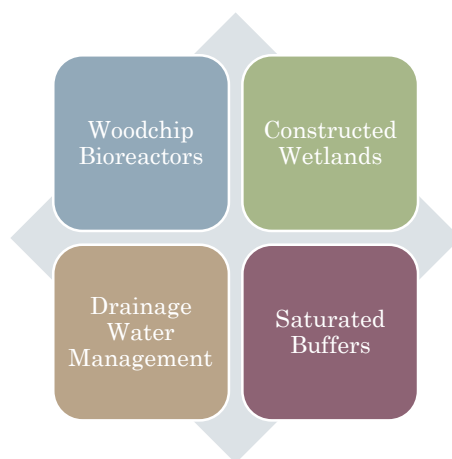


12



13

Edge of Field Practices



14



EMERGING ISSUES

15

Emerging Issues

- Dissimilatory Nitrate Reduction to Ammonium for Nitrate Retention in Agricultural Soils
- Tile Depth and Spacing
- White paper research related to P loading in Illinois River watershed
- Maize microbiome research

16

Where can I get
more info?

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- **Twitter:** @IllinoisNREC
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