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# Minnesota Corn Growers Research Funding & Outreach

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FEBRUARY 3, 2022

# Research Highlights

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- Minnesota **corn farmers invest more than \$2 million directly into research and outreach/education activities each year.**
- The research runs through the Discovery and Development team and cover six key focus areas:
  1. Agronomics/genetics/insect & pest management
  2. Soil Fertility
  3. Water Quality
  4. Livestock Nutrition
  5. Biofuels and Engine Technologies
  6. New Uses



# Research Highlights

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**Goal:** Promote research toward discovery of new or increasing uses of corn; discovery of best practices maximizing sustainable production; expanding domestic and international markets, all toward increased profitability for corn farmers.



## 2021 Primary Research Program

Type	Project	PI	Origin	Status
Contracts	MAWRC Support Operations and Discovery Farms	Warren Formo	MAWRC	Ongoing
	Nitrogen Smart	Brad Carlson	UMN	Ongoing
	Advanced Nitrogen Smart	Brad Carlson	UMN	Ongoing
	Enhancement of survey efforts for corn pests in Minnesota	Bruce Potter	UMN	Ongoing
New Uses	Sustainable polyesters from corn as tomorrow's plastics	Marc Hillmyer	UMN	4 of 5
	Recovery and use of value-added corn functional ingredients	Padmanaban Krishnan	SDSU	Final
	Efficient range extender using E85 and thermochemical recuperation	Will Northrop	UMN	Final
Production & Environmental	Hyper-thermostable enzyme (lactonases) for use as microbial biocontrol agents for plant diseases	Mikael Elias	UMN	Final
	Phenomics tools for corn breeding and management decisions	Candice Hirsch	UMN	Final
	Assessment of Minnesota's soil mineralogy and impacts on fertilizer guidelines	Dan Kaiser	UMN	Final
	Reducing reactive nitrogen losses from corn	Tim Griffis	UMN	Final
	Best management practices to integrate cover crops and manure /FFAR student	Melissa Wilson	UMN	Final
	Irrigation management impacts on corn yield and nitrate leaching	Vasu Sharma	UMN	Final
	Dialling the most profitable and environmentally responsible N Rate	Fabian Fernandez	UMN	1 of 3
	Carbon Smart	Joel Larson/Jodi DeJong-Hughes	UMN	1st year
	Climate Smart	Joel Larson/Heidi Roop	UMN	1st year

# Research Highlights

## - Production and Environmental Stewardship

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- Dr. Melissa Wilson  
*Developing practices for integrating cover crops and manure*
  - Goal: Developing BMPs for integrating cover crops, which can help reduce erosion and nutrient loss, with fall manure application
- Dr. Dan Kaiser  
*Assessing Minnesota's soil mineralogy and its impacts on fertilizer guidelines*
  - Goal: Study variables that affect corn's ability to draw potassium (K) from the soil, with the goal of using the information to update current K fertilizer rate recommendations
- Dr. Tim Griffis  
*Reducing reactive N losses from corn*
  - Goal: Understand and mitigate N<sub>2</sub>O emissions from agricultural soils



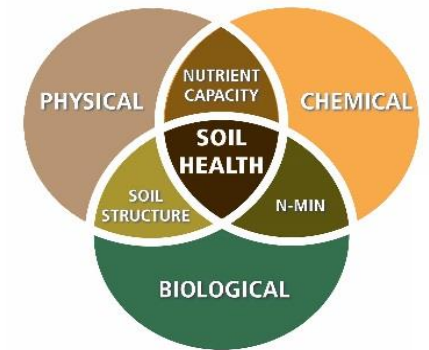
Mesocosm chambers at the University of Minnesota allow the rapid testing of how corn grows under different climatic conditions

# Research Highlights

## - Production and Environmental Stewardship

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- Dr. Vasu Sharma  
*Irrigation management impacts on corn yield and nitrate leaching*
  - Goal: Promote the best irrigation scheduling tools and make the knowledge available to farmers through extension and outreach
  
- Dr. Fabian Fernandez  
*Dialing in the most profitable and environmentally responsible N Rate*
  - Goal: Project will develop points of interception between EONR curve and curves for N loss pathways



