



Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-211

Proposal Title: Microbial Inoculants to Enhance Minnesota Agroecosystem Resilience

Project Manager Information

Name: Linda Kinkel

Organization: Jord BioScience

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Project Basic Information

Project Summary: This project will enhance resilience of Minnesota's agricultural and natural lands by providing data on microbial inoculant performance to support grower adoption of more sustainable production practices. (27 words)

ENRTF Funds Requested: \$1,199,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Land (F)

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Farmers need products that support healthy and high-yielding crops while optimizing farm income, and Minnesotans prioritize healthy and resilient ecosystems. Current crop production practices in Minnesota agroecosystems are highly reliant on synthetic inputs, including pesticides and nutrients. While supporting crop yields necessary for economic viability, synthetic inputs can have significant negative impacts on soil health, water quality, and ecosystem resilience in both agricultural and natural lands. Over the past decade, microbial inoculant options have proliferated in the market as alternatives to synthetic chemistries for crop production, often with dramatic claims of success. However, rigorous data providing field comparisons of microbials versus traditional chemistries remains limited, leaving farmers with insufficient information to confidently integrate biological products into their management systems. Minnesota farmers need robust on-farm data assessing crop yields and health when managed using leading chemistries versus or in combination with microbial inoculants to support a transition to more-sustainable and environmentally-friendly crop management options.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

This project will address the current gap in rigorous data on microbial inoculant performance and on the economic costs and benefits of conventional versus biological management. Specifically, the proposed work will establish state-wide field trials contrasting synthetic chemistries and multiple microbial inoculants in conventionally-managed and organic production systems. In addition, data on soil chemistry will shed light on the on-farm variables that may impact success of both conventional chemistry and microbial inoculants. Collectively, this project will deliver key information on conventional vs. biological/microbial input costs and yield/economic benefits, and will provide a valuable resource for growers seeking guidance on adoption and integration of microbial inoculants into crop management. Finally, we will actively communicate results of this work with farmers and agricultural scientists, with the goal of facilitating the adoption of environmentally-sustainable crop production in Minnesota agroecosystems. Farmers seek management tools that work and that provide economic and environmental benefits. Our project's goal is to provide information to farmers that will contribute to enhancing the long-term environmental resilience of Minnesota's agricultural and natural habitats while providing benefits to soil health, water, wildlife, and people.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

1. A statewide platform of field trials using conventional and organic management systems to document the costs and benefits of chemical vs. biological crop management approaches for enhancing crop productivity
2. A rigorous dataset coupled with a vigorous communications strategy to empower Minnesota farmers in making crop management decisions and to facilitate confidence in adoption of environmentally-friendly crop production.
3. With increased integration of biological crop management as part of sustainable crop production, this project will deliver Increased resilience of agroecosystems, improved soil health, and reduced negative impacts of agriculture on Minnesota's land, water, animals, plants, and people.

Activities and Milestones

Activity 1: Objective: Establish statewide field trials characterizing crop performance and economic metrics using conventional chemistries vs. biological inoculants.

Activity Budget: \$1,115,500

Activity Description:

- Task 1: Define conventional and organic field trial locations throughout Minnesota in collaboration with on-farm contract research organization(s) (CROs)
- Task 2: Prepare, produce, and test microbial inoculum
- Task 3: Acquire seed and commercial chemistries and commercial microbial inoculants
- Task 4: Treat seed for field testing
- Task 5: Collect pre-plant soil samples for soil chemistry assessments.
- Task 6: Manage collection of plant emergence, vigor, drone, yield, and crop quality (e.g. soy protein, corn test weight) data.

Activity Milestones:

Description	Approximate Completion Date
Field-ready by April 1, 2027 and April 1, 2028	April 30, 2028
Field plots established throughout Minnesota network by June 15, 2027 and June 15, 2028	June 30, 2028
Complete field data in-hand by November 1, 2027 and November 1, 2028	November 30, 2028

Activity 2: Analysis and Communication of Project Results

Activity Budget: \$83,500

Activity Description:

- Task 1: Analyze plant data (emergence, vigor, drone, crop yield, and crop quality) for conventional (synthetic chemistry-based) management, conventional chemistry plus microbial inoculants, and multiple microbial inoculants alone.
- Task 2: Characterize the relationships between soil chemistry and crop yield and quality for conventional, conventional plus microbial, and microbial-only management, with a specific focus on identifying soil chemistry factors associated with best crop outcomes in each management scenario.
- Task 3: Complete economic cost:benefit analyses for the distinct management systems.
- Task 4: Prepare results summaries for multiple audiences, including growers and agricultural scientists.
- Task 5: Publicize results in grower communities, including through presentations at grower field days (2028, 2029), Farm Innovation Expo, through leaflets incorporated with Minnesota-based Albert Lea Seeds catalog mailings (2028, 2029), and development of YouTube videos highlighting the project and our findings (2027, 2028). Share results with scientific and industry communities through participation and presentations at relevant meetings.

Activity Milestones:

Description	Approximate Completion Date
Analysis of field and economic results (2/27; 2/28), and preparation of summary materials.	June 30, 2029
Communication of data analyses and summaries to grower, scientific, and industry audiences, 2027-2028.	June 30, 2029

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

The results will be implemented through active communications with communities of interest 2027-2029. In particular, implementation will be through sharing the results of this work broadly with farmers and agricultural scientists, as described in Activity 2, below. Following completion of the project, the information generated from this project will continue to be available through our partners (Albert Lea Seeds).

Project Manager and Organization Qualifications

Project Manager Name: Linda Kinkel

Job Title: Chief Science Officer and Founder

Provide description of the project manager's qualifications to manage the proposed project.