# Research Highlights – New Uses

- Center for Sustainable Polymers

*Sustainable polyesters from corn as tomorrow's advanced plastics*

- Goal: strong potential to advance corn utilization toward sustainable polymers

- Dr. Will Northrop

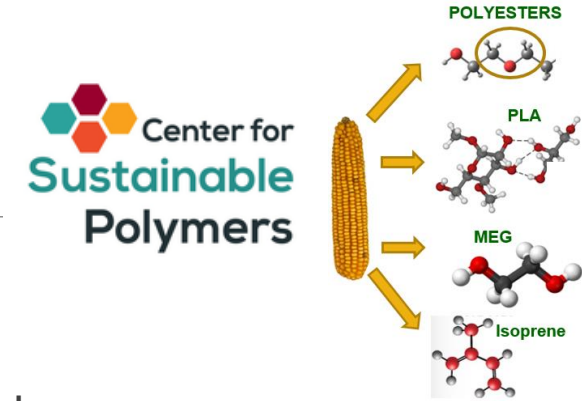
*Efficient Range Extender Using E85 and Thermochemical Recuperation*

- Goal: Investigate improvements in ethanol production and engine technologies to advance utilization of higher percent ethanol blends as biofuels produced from corn

- Dr. Mikael Elias

*Hyper-thermostable enzyme for use as microbial agents for plant diseases*

- Goal: develop a sprayable enzyme that prevents bacterial diseases from infecting plants





# 2021 Innovations Grants

Proposal Number	Level	Principle Investigator	Title	County	Year	Priority
<b>EXTENDED DURATION</b>						
1	2	Mark Enninga	Minimizing Corn Plant Variability Using a Planter Weight Distribution System	Nobles	2	Economic and management innovation
2	3	Steve Lawler	Reducing nitrate in a surficial sand aquifer, Mower County MN	Mower	3	Production practices that enhance water quality
3	3	Adam Alford	Corn trial teaching tool and ag research at SMSU	Lyon		Education
4	4	Gary Feyereisen	Establishing a Paired Watershed to Prepare for Conservation Practice Assessment (Year 2)	Faribault	2	Production practices that enhance water quality
5	4	Amy Huber	Pushing the Limits on Nitrate Removal: A Watershed-scale Bioreactor (Year 3)	Faribault	3	Production practices that enhance water quality
<b>NEW PROPOSALS</b>						
6	1	Vance Johnson	Wilkin County Soil Health Demonstration Site	Wilkin		Education
7	2	John Swanson	Performance and cost-benefit analysis of bioreactor systems for P mitigation in NW MN	Polk		Production practices that enhance water quality
8	2	Allan Dose	Nitrogen Use Efficiency Increased with Biologicals?	Sibley		Improved nutrient use efficiency
9	2	Les Anderson	Evaluating the value of a Microbial(N)in Corn Production	Godhue		Improved nutrient use efficiency
10	2	Gary Prescher	Investigating "living carbon" composted manure to improve nutrient mineralization	Faribault		Improved nutrient use efficiency
11	4	Angie Peltier	Digital Crop Doc, a digital diagnostics service for Minnesota producers	Across MN		Economic and management innovations
12	4	Lingling Liu	Value-added use of corn byproducts as nanocarriers of biopesticides	Ames, IA		New uses
13	4	Linsdey Pease	Nitrogen dynamics and losses in artificially drainage agricultural fields	Polk		Improved nutrient use efficiency
14	4	Pete Kennedy	On Farm Generation of Nitrogen Fertilizer	Swift		Economic and management innovations



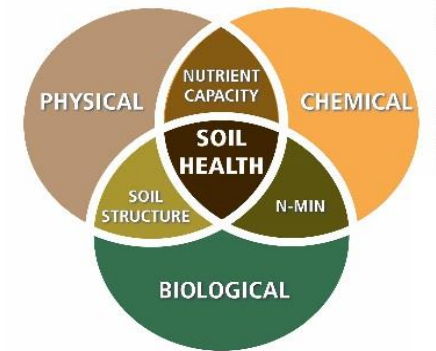
# MCGA/MCR&PC Request For Proposals RFP TIMELINE 2021/2022

Event	Date	Comments
Research Needs Assessment. Ongoing.	August 11th, 2021	Meet & Greet at the Huntington Bank Stadium with UMN researchers on possible information gaps.
RFP Release to Researchers	October 1 <sup>st</sup> , 2021	RFP posted online. Email notification sent to researchers matching the focus team's priority areas.
Preliminary Proposals Due	December 3th, 2021	Preliminary proposals due by the close of business on December 3 <sup>th</sup> , 2021 (Friday).
Review Preliminary Proposals	Late December, 2021	Decide which proposals merit a full proposal and/or researcher presentation.
Full Proposals (Invited Presentations) Decisions to be made on which projects should be recommended for funding.	February, 2022	Receive presentations on the full proposals from researchers chosen in the prior event.
Consent Agenda for recommended proposals.	February, 2022	Consent Agenda submitted at the MCR&PC and MCGA meeting
Notification of Awardees Develop and initiate contracts by April 1 <sup>st</sup> , 2022	March, 2022	Email notification of funding Contracts in place by April 1 <sup>st</sup> , 2022

# Primary Research Project Priorities FY22

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- A. Production Stewardship Research Priorities
- B. Expanded Uses Research Priorities
- C. Extended Duration Projects
- D. Unsolicited Research



# Primary Research Project Priorities

## A. Production Stewardship Research Priorities

- 1. Development of a multi-disciplinary research and extension/education efforts to address key challenges facing MN corn producers across focus areas including but not limited to air and water quality, soils, biological innovations, genetics, physiology, economics, and corn production systems.
- 2. Evaluation of innovative irrigation or drainage system practices designed to optimize field productivity while maintaining sound environmental stewardship and sustainability.
- 3. Evaluate the environmental, societal and economic impacts of land use change.
- 4. Research in soils and nutrient management including but not limited to phosphorus, improved time release nitrogen fertilizer, manure management, and increased understanding of nitrogen mineralization or immobilization processes.
- 5. Evaluation of crop management decision tools and/or precision agriculture tactics and/or robotics technologies for optimizing both productivity and economic advantage in corn production while maintaining sound environmental stewardship and sustainable practice.
- 6. Development of conservation strategies such as reduced tillage in rotation systems and cover crop systems for MN corn production. Research should endeavor to address challenges including but not limited to residue management, cover crop establishment, crop competition, nutrient management, weed management and economic viability with a multi-disciplinary approach rather than a single element focus.

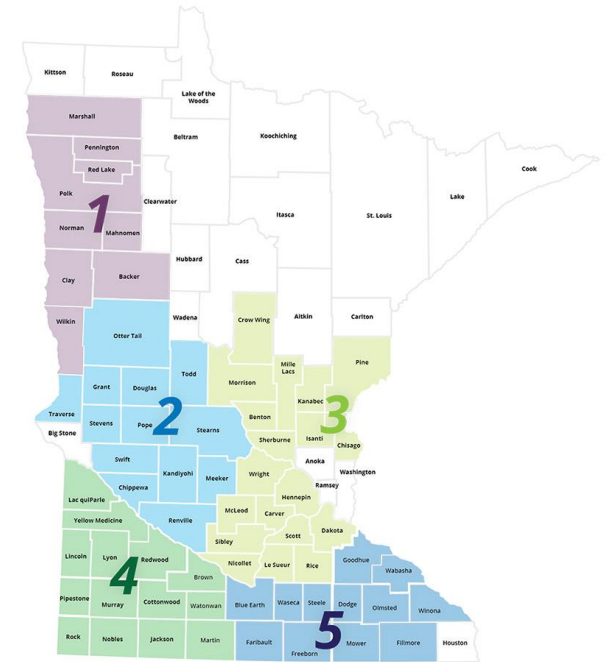
# Innovation Grants Priorities FY22

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- A. New uses
- B. Improved nutrient use efficiency of corn production
- C. Comparative tillage innovations
- D. Economic and management innovations
- E. Production practices that enhance air and water quality

# Reporting on research:

1. Quarterly and final research reports on each active project for both teams and the innovation grants are posted at: [mncorn.org/research](https://mncorn.org/research)
2. Multiple articles/PI interviews via Leader Update, Corn Talk, news releases, as well as numerous media exposures.
3. Communication out to county organizations via the five DFM's



# Thank You and Stay Connected

- **Website and Blog:** [mncorn.org](http://mncorn.org)
- **Leader Update:** Weekly e-newsletter
- **Ag Insider:** Monthly young adult e-newsletter
- **Social Media:** Facebook, Twitter, Instagram, Youtube
- **Corn Talk:** 6x/year print publication
- **Opt-In Text Alerts:** Text “MCGA” to 50457
- **Radio:** Linder, RRFN, Brownfield, KASM
- **MN Corn Podcast:** 2x/month highlighting check-off initiatives
- **Premium Content:** E-Books, free to download