Dr. Linda Kinkel has extensive experience in managing millions of dollars in federal, state, and commodity research grants over 30-plus years as a faculty member at the University of Minnesota. In this capacity, she has served as sole principal investigator or lead investigator on multi-investigator, multi-state, and multi-national grants and performed work throughout Minnesota as well as globally. Her work has encompassed decades of field trials as well as laboratory, growth chamber, and greenhouse research. Dr. Kinkel has been highly productive in accomplishing the goals of competitive funding, as measured through published manuscripts, successful supervision of hundreds of undergraduate, graduate, and post-doctoral scholars, and delivery of findings to the target communities, including farmers/growers, scientists, and the general public. As Chief Science Officer and Founder of Jord BioScience, Dr. Kinkel oversees Jord Research and Development and is well-positioned to apply her project manager skills and experience to the proposed LCCMR project.

Organization: Jord BioScience

Organization Description:

Jord BioScience is a University of Minnesota-launched start-up company that focuses on translation of University research to the agricultural community. The mission of Jord BioScience is to dramatically improve microbial product performance for farmers and accelerate adoption of regenerative, resilient agricultural management practices. Leveraging 30+ years of Minnesota research, and a collection of naturally-occurring soil and plant-associated microbes developed with federal funding, Jord BioScience seeks to transform the position of biological inoculants in agricultural cropping systems with the goal of reducing reliance on synthetic inputs. Jord works in partnership with existing companies and their microbial products to improve farmer outcomes and focuses on delivering improvements in both the effectiveness and consistency of biological inoculants. As both part owner and investor, the University of Minnesota retains a seat on the Jord BioScience Board of Directors.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Research Associate-Laboratory		Preparation of all microbial inoculum for field trials; testing of inoculum quality and vigor.			30%	1.5		\$213,109
Research Associate-Field plots and data analytics		Prepare all seed for field trials, including treating with distinct microbial and conventional products; manage database and analyses resulting from work			30%	1.5		\$213,109
							Sub Total	\$426,218
Contracts and Services								
TBD--Contract Research Organization--Agricultural Field Trials	Service Contract	The CRO will establish and manage the field trials in 15 locations over 2 years using standardized protocols to provide rigorous, objective, and validated crop performance data.				2		\$369,000
TBD-Drone data provider for agricultural crop insights	Service Contract	We will contract with an external group to provide regular drone data overflights for all field locations. This will provide robust, season-long data on plant emergence, vigor, and productivity that is necessary to characterize differences in crop management between conventional chemistries and biologicals.				2		\$179,482
TBD-analytical chemistry analysis of inoculum formulation	Service Contract	This entity will provide an analysis of the microbial inoculant chemical content.				0.1		\$5,000
TBD Organic seed treatment support	Service Contract	Support for meeting organic standards for seed treatment for use in organic production systems.				0.06		\$5,000

TBD-Organic Grower Honoraria	Service Contract	We are utilizing a network of organic growers who will provide a platform for our organic field trials. We will pay an honorarium of \$1500 per grower x 5 growers for each of the 2 years of the project.				0.2		\$15,000
TBD	Service Contract	Tillage fees to support organic on-farm trials				0.02		\$5,000
TBD	Service Contract	Coordination of field trial and grower communications				0.4		\$20,000
							Sub Total	\$598,482
Equipment, Tools, and Supplies								
	Equipment	Organic seed planter	Required for planting experimental plots on organic farms					\$80,000
	Equipment	Incubator	Incubator for preparing microbial inoculum for on-farm testing.					\$22,000
	Equipment	Drying oven	Utilized to prepare microbial inoculum for application onto seed for field testing					\$18,000
	Tools and Supplies	Seed and associated shipping costs	Corn and soy seed for field experiments in 2027 and 2028					\$5,800
	Tools and Supplies	Media and supplies	Materials required for growing multiple microbial inoculants for field applications					\$5,000
							Sub Total	\$130,800
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	3 trips (4 people per trip) over each of 2 growing seasons to visit all 15 field sites	To visit and assess field plot status					\$7,500

	Other	Supporting an organic grower event--organization, publicity, set-up	Prepare materials, publicize, participate actively in one grower event each year					\$6,000
							Sub Total	\$13,500
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	Insert summarizing trial results for distribution in Albert Lea Seeds Catalog going to 2000 MN growers	Publicizing the results of this project as defined in our workplan					\$10,000
	Publication	Preparation of 2 YouTube videos (one each season)	Summarizing the results of this work, including on-site visits as defined in our workplan					\$20,000
							Sub Total	\$30,000
Other Expenses								
							Sub Total	-
							Grand Total	\$1,199,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	-
Non-State				
In-Kind	Jord BioScience staff support	Project supervision, decision-making, interpretation, and materials preparation for project communications	Secured	\$350,000
			Non State Sub Total	\$350,000
			Funds Total	\$350,000

Total Project Cost: \$1,549,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [0623edc3-8e5.pdf](#)

Alternate Text for Visual Component

Map of Minnesota; we will place field plots in a minimum of 10 distinct counties, and up to 15 counties, selected to represent the broad variation in field conditions for corn and soybean production in Minnesota....

Financial Capacity

Title	File
Financial Capacity Note	e16a3e3e-a74.pdf

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Jord BioScience CEO Letter	fee4f078-b61.pdf
Jord BioScience CEO Letter	3afb5ea9-f78.pdf
Jord BioScience 2024 Tax Return	b2de4772-9d6.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the Commissioner's Plan applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

Yes

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

Yes

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

No

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Dr. Andrea Arias, Dr. Briana Kozlowicz, Dr. Keri Carstens, Rob DeWolfe

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

Yes, I understand

